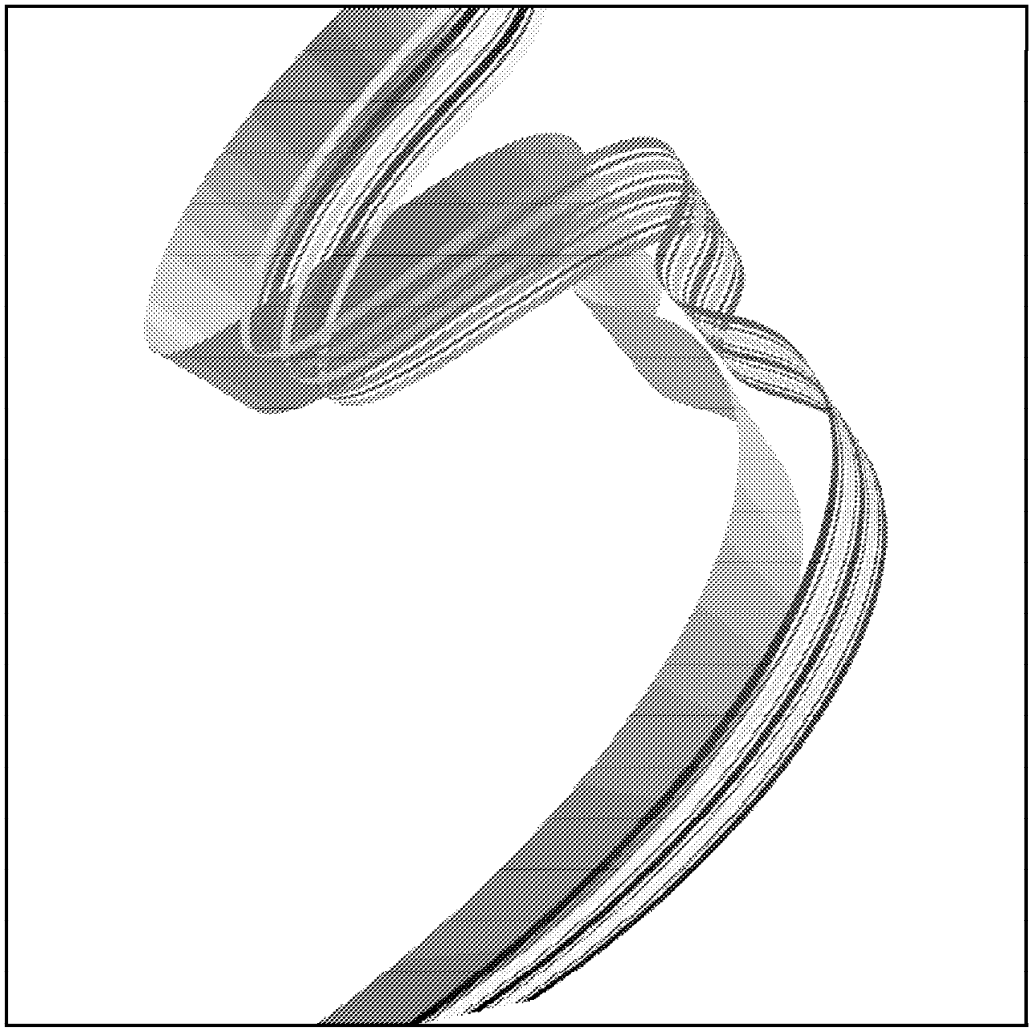
IBM

Magstar MP 3570 Tape Subsystem Maintenance Information C-Series Models



IBM

Magstar MP 3570 Tape Subsystem Maintenance Information C-Series Models

Part Number 08L6250
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Second Edition (October 1998)

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Preface

| This manual is for use by service personnel who intend to install, remove, diagnose, repair, or test the IBM
| Magstar MP 3570 Tape Subsystem Models C00, C01, C02, C11, C12, C21 and C22.

Part Number 08L6250

Magstar MP Publications

Additional information related to the subsystem is available in the following publications:

IBM Magstar MP 3570 Tape Subsystem Introduction and Planning Guide, C-Series Models, GA32-0392

IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models, GA32-0393

IBM Magstar MP 3570 Tape Subsystem Hardware Reference, C-Series Models, GA32-0394

For additional information about the Magstar MP 3575 Tape Library Dataserver, see:

IBM Magstar MP 3575 Tape Library Dataserver, Introduction and Planning Guide, GA32-0380

IBM Magstar MP 3575 Tape Library Dataserver, Operator Guide, GA32-0381

IBM Magstar MP 3575 Tape Library Dataserver, Hardware Reference, GA32-0382

IBM Magstar MP 3575 Tape Library Dataserver, Maintenance Information for Model L06, PN 05H9590

IBM Magstar MP 3575 Tape Library Dataserver, Maintenance Information for Models L12, L18, L24, and L32, PN 05H9581

AS/400 Information

For additional information about the AS/400 subsystems and software, see:

AS/400 Physical Planning Reference, SA41-3109 (IMPI)

AS/400 Physical Planning Reference, SA41-5109 (RISC)

AS/400 Basic System Operation, Administration and Problem Handling, SC41-5206

AS/400 Backup and Recovery, SC41-5304

AS/400 CL Reference Guide, SC41-5722

AS/400 System API Reference, SC41-5801

Hierarchical Storage Management, SC41-5351

Automated Tape Library Planning and Management, SC41-3309 (IMPI)

Automated Tape Library Planning and Management, SC41-5309 (RISC)

Backup Recovery and Media Services for AS/400, SC41-4345

A Practical Approach to Managing Backup Recovery and Media Services, SG24-4840

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RISC System/6000 Information

For additional information about the RISC System/6000 subsystems and software, see:

RISC System/6000 Getting Started: Using RISC System/6000, GC23-2521

RISC System/6000 Getting Started: Managing RISC System/6000, GC23-2378

RISC System/6000 V4 Problem Solving Guide, SC23-2606

RISC System/6000 V4 Message Guide & Reference, SC23-2641

RISC System/6000 Problem Solving Guide, SC23-2204

RISC System/6000 System Overview and Planning, GC23-2406

RISC System/6000 Planning for System Installation, GC23-2407

7202 Install and Service Guide, SA23-2670

7015 Install and Service Guide, SA23-2628

9076 SP2 Information

Scalable POWERparallel Systems: System Planning, SC233864 PACKAGE on MKTTOOLS

Scalable POWERparallel Systems: Installation Guide, SH23-3865

Scalable POWERparallel Systems: High-Performance Technical Computing Solutions, GH23-2485

Scalable POWERparallel Systems: Business Solutions, GA23-2475

IBM 9076 Scalable POWERparallel Systems: SP2 Administration Guide, SH26-2486

IBM 9076 Scalable POWERparallel Systems: SP2 Diagnosis and Messages, SC23-3866

IBM 9076 Scalable POWERparallel Systems: SP2 Command and Technical Reference, SC23-3867

IBM 9076 Scalable POWERparallel Systems: Maintenance Information, Vol. 1, SY66-0294

IBM 9076 Scalable POWERparallel Systems: Maintenance Information, Vol. 2, SY66-0295

Device Driver Information

IBM SCSI tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide, GC35-0154

Additional Information

Automated Tape Library Planning and Management, SC41-3309

Backup Recovery Guide—Basic, SC41-3304

Backup Recovery Guide—Advanced, SC41-3305

Backup Recovery and Media Service/400: Implementation Tips and Techniques, GG24-4300

Backup Recovery and Media Service/400, SC41-3345

| ***Second Edition, October 1998:*** Improvements and changes include packaging the tape drive as a
| single field replaceable unit (FRU), support for the Model C21 and C22 attached to the IBM Netfinity
| Server and IBM PC Server systems, and the correction of minor errors.

Changes or additions are indicated by a vertical line in the left margin. Editorial changes may not be indicated.

Start

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The IBM Magstar MP 3570 Tape Subsystem

Drive—Only Models

The IBM Magstar MP 3570 Tape Subsystem drive-only model is pictured in Figure 1. When procedures in this manual are unique for this particular model, you will be referred to **drive- only** or **non-library** procedures.

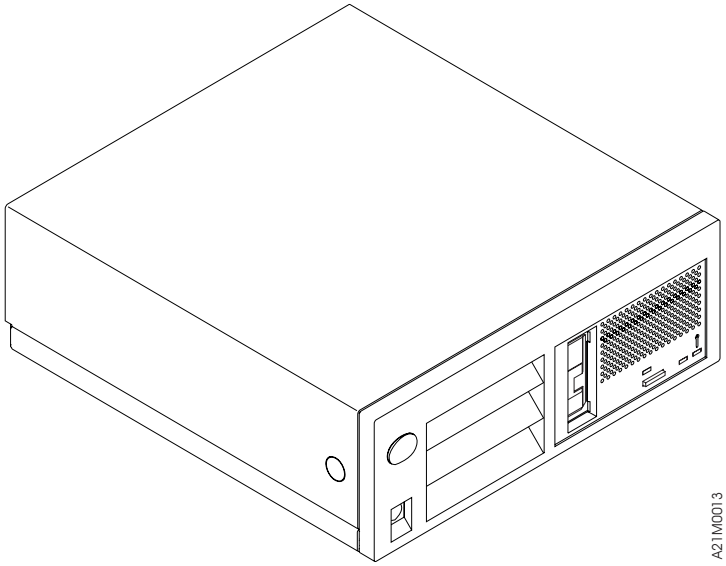

Figure 1. Drive-Only Models

Library Models

The IBM Magstar MP 3570 Tape Subsystem library model is pictured in Figure 2. When procedures in this manual are unique for library models, you will be referred to **library** procedures.

Note: In dual drive models, tape drive 1 is on the right and tape drive 2 is on the left, as you face the front of the library.

Figure 2. Library Models

Maintenance Starting Point

Begin all maintenance action here.

Note: In all countries and regions **except for EMEA** each tape drive in the Model Cxx is treated as a single FRU. No diagnosis within the drive is required. Countries and regions within EMEA (Europe, Middle East, Asia) must continue to isolate to the failing part within the tape drive. **If you are a service representative within EMEA, go immediately to "AppendB" on page APPENDB-1 and start the service call.** If you are **not in EMEA**, start the service call on this page.

Select the table below that best describes the 3570 model that you are here to work on. The two major model types are shown in Figure 1 on page START-2 and Figure 2 on page START-3. For 3570 **drives without a library**, see Figure 3. For 3570 **library models**, see Figure 4 on page START-5. If you cannot find the reason you are here in these two tables, see Figure 5 on page START-7 which has other entries into the Maintenance Information that are common to both the library and drive-only machines. Find the reason you are here in the left column of the appropriate table and perform the stated action in the right column.

Notes:

1. Be sure that you are working on a 3570 Model Cxx drive. The Model Cxx drives have a **green** UNLOAD button while the Model Bxx drives have a **blue** UNLOAD button.

   Note: A very few Model Cxx drives were shipped with blue UNLOAD buttons early in the program. You can tell if this is a Model Cxx by the level of microcode that is resident in the drive. If your microcode level is D1I4_xxx, this is a Model Bxx. If your microcode level is D1I5_xxx, this is a Model Cxx.

   If the UNLOAD button is blue, see *Magstar MP 3570 Tape Subsystem Maintenance Information B—Series Models*

2. The Model Cxx drive pack is a single FRU. It is recommended that when taking any Model Cxx trouble call, that the CE take a drive pack to the account. Most failures will occur within the drive pack. If the drive pack is not used on this call, it can be returned to stock.
3. If the service call is on a status 3 machine, see "General Instructions" in the INSP section, then return here to continue the service call.

Start Here For Drive-Only Models (C00) Without Library Attachments

Figure 3 (Page 1 of 2). Start—For All Drive-Only Models (C00) Without Library Attachments

If You Are Here For This Reason	Perform This Action
Are you repairing a **library model**?	Go to Figure 4 on page START-5.
FID message from the host.	Go to Figure 8 on page START-12 to fix the fault.
No FID message from the host, but the drive Maintenance, Busy, and Clean indicators are flashing in an attempt to pass on FID information.	Go to Figure 7 on page START-11.
ATTENTION DRIVE message in the host error log or displayed by LEDs.	Go to "Attention Drive Messages" on page START-24 for further isolation.
Some drive LEDs do light, but the drive Maintenance LED never cycles on and off at power on. Bring-up diagnostics are not running.	Go to "Other Obvious Symptom Problems" on page MAPS-19 to perform further problem determination.

Figure 3 (Page 2 of 2). Start—For All Drive-Only Models (C00) Without Library Attachments	
If You Are Here For This Reason	**Perform This Action**
Some LEDs fail to light on the front panel of the drive during power on or when the drive is in use. The drive cooling fan **is running**.	Go to "Drive LED Problems" on page MAPS-9 for further isolation.
No LED indicators light on the front panel of the drive during power on. The drive cooling fan **is not running**.	Go to "Power Problems" on page MAPS-13 for further isolation.
The drive hangs with all three LED indicators on solid. **Note:** The three LEDs will stay on momentarily during power on. If it hangs with this condition, the drive has a problem.	Go to "Other Obvious Symptom Problems" on page MAPS-19 to perform further problem determination.
You have no FID number and there are no indicators lighted to aid in isolation. Looks like power may be missing from some or all components.	Go to "Power Problems" on page MAPS-13 and perform further problem determination.
A host or channel detected problem. (No FID message)	1. Run the Verify Fix diagnostics using a scratch cartridge to test the Read/Write function. See "Verify Fix—Drive-Only Models" on page PROC-7. If Verify Fix fails, use the FID to repair the drive. 2. If you have a SCSI Wrap Tool available, perform "SCSI Port Wrap Test" on page PROC-77. 3. Verify that the SCSI address is set correctly. See "Setting the SCSI Address—Drive-Only Model C00" on page INST-9.
Were you not able to find the reason you are here?	Try the **Common** entry points Figure 5 on page START-7.

Start Here For Library Cxx Models

Note: In Models C02, C12 and C22, (dual drive models) tape drive 1 is on the right and tape drive 2 is on the left, when you face the front of the library.

Figure 4 (Page 1 of 2). Start—All Library Models	
If You Are Here For This Reason	**Perform This Action**
Are you repairing a **drive-only model without a library**?	Go to Figure 3 on page START-4.
FID is displayed on the library operator panel display, in the Error/FID log, or in a host error log entry.	Go to Figure 8 on page START-12 to fix the fault.
ATTENTION DRIVE message on library operator panel display or in the error log.	Go to "Attention Drive Messages" on page START-24 for further isolation.
ATTENTION LIBRARY message on library operator panel display or in the error log.	Go to "Attention Library Messages" on page START-25 for further isolation.
RECOVER status on library operator panel display.	Go to "Clearing Tape Drive Recover Status" on page PROC-28.
Library operator panel display hangs with two dark lines across the display. The library LEDs may or may not be flashing. **Note:** This is normal for the first 30 seconds during bring-up. If it hangs in this condition, the machine has a problem.	Go to "Other Obvious Symptom Problems" on page MAPS-19 to perform further problem determination.

Figure 4 (Page 2 of 2). Start—All Library Models

If You Are Here For This Reason	Perform This Action
Library operator panel display is blank or partial characters are indicated.	Go to “Library Operator Panel Problems” on page MAPS-3 for further isolation.
Some or all the LEDs fail to light on the front panel of a library machine.	Go to “Library LED Problems” on page MAPS-5 for further isolation.
You have no FID number and there are no indicators lighted. Looks like power is missing from some or all components.	Go to “Power Problems” on page MAPS-13 and perform further problem determination.
A host or channel detected problem. (No FID message)	1. Run the Verify Fix diagnostics using a scratch cartridge to test the Read/Write function. See “CE Verify Fix on Library Models” on page PROC-10. If Verify Fix fails, use the FID to repair the drive. 2. If you have a SCSI Wrap Tool available, perform “SCSI Port Wrap Test” on page PROC-77. 3. Verify that the SCSI address is set correctly. See “Setting the SCSI Address and Configuring the Library” on page INST-43.
You have a dual drive model, and the beginning of line three of the library operator panel display indicates an "N", or the library does not recognize that drive 2 is installed in the library.	Go to “Isolate Drive 1 / Drive 2 Communications Fault” on page PROC-35.
The tape drive status "INIT" is displayed on the operator panel for more than 5 minutes.	Go to “Isolate Drive 1 / Drive 2 Communications Fault” on page PROC-35.
The host displays a message that states: The cartridge cannot be found. The Volume ID does not match. Incorrect volume mounted in drive.	Go to “Resolving a Mismatch Between the Bar Code Label and VOLSER” on page PROC-26
The bar code reader cannot read the label on a tape cartridge.	Go to “Resolving Bar Code Reader Problems” on page PROC-24.
The tape drive status indicates "CODE LVL" on the operator panel display.	Tape drives 1 and 2 have different microcode levels installed. Update the microcode in the tape drives so that both drives have the same microcode installed. Select the appropriate update procedure below: 1. See “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34. 2. See “Updating Microcode from an AS/400” on page PROC-49. 3. See “Updating Microcode from RS/6000 by Using TAPEUTIL” on page PROC-50. 4. See “Updating Microcode from a Sun System by Using TAPEUTIL” on page PROC-54.
Were you not able to find the reason you are here?	Try the **Common** entry points Figure 5 on page START-7.

Start For Library and Drive-Only Common Entries

Figure 5 (Page 1 of 3). Start—Here for Common Entries Not Previously Listed

If You Are Here For This Reason	Perform This Action
All three drive LED indicators are on solid or library LEDs flash continuously. **Note:** This is normal for a few seconds at power on. If this condition continues, the machine has a problem.	Go to "Other Obvious Symptom Problems" on page MAPS-19 to perform further problem determination.
Removal of cartridge from loader by hand.	Go to "Removing Tape Cartridge from Drive" on page PROC-18.
Run verification tests.	Go to "Verify Fix" on page PROC-7.
1. Obtain 3570 drive error information at the host 2. Obtain Service Information Message from a RS/6000. 3. Obtain Service Information Message from an AS/400. 4. Obtain Service Information Message from a Sun System. 5. Obtain Error Information from a HP/UX System. 6. Obtain Error Information from a Windows NT System. 7. Review Service Information Messages in general.	1. See "Obtaining 3570 Drive Error Information at the Host" on page MSG-3. 2. See "Error Log Analysis—RS/6000" on page MSG-4. 3. See "Error Log Analysis—AS/400" on page MSG-24. 4. See "Sun Error Logs" on page MSG-32. 5. See "Obtaining Error Information from an HP/UX System" on page MSG-32. 6. See "Obtaining Error Information from a Windows NT System" on page MSG-32. 7. See "Service Information Messages (SIMs) and Media Information Messages (MIMs)" on page MSG-2.
Clean message from the host, the Clean indicator is on at the drive, or a Clean message is displayed on the library operator panel display.	See "Drive Cleaning Procedure" on page PROC-22 for the procedure to use to clean the drive head.
1. SCSI problems-AS/400 Environment. 2. SCSI problems-AIX Environment. 3. SCSI problems-Sun Environment. 4. SCSI problems-HP/UX Environment. 5. SCSI problems-Windows NT Environment. 6. SCSI Port Wrap Test.	1. Go to "Checking the SCSI Attachment in an AS/400 Environment" on page PROC-65. 2. Go to "Checking the SCSI Attachment in an AIX Environment" on page PROC-69. 3. Go to "Checking the SCSI Attachment in a Sun Environment" on page PROC-73. 4. Go to "Checking the SCSI Attachment in a HP-UX Environment" on page PROC-76. 5. Go to "Checking the SCSI Attachment in a Windows NT Environment" on page PROC-76. 6. Go to "SCSI Port Wrap Test" on page PROC-77.

Figure 5 (Page 2 of 3). Start—Here for Common Entries Not Previously Listed

If You Are Here For This Reason	Perform This Action
Tape damage symptoms Broken tape Outbound Reel-to-Reel motor missing tach pulses Failure of circuitry to detect tack pulses Stretched tape Outbound Reel-to-Reel motor missing tach pulses Failure of circuitry to detect tack pulses Folded over or wrinkled tape within cartridge Inbound Reel-to-Reel motor running away Failure of dynamic brake	See "FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
Installation of a machine.	Refer to the INST section.
Remove or relocate a 3570 machine.	See "Removing a 3570" on page INST-65.
Inspect a machine.	See "General Instructions" on page INSP-2.
1. Microcode update-from FMR cartridge 2. Microcode update-from AS/400 3. Microcode update-from RS/6000 4. Microcode update-from Sun 5. Microcode update-from HP/UX 6. Microcode update-from Windows NT	1. See: a. "Updating Microcode from FMR Cartridge (Library Models)" on page PROC-34. b. "Updating Microcode from FMR Cartridge (Drive-Only Models)" on page PROC-37. 2. See "Updating Microcode from an AS/400" on page PROC-49. 3. See "Updating Microcode from RS/6000 by Using TAPEUTIL" on page PROC-50. 4. See "Updating Microcode from a Sun System by Using TAPEUTIL" on page PROC-54. 5. See "Updating Microcode from a HP-UX System by Using TAPEUTIL" on page PROC-56. 6. See "Updating Microcode From a Windows NT System Using NTUTIL" on page PROC-60.
Update FMR tape with latest microcode.	1. See "Making FMR Tape from Scratch Tape—Library Models" on page PROC-31. 2. See "Updating Microcode from FMR Cartridge (Drive-Only Models)" on page PROC-37.
Making FMR tape from scratch tape.	1. See "Making FMR Tape from Scratch Tape—Library Models" on page PROC-31. 2. See "Updating Microcode from FMR Cartridge (Drive-Only Models)" on page PROC-37.
Making scratch tape from FMR tape.	1. See "Making Scratch Tape from FMR Tape—Library Models (Unmaking FMR)" on page PROC-32. 2. See "Making Scratch Tape from FMR Tape—Drive-Only Models (Unmaking FMR)" on page PROC-33.

Figure 5 (Page 3 of 3). Start—Here for Common Entries Not Previously Listed

If You Are Here For This Reason	Perform This Action
1. Perform a microcode dump to tape cartridge. 2. Off-loading dumps from 3570 attached to AS/400. 3. Off-loading dumps from 3570 to RS/6000. 4. Off-loading dumps from 3570 to a Sun System. 5. Off-loading dumps from 3570 to a HP/UX System. 6. Off-loading dumps from 3570 to a Windows NT System.	1. See: a. “Off-loading Dumps from 3570 to Tape Cartridge (Library Models)” on page PROC-47. b. “Off-loading Dumps from 3570 to Tape Cartridge (Drive-Only Models)” on page PROC-48. 2. See “Off-loading Dumps from 3570 Attached to AS/400” on page PROC-49. 3. See “Off-loading Dumps from 3570 to RS/6000 by Using TAPEUTIL” on page PROC-52. 4. See “Off-loading Dumps from 3570 to a Sun System by Using TAPEUTIL” on page PROC-55. 5. See “Off-loading Dumps from 3570 to a HP-UX System by Using TAPEUTIL” on page PROC-57. 6. See “Off-loading Dumps to a Windows NT System Using NTUTIL” on page PROC-61.
Microcode problem (FID E5).	See “FID E5—Microcode Problem” on page PROC-84.
You suspect a microcode problem, but no FID E5.	See “Suspected Microcode Problem” on page PROC-6.
Update or review microcode EC level history log.	See “Microcode EC Level History Log” on page PROC-38.
Repair a 3570 model without a FID number or ATTENTION message.	Go to “Other Obvious Symptom Problems” on page MAPS-19 to perform further problem determination.

Drive Indicators—Normal Operation for Drive-Only Model C00

For drive-only models without a library attachment, three LEDs indicate operator messages and error conditions under normal customer operations. Figure 6 shows the location of the operator panel indicators. See “Drive Indicators and Operator Controls” on page INTRO-39 for a description of the indicators.

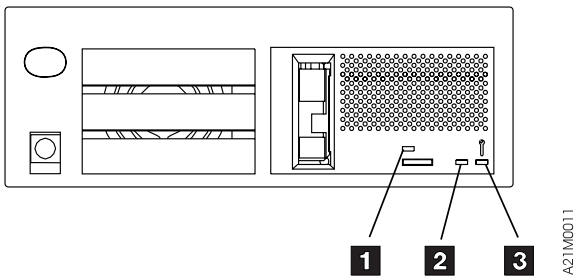

Figure 6. Drive Indicators for Drive-Only Models

Figure 7 on page START-11 shows the combination of the three indicators and their meanings under **normal customer operational conditions**. The Note column refers to an operator action or information.

For the meaning of these LEDs when in CE Mode, see Figure 246 on page PROC-9 for FID decode meanings and Figure 244 on page PROC-7 for meanings when displaying options.

Figure 7. Indicator Meaning During Normal Operational Conditions

Busy 1	**Clean** 2	**Maintenance** 3	**Note**	**Message**
Off	Off	Off	—	Inactive
Off	Off	Flashing	1	POST or write/read diagnostic test running
Off	Flashing	Off	2	Cleaning is required
Off	On	Off	2	The drive has been disabled until the Head Cleaning procedure is performed.
On	Off	Off	3	Busy, tape in motion for write, read or locate
On	On	Off	—	ATTENTION DRIVE message is indicated. See "Attention Drive Messages" on page START-24.
On	On	On	4 & 5	On momentarily as a lamp test during power-on reset or during microcode recovery.
Flashing	Off	Off	3	Unloading, rewinding or cleaning
Flashing	Flashing	Flashing	5	A hard failure on drive
Off	Off	On	5	A hard failure on drive
Flashing	Flashing	On	5	A hard failure on drive

Notes:

1. Maintenance indicator flashing: a normal condition that occurs anytime diagnostics are running. The diagnostics run:

   At power-on time.
   After a system reset.
   When a Send Diagnostic command is sent from the initiator.
   When executed by the service representative.
   For more information on LED meanings in CE Mode, see Figure 244 on page PROC-7 and Figure 246 on page PROC-9.

2. Clean indicator flashing or ON solid: the 3570 determines that the read/write heads need cleaning.

   Note: If the Clean indicator is ON solid, the 3570 drive will be disabled until the cleaning operation has been performed.

   Load the cleaning cartridge into the 3570. See "Drive Cleaning Procedure" on page PROC-22. Cleaning is automatic: the Busy indicator is lighted and remains ON until the cleaning cartridge is unloaded. If the Clean indicator remains ON after cleaning or if the Clean indicator comes ON frequently, see "Other Obvious Symptom Problems" on page MAPS-19 for further isolation.

3. Busy indicator flashing or ON solid: a normal condition that indicates that the drive is executing either a read/write operation or is locating, rewinding, or unloading.

4. Busy, Clean and Maintenance indicators lighted: the LED test that occurs at power-on time, after a system reset or during microcode recovery.

5. Two major conditions may occur here:

   a. All three indicators flash quickly, then the Maintenance LED stays ON solid while the other two LEDs flash or stay OFF. This indicates a hard failure on the drive and the drive is sending a coded message of the associated FID. For more information on LED meanings in CE Mode, see Figure 244 on page PROC-7 and Figure 246 on page PROC-9.
   b. All three indicators flash quickly, then all three come ON solid for a time, then the three indicators flash quickly again. This pattern may repeat as many as four times. This indicates that the microcode has encountered problems, and is trying to recover. If the microcode fails to recover, it will then flash the three indicators continuously until the device is powered OFF or reset.

FID Entry Point

Figure 8 lists each FRU identifier **(Reported FID)** and the field replaceable units (FRUs) to change, or problem areas to investigate under **FRU Name**. The figure (beginning with the Third Release) also contains the **Repair Sequence** you should follow in performing procedures or FRU replacements. Also included are **page Reference or Instruction** to the removal and replacement procedure for the FRU. Each FRU or problem is identified by name. The technical area code **(TAC)**, provided here and in the CARR section, is to assist you with call reporting. The **Duration in hours** is intended to give you some idea of how long each FRU removal and replacement procedure will take. These numbers, along with the time it takes to remove and replace decorative covers (see times given for covers in the CARR section) should give you a ball park estimate of what time you can expect to spend replacing the parts. These times do not include diagnose and checkout time.

FIDs are displayed on the operator/CE panel in a FID message and in the error log. For example, if the message is FID1 90, **1** is the severity and **90** is the FID. "Intervention Screens" on page PANEL-9 describes the different types of messages and their impact on 3570 availability. The FID relates to the FRUs that have the highest probability of causing the problem. Only the reported FID is displayed on the panel and in the FID log. See Figure 8 for the complete list of FIDs and associated FRUs. Always replace the FRU or perform the recommended procedure in the order of **Repair Sequence** which takes into consideration failure probability.

If the FID has cable FRUs in the FRU list, reseat the cable FRUs before replacing any FRU in the list.

If you are servicing a 3570 model that is **Rack** installed, two people are required to lift the device from the rack. Refer to "Installing the 3570 in a Rack (Models C11 and C12 Only)" on page INST-22 for the procedure to use the hoist in cases where you are alone.

The service information message (SIM) record, which the 3570 sends to the host, also has the reported FID information. See "Service Information Messages (SIMs) and Media Information Messages (MIMs)" on page MSG-2.

Figure 8 (Page 1 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
00	The drive serial number is the default value				
	1	Invalid drive serial number	—	—	Enter valid drive serial number. Go to "Drive Serial Number—Library Models Only" on page PROC-29.
01	The drive logic card serial number is the default value				
	1	Invalid drive logic card serial number. This number is set when the card is built and cannot be changed in the field.	—	—	Replace the Tape Drive. The procedure is at "Removal and Replacement Procedures—Drive Pack" on page CARR-7. If this does not resolve the problem, call for support.
03	Invalid setup detected				
	1	Configuration problem	—	—	Ensure the config/install options are correct (library models only).

Figure 8 (Page 2 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
90	Electronic fault. See also “Library Operator Panel Problems” on page MAPS-3.				
	1	Library operator panel display	50%	L05 (0.2)	CARR-19
	2	Library operator panel display cable	40%	T04 (0.1)	CARR-19
	3	Library control card	10%	T15 (0.2)	CARR-22
94	Bar code reader failure. Perform the procedure at “Resolving Bar Code Reader Problems” on page PROC-24 before replacing any of the following FRUs.				
	1	Bar code reader	70%	T18 (0.1)	CARR-20
	2	Library control card	20%	T15 (0.1)	CARR-22
	3	Picker assembly	3%	T12 (0.1)	CARR-23
	4	Picker cable	3%	T04 (0.1)	CARR-23
	5	Library interface cable	2%	T04 (0.1)	CARR-32
	6	Drive pack	2%	T22 (0.2)	CARR-7
95	Did not detect accessor movement. 1. Check for anything that might obstruct picker movement. 2. Ensure that cartridges are positioned in the magazines properly. If the picker does not place the cartridges fully into the magazines, replace the picker assembly before replacing any other FRUs. 3. This failure can also be caused by infrared light reflecting from the picker belts onto the Cartridge Present sensor. If the picker belts are shiny and you suspect this is the cause, clean the picker belts with alcohol on a lint-free cloth. 4. If the above checks don't fix the problem, cycle the power off then on to the 3570 and observe the accessor assembly before replacing FRUs: a. If the accessor motor assembly can move the picker back and forth, replace the accessor assembly before replacing any of the other FRUs. b. If accessor motor assembly cannot move the picker back and forth, replace the FRUs in the order listed below.				
	1	Accessor motor assembly	75%	T17 (0.2)	CARR-21
	2	Library control card	15%	T15 (0.1)	CARR-22
	3	Library sensor cable	5%	T04 (0.4)	CARR-33
	4	Accessor assembly	5%	T14 (0.6)	CARR-20

Figure 8 (Page 3 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
96	Timeout trying to extract a cartridge from a drive. 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred. Look for physical defects. Have the customer replace the cartridge if it is damaged. 2. A false 96 error can occur when the library door is opened when the library is attempting to put a cartridge away as part of the power-up sequence. If you believe this occurred, do not replace FRUs at this time. 3. Before replacing FRUs below, ensure that: a. All drive sensors listed on Figure 248 on page PROC-14 are working correctly. b. library sensors: Global Interference A & B, Cartridge Present, Pinch 1 & 2 and Limit 1 & 2 are working correctly. See Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu. 4. Ensure that the drive door is not binding or sticking.				
	1	Drive pack	36%	T45 (0.2)	CARR-7
	2	Picker assembly	30%	T12 (0.1)	CARR-23
	3	Drive global sensor pair	10%	T31 (0.1)	CARR-25
	4	Magazine global sensor pair	10%	T31 (0.1)	CARR-26
	5	Picker cable	5%	T04 (0.1)	CARR-23
	6	Library control card	5%	T15 (0.1)	CARR-22
	7	Library sensor cable	4%	T04 (0.4)	CARR-33
97	Electronic-detected fault				
	1	Library control card	70%	T15 (0.1)	CARR-22
	2	Drive pack	25%	T22 (0.2)	CARR-7
	3	Library interface cable	3%	C03 (0.1)	CARR-32
	4	Power supply	2%	P04 (0.1)	CARR-16
98	Load or unload error while moving cleaner cartridge between the library cleaner cartridge cell and the drive. Sensor did not change state. **Notes:** 1. Check the cleaner cartridge for physical damage. 2. Before replacing FRUs below, ensure that: a. All drive sensors listed on Figure 248 on page PROC-14 are working correctly. b. library sensors: Cleaner Cartridge Present, Global Interference A & B, Pinch 1 & 2 and Limit 1 & 2 are working correctly. See Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Picker assembly	60%	T12 (0.1)	CARR-23
	2	Cleaner cartridge-present sensor	15%	T31 (0.1)	CARR-33
	3	Drive global sensor pair	10%	T31 (0.1)	CARR-25
	4	Magazine global sensor pair	10%	T31 (0.1)	CARR-26
	5	Library control card	4%	T15 (0.1)	CARR-22
	6	Library sensor cable	1%	T04 (0.4)	CARR-33

Figure 8 (Page 4 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
9A	Library Picker Assembly problem. **Note:** Before replacing FRUs below, ensure that the Cartridge Present, Pinch 1 & 2, and Limit 1 & 2 sensors in the library are operating correctly. See Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Picker assembly	70%	T12 (0.1)	CARR-23
	2	Picker cable	20%	T04 (0.1)	CARR-23
	3	Library control card	7%	T15 (0.1)	CARR-22
	4	Library sensor cable	3%	T04 (0.4)	CARR-33
9B	Sensor in an invalid condition. **Note:** Before replacing FRUs below, ensure that the Drive Global Sensor (B) is operating correctly. The sensor is shown in Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Drive global sensor pair (B)	90%	T31 (0.2)	CARR-25
	2	Library control card	9%	T15 (0.1)	CARR-22
	3	Library sensor cable	1%	T04 (0.4)	CARR-33
9C	Sensor in an invalid condition. **Note:** Before replacing FRUs below, ensure that the Global Interference Sensor A is operating correctly. The sensor is shown in Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Magazine global sensor pair (A)	90%	T31 (0.2)	CARR-26
	2	Library control card	7%	T15 (0.1)	CARR-22
	3	Library sensor cable	3%	L01 (0.4)	CARR-33
9E	Sensor did not change state. **Note:** Before replacing FRUs below, ensure that the Priority cell cartridge present.sensor is operating correctly. The sensor is shown in Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Priority cell cartridge-present sensor	90%	T31 (0.1)	CARR-31
	2	Library sensor cable	5%	L01 (0.4)	CARR-33
	3	Library control card	5%	T15 (0.1)	CARR-22

Figure 8 (Page 5 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
9F	Load or unload error when moving a cartridge between the drive and the library (a sensor did not change state). 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred. Look for physical defects. Have the customer replace the cartridge if it is damaged. 2. A false 9F error can occur when the library door is opened when the library is attempting to put a cartridge away as part of the power-up sequence. If you believe this occurred, do not replace FRUs at this time. 3. Before replacing FRUs below, ensure that: a. All drive sensors listed on Figure 248 on page PROC-14 are working correctly. b. library sensors: Global Interference A & B, Cartridge Present, Pinch 1 & 2 and Limit 1 & 2 are working correctly. See Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu. 4. Ensure that the drive door is not binding or sticking.				
	1	Picker assembly	34%	T12 (0.1)	CARR-23
	2	Drive pack	32%	T45 (0.2)	CARR-7
	3	Picker cable	20%	C03 (0.1)	CARR-23
	4	Library control card	10%	T15 (0.1)	CARR-22
	5	Library sensor cable	4%	T04 (0.4)	CARR-33
A0	Sensor did not change state. **Note:** Before replacing FRUs below, ensure that the Magazine 2 sensor is operating correctly. The sensor is shown on Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Magazine 2 sensor	90%	T31 (0.2)	CARR-32
	2	Library control card	7%	T15 (0.1)	CARR-22
	3	Library sensor cable	3%	T04 (0.4)	CARR-33
A1	Sensor did not change state. **Note:** Before replacing FRUs below, ensure that the Magazine 1 sensor is operating correctly. The sensor is shown in Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Magazine 1 sensor	90%	T31 (0.1)	CARR-32
	2	Library control card	7%	T15 (0.1)	CARR-22
	3	Library sensor cable	3%	T04 (0.4)	CARR-33
A3	Sensor did not change state **Note:** Before replacing FRUs below, ensure that the Cleaner cartridge-present sensor is operating correctly. The sensor is shown on Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Cleaner cartridge-present sensor	90%	T31 (0.1)	CARR-33
	2	Library control card	7%	T15 (0.1)	CARR-22
	3	Library sensor cable	3%	T04 (0.4)	CARR-33

Figure 8 (Page 6 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
A7	Picker or priority slot error. **Notes:** 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged. 2. Before replacing any FRUs below, check library sensors Priority Slot, Cartridge Present, Global Interference B, Pinch 1 & 2, and Limit 1 & 2 sensors to ensure that they are operating correctly. The sensors are shown in Figure 248 on page PROC-14.				
	1	Library magazine	40%	Q05 (0.1)	Customer purchase item. Try another magazine before replacing any FRUs below.
	2	Picker assembly	30%	T12 (0.1)	CARR-23
	3	Priority cell cartridge-present sensor	10%	T31 (0.1)	CARR-31
	4	Magazine global sensor pair	10%	T31 (0.1)	CARR-26
	5	Picker cable	5%	C03 (0.1)	CARR-23
	6	Library control card	5%	T15 (0.1)	CARR-22
A8	Picker or magazine error. **Notes:** 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged. 2. Before replacing any FRUs below, check library sensors Magazine 1 Present, Magazine 2 Present, Priority Slot, Cartridge Present, Global Interference B, Pinch 1 & 2, and Limit 1 & 2 sensors to ensure that they are operating correctly. The sensors are shown in Figure 248 on page PROC-14.				
	1	Library magazine	30%	Q05 (0.1)	Customer purchase item. Try another magazine before replacing any FRUs below.
	2	Picker assembly	20%	T12 (0.1)	CARR-23
	3	Magazine 1 sensor	10%	T31 (0.1)	CARR-32
	4	Magazine 2 sensor	10%	T31 (0.1)	CARR-32
	5	Magazine global sensor pair	10%	T31 (0.1)	CARR-26
	6	Priority cell cartridge-present sensor	10%	T31 (0.1)	CARR-31
	7	Picker cable	5%	C03 (0.1)	CARR-23
	8	Library control card	5%	T15 (0.1)	CARR-22

Figure 8 (Page 7 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
A9	Picker feed error. **Notes:** 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged. 2. Before replacing any FRUs below, check library sensors: Pinch 1 & 2, Limit 1 & 2, Cartridge Present, and Global Interference A & B to ensure that they are operating correctly. The sensors are shown in Figure 248 on page PROC-14.				
	1	Library magazine	40%	Q05 (0.1)	Customer purchase item. Try another magazine before replacing any FRUs below.
	2	Picker assembly	30%	T12 (0.1)	CARR-23
	3	Drive global sensor pair	10%	T31 (0.1)	CARR-25
	4	Magazine global sensor pair	10%	T31 (0.1)	CARR-26
	5	Picker cable	5%	C03 (0.1)	CARR-23
	6	Library control card	5%	T15 (0.1)	CARR-22
AA	Library door open sensor **Note:** Before replacing FRUs below, ensure that the Library door open sensor is operating correctly. The sensor is shown in Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Library door open sensor	80%	T31 (0.2)	CARR-34
	2	Library control card	14%	T15 (0.1)	CARR-22
	3	Library sensor cable	6%	T04 (0.4)	CARR-33
B1	Drive LED fault detected				
	1	Drive pack	100%	L05 (0.1)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
B9	Cartridge is not fully seated in the loader. **Note:** This could be an operator problem in drive-only machines without a library. 1. Ensure that the cartridge is not damaged. 2. Ensure that the cartridge is a 3570 type cartridge.				
	1	Tape cartridge	40%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge before replacing the FRUs below.
	2	Drive pack	35%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
	3	Picker assembly (For library only)	25%	T12 (0.1)	CARR-23
BA	Loader asm or servo card				
	1	Drive pack	100%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.

Figure 8 (Page 8 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
BB	Loader asm, servo card, or tape cartridge. 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged. 2. Also ensure that the cartridge is a 3570 type cartridge.				
	1	Tape cartridge (check first)	20%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge. See “FID FE—Isolate Fault between Media and Hardware” on page PROC-89.
	2	Drive pack	80%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
BC	Load or unload failure. **Note:** If your drive is at microcode level D1I5_2F1 or lower, this error may be caused by the microcode failing to reset an internal counter. Before replacing any hardware, call your next level of support for advice. 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged. 2. Ensure that the cartridge is a 3570 type cartridge. 3. Ensure that all drive sensors are operating correctly. Refer to Figure 248 on page PROC-14 for the drive sensors. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Tape cartridge (check first)	20%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge. See “FID FE—Isolate Fault between Media and Hardware” on page PROC-89.
	2	Drive pack	80%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
BF	Thermal error. The tripped thermal is located on the drive logic card. Causes of a thermal trip can be overheating of the logic card circuits, a missing front drive bezel which is needed to deflect airflow to the drive logic card, a failing drive fan, or blockage of airflow in the fan area. If the cooling system appears to be adequate, replace the drive pack.				
	1	Drive pack	75%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
	2	Drive cooling fan	25%	A03 (0.3)	CARR-12
C1	12 or 36 volts not within specification.				
	1	This FID is also reported when the drive detects a power outage.			Power OFF and power back ON.
	2	Power supply	90%	P04 (0.1)	CARR-16
	3	Drive pack	10%	T53 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
C5	Tape cartridge or cartridge type sensor **Note:** Before replacing FRUs below, ensure that the Cartridge type sensor is operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Tape cartridge (Check first)	90%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge. Refer to “FID FE—Isolate Fault between Media and Hardware” on page PROC-89.
	2	Drive pack	10%	T53 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.

Figure 8 (Page 9 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
CA	Sensor failed to change state				
	1	Drive pack	100%	T31 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
CD	Sensor failed to change state				
	1	Drive pack	100%	T31 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
D0	Read or write failure, servo error, or IPS calibration error.				
	1	Clean Drive	80%	D08	See “Drive Cleaning Procedure” on page PROC-22.
	2	Drive pack	20%	T22 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
D1	Calibration error; possible interface problem between the head and the servo card				
	1	Clean Drive	55%	D08	See “Drive Cleaning Procedure” on page PROC-22.
	2	Drive pack	45%	T22 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
D2	The head did not move. Head asm, servo card, analog card, or mother board				
	1	Clean Drive	45%	D08	See “Drive Cleaning Procedure” on page PROC-22.
	2	Drive pack	55%	T22 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
D3	Servo error while moving tape.				
	1	Tape cartridge (check first)	45%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge. Refer to “FID FE—Isolate Fault between Media and Hardware” on page PROC-89.
	2	Clean Drive	20%	D08	See “Drive Cleaning Procedure” on page PROC-22.
	3	Drive pack	35%	T22 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
D8	Read/write error.				
	1	Clean Drive	36%	D08	See “Drive Cleaning Procedure” on page PROC-22.
	2	Drive pack	64%	T22 (0.2)	See “Removal and Replacement Procedures—Drive Pack” on page CARR-7.
DD	Fault detected in drive loader sensors or the sensors are in an invalid combination.				
	1	Drive pack	100%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
E0	Tape motion error				
	1	Tape cartridge (check first)	77%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge. Refer to “FID FE—Isolate Fault between Media and Hardware” on page PROC-89.
	2	Drive pack	23%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.

Figure 8 (Page 10 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
E4	Electronic-detected fault				
	1	Drive pack	92%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
	2	Power supply	8%	P04 (0.1)	CARR-16
E5	Microcode detected a fault with the microcode				
	1	Microcode (known or unknown) (M01 = known, M02 = new)	100%	M01/ M02	PROC-84
E6	Timing problem in the microcode or the electronics, or multiple check-1 errors occurred				
	1	Microcode (known or new) (M01 = known, M02 = new)	50%	M01/M02	PROC-84 and PROC-86
	2	Drive pack	50%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
E7	Timing problem in the microcode or the electronics				
	1	Microcode (known or new) (M01 = known, M02 = new)	50%	M01/ M02	PROC-84 and PROC-86
	2	Drive pack	50%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
E8	Timing problem while writing and/or reading				
	1	Set a microcode trap based on the expert systems data, get a dump , and contact your next level of support.	—	—	PROC-44
EA	Electronic failure-Drive Logic Card				
	1	Drive pack	90%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
	2	Power supply	10%	P04 (0.1)	CARR-16
EB	Electronic failure-Drive Logic Card				
	1	Drive pack	90%	T21 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
	2	Power supply	10%	P04 (0.1)	CARR-16
EC	Electronic failure-Drive Logic Card				
	1	Drive pack	90%	T53 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
	2	Power supply	10%	P04 (0.1)	CARR-16
ED	Electronic failure				
	1	Drive pack	100%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
EE	Electronic failure				
	1	Drive pack	100%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
F0	Read error				
	1	Tape cartridge	60%	D07 (0.1)	Customer supply. Refer to “FID FE—Isolate Fault between Media and Hardware” on page PROC-89.
	2	Drive pack	40%	T22 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.

Figure 8 (Page 11 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
F1	Read error				
	1	Tape cartridge	60%	D07 (0.1)	Customer supply. Refer to "FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
	2	Drive pack	40%	T22 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
F2	Read-back check error.				
	1	Tape cartridge or hardware	60%	D07 (0.1)	"FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
	2	Drive pack	40%	T22 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
F3	Servo error				
	1	Tape cartridge or hardware	60%	D07 (0.1)	"FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
	2	Clean Drive	15%	D08	See "Drive Cleaning Procedure" on page PROC-22.
	3	Drive pack	25%	T22 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
F4	RS-422 bus error (drive logic card or RS-422 cables)				
	1	RS-422 interface problem	—	—	Run the RS-422 wrap test. See "RS-422 Port Wrap Test" on page PROC-78. If problem re-occurs, replace the following FRUs. **Note:** When replacing the FRUs below, replace the cable first. If that does not fix the problem, get a microcode dump and contact your next level of support.
	2	Drive pack	80%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
	3	RS-422 cable—internal to drive	10%	C04 (0.1)	CARR-18
	4	RS-422 Cable, Drive to Drive(C02, C12 and C22 only)	10%	C04 (0.1)	CARR-18

Figure 8 (Page 12 of 12). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
F5	SCSI bus error (drive logic card or SCSI cables)				
	1	SCSI interface, operator procedural, or host problem	—	—	Run the SCSI wrap test. See "SCSI Port Wrap Test" on page PROC-77. If problem re-occurs, replace the following FRUs. **Note:** When replacing the FRUs below, replace the cable first. If that does not fix the problem, get a microcode dump and contact your next level of support.
	2	Drive pack	80%	L01 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
	3	Internal SCSI cable	20%	C04 (0.2)	CARR-17
F6	Informational message—Cleaning required due to performance.				
	1	Operator, procedural, or host problem	100%	—	See 1 on page START-23.
FE	Read/write error. See "FID FE—Isolate Fault between Media and Hardware" on page PROC-89.				
	1	Tape cartridge or hardware	100%	D07 (0.1)	"FID FE—Isolate Fault between Media and Hardware" on page PROC-89
FF	Informational or non-hardware related status or error				
	1	Operator, procedural, or host problem	100%	—	See 1 on page START-23.

Notes:

1. Information FID F6 or FF with FSCs 7036, 7037, 7038 and C559 are normal. These FSCs are generated when a drive requires cleaning or when a drive has been cleaned.

Attention Drive Messages

Library machines:

1. Some attention messages (ATTENTION DRIVE) have an associated FID that is not displayed until you press the Enter push button.
2. Use Figure 9 for ATTENTION DRIVE messages without an associated FID.
3. If ATTENTION DRIVE is displayed, press the Enter push button. If a FID appears, go to "FID Entry Point" on page START-12.
4. If no FID is presented, use Figure 9 to find the fault.

Drive-only machines:

1. On drive-only installations the drive Busy and Clean LED indicators will be on solid to show that a 'ATTENTION DRIVE' is being presented. This may apply to all ATTENTION DRIVE messages except FSC Trap Taken.
2. See "Drive Indicators—Normal Operation for Drive-Only Model C00" on page START-10 for the meaning of these flashing LEDs.

Figure 9. ATTENTION DRIVE Messages

Message Meaning	FRUs	FRU Name	Prob-ability	TAC Code& (Duration in hours)	Page Reference
Load Unload Error	1. Ensure that the cartridge and tape are not broken. 2. Ensure that the cartridge is a 3570 compatible-type cartridge. 3. Before replacing FRUs below, ensure that all drive sensors are operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	FE	Tape cartridge	50%	D07 (0.1)	Customer supply. Refer to "FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
	B3	Drive Pack	50%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
FSC Trap Taken	The microcode encountered the trap address set from a CE panel menu. This is valid only for library models.				
	—	Not a fault	—	—	—
Tension Dropped	Tape motion error (velocity or tape slipping error). Check the tape cartridge before replacing any FRUs.				
	FE	Tape cartridge	70%	D07 (0.1)	Customer supply. Refer to "FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
	B3	Drive Pack	30%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.
Invalid cartridge	1. Ensure that the cartridge and tape are not broken. 2. Ensure that the cartridge is a 3570 compatible-type cartridge. 3. Before replacing FRUs below, ensure that the Cartridge Type Sensor is operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	FE	Tape cartridge	60%	D07 (0.1)	Customer supply. Refer to "FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
	B3	Drive Pack	40%	T45 (0.2)	CARR-7 if library installed drive or CARR-10 if stand-alone drive.

Attention Library Messages

Some attention messages (ATTENTION LIBRARY) have an associated FID that is not displayed until you press the Enter push button. Use Figure 10 for ATTENTION LIBRARY messages without an associated FID.

1. If ATTENTION LIBRARY is displayed, press the Enter push button. If a FID appears, go to "FID Entry Point" on page START-12.
2. If no FID is presented, use Figure 10 to find the fault.
3. If an Attention and Supplemental Message indicating DRIVE DISABLED UNTIL CLEANED is displayed, the tape drive must be cleaned before further use of the drive is allowed. See "Resolving ATTENTION Messages" on page PANEL-10 for additional information.

Figure 10 (Page 1 of 6). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Move Error	**Notes:** 1. Ensure that the cartridge is not damaged or the tape broken, and that the cartridge is a 3570 cartridge. 2. Ensure that at least one magazine is installed and that there is no global obstruction in the picker path. 3. Check all library sensors to ensure that they are operating correctly. Refer to Figure 248 on page PROC-14.				
	9A	Picker assembly	38%	T12 (0.1)	CARR-23
	FD	Magazine	20%	Q05 (0.1)	Customer-purchased
	B3	Drive pack	18%	T45 (0.2)	CARR-7
	9E	Library Sensor—Priority Cell Cartridge-Present Sensor	3%	T31 (0.1)	CARR-31
	9C	Library Sensor—Magazine Global Sensor Pair	3%	T31 (0.1)	CARR-26
	9B	Library Sensor—Drive Global Sensor Pair	3%	T31 (0.1)	CARR-25
	A1	Library Sensor—Magazine 1 Sensor	3%	T31 (0.1)	CARR-32
	A0	Library Sensor—Magazine 2 Sensor	3%	T31 (0.1)	CARR-32
	97	Library control card	3%	T15 (0.1)	CARR-22
	99	Picker cable	3%	C03 (0.1)	CARR-23
	A5	Library sensor cable	3%	T04 (0.4)	CARR-33

Figure 10 (Page 2 of 6). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Timeout Error	An operation timed out or did not complete in the allotted time-frame. This is usually caused by a hardware failure. Check all Drive and Library Sensors. Refer to Figure 248 on page PROC-14.				
	9A	Picker assembly	44%	T12 (0.1)	CARR-23
	FD	Magazine	20%	Q05 (0.1)	Customer-purchased
	B3	Drive pack	18%	T45 (0.2)	CARR-7
	9E	Library Sensor—Priority Cell Cartridge-Present Sensor	3%	T31 (0.1)	CARR-31
	9C	Library Sensor—Magazine Global Sensor Pair	3%	T31 (0.1)	CARR-26
	9B	Library Sensor—Drive Global Sensor Pair	3%	T31 (0.1)	CARR-25
	97	Library control card	3%	T15 (0.1)	CARR-22
	99	Picker cable	3%	C03 (0.1)	CARR-23
	A5	Library sensor cable	3%	T04 (0.4)	CARR-33
Clear Picker Path A	The device detected the presence of a possible blockage in the cartridge path, such as in the magazine or in the priority cell. 1. Check the position of all cartridges to ensure they are properly positioned in the magazine and in the priority cell. A cartridge that extends too far into the magazine in the import position or a damaged cartridge can cause this error. 2. Check for a binding or sticking cartridge door. 3. Remove the magazine and look for any obvious obstructions. 4. Try another magazine in the library. 5. Before replacing FRUs below, ensure that the Magazine Global Sensor pair (A) and priority cell sensors are operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9C	Magazine global sensor pair (A)	50%	T31 (0.2)	CARR-26
	9E	Priority cell cartridge-present sensor	40%	T31 (0.1)	CARR-31
	97	Library control card	6%	T15 (0.1)	CARR-22
	A5	Library sensor cable	4%	T04 (0.4)	CARR-33
Clear Picker Path B	The device detected the presence of a possible blockage in the cartridge path between the drive and the picker, or between the cleaner cell and the picker. 1. Check the position of the cleaner cartridge and ensure that it is fully seated within the cleaner cell. If the cleaner cartridge is not fully seated in the cleaner cell, replace the cleaner cell retention spring (P/N 05H2912). 2. Ensure that no cartridges or other obstacles are in the picker path between the drive and the picker. 3. Check for a binding or sticking cartridge door. 4. Before replacing FRUs below, ensure that: Library sensor: Global Interference B Picker sensors: Cartridge Present, Pinch 1 & 2, Limit 1 & 2 Drive sensors: All are operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9B	Drive global sensor pair (B)	50%	T31 (0.2)	CARR-25
	9A	Picker assembly	40%	T12 (0.1)	CARR-23
	97	Library control card	6%	T15 (0.1)	CARR-22
	A5	Library sensor cable	2%	T04 (0.4)	CARR-33
	B3	Drive pack	2%	(0.2)	CARR-7

Figure 10 (Page 3 of 6). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Wrong Mode	An operation was requested from the initiator which cannot be run with the current mode setting.				
	—	—	100%	Q05	Change mode to Auto, Random, or Manual as needed.
No Magazine 1, 2, or Both	1. Ensure that the appropriate magazine is properly installed and latched in place. If the ATTENTION LIBRARY message persists, try a different magazine. If a different magazine fails to correct the problem, replace the FRUs below: **HINT: If both magazines are present, but neither is being sensed, the problem is not likely to be the sensor or cable.** 2. Before replacing FRUs below, ensure that the Magazine 1 and Magazine 2 sensors are operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	A0	Magazine 2 sensor	44%	T31 (0.2)	CARR-32
	A1	Magazine 1 sensor	44%	T31 (0.1)	CARR-32
	97	Library control card	8%	T15 (0.1)	CARR-22
	A5	Library sensor cable	4%	T04 (0.4)	CARR-33
No cartridge	The device detects the presence of cartridges, but cannot find a cartridge in the **import** position in the magazine or the priority cell. 1. Check the position of all the cartridges to ensure they are properly positioned in the import position of the magazine and the priority cell. If this condition is not cleared, remove and replace the magazine. 2. Press Start. 3. Before replacing FRUs below, ensure that the Magazine 1 and Magacine 2, Priority Cell, and Cartridge Present sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9A	Picker assembly	43%	T12 (0.1)	CARR-23
	9E	Priority cell cartridge-present sensor	20%	T31 (0.1)	CARR-31
	A1	Magazine 1 sensor	10%	T31 (0.1)	CARR-32
	A0	Magazine 2 sensor	10%	T31 (0.1)	CARR-32
	97	Library control card	10%	T15 (0.1)	CARR-22
	A5	Library sensor cable	7%	T04 (0.4)	CARR-33
Extra cartridge	The device loaded a cartridge from the magazine and detected that another cartridge was placed in its home position. The device attempts to place the now-displaced cartridge in the priority cell to await operator action. If the priority cell is full, it ejects the cartridge when the priority slot is unloaded or when the Enter push button is pressed. 1. Ensure that no cartridge has been inserted into an 'in use' cell. 2. Before replacing FRUs below, ensure that the Priority Cell, Cartridge Present (on picker) and Limit 1 & 2 sensors are operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9E	Priority cell cartridge-present sensor	40%	T31 (0.1)	CARR-31
	9A	Picker assembly	35%	T12 (0.1)	CARR-23
	97	Library control card	20%	T15 (0.1)	CARR-22
	A5	Library sensor cable	5%	T04 (0.4)	CARR-33

Figure 10 (Page 4 of 6). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
No Cleaner cartridge	A request was made to clean the head, but the device cannot find a cleaner cartridge in the cleaner cell. 1. Check the cleaner cell to ensure that a cleaner cartridge is present in the cell. 2. Ensure that it is a **cleaner cartridge** and not just a data cartridge. The holes in the casing are different and the media in the cleaner cartridge does not fill the entire cartridge Cleaner cartridges have a gray file protect lever. 3. Before replacing FRUs below, ensure that the cleaner cartridge present sensor and Limit 1 & 2 sensors are operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	A3	Cleaner cartridge-present sensor	64%	T31 (0.1)	CARR-33
	9A	Picker assembly	21%	T12 (0.1)	CARR-23
	A5	Library sensor cable	10%	T04 (0.4)	CARR-33
	97	Library control card	5%	T15 (0.1)	CARR-22
Tach Error	A tach error was detected during an accessor motor operation. 1. Check for anything that might obstruct picker movement. 2. Ensure that cartridges are positioned in the magazine properly. 3. If the above checks don't fix the problem, cycle the power off then on to the 3570 and observe the accessor assembly before replacing FRUs. a. If the accessor motor assembly can move the picker back and forth, replace the accessor assembly before replacing any of the other FRUs. b. If accessor motor assembly cannot move the picker back and forth, replace the FRUs in the order listed below.				
	95	Accessor motor assembly	80%	T17 (0.2)	CARR-21
	97	Library control card	10%	T15 (0.1)	CARR-22
	A5	Library sensor cable	6%	T04 (0.4)	CARR-33
	99	Picker cable	2%	C03 (0.1)	CARR-23
	92	Accessor assembly	2%	T14 (0.6)	CARR-20
Library IRQ Fault	A library interrupt is on solid. Insure that the power cable from the power supply to the library control card is plugged and not loose. A drawing of this cable with expected voltages is located at Figure 13 on page MAPS-27. If the power is OK to the library control card, replace the following FRUs in the order listed:				
	97	Library control card	90%	T15 (0.1)	CARR-22
	C1	Power supply	10%	P04 (0.1)	CARR-16
Magazine Full	The magazine is full of cartridges. The device detected that the magazine cannot hold any more cartridges. **Note:** Before replacing FRUs below, ensure that the Priority Cell and Picker Cartridge Present sensors are operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	FD	Cartridge magazine	90%	Q05 (0.1)	Remove the magazine and replace the cartridges or insert another full magazine.
	9E	Priority cell cartridge-present sensor	5%	T31 (0.1)	CARR-31
	9A	Picker assembly	4%	T12 (0.1)	CARR-23
	97	Library control card	1%	T15 (0.1)	CARR-22

Figure 10 (Page 5 of 6). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Library Not Enabled	The library is not enabled.				
		Ensure there are cartridges in the library and that they are seated in the import position.			
	9E	Priority cell cartridge-present sensor	48%	T31 (0.1)	CARR-31
	9A	Picker assembly	37%	T12 (0.1)	CARR-23
	A5	Library sensor cable	10%	T04 (0.4)	CARR-33
	97	Library control card	5%	T15 (0.1)	CARR-22
Feed Over-current	An over-current condition was detected in the library feed motor circuitry.				
	97	Library control card	60%	T15 (0.1)	CARR-22
	9A	Picker assembly	20%	T12 (0.1)	CARR-23
Pinch Over-current	An over-current condition was detected in the library pinch motor circuitry.				
	97	Library control card	60%	T15 (0.1)	CARR-22
	9A	Picker assembly	20%	T12 (0.1)	CARR-23
Picker Over-current	An over-current condition was detected in the library picker motor circuitry.				
	97	Library control card	60%	T15 (0.1)	CARR-22
	9A	Picker assembly	20%	T12 (0.1)	CARR-23
Transport Full	The picker attempted to unload a cartridge but had no place to put it. A tape cartridge is present in slot that the device tried to unload to, or it appears to the machine that the slot is full. Could be a full slot or a sense error. The tape cartridge was left in the transport. 1. Ensure that a cartridge was not placed in an **in use** cell, causing this failure. 2. Before replacing FRUs below, ensure that the Priority Cell, Picker Cartridge Present sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	FE	Tape cartridge	60%	— (0.1)	Remove the cartridge
	9E	Priority cell cartridge-present sensor	20%	T31 (0.1)	CARR-31
	9A	Picker assembly	10%	T12 (0.1)	CARR-23
	97	Library control card	6%	T15 (0.1)	CARR-22
	FD	Magazine	4%	Q05 (0.1)	Check magazine for defect.
Library Door Open	The device detected that the library door was opened. **Note:** Before replacing FRUs below, ensure that the library door sensor is operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	—	Library door open is a normal condition if the operator has been adding or removing cartridges without using the priority cell position. If the door was not opened, but the machine thinks it was, replace the FRUs that follow until the problem is fixed.	—	—	Close the library door.
	AA	Library door open sensor	90%	T31 (0.2)	CARR-34
	97	Library control card	6%	T15 (0.1)	CARR-22
	A5	Library sensor cable	4%	T04 (0.4)	CARR-33

Figure 10 (Page 6 of 6). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Target Cell Full	The device detected that the destination cell was full. **Note:** Before replacing FRUs below, ensure that the Priority Cell and Picker Cartridge Present sensors are operating correctly. Refer to Figure 248 on page PROC-14. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9E	Priority cell cartridge present sensor	40%	T31 (0.1)	CARR-31
	9A	Picker Assembly	30%	T31 (0.1)	CARR-23
	A5	Library sensor cable	20%	T04 (0.4)	CARR-33
	97	Library control card	10%	T15 (0.1)	CARR-22

MAPs

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Library Operator Panel Problems

This procedure helps you isolate library operator panel failures.
See the CARR section for check, adjustment, removal, and replacement procedures.
See "Operator Panel" on page PANEL-1 for a description of the operator panel.
Unless otherwise directed, run **Fix Verify** from the CE Options Menu to test the drive after a FRU replacement.
If the recommended repair actions do not fix the problem, call your next level of support.

The table below may send you to another MAP. If not, continue with this MAP.

Figure 11. Library LED Type Failures and Where To Go First

If You Have the Following Symptoms	Go Here First
Library LEDs flash continuously	Go to Library LED Problems step 005 on page MAPS-5.
Some or all library LEDs fail to switch ON during the power-on cycle.	Go to Library LED Problems step 008 on page MAPS-6.
Not all library LEDs switch ON during the power-on cycle.	Go to Library LED Problems step 023 on page MAPS-7.
None of these symptoms were noted	Go to Step 001.

001

(From page MAPS-3)

Have the customer vary the drive off-line, if not done before.

Perform "Prepare the Tape Device for Service" on page PROC-5.

Switch ON power to the library device.

Can you see any display on the library operator panel display?
Yes No

002

Switch the library power OFF then ON and observe the three LEDs that normally indicate that the two magazines and priority cell are busy. The LEDs should flash ON and OFF during the power-on cycle, then switch OFF after the power-on diagnostics complete execution.

Did any of the library operator panel LEDs switch ON?
Yes No

003

(Step **003** continues)

003 (continued)

A power problem is causing the operator panel to fail. Go to "Power Problems" on page MAPS-13 for further isolation. Return to this procedure if the power supply is OK.

004

3570 power is good to the library control card which drives the library operator panel LEDs.

– Refer to "CE Verify Fix Menu" on page PANEL-30 and run the Panel Test Option of the diagnostic test. The test should allow you to see if each pixel switches ON at the panel display.

Did the test fail?
Yes No

005

Go to Step 011 on page MAPS-4.

006

– Switch power OFF and check that the library operator panel display cable connector from the library operator panel display to the library control card is

seated properly.

If the library operator panel display cable connector is seated, replace the following FRUs:

1. "FID 90: Library Operator Panel Display" on page CARR-19 (90%)
2. "FID 97: Library Control Card" on page CARR-22 (8%)
3. "FID A5: Library Sensor Cable" on page CARR-33 (2%)

Note: An alternative to replacing the library sensor cable is to perform a continuity check of the cable. If it checks OK, don't replace it.

007

A display is seen, but may not be correct.

Does the data on the display seem to be correct?

Yes **No**

008

Refer to "CE Verify Fix Menu" on page PANEL-30 and run the Panel Test Option of the diagnostic test. The test should allow you to see if each pixel switches ON at the panel display.

Did the test fail?

Yes **No**

009

Go to Step 011.

010

Replace the following FRUs in the order listed:

1. "FID 90: Library Operator Panel Display" on page CARR-19 (90%)
2. "FID 97: Library Control Card" on page CARR-22 (8%)
3. "FID A5: Library Sensor Cable" on page CARR-33 (2%)

(Step **010** continues)

010 (continued)

Note: An alternative to replacing the library sensor cable is to perform a continuity check of the cable. If it checks OK, don't replace it.

011

(From Library LED Problems step 013 on page MAPS-6)
(From steps 005 and 009)

The display appears to be working for now. If the problem appears again, replace the following FRUs in the order listed:

1. "FID 90: Library Operator Panel Display" on page CARR-19 (90%)
2. "FID 97: Library Control Card" on page CARR-22 (8%)
3. "FID A5: Library Sensor Cable" on page CARR-33 (2%)

Note: An alternative to replacing the library sensor cable is to perform a continuity check of the cable. If it checks OK, don't replace it.

Library LED Problems

This procedure helps you isolate library LED failures.
See the CARR section for check, adjustment, removal, and replacement procedures.
See “Operator Panel” on page PANEL-1 for a description of the operator panel.
Unless otherwise directed, run **Fix Verify** from the CE Options Menu to test the drive after a FRU replacement.
If the recommended repair actions do not fix the problem, call your next level of support.

001

Perform “Prepare the Tape Device for Service” on page PROC-5.

Switch ON power to the library device and observe the 3 LEDs that normally switch ON when the magazines or priority cell are busy. The 3 LEDs should flash ON and OFF during power-on diagnostics, then switch OFF when the library is initialized.

Did any of the three library LEDs switch ON?
Yes No

002

None of the three library LEDs switched ON during the power-on cycle. Continue at Step 008 on page MAPS-6.

003

At least one library LED switched ON. The library LEDs should flash for a short while, then switch OFF. If they continue to flash indefinitely, a problem with library initialization has occurred.

Do the library LEDs flash ON and OFF continuously (more than one minute)?
Yes No

004

Continue at Step 023 on page MAPS-7.

005

(From page MAPS-3)
(From step 029)

When the library LEDs flash ON and OFF continuously, the library operator panel display usually has only 2 blank (dark) lines displayed. The library device was never initialized by the microcode.
(Step **005** continues)

005 (continued)

Since this is a library problem, perform removal of the following:

1. “Library Chassis Covers” on page CARR-3.
2. “Drive Assembly Top Cover” on page CARR-11.
3. “FID B2: Cooling Pack” on page CARR-12.

Now that you have access to the cable that runs from the power supply to the mother board, power OFF the device and remove the end that is plugged into connector CD3. A diagram is located at Figure 14 on page MAPS-27. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the mother board.

Does the voltage check OK?
Yes No

006

Replace the following FRUs in the order listed.

1. Power supply (80%) “FID C1: Power Supply” on page CARR-16.
2. Cable from the power supply to the Tape Drive. (20%) “FID DB: AC Switch and Cable Assembly” on page CARR-35.

007

Power is OK to the mother board. Replace the following FRUs in the order listed.

1. Tape Drive. (65%) “FID B3—Drive Pack, Library Models” on page CARR-7.
2. Library control card (30%) “FID 97: Library Control Card” on page CARR-22.
3. Library interface cable (3%) “FID A2: Library Interface Cable” on page CARR-32.
4. Library sensor cable (2%) “FID A5: Library Sensor Cable” on page CARR-33.

008

(From page MAPS-3)
(From steps 002 and 025)

Some or all library LEDs failed to switch ON during the power-on cycle.

Is the library operator panel display completely blank?

Yes **No**

009

Continue at Step 011.

010

The library operator panel display is completely blank. Continue at Step 018 on page MAPS-7.

011

(From step 009)

Display is not blank.

Does the library operator panel display have 2 dark lines showing continuously?

Yes **No**

012

– Refer to "CE Verify Fix Menu" on page PANEL-30 and run the Panel Test Option of the diagnostic loop routine. This option should allow you to determine if all the pixels are working correctly in the operator panel display.

Did the Panel Test fail?

Yes **No**

013

Go to Library Operator Panel Problems step 011 on page MAPS-4.

014

Perform the following remove procedures:

1. "Library Chassis Covers" on page CARR-3.

(Step **014** continues)

014 (continued)

Replace the following FRUs in the order listed:

1. Library control card (40%) "FID 97: Library Control Card" on page CARR-22.
2. Library operator panel display (40%) "FID 90: Library Operator Panel Display" on page CARR-19.
3. Library sensor cable (20%) "FID A5: Library Sensor Cable" on page CARR-33.

015

Two dark lines on the library operator panel display indicate that the microcode is not running properly. With power OFF, perform the following remove procedures:

1. "Library Chassis Covers" on page CARR-3.
2. "Drive Assembly Top Cover" on page CARR-11.
3. "FID B2: Cooling Pack" on page CARR-12.

Now that you have access to the cable that runs from the power supply to the mother board, power OFF the device and remove the end that is plugged into connector CD3. A diagram is located at Figure 14 on page MAPS-27. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the mother board.

Does the voltage check OK?

Yes **No**

016

Replace the following FRUs in the order listed:

1. Power supply (80%) "FID C1: Power Supply" on page CARR-16.
2. Cable from the power supply to the Tape Drive. (20%) "FID DB: AC Switch and Cable Assembly" on page CARR-35.

017

Power is OK to the library control card which drives the library operator panel LEDs and library operator panel display. Replace the following

FRUs in the order listed:

1. Library control card (50%) “FID 97: Library Control Card” on page CARR-22.
2. Tape Drive. (45%) “FID B3—Drive Pack, Library Models” on page CARR-7.
3. Library sensor cable (3%) “FID A5: Library Sensor Cable” on page CARR-33.
4. Library interface cable (2%) “FID A2: Library Interface Cable” on page CARR-32.

018

(From step 010)

With power OFF, perform the remove procedure at “Library Chassis Covers” on page CARR-3.

Now that you have access to the cable that runs from the power supply to the library control card, power OFF the device and remove the end of the cable that is plugged into connector CD5 on the library control card. A diagram is located at Figure 13 on page MAPS-27. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the library control card.

Does the voltage check OK?
Yes **No**

019

Replace the following FRUs in the order listed:

1. Power supply (80%) “FID C1: Power Supply” on page CARR-16.
2. Cable from the power supply to the library control card (20%) “FID DB: AC Switch and Cable Assembly” on page CARR-35.

020

Power is OK to the library control card. Observe the drive LEDs while switching power OFF then ON. They should all switch ON for a short time, then switch OFF, then the Maintenance LED should flash while the drive diagnostics are running.
(Step **020** continues)

020 (continued)

Did the drive LEDs all switch ON and stay ON?
Yes **No**

021

Replace the following FRUs in the order listed:

1. Library control card (80%) “FID 97: Library Control Card” on page CARR-22.
2. Library interface cable (10%) “FID A2: Library Interface Cable” on page CARR-32.
3. Library sensor cable (10%) “FID A5: Library Sensor Cable” on page CARR-33.

022

Perform the following remove procedures:

1. “Library Chassis Covers” on page CARR-3.

Replace the following FRUs in the order listed:

1. Tape Drive. (90%) “FID B3—Drive Pack, Library Models” on page CARR-7.
2. Library control card (10%) “FID 97: Library Control Card” on page CARR-22.

023

(From page MAPS-3)
(From step 004)

Some of the library LEDs are working OK, some may not be working properly. During the power-on cycle, the 2 magazine and priority cell LEDs should flash ON and OFF until the power-on diagnostics are completed. Switch power OFF then ON, and observe the library LEDs.

Do all of them flash ON and OFF?
Yes **No**

024

Do any of the 3 LEDs flash ON and OFF?
Yes **No**

025

(Step **025** continues)

025 (continued)

Continue at Step 008 on page MAPS-6.

026

Replace the following FRUs in the order listed:

1. Library LED card (80%) “FID A6: Library LED Card” on page CARR-34.
2. Library sensor cable (20%) “FID A5: Library Sensor Cable” on page CARR-33.

027

All the library LEDs flash ON and OFF. They should flash ON and OFF for a short time until power-on diagnostics are complete. Then they should switch OFF.

Do they flash ON and OFF continuously?

Yes **No**

028

This is a normal situation. The machine is working as it should.

029

Continue isolation at Step 005 on page MAPS-5.

Drive LED Problems

This procedure helps you isolate Drive LED failures.
See Figure 7 on page START-11 for a description of the Drive LEDs and their meaning during **normal operational conditions.**
See "Operator Panel" on page PANEL-1 for a description of the operator panel.
See the CARR section for check, adjustment, removal, and replacement procedures.
Unless otherwise directed, run **Fix Verify** from the CE Options Menu to test the drive after a FRU replacement.
If the recommended repair actions do not fix the problem, call your next level of support.

001

Have the customer vary the drive off-line, if not done before.

Perform "Prepare the Tape Device for Service" on page PROC-5.

Note: It is possible to see the drive LEDs on a library model without removing the library top cover. Remove a tape cartridge from the priority cell location and look in toward the drive to see the LEDs.

Switch ON power to the device and observe the 3 LEDs. The LEDs should all switch ON for a few seconds during the power-on diagnostics. When the first phase of the diagnostics are complete, the microcode will switch OFF all three LEDs momentarily. Then the Maintenance LED should flash during the next phase of the diagnostics. When all the tests complete successfully, all three LEDs will switch OFF.

Switch power ON and observe the drive LEDs.

Did any of the drive LEDs switch ON?
Yes No

002

Continue at Step 012 on page MAPS-10.

003

At least some drive LEDs switched ON. The LEDs should have switched OFF after completion of the power-on diagnostics.

Did the drive LEDs switch ON and stay ON solid?
Yes No

004

(Step **004** continues)

004 (continued)

Continue at Step 015 on page MAPS-11.

005

The drive LEDs switch ON and stay ON during the power-on cycle.

Is this a library model?
Yes No

006

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page CARR-5.

Replace the Tape Drive. See "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

007

This is a library model. Power OFF then ON, and observe the 3 LEDs on the library operator panel. They should flash ON and OFF until the power-on diagnostics are complete.

Did any of the library LEDs flash ON and OFF?
Yes No

008

Perform the following remove procedures:

1. "Library Chassis Covers" on page CARR-3.

For this step, refer to Figure 13 on page MAPS-27, then power OFF the library and remove the power cable plugged into the top of the library control card at

connector CD5. The other end goes to the power supply. Power ON and check for proper voltages at the CD5, as defined in the referenced figure.

Do the voltages check OK?
Yes No

009

One or more voltages are missing. Replace the following FRUs in the order listed.

1. Power supply (80%) "FID C1: Power Supply" on page CARR-16.
2. Cable from the power supply to the library control card (20%) "FID A2: Library Interface Cable" on page CARR-32.

010

Voltages were OK. Perform the following remove procedures:

1. "Library Chassis Covers" on page CARR-3 if not done before.

Replace the following FRUs in the order listed.

1. Tape Drive. (80%) "FID B3—Drive Pack, Library Models" on page CARR-7
2. Library control card (20%) "FID 97: Library Control Card" on page CARR-22.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

011

Library operator panel LEDs flash ON and OFF. Replace the Tape Drive.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

012

(Step **012** continues)

012 (continued)
(From step 002)

The drive LEDs did not switch ON at Power-on.

1. If this is a library model, perform the following removal procedures:
   a. "Library Chassis Covers" on page CARR-3.
   b. "Drive Assembly Top Cover" on page CARR-11.
   c. "FID B2: Cooling Pack" on page CARR-12.
2. If this is a drive-only model, perform the following removal procedures:
   a. "Decorative Cover—Drive-Only Models" on page CARR-5.
   b. "Drive Assembly Top Cover" on page CARR-11.
   c. "FID B2: Cooling Pack" on page CARR-12.

You now have access to the power cable going from the power supply to the mother board. Also, refer to Figure 14 on page MAPS-27 for a power diagram. Unplug the power cable from mother board at connector CD3, and switch power ON. Check for the appropriate voltages at the cable pins shown in the referenced figure.

Does power check OK at the cable end?
Yes No

013

Power is missing at the cable. Replace the following FRUs in the order listed.

1. Power supply (80%) "FID C1: Power Supply" on page CARR-16.
2. Power cable from the power supply to the Tape Drive. (20%) "FID DB: AC Switch and Cable Assembly" on page CARR-35.

014

Power to the mother board checks OK. Replace the Tape Drive. See "FID B3—Drive Pack, Library Models" on page CARR-7.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

015

(From step 004)

At least some drive LEDs switched ON.

Do all 3 LEDs switch ON for a few seconds when power switches ON?

Yes **No**

016

At least one LED failed to switch ON.

1. If this is a library model, perform the following removal procedures:
   a. "Library Chassis Covers" on page CARR-3.
2. If this is a drive-only model, perform the following removal procedures:
   a. "Decorative Cover—Drive-Only Models" on page CARR-5.
3. Replace the Tape Drive. See "FID B3—Drive Pack, Library Models" on page CARR-7 or "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

017

The drive LEDs appear to be working now. The problem may be intermittent. If the LED failure returns, perform the following:

1. If this is a library model, perform the following removal procedures:
   a. "Library Chassis Covers" on page CARR-3.
2. If this is a drive-only model, perform the following removal procedures:
   a. "Decorative Cover—Drive-Only Models" on page CARR-5.
3. Replace the Tape Drive. See "FID B3—Drive Pack, Library Models" on page CARR-7 or "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

Notes

Power Problems

This procedure helps you isolate power failures.
See the CARR section for check, adjustment, removal, and replacement procedures.
See "Power Supply" on page INTRO-16 for a description of 3570 power.
Unless otherwise directed, run **Fix Verify** from the CE Options Menu to test the drive after a FRU replacement.
If the recommended repair actions do not fix the problem, call your next level of support.

001

Have the customer vary the drive off-line, if it was not already done.

"Prepare the Tape Device for Service" on page PROC-5.

Perform necessary Remove/Replace procedures as follows:

1. For drive-only models, perform removal of the "Decorative Cover—Drive-Only Models" on page CARR-5 to expose the power supply for further service, then return here.
2. For library models, perform removal of the "Library Chassis Covers" on page CARR-3 to expose the power supply for further service, then return here.
3. If more than one drive is installed in the library device, answer the following questions for both drives. When a distinction needs to be made between the two drives, they will be called Drive 1 and Drive 2.
4. If your device has only one drive, this MAP will call it drive 1.
5. If power was switched OFF to perform the above procedures, switch power ON now.

Does a power supply fan fail to rotate?
Yes **No**

002

The fan or fans are rotating. Power is getting to the fan motors. Continue at Step 021 on page MAPS-15.

003

Unplug the 3570 power cord from the source outlet. Measure the ac voltage at the source outlet.
(Step **003** continues)

003 (continued)

Is ac voltage at the source outlet correct?
Yes **No**

004

Inform the customer that ac power is unavailable at the customer-provided outlet.

005

Disconnect the power cord from the 3570. Check the power cord for continuity.

Is the power cord OK?
Yes **No**

006

Replace the 3570 power cord (no FID).

007

Is there only 1 drive in this device?
Yes **No**

008

This is a library with 2 drives. Continue at Step 016 on page MAPS-14.

009

(From step 017)

Power OFF the device, refer to Figure 14 on page MAPS-27, and disconnect the cable from the mother board connector CD3 of drive 1.

Note: If you have only one drive, it is drive 1.

The other end of the cable goes to the power supply. This cable has four heavy wires and plugs into the mother board at the rear of the drive near the cooling assembly.

Switch power ON and observe the cooling fan.
(Step **009** continues)

009 (continued)

Does the cooling fan switch ON now?
Yes **No**

010

Is this a library device?
Yes **No**

011

Replace the "FID C1: Power Supply" on page CARR-16.

012

Switch power OFF, refer to Figure 13 on page MAPS-27, and disconnect the cable from the library control card connector CD5. The other end of the cable goes to the power supply. This cable has four heavy wires and plugs into the library control card at the top of the card.

Switch power ON and observe the cooling fan.

Does the cooling fan switch ON now?
Yes **No**

013

Replace the "FID C1: Power Supply" on page CARR-16.

014

Replace the "FID 97: Library Control Card" on page CARR-22.

015

Replace the following FRUs in the order listed below. Replace each FRU one at a time until the cooling fan turns on with the power connected to the drive. Reinstall all of the original drive parts that did not correct the problem.

1. Tape Drive. (80%) See "FID B3—Drive Pack, Library Models" on page CARR-7 or "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

(Step **015** continues)

015 (continued)

2. "FID C1: Power Supply" on page CARR-16. (20%) "FID C1: Power Supply" on page CARR-16.

016

(From step 008)

This device is a library with two drives.

Is drive 2 failing?
Yes **No**

017

Drive 1 or library power is failing. Continue at Step 009 on page MAPS-13.

018

Drive 2 is failing. Switch power OFF, refer to Figure 14 on page MAPS-27, and disconnect the cable from the mother board connector CD3. The other end of the cable goes to the power supply. This cable has four heavy wires and plugs into the mother board at the rear of the drive near the cooling assembly.

Switch power ON and observe the cooling fan.

Does the cooling fan switch ON now?
Yes **No**

019

Replace the "FID C1: Power Supply" on page CARR-16.

020

Replace the following FRUs in the order listed below. Replace each FRU one at a time until the cooling fan switches ON with the power connected to the drive. Reinstall all of the original drive parts that did not correct the problem.

1. Tape Drive. (80%) See "FID B3—Drive Pack, Library Models" on page CARR-7 or "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.
2. "FID C1: Power Supply" on page CARR-16. (20%) "FID C1: Power Supply" on page CARR-16.

021

(From step 002)

Is this a library Model?
Yes No

022

This is a drive-only model.

Continue at Step 034 on page MAPS-16.

023

This is a library model. Power the library OFF then ON and observe the library operator panel. Look at the library LEDs and the operator panel display.

Does the library operator panel show any signs of power being ON?
Yes No

024

The library operator panel LEDs and display show no power to them.

Perform the following removals if not done before:

1. "Library Chassis Covers" on page CARR-3.

Find the cable that runs from the power supply to the library control card, switch power OFF and remove the end that is plugged into connector CD5. A diagram is located at Figure 13 on page MAPS-27. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the library control card.

Does the voltage check OK?
Yes No

025

Replace the following FRUs in the order listed.

1. Power supply (80%) "FID C1: Power Supply" on page CARR-16.

(Step **025** continues)

025 (continued)

2. Cable from the power supply to the library control card (20%) "FID A2: Library Interface Cable" on page CARR-32.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

026

Replace the following in the order listed:

1. Library control card (80%) "FID 97: Library Control Card" on page CARR-22.
2. Tape Drive. (10%) "FID B3—Drive Pack, Library Models" on page CARR-7.
3. Power supply (10%) "FID C1: Power Supply" on page CARR-16.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

027

The library operator panel has power. Power to the library is probably OK. Power OFF the library and wait a few seconds. Power ON the library while observing the drive LEDs on the front of the drive pack.

Do any of the drive LEDs in each installed drive switch ON at all during the power-on cycle?
Yes No

028

Perform the following removals on the failing drive if not done before:

1. "Library Chassis Covers" on page CARR-3.
2. "Drive Assembly Top Cover" on page CARR-11.
3. "FID B2: Cooling Pack" on page CARR-12.

Find the cable that runs from the power supply to the mother board, switch power OFF and remove the end that is plugged into connector CD3. A diagram is located at

Figure 14 on page MAPS-27. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the mother board.

Does the voltage check OK?
Yes **No**

029

Replace the following FRUs, associated with the failing drive, in the order listed.

1. Power supply (80%) "FID C1: Power Supply" on page CARR-16.
2. Cable from the power supply to the Tape Drive. (20%) "FID DB: AC Switch and Cable Assembly" on page CARR-35.

030

Power checks OK to the mother board. Replace the Tape Drive. See "FID B3—Drive Pack, Library Models" on page CARR-7.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

031

Drive LEDs switch ON, but a power problem may still exist.

Does the drive pack fan rotate in each installed drive with power ON?
Yes **No**

032

Replace the following FRUs in the order listed:

1. "FID C1: Power Supply" on page CARR-16 90%). "FID C1: Power Supply" on page CARR-16.
2. "FID BE: Drive Cooling Fan" on page CARR-12 (9%). "FID BE: Drive Cooling Fan" on page CARR-12.

(Step **032** continues)

032 (continued)

3. Cable from the power supply to the drive pack fan (no FID assigned) (1%).

Note: An alternative to replacement of this cable is to disconnect both ends and continuity check the cable. If it checks OK, do not replace it.

033

The power supply appears to be OK, but there may be an intermittent failure or a failure in the cable from the power supply to the electronic controls. If unable to determine the failure, call the support center.

034

(From step 022)

This is a drive-only model with a power problem. Power the drive OFF then ON and observe the drive LEDs on the front of the drive pack.

Do any of the LEDs switch ON at all during the power-on cycle?
Yes **No**

035

Does the drive pack fan rotate with power ON?
Yes **No**

036

Replace the following FRUs in the order listed:

1. "FID BE: Drive Cooling Fan" on page CARR-12 (90%). "FID BE: Drive Cooling Fan" on page CARR-12.
2. "FID C1: Power Supply" on page CARR-16 (9%). "FID C1: Power Supply" on page CARR-16.
3. Cable from the power supply to the drive pack fan (no FID) (1%).

Note: An alternative to replacement of this cable is to disconnect both ends

and continuity check the cable. If it checks OK, do not replace it.

037

Both the power supply fan and the drive fan are rotating with power ON, but the drive LEDs fail to switch ON.

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page CARR-5.
2. "Drive Assembly Top Cover" on page CARR-11.
3. "FID B2: Cooling Pack" on page CARR-12.

You now have access to the power cable going from the power supply to the mother board. Also, refer to Figure 14 on page MAPS-27 for a power diagram. Unplug the power cable from mother board at connector CD3, and switch power ON. Check for the appropriate voltages at the cable pins shown in the referenced figure.

Does power check OK at the cable end?
Yes No

038

Power is missing at the cable. Replace the following FRUs in the order listed.

1. Power supply (80%) "FID C1: Power Supply" on page CARR-16.
2. Power cable from the power supply to the Tape Drive. (20%) "FID DB: AC Switch and Cable Assembly" on page CARR-35.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

039

Power to the mother board checks OK. Replace the Tape Drive. See "FID B3—Drive Pack, Library Models" on page CARR-7.
(Step **039** continues)

039 (continued)

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

040

Drive LEDs switch ON and the power supply fan rotates, but a power problem may still exist.

Does the drive pack fan rotate with power ON?
Yes No

041

Replace the following FRUs in the order listed:

1. Drive cooling fan (80%) "FID BE: Drive Cooling Fan" on page CARR-12.
2. Power supply (15%) "FID C1: Power Supply" on page CARR-16.
3. Cable from the power supply to the drive pack fan (no FID) (5%).

   Note: An alternative to replacement of this cable is to disconnect both ends and continuity check the cable. If it checks OK, do not replace it.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

042

The power supply appears to be OK, but there may be an intermittent failure or a failure in the cable from the power supply to the electronic controls. Perform "Verify Fix" on page PROC-7 and if a failure occurs, restart into the MAPs from the START section. If unable to get the failure to occur, but the customer is getting failures, call the support center.

Other Obvious Symptom Problems

This MAP is intended to assist in repairing problems that are **not** your normal **FID display**, **ATTENTION DRIVE** or **ATTENTION LIBRARY** message. The device may be hung or have an unusual LED display.

Refer to Figure 12 and attempt to find the failure symptom. Some columns have more than one symptom listed. If they all do not apply, but **one** does, try the recommended **MAP Entry**.

Figure 12. Symptoms, Comments, and Where To Go

One or More Symptoms That Brought You Here	Comments and Directions	MAP Entry
Library attachment not recognized Library never calibrates on Power On Library operator panel display has two dark lines	Drive or drive to library interface failure	Go to Step 001.
The three drive LEDs stay ON solid and the device appears to be hung.	Drive or library circuit failure.	Go to Step 004 on page MAPS-20.
The library operator panel display has a *Recovery Started* message with a FSC number, but the device appears to be hung.	Microcode or drive logic card failure.	Go to Figure 8 on page START-12 and follow the FID E6 entry in the table.
The library or drive-only device hangs.	Drive or library circuit failure	Go to Step 004 on page MAPS-20.
A drive's LEDs all switch ON at power-on, then switch OFF, but the device is hung. The library LEDs all switch ON but the library operator panel display appears to be hung (library models).	Drive or library circuit failure.	Go to Step 024 on page MAPS-23.
The library device doesn't recognize that a magazine is present.	Library magazine sensor circuit failure.	Go to Step 018 on page MAPS-22.
The library device doesn't recognize a cartridge is present in the priority cell.	The cartridge not in **import** position. The priority cell cartridge-present sensor may be failing.	Go to Step 021 on page MAPS-23.
The Maintenance LED is ON solid, and none of the other drive LEDs are ON.	Drive logic card failure	Go to Step 035 on page MAPS-25.
A drive Clean LED is ON solid, or comes on frequently.	Drive failure	Go to Step 009 on page MAPS-21.

001

(From page MAPS-19)

You are here for **one or more** of the following reasons:

(Step **001** continues)

001 (continued)

1. The machine does not recognize the fact that it is a library machine.
2. The library never calibrates itself during the power-on cycle.

(Step **001** continues)

001 (continued)

3. The Library Operator Panel Display has only two dark lines displayed.

With power ON, inspect the library LEDs, the drive fan that exhausts through the rear of the device, and any other part you can see, hear or feel (the drive LEDs are visible through the priority cell), to ensure that power is ON.

Is some power ON in the device?
Yes **No**

002

This is a power problem that is handled by another MAP. Go to "Power Problems" on page MAPS-13 and continue isolation.

003

Power appears to be OK in the device.

Perform the following remove procedures:

1. "Library Chassis Covers" on page CARR-3.

Replace the following FRUs in the failing drive in the order listed:

1. Tape Drive. (60%) "FID B3—Drive Pack, Library Models" on page CARR-7.
2. Library control card (35%) "FID 97: Library Control Card" on page CARR-22.
3. Library interface cable (5%) "FID A2: Library Interface Cable" on page CARR-32.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

004

(From page MAPS-19)
(From page MAPS-19)

You are here for **one or more** of the following reasons:

1. Three LEDs of a drive stay on all the time.
2. A drive appears to be hung.
3. The library appears to be hung.
4. The library operator panel display has a *Recovery Started* message, but the device appears to be hung.

(Step **004** continues)

004 (continued)

Is this a library machine?
Yes **No**

005

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page CARR-5.

This is a drive-only device without a library.

Replace the Tape Drive. See "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

When the repair is complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

006

This is a library machine. Inspect the drive LEDs with power ON. They should all switch ON for awhile, then switch OFF or flash.

Are any drive LEDs ON solid continuously?
Yes **No**

007

Drive LEDs are working correctly. The problem must be only with the library LEDs.

Perform the following remove procedures:

1. "Library Chassis Covers" on page CARR-3.

Replace the following FRUs in the order listed:

1. Library control card (90%) "FID 97: Library Control Card" on page CARR-22.
2. Library sensor cable (6%) "FID A5: Library Sensor Cable" on page CARR-33.
3. Library LED card (2%) "FID A6: Library LED Card" on page CARR-34.
4. Library interface cable (2%) "FID A2: Library Interface Cable" on page CARR-32.

When the repair is complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

008

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page CARR-5.

Replace the Tape Drive. See "FID B3—Drive Pack, Library Models" on page CARR-7.

When the repair is complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

009

(From page MAPS-19)
(From page PROC-22)

You are here because a drive Clean LED is ON solid, or comes ON too frequently.

Does the Clean LED in the failing drive act the same with different tape cartridges?
Yes No

010

The problem is likely a defective or worn-out tape cartridge. Install a cleaner cartridge into the failing drive and perform a clean cycle. If this does not improve the situation, ask your customer to retire that tape cartridge and begin to use another one. Go to "End of Call" on page PROC-12.

011

The failure is probably not caused by any one tape cartridge.

Does a Clean LED stay ON all the time?
Yes No

012

When a drive has been cleaned, a record of the cleaning is saved in non-volatile memory (which is updated once every 8 hours). If the drive has been cleaned but is powered OFF before the cleaning is recorded in non-volatile memory, the record of the drive cleaning is lost and the drive may require cleaning again when it is powered ON.
(Step **012** continues)

012 (continued)

To force the non-volatile memory to be updated immediately (instead of waiting for the 8 hour update), select the save statistics menu option after cleaning the drive. The save statistics option is reached from the Operator Options menu by selecting SERVICES, and then STATISTICS.

Too frequent clean requests may be caused by too many errors occurring during R/W operations. Ensure that the customer cleaner cartridge is not worn out. If it has not been replaced recently, you may want to try cleaning the failing drive with a new cleaner cartridge. If this does not fix the problem, do the following:

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page CARR-5.

Now replace the Tape Drive. See "FID B3—Drive Pack, Library Models" on page CARR-7 or "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

When complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

013

If the Clean LED is ON solid, and the Busy and Maintenance LEDs are OFF, the drive may have been disabled due to lack of cleaning.

– Clean the drive with the cleaning cartridge.

Is the Clean LED still ON solid?
Yes No

014

The problem was caused by failure to clean the drive when the Clean LED was flashing.

015

There may be a failure to reset the Clean LED. Power OFF then ON and observe the Clean LED. It should switch ON solid, then switch OFF while the drive microcode performs the power-on self tests.
(Step **015** continues)

015 (continued)

Does the Clean LED switch OFF after switching ON for a short time during the power-on cycle?

Yes **No**

016

The Clean LED is ON solid. It may not be getting a reset from the electronics.

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page CARR-5.

Replace the Tape Drive. See "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

When complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

017

The Clean LED does switch OFF. This is normal operation. The LED is not ON solid at this time. The problem may be intermittent. If the problem comes back, do the following:

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page CARR-5.

Replace the Tape Drive. See "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

When complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

018

(From page MAPS-19)

You are here because your library device does not recognize that one or more magazines are installed.

During calibrate, the library should sense that a magazine is present and then inventory the cartridges that are in the magazine. It should then mark each cartridge present or absent on the library operator panel display. With the current failure on the machine, the library device is not able to sense the presence of the magazine, with or without tape cartridges installed.

Does the machine fail to recognize both magazines?

Yes **No**

019

Only one magazine is not recognized. Inspect the failing magazine lock lever and ensure that it is not broken, and that it is in the locked position. If it **is** in the locked position, do the following:

Perform the following remove procedures:

1. "Library Chassis Covers" on page CARR-3.

Now replace the following FRUs in the order listed:

1. Magazine 2 sensor (left) or Magazine 1 sensor (right) (90%) "FID A0: Magazine 2 Sensor" on page CARR-32 or "FID A1: Magazine 1 Sensor" on page CARR-32.
2. Library sensor cable (4%) "FID A5: Library Sensor Cable" on page CARR-33.
3. Library control card (2%) "FID 97: Library Control Card" on page CARR-22.
4. Tape Drive (3%) "FID B3—Drive Pack, Library Models" on page CARR-7.
5. Library interface cable (1%) "FID A2: Library Interface Cable" on page CARR-32.

When repairs are complete, go to "Verify Fix" on page PROC-7 then go to "End of Call" on page PROC-12.

020

Neither magazine is recognized as being installed. Inspect the failing magazine lock levers and ensure that they are not broken, and are in the locked position. If they **are** in the locked position, do the following:

Perform the following remove procedures:

1. "Library Chassis Covers" on page CARR-3.

Replace the following FRUs in the order listed:

1. Library control card (45%) "FID 97: Library Control Card" on page CARR-22.

(Step **020** continues)

020 (continued)

2. Tape Drive (40%) “FID B3—Drive Pack, Library Models” on page CARR-7.
3. Library interface cable (5%) “FID A2: Library Interface Cable” on page CARR-32.

When repairs are complete, go to “Verify Fix” on page PROC-7 then go to “End of Call” on page PROC-12.

021

(From page MAPS-19)

You are here because your library device does not recognize that a cartridge is in the priority cell.

Inspect the cartridge and ensure that it is far enough into the priority cell to be detected.

Was the cartridge in far enough to be detected?

Yes **No**

022

The cartridge not being installed far enough into the priority cell was probably the problem. Go to “End of Call” on page PROC-12.

023

Sensing of the cartridge in the priority cell is failing.

Perform the following remove procedures as needed:

1. “Library Chassis Covers” on page CARR-3.

Replace the following FRUs in the order listed:

1. Priority cell cartridge-present sensor (60%) “FID 9E: Priority Cell Cartridge-Present Sensor” on page CARR-31.
2. Library control card (20%) “FID 97: Library Control Card” on page CARR-22.
3. Tape Drive (15%) “FID B3—Drive Pack, Library Models” on page CARR-7.
4. Library sensor cable (5%) “FID A5: Library Sensor Cable” on page CARR-33.

When repairs are complete, go to “Verify Fix” on page PROC-7 then go to “End of Call” on page PROC-12.

024

(From page MAPS-19)

You are here for one of two reasons:

The drive appears to hang during the power-on cycle.
The library appears to hang during the power-on cycle.

Observe the power supply fan and the drive pack fan in each drive installed in this device. They should all be ON with power to each drive.

Are all fans running?

Yes **No**

025

Continue isolation at “Power Problems” on page MAPS-13.

026

Power to the fans is OK.

Are you here because a drive may be hung?

Yes **No**

027

The library may be hung.

With power OFF, perform the remove procedure at “Library Chassis Covers” on page CARR-3.

Now that you have access to the cable that runs from the power supply to the library control card, remove the end of the cable that is plugged into connector CD5. on the library control card. A diagram is located at Figure 13 on page MAPS-27. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the library control card.

Does the voltage check OK?

Yes **No**

028

Replace the following FRUs in the order listed:

(Step **028** continues)

028 (continued)

1. Power supply (80%) “FID C1: Power Supply” on page CARR-16.
2. Cable from the power supply to the library control card (20%) “FID A2: Library Interface Cable” on page CARR-32.

029

Power is OK to the library control card. Observe the drive LEDs while switching power OFF then ON. They should all switch ON for a short time, then switch OFF, then the Maintenance LED should flash while the drive diagnostics are running.

Did the drive LEDs all switch ON and stay ON?

Yes **No**

030

Perform the following remove procedures as needed:

1. “Library Chassis Covers” on page CARR-3.
2. “Drive Assembly Top Cover” on page CARR-11.
3. “FID B2: Cooling Pack” on page CARR-12.

Replace the following FRUs in the order listed:

1. Library control card (80%) “FID 97: Library Control Card” on page CARR-22.
2. Library interface cable (10%) “FID A2: Library Interface Cable” on page CARR-32.
3. Library sensor cable (10%) “FID A5: Library Sensor Cable” on page CARR-33.

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

031

Perform the following remove procedures as needed:

(Step **031** continues)

031 (continued)

1. “Library Chassis Covers” on page CARR-3.
2. “FID B2: Cooling Pack” on page CARR-12.
3. “Drive Assembly Top Cover” on page CARR-11.

Replace the following FRUs in the order listed:

1. Tape Drive (60%) “FID B3—Drive Pack, Library Models” on page CARR-7.
2. Library control card (35%) “FID 97: Library Control Card” on page CARR-22.
3. Library interface cable (5%) “FID A2: Library Interface Cable” on page CARR-32.

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

032

A drive may be hung.

1. If this is a library model, perform the following removal procedures:
   a. “Library Chassis Covers” on page CARR-3.
   b. “Drive Assembly Top Cover” on page CARR-11.
   c. “FID B2: Cooling Pack” on page CARR-12.
2. If this is a drive-only model, perform the following removal procedures:
   a. “Decorative Cover—Drive-Only Models” on page CARR-5.
   b. “Drive Assembly Top Cover” on page CARR-11.
   c. “FID B2: Cooling Pack” on page CARR-12.

You now have access to the power cable going from the power supply to the mother board. Also, refer to Figure 14 on page MAPS-27 for a power diagram. Unplug the power cable from mother board at connector CD3, and power the device on. Check for the appropriate voltages at the cable pins shown in the referenced figure.

(Step **032** continues)

032 (continued)

Does power check OK at the cable end?
Yes **No**

033

Power is missing at the cable. Replace the following FRUs in the order listed.

1. Power supply (80%) "FID C1: Power Supply" on page CARR-16.
2. Power cable from the power supply to the Tape Drive. (20%) See "FID DB: AC Switch and Cable Assembly" on page CARR-35.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

034

Power to the mother board checks OK. Replace the Tape Drive. See "FID B3—Drive Pack, Library Models" on page CARR-7 or "FID B3—Drive Pack, Drive-Only Models" on page CARR-10.

When the repair is complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

035

(From page MAPS-19)

You are here because a drive-only device has a Maintenance LED ON solid, but none of the other drive LEDs are ON. This is an indication that the drive logic card has had a catastrophic failure.

Observe the power supply fan and the drive pack fan. They should both be running with power ON.

Are both fans running with power ON?
Yes **No**

036

The failure was probably caused by overheating of the drive logic card components.
(Step **036** continues)

036 (continued)

Is the power supply fan running?
Yes **No**

037

Continue isolation at "Power Problems" on page MAPS-13. If the symptom continues after fixing the power problem, return to the beginning of this MAP and begin again.

038

The drive cooling fan must be failing. Replace the following FRUs in the order listed:

1. Drive cooling fan (90%) "FID BE: Drive Cooling Fan" on page CARR-12.
2. Cable-drive fan to power supply (10%)

When the fan problem is corrected, check to see if the same symptom is on the machine that brought you here. If the machine is still failing the same way, replace the Tape Drive. (100%) Refer to "Removal and Replacement Procedures—Drive Pack" on page CARR-7 for the removal and replacement procedure.

039

Since the fans are both running, the failure of the drive logic card is probably not caused by overheating. Replace the Tape Drive. (100%) See "FID B3—Drive Pack, Library Models" on page CARR-7 or "FID B3—Drive Pack, Drive-Only Models" on page CARR-10. Refer to "Removal and Replacement Procedures—Drive Pack" on page CARR-7 for the removal and replacement procedure.

Notes

Diagrams Referred to by MAPs

Note: All voltage tolerances are ±5%.

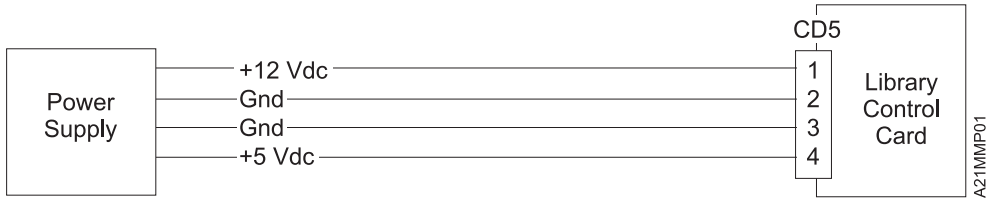

Figure 13. Library Electronic Power Diagram

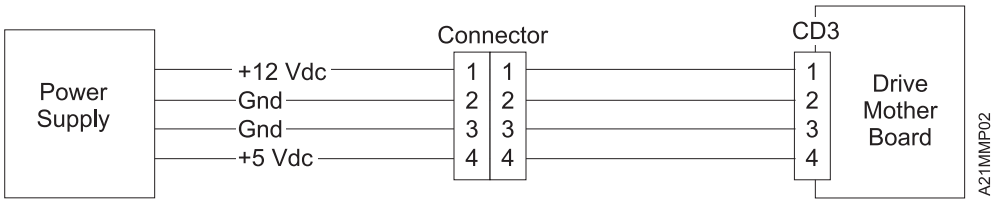

Figure 14. Drive Electronics Power

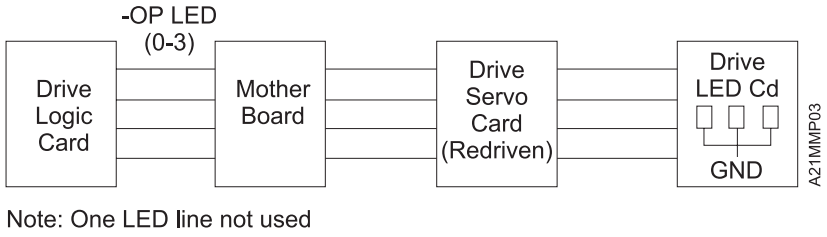

Figure 15. Drive LED Circuitry

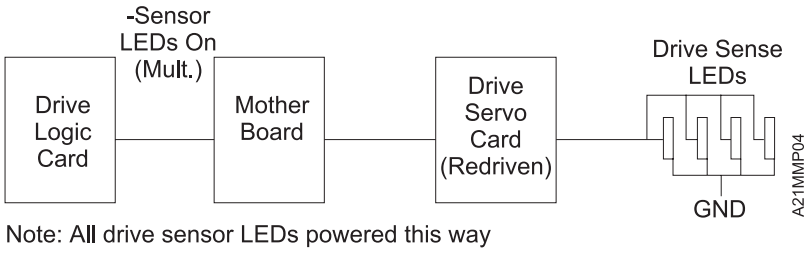

Figure 16. Drive Sensor LED Circuitry

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3570 Introduction

Product Overview

The IBM 3570 Tape Subsystem is a new family of tape handling products that provide high capacity, performance, and reliable tape cartridge processing, in a compact, low cost design. Designed for the mid-range systems, the 3570 attaches through the small computer system interface (SCSI) to systems like the AS/400, RS/6000, HP-UX, Sun (Solaris) and IBM Netfinity/PC Servers that utilize the SCSI interface.

The IBM 3570 Tape Subsystem, C-Series Models are available in stand-alone and rack-mounted units, and with drive only models. The stand-alone and rack-mounted units come with a random access cartridge loader (Library) attachment which allows up to 20 tape cartridges per Library device. Multiple devices may be added to a single SCSI interface. These library models come with one or two drives.

For more information on models, see “IBM 3570 Tape Subsystem, C-Series Models” on page INTRO-5.

New Technologies Save Time, Are More Reliable

The 3570, like the IBM 3590 High Performance Magnetic Tape Subsystem uses a newly introduced technology for longitudinal recording. In addition, the 3570 introduces a new, more reliable tape cartridge configuration that cuts in half the normal data acquisition time. The new technology and cartridge configuration can significantly increase the performance of longitudinal recording while considerably improving reliability.

Broad Applications

The Library version of the 3570 can be used to provide low cost high availability of data that is usually archived or resides on relatively expensive disk media. This application allows backup data to be available within seconds without the need to have operator intervention and mount delays.

Another use is the automatic backup storage for midrange systems or servers which have large amounts of disk or need unattended storage capacity for multiple backups.

Tape Cartridge Capacity

The IBM Magstar MP 3570 Tape Subsystem uses a metal particle tape and a new IBM Magstar Fast Access Linear Tape 3570 cartridge that can store 5GB of non-compacted data. The 3570 tape drive uses a compaction algorithm which can increase the storage capacity of these cartridge to 15GB.

Data Compression: The 3570 improved compression algorithm (IBMLZ1) provides highly efficient compression. The IBMLZ1 algorithm furnishes hardware execution efficiency by using as few machine cycles as possible to compress or decompress a byte, achieving good coding efficiency for broad applications, and performing compression without performance loss.

Large On-line Capacity Available: With 2 magazines of cartridges, each library can provide up to 300 GB of on-line data capacity with a data access rate of up to 54 GB/hr at maximum compression. Dual-drive models C02, C12 and C22 can provide up to double this data access rate (up to 108GB per hour at maximum compression.). This, along with the fact that multiple library models may be attached to one SCSI attachment allows very large on-line storage capability for the cost conscious midrange computer user.

A New Cartridge and Tape Movement Technology

The 3570 introduces a new concept for IBM tape drives that increases reliability along with faster data access. The 3570 drive, a key component of the 3570 Tape Subsystem, uses a new cartridge with a supply spool and a take-up spool. The normal start point for the 3570 tape is the physical mid point of the tape's length. As a result, to access data after the cartridge is loaded and has reached load point, the maximum distance it must travel is 1/2 the length of the tape, and the average distance is only 1/4 the length of tape. This reduced travel shortens data retrieval time and reduces head wear. Delays needed for tape load threading by other tape products is eliminated since the 3570 tape cartridge never needs to be threaded. When stationed at load point, which is near the center of the tape, the 3570 is ready to read or write data immediately in either direction.

Interleaved Longitudinal Recording Technology

The 3570 Tape Subsystem reads and writes in a new 128-track format using the serpentine interleaved longitudinal recording technology, first introduced with the IBM 3590 High Performance Magnetic Tape Subsystem.

There are two versions of the cartridges, the original B-Format and the newer, C-Format. For C-Format cartridges, the Magstar MP drives have sustained data rates of 7MB/sec native and 15MB/sec with maximum compression. For B-Format cartridges, the Magstar MP drives have sustained data rates of 3.5MB/sec native and 10.5MB/sec with 3:1 compression. The drive burst data rate is 20MB/sec. The average load and initialize time is 8 seconds, and the average search time to first byte of data is 8 seconds.

Writing and reading, with this improved methodology, along with beginning in the center of the tape, allows high speed data access at a very low cost.

The interleaved longitudinal recording technology allows the 3570 to write multiple tracks from the center of the physical tape to the end, in either direction, then index the head, or move the head vertically, for the return trip. The result is tracks interleaved across the width of the tape, from the center out in both directions.

Using the Magstar MP C-Format cartridges, the Magstar MP 3570 Tape Subsystem drive reads and writes data on 128 tracks per cartridge, eight tracks at a time. The subsystem uses an interleaved serpentine longitudinal recording format. The first set of eight tracks is written from the mid-point along the length of the tape to near the end of the tape, where the head is indexed to the next set of eight tracks for return to the tape mid-point. This process continues until all 128 tracks are written, and then is repeated for the other half of the medium until the tape is full. Operation using the Magstar MP B-Format cartridges is similar to the C-Format cartridge operation, except that four tracks, instead of eight tracks, are written at a time until all 128 tracks have been written.

Data is written on or read from metal particle tape enclosed in a tape cartridge. The Magstar MP Fast Access Linear Tape cartridges are different from cartridges used in other IBM tape storage products, and cannot be interchanged with the media used in other IBM tape products.

Historical Comparison of Tape Technologies

See Figure 17 on page INTRO-5 for an explanation of the historical changes that have led to this new technology.

Historically, the 18 tracks recorded on 3480 media were used to record ECC information along with the data. The original base 3490 models also used the same 18-track format but were later enhanced in the 3490E models, which implemented two sets of 18 tracks. In the 3490E device the first 18 tracks are

recorded when the tape moves in a forward direction until the physical end of the tape is reached. Then, using an electronic head switch (not physically moving the head itself in any direction but switching to a second set of read-write heads), a second set of 18 tracks is recorded when the tape moves in a backward direction until the physical beginning of the tape is reached.

In the 3590 a second generation of thin film magneto resistive (MR) heads is used, which, together with the 3590 tape medium allows recording with much higher area density, both in number of bits as well as number of tracks per inch. Similar to the 3590, the 3570 data is written in blocks of user data using multiple track format and where ECC information are recorded differently compared to the older track formats. The first set of eight tracks is written from the halfway point along the length of the tape to near the end of the tape, where the head is indexed to the next set of eight tracks for return to the tape center. The process continues until all 128 tracks are written. The process is repeated in the other direction of tape until the tape is full.

Note: Not all tape cartridges will be full from one end to the other. This example is used to show how a complete tape cartridge could be utilized for maximum effectiveness.

An example of tape track recording progression is shown in Figure 17. The 3570 recording process is very similar to that of the 3590, but with fewer head tracks and with a two-reel cartridge.

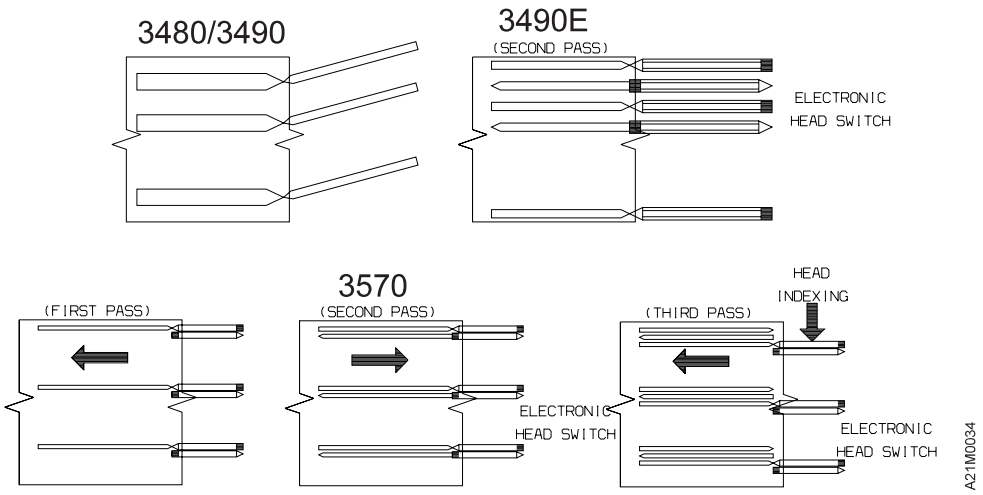


Figure 17. Serpentine Interleaved Track Sets

IBM 3570 Tape Subsystem, C-Series Models

The following single drive 3570 models are available:

Model C00 Drive is a customer setup (CSU) Tape Subsystem which may be installed on a desk or table. It does not include the library attachment. See Figure 18 on page INTRO-8.

Model C01 is a customer setup (CSU) stand-alone library Tape Subsystem with a 20-cartridge random access cartridge loader. See Figure 19 on page INTRO-8.

Model C11 is a rack-mounted library tape subsystem with a 20-cartridge random access cartridge loader. The Model C11 is similar to the Model C01 except for external covers and being rack-mounted. See Figure 19 on page INTRO-8.

| Model C21 is a customer setup (CSU) rack-mounted library Tape Subsystem with a 20-cartridge
| random access cartridge loader. It is identical to a Model C11 except that it attaches only to IBM
| Netfinity or IBM PC Server systems, and is mounted in a EIA-310-D industry standard 19-inch rack
| such as the IBM Netfinity Rack (9306900) or NetBAY22 (9306200). See Figure 19 on page INTRO-8.

The following dual drive 3570 models are available:

Model C02 is a customer setup (CSU) stand-alone library Tape Subsystem with a 20-cartridge random access cartridge loader.

Model C12 is a rack-mounted library Tape Subsystem with a 20-cartridge random access cartridge loader.

| Model C22 is a customer setup (CSU) rack-mounted library Tape Subsystem with a 20-cartridge
| random access cartridge loader that attaches only to IBM Netfinity or IBM PC Server systems, and is
| mounted in a EIA-310-D industry standard 19-inch rack such as the IBM Netfinity Rack (9306900) or
| NetBAY22 (9306200).

The 3570 C-Series models are capable of achieving a native sustained data rate over 3X that of the current B-Series models. This dramatically improves the "backup window" performance for customers in need of backing up larger amounts of data in less time. The 3570 C-Series models achieve a native sustained rate of 7MB/s by:

Doubling the read/write heads

Increasing the tape speed motion by 50%

Expanding the cache memory buffer to 4 MB

Adding a new digital data flow circuit that speeds read/write operations

These devices operate as SCSI-2 devices with SCSI-3 features. The 3570 attaches to host processors through the 3570 SCSI system adapter, which is a 2-byte wide SCSI fast interface. It uses a SCSI-3 68-pin P connector.

The 3570 can be integrated with any host system that supports a SCSI-2 interface and has the proper drivers installed.

A Bar Code Reader is standard and can improve application performance for library models. When the host re-inventories the cartridges, it can take several minutes for the host to mount each cartridge in a drive and read the volume serial number identification from the tape in a full library. A bar code reader eliminates the need to load each cartridge in a drive. This feature is installed on Magstar MP C-Series libraries and provides an efficient way to inventory cartridges in the library.

Compatibility with other Magstar MP Tape Subsystems

The Magstar MP C-Series tape drive can be distinguished from the Magstar MP B-Series tape drive by the color of the unload button on the drive front panel. The C-Series unload button is green while the B-Series unload button is blue.

The Magstar MP C-Format data cartridge can be distinguished from the Magstar MP B-Format data cartridge by the color of the file protect switch and Bar Code/Volser label and also by the Volume ID printed on the label. The C-Format switch and label are green while the B-Series switch and label are blue. The C-Format Volume ID begins with a "G" (Gxxxxxx), and the B-Format Volume ID begins with a "F" (Fxxxxxx).

The original Magstar MP 3570 B-Format Tape cartridges can be written, read, and interchanged between Magstar MP 3570 B-Series Tape Subsystems, Magstar MP 3570 C-Series Tape Subsystems and all tape drives in the Magstar MP Tape Library Dataserver.

The newer C-Format Tape cartridges can only be written, read, and interchanged between Magstar MP 3570 C-Series Tape Subsystems and the Magstar MP 3570 Model C Tape Drives feature of the Magstar

MP Tape Library Dataserver. The C-Format Tape cartridges cannot be used in Magstar MP 3570 B-Series Tape Subsystems or in Magstar MP 3570 Model B1A tape drives in a Tape Library Dataserver.

When B-Format Tape cartridges are used in the C-series tape drives, the tape drives operate with better performance than the B-series tape drives. Even higher performance is achieved by using C-Format tape cartridges.

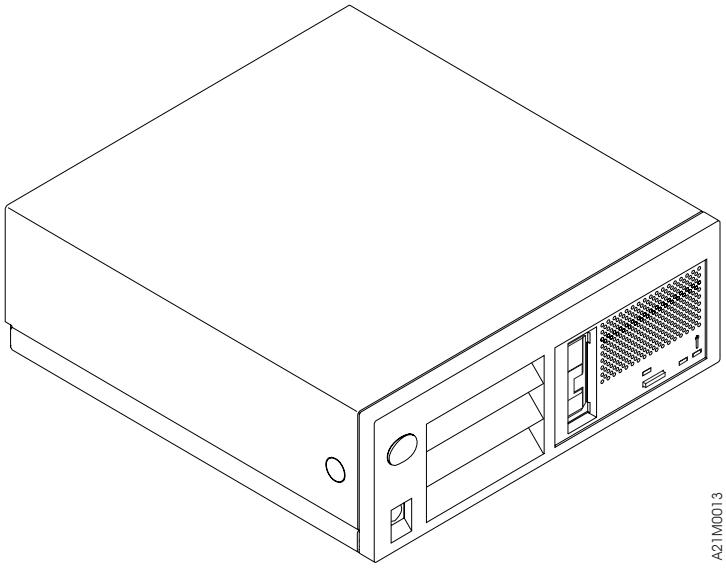


Figure 18. Model C00 Drive

| *Figure 19. Library Model C11, C12, C21 and C22*

| **Note:** The Model C21 and C22 library front cover assembly and operator display panel are slightly
| different from those shown above. For that difference, refer to Figure 32 on page INTRO-26, and
| Figure 33 on page INTRO-27, items 6 and 7 .

Operating Systems

Refer to *IBM Magstar MP 3570 Tape Subsystem Introduction and Planning Guide, C-Series Models,* GA32-0392 for planning for program support.

SCSI Physical Interface Characteristics

The 3570 Tape Subsystem operates as a SCSI-2 device with SCSI-3 features. The instruction set is SCSI-2, but includes SCSI-3 commands and mode sense data.

The 3570 Tape Subsystem attaches to host processors through the Magstar MP SCSI system adapter, which is a fast/wide (16-bit) differential SCSI interface. It uses a shielded high-density SCSI-3 68-pin P connector that accommodates 16 bus addresses. The 3570 attaches to a differentially driven, wide (16 bit) SCSI-3 P-cable.

Under the SCSI-2 protocol, this type of attachment allows cable lengths of up to 25 m (81 ft) with the appropriate cable and terminator selection. The stub length at each device must not exceed 0.2 m (0.66 ft).

The 3570 Tape Subsystem also logically supports the narrow (8-bit) protocol. An interposer is required to connect the 3570 Tape Subsystem to a SCSI-2 bus.

Note: Only 8 bus addresses (0 to 7) are valid for an 8-bit SCSI bus.

Bus Termination

The SCSI bus and all of the wires in the SCSI cable must be properly terminated according to the SCSI standard. This termination is especially important if a system mixes devices or initiators with 68-pin connectors with those of the older 50-pin style.

An external terminator may be mounted into a socket that is a part of the SCSI cable connector. A terminator must be installed on the last device on each end of a string of multiple devices. In a single-device installation, the terminator is installed in the socket of this device. The 3570 Tape Subsystem is delivered with an external differential terminator included, but it is not installed.

SCSI Bus Jumper

| Models C02, C12 and C22 include a SCSI Bus Jumper, a short SCSI cable which is attached or removed
| depending on the library configuration.

| **Base Configuration:** For Models C02, C12 and C22 set up in Base Configuration, the SCSI Bus
| jumper is attached between the two drives so the drives are on the same SCSI bus.

| **Split Configuration:** For Models C02, C12 and C22 set up in a Split configuration, the SCSI Bus
| Jumper is removed so each drive port is attached to a separate SCSI bus. Thus, each drive port in a Split
| Configuration has the same cable and termination requirements as a single-drive model C01, C11 and
| C21.

Device Characteristics

Figure 20 shows the physical specifications of the 3570 Tape Subsystem.

Figure 20. Physical Specifications

Dimensions	Model C00	Model C01	Model C02	Model C11/C21 (rack-mounted)	Model C12/C22 (rack-mounted)
Height	112 mm (4.4")	217 mm (8.5")	217 mm (8.5")	217 mm (8.5")	217 mm (8.5')
Width	320 mm (12.6")	483 mm (19.0")	483 mm (19.0")	444 mm (17.5")	444 mm (17.5")
Depth	338 mm (13.3")	771 mm (30.4")	771 mm (30.4)	714 mm (28.1")	714 mm (28.1)
Weight	8.4 kg (18.5 lb)	35 kg (77.1 lb)	40 kg (88.2 lb)	24 kg (52.8 lb)	29 kg (63.9 lb)
Weight with Pedestal	8.5 kg (18.7 lb) (see note)	39.8 kg (87.7 lb) (see note)	44.8 kg (98.6 lb) (see note)	N/A	N/A
Display Panel	No	Yes	Yes	Yes	Yes
Magstar MP Media	One cartridge	Up to 20 cartridges	Up to 20 cartridges	Up to 20 cartridges	Up to 20 cartridges
Tape Drives	1	1	2	1	2

Note:

Models C01 and C02 stand on a pedestal that raises each unit by 25 mm (1 in) above the table surface.

Orientation: Model C00 operates in two orientations:

Horizontal when the cartridge loader cell is vertical

Vertical when the cartridge loader cell is horizontal and the power switch is near the bottom.

All library models operate in horizontal orientation only, with slots arrayed vertically, and the priority cell on the right.

Power Consumption

stand-alone Models:

65 watts nominal

Library Models:

75 watts nominal

Two Drive Models

140 watts nominal

AC Distribution

AC power to the 3570 power supply is supplied from a wall outlet, rack enclosure, or other AC source.

AC Input Voltages: The 3570 power supply accepts input voltages and frequencies from 100 volts AC (nominal) to 240 volts AC (nominal), and from 50 Hz (nominal) to 60 Hz (nominal). The power supply automatically adjusts itself for proper operation when the voltages and frequencies are with the specification shown in Figure 21.

Figure 21. AC Input Voltages

Frequency	Frequency Tolerance	Input Voltage (VAC-RMS) Nominal	Input Voltage (VAC-RMS) Minimum-Maximum
50 Hz	±0.5 Hz	100 110 200 220 230 240	90–110 96.5–119 180–220 193–238 202–249 210–259
60 Hz	±0.5 Hz	100 110 120 127 200 208 220 240	90–110 96.5–119 104–127 111–137 180–220 180–220 193–238 208–254

Power Cords: A ship group provides the power cords needed to implement the electrical environment for the device. The power cords are 10-ampere line cords that provide either one-phase or two-phase power and ground, with an appliance coupler at the device end of the cord. The other end of the cord is determined by application and country and can be ordered by the customer.

See *IBM Magstar MP 3570 Tape Subsystem Introduction and Planning Guide, C-Series Models* for a list of part numbers of power cables by country.

Power Control: All 3570 models have a power-control switch located on the front of the devices. Input-power overload protection is provided by an automatic (reset) circuit breaker.

There is no power-on indicator on the device. All models have LEDs on the front. These LEDs are turned ON with power ON for a short time. The microcode turns OFF the LEDs after a checkpoint in the power-on self-test (POST). Library models have operator panels where power-on status is displayed after the LEDs have been turned OFF.

Remote power control is not the responsibility of the IBM 3570 Tape Subsystem. If required, it is provided by the enclosure or higher level subassembly.

Serial Number and Label Locations

See Figure 22 on page INTRO-12. The following labels are installed on models without the library:

UL/CSA 1
Model and serial numbers with barcode and date of manufacture, item 2 .
EC label, item 3

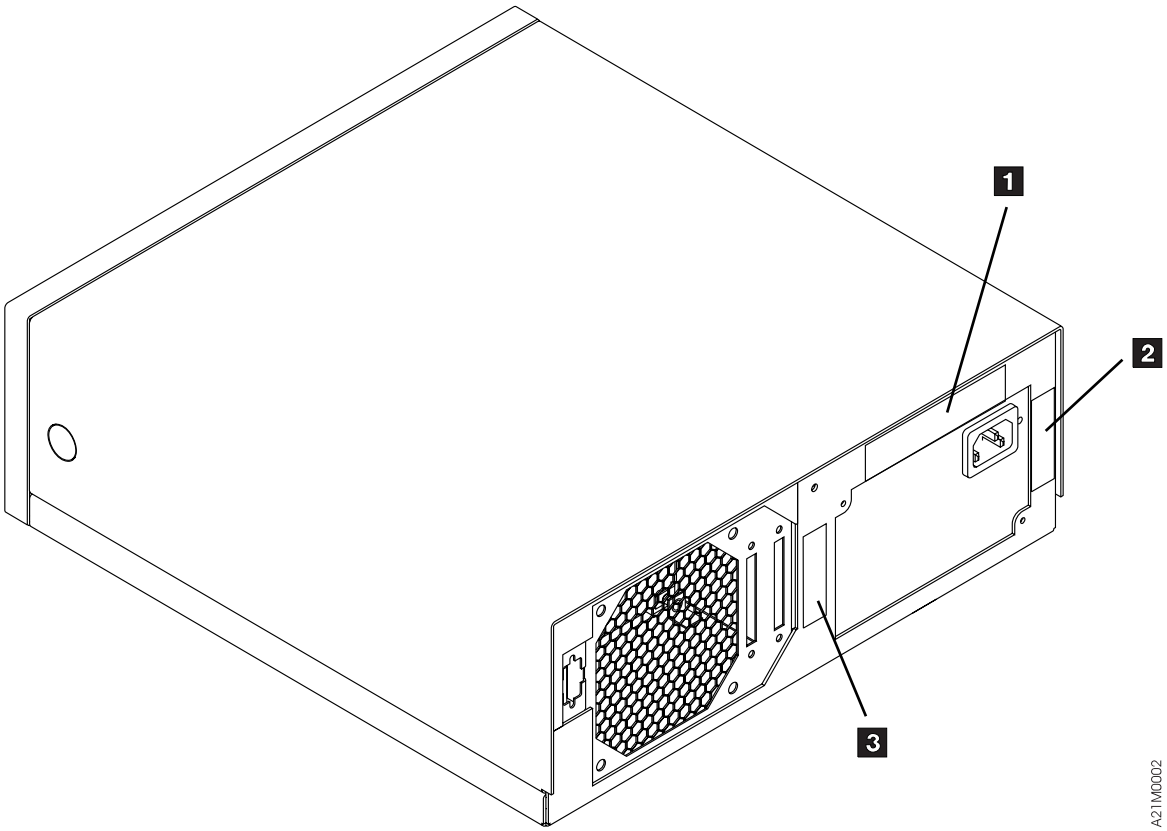


Figure 22. Label Locations for Models Without Libraries

See Figure 23. The following labels are installed on Models with libraries:

Model and serial numbers with barcode and date of manufacture, item 1
EC label, item 2
UL/CSA 3
Weight label with a triangular symbol 4

Note: The serial number label is also present above the left magazine lever opening on the front of the library. See 14 in Figure 46 on page INTRO-43.

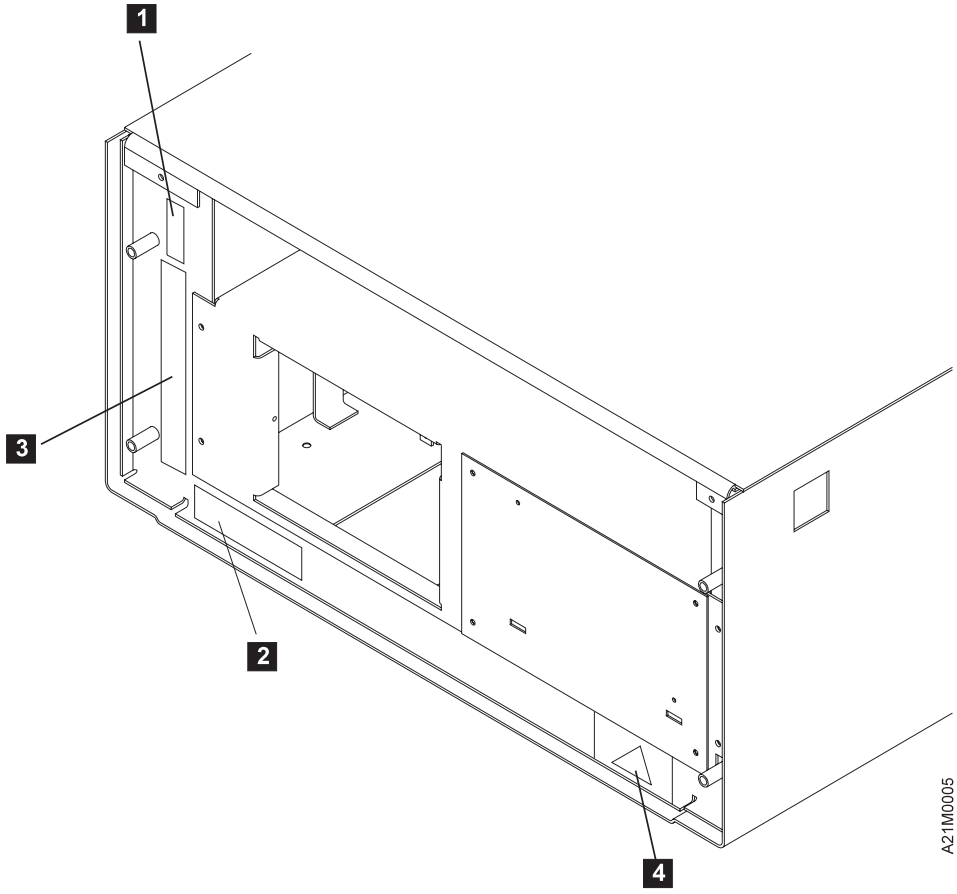


Figure 23. Label Locations for Models With Libraries

Functional Unit Descriptions

For the following functional unit descriptions, it may be helpful to refer to the following tables for exploded views of several models or major components.

Figure 24. Table of Exploded Views of Various Models

Model/Part	Description	Figure Location
Basic Drive Pack	Standard drive unit used in each model	Figure 27 on page INTRO-18
C00	Desk-top drive W/O library attachment.	Figure 25 on page INTRO-15
C01	Stand-Alone Library version with one drive	Figure 28 on page INTRO-22
C11	Rack-Mounted Library version with one drive	Figure 30 on page INTRO-24
C21	Rack-Mounted Library version with one drive	Figure 32 on page INTRO-26
C02	Stand-Alone Library version with two drives	Figure 29 on page INTRO-23
C12	Rack-Mounted Library version with two drives	Figure 31 on page INTRO-25
C22	Rack-Mounted Library version with two drives	Figure 33 on page INTRO-27

Note:

The Models C01 and C11, and Models C02 and C12 are nearly identical except for external covers and where the devices are mounted. The Models C11 and C21, and Models C12 and C22 are nearly identical except for the Front Bezel which is slotted, and the operator display panel which is **not** slopped, to allow the Models C21 and C22 to fit further into their mounting racks and not interfere with the front rack door.

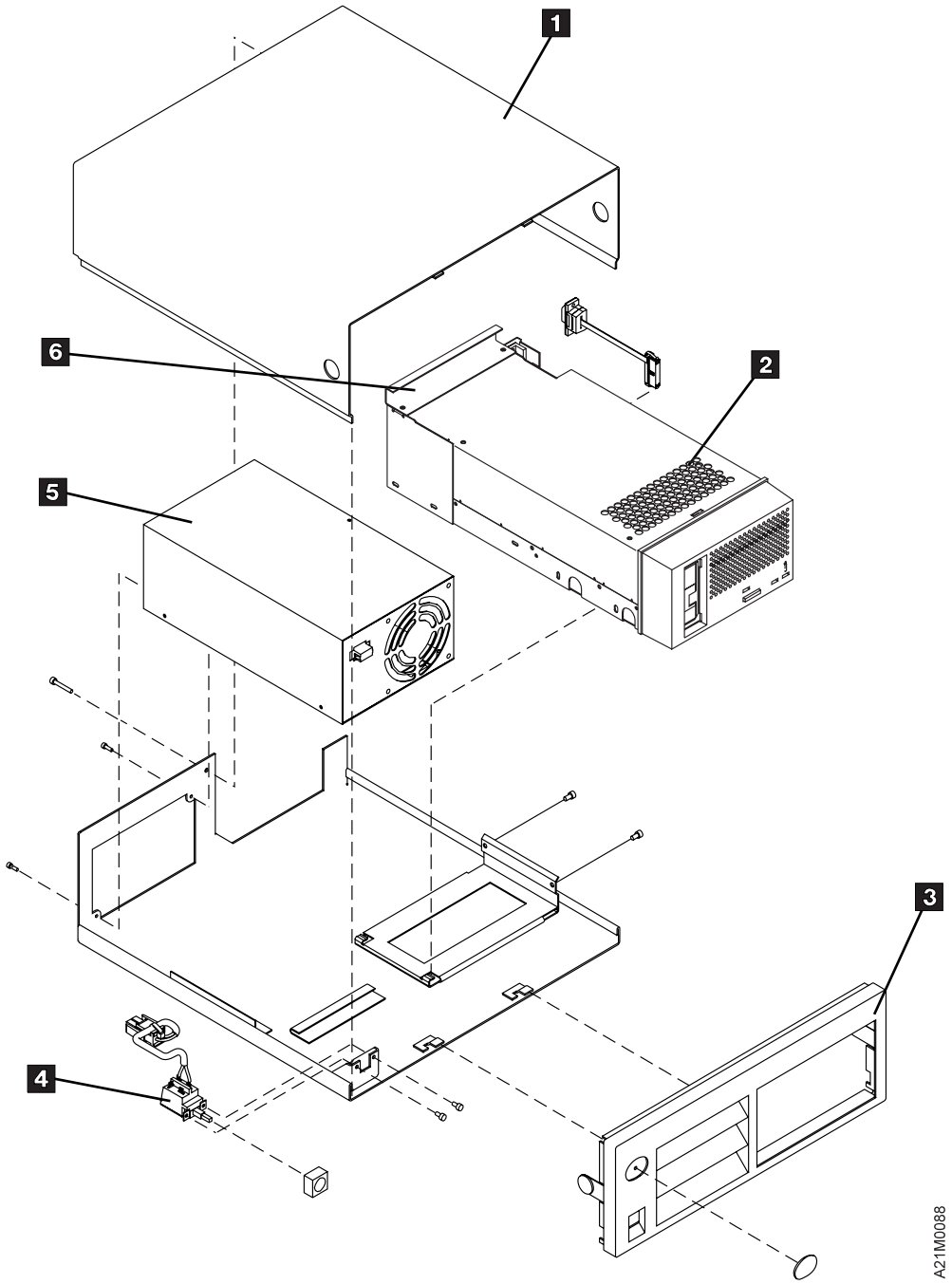


Figure 25. Model C00 Drive

Power Supply

Each model of the 3570 has a power supply under its decorative cover that supplies power to the drive and also provides power to the Library when installed in a Library Model.

When the model has two drives, each drive will have its own power supply. The first power supply (located on the right side of the box facing from the front) provides power to its drive and the library.

Figure 25 on page INTRO-15 5 , Figure 28 on page INTRO-22 item 3 , and Figure 30 on page INTRO-24 2 show all three configurations where the single drive power supply is located.

Figure 26 shows the power distribution.

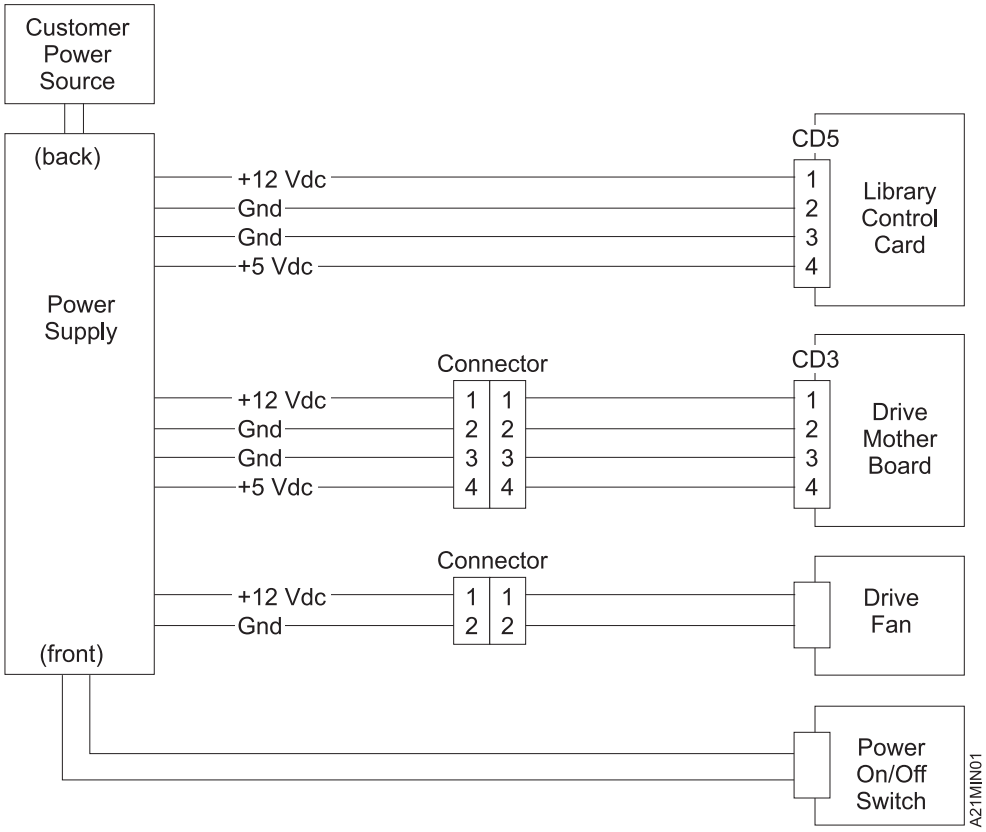


Figure 26. Power Block Diagram

Drive Pack

| **Note:** The 3570 Model Cxx drives have a **green** UNLOAD button while the Model Bxx drives have a **blue** UNLOAD button. Model Cxx drives also have microcode level D1I5_xxx while Model Bxx drives have microcode level D1I4_xxx. If the drive you are working on has a blue UNLOAD button and code level D1I4_xxx, go to *Magstar MP 3570 Tape Subsystem Maintenance Information B—Series Models.*

| *A very few early Model Cxx drives shipped with blue UNLOAD buttons. If in doubt, check the microcode level for this model.* .

The 3570 drive pack has its own protective covers. The drive pack, shown in Figure 25 on page INTRO-15 2 , in the drive-only machine, and in Figure 28 on page INTRO-22 14 and Figure 30 on page INTRO-24 12 inside two single drive library machine configurations, is a stand-alone 5.25 inch form factor functional unit with a host SCSI interface. In addition to its own protective covers, it is always covered by external decorative covers, whether a stand-alone or rack-mounted device. Power and cooling are provided under the decorative covers as well.

| The 3570 C—Series drive is packaged as a single field replaceable unit (FRU) in all countries and regions **except in EMEA** and as such is replaced as a unit if a problem occurs within the drive. This is a change in service strategy from previously shipped drives.

| Since EMEA service personnel must isolate to a FRU within the drive, a special START section (see APPENDIX B), MAP section (see APPENDIX C) and CARR section (see APPENDIX D) have been designed for that area.

| The Models C02, C12 and C22 each contain two drive packs and two power supplies. These may be referred to as dual drive models.

Cooling Pack

Figure 25 on page INTRO-15 item 6 shows where the cooling pack is attached to the drive pack. All drive packs have a cooling pack attached.

The cooling pack contains the drive cooling fan and the internal SCSI cable which plugs into the drive logic card. The cooling pack accepts the customer SCSI cable coming from the host system. The drive cooling fan and the internal SCSI cable are both FRUs.

The components contained within the drive pack are discussed below. See Figure 27 on page INTRO-18 for locations of all drive components discussed next.

| **Note:** None of the components shown in Figure 27 on page INTRO-18 may be replaced separately in the C—Series drives except in countries and regions in EMEA. In all other countries and regions, the drive is replaced as a single FRU when anything fails within it. The drive parts are shown here for information only.

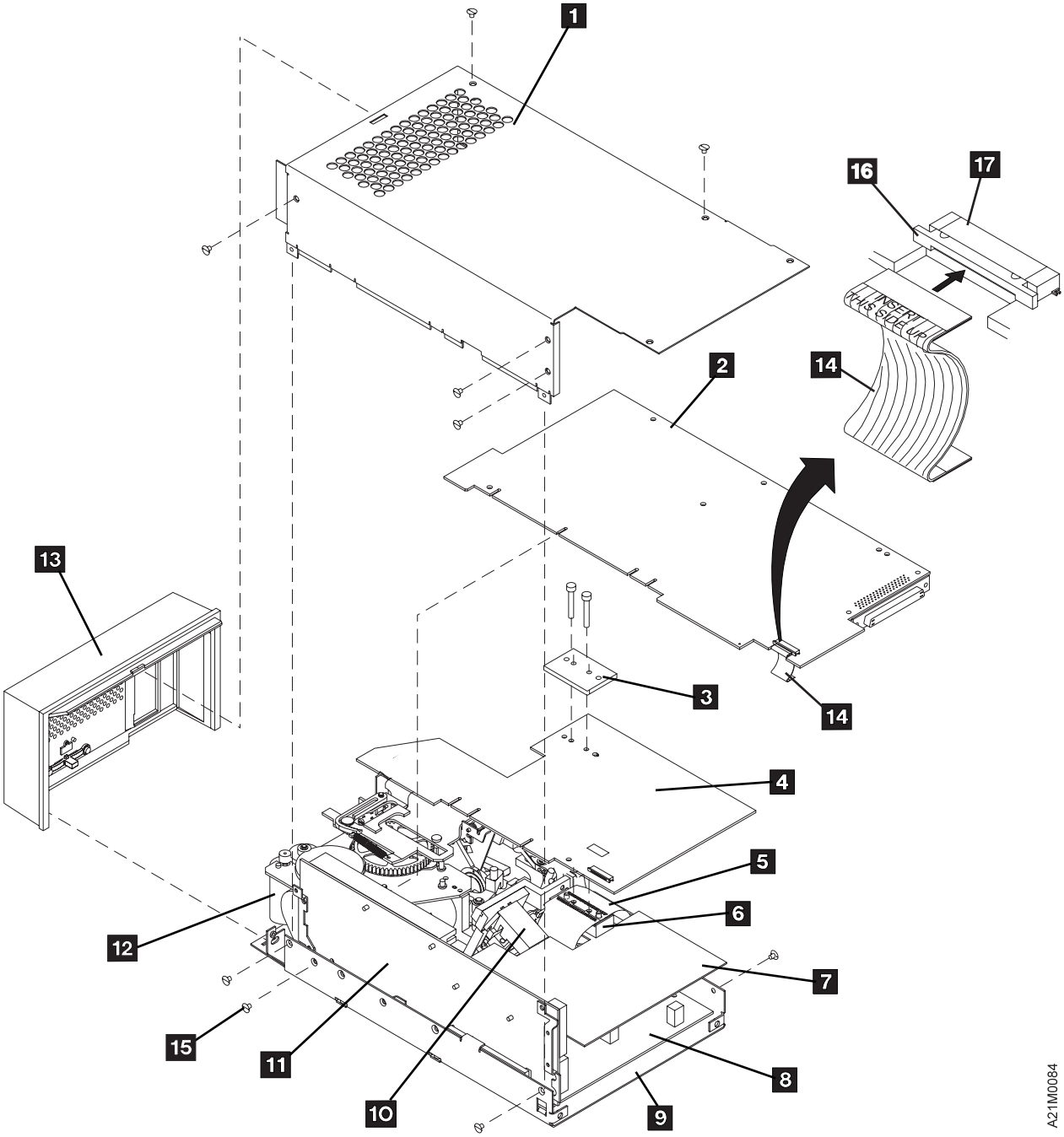


Figure 27. Base Drive Components (All Models)

Drive Logic Card Overview

The drive logic card, item 2 , contains the primary electronic controls for the drive and the library device, if installed. It is plugged into the mother board, item 11 , and is the first card visible when the top protective cover of the drive is removed. This card contains the SCSI controls for the box, several processors, memory buffers, clock generation circuits, and control logic for R/W data flow and reel to reel tape motion. It provides connectivity for the library function through the library control card.

Drive Logic Card—How it works

The drive logic card, located in each drive pack, basically consists of a data path and a control path. The data path receives data from the SCSI bus, then buffers it, checks it for parity and CRC, compacts it, re-buffers it, formats it to fit the 3570 data format, and sends it to the drive analog card, and ultimately to the head-actuator assembly to be written to the media. In read-back, it receives read data pulses from the drive analog card, clocks them, de-skews them, corrects parallel data, buffers it, de-compacts it, and transfers the data to the SCSI bus.

The drive logic card contains the main microprocessor, the microcode load, clock generation circuits, reset controls, and control registers that interface with all other drive electrical/mechanical components.

Library Models: The drive logic card controls the motion of the accessor assembly and the picker assembly by sending commands to these devices through the library control card which performs as the library interface. The drive logic card also monitors tach pulses from the motors, and sense data from the various library sensors through the library control card interface.

Host Communications: The drive logic card serves as the primary SCSI interface for the device through a SCSI adapter and on-board SCSI drivers. All host communications to the 3570 go through the drive logic card via this interface. SCSI commands are received, and routed under microcode control throughout the device. SCSI data is received and sent as discussed earlier.

The SCSI ID switch is located on the drive logic card and is used to set the SCSI address for drive-only installations. The SCSI ID switch is not used on library models. The SCSI address on library models is set from the library operator panel display.

Microcode: Microcode, which is housed on the drive logic card, handles data and commands from the SCSI bus, and transfers data and controls the drive analog card, drive servo card, the loader assembly, head-actuator assembly, and the library components. During read from the media, the microcode controls the receiving and buffering of data from the drive logic card, and controls the actuator location in relation to the media. The microcode also provides communication to the operator or CE by communicating through the drive LEDs, the library operator panel display, and library LEDs. Bring-up diagnostics perform initialization and testing during Power On, and collects and presents error or ATTENTION data when intervention is required. Each installed drive contains microcode.

Data Handling: The drive logic card controls special compaction hardware to compact data before sending it out to be written to the tape media. During a tape read operation, data that is received from the R/W head is first corrected for skew, then is un-compacted and buffered for further transmission over the SCSI bus.

Sense Gathering: Sensing devices located in the drive pack send sense data through the drive servo card to the drive logic card. Sensing devices located in the library area send sense data through the library control card to the drive logic card.

Drive Logic Card to Drive Analog Card Interface: Most clocking for the 3570 is generated by the drive logic card. It operates at 40Mhz or clocks derived from this frequency. The microprocessor resident on the drive logic card runs at 20Mhz. The only off card use for drive logic card clock circuitry is a 20Mhz signal sent to the drive analog card during write operations and during transfer of LWR (Loop Write to Read) data. The library control card contains its own clock controls. During a write operation the drive logic card sends equalized write data and clock pulses to the drive analog card. During transfer of LWR data, the drive logic card clocks the LWR data from the drive analog card. The data is buffered and checked in both directions to ensure data integrity.

Some of the signals between the drive logic card and the drive analog card are transmitted through the flat ribbon cable, item 14 .

Drive Logic Card to Drive Servo Card Interface: The drive logic card is also the primary electronic source for controlling movement of the reel-to-reel motors, the head actuator, and readout of the loader sensors. The drive logic card provides control registers for each of these functions, which in turn are powered by the drive servo card to perform the actual movement of motors and solenoids. Feedback of tach pulses and sensors is transferred to the drive logic card from the drive servo card for processing by the microcode.

Reset and Power Controls: Power-on reset for the 3570 is handled by the drive logic card. It checks power as it is switched ON or OFF, and provides reset levels to the other electronic circuits until power is at the proper levels. This *clamping* of the electronic cards keeps noise and glitches from occurring during power transitions.

Drive Analog Card

The drive analog card, item 4 , contains the write drivers, read pre-amplifiers and bias circuits for both data and servo channels. It provides precise switching of write current for four channels at a time to the R/W head during a write cycle, and detects and converts analog signals from the R/W head to digital signals during a tape read cycle. The drive analog card is designed and positioned so that it makes physical contact with the R/W head through thin film cable connections, item 5 , yet can still be plugged into the mother board. The R/W head is part of the head-actuator assembly, item 1 .

Head-Actuator Assembly

| The head-actuator assembly, item 1 , contains the R/W head, and the actuator assembly, factory
| pinned. The entire unit is a single assembly. The R/W head transfers write current as controlled by the drive analog card to the tape as it passes in contact with the R/W head during a write cycle, and transfers signals from the tape as it passes in contact with the R/W head during read cycles. The actuator assembly positions the head in the appropriate location to read or write across the width of the tape.

Drive Servo Card

The drive servo card, item 8 provides circuitry that drives the loader motor, reel motors, and head actuator from signals originating in the drive logic card. It is the last card in the stack to plug into the mother board.

Loader Assembly

The loader assembly, item 12 , is mounted on the bottom plate, item 9 . The loader assembly contains the mechanical and electrical components to move the tape cartridge into and out of the loader, to move the tape forward and backwards, to sense when the tape cartridge is in position to be read, and to sense
| the type of tape cartridge that is loaded. The loader assembly as attached to the bottom plate is a single
| assembly.

Drive Sensor Cable

The drive sensor cable (not shown) is connected to numerous sensors and components on the loader assembly, and is replaceable without replacing the loader assembly. It attaches at the other end to the drive servo card.

Loader Door

The loader door (not shown) is an integral part of the loader assembly, but may be replaced by itself if damaged.

Drive LED Card

The drive LED card (not shown) is located near the front of the tape unit and provides circuitry that lights the Busy, Clean, and Maintenance LEDs for the drive and contains the Unload push button. This card has limited function in a library configuration.

Internal SCSI Cable

The internal SCSI cable is part of the cooling pack assembly and provides SCSI signal connectivity between the drive logic card and the host system cable connection point on the rear of the cooling pack.

Library Components

The library components are shown in Figure 28, Figure 29 on page INTRO-23, Figure 30 on page INTRO-24, Figure 31 on page INTRO-25,Figure 32 on page INTRO-26 and Figure 33 on page INTRO-27. They offer 6 models, all containing a 20 cartridge automated cartridge loader capable of operating in random, auto or manual access mode for tape volumes. See *IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models* GA32-0393 for location and functional description of the library. Each major component is discussed in detail in the LIBRARY section. They are shown here only for continuity.

Since the major difference between stand-alone and rack-mounted models is the external covers, and the major differences between single drive models and dual drive models is the number of drives and drive components, the following reverse key references are made only to Figure 31 on page INTRO-25.

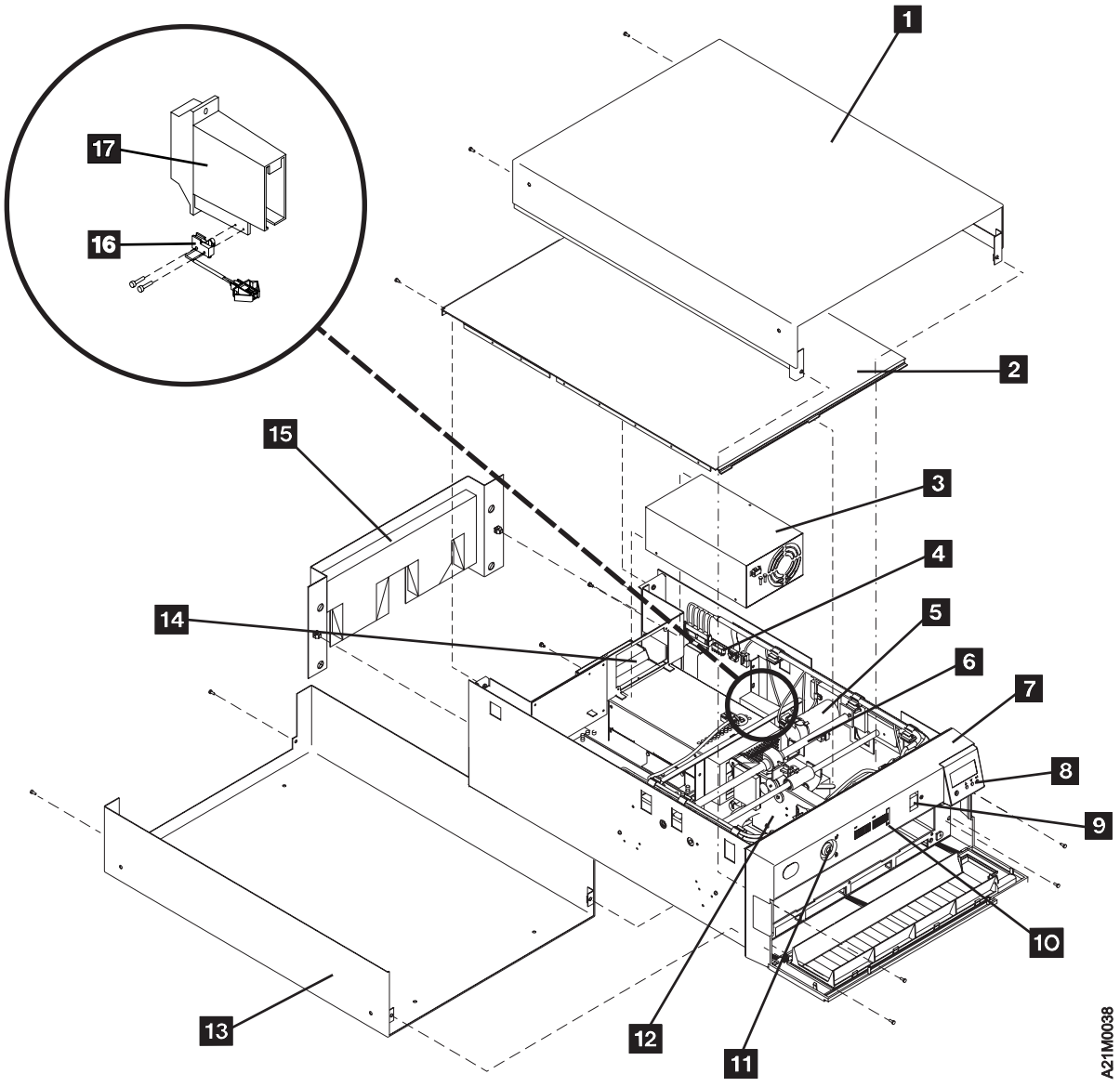


Figure 28. Model C01-Stand-Alone Library Model

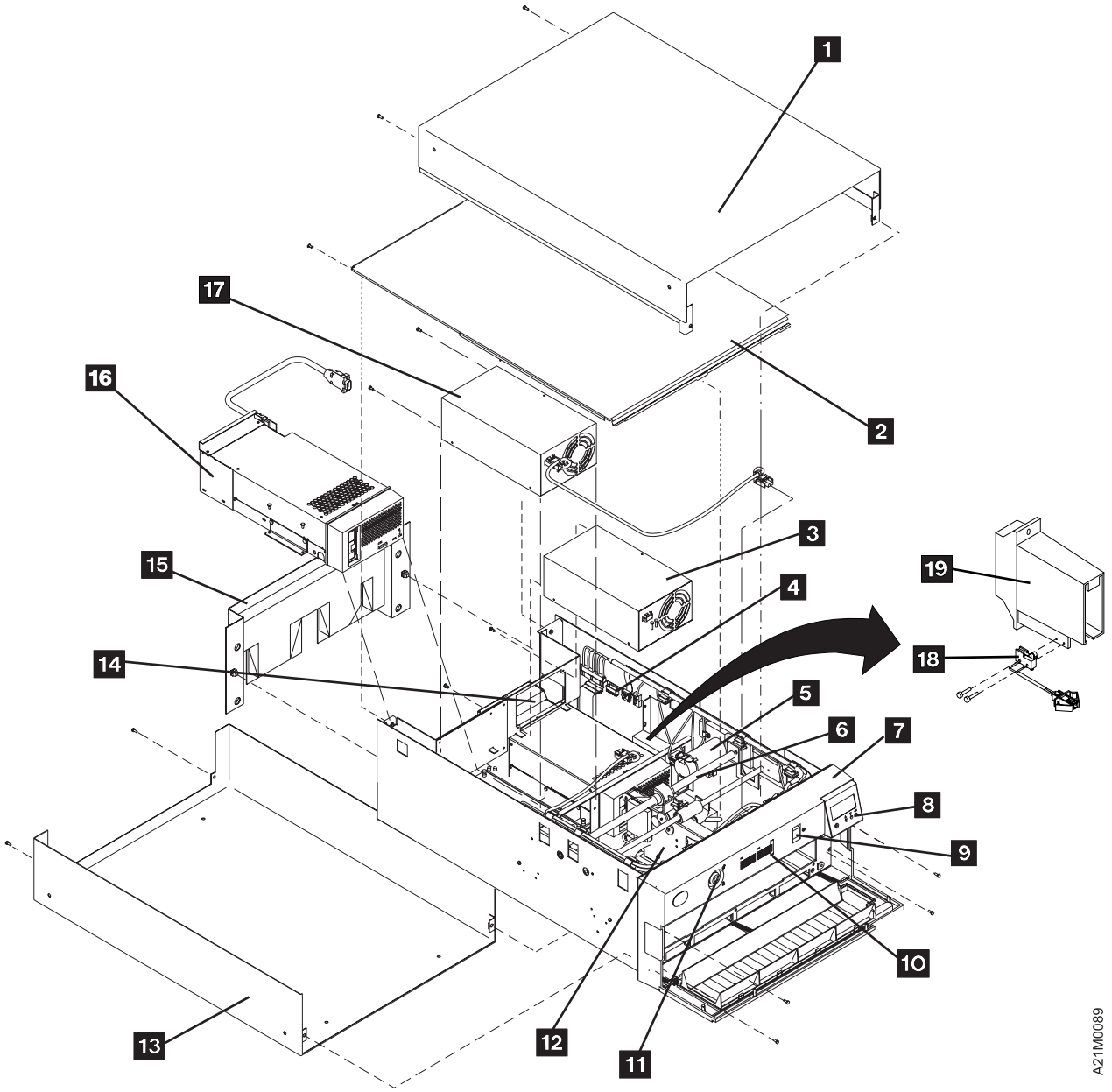


Figure 29. Model C02-Stand-Alone Library Model

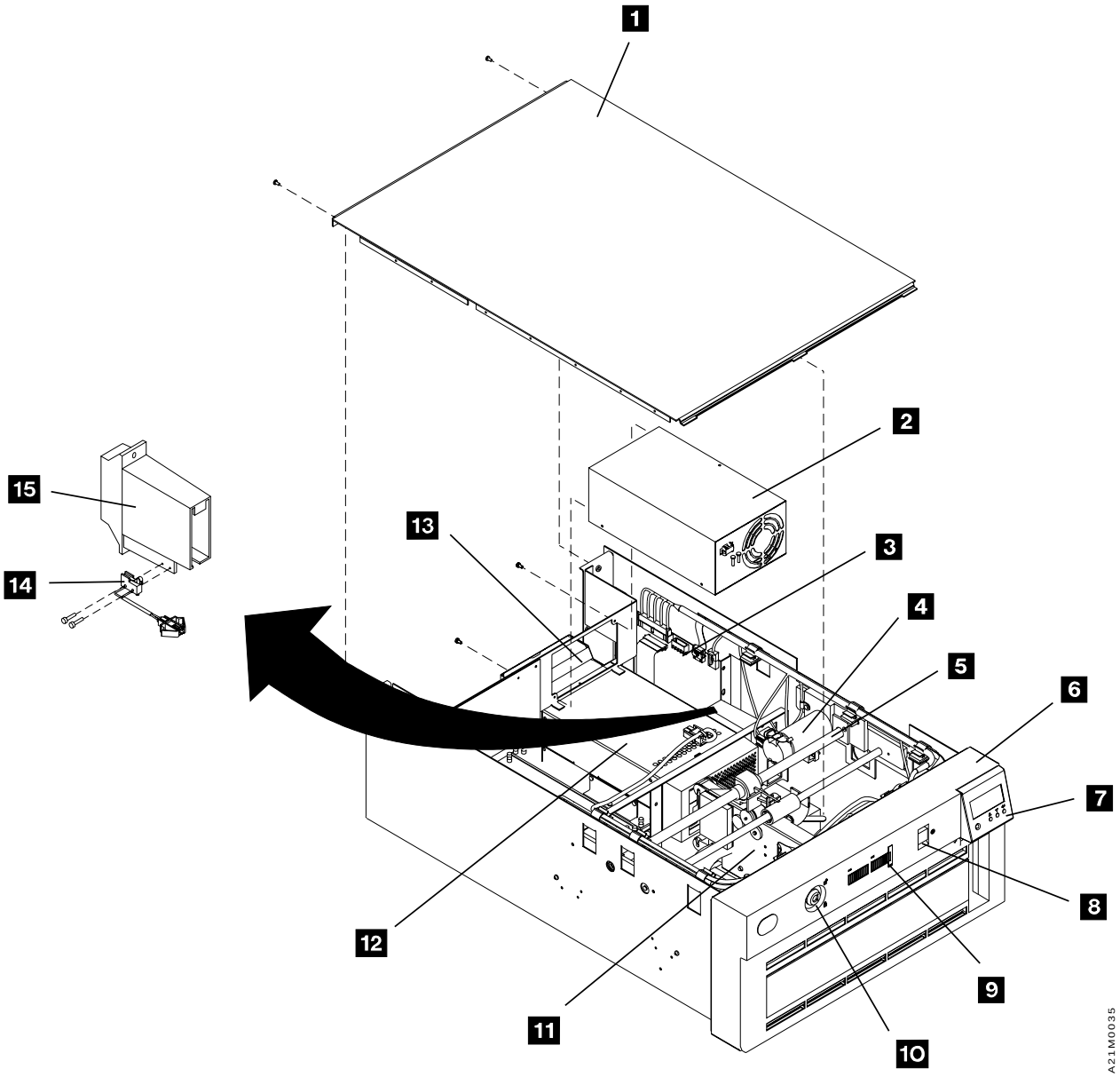


Figure 30. Model C11-Rack-Mounted Library Model

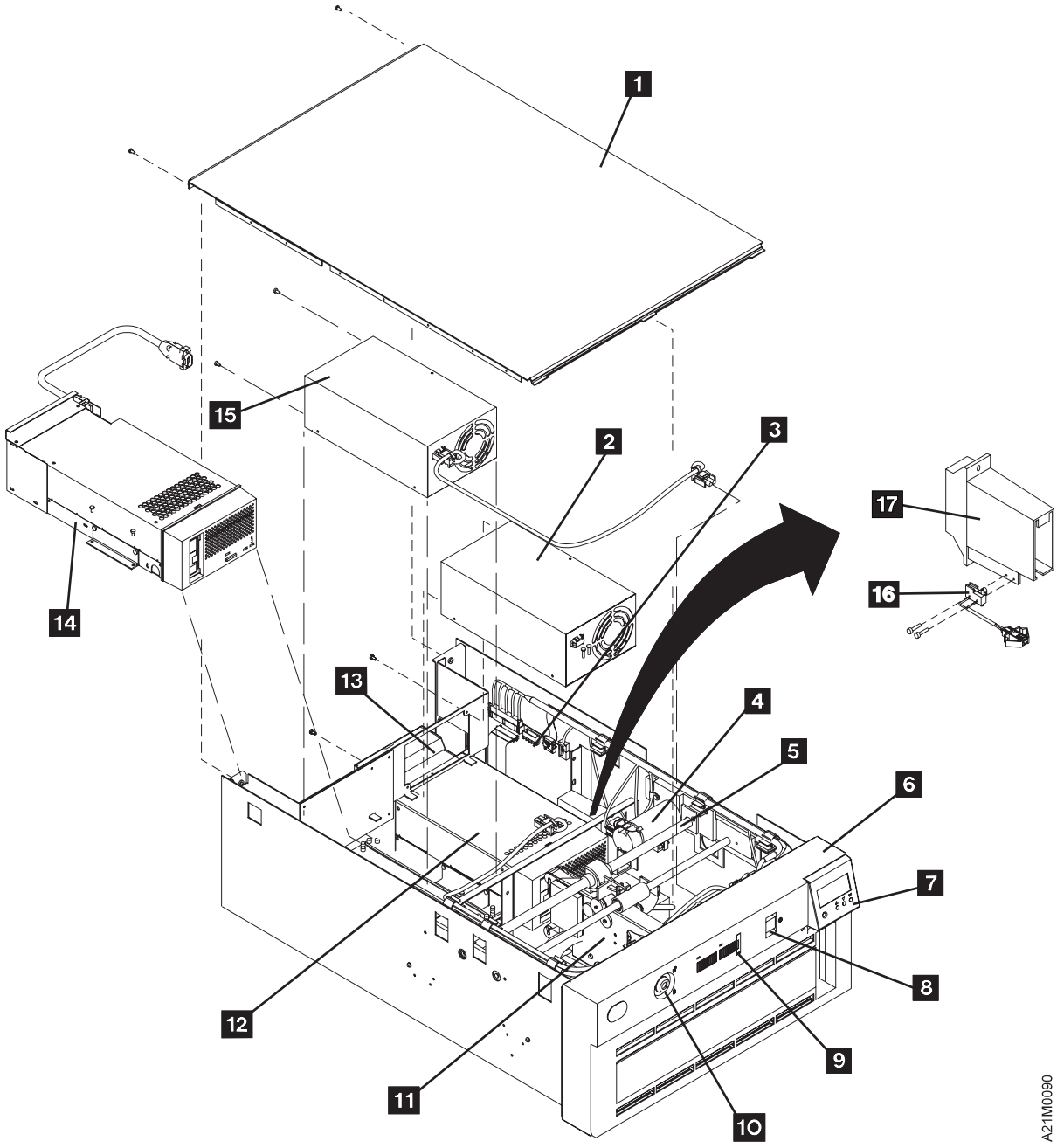
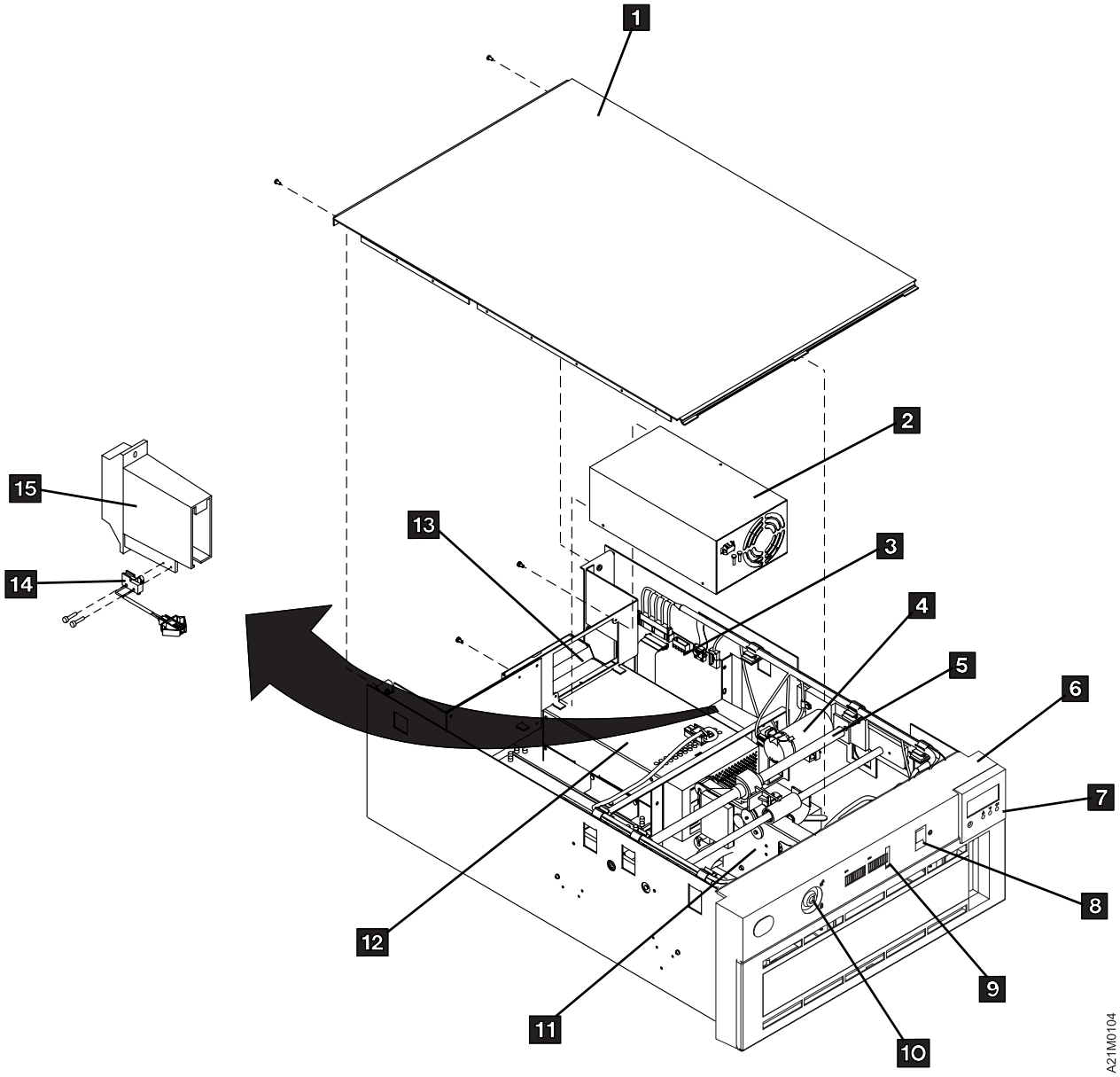


Figure 31. Model C12-Rack-Mounted Library Model



| *Figure 32. Model C21-Rack-Mounted Library Model*

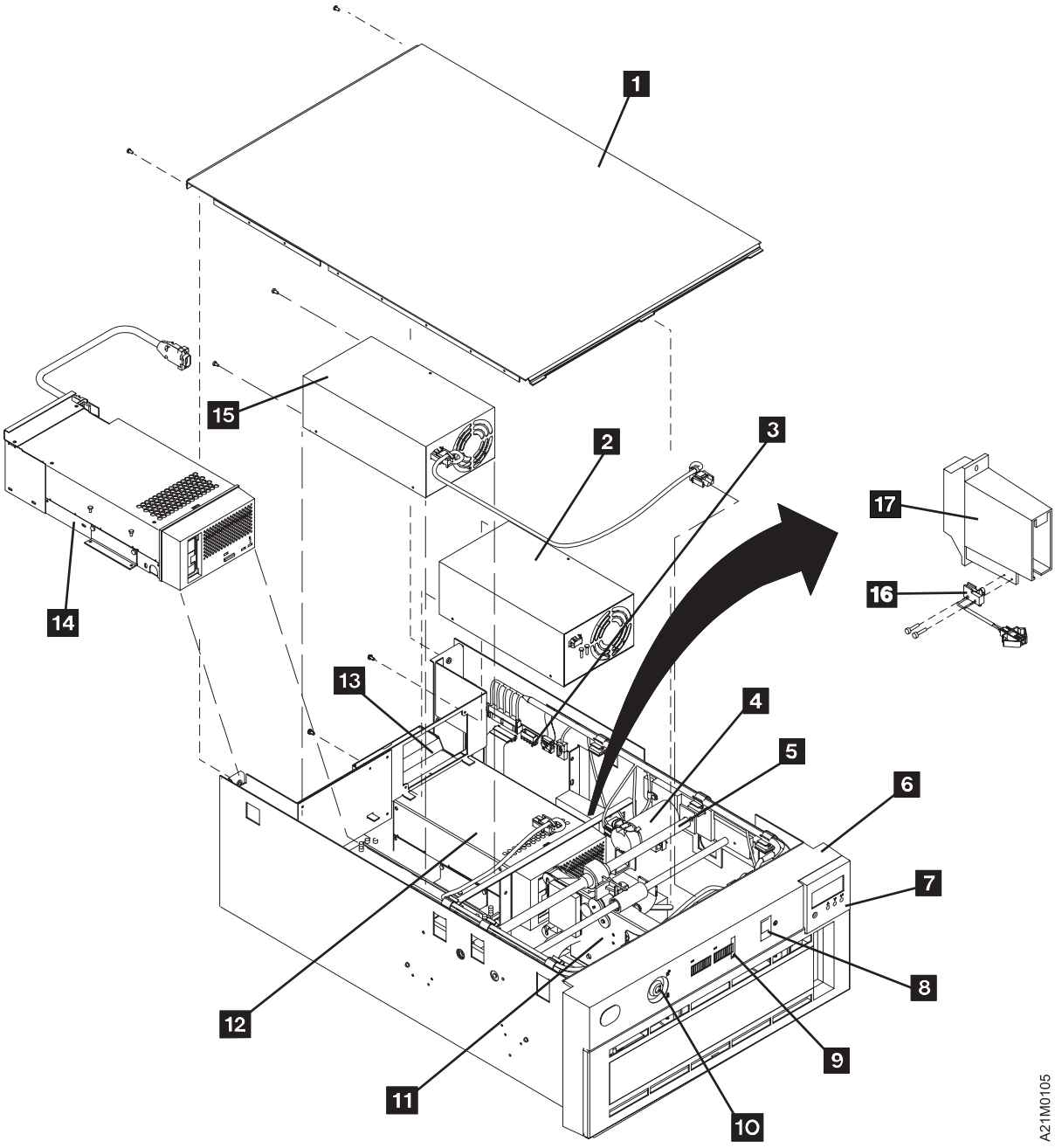


Figure 33. Model C22-Rack-Mounted Library Model

Figure 34. Library Components	
Component	**Key (Refer to Figure 31 on page INTRO-25)**
Top protective cover	1
Power supply (drive 1)	2
Library control card	3
Bar code reader	3 (card mounted on library control card)
Accessor motor assembly	4
Accessor assembly	5
Library front cover assembly	6
Library operator panel display	7
Library AC switch and cable assembly	8
Library LED card	9
Security key lock	1
Picker assembly	11
Bar code reader	11 (sensor mounted on picker assembly)
Drive pack (drive 1)	12
Cooling pack (drive 1)	13
Drive pack (drive 2)	14
Power supply (drive 2)	15
Cleaner cartridge-present sensor	16
Cleaner cell assembly	17
Library sensors and sensor cable	Not shown
Picker cable	Flat cable (not shown)
Library interface cable	Not shown.
Magazine global sensor pair	Not shown
Drive global sensor pair	Not shown
RS422 Drive-to-drive cable	Shown but not numbered (see rear of item 16).
Note: The Drive Pack, Power Supply and Cooling Pack for Drive 2 are found only in the Model C02 and C12.	

3570 Media and Cartridge

The 3570 Tape Subsystem uses a serpentine longitudinal recording technology called interleaved -longitudinal recording in a self enclosed tape cartridge. See Figure 35.

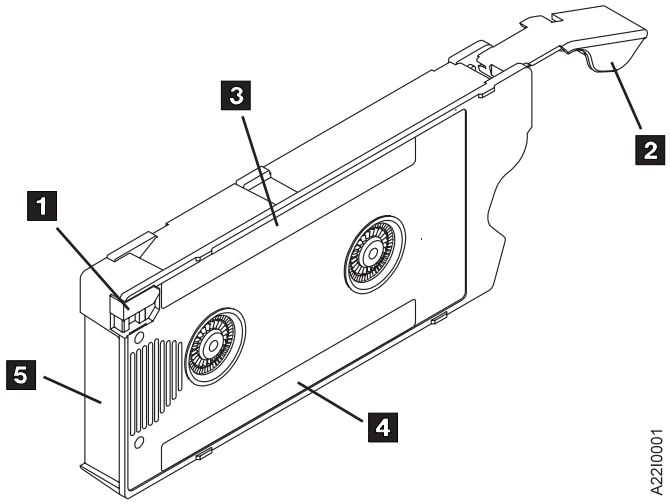


Figure 35. 3570 Fast Access Cartridge Data Tape

The automatic cartridge loader in the subsystem opens the cartridge door 2 and allows the cartridge to enter the tape path.

The cartridge remains closed during storage and handling to help protect the tape and tape path from external contaminants.

Each tape cartridge includes a file-protect selector, item 1 that, when placed in the upward position as indicated, prevents data from being written on or erased from the tape by a tape device.

Each data cartridge is identified by a factory-applied volume/serial (volser) number and a bar code. The volser and bar code appear on a label (see item 3 in Figure 35) along the edges of both the data and cleaning cartridges. Label, item 3 also has a small space in which the operator may write a note. A standard Bar Code Reader is provided to read the bar code labels.

Note: Do not write on, mark over, or otherwise obscure either of the bar codes on a cartridge; doing so may cause the system to malfunction.

Another label is placed on the cartridge along the bottom of the plastic face (see item 4 in Figure 35). It is marked IBM Magstar MP Fast Access Linear Tape (or IBM Magstar MP Cleaning Cartridge in the case of a cleaning cartridge).

User-supplied labels should not be affixed to the cartridge because they may interfere with the proper handling of the cartridge in either the drive or the library transport mechanism.

Label, item 5 is located on the end of the cartridge, opposite the cartridge door, and contains a bar code identical to the one located on the top label.

If a cartridge label needs to be replaced, a kit containing enough labels for 10 cartridges can be ordered. See “Replacing Cartridge Labels” on page PROC-23 for more information.

No labels are permitted on the back aluminum surface, narrow top or bottom surfaces, nor the flip-up door end of the cartridge.

A series of **hole location positions** are designed into the plastic casing below the file protect lever. Absence or presence of holes in these location positions are sensed by the 3570 drive to determine the type of cartridge that is being loaded. The data and cleaning tapes each have three holes open, but they are located at different location positions. The hole positions are numbered from **bottom to top**, the top being #4 which is closest to the file protect lever.

Figure 36 summarizes the IBM Magstar MP Fast Access Cartridge Tape 3570 parameters.

Figure 36. IBM Magstar MP Fast Access Cartridge Tape 3570 Cartridge Type

Cartridge Type	Hole Position #1 (bot)	Hole Position #2	Hole Position #3	Hole Position #4 (top)	Accent Color	Label Print Color
B-Format	Closed	Open	Open	Open	Blue	Blue
C-Format	Closed	Closed	Open	Open	Green	Green
Cleaner	Open	Open	Open	Closed	Gray	Gray
Not Used	Open	Open	Open	Open	—	—
Not Used	Closed	Closed	Closed	Closed	—	—
Reserved	All Other Combinations	—	—	—	—	—

3570 Cleaner Cartridge

The need for cleaning the tape head is due to the presence of various debris elements that can accumulate on the read/write head surface over usage.

The 3570 cleaner cartridge, identified by the bottom label, and by gray colored accents on the file protect selector, contains a media that, when passed over the tape head, acts to remove foreign particles attached to the head. The surface also acts to attract the removed particles.

Library Attachment for Models C01, C02, C11, C12, C21 and C22

Devices with a 20-cartridge library attachment create an automation subsystem library capable of either random access of volumes for tape processing applications or sequential access of volumes for backup, restore, and scratch volume operations. See *IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models,* GA32-0393 for location and functional description of the library.

The operating mode of the library can be selected by a SCSI command from the initiator or can be selected manually at the operator panel.

See Figure 37. The 20 cartridges for the library models are packaged 10 per magazine. Magazine 1, item 3 can contain 10 cartridges. Two of these magazines can be loaded into the subsystem at a time. The magazine is designed to provide for retention of cartridges in each of the 10 storage cells in two possible physical positions, the *Import* position or the *Export* position. See *IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models,* GA32-0393 for a detailed description of magazine functions.

Library models have a priority cell that can be used to load or unload cartridges from the subsystem without removing the cartridge magazine. To use this feature, the last cartridge cell, item 2 in magazine 1 must be unused, that is, magazine 1, item 3 can contain only 9 cartridges (the right-most cell of magazine 1 must be empty). Magazine 1 must always be present to use the priority cell. Magazine 2, item 4 may contain up to 10 cartridges.

The operator panel, item 1 has a display and push buttons for operating the subsystem.

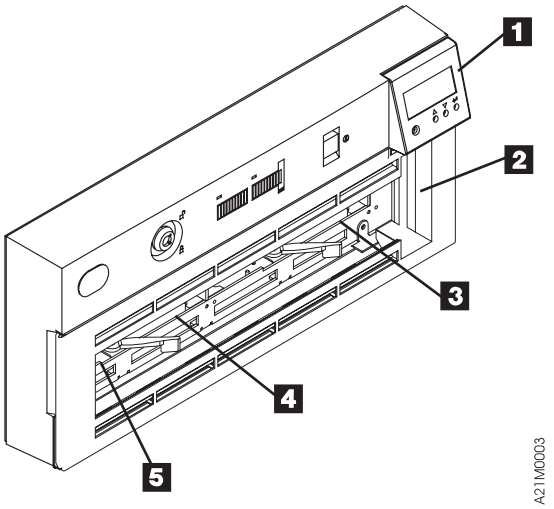


Figure 37. Magazine and Cartridge Locations, Models C01, C02, C11 and C12

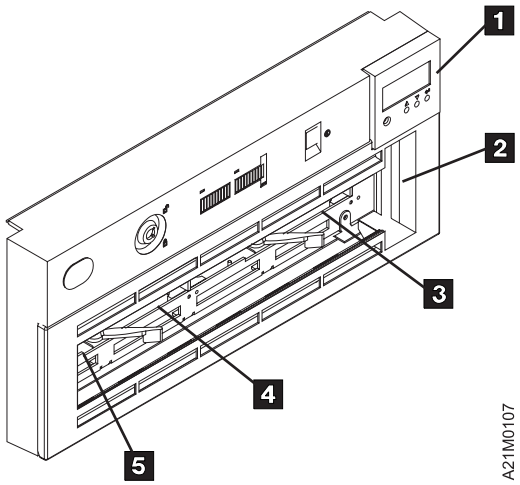


Figure 38. Magazine and Cartridge Locations, Models C21 and C22

Library Magazine

See Figure 39 on page INTRO-33. The library can hold two 10-cartridge magazines, item 1 . The magazine has two positions for each cartridge.

The cartridges are retained in either the import 2 or the export 3 position. The figure shows five cartridges in each position. This different positioning allows the operator to quickly see which and how many cartridges have been processed by the host system.

Import Position: The operator puts the cartridge to the fully inserted position, which is flush with the edge of the magazine. In this position, the library transport has easy access to the cartridge, while the operator would have difficulty removing the cartridge.

Export Position: The library puts the cartridge in this position so that the cartridge is partially exposed to where the operator can remove these *processed* cartridges.

Note: In random mode, the library returns the cartridge to the import position for future re-use, unless the initiator has asked for the cartridge to be exported from the magazine, in which case the cartridge is placed in the export position in the priority cell.

Each magazine has a cartridge lock that is automatically unlocked when the magazine is secured in the library, thus making the cartridges easily accessible to both the operator and the transport. A thumb-operated slide mechanism allows the operator to temporarily unlock the magazine for cartridge removal and refilling. When the slide is released, the magazine automatically locks.

For random mode operation, magazine 1 (see Figure 37 on page INTRO-31) must be present to allow access to the priority cell. Requests for specific cartridges to be mounted can only be satisfied when magazine 1 is present in the library.

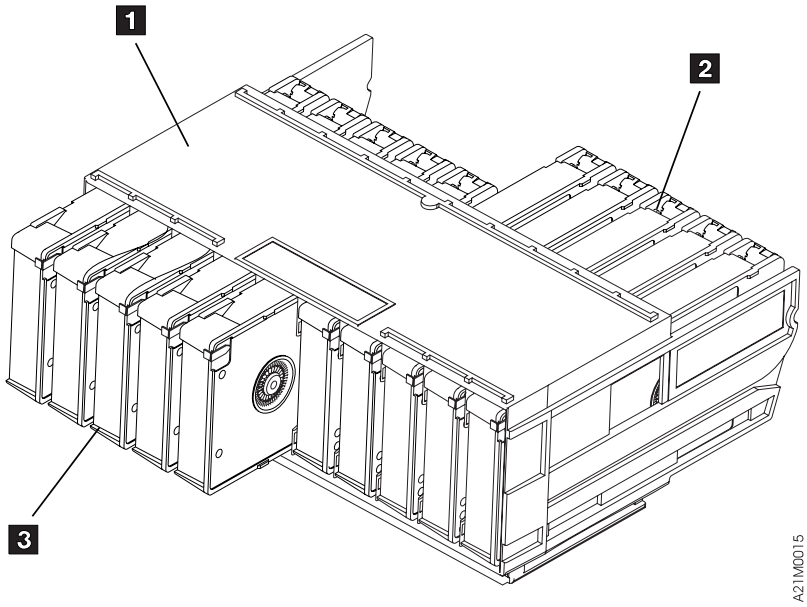


Figure 39. 3570 Cartridge Magazine

Library Modes

The library is set to either automatic, random or manual mode. For an explanation of each, see the LIBRARY section.

Library Configuration

The library is set to either base configuration or split configuration. For an explanation of each, see the LIBRARY section.

System Attachment

SCSI Addressing

The SCSI unit address is set during installation. See the INST section.

SCSI Interface and Cable

A differential SCSI interface is offered. The SCSI interface cable connector is a 68 pin P-cable connector. When configured for SCSI, the 3570 subsystems are configured with one SCSI adapter.

The 3570 SCSI system adapter is a 2-byte wide SCSI fast interface. It uses a SCSI-3 68-pin P connector interface that accommodates 16 bus addresses.

SCSI Features and Cables

The following section describes the feature codes for the RISC System/6000 and AS/400 systems (see Figure 40, Figure 41, Figure 42, and Figure 43).

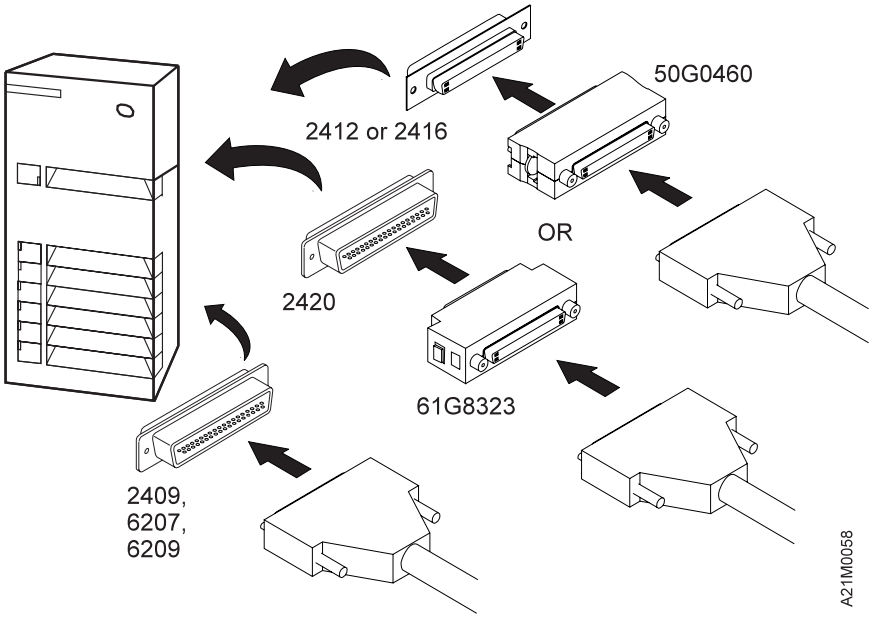


Figure 40. SCSI System Cable Attachment at the RS/6000 Host (Initiator)

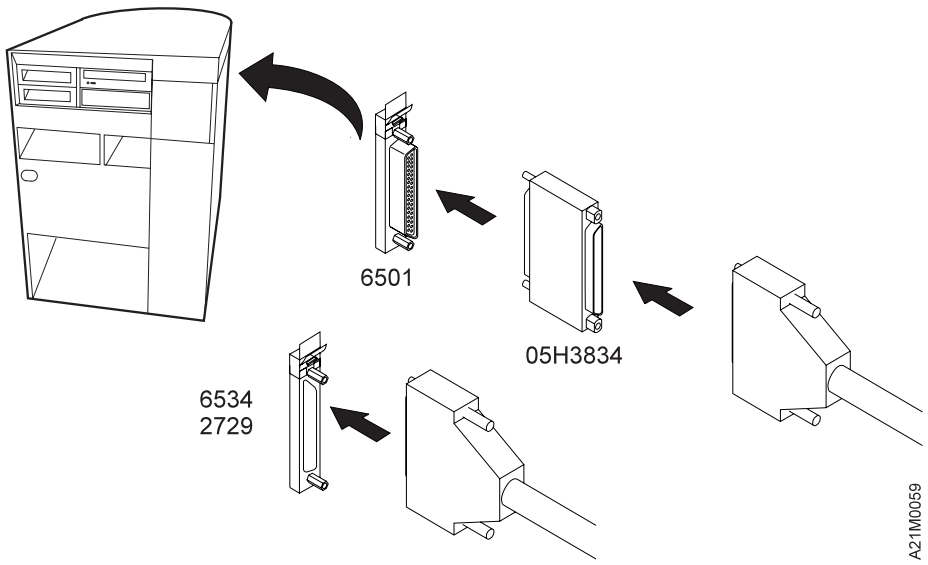


Figure 41. SCSI System Cable Attachment at the AS/400 Host (Initiator)

Notes:

1. For RISC System/6000, use the host-provided SCSI connectors at the host end to provide the daisy chain for multi-device applications.
2. For dual drive models set up in the Base Configuration, use the supplied SCSI Bus Jumper to connect drive 1 to drive 2; select a single SCSI cable feature and a single interposer feature to attach the 3570 to one SCSI bus.
3. For dual drive models set up in the Split Configuration, discard the supplied SCSI Bus Jumper and select 2 SCSI cable features and 2 interposer features for attachment of the 3570 to two SCSI busses.

Figure 42. RISC System/6000, AS/400 and Netfinity Server Interposers

Host	Host Connection (Feature Codes Are for the Host)	Interposer P/N and Feature Code (Feature Codes Are for Magstar MP)
RS/6000	PCI SCSI-2 Differential Fast/Wide Adapter (FC 2409, identifier 4-B)	None required
RS/6000	PCI SCSI-2 Differential Fast/Wide Adapter (FC 6207, identifier 4-L)	None required
RS/6000	PCI SCSI-2 Fast/Wide Differential Adapter (FC 6209, identifier 4-B)	None required
RS/6000	SCSI-2 Differential Fast/Wide Adapter/A (FC 2416, identifier 4-6)	50G0460 (FC 2892)
RS/6000	Enhanced SCSI-2 Differential Fast/Wide Adapter/A (FC 2412, identifier 4-C)	50G0460 (FC 2892)
RS/6000	SCSI-2 Differential Fast/Narrow High-Performance External I/O Controller (FC 2420, identifier 4-2)	61G8323 (FC 2891)
AS/400	Magnetic Media Subsystem Controller (FC 6501)	05H3834 (FC 2895)
AS/400	Magnetic Media Subsystem Controller (FC 6534)	None Required
AS/400	Magnetic Media Subsystem Controller (FC 2729)	None Required
PC/Netfinity		None Required

Figure 43. Magstar MP SCSI Cable Feature Codes

Feature Code (for Magstar MP)	IBM Part Number	Cable Length
FC 5205	P/N 49G6456	0.5 m (2 ft)
FC 5212	P/N 49G6458	12 m (39 ft)
FC 5218	P/N 49G6459	18 m (59 ft)
FC 5225	P/N 08L6239	25 m (81 ft)
FC 5245	P/N 49G6457	4.5 m (15 ft)
PC/Netfinity Attachment	P/N 05H9527 (Models C21 and C22)	0.5 m (2 ft)
PC/Netfinity Attachment	P/N 05H9651 (Models C21 and C22)	4.5 m (15 ft)

Notes:

1. On RS/6000 systems, cable lengths greater than 18 m (59 ft) are not permitted with feature code 2420. Cable lengths up to 25 m (81 ft) can be used with feature code 2409, 2412, or 2416.
2. On AS/400 systems, cable lengths up to 25 m (81 ft) can be used with feature code 6501.

RISC System/6000 Controller Feature 2409 or 6209: Any combination of initiators and targets up to a total of 16 is allowed if:

The SCSI bus is terminated properly at each end.

Cable restrictions are followed according to SCSI-2 specification. With RISC System/6000 SCSI controller feature code 2409 or 6209, the maximum cable length is 25 m (81 ft). Figure 43 lists the available cables used to attach the Magstar MP Tape Subsystem to a RISC System/6000 system.

Multiple RISC System/6000 systems may be linked to the Magstar MP Tape Subsystem. For maximum performance, the Magstar MP Tape Subsystem may need to be the only target on the SCSI bus.

RISC System/6000 Controller Feature 2412 or 2416: An interposer, feature code 2892 (see Figure 42), is required to attach the Magstar MP Tape Subsystem to RISC System/6000 controller feature 2412 or 2416. Any combination of initiators and targets up to a total of 16 is allowed if:

The SCSI bus is terminated properly at each end.

Cable restrictions are followed according to SCSI-2 specification. With RISC System/6000 SCSI controller feature code 2412 or 2416, the maximum cable length is 25 m (81 ft). Figure 43 lists available cables used to attach the Magstar MP Tape Subsystem to RISC System/6000.

Multiple RISC System/6000 systems may be linked to the Magstar MP Tape Subsystem. For maximum performance, the Magstar MP Tape Subsystem may need to be the only target on the SCSI bus.

RISC System/6000 Controller Feature 2420: A 1-byte to 2-byte interposer, feature code 2891 (see Figure 42), is required to attach the Magstar MP Tape Subsystem to RISC System/6000 controller or RS/6000 SP feature 2420. If feature 2420 is used, the Magstar MP must be attached at the end of the SCSI bus. Any combination of initiators and targets up to a total of eight is allowed if:

A Magstar MP is the last device on the SCSI bus.

The SCSI bus is properly terminated at each end.

Cable restrictions are followed according to RISC/6000 requirements. With SCSI controller feature 2420, the maximum cable length is 18 m (59 ft). Figure 43 lists the available cables used to attach the Magstar MP Tape Subsystem to RISC System/6000.

Multiple RISC System/6000 systems may be linked to the Magstar MP Tape Subsystem. For maximum performance, the Magstar MP Tape Subsystem may need to be the only target on the SCSI bus.

AS/400 System Feature 6501, 6534, or 2729: An interposer, feature code 2895 (see Figure 42), is required to connect the Magstar MP 3570 Tape Subsystem to system feature 6501. No interposers are required to connect the Magstar MP 3570 Tape Subsystem to system feature 6534 or 2729.

The following condition applies to AS/400 9404 and 9406 SCSI bus attachment of system features to the Magstar MP Tape Subsystem:

Feature code 6534 and 2729 each provide one port.

Feature code 6501 provides two ports.

Each port can support one Magstar MP Tape Subsystem. Therefore, two subsystems may be attached.

No other devices can be supported on a feature 2729, 6501, or 6534 port with the Magstar MP Tape Subsystem attached.

An AS/400 system cannot be interconnected with any other system (including another AS/400) on the same SCSI bus. See “Connecting the 3570 to Multiple Systems” on page INTRO-39.

When the subsystem is attached to AS/400 with features 6501, 6534, or 2729, one of the SCSI addresses on the Magstar MP must be set to 0 if the 3570 is to be used as an alternate IPL device.

Figure 43 lists the available cables of the proper length for attaching the Magstar MP Tape Subsystem to AS/400 with feature code 6501, 6534 or 2729.

Hewlett Packard: Requires 9000 Series servers running HP-UX 10.01, 10.10 or 10.20. Other servers that support HP Precision Bus (HP-PB) fast/wide (F/W) Differential Adapter 28696A, with firmware revision 3543 or higher.

Windows NT: Requires Microsoft Windows NT version 4.0 with service pack 3 or greater on an Intel processor. Intel processors require an Adaptec 2944 fast/wide SCSI adapter, or equivalent.

Sun Solaris: Requires Solaris 2.3, 2.4, 2.51, and 2.6 for Sun and Sun Sparc. Requires SCSI-2 fast/wide differential adapter.

Connecting the 3570 to Multiple Systems

AS/400

| **Note:** For dual drive models, the SCSI addresses of each drive **must be different** if connected to the same host. The only time the drives can have the same SCSI address is when the drives are connected to different host initiators.

An AS/400 system cannot be interconnected with any other system (including another AS/400) on the same SCSI bus. Therefore, a Model C02 or C12 in a Split Configuration is the only 3570 Tape Subsystem that can be attached to an AS/400 system and another system at the same time (on separate SCSI busses).

RS/6000: Multiple RS/6000 systems may be attached to a 3570 Tape Subsystem.

Drive Indicators and Operator Controls

Model C00 Drive has an operator panel that has three LED indicators, one push button and a Power On/Off switch. See Figure 44 on page INTRO-40. See *IBM Magstar MP 3570 Tape Subsystem Operator's Guide, C-Series Models,* GA32-0393 for location and functional description of operator controls and indicators. These elements are:

1 Power On/Off Switch

This switch is connected to the ac/dc power supply by a cable. The switch removes dc power from the output of the power supply.

Note: With the switch in the Off position, ac voltage is still available at, and inside the device power supply.

2 Busy Indicator

This green LED provides a visual indication of tape motion and will turn ON solid when tape is in motion for reading, writing, loading, and locating. This indicator flashes when the operator presses the Unload button to rewind/unload tape.

This indicator is also used in conjunction with the other two LED indicators to display maintenance conditions (see "Drive Indicators—Normal Operation for Drive-Only Model C00" on page START-10).

3 Unload Push Button

This push button allows the operator/CE to cause a loaded cartridge to be rewound to load point and unloaded from the drive. Pressing the Unload push button causes the Busy indicator to flash while the tape is rewinding. The Busy indicator turns off when the cartridge is unloaded.

This switch is also used in the maintenance procedure to select and execute the functional Read/Write diagnostic. See "Verify Fix" on page PROC-7 for diagnostic selection procedures.

4 Clean Indicator

This yellow LED is used to indicate to the operator that cleaning is required. When used for this purpose, the indicator will flash while the Busy and Maintenance indicators are off. A special cleaning cartridge is inserted to clean the tape head.

This indicator is also used with the other two indicators to display maintenance information to the operator or CE. See "Drive Indicators—Normal Operation for Drive-Only Model C00" on page START-10 for the other uses of this indicator.

5 Maintenance Indicator

The right-most of the three LEDs is a yellow indicator that is labeled by a symbol that looks like a wrench. This LED provides a visual indication that the device needs service or is running diagnostics.

This LED turns ON solid for a short time during power-on reset as a lamp test, then changes to flashing until the power-on self-tests have completed.

The Maintenance indicator is also used to show the subsystem's response to an off-line request from the operator/CE to execute the functional Read/Write diagnostic. This LED also flashes any time the device is busy running the functional Read/Write diagnostic with a scratch cartridge loaded. See "Verify Fix" on page PROC-7 for the Read/Write diagnostic selection procedure.

Another use of this LED is in conjunction with the Busy and Clean indicators to display additional maintenance information to the operator or CE. See "Drive Indicators—Normal Operation for Drive-Only Model C00" on page START-10 for the other uses of the Maintenance indicator.

Last, this indicator will flash, along with the Busy and Clean LEDs, when the device detects a problem that requires a service call for resolution. Also, if, during the power-on sequence, this LED does not flash or does not turn OFF but remains ON solid, the device needs service.

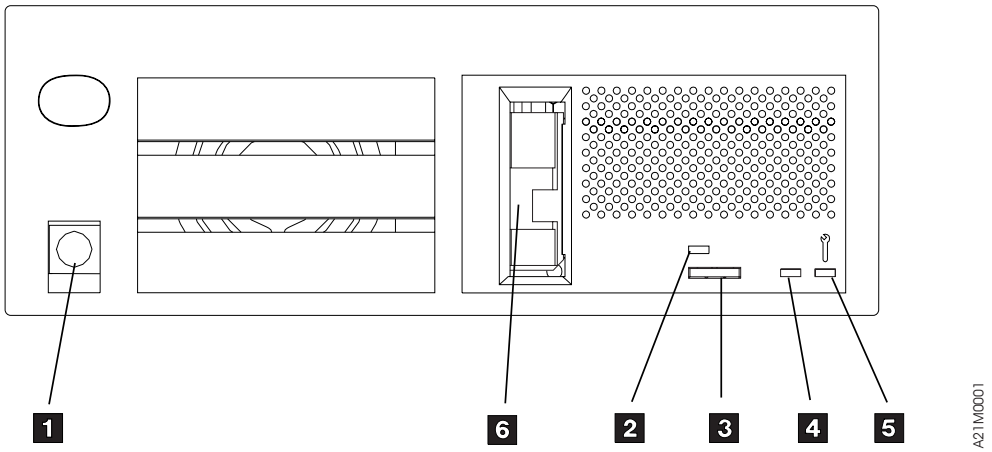


Figure 44. Model C00 Drive Operator Controls

Note: There is no indicator on the Model C00 to indicate when a cartridge is loaded and ready for reading and writing. As a cartridge is loaded in the drive, the BUSY indicator will momentarily light while the drive is locating to the load point on the tape. The drive is ready for reading and writing when the indicator goes out after loading the tape.

Library Operator Panel

Library models have an operator panel that has four push buttons and a LCD display located in the upper right-hand corner of the library when the subsystem is in a horizontal position. See item 1 in Figure 46 on page INTRO-43 and item 1 in Figure 45 on page INTRO-41. The library operator panel display is the interface for all operator and CE functions that are available in the library models of the 3570 Tape Subsystem. See "Operator Panel" on page PANEL-1 for details of the operator panel operations, LED indicators, and messages displayed. A brief description of the operator panel control switches and LED indicators follows. The key lock and library door are also briefly described.

Notes:

1. Figure 45 on page INTRO-41 shows the library operator panel display and its controls. The operator panel consists of a library operator panel display, operator panel LED indicators, a Power On/Off push button, and a key lock. These and additional components of the front cover assembly are discussed in more detail later in this chapter.
2. The operator panel display for the library versions of the 3570 comes in two shapes. Models C01, C02, C11 and C12 have a display that has a sloping face to reduce glare. The Model C21 and C22 has a display with a flat face. Except for the shape and part number, they are identical.

Operator Panel Controls and Indicators: The operator panel on library models provides a menu-driven operator and service display interface. It is the primary means of communication to the operator and service representative on library machines. Refer to Figure 45.

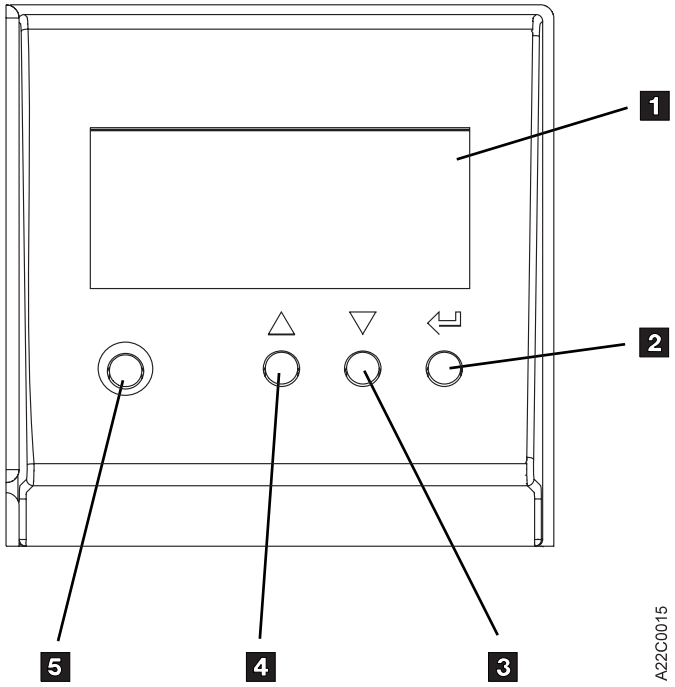


Figure 45. Operator Panel Display for Library Models

The operator panel has the following display and menu control switches:

Library operator panel display, item 1
Enter push button, item 2
Scroll Down push button, item 3
Scroll Up push button, item 4
Mode push button, item 5

Each is further defined below. Refer to Figure 45 for the locations of the operator panel display and switches.

Item 1 Library operator panel display***:*** The library operator panel display has the following attributes:

Four lines by sixteen characters
58.2 mm (2.3 in.) wide by 25.2 mm (1 in.) high

The library operator panel display provides the primary feedback to the operator and service representative for most library activities.

Item 2 Enter Push Button***:*** The Enter push button is marked by a backward arrow

icon symbolizing the **Enter** key as used on some keyboards. Pressing this push button causes the device to select the option or to perform the function indicated.

Item 3 Scroll Down Push Button***:*** The Scroll Down push button is marked with a down arrow head icon. Pressing this push button causes the selection arrow **>** to move down to the next option on the menu if any additional options are *below* the currently-indicated option. If additional menu items are below the last item on the menu, a + is indicated in the lower right-hand corner of the display.

Item 4 Scroll Up Push Button***:*** The Scroll Up push button is marked with an up arrow head icon. Pressing this push button causes the selection arrow **>** to move up to the next option on the menu if any additional options are *above* the currently-indicated option. When additional menu items are above the top item on the menu, a + is indicated in the upper right-hand corner of the display. If no additional options are above the highest displayed option, pressing the push button does not affect operations.

Item 5 Mode Push Button***:*** The Mode push button is used for selecting either CE mode or operator mode. At power-on, the device is always in operator mode. CE mode may be selected at any time, but the 3570 will not allow a mode change until the operation in progress is completed. Operator mode can be selected at any time. The Change Mode push button should only be used by qualified service representatives. This push button should not be used during normal operations.

Note: While the 3570 is in CE mode, the subsystem is off-line to the host and unavailable for read and write operations.

Front Panel Overview

Figure 46 shows the front assembly for Models C01, C02, C11 and C12, and Figure 47 on page INTRO-44 shows the front assembly for Models C21 and C22.

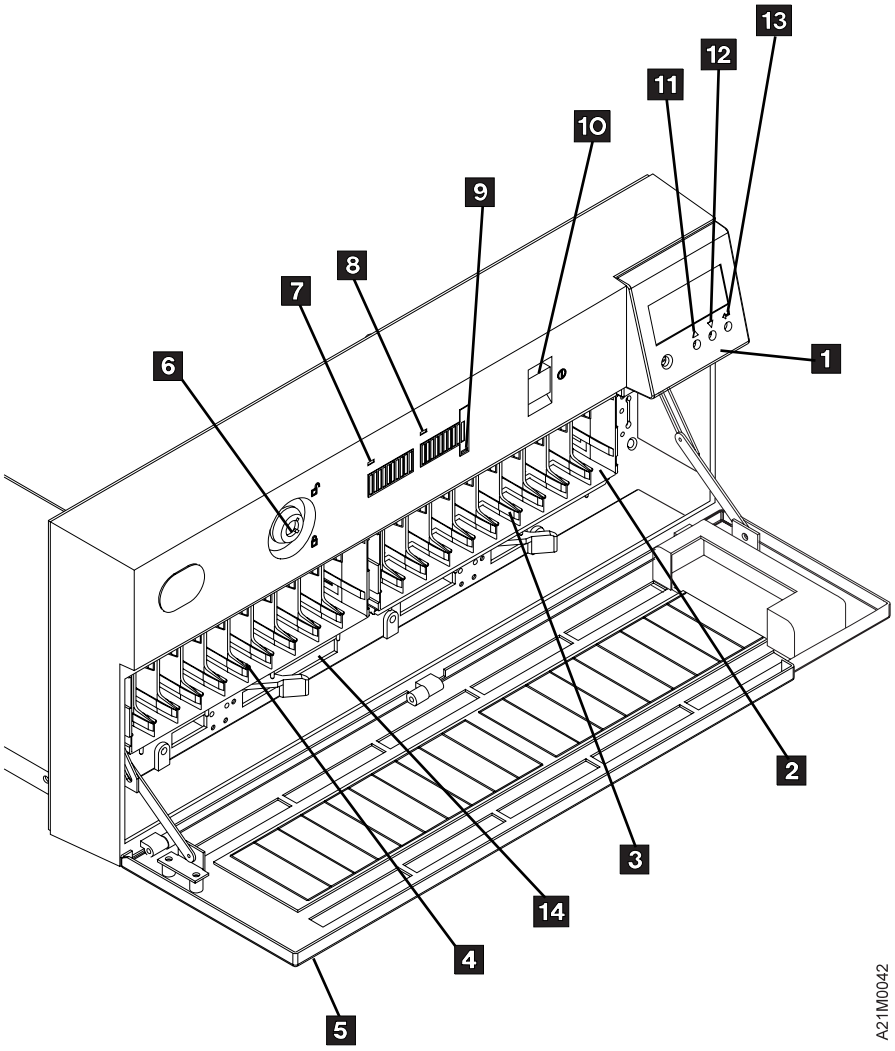


Figure 46. Front Assembly for Model C01, C02, C11, and C12

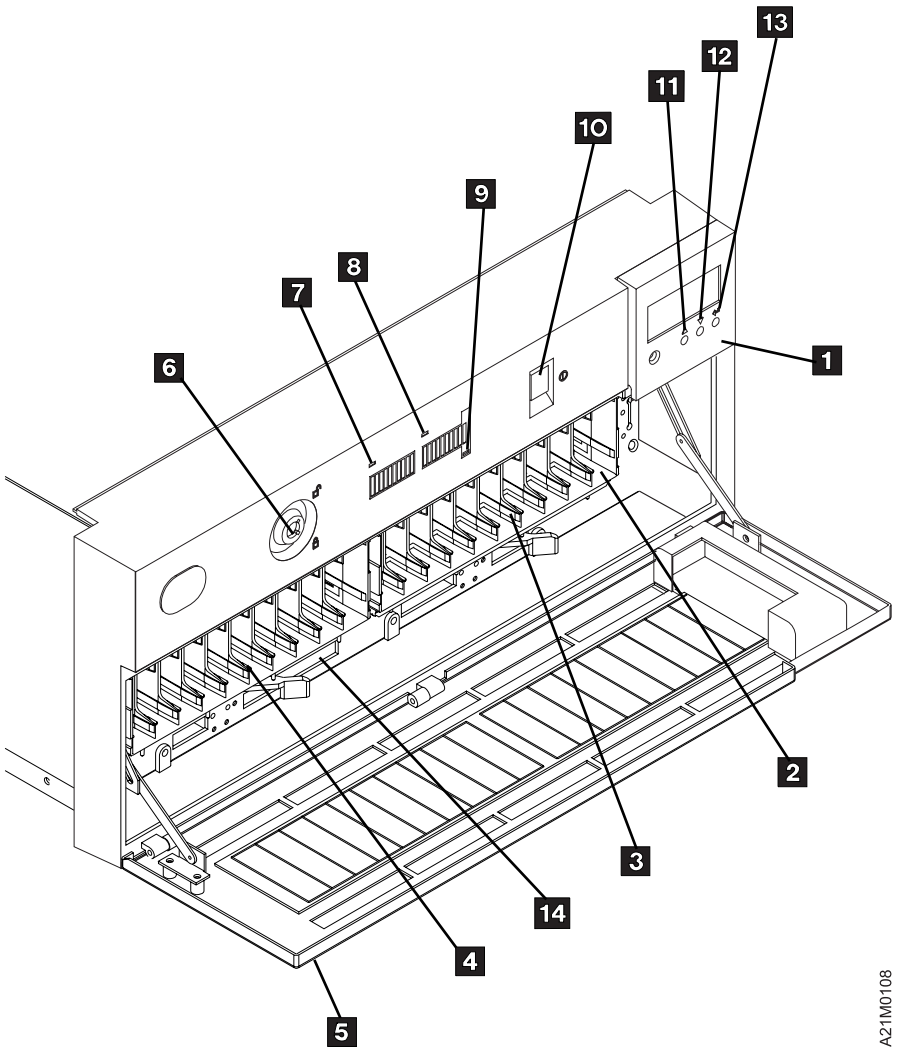


Figure 47. Front Assembly for Model C21 and C22

1 **Operator Panel Display**

See “Operator Panel Overview” on page PANEL-3 for a description of the operator panel.

2 **Priority Cell**

| Models C01, C02, C11, C12, C21 and C22 have a priority cell that can be used to load or unload cartridges from the subsystem without removing the cartridge magazine. Because cartridges can be inserted without opening the door, the integrity of the tape inventory is not violated. To use this feature, magazine 1 must be present and the rightmost cartridge cell must be unused.

Its functions are as follows:

When in automatic or manual mode, requests to mount an external cartridge can be satisfied by placing the specified cartridge into the priority cell in the import position and pressing START. The cartridge in the priority cell will be the next one loaded into the drive. When the drive has unloaded the cartridge, it will be returned to the priority cell in the export position.

When in random mode, the priority cell acts as an import/export station for the automated library. Because cartridges can be inserted into the priority cell without opening the door, additions or removals can be made to the cartridge inventory under control of the host (initiator) without opening the door and violating the integrity of the inventory.

Note: When using the priority cell, the cartridge must be placed in the import position.

3 **Magazine 1 Location**

4 **Magazine 2 Location**

5 **Door**

The door protects the integrity of the inventory in the library units. As long as the door remains closed, the host knows that the magazine inventory remains unchanged. If the door is opened, the host (initiator) is alerted that the inventory may have changed. The door also acts as a safety interlock. When the door is opened, the transport mechanism will complete any movement in progress and stop. The transport mechanism will not move until the door is closed. The library will restart when the door is closed without any further intervention by the operator.

Note: Be careful, when opening the library door, to **not** move cartridges from the export position back to the import position.

6 **Security Key Lock**

The security key lock locks the door closed. The Security Key lock on the library helps maintain security for cartridges in the library unit. It is a physical lock only, and is not sensed or controlled by the initiator or device. When locked, the only way to add or remove cartridges to or from the library units is through the priority cell.

7 **Magazine 2 In Use Indicator**

The yellow LED indicates the status of Magazine 2. When it is on, the operator should not add or remove cartridges to or from that magazine and should not remove that magazine from the library unit. The Magazine In Use LED is on when a cartridge from the magazine has been transported to the drive for processing, or when the library unit is in random mode and the initiator has issued the Prevent/Allow Medium Removal command with the prevent bit set.

The LED also turns ON solid momentarily during power-on reset as a lamp test, and it flashes during power-on diagnostics.

8 **Magazine 1 In Use Indicator**

This yellow LED indicates the status of Magazine 1 and operates the same as indicator 7 .

9 **Priority Cell In Use Indicator**

This yellow LED indicates the status of the priority cell. When the LED is on, a cartridge is in the priority cell or the priority cell is reserved for the cartridge currently being processed in the drive. When the LED is on, the operator should not place a cartridge in the priority cell or remove a cartridge from the priority cell. When the LED is not on, the operator can place a cartridge in the priority cell for processing or can remove a cartridge from the priority cell. The indicator is visible with the door open or closed.

This LED turns ON solid momentarily during the power-on reset as a lamp test, and flashes during the power-on diagnostics. After completion of the power-on sequence, this LED is turned OFF until it is turned ON by activity that involves the priority cell.

1 **Power On/Off Switch**

This switch is connected to the dc power supply by a cable. The switch removes dc power from the output of the power supply. There is no LED to indicate a power-on condition of the library units. The power is on when the operator panel is active.

Note: With the switch in the Off position, ac voltage is still available inside the subsystem power supply.

11 **Scroll Up Button**

12 **Scroll Down Button**

13 **Enter Button**

14 **Serial number (above lever opening)**

Subsystem Initialization

Subsystem initialization includes power sequencing, initial microprogram load (IML), and subsystem diagnostics.

Initial Microprogram Load: During an initial microprogram load (IML), a microcode image that permits the subsystem to become functional is loaded into the subsystem RAM.

When the subsystem is powered on, the unit attempts to perform an IML from flash EPROMs.

Power Sequencing: When power is applied, internal logic of the integrated control unit checks the voltages. When all the voltages have tested correctly, the power-on self-test (POST) is executed at power-on time by the RAS microcode. If the voltage is out-of-spec, the subsystem logic is held in the reset state. Errors detected during the power-on sequence are displayed in the LED indicators on the drive and on the Library operator panel if installed.

Subsystem Diagnostics

Subsystem Diagnostics are divided into two categories:

Power-on self-test (POST)

Functional Tests

POST Diagnostics: POST diagnostics are initiated at power-on time. They are a combination of built-in self-tests of logic modules, memory tests, control logic, sensor tests and data path tests. A portion of the POST diagnostics is also executed when a fix-verification test is invoked from the host processor via a SCSI command.

Errors detected during execution of POST are displayed as a FRU identifier code (FID) in the drive LED indicators and on the operator message panel of Library models. The error information is also sent in a service information message (SIM) over the SCSI interface if the customer application supports the SIM feature. The FID can be cross referenced to the entry table in Figure 8 on page START-12.

Functional Tests: The functional-test diagnostics verify that the machine performs without errors. They can be invoked at any time either to verify a fix or to exercise the subsystem. These diagnostics may be invoked from the host via a SCSI command or from the drive operator controls or the operator panel on the library. See “Verify Fix” on page PROC-7 for detailed descriptions of test selections.

Special RAS Characteristics: The special RAS characteristics include:

Real-time diagnostics

Real-time failure isolation

Hardware/media isolation

On-line microcode update

Also, the subsystem design permits:

Complete self-testing whenever the subsystem is powered on.

Operator notification whenever a failure is detected.

Special Tools: Special tools are either shipped, purchased, or ordered to repair the subsystem. See “Cleaning Cartridge” on page INTRO-47 and Figure 48 on page INTRO-47 for examples of special tools.

Cleaning Cartridge: A special cleaning cartridge is part of the 3570 subsystem. This tool (P/N 05H2463) is used to clean the tape head. It is shipped with the subsystem. The cleaning cartridge is identified by a gray file protect selector. The need for cleaning is determined by the microcode in the 3570 Tape Subsystem.

Model C00 Drive: If the operator does not have ready visibility of host console messages when cleaning is required, the Clean LED indicator (see Figure 44 on page INTRO-40) will also flash to indicate that cleaning is required. The operator will load the cleaning cartridge on the drive and the cleaning procedure occurs automatically. The cartridge unloads when the cleaning procedure is done.

Library Models: In the library configuration of the 3570 Tape Subsystem, the cleaning cartridge has a special storage location inside of the subsystem enclosure. This allows the cleaning cartridge to be automatically loaded when cleaning is required. At the completion of the cleaning operation, the cleaning cartridge is automatically returned to its storage cell. Cleaning can also be invoked for immediate action by an operator request through the operator panel.

ESD Kit

The ESD kit (P/N is available in *General CE Tools Reference Summary*, 5131-0075) is used to prevent damage when you work with electrostatic discharge (ESD) sensitive parts. See “Working with Electrostatic Discharge (ESD) Parts” on page PROC-3 for information on using the ESD grounding wrist strap and mat. **This tool (Figure 48) is not shipped with the subsystem and must be ordered.**

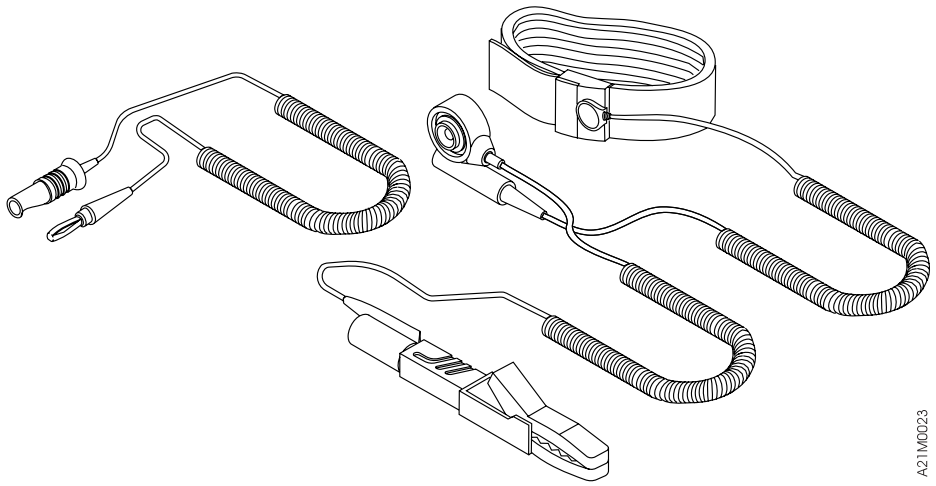


Figure 48. ESD Grounding Strap

Library

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Library Description

The library models have, in addition to the drive units, a random access cartridge loader (library) which can load and unload tape cartridges from up to 20 magazine positions into the device drives, under control of the host system. Models with 1 drive may only operate in Base Configuration. Models with 2 drives may operate in Base Configuration or Split Configuration, as selected in the operator menus. The library can run in Automatic, Random, or Manual Mode and provides enhanced operator and CE communications with a library operator panel display that can present plain language messages to the operator and CE. This library operator panel display also provides a means to input operator or CE commands into the library device.

Library Attachment for Library Models

Devices with a 20-cartridge library attachment create an automation subsystem library capable of either random access of volumes for tape processing applications or sequential access of volumes for backup, restore, and scratch volume operations. See *IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models,* GA32-0393 for location and functional description of the library.

The operating mode of the library can be selected manually at the operator panel.

See Figure 49 and Figure 50 on page LIBRARY-3. The 20 cartridges for the library models are packaged 10 per magazine. Magazine 2 4 can contain 10 cartridges. Two of these magazines can be loaded into the subsystem at a time. The magazine is designed to provide retention of cartridges in each of the 10 storage cells in two possible physical positions, the *Import* position or the *Export* position. See *IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models,* GA32-0393 for a detailed description of magazine functions.

Library models have a priority cell that can be used to load or unload cartridges from the subsystem without removing the cartridge magazine. To use this feature, the last cartridge cell in magazine 1 2 must be unused, that is, magazine 1 3 can contain only 9 cartridges (the right-most cell of magazine 1 must be empty). Magazine 1 must always be present to use the priority cell.

The operator panel 1 has a display and push buttons for operating the subsystem.

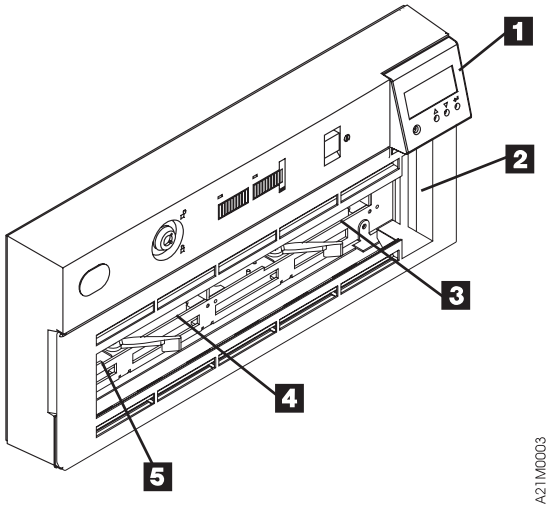


Figure 49. Magazine and Cartridge Locations, Models C01, C02, C11 and C12

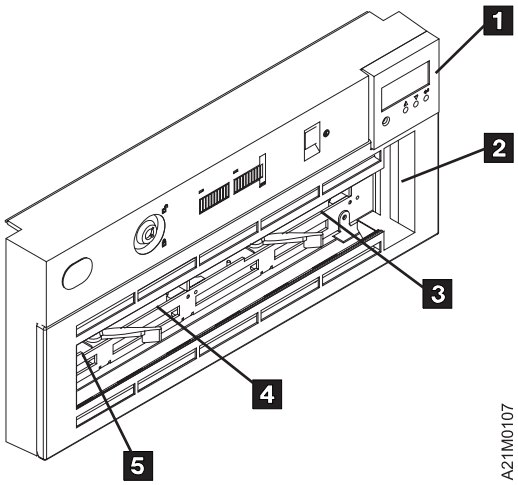


Figure 50. Magazine and Cartridge Locations, Models C21 and C22

Library Magazine

See Figure 51 on page LIBRARY-4. The library can hold two 10-cartridge magazines 1 . The magazine has two positions for each cartridge.

The cartridges are retained in either the import 2 or the export 3 position. The figure shows five cartridges in each position. This different positioning allows the operator to quickly see which and how many cartridges have been processed by the host system.

Replacement and additional magazines are purchased by the customer.

Import Position: The operator puts the cartridge to the fully inserted position, which is flush with the edge of the magazine. In this position, the Library transport has easy access to the cartridge, while the operator would have difficulty removing the cartridge.

Export Position: The library puts the cartridge in this position so that the cartridge is partially exposed to where the operator can remove these *processed* cartridges.

Note: In random mode, the library returns the cartridge to the import position for future re-use, unless the initiator has asked for the cartridge to be exported from the magazine, in which case the cartridge is placed in the export position in the priority cell.

Each magazine has a cartridge lock that is automatically unlocked when the magazine is secured in the library, thus making the cartridges easily accessible to both the operator and the transport. See item 1 in Figure 52 on page LIBRARY-4.

A thumb-operated slide mechanism allows the operator to temporarily unlock the magazine for cartridge removal and refilling. When the slide is released, the magazine automatically locks.

For random mode operation, magazine 1 (see Figure 49 on page LIBRARY-2) must be present to allow access to the priority cell. Requests for specific cartridges to be mounted can only be satisfied when magazine 1 is present in the library.

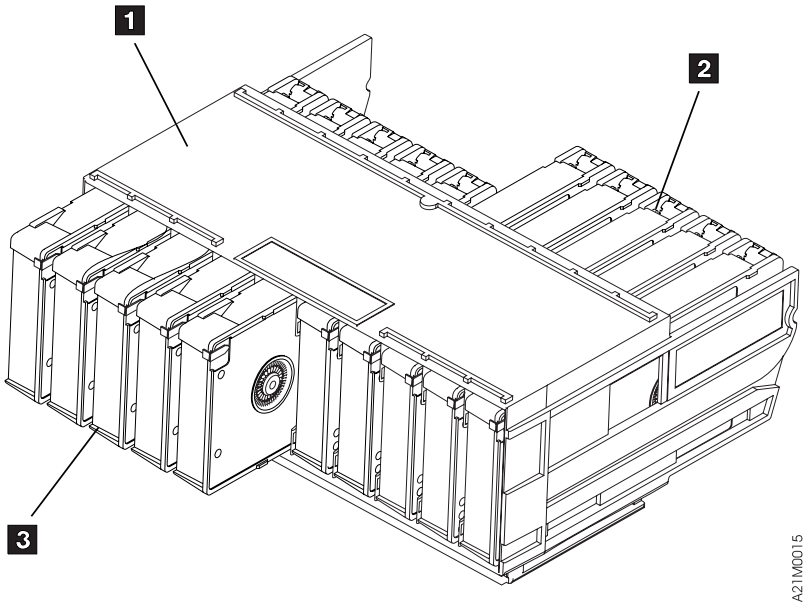


Figure 51. 3570 Cartridge Magazine

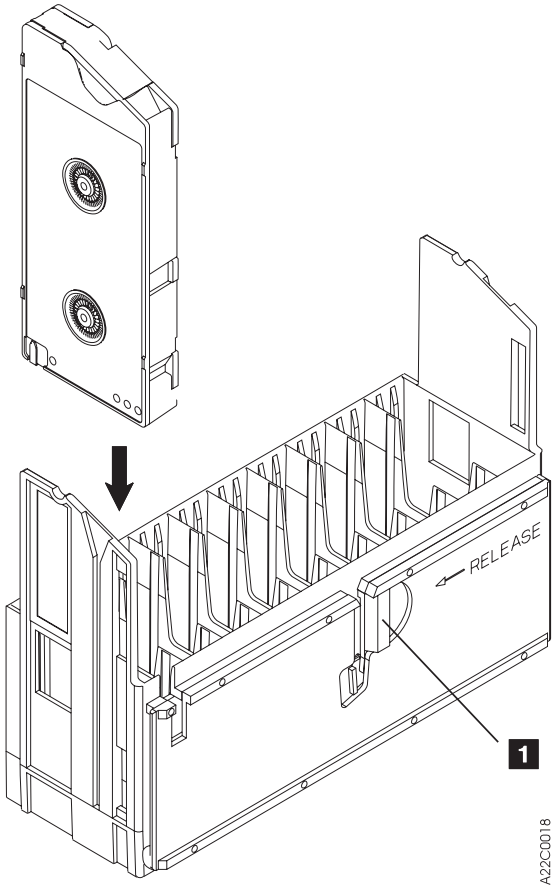


Figure 52. 3570 Cartridge Magazine Lock Lever

Library Operation

Library Modes of Operation

This section describes the library modes of operation, operating procedures, and operator menus for Models C01, C11, C02, C12, C21 and C22.

The library processes cartridges either sequentially or non-sequentially under direction of the host. For sequential processing, the library is capable of operating in either automatic or manual modes, selectable at the operator panel. These two modes are identical except that following each unload operation in manual mode, the operator must push a button to initiate the next load operation.

In order to process cartridges in a non-sequential manner, the library must be set to random mode at the operator panel.

The mode selected by the operator is stored in non-volatile memory and becomes the default mode during subsequent power-on cycles.

ADSM Note: When using ADSM with a Magstar MP model C02 or C12, it is recommended the Magstar MP be configured to operate in Random Mode in Base Configuration. This allows ADSM to use the second drive for reclamation.

Random Mode

Random mode allows the Magstar MP to act as a self-contained library of up to 19 cartridges, controlled entirely by SCSI hosts. In addition, access is provided to a 20th cartridge through the priority cell. The host uses SCSI commands to a Medium Changer device to select a cartridge from a source element and move it to its destination element. Control of the source and destination elements is left entirely to the host.

A request for an external cartridge to be mounted can be satisfied by inserting the cartridge into the priority cell in the import position. The Magstar MP notifies hosts of the presence of a cartridge in the priority cell, but the host must specifically address that cell to access the cartridge.

When the destination of a move is a magazine cell, the transport mechanism places the cartridge in the cell in the import position for possible later re-use. However, if the destination is the priority cell, the transport mechanism places the cartridge in the cell in the export position.

Because the library door must be closed while in random mode, the priority cell is used as an import/export station to add or remove cartridges from the library without violating the integrity of the magazine inventory. A host can cause cartridges from the priority cell to be moved to any empty magazine cell or to a device. It can also cause cartridges from a magazine or a device to be moved to the priority cell. Requests for external cartridges to be mounted can only be satisfied when magazine 1 (the rightmost magazine) is present. Library inventory and control is entirely the responsibility of the hosts. If the library door is opened while in random mode, the drive responds to the next command with a Unit Attention condition.

Automatic (Sequential) Mode

Automatic mode provides the customer the ability to operate the library as a sequential auto-loader, keeping the tape drive continually fed with cartridges. The host (initiator) controls only the unload of a cartridge from the tape drive. The library will automatically load the next available cartridge into the drive after the ejected cartridge is put back into the magazine. All media changer operations are effectively hidden from the system.

When automatic mode is selected, the cartridges are automatically processed according to their positions in the magazines. The library processes all cartridges that are in import positions sequentially, beginning at the rightmost cell position and then proceeding from right to left as viewed from the front of the library.

After processing a cartridge, the library returns it to its original magazine cell and places it in the export position.

The operator can supply external cartridges to an application by inserting a cartridge in the priority cell in the import position. Any cartridge inserted in the priority cell will automatically be the next cartridge loaded into the drive. When that specific cartridge is unloaded, the library returns the cartridge to the priority cell in the export position and resumes processing cartridges from the magazine. The library continues to search for cartridges until it has searched all cells without finding a cartridge in the import position.

The operator can remove cartridges that are in the export position from magazines and add cartridges in the import position to the magazine while the library is in automatic mode. The library stops when the door is opened. When the door is closed, the library resumes operation where it left off. If a cartridge is in a drive when the door is opened, processing continues until complete. When the door is closed, the cartridge is returned to the cell from which it was removed.

An operator may also insert full magazines into the library when it is in automatic mode.

If the operator unloads a cartridge from the tape drive by using the operator panel on the Magstar MP Tape Subsystem, the operator must select START on the operator panel to load the next cartridge. If the cartridge is unloaded from the tape drive by the host, the next cartridge is automatically loaded in the tape drive. There is no need for the operator to select START on the operator panel.

Manual (Sequential) Mode

In manual mode, the library functions the same as in the automatic mode, except the operator initiates each load operation. Each time the operator selects START from the **Options Menu**, the library selects the cartridge from the next unprocessed magazine cell and mounts it in the drive. Manual mode operation is also activated by placing a cartridge in the import position of the priority cell and selecting START. Only one cartridge is processed for each operator action. After being unloaded, each cartridge is returned to the magazine location from which it was taken and placed in the export position.

The library starts processing cartridges beginning at the rightmost cell in the library. The search for unprocessed cartridges is from right to left across the magazine(s) as viewed from the front of the library.

Library Configurations

| Dual drive models (C02, C12, and C22) may operate in Base Configuration or Split Configuration as
| selected in the operator menus. Single drive models (C01, C11 and C21) do not support Split
| Configuration.

AS/400 Notes:

1. If attached to an AS/400 system, when switching between Base and Split configuration, the I/O processor must be reloaded. To reload the I/O processor, vary OFF and ON with reset, or use STRSST to IPL the I/O processor.
2. If the Magstar MP Model C02 or C12 is in Split Configuration, microcode update is not supported using the PTF process. The service representative must update the Magstar MP using an FMR tape according to the instructions in the maintenance information manual.

Base Configuration

In a Base Configuration, all magazine cells are accessible to all hosts (initiators) on the bus. The library
| mode of operation is selected at the operator panel for drive 1 only, but it applies to the entire library. For
| dual drive libraries in Base Configuration, single host drives **must have a unique SCSI address.** Multiple
| host attachments may have unique or identical address.

Random Mode - Base Configuration: See “Random Mode” on page LIBRARY-5 for an overview of this mode. Magstar MP acts as a self-contained library of up to 19 cartridges with additional access to a 20th cartridge through the priority cell. In models with 2 drives, the source and destination elements of a move can indicate either drive. (Both drives can be used.) See “SCSI Medium Changer Addressing for Base and Split Configurations” on page LIBRARY-8.

Automatic Mode - Base Configuration: See “Automatic (Sequential) Mode” on page LIBRARY-6 for an overview of this mode. In models with 2 drives, only drive 1 is used for this mode. Drive 2 is unused. The library processes all cartridges that are in import positions sequentially, beginning at the rightmost priority cell position, then proceeding from right to left across both magazines as viewed from the library front.

Manual Mode - Base Configuration: See “Manual (Sequential) Mode” on page LIBRARY-6 for an overview of this mode. In models with 2 drives, only drive 1 is used for this mode. Drive 2 is unused. The library processes all cartridges that are in import positions sequentially, beginning at the rightmost priority cell position, then proceeding from right to left across both magazines as viewed from the library front.

Split Configuration

It is advantageous to be able to share a single library between host systems. Unfortunately, some applications (and some systems) do not allow for sharing devices between systems. Split Configuration allows for a single library to be used by multiple systems by having the library manage this ‘sharing’. This is accomplished by having the library appear as two separate half-size libraries on each of two SCSI busses. Two SCSI busses are created when the SCSI Bus Jumper is removed between the drive 1 and drive 2 SCSI ports.

Split Configuration is created by logically dividing one physical library into two logical libraries.

Logical Library 1 consists of:

Drive 1,
Magazine 1 (including the priority cell), and
The transport mechanism.

Logical Library 2 consists of:

Drive 2,
Magazine 2, and
The transport mechanism.

Logical Library 1 is available to host systems via the drive 1 SCSI port, and Logical Library 2 is available to host systems via the drive 2 SCSI port. Cartridges not in the logical library associated with a port are not accessible to commands received on that port.

In a Split Configuration, the library mode of operation is selected separately for drive 1 (Logical Library 1) and drive 2 (Logical Library 2). All possible combinations of modes of operation are allowed in Split Configuration. For dual drive libraries in Split Configuration, single host drives **must have unique SCSI address.** Multiple host attachments may have unique or identical address.

Random Mode - Split Configuration: See "Random Mode" on page LIBRARY-5 for an overview of this mode. All operations for the priority cell are associated with Logical Library 1 only. For Logical Library 1, Magstar MP acts as a self-contained library of up to 9 cartridges with additional access to a 10th cartridge through the priority cell. For Logical Library 2, the Magstar MP acts as a self-contained library of up to 10 cartridges, with no host access to the priority cell. See "SCSI Medium Changer Addressing for Base and Split Configurations."

Automatic Mode - Split Configuration: See "Automatic (Sequential) Mode" on page LIBRARY-6 for an overview of this mode. All operations for the priority cell are associated with Logical Library 1 only. For Logical Library 1, the operation begins at the right-most priority cell position, then proceeds from right to left across magazine 1. For Logical Library 2, the operation begins at the right-most cell in magazine 2, then proceeds from right to left across magazine 2.

Manual Mode - Split Configuration: See "Manual (Sequential) Mode" on page LIBRARY-6 for an overview of this mode. All operations for the priority cell are associated with Logical Library 1 only. For Logical Library 1, the operation begins at the right-most priority cell position, then proceeds from right to left across magazine 1. For Logical Library 2, the operation begins at the right-most cell in magazine 2, then proceeds from right to left across magazine 2.

SCSI Medium Changer Addressing for Base and Split Configurations

Magstar MP library models are consistent with the SCSI standard for Sequential Access and Medium Changer devices. Each tape drive in a Magstar MP library has a unique SCSI device ID. The library control interface consists of a SCSI Medium Changer device available as a logical unit through one or both drive ports, depending on the library configuration.

For a Base Configuration, a Medium Changer device is available through the drive 1 SCSI port only. This is the default configuration for all library models.

For Split Configuration, the transport mechanism is shared, but it appears as two Medium Changer devices, one for each drive SCSI port.

Front Panel Overview

| Figure 53 and Figure 54 on page LIBRARY-10 show the front assembly for Model C.

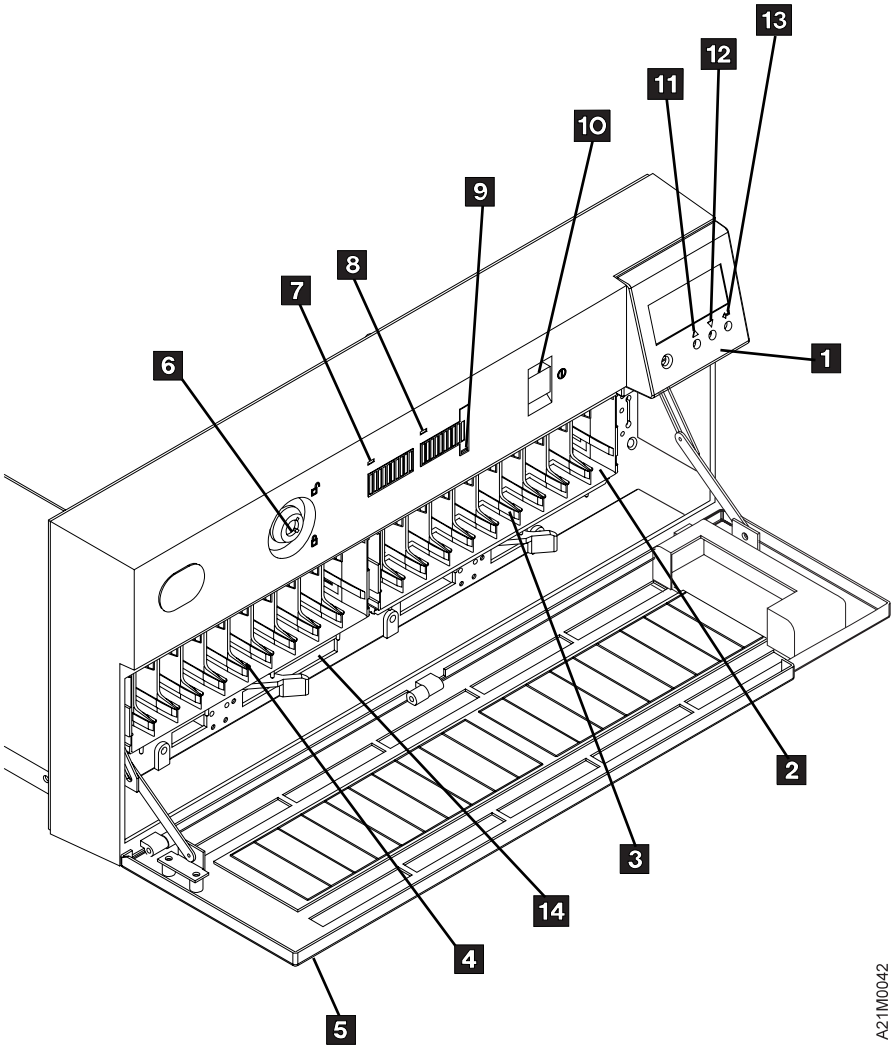
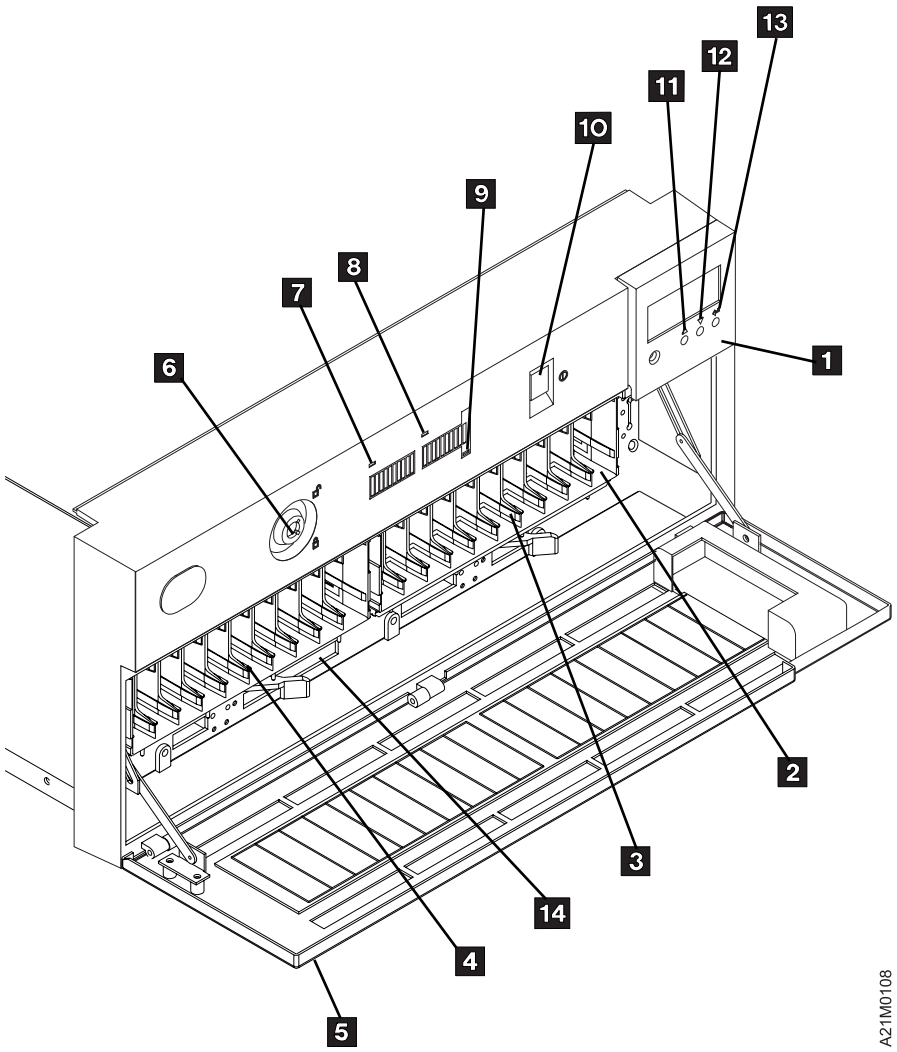


Figure 53. Front Assembly for Model C01, C02, C11, and C12



| *Figure 54. Front Assembly for Model C21 and C22*

1 **Operator Panel Display**

See “Library Operator Panel” on page INTRO-40 for a description of the operator panel.

2 **Priority Cell**

| Models C01, C02, C11, C12, C21 and C22 have a priority cell that can be used to load or unload cartridges from the subsystem without removing the cartridge magazine. Because cartridges can be inserted without opening the door, the integrity of the tape inventory is not violated. To use this feature, magazine 1 must be present and the rightmost cartridge cell must be unused.

Its functions are as follows:

When in automatic or manual mode, requests to mount an external cartridge can be satisfied by placing the specified cartridge into the priority cell in the import position and pressing START. The cartridge in the priority cell will be the next one loaded into the drive. When the drive has unloaded the cartridge, it will be returned to the priority cell in the export position.

When in random mode, the priority cell acts as an import/export station for the automated library. Because cartridges can be inserted into the priority cell without opening the door, additions or removals can be made to the cartridge inventory under control of the initiator without opening the door and violating the integrity of the inventory.

Note: When using the priority cell, the cartridge must be placed in the import position.

3 **Magazine 1 Location**

4 **Magazine 2 Location**

Library Operator Panel

Library models have an operator panel that has four push buttons and a display located in the upper right-hand corner of the library when the subsystem is in a horizontal position. See Figure 55. The library operator panel display is the interface for all operator and CE functions that are available in the library models of the 3570 Tape Subsystem. See “Operator Panel” on page PANEL-1 for a details of the operator panel operations, LED indicators, and messages displayed. A brief description of the operator panel control switches and LED indicators follows. The key lock, library door, and other front cover components are described briefly.

Operator Panel Display and Controls: Figure 55 shows the operator panel display and operator panel controls:

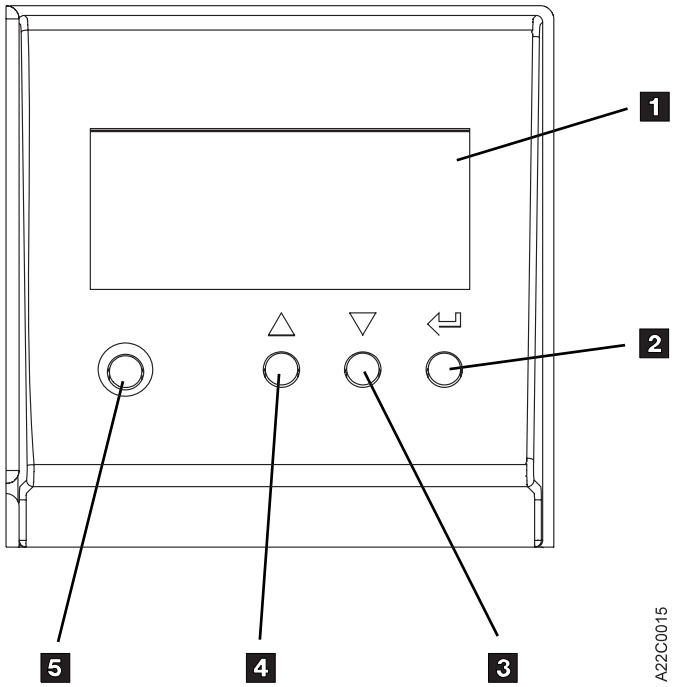


Figure 55. Operator Panel Display for Library Models

Item 1 Library operator panel display***:*** The library operator panel display consists of the following:

Four lines by sixteen characters
58.2 mm (2.3 in.) wide by 25.2 mm (1 in.) high

| **Note:** There are two styles of library operator display panel. The Models C01, C02, C11 and C12 have a
| display with a sloping face to reduce glare. The Models C21 and C22 display has a flat face.
| Except for the shape and part number, they are identical.

Operator Panel Control Push Buttons: The library operator panel display has the following menu control switches:

Enter push button, item 2
Scroll Down push button, item 3
Scroll Up push button, item 4
Mode push button, item 5

Item 2 Enter Push Button***:*** The Enter push button is marked by a backward arrow

icon symbolizing the **Enter** key as used on some keyboards. Pressing this push button causes the device to select the option or to perform the function indicated. If a FID was being displayed when enter was pressed, the FID is deleted from the display panel and entered into the Error log.

Item 3 Scroll Down Push Button***:*** The Scroll Down push button is marked with a down arrow head icon. Pressing this push button causes the selection arrow **>** to move down to the next option on the menu, if any additional options are *below* the currently-indicated option. If additional menu items are below the last item on the menu, a + is indicated in the lower right-hand corner of the display. If no additional options are below the currently selected option, pressing the push button does not affect operations.

Item 4 Scroll Up Push Button***:*** The Scroll Up push button is marked with an up arrow head icon. Pressing this push button causes the selection arrow **>** to move up to the next option on the menu if any additional options are *above* the currently-indicated option. If no additional options are above the currently selected option, pressing the push button does not affect operations.

Item 5 Mode Push Button***:*** The Mode push button is used for selecting either CE mode or operator mode. At power ON, the device is always in operator mode. CE mode may be selected at any time, but the 3570 will not allow a mode change until the operation in progress is completed. Operator mode can be selected at any time. The Mode push button should only be used by qualified service representatives. This push button should not be used during normal operations.

Note: While the 3570 is in CE mode, the subsystem is off-line to the host and unavailable for read and write operations.

Front Panel Indicators and Controls

Figure 53 shows the front assembly for Model C.

1 **Operator Panel Display**

See “Operator Panel Overview” on page PANEL-3 for a description of the operator panel.

2 **Priority Cell**

| Models C01, C02, C11, C12, C21 and C22 have a priority cell that can be used to load or unload cartridges from the subsystem without removing the cartridge magazine. Because cartridges can be inserted without opening the door, the integrity of the tape inventory is not violated. To use this feature, magazine 1 must be present and the rightmost cartridge cell must be unused.

Its functions are as follows:

When in automatic or manual mode, requests to mount an external cartridge can be satisfied by placing the specified cartridge into the priority cell in the import position and pressing START. The cartridge in the priority cell will be the next one loaded into the drive. When the drive has unloaded the cartridge, it will be returned to the priority cell in the export position.

When in random mode, the priority cell acts as an import/export station for the automated library. Because cartridges can be inserted into the priority cell without opening the door, additions or removals can be made to the cartridge inventory under control of the host (initiator) without opening the door and violating the integrity of the inventory.

Note: When using the priority cell, the cartridge must be placed in the import position.

3 **Magazine 1 Location**

4 **Magazine 2 Location**

5 **Door**

The door protects the integrity of the inventory in the library units. As long as the door remains closed, the host knows that the magazine inventory remains unchanged. If the door is opened, the host (initiator) is alerted that the inventory may have changed. The door also acts as a safety interlock. When the door is opened, the transport mechanism will complete any movement in progress and stop. The transport mechanism will not move until the door is closed. The library will restart when the door is closed without any further intervention by the operator.

Note: Be careful, when opening the library door, to **not** move cartridges from the export position back to the import position.

6 **Security Key Lock**

The security key lock locks the door closed. The Security Key lock on the library helps maintain security for cartridges in the library unit. It is a physical lock only, and is not sensed or controlled by the initiator or device. When locked, the only way to add or remove cartridges to or from the library units is through the priority cell.

7 **Magazine 2 In Use Indicator**

The yellow LED indicates the status of Magazine 2. When it is ON, the operator should not add or remove cartridges to or from that magazine and should not remove that magazine from the library unit. The Magazine In Use LED is ON when a cartridge from the magazine has been transported to the drive for processing, or when the library unit is in random mode and the initiator has issued the Prevent/Allow Medium Removal command with the prevent bit set.

The LED also turns ON solid momentarily during power-on reset as a lamp test, and it flashes during bring-up diagnostics.

8 **Magazine 1 In Use Indicator**

This yellow LED indicates the status of Magazine 1 and operates the same as indicator 7 .

9 **Priority Cell In Use Indicator**

This yellow LED indicates the status of the priority cell. When the LED is ON, a cartridge is in the priority cell or the priority cell is reserved for the cartridge currently being processed in the drive. When the LED is ON, the operator should not place a cartridge in the priority cell or remove a cartridge from the priority cell. When the LED is **not** ON, the operator can place a cartridge in the priority cell for processing or can remove a cartridge from the priority cell. The indicator is visible with the door open or closed.

This LED turns ON solid momentarily during the power-on reset as a lamp test, and flashes during the power-on diagnostics. After completion of the power-on sequence, this LED is turned OFF until it is turned ON by activity that involves the priority cell.

1 **Power On/Off Switch**

This switch is connected to the dc power supply by a cable. The switch removes dc power from the output of the power supply. There is no LED to indicate a power-on condition of the library units. The power is ON when the operator panel is active.

Note: With the switch in the Off position, ac voltage is still available inside the subsystem power supply.

11 **Scroll Up Button**

12 **Scroll Down Button**

13 **Enter Button**

14 **Serial number (above lever opening)**

Library Components—Library Models

The library components for all the library models are shown in Figure 56, Figure 57 on page LIBRARY-16, Figure 58 on page LIBRARY-17, Figure 59 on page LIBRARY-18, Figure 60 on page LIBRARY-19 and Figure 61 on page LIBRARY-20. They offer 20 cartridge automated cartridge loader capable of operating in random access mode or sequential access mode for tape volumes. See *IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models,* GA32-0393 for location and functional description of the library. Each major component is discussed below. Because the six library configurations are nearly identical except for number of drives installed, and design of external covers, references will be made to Figure 59 on page LIBRARY-18 to simplify the presentation. Be aware that the Models C02, C12 and C22 have two drives installed while the Models C01, C11 and C21 have only one drive.

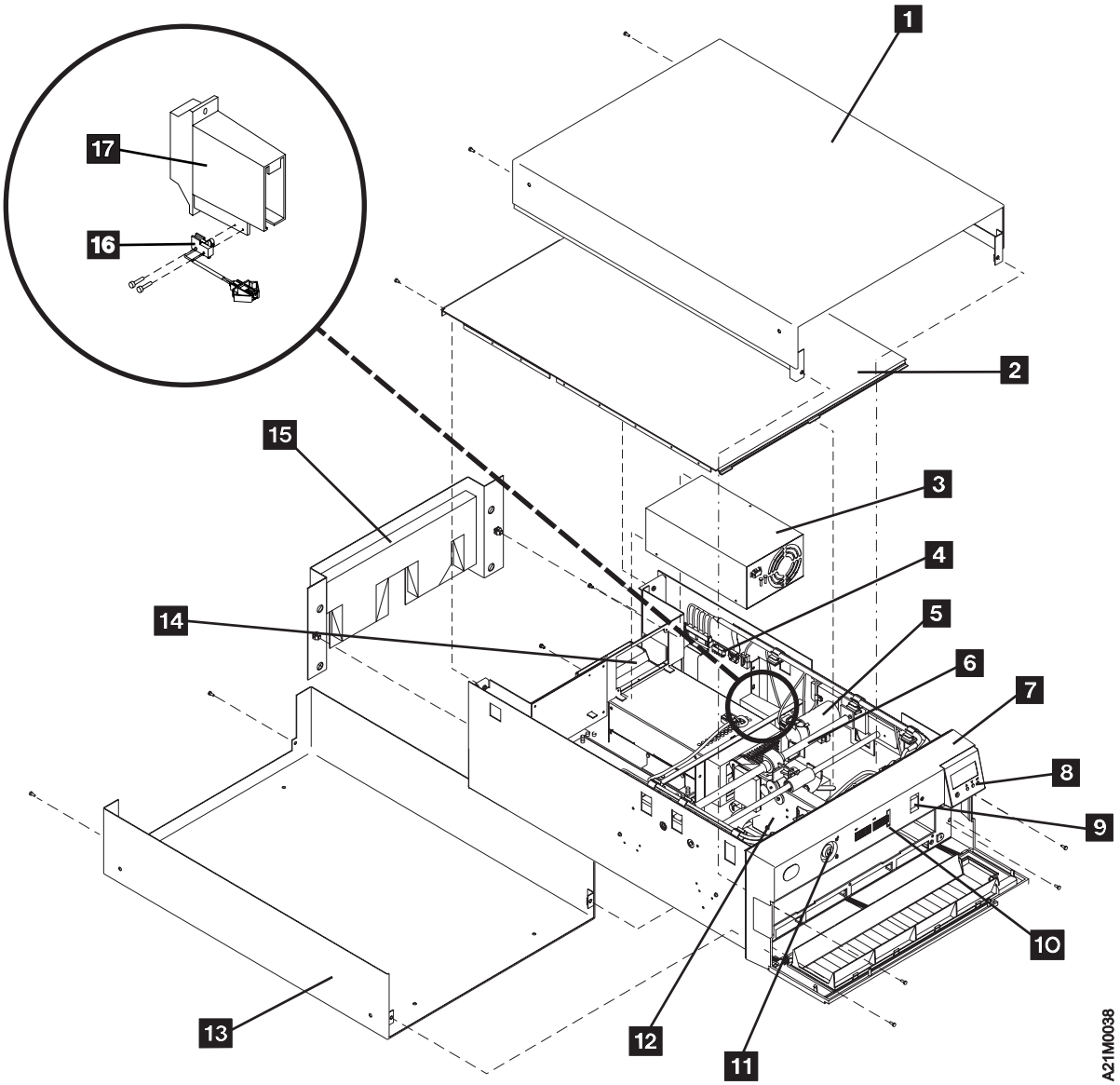


Figure 56. Model C01-Stand-Alone Library Model

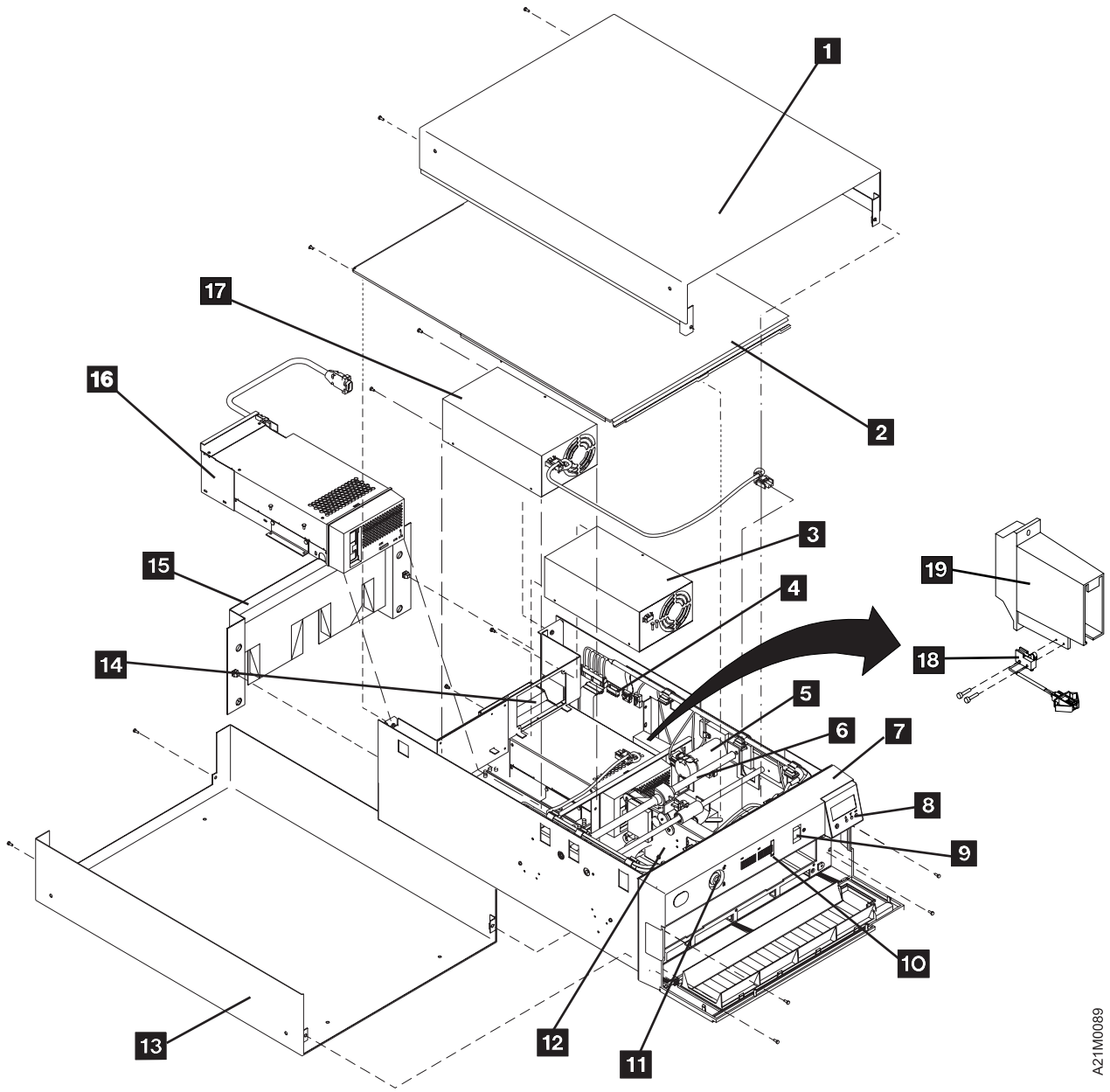


Figure 57. Model C02-Stand-Alone Library Model

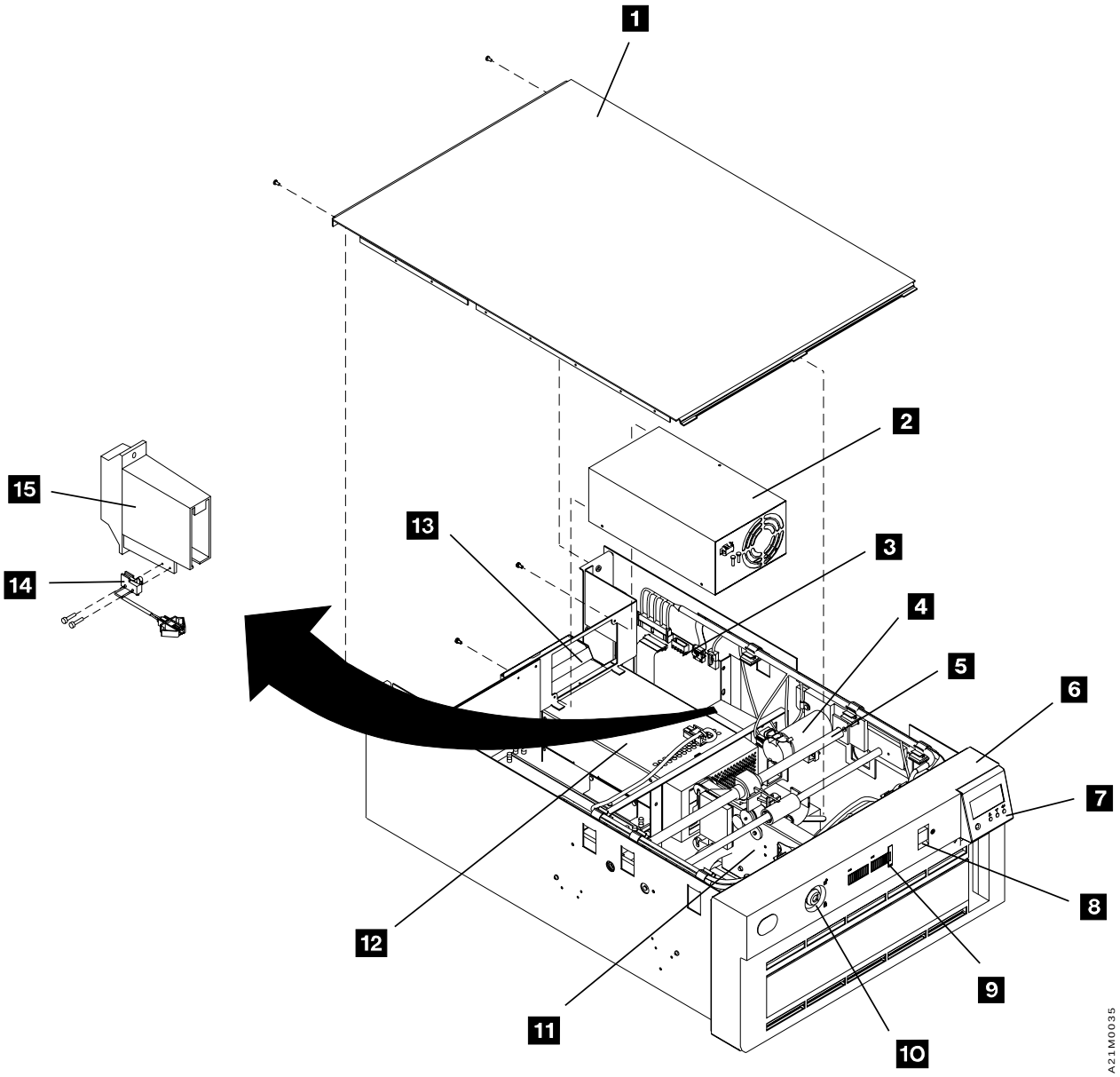


Figure 58. Model C11-Rack-Mounted Library Model

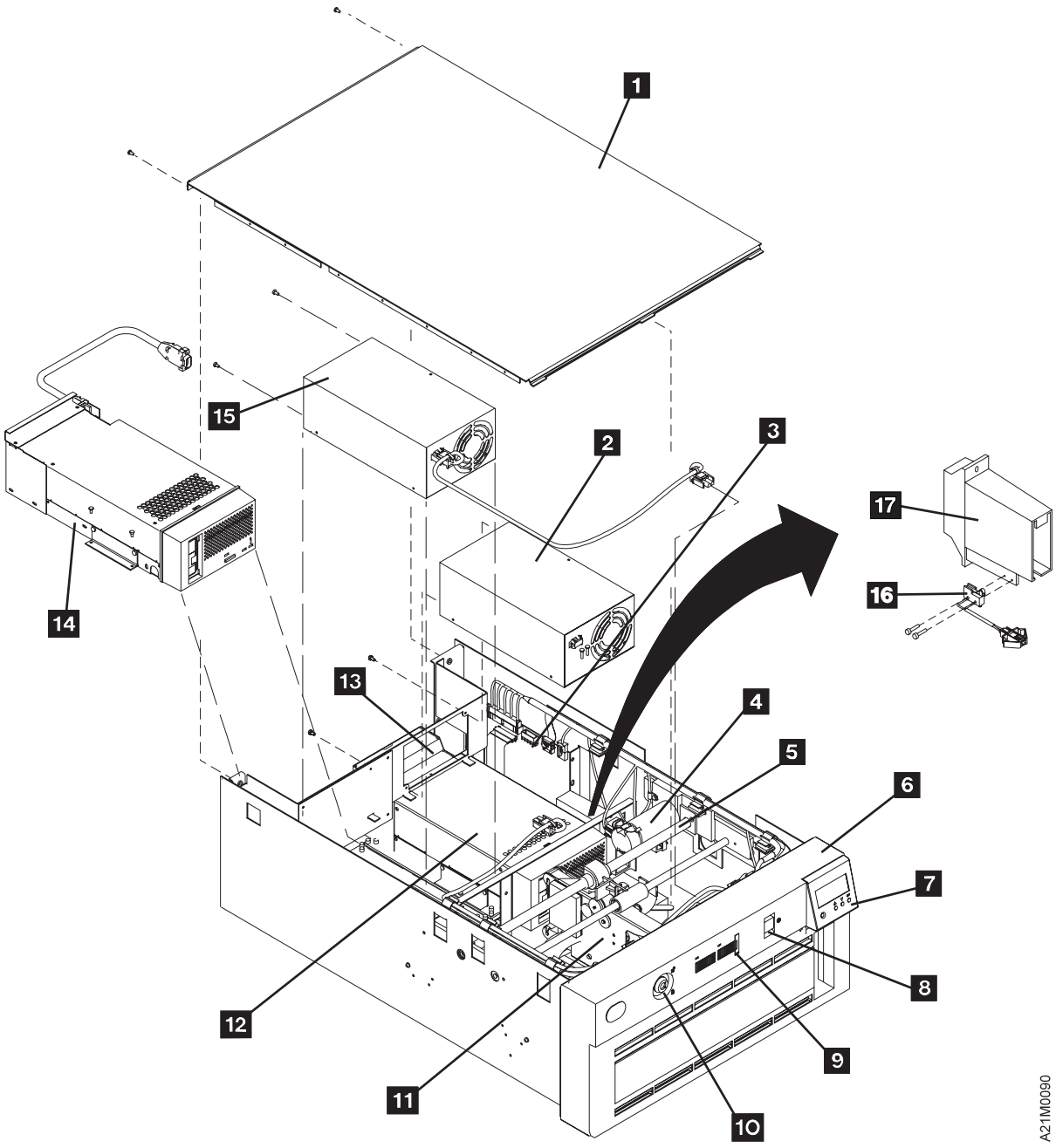
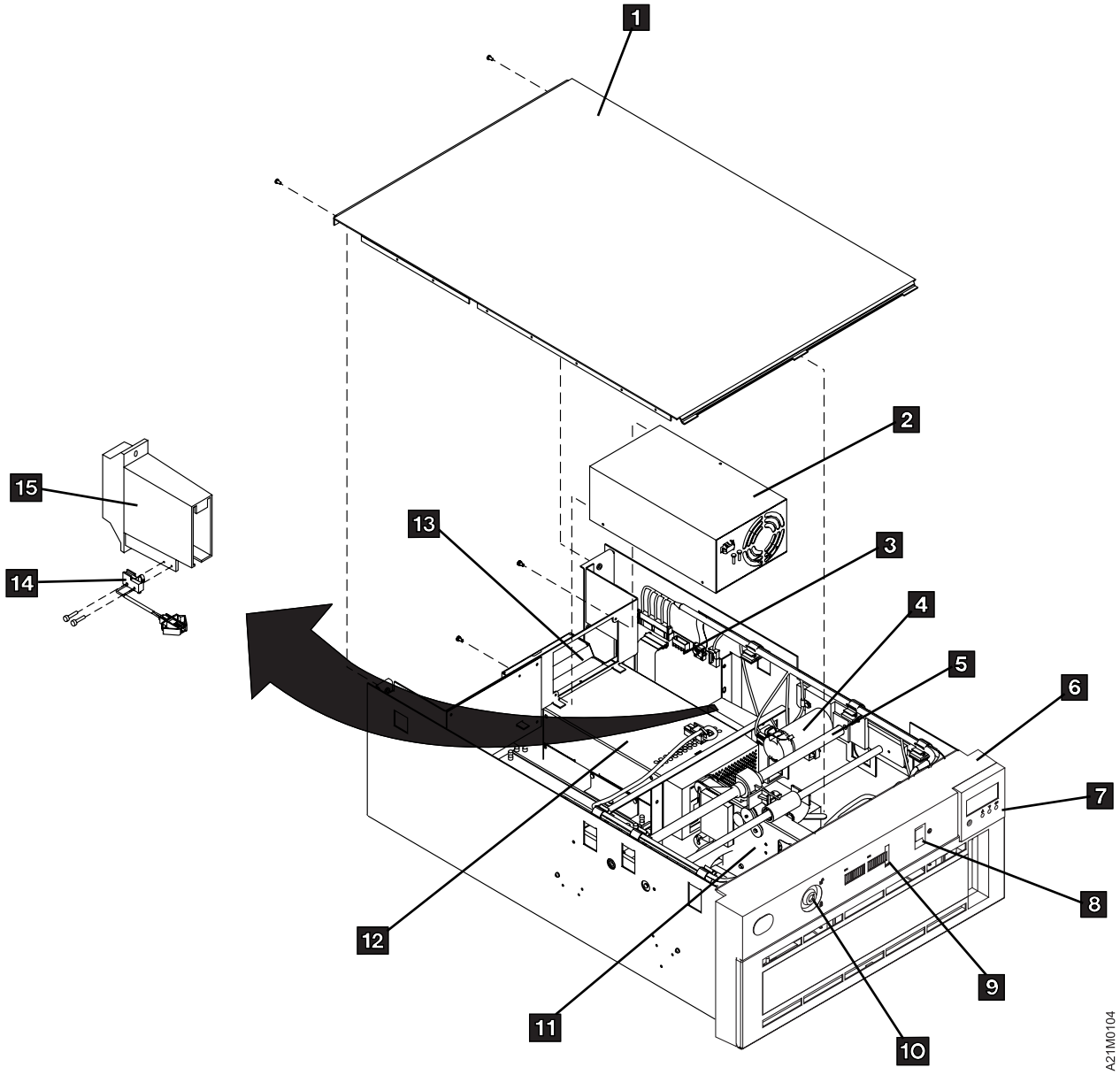


Figure 59. Model C12-Rack-Mounted Library Model



| *Figure 60. Model C21-Rack-Mounted Library Model*

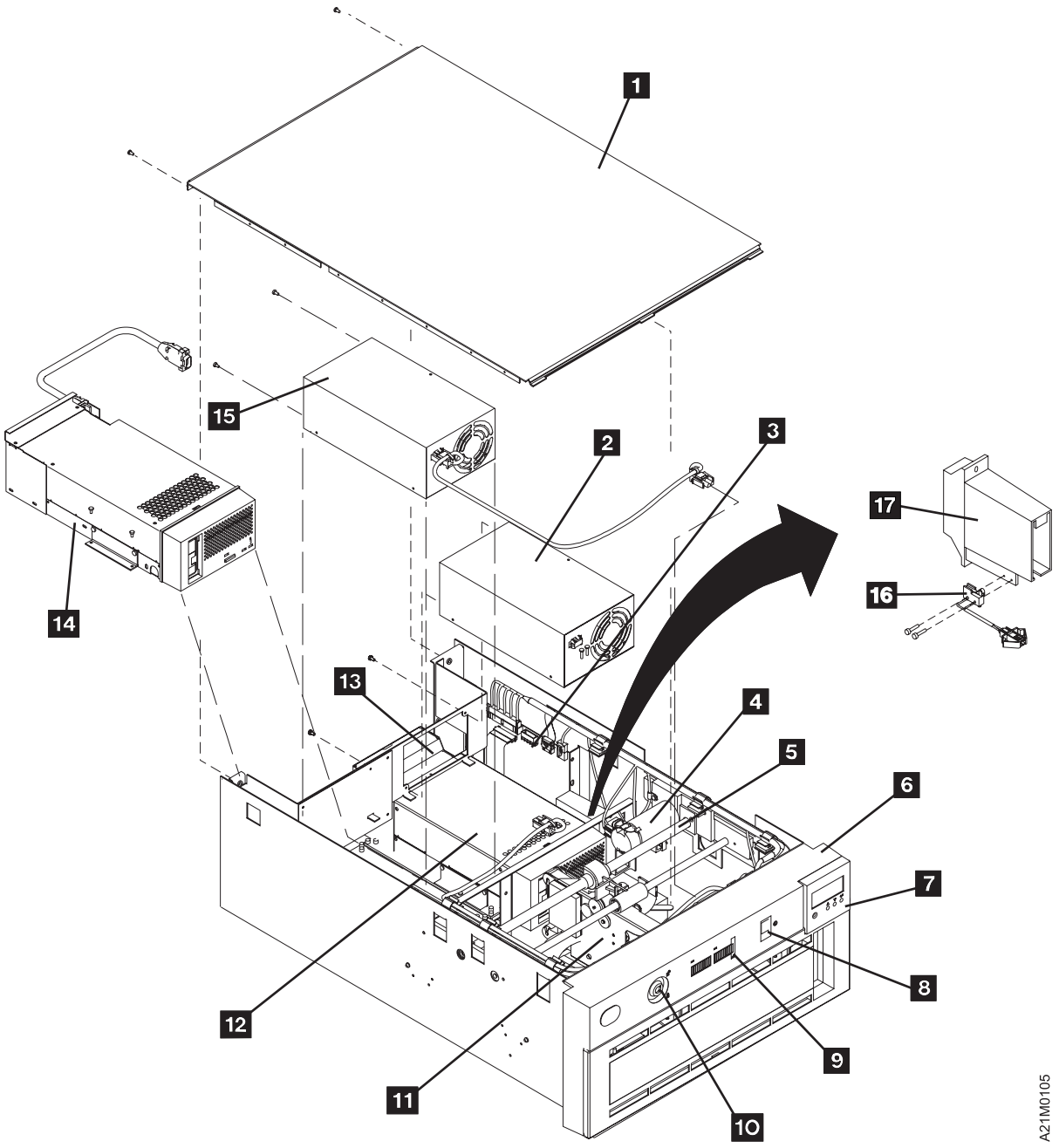


Figure 61. Model C22-Rack-Mounted Library Model

Library Control Card: The library control card, item 3 , is the electronic interface to the accessor motor assembly, picker motor, operator display functions, and cartridge management. It is heavily dependent upon the drive logic card, located inside the drive pack, item 13 (drive 1) for microcode control and command generation which it passes on to the individual library components. A drive logic card is also present in the drive pack, item 14 (drive 2) which controls that drives components. It also passes on to the drive logic card sense data from the library components and tach counts from the library motors for control purposes.

A Bar Code Reader feature is standard on all library models. The bar code reader is mounted on the picker assembly and is connected to the bar code reader card through the library sensor cable.

Accessor Assembly: The accessor assembly, item 5 , is made up of a screw shaft and guide shaft used to position the picker assembly, item 11 for access to all 20 magazine slots and to the drive unit slot. The accessor assembly is under control of the accessor motor assembly, item 4 for back and forth motion.

Picker Assembly: The picker assembly, item 11 , rides on the screw shaft and is guided by the guide shaft back and forth to access any of 20 cartridge positions in the magazines or the drive unit. The picker grasps the desired cartridge from a magazine slot, moves to the drive door, and inserts the cartridge into the drive unit. When the drive unit is unloaded, the picker assembly moves to the drive, picks the tape cartridge from the drive unit, and places it back into a magazine at an appropriate slot location.

A Bar Code Reader feature is standard on all library models. The reader is mounted on the picker assembly in a position that allows it to read the bar code label as a cartridge is moved through the picker. The electronic controls for the bar code reader are mounted on the library control card, item 3 .

The picker assembly, under program control, performs an inventory of the magazines to determine which slots, if any, contain tape cartridges, then sends that information back to the host processor.

Library Front Cover Assembly: The library front cover, item 6 , comes in two colors, black or white, and is the decorative cover for the front of the library device. It contains a security key lock, door open sensor (not shown), library LED card, item 9 , ac switch and cable assembly, item 8 , room for the library operator panel display, item 7 a magazine access door, a priority cell position, and two magazine assemblies and magazine locking hardware. See *IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models,* GA32-0393 for location and functional description of the library.

Library Sensors and Sensor Cable: The library sensors and associated cable (not shown here) provide sensing for the following conditions:

Magazine 1 and 2 are present

Priority cell contains a tape cartridge

Library front door has been opened

Tape cartridge present in magazine cell

Global interference

Picker sensors

- Cartridge present
- Limit sensor
- Pinch sensor

Cleaner cartridge present

For a diagram of these sensors and their connections, see Figure 62 on page LIBRARY-23.

Library Operator Panel Display: The library operator panel display, item 7 , is attached to the library control card by the library operator panel display cable. Both are FRUs.

Picker Cable: The picker cable is the flat cable on the bottom of the library base (not shown) that rides back and forth with the picker assembly. It is attached to the library control card.

Library Interface Cable: The library interface cable attaches the drive logic card to the library control card through the mother board.

Library AC Switch and Cable Assembly: The library ac switch and cable assembly, item 8 is housed in the library front cover and is connected to the power supply, item 2 (drive 1 power) and item 15 (drive 2 power). See Figure 26 on page INTRO-16 for power distribution.

Cleaner Cell Assembly: The cleaner cell, item 17 , is located on the inside right wall of the library frame and is used to house the cleaner cartridge when it is not being used for cleaning the drive R/W head. The cleaner cell is directly reachable by the picker assembly when a cleaning cycle is needed.

Magazine Global Sensor Pair: The magazine global sensor pair is made up of a light source and a light sensor, and is used to sense one of two conditions:

Any cartridge that is extending too far into the picker path, between the picker and the magazine, and might cause an interference. This interference is ignored during loading and unloading of cartridges from the magazine.

Any cartridge that is placed into the magazine in the wrong orientation (upside down or backwards).

Drive Global Sensor Pair: The drive global sensor pair is made up of a light source and a light sensor, and is used to sense when a cartridge is extending too far into the picker path, between the picker and the drive, and might cause an interference. This interference is ignored during loading and unloading of cartridges from the drive.

Library LED Card: The library LED card, item 9 is attached directly behind three holes in the library front cover to allow Magazine 1 and 2 Busy indicators and Priority Cell in Use indicators to be visible to the operator. See *IBM Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models,* GA32-0393 for location and functional description of the library and all operator accessible functions.

Data Flow and Cable Diagram – Library Models

Figure 62 shows the general data flow and cable diagram for the library models.

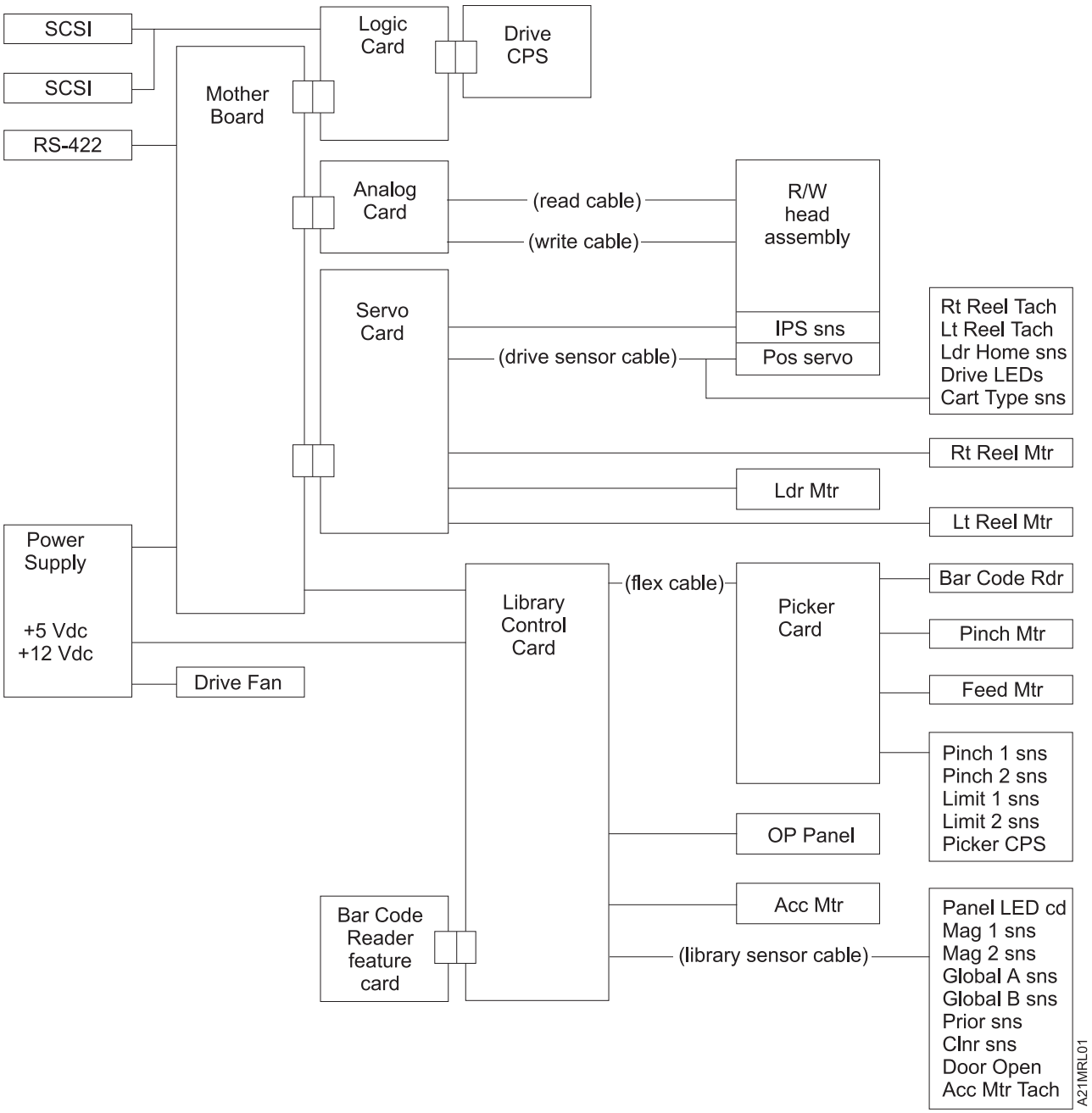


Figure 62. General Data Flow and Connectivity – Library Models

Messages

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Service Information Messages (SIMs) and Media Information Messages (MIMs)

The SIM and MIM functions are a primary factor in the 3570 maintenance plan for improved product availability.

A SIM alerts the customer when an abnormal operational condition in the 3570 requires service attention. Information in the SIM identifies the affected drive, the failing component and the severity of the fault condition, and the expected operational impact of the pending service action. This information helps the user to initiate and expedite appropriate recovery and service procedures so that normal operation is restored with maximum efficiency and minimal disruption.

A SIM contains the machine type, machine serial number, and FID that allows the dispatch of the appropriate service personnel and the replacement parts required to correct the machine fault. This procedure helps improve service response time and helps reduce the time required for machine repair.

Physical location identifiers in the SIM directs the CE to the failing unit in the customers account. The SIM FID code specifies the parts to be replaced and directs the CE to appropriate service procedures. This allows the machine fault to be repaired without first looking in log records and without having to try to recreate the failure with diagnostic procedures. Both of these advantages further contribute to reduced outage durations.

A MIM identifies problems with the media (tape) and the volume number of the *bad* cartridge. This allows the customer to do maintenance within the tape library and to prevent unnecessary service calls when the fault is media.

The detailed information within SIMs and MIMs is for use by the dispatcher or the CE in the branch office. This individual is responsible for decoding the information and scheduling for service based on data content within the SIM or MIM.

The customer can select, depending on their software, the severities that they wish to see. For example, one customer may only want to see the *Acute* SIM/MIM and another customer may want to see all the SIMs and MIMs that are sent to the host. The 4 severity codes follow:

Severity *0* (FID4) code means that the device needs service.

Severity *1* (FID3) code means that the problem is moderate.

Severity *2* (FID2) code means that the problem is serious.

Severity *3* (FID1) code means that the problem is acute.

A service message within the SIM also informs the customer what the service impact will be; for example, *impact unknown* disables access to the drive or requires the interface to be disconnected.

A MIM specifies what is wrong with the cartridge that is indicated. The 3 MIM severity codes are as follows:

Severity 1 indicates moderate *high temporary read/write* errors were detected.

Severity 2 indicates serious *permanent read/write* errors were detected.

Severity 3 indicates acute *block 0*, *cartridge type*, or *vol label* errors were detected.

Note: A FID may also be indicated in the MIM. If the cartridge is not the problem, you can replace the failing FRU indicated.

Statistical Analysis and Reporting System

The statistical analysis and reporting system (SARS) assists in determining whether read and write errors are caused by the media (tape) or the hardware in the drive and provides SIMs, MIMs, and/or media isolation messages. To analyze errors, the 3570 microcode contains a volume SARS (VSARS) algorithm and a hardware SARS (HSARS) algorithm.

The algorithms are executed in the 3570 just before a tape is unloaded. The HSARS data is stored in nonvolatile storage in the drive and the VSARS data is stored in the volume control region (VCR) on the tape.

To distinguish error patterns and trends, the SARS *volume* algorithms require the tape to be mounted on different drives while the SARS *hardware* algorithms require different volumes to be mounted on one drive. As degraded hardware passes through predefined error thresholds, cleaning and service repair messages and/or error codes are presented. Similarly, if tape volumes continue to perform poorly on different drives, re-write or discard-media messages are presented.

| The current default value for SARS options is **ON** for microcode level D1I5 and higher. SARS options
| must be enabled to take full advantage of media error isolation via MIMs and some SIMs. You can enable
| or disable SARS options from “CE Drive Features Menu” on page PANEL-40.

Obtaining 3570 Drive Error Information at the Host

IBM device drivers for the RS/6000 and AS/400 systems log service information messages (SIMs and MIMs) when an error occurs on a 3570 drive.

| **Note:** Sun, HP-UX and Winndows NT systems do not log SIM/MIM data.

The SIM includes the following error information:

| 1. Which drive the SIM refers to.
2. The FRU identifier (FID) code and FID severity for Drive errors. The FID is used to enter the START section where it specifies the failing FRU group.
3. The message code presented to the customer. See “Message Codes” on page MSG-11.
4. The first FSC, second FSC or flag bytes, model and microcode link level are not required to enter the START section. This support data may be requested by your next level of support.

The MIM includes the following error information:

1. The message code presented to the customer. See “Message Codes” on page MSG-11.
| 2. VOLSER of the cartridge which is having a problem.
3. The first FSC and model and link level are not required to enter the START section. This support data may be requested by your next level of support.

This information is used to service the 3570 drive and can also be obtained directly from the library display. The PANEL section describes the 3570 display.

3570 Drive Display Panel: The following screen is an example of an error log display:

```
   CE ERROR LOG    |
   FID1 E4        |
   A 8F A F9 2D4   |
      5 17:  :15 + |


FID1 EA            1 = FID Severity
                  E4 = FID
A 8F A F9         A 8F = First FSC
                 A F9 = Second FSC
2D4               2D4  = Model and Microcode Level

   5 17:  :15           Time Stamp (not real time, but relative
                          to power-on time, except that the
                          time is saved in VPD each hour.)
```

The following text explains how to obtain 3570 error information from the RS/6000, AS/400 and Sun platforms. If the utilities described below are not used on your system, please refer to the documentation that came with your system drivers.

See “Service Information Messages (SIMs) and Media Information Messages (MIMs)” on page MSG-2 for additional information on SIMs.

Error Log Analysis—RS/6000

The AIX Tape and Medium Changer Device Driver for the RS/6000 provides logging to the system error log for a variety of errors. You can view the error log in various formats by using one of the following AIX commands:

tapeutil command on page MSG-4
diag command on page MSG-4
smit command on page MSG-19
errpt command on page MSG-19

Use the Hex to ASCII conversion in Figure 70 on page MSG-9. Examples of the different error log formats are shown following this text.

To use the **tapeutil** command:

Note: The **tapeutil** command gives you a detailed report by device only.

1. Type **tapeutil** at the AIX command line.
2. Select **Tape Drive Service Aids** (listed under General Commands) from the menu.
3. Select **Error Log Analysis** from the Service Aid menu.
4. Select the device from the Drive Selection menu and press PF7 to commit. The error log will be displayed.
5. You can scroll through the log by pressing the Enter key.

To use the **diag** command:

Note: You must have root authority to run the AIX **diag** command.

Note: The **diag** command gives you a detailed report by device only.

1. Type **diag** at the AIX command line.
2. Select **Service aids** from the Diagnostic Function Selection menu.
3. Select **IBM Tape Drive Service Aids** from the Service Aid Selection menu.

4. Select **Error Log Analysis** from the Service Aid menu.
5. Select the device from the Selection menu and press PF7 to commit. The error log will be displayed.
6. You can scroll through the log by pressing the Enter key.

Analyse Sense Key and ASC/ASCQ data to determine the type of Sense information that is reported in the error log. If a hardware problem is indicated, use the FID, go to START-1 for problem determination. For errors that indicate SCSI adapter or SCSI bus errors, see Figure 68 on page MSG-8, go to "SCSI Bus Problem Determination" on page PROC-79.

For errors indicating system problems, enter the appropriate maintenance package.

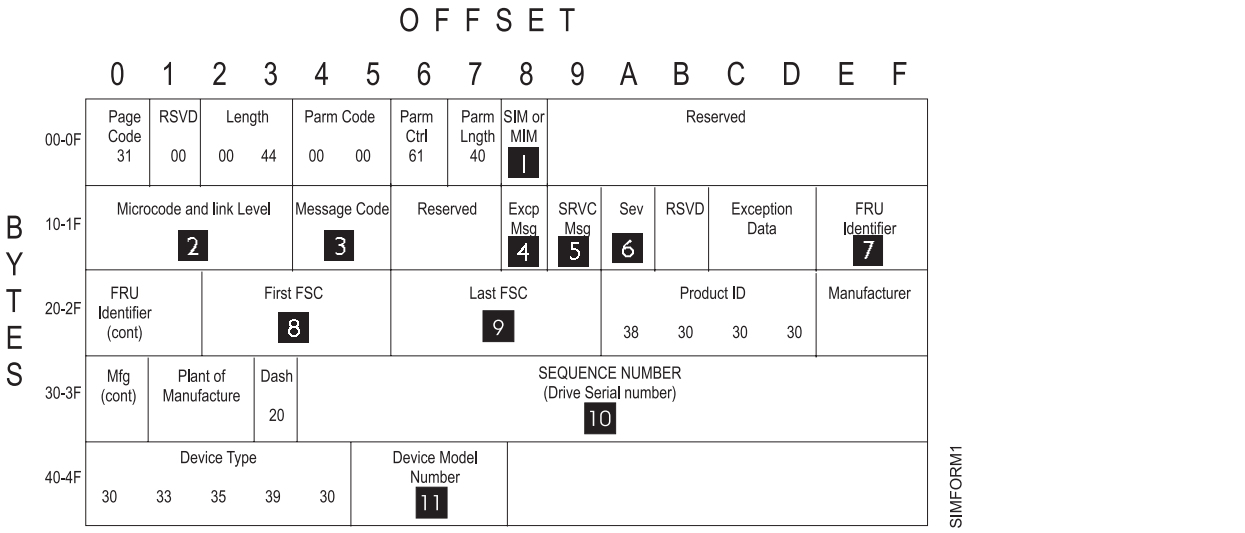

```
IBM Tape Device Error Log Analysis

NAME: rmt1   LOCATION:   - 2- 1-2    DEVICE TYPE: 357

DATE: 1 /31/98  7:33:21   SEQUENCE #2 3274   ERROR ID: HARDWARE ERROR

SCSI CDB:  A 1    14

SCSI STATUS BYTE: CHECK CONDITION    SENSE KEY: 4    ASC/ASCQ: 44
SCSI SENSE BYTES  -17:
     1                  2  3    4

  71   1        4         44  E4 8A 8F
                                      5
SCSI EXTENDED SENSE BYTES:
  4132 3 1 1      7241     A5  53343   E        A F9

  FFFFFF                                    4438362 2 2 2

                                         6

Press ENTER for additional entries...


F3=Cancel          F1 =Exit          Enter
```

	HEX	ASCII	Description
1	1		Sense key (Byte 2)
2	44		ASC/ASCQ (additional sense code/additional sense code qualifier)(Bytes 12 and 13) (See "Sense Key, ASC and ASCQ Information" on page MSG-13, for error sense information.)
3	E4		FID (FRU identification number) Byte 14
4	A 8F		First FSC (fault symptom code) Bytes 16 and 17
5	A F9		Second FSC (fault symptom code) Bytes 41 and 42
6	443836	D86	Microcode link level, Bytes 72-78
	(Not shown)		VOLSER# in ASCII/EBCDIC, Bytes 83-88

Figure 63. AIX TAPEUTIL and DIAG Commands Error Log Example

```
IBM Tape Device Error Log Analysis

NAME: rmt1   LOCATION:    - 2- 1-2    DEVICE TYPE: 357

DATE: 1 /31/95  7:33:21   SEQUENCE #2 3274   ERROR ID: 357  SIM/MIM PAGE

                1               2    3         6         7    8
SIM/MIM DATA:
  31    44    614  13 3 3 3 3 3 3 3144383634313 3 3737323 3 3 3 3 45383338
  3 3933383 39383 3 3 49434D31332D3 3 3 3 3 3 3 3 3331353 3335373 433131

        9                                1                   11

Press ENTER for additional entries...



F3=Cancel         F1 =Exit          Enter
```

Figure 64. AIX TAPEUTIL and DIAG Commands SIM Error Log Example



1 SIM/MIM Present
No SIM or MIM present
1 SIM present
2 MIM present

11 Device Model Number
433 3 C (Drive-Only)
433 31 C 1 (Stand-Alone Library)
433131 C11 (Rack-Mounted Library, C11 and C21)
433 32 C 2 (Stand-Alone Library with 2 drives)
433132 C12 (Rack-Mounted Library with 2 drives, C12 and C22)

3 Message Code
See “Message Codes” on page MSG-11

6 Severity
See “FID Severity” on page MSG-13

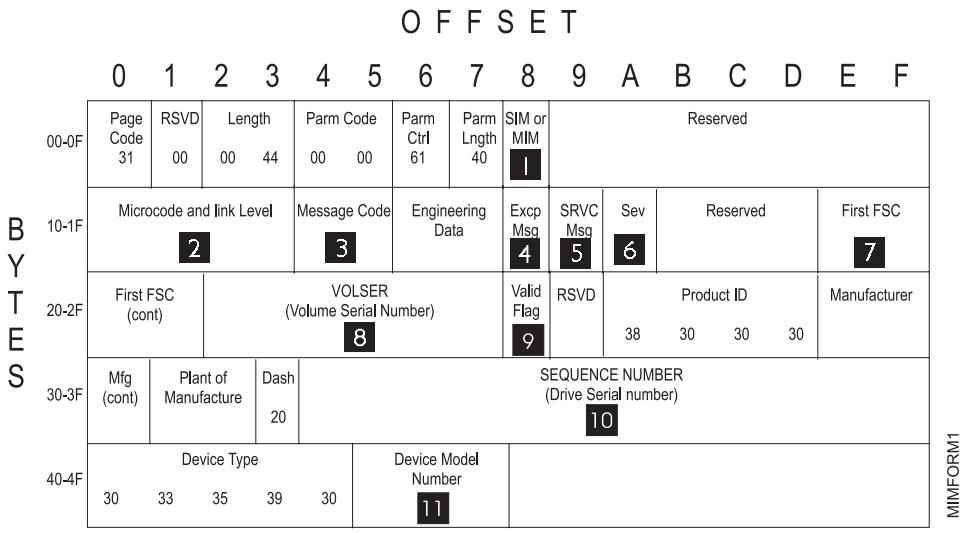
4 Exception Message
See “SIM Exception Messages” on page MSG-12

5 Service Message
See “SIM Service Messages” on page MSG-12

Figure 65. SIM Format

```
IBM Tape Device Error Log Analysis

NAME: rmt1   LOCATION:    - 2- 1-2    DEVICE TYPE: 357

DATE: 1 /31/95  7:33:21   SEQUENCE #2 3274   ERROR ID: 357  SIM/MIM PAGE

                1               2     3     4   6         7     8
SIM/MIM DATA:
  31    44    614  23 3 3 3 3 3 3 323 38453631 3  373 313 3 3 333631342 2
  2 2 2 2   3 383 3 3 49424D31322D3 3 3 3 3 3 3 3 7463333 3335373 423131

         9                              1                    11

Press ENTER for additional entries...



F3=Cancel         F1 =Exit          Enter
```

Figure 66. AIX TAPEUTIL and DIAG Commands MIM Error Log Example



1 SIM/MIM Present
- No SIM or MIM present
- 1 SIM present
- 2 MIM present

11 Device Model Number
- 433 3 C (Drive-Only)
- 433 31 C 1 (Stand-Alone Library)
- 433131 C11 (Rack-Mounted Library, C11 and C21)
- 433 32 C 2 (Stand-Alone Library with 2 drives)
- 433132 C12 (Rack-Mounted Library with 2 drives, C12 and C22)

3 Message Code
See "Message Codes" on page MSG-11

6 Severity
See "FID Severity" on page MSG-13

4 Exception Message
See "MIM Exception Messages" on page MSG-11

9 VOLSER valid flag
- VOLSER not valid
- 1 VOLSER valid

5 Service Message
See "SIM Service Messages" on page MSG-12

Figure 67. MIM Format

```
IBM Tape Device Error Log Analysis

NAME: rmt1   LOCATION:    - 2- 1-2    DEVICE TYPE: 357

DATE: 1 /31/95  7:33:21   SEQUENCE #2 3274   ERROR ID: SCSI ADAPTER ERROR

SCSI CDB: 17

SCSI ADAPTER ERROR: COMMAND TIMEOUT

Press ENTER for additional entries...


F3=Cancel          F1 =Exit          Enter
```

Figure 68. AIX TAPEUTIL and DIAG commands error log example

Running Tapeutil

If **tapeutil** is running and an error condition is detected, an error message is displayed. The error sense data has the format seen in Figure 69. The **errno**, or error number, is explained in Figure 71 on page MSG-10.

```
Read/Write test terminated, total bytes written
Operation failed with errno 5: I/O error
Residual count: 2 48

Error Sense Data,  Length 8

            1  2 3  4 5  6 7  8 9  A B  C D  E F
        - 71    4          4            44   E4 3  [q......@....D.õ.]
     1  - A 8F   21  2 1  1                  A    [!..!............]
     2  -                                         [................]
     3  -                                         [................]
     4  -                     4438 362  2 2  2    [........D86    .]
```

```
   HEX    ASCII   DESCRIPTION
     E4          FID (FRU identification number) Byte 14
   A 8F          FSC (fault symptom code) Bytes 16 and 17
  443836    D86    Microcode level, Bytes 72-74
(Not shown)        VOLSER# in ASCII or EBCDIC, Bytes 83-88
```

Figure 69. Tape Util Error Sample

Figure 70. Hex to ASCII Conversion

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
00	Null	30	0	41	A	4A	J	54	T
20	Space	31	1	42	B	4B	K	55	U
		32	2	43	C	4C	L	56	V
		33	3	44	D	4D	M	57	W
		34	4	45	E	4E	N	58	X
		35	5	46	F	4F	O	59	Y
		36	6	47	G	50	P	5A	Z
		37	7	48	H	51	Q	5F	_
		38	8	49	I	52	R		
		39	9			53	S		

Note: All codes are not shown.

Figure 71 shows only the **errno** values pertaining to tape devices. The complete list of **errno** values can be found in the AIX **/usr/include/sys/errno.h** header file.

Figure 71. Device Driver to AIX ERRNO Translation

AIX errno	Device Driver Error Code	Description
1	EPERM	**General:** The process does not have adequate permission to perform the desired function.
5	EIO	**Open:** An I/O error occurred that indicates a failure to operate the device. **Write:** The physical end of medium was detected, or it is a general error state indicating a failure to write to device. **IOCTL:** An I/O error occurred during the operation. **Close:** An I/O error occurred during the operation.
6	ENXIO	**General:** The device has not been configured and is not receiving requests. **Write:** A write operation was attempted after the device had reached end of medium.
9	EBADF	**General:** A bad file descriptor was passed. **Write:** A write operation was attempted on a device that was opened for read only.
11	EAGAIN	**Read:** The device is already opened.
12	ENOMEM	**General:** Insufficient memory available for some internal memory operation. **Read:** The number of bytes requested in a read of a variable block record was less than the size of the block. This is referred to as an over-length condition.
14	EFAULT	**General:** A memory failure occurred due to an invalid pointer or address.
16	EBUSY	**General:** An excessive busy state was encountered. **Open:** The device is reserved by another initiator or an excessive busy state was encountered.
22	EINVAL	**Open:** The operation requested had invalid parameters or an invalid combination of parameters. **Write:** The operation requested had invalid parameters or an invalid combination of parameters, or the number of bytes requested in the write was not a multiple of the block size for a fixed block transfer, or the number of bytes requested in the write was greater than the maximum block size allowed by the device for variable block transfers.
28	ENOSPC	**Write:** A write operation failed because it had reached the early warning mark while running in label processing mode. This return code is only returned once at the moment early warning is reached.
46	ENOTREADY	**General:** The device is not ready for operation or a tape is not in the drive. **Open:** If not opened with the O_NONBLOCK or O_NDELAY, the drive is not ready for operation or there is no tape in drive. If the non-blocking flags are used, the drive is not ready for operation.
47	EWRPROTECT	**Open:** An open operation with the O_RDWR or O_WRONLY flag was attempted on a write-protected tape. **Write:** A write operation was attempted on a write-protected tape. **IOCTRL:** An operation that would modify the media was attempted on a write-protected tape or a device that was opened for O_RDONLY.
78	ETIMEDOUT	**General:** A command has timed out.
110	EMEDIA	**General:** An unrecoverable media error was detected.

Message Codes

Figure 72. Message Code Descriptions

Message Code Hex	Message Code ASCII	Description
3030	00	**No Message:** This is the default message indicating that the device does not have an error to report.
3430	40	**Operator Intervention Required:** An operator action is required at the device. For example, a magazine is full and needs to be replaced or emptied. Check the device error log for possible repair action. See “3570 Drive Display Panel” on page MSG-4 and also the PANEL section describes the 3570 display.
3431	41	**Device Degraded:** The device is performing in a degraded state, but can be used. A FID is displayed with the error message. Check the device error log for possible repair action. See “3570 Drive Display Panel” on page MSG-4 and also the PANEL section describes the 3570 display.
3432	42	**Device Hardware Failure:** The device can not be used. A FID is displayed with the error message. Check the device error log for possible repair action. See “3570 Drive Display Panel” on page MSG-4 and also the PANEL section describes the 3570 display.
3433	43	**Service Circuits Failed, Operations not Affected:** This error does not affect the performance of the device. The failure only affects circuits used for non-operational testing. A FID is displayed with the error message. Check the device error log for possible repair action. See “3570 Drive Display Panel” on page MSG-4 and also the PANEL section describes the 3570 display.
3535	55	**Clean Device:** Load a cleaning cartridge in the device. The drive returns the cleaning cartridge following the cleaning procedure.
3537	57	**Device has been cleaned:** The drive has been cleaned by a cleaning cartridge.
3630	60	**Bad Media, Read Only Permitted:** MIM message. Cartridge is logically write protected. Read only is allowed. If the customer wishes to write to this tape, they should copy data to another volume. Remove this volume from the library.
3631	61	**Rewrite Media if Possible:** MIM message. Data on the tape cartridge is degraded. Attempt to copy data to a new volume. This volume should be removed from the library.
3634	64	**Bad Media, Cannot Read or Write:** MIM message. Remove media from the tape library. Data is likely lost without special tools to recover it.
3732	72	**Replace Cleaner Cartridge:** MIM message. Have the customer order a new cleaner cartridge.

MIM Exception Messages

The following provides descriptions of Exception Messages for your information. Action information can be obtained by use of “ Message Code” contained in reported MIM.

Figure 73. Exception Message Descriptions

Exception Message Hex	Exception Message ASCII	Description
32	2	**Data Degraded:**
34	4	**Medium Degraded:**
36	6	**Block 0 Error:**
37	7	**Medium Exception:**

SIM Exception Messages

The following provides descriptions of SIM Exception Messages for your information. Action information can be obtained by use of " Message Code and FID" contained in reported SIM.

Figure 74. SIM Exception Message Descriptions

Exception Message Hex	Exception Message ASCII	Description
30	0	**Reserved**
31	1	**Effect of failure unknown**
32	2	**Dev. Exception - No performance impact**
33	3	**Dev. Exception on interface**
34	4	**Dev. Exception on RACL**
35	5	**Dev. Exception on Operator Panel**
36	6	**Dev. Exception on Tape path**
37	7	**Dev. Exception in Drive**
38	8	**Dev. Preventive Maintenance Required**
39-3F	9-F	**Reserved**

SIM Service Messages

The following provides descriptions of SIM Service Messages for your information. Action information can be obtained by use of " Message Code and FID" contained in reported SIM.

Figure 75. SIM Service Message Descriptions

Service Message Hex	Service Message ASCII	Description
30	0	**Reserved**
31	1	**Repair impact is unknown**
32-36	2-6	**Reserved**
37	7	**Repair will disable access to Dev.**
38	8	**Repair will disable message display ids on Dev.**
39	9	**Dev. Cleaning Required**
3A	A	**Dev. Cleaning Complete**
3B-3F	B-F	**Reserved**

FID Severity

Figure 76. FID Severity Descriptions

FID Severity HEX	FID Severity ASCII	FID Severity Algorithm	FID Severity Real	Description
33	3	4–3=1	1	**Acute:** Device requires immediate attention. Device is unusable.
32	2	4–2=2	2	**Serious:** Device is useable but is seriously degraded.
31	1	4–1=3	3	**Moderate:** Device is useable but is running degraded.
30	0	4–0=4	4	**Service:** Device needs scheduled maintenance but is useable.

Sense Key, ASC and ASCQ Information

The following tables list all possible combinations of Sense Keys, Additional Sense Codes (ASC), and Additional Sense Code Qualifiers (ASCQ) that are reported by the 3570. See *IBM Magstar MP 3570 Tape Subsystem Hardware Reference, C-Series Models,* for additional information.

Sense Key 0

Figure 77. ASC, and ASCQ Summary for Sense Key 0 (No Sense)

ASC ASCQ	Description	Drive	Library
00 00	No Additional Sense Information - EOM	X	
00 00	No Additional Sense Information - ILI	X	
00 00	No Additional Sense Information - FM	X	
00 01	Filemark Detected	X	
00 04	Beginning-of-Partition or Medium Detected	X	

Sense Key 1 (Recovered Error)

Figure 78. ASC, and ASCQ Summary for Sense Key 1 (Recovered Error)

ASC ASCQ	Description	Drive	Library
00 00	No Additional Sense Information	X	X
00 17	Drive Needs Cleaning	X	
0A 00	Error Log Overflow	X	
17 01	Recovered Data with Retries	X	
18 00	Recovered Data with Error Correction Applied	X	
37 00	Rounded Parameter	X	
5B 01	Threshold Condition Met	X	
5B 02	Log Counter at Maximum	X	

Sense Key 2 (Not Ready)

Figure 79. ASC, and ASCQ Summary for Sense Key 2 (Not Ready)

ASC ASCQ	Description	Drive	Library
04 00	Logical Unit Not Ready, Cause Not Reportable	X	X
04 01	Logical Unit Is in Process of Becoming Ready	X	X
04 03	Logical Unit Not Ready, Manual Intervention Required	X	X
04 04	Logical Unit Not Ready, Format in Progress	X	
04 85	Open Door		X
04 8D	In Manual (Sequential) Mode		X
04 8E	In Automatic (Sequential) Mode		X
15 01	Mechanical Positioning Error, Manual Intervention Required		X
30 03	Cleaning in Progress	X	
3A 00	Medium Not Present	X	
53 00	Media Load or Eject Failed	X	

Sense Key 3 (Medium Error)

Figure 80 (Page 1 of 2). ASC, and ASCQ Summary for Sense Key 3 (Medium Error)

ASC ASCQ	Description	Drive	Library
03 02	Excessive Write Errors	X	
09 00	Track Following Error	X	
0C 00	Write Error	X	
11 00	Unrecovered Read Error	X	
11 01	Read Retries Exhausted	X	
11 08	Incomplete Block Read	X	
14 00	Recorded Entity Not Found	X	
14 01	Record Not Found	X	
14 02	Filemark or Setmark Not Found	X	
14 03	End-of-Data Not Found	X	
14 04	Block Sequence Error	X	
30 00	Incompatible Medium Installed	X	
30 01	Cannot Read Medium, Unknown Format	X	
30 02	Cannot Read Medium, Incompatible Format	X	
31 00	Medium Format Corrupted	X	
31 01	Format Command Failed	X	
33 00	Tape Length Error	X	
51 00	Erase Failure	X	
85 00	Write Protected Because of Tape or Drive Failure	X	
85 01	Write Protected Because of Tape Failure	X	

Figure 80 (Page 2 of 2). ASC, and ASCQ Summary for Sense Key 3 (Medium Error)			
ASC ASCQ	**Description**	**Drive**	**Library**
85 02	Write Protected Because of Drive Failure	X	

Sense Key 4 (Hardware Error)

Figure 81. ASC, and ASCQ Summary for Sense Key 4 (Hardware Error)

ASC ASCQ	Description	Drive	Library
09 00	Track Following Error	X	
15 01	Mechanical Positioning Error	X	
3B 00	Sequential Positioning Error	X	
3B 08	Reposition Error	X	
40 00	Diagnostic Failure	X	
44 00	Internal Target Failure	X	X
4C 00	Logical Unit Failed Self-Configuration	X	
52 00	Cartridge Fault	X	
53 00	Media Load or Eject Failed	X	
53 01	Unload Tape Failure	X	

Sense Key 5 (Illegal Request)

Figure 82. ASC, and ASCQ Summary for Sense Key 5 (Illegal Request)

ASC ASCQ	Description	Drive	Library
1A 00	Parameter List Length Error	X	X
20 00	Invalid Command Operation Code	X	X
21 01	Invalid Element Address		X
24 00	Invalid Field in CDB	X	X
25 00	Logical Unit Not Supported	X	X
26 00	Invalid Field in Parameter List	X	X
26 01	Parameter Not Supported	X	
26 02	Parameter Value Invalid	X	
26 03	Threshold Parameters Not Supported	X	
2C 00	Command Sequence Error	X	
39 00	Saving Parameters Not Supported	X	
3B 0D	Medium Destination Element Full		X
3B 0E	Medium Source Element Empty		X
3B 11	Medium Magazine Not Accessible		X
3B 80	Medium Transport Element Full		X
3D 00	Invalid Bits in Identify Message	X	X
53 02	Medium Removal Prevented	X	X
5B 03	Log List Codes Exhausted	X	
80 00	CU Mode, Vendor-Unique	X	X
85 03	Write Protected Because of Current Tape Position	X	

Sense Key 6 (Unit Attention)

Figure 83. ASC, and ASCQ Summary for Sense Key 6 (Unit Attention)

ASC ASCQ	Description	Drive	Library
00 02	End-of-Partition/Medium Detected, Early Warning	X	
28 00	Not Ready to Ready Transition, Medium May Have Changed	X	X
28 01	Import or Export Element Accessed		X
28 80	Not Ready to Ready Transition, Medium Changer		X
29 00	Power On, Reset, or Bus Device Reset Occurred	X	X
2A 01	Mode Parameters Changed	X	X
2A 02	Log Parameters Changed	X	
2F 00	Commands Cleared by Another Initiator	X	
30 00	Incompatible Medium Installed	X	
3B 12	Medium Magazine Removed		X
3B 13	Medium Magazine Inserted		X
3B 14	Medium Magazine Locked		X
3B 15	Medium Magazine Unlocked		X
3F 01	Microcode Has Been Changed	X	X
3F 02	Changed Operating Definition	X	X
3F 03	Inquiry Data Has Changed	X	X
5A 01	Operator Medium Removal Request	X	
82 83	Cleaning Completed, Cleaning Cartridge Ejected	X	

Sense Key 7 (Data Protect)

Figure 84. ASC, and ASCQ Summary for Sense Key 7 (Data Protect)

ASC ASCQ	Description	Drive	Library
27 00	Write Protected	X	

Sense Key 8 (Blank Check)

Figure 85. ASC, and ASCQ Summary for Sense Key 8 (Blank Check)

ASC ASCQ	Description	Drive	Library
00 05	End-of-Data Detected	X	
14 01	Record Not Found, Void Tape	X	

Sense Key B (Aborted Command)

Figure 86. ASC, and ASCQ Summary for Sense Key B (Aborted Command)

ASC ASCQ	Description	Drive	Library
14 00	Recorded Entity Not Found	X	
14 01	Record Not Found	X	
14 02	Filemark or Setmark Not Found	X	
1B 00	Synchronous Data Transfer Error	X	X
43 00	Message Error	X	X
44 00	Internal Target Failure	X	X
45 00	Select or Re-select Failure	X	X
47 00	SCSI Parity Error	X	X
48 00	Initiator Detected Error Message Received	X	X
49 00	Invalid Message Error	X	X
4A 00	Command Phase Error	X	X
4B 00	Data Phase Error	X	X
4E 00	Overlapped Commands Attempted	X	X

Sense Key D (Volume Overflow)

Figure 87. ASC, and ASCQ Summary for Sense Key D (Volume Overflow)

ASC ASCQ	Description	Drive	Library
00 02	End-of-Partition/Medium Detected	X	

Using SMIT/ERRPT Commands

To use the **smit** command:

Note: The **smit** command has various ways to format the error log.

1. Type **smit** at the AIX command line.
2. Select **Problem Determination** from the System Management menu.
3. Select **Error Log** from the Problem Determination menu.
4. Select **Generate Error Report** from the Error Log menu.
5. Select **filename**, then select **no** from the Single Select list.
6. From the Generate Error Report menu you can select the type of reports you want to view, then press the **Do** icon.
7. You can scroll through the log by using the up or down icons on the menu.

To use the **errpt** command:

1. Select **errpt |pg** at the AIX command line. The summary report will be displayed.
2. You can scroll through the log by pressing the Enter key for the next page.
3. You can type **q** to quit the error log at any time.

Or,

1. Type **errpt -a |pg** at the AIX command line. The detailed report will be displayed.
2. You can scroll through the log by pressing the Enter key for the next page.
3. You can type **q** to quit the error log at any time.

| Analyse Sense Key and ASC/ASCQ data to determine the type of Sense information that is reported in
| the error log. If a hardware problem is indicated, use the FID, go to START-1 for problem determination. For errors that indicate SCSI adapter or SCSI bus errors, see Figure 68 on page MSG-8, go to "SCSI Bus Problem Determination" on page PROC-79.

For errors indicating system problems, enter the appropriate maintenance package.

Figure 88. Hex to ASCII Conversion

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
00	Null	30	0	41	A	4A	J	54	T
20	Space	31	1	42	B	4B	K	55	U
		32	2	43	C	4C	L	56	V
		33	3	44	D	4D	M	57	W
		34	4	45	E	4E	N	58	X
		35	5	46	F	4F	O	59	Y
		36	6	47	G	50	P	5A	Z
		37	7	48	H	51	Q	5F	_
		38	8	49	I	52	R		
		39	9			53	S		

Note: All codes are not shown.

```
ERROR LABEL:    TAPE_ERR2
ERROR ID:      476B351D

Date/Time:      Tue Oct 31  7:33:21
Sequence Number: 2 3274
Machine ID:          32437
Node ID:        kitt
Error Class:     H
Error Type:      PERM
Resource Name:   rmt1
Resource Class:  tape
Resource Type:   357
Location:          - 2- 1-2
VPD:
       Manufacturer.................IBM
       Machine Type and Model...... 357 C11
       Serial Number...............         315
       Device Specific . (FW) .....4D86

Error Description
TAPE DRIVE FAILURE

Probable Causes
TAPE DRIVE

Failure Causes
TAPE
TAPE DRIVE

       Recommended Actions
       PERFORM PROBLEM DETERMINATION PROCEDURES

Detailed Data
SENSE DATA
 6 4      11 1 FFFF FE                    1 2      7     4           48
44   E4 3 A 8F   4A 1E 1  191   4A 825        11     36 28     33 4D     A  F9
           19       27          2                          C7         4438 362
2 2  2
```

HEX	ASCII	Description
4		Sense key
44		ASC/ASCQ (additional sense code/additional sense code qualifier)
		(See “Sense Key, ASC and ASCQ Information” on page MSG-13 for error sense information.)
E4		FID (FRU identification number)
A 8F		First FSC (fault symptom code)
3628		Second FSC (fault symptom code)
334D		Next to Last FSC (fault symptom code)
A F9		Last FSC (fault symptom code)
443836	D86	Microcode link level

Figure 89. AIX SMIT and ERRPT Command Error Log Example

```
ERROR LABEL:    SIM_MIM_RECORD_357
ERROR ID:      2E2EFDDE

Date/Time:      Tue Oct 31  7:33:21
Sequence Number: 2 3274
Machine ID:          32437
Node ID:        kitt
Error Class:     H
Error Type:      UNKN
Resource Name:   rmt1
Resource Class:  tape
Resource Type:   357
Location:          - 2- 1-2
VPD:
       Manufacturer.................IBM
       Machine Type and Model...... 357 C11
       Serial Number...............         315
       Device Specific . (FW) .....4D86

Error Description
UNDETERMINED ERROR

Probable Causes
TAPE DRIVE
TAPE CONTROL UNIT

Failure Causes
TAPE DRIVE

       Recommended Actions
       PERFORM PROBLEM DETERMINATION PROCEDURES
       RUN DIAGNOSTICS AGAINST THE FAILING DEVICE
       CONTACT APPROPRIATE SERVICE REPRESENTATIVE

Detailed Data
DIAGNOSTIC EXPLANATION
                 1                    2      3           4

31     44      614   13  3 3  3 3  3 3  3144 3836 3431 3 3  3737 323  3 3  3 3
4534 413  3846 413  4639 383  3 3  4942 4D5  4D2D 5365 7175 656E 6365 4E75 6D

  5     6        7
```

	HEX	ASCII	Description
1	1		1=SIM 2=MIM
2	31443836	1D86	Model and Microcode link level
3	3431	41	Message code (See “Message Codes” on page MSG-11))
4	32	2	FID severity (See “FID Severity” on page MSG-13)
5	4534	E4	FID (FRU identification number)
6	413 3846	A 8F	First FSC (fault symptom code)
7	413 4639	A F9	Last FSC (fault symptom code)

Figure 90. Error Log Example of SIM Message

```
ERROR LABEL:    RECOVERED_ERROR
ERROR ID:       F78A 11

Date/Time:      Mon Nov 2   7:33:21
Sequence Number: 232646
Machine ID:          32437
Node ID:        kitt
Error Class:     H
Error Type:      TEMP
Resource Name:   rmt1
Resource Class:  tape
Resource Type:   357
Location:          - 2- 1-2
VPD:
       Manufacturer.................IBM
       Machine Type and Model...... 357 C11
       Serial Number...............         315
       Device Specific . (FW) .....4D86

Error Description
Recovery logic initiated by device

Probable Causes
Undetermined

Failure Causes
TAPE DRIVE
MEDIA

       Recommended Actions
       THIS ALERT IDENTIFIES THE CAUSE OF A PREVIOUS ERROR WHICH HAS BEEN RECOVERED

Detail Data
SENSE DATA
 6 2       A 1      14                    1 2      71    1          4
44   E4 8 A 8F 4132  3 1  1        7241       A5   533 43    E          A  F9
               FFFF FF                                              4438 362
2 2  2
```

HEX	ASCII	Description
1		Sense Key
44		ASC/ASCQ
E4		FID (FRU identification number)
A 8F		First FSC (fault symptom code)
3343		Second FSC (fault symptom code)
		Next to Last FSC (fault symptom code)
A F9		Last FSC (fault symptom code)
443836	D86	Microcode level

Figure 91. AIX SMIT and ERRPT Command Error Log Example

```
   1        2     3  4    5           6
 5 2F666 1  3 75695  P  H  scsi       ADAPTER ERROR
 5 2F666 1  3 75595  P  H  scsi       ADAPTER ERROR
11 4AA28 1  3 75495  T  S  SYSPROC    System reset interrupt received
9DBCFDEE 1  3 75795  T  O  errdemon   Error logging turned on
 F78A 11 1  3 75195  T  H  rmt1       Recovery logic initiated by device
4865FA9B 1  3 74995  P  H  rmt1       TAPE OPERATION ERROR
476B351D 1  3 74995  P  H  rmt1       TAPE DRIVE FAILURE
2E2EFDDE 1  3 74995  U  H  rmt1       UNDETERMINED ERROR
476B351D 1  3 74995  P  H  rmt1       TAPE DRIVE FAILURE
2E2EFDDE 1  3 74995  U  H  rmt1       UNDETERMINED ERROR
2E2EFDDE 1  3 74995  U  H  rmt1       UNDETERMINED ERROR
 5 2F666 1  3 74495  P  H  scsi       ADAPTER ERROR
 5 2F666 1  3 74395  P  H  scsi       ADAPTER ERROR
11 4AA28 1  3 74395  T  S  SYSPROC    System reset interrupt received
9DBCFDEE 1  3 74595  T  O  errdemon   Error logging turned on
4865FA9B 1  3 73795  P  H  rmt1       TAPE OPERATION ERROR
476B351D 1  3 73795  P  H  rmt1       TAPE DRIVE FAILURE
2E2EFDDE 1  3 73795  U  H  rmt1       UNDETERMINED ERROR
476B351D 1  3 73795  P  H  rmt1       TAPE DRIVE FAILURE
2E2EFDDE 1  3 73595  U  H  rmt1       UNDETERMINED ERROR
AA8AB241 1  3 3 195  T  O  OPERATOR   OPERATOR NOTIFICATION
AA8AB241 1  2 3 195  T  O  OPERATOR   OPERATOR NOTIFICATION
AA8AB241 1  1 3 195  T  O  OPERATOR   OPERATOR NOTIFICATION
FCA96 CE 1  1  1395  T  S  tok        EXCESSIVE TOKEN-RING ERRORS
2 188DE1  928 91195  P  H  tok        WIRE FAULT
476B351D  927132795  P  H  rmt       TAPE DRIVE FAILURE
476B351D  927132795  P  H  rmt       TAPE DRIVE FAILURE
476B351D  927132695  P  H  rmt       TAPE DRIVE FAILURE
476B351D  927132695  P  H  rmt       TAPE DRIVE FAILURE
5537AC5F  927132495  P  H  rmt       TAPE DRIVE FAILURE
```

NUMBER	DESCRIPTION
1	Error ID
2	Time-stamp
3	Error Type
4	Error Class
5	Resource Name
6	Error Description

ERROR CLASS	DESCRIPTION
H	Hardware
S	Software
O	Informational

ERROR TYPE	DESCRIPTION
PEND	The availability loss of a device or component is imminent.
PERF	The performance of a device or component has degraded to an unacceptable level.
PERM	A hardware or software condition that could not be recovered from.
TEMP	A hardware condition that was recovered from after several unsuccessful attempts.
UNKN	The severity of the condition could not be determined.

Figure 92. AIX SMIT and ERRPT Commands Error Log Example

Error Log Analysis—AS/400

To gain access to the AS/400 Problem logs and error logs, sign on at any available workstation using the QSRV logon and its security password (QSRV). After sign on, the proper access authorizations will be granted and the AS/400 MAIN MENU will be displayed.

There are two procedures depending on which version/release of OS/400 you are running.

AS/400 System with CISC Processor

1. Type STRSST (Start System Service Tools) command on the command entry line on the AS/400 Main Menu and press enter.
2. Select “Start a service tool”.
3. Select “Error log utility”.
4. Select “Analyze error log”.
5. Specify the time period for searching the error log, then select “Magnetic media”.
6. On the Select Analysis Report Options menu, specify a device type of 3570 and press enter. Leave all other options at their default value.
7. Use the “Display report” option to display the desired error log entry.
8. The following figure is a sample AS/400 Error Log display screen showing the 3570 error log data.

```
                    Display Detail Report for Resource

                                        Serial
Resource         Type     Model           Number          Address
TAP 2           357      C11            13-1  63         27 -17  FFFF

Error log ID  . . . . . :    46 2D2     Sequence . . . . . :    178324
Date  . . . . . :   1 /23/95     Time . . . . . :   11:38: 2
Reference code  . . . . . :   935         Error code . . . . . :
Table ID  . . . . . :   357  C11     IPL source . . . . . :   B
Error type  . . . . . :   Permanent
Description . . . . . :
Tape unit failure
                                1   2        3   4   5

SIM/MIM message . . . . . :          137E42  773     E4A 8FA
                          F98    B 13           75 357 C11


                                       6     7   8
Press Enter to continue.

F3=Exit                                  F6=Display hexadecimal report
F1 =Display previous detail report          F12=Cancel
```

1 Microcode and Link Level
2 Message Code
See “Message Codes” on page MSG-11
3 FID (FRU Identifier)
4 First FSC (fault symptom code)
5 Last FSC (fault symptom code)
6 Sequence Number (drive serial number)
7 Device Type
8 Device Model Number

Figure 93. AS/400 Example Error Log of SIM

To display the hexadecimal error report, press F6. The following figure is an example of a 3570 hexadecimal error report which shows a permanent read/write error. Press **Page Up** or **Page Down** to display offset 0130 to 016C in the error log.

```
            Display Hexadecimal Report for Resource

                                 Serial                Resource
 Name           Type     Model     Number                 Name
 TAP 2          357      C11       13-1  63               DEVICE

 Offset         1 2 3  4 5 6 7  8 9 A B  C D E F    EBCDIC
     C                                               ................
     D                                               ................
     E        F88 78   65 1   1      27  17  FFFF   8...............
     F        357  C11 935    1   6312 2  5D8D5E6   .....&.......QNW
    1         F F F5F  4 4 425      92                  5   .&........
    11           4         A B   E223444 3244        ................
    12            F     3          4           9      .. ...... ......
    13        E42AA 8F    1   3  13    9 4249428     ................
    14        1   1 35 42   133 6B 5 4A  F9          ........,.......
    15              3       4       5A9         3     ..........!.....
    16               1       23       4438 362 2 2    ................
    17        2   1       3                    6      ................
                                                            More...
 Press Enter to continue.

 F3=Exit       F12=Cancel
```

```
OFFSET      HEX    ASCII  DESCRIPTION
  E4-  E5     65 1          IOP Type
  EC-  ED     17            1 = IOP Port Used
                          7   = Drive Address
   F -  F3  357  C11          Device Type and Model
   F4-  F5     935           SRC (system reference code)
 13             E4          FID (FRU identification number)
 132- 133     A 8F           First FSC (fault symptom code)
 143- 144     3542           Second FSC (fault symptom code)
 147- 148     336B           Next to Last FSC (fault symptom code)
 14B- 14C     A F9           Last FSC (fault symptom code)
 16A- 16C   443836    D86    Microcode level
```

Figure 94. AS/400 Hexadecimal Error Log (display)

Figure 95. Hex to ASCII Conversion

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
00	Null	30	0	41	A	4A	J	54	T
20	Space	31	1	42	B	4B	K	55	U
		32	2	43	C	4C	L	56	V
		33	3	44	D	4D	M	57	W
		34	4	45	E	4E	N	58	X
		35	5	46	F	4F	O	59	Y
		36	6	47	G	50	P	5A	Z
		37	7	48	H	51	Q	5F	_
		38	8	49	I	52	R		
		39	9			53	S		

Note: All codes are not shown.

The following figure is an example of an AS/400 hex error report with an Error Type of Permanent.

The FID and FSC in the error log are in hex, while the microcode level is in ASCII. Use the ASCII to Hex Conversion table provided.

```
 Error Log Utility                                  Page . . . :      2
                                                IBM      1 /23/95  14:13:1
                      Partial Report for Resource

 From . . :   1 /12/95   14:13:1       To . . :  1 /23/95   14:13:1

                             Serial
Resource      Type     Model     Number        Address        Total Count
TAP 2         357      C11       13-1  63      27 -17  FFFF        286

Reference Code              Error Type                 Count

   935                    Permanent                    3
   9355                   Permanent                   21
   FFF6                   Statistic                  262

                      Detail Report for Resource

                                     Serial
Resource         Type        Model       Number           Address
TAP 2            357         C11         13-1  63          27 -17  FFFF

Error Log ID . . . . . . :     46 2D2     Sequence . . . . . . :       178324
Date . . . . . . . . . . :   1 /23/95     Time . . . . . . . . :    11:38: 2
Reference code . . . . . :   935         Error Code . . . . . :
Table ID . . . . . . . . :   357  C11     IPL Source . . . . . :    C11
Error Type . . . . . . . :   Permanent
Description  . . . . . . :
Tape unit detected a read or write error on tape medium
          1                                    2                                        3

                C5D3F F2       F8    7   E  787BB495   F5    DC    2B894  2 F6F5F  F1 27      EL 2...8.....#..5........65 1...
                                                                                             ................................
                     E3 C1D7F F2  4 4 4 4  4 F3F5F7   F C3F1F1    1  63  935   46  2D2       ...TAP 2    357 C11.....&...K..
                           17    FFFF11               F3F5F7F  F C3F1F1  4 D4C4C4 C3D4      ...............357  C11 MDDCM..
                    F1F3 4 4 4 4   4 4 4 4  4 4 4 4     7                      F8  82 E2C9   ..13           ...........8..SI
               F1F84 4  4 4 4 4   C4C3F7F3 4 4 4 4    4 4 E3C1 D7F2F54   4 4 4 4            18     DC73     TAP25    ....
                                                                                             ................................
               F88 78   65 1   1       27  17  FFFF   357  C11 935    1    6312 2  5D8D5E6   8.....................&      QNW
           F F F5F  4 4 425       92                    4         A B    E223444 3244         5   .&.........................
               F     3          4          9          E42AA 8F    1   3   13    9 4249428    .. ..............................
           1   1 35 42   133  6B 5 4A  F9                    3      4        5A9         3    ........,.................!.....
                1       23        4438 362 2 2         2   1       3                   6     ................................
            3  39        3        1                       131    3          4           9     ........................... ......
           FE2A38     1712 2   5D8       1712 2    5D81       5        1712 2  5D8 6         .........Q.......Q...........Q..
           1   2     2          1712 2  5D8 6                          4 4 4 4  4 4 4 4      ............Q..........

 1   Offset into the error log
 2   Hexadecimal error log
 3   EBCDIC field

 OFFSET     HEX    ASCII  DESCRIPTION
   E4-  E5     65 1          IOP Type
   EC-  ED     17            1 = IOP Port Used
                           7   = Drive Address
   F -  F3  357  C11          Device Type and Model
   F4-  F5     935           SRC (system reference code)
  13            E4          FID (FRU identification number)
  132- 133     A 8F          First FSC (fault symptom code)
  143- 144     3542          Second FSC (fault symptom code)
  147- 148     336B          Next to Last FSC (fault symptom code)
  14B- 14C     A F9          Last FSC (fault symptom code)
  16A- 16C   443836    D86    Microcode level
```

Figure 96. AS/400 Hexadecimal Error Log (printout)

Once you have located the FID, go to START-1 for problem determination.

See *AS/400 Advanced Series Service Functions*, SY44-4902 for more detailed information on displaying and printing the error logs.

AS/400 System with RISC Processor

1. Type STRSST (Start System Service Tools) command on the command entry line on the AS/400 Main Menu and press enter.
2. Select “Start a service tool”.
3. Select “Product activity log”.
4. Select “Analyze log”.
5. Specify the time period for searching the error log, then select “Magnetic media” option.
6. On the “Select Analysis Report Options” menu, specify a device type of 3570 and press enter. Leave all other options at their default value.
7. Use the “Log Analysis Report” menu to display the desired error log entry.

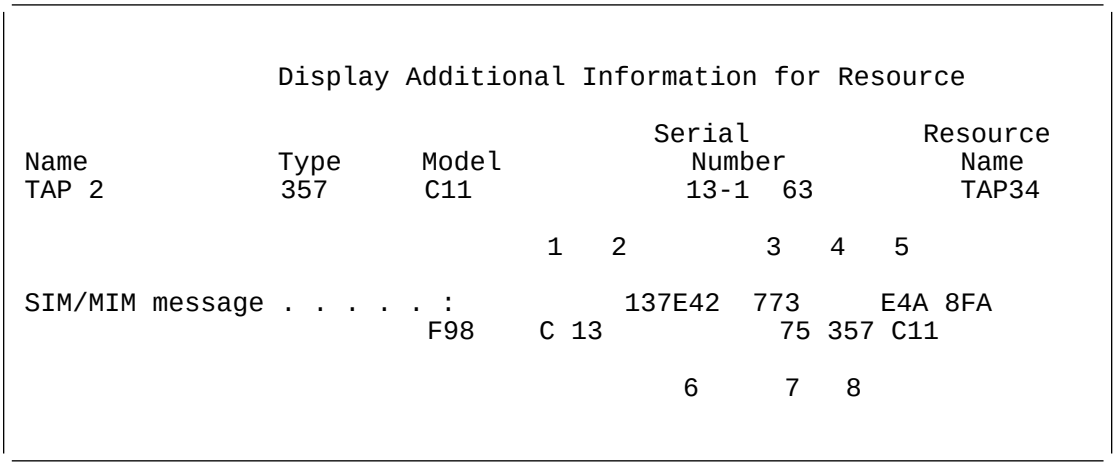
   Note: You may use the PF11 function key which will give you a brief description of the error log entry. This could be helpful when scanning the error logs.
8. The following figure is a sample AS/400 Error Log display screen showing the 3570 error log data.

```
                    Display Detail Report for Resource

                                        Serial          Resource
Name            Type     Model            Number           Name
TAP 2           357      C11              13-1  63         TAP34

Error log ID  . . . . . :     46 2D2     Sequence . . . . . :     178324
Date  . . . . . :   1 /23/95     Time . . . . . :    11:38: 2
Reference code  . . . . . :   935          Secondary code . . . :
Table ID  . . . . . :   357  C11     IPL source/state . . :    B/3

Class . . . . . :   Permanent
System Ref Code . . . . . :   357 93
Tape unit failure
                                1   2         3   4   5

SIM/MIM message . . . . . :           137E42  773     E4A 8FA
                          F98    C 13            75 357 C11

                                       6      7   8
Press Enter to continue.

F3=Exit               F4=Additional Information   F6=Hexadecimal report
F9=Address Information  F1 =Previous detail report  F12=Cancel
```

1 Microcode and Link Level
2 Message Code
See “Message Codes” on page MSG-11
3 FID (FRU Identifier)
4 First FSC (fault symptom code)
5 Last FSC (Fault Symptom Code)
6 Sequence Number (drive serial number)
7 Device Type
8 Device Model Number

Figure 97. AS/400 Example Error Log of SIM Message

9. Press F4 to display additional information. See the example in Figure 98 on page MSG-28.



1 Microcode and Link Level
2 Message Code
See “Message Codes” on page MSG-11
3 FID (FRU Identifier)
4 First FSC (fault symptom code)
5 Last FSC (Fault Symptom Code)
6 Sequence Number (drive serial number)
7 Device Type
8 Device Model Number

Figure 98. AS/400 Example Error Log of SIM Message

To display the hexadecimal error report, press F6. The following figure is an example of a 3570 hexadecimal error report which shows a permanent read/write error. Press **Page Up** or **Page Down** to display offset 0130 to 016C in the error log.

```
            Display Hexadecimal Report for Resource

                                  Serial                Resource
 Name           Type     Model     Number                 Name
 TAP 2          357      C11       13-1  63               DEVICE

 Offset         1 2 3  4 5 6 7  8 9 A B  C D E F    EBCDIC
    18        F88 78   65 1   1      27  17  FFFF   8..............
    19        357  C11 935    1   6312 2  5D8D5E6   .....&.......QNW
    1A        F F F5F  4 4 425      92                5   .&........
    1B           4         A B   E223444 3244       ................
    1C            F     3         4           9      .. ...... ......
    1D        E42AA 8F    1   3  13    9 4249428    ................
    1E        1   1 35 42   133 6B 5 4A  F9         ........,........
    1F               3      4       5A9         3   ..........!.....
    2                 1       23       4438 362 2 2  ................
    21        2   1       3                    6     ................
    22                                               ................
    23            1       3FFFF FFFC12    331D9E2   ..............RS
                                                            More...
Press Enter to continue.

F3=Exit       F12=Cancel
```

OFFSET	HEX	ASCII	DESCRIPTION
184- 185	65 1		IOP Type
18C- 18D	17		1 = IOP Port Used
			7 = Drive Address
19 - 193	357 C11		Device Type and Model
194- 195	935		SRC (system reference code)
1D	E4		FID (FRU identification number)
1D2- 1D3	A 8F		First FSC (fault symptom code)
1E3- 1E4	3542		Second FSC (fault symptom code)
1E7- 1E8	336B		Next to Last FSC (fault symptom code)
1EB- 1EC	A F9		Last FSC (fault symptom code)
2 A- 2 C	443836	D86	Microcode level

Figure 99. AS/400 Hexadecimal Error Log (display)

The following figure is an example of an AS/400 hex error report with an Error Type of Permanent.

The FID and FSC in the error log are in hex, while the microcode level is in ASCII. Use the ASCII to HEX Conversion table provided.

```
 Error Log Utility                                  Page . . . :      2
                                                IBM      1 /23/95  14:13:1
                     Partial Report for Resource

 From . . :   1 /12/95   14:13:1       To . . :  1 /23/95   14:13:1
                           Serial
Resource      Type     Model     Number        Address         Total Count
TAP 2         357      C11       13-1  63      27 -17  FFFF        286

Reference Code             Error Type                 Count

   935                    Permanent                    3
   9355                   Permanent                   21
   FFF6                   Statistic                  262

                     Detail Report for Resource
                                  Serial
Resource          Type        Model       Number           Address
TAP 2            357          C11        13-1  63          27 -17  FFFF

Error Log ID . . . . . . :    46 2D2     Sequence . . . . . . :      178324
Date . . . . . . . . . . :   1 /23/95    Time . . . . . . . . :   11:38: 2
Reference code . . . . . :   935         Error Code . . . . . :
Table ID . . . . . . . . :   357  C11    IPL Source . . . . . :   C
Error Type . . . . . . . :   Permanent
Description  . . . . . . :
Tape unit detected a read or write error on tape medium
          1                                   2                                                  3

               C5D3F F2       F8    7   E  787BB495   F5    DC    2B894  2 1  1 3 3C         EL 2...8.....#..5.............
     2         921      11                  172        F3F5F7F  C3F1F14   F1F26 F  F F F F     ...............357 C11 12-
     4         4 4 F6F5 F F1              1    1           2        5   1     2FFFF     FFFF   ..65 1.........................
     6                                                                                         ................................
     8                                                                                E3C1     ..............................TA
     A         D7F F74  4 4 4 4                                                 4 4 4 4  4 4 4 4   P 7    ................
     C         4 4 4 4  4 4 4 4   4 4 4 4  4 4 4 4    4 4 4 4  4 4 4 4   4 4 4 4  4 4 4 4
     E         F3F5F7F  F C3F1F1      E2D3 C9C3C9D6   4 4 E5F3 D9F6D4F   4 4                 357  C11..SLICIO  V3R6M   ......
    1            79                    17                          172                        ................................
    12                                                                                         ................................
    14         E3C1D7F  F74 4 4   4 4                  4 4 4 4  4 4 4 4   4 4 4 4     7   1   TAP 7    .....           ....
    16                  1 2    3                                            5  1E      188    ................................
    18         F88 78   65 1   1       12  12F FFFF   357  B11 921           12 2  624       8.............  ..................
    1A                      425       92 E               4         A B    E213234 4338  B4   .......&........................
    1C             F     3          4          9        E42AA 8F    1   3   13    9 4249428   .. ..............................
    1E         1   1 35 42   133  6B 5 4A  F9                 3      4        5A9         3   ........,.................!......
    2           1       23        4438 362 2 2        2   1       3                    6      ................................
    22       3  39        3       1                      131    3          4           9      ..............................  ......
    24         FE2A38     1712 2   5D8       1712 2     5D81        5        1712 2  5D8 6    .........Q.......Q...........Q..
    26         1   2      2          1712 2  5D8 6                          4 4 4 4  4 4 4 4   .............Q..........
    28                                                                                         ................................
           1 LINES                  2A      TO              2A     SAME AS ABOVE
    2C                                                                                   D5    ................................N
    2E                                                                                 D5      ................................N.
    3                           4 4 4 4  4 4 4 4    4 4 4 4  4 4 4 4  4 4 4 4  4 4 4 4       ........
     E N D  O F  C O M P U T E R  P R I N T O U T

 1   Offset into the error log
 2   Hexadecimal error log
 3   EBCDIC field

 OFFSET     HEX    ASCII  DESCRIPTION
  184- 185     65 1          IOP Type
  18C- 18D     12F           1 = IOP Port Used
                            2F  = Drive Address
  19 - 193  357  C11           Device Type and Model
  194- 195     935           SRC (system reference code)
  1D            E4          FID (FRU identification number)
  1D2- 1D3     A 8F          First FSC (fault symptom code)
  1E3- 1E4     3542          Second FSC (fault symptom code)
  1E3- 1E4     3542          Next to Last FSC (fault symptom code)
  1EB- 1EC     A F9          Last FSC (fault symptom code)
  2 A- 2 C   443836    D86    Microcode level
```

Figure 100. AS/400 Hexadecimal Error Log (printout)

Check the Message Code, see “Message Codes” on page MSG-11, for all SIMs before entering the START section with the FID. Once you have located the FID, go to START-1 for problem determination.

See *AS/400 Advanced Series Service Functions,* SY44-4902 for more detailed information on displaying and printing the error logs.

Figure 101. Hex to ASCII Conversion

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
00	Null	30	0	41	A	4A	J	54	T
20	Space	31	1	42	B	4B	K	55	U
		32	2	43	C	4C	L	56	V
		33	3	44	D	4D	M	57	W
		34	4	45	E	4E	N	58	X
		35	5	46	F	4F	O	59	Y
		36	6	47	G	50	P	5A	Z
		37	7	48	H	51	Q	5F	_
		38	8	49	I	52	R		
		39	9			53	S		

Note: All codes are not shown.

Sun Error Logs

The Sun system does not provide error logs for analysis; therefore, you will have to use the device diagnostics and Device Error Log for problem determination. See “CE Logs Menu” on page PANEL-41 and “Error Log Analysis Procedure” on page PROC-39. When you have located a FID, go to START-1.

| You may refer to APPENDIX A which contains additional information concerning host attachment software
| service tools for Sun (Solaris), including *tapeutil*.

See *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide,* GC35-0154 for additional information about Solaris service and diagnostic aids.

Obtaining Error Information from an HP/UX System

| The HP-UX system does not provide error logs for analysis; therefore, you will have to use the device
| diagnostics and Device Error Log for problem determination. See “CE Logs Menu” on page PANEL-41
| and “Error Log Analysis Procedure” on page PROC-39. When you have located a FID, go to START-1.

| You may refer to APPENDIX A which contains additional information concerning host attachment software
| service tools for HP-UX systems, including *tapeutil*.

See *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide,* GC35-0154 for additional information about HP/UX service and diagnostic aids.

Obtaining Error Information from a Windows NT System

| You may refer to APPENDIX A which contains additional information concerning host attachment software
| service tools for Windows NT systems, including *ntutil*.

See *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide,* GC35-0154 for additional information about Windows NT service and diagnostic aids.

| Running NT Util

| If **ntutil** is running and an error condition is detected, an error message is displayed. The error sense
| data has the format seen in Figure 102 on page MSG-33. The **err 0 ERROR_SUCCESS>**, or error
| number, is explained in “NTUTIL Symbolic Error and Error Number” on page MSG-33.

```
enter selection:  39
Scsi status:   2h/Sense information Length 6 h
Sense  KEY/ASC/ASCQ =  2/3a/
      KEY   meaning is:  not ready
Sense Info - - - consult SCSI spec for details

             1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
 ------------------------------------------------------------
        - 7      2              58              3a    FF  2
     1  - C4  8              1 4                      A
     2  -
     3  -
     4  -                          32 46 31 2  2  2  2
     5  -

analyze <> called with rc 1 err   <ERROR_SUCCESS> data
total elapsed time in seconds =    .
Return to continue:
```

```
   HEX    ASCII    DESCRIPTION
    FF             FID (FRU identification number) Byte 14
   C4 8            FSC (fault symptom code) Bytes 16 and 17
 324631    2F1     Microcode level, Bytes 72-74
(Not shown)        VOLSER# in ASCII or EBCDIC, Bytes 83-88
```

Figure 102. Tape Util Error Sample

For further information on gathering error data, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide,* GC35-0154, and the Hardware Reference Manual. On certain errors a ntutil test_unit_ready command (39) has to be issued to display the sense information. Sense information can also be retrieved with a Log_sense command (83).

Figure 103. Hex to ASCII Conversion

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
00	Null	30	0	41	A	4A	J	54	T
20	Space	31	1	42	B	4B	K	55	U
		32	2	43	C	4C	L	56	V
		33	3	44	D	4D	M	57	W
		34	4	45	E	4E	N	58	X
		35	5	46	F	4F	O	59	Y
		36	6	47	G	50	P	5A	Z
		37	7	48	H	51	Q	5F	_
		38	8	49	I	52	R		
		39	9			53	S		

Note: All codes are not shown.

NTUTIL Symbolic Error and Error Number

Symbolic Error	NT Error Number
ERROR_SUCCESS	
ERROR_INVALID_FUNCTION	1
ERROR_FILE_NOT_FOUND	2
ERROR_PATH_NOT_FOUND	3
ERROR_TOO_MANY_OPEN_FILES	4
ERROR_ACCESS_DENIED	5
ERROR_INVALID_HANDLE	6
ERROR_NOT_ENOUGH_MEMORY	8
ERROR_BAD_FORMAT	9
ERROR_INVALID_BLOCK	1
ERROR_BAD_ENVIRONMENT	11
ERROR_INVALID_ACCESS	12
ERROR_INVALID_DATA	13
ERROR_OUTOFMEMORY	14
ERROR_INVALID_DRIVE	15
ERROR_WRITE_PROTECT	19
ERROR_BAD_UNIT	2
ERROR_NOT_READY	21
ERROR_BAD_COMMAND	22
ERROR_CRC	23
ERROR_HANDLE_EOF	38
ERROR_NOT_SUPPORTED	5
ERROR_DEV_NOT_EXIST	55
ERROR_ALREADY_ASSIGNED	85
ERROR_INVALID_PARAMETER	87
ERROR_OPEN_FAILED	11
ERROR_INSUFFICIENT_BUFFER	122
ERROR_INVALID_NAME	123
ERROR_BUSY_DRIVE	142
DD_NO_SENSE	2
DD_DEVICE_DRIVER_FAILURE	2 1
DD_EEPROM_FAILURE	2 2
DD_MANUAL_INTERVENTION	2 3
DD_RECOVERED_ERROR	2 4
DD_SCSI_ADAPTER_ERROR	2 5
DD_SCSI_ERROR	2 6
DD_SCSI_BUSY	211
DD_ILLEGAL_REQUEST	2 7
DD_COMMAND_ABORTED	2 8
DD_HARDWARE_MICROCODE	2 9
DD_UNIT_ATTENTION	21
ERROR_MORE_DATA	234
DD_CARTRIDGE_ENTRY_FAILURE	3

Symbolic Error	NT Error Number
DD_CARTRIDGE_LOAD_FAILURE	3 1
DD_CARTRIDGE_IN_FAILED_DRIVE	3 2
DD_CAROUSEL_NOT_LOADED	3 3
DD_CHANGER_FAILURE	3 4
DD_DRIVE_FAILURE	3 5
DD_DRIVE_OR_MEDIA_FAILURE	3 6
DD_ENTRY_EXIT_FAILURE	3 7
DD_ENTRY_EXIT_NOT_PRESENT	3 8
DD_LIBRARY_AUDIT	3 9
DD_LIBRARY_FULL	31
DD_MEDIA_EXPORT	311
DD_SLOT_FAILURE	312
DD_SLOT_OR_MEDIA_FAILURE	313
DD_SOURCE_EMPTY	314
DD_DESTINATION_FULL	315
DD_CLEANER_INST	316
DD_MEDIA_NOT_EJECTED	317
DD_IOPORT_NOT_CONFIG	318
DD_FIRST_DEST_EMPTY	319
DD_END_PHYSICAL_MEDIA	4
DD_MEDIA_BLANK	4 1
DD_MEDIA_CORRUPTED	4 2
DD_MEDIA_FAILURE	4 3
DD_MEDIA_INCOMPATIBILITY	4 4
DD_SECTOR_RELOCATION	4 5
DD_SECTOR_OUT_OF_RANGE	4 6
DD_WRITE_PROTECT	4 7
DD_CLEAN_MEDIA	4 8
DD_MEDIA_FAULT	4 9
DD_CLEANING_COMPLETE	41
DD_LOGICAL_END_OF_MEDIA	411
DD_MEDIA_NOT_PRESENT	412
DD_BEGINNING_OF_MEDIA	413
DD_ERASE_FAILURE	414
DD_WRITE_TO_WRITTEN_WORM	415
DD_WRONG_LENGTH_BLOCK	416
ERROR_IO_INCOMPLETE	996
ERROR_IO_PENDING	997
ERROR_NOACCESS	998
ERROR_CANTOPEN	1 11
ERROR_CANTREAD	1 12
ERROR_CANTWRITE	1 13
ERROR_END_OF_MEDIA	11

Symbolic Error	NT Error Number
ERROR_FILEMARK_DETECTED	11 1
ERROR_BEGINNING_OF_MEDIA	11 2
ERROR_SETMARK_DETECTED	11 3
ERROR_NO_DATA_DETECTED	11 4
ERROR_PARTITION_FAILURE	11 5
ERROR_INVALID_BLOCK_LENGTH	11 6
ERROR_DEVICE_NOT_PARTITIONED	11 7
ERROR_UNABLE_TO_LOCK_MEDIA	11 8
ERROR_UNABLE_TO_UNLOAD_MEDIA	11 9
ERROR_MEDIA_CHANGED	111
ERROR_BUS_RESET	1111
ERROR_NO_MEDIA_IN_DRIVE	1112
ERROR_IO_DEVICE	1117
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Operator Panel

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Operator Panel Overview

Figure 104 shows the operator panel for the library models and illustrates the Liquid Crystal Display screen 1 :

Four types of screens are displayed on the operator panel:

"Status Screen" on page PANEL-5

"Intervention Screens" on page PANEL-9

"Supplemental Message Screens" on page PANEL-11

"Menu Screens" on page PANEL-11

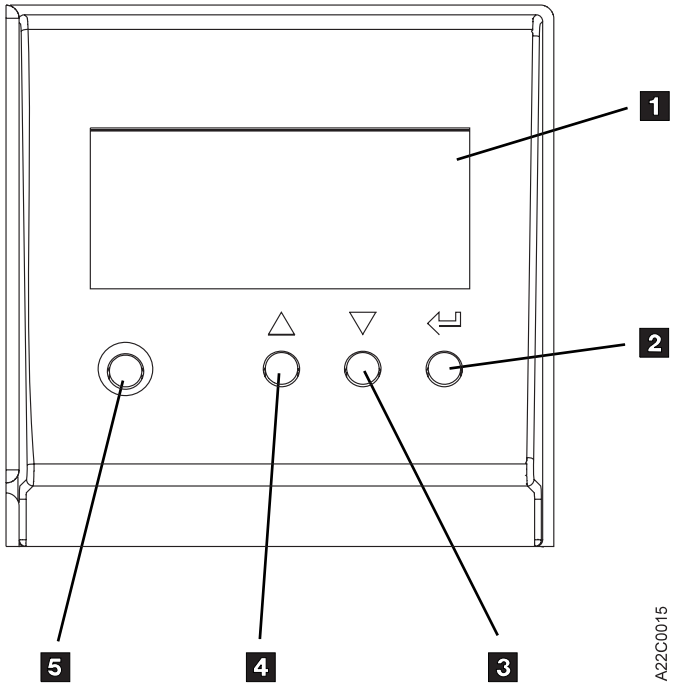


Figure 104. Operator Panel for Library Models

| **Note:** The operator panel for the Models C21 and C22 has a straight front cover while the operator panel
| for the Models C01, C02, C11 and C12 has a sloping shape to its front cover. The straight design
| was required to fit into the Netfinity rack system.

The operator panel has the following four control buttons:

2 **Enter button**

Pressing this button causes the device to select the option or perform the function indicated by the selection arrow (>).

Note: Hardware Reset is accomplished by pressing the Menu Mode, Scroll Up, and Enter buttons all at the same time.

3 **Scroll Down button**

Pressing the Scroll Down button moves the selection arrow (>) down to the next option, if any, on the menu. If none, the button action is ignored. The plus (+) symbol in the lower right corner of the display indicates that the list of additional menu items continues below the last item visible on the display. To view these selections, press the Scroll Down button.

4 **Scroll Up button**

Pressing the Scroll Up button moves the selection arrow (>) up to the next option, if any, on the menu. If none, the button action is ignored. The plus (+) symbol in the upper right corner of the display indicates that the list of additional menu items continues above the first item visible on the display. To view these selections, press the Scroll Up button.

Note: Hardware Reset is accomplished by pressing the Menu Mode, Scroll Up, and Enter buttons all at the same time.

5 **Menu Mode button**

The Menu Mode button allows selection of operator or service mode at any time.

At power on, the device will be in Operator mode.

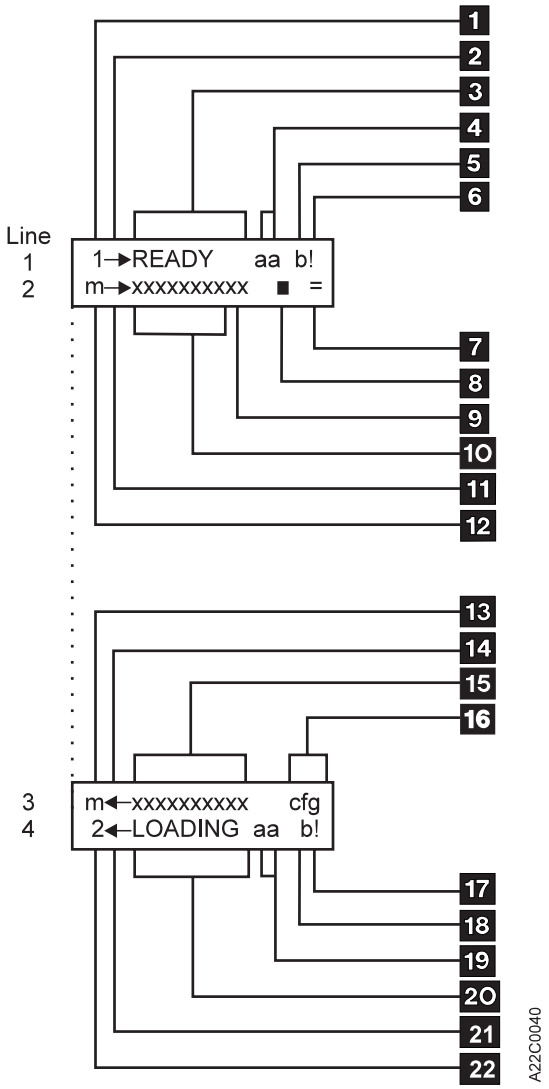
The Menu Mode button is recessed slightly in the panel to prevent inadvertent mode changes by the operator and should not be used during normal operations. If you press the Menu Mode button and receive the message “Warning - Service Personnel Only,” press the Enter button and then select Cancel to return to normal operating mode. During the time the library unit is in service mode, the subsystem is off-line to the host and unavailable for read and write operations.

Note: Hardware Reset is accomplished by pressing the Menu Mode, Scroll Up, and Enter buttons all at the same time.

Status Screen

The explanation of the status and intervention screens that follows describes the messages displayed on the operator panel by the library. It is possible for system application software to display other information or messages on the operator panel. Refer to the system application software documentation for explanations of any messages not described below.

The status screen (Figure 105) provides a view of the current operational status of the library and drive. This screen is the normal default screen. If some other screen is the current display and you want to check status, select SHOW STATUS from the **Options Menu**.



1. 1 Drive in use
2. 2 Drive location
3. 3 Drive status
4. 4 Percentage (%) of tape processed
5. 5 File protect status
6. 6 Dump available symbol (!) or drive requires cleaning (*)
7. 7 Library status
8. 8 Cleaning cartridge status
9. 9 Priority cell
10. 1 Magazine 1 cells (10-1) status
11. 11 Magazine 1 location
12. 12 Library Mode
13. 13 Library Mode
14. 14 Magazine 2 location
15. 15 Magazine 2 cells (20-11) status
16. 16 Library Configuration
17. 17 Dump available symbol (!) or drive requires cleaning (*)
18. 18 File protect status
19. 19 Percentage (%) of tape processed
20. 2 Drive status
21. 21 Drive position
22. 22 Drive in use

Figure 105. Status Screen

Line 1: Line 1 displays the status of drive 1.

1 the numeral “1” indicates that the remainder of this line of text refers to drive 1.

2 indicates the physical location of drive 1

→ indicates drive 1 is located on the right.

3 a word such as READY is displayed to indicate a brief status of drive 1. The following is a list of the words that are displayed in this field:

CLEANING	A head cleaning operation is in process.
READY	The device is loaded, not moving media, and not performing a rewind-unload operation.
LOADING	The cartridge is being loaded into the drive.
LOCATING	The device is moving the media to a specific location.
READING	The device is reading data from the media to the device buffer.
WRITING	The device is writing data from the device buffer to the media.
ERASING	The device is erasing data from the media.
REWINDNG	The device is rewinding the media to the beginning of the logical volume.
UNLOADNG	The cartridge is being removed from the drive.
[blank field]	The library is inactive and the drive is not loaded.
LOAD PT	The volume in the device is positioned at load point.
ACCESSNG	The picker is moving to get a cartridge.
XFERRING	The picker is moving a cartridge to another slot or to the drive.
DIAG RUN	The diagnostic tests are running.
UCODE LD	Microcode is loading.
INIT	The drive is in the process of resetting.
CODE LVL	A microcode mismatch exists between drive 1 and 2.
RECOVER	The drive requires recovery. See “Clearing Tape Drive Recover Status” on page PROC-28.

REPLACE CLN CART The cleaning cartridge needs to be replaced.

4 indicates the percentage of media that has been *used* (processed) by drive 1.

5 is a lock symbol that indicates the status of the file-protect switch on the cartridge currently loaded in drive 1.

The file-protected icon is a *read only* symbol that indicates that the file-protect switch is in the write-prevent position.

The file-unprotected icon is a *read/write* symbol that indicates that the file protect switch is in the allow-write position.

6 when the exclamation point (!) is displayed, a dump is available for drive 1. A dump contains detailed information that pertains to the device operation at the time of a failure. When the asterisk (*) is displayed, Drive 1 needs to be cleaned.

Line 2: Line 2 displays the status of magazine 1, the cleaning cartridge cell, and the library.

7 indicates the library status; that is, if the library is moving, a gripper (=) is shown. If a cartridge is being moved, a horizontal line appears between the *fingers* of the gripper (÷).

8 indicates the status of the cleaning cartridge storage slot located inside the Magstar MP subsystem. A solid pattern ▯ indicates that the cleaning cartridge is in the storage slot. A dash (–) indicates that no cleaning cartridge is present in the storage slot.

9 indicates the state of the priority cell where the operator can load a cartridge.

A solid pattern ▯ indicates that a cartridge is present and that it is in the *import* position; that is, accessible to the library.

An open pattern ▯ indicates that a cartridge is present and that it is in the *export* position; that is, not accessible to the library.

A one (1) indicates that the cell is in use by drive 1.

A two (2) indicates that the cell is in use by drive 2.

A dash (–) indicates that no cartridge is present in that position of the magazine.

An hour-glass shape (an X filled in at the top and bottom) indicates the Magstar MP has not determined the status of a magazine cell.

1 indicates the state of the ten storage elements associated with magazine 1, (including the priority cell). The cells are numbered from 10 to 1, left to right. See item 9 above for a list of symbols that can appear in this field.

11 indicates the physical location of magazine 1

→ indicates magazine 1 is located on the right.

12 displays the library mode (A=AUTO, R=RANDOM, M=MANUAL) for all drives in a Base Configuration or associated with drive 1 in a Split Configuration. During a power-on reset before the microcode can determine the mode set in nonvolatile storage, N is displayed.

Line 3: Line 3 displays the status of magazine 2 and the library configuration.

13 displays the library mode (A=AUTO, R=RANDOM, M=MANUAL) associated with drive 2 in a Split Configuration. During a power-on reset before the microcode can determine the mode set in nonvolatile storage, N is displayed.

14 indicates the physical location of magazine 2.

← indicates magazine 2 is located on the left.

15 indicates the state of the ten storage elements associated with magazine 2. The cells are numbered from 20 to 11, left to right. See 9 in the Line 2 description for a list of the symbols that are displayed in this field.

16 indicates the library configuration.

BAS indicates the base library configuration.

SPL indicates the split library configuration.

Line 4: Line 4 displays the status of drive 2.

17 when the exclamation point (!) is displayed, a dump is available for drive 2. A dump contains detailed information that pertains to the device operation at the time of a failure. When the asterisk (*) is displayed, Drive 2 needs to be cleaned.

18 is a lock symbol that indicates the status of the file-protect switch on the cartridge currently loaded in drive 2. See 5 in the Line 1 description for a list of the symbols that are displayed in this field.

19 indicates the percentage of media that has been *used* (processed) by drive 2.

2 indicates the status of drive 2. See 3 in the Line 1 description for a list of the words that are displayed in this field.

21 indicates the physical location of drive 2.

← indicates drive 2 is located on the left.

22 the numeral “2” indicates that the remainder of this line of text refers to drive 2.

Intervention Screens

Intervention messages are presented on the operator panel in the intervention screen. The intervention screen consists of a message displayed in a screen with a black border. The drive number which generated the message is listed on the top line.

Device activity or status messages are informational, not intervention notices. These messages are displayed on the Status screen. These messages include *reading*, *writing*, and *locating*.

The intervention message types are FID1 messages, FID2 messages, FID3 messages, FID4 messages, attention messages, and routine messages.

Note: When the FID message appears, write down the FID number and the drive number should they be needed by the service representative to describe the error condition. As you try to fix the error condition, the FID message that originally appeared will be replaced on the display screen with supplemental messages. You will not be able to restore this FID message to the screen unless you recreate the error condition.

FID1 Messages

The FID1 message is displayed when a hardware failure occurs within the device. Call for service.

Figure 106 shows an example of the FID1 92 message posted by drive 2.

Figure 106. Error Message Example

FID2, FID3, and FID4 Messages

The FID2, FID3, and FID4 messages indicate that the library requires service but can still be used. Schedule a service call.

Support Data

If a FID message is displayed when a hardware failure occurs, a supplemental message screen with additional support data can be displayed by pressing the Enter button. The support data will be 1 or more lines of 12 characters in the form:

XXXX YYYY ZZZZ

where XXXX is the first FSC (Fault Symptom Code), YYYY is the second FSC, and ZZZZ is the microcode level.

ATTENTION Messages

The ATTENTION messages indicate error conditions that you may be able to resolve.

After an Attention message is received, note the drive number and press the Enter key to observe any supplemental messages with additional information.

The ATTENTION messages can be either ATTENTION DRIVE or ATTENTION LIBRARY messages (see Figure 107).

Figure 107. Attention Message Example

Routine Messages

Routine Messages consist of messages received from the host through the SCSI Display Message command. These messages include **MOUNT** (Mvolser prompts the operator to mount volser in the priority cell), **DEMOUNT** (Dvolser prompts the operator to remove volser from the priority cell), and messages from the device (for example, ***CLEAN**, which prompts the operator to clean the tape drive when automatic cleaning is turned off). Another example of a routine message is **NO CARTRIDGE**. This message is displayed when the library is set to Automatic Mode and there are no cartridges remaining in the magazine(s) to be loaded in the drive.

The routine messages that are received through the Display Message command consist of mount messages, demount messages, and general (custom) messages.

Resolving ATTENTION Messages

Many ATTENTION messages are caused by conditions that the operator should be able to resolve without the necessity of a service call. In these cases, pressing the Enter button will cause a supplemental message to appear that will further clarify the nature of the problem. Depending upon the supplemental message, the operator should take recommended actions to fix the problem when it happens.

If the supplemental message indicates **DRIVE DISABLED UNTIL CLEANED**, the tape drive must be cleaned before further use of the drive is allowed. This supplemental message is only displayed if the **CLEAN** message is repeatedly ignored. For instructions on cleaning the tape drive, see “Drive Cleaning Procedure” on page PROC-22. The Magstar MP can be configured for automatic cleaning. Refer to “Inserting or Removing a Cleaning Cartridge” on page PROC-22 and “Setting Automatic Cleaning” on page PROC-22.

If the supplemental message indicates **REPLACE CLN CART**, the cleaning cartridge needs to be
| replaced. Ask your customer to re-order cleaning cartridges by using the procedure in *IBM Magstar MP*
| *3570 Tape Subsystem Operator Guide, C Series Models*. You can replace the cleaning cartridge by following the procedure at “Inserting or Removing a Cleaning Cartridge” on page PROC-22. Continue to use the old cleaning cartridge until your customer receives the new one.

In the event that no effective operator resolution of an ATTENTION message is possible, call for service.

Do the following simple steps first whenever normal operation is disrupted:

Ensure that all cartridges are properly positioned in magazine cells or the drive.

Try to unload the cartridge. If a cartridge is stuck in the drive, see “Removing Tape Cartridge from Drive” on page PROC-18.

Check the integrity of the cartridge to see that it is properly functioning and is not broken or otherwise obstructed by contaminants or improperly applied user labels.

Check the display panel to see if a closed lock symbol is present. If it is, the cartridge is write protected and will not allow a write operation to take place.

Check to see if the write-protect tab is set in the upward position to protect the tape from being written on. If you are attempting to write on the tape with the write-protect tab upward, you will experience an error condition.

Check to ensure that the cartridge is the proper type (Magstar MP Fast Access Linear Tape).

Ensure that a cleaner cartridge has been inserted if one has been requested and, conversely, that no cleaner cartridge has been inserted if a data cartridge is required.

Check to see if the display indicates FID1 95. If it does, you may have forgotten to remove the shipping bracket. Remove the bracket and continue the procedure. See steps at “Installation Checkout—Library Models” on page INST-40.

Ensure that the library is in operator mode (see 5 in Figure 104 on page PANEL-3).

Ensure that the library is on-line.

Turn the power off and then on again.

Note: Two power cords are required for Models C02 and C12. Make sure both power cords are plugged into the library unit and into the power outlet.

Supplemental Message Screens

Supplemental screens provide additional information to the operator to clarify an error condition or to advise the operator to follow a particular course of action to resolve specific error conditions.

Generally, it is necessary to press the Enter button after an error message appears to see the accompanying supplemental screen.

Menu Screens

When a menu screen is present, use the Scroll Down button (see 3 in Figure 104 on page PANEL-3) or the Scroll Up button (see 4 in Figure 104 on page PANEL-3) to move the arrow (>) to the desired selection, and then press the Enter button (see 2 in Figure 104 on page PANEL-3). This operation will select the desired option from the menu.

Note: An option marked with an **asterisk** indicates the option is not available for selection or the option is the selection currently in use by the library. For example: if the drive is not loaded with a tape cartridge, the UNLOAD DRIVE option will be marked with an **asterisk** indicating it is not available for selection.

Operator Menus

Figure 108 on page PANEL-12 shows the operator menu functions. (The bold text in the figure shows the names of the menus.)

These menus are available after the successful completion of the power-on self-test.

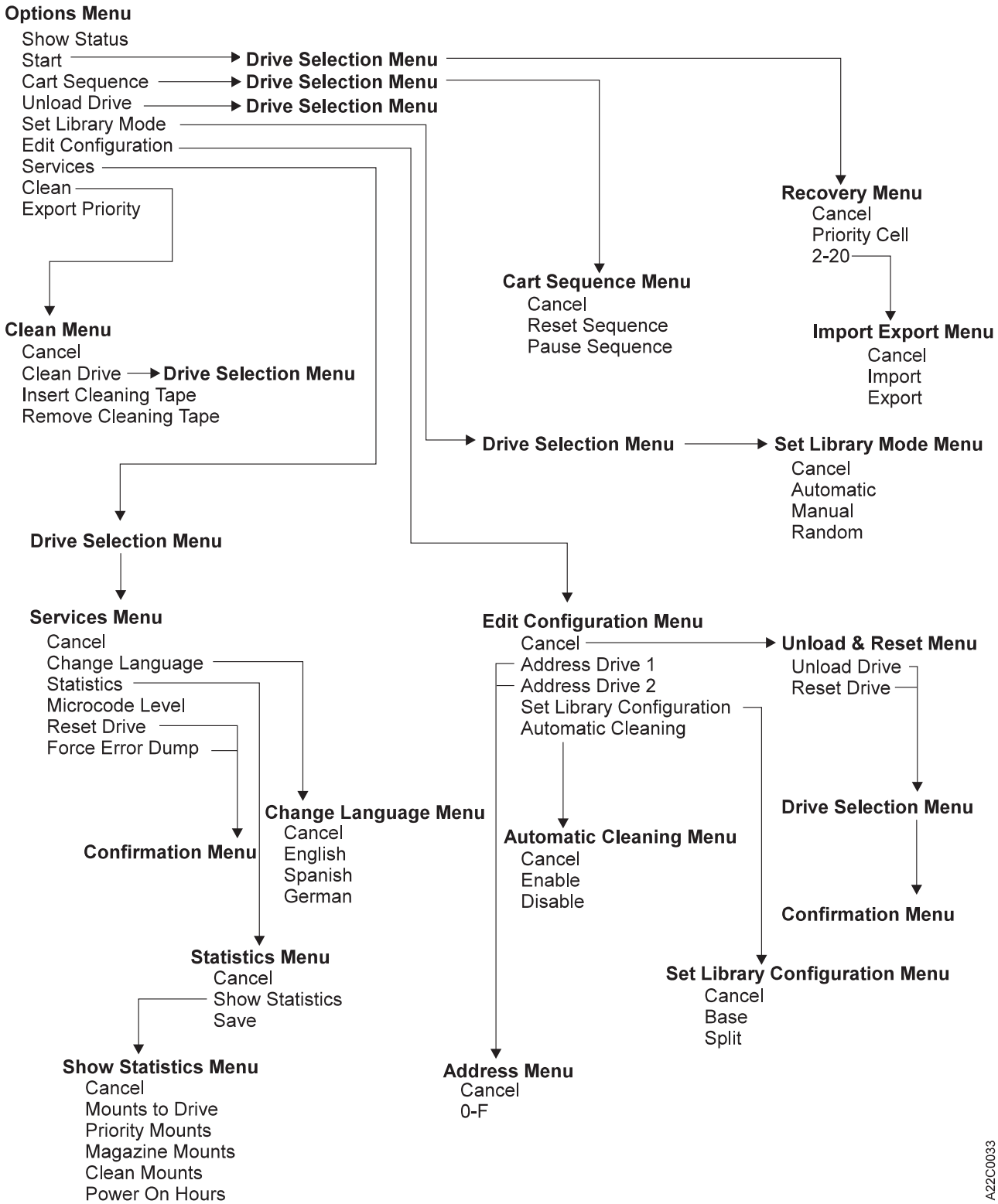


Figure 108. Operator Menus

Options Menu

Figure 109. Options Menu

Function	Next Menu
SHOW STATUS	"Status Screen" on page PANEL-5
START	"Drive Selection Menu" on page PANEL-14
CART SEQUENCE	After "Drive Selection Menu" on page PANEL-14 to "Cart Sequence Menu" on page PANEL-14.
UNLOAD DRIVE	"Drive Selection Menu" on page PANEL-14
SET LIBRARY MODE...	After "Drive Selection Menu" on page PANEL-14 to "Set Library Mode Menu" on page PANEL-16
EDIT CONFIGURATION...	"Edit Configuration Menu" on page PANEL-16
SERVICES...	After "Drive Selection Menu" on page PANEL-14 to "Services Menu" on page PANEL-20
CLEAN...	"Clean Menu" on page PANEL-22
EXPORT PRIORITY	—

Show Status
Displays the Status screen (see Figure 105 on page PANEL-5).

Start
Loads cartridge into the drive in automatic or manual mode, or starts the library error recovery. (See "Clearing Tape Drive Recover Status" on page PROC-28).

Cart Sequence
Allows the operator to pause or to reset the sequence of cartridges processed by the drive.

Unload Drive
After selecting the drive to be unloaded, it causes the drive to rewind and unload the cartridge in the drive. If the library is in random mode, the cartridge destination is selectable by the operator. (See "Clearing Tape Drive Recover Status" on page PROC-28).

Set Library Mode
Sets the Library mode to automatic, manual, or random.

Edit Configuration
Allows the operator to perform configuration tasks.

Services
Allows the operator to perform miscellaneous tasks, such as setting the language used on the panel.

Clean
Allows cleaning of the drive tape path and cleaner cartridge handling.

Export Priority
Moves a cartridge in the priority slot into the export position.

Drive Selection Menu

This menu is applicable to models C02 or C12 only.

Figure 110. Drive Selection Menu	
Function	**Next Menu**
CANCEL	Previous menu
DRIVE 1	–
DRIVE 2	–

Cancel
Displays the previous menu that was active.

Drive 1
Selects Drive 1 as the drive to be used when displaying the next menu, or when performing the selected option.

Drive 2
Selects Drive 2 as the drive to be used when displaying the next menu, or when performing the selected option.

Cart Sequence Menu

Figure 111. Cart Sequence Menu	
Function	**Next Menu**
CANCEL	After “Drive Selection Menu” to “Options Menu” on page PANEL-13
RESET SEQUENCE	“Options Menu” on page PANEL-13
PAUSE SEQUENCE	“Options Menu” on page PANEL-13

Cancel
Causes the “Drive Selection Menu” to appear.

Reset Sequence
This option resets the order in which cartridges are processed by the drive.

If the drive is set to Automatic Mode or Manual Mode and the Reset Sequence option is selected, the drive will stop processing cartridges when the tape currently loaded in the drive has been unloaded. In order to resume operation, the operator must select START on the options Menu. Instead of resuming operation where it left off, the library loads the first cartridge it finds in the import position beginning at the rightmost cell position.

The Reset Sequence option is not available if the drive is set to Random Mode of Operation.

Pause Sequence
This option causes the drive to stop loading cartridges.

If the drive is set to Automatic Mode and the Pause Sequence option is selected, the drive will stop processing cartridges when the tape currently loaded in the drive has been unloaded. In order to resume the operation, the operator must select START on the Options Menu. The drive will then load the next available cartridge.

The Pause Sequence option is not available if the drive is set to Manual or Random Mode of operation.

Set Library Mode Menu

Figure 112. Set Library Mode Menu

Function	Next Menu
CANCEL	After “Drive Selection Menu” on page PANEL-14 to “Options Menu” on page PANEL-13
AUTOMATIC	After “Drive Selection Menu” on page PANEL-14 to “Options Menu” on page PANEL-13
MANUAL	After “Drive Selection Menu” on page PANEL-14 to “Options Menu” on page PANEL-13
RANDOM	After “Drive Selection Menu” on page PANEL-14 to “Options Menu” on page PANEL-13
Note: Model C02 or C12 causes the “Drive Selection Menu” on page PANEL-14 to appear. Model C01 or C11 causes the “Options Menu” on page PANEL-13 to appear.	

Cancel

Causes the “Drive Selection Menu” on page PANEL-14 to appear.

Automatic, Manual, or Random

See “Library Modes of Operation” on page LIBRARY-5.

Edit Configuration Menu

Figure 113. Edit Configuration Menu

Function	Next Menu
CANCEL	“Unload & Reset Menu” on page PANEL-19 or “Options Menu” on page PANEL-13
ADDRESS DRIVE 1	“Address (SCSI ID) Drive 1 or Drive 2 Menu” on page PANEL-18
ADDRESS DRIVE 2	“Address (SCSI ID) Drive 1 or Drive 2 Menu” on page PANEL-18
SET LIBRARY CONFIGURATION	“Set Library Configuration Menu” on page PANEL-18
AUTO CLEAN	“Clean Menu” on page PANEL-22

Cancel

Causes the “Unload & Reset Menu” on page PANEL-19 to appear if any changes were made to the configuration; otherwise the “Options Menu” on page PANEL-13 will appear.

Address Drive 1

Allows the operator to select the SCSI address to be used for the device-to-host interface for tape drive 1. The address consists of one hexadecimal digit that specifies the SCSI ID for that interface.

Address Drive 2

Allows the operator to select the SCSI address to be used for the device-to-host interface for tape drive 2. The address consists of one hexadecimal digit that specifies the SCSI ID for that interface.

Set Library Configuration

Allows the operator to configure the library to operate in base or split configuration.

Automatic Cleaning

Allows the operator to choose whether or not the library unit will automatically clean the tape drive(s) when they require cleaning.

Address (SCSI ID) Drive 1 or Drive 2 Menu

Figure 114. Set Address (SCSI ID) Menu

Function	Next Menu
CANCEL	"Edit Configuration Menu" on page PANEL-16
0–F (hexadecimal)	"Edit Configuration Menu" on page PANEL-16

Note: The address must be defined also at the host.

Cancel
Causes the "Edit Configuration Menu" on page PANEL-16 to appear.

<**value**>
Allows the operator to set the SCSI ID of the library. The value can be from 0–F (16 addresses in hexadecimal).

Notes:

1. You must select Reset Drive from the **Unload and Reset Menu** or switch off power to the device and then switch on power to activate the new address.
2. For dual drive models attached to a single host initiator, each drive must have a unique address. They can not be the same. When these models are attached to two host initiators (one host to each drive), the drive addresses may be the same or they may be unique.
3. The physical drive address switch is ignored for library models. The address is only selected at the operator panel and retained in nonvolatile memory.

Set Library Configuration Menu

Figure 115. Set Configuration Menu

Function	Next Menu
CANCEL	"Edit Configuration Menu" on page PANEL-16
BASE	"Edit Configuration Menu" on page PANEL-16
SPLIT	"Edit Configuration Menu" on page PANEL-16

Cancel
Causes the "Edit Configuration Menu" on page PANEL-16 to appear.

Base
Allows the Magstar MP to be configured to operate in base configuration. The display shows **BASE**.

Split
Allows the Magstar MP to be configured to operate in split configuration. The display shows **SPLIT**.

See "Library Configurations" on page LIBRARY-7

Automatic Cleaning Menu

Figure 116. Auto Clean Menu	
Function	**Next Menu**
CANCEL	"Edit Configuration Menu" on page PANEL-16
ENABLE	"Edit Configuration Menu" on page PANEL-16
DISABLE	"Edit Configuration Menu" on page PANEL-16

Cancel
Causes the "Edit Configuration Menu" on page PANEL-16 to appear.

Enable
Allows the 3570 to automatically clean the tape drives when cleaning is required.

Disable
The 3570 will not automatically clean the tape drives when cleaning is required.

If the display shows *****ENABLE, the tape drive will be cleaned automatically. If the display shows *****DISABLE, the operator must take action to clean the tape drive(s) when cleaning is required.

If the display shows both the ENABLE and DISABLE menu options without asterisks in front, there is a mismatch in the settings for drive 1 and drive 2 (in 2 drive models). Select ENABLE or DISABLE and press ENTER to correct the mismatch.

Note: It is recommended that automatic cleaning be set to enable.

Unload & Reset Menu

Figure 117. Unload & Reset Menu	
Function	**Next Menu**
UNLOAD DRIVE	After "Status Screen" on page PANEL-5 to "Unload & Reset Menu"
RESET DRIVE	After confirmation, to "Status Screen" on page PANEL-5

Unload Drive
Causes the device to rewind and unload the cartridge in the device. Press Enter to return to the Unload & Reset Menu.

Reset Drive
Causes the tape drive to perform power-on reset.

Services Menu

Figure 118. Services Menu

Function	Next Menu
CANCEL	After “Drive Selection Menu” on page PANEL-14 to “Options Menu” on page PANEL-13
CHANGE LANGUAGE	“Change Language Menu”
STATISTICS...	“Statistics Menu” on page PANEL-21
MICROCODE LEVEL	After microcode level display, to “Services Menu”
RESET DRIVE	After confirmation, to “Services Menu”
FORCE ERROR DUMP	After confirmation, to “Services Menu”

Cancel
For Model C02 or C12, causes the “Drive Selection Menu” on page PANEL-14 to appear.
For Model C01 or C11, causes the “Options Menu” on page PANEL-13 to appear.

Change Language
Allows the operator to select the operator panel language.

Statistics
Displays the number of times certain events occurred.

Microcode Level
Displays the microcode level.

Reset Drive
Causes the library to perform a power-on reset.

Force Error Dump
For service use only.

Change Language Menu

Figure 119. Change Language Menu

Function	Next Menu
CANCEL	“Services Menu”
ENGLISH	“Options Menu” on page PANEL-13
SPANISH	“Options Menu” on page PANEL-13
GERMAN	“Options Menu” on page PANEL-13

Cancel
Causes the “Services Menu” to appear.

<**language**>
Allows the operator to select the operator panel language. The languages supported are English, German, or Spanish.

Statistics Menu

Figure 120. Statistics Menu	
Function	**Next Menu**
CANCEL	"Services Menu" on page PANEL-20
SHOW STATISTICS	"Show Statistics Menu"
SAVE	"Statistics Menu"

Cancel
Causes the "Services Menu" on page PANEL-20 to appear.

Show Statistics
Causes the "Show Statistics Menu" to appear.

Save
Causes the statistics to be saved in nonvolatile storage.

Show Statistics Menu

Figure 121. Show Statistics Menu	
Function	**Next Menu**
CANCEL	"Statistics Menu"
MOUNTS TO DRIVE	"Show Statistics Menu"
PRIORITY MOUNTS	"Show Statistics Menu"
MAGAZINE MOUNTS	"Show Statistics Menu"
CLEANING MOUNTS	"Show Statistics Menu"
POWER-ON HOURS	"Show Statistics Menu"

Cancel
Causes the "Statistics Menu" to appear.

Mounts to Drive
Displays the total number of times a cartridge was mounted in the drive.

Priority Mounts
Displays the total number of times a cartridge was loaded in the priority cell.

Magazine Mounts
Displays the total number of times a cartridge was loaded in any of the cells of the magazine.

Cleaning Mounts
Displays the total number of times a cartridge was moved from the cleaning cartridge slot to the tape drive.

Power-on Hours
Displays the total number of hours the device was powered on.

Note: The statistic values are displayed in decimal for the customer's convenience.

Clean Menu

Figure 122. Clean Menu

Function	Next Menu
CANCEL	"Options Menu" on page PANEL-13
CLEAN DRIVE	"Drive Selection Menu" on page PANEL-14 (Model C02 or C12)
INSERT CLEANING TAPE	–
REMOVE CLEANING TAPE	–
AUTO CLEAN OFF/ON	–

Cancel
Causes the "Options Menu" on page PANEL-13 to appear.

Clean Drive
After selecting the drive to be cleaned (Model C02 or C12 only), it loads the cleaner cartridge from the internal cleaner slot into the drive. Once cleaned, the cartridge is returned to the internal cleaner slot. See "Drive Cleaning Procedure" on page PROC-22.

Insert Cleaning Tape
Moves the cleaning cartridge from the priority slot to the internal cleaner slot. If a cartridge is not present, a message will be displayed that prompts the operator to put the cleaning cartridge into the priority slot. See "Setting the SCSI Address and Configuring the Library" on page INST-43.

Remove Cleaning Tape
Moves the cleaning cartridge from the internal cleaner slot to the priority slot.

Recovery Menu

Figure 123. Recovery Menu

Function	Next Menu
CANCEL	After "Drive Selection Menu" on page PANEL-14 to "Options Menu" on page PANEL-13
PRIORITY CELL	Go to "Options Menu" on page PANEL-13
2-20	"Import Export Menu" on page PANEL-23

Cancel
Causes the "Drive Selection Menu" on page PANEL-14 to appear.

Priority Cell
Moves the cartridge to the export position in the priority cell.

<value>
Allows the operator to select the magazine cell where the cartridge will be placed.

Import Export Menu

Figure 124. Import Export Menu	
Function	**Next Menu**
CANCEL	"Recovery Menu" on page PANEL-22
IMPORT	"Options Menu" on page PANEL-13
EXPORT	"Options Menu" on page PANEL-13

Cancel
Causes the "Recovery Menu" on page PANEL-22 to appear.

Import
Causes the cartridge to be placed in the import position of the desired magazine cell.

Export
Causes the cartridge to be placed in the export position of the desired magazine cell.

Confirm Mode Change Menu

Figure 125. Confirm Mode Change Menu	
Function	**Next Menu**
CANCEL	Previous menu
PROCEED	"Options Menu" on page PANEL-13

When the Menu Mode button is pressed, this menu is displayed when switching from operator to service mode or service to operator mode (dependent on job activity).

Cancel
Displays the previous menu that was active before the Menu Mode button is pressed.

Proceed
Forces the device off-line if going to service mode.

If write activity exists, any write data in the device is lost and the job is terminated.

Attention: The device should be quiesced (varied off-line) by the host before entering service mode. The on-line status of the device is restored when changing from service mode to operator mode.

CE Mode Menus

The CE menus are always displayed in English. The CE menus appear on the operator panel when you press the Mode push button.

Attention

1. Entering CE mode causes the device to go off-line to all initiators on the bus. Any commands-in-progress are completed. A verification-warning message is presented on the display before the off-line action is initiated.
2. Pressing the Mode push button again, while in CE mode, returns the 3570 on-line to the host and to Operator mode.
3. The device should be quiesced by the host (vary device off-line) before taking the device off-line by entering CE mode or by powering off the device.

The first display confirming the CE mode change appears as follows:

```
WARNING:
SERVICE
PERSONNEL
ONLY
```

Press enter and the next screen will appear asking you to confirm the request for a mode change.

```
CONFIRM MODE CHG
>CANCEL
 PROCEED
```

The Confirm Mode Change Menu, Figure 125 on page PANEL-23 is described below.

Confirm Mode Change Menu: Figure 125 on page PANEL-23 shows the Confirm Mode Change menu.

Figure 126. Confirm Mode Change

Function	Next Menu
CANCEL	Previous menu
PROCEED	"Options Menu" on page PANEL-13 if no job, or Figure 127 on page PANEL-25 if job is in progress.

When the Change Mode push button is pressed, this menu may be displayed when switching from operator to CE mode or CE to operator mode (dependent on job activity).

Cancel Displays the previous menu that was active before the Change Mode push button is pressed.

Proceed Forces the ports off-line if going to CE mode and no job was in progress. If a job was active at the time, a new menu shown below is displayed:

```
RESET DRIVE...
 >CANCEL..
  RESET DRIVE...
  FORCE ERROR DUMP...
```

Figure 127. Confirm Mode Change-Proceed Menu

The RESET DRIVE option results in job termination.

Attention: The device should be quiesced by the host (vary device off-line) before taking the device off-line, powering off the device, or entering CE mode.

Note: The on-line status of the SCSI ports is restored when changing from CE mode to operator mode.

Press the Scroll Down push button until the arrow head lines up with the Proceed option, then press the Select push button to obtain the following CE Option menu:

```
  CE OPTION
> VERIFY FIX
  DUMP
  FMR TAPE          +
```

The CE Option menu contains the following options. You must press the Scroll Down push button to view all the options. The plus (+) indicates that more options are available.

```
  VERIFY FIX
  DUMP
  FMR TAPE
  CONFIG/INSTALL.      +

. ERROR LOG             .
. UTILITIES.            .
. . . . . . . . . . . . . .
```

Note: Any menu option that is preceded by an asterisk (*) requires intervention prior to that option being available for selection. For example, if the option ***UNLOAD DRIVE** appears, it means that there is no drive loaded at this time. To remove the (*), simply select START and load a cartridge. Another example is if ***START** appears in a menu, it means that a cartridge is already loaded and at load point. To remove the (*), simply select the UNLOAD DRIVE option and unload the cartridge.

CE Panel Flow Charts

Figure 108 on page PANEL-12 shows the operator panel functions and Figure 128 on page PANEL-26 shows the CE panel functions. Bold text in the figures shows the names of the menus.

The Operator Menus are available immediately after successful completion of the power-on self-test.

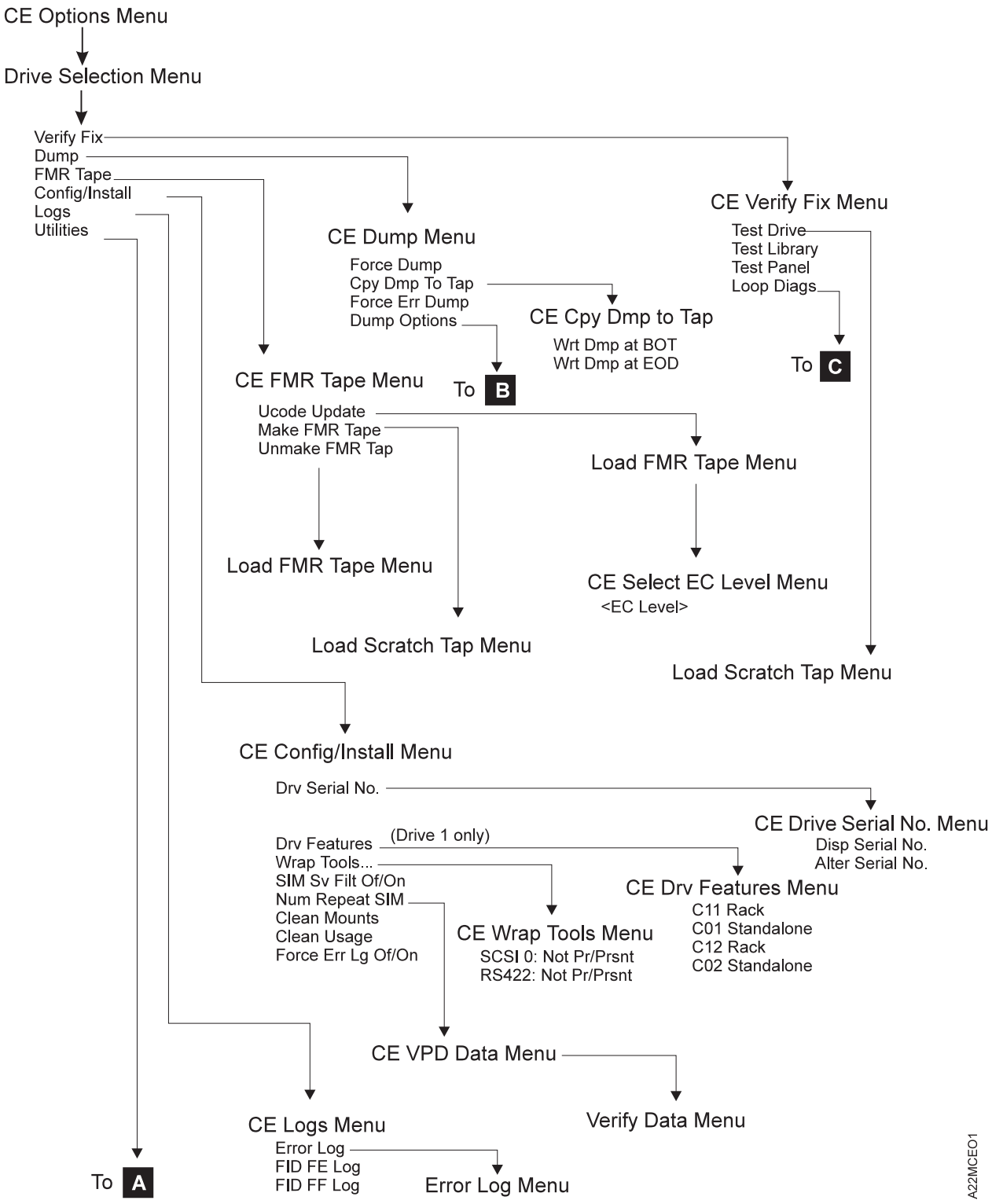


Figure 128 (Part 1 of 3). CE Panel Menu

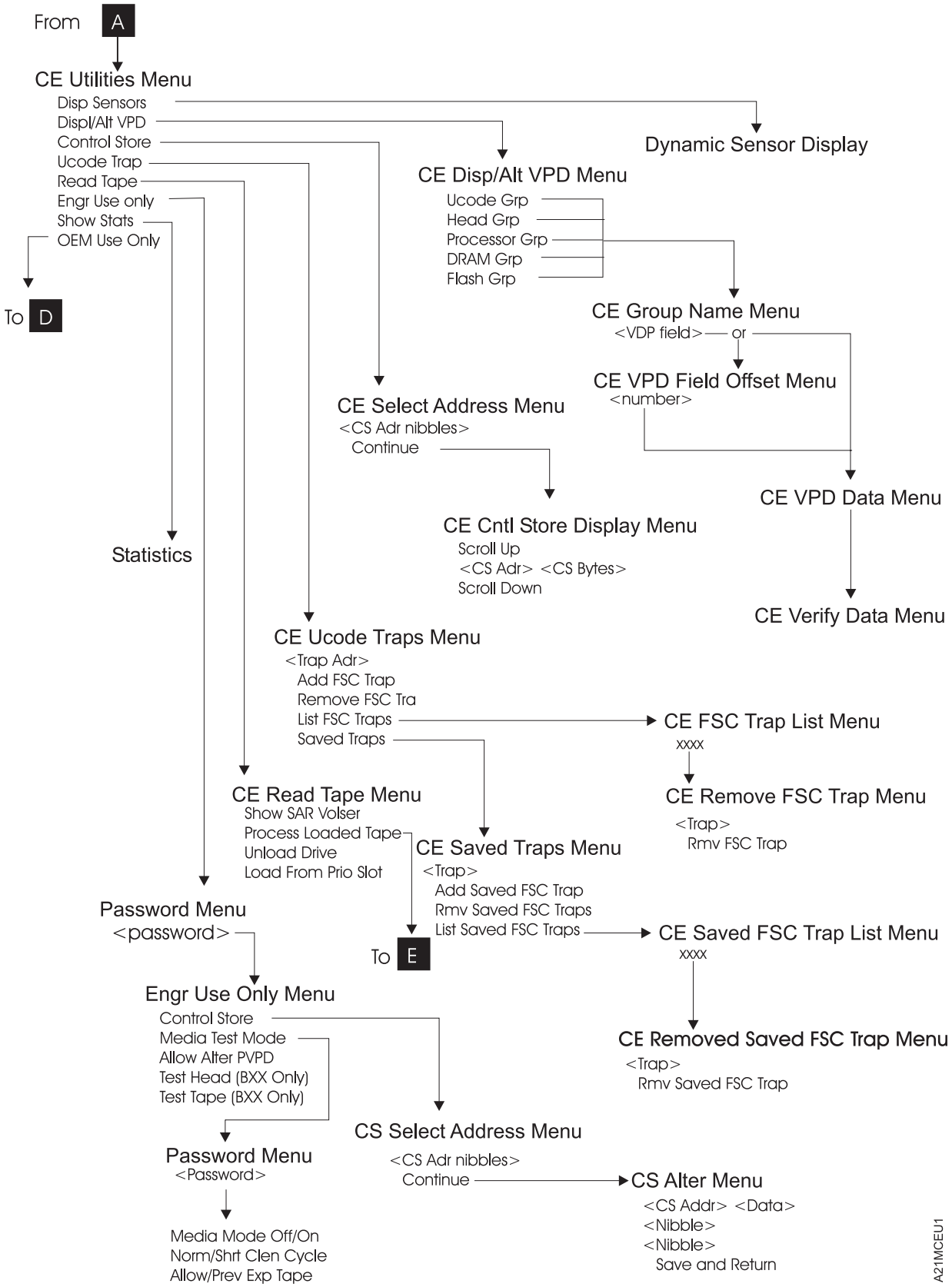


Figure 128 (Part 2 of 3). CE Panel Menu

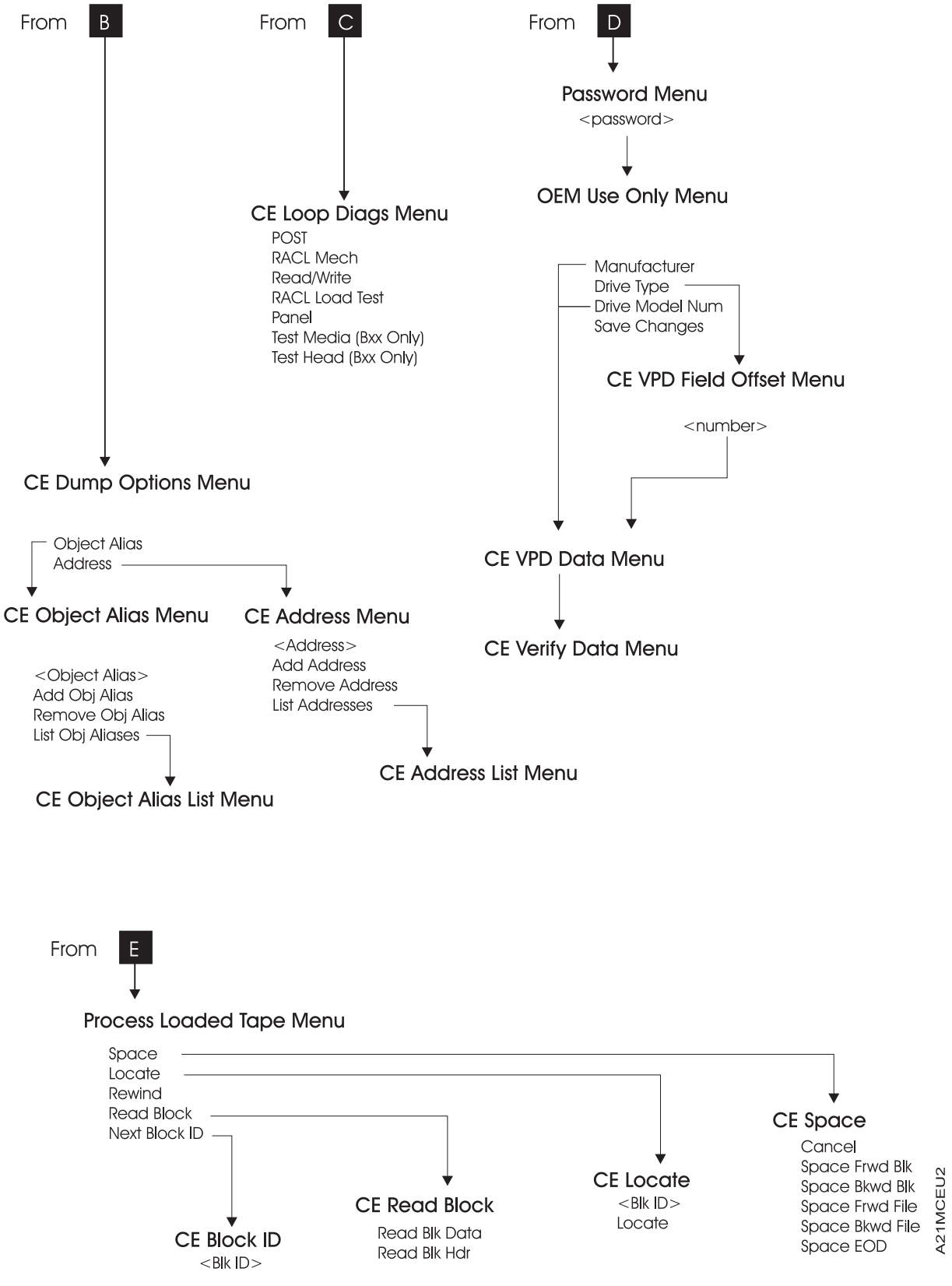


Figure 128 (Part 3 of 3). CE Panel Menu

CE Panel Menus

Attention: Entering CE mode causes all drives in the device to immediately go offline to all host systems (initiators) attached to it; therefore, any current read/write activity results in job termination. In general, the device should be quiesced by the host (vary device offline) before taking the device offline, powering off the device, or entering CE mode.

Note: An option marked with an asterisk indicates the option is not available for selection or the option is the selection currently in use by the library. For example: if the drive is not loaded with a tape cartridge, the UNLOAD DRIVE option will be marked with an asterisk, indicating it is not available for selection.

The following menus are accessed by pressing the Change Mode push button.

CE Options Menu: Figure 129 shows the CE Options menu.

Figure 129. CE Options

Function	Next Menu
VERIFY FIX...	"CE Verify Fix Menu" on page PANEL-30
DUMP...	"CE Main Dump Menu" on page PANEL-32
FMR TAPE...	"CE FMR Tape Menu" on page PANEL-35
CONFIG/INSTALL...	"CE Config/Install Menu" on page PANEL-39
LOGS...	"CE Logs Menu" on page PANEL-41
UTILITIES...	"CE Utilities Menu" on page PANEL-45

Verify Fix Allows the CE to check *good machine* operation.

Dump Allows the CE to move dump data.

FMR Tape Allows the CE to perform microcode updates.

Config/Install Allows the CE to customize the device to meet the customer's requirements at installation.

Logs Allows the CE to view or reset the CE logs.

Utilities Allows the CE to display control store and register data from any valid address. Use this option with assistance from support personnel.

CE Verify Fix Menu: Figure 130 shows the CE Verify Fix menu. This menu allows the CE to choose tests to run.

Note: See "CE Verify Fix on Library Models" on page PROC-10 for detailed information about running the test.

Figure 130. CE Verify Fix

Function	Next Menu
CANCEL	"CE Options Menu" on page PANEL-29
TEST DRIVE	Figure 132 on page PANEL-31
TEST LIBR	Figure 132 on page PANEL-31
TEST PANEL	"CE Loop Diag Menu"
LOOP DIAGS	"CE Loop Diag Menu"

Cancel Causes the CE Options menu to appear.

Test Drive Runs most of the tests that normally occur when power is switched on to the drive. Also, the CE is requested to load a tape to run the tape motion tests. The test checks motors, sensors, memory, and the card pack.

Test LIBR Runs tests on the random-access cartridge loader.

Test Panel Runs tests on the operator panel display. Allows the service representative to visually check all pixels on the operator panel display.

Loop Diags Allows the service representative to loop the diagnostic tests from "CE Loop Diag Menu."

CE Loop Diag Menu: Figure 131 shows the CE Loop Diag menu. This menu allows the CE to select tests to run in loop mode.

Figure 131. CE Loop Diag

Function	Next Menu
CANCEL	"CE Verify Fix Menu"
POST	"CE Loop Diag Menu"
LIBRARY MECH	"CE Loop Diag Menu"
READ/WRITE	"CE Loop Diag Menu"
LIBRARY LOAD TEST	"CE Loop Diag Menu"
PANEL	"CE Loop Diag Menu"

Cancel Causes the CE Verify Fix menu to appear.

POST (Power On Self Test) Runs most of the tests that normally occur when power is switched ON to the drive. The test checks motors, sensors and memory. This test also includes the Library Mech test.

Library Mech Test Runs tests on the library mechanism. The test checks motors, sensors, and the library control card.

Read/Write Test Runs a Read/Write test. This test takes approximately 3 minutes for each cycle. A scratch tape must be loaded before selecting this test.

Library Load Test Runs tests on the library cartridge load mechanism. The library should be in **random** mode, with a cartridge loaded into the **import** position of the priority cell.

The test will move the cartridge from the priority cell into every available empty magazine cell, then back to the priority cell in the **export** position. To restart the test it will be necessary to manually move the cartridge into the **import** position.

Panel Test Runs tests on the operator panel display. Allows the service representative to visually check all pixels on the operator panel display.

To stop the Panel test, select **STOP RUNNING** between test cycles.

When a test starts to run, the CE WAIT Menu shown in Figure 132 appears.

```
CE WAIT MENU
 RUNNING...
 STOP AND
  FORCE ERR DUMP
```

Figure 132. CE Wait Menu

```
CE DIAGS GOOD

>CANCEL       DIAGS COMPLETED
 UNLOAD DRIVE  SUCCESSFULLY
```

```
CE DIAG FAILED

>CANCEL       DIAGS FAILED
 UNLOAD DRIVE
```

```
CE DIAG BLOCKED

>CANCEL       DIAGS BLOCKED
 UNLOAD DRIVE
```

Figure 133. Final Status

When the test needs a tape, “CE Load Scratch Tape Menu” on page PANEL-37 is displayed. At that time, you should load a scratch cartridge into the priority cell and select LOAD FROM PRI SLOT. When the cartridge is loaded and at ready point, press ENTER and select **Process Loaded Tape**. At that time, Figure 132 is again displayed until the test is completed or until an error is detected.

Allow the tests to run to completion. When a test ends, the results are displayed on Figure 133 (the second screen shows an example of a failure).
Attention: Do not select **Force Err Dump** from the menu when the tests are running unless you are sure the 3570 is in a hung condition. Also, when the tests are running, do not change to operator mode by pressing the Change Mode push button. Aborting a test can cause unexpected results.

The CE DIAG BLOCKED menu can occur if the drive goes through microcode recovery, or if a tape cartridge was loaded when diagnostics were requested. To recover from the first condition, power the drive off and then back on. To recover from the second, unload the tape and request diagnostics again. Use the FID that was displayed and go to the START section.

CE Main Dump Menu: Figure 134 shows the CE Main Dump menu. This menu allows the CE to force a dump or to copy a dump from dynamic random access memory (DRAM) to a cartridge.

Figure 134. CE Dump Menu

Function	Next Menu
CANCEL	"CE Options Menu" on page PANEL-29
FORCE DUMP	—
CPY DMP TO TAP	"CE Copy Dump to Tape Menu" on page PANEL-34
FORCE ERR DUMP	—
DUMP OPTIONS	"CE Dump Options Menu" on page PANEL-33.

The *dump* icon (!) appears when the dump is available, and remains on the screen to indicate that trace data is stored in the device. The icon is not displayed after the host takes a dump or the dump is written to tape.
Attention: Trace data is volatile and is lost if you press the Reset push button or switch off power to the device.

Cancel Causes the CE Options menu to appear.

Force Dump Causes a dump to control store DRAM to occur. The initiator can retrieve the data via a Read Buffer command to the control store DRAM.
Attention: Do not use this option if a FID1 condition has already caused a dump to be created. For this case, the dump data of interest is lost if you execute the Force Dump function.

Do not use Force Dump if the bus is in a hung state; instead, use the Force Err Dump option.

Copy Dump to Tape Causes the "CE Copy Dump to Tape Menu" on page PANEL-34 to appear.

Force Error Dump Causes a recovery procedure in which the microcode is reloaded. This option is used if a microcode-hang condition exists (that is, the host cannot communicate with the drive and no hardware fault is detected).

When a hang condition exists, the host can attempt to request a microcode dump through a SCSI port, but does not receive it from the drive.

This option is also used if a microcode dump is needed and the Force Dump option on this menu cannot provide a dump. The host is then able to successfully request the dump information via the SCSI port, or the CE can use the Copy Dump to Tape option on this menu.

Dump Options Allows the CE to customize the dump based on Engineering or Support request.

CE Dump Options Menu: Figure 139 on page PANEL-35 shows the Dump Options menu.

Figure 135. Dump Options Menu

Function	Next Menu
CANCEL	"CE Main Dump Menu" on page PANEL-32
OBJECT ALIAS...	"CE Object Alias Menu"
ADDRESS...	"CE Address Menu" on page PANEL-34

Cancel Causes the "CE Main Dump Menu" on page PANEL-32 to appear.

Object Alias Allows the CE to enter Object Alias data for dump options.

Address Allows the CE to enter Control Store addresses for dump options.

CE Object Alias Menu: Figure 136 shows the Object Alias menu.

Figure 136. Object Alias Menu

Function	Next Menu
CANCEL	"CE FMR Tape Menu" on page PANEL-35
OBJECT ALIAS (4 characters displayed vertically)	—
ADD OBJECT ALIAS	—
REMOVE OBJECT ALIAS	—
LIST OBJECT ALIAS...	"List Object Alias Menu"

Cancel Causes the "CE FMR Tape Menu" on page PANEL-35 to appear.

Object Alias Allows the CE to select a specific hex value. To change the value of the nibble, select the nibble, which causes a new menu to appear where you can select 0–F.

Add Object Alias Allows the CE to add Object Alias data to the dump options.

Remove Object Alias Allows the CE to remove Object Alias data from dump options.

List Object Alias Allows the CE to list Object Alias data from the dump options.

CE Address Menu: Figure 137 shows the Address menu.

Figure 137. Address Menu	
Function	**Next Menu**
CANCEL	"CE FMR Tape Menu" on page PANEL-35
ADDRESS (4 characters displayed vertically)	—
ADD ADDRESS	—
REMOVE ADDRESS	—
LIST ADDRESS	"List Address Menu"

Cancel Causes the "CE FMR Tape Menu" on page PANEL-35 to appear.

Address Allows the CE to select a specific hex value. To change the value of the nibble, select the nibble, which causes a new menu to appear where you can select 0–F.

Add Address Allows the CE to add Address data to the dump options.

Remove Address Allows the CE to remove Address data from dump options.

List Address Allows the CE to list Address data from the dump options.

CE Copy Dump to Tape Menu: Figure 138 shows the CE Copy Dump to Tape Menu. This menu copies the dump data to a cartridge. A menu prompts the CE to load a scratch tape.

Attention: Data on the tape may be overwritten. The Final Status menus, Figure 141 on page PANEL-36 and Figure 142 on page PANEL-36 indicate the status of the copy to tape (successful copy or unsuccessful copy). This option is invalid if no dump data exists.

Figure 138. CE Copy Dump to Tape Menu	
Function	**Next Menu**
CANCEL	"CE Main Dump Menu" on page PANEL-32
WRT DMP AT BOT	"CE Load Scratch Tape Menu" on page PANEL-37
WRT DMP AT EOD	"CE Load Scratch Tape Menu" on page PANEL-37

Cancel Causes "CE Main Dump Menu" on page PANEL-32 to appear.

WRT DMP AT BOT Copies the dump to the beginning of a tape cartridge.

WRT DMP AT EOD Appends the dump to data already written on the tape.

CE FMR Tape Menu: Figure 139 shows the FMR Tape menu.

Figure 139. FMR Tape Menu

Function	Next Menu
CANCEL	"CE Options Menu" on page PANEL-29
UCODE UPDATE ...	"CE Load FMR Tape Menu" on page PANEL-38
MAKE FMR TAPE...	"CE Load Scratch Tape Menu" on page PANEL-37
UNMAKE FMR TAPE...	"CE Load FMR Tape Menu" on page PANEL-38

Cancel Allows the CE to abort an FMR and return to the CE Options menu.

Ucode Update Allows the CE to replace the microcode in the device from a field microcode replacement (FMR) tape and to update the FMR cartridge with the microcode. A menu prompts the CE to load the FMR tape in the device. When the 3570 reads the FMR tape, it checks the EC levels on the tape. If the tape does not contain the EC level of the drive, it automatically writes the microcode to the FMR tape. It then displays the EC level on the next screen.

Selecting this option causes the "CE Select EC Level Menu" on page PANEL-36 to appear.

While this option is running, the Figure 132 on page PANEL-31 is displayed. Upon exit, Final Status Menu Figure 141 on page PANEL-36 is displayed.

Make FMR Tape Allows the CE to create a field microcode replacement (FMR) tape from a scratch tape. The FMR tape contains the current level of microcode that is active in the device. A menu prompts the CE to load a scratch tape in the device. While the option is running, the Figure 132 on page PANEL-31 is displayed. After the tape is written, the final status menu, Figure 141 on page PANEL-36 will indicate if the operation was successful.

Unmake FMR Tape Allows the CE to convert an FMR tape to a scratch tape. A menu prompts the CE to load an FMR tape in the device. While the option is running, the Figure 132 on page PANEL-31 is displayed. After the tape has the header information changed, the final status menu, Figure 141 on page PANEL-36 will indicate if the operation was successful.

CE Select EC Level Menu: Figure 140 shows the Select EC menu. This menu is displayed when the device loads an FMR tape. The device reads all the EC levels and displays them on this menu. The invalid EC levels are displayed in a lighter font. The message lines display the EC level running in the device. The ECs are displayed in the same order as they appear on tape. The CE picks which EC level to load into the device.

After the FMR tape is read, a power-on reset or CE reset is needed to activate the microcode that was just loaded.

Operational Note: If you insert the FMR cartridge and the EC level of the code is not on the cartridge, the microcode is automatically copied from the drive to the cartridge.

Figure 140. Select EC Level

Function	Next Menu
CANCEL	"CE Options Menu" on page PANEL-29
EC=aaaaaaa LL=bbbb	—
EC=ccccccc LL=dddd	—
EC=eeeeeee LL=ffff	—

Cancel Allows the CE to abort an FMR and return to the CE Options menu.

EC Level Allows the CE to pick which EC level to load into the device.

The latest EC level is determined by the link level (LL), as the EC level may not always increment to a higher number. The following example shows that the second entry is the latest level microcode.

```
EC=6C56789 LL=4D D
EC=3C56789 LL=5B 2  (highest EC level)
```

The Final Status menu shows the completion status of the operation you selected and allows you to select the options shown. (CE ACTN SUCCESS indicates that the CE action was successful.) If a failure occurs, the Final Status menu indicates CE ACTN FAILED. This failure can occur if the drive cannot read or write the tape.

```
CE ACTN SUCCESS
>CANCEL
 UNLOAD DRIVE
 SHOW STATUS   +
```

Figure 141. Final Status Menu

```
CE ACTN FAILED
>CANCEL
 UNLOAD DRIVE
 SHOW STATUS   +
```

Figure 142. Final Status Menu

CE Load Scratch Tape Menu: Figure 143 shows the menu that prompts the CE to load a scratch tape into the priority slot. The scratch tape should not have a label or data unless it is OK to overwrite it.

If the scratch cartridge in the drive has a volser written on the tape, it is overwritten.

Figure 143. Load Scratch Tape

Function	Next Menu
CANCEL	Previous menu
PROC LOAD TAPE	Next menu
UNLOAD DRIVE	"CE Load Scratch Tape Menu"
SHOW STATUS	"Status Screen" on page PANEL-5
LOAD FROM PRI SLOT	—

Cancel Allows the CE to return to the CE Options or other menu depending upon the previous menu. See Figure 128 on page PANEL-26 for details.

Process Loaded Tape If scratch tape is loaded and at ready point, then a **new** menu will be displayed, depending on the previous menu. See Figure 128 on page PANEL-26 for detail.

Unload Drive Allows the CE to unload the cartridge from the drive.

Show Status Displays the Status screen.

Load From PRI Slot Loads a cartridge from the priority slot into the drive.

Messages That May Result

Figure 144. Load Scratch Tape—Messages That May Result

Message	Meaning and Action To Take
WRONG TAPE TYPE	An FMR tape was loaded. Reload with a scratch tape.
TAPE NOT AT LOAD PT	Tape was not at load point and is rewinding. Wait.
TAPE WRITE PROT'D	Tape is write protected. Un-protect it before proceeding.
USE UNLABELED TAPE	A message to remind you to use an unlabeled tape. Load an unlabeled tape unless the tape will be allowed to be overwritten. If a label is present, the label and all data will be overwritten.

CE Load FMR Tape Menu: Figure 145 shows the menu that prompts the CE to load the FMR tape into the priority slot.

Figure 145. Load FMR Tape

Function	Next Menu
CANCEL	Previous menu
PROC LOAD TAPE	Next menu
UNLOAD DRIVE	"CE Load FMR Tape Menu"
SHOW STATUS	"Status Screen" on page PANEL-5
LOAD FROM PRI SLOT	—

Cancel Allows the CE to return to the CE Options or other menu depending upon the previous menu. See Figure 128 on page PANEL-26 for details.

Process Loaded Tape If FMR tape is loaded and at ready point, then a **new** menu will be displayed, depending on the previous menu. See Figure 128 on page PANEL-26 for detail.

Unload Drive Allows the CE to unload the cartridge from the drive.

Show Status Displays the Status screen.

Load From PRI Slot Loads a cartridge from the priority slot into the drive.

Messages That May Result

Figure 146. Load FMR Tape—Messages That May Result

Message	Meaning and Action To Take
WRONG TAPE TYPE	A scratch tape was loaded. Reload with an FMR tape.
TAPE NOT AT LOAD PT	Tape was not at load point and is rewinding. Wait.
TAPE WRITE PROT'D	Tape is write protected. Un-protect it before proceeding.
USE UNLABELED TAPE	A message to remind you to use an unlabeled tape. Load an unlabeled tape unless the tape used can be overwritten. If a label is present, the label and all data will be overwritten.

CE Config/Install Menu: Figure 147 shows the Config/Install menu. The default values are in a bold font.

Note: The CE Config/Install menu options display the current status. For example, if an option says Forced Error Logging Off, that means that forced error logging is off. To turn it on, select the option. The option will change to show the new current status, Forced Error Logging On.

Figure 147. Config/Install

Function	Next Menu
CANCEL	"CE Options Menu" on page PANEL-29
DRV SERIAL NO	"CE Drive Serial Number Menu" on page PANEL-40
DRV FEATURES...	"CE Drive Features Menu" on page PANEL-40
WRAP TOOLS.....	"CE Wrap Tools Menu" on page PANEL-41
SIM SV FILT ON/**OFF**	—
NUM REPEAT SIM	—
CLEAN MOUNTS	—
CLEAN USAGE	—
FORCE ERROR LOG ON/**OFF**	—

Cancel Causes the CE Options menu to appear.

Drv Serial No Causes the "CE Drive Serial Number Menu" on page PANEL-40 to appear.

Drv Features Allows the CE to set items from "CE Drive Features Menu" on page PANEL-40.

Wrap Tools Causes the "CE Wrap Tools Menu" on page PANEL-41 to appear.

SIM Sev Filt On/Off Allows the CE to filter the messages displayed on the panel. When this option is set to **On**, only *acute* and *serious* severity service information messages (SIMs) are displayed. *Moderate* and *service-related* severity SIMs are not displayed. When this option is set to Off, all SIMs are displayed. The default is *Off*.

Num Repeat SIMs Allows the CE to determine how many times to repeat sending the same SIMs to the host. For example, if you set the value to 3, the SIM is sent to the host when a SIM is generated, again eight hours later, then again eight hours later. You cannot change the time between the presentation of SIMs, which is eight hours.

Clean Mounts Allows the CE to change the quantity specifying the number of mounts required for the drive before a **clean** message is posted on the operator panel.

Clean Usage Allows the CE to change the quantity specifying the number of bytes processed by the drive before a **clean** message is posted on the operator panel.

Force Error Log On/Off Allows the CE to turn error logging on. When On is displayed, deferred-check conditions are reported to the host. Therefore, temporary errors are reported in the sense data. The default is *Off*. This selection is normally used because of specific requests from support personnel.

CE Drive Serial Number Menu:

Figure 148 shows the Drive Serial Number menu.

This menu allows the CE to set the serial number of the drive from the operator panel.

Figure 148. CE Drive Serial Number

Function	Next Menu
CANCEL	"CE Config/Install Menu" on page PANEL-39
DISP SERIAL NO	—
ALTER SERIAL NO	"CE VPD Field Offset Menu" on page PANEL-48

Cancel Causes the "CE Config/Install Menu" on page PANEL-39 to appear.

Disp Serial No Displays the drive serial number in the format **0000 000n nnnn**.

Alter Serial No Allows the CE to enter the drive serial number field, using the VPD Field Offset menu and the VPD Data menu. See "Drive Serial Number—Library Models Only" on page PROC-29 for detailed instructions.

CE Drive Features Menu:

Figure 149 shows the Drive Features menu.

This menu allows the CE to set the model number of the library from the operator panel. The default values are in bold font.

Note: A drive will be configured by microcode as a C00 Model automatically when the library is disconnected from the logic and the drive is powered on. Also, when a C00 Model is installed into a library, it will be automatically configured as a C01. The CE can override this with the operator panel and make it a C11.

Figure 149. CE Drv Features

Function	Next Menu
CANCEL	"CE Config/Install Menu" on page PANEL-39
C11 RACK (Pick this option for C21 also)	—
C01 STANDALONE	—
C12 RACK (Pick this option for C22 also)	—
C02 STANDALONE	—

Cancel Causes the "CE Config/Install Menu" on page PANEL-39 to appear.

C11 Rack (and C21, see Note) Allows the CE to configure the library as a Model C11 which is a rack model with one drive.

C01 Standalone Allows the CE to configure the library as a Model C01 which is a stand-alone model with one drive.

C12 Rack (and C22, see Note) Allows the CE to configure the library as a Model C12 which is a rack model with two drive units.

C02 Standalone Allows the CE to configure the library as a Model C02 which is a stand-alone model with two drive units.

Note: Models C21 and C22 look to the host initiator as Models C11 and C12 respectively. When selecting the option, select C11 for Models C11 and C21, and select C12 for Models C12 and C22.

CE Wrap Tools Menu: Figure 150 shows the CE Wrap Tool Menu.

Figure 150. CE Wrap Tools Menu

Function	Next Menu
CANCEL	"CE Config/Install Menu" on page PANEL-39
SCSI 0: NOT PR/PRSNT	—
RS422: NOT PR/PRSNT	—

Cancel Causes the "CE Config/Install Menu" on page PANEL-39 to appear.

SCSI 0: NOT PR/PRSNT Indicates whether or not the SCSI wrap tool is installed on the SCSI connector. PRSNT indicates the wrap tool is installed. NOT PR indicates the wrap tool is not installed.

RS422: NOT PR/PRSNT Indicates whether or not the RS422 wrap tool is installed on the RS422 connector. PRSNT indicates the wrap tool is installed. NOT PR indicates the wrap tool is not installed.

CE Logs Menu: Figure 151 shows the Logs menu. This menu allows the CE to access the CE error logs.

Figure 151. CE Logs

Function	Next Menu
CANCEL	"CE Options Menu" on page PANEL-29
ERROR LOG...	"CE Error Log Menu" on page PANEL-42
FID FE LOG...	"CE FID FE Log Menu" on page PANEL-43
FID FF LOG...	"CE FID FF Log Menu" on page PANEL-44

Cancel Causes the "CE Options Menu" on page PANEL-29 to appear.

Error Log Allows the CE to view the Error Log.

FID FE Log Allows the CE to view the FID FE log.

FID FF Log Allows the CE to view the FID FF log.

The **CE Error Log** logs every FID or ATTN message posted to the operator panel.

The **FID FE Log** logs a filtered subset of all sense data sent to the host with a FID of **FE**.

The **FID FF Log** logs a filtered subset of all sense data sent to the host with a FID of **FF**.

CE Error Log Menu: Figure 152 shows an example of the menu when the log contains entries. The format is:

```
FIDx yy                        ATTN DRV/LIBR
 aaaa bbbb cccc       --OR--      (detailed message)
 dddd hh : mm : ss                dddd hh : mm : ss
```

See Figure 106 on page PANEL-9 for a description of the fields.

Figure 152. CE Error Log

Function	Next Menu
CANCEL **or** No Entries	"CE Logs Menu" on page PANEL-41
CLEAR ERR LOG	"CE Logs Menu" on page PANEL-41
FID1 DD 3130 0030 283A 0001 02:42:10	"CE Logs Menu" on page PANEL-41
FID1 CD 311A 311A 283A 0001 02:39:34	"CE Logs Menu" on page PANEL-41

Time Stamp for CE Error Log: A time stamp accompanies each error log entry. It is **not real time** but is **relative time**. A clock counter is started with power-on, but is saved each hour in VPD. The times may vary from real "relative time" depending on the number of power cycles taken, and timing between them.

```
dddd  hh   : mm  : ss
Days  hours  mins  secs
Time is relative to power on time for the logic card, not real time.

EXAMPLE:
   ATTN DRV
   LOAD/UNLOAD ERROR
      1  2:42:28
```

Cancel Causes the "CE Logs Menu" on page PANEL-41 to appear.

No Entries Indicates that no entries are in the Error log. Choosing this option causes "CE Logs Menu" on page PANEL-41 to appear.

Clear Err Log Clears the error log if at least one entry is in the log. Returns to "CE Logs Menu" on page PANEL-41.

FID1 DD This example indicates a possible fault with one of the sensors. The fault symptom codes are 3130 and 0030. The next character (2 in 283A) represents the model number followed by the microcode link (83A). A "relative time" time stamp follows. Choosing this option causes "CE Logs Menu" on page PANEL-41 to appear.

FID1 CD This example indicates a possible fault with the cartridge present sensor. The fault symptom codes are 311A. The next character (2 in 283A) represents the model number followed by the microcode link (83A). A time stamp follows. Choosing this option causes "CE Logs Menu" on page PANEL-41 to appear.

The maximum entry in the Error log is 30. If a fault is detected and the log contains 30 entries, the oldest entry is scrolled off the bottom and the newest FID is put in position 1 (the first position in the list).

CE FID FE Log Menu: The **FID FE Log** logs a filtered subset of all sense data sent to the host with a FID of **FE**. It also provides alternative FIDs for the CE to use when diagnosing drive failures.

Figure 153 shows an example of the menu when the log contains entries. See “CE Error Log Menu” on page PANEL-42 for format information.

See “Error Log Analysis Procedure” on page PROC-39 for a procedure to assist you in analyzing the error log. The format is:

```
FID xx yy
aaaa bbbb cccc
dddd hh:mm:ss
VS: vvvvvv
```


Figure 153. CE FID FE Log

Function	Next Menu
CANCEL or No Entries	“CE Logs Menu” on page PANEL-41
CLEAR ERROR LOG	“CE Logs Menu” on page PANEL-41
FID D3 E0 3542 313F 1166 0002 17:37:25 VS: 156M95	“CE Logs Menu” on page PANEL-41

Cancel Causes the “CE Logs Menu” on page PANEL-41 to appear.

No Entries Indicates that no entries are in the Error log. Choosing this option causes “CE Logs Menu” on page PANEL-41 to appear.

CLEAR ERROR LOG Allows the CE to erase the error log. This option will only be displayed when there is at least one entry in error log. Choosing this option causes “CE Logs Menu” on page PANEL-41 to appear.

FID D3 E0 This example indicates a possible fault with the tape cartridge. The fault symptom codes are 3542 and 313F. The next character (1 in 1166) represents the model number followed by the microcode link (166). A time stamp follows. The last entry is the Volume Serial number. If the Volume Serial number is not known, it will show "UNKNOWN". Choosing this option causes “CE Logs Menu” on page PANEL-41 to appear.

The maximum entry in the FID FE log is 10.

Only the last 10 entries in the log are displayed. If a fault is detected and the log contains 10 entries, the oldest entry is scrolled off the end and the newest error is put in position 1 (the first position in the list).

CE FID FF Log Menu: The **FID FF Log** logs a filtered subset of all sense data sent to the host with a FID of **FF**. It also provides alternative FIDs for the CE to use when diagnosing drive failures.

Figure 154 shows an example of the menu when the log contains entries. See "CE Error Log Menu" on page PANEL-42 for format information.

See "Error Log Analysis Procedure" on page PROC-39 for a procedure to assist you in analyzing the error log. The format is:

```
FID xx yy
aaaa bbbb cccc
dddd hh:mm:ss
```

Figure 154. CE FID FF Log

Function	Next Menu
CANCEL or No Entries	"CE Logs Menu" on page PANEL-41
CLEAR ERROR LOG	"CE Logs Menu" on page PANEL-41
FID D3 E0 3542 313F 1166 0002 17:37:25	"CE Logs Menu" on page PANEL-41

Cancel Causes the "CE Logs Menu" on page PANEL-41 to appear.

No Entries Indicates that no entries are in the Error log. Choosing this option causes "CE Logs Menu" on page PANEL-41 to appear.

CLEAR ERROR LOG Allows the CE to erase the error log. This option will only be displayed when there is at least one entry in error log. Choosing this option causes "CE Logs Menu" on page PANEL-41 to appear.

FID D3 E0 This example indicates a possible fault with the tape cartridge. The fault symptom codes are 3542 and 313F. The next character (1 in 1166) represents the model number followed by the microcode link (166). A time stamp follows.

The maximum entry in the FID FF log is 10.

Only the last 10 entries in the log are displayed. If a fault is detected and the log contains 10 entries, the oldest entry is scrolled off the end and the newest error is put in position 1 (the first position in the list).

CE Utilities Menu: Figure 155 shows the Utilities menu.

Note: This menu is normally used because of specific requests from support personnel.

Figure 155. Utilities

Function	Next Menu
CANCEL	"CE Options Menu" on page PANEL-29
DISP SENSORS...	"CE Disp Sensors Menu" on page PANEL-46
DISP/ALT VPD...	"CE Disp/Alt VPD Menu" on page PANEL-47
CONTROL STORE ...	"CE Control Store Select Address Menu" on page PANEL-50
UCODE TRAP ...	"CE Microcode Trap Menu" on page PANEL-51
READ TAPE ...	"CE Read Tape Menu" on page PANEL-51
ENGR USE ONLY...	"Password Menu" on page PANEL-53
SHOW STATS...	"Statistics Menu" on page PANEL-56
OEM USE ONLY...	"OEM Use Only Menu" on page PANEL-46

Cancel Causes the "CE Options Menu" on page PANEL-29 to appear.

Disp Sensors Allows the CE to display the library and drive sensors and change sensor states dynamically.

Disp/Alt VPD Allows the CE to display or change the vital product data (VPD). Change the VPD be done with assistance from support personnel.

Control Store Allows the CE to read any address in nonvolatile storage and control store.

Ucode Trap Allows the CE to set a specific FSC trap (error code match) in microcode to force a microcode dump.

Read Tape Allows the CE to display a portion of the data on the tape.

Engr Use Only Allows support personnel to access selected utilities.

Show Stats Allow the CE to display internal counts of activities.

OEM Use Only Allows OEM support personnel to access selected utilities.

OEM Use Only Menu: Figure 156 shows the OEM Use Only menu. This menu allows OEM support personnel to access the menu items, after entering the password.

Figure 156. OEM Use Only Menu

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
MANUFACTURER	"CE VPD Data Menu" on page PANEL-49
DRIVE TYPE	"CE VPD Field Offset Menu" on page PANEL-48
DRIVE MODEL NUM	"CE VPD Data Menu" on page PANEL-49
SAVE CHANGES	—

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

Manufacturer Allows OEM support personnel to customize the **manufacturer** field in the VPD Data menu.

Drive Type Allows OEM support personnel to customize the **drive type** field, using the VPD Field Offset menu and the VPD Data menu.

Drive Model Num Allows OEM support personnel to customize the **drive model number** field in the VPD Data menu.

Save Changes Stores the changes into non-volatile storage (NVS).

CE Disp Sensors Menu: Figure 157 shows the Disp Sensors menu. This menu allows the CE to view the state of the library and drive sensors, and to change the states dynamically. A delay of approximately one second is required between sensor state changes.

Figure 157. Disp Sensors

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
CI:1 UB:1	Display Loader cartridge inserted, Unload button sensor states
CT:0000	Cartridge type sensor states
LH:0 FP:0	Display Loader home, File protect sensor states
DO:1 CCP:0	Display Library door open, Clean cartridge present sensor states
M1P:0 M2P:0	Display magazine 1 and 2 present sensor states
GIA:0 GIB:0	Display Global interference A and B sensor states
PS:1 CP:1	Display Priority slot, Cartridge present sensor states
P1:1 P2:0	Display Picker pinch 1 and 2 sensor states
L1:1 L2:0	Display Picker limit 1 and 2 sensor states

Note: The values shown for each sensor will vary on your machine depending upon whether a cartridge is loaded and other variables. For information on how to change states on each sensor, see "Library Sensors Checkout Procedure" on page PROC-13.

CE Disp/Alt VPD Menu:

Figure 158 shows the Disp/Alt VPD menu.

This menu allows the CE to select the vital product data (VPD) group that contains the specific VPD field to be displayed or altered. All groups listed below may be displayed, but only some groups that are contained in the **Flash Grp** may be altered with this menu. Changes are not saved to non-volatile storage (Flash EEPROM) until the CANCEL option in the Disp/Alt VPD menu is selected.

Note: This menu is normally used because of specific requests from support personnel.

Figure 158. Disp/Alt VPD

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
UCODE GRP	"CE Group Name Menu" on page PANEL-48
HEAD GRP	"CE Group Name Menu" on page PANEL-48
PROCESSOR GRP	"CE Group Name Menu" on page PANEL-48
DRAM GRP	"CE Group Name Menu" on page PANEL-48
FLASH GRP	"CE Group Name Menu" on page PANEL-48

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

Ucode Grp The link level and size of the microcode.

Head Grp The initial position sensor (IPS) gain settings, plant of manufacture, and serial number of the read/write head.

Processor Grp The type of processor in the card pack.

Dram Grp The EC levels of the module. These fields are only maintained in DRAM, not in flash EEPROM or in the microcode.

Flash Grp The SCSI addresses, the LIBR mode, and the other setup choices you can make from the operator/CE panel (the dynamic information). This information is in flash EEPROM.

CE Group Name Menu: Figure 159 shows the Group Name menu. This menu allows the CE to select a VPD field to display or alter.

Note: This menu is normally used because of specific requests from support personnel.

Figure 159. Group Name

Function	Next Menu
CANCEL	"CE Disp/Alt VPD Menu" on page PANEL-47
<VPD field i>	"CE VPD Field Offset Menu" or "CE VPD Data Menu" on page PANEL-49
<VPD field i+1>	"CE VPD Field Offset Menu" or "CE VPD Data Menu" on page PANEL-49
...	"CE VPD Field Offset Menu" or "CE VPD Data Menu" on page PANEL-49
<VPD field i+n>	"CE VPD Field Offset Menu" or "CE VPD Data Menu" on page PANEL-49

Cancel Causes the "CE Disp/Alt VPD Menu" on page PANEL-47 to appear.

VPD field Causes the selected VPD field to appear. If the VPD field selected is large, the VPD Field Offset menu is displayed. Otherwise, the VPD data menu is displayed.

CE VPD Field Offset Menu: Figure 160 shows the VPD Field Offset menu. This menu selects the number of bytes to skip (bytes to not display) in the VPD field chosen at "CE Group Name Menu."

Note: This menu is normally used because of specific requests from support personnel.

Figure 160. VPD Field Offset

Function	Next Menu
CANCEL	"CE Group Name Menu"
OFFSET VALUE	—
000 30	"CE VPD Data Menu" on page PANEL-49
001 30	"CE VPD Data Menu" on page PANEL-49
002 4B	"CE VPD Data Menu" on page PANEL-49
....	"CE VPD Data Menu" on page PANEL-49

Cancel Causes the "CE Group Name Menu" to appear.

<number> Allows the CE to select an offset in the VPD field. After you select a number, "CE VPD Data Menu" on page PANEL-49 is displayed.

The message **Field Protected** is informing the CE that the VPD field just selected is displayed, but cannot be modified.

CE VPD Data Menu: Figure 161 shows the VPD Data menu. This menu allows the CE to modify any character in the selected offset for the selected VPD field.

Note: This menu is normally used because of specific requests from support personnel.

Figure 161. VPD Data

Function	Next Menu
CANCEL	"CE VPD Field Offset Menu" on page PANEL-48 or "CE Group Name Menu" on page PANEL-48
<VPD offset high nibble>	—
<VPD offset next nibble>	—
<VPD offset next nibble>	—
<VPD offset low nibble>	—
SAVE AND CONTINUE	"CE Verify Data Menu"

Cancel Causes the "CE VPD Field Offset Menu" on page PANEL-48 to appear if an offset is required. If offset is not required, "CE Group Name Menu" on page PANEL-48 appears. Any changes to VPD Data are **not** saved.

<VPD nibble> Shows the data (hex number) contained in the selected VPD field for the offset selected. The CE can select another value for that nibble.

Save and Continue Causes the "CE Verify Data Menu" to appear. This option is invalid if the VPD field is protected.

CE Verify Data Menu: Figure 162 shows the Verify Data menu. This menu allows the CE to check and verify the VPD entered before the data is stored in nonvolatile storage.

Note: This menu is normally used because of specific requests from support personnel.

Figure 162. Verify Data

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
YES	"CE Utilities Menu" on page PANEL-45
NO	"CE VPD Data Menu"

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear. The VPD data is not modified.

Yes Causes the verified data to be stored in nonvolatile storage, then causes "CE Utilities Menu" on page PANEL-45 to appear.

No Causes the "CE VPD Data Menu" to appear. The VPD data is not modified.

CE Control Store Select Address Menu: Figure 163 shows the Control Store Select Address menu.

Note: This menu is applicable to drive 1 only.

This menu allows the CE to select an address in control store. The byte is read from the selected address. The message line indicates that the control store option was selected on the previous screen.

Note: This menu is normally used because of specific requests from support personnel.

Figure 163. Control Store Select Address

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
CS ADR (8 characters displayed vertically)	—
CONTINUE	"CE Control Store Display Menu"

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

<CS Adr> Defines the address to be chosen. To change the value of the nibble, select the nibble, which causes another menu to appear where you can select 0–F.

Continue Takes the address displayed and goes to "CE Control Store Display Menu."

CE Control Store Display Menu: Figure 164 shows the Control Store Display menu. This menu allows the CE to display the byte in the specified address. The message line indicates the current control store address and value.

Note: This menu is normally used because of specific requests from support personnel.

Figure 164. Control Store Display

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
SCROLL UP	—
<CS Adr+0> <CS Data>	—
<CS Adr+4> <CS Data>	—
<CS Adr+8> <CS Data>	—
<CS Adr+...> <CS Data>	—
SCROLL DOWN	—

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

Scroll Up Causes previous addresses to be displayed (scrolling up through memory).

<CS Adr> <data> Shows the data contained in the word starting at the specified address and causes the "CE Control Store Select Address Menu" to appear.

Scroll Down Causes the next address to be displayed (scrolling down through memory).

CE Microcode Trap Menu: Figure 165 shows the Microcode Trap menu. This menu allows the CE to set a specific trap in microcode to force a microcode dump.

This menu is applicable to drive 1 only.

Note: This menu is normally used because of specific requests from support personnel.

Figure 165. Ucode Trap

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
TRAP (4 characters displayed vertically)	—
ADD FSC TRAP	—
REMOVE FSC TRAP	—
LIST FSC TRAPS	"CE FSC Trap List Menu" on page PANEL-60
SAVED TRAP	"CE Saved Traps Menu" on page PANEL-58

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear. The address is not saved.

Trap Allows the CE to select a specific hex value. To change the value of the nibble, select the nibble, which causes another menu to appear where you can select 0–F.

Add FSC Trap Allows the CE to add an FSC trap.

Remove FSC Trap Allows the CE to remove an FSC trap.

List FSC Traps Causes all FSC traps to be displayed in "CE FSC Trap List Menu" on page PANEL-60.

Saved Trap Causes the "CE Saved Traps Menu" on page PANEL-58 to appear.

CE Read Tape Menu: Figure 166 shows the Read Tape menu. This menu allows the CE to select portions of the tape to be displayed on the operator panel display.

Note: This menu is normally used because of specific requests from support personnel.

Figure 166. CE Read Tape

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
SHOW SARS VOLSER	—
PROCESS LOADED TAPE	"CE Process Tape Menu" on page PANEL-52
UNLOAD DRIVE	—
LOAD FROM PRIO SLOT	—

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

Show SARS Volser Displays SARS Volser

Process Loaded Tape Allows CE to move and read tape.

Unload Drive Allows the CE to unload the cartridge from the Drive.

Load from prio slot Enables the library to load a tape from the priority slot.

CE Process Tape Menu: Figure 167 shows the Process Tape menu. This menu allows the CE to select portions of the tape to be displayed on the operator panel display.

Note: This menu is normally used because of specific requests from support personnel.

Figure 167. CE Process Tape

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
SPACE	"Space Menu"
LOCATE	—
READ BLOCK	"Read Block Menu" on page PANEL-53
NEXT BLOCK ID	"Next Block ID Menu" on page PANEL-53

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

Space Allows CE to move to different parts of tape.

Locate Allows the CE to locate to any block on the tape.

Read Block Allows the CE to read data or header information from tape.

Next Block ID Displays the next block ID on tape.

Space Menu: Figure 168 shows the Space menu. This menu allows the CE to select portions of the tape to be displayed on the operator panel display.

Note: This menu is normally used because of specific requests from support personnel.

Figure 168. Space Menu

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
SPACE FRWD BLK	number of blocks
SPACE BKWD BLK	number of blocks
SPACE FRWD FILE	number of files
SPACE BKWD FILE	number of files
SPACE EOD	—

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

Space FRWD BLK Allows CE to space forward on tape the number of blocks specified.

Space BKWD BLK Allows the CE to space backwards on tape the number of blocks specified.

Space FRWD File Allows CE to space forward on tape the number of files specified.

Space BKWD File Allows the CE to space backwards on tape the number of files specified.

Space EOD Allows the CE to space to the end of data.

Read Block Menu: Figure 169 shows the Read Block Menu. This menu allows the CE to do a read block command.

Note: This menu is normally used because of specific requests from support personnel.

Figure 169. Read Block Menu

Function	Next Menu
READ BLK DATA	—
READ BLK HDR	—

Read BLK Data Displays the first 80 characters of blocks data. At bottom of menu you can go to next 80 character and up to 16K.

Read BLK HDR Displays the first 80 characters of blocks header. By scrolling down you can display the next 16 characters.

Next Block ID Menu: Figure 170 shows the Next Block ID Menu This menu allows the CE to show the next block id.

Note: This menu is normally used because of specific requests from support personnel.

Figure 170. Next Block ID Menu

Function	Next Menu
NEXT BLOCK ID :xxxxxxxx	—

Next Block ID Displays the next blocks ID.

Password Menu: Figure 171 shows the Password menu. This menu is displayed when Engr Use Only is chosen from the "CE Utilities Menu" on page PANEL-45. If the correct password is entered, the "Engr Use Only Menu" on page PANEL-55 appears.

Note: This menu is normally used because of specific requests from support personnel.

Figure 171. Enter Password

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
A...	"Engr Use Only Menu" on page PANEL-55
Z...	"Engr Use Only Menu" on page PANEL-55
0...	"Engr Use Only Menu" on page PANEL-55
9	"Engr Use Only Menu" on page PANEL-55

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

<character> Indicates the current character to be entered into the password. When this option is chosen, the character selected is entered into the password and displayed in the message area. After the last letter is entered and the password is correct, the "Engr Use Only Menu" on page PANEL-55 is displayed. If the password is not correct, "CE Utilities Menu" on page PANEL-45 is displayed.

The message area indicates that a password is being entered. Every character entered in the password field is displayed in the message area.

Engr Use Only Menu: Figure 172 shows the Engr Use Only menu. This menu allows product engineers and design engineers, after entering the password, to access the menu items.

Note: This menu is normally used because of specific requests from support personnel.

Figure 172. Engr Use Only Menu

Function	Next Menu
CANCEL	"CE Utilities Menu" on page PANEL-45
CONTROL STORE ...	"Control Store Select Address Menu" on page PANEL-57
MEDIA TEST MODE	"Password Menu" on page PANEL-53
ALLOW ALTER PVPD	—

Cancel Causes the "CE Utilities Menu" on page PANEL-45 to appear.

Control Store Allows a product engineer (PE) to read and write any address in nonvolatile store and in control store DRAM.

Attention: The message area warns that damage can occur to the machine. The machine can be configured improperly and made inoperable with this option.

Media Test Mode Causes the password menu to appear. After you enter the password in "Password Menu" on page PANEL-53, "Media Mode Menu" allows you to set media mode.

Allow Alter PVPD Allows a product engineer (PE) to alter any Flash Group VPD field.

Media Mode Menu: Figure 173 shows the Media Mode menu. This menu allows product engineers and design engineers, after entering the password, to access the menu items.

Note: This menu is normally used because of specific requests from support personnel.

Figure 173. Media Mode Menu

Function	Next Menu
CANCEL	"Engr Use Only Menu"
MEDIA MODE OFF/ON	—
NORM/SHRT CLEN CYCLE	—
ALLOW/PREV EXP TAPE	—

Cancel Causes the "Engr Use Only Menu" to appear.

Media Mode Off/On Allows a product engineer (PE) to set Media Mode Off or On

Norm/Shrt Clen Cycle Allows a product engineer (PE) to set the cleaning cycle to normal or short duration.

Allow/Prevent Exp Tape Allows a product engineer (PE) to allow or prevent Exp Tape

The default is *off*. When this option is set to **on**, the drive is placed in a special mode to test the media. Any media written in this mode can only be read by a device in media mode. If the device reading the media is not in media mode, the cartridge appears as a scratch.

Statistics Menu: Figure 174 shows part of the Statistics menu.

Note: Statistics are valid only if the *Save* option is selected in “Statistics Menu” on page PANEL-21.

Figure 174. Statistics

Function	Next Menu
CANCEL	“CE Utilities Menu” on page PANEL-45
See below for complete list	“Statistics Menu”

Note: The statistic values are displayed in decimal.

All functions are from the library *transport*. For example, **Put Mag Fail** is a failure when the cartridge is moved from the *transport* to the magazine.

Cancel Causes the “Statistics Menu” on page PANEL-21 to appear.

Mounts to Drv The total number of times a cartridge was mounted in the drive.

Priority Mnts The total number of times a cartridge was mounted from the priority cell.

Magazine Mnts The total number of times a cartridge was mounted from any of the magazine cells.

Clean Mounts The total number of times a cartridge was moved from the cleaning cartridge slot to the tape drive.

Pwr On Hrs The total number of hours the device was powered on.

Library Errors The total number of errors that occurred on Library operations.

Put Drive Fail The total number of errors that occurred when a cartridge was inserted in the drive.

Get Drive Fail The total number of errors that occurred when a cartridge was being removed from the drive.

Pinch Mtr Err The total number of timeouts on the motor.

Feed Mtr Error The total number of timeouts on the motor.

Cell to Cell The total number of times cartridges were moved to or from any cells.

Re-calibrations The total number of times the transport had to be re-calibrated.

Put Mag Fail The total number of errors that occurred when a cartridge was inserted in the magazine.

Get Mag Fail The total number of errors that occurred when a cartridge was being taken from the magazine.

Put Pri Fail The total number of errors that occurred when a cartridge was being inserted in the priority cell.

Get Pri Fail The total number of errors that occurred when a cartridge was being retrieved from the priority cell.

Get Mag Retry The total number of errors that required a retry operation when a cartridge was being retrieved from a magazine or priority cell (from the front of the Library).

Put Mag Retry The total number of errors that required a retry operation when a cartridge was being put into the magazine or priority cell (from the front of the library).

Get Dri Retry The total number of errors that required a retry operation when a cartridge was being retrieved from the drive.

Put Dri Retry The total number of errors that required a retry operation when a cartridge was being put into the drive.

Control Store Select Address Menu: Figure 175 shows the Control Store Select Address menu. This menu allows the CE to select an address in control store. Data is written into the selected address. The message line indicates that the Control Store option was chosen on the previous screen.

Note: This menu is normally used because of specific requests from support personnel.

Figure 175. Select Address

Function	Next Menu
CANCEL	"Engr Use Only Menu" on page PANEL-55
CS ADR (8 characters displayed vertically)	—
CONTINUE	"Control Store Alter Menu"

Cancel Causes the "Engr Use Only Menu" on page PANEL-55 to appear.

CS Adr Defines the hex address to be chosen. To change the value of the nibble, select the nibble, which causes another menu to appear where you can select 0–F.

Continue Takes the address displayed and goes to "Control Store Alter Menu."

Control Store Alter Menu: Figure 176 shows the Control Store Alter menu. This menu allows a PE to display the byte in the specified address and to update the data in that address. The message lines indicate the control store address selected and indicates the value at that address.

Note: This menu is normally used because of specific requests from support personnel.

Figure 176. Display/Alter

Function	Next Menu
CANCEL	"Control Store Select Address Menu"
<CS Addrss> <CS Data>	—
<CS hi nibble>	—
<CS low nibble>	—
SAVE AND RETURN	"Control Store Select Address Menu"
Note: Enter CS Addr CS Val: <CS Data>	

Cancel Causes the "Control Store Select Address Menu" to appear. Any modifications to the byte are canceled.

<address> <data> Shows the data contained in the word (4 bytes) selected. This display cannot be selected and is for information purposes only.

<CS nibble> Shows the current nibble (hex number) in the byte selected. To change the value of the nibble, select the nibble, which causes another menu to appear where you can select 0–F.

Save and Return Saves the updated byte in the address and returns to the "Control Store Select Address Menu."

CE Saved Traps Menu: Figure 177 shows the Saved Traps menu.

This menu allows the CE to add, remove or list **saved** FSC traps.

Note: This menu is normally used because of specific requests from support personnel.

Figure 177. Saved Traps

Function	Next Menu
CANCEL	"CE Microcode Trap Menu" on page PANEL-51
TRAP (4 characters displayed vertically)	—
ADD SAVED FSC TRAP	—
RMV SAVED FSC TRAPS	—
LIST SAVED FSC TRAPS	"CE Saved FSC Trap List Menu"

Cancel Causes the "CE Microcode Trap Menu" on page PANEL-51 to appear. The address is not saved.

Trap Allows the CE to select a specific hex value. To change the value of the nibble, select the nibble, which causes another menu to appear where you can select 0–F.

Add Saved FSC Trap Allows the CE to add a Saved FSC trap.

Rmv Saved FSC Traps Allows the CE to remove a Saved FSC trap.

List Saved FSC Traps Causes the "CE Saved FSC Trap List Menu" to be displayed.

CE Saved FSC Trap List Menu: Figure 178 shows the Saved FSC Trap List menu.

This menu allows the CE to select a saved FSC to be removed from a list of **saved** FSC traps.

Note: This menu is normally used because of specific requests from support personnel.

Figure 178. Saved FSC Trap List

Function	Next Menu
CANCEL	"CE Saved Traps Menu"
SAVED FSC1	"CE Remove Saved FSC Trap Menu" on page PANEL-60
SAVED FSC2	"CE Remove Saved FSC Trap Menu" on page PANEL-60
SAVED FSC3	"CE Remove Saved FSC Trap Menu" on page PANEL-60

Cancel Causes the "CE Saved Traps Menu" to appear.

Saved FSC1 Selecting this FSC will cause "CE Remove Saved FSC Trap Menu" on page PANEL-60 to be displayed. If no saved trap exists, then "SLOT EMPTY" will be displayed.

Saved FSC2 Selecting this FSC will cause "CE Remove Saved FSC Trap Menu" on page PANEL-60 to be displayed. If no saved trap exists, then "SLOT EMPTY" will be displayed.

Saved FSC3 Selecting this FSC will cause “CE Remove Saved FSC Trap Menu” on page PANEL-60 to be displayed. If no saved trap exists, then “SLOT EMPTY” will be displayed.

Note: Only **three saved** traps can be active at a time.

CE Remove Saved FSC Trap Menu:

Figure 179 shows the Remove Saved FSC Trap menu.

This menu allows the CE to remove a **saved** FSC trap which was selected in "CE Saved FSC Trap List Menu" on page PANEL-58.

Note: This menu is normally used because of specific requests from support personnel.

Figure 179. Remove Saved FSC Trap

Function	Next Menu
CANCEL	"CE Saved Traps Menu" on page PANEL-58
TRAP (4 characters displayed vertically)	—
RMV SAVED FSC TRAP	—

Cancel Causes the "CE Saved Traps Menu" on page PANEL-58 to appear.

Trap Allows the CE to select a specific hex value. To change the value of the nibble, select the nibble, which causes another menu to appear where you can select 0–F.

Rmv Saved FSC Trap Allows the CE to remove the Saved FSC trap which was selected in the previous menu "CE Saved FSC Trap List Menu" on page PANEL-58.

CE FSC Trap List Menu:

Figure 180 shows the FSC Trap List menu.

This menu allows the CE to select a (normal) FSC to be removed from a list of (normal) FSC traps.

Note: This menu is normally used because of specific requests from support personnel.

Figure 180. FSC Trap List

Function	Next Menu
CANCEL	"CE Microcode Trap Menu" on page PANEL-51
FSC1 (normal trap)	"CE Remove FSC Trap Menu" on page PANEL-61
FSC2 (normal trap)	"CE Remove FSC Trap Menu" on page PANEL-61
.... (normal trap)	"CE Remove FSC Trap Menu" on page PANEL-61

Cancel Causes the "CE Microcode Trap Menu" on page PANEL-51 to appear.

FSC1 Selecting this FSC will cause "CE Remove FSC Trap Menu" on page PANEL-61 to be displayed.

FSC2 Selecting this FSC will cause "CE Remove FSC Trap Menu" on page PANEL-61 to be displayed.

.... Selecting this FSC will cause "CE Remove FSC Trap Menu" on page PANEL-61 to be displayed.

Note: If no traps exist, then "NO TRAPS SET" is displayed.

Note: More than three (normal) FSCs may be displayed on this menu.

CE Remove FSC Trap Menu: Figure 181 shows the Remove FSC Trap menu.

This menu allows the CE to remove a (normal) FSC trap which was selected in “CE FSC Trap List Menu” on page PANEL-60.

Note: This menu is normally used because of specific requests from support personnel.

Figure 181. Remove FSC Trap

Function	Next Menu
CANCEL	“CE Microcode Trap Menu” on page PANEL-51
TRAP (4 characters displayed vertically)	—
REMOVE FSC TRAP	—

Cancel Causes the “CE Microcode Trap Menu” on page PANEL-51 to appear.

Trap Allows the CE to select a specific hex value. To change the value of the nibble, select the nibble, which causes another menu to appear where you can select 0–F.

Remove FSC Trap Allows the CE to remove the (normal) FSC trap which was selected in the previous menu “CE FSC Trap List Menu” on page PANEL-60.

Inspection

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General Instructions

Use this checklist to ensure that a machine not covered by an IBM Maintenance Agreement has the necessary safety items installed and no other changes were made that would make it unsafe or inoperable. Each machine, as it was designed and assembled, had needed safety items installed to protect the owners, operators, and service personnel from injury.

Note: This equipment is designed for connection to IT (impedance transformer) power subsystems.

Materials Needed

The following items are needed or are useful during the inspection:

Copies of safety service memorandums (SMs) and engineering change announcements (ECAs) for this machine type

Machine history

Electrical Safety for IBM Customer Engineers, S229-8124

Education

Service personnel must be trained on the new general maintenance agreement qualification (MAQ), tailored-maintenance agreement qualification, and changed machine safety inspection procedures as part of the electrical safety course.

Safety

The general caution symbol identifies conditions where caution must be used.

The electrical caution symbol identifies electrical hazards where extreme caution must be used.

Perform this inspection before the normal inspection for a maintenance agreement. **Suspect that the 3570 is unsafe until you verify that it is safe**. Possible safety hazards are:

Electrical
An electrically charged frame can cause serious or lethal electrical shock.

Mechanical
Hazards, such as a safety cover missing, are potentially harmful to people.

Chemical
Do not use solvents, cleaners, or other chemicals not approved for use on this product.

Any of the problems listed above must be repaired before you use the 3570.

The following notices are translated into selected languages. Each notice contains an identifier (Caution=Cx).

C1 **CAUTION**
The 3570 Model C01 weighs approximately 35 kilograms (77 pounds); it takes three persons to safely lift this unit.

C2 **CAUTION**
The 3570 Models C11 and C21 each weigh approximately 24 kilograms (53 pounds); it takes two persons to safely lift these units.

C3 **CAUTION**
The 3570 Model C02 weighs approximately 40 kilograms (88 pounds); it takes three persons to safely lift this unit.

C4 **CAUTION**
The 3570 Models C12 and C22 each weigh approximately 29 kilograms (64 pounds); it takes two persons to safely lift these units.

C5 **CAUTION**
When you are sliding the 3570 drive tray assembly in or out, make sure you do not get your hand caught between the drive and the rack. Also, when you are servicing the 3570, make sure the slide and tray assembly is fully extended and locked.

Safety Inspection Procedures

Before performing the safety procedures, ensure the existing room and electrical conditions are safe.

See “Device Covers” and “Serial Number and Label Locations” for locations. Perform the following steps:

1. Power off the 3570.
2. Disconnect the channel cables.
3. See Figure 182. Disconnect the power cord 1 from its source.
4. Check that no voltage exists between the housing on the power source and building ground.
5. Check that resistance is less than 0.1 ohm from the building ground to the power supply enclosure 3 .
6. Inspect the power cable 1 for visible cracks, wear, or damage.
7. Check that the resistance between the power cable ground and the 3570 frame 2 is less than 0.1 ohm.
8. Inspect the enclosure covers 3 to ensure all screws are installed and tight.

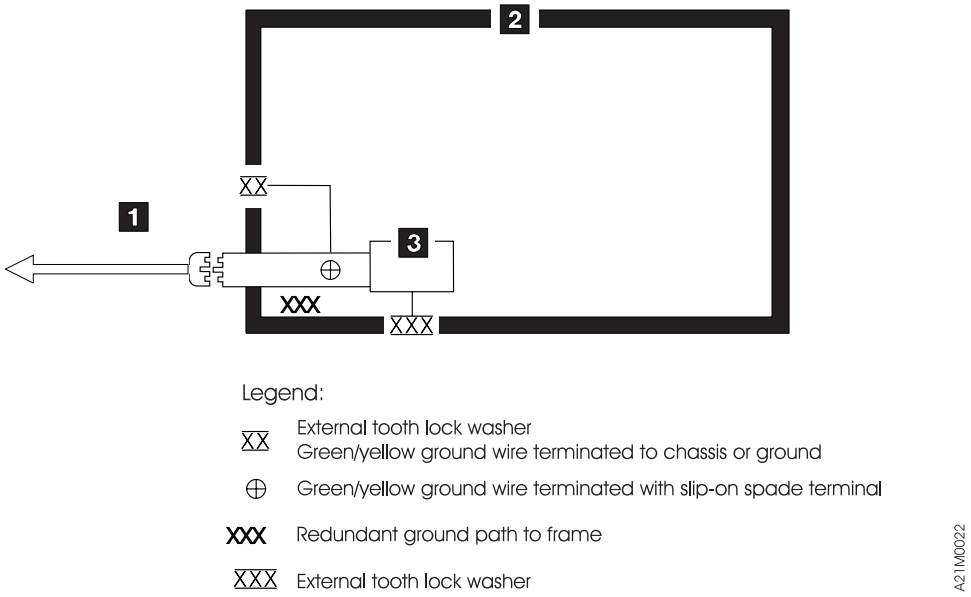

Figure 182. AC Grounding Diagram (50 Hz and 60 Hz)

Sécurité

Le symbole attention indique qu'une attention particulière est nécessaire.

Le symbole risque électrique identifie des risques liés au courant électrique ; il faut en ce cas faire preuve d'une extrême prudence.

Ces procédures doivent être effectuées avant l'inspection normale pour un contrat de maintenance. **Le sous-système de bande magnétique IBM 3570 doit être considéré comme potentiellement dangereux tant qu'il n'a pas été vérifié**. Si vous détectez la moindre condition d'insécurité, vous devez évaluer sa gravité et déterminer si vous pouvez continuer ou non sans avoir d'abord corrigé le problème. Les risques peuvent être de différentes natures :

Risques électriques
Un châssis chargé en électricité peut provoquer un choc électrique grave ou mortel.

Risques mécaniques
L'absence d'un carter de sécurité, par exemple, peut être à l'origine de blessures.

Risques chimiques
Utilisez uniquement les produits de nettoyage et autres produits chimiques recommandés pour ce matériel.

Assurez-vous que toutes ces conditions de sécurité sont remplies avant d'utiliser le sous-système de bande magnétique IBM 3570.

Chaque consigne est introduite par un identificateur (Attention=Cn).

C1	**ATTENTION** **Le sous-système 3570 modèle C01 pèse 35 kilogrammes. La présence de 3 personnes est nécessaire pour le soulever.**
C2	**ATTENTION** **Le sous-système 3570 modèle C11 pèse 24 kilogrammes. La présence de deux personnes est nécessaire pour le soulever.**
C3	**ATTENTION** **Le sous-système 3570 modèle C02 pèse 40 kilogrammes. La présence de 3 personnes est nécessaire pour le soulever.**
C4	**ATTENTION** **Le sous-système 3570 modèle C12 pèse 29 kilogrammes. La présence de deux personnes est nécessaire pour le soulever.**

Inspection de sécurité

Avant de procéder à l'inspection de sécurité, assurez-vous que la salle ainsi que l'installation électrique remplissent toutes les conditions de sécurité.

Pour plus de détails sur les emplacements des éléments, reportez-vous aux sections “Device Covers” et “Labels.” Effectuez les opérations ci-dessous.

1. Mettez le sous-système 3570 hors tension.
2. Débranchez les cordons de transmission.
3. Reportez-vous à la Figure 183. Débranchez le cordon d'alimentation 1 du socle de prise de courant.
4. Assurez-vous que la tension est nulle entre le boîtier de la source d'alimentation et la terre du bâtiment.
5. Vérifiez que la résistance est inférieure à 0,1 ohm entre la terre du bâtiment et le carter du sous-système 2 .
6. Examinez le cordon d'alimentation 1 et assurez-vous qu'il n'est ni craquelé, ni troué, ni endommagé.
7. Vérifiez que la résistance entre la broche de terre du cordon d'alimentation et le sous-système 3570 est inférieure à 0,1 ohm.
8. Examinez les capots 3 et assurez-vous que les vis sont correctement placées et serrées

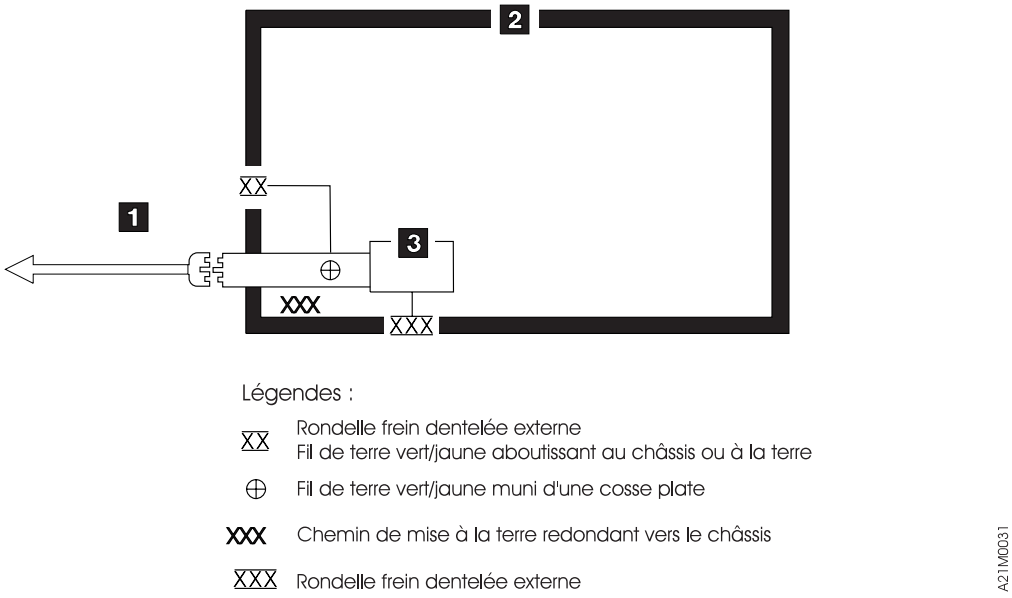

Figure 183. Schéma de mise à la terre c.a. (50/60 Hz)

안전

⚠ 일반 주의사항 기호는 주의를 요하는 조건들을 나타냅니다.

전기적 주의사항 기호는 극도의 주의를 요하는 전기적 위험들을 나타냅니다.

유지보수 일치에 대한 일반 검사를 수행하기 전에 이 검사를 수행하십시오. 안전을 확인할 때까지 **3570**의 안전성을 의심하십시오. 안전하지 않은 조건들이 존재할 경우, 그 위험 요소의 심각성 정도와 이러한 문제를 정정하지 않고 작업을 계속할 수 있는지의 여부를 결정하십시오. 안전 저해 요인으로는 다음을 들 수 있습니다:

전기적
: 충전 프레임은 심각하거나 치명적인 감전 사고를 초래할 수 있습니다.

기계적
: 안전 커버 등이 없을 경우, 사람들에게 위험을 가할 수 있습니다.

화학적
: 이 제품용으로 승인되지 않은 솔벤트, 클리너 또는 기타 화학품들을 사용하지 마십시오.

여기에 열거된 문제점들을 반드시 해결한 다음, 3570을 사용하십시오.

다음 주의사항은 C1(주의사항 1)과 C2(주의사항 2)로 되어있습니다.

C1 주의사항
3570 모델 C01 의 무게는 약 35 킬로그램(77 파운드)입니다. 이 장치를 안전하게 옮기기 위해서는 두 사람이 필요합니다.

C2 주의사항
3570 모델 C11 의무게는 약 **24** 킬로그램(**53** 파운드)입니다. 이 장치를 안전하게 옮기기 위해서는 두 사람이 필요합니다.

C3 주의사항
3570 모델 C02 의 무게는 약 40 킬로그램(88 파운드)입니다. 이 장치를 안전하게 옮기기 위해서는 두 사람이 필요합니다.

C4 주의사항
3570 모델 C12 의무게는 약 29 킬로그램(64 파운드)입니다. 이 장치를 안전하게 옮기기 위해서는 두 사람이 필요합니다.

안전

일반 주의사항 기호는 주의를 요하는 조건들을 나타냅니다.

전기적 주의사항 기호는 극도의 주의를 요하는 전기적 위험들을 나타냅니다.

유지보수 일치에 대한 일반 검사를 수행하기 전에 이 검사를 수행하십시오. 안전을 확인할 때까지 **3570**의 안전성을 의심하십시오. 안전하지 않은 조건들이 존재할 경우, 그 위험 요소의 심각성 정도와 이러한 문제를 정정하지 않고 작업을 계속할 수 있는지의 여부를 결정하십시오. 안전 저해 요인으로는 다음을 들 수 있습니다:

전기적
: 충전 프레임은 심각하거나 치명적인 감전 사고를 초래할 수 있습니다.

기계적
: 안전 커버 등이 없을 경우, 사람들에게 위험을 가할 수 있습니다.

화학적
: 이 제품용으로 승인되지 않은 솔벤트, 클리너 또는 기타 화학품들을 사용하지 마십시오.

여기에 열거된 문제점들을 반드시 해결한 다음, 3570을 사용하십시오.

다음 주의사항은 C1(주의사항 1)과 C2(주의사항 2)로 되어있습니다.

C1 주의사항
3570 모델 **B01**의 무게는 약 **40** 킬로그램**(88** 파운드**)**입니다. 이 장치를 안전하게 옮기기 위해서는 두 사람이 필요합니다.

C2 주의사항
3570 모델 **B11**의무게는 약 **24** 킬로그램**(53** 파운드**)**입니다. 이 장치를 안전하게 옮기기 위해서는 두 사람이 필요합니다.

Seguridad

El símbolo general de precaución identifica situaciones en las que debe tener precaución.

El símbolo de precaución eléctrica identifica situaciones de riesgo eléctrico en las que debe extremar la precaución.

Realice esta inspección antes de la inspección normal para un acuerdo de mantenimiento. **Considere que la 3570 no es segura hasta verificar que lo es**. Si detecta alguna condición poco segura, decida el grado de riesgo existente y si puede continuar sin solucionar primero el problema. Posibles condiciones de riesgo para su seguridad son,

Riesgos eléctricos
Un bastidor cargado eléctricamente puede producir descargas serias o letales.

Riesgos mecánicos
Riesgos, como la falta de la cubierta de seguridad, son potencialmente perjudiciales para la gente.

Riesgos químicos
No use disolventes, artículos de limpieza u otros productos químicos que no hayan sidos aprobados para ser usados en este producto.

Cualquier problema de los listados anteriormente debe ser corregido antes de usar la 3570.

Los avisos siguientes se han traducido en varios idiomas. Cada aviso contiene un identificador (Precaución=Cx).

C1	**PRECAUCION** **La 3570 modelo 3570 C01 pesa 35 kilogramos (77 libras); se necesitan tres personas para levantar esta unidad sin peligro.**
C2	**PRECAUCION** **La modelo 3570 C11 pesa 24 kilogramos (53 libras); se necesitan dos personas para levantar esta unidad sin peligro.**
C3	**PRECAUCION** **La 3570 modelo 3570 C02 pesa 40 kilogramos (88 libras); se necesitan tres personas para levantar esta unidad sin peligro.**
C4	**PRECAUCION** **La modelo 3570 C12 pesa 29 kilogramos (64 libras); se necesitan dos personas para levantar esta unidad sin peligro.**

Procedimiento de inspección de seguridad

Antes de proceder con esta inspección, asegúrese de que las condiciones eléctricas y de carácter general existentes son seguras.

Consulte “Cubiertas del dispositivo” (“Device Covers”) y “Etiquetas” (“Labels”) para saber donde se encuentran. Siga los pasos siguientes:

1. Desconecte la 3570.
2. Desconecte los cables de canal.
3. Consulte la Figure 184. Desconecte el cable de alimentación 1 de su fuente de alimentación.
4. Compruebe que no hay voltaje entre el receptáculo de la fuente de alimentación y la toma de tierra del edificio.
5. Compruebe que la resistencia es menor de 0.1 ohmios desde la toma de tierra del edificio hasta el recinto del dispositivo 2 .
6. Inspeccione el cable de alimentación 1 para detectar grietas, desgaste excesivo u otros desperfectos visibles.
7. Compruebe que la resistencia entre la toma de tierra del cable de alimentación y la 3570 es menor de 0.1 ohmios.
8. Inspeccione las cubiertas del recinto 3 para comprobar que todos los tornillos están instalados y firmes.

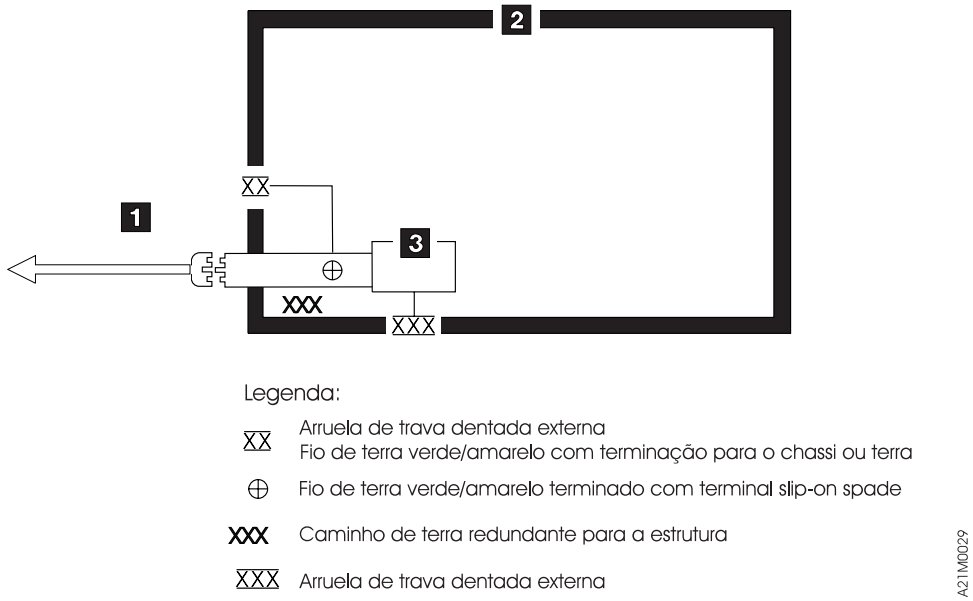

Figure 184. Diagrama de toma de tierra CA (50 Hz y 60 Hz)

Segurança

O símbolo geral de cuidado ⚠ identifica condições nas quais é necessário cuidado.

O símbolo de cuidado elétrico identifica riscos elétricos onde é necessário cuidado máximo.

Execute esta inspeção antes da inspeção normal para um contrato de manutenção. **Não acredite na segurança do 3570 até certificar-se de que é seguro**. Se houver qualquer condição insegura, verifique a gravidade do risco e se você pode continuar sem antes corrigir o problema. Os riscos de segurança possíveis são:

Elétrico
Uma estrutura carregada eletricamente pode causar choque elétrico sério ou letal.

Mecânico
Riscos, tais como a falta de uma tampa de segurança, são potencialmente prejudiciais para as pessoas.

Químico
Não utilize solventes, produtos de limpeza ou outros produtos químicos não-aprovados para uso neste produto.

Qualquer um dos problemas acima relacionados deve ser resolvido antes de se iniciar a utilização do 3570.

Os seguintes avisos são traduzidos nos idiomas selecionados. Cada aviso contém um identificador (Cuidado=Cx).

C1	**CUIDADO** **O 3570 Modelo C01 pesa 35 quilos (77 libras); são necessárias 3 pessoas para levantar esta unidade com seguran ça.**
C2	**CUIDADO** **O 3570 Modelo C11 pesa 24 quilos (53 libras); são necessárias duas pessoas para levantar esta unidade com segurança.**
C3	**CUIDADO** **O 3570 Modelo C02 pesa 40 quilos (88 libras); são necessárias 3 pessoas para levantar esta unidade com seguran ça.**
C4	**CUIDADO** **O 3570 Modelo C12 pesa 29 quilos (64 libras); são necessárias duas pessoas para levantar esta unidade com segurança.**

Procedimentos Para Inspeção de Segurança

Antes de realizar os procedimentos de segurança, certifique-se de que o local e as condições elétricas existentes são seguras.

Consulte “Device Covers” e “Labels” para obter informações sobre localizações. Execute os seguintes passos:

1. Desligue o 3570.
2. Desconecte os cabos de canal.
3. Consulte Figure 185. Desconecte o cabo de alimentação 1 da sua fonte.
4. Confirme se não existe voltagem entre o compartimento na fonte de alimentação e o terra do prédio.
5. Confirme se a resistência é menor do que 0,1 ohm entre o terra do prédio e o compartimento do dispositivo 2 .
6. Inspecione o cabo de alimentação 1 para verificar se existem fissuras, desgastes ou danos.
7. Confirme se a resistência entre o terra do cabo de alimentação e o 3570 é menor do que 0,1 ohm.
8. Inspecione as tampas dos compartimentos 3 para certificar-se de que todos os parafusos estão instalados e apertados.

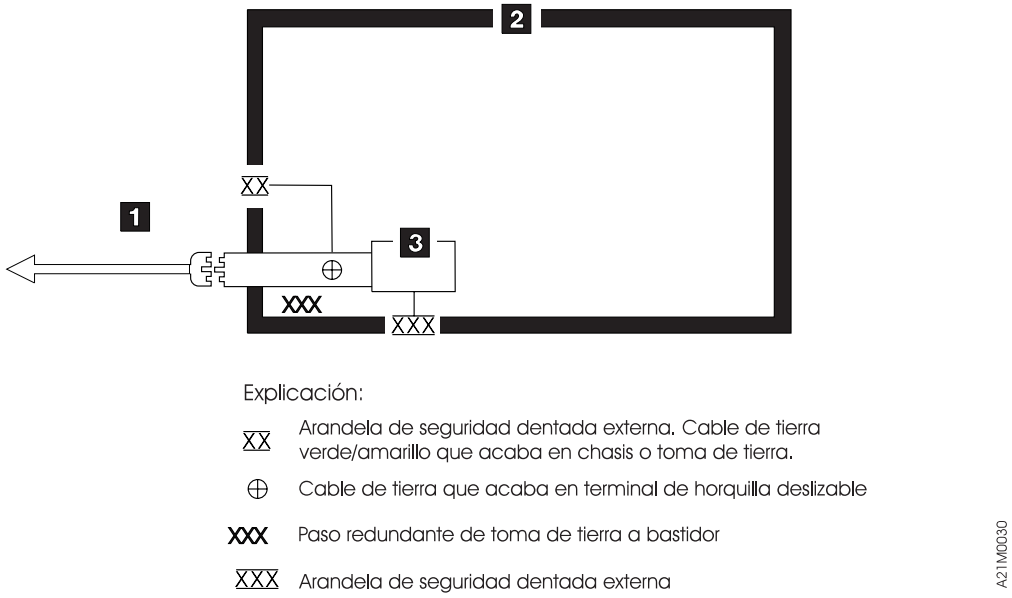

Figure 185. Diagrama de Aterramento AC (50 Hz e 60 Hz)

Covers and Slides

Device Covers

Ensure that the external parts of the device are not damaged and do not have sharp edges.

Support Slides—Rack-Mounted Drives

See Figure 186, and Figure 188 on page INSP-15.

1. Ensure that the supporting slides work properly, are not damaged, and do not have sharp edges.
2. Ensure that all of the slide-mounting screws, item 2 are in place, and are tight.

   See Figure 190 on page INSP-16.

3. Ensure that the front and rear drive-mounting screws, item 1 are in place, and are tight.

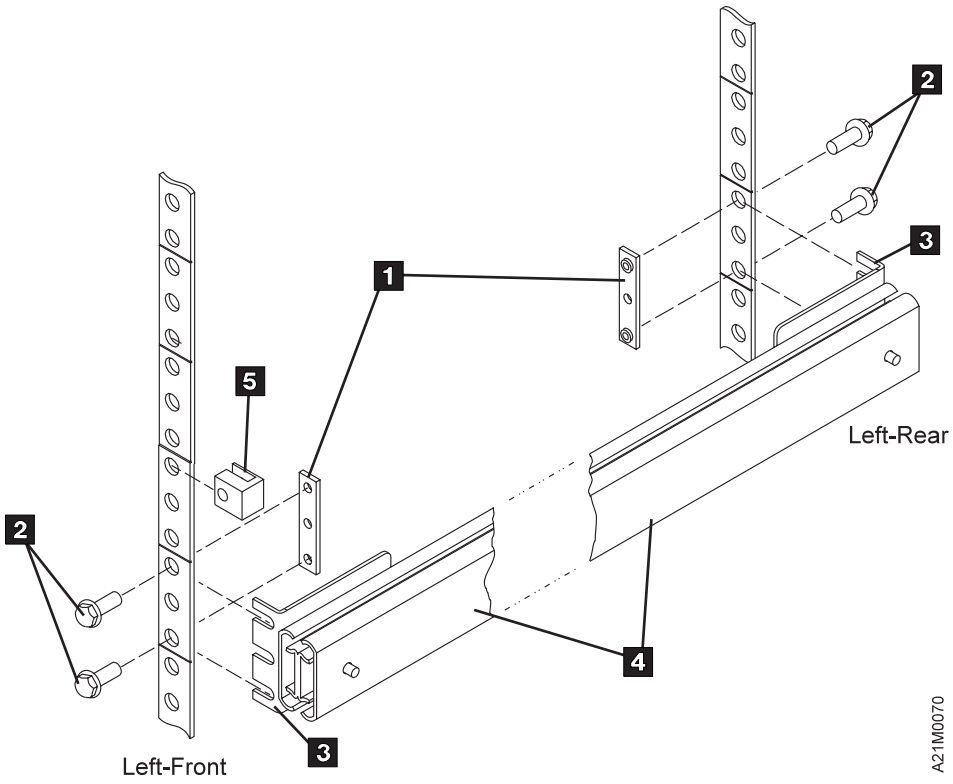

Figure 186. Support Slide, left side, Models C11 and C12

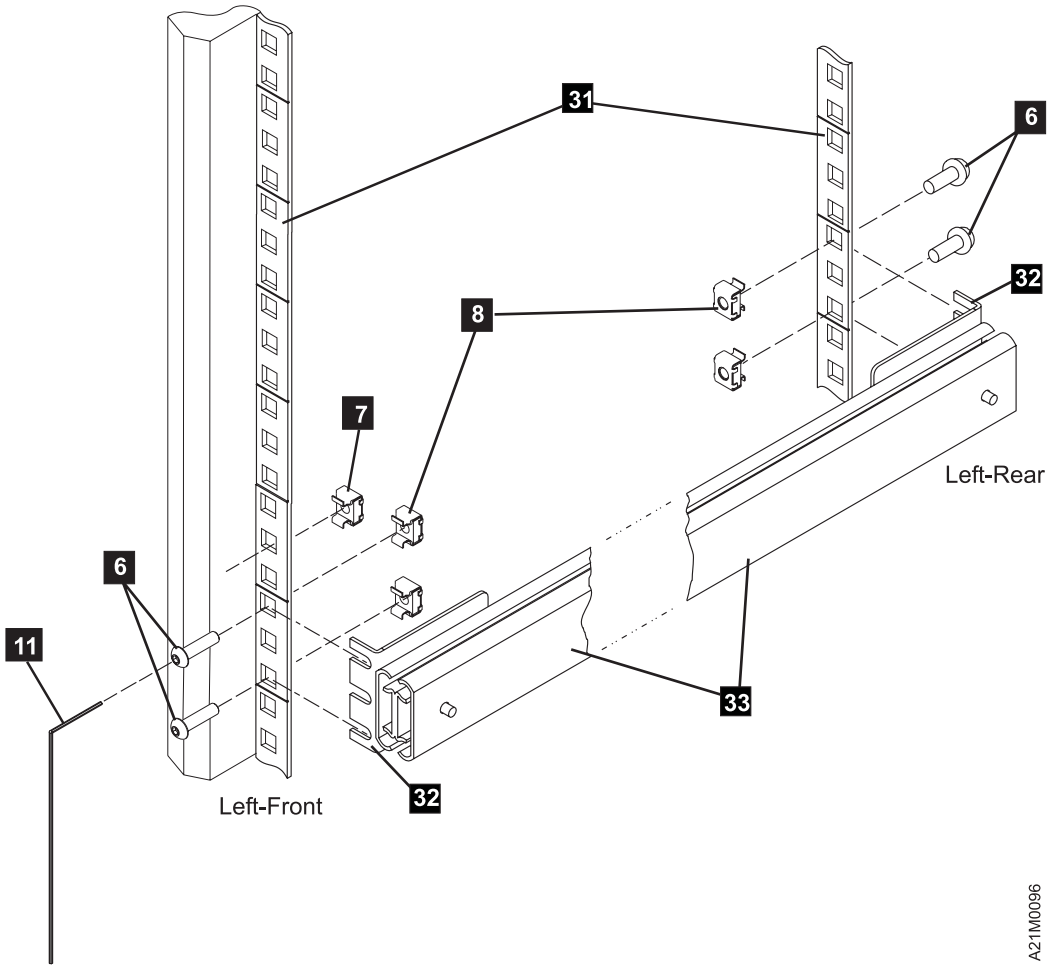

Figure 187. Support Slide, left side, Models C21 and C22

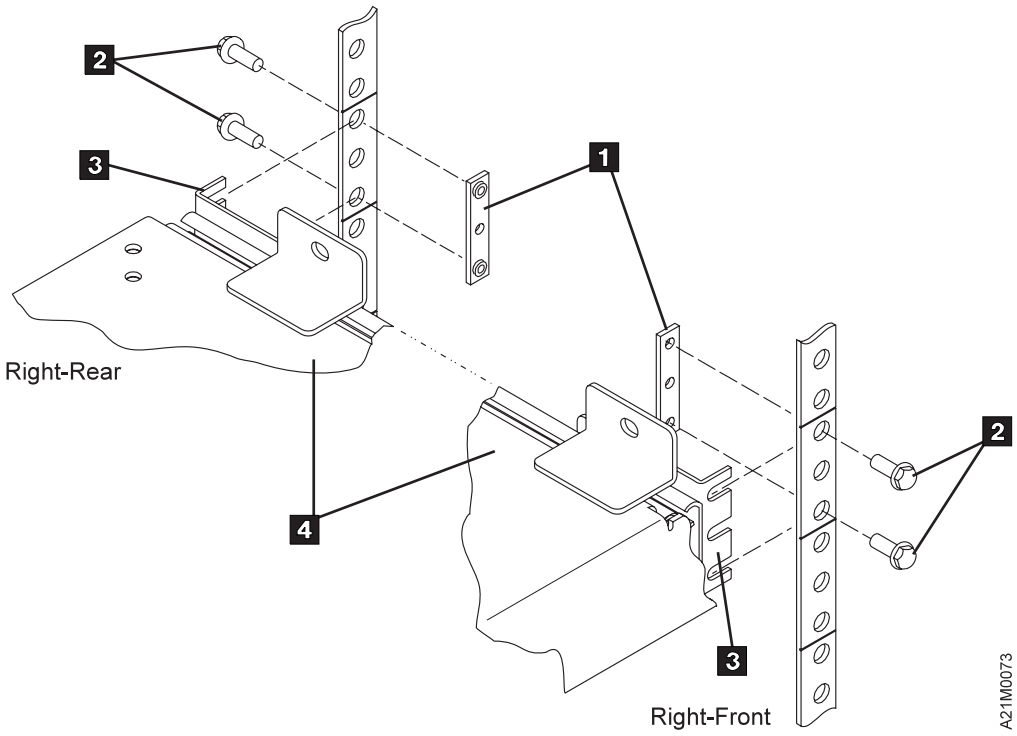

Figure 188. Support Slide, right side, Models C11 and C12

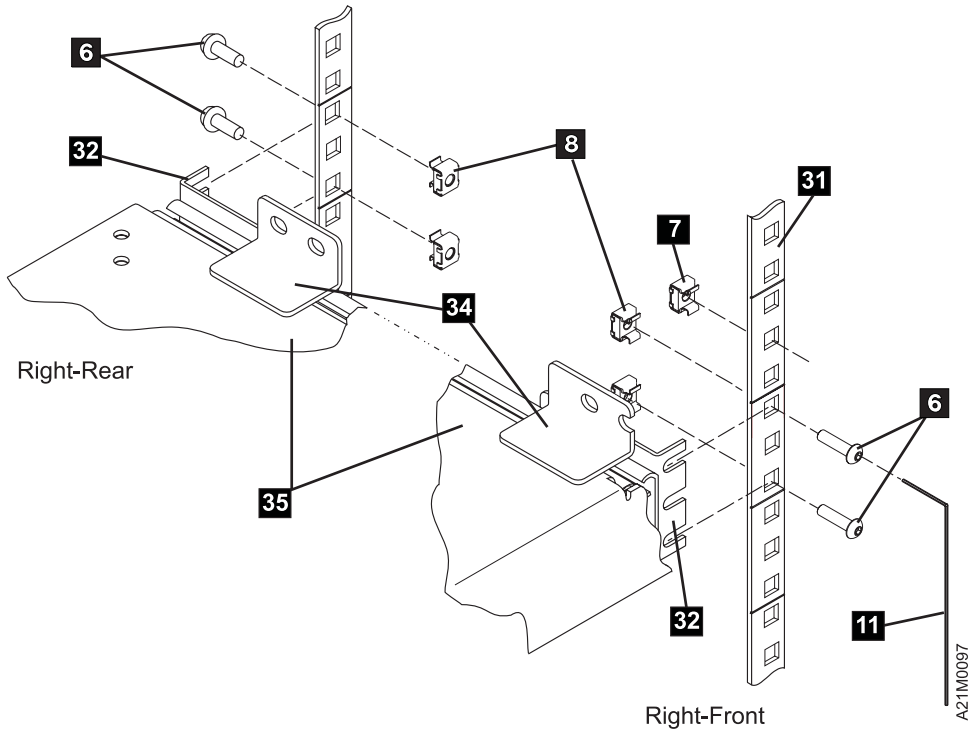

Figure 189. Support Slide, right side, Models C21 and C22

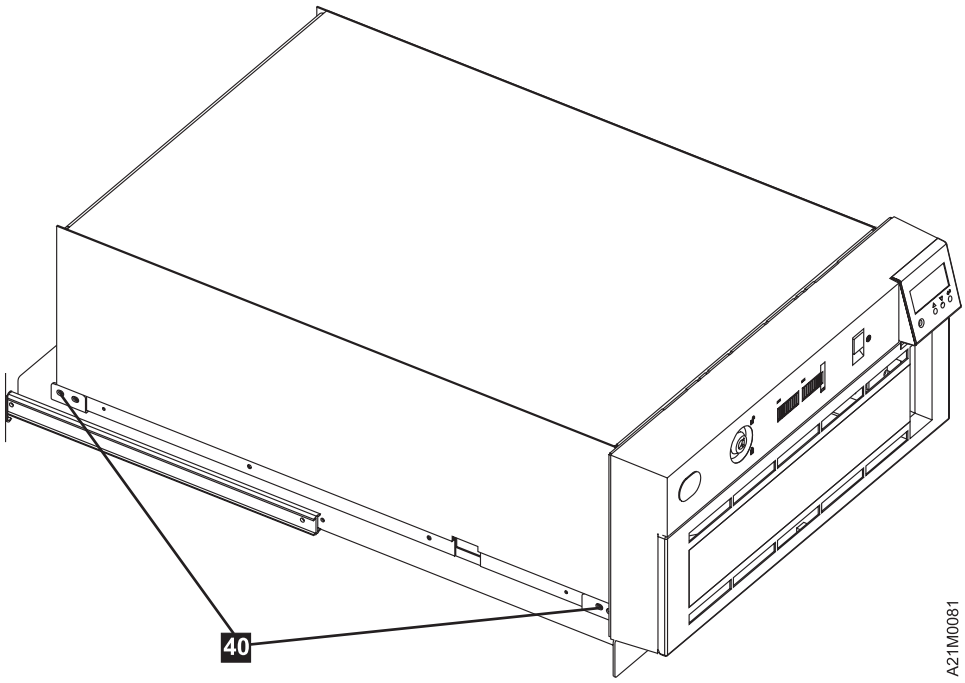

Figure 190. Attaching the 3570 to the rack tray.

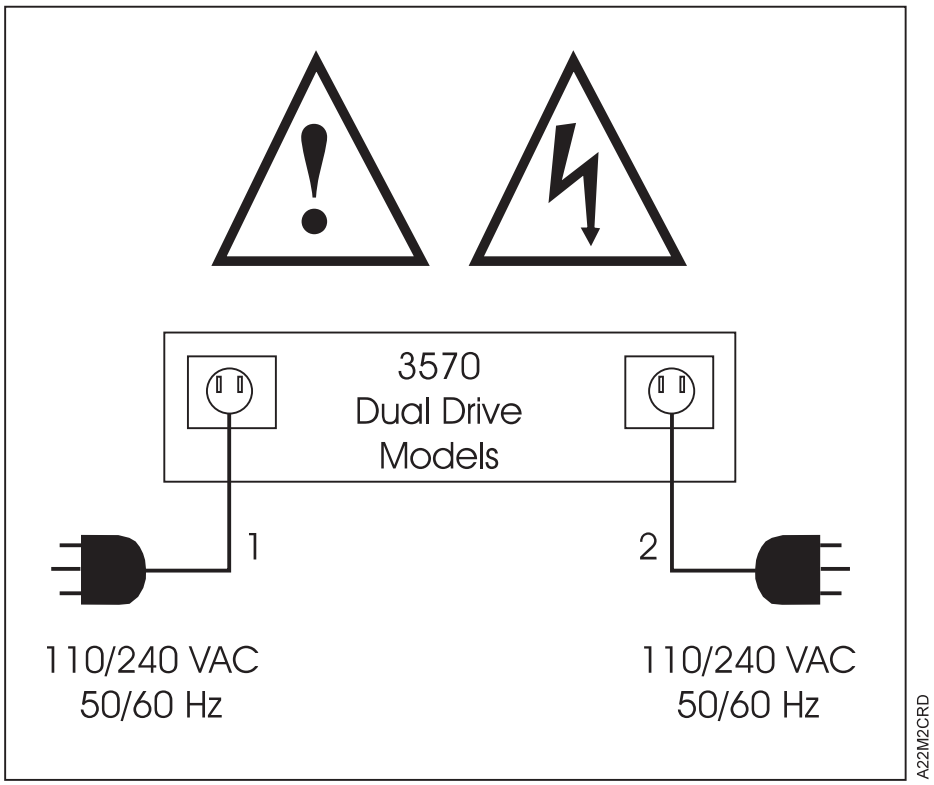

Figure 191. 3570 Model C02, C12 and C22 Power Cords

Note: Dual drive models use 2 power cords. Disconnect both power cords before servicing the library.

Completion Report

Safety inspection for machine type 3570

General safety inspection

Maintenance agreement qualification (MAQ)

After the inspection, sign, date, and store the checklist with the Maintenance Agreement inspection.

_____ _____ _____

NAME DATE SERIAL NUMBER

SAFETY HAZARDS

LIST ALL SAFETY HAZARDS. IF NONE, SAY NONE.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

1 . _____

This report completes the safety inspection.

1. Reconnect the 3570 power cable(s) into the customer's power receptacle.
2. Reconnect the channel cables to the subsystem.

Installation

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Applicable Models

This installation section applies to Library Models C11 and C12 which are rack-mounted and are installed by the CE. It also includes Models C21 and C22 which are rack-mounted and which may be installed by the customer or the CE. The Model C00 is a drive-only device. Library Models C01 and C02 are stand-alone models. All drive-only and stand-alone devices may be installed by the customer or the CE.

Note: When the service representative installs the Model C00, C01, C02, C21 or C22, it is a customer billable call. The customer uses *IBM Magstar MP 3570 Tape Subsystem Operator Guide C-Series Models*, GA32-0393 for installing the 3570.

Read and check off each installation step as it is completed.

Pre-Installation Checks

Check with the IBM branch office or physical planning representative to ensure that installation planning specifications have been met (correct power service outlet or connector, line voltage, grounding, cable lengths, service space and environment).

Attention:
The 3570 is a precision device that requires careful handling to prevent data loss or permanent damage to the device. Avoid bumping or dropping the 3570.

Open the shipping container and inventory the parts listed on the 3570 bills of material.

Note: Save the packaging material for 3570 reshipment or relocation.

Check to make sure that you received the following items:

__ 1. Appropriate power cable(s). Figure 192 on page INST-3 lists all available power cords for the Magstar MP 3570 Tape Subsystem.

Note: Two power cables are required for Models C02, C12 and C22.

__ 2. Interposer(s) (if required) for attachment to host:

P/N	Attachment
05H3834	AS/400 with FC 2895
None	AS/400 with FC 2729
None	AS/400 with FC 6534
61G8323	RS/6000 with FC 2891
50G0460	RS/6000 with FC 2892
None	RS/6000 with FC 2409, 6209 or 6207
None	Windows NT based PC
None	HP-UX Systems
None	Sun (Solaris) Systems

__ 3. Cleaning cartridge P/N 05H2463 (give to customer).

__ 4. One or more tape cartridges P/N 08L6187 as ordered by the customer. Give to the customer after you run diagnostics.

__ 5. Two 10-cartridge magazines, P/N 49G6598

__ 6. SCSI Terminator P/N 61G8324. Two SCSI terminators are included with Models C02, C12 and C22.

__ 7. Appropriate SCSI cable. Figure 193 on page INST-4 lists the available SCSI cables for the Magstar MP 3570 Tape Subsystem. One SCSI bus jumper P/N 49G6456 is included with Models C02 and C12. One SCSI bus jumper P/N 05H9527 is included with Models C22.

__ 8. RS-422 jumper cable, P/N 65F5399 (Model C02, C12 and C22 only). This cable, which connects the two drives in a dual drive model library, may be installed in the Model C02 at the factory, but is usually shipped **un-installed** in the Model C12 and C22 due to space limits within the packing materials. If not already installed, it will be installed later in these procedures.

__ 9. Pedestal parts (Models C01 and C02 only).

__ 10. Rack mounting hardware (Models C11 and C12 only). See Figure 201 on page INST-14 for a detailed list.

__ 11. Rack mounting hardware (Models C21 and C22 only). See Figure 211 on page INST-26 for a detailed list.

__ 12. Alternate Operator Panel housing (Models C11 and C12 only).

__ 13. Library Door Keys (not included with Model C00). The keys are taped to the rear of the unit. The 5—digit number from the key tag may be printed on a label that is located under the right cartridge magazine. Look through the priority cell and underneath the right corner of the right cartridge magazine for the key code label. If the label is not present, record the 5-digit number from the key tag here_____. If the keys are lost or need to be replaced, additional keys can be ordered from:

    Attention - IBM Account Manager
    Fort Lock Corp.
    3000 North River Road
    River Grove, IL 60171
    708-456-1100
    708-456-9476 FAX

    Specify Vendor P/N - G010103AX-3228 (C1038AD "Short" with IBM Logo) along with the 5-digit code that came with the original keys.

The following items are also provided:

__ 1. One device driver kit P/N 08L6310 which contains appropriate device drivers and documentation for all host attachments supported except for the AS/400 system.

    Note: A device driver diskette is not needed for AS/400 systems. The device driver is part of the operating system.

__ 2. If this is a Model C21 or C22 attached to a IBM Netfinity 5500/7000 or IBM PC Server 325/300 system, a 2944/UW Fast and Wide SCSI adapter, P/N 59H4231, will be included and packaged with installation instructions. The adapter and instructions should be given to the customer so that they may install it in the PC system.

__ 3. The *Magstar MP 3570 Tape Subsystem Operator Guide, C-Series Models* , GA32-0393.

__ 4. The *IBM Magstar MP 3570 Tape Subsystem Maintenance Information, C-Series Models*, P/N 08L6250.

__ 5. *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide*, GC35-0154.

Figure 192. Available Power Cords for Magstar MP 3570 Tape Subsystem

Magstar MP P/N and Feature Code	Description
46F5893 (FC 9080 and 9986)	Watertight Plug/Power Cord, Chicago
46F5894 (FC 9080 and 9800)	Watertight Plug/Power Cord, U.S.A.
6952300 (FC 9800)	9 ft. Power Cord, 125V, 10A U.S.A./Canada
76H4962 (Netfinity)	Power Cord, 110V
13F9979 (FC9820)	2.7-m Power Cord, 250V, 10A France
13F9997 (FC9821)	2.7-m Power Cord, 250V, 10A Denmark
14F0033 (FC9825)	2.7-m Power Cord, 250V, 10A U.K.
14F0087 (FC9827)	2.7-m Power Cord, 250V, 10A Israel
14F0051 (FC9828)	2.7-m Power Cord, 250V, 10A Switzerland
14F0015 (FC9829)	2.7-m Power Cord, 250V, 10A South Africa
14F0069 (FC9830)	2.7-m Power Cord, 250V, 10A Italy
13F9940 (FC9831)	2.7-m Power Cord, 250V, 10A Australia
1838574 (FC9833)	9-ft Power Cord, 250V, 10A U.S.A./Canada
07H0075 (Netfinity)	Power Cord, 250V
6952301 (FC9986)	6-ft Power Cord, 125V, 10A Chicago

Figure 193. Attachment Features (SCSI Cables) for Magstar MP 3570 Tape Subsystem

Magstar MP P/N and Feature Code	Description
P/N 49G6456 (FC 5205)	0.5-m (2-ft) SCSI Cable (SCSI Bus Jumper)
P/N 49G6458 (FC 5212)	12-m (39-ft) SCSI Cable
P/N 49G6459 (FC 5218)	18-m (59-ft) SCSI Cable
P/N 49G6457 (FC 5245)	4.5-m (15-ft) SCSI Cable
P/N 05H9527 (Models C21 and C22)	0.5-m (2-ft) SCSI Cable (SCSI Bus Jumper)
P/N 05H9651 (Models C21 and C22)	4.5-m (15-ft) SCSI Cable
P/N 08L6201 (FC 5225)	25-m (81-ft) SCSI Cable

Tools and Test Equipment

The following items will be needed, but are not in the ship group:

Host On-line Test routines (if available)

Nut-driver for rack installation (7 mm) with extension

Screw starter

Phillips screwdriver, #1

Flat-blade screwdriver

SCSI wrap tool P/N 05H9163

RS-422 9-pin to 25-pin interposer P/N 05H3895

RS-422 Wrap Plug P/N 39F3884

| Wrench Kit (Model C21 and C22 only) P/N 08L6557

| – 3mm Hex Wrench
| – 4mm Hex Wrench

Note: DO NOT use any magnetized tools on or near the head assembly, as they will destroy the head!

Before You Begin

If the host system has any software or written instructions for system upgrades, use those instructions.

If there are no specific host system software aids or written instructions for system upgrades, use the following installation instructions. You may need to refer to your host system management or system hardware books to locate information you need to install the 3570.

| Models C01, C02, C11, C12, C21 and C22 may be installed only for horizontal operation.

RS/6000 Note:

Check that the flash memory on the SCSI adapter in the system contains the proper level of microcode. Affected machine types include any system that contains a SCSI-2 Differential F/W adapter (4-6), or SCSI-2 Enhanced Differential F/W adapter (4-C).

To determine if your machine has an adapter with down-level microcode, type this command on an AIX prompt: **lscfg -vl ascsi* | pg**

To determine if you have a 4-6 or 4-C SCSI adapter, look at the lines labeled **Displayable Message** and **Loadable Microcode Level.**

The **4-6** adapter will indicate:

```
Displayable Message.............SCSI-2FWSD
Loadable Microcode Level........  1
```

The **4-C** adapter will indicate:

```
Displayable Message.............SCSI-2FWSD
Loadable Microcode Level........  8
```

Look for the line **ROS Level and ID** which should show as:

```
ROS Level and ID ..............XX
```

For the 4-6:

XX should be either 67, 68, 70, 72, 73, 74, or higher.

If 74 or higher is displayed, there is no need to apply any update to the 4-6.

For the 4-C:

XX should be either C4, C5, C6, or higher.

If C6 or higher is displayed, there is no need to apply any update to the 4-C.

Level 74 & C6 or higher microcode is strongly recommended for use with IBM Magstar MP tape drives, to ensure optimum performance and reduced errors. It may also resolve problems with other sequential SCSI devices (or devices that do not support command queueing) that are attached to dedicated F/W controllers and used in systems with multiple F/W adapters.

AS/400 Note:

PTFs are required prior to attaching a 3570 Magstar MP Tape Subsystem to an AS/400 system. The PTFs for all supported AS/400 releases are listed in INFO APAR II10363. This information APAR contains the most current PTF information for all supported releases and important information concerning the attachment of the 3570 Magstar MP Tape Subsystem to the AS/400.

After installing the appropriate PTFs, a SAVSYS must be done to ensure the new IOP code is available during a system recovery.

Figure 194. PTFs Required for AS/400 Systems

| __ 1. If you are installing a Magstar MP Tape Subsystem Model C02, C12 or C22 in a Split Configuration, skip to 7. Otherwise, continue with the next step. (See “Library Configurations” on page LIBRARY-7 for an explanation of Base and Split Configurations.)

__ 2. Record the host processing unit _____.

__ 3. Record the host processing unit SCSI port _____.

Note: If attaching the library to an AS/400 system, only one library can be attached to a port. (There are two ports per SCSI controller.)

__ 4. Record the SCSI address to be used for drive 1_____. (It is recommended that SCSI address 0 be used for connection to AS/400 systems.)

| __ 5. If you are installing a Model C02, C12 or C22, record the SCSI address to be used for tape drive
| 2_____. (The SCSI address for tape drive 2 must be different from the SCSI
| address used for tape drive 1 unless each drive is attached to different host intitiators.)

__ 6. Continue with step 13.

__ 7. Record the host processing unit that will attach to tape drive 1_____.

__ 8. Record the host processing unit that will attach to tape drive 2_____.

__ 9. Record the host processing unit SCSI port that will attach to tape drive 1_____.

Note: If attaching the library to an AS/400 system, only one library can be attached to a port. (There are two ports per SCSI controller.)

__ 10. Record the host processing unit SCSI port that will attach to tape drive 2_____.

__ 11. Record the SCSI address to be used for drive 1_____. (It is recommended that SCSI address 0 be used for connection to AS/400 systems.)

__ 12. Record the SCSI address to be used for drive 2_____. (It is recommended that SCSI address 0 be used for connection to AS/400 systems.)

__ 13. Determine the proper way to do a controlled shutdown and system start-up of the host system.

__ 14. If you are installing the 3570 in an AS/400 environment, ensure that the customer has the AS/400 System Value for Auto-configure Devices set to **on**.

| If you are installing the 3570 in a 9309 rack (AS/400 or RS/6000 attached), go to “Rack-Mounted Models
| (Models C11 and C12)” on page INST-14.

| If you are installing the 3570 in a Netfinity rack (PC attached using Windows NT), go to “Rack-Mounted
| Models (Models C21 and C22)” on page INST-26.

If you are installing a drive-only or stand-alone model, go to “Drive-Only or Stand-Alone Models” on page INST-8.

Drive-Only or Stand-Alone Models

The Model C00 is a drive-only device. Models C01, and C02 are stand-alone library models.

Drive-only and stand-alone models may be installed by the customer or service representative. When the service representative installs these devices, it is a customer billable call. This information is included here to ensure that you understand the restrictions and recommendations for this device.

Placing the Drive-Only or Stand-Alone Models

The following notices are translated into selected languages. Each notice contains an identifier (Caution=Cx).

C1 **CAUTION**
The 3570 Model C01 weighs approximately 35 kilograms (77 pounds); it takes three persons to safely lift this unit.

C3 **CAUTION**
The 3570 Model C02 weighs approximately 40 kilograms (88 pounds); it takes three persons to safely lift this unit.

Note: This notice is translated into selected languages. See **C1** and **C3** in the INSP section.
The 3570 can be located anywhere that is convenient to the system unit. The only restrictions to the location of the 3570 are the length of the power cord(s) and the length of the SCSI cable(s).

Attention

This is a precision device that requires careful handling to prevent data loss or permanent damage to the 3570.

Avoid bumping or dropping the 3570.

Do not place the 3570 in a dusty location.

Do not grasp the operator panel display (see 1 , Figure 49 on page LIBRARY-2) when lifting any library model from the shipping container.

Note: Some external devices attached to the system unit can be stacked. Do not place more than one other 3570 on top of the 3570 when stacking external devices.

__ 1. Open the shipping container and inventory the parts listed on the 3570 bills of material.

__ 2. Place the device in the desired position.

__ 3. Install pedestal hardware on the table-top device as follows:

   a. On the library, attach the pedestals to the bottom of the unit using the four screws provided, for operation in the horizontal position. The Models C01 and C02 may only be installed for horizontal operation.

      Note: All stand-alone library models come with a pedestal which must be installed. The library model front door will not open properly if the pedestals are not installed.

   b. For drive-only boxes: If the Model C00 is to be used in a vertical orientation, attach the pedestal to the side of the Model C00 with a single screw. Model C00 may be installed for either vertical or horizontal operation.

__ 4. If this device is a library model, go to “Installation Checkout—Library Models” on page INST-40.

__ 5. If this device is a drive-only model without a cartridge loader feature, go to “Setting the SCSI Address—Drive-Only Model C00” on page INST-9.

Setting the SCSI Address—Drive-Only Model C00

The SCSI address switch is used to set the SCSI address in a drive-only model C00, and is set to X'0' at the factory.

This unique address identifies the 3570 to the system unit.

__ 1. Be sure the power switch for the 3570 is set to the OFF position.

__ 2. Refer to Figure 195 and remove the front cover, item 2 by pressing the two side buttons, item 1 and pulling the cover from the front of the drive.

__ 3. Refer to Figure 196 on page INST-10 and, with the drive exposed, remove the drive inner cover, item 3 by pressing down on the center top of the cover and tilting it outward for removal. This will expose the SCSI address switch, item 4 , located in the upper right hand corner.

__ 4. Set the rotary SCSI address switch (see 4 in Figure 196 on page INST-10), located in the upper right corner near the drive gear, to the specified address. The switch is set to 0 at the factory.

Note: Use the SCSI address previously selected and recorded per the instructions and checklist in “Before You Begin” on page INST-5.

Note: For connection to the AS/400, it is recommended that the SCSI address switch is set to '0'.

__ 5. Securely place the drive inner cover back on the front of the drive unit, and place the outer cover back on the front of the 3570.

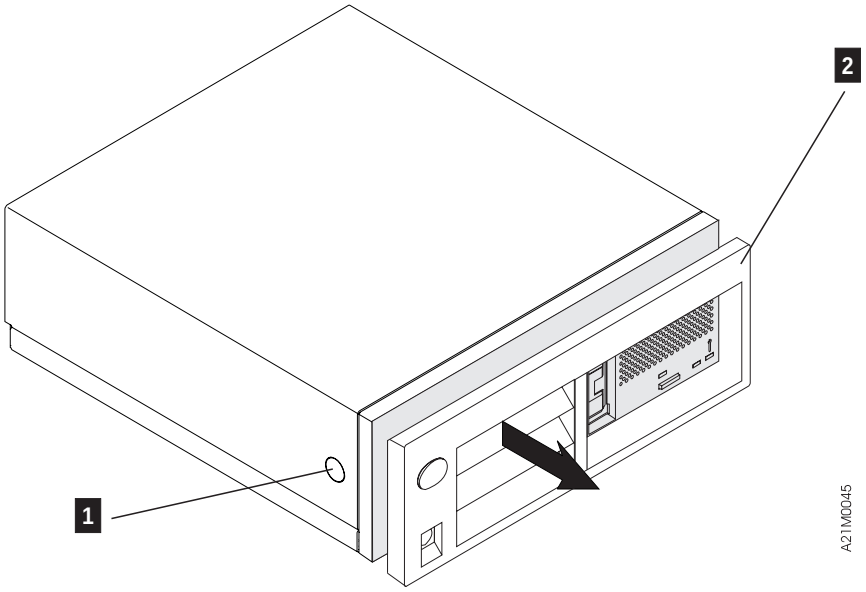

Figure 195. Model C00 Drive Outer Cover Configuration

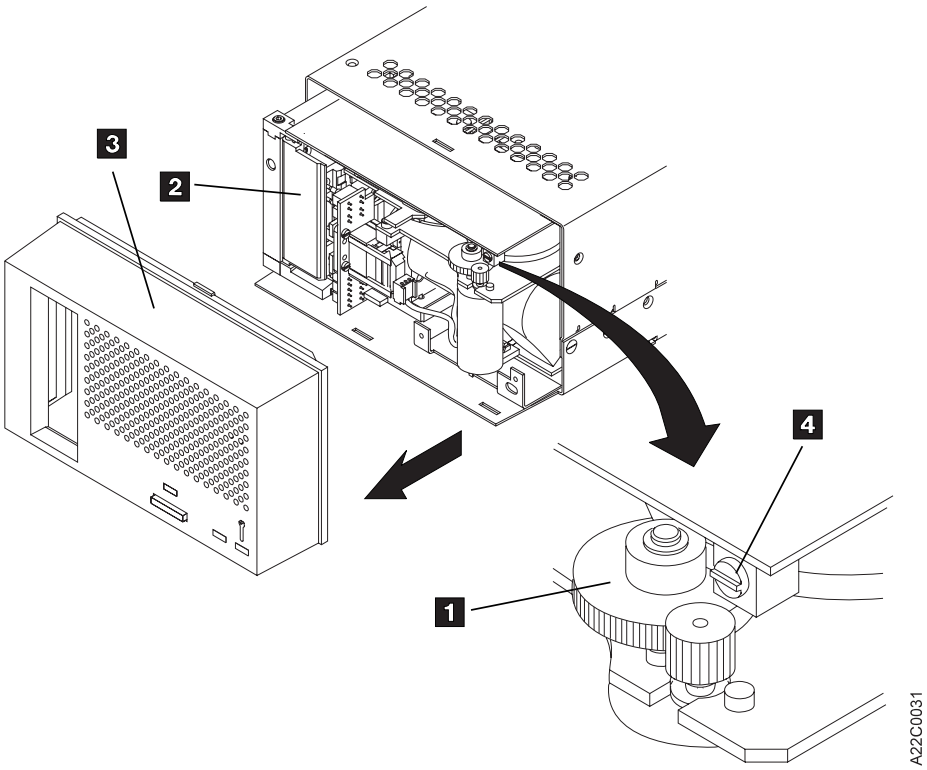

Figure 196. Model C00 Drive Inner Cover Configuration

Installation Checkout—Drive-Only Model C00

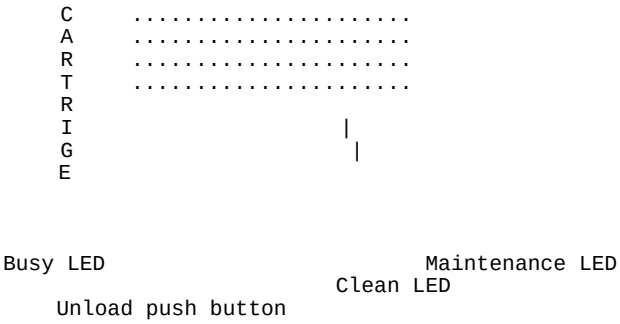

Figure 197. Operator Panel, Drive-Only Models

__ 1. Ensure that the power switch for the 3570 is in the OFF position.

__ 2. A SCSI Wrap Tool, P/N 05H9163, is not part of the ship group, but is available through the service branch. If you have this tool available, perform "SCSI Port Wrap Test" on page PROC-77, then go to 7. If the tool is not available, continue with the next step.

__ 3. Connect the power cable to the 3570.

__ 4. Connect the power cable to the power source outlet.

__ 5. Place the power switch to the ON position.

If the Maintenance, Busy and Clean LEDs flash, or if the Maintenance LED comes ON solid and stays ON solid after 5 minutes, go to the START section.

Hint

The Maintenance LED is ON solid until the 3570 microcode is loaded and running, then it starts blinking.

The Maintenance LED continues to blink until all of the power-on self-tests (POSTs) are completed.

If the Maintenance LED continues to blink, along with the Busy and Clean LEDs, the diagnostics found a fault with the 3570. Go to the START section to fix the fault.

End of Hint

__ 6. To ensure that the read/write functions work correctly, perform the procedure at "Verify Fix—Drive-Only Models" on page PROC-7. If this operation does not complete successfully, go to the START section to fix the fault.

__ 7. Place the power switch to the OFF position.

__ 8. Remove the SCSI wrap tool from the SCSI connector if installed earlier.

Connecting the SCSI Cable to the Drive Subsystem

__ 1. If the Magstar MP is the first or only SCSI device connected in line to the initiator, connect the SCSI interface cable coming from the initiator to the leftmost SCSI connector on the back of the Model C00 (see item 3 in Figure 200 on page INST-13).

__ 2. If the Magstar MP is not the first device on the SCSI bus, connect the SCSI interface cable coming from the next closest device to the leftmost SCSI connector on the back of Model C00 (see item 3 in Figure 200 on page INST-13).

__ 3. If this is the last device on this SCSI bus, locate the SCSI interface terminator (P/N 61G8324) and attach it to the rightmost SCSI connector on the back of the Model C00 (see item 2 in Figure 200 on page INST-13).

Note: There are two SCSI connectors on the back of the Magstar MP Model C00. When connected correctly, each of these connectors must have either a SCSI interface cable or a SCSI terminator attached.

__ 4. Go to “Online Tests for Library Models” on page INST-63.

Figure 198 shows an example of a single Magstar MP attached to the host (initiator). Figure 199 shows an example of attaching multiple SCSI devices to a host.

Note: The figures do not show any interposers if needed.

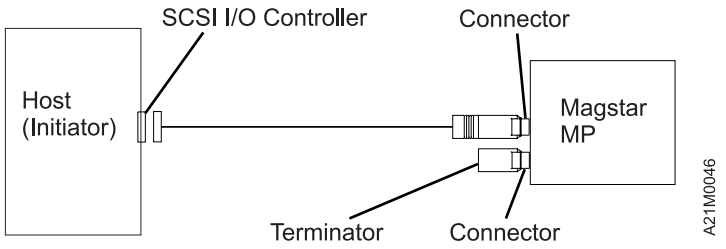

Figure 198. Example of Attaching One SCSI Device to the Host (Initiator)

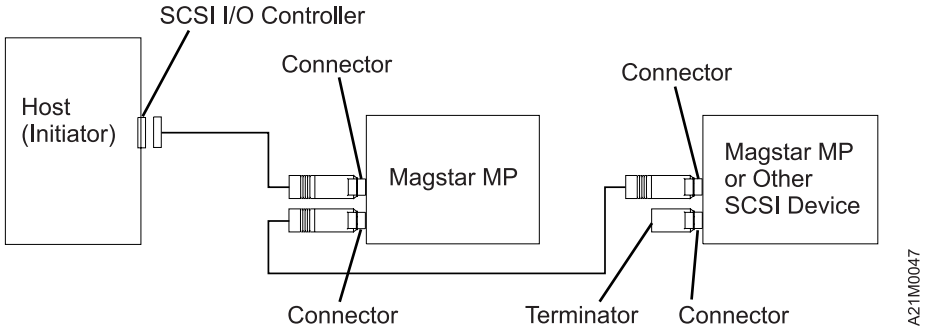

Figure 199. Example of Attaching Multiple SCSI Devices to the Host

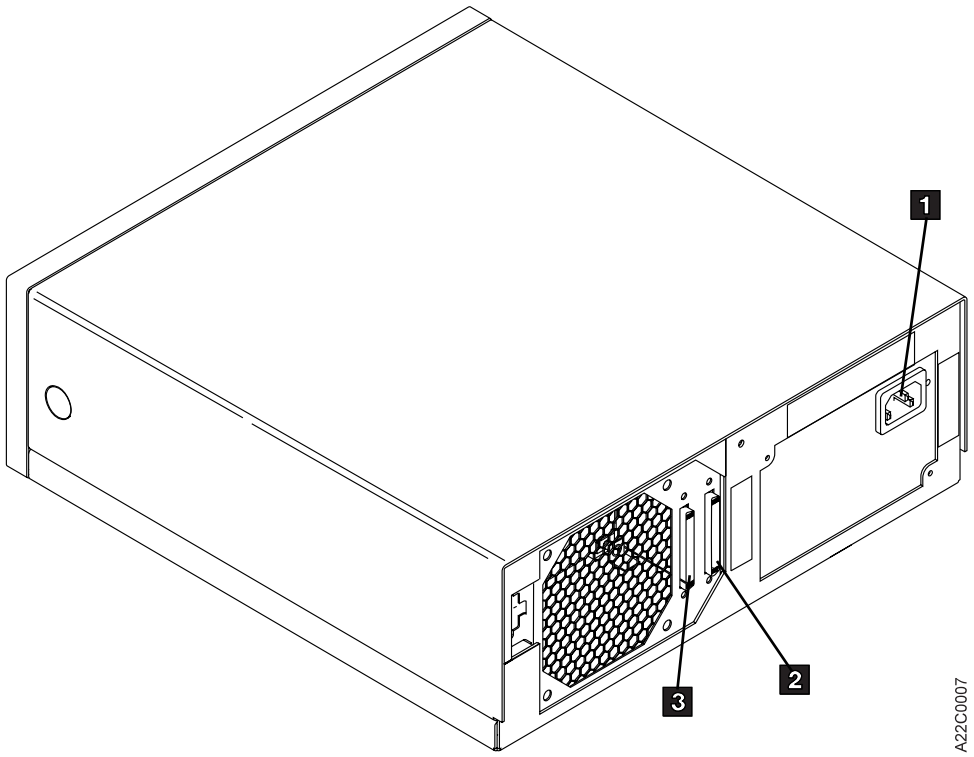

Figure 200. Drive-Only Model C00 SCSI Connection

Rack-Mounted Models (Models C11 and C12)

When you are installing a Model C11 or Model C12 (rack-mounted unit) in a 9309 rack, you are instructed to locate components by EIA rack unit and hole location. All hole locations are specified within contiguous EIA rack units.

Figure 202 on page INST-15 is a template that may be removed from the book, or copied, to be used as an aid to locating the proper holes in the EIA strip for rack installation of the Models C11 and C12.

__ 1. Figure 201 lists the parts necessary for the rack mount installation. Ensure that you have the necessary hardware to begin the installation.

Figure 201. Rack Mounted Hardware List

Part Number	Quantity	Description
08L6254	1	Kit, rack mount tray, slides, and hardware
--	1	Right-hand Slide, Bracket and Tray assembly
--	1	Left-hand Slide and Bracket assembly
--	4	Nut-plates
1621190	3	Screws, M4 x 8, Tray mounting
1622403	3	Nuts, M4, Tray mounting
1624778	8	Screws, M5 x 12, Slide mounting
1624778	6	Screws, M5 x 12, Cable Arm, Strain Relief, & Drive Attach
45G0181	1	Cable Strain Relief assembly
05H2629	1	Strain Relief Clamp
05H9208	1	Cable Arm assembly
08L6271	1	Hinge, Cable Arm
74F1823	3	Nut-clips
1159519	12	Cable Ties

Note: Actual part numbers and quantities may change. Rely on the shipping list for actual part numbers and quantities.

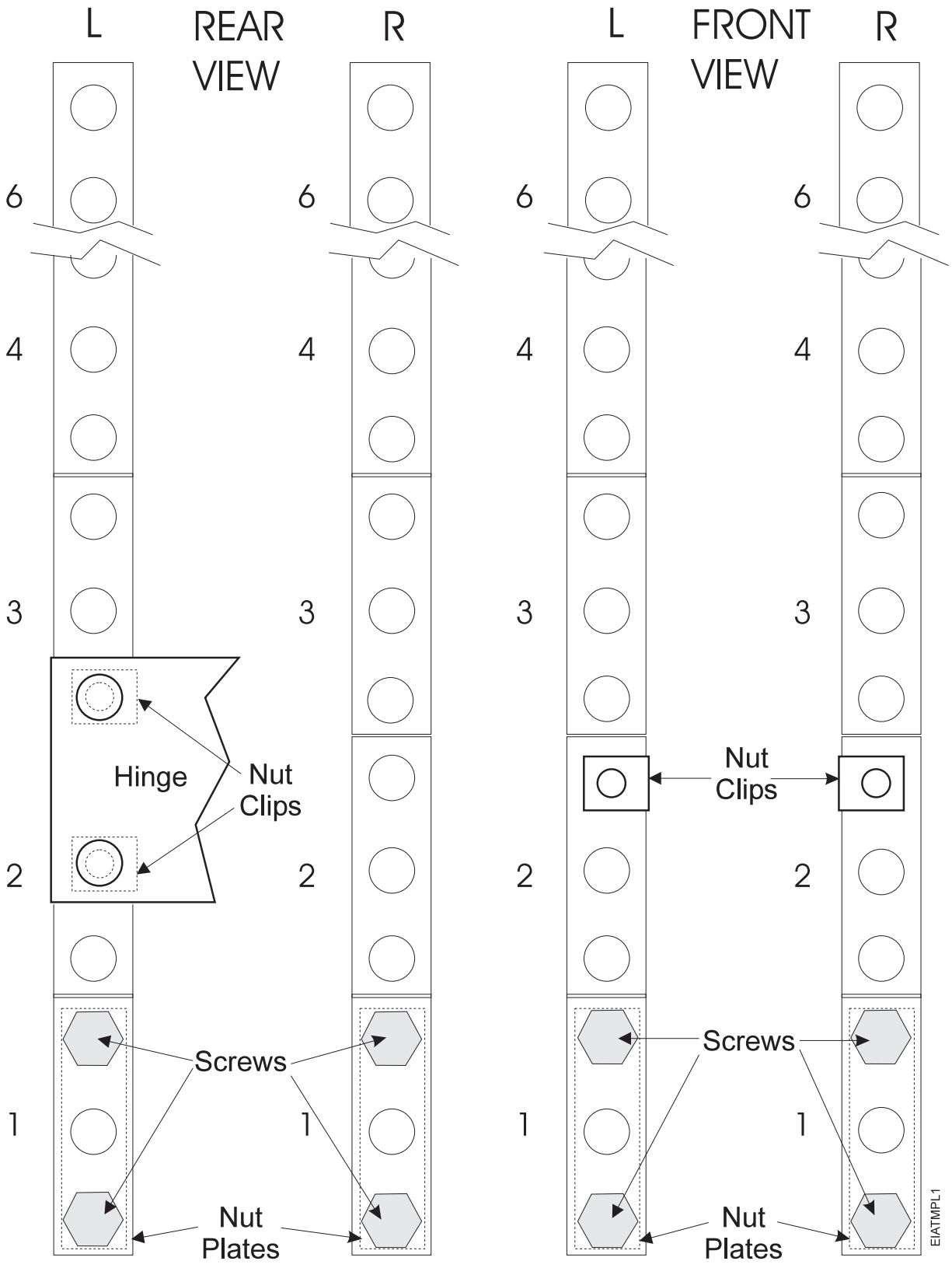

Figure 202. EIA Rack Template for Models C11 and C12

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__ 2. Position the shipping container that contains the 3570 in front of the rack.

__ 3. Position the rack and locate the physical area in the rack where the 3570 is to be installed.

Note: Because of the weight of the 3570, it is recommended that the 3570 be installed as low as possible in the rack.

The 3570 requires 6 EIA units. Each EIA unit consists of 3 holes in the rack. The supporting slides must be installed level in the rack. Figure 203 on page INST-18 and Figure 204 on page INST-19 show the locations of the holes used.

EIA unit number 32 (top of rack) has only two holes, all other EIA units have three holes. EIA unit numbers are shown in the rear of the rack.

__ 4. Ensure that the rack stabilizer is installed before beginning the installation. See *7202 Install and Service Guide*, *7015 Install and Service Guide*, or *9309 Model 1 and 2 Setup and Operator Guide*.

Installing Supporting Slides and Tray in Rack

When installing the library models in a rack, 6 EIA rack units must be available.

__ 1. Determine which rack location the 3570 will be installed in. Count and mark the 6 EIA units on the left and right sides of the front and the rear of the rack.

__ 2. See Figure 203. Install the 2 nut-plates 1 , using 4 screws 2 , P/N 1624778, in the bottom EIA units on the left side, as shown. Leave the screws loose enough to be able to insert the slide mounting brackets 3 under the nut-plates.

__ 3. Install the left-hand slide assembly 4 . Insert the brackets 3 under the nut-plates 1 and tighten the screws 2 .

Notes:

a. Ensure that the slide extends toward the front of the rack.

b. If it is necessary to adjust the length of the slide mounting brackets to fit the rack, **do not** loosen the front mounting bracket screws. Do all of the adjustment with the rear mounting bracket.

| __ 4. Install the nut-clip 5 , P/N 74F1823, in the top hole of the first EIA unit above the left slide as
| shown in Figure 203. The screw will be installed later in step 8 on page INST-63.

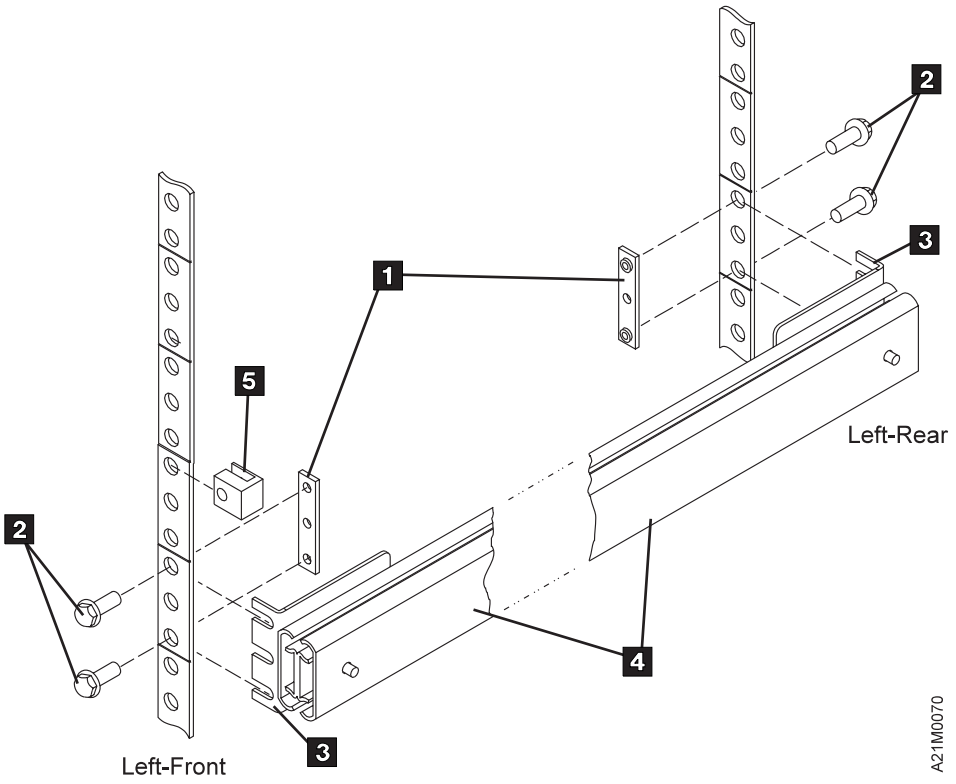

Figure 203. Attaching Left-hand Slide and Bracket assembly

__ 5. See Figure 204. Install the right-hand slide and tray assembly 4 .

__ a. Install the 2 nut-plates 1 , using 4 screws 2 , P/N 1624778, in the bottom EIA units on the right side, as shown. Leave the screws loose enough to be able to insert the slide mounting brackets 3 under the nut-plates.

__ b. Raise the left side of the slide and tray assembly so the tray is tilted to the right. (The square hole in the center of the tray can be used as a hand hold.) Insert the tray assembly into the rack above the left-hand slide assembly.

Notes:

1) Ensure that the four drive mounting tabs are pointing up.

2) If it is necessary to adjust the length of the slide mounting brackets to fit the rack, **do not** loosen the front mounting bracket screws. Do all of the adjustment with the rear mounting bracket.

__ c. Insert the mounting brackets 3 under the nut-plates 1 on the right-hand side.

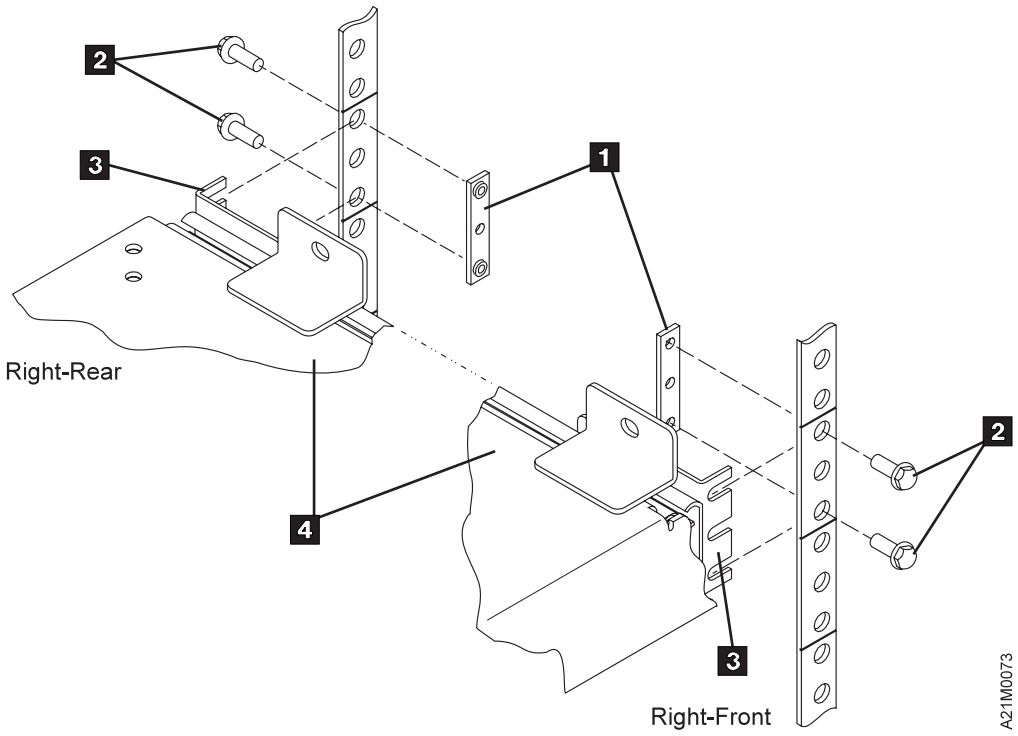

Figure 204. Attaching Right-hand Slide, Bracket and Tray assembly

__ d. See Figure 205. Lower the left side of the tray down so the tabs on the tray 1 set on the top of the left-hand slide assembly 3 . The brackets on the right-hand side should slide all the way under the nut-plates.

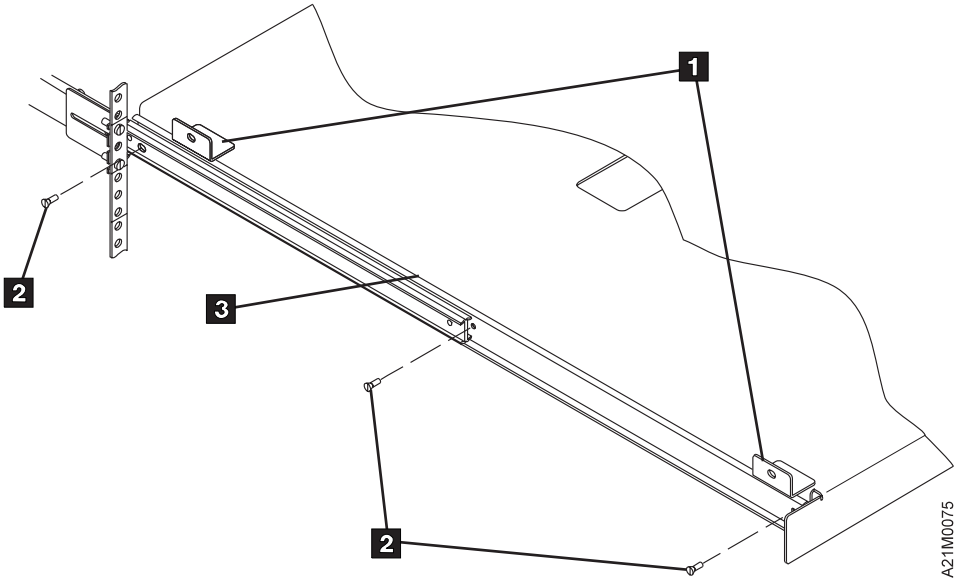

Figure 205. Attaching Tray to Left-hand Slide

__ 6. See Figure 206. Pull the tray and slides out far enough so that the inner slide 2 extends out approximately 24mm (1 in.) past the rack frame 1 .

__ 7. Ensure that the inner slides do not rub on the rack frame. Tighten all of the slide mounting screws 1 .

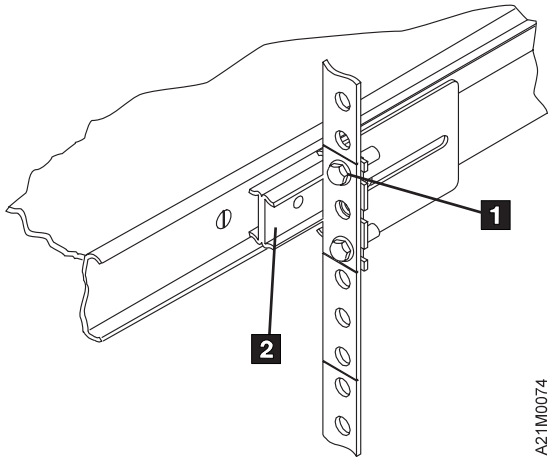

Figure 206. Inner Slide to Rack Clearance

__ 8. See Figure 205. Pull the tray assembly out so the slides are extended all the way out.

__ 9. Raise the left-hand side of the tray enough to align the holes in the tray with the mounting holes in the slide 3 . Attach the tray to the left-hand slide using 3 M4 x 8 screws 2 . After the screws are installed and tightened, install 3 M4 lock-nuts on the screws to prevent them from loosening.

__ 10. Ensure that all of the 7mm hex-head screws holding the slides to the rack are tight.

__ 11. Ensure that the slides operate properly. They should extend all the way out without binding or rubbing on the rack frame. Loosen the screws and adjust the slide mounting brackets, if necessary.

__ 12. See Figure 207. Install the cable strain relief bracket 8 , P/N 45G0181, using 2 screws 5 , P/N 1624778, at the right rear of the tray as shown.

__ 13. Install the strain relief clamp 7 , P/N 05H2629, on the strain relief bracket with 1 screw 6 , P/N 1624778. Leave the screw loose at this time. The cables will be routed through the clamp in a later step.

__ 14. Install the cable arm hinge 3 , P/N 08L6271, using 2 screws 1 , P/N 1624778, and 2 nut-clips 4 , P/N 74F1823, at the right rear of the rack as shown. The cable arm hinge should be installed in the EIA unit just above the right rear slide mounting position.

__ 15. Install the cable arm assembly 2 , P/N 05H9208, in the hinge as shown. If there is a washer on the cable arm assembly, it should be installed on the bottom, just above the retaining pin.

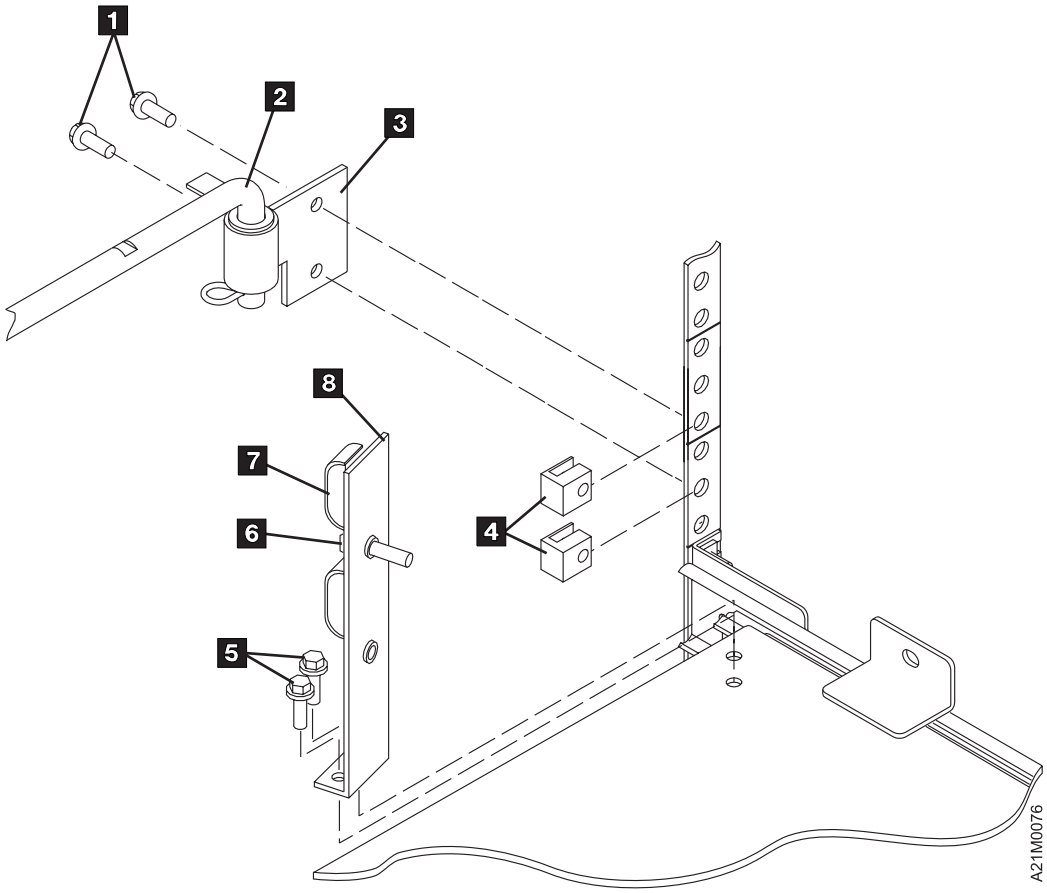

Figure 207. Attaching Cable Arm and Strain Relief

Installing the 3570 in a Rack (Models C11 and C12 Only)

Note: The **Rack Hoist** is only used when installing the Model C11 and C12 drives in a 9309 Rack system. The hoist is not used when installing the Models C21 and C22 in a Netfinity rack. For these models, the CE or customer will require assistance in lifting the drives onto the tray.

The following notices are translated into selected languages. Each notice contains an identifier (Caution=Cx).

C2 **CAUTION**
The 3570 Model C11 weighs approximately 24 kilograms (53 pounds); it takes two persons to safely lift this unit.

C4 **CAUTION**
The 3570 Model C12 weighs approximately 29 kilograms (64 pounds); it takes two persons to safely lift this unit.

Note: This notice is translated into selected languages. See **C2** and **C4** in the INSP section.

__ 1. See Figure 210 on page INST-25. Remove the 4 corner screws 1 from the drive. These will be used to attach the drive to the tray in a later step.

__ 2. If you have assistance to lift the 3570, go to step 15 on page INST-24.

Rack Hoist Only

If you do not have assistance, use the rack hoist P/N 69X5542 (branch office tool) or equivalent to install the 3570.

__ 3. Install the rack hoist using the instructions provided.

__ 4. Position the 3570 shipping container in front of the rack.

__ 5. See Figure 208 on page INST-23. Route one end of the hoist sling strap 1 under the 3570 while it is still in the shipping container. If necessary, cut the sides of the box so you can get the strap under the 3570.

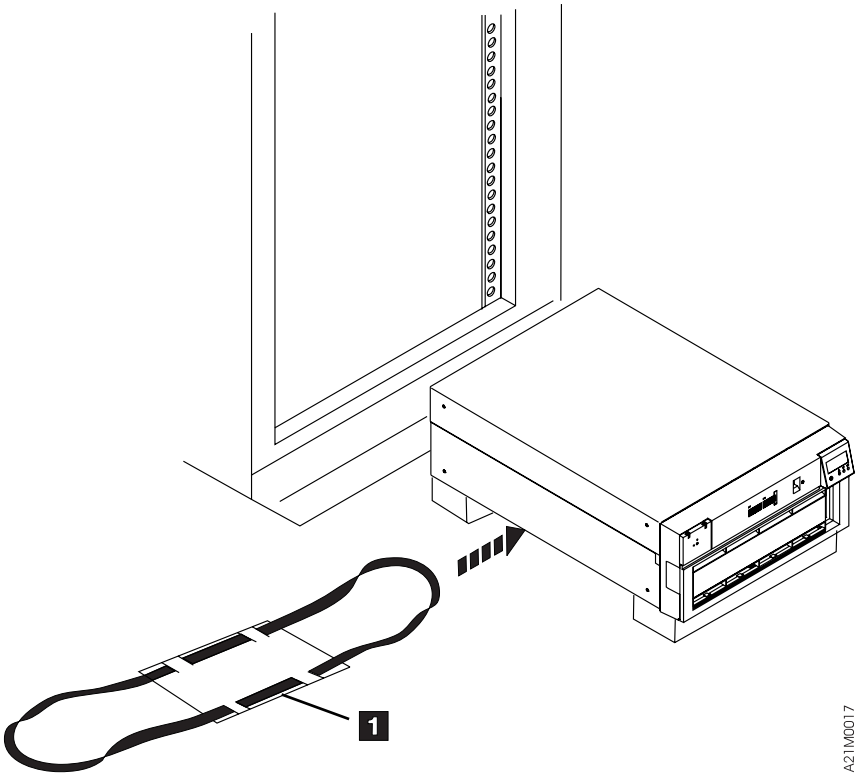

Figure 208. Sliding Strap Under Drive

__ 6. Attach the sling to the hoist.

Attention: The balance point of the 3570 is toward the rear of the 3570.

__ 7. Raise the 3570 slightly to check for proper balance. If required, lower the 3570 and readjust the position of the sling.

__ 8. See Figure 209 on page INST-24. Use the hoist 1 to raise the 3570 until it clears the shipping container.

__ 9. Move the shipping container away from the rack far enough so you can complete the installation.

__ 10. Raise the 3570 above the slide and tray assembly.

__ 11. Extend the slide and tray assembly 2 all the way out so it is locked in the extended position.

C5 **CAUTION**
When you are sliding the 3570 drive tray assembly in or out, make sure you do not get your hand caught between the drive and the rack. Also, when you are servicing the 3570, make sure the slide and tray assembly is fully extended and locked.

Note: This notice is translated into selected languages. See **C5** in the INSP section.

__ 12. Lower the 3570 onto the tray. Ensure that the screw holes in the 3570 align with the holes in the mounting tabs on the tray.

__ 13. Remove the rack hoist and store it by using the instructions supplied with the rack hoist.

__ 14. Go to step 18 on page INST-24.

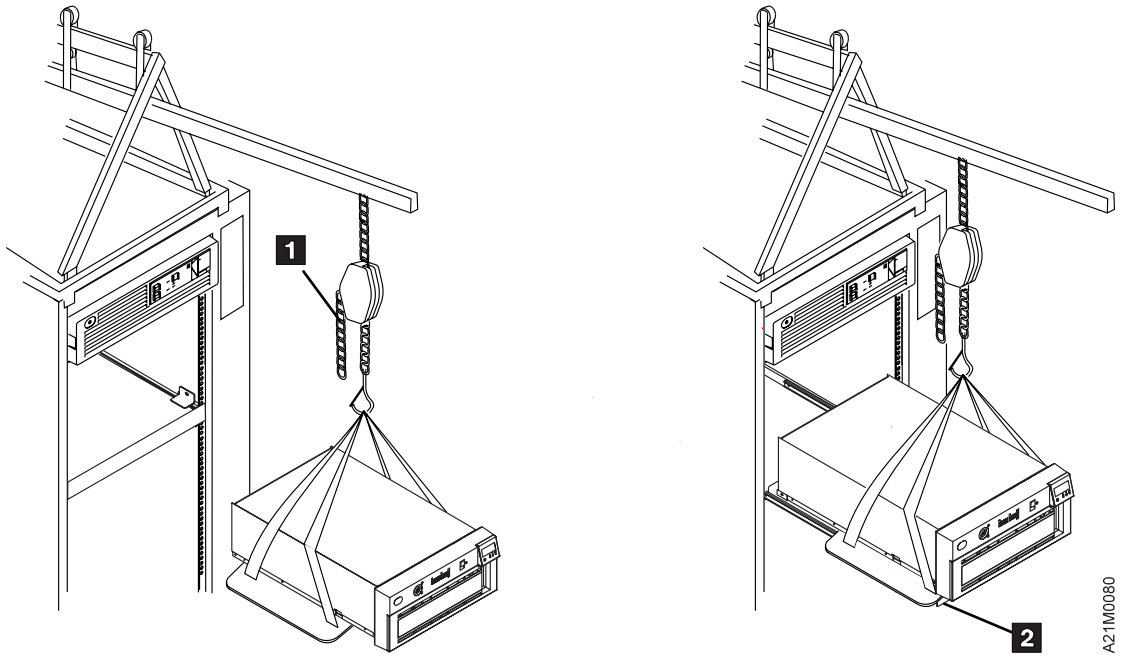

Figure 209. Raising 3570 Using Hoist

End of Rack Hoist Only

With Assistance Only

__ 15. Extend the slide and tray assembly 2 all the way out so it is locked in the extended position.

C5 **CAUTION**
When you are sliding the 3570 drive tray assembly in or out, make sure you do not get your hand caught between the drive and the rack. Also, when you are servicing the 3570, make sure the slide and tray assembly is fully extended and locked.

Note: This notice is translated into selected languages. See **C5** in the INSP section.

__ 16. Lift the 3570, with assistance, and set it on the tray. Ensure that the screw holes in the 3570 align with the holes in the mounting tabs on the tray.

__ 17. Continue with step 18.

End of With Assistance Only

__ 18. See Figure 210 on page INST-25. Fasten the 4 mounting tabs on the tray 1 to the 4 corners of the 3570 with the 4 screws that were removed in 1 on page INST-22.

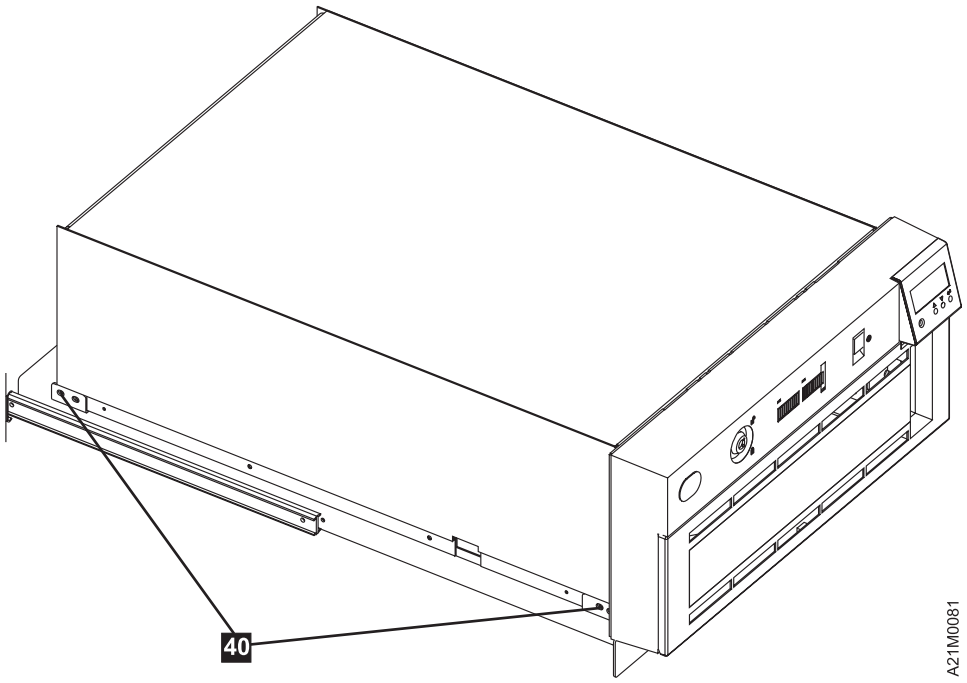

Figure 210. Attaching the 3570 to the Rack Tray

__ 19. Move the tray and slide assembly into and out of the rack several times to ensure that the slides operate without binding.

__ 20. Ensure that the rack doors will close without hitting the 3570.

Note: In some racks the angled Operator Panel may interfere with the closing of the rack door. (For example, if the 3570 is installed in a Model 7014-S00 rack, the Operator Panel will interfere with the rack door unless the top of the 3570 is at EIA position 27 or 28.) An alternate Operator Panel housing is provided in the ship group for use in racks where there is interference. If the Operator Panel interferes with the rack door, replace the angled Operator Panel housing with the non-angled Operator Panel. Refer to “FID 90: Library Operator Panel Display” on page CARR-19 for instructions.

Rack-Mounted Models (Models C21 and C22)

The IBM Magstar MP 3570 Tape library Models C21 and C22 are designed only for installation in the IBM Netfinity Rack (9306900) or NetBAY22 (9306200) rack. They can be attached to IBM Netfinity 5500 or 7000 and IBM PC Server 325 or 330 systems that support attachment with an included adapter card.

When you are installing a Model C21 or Model C22 in a rack, you are instructed to locate components by Electronic Industry Association (EIA) rack unit and hole location. An EIA unit takes up three holes. See Figure 214 on page INST-34 for an example.

Figure 212 on page INST-29 is a template that may be removed from the book, or copied, to be used as an aid to locating the proper holes in the EIA strip for rack installation of the Models C21 and C22. All hole locations are specified within contiguous EIA rack units, and are square shaped in both racks.

The IBM Netfinity Rack (9306900) has a total of 42 EIA units while the NetBAY22 (9306200) rack has a total of 22 EIA units.

Note: Because of the weight of the 3570, it is recommended that the 3570 be installed as low as possible in the rack. **In no case should the 3570 be installed any higher than EIA unit 28.** This means that **the top of the drive should not extend any higher than EIA 28** in the Netfinity Rack (9306900). There are no height restrictions in the NetBAY22 (9306200) rack.

__ 1. Figure 211 lists the parts necessary for the rack mount installation of the Model C21 and C22. Ensure that you have the necessary hardware to begin the installation.

Figure 211 (Page 1 of 2). Model C21 and C22 Rack Mounted Hardware List

Package Bill Number	Part Number	Quantity	Description
08L6489			
	08L6502	3	Nut, M4 Caged
	08L6557	1	Wrench kit, hex M3/M4
	12J5288	11	Nut, M6 caged
	1621510	3	Screw, M4 X 10 socket button-head
	1621950	11	Screw, M6 X 12 socket button-head
08L6255			
	05H2629	1	Strain relief clamp
	05H9208	1	Cable arm assembly
	08L6495	1	Cable backet (SCSI Z shaped)
	08L6501	1	Cable arm hinge
	1159519	12	Tie, adjust strap
	1621465	2	Screw, M5 X 8 sockethead
	1621519	2	Screw, M5 X 12, SCSI cable clamp
	1624778	6	Screw, M5 X 12, (Included but not used; scrap locally)
	74F1823	3	Nutclip, M5 (Included but not used; scrap locally)
08L6488			
	08L6499	1	Slide, left & right pair
	08L6500	1	Slide tray

Figure 211 (Page 2 of 2). Model C21 and C22 Rack Mounted Hardware List

Package Bill Number	Part Number	Quantity	Description
	1621191	6	Screw, M4 X 10 Pan head
	1621309	6	Screw, M4 X 10 Flat head
	1622403	6	Lock nut, M4

Note: Actual part numbers and quantities may change. Rely on the shipping list for actual part numbers and quantities. Some parts may have extra parts included.

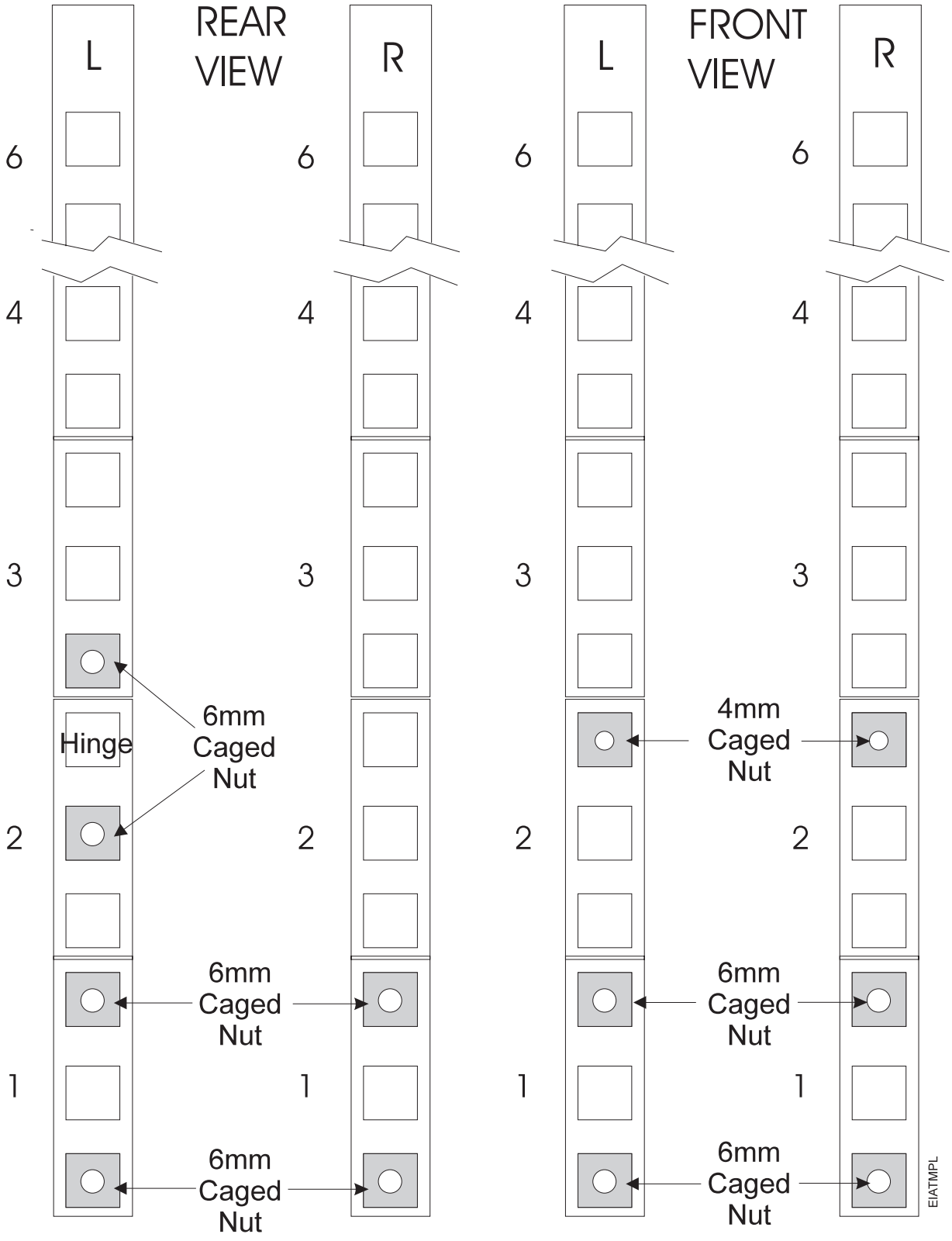

Figure 212. EIA Rack Template for Models C21 and C22

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| __ 2. Position the rack in the area of the customer's location where it will be installed.

| __ 3. Locate the physical area in the rack (which EIA units the drive will occupy).

| **Note:** Because of the weight of the 3570, it is recommended that the 3570 be installed as low as possible in the rack. Never install the drive so that the top of the 3570 is higher than EIA unit 28 in the Netfinity Rack (9306900). There are no height restrictions in the NetBAY22 (9306200) rack.

| The 3570 requires 6 EIA units on each side. Each EIA unit consists of 3 holes in the rack. The supporting slides must be installed level in the rack. Figure 213 on page INST-33 and Figure 214 on page INST-34 show the locations of the holes used.

| __ 4. It is necessary to remove the front door of the Netfinity rack to install the slide assemblies. This is done by removing the hinge pins that hold the door to the frame.

Caution

Removal of the Netfinity rack door requires two people. One to hold the door while the other removes the hinge pins. It is suggested that you remove the top hinge pin **last**.

Installing Supporting Slides and Tray in Rack

When installing the library models in a rack, 6 EIA rack units must be available. See Figure 212 on page INST-29 for a template of where the particular parts must go to hold the rails and cable arm assembly.

__ 1. Determine which rack location the 3570 will be installed in. Count and mark the 6 EIA units on the left and right sides of the front and the rear of the rack.

__ 2. Refer to Figure 213 on page INST-33 and install the 4 M6 caged nuts 8 , P/N 12J5288 and 4 M6 X 12 socket button-head screws, 6 , P/N 1621950, in the bottom EIA units on the left side, as shown. Leave the screws loose enough to insert the slide mounting brackets 32 between the screw heads and the EIA strips.

__ 3. Read the notes below before continuing.

Notes:

a. Ensure that the slide is oriented so that when the inner slide is extended out, it extends toward the front of the rack.

b. You will need an adjustable wrench to loosen the nuts holding the **rear** slide bracket to adjust it to the depth of the EIA units. The bracket fingers must go outside the EIA strips (the opposite side of where the captive nuts are installed) for both the front and rear mounting points.

c. Do all of the adjustment with the rear mounting bracket. **DO NOT** loosen the front mounting bracket screws.

__ 4. Next, fit the left-hand slide assembly 33 as shown inFigure 213 on page INST-33. Ensure that the front and rear brackets 32 are flush to the EIA strips 31 on the opposite sides of where the captured nuts 8 are installed. Tighten the nuts that hold the rear slide bracket.

__ 5. Remove the left-hand slide assembly 33 and use that assembly to measure and adjust the right-hand slide assembly that is attached to the tray assembly.

Notes:

a. Ensure that the slide is oriented so that when the inner slide is extended out, it extends toward the front of the rack.

b. Remember to make adjustments only on the rear slide bracket assembly. **DO NOT** loosen the front slide bracket.

The two slides should both be the same length. Tighten the nuts holding the right rear slide bracket and set that assembly asside for now.

__ 6. Re-install the left-hand slide assembly as shown in Figure 213 on page INST-33. Tighten the four screws 6 .

Note: Be sure that these brackets are tightened securely using the special hex wrenches provided.

__ 7. Install a caged M6 nut, P/N 12J5288, 7 in the top hole of the first EIA unit above the left slide and another M6 nut in the top hole of the first EIA unit above the right slide. Refer to Figure 213 on page INST-33 and Figure 214 on page INST-34 7 for the location. Another view can be seen in Figure 212 on page INST-29. You will install M6 X 12 socket button-head screws, P/N 1621950 later, in step 9 on page INST-63.

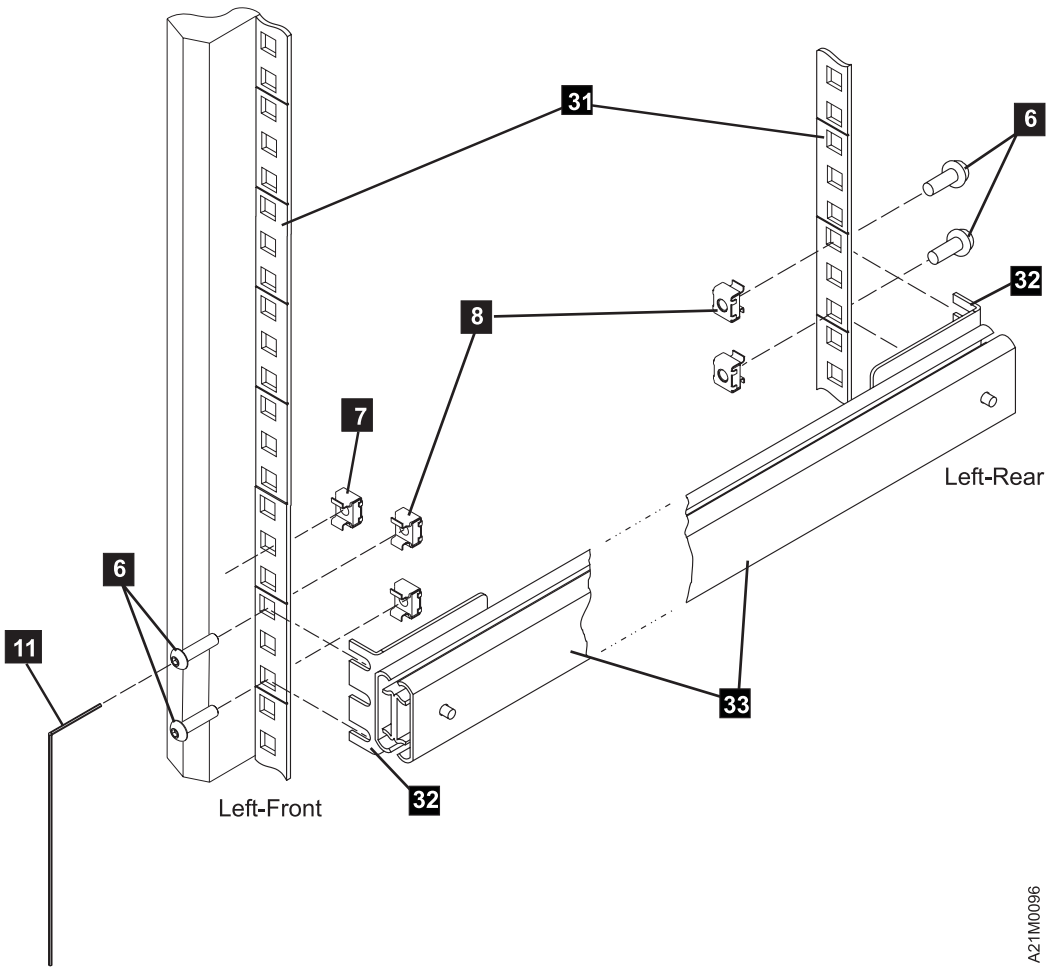


Figure 213. Attaching Left-hand Slide and Bracket assembly

__ 8. Refer to Figure 214 on page INST-34 and install the right-hand slide and tray assembly 35 as follows:

__ a. Install the 4 M6 caged nuts 8 , P/N 12J5288 and 4 M6 X 12 socket button-head screws, 6 , P/N 1621950, in the bottom EIA units on the right side, as shown. Leave the screws loose enough to insert the slide mounting brackets 32 between the screw heads, 6 and the EIA strips 31 .

Note: The right-hand slide bracket should have been adjusted in a previous step. If a fine adjustment is needed, make all the adjustments at the **rear** bracket. The bracket fingers must go outside the EIA strips (the opposite side of where the captive nuts are installed) for both the front and rear mounting points.

__ b. Raise the left side of the slide and tray assembly so the tray is tilted to the right.

Notes:

1) Ensure that the four drive mounting tabs, 34 are pointing up.

2) The square hole in the center of the tray can be used as a hand hold while tilting and installing the slide/tray assembly.

__ c. Insert the right-hand slide and tray assembly, 35 into the rack above the left-hand slide assembly installed earlier. Ensure that the rear brackets, 32 are inserted between the EIA strips 31 and the M6 X 12 socket button-head screws 6 that were left loose in an

earlier step. The bracket fingers should reside on the opposite sides of the EIA strip 31 from the captured nuts 8 .

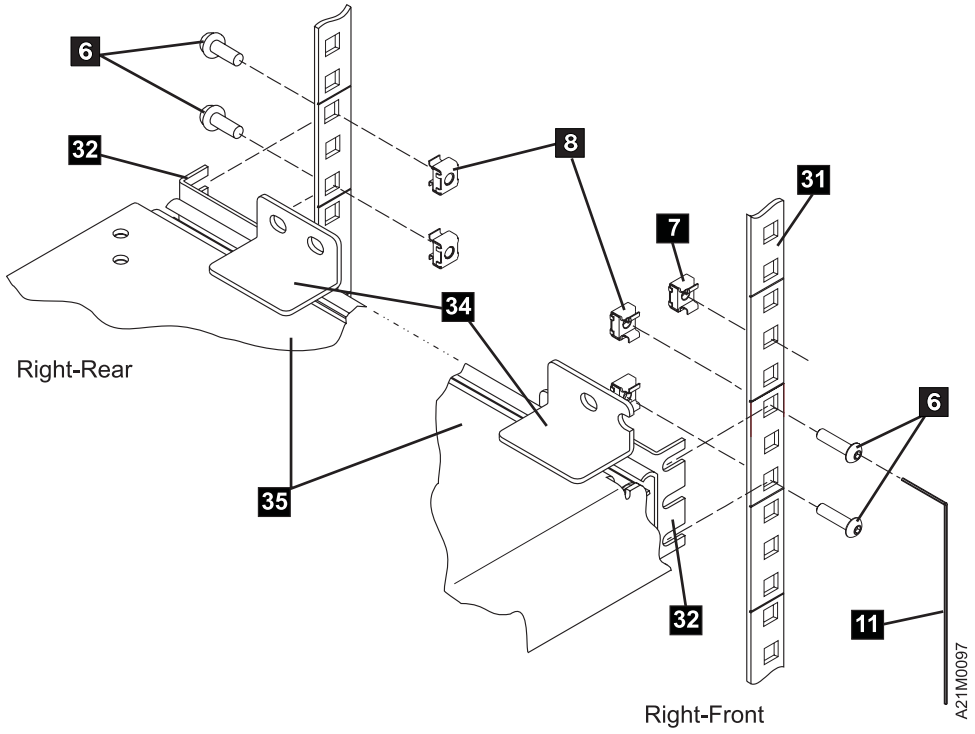


Figure 214. Attaching Right-hand Slide, Bracket and Tray assembly

| __ d. See Figure 215. Lower the left side of the tray down so the tabs on the tray 34 set on the top of the left-hand slide assembly 36 . The brackets on the right-hand side should slide all the way under the captured nuts.

| __ e. Tighten the screws 6 shown on Figure 214 on page INST-34.

Note: Be sure that these brackets are tightened securely using the special hex wrenches provided.

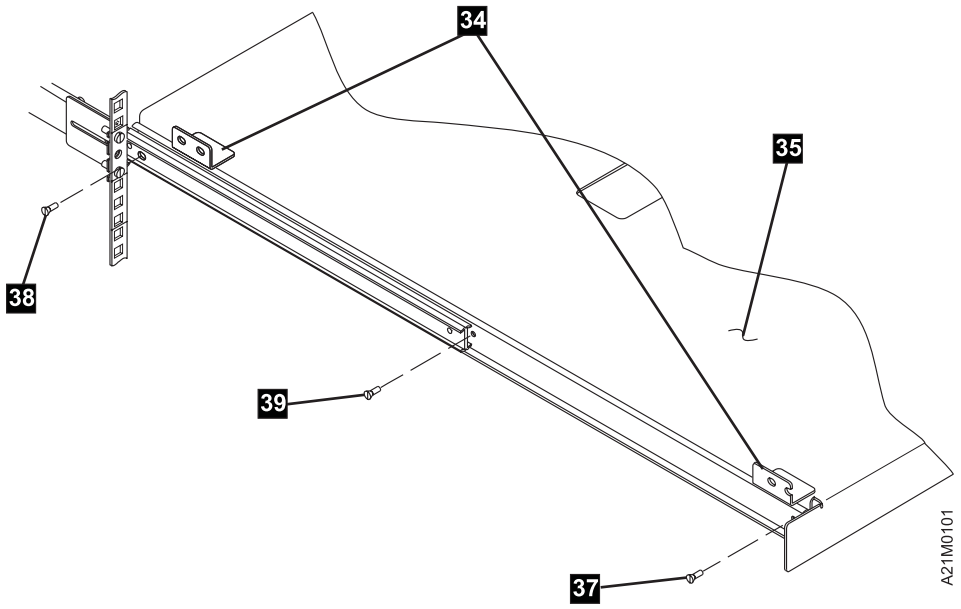


Figure 215. Attaching Tray to Left-hand Slide

| __ 9. Referring again to Figure 215, pull the tray and slides all the way out toward the front of the rack and lock the slides in place.

Notes:

a. The next steps will require you to slide the tray in and out, and lift the left side of the tray slightly in order to align the left slide **clearance** holes with the tray's **threaded** holes. This alignment will be easier if you first install the front screw, 37 (tray pulled out all the way), then the rear screw, 38 , and finally the middle screw, 39 (with the tray partially pushed in).

b. Install the middle screw by pushing the tray toward the rear until the threaded screw hole appears.

| __ 10. Raise the left-hand side of the tray enough to align the holes in the slide with the mounting holes in the tray. Attach the left-hand slide to the tray using 3 M4 x 10 socket head screws 37 , 38 and 39 , P/N 1621510. Ensure that the screws are tight.

| __ 11. Install 3 lock nuts, P/N 1622403, on the threads of the 3 screws just installed. This will ensure that none of the screws come loose during usage.

| __ 12. See Figure 213 on page INST-33 and Figure 214 on page INST-34. Pull the tray assembly out so the slides are extended all the way out.

| __ 13. Refer to Figure 214 on page INST-34 and Figure 213 on page INST-33. Ensure that all of the
| rail mounting screws, 6 , holding the slides to the rack are tight.

| __ 14. Refer to Figure 216 on page INST-37 and install the cable arm hinge 3 , P/N 08L6501, using 2
| socket button-head screws, 1 , P/N 1621950, and 2 M6 caged nuts 4 , P/N 12J5288. The
| cable arm hinge should be installed in the EIA unit just above the left rear slide mounting position,
| as you face the rack from the rear.

| **Note:** Move the hinge bracket up **one hole** from the bottom of the EIA unit as shown in
| Figure 212 on page INST-29. The EIA unit holes are not all equally spaced from each
| other.

| __ 15. Install the articulating arm 2 , P/N 05H9208, in the hinge as shown if not pre-assembled. If there
| is a washer on the cable arm assembly, it should be installed on the bottom, just above the
| retaining pin.

| __ 16. See Figure 216 on page INST-37. Install the cable strain relief bracket 8 , P/N 08L6495, using 2
| M5 x 8 socket head screws, 5 , P/N 1621465, at the standoffs, item 9 at the rear of the drive
| as shown.

| __ 17. Install the strain relief clamp 7 , P/N 05H2629 on the strain relief bracket with 1 M5 X 12 SCSI
| cable clamp screw, 6 , P/N 1621519. Leave the screw loose at this time. The cables will be
| routed through the clamp in a later step.

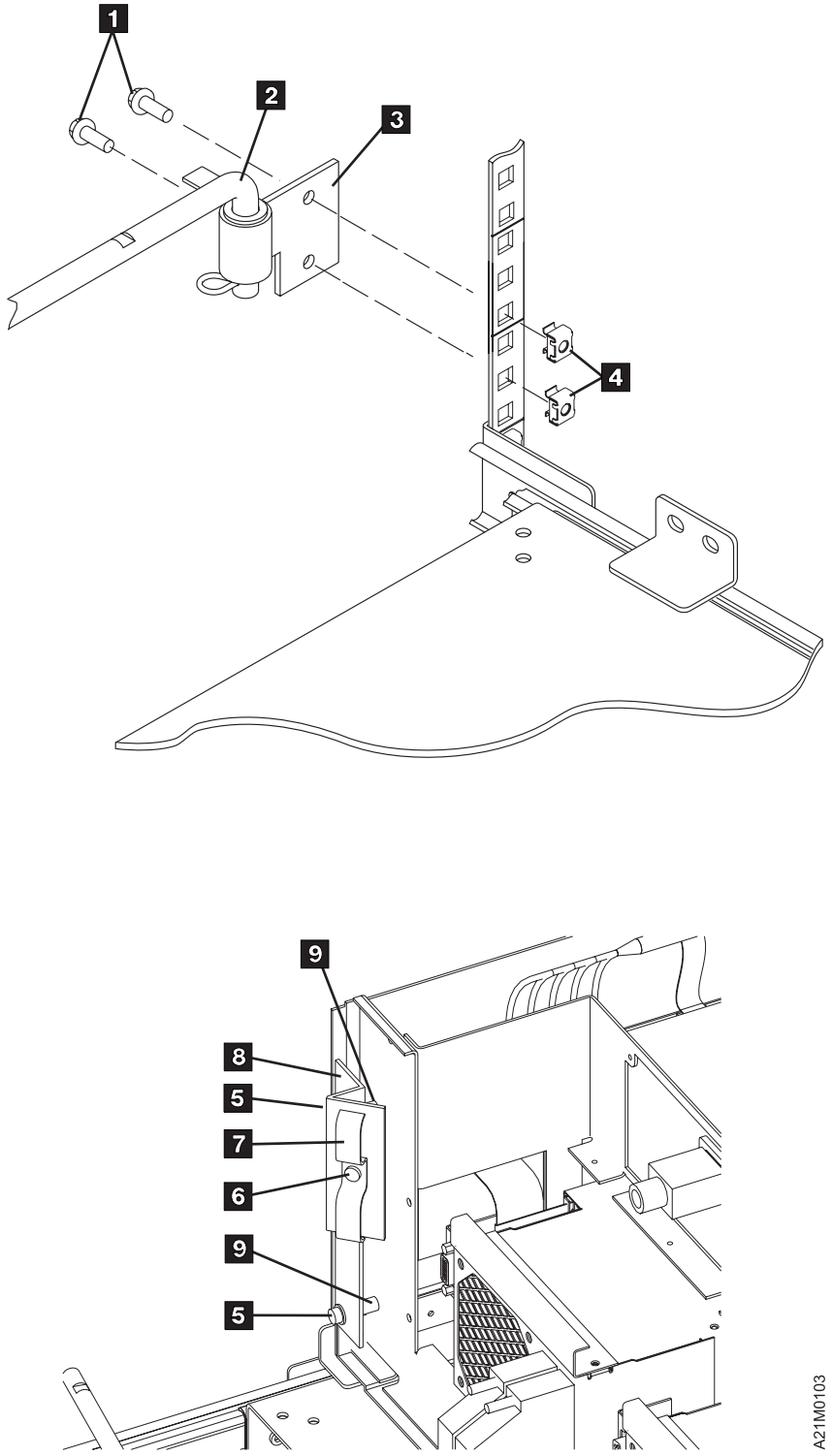


Figure 216. Attaching Cable Arm and Strain Relief Bracket

Installing the 3570 in a Netfinity Rack

The following notices are translated into selected languages. Each notice contains an identifier (Caution=Cx).

C2 **CAUTION**
The 3570 Model C21 weighs approximately 24 kilograms (53 pounds); it takes two persons to safely lift this unit.

C4 **CAUTION**
The 3570 Model C22 weighs approximately 29 kilograms (64 pounds); it takes two persons to safely lift this unit.

Note: This notice is translated into selected languages. See **C2** and **C4** in the INSP section.

__ 1. See Figure 217 on page INST-39. Remove the 4 corner screws 1 from the drive. These will be used to attach the drive to the tray in a later step.

__ 2. You must have assistance to lift the 3570, go to step 3.

With Assistance Only

__ 3. Extend the slide and tray assembly 2 all the way out. Ensure that the slide tray assembly **is locked in the extended position.**

C5 **CAUTION**
When you are sliding the 3570 drive tray assembly in or out, make sure you do not get your hand caught between the drive and the rack. Also, when you are servicing the 3570, make sure the slide and tray assembly is fully extended and locked.

Note: This notice is translated into selected languages. See **C5** in the INSP section.

__ 4. Lift the 3570, with assistance, and set it on the tray. Ensure that the screw holes in the 3570 align with the holes in the mounting tabs on the tray.

__ 5. Continue with step 6.

End of With Assistance Only

__ 6. See Figure 217 on page INST-39. Fasten the 4 mounting tabs on the tray 1 to the 4 corners of the 3570 with the 4 screws that were removed in 1 on page INST-22. Make sure that the mount tabs in the tray are on the outside. On the mount tabs, use the mounting holes closest to the rear of the machine.

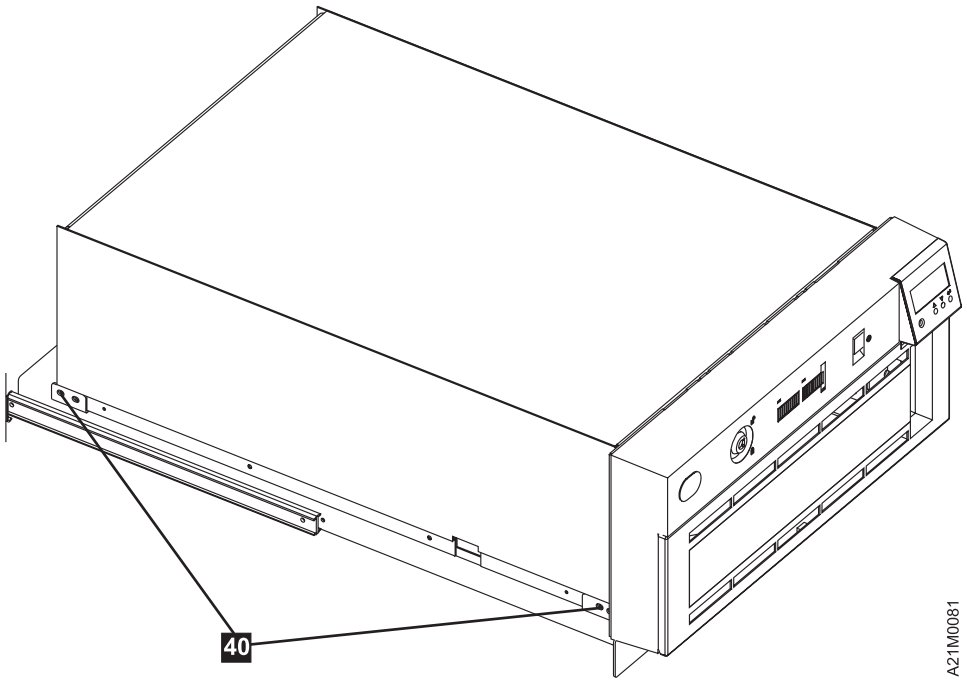


Figure 217. Attaching the 3570 to the Rack Tray

Note: The Model C11 or C12 is shown, but these screw locations are similar for all models.

7. Move the tray and slide assembly into and out of the rack several times to ensure that the slides operate without binding.
8. Re-install the rack door removed earlier.
9. Ensure that the rack door will close without hitting the 3570.

Installation Checkout—Library Models

Before turning on power, the orange stopper shown in Figure 218 must be removed from the unit. The stopper is pressed on the rail to prevent the picker from moving during shipping. To remove the stopper:

__ 1. Unlock the library front door if necessary. The keys are taped to the rear of the unit. See step 13 on page INST-3 for additional information about the keys, if necessary.

__ 2. Look inside the unit and find the orange tag, item 2 that is attached to the stopper, item 1 . The orange tag will assist you in finding the orange stopper.

__ 3. **Do not pull on the string or the tag to remove the stopper.** Reach inside the unit and remove the orange stopper from the rail using your fingers. Remove the stopper, string and tag.

Note: Save the stopper with the packaging material for later reshipment or relocation.

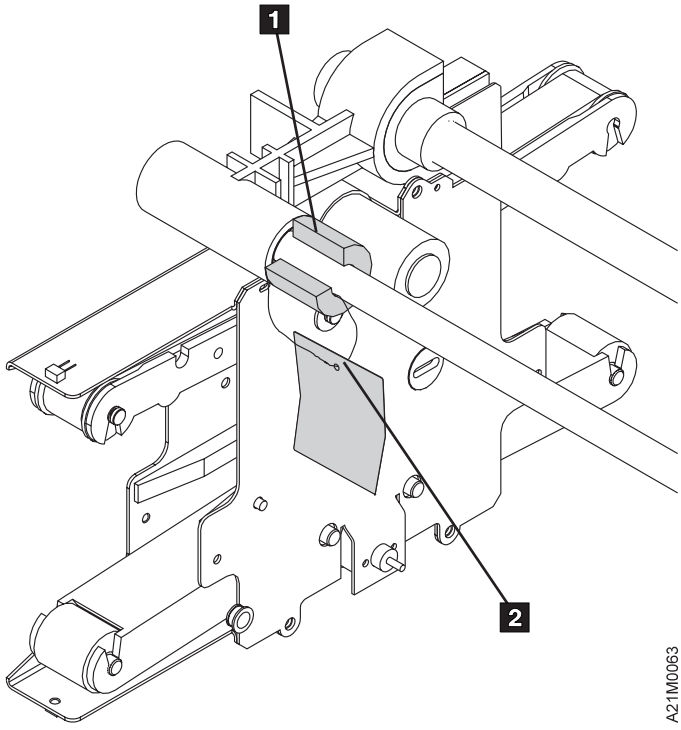


Figure 218. Stopper and Orange Tag

__ 4. Install the magazines that were included in the ship group and close the library front door.

__ 5. If this machine is a Model C01 or Model C02, remove the rear cover from the library. The cover is attached using plastic snap-in retainers. Rotate the plastic retainers one-quarter turn in either direction to release the cover.

__ 6. If not done by the factory, install the RS-422 jumper cable P/N 65F5399 between drive 1 and drive 2 RS-422 connectors in the rear of the drive units. Some models may ship with this cable un-installed. The DU0 end of the cable goes to drive 1, and the DU1 end goes to drive 2.

__ 7. Install the power cable in the 3570 and plug it into its power source.

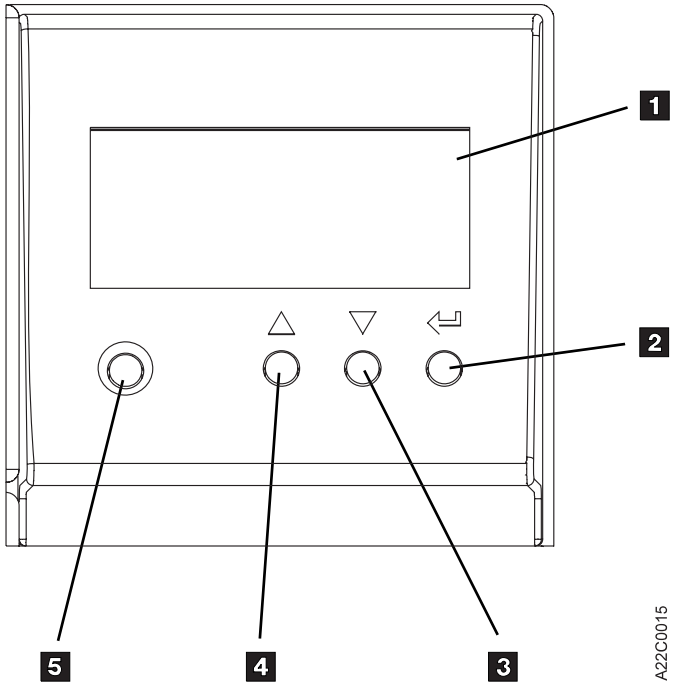
| **Note:** Two power cables are required for Models C02, C12 and C22.

__ 8. A SCSI Wrap Tool, P/N 05H9163 is not part of the ship group, but is available through the service branch. If you have this tool available, perform “SCSI Port Wrap Test” on page PROC-77 on all the tape drives, then return here. If the tool is not available, continue with the next step.

__ 9. Power the device ON.

__ 10. Go to “Operator Panel Setup and Tests—Library Models.”

Operator Panel Setup and Tests—Library Models



1 Liquid Crystal Display Screen
2 Enter Button
3 Scroll Down Button
4 Scroll Up Button
5 Menu Mode Button

Figure 219. Operator Panel, Library Models

When the instructions for using the panel use the term *select*, use the **arrow** push buttons to move the cursor to the selection, then press **Enter**.

Pressing **Change Mode** selects either the *operator* Options menu or the *CE* Options menu.

If the power-on diagnostics detect a problem, a FRU identifier (FID) is posted in the operator panel. If an error occurs, note the FID and go to the START section.

See “Operator Panel” on page PANEL-1 for details about the operator panel and the meaning of the menu options.

Check EC Level—Library Models

__ 1. When the power-on diagnostics complete successfully, press Enter.

__ 2. From the operator Options menu, select **Services**.

__ 3. If asked to select a drive, select drive 1.

__ 4. From the Services menu, select **Microcode Level**.

__ 5. Record the EC level and link level in “Microcode EC Level History Log” on page PROC-38.

__ 6. Select Cancel repeatedly until you return to the Main menu.

Set Drive Options—Library Models

__ 1. Press the Change Mode push button to place the 3570 in CE mode.

__ 2. Select **Drive 1** and press ENTER.

__ 3. Select **Config/Install** from the CE Options Menu.

__ 4. Select **Drv Features** from the Config/Install Menu.

__ 5. Select one of the following (an "*" shows which model is currently selected):

| a. Select **C11 Rack** if you are installing a 3570 model C11 or C21. The host will see a Model
| C21 as a Model C11. The C21 emulates the C11.
| b. Select **C12 Rack** if you are installing a 3570 model C12 or C22. The host will see a Model
| C22 as a Model C12. The C22 emulates the C12.

c. Select **C01 Standalone**
if you are installing a 3570 model C01.

d. Select **C02 Standalone**
if you are installing a 3570 model C02.

__ 6. Select **Yes** from the CE Save Data Menu, if you changed the model; otherwise select **Cancel**.

__ 7. If you are not changing the SIM sensitivity, skip the next few steps, and go to “Run Tests—Library Models.”

__ 8. Select whether to filter the messages displayed on the panel. The default is **off**. See **SIM Sv Filt On/Off** in the “CE Config/Install Menu” on page PANEL-39.

__ 9. Select **Cancel** to return to the Main menu.

__ 10. Switch power OFF, then back ON to activate the changes.

Run Tests—Library Models

__ 1. Perform “CE Verify Fix on Library Models” on page PROC-10 and return here.

Note: The Read/Write test that is part of the CE Verify Fix takes 3 minutes to run to completion for each drive that is being installed.

__ 2. Go to “Setting the SCSI Address and Configuring the Library” on page INST-43.

SCSI Attachment

Setting the SCSI Address and Configuring the Library

The settings and configuration information selected in this procedure are saved in non-volatile memory and become the default settings after subsequent power-on cycles.

This section describes how to:

Select the language used by the menus at step 2 of the following list.
Load the cleaning cartridge as defined in step 3 below.
Select the library configuration from the following list at step 4, then
| Set the SCSI address(es) in step 8 for Models C02, C12 and C22. and in step 10 on page INST-44
| for Models C01, C11 and C21.
| Select the library mode of operation at step 20 on page INST-44 for Models C02, C12 and C22, and
| in step 32 on page INST-45 for Models C01, C11 and C21.

Perform the following steps in the order indicated:

__ 1. At power ON, the Status screen will be displayed (see Figure 220 on page INST-45). Press the Enter button to display the **Options Menu**.

__ 2. If a language for the menus other than English is desired, select SERVICES from the **Options Menu** and press Enter. Then select CHANGE LANG and press Enter. When the **Change Language Menu** appears, select English, Spanish, or German for the menus on the operator screen and press Enter.

__ 3. Select CLEAN from the **Options Menu** and press Enter. When the **Clean Menu** appears, select INSERT CLN TAPE and press Enter. If there is not a cleaning cartridge in the Priority Cell, a message will appear prompting the operator to PUT CLEANING CARTRIDGE IN PRIORITY CELL PRESS ENTER. After a cleaning cartridge is put in the Priority Cell and the Enter button is pressed, the cleaning cartridge will be loaded into the 3570 and stored in the internal cleaning cartridge storage cell. Select CANCEL and press Enter to return to the **Options Menu**.

__ 4. Select EDIT CONFIG from the **Options Menu** and press Enter.

| __ 5. If a 3570 Tape Subsystem Model C01, C11 or C21 is being installed, skip to step 10 on
| page INST-44.

__ 6. Select SET LIBR CONFIG from the **Edit Configuration Menu** and press Enter.

__ 7. An asterisk (*****) in front of BASE or SPLIT indicates the configuration that is currently selected. To keep the current configuration, select CANCEL and press Enter. To change the configuration, move the arrow to select the desired configuration (BASE or SPLIT) and press Enter. Set the configuration as instructed by the customer. After making your choice, Select CANCEL and press ENTER to return to the **Edit Configuration Menu**. See “Set Library Configuration Menu” on page PANEL-18 for an explanation of the configurations.

__ 8. Select ADDRESS DRV2 from the **Edit Configuration Menu** and press Enter.

__ 9. Select the SCSI address for tape drive 2 and press Enter. After making your choice, Select CANCEL and press ENTER to return to the **Edit Configuration Menu**.

Note: Select the SCSI address previously recorded by following the instructions and checklist in
| “Before You Begin” on page INST-5. Remember, in a dual drive model, the SCSI
| addresses for the two drives **must be unique** if both drives are attached to the same host
| initiator. If the drives will be attached to different host initiators, then the SCSI address may
| be either unique or the same.

__ 10. Select ADDRESS DRV1 from the **Edit Configuration Menu** and press Enter.

__ 11. Select the SCSI address for tape drive 1 and press Enter. For connection to AS/400, SCSI address 0 is recommended. After making your choice, Select CANCEL and press ENTER to return to the **Edit Configuration Menu**.

Note: Select the SCSI address previously recorded by following the instructions and checklist in "Before You Begin" on page INST-5. Remember, in a dual drive model, the SCSI addresses for the two drives **must be unique** if both drives are attached to the same host initiator. If the drives will be attached to different host initiators, then the SCSI address may be either unique or the same.

__ 12. Select AUTO CLEAN from the **Edit Configuration Menu** and press Enter.

__ 13. An asterisk (*****) in front of ENABLE or DISABLE indicates if automatic cleaning is enabled or disabled. The default setting is **ENABLED.** If the display shows *ENABLE, the library unit will automatically clean the tape drive(s) when they require cleaning. If the display shows *DISABLE, the operator must take action to clean the tape drive(s) when cleaning is required.

To keep the current configuration, select CANCEL and press Enter. To change the configuration, move the arrow to select the desired configuration (ENABLE or DISABLE) and press Enter. After making your choice, Select CANCEL and press ENTER to return to the **Edit Configuration Menu**.

__ 14. Select CANCEL from the **Edit Configuration Menu** and press Enter.

__ 15. If a 3570 Tape Subsystem Model C01, C11 or C21 is being installed, skip to step 29 on page INST-45.

__ 16. If * UNLOAD DRIVE is displayed, there is no cartridge in the drive. If UNLOAD DRIVE (without an asterisk) is displayed, there is a cartridge in the drive. The UNLOAD DRIVE option on line 3 pertains to drive 1 and the UNLOAD DRIVE option on line 4 pertains to drive 2.

If a cartridge is loaded in drive 1 or drive 2, select UNLOAD DRIVE from the **Unload and Reset Menu** and press Enter; otherwise continue with step 19.

__ 17. The cartridge will be unloaded from the drive and the status screen will be displayed. Press Enter to return to the **Unload and Reset Menu.**

__ 18. Repeat step 17 until there are no cartridges loaded in drive 1 or drive 2.

__ 19. Select RESET DRIVE and press Enter, then select PROCEED and press Enter. This will activiate changes.

__ 20. The 3570 will reset, run power-on diagnostics, and check the magazine cells to determine if cartridges are present. The reset is complete when all movement in the library has stopped and the hour-glass symbols for each of the magazine cells has been replaced with a solid block, an open block, or a dash. When the reset is complete, press Enter to return to the **Options Menu.**

__ 21. Select SET LIBR MODE from the **Options Menu.** and press Enter.

__ 22. Select DRIVE 1 and press Enter.

__ 23. See "Library Modes of Operation" on page LIBRARY-5.

Note: If the 3570 is configured to operate in Base Configuration, it is recommended to select the Random Mode of operation. Drive 2 is not used when the 3570 is set in Base Configuration and Manual or Automatic Mode of operation.

Select the desired mode of operation (MANUAL, AUTOMATIC, or RANDOM) for tape drive 1 and press Enter.

__ 24. If the 3570 is configured to operate in Base Configuration, continue with step 27 on page INST-45.

__ 25. Select DRIVE 2 and press Enter.

__ 26. Select the customer's desired mode of operation (MANUAL, AUTOMATIC, or RANDOM) for tape drive 2 and press Enter.

__ 27. Select CANCEL and press Enter until the **Options Menu** is reached.

__ 28. Continue at step 35.

__ 29. If * UNLOAD DRIVE is displayed, there is no cartridge in the drive. If UNLOAD DRIVE (without an asterisk) is displayed, there is a cartridge in the drive. If a cartridge is loaded in the tape drive, select UNLOAD DRIVE from the **Unload and Reset Menu** and press Enter; otherwise continue with step 31.

__ 30. The cartridge will be unloaded from the drive and the status screen will be displayed. Press Enter to return to the **Unload and Reset Menu.**

__ 31. Select RESET DRIVE and press Enter, then select PROCEED and press Enter.

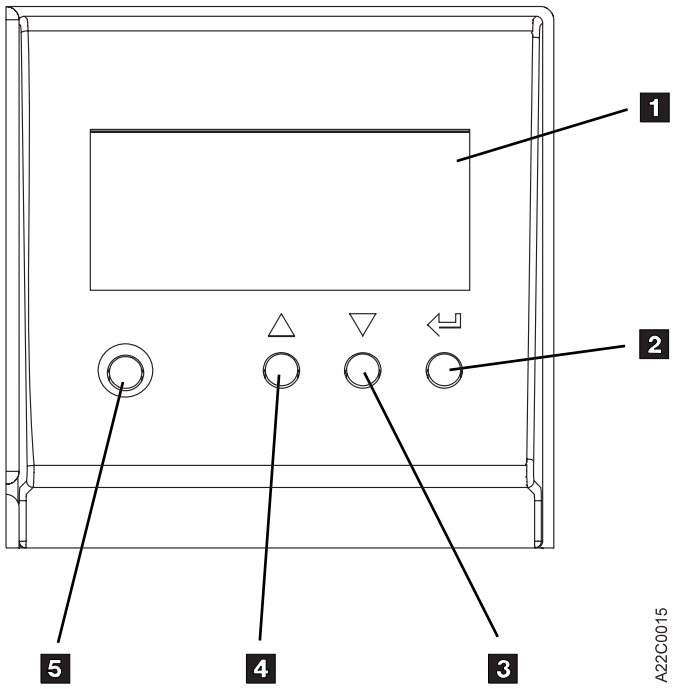
__ 32. The 3570 will reset, run power-on diagnostics, and check the magazine cells to determine if cartridges are present. The reset is complete when all movement in the library has stopped and the hour-glass symbols for each of the magazine cells has been replaced with a solid block, an open block, or a dash. When the reset is complete, press Enter to return to the **Options Menu.**

__ 33. Select SET LIBR MODE from the **Options Menu** and press Enter.

__ 34. Select the customer's desired mode of operation (MANUAL, AUTOMATIC, or RANDOM) and press Enter. (For additional information, see “Library Modes of Operation” on page LIBRARY-5.)

__ 35. Press the Power switch (see 1 in Figure 46 on page INTRO-43) to the OFF position.

__ 36. Proceed with “Host (Initiator) Connection.”



1 Liquid Crystal Display Screen
2 Enter Button
3 Scroll Down Button
4 Scroll Up Button
5 Menu Mode Button

Figure 220. Buttons Used to Make Selections from the Operator Menus

For a detailed description, see “Library Operator Panel” on page INTRO-40.

Host (Initiator) Connection

Attention: The host (initiator) SCSI port must be quiesced (varied off-line) before removing any SCSI device.

For AS/400, only one SCSI device is permitted per SCSI initiator, and an AS/400 system cannot be interconnected with any other system (including another AS/400) on the same SCSI bus.

If the 3570 is to be attached to a 6501 feature and used as an alternate IPL device, the bottom port of the 6501 must be used.

__ 1. An interposer may be required at the initiator end of the SCSI cable. If so, install the appropriate interposer at the initiator (the host port where SCSI cable will be attached). Be sure to attach the interposer securely before attaching the SCSI cable to the interposer. For more information on the host connection requirements, see:

Figure 222 on page INST-47

Figure 223 on page INST-47

“Sun Systems Attachment” on page INST-47

“HP-UX Systems Attachment” on page INST-48

“Windows NT Systems” on page INST-48

See Figure 221 for SCSI cable feature codes. See Figure 222 for SCSI cable connections to the host.

__ 2. For installation of Model C01, C11 or C21 continue with “Model C01, C11 and C21 Connections” on page INST-48.

__ 3. For installation of Model C02, C12 or C22, continue with “Model C02, C12 and C22 Connections” on page INST-50.

Figure 221. SCSI Cable Feature Codes

Magstar MP 3570 Feature Code and P/N	**Cable Length**
FC 5205 (P/N 49G6456)	0.5 m (2 ft) (SCSI Bus Jumper)
FC 5212 (P/N 49G6458)	12 m (39 ft)
FC 5218 (P/N 49G6459)	18 m (59 ft)
FC 5245 (P/N 49G6457)	4.5 m (15 ft)
FC 5225 (P/N 08L6201)	25 m (81 ft)
None (P/N 05H9527, Models C21 and C22)	0.5 m (2 ft) (SCSI Bus Jumper)
None (P/N 05H9651, Models C21 and C22)	4.5 m (15 ft)

Note: Cable lengths greater than 18 m (59 ft) cannot be used with RS/6000 controller FC 2420. Cable lengths up to 25 m (81 ft) can be used with RS/6000 controller FC 2409, 2412, 2416, 6209.

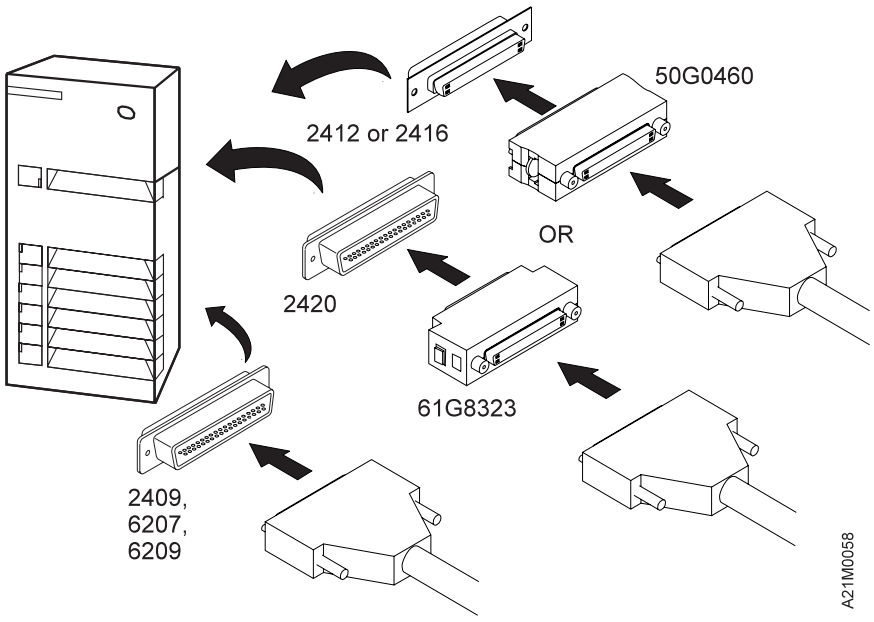


Figure 222. Installing the SCSI System Cable at the RS/6000 Host (Initiator)

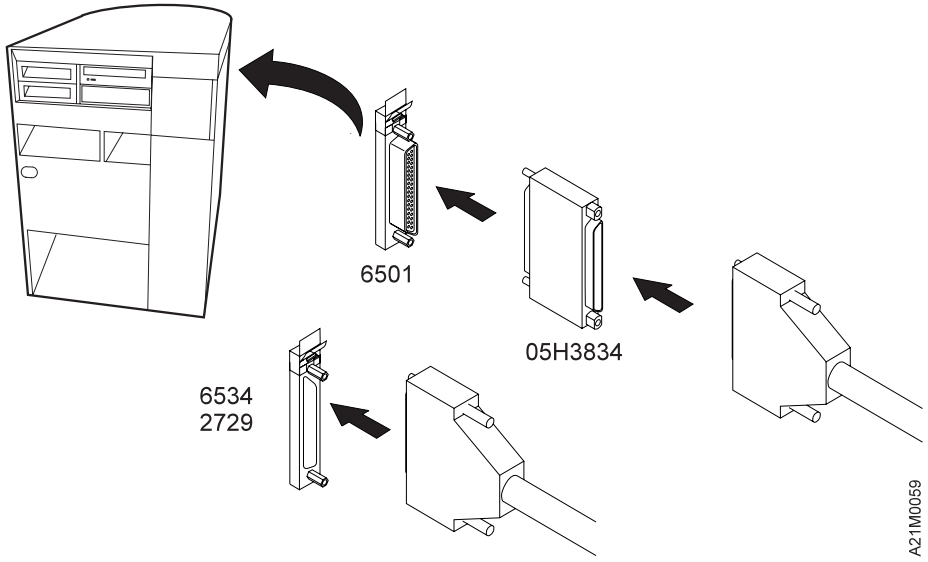


Figure 223. Installing the SCSI System Cable at the AS/400 Host (Initiator)

Sun Systems Attachment

All 3570 models can be installed on all Sun workstations that support a SCSI-2 differential ended adapter.

For Sun systems, SunOS 5.x (Solaris 2 or higher) is required to support the 3570 models. The Sun Device Driver provides specific Sun device support and is included in the ship group. ADSM for Sun Solaris 1.2.1 with PTFs also supports the 3570. No interposers are required when attaching to these systems.

Figure 221 on page INST-46 shows the cable feature codes for the cable of the appropriate length.

HP-UX Systems Attachment

The 3570 models are supported on Hewlett— Packard (HP) 9000 Series 800 Business Servers. They are also supported in other HP-PB based servers which support a SCSI Fast/Wide Differential adapter including:

- HP9000 Series /T Class Server (T500, T520, T600)
- HP9000 Series /K Class Server (K4xx, K2xx)
- HP9000 Series /D Class Server (D3xx, D2xx)

The Models C11 and C12 require installation in a support rack or space in an existing customer rack (one Cxx unit per 6 EIA positions). The maximum SCSI cable length is 25 meters. See Figure 221 on page INST-46 and the Introduction and Planning Guide (GA32-0392) for additional SCSI cable planning information.

HP-UX 10.0x supports the IBM 3570 models through HP-UX 10.3x. The device drivers are included in the ship group. No interposers are required with these attachments.

Figure 221 on page INST-46 shows the cable feature codes for the cable of the appropriate length.

Windows NT Systems

The 3570 models are supported in Intel based processors. These include Intel 486DX or Pentium* processor with sufficient RAM and disk space for operation of Microsoft's Windows NT operating system. An appropriate SCSI F/W Differential adapter and associated cable is also required. Models C21 and C22 are specifically designed to be installed into the IBM Netfinity Rack (9306900) or NetBAY22 (9306200) rack. They can be attached to IBM Netfinity 5500 or 7000 PC Server 325 or 330 systems that support attachment with an included adapter card. A 4.5 meter SCSI cable is included for these attachments. The maximum SCSI cable length is 25 meters. See Figure 221 on page INST-46 and the Introduction and Planning Guide (GA32-0392) for additional SCSI cable planning information.

Microsoft's Windows NT Server Version 4.0, and later releases, support the IBM 3570. The Windows NT Device Drivers are included in the ship group. No interposers are required for these attachments.

Figure 221 on page INST-46 shows the cable feature codes for the cable of the appropriate length.

Model C01, C11 and C21 Connections

Refer to “Examples of SCSI Bus Cabling, Models C01, C11 and C21” on page INST-49 for typical SCSI cabling diagrams while performing the following steps.

__ 1. If this machine is a Model C01, remove the rear cover from the library. The cover is attached using plastic snap-in retainers. Rotate the plastic retainers one-quarter turn in either direction to release the cover.

__ 2. If the 3570 is the first or only SCSI device connected in line to the initiator, connect the SCSI cable coming from the initiator to the leftmost SCSI connector on the back of the library (see 1 in Figure 224).

__ 3. If the 3570 is not the first device on the SCSI bus, connect the SCSI interface cable coming from the next closest device to the leftmost SCSI connector on the back of the library (see 1 in Figure 224).

__ 4. If this is the last device on this SCSI bus, locate the SCSI interface terminator (P/N 61G8324) and attach it to the rightmost SCSI connector on the back of the library (see 2 in Figure 224).

__ 5. If the library is not the last device on this SCSI bus, locate the SCSI interface cable to the next device and connect it to the unused, rightmost SCSI interface connector on the back of the library (see 2 in Figure 224).

Note: There are two SCSI connectors on the back of the 3570 library. When they are connected correctly, each of these connectors must have either a SCSI cable or a SCSI terminator attached.

| __ 6. If this machine is a Model C11 or C21, proceed to “Cable Routing—Rack-Mounted Models” on page INST-58.

__ 7. If this machine is a Model C01, proceed to “Online Tests for Library Models” on page INST-63.

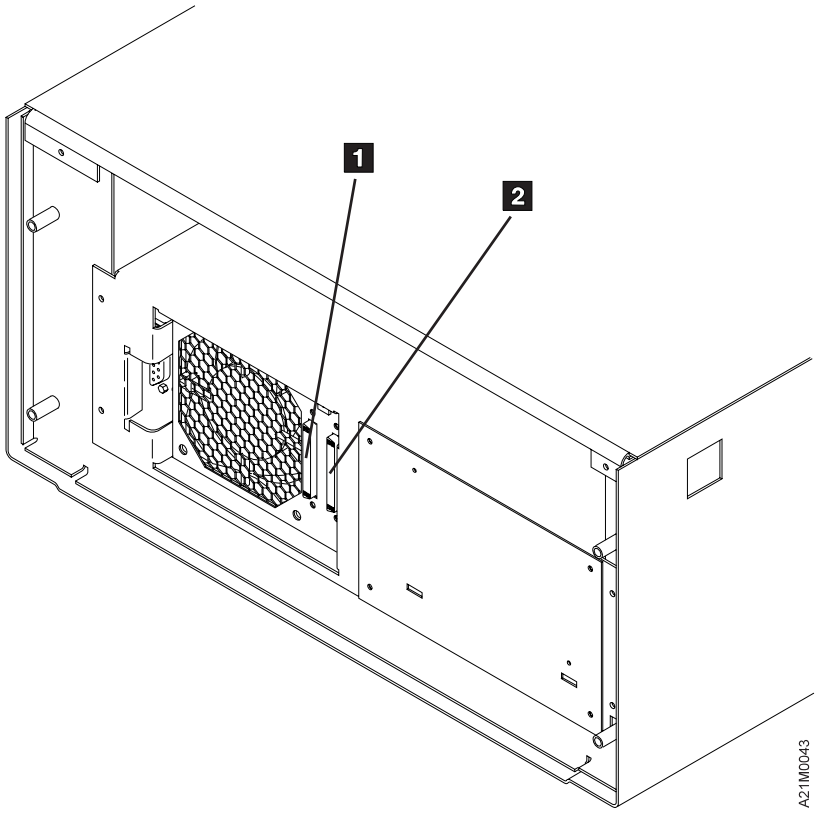


Figure 224. Rear View of Model C01 or C11

| **Examples of SCSI Bus Cabling, Models C01, C11 and C21** Figure 225 shows an example of a single 3570 attached to the host (initiator). Figure 226 on page INST-50 shows an example of attaching multiple SCSI devices to a host.

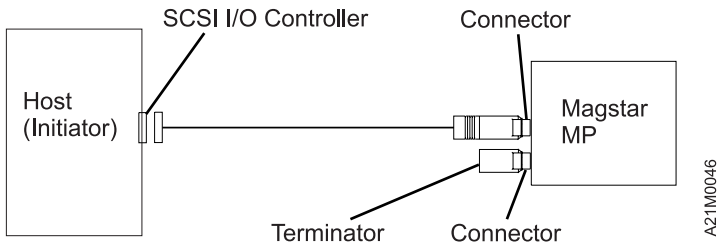


Figure 225. Example of Attaching One SCSI Device to the Host (Initiator)

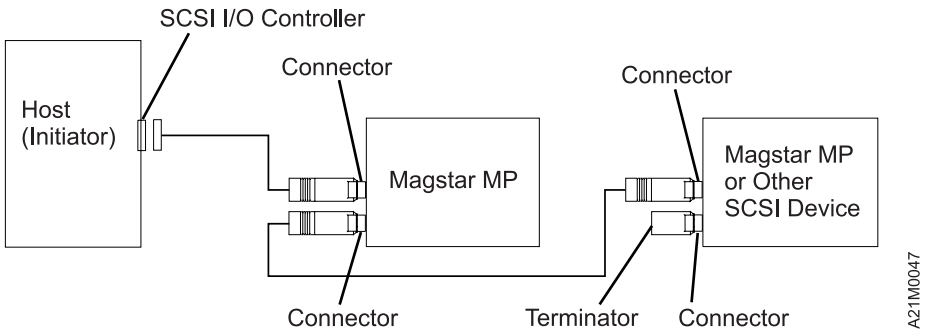


Figure 226. Example of Attaching Multiple SCSI Devices to the Host

| **Note:** The AS/400 does not support an attachment as shown in Figure 226.

Model C02, C12 and C22 Connections

Refer to “Examples of SCSI Bus Cabling, Models C02, C12 and C22” on page INST-53 for typical SCSI cabling diagrams while performing the following steps.

__ 1. If this machine is a Model C02, remove the rear cover from the library. The cover is attached using plastic snap-in retainers. Rotate the plastic retainers one-quarter turn in either direction to release the cover.

__ 2. For a 3570 Split Configuration setup, continue at step 8. For a 3570 Base Configuration setup, continue with the following step. (See “Library Configurations” on page LIBRARY-7 for information about base and split configurations.)

Base Configuration:

__ 3. Ensure the SCSI Bus Jumper (P/N 49G6456) or (P/N xxxxxxx) is connected to the rightmost SCSI connector on the back of tape drive 1, and to the leftmost SCSI connector on the back of tape drive 2. (See items 2 and 3 in Figure 227 on page INST-52).

__ 4. If the 3570 is the first, or only, device in line connected to the initiator, connect the SCSI cable coming from the initiator to the leftmost SCSI connector on the back of the library. (See item 1 in Figure 227 on page INST-52).

__ 5. If the 3570 is **not** the first device on the SCSI bus, connect the SCSI interface cable coming from the next closest device to the leftmost SCSI connector on the back of the library. (See item 1 in Figure 227 on page INST-52).

__ 6. If this is the last device on the SCSI bus, locate the SCSI interface terminator (P/N 61G8324) and attach it to the rightmost SCSI interface connector on the back of the library. (See item 4 in Figure 227 on page INST-52). If the library is **not** the last device on the SCSI bus, locate the SCSI interface cable to the next device, and connect it to the unused, rightmost SCSI interface connector on the back of the library. (See item 4 in Figure 227 on page INST-52).

__ 7. Continue at step 17 on page INST-51.

Split Configuration:

| __ 8. Remove the SCSI Bus Jumper (P/N 49G6456) or (P/N 05H9527) that connects the SCSI connector on the back of tape drive 1 to the SCSI connector on the back of tape drive 2, if it is installed. (See items 2 and 3 in Figure 227 on page INST-52).

__ 9. If tape drive 1 in the 3570 is the first, or only, device in line connected to the initiator, connect the SCSI cable coming from the initiator to the leftmost SCSI connector on the back of tape drive 1. (See item 1 in Figure 227 on page INST-52).

__ 10. If tape drive 1 is **not** the first device on the SCSI bus, connect the SCSI interface cable coming from the next closest device to the leftmost SCSI connector on the back of tape drive 1. (See item 1 in Figure 227 on page INST-52).

__ 11. If tape drive 1 is the last device on the SCSI bus, locate the SCSI interface terminator (P/N 61G8324) and attach it to the rightmost SCSI interface connector on the back of tape drive 1. (See item 2 in Figure 227 on page INST-52).

__ 12. If tape drive 1 is **not** the last device on the SCSI bus, locate the SCSI interface cable to the next device, and connect it to the unused, rightmost SCSI interface connector on the back of tape drive 1. (See item 2 in Figure 227 on page INST-52).

__ 13. If tape drive 2 in the 3570 is the first, or only, device in line connected to the initiator, connect the SCSI cable coming from the initiator to the leftmost SCSI connector on the back of tape drive 2. (See item 3 in Figure 227 on page INST-52).

__ 14. If tape drive 2 is **not** the first device on the SCSI bus, connect the SCSI interface cable coming from the next closest device to the leftmost SCSI connector on the back of tape drive 2. (See item 3 in Figure 227 on page INST-52).

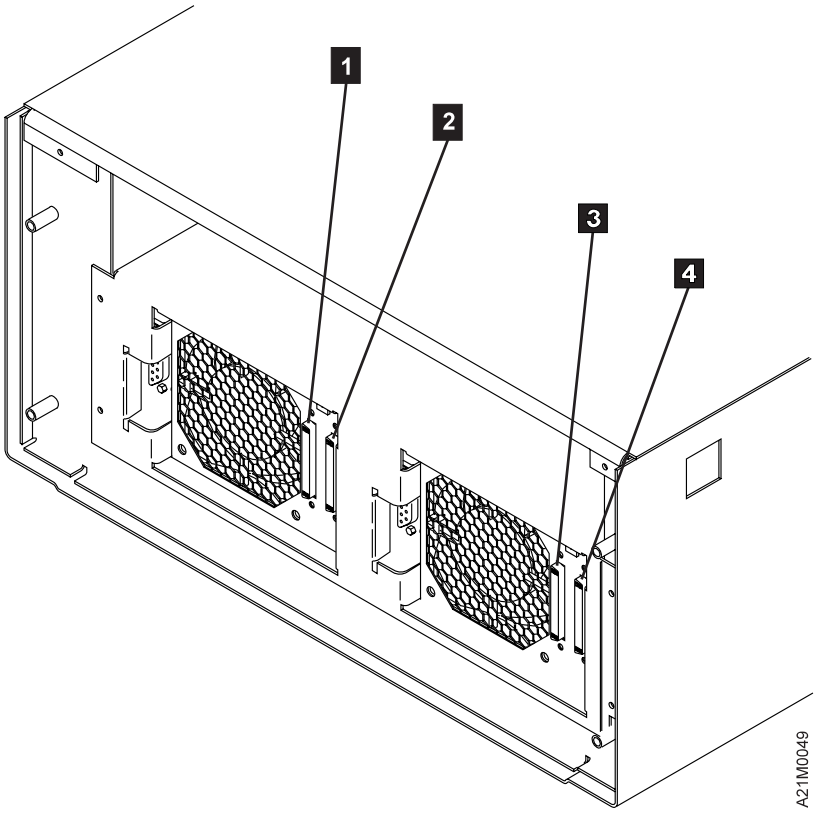
__ 15. If tape drive 2 is the last device on the SCSI bus, locate the SCSI interface terminator (P/N 61G8324) and attach it to the rightmost SCSI interface connector on the back of tape drive 2. (See item 4 in Figure 227 on page INST-52).

__ 16. If tape drive 2 is **not** the last device on the SCSI bus, locate the SCSI interface cable to the next device, and connect it to the unused, rightmost SCSI interface connector on the back of tape drive 2. (See item 4 in Figure 227 on page INST-52).

__ 17. When the 3570 is correctly connected, all four SCSI connectors on back of the 3570 (see 1 , 2 , 3 , and 4 in Figure 227 on page INST-52) must have either a SCSI cable or a SCSI terminator attached.

| __ 18. If this machine is a Model C12 or C22, proceed to “Cable Routing—Rack-Mounted Models” on page INST-58.

| __ 19. If this machine is a Model C02, proceed to “Online Tests for Library Models” on page INST-63.



| *Figure 227. Rear View of Model C02, C12 or C22*

| **Examples of SCSI Bus Cabling, Models C02, C12 and C22:** Figure 228 shows an example of a single 3570 Model C02, C12 or C22 in Base Configuration attached to the host (initiator). Figure 229 shows an example of a single 3570 Model C02, C12 or C22 in Base Configuration attached to the host (initiator) with multiple other SCSI devices.

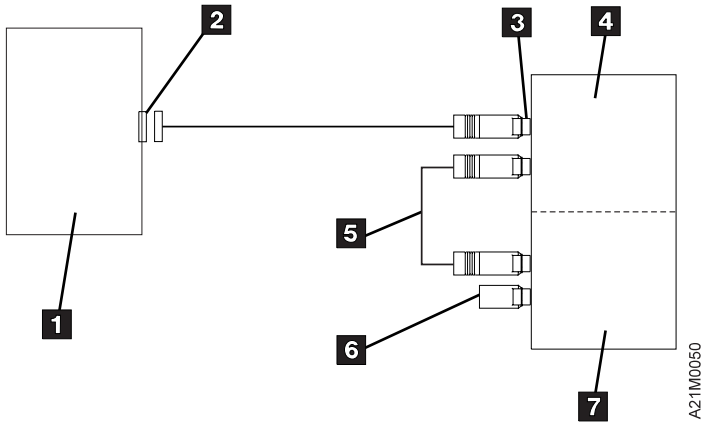


Figure 228. Example of Attaching One SCSI Device to the Host (Initiator)

| **Note:** The 3570 Models C02, C12 or C22 are in Base Configuration

1 Host (Initiator)
2 SCSI I/O Controller
3 SCSI Connector
4 3570 Tape Drive 1
5 SCSI Bus Jumper
6 SCSI Terminator
7 3570 Tape Drive 2

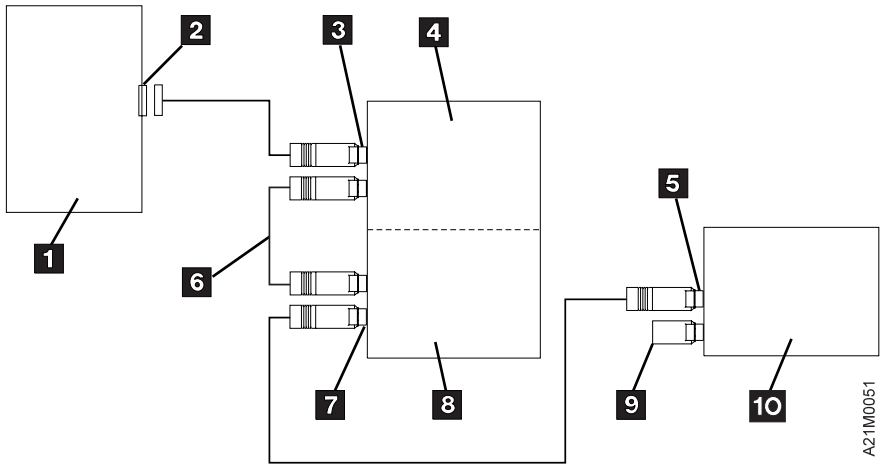


Figure 229. Example of Attaching Multiple SCSI Devices to a Host (Initiator)

| **Note:** The 3570 Models C02, C12 or C22 are in Base Configuration

1 Host (Initiator)
2 SCSI I/O Controller
3 SCSI Connector
4 3570 Tape Drive 1
5 SCSI Connector
6 SCSI Bus Jumper
7 SCSI Connector
8 3570 Tape Drive 2
9 SCSI Terminator
1 3570 or Other SCSI Device

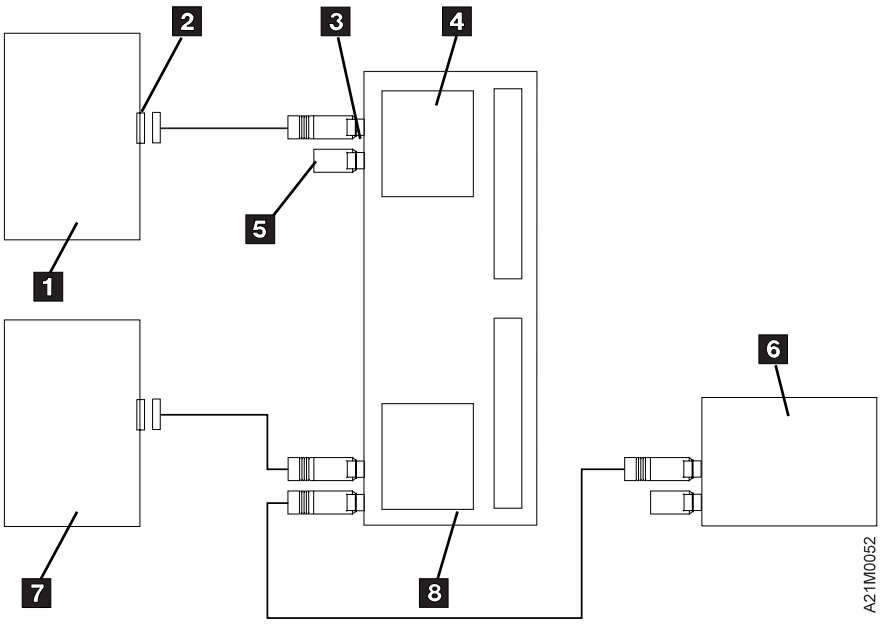


Figure 230. Attaching 3570 Models C02 or C12 In Split Configuration

1 Host (Initiator)
2 SCSI I/O Controller
3 SCSI Connector
4 3570 Tape Drive 1
5 SCSI Terminator
6 3570 or Other SCSI Device
7 Host (Initiator)
8 3570 Tape Drive 2

| Figure 230 shows an example of a single 3570 Model C02, C12 or C22 in Split Configuration. Tape drive 1 4 is a single SCSI device attached to the first host (initiator). Tape drive 2 8 is attached to the second host (initiator) with multiple other SCSI devices.

AS/400 FC 6501 Connections to C02 or C12: The following figures; Figure 231, Figure 232 on page INST-55, Figure 233 on page INST-55, Figure 234 on page INST-56, and Figure 235 on page INST-56, show examples of 3570 Model C02 or C12 connections to an AS/400 FC 6501.

Base Configuration

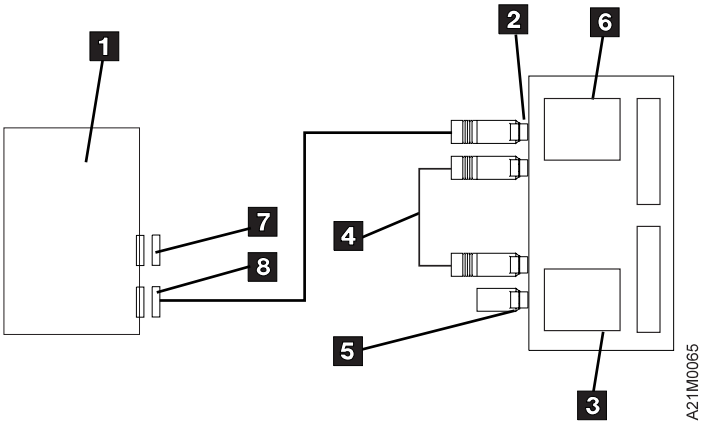


Figure 231. AS/400 FC 6501—Base Configuration

1 Host (Initiator) FC 6501
2 SCSI Connector
3 3570 Tape Drive 2
4 SCSI Bus Jumper
5 SCSI Terminator
6 3570 Tape Drive 1
7 Port 1
8 Port 2

Split Configuration (single host, one IOP, one port)

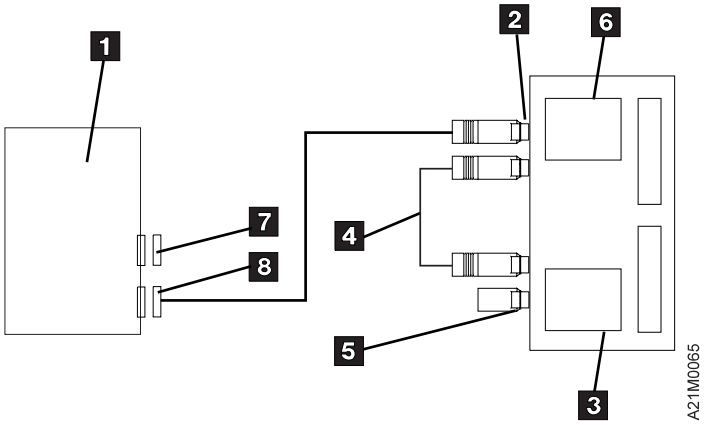


Figure 232. AS/400 FC 6501—Split Configuration (single host, one IOP, one port)

Note: The cable connections are the same as for the Base Configuration.

1 Host (Initiator) FC 6501
2 SCSI Connector
3 3570 Tape Drive 2
4 SCSI Bus Jumper
5 SCSI Terminator
6 3570 Tape Drive 1
7 Port 1
8 Port 2

Split Configuration (single host, one IOP, both ports)

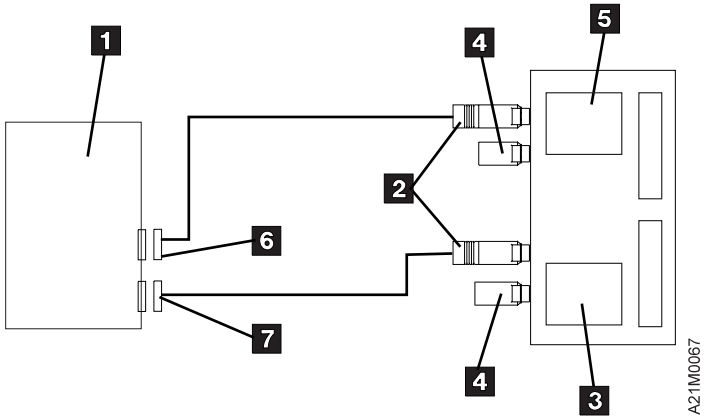


Figure 233. AS/400 FC 6501—Split Configuration (single host, one IOP, both ports)

1 Host (Initiator) FC 6501
2 SCSI Connector
3 3570 Tape Drive 2
4 SCSI Terminator
5 3570 Tape Drive 1
6 Port 1
7 Port 2

Split Configuration (two hosts)

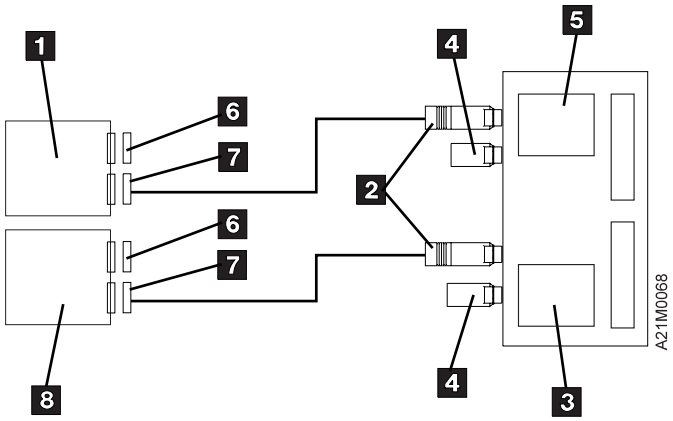


Figure 234. AS/400 FC 6501—Split Configuration (two hosts)

1 Host (Initiator) A, FC 6501
2 SCSI Connector
3 3570 Tape Drive 2
4 SCSI Terminator
5 3570 Tape Drive 1
6 Port 1
7 Port 2
8 Host (Initiator) B, FC 6501

Split Configuration (single host, two IOPs)

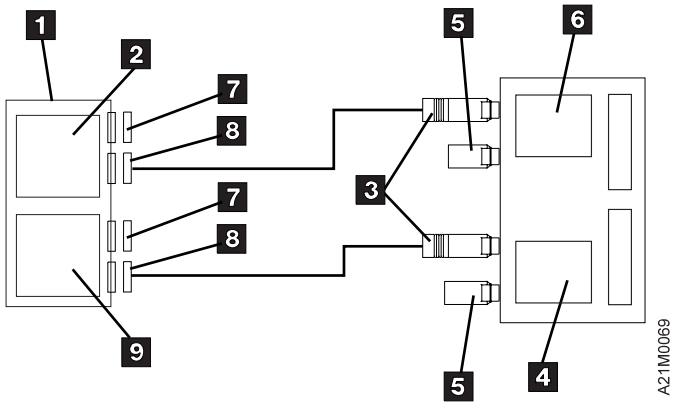


Figure 235. AS/400 FC 6501—Split Configuration (single host, two IOPs)

1 Host (Initiator)
2 SCSI I/O Controller A, FC 6501
3 SCSI Connector
4 3570 Tape Drive 2
5 SCSI Terminator
6 3570 Tape Drive 1
7 Port 1
8 Port 2
9 SCSI I/O Controller B, FC 6501

Connecting the 3570 to Multiple Systems

AS/400 Systems:

AS/400 systems cannot be interconnected using feature code 6501. Therefore a 3570 can only be attached to one AS/400 system at a time.

RS/6000 Systems:

Multiple RS/6000 systems may be linked to a 3570, but the systems cannot use the drive simultaneously. See Figure 236. The systems can be interconnected using RS/6000 feature codes 2424, 2425, and 2426. Refer to RISC System/6000 documentation for additional information.

Sun, HP-UX and Windows NT Systems

Sun, HP-UX and Windows NT systems may be linked to a 3570, but the systems cannot use the drive simultaneously. See Figure 236.

Note: The maximum SCSI bus length for a differential SCSI bus is 25 M (82.02 ft) minus 0.2 M (0.66 ft) per connection. Ensure that the total length of all SCSI cables and connections does not exceed the maximum.

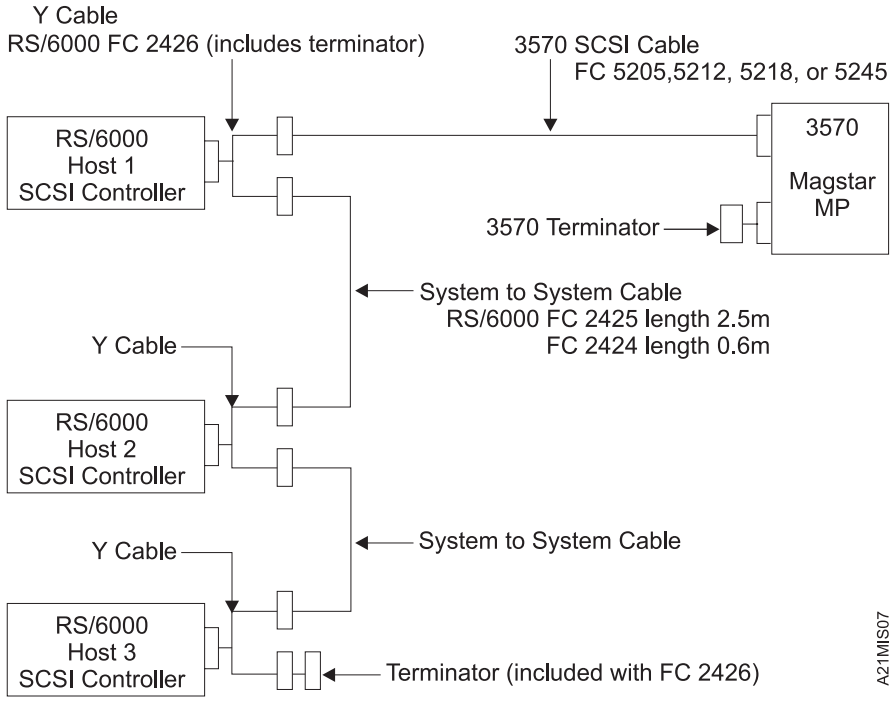


Figure 236. Multiple RS/6000 Systems Attached to a 3570

Cable Routing—Rack-Mounted Models

See Figure 237 on page INST-59 for Model C11, and Figure 238 on page INST-60 for Model C12.

See Figure 240 on page INST-61 for Model C21, and Figure 241 on page INST-62 for Model C22.

__ 1. Route the power and signal cables 2 through the strain relief clamp 1 and along the cable arm assembly 3 , as shown.

__ 2. Loosely attach the cables to the cable arm assembly with cable ties 4 P/N 1159519. Do not tighten the cable ties until the cable length has been adjusted in the next step.

Note that there are 3 flat spots on each cable arm. Attach the cable ties at the flat spots.

__ 3. Extend the slide and tray assembly all the way out so it is locked.

__ 4. Adjust the cable length so there is no slack between the strain relief clamp and the end of the cable arm, as shown in Figure 239 on page INST-60 and Figure 242 on page INST-62.

__ 5. Tighten all of the cable ties.

Note: Ensure that the connecting point of the cable ties are on the bottom side of the cables, as shown.

__ 6. Move the slide and tray assembly all the way in and all the way out to ensure that the cables do not rub any place.

Ensure that the cable loop between the strain relief clamp and the end of the cable arm does not touch the rack side cover.

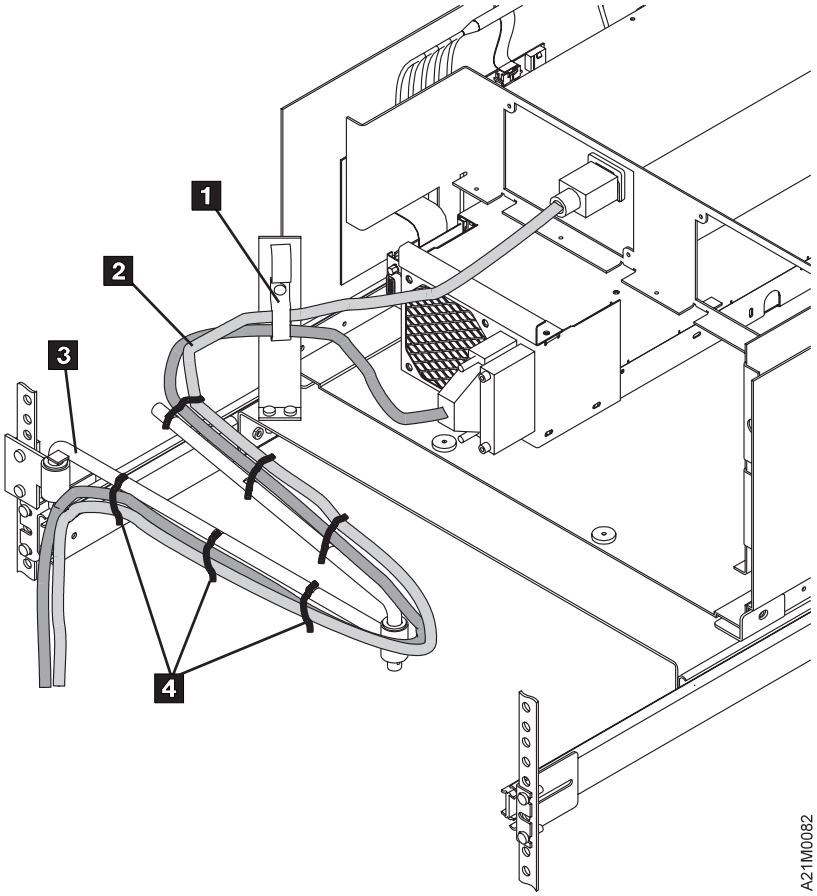


Figure 237. Cable Routing, Model C11

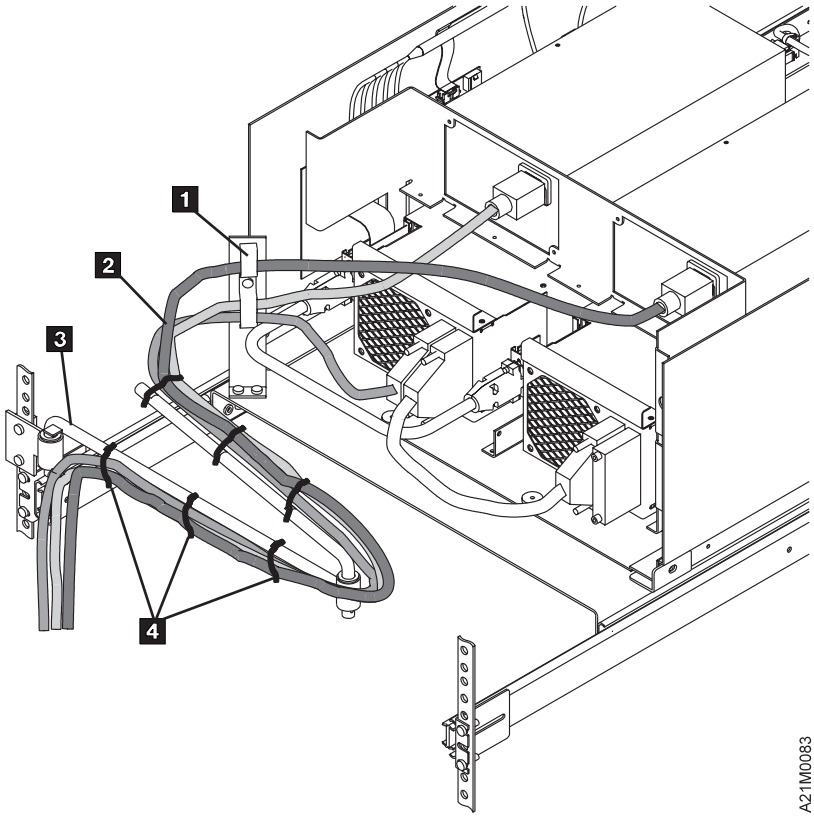


Figure 238. Cable Routing, Model C12

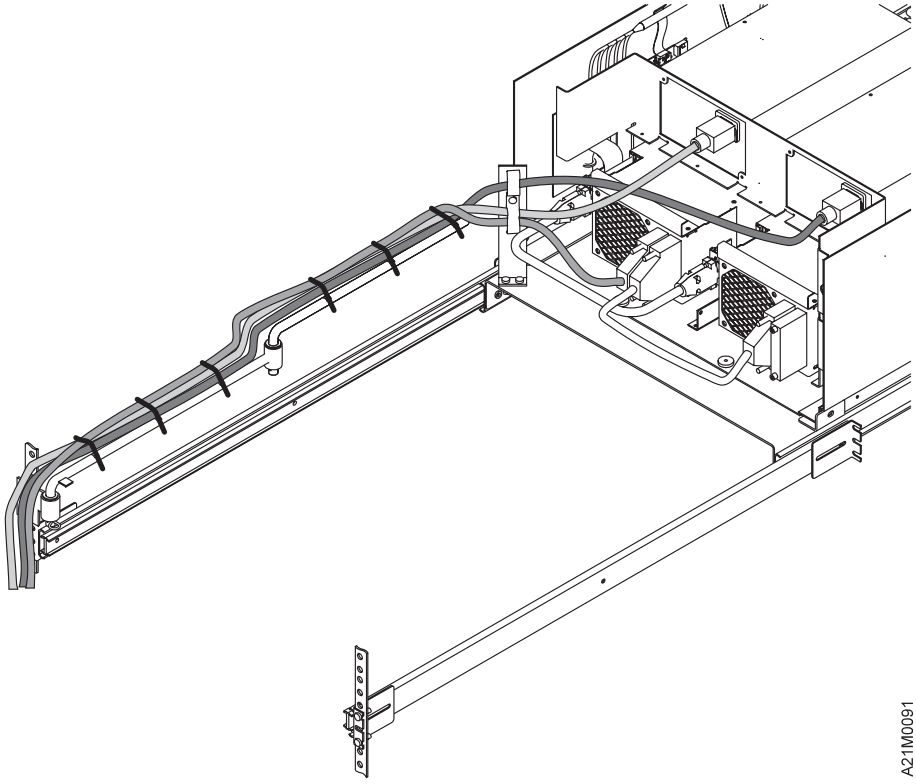
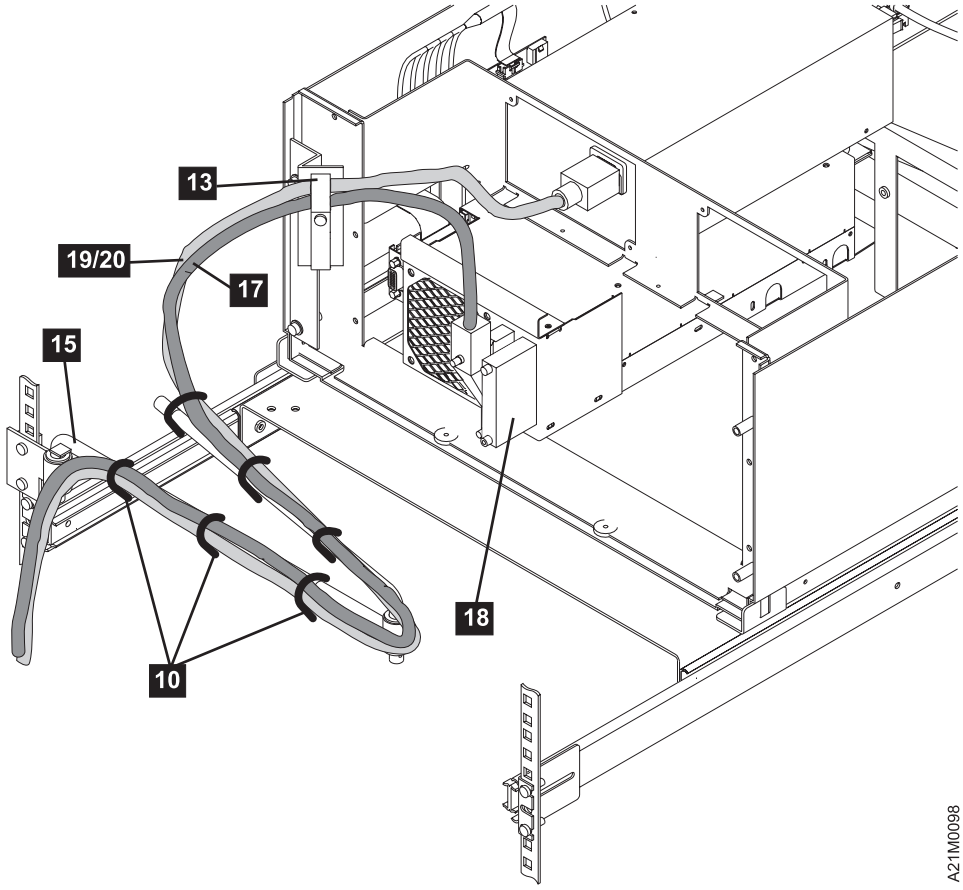
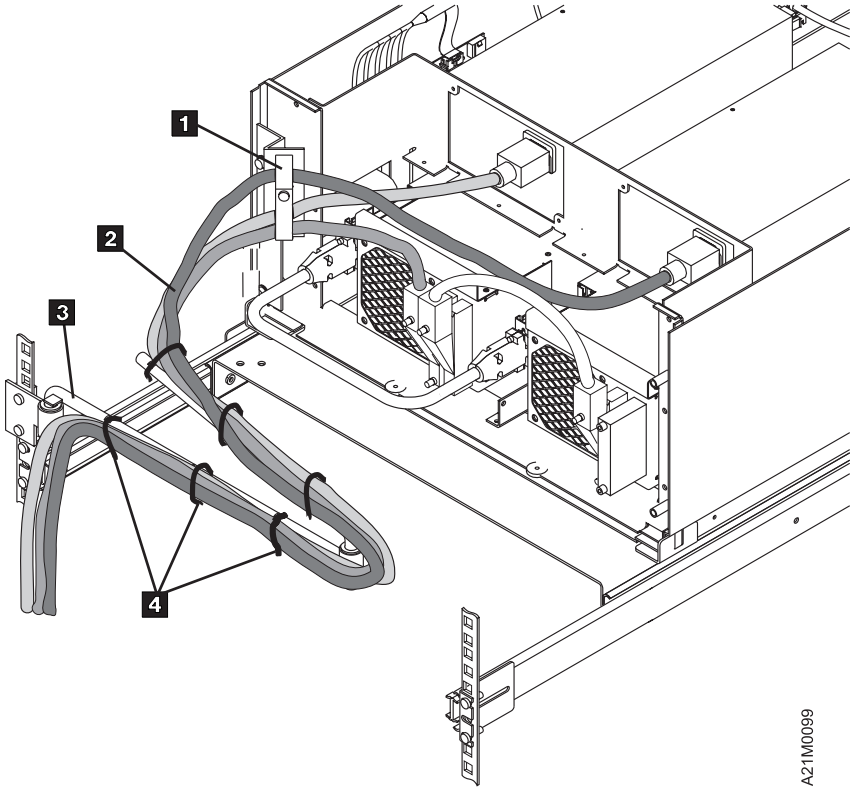


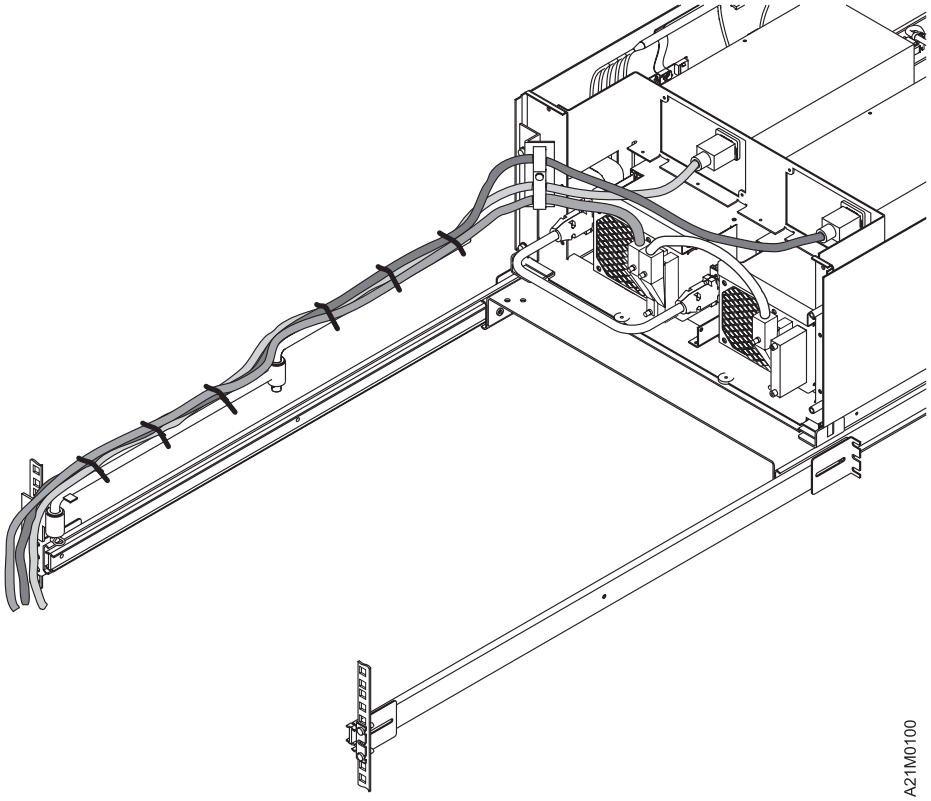
Figure 239. Cable length adjusting Models C11 and C12



| *Figure 240. Cable Routing, Model C21*



| *Figure 241. Cable Routing, Model C22*



| *Figure 242. Cable length adjusting Models C21 and C22*

__ 7. Open the library front cover. (Unlock the door if necessary.)

__ 8. For Model C11 and C12 rack installations, in the front of the rack, fasten the left front plate of the library to the rack with screw P/N 1624778. The screw should fasten to the nut-clip P/N 74F1823 in the top hole of the EIA unit above the left front slide. See 5 in Figure 203 on page INST-18.

__ 9. For Model C21 and C22 rack installations, in the front of the rack, fasten the front plate of the library to the rack with two M6 X 12 socket button-head screws,P/N 1621950. The screws should fasten to the caged M6nuts, P/N 12J5288, in the top hole of the EIA units above the left and right front slides. The location of these caged nuts is shown in Figure 212 on page INST-29, and Figure 213 on page INST-33 and Figure 214 on page INST-34 7 .

__ 10. Install the SCSI cable from the first drive (if single host) or from each drive (for multiple hosts) to the appropriate host SCSI adatper.

Note: This adapter should have been installed earlier by your customer along with the appropriate driver software.

Online Tests for Library Models

__ 1. If this machine is a Model C01 or Model C02, re-install the rear cover on the library. Position the cover properly, then push the two plastic fasteners in place and turn each one slightly until secure.

__ 2. Ensure the power cord(s) are connected to the library and to the power source outlet selected.

__ 3. Place the Power switch to the ON position.

Note: Whenever the 3570 power is switched OFF, wait approximately five seconds before switching the power ON again.

This power-on test takes approximately 2.5 minutes to complete, and is automatically performed when the device is powered ON.

If a failure occurs, a message can be posted in the operator panel or the operator panel can be blank. If either of these conditions exist, go to the START section for further analysis. When any faults are corrected, return here.

Note: If the 3570 is connected to a Windows NT device, the 3570 power must be switched ON first. If the 3570 power is **not** ON when the Windows NT device is powered ON, the Windows NT device will not recognize the 3570, even if the 3570 power is switched ON later.

__ 4. The initiator device drivers must be loaded to communicate with the 3570. When this has been done, the library is ready for use. For attachment in RISC System/6000, Sun, HP-UX, Windows NT, or other Open System environments see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide* GC35-0154 for instructions to install and configure the device driver. Tape device drivers are supplied for attachment to these systems. The AS/400 system has a tape device driver supplied as part of the operating system.

Note: Ensure that the customer has installed the device driver (Windows NT, HP-UX, Sun (Solaris) or RS/6000 systems), or the required PTFs (AS/400 systems).

To install the device driver and configure the device with **default** parameters, use the following procedures:

For RISC System/6000:

Note: For additional information, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide*, GC35-0154.

Performing the Default AIX Installation

Use the *installp* utility for installation. The software is always committed after installation. Insert the Tape Device Driver/AIX Enhanced diskette into the diskette drive on the workstation.

Note: You must have *root* authority to perform the commands in this section.

To install the device driver, enter the following command from the command line:

```
installp -acXd /dev/rfd  Atape.driver
```

If the same version of *Atape.driver* is installed, then use the *installp* command with the *-F* flag to force an installation. The installation procedure automatically de-configures any devices from the device driver and reconfigures them after the new driver is installed.

Enter the following command to list the currently installed version of *Atape.driver*:

```
lslpp -l Atape.driver
```

Configuring the 3570

After the driver software is installed and a 3570 is connected to the adapter card, the 3570 can be configured and made available for use. Access to the 3570 is not provided until the 3570 is configured.

a. Configure a 3570 Tape Subsystem by entering the following command with no parameters:

   ```
   cfgmgr
   ```

   The command automatically configures all devices known to the *Atape.driver*, including any new 3570 devices.

b. Enter the following command to verify that the configuration completed successfully:

   ```
   lsdev -Cc tape
   ```

For AS/400:

Ensure the AS/400 system value for Auto Configure Devices is set to **ON**.

Turn the power ON. If the 3570 is not recognized by the host (initiator), confirm that the required PTFs are installed (see Figure 194 on page INST-6), and re-IPL the AS/400 IOP card to which the 3570 is attached.

For other systems:

For other system attachments, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide* GC35-0154 for instructions to install and configure the device driver.

Note: If this is a Windows NT system, ensure that your customer has installed the proper Adaptec adapter card that is needed to attach the 3570 drive subsystem. See "Pre-Installation Checks" on page INST-2.

__ 5. In the following host test, you should read and write a cartridge on any single drive system, and if more than one drive is being installed, you should write on the first and read back on the second, then write on the second and read back on the first.

a. If you are installing the 3570s in an AIX environment, perform "Checking the SCSI Attachment in an AIX Environment" on page PROC-69 and return here.

b. If you are installing the 3570s in an AS/400 environment, perform "Checking the SCSI Attachment in an AS/400 Environment" on page PROC-65 and return here.

c. If you are installing the 3570s in a Sun environment, perform "Checking the SCSI Attachment in a Sun Environment" on page PROC-73 and return here.

| d. If you are installing the 3570s in a HP-UX environment, perform “Checking the SCSI
| Attachment in a HP-UX Environment” on page PROC-76 and return here.

| e. If you are installing the 3570s in a Windows NT environment, perform “Checking the SCSI
| Attachment in a Windows NT Environment” on page PROC-76 and return here.

Post Installation Reporting

After the 3570 is installed and tested:

__ 1. Update the account management plan book.

__ 2. Record the serial number (from the label) into the machine history log. See “Serial Number and Label Locations” on page INTRO-11 for its location.

Note: This serial number must be recorded so it can be used to restore nonvolatile storage, as required by certain repair procedures.

__ 3. Record in the machine history log the level of the microcode installed. See “Check EC Level—Library Models” on page INST-41.

__ 4. Save the tools and the cartridges in a safe place.

__ 5. Report the installation complete using the existing branch office procedure.

__ 6. After successfully completing installation, notify the customer that the subsystem is now available for use.

Removing a 3570

Notes:

1. For World Trade countries, refer to WT General CEM 257, “General Internal Packaging Instructions for Replant Machines.”
2. Before attempting to remove a 3570, ensure that you have the relocation kit.
3. If your host system has software aids for system upgrades, installations, or relocations, execute that software and follow the instructions it provides.

To remove a 3570, perform the following steps:

__ 1. Before proceeding, check the following:

__ a. Ensure that the 3570 is unloaded and the tape cartridge has been removed or stored in the magazine.

__ b. Notify the system operator that you must switch OFF power to the 3570 and that it will not be available.

__ 2. Set the Power switch to the OFF position.

__ 3. Open the rear door of the rack.

__ 4. Set the circuit protector (CP) to the OFF position ***for this device only***.

__ 5. Remove the power cable(s) ***for this device only*** from the outlet in the rack.

__ 6. Disconnect the ac power cable from the 3570.

__ 7. Disconnect the interface cables from the 3570.

__ 8. Remove the cleaner cartridge from the cleaner cartridge storage cell.

Remove or Relocate the Library Model in a Rack

The following notices are translated into selected languages. Each notice contains an identifier (Caution=Cx).

C2 **CAUTION**
The 3570 Model C11 and C21 weighs approximately 24 kilograms (53 pounds); it takes two persons to safely lift this unit.

C4 **CAUTION**
The 3570 Model C12 and C22 weighs approximately 29 kilograms (64 pounds); it takes two persons to safely lift this unit.

Note: This notice is translated into selected languages. See **C2** and **C4** in the INSP section.

When removing nut clips, bolts, and screws, put them into the containers provided. Mark the containers with the correct part number.

__ 1. Remove the rack covers.

__ 2. Remove the 3570 from the shelf.

__ 3. If the 3570 is to be relocated to a different rack or a different location in the same rack, perform the installation instructions.

__ 4. Place the 3570 in the customer supplied shipping box if you are not reinstalling the 3570. See “Repack Instructions for the 3570” on page INST-67.

Remove or Relocate a Stand-Alone or Drive-Only Model

The following notices are translated into selected languages. Each notice contains an identifier (Caution=Cx).

C1 **CAUTION**
The 3570 Model C01 weighs approximately 35 kilograms (77 pounds); it takes three persons to safely lift this unit.

C3 **CAUTION**
The 3570 Model C02 weighs approximately 40 kilograms (88 pounds); it takes three persons to safely lift this unit.

Note: This notice is translated into selected languages. See **C1** and **C3** in the INSP section.

When removing nut clips, bolts, and screws, put them into the containers provided. Mark the containers with the correct part number.

__ 1. Ensure all the cables are disconnected.

__ 2. Move the device to the new location.

OR

__ 3. If you are not reinstalling the 3570, place it in the shipping box. See “Repack Instructions for the 3570” on page INST-67.

Repack Instructions for the 3570

Before repacking the 3570, verify that there is no tape cartridge inserted in the 3570. For the library, verify there are no tape cartridges loaded in the magazine. If there are cartridges present, remove them.

To protect the tape drive loader mechanism during shipping, the loader should be moved manually to the **loaded** position. Before shipping the 3570, perform the steps under “Manual Load Procedure” on page PROC-19, but do not insert a cartridge when you are told to do so.

Remove the magazines from the library and slide the picker assembly all the way to the left. Refer to Figure 218 on page INST-40 and install the shipping stopper, item 1 , with the orange tag, item 2 , on the picker shaft to prevent the picker from moving during shipment.

Re-install the magazines, then close and lock the library door.

Common Procedures

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This section contains the common procedures that are referenced from other sections of the manual.

Working with Electrostatic Discharge (ESD) Parts

See Figure 243 on page PROC-4. When wearing the ESD grounding wrist band 1 , ensure that the ground clip 4 remains connected. Failure to do this creates a safety exposure, the same as wearing jewelry while working on live exposed electrical circuits.

Use the most current part number available when ordering a field ESD kit. In addition to the mat, the kit P/N 93F2649 contains the following components in a reclosable static-shielding bag:

Adjustable wrist band P/N 6405959 1
Wrist band cord P/N 74F9658 2
Mat cord P/N 93F2652 3
Cord extension P/N 93F2653 4
Large ground clip P/N 93F2654 5

All of the logic cards and sensors are ESD-sensitive parts in the 3570.

To prevent damage when working with ESD-sensitive parts, observe the following instructions and the instructions printed on the ESD mat. The following instructions are in addition to all the usual precautions:

Switch OFF power to the 3570.

Put on the ESD grounding wrist strap 1 before touching the ESD-sensitive part. This strap has a high resistance (1 megohm) resistor in series with the grounding clip 5 . Use of the ESD grounding wrist strap is not dangerous to you. It discharges the static electricity from your body. Connect the clip to the flex ground strap of the gate to the frame. Keep the strap on while you are inserting or removing a logic card or handling any ESD-sensitive part.

Keep ESD-sensitive parts in their special ESD shipping bag until ready for installation.

Do not place ESD-sensitive parts on any machine cover or on a metal table. If you need to put down the ESD-sensitive part for any reason, place it inside its protective shipping bag or on the ESD grounded mat provided in the ESD kit. (Large metal objects can be discharge paths without being grounded.)

Prevent ESD-sensitive parts from being touched by other personnel.

Reinstall all covers when not working on the machine.

Be extra careful when handling ESD-sensitive parts when cold-weather heating is used. Heating of cold air lowers the relative humidity, which increases the static electricity.

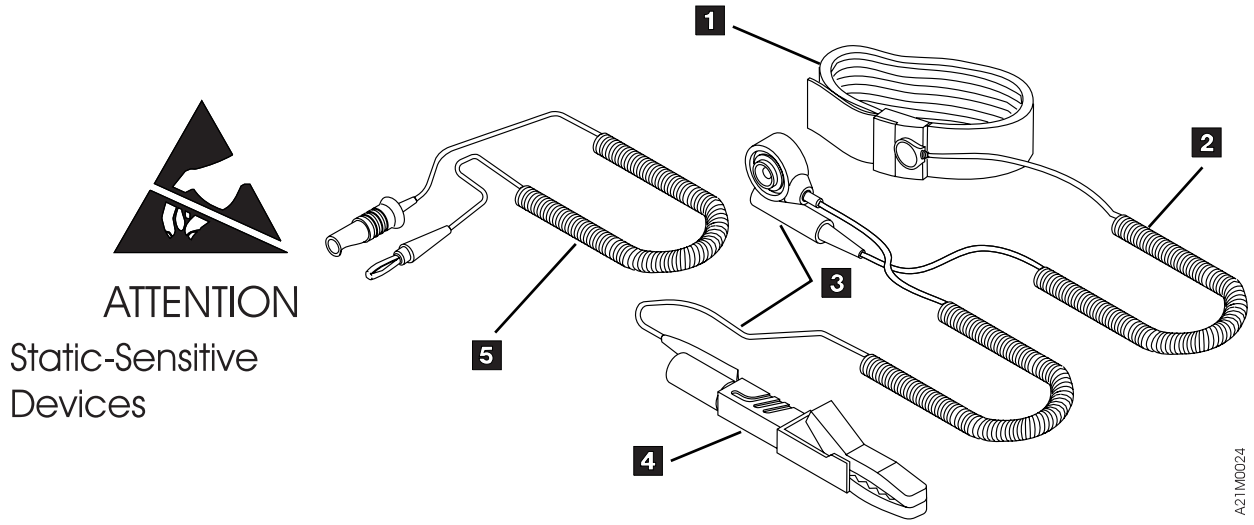


Figure 243. Static-Sensitive Device Attention Symbol and Grounding Wrist Strap

FRU Removal and Replacement Procedures

Each FRU has its own specific format. A detailed illustration identified with numerals in reverse representation (for example, 1) indicates a part that must be removed. When a part is ESD-sensitive, it is identified with the ESD symbol that indicates that the ESD grounding strap is required.

Compare the FRU in the subsystem to the replacement FRU. Note the cable and plug locations, and method of retention (screws, nuts, washers, or clips). Identify and label all wiring connectors to avoid incorrect connections when reinstalling the FRU. The removal then begins as indicated.

Follow the removal instructions and obey all Attention and Danger notes.

The replacement procedure is the reverse of the removal procedure, unless otherwise specified. If other procedures must be performed to verify the replacement, they are defined in the FRU's replacement procedure.

The same screws, nuts, washers, or clips are used in the replacement procedures unless otherwise noted.

Tools Required

The following tools are used to perform certain procedures on the 3570 subsystem.

Screwdrivers

- Flat-blade
- Phillips

Allen wrench (2.5 mm and larger)

Nut-driver (7 mm)

Prepare the Tape Device for Service

1. Notify the customer that the failing device must be varied off-line so the device power can be switched OFF.

   Note: Both drives must be varied off-line for Model C02 and Model C12. It is not possible to service one drive while the other drive is being used.

   Proceed with the following steps after the device is off-line.

2. Set the device power switch to the OFF position.
3. Return to the removal/replacement procedure that sent you here.

Powering Device ON and OFF

Attention: If the covers are removed, be careful of moving parts when power is ON.

Removing Subsystem Power during Normal Operations

To switch OFF power during normal operations, perform the following steps:

1. If the device is not varied off-line, have the customer vary it off-line.
2. If a cartridge is in the tape drive, select **Unload Drive** from the operator Options menu.
3. Switch OFF power by using the power switch at the front of the device.

Restoring Drive Power during Normal Operations

Restore power by setting the power switch to the ON position. The power-on self-test runs automatically.

Note: When you switch OFF power to the 3570, wait approximately 5 seconds before you switch ON power again.

This power-on self-test takes approximately 2.5 minutes to complete. When the test is running, the panel indicates **Diags Running**. Communications with the interface is not acknowledged during the power-on self-test.

When the power-on self-test is complete, the customer can vary the device on-line.

If a failure occurs, a message is posted in the operator panel or the panel will be blank. If either of these conditions exist, go to “Maintenance Starting Point” on page START-4 and isolate the failure.

FID FF—Operator Action or Host Program Error

FID FF is always presented to the host. Some types of problems are also presented on the operator panel.

| "CE FID FF Log Menu" on page PANEL-44 provides a log of a filtered subset of all Sense data sent to
| the host with a FID of FF. Use this log to assist in diagnosis of a FID FF problem.

FID FF Displayed on Operator Panel and at Host

When the operator selects Force Error Dump from the Operator Services menu, the Dump icon will also light indicating that a dump is available.

Action: To remove the dump icon, the device power can be switched OFF, then ON, or the dump can be read by the system host. The FID message can be removed without removing the dump icon by selecting **Reset Drive** on the Operator Services menu.

When a FID FF appears on the operator panel with a FSC E009, it is caused by someone forcing a check1 condition. When this happens, the service representative should look at the device error log for ATTENTION LIBRARY messages in the same time-frame. If no relevant ATTENTION LIBRARY messages are found in the device error log, the rest of the FID FF messages should be ignored, as they are intended for the host program use only, and are informational in nature.

FID FF Displayed at Host Only—Not at Operator Panel

If FID FF was reported in the host error log via a **SIM message**, then perform action indicated in the SIM message codes (e.g. clean drive). Refer to the MSG section.

An invalid and unsupported SCSI command or parameter was received at the device from the host.
| This represents a SCSI application program software problem. Sense data exists at the host.

An operator procedural problem. For example, FID FF is presented when a magazine is not in the library and the host issues a Load command. Another example is when the operator tries to switch to random mode when the magazine is not locked.

The service representative should look in the drive error log for any ATTENTION DRIVE or ATTENTION LIBRARY messages (which may have caused the FID FF to be sent to the host via sense data). If any of these ATTENTION messages are present in the error log, use that data to do further isolation for the FID FF cause.

Suspected Microcode Problem

1. Switch the device power OFF, then ON.
2. Perform "Verify Fix" on page PROC-7 then return here.
3. If you get a FID, go to Figure 8 on page START-12 with that FID.
4. If the drive tests work OK, the fault could be a microcode problem or an intermittent hardware problem.

   Ask the customer to try to recreate the failure and to collect as much job/observation information as possible.
5. When a failure occurs, collect the information from the customer and contact your next level of support.

Verify Fix

You can run Verify Fix diagnostics on the device from the operator panel. See “Verify Fix—Drive-Only Models” or “CE Verify Fix on Library Models” on page PROC-10.

You can also run the Verify Fix diagnostics from the host via the SCSI Send Diagnostic command. Results of the tests will be returned to the host via the SCSI Receive Diagnostic Results command.

Verify Fix—Drive-Only Models

Verify fix for drive-only models requires selection of the Write/Read functional diagnostic test. POST (power-on self-test) diagnostics are automatically run when the drive is powered ON. POST diagnostics are also run automatically when the Write/Read functional test is selected. To run the Write/Read test:

1. While the drive unit is unloaded, press the Unload push-button 3 times within a 1 second interval. Pressing a push-button outside of the 1 second limit is ignored to allow for inadvertent operation by an operator. Pressing the Unload push-button 3 times within 1 second causes selection of option 1, where the Maintenance and Clean indicator LEDs start flashing. The Maintenance LED will continue to flash while in **CE Mode**.
2. While the Maintenance indicator flashes, and while in CE Mode, the other two LED's represent the meanings described in Figure 244.

Figure 244. Stand Alone Drive CE Mode Options

Busy LED 1	**Clean LED** 2	**Maintenance LED** 3	**Option**	**Meaning**
OFF	Flash	Flash	1	Exit Diagnostic Mode
OFF	ON	Flash	2	Run Diagnostics (Fix Verify)
Flash	OFF	Flash	3	Read FMR Tape (U-code Update)
Flash	Flash	Flash	4	Make FMR Tape
Flash	ON	Flash	5	Force Dump (Via System)
ON	OFF	Flash	6	Write Dump to Tape
ON	Flash	Flash	7	Reserved

Note:

1. Options 2, 4 and 6 require a scratch tape, and option 3 requires a FMR tape to be loaded.
2. See Figure 245 on page PROC-8 for location of stand-alone drive LED indicators.

1. To cycle through the options, press the Unload push-button at 1 second intervals.
2. To select an option, press the Unload push-button 2 times within a 1 second interval. The Busy and Clean LEDs will then go OFF.
3. You may leave the CE Mode at any time by selecting Option 1, or by switching the drive power OFF, then ON.
4. When one of the options is selected that requires a tape cartridge to be loaded, the drive requests a tape to be loaded by flashing the Clean LED. The microcode will wait at least 20 seconds for a cartridge to be loaded. If a cartridge is not inserted within the 20+ second window, the test will fail with the Maintenance LED ON solid. Press Unload to return to Operator Mode. Return to CE Mode and select the option again.

5. If a cartridge is inserted within the 20+ second window, the appropriate option is initiated and the Maintenance indicator LED continues to flash during the test.
6. At the completion of a **successful** Write/Read test, the Maintenance indicator turns OFF, and the Clean LED turns ON solid. Press Unload to return to Operator Mode, and press Unload again to unload the cartridge.

   Notes:

   a. Pressing the Unload push-button with a tape cartridge in the unloaded position in the drive is sensed and ignored by the microcode. No test activity is initiated.

   b. Pressing the Unload push-button any number of times if a cartridge is loaded causes the cartridge to unload and no tests are initiated.
7. There are two ways to determine if the option ended without success:

   a. The Maintenance LED comes ON solid when an operational error occurs. Operational errors will occur if the cartridge was file protected, or a cartridge was not loaded. To recover, press the Unload push-button to return to Operator Mode, then press the Unload push-button again to unload tape, if it was loaded. Correct the problem and try the option again.

   b. A hard error is detected while running any of the options. All three LED's will begin to flash quickly in unison, then all three LED's will go OFF for approximately one full second before sending out the FID message in the form of flashing LED's. The CE must count the number of flashes for each LED to determine which FID is being presented. The LED counts arrive in approximately 1 second intervals. When all the LED's flash in unison again, the count is about to begin again. This will continue until reset by power OFF. The FID meanings are shown in Figure 246 on page PROC-9. Refer also to Figure 245 for location of LEDs on drive-only machines.

Drive Indicator Decode for Drive-Only Models

For drive-only models, three drive LEDs provide operator messages under normal conditions. When a hard failure occurs, or when the drive is placed into CE Mode, the LEDs take on a new meaning. See “Drive Indicators and Operator Controls” on page INTRO-39 for a description of the indicators under normal operational mode.

Figure 245 shows the location of the Busy 1 , Clean 2 , and Maintenance 3 LED drive indicators. They are to be used to display CE Mode options and FID information on hard failures, when the drive is not part of a library machine.

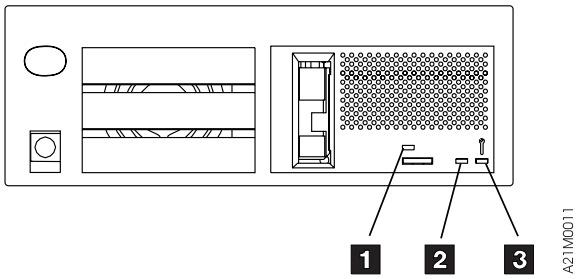


Figure 245. Drive Indicators—Drive-Only Models

Busy 1 , Clean 2 , and Maintenance 3 LEDs are also shown in Figure 246 on page PROC-9 along with the designated FIDs they represent while flashing after a hard failure.

Figure 246. Mapping of LEDs to FIDs on Drive-Only Devices

Busy LED 1	***Clean LED*** 2	***Maintenance LED*** 3	***FID***
Number of Flashes in Cycle			
0	2	On Solid	DD
0	4	On Solid	E0
0	5	On Solid	E8
1	0	On Solid	B1
1	1	On Solid	BA
1	2	On Solid	BB
1	3	On Solid	BC
1	4	On Solid	C1
1	5	On Solid	C5
2	0	On Solid	B9
2	2	On Solid	BF
2	3	On Solid	CA
2	4	On Solid	CD
2	5	On Solid	D0
3	0	On Solid	D1
3	1	On Solid	D2
3	2	On Solid	D3
3	3	On Solid	D8
3	4	On Solid	E4
3	5	On Solid	E5
4	0	On Solid	E6
4	1	On Solid	E7
4	2	On Solid	EA
4	3	On Solid	EB
4	4	On Solid	EC
4	5	On Solid	ED
5	0	On Solid	EE
5	1	On Solid	F0
5	2	On Solid	F1
5	3	On Solid	F2
5	4	On Solid	F3
5	5	On Solid	FF

1. If a hard error is detected while running any of the options, all three LED's will begin to flash quickly in unison, then all three LED's will go OFF for approximately one full second before sending out the FID message in the form of flashing LED's. The CE must count the number of flashes for each LED to determine which FID is being presented. The LED counts arrive in approximately 1 second intervals. When all the LED's flash in unison again, the count is about to begin again. This will continue until reset by power OFF. The FID meanings are shown in Figure 246.

2. After decoding the FID number from the flashing drive LEDs, go to “FID Entry Point” on page START-12 for further isolation.

CE Verify Fix on Library Models

Note: To run the verify fix diagnostics on drive-only models, see “Verify Fix—Drive-Only Models” on page PROC-7.

Verify fix for these library models requires selection of the Write/Read functional test through the Test Drive option on the CE Verify Fix menu of the operator panel. See “CE Verify Fix Menu” on page PANEL-30.

Selection of the Test Drive option automatically executes the POST diagnostic tests before the Write/Read functional test is run. Some library tests are also part of the Test Drive option. Perform the following:

Note: Before you continue, take notice of the library mode that the machine is in because you will need to return the machine to that mode when the call is complete. You can determine the mode by selecting the **Show Status** screen on the Operator Mode menu.

1. At the library operator panel display, select **Set Library Mode** from the operator Options menu, then select the number of the drive to be tested.
2. From the Set Mode menu, select **Auto** or **Manual** mode for the library. The library must be in Auto mode to satisfy requests for specific cartridge mounts where the specified cartridge is placed in the priority cell.
3. Press the Mode push-button on the operator panel to select CE Mode.

   Note: When the 3570 is in CE mode, the subsystem is off-line to the host and is unavailable to the host for read and write operations.

   Figure 247 is displayed. Press enter.

```
WARNING:
SERVICE
PERSONNEL
ONLY
```

Figure 247. Warning Message

Select the number of the drive to be tested and press enter. The next screen will appear asking you to confirm the request for a mode change. See “Confirm Mode Change Menu” on page PANEL-23 for details on each option.

```
CONFIRM MODE CHG
>CANCEL
 PROCEED
```

Press the Scroll Down push-button until the arrow head lines up with the Proceed option, then press the Select push-button to obtain the following CE Option menu. For details on each option, see “CE Options Menu” on page PANEL-29.

```
 CE OPTION
> VERIFY FIX
  DUMP
  FMR TAPE          +
```

4. Press the Scroll Down push-button until the arrow head (>) points to the Verify Fix option. Select **Verify Fix** from the CE Options menu, then select **Test Drive** from the CE Verify Fix menu.
5. The routine is executed in two parts:

   All of the (POST) verification routines are executed. If no failures are detected, a message is displayed on the library operator panel display with instructions to load a scratch cartridge by placing it in the priority cell.

   Load a scratch tape into the priority cell and select **Load From PRI Slot** on the Load Scratch Tape Menu. When you load a scratch cartridge, all of the motion and write/read verification tests are executed. Other panels and messages are displayed during execution of the Test library option.
6. After the successful completion of the Write/Read functional tests, a menu is displayed which allows the scratch cartridge to be unloaded. After all verification tests have completed successfully, the operator panel displays a menu showing CE Action Successful.
7. If testing more than one drive, repeat the previous steps for the second drive.
8. If the diagnostics fail without a FID displayed,
   a. Select Unload drive.
   b. Select Cancel.
   c. Select Verify Fix.
   d. When the request for scratch tape appears, try another tape cartridge. If the drive stills fails, go to Reported FID F0 in “FID Entry Point” on page START-12.
9. If additional library tests need to be run to verify the area that was failing, one or more scratch tapes may be placed in any magazine cell, in Import position. If you power OFF the device, and power it back ON, the library will load and read the bar code of each cartridge that it finds in the Import position. If only one scratch tape is available, move the tape to another slot in Import position, power OFF, then power ON. This must be repeated for each magazine cell to be tested.
10. If an error occurs, a FID message is displayed on the library operator panel display. Go to “FID Entry Point” on page START-12 and use the displayed FID to determine the repair actions.

Verify Fix from the Host

SCSI diagnostic commands initiated from the host perform special functions normally only available from the operator panel of the 3570 library models. They are also used to execute 3570 fix-verification diagnostics for all 3570 models. The ability to exercise/test the device is dependent upon the host that is attached. Most can be configured to invoke any of the following Verify Fix tests:

POST tests
Write/read functional tests
Library tests
Self-test

For procedures that pertain to your host, refer to one of the following:

1. “Checking the SCSI Attachment in an AS/400 Environment” on page PROC-65.
2. “Checking the SCSI Attachment in an AIX Environment” on page PROC-69.
3. “Checking the SCSI Attachment in a Sun Environment” on page PROC-73.
4. “Checking the SCSI Attachment in a HP-UX Environment” on page PROC-76.
5. “Checking the SCSI Attachment in a Windows NT Environment” on page PROC-76.

Hardware Reset

In library models, a hardware reset equivalent to a power-on reset of the drive unit and library can be done from the operator panel by pressing the Change Mode push-button, the Scroll Up push-button and the Enter push-button at the same time (Change-Mode+Scroll-Up+Enter).

In drive-only models, switch power OFF and then back ON to create a hardware reset.

End of Call

Note: When you switch power OFF to the drive or library device, wait approximately 5 seconds before switching power ON again.

1. Set the Power switch to the ON position.

   The power-on test takes approximately 2.5 minutes to complete, and is automatically performed when the 3570 power is switched on. The tests that run depend on the model of 3570 you have installed:

   Model C00 Drive

   a. The drive LEDs will light solid for a time, then go out.
   b. The Maintenance LED will blink while the diagnostic is running.
   c. When the test is concluded without error, the drive LEDs will all go off.
   d. If an error occurs, the drive LEDs will flash quickly, then begin to send the FID via flashing LEDs. To decode these flashing LEDs, see Figure 245 on page PROC-8.

   For library Models:

   a. The three LEDs will go on solid momentarily, then will begin to blink as the bring up diagnostics run.
   b. The picker assembly will move back and forth from side to side, then will begin to calibrate its position in relation to the magazines.
   c. The picker assembly will then sense each cartridge and indicate full or empty slots in the magazine.
   d. If an error occurs, it is displayed in the library operator panel display.

   If a failure occurs on any model, go to the START section for further analysis.

2. If you replaced the drive, do the following:

   a. Ensure the microcode was updated.

   b. Ensure the drive options and customer options are correct. See “Set Drive Options—Library Models” on page INST-42.

3. Run tests for the areas you have been making repairs to; if the drive was repaired, run the Drive Test, if the library was being repaired, run the library Test:

   a. For the procedure to verify the fix on library models, continue at “CE Verify Fix on Library Models” on page PROC-10 then return here.
   b. For the procedure to verify the fix on drive-only models, continue at “Verify Fix—Drive-Only Models” on page PROC-7 then return here.

4. If this is a drive-only model, continue at step 11 on page PROC-13.

5. If your machine is a library model, continue at step 6 on page PROC-13.

Library Models Only

6. You were asked to note the library mode that the customer was using, before you ran library diagnostics. You will need to return the library to the customer desired mode when you are done with this call.
7. Press the Change Mode push-button to place the device in operator mode.
8. Select **Set library Mode**, then select the drive number.
9. Set the library mode to the mode that the customer was using before you made any mode changes.
10. If the display indicates *Offline*, have the operator perform the procedure to set the device on-line. Now continue at 11.

End of Library Models Only

11. If the problem involved the SCSI bus or hang conditions, perform one of the following:

    "Checking the SCSI Attachment in an AS/400 Environment" on page PROC-65

    "Checking the SCSI Attachment in an AIX Environment" on page PROC-69

    "Checking the SCSI Attachment in a Sun Environment" on page PROC-73

    "Checking the SCSI Attachment in a HP-UX Environment" on page PROC-76

    "Checking the SCSI Attachment in a Windows NT Environment" on page PROC-63

Library Sensors Checkout Procedure

This procedure is used to display the dynamic settings of the library and drive sensors. A delay of approximately one second is required for the sensor to change state. The Disp Sensor menu and routine may be accessed from the "CE Mode Menus" on page PANEL-24, then select **UTILITIES** then **DISP SENSORS**. Figure 248 on page PROC-14 summarizes the Sense routine menu, the meaning of each menu item, and one or more suggested methods to test each sensor.

Use the Up or Down arrows to display the sensor status that you want to check. There is a blank line separating the drive sensors and the library sensors.

Note: It is necessary to have power ON the machine while running the sensor checkout procedure. Some procedures, such as manual load and unload of a cartridge, may ask you to power OFF the device to perform a procedure safely. When the procedure is completed, you will need to power ON the machine and start the sensor checkout procedure again to verify the sensors.

Figure 248. Library Sensors Menu Display, Meanings and Test Methods

Menu Display	Meaning and How To Test
>CANCEL +	Select to cancel routine
	******* DRIVE SENSORS *******
CI:0 UB:0	**Cartridge inserted in loader and Unload button.** Manually load and unload a cartridge into the drive. 1. Load and unload a cartridge to test the Cartridge Inserted sensor. See “Manual Unload of Tape Cartridge” on page PROC-18 and “Manual Load Procedure” on page PROC-19 for procedures. The cartridge moves a flag up when inserted to block a sensor on the drive logic card. Inserted=1; removed=0. **Note:** Some referenced procedures ask you power OFF the device to perform the procedure safely. After completion of the procedure, you will need to power ON and restart the Sensor Checkout Routine. 2. Press the Unload push-button to change the state of the UB sensor.
CT:0000	**Cartridge type**. Manually operate the four cartridge type sense pins that sense the holes at the bottom of the cartridge case (3) and the hole below the file protect hole (1). The bits should change to reflect the four pins as they are depressed. See Figure 249 on page PROC-15 for a picture of the cartridge sense assembly and the pin layout.
LH:1 FP:0	**Loader home, File protected.** Manually load and unload a cartridge into the drive. With the loader **unloaded** the loader home sensor should=1. With a cartridge **loaded**, the loader home sensor should=0. See “Manual Unload of Tape Cartridge” on page PROC-18 and “Manual Load Procedure” on page PROC-19 for procedures. **Note:** Some referenced procedures ask you power OFF the device to perform the procedure safely. After completion of the procedure, you will need to power ON and restart the Sensor Checkout Routine. To exercise the file protect sensor, move the file protect lever to the top of a cartridge and load that cartridge, **or** if no cartridge is loaded, open the drive door and press the top pin that senses the file protect lever located inside the cartridge. Pin depressed (file protected) the sensor should=1; release the pin (not file protected) should=0.
	****** LIBRARY SENSORS ******
DO:0 CCP:1	**Library door open, Cleaner cartridge present** in the library clean slot. Open and close the library door. Door open=1; door closed=0. Remove and insert a cleaner cartridge. Cleaner cartridge present=1; not present=0.
M1P:1 M2P:1	**Magazine 1 and 2 present.** Remove and insert magazines. Magazine present=1; not present=0.
GIA:0 GIB:0	**Global interference A and B**. Block the global sensor between the drive and picker (B) or between the magazine and picker (A). Blocked (interference)=1; not blocked (no interference)=0.
PS:0 CP:0	**Priority slot, Cartridge present**. Remove or insert cartridges in the priority slot. Priority slot=1 when full; empty=0. The cartridge present sensor is located on the picker assembly on the magazine side. Load a cartridge in the picker and observe the cartridge present sensor indication. When cartridge is present, cartridge present=1; not present=0.
P1:0 P2:0	**Accessor picker pinch 1 and 2**. Manually activate and release pinch 1 and 2 mechanisms by turning picker gears which move the picker cam in either direction. Pinch activated=1; deactivated=0.
L1:0 L2:0	**Access limit sensors 1 and 2**. Manually insert a cartridge into the picker and move the cartridge either direction from center to activate limit switches. At limit of travel=1; not at limit of travel=0.

Note:

Menu values represent a library with an empty drive, picker, and priority cell, cleaner cartridge and both magazines installed, and the library door closed. The Unload push-button is not depressed.

Cartridge Sensor Pin Locations

The following graph depicts the locations of the cartridge sensor pins. The pins may be observed through the drive door at the front of the drive:

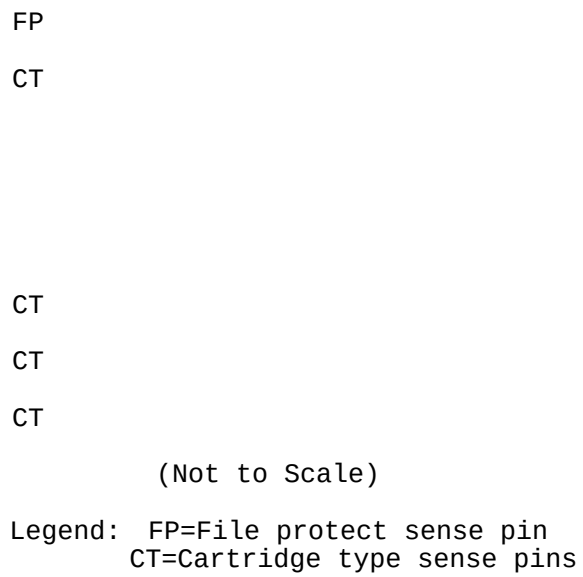


Figure 249. Cartridge Sensor Assembly, Drive Front View (Unloaded)

Inserting or Removing a Magazine

Note: Be careful when opening and closing the library door not to move cartridges from the export position back to the import position.

There is a release lever under each magazine 1 and 2. Both of these levers look and operate alike. An example of how to insert the rightmost magazine (magazine 1) into the library unit follows. The procedure for the leftmost magazine (magazine 2) is identical.

Insert a Magazine:

To insert a magazine, refer to Figure 250 on page PROC-16.

1. Open the library door, item 1 .
2. Ensure that the magazine release lever, item 2 is in the open position (all the way to the right).
3. Slide the cartridge magazine into the magazine opening, 3 until it seats fully. The magazine is oriented with its own release latch (see item 1 in Figure 251 on page PROC-17) **on the bottom** of the magazine.

   Notes:

   a. Do not attempt to insert the magazine when it is upside down. The release latch, item 1 must always be at the bottom.

   b. If there are multiple cartridges in the magazine, they must all be evenly positioned in either the import or export position. If all of the cartridges in the magazine are not carefully and uniformly lined up in the import position, or all of them are not carefully and uniformly lined up in the export position, the magazine cannot be inserted.

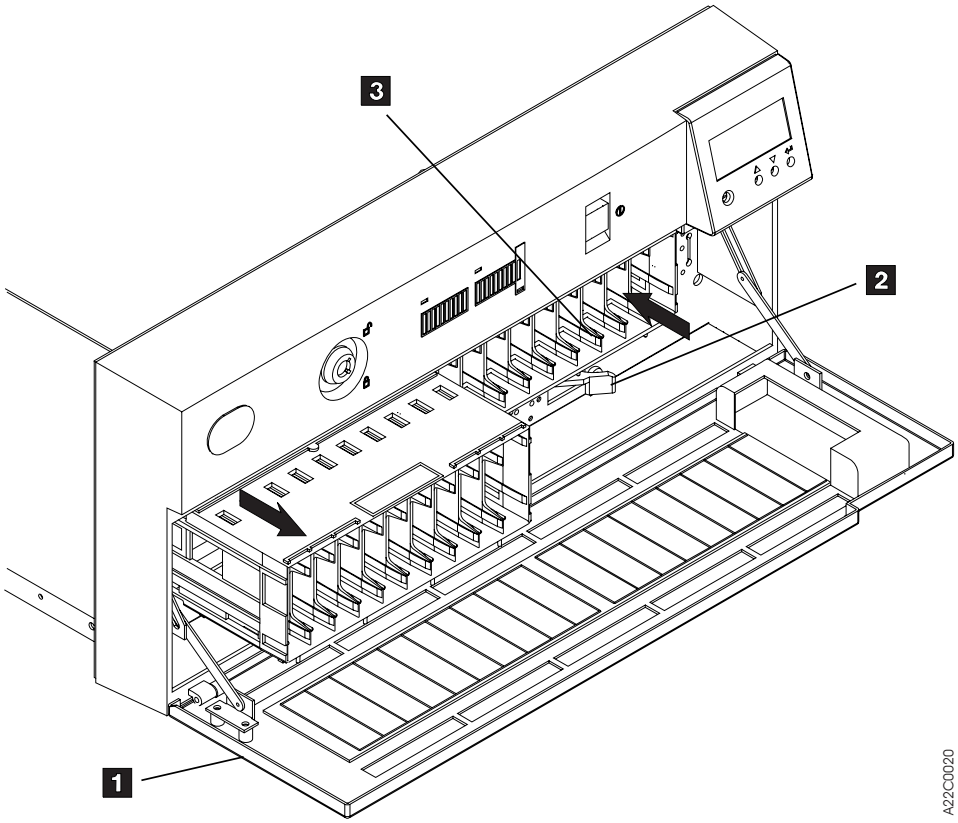


Figure 250. Loaded and unloaded Magazine (with the Door in the Open Position)

| **Note:** Figure 250 shows the Model C01, C02, C11 and C12 style door and operator display. The
| Model C21 and C22 is similar but has notched slots in the library front cover assembly and a
| flat faced operator display panel.

4. Move the magazine release lever, item 2 all the way to the left to lock the magazine in place.
5. Close the library door.

Remove a magazine: To remove a magazine, refer to Figure 250.

1. Open the library door.
2. Move all exported cartridges back to the import position.

   Note: All the cartridges in a magazine must be evenly lined up in the import position or the magazine cannot be removed.
3. Move the library unit's magazine release lever, item 2 beneath the magazine to the open position (to the right).
4. Pull the magazine straight out as shown in Figure 250.
5. After removing the magazine from the library, close the door, item 1 .

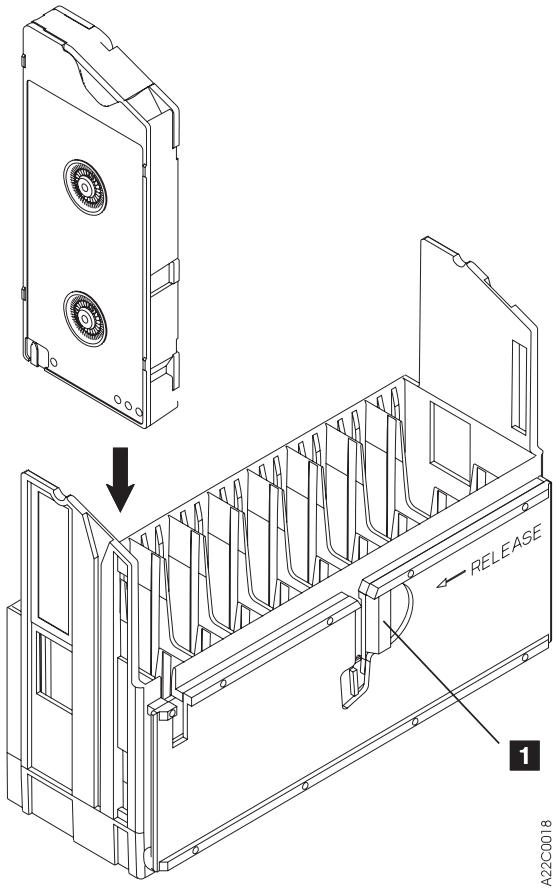


Figure 251. Loading a Cartridge in a Magazine (with Operator Side Facing Down)

Removing Tape Cartridge from Drive

The following procedure should be used when removing a tape cartridge from a 3570 tape drive. Two conditions are defined; remove the tape cartridge with power ON the device if possible, and removing a tape cartridge manually, with power OFF the device. Choose the condition that best fits your situation.

Remove Tape Cartridge Under Power

Use this procedure if the tape cartridge is not physically bound-up inside the drive.

Note: If the cartridge is bound-up inside the drive, you should perform the “Manual Unload of Tape Cartridge.”

“Prepare the Tape Device for Service” on page PROC-5, then power the device off then back on. If the drive circuits are working properly, the drive should automatically unload the tape cartridge. An alternate method is to press the Unload push-button on a stand-alone drive, or select the **Unload Drive** from the operator Options menu. If either of these methods fail to unload the tape cartridge, see “Manual Unload of Tape Cartridge” for further directions.

Manual Unload of Tape Cartridge

Choose the configuration that best fits your customer situation:

Preparation for Stand-alone Drive

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Power OFF the drive if not done already.
3. Perform the removal of the “Decorative Cover—Drive-Only Models” on page CARR-5 if needed to complete the next step.
4. Perform the removal of the “Drive Assembly Front Cover” on page CARR-11 to expose the drive loader motor and sensors.
5. Continue at “Continue Manual Unload Procedure.”

Preparation for library Models

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Power OFF the library device if not done already.
3. Perform the removal procedure for “Library Chassis Covers” on page CARR-3.
4. Perform the removal procedure for “Drive Assembly Front Cover” on page CARR-11 if it is installed.
5. Continue at “Continue Manual Unload Procedure.”

Continue Manual Unload Procedure: Refer to Figure 253 on page PROC-21 to see key components which show if the drive is in the ‘unloaded’ or the ‘loaded’ position. If tab, item 2 is between the sensors as shown on Figure 253 on page PROC-21, the drive is in the unloaded position. File protect and cartridge sensor assembly, item 1 will be away from the cartridge door as shown. Refer to Figure 254 on page PROC-21 to see key components which show if the drive is in the loaded position. In this case, the tab, item 2 is NOT between the sensors, and file protect and cartridge sensor assembly, item 1 is against the closed door (if no cartridge is present) or is touching the cartridge (if one is present).

| **Note:** On some drives a metal shield prevents you from seeing the tab 2 from the front of the drive.
| You will be able to see the tab 2 move if you look down from the top of the drive.

Refer to Figure 253 on page PROC-21 and Figure 254 on page PROC-21 when performing the following procedure. The reverse keys given will refer to these figures. For ease of understanding, Figure 252 on page PROC-20, a view of the front of the loader is also given. The large drive gear in the procedure is item 1 in this view. The procedure will refer to Figure 253 on page PROC-21 and Figure 254 on page PROC-21.

1. Rotate the first intermediate drive gear, the large gear, item 3 in a clockwise direction. This large gear turns the smaller drive loader motor gear, item 4 . Rotate the gear until the cartridge is freed and moves slightly out of the drive, and the tab 2 lines up with the sensor assembly, and the file protect and cartridge type sensor assembly 1 moves to the right away from the cartridge door.
2. Remove the tape cartridge if present.

Manual Load Procedure: While repairing a drive, you may need to perform manual load of a tape cartridge.

Refer to Figure 253 on page PROC-21 and Figure 254 on page PROC-21 when performing the following procedure. The reverse keys given will refer to these figures. For ease of understanding, Figure 252 on page PROC-20, a view of the front of the loader is also given. The large drive gear in the procedure is item 1 in this view. The procedure will refer to Figure 253 on page PROC-21 and Figure 254 on page PROC-21. For the tape cartridge manual load procedure, follow the steps below:

1. Power OFF the device if not done already.

   Note: If testing the drive sensors, do not power OFF the device. Instead load a cartridge into the drive by inserting a tape cartridge into the drive door slot with the device powered ON. If the drive does not load the cartridge continue with step 4 to manually load the cartridge.
2. Ensure that the drive is fully unloaded. See “Continue Manual Unload Procedure” on page PROC-18 if the drive needs to be unloaded.
3. Slowly insert a tape cartridge completely into the drive door slot, but do not force the cartridge.
4. Rotate the first intermediate drive gear, item 3 in a counter clockwise direction. This gear drives the drive loader motor gear, item 4 . Rotate the gear in a counter clockwise direction until the tab 2 moves out from between the two sensors on the sensor assembly, and the cartridge moves into the drive.

   | **Note:** On some drives a metal shield prevents you from seeing the tab 2 from the front of the drive.
   | You will be able to see the tab 2 move if you look down from the top of the drive.

   When the file-protect and cartridge-type sensor 1 moves to the left and comes into contact with the tape cartridge, the cartridge is fully loaded.

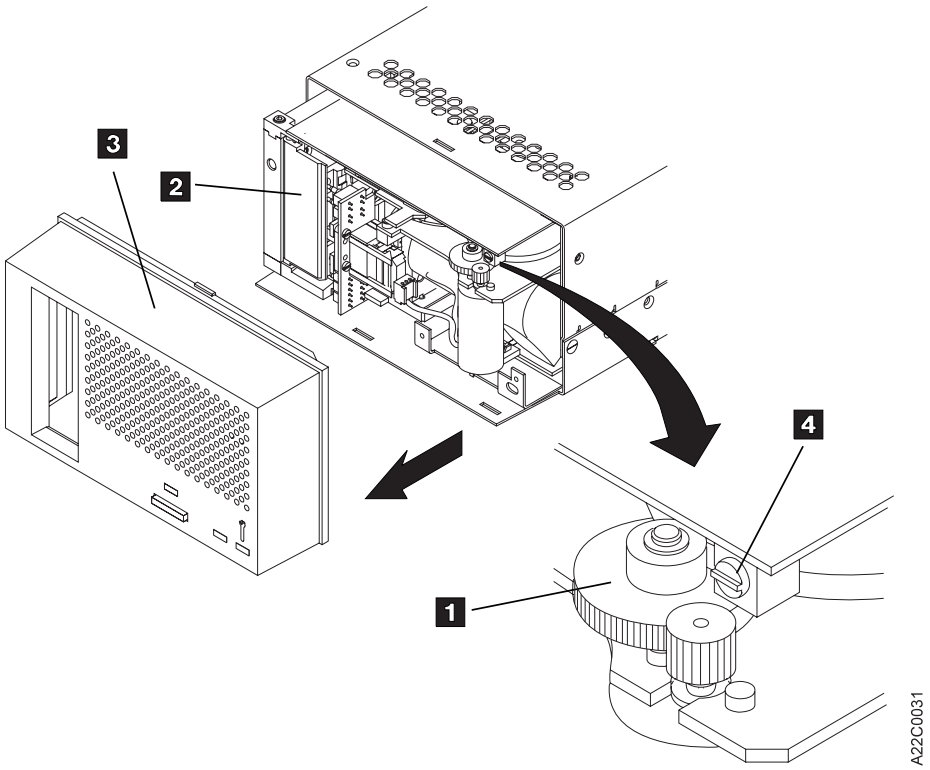
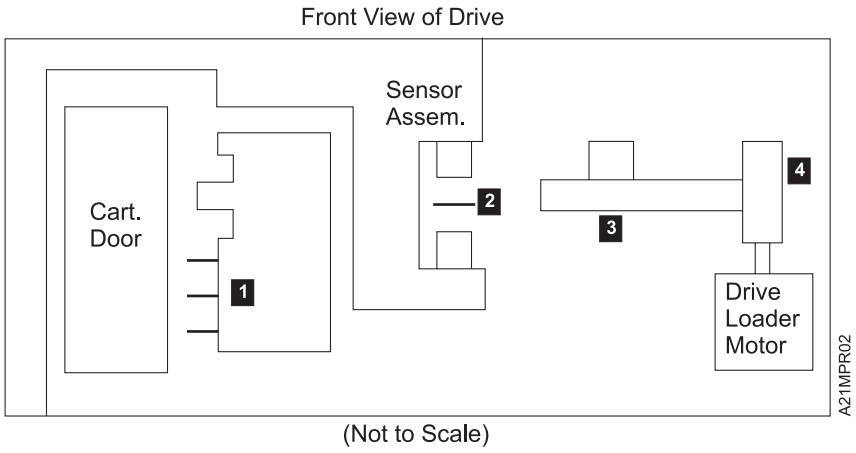
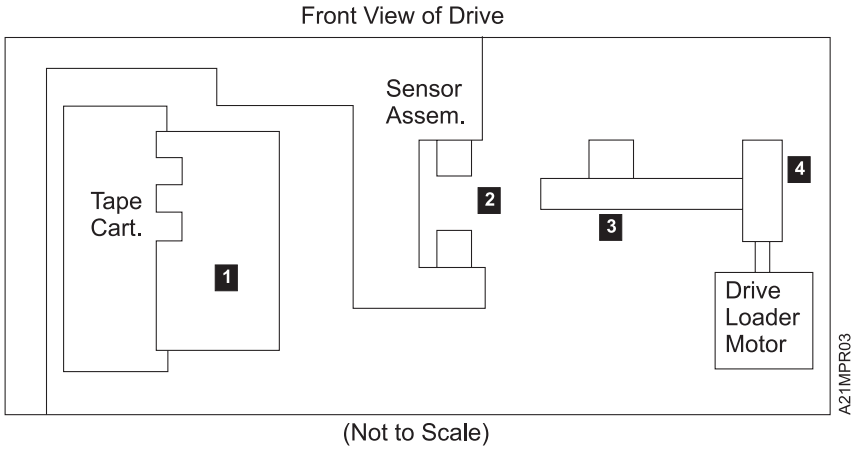


Figure 252. Removing a Stuck Cartridge From a Drive



| *Figure 253. Drive Front View (Unloaded)*



| *Figure 254. Drive Front View (Loaded)*

Inserting or Removing a Cleaning Cartridge

1. Change from the default Status screen to the **Options Menu** by pressing the Enter button.
2. Select the Clean option and press Enter.
3. If inserting a cleaning cartridge in the library, go to 5.
4. If removing a cleaning cartridge from the library, select REMOVE CLN TAPE and press Enter. The cleaning cartridge will be removed from its internal storage cell and placed in the priority cell. Remove the cleaning cartridge from the priority cell and continue with 6.
5. Select INSERT CLN TAPE and press Enter. A message will appear prompting the operator to PUT CLEANING CARTRIDGE IN PRIORITY CELL PRESS ENTER. Put the cleaning cartridge in the priority cell and press enter. The cleaning cartridge will be loaded in the library and stored in its internal storage cell.
6. Select CANCEL to return to the **Options Menu**.

Setting Automatic Cleaning

1. Because the Magstar MP will be reset at the end of this procedure, you should make sure that the drive(s) have been unloaded and that the drives are not being used by the host system.
2. Select EDIT CONFIG from the **Options Menu** and press ENTER.
3. Select AUTO CLEAN from the **Edit Configuration Menu** and press ENTER.

   An asterisk (*) in front of ENABLE or DISABLE indicates if automatic cleaning is enabled or disabled. The default setting is *ENABLE. If the display shows *ENABLE, the library unit will automatically clean the tape drive(s) when they require cleaning. If the display shows *DISABLE, the operator must take action to clean the tape drive(s) when cleaning is required.
4. To change the configuration, move the arrow to select the desired configuration (ENABLE or DISABLE) and press ENTER. If the display shows both the ENABLE and the DISABLE menu options without asterisks in front, there is a mismatch in the settings for drive 1 and drive 2 (in two drive models). Select ENABLE or DISABLE and press ENTER to correct the mismatch.
5. When the configuration is set correctly, select CANCEL and press ENTER to return to the **Edit Configuration Menu**.
6. Select CANCEL from the **Edit Configuration Menu** and press ENTER.
7. Select RESET DRIVE from the **Unload and Reset Menu** and press ENTER.
8. Then select PROCEED and press ENTER.

   The Magstar MP will reset and the status screen will be displayed.
9. Press ENTER to return to the **Options Menu**.

Drive Cleaning Procedure

Notes:

1. If the drive requires cleaning too frequently (for example, every day), go to Step 009 on page MAPS-21.
2. The need for cleaning is determined by the tape drive. The tape drive should be cleaned **only when indicated by the 3570**. Cleaning the drive too frequently with the cleaning tape may cause excessive wear of the head assembly and may lead to read and write errors.

a. Model C00 should be cleaned only when the Clean LED indicator on the drive bezel flashes.

b. Library models should be configured to have automatic cleaning enabled and should have the cleaning cartridge loaded into the cleaning cell. The operator should allow the 3570 tape drives to clean themselves when necessary.

c. Inform the operator that the 3570 should not be cleaned unless indicated. Cleaning the drive too frequently with the cleaning tape may cause excessive wear of the head assembly and may contribute to read and write errors.

The drive will normally determine if there is a reason to clean itself. The operator or CE has the option of overriding this feature any time by performing the following steps:

1. Head cleaning—library device

   Notes

   1. If a cartridge is loaded in the drive, the library should be put in **Manual Mode** and the drive unloaded before selecting the cleaning options on the menu. See "Options Menu" on page PANEL-13 for procedure to set the device to Manual mode and to unload the drive. After cleaning, restore the library to the mode it was in before changing to Manual mode.
   2. This procedure assumes that a cleaner cartridge is installed in the cleaner cell position.

   a. Select the CLEAN option of the **Options Menu** at the library operator panel display.
   b. Use the 'Scroll Up' or 'Scroll Down' push buttons to scroll to the CLEAN DRIVE option of the CLEAN Menu.
   c. Select the drive number to be cleaned and press ENTER.
   d. The drive should automatically clean itself.

2. Head cleaning—drive without library attachment

   a. Insert the cleaner cartridge into the tape drive.
   b. The drive will automatically perform the clean cycle.

Note: The cleaning cartridge should be replaced after 100 cleaning cycles.

Cleaning Cartridge Labels

Cartridge labels cannot have folds, missing pieces, tears or any extraneous markings, including smears or smudges along the length of the label.

If the labels become dirty, wipe them with a dry, lint-free cloth. Do not use water or any chemicals to clean the label.

If a cartridge needs to be replaced, a kit containing enough labels for 10 cartridges can be ordered. See "Replacing Cartridge Labels."

Replacing Cartridge Labels

If a cartridge label needs to be replaced, the customer can order a kit containing enough replacement labels for 10 cartridges (part number 05H9393 for B-format cartridges or 08L6191 for C-format cartridges).

1. Carefully peel the old labels off the cartridge. The old labels must be completely removed with no residue left behind in the recessed label area. Any left over glue residue can be easily removed by rubbing it off with your finger.

   Note: Do not use any sharp object, water or any chemicals to clean the label areas of the cartridge.

2. The labels must be oriented on the cartridge, as shown in Figure 255 on page PROC-24. The new cartridge labels must be placed totally within the recessed area on the tape cartridge. The label must be placed flat over the length of the label and cannot have folds, missing pieces, tears or have any extraneous markings, including smears or smudges.

If the label is not placed properly, the bar code reader cannot read the bar code. Misplaced labels may also interfere with the proper operation of the drive.

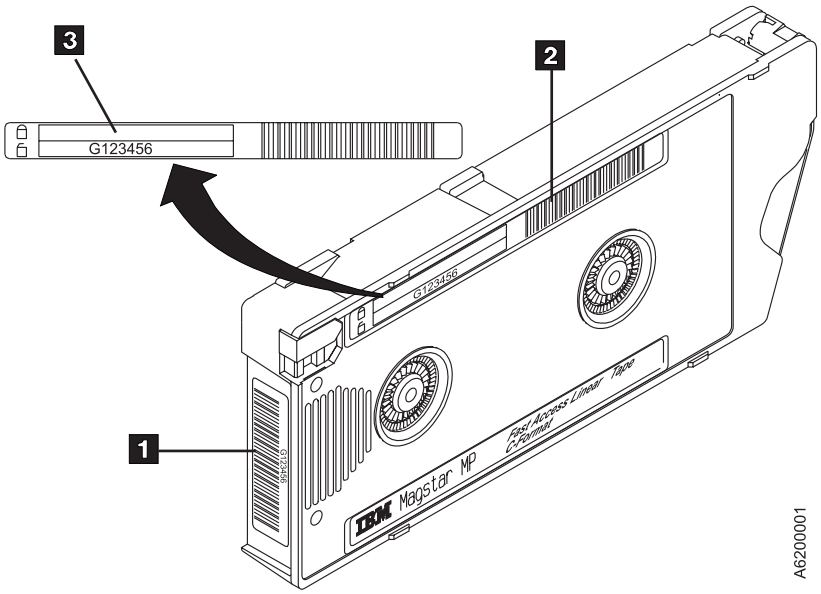


Figure 255. Label Placement on 3570 Cartridge

Resolving Bar Code Reader Problems

If there is a mismatch between the VOLSER and the bar code label, see “Resolving a Mismatch Between the Bar Code Label and VOLSER” on page PROC-26.

If the host displays a message stating that either the VOLSER (Volume ID) does not match or a cartridge is not found, see “Resolving a Mismatch Between the Bar Code Label and VOLSER” on page PROC-26.

If the Bar Coder Reader cannot read the bar code label on a tape cartridge, perform the following:

1. Check the cartridge labels for folds, missing pieces, tears or any extraneous markings, including smears or smudges along the length of the label.
2. If the labels are dirty or marked, clean the labels. See “Cleaning Cartridge Labels” on page PROC-23.
3. If a cartridge label needs to be replaced, the customer can order a kit containing enough replacement labels for 10 cartridges. See “Replacing Cartridge Labels” on page PROC-23.
4. If the cartridge labels are not damaged or dirty, clean the bar code sensor which is mounted on the picker assembly. Because the sensor is located inside the picker, the picker assembly must be removed from the library in order to reach the sensor. For picker removal and replacement procedures, refer to “FID 9A: Picker Assembly” on page CARR-23. Using a cotton swab with a 4 inch or longer extension and a small amount of alcohol, gently clean the glass window of the sensor. Two or three swipes over the window area is sufficient to clean the sensor.
5. If the Bar Code Reader still does not work, replace the FRUs listed under FID 94 in Figure 8 on page START-12.

Initializing the Tape Volume Serial Number

The cartridge label bar code on the Magstar MP cartridge is unique and is used to identify each cartridge. For Standard Label tape processing using the Bar Code Reader, the bar code labels and internally recorded VOLSER must match. Most IBM tape management systems, like ADSM and BRMS/400, use Standard Label tape processing. To maintain compatibility with Standard Label tape processing, it is required that the operator initialize tape cartridges using the VOLSER printed on the Bar Code Label. The internal VOLSER on the tape should be identical with the external VOLSER that appears on the two matching Bar Code Labels (1 , 2 , and 3 in Figure 256) of each cartridge. **To use cartridges in a Magstar MP Tape Subsystem with the Bar Code Reader, the internal VOLSER must match the Bar Code Label.**

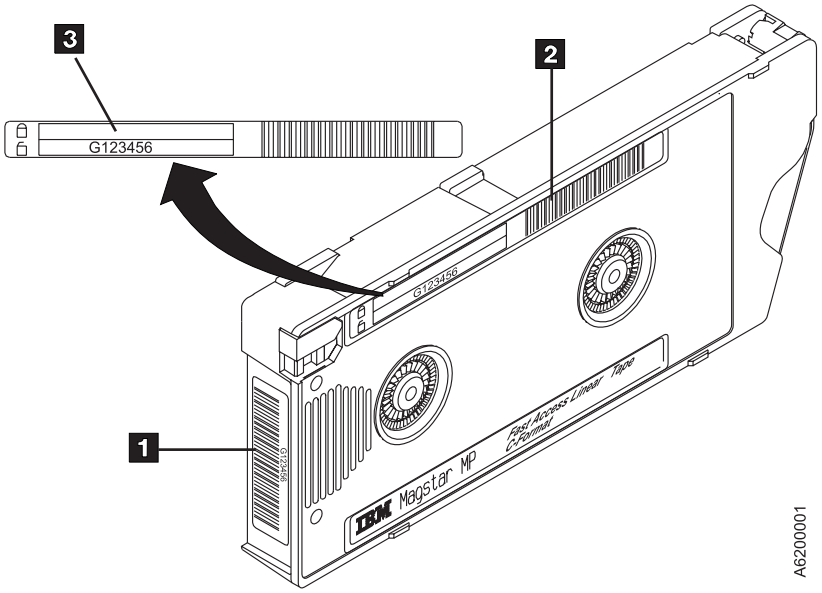


Figure 256. Magstar MP Tape Cartridge Labels

Bar Code Format

The bar code is seven characters in length not including the start/stop characters.

The first character (left-most character) is the media type character and is an upper case "G" for C-format cartridges (see Figure 256 3) and an upper case "F" for all B-format cartridges and the cleaning cartridge.

The remaining six (right most) are used to uniquely identify the cartridges. The valid bar code characters are as follows:

- Uppercase Alphabetic - A through Z
- Numeric - 0 through 9
- Blanks (or Spaces) - Trailing only.

The bar code can be any mixture of alphabetic and numeric characters such as the following:

- "GABC123" "GA1B2C3" "G123ABC"
- "G12345 " (with a trailing blank character)
- "GA3B " (with 3 trailing blank characters)

The bar code is located on two labels on the Magstar MP cartridge, (items 1 , 2 and 3 in Figure 256).

Some operating systems or applications, like ADSM and BRMS/400, only display the last six characters (the media type "F" or "G" is not displayed).

For Standard Label tape Processing using the Bar Code, the bar code labels and internally recorded VOLSER must match, If there are existing cartridges where there is a mismatch between the BAR Code Label and the VOLSER with which the tape was initialized, a set of custom cartridge labels can be ordered to match the BAR Code Label to the internal VOLSER. To receive the custom labels, order part number 05H9643 for B-format cartridges or 08L6192 for C-format cartridges, from IBM Supply Fulfillment Operations:

1-888-IBM-MEDIA in the United States, or

+31 433 502 576 in Europe.

Resolving a Mismatch Between the Bar Code Label and VOLSER

If there is a mismatch between the Bar Code Label and the VOLSER that the tape was initialized with, the customer can order a set of cartridge labels to match the Bar Code Label with the internal VOLSER. To receive the replacement labels, the customer should order part number 05H9643 for B-format cartridges or 08L6192 for C-format cartridges from IBM Supply Fulfillment Operations:

1-888-IBM-MEDIA in the United States, or

+31 433 502 576 in Europe.

Refer the operator to “Replacing Cartridge Labels” in the Operator Guide for instructions explaining the procedures for removing the old labels and installing the new labels.

Instead of replacing the Bar Code Labels, the operator may choose to re-initialize the tape when the data contained on the tape has expired.

Library Mode Selection

To change the operating mode of a library unit, perform the following steps in the order indicated:

1. At power ON, the Status screen will be displayed. Press the Enter button to display the **Options Menu**.
2. Select SET LIBR MODE from the **Options Menu** and press the Enter button.
3. If the Magstar MP is Model C02 or C12, and the library is configured to operate in Split Configuration, select Drive 1 or Drive 2 and press Enter.
4. When the **Set Library Mode Menu** appears, use the Scroll Up and Scroll Down buttons to move the selection arrow (>) until it is pointing to the desired mode. Press the Enter button. The library unit will be set to the mode that you have selected. the **Options Menu** is displayed.
5. Select CANCEL and press Enter until the **Options Menu** is displayed.

For additional information, see “Library Modes of Operation” on page LIBRARY-5.

Library Configuration Selection

Library configuration is only available on Magstar MP Models C02, C12 and C22. To change the configuration of a library unit, perform the following steps in the order indicated:

1. At power ON, the Status Screen will be displayed. Press the Enter button to display the **Options Menu**.
2. Select EDIT CONFIG from the **Options Menu** and press the Enter button.
3. Select SET LIBR CONFIG from the **Edit Configuration Menu** and press Enter.
4. An asterisk (*****) in front of BASE or SPLIT indicates the configuration that is currently selected. To keep the current configuration, select CANCEL and press Enter. To change the configuration, move the arrow to select the desired configuration (BASE or SPLIT) and press Enter. Select CANCEL from the **Edit Configuration Menu** and press Enter.
5. If a cartridge is loaded in drive 1 or drive 2, select UNLOAD DRIVE from the **Unload and Reset Menu** and press Enter; otherwise continue with step 8.
6. Select the drive number to be unloaded and press Enter. The cartridge will be unloaded from the drive and the status screen will be displayed. Press Enter to return to the **Drive Selection Menu.**
7. Repeat step 6 until there are no cartridges loaded in drive 1 or drive 2. Then select CANCEL to return to the **Unload and Reset Menu.**
8. Select RESET DRIVE and press Enter.
9. Select PROCEED and press Enter.
10. The Magstar MP will reset and the status screen will be displayed. The new library configuration will be displayed on line 3 of the operator panel display. (See 16 in Figure 105 on page PANEL-5).
11. If attached to an AS/400 System, re-IPL the AS/400 IOP card(s) to which the 3570 is attached.
12. If attached to a RS/6000, you must de-configure the Magstar MP device at the host and then re-configure it before using the new library configuration.
13. If attached to a Sun or HP-UX system, you must de-configure the Magstar MP device at the host and then re-configure it before using the new library configuration.
14. If attached to a Windows NT system, you must re-IPL the system and allow the system to detect and re-configure the device.

Pausing the Cartridge Sequence

In automatic mode, the library keeps the tape drive continually fed with cartridges. The next available cartridge is automatically loaded into the tape drive after the ejected cartridge is put back into the magazine.

The operator can pause the auto-loading of cartridges into the drive by making the following selections on the Operator Panel:

1. If the status screen is displayed, press the Enter button to display the **Options Menu**.
2. Select CART SEQUENCE from the **Options Menu** and press the Enter button.
3. If the Magstar MP is a dual drive model operating in Split Configuration, select the drive number to be paused.
4. Select PAUSE SEQUENCE from the **Cartridge Sequence Menu**.

When the tape in the drive has been unloaded, the library will not automatically load the next cartridge into the drive. In order to resume operation, the operator must select START on the **Options Menu**.

This operation is available only in Automatic Mode.

Resetting the Cartridge Sequence

In automatic mode and manual mode, the library processes cartridges sequentially beginning at the rightmost cell position, proceeding from right to left as viewed from the front of the library.

The operator can reset the order that the cartridges are processed by making the following selections on the Operator Panel:

1. If the status screen is displayed, press the Enter button to display the **Options Menu**.
2. Select CART SEQUENCE from the **Options Menu** and press the Enter button.
3. If the Magstar MP is a dual drive model operating in Split Configuration, select the drive number to be reset.
4. Select RESET SEQUENCE from the **Cartridge Sequence Menu**.

When the tape in the drive has been unloaded, the library will not automatically load the next cartridge into the drive. The operator can then open the library door and insert or remove cartridges from the magazines.

In order to resume operation, the operator must select START on the **Options Menu**. Instead of resuming operation where it left off, the library loads the first cartridge it finds in the import position beginning at the rightmost cell position.

This operation is available only in Automatic Mode or Manual Mode.

Clearing Tape Drive Recover Status

When the tape drive does not know where to put a tape cartridge, it displays **RECOVER** status on the operator panel. For example, if the Magstar MP is powered off and then back on with a tape loaded in the drive, the Magstar MP does not know where to put the cartridge when it is unloaded from the drive. The tape drive goes into **RECOVER** status to allow the operator to choose where the cartridge should be moved.

To clear the **RECOVER** status:

1. Select START from the **Options menu**.
2. If asked, select the drive with **RECOVER** status.
3. On the **Recovery Menu**, select where the cartridge should be moved, the priority cell or one of the magazine cells (2 through 20).
4. If the priority cell is selected, the cartridge will be moved to the export position in the priority cell.
5. If one of the magazine cells is chosen, select the import or export position. The tape will be moved to the selected magazine cell and placed in the desired position.

Drive Serial Number—Library Models Only

1. Switch to CE mode by pressing the Mode Change push-button.
2. If you are working on a 2-drive library, select the drive number you are working on.
3. Select the **CONFIG/INSTALL** option.
4. Select the **DRV SERIAL NO** option.
5. Select the **DISP SERIAL NO** option to display the current drive serial number stored in VPD memory. The serial number will display in the ASCII format:

   ```
   nnnnn  (Where nnnnn are decimal numbers.)
   ```

   Note: The default value for a new card pack is set by the factory to:

   ```
   SequenceNum
   ```

6. Select **CANCEL** to return to the CE DRV SER NO menu.
7. Select the **ALTER SERIAL N** option.

   The VPD FIELD OFFSET menu will appear and the display will show the hex values for offsets **000** through **00B**. It will be necessary to scroll the cursor up or down to see all of the offset locations.

   All of the VPD offset field data is displayed and entered in hex. (See Figure 257 on page PROC-30 for a conversion chart.)

   An example of a five digit (ASCII) serial number (53912) is shown below on the left, and the default value (SequenceNum), as set by the factory, is shown on the right.

   ```
   CANCEL              CANCEL
   OFFSET  VALUE        OFFSET  VALUE
           3                    53
     1     3             1      65
     2     3             2      71
     3     3             3      75
     4     3             4      65
     5     3             5      6E
     6     3             6      63
     7     35            7      65
     8     33            8      4E
     9     39            9      75
     A     31            A      6D
     B     32            B
   ```

   Offset fields **000** through **006** are always set to hex 30 (ASCII 0), and the 5 character serial number is entered into offsets **007** through **00B**.

8. Select offset **000**.

   The CE VPD DATA menu will appear and the display will show, vertically, the 4 bytes (8 hex digits) for offsets **000** through **003**. It will be necessary to scroll the cursor up or down to see all 8 of the hex digits for these 4 offset locations.

   The menu displays the first 4 bytes (8 digits) of the serial number vertically as follows:

   ```
   CANCEL
   5
   3
   6
   5
   7
   1
   7
   5
   SAVE AND CONT
   ```

   This represents the characters **S e q u** in the example above, and should be changed to:

```
CANCEL
3

3

3

3

SAVE AND CONT
```

9. Move the cursor to the digit you want to change and press Enter.

   Note: You must enter the serial number in HEX values, not ASCII.

10. The CE CHOOSE VALUE menu will appear so you can select the desired digit. Move the cursor to the desired digit and press Enter. The data will be updated and the previous menu (CE VPD DATA) will appear.
11. Repeat steps 9 and 10 until all 4 bytes (8 digits) are correct.
12. When you have finished changing the data in these 4 offset fields, select **SAVE AND CONT**.
13. Select **YES** on the CE SAVE DATA? menu.
14. The CE DRV SER NO menu will appear. Repeat steps 7 on page PROC-29 through 13 for the next 4 bytes (8 digits) of the serial number. Select offset **004** to display and update the data for offset fields **004** through **007**.
15. After offset fields **004** through **007** have been updated and saved, select offset **008** to display and update the data for offset fields **008** through **00B**.
16. After the last 4 offset fields have been updated and saved, select the **DISP SERIAL NO** option to confirm that the correct serial number is entered.
17. Select **CANCEL** as many times as necessary to return to the CE OPTIONS menu.

    Note: The CE WAIT menu may appear momentarily while the new serial number data is written into memory.

18. Return to the procedure that sent you here.

Figure 257. Hex to ASCII Conversion

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
00	Null	30	0	41	A	4A	J	54	T
20	Space	31	1	42	B	4B	K	55	U
		32	2	43	C	4C	L	56	V
		33	3	44	D	4D	M	57	W
		34	4	45	E	4E	N	58	X
		35	5	46	F	4F	O	59	Y
		36	6	47	G	50	P	5A	Z
		37	7	48	H	51	Q	5F	_
		38	8	49	I	52	R		
		39	9			53	S		

Note: All codes are not shown.

Making FMR Tape from Scratch Tape—Library Models

This procedure creates an FMR tape from a scratch tape for library models. The scratch tape will contain the microcode that is active in the device.

1. Make a note of the library mode that the device is in. You will need to return the library to that mode when the call is complete. The mode of operation can be determined by selecting the **show status** screen on the Operator Options Menu.
2. Select **Set Library Mode** from the Operator Options Menu.
3. From the Set Library Mode Menu, select **Manual** Mode.

   Note: If you want to replace the microcode in the device from a field microcode replacement (FMR) tape or want to update the FMR cartridge with the microcode in the drive, go to “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34.
4. Switch to CE Mode by pressing the Mode Change push-button.
5. Select drive 1.
6. From the CE Options menu, select **FMR Tape**.
7. From the CE FMR Tape menu, select **Make FMR Tape**.
8. When you are prompted from the LOAD SCRATCH TAP Menu, load a scratch cartridge into the priority slot.
9. Select **START** on the LOAD SCRATCH TAP Menu.
10. When the cartridge is loaded and at ready point, press Enter and then select **PROC LOAD TAPE**
11. When the EC Levels menu is displayed, select **Cancel**.
12. Select **Unload Drive**.
13. If not labeled, label the cartridge as the FMR tape and save the cartridge in a secure place.
14. When you have finished the call, return the library to the mode that it was in before you changed it.

Making FMR Tape from Scratch Tape—Drive-Only Models

This procedure creates an FMR tape from a scratch tape for drive-only models. The scratch tape will contain the microcode that is active in the device.

Note: If you want to replace the microcode in the device from a field microcode replacement (FMR) tape or want to update the FMR cartridge with the microcode in the drive, go to “Updating Microcode from FMR Cartridge (Drive-Only Models)” on page PROC-37.

1. Refer to the procedure at “Verify Fix—Drive-Only Models” on page PROC-7, and select Option 4 (Make FMR Tape). When you are prompted (flashing Clean LED), load a scratch tape. You will have about 20 seconds to load the tape before the routine will fail. If a cartridge is not inserted within the 20+ second window, the test will fail with the Maintenance LED on solid. Press unload to return to Operator Mode. Select CE mode again, and re-try the option.
2. There are two ways to tell if the option ended **without success**:
   a. If the Maintenance LED comes on solid, it indicates an operational error such as the cartridge was file protected, or the cartridge was not loaded.
   b. If a hard error is detected while running any of the options, all three LED's will begin to flash quickly in unison, then all three LED's will go **off** approximately one full second before sending out the FID message in the form of flashing LED's. The CE must keep count of the number of flashes

for each LED to determine which FID is being presented. The LED counts arrive in approximately 1-second intervals. When all the LED's flash in unison again, the count is about to begin again. This will continue until reset by power OFF. The FID meanings are shown in Figure 246 on page PROC-9. Refer also to Figure 245 on page PROC-8 for location of LEDs on drive-only machines.

3. If loading of the scratch tape was performed within the 20 seconds, and no other problems were encountered, option 4 is initiated and the Maintenance indicator LED continues to flash during the operation.
4. At the successful completion of the **make FMR tape** operation, the Maintenance indicator turns off and the Clean LED turns on solid. Press Unload to return to Operator Mode and press Unload again to unload the new FMR cartridge.
5. You may leave the CE Mode at any time by turning the drive power OFF, then ON.
6. If not labeled, label the cartridge as the FMR tape and save the cartridge in a secure place.

Making Scratch Tape from FMR Tape—Library Models (Unmaking FMR)

This procedure creates a scratch tape from an FMR tape for library models.

1. Make a note of the library mode that the device is in. You will need to return the library to that mode when the call is complete. The mode of operation can be determined by selecting the **show status** screen on the Operator Options Menu.
2. Select **Set Library Mode** from the Operator Options Menu.
3. Select DRIVE 1 if asked to select a drive.
4. From the Set Library Mode Menu, select **Manual** Mode.

   Note: If you want to replace the microcode in the device from a field microcode replacement (FMR) tape or want to update the FMR cartridge with the microcode in the drive, go to “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34.
5. Press the Mode push-button on the operator panel to select CE Mode.
6. Press Enter.
7. Select DRIVE 1 if asked to select a drive, then select PROCEED.
8. From the CE Options menu, select **FMR Tape**.
9. From the CE FMR Tape menu, select **Unmake FMR Tape**.
10. When you are prompted from the LOAD FMR TAP Menu, load the FMR cartridge into the priority slot.
11. Select **START** on the LOAD FMR TAP Menu.
12. When the cartridge is loaded and at ready point, select **PROC LOAD TAPE**
13. When the EC Levels menu is displayed, select **Cancel**.
14. Select **Unload Drive**.
15. If not labeled, label the cartridge as a scratch tape.
16. When you have finished the call, return the library to the mode that it was in before you changed it.

Making Scratch Tape from FMR Tape—Drive-Only Models (Unmaking FMR)

This procedure cannot be performed on drive-only models. It is available only to library models. See “Making Scratch Tape from FMR Tape—Library Models (Unmaking FMR).”

Updating Microcode from FMR Cartridge (Library Models)

The cartridge must not be file protected.

| **Note:** If updating microcode in a 3570 Model C02, C12 or C22, update the microcode in drive 2 before updating drive 1. If you update drive 1 before drive 2, you may not be able to use this process to update drive 2. **Both tape drives in the 3570 must be at the same microcode level to operate correctly.**

If there is a mismatch in the microcode levels on tape drive 1 and tape drive 2, the microcode in tape drive 2 cannot be updated using this process. Refer to “Updating Microcode in Drive 2 from FMR Cartridge” on page PROC-36.

This procedure automatically updates the field microcode replacement (FMR) tape with the microcode from the drive if that level of microcode is not already on the FMR tape. The device is then updated with the microcode on the FMR tape.

| 1. Make a note of the library mode that the device is in. (Do this for both drives in a Model C02, C12 or
| C22.) You will need to return the library to that mode when the call is complete. The mode of operation can be determined by selecting the **Show Status** screen on the Operator Options Menu.
2. Select **Set Library Mode** from the Operator Options Menu.
| 3. If updating a Model C02, C12 or C22, select the drive number that you want to update.
| 4. From the Set Library Mode Menu, select **Manual** Mode. (If updating a Model C02, C12 or C22, repeat
| steps 1 thru 4 for both tape drives.)

   Note: If you want to create an FMR tape from a scratch tape that will contain the microcode that is active in the device, go to “Making FMR Tape from Scratch Tape—Library Models” on page PROC-31.

| 5. Change to CE Mode and if updating a Model C02, C12 or C22, select the drive to be updated.
6. From the CE Options menu, select **FMR TAPE**.
7. From the CE FMR TAPE Menu, select **UCODE UPDATE**.
8. When LOAD FMR TAPE Menu prompts to load a tape, load a FMR cartridge into the priority slot.
9. Scroll down and select **START** on the LOAD FMR TAPE Menu.
10. When the cartridge is loaded and at ready point, press Enter and then select **PROC LOAD TAPE**.
11. When the SELECT EC LEVEL Menu is displayed, select the desired EC level. The microcode checks to see if the FMR tape contains the microcode in the drive logic card, and if the tape does not contain the EC level, it automatically copies the microcode to the FMR tape. After action is completed, good or bad status will be displayed. If status is bad, **retry** with another cartridge or same cartridge.

    Note: Do not cause the machine to power OFF or reset while microcode update is in process.

    select **Unload Drive**.
12. Power OFF and power ON the device to activate the microcode.
| 13. If updating microcode in Model C02, C12 or C22, repeat this procedure for drive 1 after the update to
| drive 2.
14. Record the EC level and link level of the microcode in “Microcode EC Level History Log” on page PROC-38.
15. Save the FMR cartridge in a secure place.
16. When you have finished the call, return the library to the mode that it was in before you changed it.

Isolate Drive 1 / Drive 2 Communications Fault

If tape drive 1 cannot communicate with tape drive 2, or if the microcode installed in the tape drives are at different EC levels, the status ACCESSING or XFERRING is never displayed on the bottom line of the operator panel display when the library is powered up.

If the library is set to split configuration, another indication that the tape drive 1 cannot communicate with tape drive 2 is the letter "N" or a blank space at the beginning of line 3 of the library operator panel display.

Check the following:

1. **Both** power cords are plugged into the 3570 and into the AC power source.
2. Check that the drive features are set correctly. See “Set Drive Options—Library Models” on page INST-42.
3. If the library operator panel displays "CODE LVL", the microcode levels in the drives are not the same. Update the microcode. See the procedures listed under step 8.
4. If the microcode EC levels for each of the tape drives can be read by the host and displayed, compare the microcode levels for the tape drives. If they are different, update the microcode. See the procedures listed in step 8.
5. The RS-422 cable which connects drive 1 to drive 2 is correctly plugged into the connectors on the cooling packs. If you corrected the RS-422 cable, power the library off and back on to verify that the cable fixed the problem.
6. The internal RS-422 cable is correctly plugged into the mother board on each of the drives. If you corrected the RS-422 cable, power the library off and back on to verify that the cable fixed the problem.
7. Run the RS-422 Wrap Test. See “RS-422 Port Wrap Test” on page PROC-78.
8. If the EC levels in the tape drives could not be verified, the microcode installed in drive 2 may be at a different level than the level installed in tape drive 1. Update the microcode in the tape drives using one of the following procedures:

   “Updating Microcode from an AS/400” on page PROC-49

   “Updating Microcode from RS/6000 by Using TAPEUTIL” on page PROC-50

   “Updating Microcode from a Sun System by Using TAPEUTIL” on page PROC-54

   “Updating Microcode from a HP-UX System by Using TAPEUTIL” on page PROC-56

   “Updating Microcode From a Windows NT System Using NTUTIL” on page PROC-60

   “Updating Microcode in Drive 2 from FMR Cartridge” on page PROC-36 followed by “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34
9. If the problem is not corrected by any of the above actions, one of the drive logic cards (FID EA), or one of the RS-422 cables (FID DE) may have failed.

Updating Microcode in Drive 2 from FMR Cartridge

If there is a mismatch in the microcode levels on tape drive 1 and tape drive 2, the microcode in tape drive 2 cannot be updated using the process described in “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34.

Note: The SCSI address for drive 2 is sometimes changed during this procedure because when drive 2 powers up, and drive 1 does not attempt communications (which will always happen in this procedure because drive 1 is not connected), a 5 minute timer is started by the microcode. After 5 minutes has elapsed, the drive will reset itself, and become a Model C00. A Model C00 uses the SCSI ID switch to determine the SCSI address, while the library models use VPD in the logic card to determine the SCSI address. Unless the switch setting is identical to the VPD address, the SCSI address will change. If the FMR process is completed in the 5 minute window, the address will not change. In any case, after the code is updated and both drives 1 and 2 are powered on, drive 2 will convert back to a library model, and will use VPD to determine the SCSI address.

Before returning the library to the customer, use the operator menus to verify that the SCSI address for drive 2 is set correctly.

In order to update the microcode in drive 2, perform the following:

1. Switch off power to the 3570.
2. Remove the power cord from the power supply above drive 1. Be sure to leave the power cord plugged into the power supply above drive 2.
3. Switch on power to the 3570. The library will not move and the operator panel will not display any information because these items are controlled by drive 1 (which is not powered on at this time).
4. Perform the procedure described in “Updating Microcode from FMR Cartridge (Drive-Only Models)” on page PROC-37 to load the microcode on drive 2.
5. Switch off power to the 3570.
6. Reconnect the power cord to the power supply above drive 1. Be sure to leave the power cord plugged into the power supply above drive 2.
7. Switch on power to the 3570.
8. If updating the microcode in tape drive 1, refer to “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34.

Updating Microcode from FMR Cartridge (Drive-Only Models)

The cartridge must not be file protected.

This procedure automatically updates the field microcode replacement (FMR) tape with the microcode from the drive if the FMR tape does not contain the microcode and updates the microcode in the device with the first available EC level of microcode on the FMR tape.

Note: If you want to create an FMR tape from a scratch tape that will contain the microcode that is active in the device, go to “Making FMR Tape from Scratch Tape—Drive-Only Models” on page PROC-31.

1. With the drive unloaded, press the UNLOAD push-button 3 times within a 1-second interval. The Maintenance and Clean indicators start flashing.
2. Press the UNLOAD push-button 2 times at one second intervals to advance to the Update Microcode From An FMR Tape option. The Maintenance and Busy indicators start flashing and the Clean LED is off.
3. Press the UNLOAD push-button 2 times within a 1-second interval to select the Update Microcode From An FMR Tape option. The Busy and Clean LEDs go off.
4. The drive requests that an FMR tape cartridge be loaded by flashing the Clean LED. The microcode waits about 20 seconds for a cartridge to be loaded. The cartridge **Must Not** be file protected. If a cartridge is not inserted within the 20 second window, the test fails with the Maintenance LED on solid. Press UNLOAD to return to Operator Mode. Return to CE Mode and select the option again.
5. If a cartridge is inserted within the 20 second window, the Update Microcode From An FMR Tape procedure is started and the Maintenance indicator flashes during the procedure.
6. There are two ways to tell if the option ended without success:
   a. If the Maintenance LED comes on solid, it indicates an operational error such as the cartridge was file protected, or the cartridge was not loaded.
   b. If a hard error is detected while running any of the options, all three LED's will begin to flash quickly in unison, then all three LED's will go **off** approximately one full second before sending out the FID message in the form of flashing LED's. The CE must keep count of the number of flashes for each LED to determine which FID is being presented. The LED counts arrive in approximately 1-second intervals. When all the LED's flash in unison again, the count is about to begin again. This will continue until reset by power OFF. The FID meanings are shown in Figure 246 on page PROC-9. Refer also to Figure 245 on page PROC-8 for location of LEDs on drive-only machines.
7. If loading of the FMR tape was performed within the 20 seconds, and no other problems were encountered, the Maintenance LED will flash during the FMR update operation.
8. At the successful completion of the FMR update operation, the Maintenance indicator turns off, and after a few minutes, the Clean LED turns on solid. **Wait until the Clean LED turns on before powering the drive OFF.**
9. At the completion of the **read FMR tape** (u-code update) operation, switch the drive power OFF, then ON to activate the microcode. The FMR tape will be unloaded.
10. Save the FMR tape cartridge in a secure place.

Microcode EC Level History Log

Figure 258 shows how to determine the EC level and link level of the microcode from the operator Services menu. Use the link level 1 to determine the latest EC level.

If you read the EC level and link level from the FMR tape (“Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34), the link level (LL) is displayed as dddd instead of d_ddd. The following example shows that the second entry is the latest level microcode:

```
EC=6C56789 LL=4D D
EC=3C56789 LL=5B 2  (highest EC level)
```

Figure 259 shows the EC history of the microcode where you write the EC and link levels of the microcode, the date, and the device serial number. You write the values here when you install the device, replace the card pack, or update the device to a new microcode level.

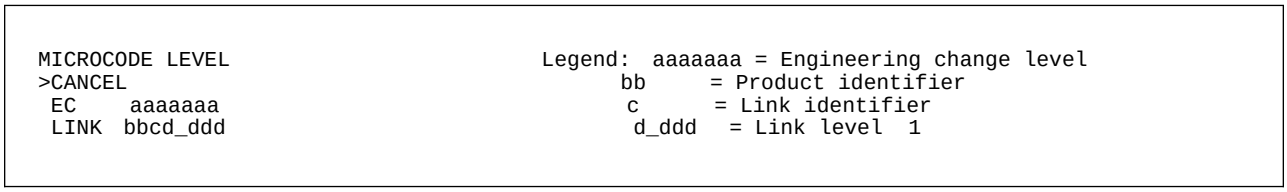


Figure 258. Microcode Level Menu

Figure 259. Microcode EC Level History Log

EC Level	Link Level 1	Date	Drive Serial Number

Figure 259. Microcode EC Level History Log

EC Level	Link Level 1	Date	Drive Serial Number

Error Log Analysis Procedure

The Error Log Analysis Procedure is designed to assist the service representative in isolation of intermittent failures, or chronic problems that seldom happen but occur often enough to cause a concern. We will use the error log to demonstrate how one might look for possible leads on which FRUs to replace in such a case. The example we will use is not a real example, but is intended for demonstration only.

Figure 260 on page PROC-41 shows a blank Error Log Analysis Work Sheet that you may make copies of and use to write down FIDs with the following procedure. Figure 263 on page PROC-43 shows the same Error Log Analysis Work Sheet with a sample extraction from the 3570 error log.

Following is an example of how you might gather and analyze error log data. The 10 entries below represent a summary of what you might find in the 3570 error log:

```
Entry 1  FID 98
Entry 2  FID 9E
Entry 3  FID 9F
Entry 4  FID C5
Entry 5  FID BF
Entry 6  FID CA
Entry 7  FID C5
Entry 8  FID A8
Entry 9  FID 9F
Entry 1  FID 98
```

In a real situation, you would extract the error log FID data and fill out the blank Error Log Analysis Work Sheet using the following procedure. Our example has all the data recorded for your convenience:

Note: When you have concluded reading out the error log, reset the device by switching power OFF then ON.

1. Take the FID from the most recent error log entry and put it in the first column labeled **Error Log FID Entries**, row one, (FID 98 in our example). Continue listing FIDs that you find in the error log until you get to the last one you choose to use in the analysis.

   Note: If the time stamp shows a long duration between one entry and the next, you may want to ignore any of the older entries for the purpose of this exercise.

2. Refer to “FID Entry Point” on page START-12, under the table column **Reported FID** and locate the first FID that you extracted from the error log and wrote down in the left column of your work sheet. To the right of that entry on the work sheet, under **START Section FRU Names (FID Numbers)**, list from left to right, in order of listed probability, the FRU that is called out under the column **FRU Name** in the START pages. To save space, use the FID number that is associated with each FRU. A cross reference of FRU Names to FID Numbers may be found in Figure 261 on page PROC-42, and a cross reference of FID Numbers to FRU Names may be found in Figure 262 on page PROC-42. In the top line of our example, we listed FIDs 9A, A3, 97 and A5.

3. Repeat the previous step for each FID you wrote down on the work sheet. When all has been written down, continue with the next step.

4. Look first in the left two or three columns of your Error Log Analysis Work Sheet, under the **START Section FRU Names (FID Numbers)** and draw a circle around the FID that appears most often (in our example we circled FID 9A five times).

5. Next, look in the left two or three columns and draw a square around the next FID that occurs the most often (in our example we drew a square around FID BC, four times).

6. Now, look at the overall entries, and draw a diamond around any FID that occurs most often (in our example we drew a triangle around FID 97.)

Note: FID 97 only occurred in the columns in the right-hand portion of the work sheet, but that is because it was considered a low probability of failure when taken one FID at a time. If a FID occurs often, but always falls in a low probability position, That FID may be causing the problems but due to limitations of error logging, it never shows up as a high probability of being the failure. This error log analysis procedure is intended to show up some of these problems.

7. Last, look up the FID number and associated names of the FRUs they represent (in our example, the three FIDs are listed under **Legend**). Now use your training, intuition, or experience to decide which FRU is most likely to be causing the problem. In our example, the likely failing FRU might be the picker assembly, the loader assembly, or the library control card. A decision at this time might be to replace the FID 9A FRU (the picker assembly) first for the following reasons:

   a. FID 9A occurs most often of all high probability FIDs (5 times), and its position is, in all cases, in the high probability area (left most three columns). It does, however, have a medium variation.

      Note: Variation is used here to define a measure of how often a FID occurs exactly the same way in a given error log sample. For example, if the FID 9A had occurred as the first FID after a FID 98 all five times instead of how it did occur, it would have a small variation or a high correlation. Small variation (similar to high correlation) **Error Log FID Entries** tend to point to those FIDs as the most likely failing components. Large variation (similar to low correlation) **Error Log FID Entries** tend to point to those FIDs as **not** the most likely failing components.

   b. The FID BC occurs quite often, but has a slightly lower probability based upon which column it appears. FID BC has a slightly smaller variation in the Error Log FID Entries, which may point to it as the failing component.

   c. The FID 97 seems to be a medium probability due to its position in the middle columns (that are used), but has the greatest variation in the Error Log FID Entries.

   Had the FID BC had a very small variation in the Error Log FID Entries (such as only one or two different FIDs), or appeared in a slightly higher probability of failure position (some entries in the left-most column), it might have been selected as the FRU to replace first. Had the FID 97 had a smaller variation in the Error Log FID Entries (such as only one or two different FIDs), it might have been selected as the FRU to replace first.

   These decisions must rely heavily on your experience and knowledge of the device, the timing of the errors that occurred, error history of this device, and your customer environment.

Error Log Analysis Work Sheet

Error Log FID Entries	START Section FRU Names (FID Numbers) (Enter starting with Highest Probability on Left)											

A21MCEL1

Figure 260. Blank Error Log Analysis Work Sheet

Figure 261. FRU Name to FID Number Cross Reference

FRU Name	FID Number
Accessor Assembly	92
Accessor Motor Assembly	95
AC Power Cord	DC
AC Switch and Cable Assembly	DB
Cleaner Cartridge- Present Sensor	A3
Cooling Pack	B2
Drive Pack	B3
Drive Global Sensor Pair	9B
Internal SCSI Cable	CB
Library Control Card	97
Library Door Open Sensor	AA
Library Front Cover Assembly	9D
Library Interface Cable	A2
Library LED Card	A6
Library Magazine	FD
Library Sensor Cable	A5
Library Operator Panel Display	90
Library Operator Panel Display Cable	91
Magazine 1 Sensor	A1
Magazine 2 Sensor	A0
Magazine Global Sensor Pair	9C
Picker Cable	99
Picker Assembly	9A
Power Supply	C1
Priority Cell Cartridge- Present Sensor	9E
Tape Cartridge	FE

Figure 262. FID Number to FRU Name Cross Reference

FID Number	FRU Name
90	Library Operator Panel Display
91	Library Operator Panel Display Cable
92	Accessor Assembly
95	Accessor Motor Assembly
97	Library Control Card
99	Picker Cable
9A	Picker Assembly
9B	Drive Global Sensor Pair
9C	Magazine Global Sensor Pair
9D	Library Front Cover Assembly
9E	Priority Cell Cartridge- Present Sensor
A0	Magazine 2 Sensor
A1	Magazine 1 Sensor
A2	Library Interface Cable
A3	Cleaner Cartridge- Present Sensor
A5	Library Sensor Cable
A6	Library LED Card
AA	Library Door Open Sensor
B2	Cooling Pack
B3	Drive Pack
BE	Drive Cooling Fan
C1	Power Supply
CB	Internal SCSI Cable
DB	AC Switch and Cable Assembly
DC	AC Power Cord
FD	Library Magazine
FE	Tape Cartridge

Error Log Analysis Work Sheet

Error Log FID Entries	START Section FRU Names (FID Numbers) (Enter Starting with Highest Probability on Left)											
98	(9A)	A3	◇97	A5								
9E	9E	A5	◇97									
9F	(9A)	[BC]	99	◇97	EA	CA	A5					
C5	FE	[BC]	EC									
BF	EA	BE										
CA	CA	EC	DA									
C5	FE	[BC]	EC									
A8	FD	(9A)	99	◇97								
9F	(9A)	[BC]	99	◇97	EA	CA	A5					
98	(9A)	A3	◇97	A5								

Legend:

9A=Picker Asm.
BC=Loader Asm.
97=Library Control Card

A21MCEL2

Figure 263. Example—Error Log Analysis Work Sheet

Set Error Match Trap (To Get a Dump)

RS/6000 Note: The AIX Tape and Medium Changer Device Driver provides an automatic dump facility. It automatically reads a dump from the 3570 when it is available and stores the dump in a directory on the RS/6000 system. See the Problem Determination chapter in the *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide* GC35-0154 for more information.

The dump icon **!** appears when the dump is available and remains on the screen to indicate that trace data is stored in the device. When the trap is **hit**, an ATTENTION DRIVE FSC Trap Taken message is displayed on the operator panel. If a FID1 E5 occurs, that may overlay the ATTENTION DRIVE message, but the dump icon will still he displayed, and the ATTENTION DRIVE message will be underneath.

Attention: *Normal* error match traps are volatile and are lost if you reset the drive, switch off power to the device or microcode recovery occurs (via Check-1, FMR, etc.). *Saved* error match traps cannot be lost by a drive reset, power OFF, or microcode recovery, and require a special procedure for removal. Please see procedure “Remove Error Match Trap” on page PROC-45 for details.

To set an error match trap:

1. Press the Change Mode push-button to place the drive in CE mode.
2. Select the drive number.
3. Select **PROCEED**.
4. Select **UTILITIES** from the CE OPTIONS Menu.
5. Select **UCODE TRAP** from the CE UTILITIES Menu.

   After the CE Microcode Trap menu is displayed, four characters matching the desired error code (FSC) must be entered. Select each character and modify to the desired value.
6. With the CE UCODE TRAP Menu still selected there will be 4 options presented:

   a. ADD FSC TRAP

   b. REMOVE FSC TRAP

   c. LIST FSC TRAPS

   d. SAVED TRAPS

   There are two options available to set the trap:

   Use option **a** - Select **ADD FSC TRAP** which saves the *normal* trap until the next code reset. Selection of this option ends the procedure. Skip to step 10 for completion of the procedure.

   Or use option **d** - Select **SAVED TRAPS** to save the *saved* trap in the drive until it is manually removed. A code reset will not eliminate a *saved* trap from the drive. See procedure “Remove Error Match Trap” on page PROC-45 for removal of a saved FSC trap.
7. Selection of the **SAVED TRAPS** option from the CE Microcode Trap menu will cause the CE SAVED TRAPS Menu to be displayed next.
8. Select **ADD SAVED FSC TRAP** from the CE SAVED TRAPS Menu to save the trap.
9. Select BACK TO CE MEN to return to the **CE Saved Traps Menu**.
10. Select **CANCEL** to return to the previous CE menu. Repeat this step as needed to return to previous CE menus.
11. Perform “End of Call” on page PROC-12 or return to the procedure that sent you here.

Note: Only three **saved** traps can be active at a time. If more than three are selected, the procedure will not be successful. To see how many saved traps are active, select **SAVED TRAPS** from the CE UCODE TRAP Menu and then select the **LIST SAVED FSC TRAPS** option.

Remove Error Match Trap

Note: This procedure is similar to procedure "Set Error Match Trap (To Get a Dump)" on page PROC-44, except that it removes the trap(s) set in the previous procedure. See the definition of *normal* trap versus *saved* trap in procedure "Set Error Match Trap (To Get a Dump)" on page PROC-44.

1. Press the Change Mode push-button to place the drive in CE mode.
2. Select the drive number.
3. Select **PROCEED**.
4. Select **UTILITIES** from the CE OPTIONS Menu.
5. Select **UCODE TRAP** from the CE UTILITIES Menu.

   At this point it is necessary to distinguish between removal of a *normal* trap or a *saved* trap.
   If the trap is known to be *normal*, go to heading "Remove NORMAL Trap."
   If the trap is known to be *saved*, go to heading "Remove SAVED Trap" on page PROC-46.
   If the *type* of trap is unknown, but the error code is known, proceed as follows:

   a. Select **SAVED TRAPS** from the CE UCODE TRAPS Menu
   b. Select **LIST SAVED FSC TRAPS** from the CE SAVED TRAPS Menu. The list is displayed.
   c. Check the list of Saved FSC traps for a match of the error code.
   d. If there is no match, the trap is presumed to be *normal*. Select **CANCEL** twice to return to the CE UCODE TRAP Menu. Skip to heading "Remove NORMAL Trap."
   e. If there is a match, then select the appropriate error code.
   f. Select **REMOVE SAVED FSC TRAP** from the CE FSC TRAP LIST Menu. Success or failure of the CE action will be indicated on the Op panel. Select BACK TO CE MEN to return to the **CE Saved Traps Menu**.
   g. Select **CANCEL** twice to return to CE UCODE TRAP Menu. Repeat this step as needed to return to previous CE menus.

      This completes removal of a known, saved FSC trap.

6. Perform "End of Call" on page PROC-12 or return to the procedure that sent you here.

Remove NORMAL Trap:

Known Normal Error Code: If the error code is unknown, go to heading "Unknown Normal Error Code" on page PROC-46.
With the error code **known**, proceed:

1. With the CE UCODE TRAPS Menu still selected, four characters matching the error code (FSC) must be set. Select each character and modify to the desired value.
2. Select the **REMOVE FSC TRAP** option from the CE UCODE TRAPS Menu. The Op panel will indicate success or failure of the CE action.
3. Select **CANCEL** to return to CE UTILITIES Menu and repeat this step as needed to return to the previous CE menu.

This completes removal of a known, normal FSC trap.

4. Perform “End of Call” on page PROC-12 or return to the procedure that sent you here.

Unknown Normal Error Code

1. With the CE UCODE TRAPS Menu displayed, select **LIST FSC TRAPS**. The list is displayed.
2. Select the error code to be removed (from the list).
3. Select **REMOVE FSC TRAP** from the CE REMOVE FSC TRAP Menu. The Op panel will indicate success or failure of the CE action.
4. Select **CANCEL** to return to the CE UCODE TRAPS Menu. Repeat this step as needed to return to previous CE menus.

   This completes removal of an unknown, normal FSC trap.

5. Perform “End of Call” on page PROC-12 or return to the procedure that sent you here.

Remove SAVED Trap:

Known Saved Error Code: If the error code is unknown, go to “Unknown Saved Error Code.” With the error code **known**, proceed:

1. From the CE UCODE TRAPS Menu (still displayed), select **SAVED TRAPS**.
2. The CE SAVED TRAPS Menu is selected. Four characters matching the error code (FSC) must be set. Select each character and modify to the desired value.
3. Select the **RMV SAVED FSC TRAPS** option from the CE SAVED TRAPS Menu. The Op panel will indicate success or failure of the CE action.
4. Select **CANCEL** to return to CE UCODE TRAP Menu. Repeat this step as needed to return to previous CE menus.

   This completes removal of a known, saved FSC trap.

5. Perform “End of Call” on page PROC-12 or return to the procedure that sent you here.

Unknown Saved Error Code

1. From the CE UCODE TRAPS Menu (still displayed), select **SAVED TRAPS**.
2. Select **LIST SAVED FSC TRAPS** from the CE SAVED TRAPS Menu. The list is displayed.
3. Select the error code to be removed (from the list).
4. Select **RMV SAVED FSC TRAPS** from the CE FSC TRAP LIST Menu. The Op panel will indicate success or failure of the CE action.
5. Select **CANCEL** to return to the CE SAVED TRAPS Menu. Repeat this step as needed to return to previous CE menus.

   This completes removal of an unknown, saved FSC trap.

6. Perform “End of Call” on page PROC-12 or return to the procedure that sent you here.

Off-loading Dumps from 3570 to Tape Cartridge (Library Models)

Note: Be sure to off-load dumps for both drive 1 and drive 2 in Models C02 and C12. Both dumps can be copied to the same scratch tape.

The dump icon **!** appears when the dump is available and remains on the screen to indicate that dump data is stored in the device.
Attention: Dump data is volatile and is lost if you switch off power to the device.

RS/6000 Note: The AIX Tape and Medium Changer Device Driver provides an automatic dump facility. It automatically reads a dump from the 3570 when it is available and stores the dump in a directory on the RS/6000 system. See the Problem Determination chapter in the *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide* GC35-0154 for more information.

1. Make a note of the library mode that the device is in. You will need to return the library to that mode when the call is complete. The mode of operation can be determined by selecting the **show status** screen on the Operator Options Menu.
2. Select **Set Library Mode** from the Operator Options Menu.
3. From the Set Library Mode Menu, select **Manual** Mode.
4. Press the Change Mode push-button to place the drive in CE mode.
5. Select the drive number that you are copying the dump from.
6. Select **DUMP** from the CE OPTIONS Menu.
7. Select **CPY DMP TO TAP** to copy a dump from dynamic random access memory (DRAM) to a tape cartridge.
8. Select **WRT DMP BOT** if you want to copy the first dump to tape. Select **WRT DMP AT EOD** if you want to add a second dump to the tape.
9. When you are prompted from the LOAD SCRATCH TAP Menu, load a scratch cartridge into the priority slot and select **LOAD FROM PRIO**.
10. When the cartridge is loaded and at ready point, press Enter and then select **PROC LOAD TAPE**.

    A screen indicates the status of the copy to medium (Successful Copy or Unsuccessful Copy).
11. Select **UNLOAD DRIVE** to remove the cartridge.
12. When the dump to tape has completed, contact your next level of support for further instructions.

    The dump icon **!** disappears from the 3570 operator panel when the dump to tape has completed.
13. When you have finished the call, return to Operator Mode and put the library in the mode that it was in before you changed it.

Off-loading Dumps from 3570 to Tape Cartridge (Drive-Only Models)

RS/6000 Note: The AIX Tape and Medium Changer Device Driver provides an automatic dump facility. It automatically reads a dump from the 3570 when it is available and stores the dump in a directory on the RS/6000 system. See the Problem Determination chapter in the *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide* GC35-0154 for more information.

1. Refer to “Verify Fix—Drive-Only Models” on page PROC-7 and select Option 6. When you are prompted (flashing Clean LED), load a scratch tape. You will have about 20 seconds to load the tape before the routine will fail. If a cartridge is not inserted within the 20+ second window, the test will fail with the Maintenance LED on solid. Press unload to return to Operator Mode. Select CE mode again, and re-try the option.
2. There are two ways to tell if the option ended without success:
   a. If the Maintenance LED comes on solid, it indicates an operational error such as the cartridge was file protected, or the cartridge was not loaded.
   b. If a hard error is detected while running any of the options, all three LED's will begin to flash quickly in unison, then all three LED's will go **off** approximately one full second before sending out the FID message in the form of flashing LED's. The CE must keep count of the number of flashes for each LED to determine which FID is being presented. The LED counts arrive in approximately 1-second intervals. When all the LED's flash in unison again, the count is about to begin again. This will continue until reset by power OFF. The FID meanings are shown in Figure 246 on page PROC-9. Refer also to Figure 245 on page PROC-8 for location of LEDs on drive-only machines.
3. You may leave the CE Mode at any time by selecting Option 1, or by switching the drive power OFF, then ON.
4. At the successful completion of a **Write Dump to Tape** operation, unload the drive.
5. Contact your next level of support for further instructions.

Updating Microcode from an AS/400

Microcode load for the 3570 tape drives directly attached to an AS/400 with the SCSI is obtained from the AS/400 using the program temporary fix (PTF) process.

Note: If the Magstar MP Model C02 or C12 is in Split Configuration, microcode update is not supported using the PTF process. The microcode must be updated according to the instructions in “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34. If both drives in a Magstar MP Model C02 or C12 are attached to the same AS/400 system (Base Configuration), both drives will be updated with new microcode at the same time when the PTF is applied. **Both tape drives in the Magstar MP must be at the same microcode level for the library to operate correctly.**

1. Determine if any PTFs are required for attachment of the Magstar MP 3570. The PTFs for all supported AS/400 releases are listed in INFO APAR II10363. This information APAR contains the most current PTF information for all supported releases and important information concerning the attachment of the 3570 to the AS/400.
2. Notify the customer that a microcode load for the Magstar MP 3570 is available via a PTF.
3. The customer will apply the PTF.
4. Before the customer applies the PTF(s) and IPLs the input/output processor (IOP), verify that the drive(s) in the 3570 are unloaded and not being used by the AS/400.
5. The PTFs can now be applied and the IOP can be IPLed. The IPL causes the 3570 microcode load to proceed.
6. When the microcode load is complete, the drive performs a soft power-on reset (restarts the code).

   Important

   Wait at least 6 minutes (12 minutes for a Model C02 or C12) after the IOP has finished with its IML before powering off or resetting the drive. If the drive is powered off or reset before the drive completes its power-on sequence, the drive logic card may be damaged.

   Note: If an error occurs, a message should be displayed that the error occurred. Whether successful or not, **the drive will be reset** by the device microcode. To verify that the load occurred as expected, refer to “Microcode EC Level History Log” on page PROC-38 to verify the level that actually loaded.
7. If the load was successful, update the account FMR cartridge. See “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34.

Off-loading Dumps from 3570 Attached to AS/400

Use the “Off-loading Dumps from 3570 to Tape Cartridge (Library Models)” on page PROC-47 procedure.

Updating Microcode from RS/6000 by Using TAPEUTIL

You may require assistance from the customer during this process.

Note: If updating microcode in a Magstar MP 3570 Model C02 or C12, update the microcode in drive 2 **before** drive 1. **Both tape drives in the 3570 must be at the same microcode level for the library to operate correctly.**

This procedure down-loads microcode to the tape drive from a file or diskette. This diskette must be in AIX/UNIX format. The Microcode Load utility is only supported on the IBM 3570 and 3590 tape drives.

1. Verify that the drive(s) are unloaded.
2. Verify that the drive(s) are not in use by another host.
3. Insert the diskette with the microcode load into the system diskette reader.
4. Start the tape utility program by typing **tapeutil** at the prompt.
5. Select Tape Drive Service Aids from the menu by selecting **Tape Drive Service Aids** option and pressing Enter.
6. Select **Microcode load** from the following panel then press **Enter**.

```
IBM Tape Device Service Aid Menu                          7


 Select One of the Service Aids to be performed

  Force Microcode Dump
    Perform a microcode dump of the system. The dump is stored in
    the device.
    After the dump is performed it must be read using Read Dump.
  Read Dump
    Transfer a dump from the tape device to a host file, diskette or
    a tape cartridge.
  Microcode load
    Down-load microcode from host file or diskette to tape device via
    SCSI bus.
  Error Log Analysis
    Analyze system error log for device.
F3=Cancel                        F1 =Exit
```

7. Select a **Device** and press **F7=Commit** from the following panel. You must press **F7=Commit** after selecting the drive.

```
IBM Tape Device Selection Menu.                           9

 Select One of the devices listed below.

 NAME       LOCATION    TYPE

 rmt2         - 5- 1-1   IBM 357  Tape Drive and Medium Changer
 rmt3         - 5- 1 3   IBM 357   Tape Drive and Medium Changer









F3=Cancel          F7=Commit          F1 =Exit
```

8. If loading the microcode from the diskette reader, press **F7=Commit** from the following panel. Otherwise, enter the **path** and **filename** and press **F7=Commit**.

   Enter the filename ***/xxx.yyyy*** in the source field where xxx.yyyy is the filename of the microcode file to be loaded. For example, type ***/762.fmrz***.

   You must press **F7=Commit** after entering the filename.

```
Prompting for Srce File for Operation on rmt3 located at   - 5- 1-3
                                                        B

Please enter the following fields...

  Enter Filename:                                  /dev/rfd  +/


F1=Help           F2=Refresh        F3=Cancel         F4=List
F5=Reset          F7=Commit         F1 =Exit
```

9. While the microcode load takes place, the display shows:

```
"Operation running, please stand by"
```

10. When the microcode load completes, the initiator display shows:

```
Operation completed successfully!
```

    The drive performs a soft power-on reset (restart the code).

    Note: If an error occurs, a message should be displayed that the error occurred. Whether successful or not, **the drive will be reset** by the device microcode. To verify that the load occurred as expected, refer to "Microcode EC Level History Log" on page PROC-38 to verify the level that actually loaded.

11. Press **F10** to exit the microcode load.
12. Press **q** to quit tapeutil.
13. Remove the diskette from the diskette reader.

    Note: You must have root authority to do the following step.

14. Update the VPD data in the host RS/6000 by un-configuring the device **(Example: rmdev -l rmt3)** and reconfiguring the device **(Example: mkdev -l rmt3).**
15. If updating microcode in a Magstar MP 3570 Model C02 or C12, repeat these steps to update the microcode in drive 1 after drive 2 has been updated.
16. If the load was successful, update the account FMR cartridge. See "Updating Microcode from FMR Cartridge (Library Models)" on page PROC-34.

Off-loading Dumps from 3570 to RS/6000 by Using TAPEUTIL

Note: Be sure to off-load dumps for both drive 1 and drive 2 in Models C02 and C12.

The dump icon **!** appears when the dump is available, and remains on the screen to indicate that trace data is stored in the device.

Note: Trace data is volatile and is lost if you switch off power to the device.

RS/6000 Note:: The AIX Tape and Medium Changer Device Driver provides an automatic dump facility. It automatically reads a dump from the 3570 when it is available and stores the dump in a directory on the RS/6000 system. See the Problem Determination chapter in the *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers Installation and User's Guide* GC35-0154 for more information.

You may require assistance from the customer during this process.

This procedure reads a dump from the 3570 and writes it to a diskette in AIX/UNIX format.

1. On the drive operator panel, verify that the drive is On-line.
2. Verify that the drive is unloaded.
3. Verify that the drive is **not in use** by another host.
4. Insert the diskette that will be used for the dump in the system floppy diskette reader.
5. When the prompt appears, format the diskette by typing **format** and pressing enter.
6. Start the tape utility program by typing **tapeutil** at the prompt.
7. Select **Tape Drive Service Aids** option from the menu and press **Enter**.
8. Select **Read Dump** from the following panel and then press **Enter**.

```
IBM Tape Device Service Aid Menu                          7


 Select One of the Service Aids to be performed

  Force Microcode Dump
    Perform a microcode dump of the system. The dump is stored in
    the device.
    After the dump is performed it must be read using Read Dump.
  Read Dump
    Transfer a dump from the tape device to a host file, diskette or
    a tape cartridge.
  Microcode load
    Down-load microcode from host file or diskette to tape device via
    SCSI bus.
  Error Log Analysis
    Analyze system error log for device.
F3=Cancel                       F1 =Exit
```

9. Select a **Device** and press **F7=Commit** from the following panel. You must press **F7=Commit** after selecting the drive.

```
IBM Tape Device Selection Menu.                          9

 Select One of the devices listed below.

 NAME       LOCATION    TYPE

 rmt2         - 5- 1-1   IBM 357  Tape Drive and Medium Changer
 rmt3         - 5- 1-3   IBM 357  Tape Drive and Medium Changer









F3=Cancel          F7=Commit          F1 =Exit
```

10. At the next screen press **F7=Commit** to write the file to the diskette.

```
Prompting for Dest File for Operation on rmt3 located at   - 5- 1-3
                                                        B

Please enter the following fields...

  Enter Filename:                                /dev/rfd  +/


F1=Help            F2=Refresh         F3=Cancel          F4=List
F5=Reset           F7=Commit          F1 =Exit
```

11. Press **F10** to exit the read dump.

    The dump icon **!** disappears from the 3570 operator panel when the dump to tape has completed.

12. Press **q** to quit tapeutil.

13. Remove the diskette from the diskette reader. The dump diskette created above is in AIX/UNIX format.

Updating Microcode from a Sun System by Using TAPEUTIL

TAPEUTIL

Refer to APPENDA for more information on using *tapeutil* in the Sun (Solaris) system environment. For a complete update on device driver software, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154.

You may require assistance from the customer during this process.

Note: If updating microcode in a 3570 Model C02 or C12, update the microcode in drive 2 **before** drive 1. Then update the microcode in drive 1. **Both tape drives in the 3570 must be at the same level for the library to operate correctly.**

The 3570 supports downloading a new microcode image from the host system via the SCSI bus. This procedure down-loads microcode to the tape drive from a file or diskette. This diskette must be in AIX/UNIX format.

To download microcode to these devices, perform the following steps:

1. Verify that the IBM tape subsystem is powered ON and online.
2. Verify that the tape drive does not currently have a tape cartridge loaded.
3. Verify that no other attached host is using the drive at this time.
4. Determine the current version of microcode present on the device by entering the following command, substituting **n** with the actual value from the device special file associated with the target device:

   ```
   /opt/IBMtape/tapeutil -f /dev/rmt/nst -o qmc -v
   ```

5. Determine the source of the new microcode image file (that is, floppy diskette such as /vol/dev/aliases/floppy0 or host file such as /tmp/ucode_image.file).
6. Enter the following command, substituting **file** with the actual path and filename of the microcode image file, and substituting **n** with the actual value from the device special file associated with the destination device:

   ```
   /opt/IBMtape/tapeutil -f /dev/rmt/nst -o dmc -z file -v
   ```

Note: The microcode download procedure may also be performed using the menu-driven interface of the tapeutil program. To invoke the tapeutil program in this format, enter the following command, and then choose option 1 to open the device, followed by option 4 to query the current device microcode level, and option 7 to download new microcode:

```
/opt/IBMtape/tapeutil
```

Off-loading Dumps from 3570 to a Sun System by Using TAPEUTIL

TAPEUTIL

Refer to APPENDA for more information on using *tapeutil* in the Sun (Solaris) system environment. For a complete update on device driver software, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154.

The 3570 supports forcing a diagnostic dump and storing that dump to a mounted tape cartridge or to a host system file via the SCSI bus.

Note: Be sure to off-load dumps for both drive 1 and drive 2 in Models C02 and C12.

The dump icon **!** appears when the dump is available, and remains on the screen to indicate that trace data is stored in the device.

Notes:

1. Trace data is volatile and will be lost if you switch OFF power to the device.
2. If you force a dump when the dump icon **!** is already displayed, the existing trace data will be overlayed by the new trace data.

You may require information from the customer during this process.

To force and store a diagnostic dump on these devices, perform the following steps:

1. Verify that the IBM tape subsystem is powered ON and online.
2. Enter the following command to force the dump, substituting **n** with the actual value from the device special file associated with the target device:

   ```
   /opt/IBMtape/tapeutil -f /dev/rmt/nst -o fdp -v
   ```

3. Determine the location for the dump to be stored (that is, floppy diskette such as /vol/dev/aliases/floppy0 or host file such as /tmp/diag_dump.file).
4. Enter the following command, substituting **file** with the actual path and filename of the dump destination file, and substituting **n** with the actual value from the device special file associated with the dump device:

   ```
   /opt/IBMtape/tapeutil -f /dev/rmt/nst -o sdp -z file -v
   ```

5. The dump may also be written to a tape cartridge mounted in the dump device by using ***tapedrive*** for **file**

Note: The diagnostic dump procedure may also be performed using the menu-driven interface of the tapeutil program. To invoke the tapeutil program in this format, enter the following command, and then choose option 1 to open the device, followed by option 5 to force a dump, and option 6 to store the dump:

```
/opt/IBMtape/tapeutil
```

Updating Microcode from a HP-UX System by Using TAPEUTIL

TAPEUTIL

Refer to APPENDA for more information on using *tapeutil* in the HP=UX system environment. For a complete update on device driver software, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154.

You may require assistance from the customer during this process.

Note: If updating microcode in a 3570 Model C02 or C12, update the microcode in drive 2 **before** drive 1. Then update the microcode in drive 1. **Both tape drives in the 3570 must be at the same level for the library to operate correctly.**

The 3570 supports downloading a new microcode image from the host system via the SCSI bus. This procedure down-loads microcode to the tape drive from a file or diskette. This diskette must be in AIX/UNIX format.

To download microcode to these devices, perform the following steps:

1. Verify that the IBM tape subsystem is powered ON and online.
2. Verify that the tape drive does not currently have a tape cartridge loaded.
3. Determine the current version of microcode present on the device by entering the following command, substituting **n** with the actual value from the device special file associated with the target device:

   ```
   /opt/IBMtape/tapeutil -f /dev/rmt/nst -o qmc -v
   ```

4. Determine the source of the new microcode image file (that is, floppy diskette such as /vol/dev/aliases/floppy0 or host file such as /tmp/ucode_image.file).
5. Enter the following command, substituting **file** with the actual path and filename of the microcode image file, and substituting **n** with the actual value from the device special file associated with the destination device:

   ```
   /opt/IBMtape/tapeutil -f /dev/rmt/nst -o dmc -z file -v
   ```

Note: The microcode download procedure may also be performed using the menu-driven interface of the tapeutil program. To invoke the tapeutil program in this format, enter the following command, and then choose option 1 to open the device, followed by option 4 to query the current device microcode level, and option 7 to download new microcode:

```
/opt/IBMtape/tapeutil
```

Off-loading Dumps from 3570 to a HP-UX System by Using TAPEUTIL

TAPEUTIL

Refer to APPENDA for more information on using *tapeutil* in the HP=UX system environment. For a complete update on device driver software, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154.

The 3570 supports forcing a diagnostic dump and storing that dump to a mounted tape cartridge or to a host system file via the SCSI bus.

Note: Be sure to off-load dumps for both drive 1 and drive 2 in Models C02 and C12.

The dump icon **!** appears when the dump is available, and remains on the screen to indicate that trace data is stored in the device.

Notes:

1. Trace data is volatile and will be lost if you switch OFF power to the device.
2. If you force a dump when the dump icon **!** is already displayed, the existing trace data will be overlayed by the new trace data.

You may require information from the customer during this process.

To force and store a diagnostic dump on these devices, perform the following steps:

1. Verify that the IBM tape subsystem is powered ON and online.
2. Enter the following command to force the dump, substituting **n** with the actual value from the device special file associated with the target device:

   ```
   /opt/IBMtape/tapeutil -f /dev/rmt/nst -o fdp -v
   ```

3. Determine the location for the dump to be stored (that is, floppy diskette such as /vol/dev/aliases/floppy0 or host file such as /tmp/diag_dump.file).
4. Enter the following command, substituting **file** with the actual path and filename of the dump destination file, and substituting **n** with the actual value from the device special file associated with the dump device:

   ```
   /opt/IBMtape/tapeutil -f /dev/rmt/nst -o sdp -z file -v
   ```

5. The dump may also be written to a tape cartridge mounted in the dump device by using ***tapedrive*** for **file**

Note: The diagnostic dump procedure may also be performed using the menu-driven interface of the tapeutil program. To invoke the tapeutil program in this format, enter the following command, and then choose option 1 to open the device, followed by option 5 to force a dump, and option 6 to store the dump:

```
/opt/IBMtape/tapeutil
```

Windows NT Environment

Starting NT UTIL In a Windows NT System

from a Windows NT System

NTUTIL

Refer to APPENDA for more information on using *ntutil* in the Windows NT system environment. For a complete update on device driver software, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154.

You may require assistance from the customer during this process.

Note: If updating microcode in a 3570 Model C02 or C12, update the microcode in drive 2 **before** drive 1. Then update the microcode in drive 1. **Both tape drives in the 3570 must be at the same level for the library to operate correctly.**

1. This is a common start, open, and close procedure.
2. Click the **Start** icon.
3. Click on the **Program.**
4. Click on the **Command Prompt**

   The cursor will be at the right of the default prompt **C:\>** Any data that is read will be stored in that drive/directory and any data writen will try to originate from the same drive/directory. If you wish to read or write to or from a different drive/directory then enter **cd newdir** (where newdir is a fully qualified valid drive and dir) to change to the new directory.
5. Enter **ntutil**
6. The following menu will appear on the screen.

```
Manual Test:
Batch Test:
Exit ntutil:
    Enter Command:
```

7. Select **Manual Test**

   The Manual Menu will appear see Figure 264 on page PROC-59.
8. Select Open by its number **20** open.

```
SYNTAX: open device-file RW
                $D        RO

          where RW means read/write
                RO means read only

          for example,
                open RW       means open default device tape
                open $D RO     means open device specified by -d option
                open tape  RO   means open device tape

     If the special file $D is specified, the -d value must be given on the
     command line, and will be substituted for $D.
```

9. * * * Select the desired test to run by it's number. * * *

   Run the appropriate test(s) and complete the necessary task(s).

   * * * Then you will return here to finish the call. * * *

| 10. Select close **21** and enter.
| 11. After tests are complete, quit the **Command Prompt** window by clicking on the **X** in the upper right hand corner of the screen.
| 12. Call completed see “End of Call” on page PROC-12.

| BASE MODE

```
Test tool version x.x.x.x
Variable settings
==================== BASE MODE ========================================
gp->fd =-1  gp->fd1=-1 block size=1 24  block count=1
hex block id =
return_error_when_fail 1  exit_on_unexpected_result    trace_flag

manual test menu:
=============================================================================
  1: set device special file           2: display symbols
  3: set block size R/W (now !  fixed)   4: set block count (R/W)
  5: set return error when fail         6: set/reset trace
  7: set exit on unexpected result      8: Library Mode
=============================================================================
 2 : open                            21: close
 22: read                            23: write
 24: read and display block             25: flush (buffer->media)
 26: read block id                    27: erase
 28: locate block id                   29: display block data
=============================================================================
 3 : write filemark(s)                 31: rewind
 32: forward space filemark(s)          33: unload
 34: reverse space filemark(s)          35: load (359  System Mode)
 36: forward space record(s)           37: return error
 38: reverse space record(s)           39: test unit ready
 43: set media parms (block size)       44: set dev parms (compression)
 46: get device information
 48: get medium information            49: inquiry
 53: space EOD                        54: display message
=============================================================================
 7 : system command

=============================================================================
 8 : Force Dump                      81: Read Dump
 82: Update Code                     83: Log Sense
 84: Get Last Sense                   85: Get Version
 86: Associative/Persistent WProtect   87: Read/Write Test
 88: Find Devices                    89: Get MTDevice info
=============================================================================
 99: return to main menu

=============================================================================
enter selection:
```

| *Figure 264. Base Mode*

Updating Microcode From a Windows NT System Using NTUTIL

updating ucode

Refer to *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154 for details of the **NT Util** program in the WINDOWS NT system.

You may require assistance from the customer during this process.

Note: If updating microcode in a 3570 Model C02 or C12, update the microcode in drive 2 **before** drive 1. Then update the microcode in drive 1. **Both tape drives in the 3570 must be at the same level for the library to operate correctly.**

The 3570 support downloading a new microcode image from the host system via the SCSI bus. This procedure down-loads microcode to the tape drive from a file or diskette.

Note: The microcode download procedure may be performed using the menu-driven interface of the ntutil program. To invoke the ntutil program in this format go to the common start: followed commands: option 20 to open the device, followed by option 85 to query the current device microcode level, and option 82 to download new microcode:

1. Verify that the IBM tape subsystem is powered ON and on-line.
2. Verify that the tape drive does not currently have a tape cartridge loaded.
3. Start ntutil and open the drive! see :refid=ntst1. for procedure.
4. Determine the current version of microcode present on the device by entering the following command **85** (Get Version).
5. Update the code by entering the following command **82** (Update Code).

   Ntutil will prompt you for the code level.
6. Enter the code level (**d0i9_430**) for example.

   This command will call the device driver DeviceIoControl() entry point and load the new ucode.
7. Go to close routine and finish :refid=ntst5..

Off-loading Dumps to a Windows NT System Using NTUTIL

NTUTIL

Refer to APPENDA for more information on using *ntutil* in the Windows NT system environment. For a complete update on device driver software, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154.

Note: The dump procedure may be performed using the menu-driven interface of the ntutil program. To invoke the ntutil program in this format, enter the common commands and option 80 to Force Dump:

Remember the dump goes to the default drive/directory.

1. Verify that the IBM tape subsystem is powered ON and online.
2. Verify that the tape drive currently has a tape cartridge loaded.
3. Start ntutil and open the drive! see 1 on page PROC-58 for procedure.
4. Determine the current version of microcode present on the device by entering the following command **85** (Get Version).
5. Force the dump by entering the following command **80** (Force Dump)

   If operation completed successful (Message **Error_Success**) then go to end of test 11 on page PROC-59 else go to Start Page. “SCSI Bus Problem Determination” on page PROC-79.

Exercising a Drive Attached to a Windows NT System Using NTUTIL

NTUTIL

Refer to APPENDA for more information on using *ntutil* in the Windows NT system environment. For a complete update on device driver software, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154.

Note: The drive exercise procedure may be performed using the menu-driven interface of the NTUTIL program. To invoke the NTUTIL program in this format, enter the common commands and option 87 to Read/Write Test:

Remember the read/write test writes on the tape. **Use a scratch tape.**

1. Verify that the IBM tape subsystem is powered ON and online.
2. Verify that the tape drive currently has a scratch tape cartridge loaded.
3. Start NTUTIL and open the drive. See 1 on page PROC-58 for procedure.
4. Either do a **rewind** (31) or a **test unit ready** (39) to clear not ready to ready status. If status is present, NTUTIL will issue a 1110 (ERROR_MEDIA_CHANGED) message.
5. Read and write on the tape by using the following command **87** (Read/Write Test).

   If operation completed successful (Message **Error_Success**) then go to end of test 11 on page PROC-59 else go to Start Page. “SCSI Bus Problem Determination” on page PROC-79.

Checking the SCSI Attachment in a Windows NT Environment

NTUTIL

Refer to APPENDA for more information on using *ntutil* in the Windows NT system environment. For a complete update on device driver software, see *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154.

Note: The 3570 must be powered ON before the Windows NT device power is switched ON.

If the 3570 power is **not** ON when the Windows NT power is switched ON, the Windows NT device will not recognize the 3570. If the 3570 power is switched ON **after** the Windows NT device power has been switched ON, the Windows NT device will still not recognize the 3570.

Note: The sense procedure may be performed using the menu-driven interface of the ntutil program. To invoke the ntutil program in this format enter the common commands, item 83 to Force the Log of Sense, and item 84 Get Last Sense.

To test out the SCSI interface execute a force sense followed by a Get last sense:

1. Verify that the IBM tape subsystem is powered ON and online.
2. Verify that the tape drive currently has a tape cartridge loaded.
3. Start ntutil and open the drive! see 1 on page PROC-58 for procedure.
4. Execute the following command **83** (Log Sense).
5. Read the sense information by executing the following command **84** (Get Last Sense).

If operation completed successful (Message **Error_Success**) then go to end of test 11 on page PROC-59 else go to SCSI Wrap Test “SCSI Bus Problem Determination” on page PROC-79.

Mapping Element Addresses to Physical Locations

Each physical location capable of holding a tape cartridge is assigned an element address value. The physical cartridge locations and their element address values are shown in Figure 265. (Figure 265 is a top view of the library with the back at the top of the figure.)

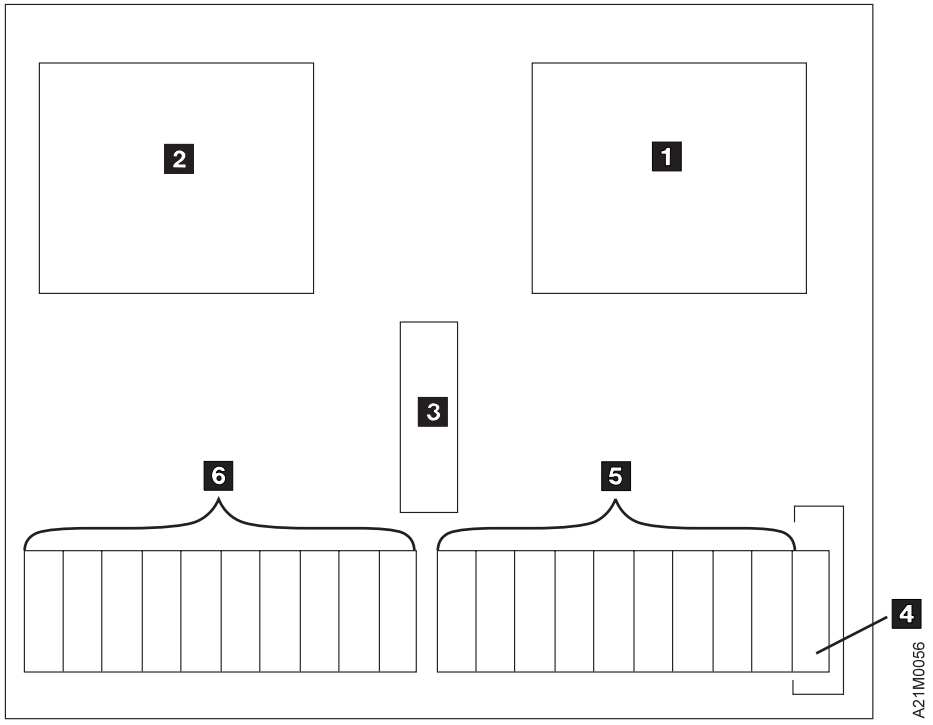


Figure 265. Magstar MP Element Address

1 Drive 1 (Data Transfer, Element Address 16)
2 Drive 2 (Data Transfer, Element Address 17)
3 Transport Mechanism (Medium Transport, Element Address 0)
4 Priority Cell (Import/Export, Element Address 31)
5 Magazine 1 excluding Priority Cell (Storage, Element Addresses 32-40 from right to left)
6 Magazine 2 excluding Priority Cell (Storage, Element Addresses 41-50 from right to left)

The SCSI-2 model assumes that each physical component has one unique element address and that all elements are visible to all hosts. SCSI-2 does not directly discuss library segmentation which occurs in a Split Configuration. Segmentation results in a subset of the library physical components becoming unavailable to a host. To handle library segmentation, the following rules apply:

1. The element address mapping (as indicated in Figure 265) is unchanged for a Split Configuration.
2. If a physical component is unavailable to a host because of Split Library configuration, the element address associated with that physical component is also unavailable as reflected in Mode Page X'ID' (Element Address Assignment) and in the response to a Read Element Status command.
3. Mode Page X'1F' (Device Capabilities) is unchanged for a Split Configuration.
4. For a Move Medium command or Reserve command, the elements which are unavailable are treated as invalid element addresses. Any attempt to access or reserve an unavailable element results in a CHECK CONDITION status.

Checking the SCSI Attachment in an AS/400 Environment

If you are having problems with your connection to an AS/400, review the following **Hints** for possible causes, then continue with the SCSI checkout:

AS/400 Hints:

PTFs are required prior to attaching a 3570 Magstar MP Tape Subsystem to an AS/400 system. The PTFs for all supported AS/400 releases are listed in INFO APAR II10363. This information APAR contains the most current PTF information for all supported releases and important information concerning the attachment of the 3570 to the AS/400.

After installing the appropriate PTFs, a SAVSYS must be done to ensure the new IOP code is available during a system recovery.

The FC 2729 adapter shares a Combined Function IOP with the communications subsystems. Resetting the 2729 will disrupt the associated communications adapters.

Whenever possible, create the 3570 configuration by performing an IPL of the I/O processor after attaching it to the 3570. Ensure that the AS/400 system value for Auto-configure Devices is set to ON. The I/O processor may be IPLed by varying OFF and varying ON with reset or by using the System Service Tools (STRSST). Refer to the *Application System/400 Service Functions User's Guide* for information about the System Service Tools.

For Alt-IPL ("D" IPL) use Automatic or Manual Mode. Random mode can be used after XPF has been installed and the device configurations have been created or restored. When using BRMS/400, follow the recovery report.

When upgrading or installing a new release of OS/400 the 3570 must be in Automatic or Manual mode.

Base and Split configurations are supported. When switching between Base and Split configuration the I/O processor must be reloaded. To reload the I/O processor, vary OFF and vary ON with reset or use STRSST to IPL the I/O processor.

In Base configuration, each tape drive must be set to a different SCSI address.

For Operating System/400 V3R1 and V3R2:

The Magstar MP will be configured as TAPxx, where xx is number of the next tape device.

A library device must be created to operate in Random mode.

The VFYTAP command must be run in MANUAL mode or AUTOMATIC mode. Inconsistent results happen when run in Random mode.

For Operating System/400 V3R6 and V3R7:

The Magstar MP configuration will consist of both a tape device (TAPxx), and a library device (TAPLIByy for V3R6; TAPMLByy for V3R7), where xx is number of the next tape device and yy is the number of the next library device.

The system will configure with TAPLIByy or TAPMLByy as varied ON.

- To run with TAPLIByy or TAPMLByy configurations, the 3570 must be in Random mode.
- When not running in library mode, vary TAPLIByy or TAPMLByy OFF and vary TAPxx ON.
- **Never** have both TAPLIByy or TAPMLByy and TAPxx varied ON at the same time.

Run the VFYTAP command in MANUAL mode or AUTOMATIC mode.

BRMS/400 Requirements

For OS/400 releases V3R1 and V3R2, the library device must be placed in "hold" status when switching from Random mode to Automatic or Manual mode. Use the WRKDEVBRM command to hold/release the library device.

AS/400 SCSI Checkout

To verify that a 3570 is attached properly to an AS/400, do the following:

1. Type **WRKCFGSTS *DEV ASTLVL(*BASIC)** at the prompt. The following screen appears, which shows all of the attached tape device names. In this example, TAP13 1 is the device name to use for VFYTAP.

```
                         Work with Tape Devices
                                                 System: 12345678
Type options below, then press Enter.
  1=Make available    2=Make unavailable      5=Display details
  7=Display message   8=Work with controller   9=Rename
  13=Change description

Opt  Device     Type    Status
     TAPM1.B1   357     Unavailable (use Opt 1)
     TAP 1      638     Unavailable (use Opt 1)
     TAP 2      349     Unavailable (use Opt 1)
     TAP 3      349     Unavailable (use Opt 1)
     TAP 9      639     Unavailable (use Opt 1)
     TAP1       348     Unavailable (use Opt 1)
     TAP11      348     Unavailable (use Opt 1)
     TAP13  1    357     Available to use
     TAP14      639     Unavailable (use Opt 1)
     TAP15      638     Unavailable (use Opt 1)
     TAP16      639     Available to use
     TAP17      638     Available to use
                                                              Bottom
F1=Help  F3=Exit  F5=Refresh F9=Command line F11=Display descriptions
F12=Cancel     F17=Top    F18=Bottom  F21=Select assistance level
```

Note: If the Magstar MP is not recognized by the host, re-IPL the AS/400 IOP card to which the Magstar MP is attached. Ensure that the AS/400 System Value for Auto-configure Devices is set to **on**.

2. Press F12 to get a command line.
3. Type **VFYTAP** (the Verify Tape command) on the AS/400 command line.
4. Type **tap13**, the device associated with the 3570 tape device.
5. Select the **Basic read/write test** 2 option on the Tape Device Test Menu and follow the instructions provided.

```
 AJCUHQV2                                Tape Device Test Menu

      Select one of the following:

          1. Basic read/write test  2
          2. Read/write reliability test
          3. Exit test menu  3
 Selection
     _

 F3=Exit
```

The following screen is displayed when the verification test completes successfully:

```
AJCUHQV3        Tape Problem Analysis

     The verification test completed successfully.
     Press Enter to continue.
```

6. When the Tape Device Test menu is displayed, select **Exit test menu** 3 .

Checking the SCSI Attachment in an AIX Environment

The devices must be fully installed and the host device drives must be configured and available. If you are not familiar with RS/6000, you may want to ask the system operator to **configure** and **make available** the drive or drives you wish to test if this has not been done before. See *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide*, GC35-0154 for information about installing and using the IBM SCSI tape drive, medium changer, and library device drivers. Also, "Installation and Configuration Instructions" in the above guide describes the *smit* and *cfgmgr* commands.

Figure 266 shows an example of the software and hardware paths that are used in the following tests. The figure illustrates unique SCSI *initiator* addresses for a configuration with more than one initiator sharing a SCSI bus.

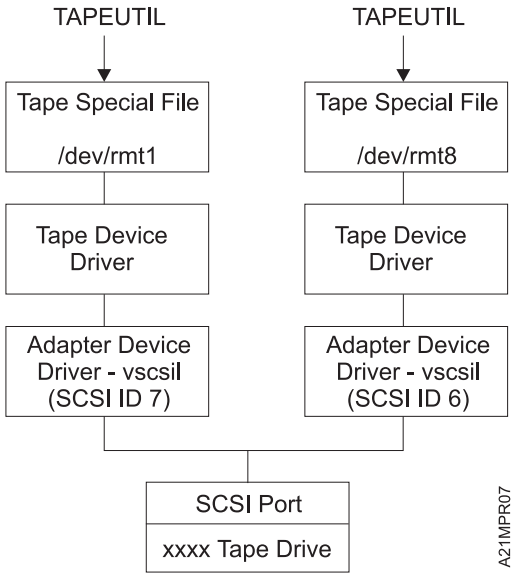


Figure 266. Host Attachment Example

Note: The SCSI port of a 3570 is connected to two hosts. The host drivers are configured so that one initiator is at SCSI address 7 and one initiator is at SCSI address 6. The tape special file names on each host are independent and may be different.

Inquiry Command

1. To check installed tape devices, type the **lsdev -Cc tape** command. From the listing of devices, remember the ones you are to test. In the following example, device rmt0 is *defined* 1 to the host, but is not available. Device rmt1 is *available*, which indicates it can communicate with the host. The SCSI port address of the devices 2 are also shown.

```
          1
                        2

rmt  Defined     - 2-  -2  IBM 357  Tape Drive and Medium Changer
rmt1 Available   - 2-  -1  IBM 357  Tape Drive and Medium Changer
```

   The example in the following text refers to the device as *rmt1*. If you do not know which devices to test, ask the customer's system administrator.

2. Type **tapeutil** and the following menu appears:

```
 General Commands:
   1. Open a Device           5. Inquiry          9. Log Sense Page
   2. Close a Device          6. Test Unit Ready   1 . Mode Sense Page
   3. Device Info            7. Reserve Device    11. Release Device
   4. Tape Drive Service Aids  8. Request Sense     Q. Quit Program

 Medium Changer Commands:
  12. Element Information     16. Move Medium
  13. Position To Element     17. Load/Unload Medium
  14. Element Inventory       18. Initialize Element Status
  15. Prevent Medium Removal   19. Allow Medium Removal

 Tape Commands:
  2 . Query/Set Parameters    3 . Read and Write Tests
  21. Load Tape              31. Unload Tape
  22. Rewind                 32. Erase
  23. Erase Gap              33. Write Filemarks
  24. Forward Space Filemarks  34. Backward Space Filemarks
  25. Forward Space Records    35. Backward Space Records
  26. Space to End of Data     36. Query/Set Tape Position
  27. Log Sense              37. Library Sequence Number
  28. Display Message         38. Read or Write Files
  29. Synchronize Buffers     39. Recover Buffer Data
Enter Selection:
```

3. At the **Enter Selection:** prompt, type **1** to open a device.
4. At the **Enter the device special file name:** prompt, type **/dev/rmt1** (or your actual device).
5. At the **Select mode (1=Read/Write, 2=Read Only, 3=Write Only, 4=Append):** prompt, type **1** to receive the **Opening device...** prompt.
6. At the **Hit any key to continue...** prompt, press Enter.

```
 General Commands:
   1. Open a Device           5. Inquiry          9. Log Sense Page
   2. Close a Device          6. Test Unit Ready   1 . Mode Sense Page
```

7. At the **Enter Selection for /dev/rmt1:** prompt, respond with **5** to receive the **Issuing inquiry...** and the following data:

   Note: The display in this step may not match the example exactly.

```
Inquiry Data,  Length 127

           1  2 3  4 5  6 7  8 9  A B  C D  E F    123456789ABCDEF
       -  18   2 2 33     38 4942 4D2  2 2  2 2     ..3..8IBM
    1  - 3 33 3539 3 45 3 31 3 33 3539 3 43 3131    357 C11 357 C11
    2  - 3344 32 1 4353 3 3  3 3  3 3  3 3  3 31   3D2.CS         1
    3  - 3632 2 41 C     18   4D  61 1 82D  61 1   62 A.....Pa..Pa.
    4  - 8 D                          61 1   .Pa.. a..Pa..Pa.
    5  -  2D          Example                 .Pa..Pa.........
    6  -                                     ................
    7  -                                          ................
```

8. At the **Hit any key to continue...** prompt, press Enter. If the Inquiry Command fails, continue diagnosis at “SCSI Bus Problem Determination” on page PROC-79.

```
 General Commands:
   1. Open a Device           5. Inquiry          9. Log Sense Page
   2. Close a Device          6. Test Unit Ready   1 . Mode Sense Page
```

9. At the **Enter Selection for /dev/rmt1:** prompt, type **2**.

   The system response is **Device closed...**

Read and Write Tests

Load a scratch cartridge in the 3570 before you start this test.

Attention: This test overwrites any data or tape label on the tape.

1. If the response from the previous test is **Hit any key to continue...**; press Enter. Otherwise, type **tapeutil** to restart.

```
General Commands:
  1. Open a Device          5. Inquiry          9. Log Sense Page
  2. Close a Device         6. Test Unit Ready   1 . Mode Sense Page
```

2. At the **Enter Selection:** prompt, type **1**.
3. At the **Enter the device special file name:** prompt, type **/dev/rmt1** (or your specific device).
4. At the **Select mode (1=Read/Write, 2=Read Only, 3=Write Only, 4=Append):** prompt. type **1**.

   At the **Opening device...** and the **Hit any key to continue...**. prompts, press Enter.

```
General Commands:
  1. Open a Device          5. Inquiry          9. Log Sense Page
  2. Close a Device         6. Test Unit Ready   1 . Mode Sense Page
  3. Device Info            7. Reserve Device   11. Release Device
  4. Tape Drive Service Aids  8. Request Sense     Q. Quit Program

Medium Changer Commands:
  12. Element Information     16. Move Medium
  13. Position To Element     17. Load/Unload Medium
  14. Element Inventory       18. Initialize Element Status
  15. Prevent Medium Removal   19. Allow Medium Removal

Tape Commands:
  2 . Query/Set Parameters    3 . Read and Write Tests
```

5. At the **Enter Selection for /dev/rmt1:** prompt, type **30:**.
6. At the **Select test (1=Read/Write, 2=Read Only, 3=Write Only):** prompt, type **1**.
7. At the **Hit <Enter> for default 10240 block size or enter new block size:**, type **262144** to ensure that the adapter device driver *vsci1* is properly installed and configured.
8. At the **Hit <Enter> for default 20 blocks per read/write or enter new blocks:** prompt, type **1**.
9. At the **Hit <Enter> for default 1 repetition or enter new repetition:** prompt, press Enter.

   The following data is displayed:

```
Read/Write test, blocksize 262144 count 1 repetition 1
Setting block size...

Read/Write test pass 1
Writing 262144 bytes, 1 blocks...
Write complete, bytes written 262144, blocks 1
Writing 2 file marks...
Backward spacing 2 file marks...
Backward spacing 1 records...
Reading 262144 bytes, 1 blocks...
Read complete, bytes read 262144, blocks 1
Forward spacing file mark...
Data verification complete, no discrepancies found

Read/Write test completed, total bytes written 262144
```

10. At the **Hit any key to continue...** prompt, press Enter.

```
General Commands:
  1. Open a Device          5. Inquiry          9. Log Sense Page
  2. Close a Device         6. Test Unit Ready   1 . Mode Sense Page
```

11. At the **Enter Selection for /dev/rmt1:** prompt, type **2**.

    At the **Device closed...**
    Hit any key to continue... prompt, press Enter.

```
General Commands:
  1. Open a Device          5. Inquiry          9. Log Sense Page
  2. Close a Device         6. Test Unit Ready   1 . Mode Sense Page
```

12. At the **Enter Selection:** prompt, type **q** to stop the tapeutil program.

Checking the SCSI Attachment in a Sun Environment

TAPEUTIL

Refer to *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154 for details of the **tapeutil** program in the Sun (Solaris) system.

The devices must be fully installed and the host device drives must be configured and available before *tapeutil* can operate.

Note: A synopsis of the commands may be found in "TAPEUTIL in a Sun (Solaris) System Environment" on page APPENDA-2.

To verify that the device driver and the devices are functional, use the **tapeutil** program, which is provided with the *IBM SCSI Tape and Medium Changer Device Driver for Solaris*.

Figure 266 on page PROC-69 shows an example of the software and hardware paths that are used in the following tests.

1. Load a scratch tape cartridge in the IBM 3570.
   Attention: This test overwrites any data or label existing on the tape cartridge.
2. Type **/opt/IBMTape/tapeutil**. The menu shown in Figure 267 on page PROC-74 will appear. (This menu reappears at the completion of each command.)

```
+-------------------------------------------------------------+
|     IBM SCSI TAPE & MEDIUM CHANGER UTILITY PROGRAM          |
+-----------------------------+-------------------------------+
|  GENERAL COMMANDS           |  BASIC SCSI COMMANDS          |
|  1: Open Device             |   9: Test Unit Ready          |
|  2: Close Device            |  1 : Inquiry                  |
|  D: Device Type             |  11: Request Sense            |
|  M: Menu Refresh            |  12: Reserve                  |
|  Q: Quit Program            |  13: Release                  |
+-----------------------------+-------------------------------+
|  SERVICE COMMANDS           |  MEDIUM CHANGER COMMANDS      |
|  3: Query Serial Number     |  14: Move Medium              |
|  4: Query Microcode Level   |  15: Position To Element      |
|  5: Force Dump              |  16: Element Information      |
|  6: Store Dump              |  17: Inventory                |
|  7: Download Microcode      |  18: Audit                    |
|  8: Format Cartridge        |  19: Lock/Unlock Door         |
+-----------------------------+-------------------------------+
|                TAPE DRIVE COMMANDS                          |
|  2 : Read Data               32: Locate End Of Data         |
|  21: Write Data              33: Get Record Size            |
|  22: Write File Mark         34: Set Record Size            |
|  23: Erase Tape              35: Get Device Status          |
|  24: Rewind                  36: Get Device Info            |
|  25: Retension               37: Get Media Info             |
|  26: Offline                 38: Get Position               |
|  27: Load/Unload Tape        39: Set Position               |
|  28: Forward Space File       4 : Get Parameter             |
|  29: Backward Space File     41: Set Parameter              |
|  3 : Forward Space Record    42: Sync Buffer                |
|  31: Backward Space Record   43: Display Message            |
+-------------------------------------------------------------+
```

Figure 267. TAPEUTIL Program Menu

3. At the **Enter Selection:** prompt, select **1** to open the device.
4. At the **Enter device special file name:** prompt, type **/dev/rmt/1st** (or the actual device special file for your device).
5. At the **Select mode (1=read-write, 2=read, 3=write, 4=append):** prompt, type **1**. The **Device opened** response is displayed.
6. At the **Enter Selection:** prompt, select **10** to receive the device inquiry data. The inquiry data follows:

   Note: Your data may differ. This is only an example.

```
The IOC_INQUIRY ioctl succeeded.    (EXAMPLE)

The inquiry data is:

 1 8   2  2 33       38 49 42 4d 2  2  2  2  2
3  33 35 39 3  42 31 31 2  2  2  2  2  2  2  2
34 44 3  33 54 55 2  2  2  2  2  2  3  3  3
32 39 3  2   3       81
```

7. At the **Enter Selection:** prompt, select **9** to verify device test-unit ready. The response is:

```
The IOC_TEST_UNIT_READY ioctl succeeded.
```

8. At the **Enter Selection:** prompt, select **21** to perform write verification.
9. At the **Enter block size:** prompt, type **1024**.
10. At the **Enter blocking factor:** prompt, type **256**.
11. At the **Enter megabytes to write:** prompt, type **10**.
12. At the **Enter pattern file name:** prompt, press Enter.
13. At the **Enter random seed:** prompt, type **0**. The response is:

```
Generated 262144 bytes of random data using seed 7892.

Transferred 1 MB in 1.98 seconds for rate of 5.16MB/second.
```

14. At the **Enter Selection:** prompt, select **24** to rewind the tape. The response is:

```
The STIOC_TAPE_OP ioctl succeeded.
```

15. At the **Enter Selection:** prompt, select **20** to perform read verification.
16. At the **Enter block size:** prompt, type **1024**.
17. At the **Enter blocking factor:** prompt, type **256**.
18. At the **Enter megabytes to write:** prompt, type **10**. The response is:

```


Transferred 1 MB in 2.19 seconds for rate of 4.69MB/second.
```

19. At the **Enter Selection:** prompt, select **24** to rewind the tape. The response is:

```
The STIOC_TAPE_OP ioctl succeeded.
```

20. At the **Enter Selection:** prompt, select **2** to close the device. The **Device closed** response is displayed.
21. At the **Enter Selection:** prompt, select **Q** to exit the tapeutil program.

Checking the SCSI Attachment in a HP-UX Environment

TAPEUTIL

Refer to *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154 for details of the **tapeutil** program in the HP-UX system.

The devices must be fully installed and the host device drives must be configured and available.

Figure 266 on page PROC-69 shows an example of the software and hardware paths that are used in the following tests. The figure illustrates unique SCSI *initiator* addresses for a configuration with more than one initiator sharing a SCSI bus.

Note: In this example, the SCSI port of the 3570 is connected to two hosts. The host drivers are configured so that one initiator is at SCSI address 7 and one initiator is at SCSI address 6. The tape special file names on each host are independent and may be different.

Refer to "TAPEUTIL in a HP-UX System Environment" on page APPENDA-9 and perform the following commands using the command details in that section:

1. Inquiry Command
2. Read and Write Tests

At the conclusion of the test, at the **Enter Selection:** prompt, type **q** to stop the tapeutil program.

Checking the SCSI Attachment in a Windows NT Environment

NTUTIL

Refer to *IBM SCSI Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide* GC35-0154 for details of the **ntutil** program in the Windows NT system.

Note: The 3570 must be powered ON before the Windows NT device power is switched ON.

If the 3570 power is **not** ON when the Windows NT power is switched ON, the Windows NT device will not recognize the 3570. If the 3570 power is switched ON **after** the Windows NT device power has been switched ON, the Windows NT device will still not recognize the 3570.

SCSI Port Wrap Test

Use **only** P/N 05H9163 for the SCSI wrap test; using the wrong wrap tool may cause the 3570 to not run the wrap test.

Note: Wrap tool P/N 05H9163 is not shipped with the machine but is available from your service branch.

To perform the SCSI wrap test on Drive 1, continue at "SCSI Wrap Test—Drive 1." To perform the SCSI wrap test on Drive 2, continue at "SCSI Wrap Test—Drive 2."

SCSI Wrap Test—Drive 1

1. Set the power switch to the Off position.
2. Disconnect the SCSI cables and terminators from Drive 1 before attaching the wrap tool.
3. Install the SCSI wrap tool in either of the SCSI connectors on drive 1.

   Note: When you switch off power to the 3570, wait approximately 5 seconds before you switch on power again.
4. Set the power switch to the On position. The wrap test runs automatically.

   This power-on test takes approximately 2.5 minutes to complete.
5. On library models, if the wrap tool is detected in drive 1 when power is turned on, the device will come up in CE Mode. If the device comes up in CE Mode, the wrap test was successful.

   Note: Device will not come up in CE Mode if wrap plug is installed in Drive 2. See "SCSI Wrap Test—Drive 2."

   If a failure occurs, a message can be posted in the operator panel, or the operator panel can be blank. If any of these conditions exist:

   a. Be sure that the wrap plug has no broken or bent pins which might have caused the wrap test to fail.
   b. Go to the START section for further analysis.
6. Set the power switch to the Off position and remove the SCSI wrap tool.
7. Repeat the above steps with the SCSI wrap tool on the other SCSI connector in Drive 1.
8. Re-connect the SCSI cables and terminators removed earlier.
9. If you want to perform the SCSI wrap test on Drive 2, continue at: "SCSI Wrap Test—Drive 2," otherwise return to the procedure that sent you here.

SCSI Wrap Test—Drive 2

1. Set the power switch to the Off position.
2. Disconnect the SCSI cables and terminators from Drive 2 before attaching the wrap tool.
3. Install the SCSI wrap tool in either of the SCSI connectors on drive 2.

   Note: When you switch off power to the 3570, wait approximately 5 seconds before you switch on power again.
4. Set the power switch to the On position. The device will come up in operator mode after the power-on test is completed. To run the wrap test on Drive 2, do the following:

   a. Switch to CE Mode. See "CE Mode Menus" on page PANEL-24.
   b. Select Drive 2. See "Drive Selection Menu" on page PANEL-14.

c. Select the Config/Install menu. See “CE Options Menu” on page PANEL-29.
d. Select the Wrap Tools option. See “CE Config/Install Menu” on page PANEL-39.
e. Observe the display for SCSI Wrap feedback. See “CE Wrap Tools Menu” on page PANEL-41 If the display shows SCSI: PRSNT, the wrap plug was detected and the test was successful. If the display shows SCSI: NOT PR, the wrap test was not successful.

5. If a failure occurs, a message will usually be posted in the operator panel, but at times the operator panel can be blank. If any of these conditions exist:
   a. Be sure that the wrap plug has no broken or bent pins which might have caused the wrap test to fail.
   b. Go to the START section for further analysis.
6. Set the power switch to the Off position and remove the SCSI wrap tool.
7. Repeat the above steps with the SCSI wrap tool on the other SCSI connector in Drive 2.
8. Re-connect the SCSI cables and terminators removed earlier.
9. If you want to perform the SCSI wrap test on Drive 1, continue at: “SCSI Wrap Test—Drive 1” on page PROC-77, otherwise return to the procedure that sent you here.

RS-422 Port Wrap Test

Use **only** P/N 39F3884 for the wrap test; using the wrong wrap tool may cause the 3570 to not run the wrap test.

Note: The RS-422 interposer and wrap plug are not shipped with the 3570 but are available through the service branch.

1. Set the power switch to the Off position.

   Note: When you switch off power to the 3570, wait approximately 5 seconds before you switch on power again.
2. Plug the 9-pin to 25-pin interposer P/N 05H3895 in the RS-422 port in the back of the drive. Plug the wrap plug P/N 39F3884 in the interposer.
3. Set the power switch to the On position. The wrap test runs automatically. When the drive detects that the wrap tool is installed in the port, the drive enters CE mode rather than operator mode during the power-on sequence.

   This power-on test takes approximately 2.5 minutes to complete.

   If a failure occurs, a message can be posted in the library operator panel display, or the library operator panel display can be blank. If any of these conditions exist, go to the START section for further analysis.
4. Set the power switch to the Off position and remove the wrap tool.
5. Return to the procedure that sent you here.

SCSI Bus Problem Determination

Use the “Solid Errors” or the “Intermittent Errors” on page PROC-81 procedure.

Solid Errors

Determine the number of drives on the SCSI bus.

Single Tape Drive on SCSI Bus

1. Check to see if drive power is on.
2. Check to see if the drive SCSI address is the same as the SCSI address being used by the host program.
3. If steps 1 and 2 are OK, run the SCSI wrap test. See “SCSI Port Wrap Test” on page PROC-77.

   Note: Refer to “SCSI Attachment” on page INST-43 to ensure that cables, interposers and terminators are installed correctly.

4. If the SCSI wrap test fails, replace the drive pack. See “Removal and Replacement Procedures—Drive Pack” on page CARR-7.
5. If the SCSI Wrap test runs successfully, you may want to confirm a problem still exists by performing one of the following:
   a. Check the SCSI attachment in an AIX Environment. See “Checking the SCSI Attachment in an AIX Environment” on page PROC-69.
   b. Check the SCSI attachment in an AS/400 Environment. See “Checking the SCSI Attachment in an AS/400 Environment” on page PROC-65.
   c. Check the SCSI attachment in an HP-UX Environment. See “Checking the SCSI Attachment in a HP-UX Environment” on page PROC-76
   d. Check the SCSI attachment in an Windows NT Environment. See “Checking the SCSI Attachment in a Windows NT Environment” on page PROC-63
   e. Check the SCSI attachment in a Sun Environment. See “Checking the SCSI Attachment in a Sun Environment” on page PROC-73.

   This will help ensure that the drive is available and properly configured at the host. After checking the SCSI attachment, if the problem still exists, replace the SCSI terminator (first), then the SCSI cable and the interposer (if installed).

   After replacing the SCSI terminator or SCSI cable and the interposer, if a problem still exists, the fault is with the host hardware or software. Go to the host service documentation to isolate the cause of the failure.

   Note: Refer to “SCSI Attachment” on page INST-43 to ensure that cables, interposers and terminators are installed correctly.

Multiple Tape Drives on SCSI Bus

1. Determine if the problem exists with more than one drive. If the problem is with all of the devices on the SCSI bus, either the bus is hung or the SCSI cable from the host to the first device on the bus is defective.
2. Check to make sure the SCSI cable from the host to first device is connected.
3. Disconnect all except the first drive on the SCSI bus. Move the terminator to the first SCSI device.

4. If the error still occurs, run the SCSI wrap test on the first drive. See “SCSI Port Wrap Test” on page PROC-77.
5. If the SCSI Wrap test fails, replace the first drive. (See “Removal and Replacement Procedures—Drive Pack” on page CARR-7)
6. If the SCSI Wrap test runs successful on the first drive, you may want to confirm a problem still exists by performing one of the following:
   a. Check the SCSI attachment in an AIX Environment. See “Checking the SCSI Attachment in an AIX Environment” on page PROC-69.
   b. Check the SCSI attachment in an AS/400 Environment. See “Checking the SCSI Attachment in an AS/400 Environment” on page PROC-65.
   c. Check the SCSI attachment in an HP-UX Environment. See “Checking the SCSI Attachment in a HP-UX Environment” on page PROC-76
   d. Check the SCSI attachment in an Windows NT Environment. See “Checking the SCSI Attachment in a Windows NT Environment” on page PROC-63
   e. Check the SCSI attachment in a Sun Environment. See “Checking the SCSI Attachment in a Sun Environment” on page PROC-73.

   This will help ensure that the drive is available and properly configured at the host. After checking the SCSI attachment, if the problem still exists, replace the SCSI terminator (first), then the SCSI cable and the interposer (if installed).

   After replacing the SCSI terminator or SCSI cable and the interposer, if a problem still exists, the fault is with the host hardware or software. Go to the host service documentation to isolate the cause of the failure.

   Note: Refer to “SCSI Attachment” on page INST-43 to ensure that cables, interposers and terminators are installed correctly.
7. If the error does not occur, connect one drive at a time back on the bus until the error reoccurs.

   Note: Ensure the SCSI terminator is always on the last drive on the bus.
8. When the error reoccurs, run the SCSI Wrap test on that drive. See “SCSI Port Wrap Test” on page PROC-77. If the test fails, replace the drive. (See “Removal and Replacement Procedures—Drive Pack” on page CARR-7.) If the test does not fail, you may want to confirm a problem still exists by performing one of the following:
   a. Check the SCSI attachment in an AIX Environment. See “Checking the SCSI Attachment in an AIX Environment” on page PROC-69.
   b. Check the SCSI attachment in an AS/400 Environment. See “Checking the SCSI Attachment in an AS/400 Environment” on page PROC-65.
   c. Check the SCSI attachment in an HP-UX Environment. See “Checking the SCSI Attachment in a HP-UX Environment” on page PROC-76.
   d. Check the SCSI attachment in an Windows NT Environment. See “Checking the SCSI Attachment in a Windows NT Environment” on page PROC-63.
   e. Check the SCSI attachment in a Sun Environment. See “Checking the SCSI Attachment in a Sun Environment” on page PROC-73.

   This will help ensure that the drive is available and properly configured at the host. After checking the SCSI attachment, if problem still exists, replace the SCSI terminator (first), then the SCSI cable to the drive and interposer (if installed).
9. If the problem is with two or more of the drives, locate the first drive on the bus that has the error and replace the SCSI cable connecting that drive and the interposer (if installed).

10. If only one drive on the bus has the failure, run the SCSI wrap test on that drive. See “SCSI Port Wrap Test” on page PROC-77.
11. If the SCSI Wrap test fails, replace the drive. (See “Removal and Replacement Procedures—Drive Pack” on page CARR-7.)
12. If the SCSI Wrap test is successful, you may want to confirm a problem still exists by performing one of the following:

    Note: Refer to “SCSI Attachment” on page INST-43 to ensure that cables, interposers and terminators are installed correctly.

    a. Check the SCSI attachment in an AIX Environment. See “Checking the SCSI Attachment in an AIX Environment” on page PROC-69.
    b. Check the SCSI attachment in an AS/400 Environment. See “Checking the SCSI Attachment in an AS/400 Environment” on page PROC-65.
    c. Check the SCSI attachment in an HP-UX Environment. See “Checking the SCSI Attachment in a HP-UX Environment” on page PROC-76.
    d. Check the SCSI attachment in an Windows NT Environment. See “Checking the SCSI Attachment in a Windows NT Environment” on page PROC-63.
    e. Check the SCSI attachment in a Sun Environment. See “Checking the SCSI Attachment in a Sun Environment” on page PROC-73.

    This will help ensure that the drive is available and properly configured at the host. After checking the SCSI attachment, if problem still exists, replace the SCSI terminator (first), then the SCSI cable to that drive and interposer (if installed).

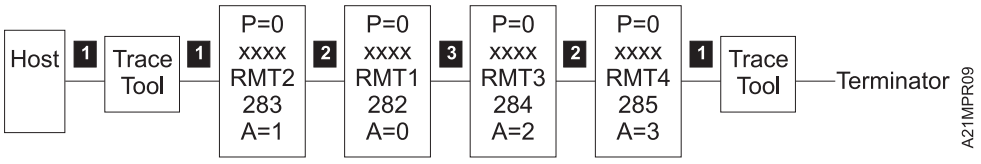
    Note: Refer to “SCSI Attachment” on page INST-43 to ensure that cables, interposers and terminators are installed correctly.

13. Go to “End of Call” on page PROC-12.

Intermittent Errors

This procedure defines using a *trace tool*. The trace tool is used under direct assistance from your next level of support.

1. Get the layout of failing SCSI bus. The maximum SCSI bus length for a differential SCSI bus is 25 M (82.02 ft) minus 0.2 M (0.66 ft) per connection. Figure 268 shows an example of how to calculate the bus length. Figure 269 on page PROC-82 shows the cable part numbers for each length.



23.7M = .5M +.2M + .5M +.2M + 4.5M +.2M +12M +.2M + 4.5M +.2M + .5M +.2M

Figure 268. SCSI Bus Cable Lengths

Figure 269. Part Numbers for the 3570 SCSI Bus Cables and Terminators

Key	Meters	Feet	P/N	Usual Connection
1	0.5	2	49G6456	Devices in same rack
2	4.5	15	49G6457	Side by side
3	12.0	39	49G6458	Device connection to the host
4	18.0	59	49G6459	Device connection to the host
5	N/A	N/A	05H3834	Interposer
6	N/A	N/A	61G8323	Interposer
7	N/A	N/A	50G0460	Interposer
8	N/A	N/A	61G8324	Terminator

2. Obtain the errors that the device reported to the host. For example, if the device is attached to a RS/6000, run **tapeutil**. Select option 9, **Error Log Analysis**. Gather all possible error information.

Note: If you run a SCSI bus trace tool and you have more than one drive running, the non-failing drives may overlay the error.

If Single Drive on SCSI Bus

1. Get a 3570 microcode dump and send it to your next level of support for analysis if the next step fails to fix the fault.
2. Replace or swap the SCSI bus cable and the terminator.
3. Start the trace of the next failure. For example, if you are using the AIX Tape Device Driver, type **atrc** to start the trace.
4. Connect the SCSI bus trace tool if a failure occurs. On the next failure, get a 3570 microcode dump and a SCSI bus trace. Send the dump and trace to your next level of support for analysis.

If Multiple Drives on SCSI Bus

If all drives fail:

1. Get a 3570 microcode dump and send it to your next level of support for analysis if next step fails.
2. Replace or swap the SCSI bus cable between the host and the first device and terminator.
3. Start the trace of the next failure. For example, if you are using the AIX Tape Device Driver, type **atrc** to start the trace.
4. Attach the SCSI bus trace tool if a failure occurs. On the next failure, get a 3570 microcode dump and a SCSI bus trace. Send the dump and the trace to your next level of support for analysis.

If end drives fail:

1. Get a 3570 microcode dump and send it to your next level of support for analysis if next step fails.
2. Replace or swap the SCSI bus cable and the terminator between the last drive that works and the first drive that fails.
3. Start the trace of the next failure. For example, if you are using the AIX Tape Device Driver, type **atrc** to start the trace.
4. Connect the SCSI bus trace tool if a failure occurs. On the next failure, get a 3570 microcode dump and a SCSI bus trace. Send the dump and the trace to your next level of support for analysis.

If only one drive (not end drive) fails:

1. Get a 3570 microcode dump and send it to your next level of support for analysis.

2. Start the trace of the next failure. For example, if you are using the AIX Tape Device Driver, type **atrc** to start the trace.
3. Trace only the failing drive or run only the failing drive.
4. Connect the SCSI bus trace tool if a failure occurs.
5. On the next failure, get a 3570 microcode dump and a SCSI bus trace. Send the dump and trace to your next level of support for analysis.

FID E5—Microcode Problem

Note: For drive only models, get the support data from the host.

If FID E5 is currently displayed on the drive, go to step 1. If FID E5 is not currently displayed on the drive, go to step 2.

1. If FID E5 **is currently displayed** on the drive:
   a. From FID display, write down the support data (12 characters).
   b. Call your next of support with the FID and support data to determine if this problem is a new or known microcode problem.
   c. For *known* microcode problems, ask your next level of support to see if a fix exists on latest EC Level. If a fix exists, update the device to latest EC level.

      If a fix is not yet available, tell the customer that engineering is aware of problem and is working on a fix. Install the fix when available. For known microcode problems, use TAC M01.

New Microcode Problem

   d. For *new* microcode problems, you must provide a microcode dump, the reported FID, and FID support data to your next level of support.
   e. For certain failures, the drive automatically collects dump information. If the dump icon **! is displayed** when FID E5 is displayed, retrieve the dump via SCSI or cartridge and provide it to your next level of support.

      Note: Retrieve dumps for both drive 1 and drive 2 in dual drive models.

      See the START section entry point for microcode dump procedures. For new microcode problems, use TAC M02.
   f. If the dump icon is **not displayed** when FID E5 is displayed, a dump must be forced:
      1) Check with the customer to determine if they have collected a dump via SCSI for this problem (could be reason why no dump icon is displayed).
      2) If the customer has the dump data, provide it to your next level of support.
      3) If the customer does not have dump data or is not sure, go to CE Main Dump menu, and select **Force Dump**. A dump is available when the dump icon is displayed.
      4) Retrieve the dump via SCSI or cartridge and provide it to your next level of support. See the START section entry point for microcode dump procedures. For new microcode problems, use TAC M02.

End of New Microcode Problem

2. If FID E5 is **not currently displayed** on the drive:
   a. Look at the FID log for most recent FID E5 entry. From the FID log, write down the support data (12 characters). Call your next level of support with the FID and support data to determine if this problem is a new or known microcode problem.
   b. For *known* microcode problems, ask your next level of support to see if a fix exists on latest EC Level. If one exists, update customer to latest EC level.

      If a fix is not available, tell the customer that engineering is aware of problem and working on fix. Install the fix when available. For known microcode problems, use TAC M01.

c. For *new* microcode problems, a dump is needed. Check with customer to determine if they had collected a dump via SCSI for this problem when the FID and the dump icon was displayed. See "Microcode Dump Procedures" on page PROC-85.

   If the customer has the dump information, provide the dump, the FID, and the FID support data to your next level of support.

   If no dump exists, go to step 3. For new microcode problems, use TAC M02.

3. Determine if the customer can readily recreate the FID E5 message.

   If the customer **can** readily perform operations and/or run job that caused the E5 message, wait until it occurs and follow the procedure starting at step 1 on page PROC-84.

   If the customer **cannot** readily recreate the message or it is an inconvenient time, the following options exist to acquire the dump for the next level of support:

   a. Allow the problem to reoccur and customer take the initiative.

   b. The customer can leave the drive with FID E5 message displayed and then call for service.

   c. If the dump icon is also displayed, the customer can retrieve the dump via SCSI (if host device driver software supports the dump function). See "Microcode Dump Procedures."

   d. If the dump icon is not displayed, the customer can force an error dump (Op Services menu), which provides a FID FF and the dump icon. The FID FF indication means that a dump was forced (information message). The icon is for the FID E5, so now the customer can retrieve a dump via SCSI (if the host device driver software supports the dump function). See "Microcode Dump Procedures."

   e. If the customer does not take the initiative, you can set a microcode trap. From the 12-character support data, do the following:

      1) Use the first four characters (if not starting with 'A' such as Axxx). Use the second set of four characters if first four characters are Axxx.

      2) Take the four characters (FSC) and select **UCODE TRAP** under the CE SERVICE UTILITIES Menu. Use the **ADD FSC TRAP** function. Refer to "Set Error Match Trap (To Get a Dump)" on page PROC-44. With this trap set, a dump will automatically be taken when this FSC is encountered, and the dump icon is displayed.

      3) The customer can retrieve the dump via SCSI for you or call you when the dump icon appears. See "Microcode Dump Procedures."

4. Return to the procedure that sent you here or go to "End of Call" on page PROC-12.

Microcode Dump Procedures: To get a microcode dump via the host through the SCSI interface or via a cartridge, see one of the following:

"Off-loading Dumps from 3570 to RS/6000 by Using TAPEUTIL" on page PROC-52
"Off-loading Dumps from 3570 Attached to AS/400" on page PROC-49
"Off-loading Dumps from 3570 to a Sun System by Using TAPEUTIL" on page PROC-55
"Off-loading Dumps from 3570 to Tape Cartridge (Library Models)" on page PROC-47
"Off-loading Dumps from 3570 to a HP-UX System by Using TAPEUTIL" on page PROC-57
"Off-loading Dumps to a Windows NT System Using NTUTIL" on page PROC-61

FID E6 or E7—Isolate Fault between Microcode and Hardware

Note: For drive only models, get the support data from the host.

FID E6 can be displayed with several lines of support data (abnormal condition). If FID E6 or FID E7 is displayed use “FID E6, E7—Normal FID Display Procedure.”

FID E6, E7—Normal FID Display Procedure

Note: For drive only models, get the support data from the host.

Use either the “FID Currently Displayed on Drive” or the “FID Not Currently Displayed on Drive” on page PROC-87 procedure.

FID Currently Displayed on Drive

1. From FID display, write down the support data (12 characters). Call your next level of support with the FID and support data to determine if this problem is a new or a known microcode problem.

Known Microcode Problem

2. For known microcode problems, see if a fix exists on latest EC Level. If a fix exists, update the drive to the latest EC level. For known microcode problems, use TAC M01.
3. If a fix does not exist, tell the customer that engineering is aware of problem and is working on a fix. Install the fix when it is available.

End of Known Microcode Problem

Possible New Microcode Problem

4. At this point it could be a new microcode problem or a hardware problem. Because it could be a potential new microcode problem, get a microcode dump.

Dump Icon (!) Also Displayed

For certain failures, the drive automatically collects dump information. Retrieve the dump via SCSI or cartridge (save for now).

Dump Icon Not Displayed

For certain failures, the drive automatically collects dump information, other failures require you to force a microcode dump.

1. Check with the customer to determine if they collected a dump via SCSI for this problem (could be why no dump icon is displayed).
2. If the customer has the dump data, save it for now.
3. If the customer does not have the dump data, or is not sure, go to the CE Main Dump menu, and select the **Force Dump** option. Dump exists when dump icon is displayed.
4. Retrieve a dump via SCSI or cartridge; save it for now.
5. Power OFF the device and then power ON the device.
6. Run Verify Fix diagnostics.

a. If you get a new or a different FID, go to the START section with that information.

b. If you get the same FID (E6 or E7), a hardware problem exists. Do not save the microcode dump. Perform actions for next FRU in the FID List.

c. If an error does not occur, the fault could be a new microcode problem or an intermittent electronics problem. Call your next level of support and provide them with dump and the 12-character support data. For new microcode problems, use TAC M02. For electronic problems, use TAC T21.

End of Possible New Microcode Problem

7. Go to "End of Call" on page PROC-12.

FID Not Currently Displayed on Drive

1. Look at the FID Log for most recent FID E6 or FID E7 entry.
2. From the FID Log, record the support data (12 characters). Call your next level of support with the FID and support data to determine if this problem is a known microcode problem.
3. For new or known microcode problems:
   a. From support, see if fix exists on latest EC Level. If a fix exists, update the drive to latest EC level.
   b. If a fix does not exist, tell customer that engineering is aware of problem and working on a fix. Install the fix when it is available. For known microcode problems, use TAC M01.
4. At this point it could be a new microcode problem or a hardware problem.
   a. Power OFF the device and then power ON the device.
   b. Run **Verify Fix** from the CE Options menu.
   c. If you get a new or a different FID, go to the START section with that information.
   d. If you get the same FID (E6 or E7), a hardware problem exists. Perform the actions for next FRU in FID List.
5. If an error does not occur, the fault could be a new microcode problem or an intermittent electronics problem. You need to get a dump.
   a. A dump may already exist. Check with the customer to determine if they had collected a dump via SCSI for this problem when the FID and the dump icon were displayed.

      If the customer has the dump data, provide the dump, the FID, and the FID support data to your next level of support.
   b. If no dump exists, go to step 6.
6. Determine if the customer can readily recreate the FID message.
7. If the customer can readily perform operations and/or run the job that caused the message, wait until it occurs and follow the procedure for the FID currently displayed.
8. If the customer cannot readily recreate the message, or if this is an inconvenient time, the following options exist to acquire the dump for your next level of support.

   Allow the problem to reoccur and have the customer take the initiative (go to step 8a) or you can take the initiative (go to step 9 on page PROC-88).
   a. The customer can leave the drive with FID message displayed and then call for service.

b. If the dump icon is also displayed, the customer can retrieve a dump via SCSI (if host device driver software supports).

c. If the dump icon is not displayed, the customer can select Force Error Dump (operator Services menu), which will provide a FID FF and the dump icon. FID FF indicates that a dump was forced (information message). The icon is for the FID E6, so now the customer can retrieve a dump via SCSI (if the host device driver software supports dumps)

9. You can take the initiative and Set a Microcode Trap as follows:

   a. From the 12-character support data, use the first four characters (if it does not start with 'A' such as Axxx). Use the second set of four characters if the first four are Axxx.

   b. Take the four characters (FSC) and use the Microcode Trap facility under CE Utilities menu. Use the Add FSC Trap function. With this trap set, a dump will automatically be taken when this FSC is encountered, and the dump icon is displayed. The customer can retrieve the dump via SCSI for you or can call for service when the dump icon appears.

10. Perform "End of Call" on page PROC-12 or return to the procedure that sent you here.

FID E6—Abnormal Display Condition

FID1 E6 is followed by four lines of support data. As the following example shows, each line contains eight characters:

```
     FID1 E6
FSC  AAAA BBBB
FSC  CCCC DDDD
FSC  EEEE FFFF
FSC  F 2  EEEE
```

When the above is displayed (EEEE is repeated), the operator panel is frozen (you cannot select another menu, and the push-buttons do not respond). Therefore, you cannot use the panel or cannot get dumps from either the host or the panel.

1. Obtain as much information as possible regarding the job being run, any drive operations, and the failure scenario. Record the information displayed on the panel (including the four lines of support data). Save this information for now.
2. Switch off power, wait 5 seconds and then switch on power to run the power-on self-test (POST).
   a. If you get a FID EA in small letters during the POST, replace the logic card.
   b. If you get a different FID, use it and go to the START section.
   c. If the POST is OK, select **Verify Fix** and **Test Drive**.
      1) If you get a FID, use it and go to the START section.
      2) If it runs OK, we are in recreate mode.
      3) If the customer can readily perform operations and/or run the job that caused this condition, wait until it occurs. Obtain as much information as possible regarding job being run, any drive operations, and failure scenario. Record all the information displayed on the panel.
      4) Call your next level of support.
      5) Use TAC M01 for known microcode problems and TAC M02 for new microcode problems.
      6) If the customer cannot readily recreate the message, or it is an inconvenient time, take the information previously saved and contact your next level of support.
      7) Use TAC M01 for known microcode problems and use TAC M02 for new microcode problems.
      8) Go to "End of Call" on page PROC-12.

FID FE—Isolate Fault between Media and Hardware

A FID FE will be generated when the drive experiences an error and cannot determine if the error was caused by the tape cartridge or by a problem in the drive hardware. The FID FE **is not** displayed on the drive, but is logged in the sense information that is returned to the host system. If the customer receives errors when reading or writing to the drive and there is no FID displayed on the drive, a FID FE was probably returned in the sense information to the host. If needed, refer to the MSG section to determine how to obtain service information from the host system.

To determine the cause of the read or write errors, follow the steps below:

1. Ensure that the tape drive is not overdue for cleaning. The need for cleaning is determined by the tape drive. The tape drive should be cleaned **only when indicated by the 3570**. Cleaning the drive too frequently with the cleaning tape may cause excessive wear of the head assembly and may lead to read and write errors.
   a. Model C00 should be cleaned only when the Clean LED indicator on the drive bezel flashes.
   b. Library models should be configured to have automatic cleaning enabled and should have the cleaning cartridge loaded into the cleaning cell. The operator should allow the 3570 tape drives to clean themselves when necessary.
   c. Inform the operator that the 3570 should not be cleaned unless indicated. Cleaning the drive too frequently with the cleaning tape may cause excessive wear of the head assembly and may contribute to read and write errors.
   d. If a Model C00, clean if the CLEAN LED is lit.
   e. If a Library Model tape drive, ensure that the AUTO CLEAN option is ON and that a cleaner cartridge is installed.
   f. Always avoid excessive cleaning as this will damage the heads.
2. Determine which VOLSER #s or cartridges are potential problems:
   a. Ask the customer to note which cartridges (VOLSER #s) fail during the operation. (It is possible to have multiple bad cartridges.)
   b. If the customer received MIM Messages at the host, get the “Message Code” and associated VOLSER #. Refer to “Message Codes” on page MSG-11 and Figure 67 on page MSG-7.

      Note: VOLSER # is not in MIM if your drive is at microcode level D1I4_xxx.

   c. Examine the FID FE log using the "LOGS" option of the CE Menu on the operator panel. Collect both FIDs and associated VOLSER #s. See Figure 128 on page PANEL-26 and “CE FID FE Log Menu” on page PANEL-43. The FE log will display entries for up to 10 of the most recent occurrences of the FE error. Each entry consists of four lines of information that pertain to the error:
      1) The first line provides an alternate FID number that you can use to isolate the problem.
      2) The second line displays the first and last FSC's and the microcode link.
      3) The third line provides a power-on date/time stamp which can be corollated with power-on hours in the "Show Statistics Menu", or a “Current Time Stamp” option (if present).
      4) The fourth line provides VOLSER# of the suspect cartridge.

         Note: VOLSER # is not in MIM if your drive is at microcode level D1I4_xxx.

   d. If the customer received SIM messages at the host, get VOLSER #s from Sense Data which accompanied the SIM. Refer to “Obtaining 3570 Drive Error Information at the Host” on page MSG-3 and Figure 65 on page MSG-6.

      Note: VOLSER # is not in Sense Data if your drive is at microcode level D1I4_xxx.

3. Determine if the cartridges are bad:

   a. If you have a MIM Message Code for the suspect VOLSER # cartridge, Perform the action stated in the “Message Codes” on page MSG-11.

   b. Examine cartridge for damage, for example, leader block not attached or cracked cartridge. If damaged, ask customer to repair or replace cartridge.

      Note: a repaired cartridge may be used long enough to recover data on that cartridge. When the data has been recovered, the cartridge should be taken out of service by the customer and discarded.

   c. If the cartridges look OK and you have access to another 3570 try the operation with the suspect cartridges in another 3570.

   d. Have the customer replace any cartridges that have failed in more than one 3570.

4. If the cartridges are not bad,

   a. Examine the log entries and using the alternate FID numbers provided, try to determine a common reason for the FE errors.
   b. Use the error log analysis procedure at “Error Log Analysis Procedure” on page PROC-39 as an approach to problem isolation.
   c. In EMEA only, isolate the problem to a drive FRU:, at 5.
   d. In other areas, replace the drive, at 6.

5. EMEA ONLY. Correct the failure:

   Note: These steps apply only in EMEA countries and regions that do not support the Drive Pack as a single FRU.

   a. Before replacing any FRUs, check the head cable connections. Make sure that the head cables are not loose. After replacing FRUs, go to 5b.

   b. Test the drive:

      1) Run drive verify diagnostics. See “Verify Fix—Drive-Only Models” on page PROC-7 or “CE Verify Fix on Library Models” on page PROC-10 for procedures. Use the CE scratch tape when you are prompted to load a tape.

         If the test fails with the same FID as the one reported or logged, go to “FID Entry Point” on page START-12 to fix the fault. Continue with the FRU list for this FID.

         If the test fails with a different FID from the one reported or logged, use the new FID and go to “FID Entry Point—EMEA Only” on page APPENDB-12 to fix the fault.

   c. If the customer still has a problem, replace the tape drive. See “Removal and Replacement Procedures—Drive Pack” on page CARR-7. If the “New Drive” does not fix the problem, reinstall the old drive and tell the customer that they have media problems.

6. NON-EMEA only. Correct the failure:

   Note: This step applies only to countries and regions that support the Drive Pack as a FRU.

   If the customer still has a problem, replace the tape drive. See “Removal and Replacement Procedures—Drive Pack” on page CARR-7. If the “New Drive” does not fix the problem, reinstall the old drive and tell the customer that they have media problems.

7. Perform “End of Call” on page PROC-12 or return to the procedure that sent you here.

No Response from Operator/CE Panel and No Message

1. If hung/frozen panel was reported by customer but **does not currently exist** on drive, ask the customer if they can readily recreate the failure. If they cannot recreate the failure or it is an inconvenient time for the customer, have them call for service when the fault reoccurs. When the fault occurs, ask them to leave the drive in that condition and call for service.

   If the host software supports microcode dumps, ask the customer to force a dump via SCSI and retrieve dump via SCSI because this type of fault prevents dumps via the panel.

   When the problem is recreated, with or without a dump, contact your next level of support.

2. If hung/frozen panel **currently exists** on the drive, check to see if the dump icon **!** is displayed.

   a. If the dump icon is not displayed and the host software supports microcode dumps, ask the customer to force a SCSI dump and retrieve the dump via SCSI.

   b. Get the dump and contact your next level of support.

   Note: A dump may be forced by pressing the Mode push-button 10 times in a row.

3. If the dump icon is displayed and the host software supports microcode dumps, ask the customer to retrieve the dump via SCSI.

   Take a microcode dump and contact your next level of support.

4. If the host does not support SCSI retrieval of dump:

   a. Press Change Mode to try to get into service mode.

   b. If you cannot get into service mode, contact your next level of support.

      Note: A dump may be forced by pressing the Mode push-button 10 times in a row.

   c. If you can get into service mode, copy dump to cartridge and save it for now.

      1) Power OFF the device and then power the device ON.

      2) Run the Verify Drive diagnostic.

      3) If a failure occurs with a new FID, use the new FID and go to the START section.

      4) If no error occurs, the problem can be a microcode problem or an intermittent hardware problem. Call your next level of support and provide them with the microcode dump.

5. Perform “End of Call” on page PROC-12 or return to the procedure that sent you here.

Checks, Adjustments, Removals, and Replacements

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Introduction

This section contains the information necessary to find, check, adjust if necessary, and exchange the failing field replaceable unit (FRU).

The FID (FRU identifier) numbers are listed in hexadecimal ascending order in Figure 8 on page START-12. You may be directed to the **START** section, and then to this section, when a FID number is presented in one of the following ways:

By the LED indicators flashing a FID code through the front bezel of the Model C00 Drive.

On the operator panel display of library Models

At the host console from the service information message (SIM) for any 3570 Tape Subsystem.

From the MAPs.

Removal and Replacement Procedures—External Covers

Note: When you are removing a cover to access FRUs inside the machine, you may want to complete your testing prior to replacement of these covers, in case the FRU you replaced did not fix the problem.

Library Chassis Covers

Removal of Library Chassis Covers: Figure 270 on page CARR-4 shows an exploded view of the Model C01 machine with its decorative covers and internal components.

To remove the library chassis covers follow the steps below:

1. If not already done, “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. For the stand-alone Models C01 and C02, remove the decorative chassis cover as follows:
   a. Open the magazine door and remove two screws from the front and two screws in the rear securing the library top decorative chassis cover, item 1 .
   b. Slide the top cover clear to expose the top protective cover.
   c. Remove the top protective cover, item 2 by removing two screws in the rear, and two screws on the sides of the cover.
   d. Lift the rear of the cover and pull toward the rear of the device to clear the front tab from the library front decorative cover.
   e. If necessary, remove the rear cover 15 from the library. The cover is attached using plastic snap-in retainers. Rotate the plastic retainers one-quarter turn in either direction to release the cover.
3. For the rack-mounted Models C11, C12, C21 and C22, there is no decorative chassis cover.
   a. Open the library front cover. (Unlock the door if necessary.)
   b. Remove screw P/N 1624778 on the left front of the library. This screw attaches the library front plate to the rack.
   c. Extend the slide and tray assembly all the way out so it is locked in the extended position.

      C5 **CAUTION**
      When you are sliding the 3570 drive tray assembly in or out, make sure you do not get your hand caught between the drive and the rack. Also, when you are servicing the 3570, make sure the slide and tray assembly is fully extended and locked.

      Note: This notice is translated into selected languages. See **C5** in the INSP section.

   d. Remove the top protective cover by removing two screws in the rear and two screws on the sides of the cover. Lift the rear of the cover and pull toward the rear of the device to clear the front tab from the library front decorative cover.

Replacement of Library Chassis Covers

1. Perform the removal procedure in the reverse order, then return here.
2. Return to the procedure that sent you here.

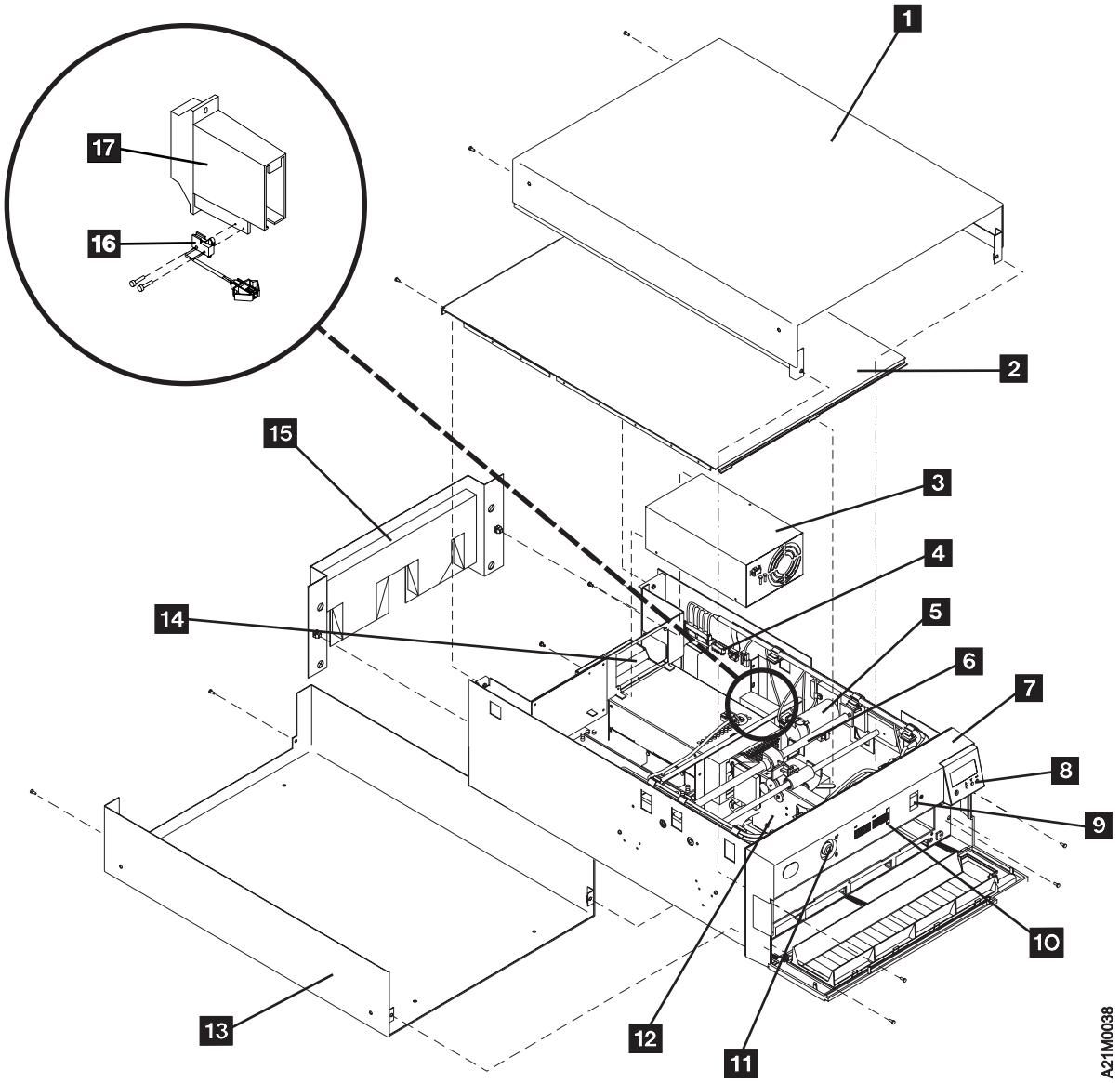


Figure 270. Library Model C01—Exploded View

Decorative Cover—Drive-Only Models

The decorative cover 2 of drive-only models must be removed for access to most FRUs in the drive. See Figure 271.

Removing the Decorative Covers—Drive-Only Models

1. From the rear of the unit, remove and save the 3 screws, items 3 (two screws not shown), that hold the decorative cover 2 to the chassis.
2. From the front of the unit, depress the tabs 1 on both sides of the cover and carefully pull the drive front cover away from the chassis. Be sure to observe the detents in the chassis as you pull on this cover.
3. From the front of the unit, grip the cover at the sides and push backward to clear two holding hooks, then lift clear of the chassis.
4. If removal of the drive pack is required, go to “FID B3—Drive Pack, Drive-Only Models” on page CARR-10.
5. Return to the procedure that sent you here.

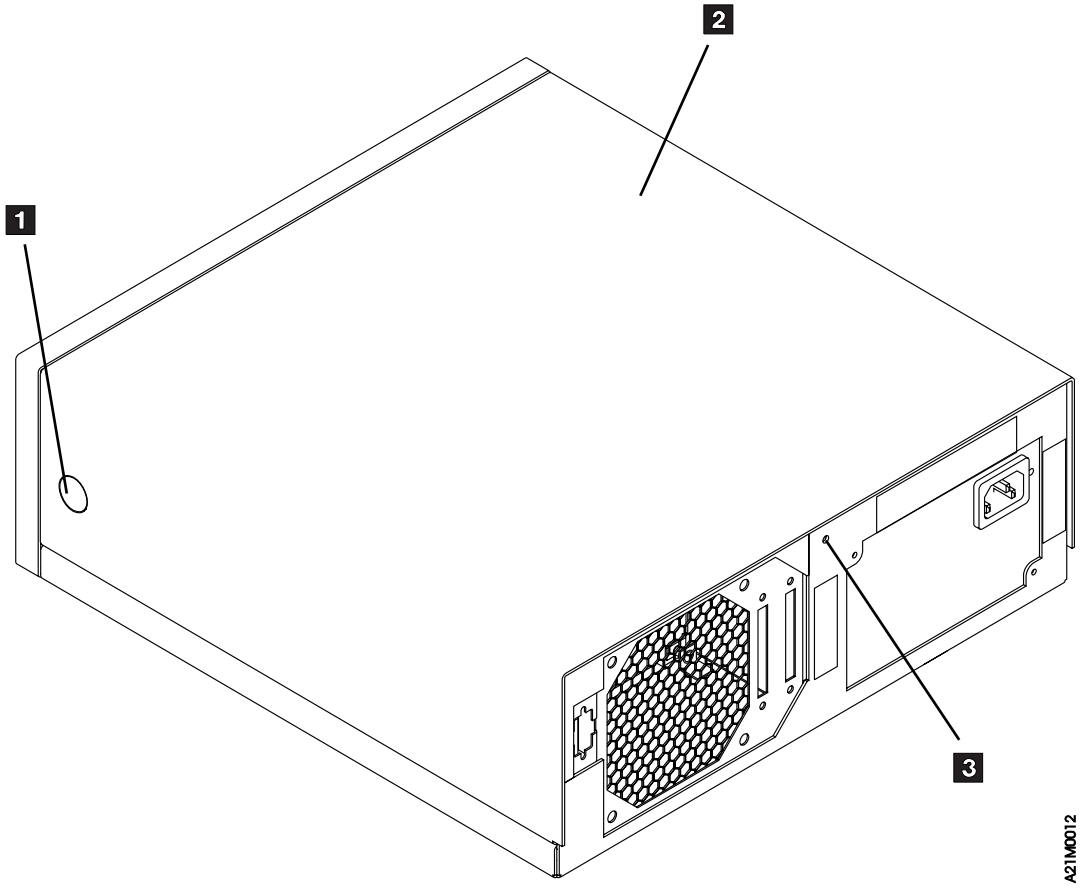


Figure 271. Decorative Cover for Model C00 Drive

Replacing the Decorative Covers—Drive-Only Models

1. Place the decorative cover 2 on the chassis by fitting it to the rear of the chassis first and then moving it forward to the front.
2. Replace and tighten the 3 cover screws, item 3 (two screws not shown).

3. Reattach the drive front cover. Observe the detents in the front of the chassis as the front cover is engaged to the top cover with tabs 1 .

Removal and Replacement Procedures—Drive Pack

Notes:

1. This procedure applies only to **Non EMEA countries and regions that support the Drive Pack as a single FRU. EMEA countries should be using the procedures at "Appendix D" on page APPENDD-1.**
2. Be sure that you are working on a C—Series drive. C—Series drives have **green** UNLOAD buttons and are at microcode level D1I5_xxx or higher. If your drive has a **blue** UNLOAD button, or is at microcode level D1I4_xxx, refer to *Magstar MP 3570 Tape Subsystem Maintenance Information B—Series Models*.
3. When you are removing the drive pack, you may want to complete your testing prior to replacement of the covers. For testing purposes, you can feed cartridges in a drive-only device, without having all the covers back on, if you connect all the cables and place the drive on a flat surface.

FID B3—Drive Pack, Library Models

Note: After replacing a drive pack, you must update the microcode to the latest level on all drives in the device.

Removal of Drive Pack from Chassis: To remove the physical drive follow the steps below:

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. If this is a drive in a Model C02, C12, or C22, when the new drive is installed, if it is at a higher level than the other drive in the device, you will be asked to update the other drive to the level of microcode that the new drive is at. If the other drive is at a higher level than the new drive, you will be updating the new drive to the same level as the other drive.

   Note: If you have any questions, call the support center for advice.
3. Perform removal of the "Library Chassis Covers" on page CARR-3.

   Note: Refer to Figure 270 on page CARR-4 for a view of the drive pack within a typical library model environment.
4. Remove the ac power cord to power supply
5. Remove the 4 screws that hold the rear plate, item 15 to the library frame and remove the plate.
6. Remove the following from the drive:
   a. 4-wire power connection between the drive and power supply
   b. 2-wire fan power connection between the drive and power supply
   c. Ribbon cable (Library Interface/RS-422) from the library control card (library models, drive 1 only)

      Note: To remove the cable connector from the drive and control card connectors, depress the tension clips on either side of the cable connectors.
   d. SCSI cable(s)
   e. SCSI terminator if installed
   f. The RS-422 cable connecting drive 1 to drive 2 (Models C02, C12 and C22 only)

      Note: Remove the stand-offs that hold the RS-422 cable to the drive frame, and set the cable assembly aside for now.
7. Refer to Figure 270 on page CARR-4 for a view of the drive pack within a typical library model environment.

8. Remove the two screws on either side of the drive pack and remove the drive assembly from the library chassis.
9. **Do not remove** the cooling pack from the drive. The new drive will come with a new cooling pack.

Replacement of Drive Pack into Library Chassis

1. Perform the removal procedure in the reverse order, then return here.

   Note: Refer to Figure 272 for the proper orientation of the RS-422 cable when you re-install it on the drive. If your drive RS-422 cable has a small electronic card, 1 soldered on the cable assembly, the electronic card must be to the left of the connector, 2 facing from the rear of the drive. If the card is allowed to be on the right, the electronics may short to the drive frame.

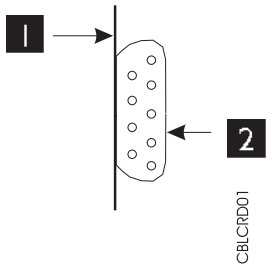


Figure 272. RS-422 Cable Orientation

2. If this is a drive in a Model C02, C12, or C22, when the new drive is installed, if it is at a higher level than the other drive in the device, you will be asked to update the other drive to the level of microcode that the new drive is at. If the other drive is at a higher level than the new drive, you will be updating the new drive to the same level as the other drive.

   Note: If you have any questions, call the support center for advice.

   a. If you replaced drive 2 (dual drive models only), refer to “Updating Microcode in Drive 2 from FMR Cartridge” on page PROC-36.

   b. If you replaced drive 1 in any library model, refer to “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34.

   c. If you replaced the drive in Model C00, refer to “Updating Microcode from FMR Cartridge (Drive-Only Models)” on page PROC-37.

3. The SCSI address of the new tape drive must be set and the tape drive must be properly configured. Refer to “Setting the SCSI Address—Drive-Only Model C00” on page INST-9 for Model C00. For all other models, perform the steps in “Set Drive Options—Library Models” on page INST-42 and “Setting the SCSI Address and Configuring the Library” on page INST-43.

4. The drive FRU will report to the host system using a different serial number than the failed drive. Attach the Magstar MP to the host and configure the host system to use the new drive.

   a. **AS/400 Systems:** From the AS/400, print or copy the device description and configuration of the drive FRU to be replaced. Remove the old device description. If possible, reset the IOP that attaches to the Magstar MP. If AUTO-CONFIG is ON, a new device description will be created for the new tape unit, once installed. Verify configuration and rename the new device description to the name of the old device description.

      V3R1 and V3R2 use device description TAPxx
      V3R6 use device description TAPxx and TAPLIBxx
      V3R7 and above use device description TAPxx and TAPMLBxx

   b. **RS/6000 Systems:**

| Use rmdev and mkdev to reconfigure.
| For example: rmdev -l rmt0 and mkdev -l rmt0.

| c. **Other Systems:**

| Use the device driver or application documentation to unconfigure and
| reconfigure the system for the new drive.

| 5. Test the operation of the drive by repeating the procedure which caused the drive failure. If the failure
| continues with the new drive, reinstall the old drive. If the failure was:

| a. Read or Write Errors

| Isolate the failure to one or more bad tape cartridges.

| b. SCSI or Attachment Errors

| Isolate the problem to a bad SCSI cable, terminator, interposer or
| host adapter.

| c. Mechanical Load or Unload Errors

| Isolate the problem to the picker or accessor or tape cartridge.

| 6. Carefully pack the tape drive that you are returning in the same package that the FRU was shipped.
| Return the drive using the parts return process.

7. Return to the procedure that sent you here.

FID B3—Drive Pack, Drive-Only Models

Note: This procedure applies only to **Non EMEA countries and regions that support the Drive Pack as a single FRU. EMEA countries should be using the procedure at "Appendix D" on page APPENDD-1.**

Removal of Drive Pack from Chassis: To remove the physical drive follow the steps below:

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. Perform removal of the "Decorative Cover—Drive-Only Models" on page CARR-5.
3. Remove the following electrical connections from the drive:
   a. The ac power cord to power supply
   b. 4-wire power connection between the drive and power supply
   c. 2-wire fan power connection between the drive and power supply
   d. SCSI cable(s)
   e. SCSI terminator if installed
4. Refer to Figure 274 on page CARR-15 for a view of the drive pack as it looks within all the models.
5. Remove the two screws on the right hand side as you face the front of the drive (not shown).
6. Remove the two screws on the left hand side as you face the front of the drive. These screws secure the left holding bracket to the base.
7. Lift and remove the drive assembly from the chassis.
8. **Do not remove** the cooling pack from the drive. The new drive will come with a new cooling pack.

Replacement of Drive Pack into Chassis

1. Perform the removal procedure in the reverse order, then return here.
2. Return to the procedure that sent you here.

Removal and Replacement Procedure—Drive Pack Covers

Drive Assembly Front Cover

Removal of Drive Assembly Front Cover: See Figure 274 on page CARR-15 for an exploded view of the drive pack. To remove the drive assembly front cover, item 13 , follow the steps below if not done before:

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. Perform removal of the "Library Chassis Covers" on page CARR-3 for library machines, **or** "Decorative Cover—Drive-Only Models" on page CARR-5 for drive-only machines.
3. Perform removal of the "FID B3—Drive Pack, Library Models" on page CARR-7 for library machines, **or** "FID B3—Drive Pack, Drive-Only Models" on page CARR-10 for drive-only machines.
4. Press down on the top center of the drive assembly front cover and tilt it forward and off the drive assembly.

   Note: Be sure to install the cover back on the drive pack before the call is completed. The cover is required to get proper air flow to the drive logic card.

Replacement of Drive Assembly Front Cover

1. Perform the removal procedure in the reverse order.

   Attention

   Be sure to insert the bottom of the bezel first before attempting to tilt the top of the bezel into its proper latching position. Damage may occur to components on the drive logic card that are in close proximity to the top of the bezel, if the top of the bezel is inserted first.

2. Return to the procedure that sent you here.

Drive Assembly Top Cover

Removal of Drive Assembly Top Cover: See Figure 274 on page CARR-15 for an exploded view of the drive pack. To remove the drive assembly top cover 1 follow the steps below if not done before:

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. Perform removal of the "Library Chassis Covers" on page CARR-3 for library machines, **or** "Decorative Cover—Drive-Only Models" on page CARR-5 for drive-only machines.
3. Perform removal of the "FID B3—Drive Pack, Library Models" on page CARR-7 for library machines, **or** "FID B3—Drive Pack, Drive-Only Models" on page CARR-10 for drive-only machines.
4. Perform removal of the "Drive Assembly Front Cover."
5. Remove 2 top cover screws that attach the top cover and the top cover extension to the cooling pack fan.
6. Remove the top cover extension.
7. Remove 2 top cover screws, 5 right side screws, and 2 left side screws that attach the top cover 1 to the drive pack. (Use a number 0 or number 1 phillips screwdriver.)
8. Carefully lift the top cover clear of the drive unit.

Replacement of Drive Assembly Top Cover

1. Perform the replacement procedure in the reverse order.
2. Return to the procedure that sent you here.

Removal and Replacement Procedure—Cooling Pack

Note: When you are removing the cooling pack to access parts inside the drive, you may want to complete your testing prior to replacement of the cooling pack, in case the FRU you replaced did not fix the problem. You can run the drive for a short period of time without the cooling pack to verify, for testing purposes, that the FRU you just replaced, was the failing FRU. Long term running without the cooling pack may damage the machine or shorten component life.

FID B2: Cooling Pack

Removal of the Cooling Pack: For location of the cooling pack in a drive-only model, see Figure 25 on page INTRO-15 item 6 . For location of the cooling pack in a library model, see Figure 270 on page CARR-4 item 14 .

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. Perform removal of the "Library Chassis Covers" on page CARR-3 for library machines, **or** "Decorative Cover—Drive-Only Models" on page CARR-5 for drive-only machines.
3. Perform removal of the "FID B3—Drive Pack, Library Models" on page CARR-7 for library machines, **or** "FID B3—Drive Pack, Drive-Only Models" on page CARR-10 for drive-only machines.
4. Perform removal of the "FID B2: Cooling Pack" as follows:
   a. Perform removal of the "Drive Assembly Front Cover" on page CARR-11.
   b. Perform removal of the "Drive Assembly Top Cover" on page CARR-11.
   c. Remove one screw in the rear of the drive pack (not shown) that holds the cooling pack to the drive assembly. The other side of the cooling pack is held in place by a holding stud.
   d. Squeeze the holding springs and disconnect the small flat cable (RS-422) from the Mother board.
   e. Disconnect the large flat cable (internal SCSI cable) from the Drive logic card.
   f. Remove the cooling pack from the drive pack.

Replacement of the Cooling Pack

Note: Be careful to route the SCSI cable so that it does not contact the cooling fan blades.

1. Perform the removal procedure in the reverse order.
2. Perform "End of Call" on page PROC-12.
3. The cooling pack (FID B2) is not a FRU. The drive cooling fan (FID BE) and the internal SCSI connector (FID CB) are FRUs. If one of these two FRUs is replaced, use the FID and TAC code for the FRU that is replaced.
4. Return to the procedure that sent you here.

FID BE: Drive Cooling Fan

Removal of Drive Cooling Fan

1. Prepare the drive for service.
2. Preform “FID B3—Drive Pack, Library Models” on page CARR-7 for library models, or “FID B3—Drive Pack, Drive-Only Models” on page CARR-10 for drive-only models.
3. Perform “FID B2: Cooling Pack” on page CARR-12 then return here.
4. Remove the four plastic inserts and insert clamps from the back of the cooling pack and remove the drive cooling fan.

Replacement of Drive Cooling Fan

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **A03** for the area of failure.
4. Return to the procedure that sent you here.

Removal and Replacement Procedures—Base Drive Components

Before performing any recommended removal or replacement procedures, you should complete the following procedures that apply to the model of 3570 you are here to repair:

Note: The removal and replacement Time Estimate in the last column of the table may be used, along with the FID removal and replacement durations given in the START section to help you determine how much time you will need to repair the device. Diagnose and test time are not included in the estimates.

Figure 273. Prerequisite Procedures

3570 Model	Service Procedure Description	Procedure Location	Time Estimate
C00	1. Prepare the tape drive for service	1. “Prepare the Tape Device for Service” on page PROC-5	1. (0.1)
	2. Decorative Cover—Drive-Only Models	2. “Decorative Cover—Drive-Only Models” on page CARR-5	2. (0.1)
	3. Drive Pack, Drive-Only Models	3. “FID B3—Drive Pack, Drive-Only Models” on page CARR-10	3. (0.2)
	4. Drive Assembly Front Cover	4. “Drive Assembly Front Cover” on page CARR-11	4. (0.1)
	5. Drive Assembly Top Cover	5. “Drive Assembly Top Cover” on page CARR-11	5. (0.1)
	6. FID B2: Cooling Pack	6. “FID B2: Cooling Pack” on page CARR-12	6. (0.1)
C01, C02, C11, C12, C21 and C22	1. Prepare the tape drive for service	1. “Prepare the Tape Device for Service” on page PROC-5	1. (0.1)
	2. Library Chassis Covers	2. “Library Chassis Covers” on page CARR-3	2. (0.2)
	3. Drive Pack, Library Models	3. “FID B3—Drive Pack, Library Models” on page CARR-7	3. (0.2)
	4. Drive Assembly Front Cover	4. “Drive Assembly Front Cover” on page CARR-11	4. (0.1)
	5. Drive Assembly Top Cover	5. “Drive Assembly Top Cover” on page CARR-11	5. (0.1)
	6. FID B2: Cooling Pack	6. “FID B2: Cooling Pack” on page CARR-12	6. (0.1)

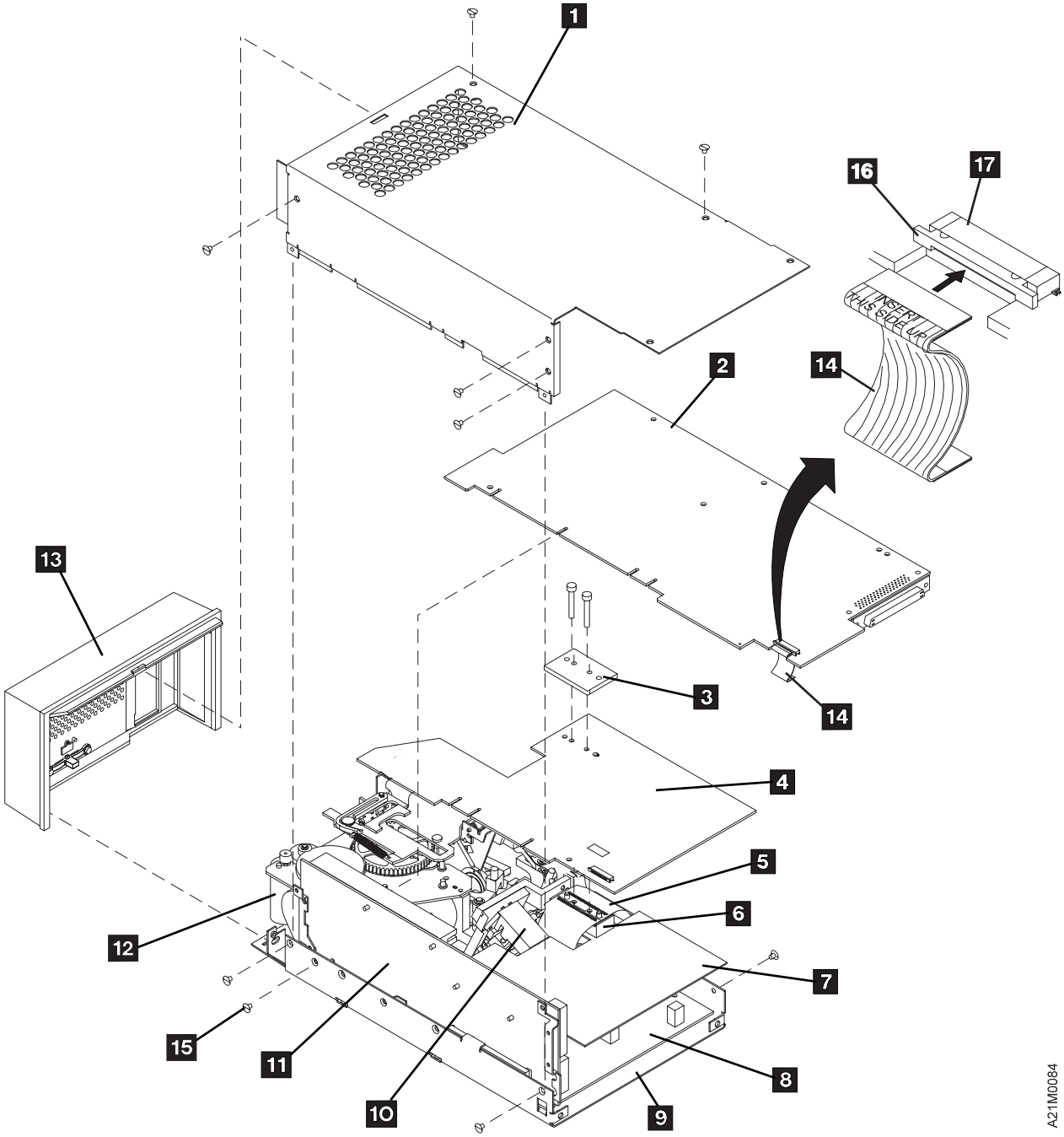


Figure 274. Base Drive FRU Breakout

FID C1: Power Supply

Removal of the Power Supply: Electrical shock potential in this area. Ensure that the 3570 power cord is removed from the customer power source before proceeding.

1. Perform the “Prepare the Tape Device for Service” on page PROC-5 procedure, then return here.
2. Perform the “Library Chassis Covers” on page CARR-3 for library machines, **or** the “Decorative Cover—Drive-Only Models” on page CARR-5 for drive-only machines.
3. Disconnect the cooling fan cable connector.
4. If replacing the power supply for drive 1 in any library model, disconnect the power cable at terminal CD5 on the library control card.
5. Disconnect the power cable to the drive (mid-cable connector).

   Note: Removal of the two screws in the next step, will allow the back of the power supply to drop. Hold the back of the power supply while removing the two screws.
6. Remove the two screws from the back side of the power supply that secure the power supply to the mounting bracket.
7. Slide the power supply forward and unhook the power supply from the front mounting bracket.
8. Remove the power supply from the machine.

Replacement of Power Supply

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **P04** for the area of failure.
4. Return to the procedure that sent you here.

FID CB: Internal SCSI Cable

Removal of Internal SCSI Cable

1. Prepare the drive for service.
2. Perform “FID B3—Drive Pack, Library Models” on page CARR-7 for library models, or “FID B3—Drive Pack, Drive-Only Models” on page CARR-10 for drive-only models.
3. Perform “FID B2: Cooling Pack” on page CARR-12 then return here.
4. Remove four screws holding the internal SCSI cable to the cooling pack sheet metal.

Replacement of Internal SCSI Cable

Note: Be careful to route the SCSI cable so that it does not contact the cooling fan blades.

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C04** for the area of failure.
4. Return to the procedure that sent you here.

FID DE: RS-422 Cable—Internal to Drive

Removal of RS-422 Cable—Internal to Drive

1. Perform the “Removal of Library Chassis Covers” on page CARR-3.
2. Remove the RS-422 cable connecting drive 1 to drive 2 (Models C02, C12 and C22 only).
3. Remove two screws that hold the RS-422 cable to the cooling pack.
4. Unplug the cable connector at the mother board and remove the RS-422 cable—internal to drive (Models C02, C12 and C22, drive 2 only).
5. Unplug the cable connector at the mother board and at the library control card, then remove the RS-422 cable—internal to drive (all library models, drive 1 only).

Replacement of RS-422 Cable—Internal to Drive

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C04** for the area of failure.
4. Return to the procedure that sent you here.

RS-422 Cable, Drive to Drive

This procedure applies only to Models C02, C12 and C22.

Removal of RS-422 Cable, Drive to Drive

1. Perform the “Removal of Library Chassis Covers” on page CARR-3.
2. Refer to one of the following drawings in the Parts Catalog for the location of the RS-422 Cable between drives:

   Model C02: “Assembly 5: Desktop Library Assembly, Model C02” on page PARTS-14 item 22
   Model C12: “Assembly 4: Rackmount Library Assembly, Model C12” on page PARTS-10 item 18
   Model C22: “Assembly 7: Rackmount Library Assembly, Model C22” on page PARTS-20 item 18
3. Remove the RS-422 cable connecting drive 1 to drive 2 (Models C02, C12, and C22 only).

Replacement of RS-422 Cable, Drive to Drive

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C04** for the area of failure.
4. Return to the procedure that sent you here.

Removal and Replacement Procedures for the Library

The following removal and replacement procedures are for all models of the library and are listed by FID order.

FID 90: Library Operator Panel Display

Removal of Library Operator Panel Display

1. “Prepare the Tape Device for Service” on page PROC-5.

   Note: **Attention:** The logic cards are ESD sensitive. Special care must be used when handling ESD parts. See “Working with Electrostatic Discharge (ESD) Parts” on page PROC-3.

2. Remove the library operator panel display from the front panel by pushing down on the top of the library operator panel display, and using both thumbs, pivoting the assembly out. When replacing, put the bottom in first, and pivot the top up and into the front cover assembly.
3. Remove the cable that goes from the back of the library operator panel display to the library control card at the display end by squeezing the two retaining springs in the cable connector.
4. Remove the three screws holding the LCD card to the panel.
5. Remove the LCD card.

Replacement of Library Operator Panel Display

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **L05** for the area of failure.
4. Return to the procedure that sent you here.

FID 91: Library Operator Panel Display Cable

Removal of Library Operator Panel Display Cable

1. “Prepare the Tape Device for Service” on page PROC-5.

   Note: **Attention:** The logic cards are ESD sensitive. Special care must be used when handling ESD parts. See “Working with Electrostatic Discharge (ESD) Parts” on page PROC-3.

2. Remove the library operator panel display from the front panel.
3. Remove the cable that goes from the back of the library operator panel display to the library control card at the display end.
4. Remove the cable at the library control card end. The connector at that end is shown as item E on Figure 276 on page CARR-22 and can be removed by squeezing the two holding springs and lifting up.
5. Unlace cable from cable retention hardware and remove cable.

Replacement of Library Operator Panel Display Cable

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C03** for the area of failure.
4. Return to the procedure that sent you here.

FID 92: Accessor Assembly

Removal of Accessor Assembly

1. Perform the “FID 9A: Picker Assembly” on page CARR-23 removal procedure, then return here.
2. Refer to Figure 276 on page CARR-22, item F, and remove the cable between the library control card and accessor motor assembly (CD6) from the library control card end, and release the cable from the cable retention hardware.
3. Remove the motor tach cable from the accessor motor assembly.
4. Remove the three inside screws on the right side of the machine, and the three inside screws on the left side of the machine that secure the accessor assembly to the side plates. The assembly should now rest on the side wall support pins.
5. Lift and remove the accessor assembly, lead screw, and accessor motor assembly out of the machine.
6. Remove the accessor motor assembly from the accessor assembly and install it on the new accessor assembly. See “FID 95: Accessor Motor Assembly” on page CARR-21.

   Note: When installing the accessor motor assembly, make sure that the gear on the motor shaft fully meshes with the gear on the accessor assembly. Also note the orientation of the accessor motor assembly tach cable connector. The tach cable connector should face the rear of the machine.

Replacement of Accessor Assembly

1. Perform the removal procedure steps in the reverse order except for the step concerning the accessor motor assembly.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T14** for the area of failure.
4. Return to the procedure that sent you here.

FID 94: Bar Code Reader

Removal of Bar Code Reader

1. Refer to Figure 275 on page CARR-21.
2. Refer to “FID 9A: Picker Assembly” on page CARR-23 and remove the picker assembly.
3. Disconnect the bar code reader cable 1 .

   Note: The top of connector has a locking tab.

   Slide the tab up and disconnect the cable.
4. The bar code reader is held in place by 4 snap connectors. With the blade of a screwdriver, pry up at 2 to disengage the first connector.
5. Pry up at the picker end of each mounting post, items 3 and remove the reader.
6. Remove the bar code reader interface card from the library control card. See G in Figure 276 on page CARR-22.

Replacement of Bar Code Reader

1. Replace the bar code interface card by plugging it on the library control card.
2. Refer to Figure 275 on page CARR-21. The gear on the bar code reader has an arrow that must be aligned with the arrow on the picker assembly gear 4 . Align the arrows and snap in place 2 .
3. Snap the three remaining connectors in place 3 .

4. Reconnect the connector 1 .

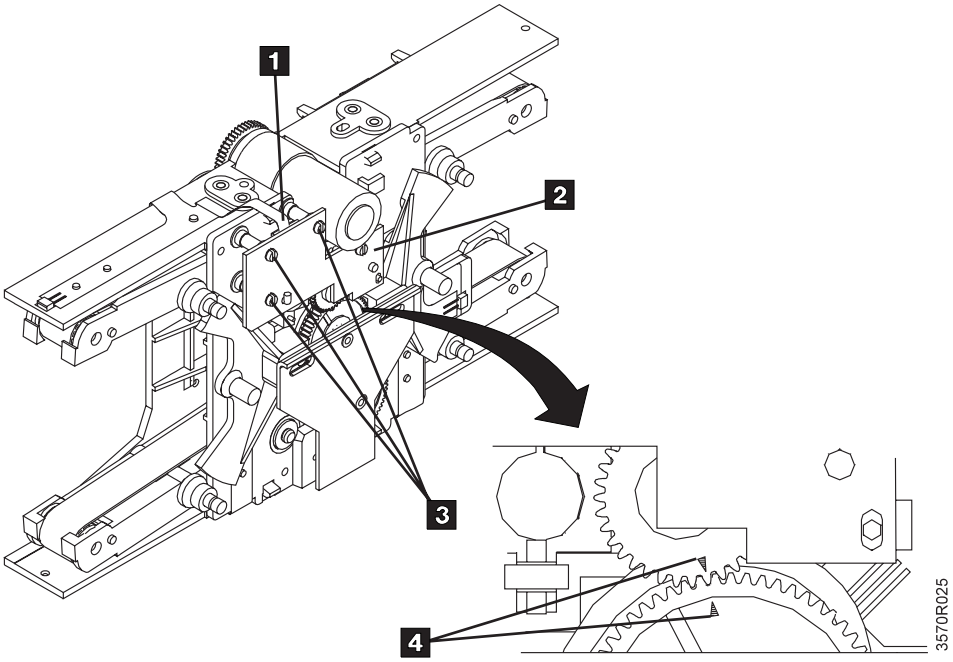


Figure 275. Barcode Reader

FID 95: Accessor Motor Assembly

Removal of Accessor Motor Assembly

Note: Shiny picker belts can cause FID 95 failures due to infrared light reflecting from the belts onto the Cartridge Present sensor. If the picker belts must be cleaned for FID 95 problems, use a lint-free cloth and some alcohol to clean the belts. Be sure to wait until the belts have completely dried before using the library.

1. Refer to Figure 276 on page CARR-22, item F, and remove the cable between the library control card and accessor motor assembly (CD6) from the library control card end.
2. Remove the motor tach cable from the accessor motor assembly.
3. Loosen the set screw and remove the small pulley on the accessor motor assembly shaft.
4. Remove the four outside screws on the right side of the machine, and the four outside screws on the left side of the machine, that hold the accessor motor assembly to the accessor assembly.
5. Remove the accessor motor assembly.

   Note: Observe the orientation of the accessor motor assembly. When replacing the unit, the tach cable connector should face the rear of the machine.

Replacement of Accessor Motor Assembly

1. Perform the removal procedure steps in the reverse order.

   Note: When installing the accessor motor assembly, make sure that the gear on the motor shaft fully meshes with the gear on the accessor assembly.

2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T17** for the area of failure.
4. Return to the procedure that sent you here.

FID 97: Library Control Card

Removal of Library Control Card

Note: Attention: The logic cards are ESD sensitive. Special care must be used when handling ESD parts. See “Working with Electrostatic Discharge (ESD) Parts” on page PROC-3.

Refer to Figure 276 for a pictorial of the cable connections for the following steps:

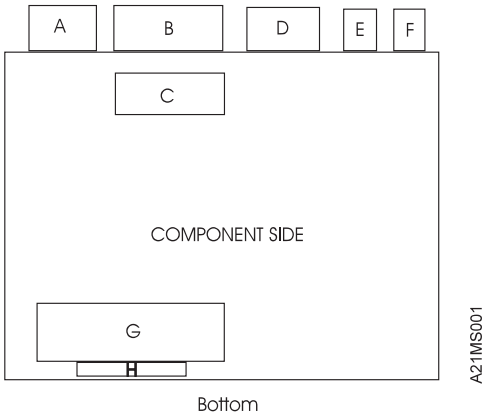


Figure 276. Library Control Card Cable and Bar Code Reader Card Layout

1. Prepare the drive for service.
2. Remove the six cables from the library control card:
   a. CD1=A, Library interface cable (squeeze springs)
   b. CD2=B, Library sensor cable (pivot out plastic retainers)
   c. CD3=C, Picker cable (lock is under connector)
   d. CD4=D, From Power supply
   e. CD5=E, Library operator panel display cable (squeeze springs)
   f. CD6=F, Accessor motor assembly drive
   g. G, Bar Code Reader Card
   h. H, Bar Code Reader Connector
3. Remove top retaining bracket and screw that holds the library control card in place. The screw is located on the right outside of the machine.
4. Lift and remove the library control card from the machine.
5. Remove the Bar Code Reader card, item G in Figure 276 from the old card and install it on the new card.

Replacement of Library Control Card

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T15** for the area of failure.
4. Return to the procedure that sent you here.

FID 99: Picker Cable

Removal of Picker Cable

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Refer to Figure 276 on page CARR-22, item C, and disconnect the cable connector (CD3) from the library control card by releasing the lock on the bottom of the connector.
3. Disconnect the picker cable from the picker assembly.
4. Slide the cable out from under the existing hardware, and remove.

   Note: The cable will be secured to the base with adhesive. Carefully pull the cable upward from either end until it comes free.

Replacement of Picker Cable

1. Use the old cable as a pattern to fold the new cable.
2. Perform the removal procedure steps in the reverse order.
3. Prepare the drive for customer operation.
4. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C03** for the area of failure.
5. Return to the procedure that sent you here.

FID 9A: Picker Assembly

Note: Cleaning of the picker belts is not recommended to correct cartridge slipping problems. If the cartridges are slipping on the belts, the picker assembly should be replaced.

Shiny picker belts can cause FID 95 failures due to infrared light reflecting from the belts onto the Cartridge Present sensor.

If the picker belts must be cleaned for FID 95 problems, or because a FRU is not readily available, use a lint-free cloth and some alcohol to clean the belts. Be sure to wait until the belts have completely dried before using the library.

Removal of Picker Assembly

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the four screws on top that secure the picker assembly to the accessor assembly.
3. Disconnect the picker cable (flex cable) from the library control card to the picker assembly, at the picker assembly end only.
4. Remove the picker assembly from the machine.

   Note: Observe the orientation of the picker assembly. The springs are to the right, and the gears are to the left, facing from the front of the machine.

5. Remove the Bar Code Reader from the old picker assembly and install it on the new one. See “FID 94: Bar Code Reader” on page CARR-20 for procedure.

Replacement of Picker Assembly

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T12** for the area of failure.
4. Return to the procedure that sent you here.

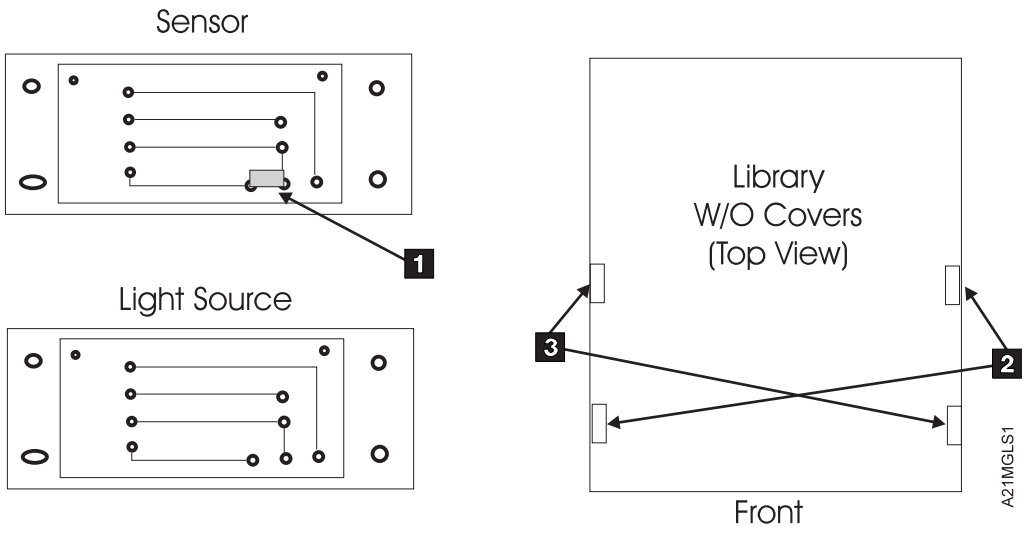


Figure 277. Library Global Sensor Component Identification and Locations

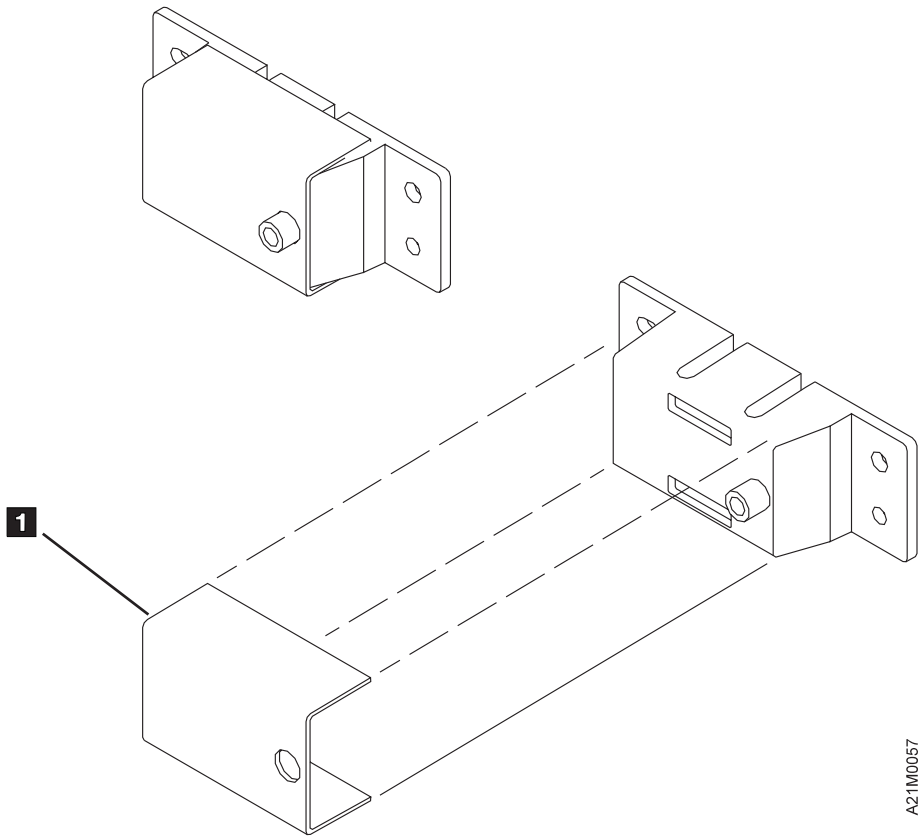


Figure 278. Library Global Sensor Component Plastic Covers

FID 9B: Drive Global Sensor Pair

Removal of Drive Global Sensor Pair

Note: When replacing any part of the drive global sensor pair, replace both the sensor and the light source at the same time. Be aware that the two parts **look very much alike** and will not work if interchanged. Refer to Figure 277 on page CARR-24 and note that the sensor has a small component, item 1 , soldered on the circuit board while the light source is missing this component. Also note from the figure where the light sources, item 3 and sensors, item 2 are located in the library.

1. “Prepare the Tape Device for Service” on page PROC-5.
2. You may have to push the picker assembly out of the way to gain access to the sensor.

   Note: On some libraries, there may be plastic snap-on covers installed on the global sensor and light source. If so, pull the covers off to install them on the new sensor pair. See Figure 278 on page CARR-24, item 1 .

   Left side light source
   a. Disconnect the light source cable at the light source.
   b. Remove the two screws that secure the light source to the left side chassis,
   c. Remove the light source.

   Right side sensor
   a. Disconnect the sensor cable at the sensor.
   b. Remove the two screws that secure the sensor to the right side chassis.
   c. Remove the sensor.

Replacement of Drive Global Sensor Pair

1. Perform the removal procedure steps in the reverse order.
2. Position the sensor and light source over their respective alignment pins, then secure with screws.
3. If you removed plastic snap-on covers from the sensor and light source, re-install the covers.

   Note: Be sure that the hole in the cover aligns with the sensor and the light source.

4. Prepare the drive for customer operation.
5. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
6. Return to the procedure that sent you here.

FID 9C: Magazine Global Sensor Pair

Removal of Magazine Global Sensor Pair

Note: When replacing any part of the magazine global sensor pair, replace both the sensor and the light source at the same time. Be aware that the two parts **look very much alike** and will not work if interchanged. Refer to Figure 277 on page CARR-24 and note that the sensor has a small component, item 1 , soldered on the circuit board while the light source is missing this component. Also note from the figure where the light sources, item 3 and sensors, item 2 are located in the library.

1. "Prepare the Tape Device for Service" on page PROC-5.
2. Remove the magazines if present.

   Note: On some libraries, there may be plastic snap-on covers installed on the global sensor and light source. If so, pull the covers off to install them on the new sensor pair. See Figure 278 on page CARR-24, item 1 .

   Left side sensor
   a. Disconnect the cable from the sensor on the left side.
   b. Remove the two screws securing the sensor to the left side chassis.
   c. Remove the sensor.

   Right side light source
   a. Disconnect the cable at the light source.
   b. Remove the two screws securing the light source to the right side chassis.
   c. Remove the light source.

Replacement of Magazine Global Sensor Pair

1. Perform the removal procedure steps in the reverse order.
2. Position the sensor and light source over their respective alignment pins, then secure with screws.
3. If you removed plastic snap-on covers from the sensor and light source, re-install the covers.

   Note: Be sure that the hole in the cover aligns with the sensor and the light source.

4. Prepare the drive for customer operation.
5. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
6. Return to the procedure that sent you here.

FID 9D: Library Front Cover Assembly

There are at least 3 styles of hinges and 2 styles of library front cover assemblies. Removal and replacement is different on each one. Study the drawings at Figure 279 on page CARR-28, Figure 280 on page CARR-29 and Figure 281 on page CARR-29, and decide which style front cover assembly is on the problem machine. Here's how you can tell.

Oldest style — Look behind the removable operator panel, item 2 on Figure 279 on page CARR-28. Remove the library operator panel display assembly by pushing down and tilting out from the top. If there is no access hole to a screw behind the library operator panel display, you have the old style front cover assembly. Follow the procedure at "Removal of Library Front Cover Assembly (Old Style)" on page CARR-30.

Newer style — Look at Figure 280 on page CARR-29 and if your hinges match that type, you have a newer style. Follow the procedure at "Removal of Library Front Cover Assembly (Newer Style)" but watch for notes concerning hinge removal unique to this style.

Newest style — Look at Figure 281 on page CARR-29 and if your hinges matche that type, you have the newest style. Follow the procedure at "Removal of Library Front Cover Assembly (Newer Style)" but watch for notes concerning hinge removal unique to this style.

Removal of Library Front Cover Assembly (Newer Style)

1. "Prepare the Tape Device for Service" on page PROC-5.
2. Refer to Figure 279 on page CARR-28 and remove the library operator panel display assembly, item 2 , by pushing down and tilting out from the top.
3. Disconnect the library operator panel display cable from the library operator panel display.
4. Set the library operator panel display and library operator panel display cable aside for now.
5. Remove any magazines that are installed.

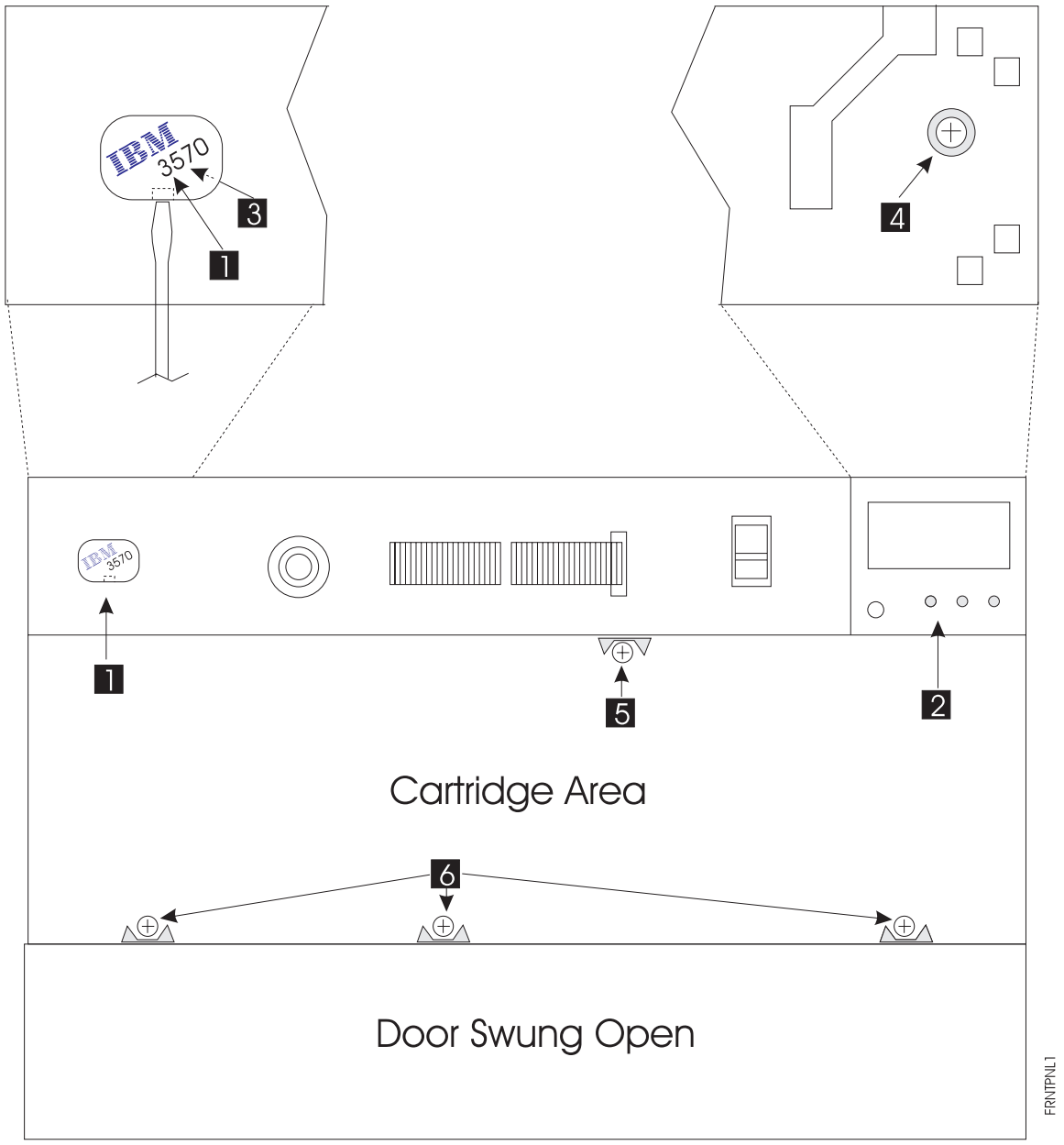
Notes:

a. Read the rest of this procedure carefully before continuing. The Library front cover assembly has many screws, but only six secure the front cover and two to four secure the hinges depending on the style that your machine has. Pay close attention to the next few steps and it will save you some time.

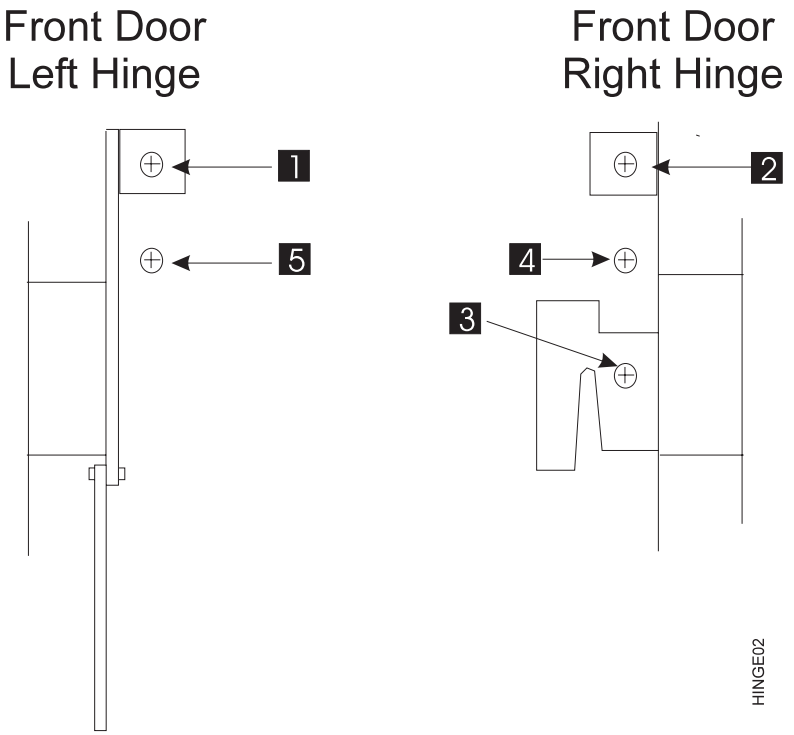
b. The front cover (plastic) and the metal mounting plate are separate parts, and the metal mounting plate is not removed.

6. Refer to Figure 279 on page CARR-28, locate the access hole and screw, item 4 , and remove the screw.
7. Carefully place a small flat blade screw driver at the **bottom** of the IBM logo, item 1 , insert the screw driver under the logo and at a slight angle, and pry it up and out. The logo should come out easily, and provide access to one of the holding screws. Remove the screw, item 3 which was hidden by the logo.
8. Remove upper screw, item 5 and the three lower screws, item 6 . The upper and lower screws are partially surrounded by a plastic "channel" that provides strength to the assembly.
9. If you have a set of hinges that look similar to those in Figure 280 on page CARR-29, remove screws 1 , 2 (if it exists), and 3 . **Do not** remove screws 4 and 5 . They do not need to be removed.
10. If you have a set of hinges that look similar to those in Figure 281 on page CARR-29, remove screws 1 and 2 . **Do not** remove screws 3 or 4 . They do not need to be removed.
11. Slowly pull on the front cover assembly enough to gain access to the cables leading to the library LED card and the library door open sensor.
12. Disconnect the cable connectors and remove the library front cover assembly.

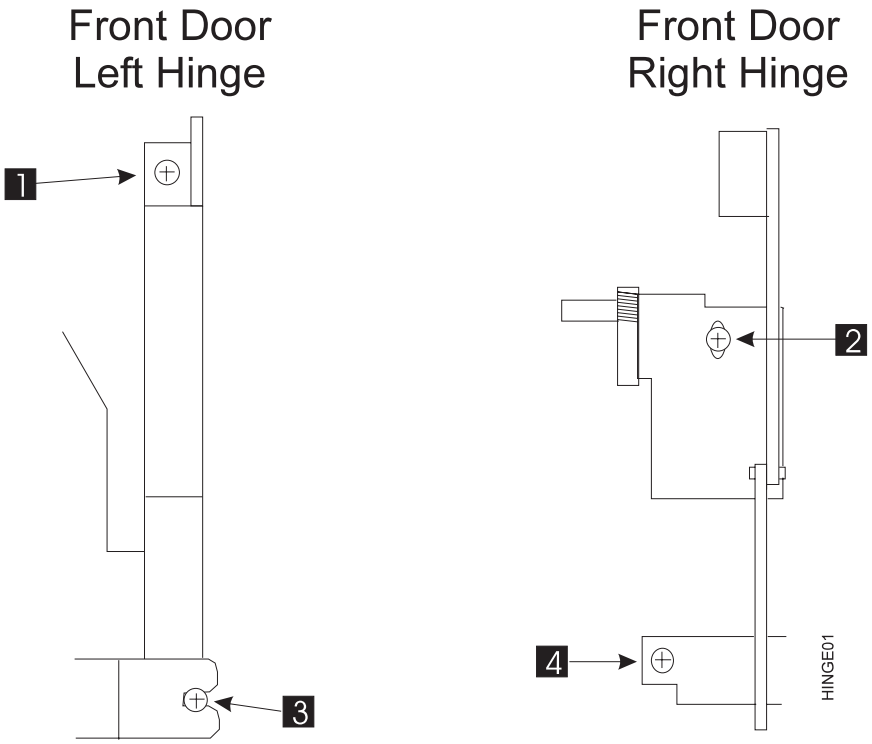
Note: It may be easier to remove the library door open sensor from its bracket than to disconnect the connector.



| *Figure 279. Library Front Door Assembly—Holding Screws*



| *Figure 280. Library Front Door Assembly—Newer Style Hinges*



| *Figure 281. Library Front Door Assembly—Newest Style Hinges*

Removal of Library Front Cover Assembly (Old Style)

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the library operator panel display assembly by tilting out from the top.
3. Disconnect the library operator panel display cable from the library operator panel display.
4. Set the library operator panel display and library operator panel display cable aside for now.
5. Remove any magazines that are installed.

   Notes:

   a. Read the rest of this procedure carefully before continuing. The Library front cover assembly has many screws, but only six secure the front cover and three are hinge screws. Pay close attention to the next few steps and it will save you some time.

   b. The front cover and the metal mounting plate are separate parts, and the metal mounting plate is not removed.

6. Refer to Figure 282, and remove three screws, item 1 , on the inside near the top of the front cover assembly. The library operator panel display cable hole, item 2 and rear of key lock, item 3 are shown as reference.
7. From the front of the library, open the library door.
8. Refer to Figure 283 on page CARR-31, and remove the three screws, item 1 that line up with the raised areas in the front cover assembly, near the bottom.
9. Remove two screws, item 2 , on both sides of the library door that secure the bottom bracket of the door stops.
10. Slowly pull on the front cover assembly enough to gain access to the cables leading to the library LED card and the library door open sensor.
11. Disconnect the cable connectors and remove the library front cover assembly.

    Note: It may be easier to remove the library door open sensor from its bracket than to disconnect the connector.

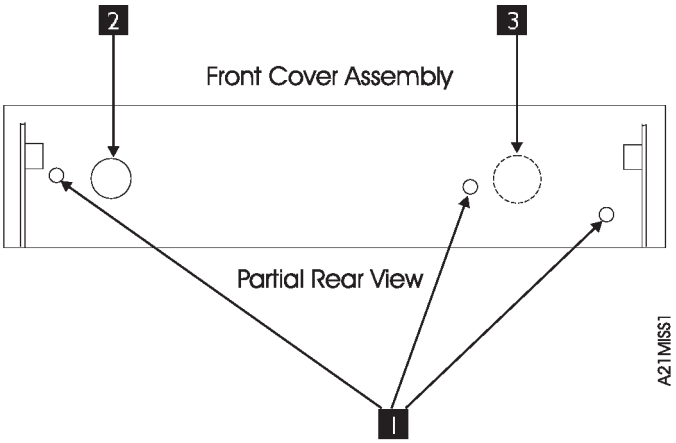


Figure 282. Library Front Door Assembly—Rear View Holding Screws

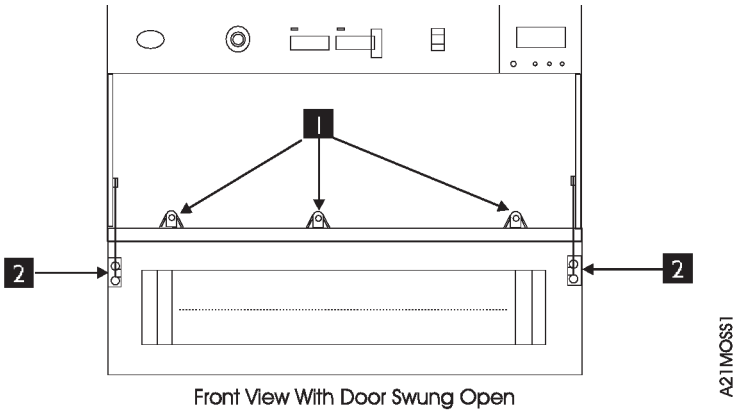


Figure 283. Library Front Door Assembly—Front View Holding Screws

Replacement of Library Front Cover Assembly (All Styles)

1. Perform the removal procedure steps in the reverse order.
2. When re-installing the front cover assembly, ensure that the Power On/Off switch does not bind when tightening the cover holding screws. Alignment of the front cover assembly is critical.
3. Prepare the drive for customer operation.
4. Return to the procedure that sent you here.

FID 9E: Priority Cell Cartridge-Present Sensor

Removal of Priority Cell Cartridge-Present Sensor

1. "Prepare the Tape Device for Service" on page PROC-5.
2. Remove the magazine if present.
3. Disconnect the cable from the sensor.
4. Remove the two screws securing the sensor to the mounting plate.
5. Remove the sensor.

Replacement of Priority Cell Cartridge-Present Sensor

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID A0: Magazine 2 Sensor

Removal of Magazine 2 Sensor

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the magazine if present.
3. Disconnect the cable from the sensor.
4. Remove the screw securing the sensor to the mounting plate.
5. Remove the sensor.

Replacement of Magazine 2 Sensor

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID A1: Magazine 1 Sensor

Removal of Magazine 1 Sensor

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the magazine if present.
3. Disconnect the cable from the sensor.
4. Remove the screw securing the sensor to the mounting plate.
5. Remove the sensor.

Replacement of Magazine 1 Sensor

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID A2: Library Interface Cable

Removal of Library Interface Cable

1. “Prepare the Tape Device for Service” on page PROC-5.

   Note: Removal of the SCSI connector may disrupt the host system if the 3570 is not the last drive in the string, and is not terminated.

2. Remove the SCSI cable and terminator if the last drive in a string, or both cables if in the middle of the string.
3. Remove 4 screws that secure a cover in the back of the machine.
4. Remove the cover and expose access to the library interface cable.
5. Remove one end of the library interface cable from the rear of the drive pack, and the other from the library control card.

Replacement of Library Interface Cable

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C03** for the area of failure.

4. Return to the procedure that sent you here.

FID A3: Cleaner Cartridge-Present Sensor

Removal of Cleaner Cartridge-Present Sensor

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the two screws securing the cleaner cell to the bracket. These screws may be seen easily from the front of the machine.
3. Pull the cleaner cell far enough to disconnect the sensor cable.
4. Remove the two screws securing the micro-switch (sensor) to the cleaner cell.
5. Remove the micro-switch (sensor).

Replacement of Cleaner Cartridge-Present Sensor

1. Install the new micro switch.
2. Install a cartridge into the cleaner-cartridge holder and adjust the micro switch until there is continuity between the two pins. Adjust further until there is no free play in the micro switch actuator.

   Note: Do not adjust the switch beyond the point of free play or you may bend or otherwise damage the actuator.
3. Tighten the switch holding screws.
4. Remove the cartridge and re-install the wires removed earlier.
5. Reinstall the cleaner cartridge holder into the library.
6. Prepare the drive for customer operation.
7. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
8. Return to the procedure that sent you here.

FID A5: Library Sensor Cable

Removal of library sensor cable

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Refer to Figure 276 on page CARR-22, item B, and disconnect the cable connector (CD2) from the library control card.
3. Perform the removal procedure for “FID 9D: Library Front Cover Assembly” on page CARR-27.
4. Disconnect the cable connectors from the following sensors and LEDs:
   a. Cleaner cartridge-present sensor
   b. Accessor motor calibrate sensor
   c. Drive global sensor pair (right side)
   d. Magazine global sensor pair (right side)
   e. Priority cell cartridge-present sensor
   f. Library LED card
   g. Library door open sensor
   h. Drive global sensor pair (left side)
   i. Magazine global sensor pair (left side)
5. Open the cable clamps as required to remove the cable from the machine.

Replacement of Library Sensor Cable

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C03** for the area of failure.
4. Return to the procedure that sent you here.

FID A6: Library LED Card

Removal of Library LED Card

1. “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. Perform removal of the “Library Chassis Covers” on page CARR-3.
3. Perform removal of the “FID 9D: Library Front Cover Assembly” on page CARR-27.
4. With the front cover lying face down on a soft surface, remove the two screws holding the library LED card card to the front cover.
5. Lift and remove the library LED card and holding frame out of the Library front cover.

Replacement of Library LED Card

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID AA: Library Door Open Sensor

Removal of Library Door Open Sensor

1. “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. Perform removal of the “Library Chassis Covers” on page CARR-3.
3. Perform removal of the “FID 9D: Library Front Cover Assembly” on page CARR-27.
4. With the front cover lying face down on a soft surface, remove the library door open sensor assembly from its bracket.

Replacement of Library Door Open Sensor

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **L05** for the area of failure.
4. Return to the procedure that sent you here.

FID DB: AC Switch and Cable Assembly

Removal of Library Door Open Sensor

1. “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. Perform removal of the “Library Chassis Covers” on page CARR-3.
3. Perform removal of the “FID 9D: Library Front Cover Assembly” on page CARR-27.
4. Set the front cover aside for now.
5. Remove the AC On/Off switch cable from the power supply that supplies power to drive 1.
6. If you are working on a dual drive model, remove the AC On/Off power extension cable that supplies power to drive 2 power supply from the rear of the AC On/Off switch.
7. Open the cable clamps as necessary to remove the cable from the trough.
8. Remove the AC On/Off switch feed-through cable from the mounting bracket.
9. Remove the two screws that secure the AC On/Off switch to the front chassis mounting bracket.
10. Remove the AC switch and cable from the machine.

Replacement of AC Switch and Cable Assembly

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C02** for the area of failure.
4. Return to the procedure that sent you here.

FID DC: AC Power Cord

Removal of AC Power Cord

1. Prepare the drive for service.
2. Remove power from the device.
3. Remove the power connection from the customer wall outlet.
4. Remove the power connection from the device.

Replacement of AC Power Cord

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C02** for the area of failure.
4. Return to the procedure that sent you here.

AppendA

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TAPEUTIL in a Sun (Solaris) System Environment

A SCSI Tape and Medium Changer Utility Program called *tapeutil* is provided with the IBM SCSI Tape and Medium Changer Device Driver for Solaris and installed in the */opt/IBMtape* directory as part of the IBMtape package. This program fulfills several purposes:

It provides the following service aids for IBM tape subsystems:

- Query Device Type/Verify Device Attachment
- Query Device Serial Number
- Query Device Microcode Level
- Force Device Diagnostic Dump
- Store Device Diagnostic Dump
- Download Device Microcode

It provides a menu-driven test tool for exercising or testing IBM tape and medium changer devices with a full set of supported operations:

- Reading/Writing Data
- Tape Motion Commands
- Setting/Displaying Device Information/Status
- Mounting/Demounting Cartridges
- Cartridge Inventory

In addition to the menu-driven front end, the *tapeutil* program provides a command-line interface that is convenient for use in shell scripts.

Note: When using the command-line calls to the *tapeutil* program, the tape device is opened and closed for each invocation. Configuration parameters that are changed in one call to the *tapeutil* program are returned to default values when the device is closed.

The source code for the *tapeutil* program is provided for example purposes, and is installed in the */opt/IBMtape* directory during the IBMtape package installation. This source code is commented and demonstrates calls to all of the supported device driver entry points and *ioctl* commands, thus giving the application developer a starting point for interfacing to the IBMtape device driver.

The *tapeutil* program provides both an interactive menu-driven interface as well as a command-line interface. If the *tapeutil* program is invoked with no command-line parameters, the menu-driven version will be started. In the menu-driven version, the device to be operated on should first be opened using option 1. Other options may then be selected.

The user will be prompted for additional information if required for the specific options selected. The results of a command are displayed after it is executed. If an error occurs for the command, error information and device sense data are displayed. The device can be closed using option 2, or it will automatically be closed when the Quit option is selected. The menu is automatically displayed once when the program is first invoked. To prevent unnecessary scrolling of the screen, the menu is not automatically displayed again after each command, but is instead refreshed only after the M (menu refresh) command is entered.

Figure 284 on page APPENDA-3 shows the menu that is displayed by the *tapeutil* program.

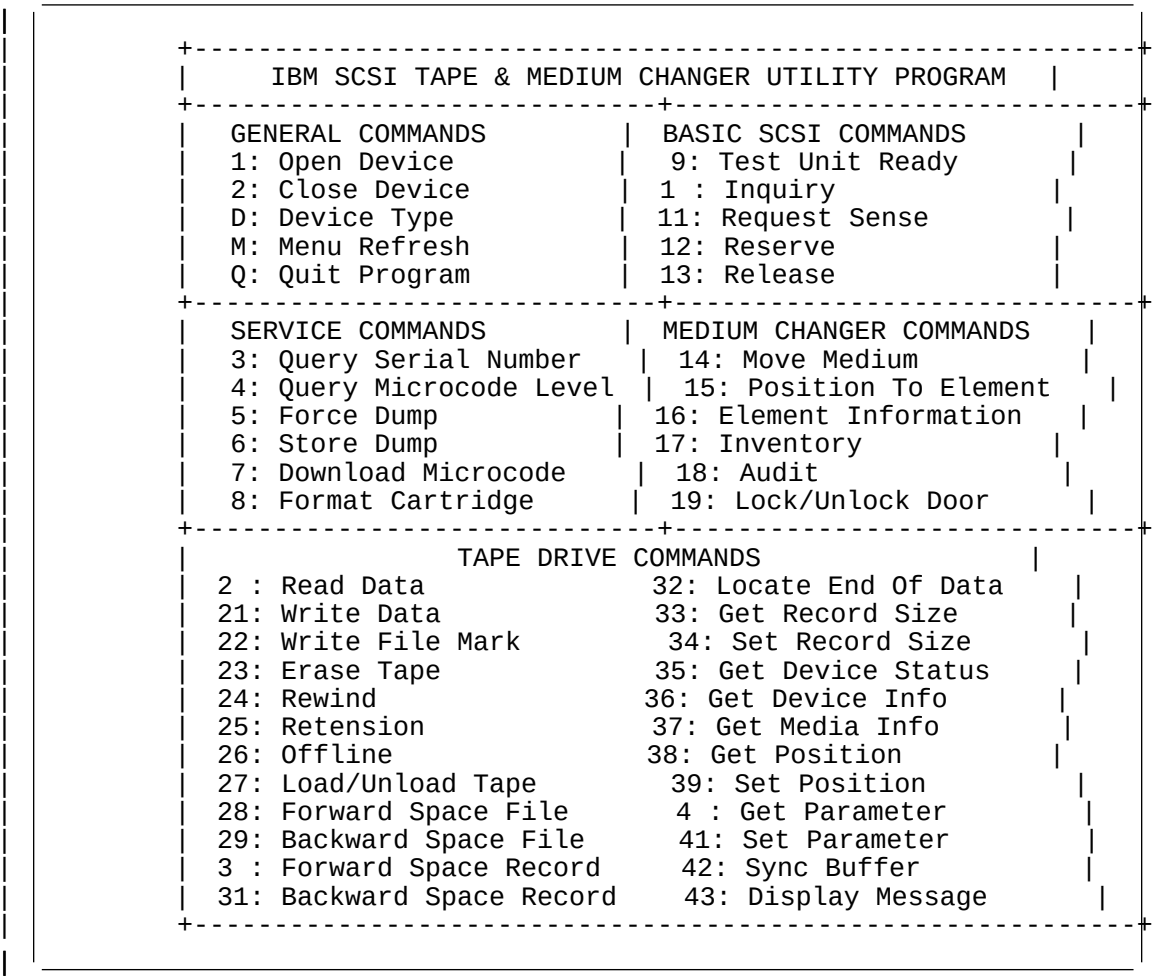

Figure 284. TAPEUTIL Program Menu

If command-line parameters are provided when the program is invoked, the command-line mode will be started. For each command-line execution of the program, the device is first opened, the specific command is issued, and the device is then closed. The program can be driven from within a shell script if desired. Results of the operation will be displayed only when executed in verbose mode. No information is displayed when not in verbose mode. This is particularly useful for quiet shell script implementations. A completion code, as defined in */usr/include/sys/errno.h* for the operation requested is always returned from the program upon exit (in both verbose and quiet mode).

Note: Options 4 through 8 of the *tapeutil* program supported **only** by the Magstar MP 3570 Tape Subsystem and the IBM 3590 High Performance Tape Subsystem.

The usage of the *tapeutil* program in command-line mode is as follows:

```
tapeutil -f device -o operation [options]
```

where **device** is the name of the tape device special file (for example: /dev/rmt/1st) and **operation** is one of the values listed below. The device special file and the operation are required. The specific **options** associated with a particular operation are indicated in Figure 285, Figure 286 on page APPENDA-4, Figure 287 on page APPENDA-4 and Figure 288 on page APPENDA-5. Parameters enclosed in square brackets are optional. All others are required.

Figure 285. Service Commands and Syntax

Service Commands	**Syntax**
Query Serial Number	tapeutil -f **f**.-o qsn [-w w][-v]
Query Microcode Level	tapeutil -f **f**.-o qmc [-w w][-v]
Force Dump	tapeutil -f **f**.-o fdp [-w w][-v]
Store Dump	tapeutil -f **f**.-o sdp [-w w][-v] -z **z**
Download Microcode	tapeutil -f **f**.-o dmc [-w w][-v] -z **z**
Format Cartridge	tapeutil -f **f**.-o fmt [-w w][-v]
Query Device Type	tapeutil -f **f**.-o chk [-w w][-v]

Figure 286. Basic SCSI Commands and Syntax

Basic SCSI Commands	**Syntax**
Test unit Ready	tapeutil -f **f**.-o tur [-w w][-v]
Inquiry	tapeutil -f **f**.-o inq [-w w][-v]
Request Sense	tapeutil -f **f**.-o req [-w w][-v]
Reserved	tapeutil -f **f**.-o res [-w w][-v]
Reserved	tapeutil -f **f**.-o rel [-w w][-v]

Figure 287. Medium Changer Commands and Syntax

Medium Changer Commands	**Syntax**
Move Medium	tapeutil -f **f**.-o mov [-w w][-v] -s **s** -d **d**
Position To Element	tapeutil -f **f**.-o pos [-w w][-v] -s **s**
Element Information	tapeutil -f **f**.-o ele [-w w][-v]
Inventory	tapeutil -f **f**.-o inv [-w w][-v]
Audit	tapeutil -f **f**.-o aud [-w w][-v]
Lock/Unlock Door	tapeutil -f **f**.-o lck [-w w][-v] -x **x**

Figure 288. Tape Drive Commands and Syntax

Tape Drive Commands	Syntax
Read	tapeutil -f **f**.-o rea [-w w][-v] -b **b** -n **n** -m **m**
Write	tapeutil -f **f**.-o wri [-w w][-v] -b **b** -n **n** -m **m** [-r **r**] [-z **z**]
Write File Mark	tapeutil -f **f**.-o eof [-w w][-v] -c **c**
Erase Tape	tapeutil -f **f**.-o era [-w w][-v]
Rewind	tapeutil -f **f**.-o rew [-w w][-v]
Retension	tapeutil -f **f**.-o ret [-w w][-v]
Offline	tapeutil -f **f**.-o off [-w w][-v]
Load/Unload Tape	tapeutil -f **f**.-o lod [-w w][-v] -x **x**
Forward Space File	tapeutil -f **f**.-o fsf [-w w][-v] -c **c**
Backward Space File	tapeutil -f **f**.-o bsf [-w w][-v] -c **c**
Forward Space Record	tapeutil -f **f**.-o fsr [-w w][-v] -c **c**
Backward Space Record	tapeutil -f **f**.-o bsr [-w w][-v] -c **c**
Locate End of Data	tapeutil -f **f**.-o eod [-w w][-v]
Get Record Size	tapeutil -f **f**.-o grs [-w w][-v]
Set Record Size	tapeutil -f **f**.-o srs [-w w][-v]
Get Device Status	tapeutil -f **f**.-o gds [-w w][-v]
Get Device Information	tapeutil -f **f**.-o gdi [-w w][-v]
Get Media Information	tapeutil -f **f**.-o gmi [-w w][-v]
Get Position	tapeutil -f **f**.-o gpo [-w w][-v] -t **t**
Set Position	tapeutil -f **f**.-o mov [-w w][-v] -t **t** -x **x**
Get Parameter	tapeutil -f **f**.-o gpa [-w w][-v] -t **t**
Set Parameter	tapeutil -f **f**.-o spa [-w w][-v] -t **t** -x **x**
Sync Buffer	tapeutil -f **f**.-o syn [-w w][-v]
Display Message	tapeutil -f **f**.-o msg [-w w][-v] -t **t** -y **y1,y1**

Note: Invoking the *tapeutil* program with the **-h** flag (for example, **tapeutil -h**) or the **-?** flag (for example, **tapeutil -?**) will display the usage help information.

| The supported flags, their meanings, their associated operations, and their acceptable ranges are as
| follows:

| ***Flag Description***

| -? Usage Help (stand-alone flag) {no value required}

| -b Block Size (rea, wri) {0 < (block size x blocking factor) <2097152}

| -c Operation Count (eof, fsf, fsr, bsf, bsr) {0 - 65535}

| -d Destination Address (mov) {device specific, determine range from Element Info}

| -f Device Special File Name (always required) {/dev/rmt/1st or similar}

| -h Usage Help (stand-alone flag) {no value required}

| -m Multiples to Read or Write (rea, wri) {0 - 2097152}

| -n Blocking Factor (rea, wri) {0 > (block size x blocking factor) <2097152}

| -o Operation (always required) {refer to previous list}

| -r Random Seed (wri) {0 - 65535}

| -s Source Address (mov, pos) {device specific, determine range from Element Info}

| -t Type of Parameter Value

| (gpo) {1=logical block, 2=physical block}
| (spo) {1=logical block, 2=physical block}
| (gpa) {1=block size, 2=compression, 3=buffering, 4=immediate, 5=trailer, 6=write protect, 7=acf
| mode, 8=capacity, 9=sili}
| (spa) {1=block size, 2=compression, 3=buffering, 4=immediate, 5=trailer, 6=write protect,
| 8=capacity, 9=sili}
| (msg) {1=display msg0, 2=display msg1, 3=flash msg0, 4=flash msg1, 5=alternate msg1/msg2}

| -v Verbose Mode (optional for all commands, stand-alone flag) {no value required, absence of flag
| means quiet mode}

| -w Open Mode (optional for all commands) {1=read/write, 2=read only (default), 3=write only, 4=append}

| -x Parameter Value

| (lck) {1=lock, 2=unlock}
| (lod) {1=load, 2=unload}
| (srs) {0 - 65536}
| (spo) {0 - 65535}
| (spa) {0 - 65535}

| -y Messages (msg) {message1,message2}

| -z Input/Output File Name

| (sdp) {path and name of the file in which to store dump}
| (dmc) {path and name of the microcode image file}
| (wri) {path and name of the file containing write data pattern}

| **Notes:**

| 1. For read and write operations, the size of one buffer of data transferred during a single SCSI read or
| write command is determined by the product of the *Block Size* value and the *B Factor* value. The
| number of these buffers transferred is determined by *Multiplier* value. The actual total number of
| bytes transferred is then (Block Size) x (Blocking Factor) x (Multiplier). If the device is set to fixed
| block mode (block size not equal to zero), the product of *Block Size* and *Blocking Factor* must be a
| multiple of the device block size setting.

| 2. For further information on the Get Parameter (gpa) and Set Parameter (spa) operations, refer to the
| STIOC_GET_PARM and STIOC_SET_PARM ioctl commands described in the *Programming*
| *Reference*.

| The following examples should help to demonstrate and clarify the command-line usage of the *tapeutil* program. For all examples, substitute the actual value of the special file associated with the target device.

| To query the serial number of the device:

```
| /opt/IBMtape/tapeutil -f /dev/rmt/ st -o qsn -v
```

| To request inquiry data from the device:

```
| /opt/IBMtape/tapeutil -f /dev/rmt/ st -o inq -v
```

| To move a cartridge from cell 32 to the tape drive (16):

```
| /opt/IBMtape/tapeutil -f /dev/rmt/ smc -o mov -s 32 -d 16 -v
```

| To set the block size of the device to 64K:

```
| /opt/IBMtape/tapeutil -f /dev/rmt/ st -o spa -t 1 -x 65535 -v
```

| To write 100 64K blocks of data to the tape device:

```
| /opt/IBMtape/tapeutil -f /dev/rmt/ stn -w 1 -o wri -b 65535
| -n 1 -m 1   -v
```

| To write two file marks to the tape device:

```
| /opt/IBMtape/tapeutil -f /dev/rmt/ stn -w 1 -o eof -c 2 -v
```

| To rewind the tape device:

```
| /opt/IBMtape/tapeutil -f /dev/rmt/ stn -o rew -v
```

| To read 100 64K blocks of data from the tape device:

```
| /opt/IBMtape/tapeutil -f /dev/rmt/ stn -o rea -b 65535 -n 1 -m
| 1   -v
```

TAPEUTIL in a HP-UX System Environment

Introduction

A SCSI Tape and Medium Changer Utility Program called *tapeutil* is provided with the IBM SCSI Tape and Medium Changer Device Driver for HP-UX and installed in the */usr/bin* directory. The *tapeutil* program fulfills several purposes:

It provides the following service aids for IBM tape subsystems:

- Query Device Type/Verify Device Attachment
- Query Device Serial Number
- Query Device Microcode Level
- Force Device Diagnostic Dump
- Store Device Diagnostic Dump
- Download Device Microcode

It provides a menu-driven test tool for exercising or testing IBM tape and medium changer devices with a full suite of supported operations:

- Reading/Writing Data
- Tape Motion Commands
- Setting/Displaying Device Information/Status
- Mounting/Demounting Cartridges
- Cartridge Inventory

In addition to the menu-driven front end, the tapeutil program provides a command-line interface which is convenient for use in shell scripts.

The source code for the tapeutil program is provided for example purposes, and is installed in the *tapeutil* directory during the tapeutil package installation. This source code is commented and demonstrates calls to all of the supported device driver entry points and *ioctl* commands, thus giving the application developer a starting point for interfacing to the HP-UX device driver.

The tapeutil program provides both an interactive menu-driven interface as well as a command-line interface. If the tapeutil program is invoked with no command-line parameters, the menu-driven version will be started. In the menu-driven version, the device to be operated on should first be opened using option 1. Other options may then be selected. The user will be prompted for additional information if required for the specific options selected. The results of a command are displayed after it is executed. If an error occurs for the command, error information and device sense data are displayed. The device can be closed using option 2, or it will automatically be closed when the Quit option is selected. The menu is automatically displayed once when the program is first invoked. To prevent unnecessary scrolling of the screen, the menu is not automatically displayed again after each command, but is instead refreshed only after the M (menu refresh) command is entered.

Interactive Menu-Driven Interface

Figure 289 on page APPENDA-10 shows the menu that is displayed by the *tapeutil* program when the program is invoked, and no command-line parameters are entered:

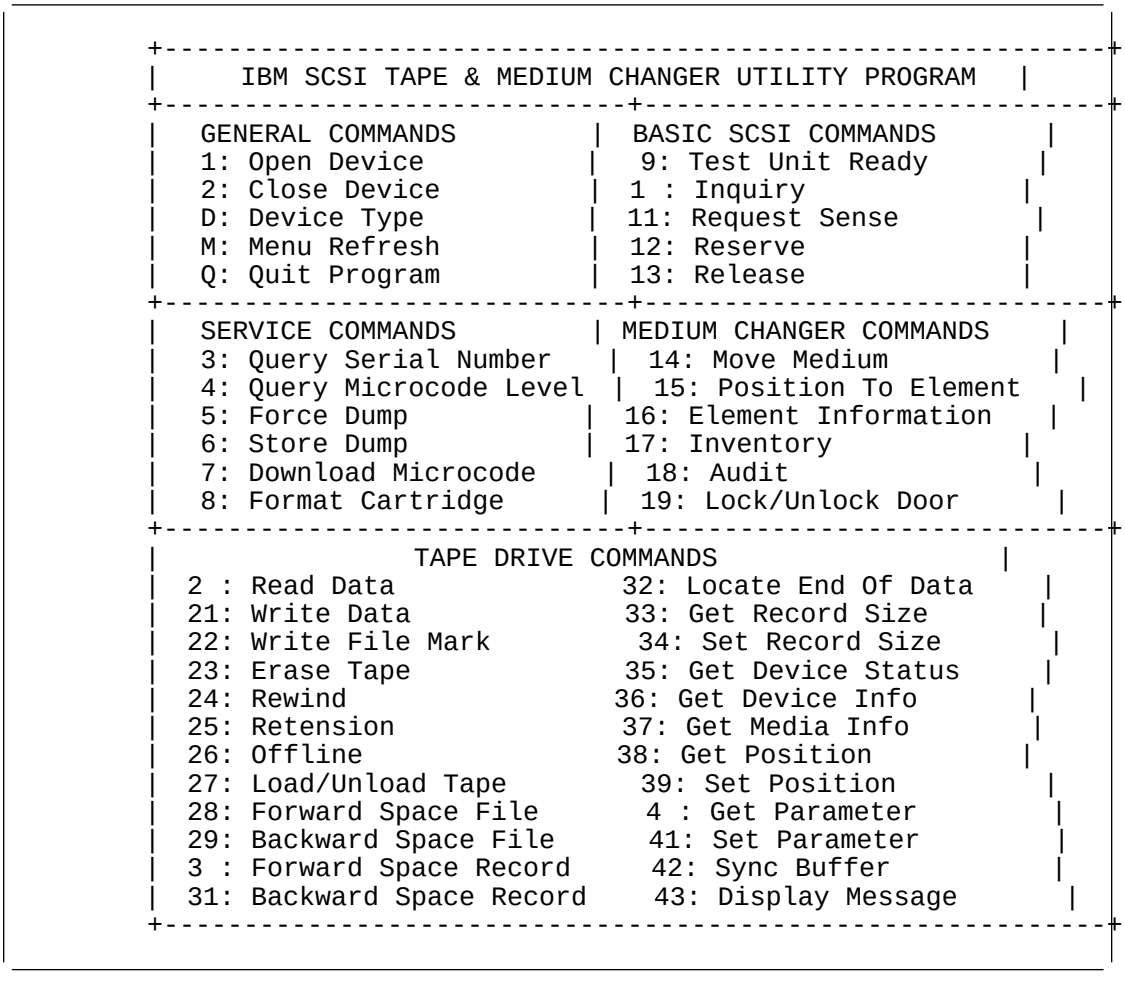

Figure 289. TAPEUTIL Program Menu

Command-Line Mode

If command-line parameters are provided when the *tapeutil* program is invoked, the command-line mode will be started. For each command-line execution of the program, the device is first opened, the specific command is issued, and the device is then closed. The program can be driven from within a shell script if desired. Results of the operation will be displayed only when executed in verbose mode. No information is displayed when not in verbose mode. This is particularly useful for quiet shell script implementations. A completion code, as defined in */usr/include/sys/errno.h* for the operation requested is always returned from the program upon exit (in both verbose and quiet mode).

Command-Line Commands and Syntax: The usage of the *tapeutil* program in command-line mode is as follows:

```
  tapeutil -f device -o
operation [options]
```

where **device** is the name of the tape device special file (for example: /dev/rmt/1m) and **operation** is one of the values listed below. The device special file and the operation are required. The specific **options** associated with a particular operation are indicated in Figure 290, Figure 291, Figure 292 and Figure 293 on page APPENDA-12. Parameters enclosed in square brackets are optional. All others are required.

Figure 290. Service Commands and Syntax

Service Commands	Syntax
Query Serial Number	tapeutil -f **f**.-o qsn [-w w][-v]
Query Microcode Level	tapeutil -f **f**.-o qmc [-w w][-v]
Force Dump	tapeutil -f **f**.-o fdp [-w w][-v]
Store Dump	tapeutil -f **f**.-o sdp [-w w][-v] -z **z**
Download Microcode	tapeutil -f **f**.-o dmc [-w w][-v] -z **z**
Format Cartridge	tapeutil -f **f**.-o fmt [-w w][-v]
Query Device Type	tapeutil -f **f**.-o chk [-w w][-v]

Figure 291. Basic SCSI Commands and Syntax

Basic SCSI Commands	Syntax
Test unit Ready	tapeutil -f **f**.-o tur [-w w][-v]
Inquiry	tapeutil -f **f**.-o inq [-w w][-v]
Request Sense	tapeutil -f **f**.-o req [-w w][-v]
Reserved	tapeutil -f **f**.-o res [-w w][-v]
Reserved	tapeutil -f **f**.-o rel [-w w][-v]

Figure 292 (Page 1 of 2). Medium Changer Commands and Syntax

Medium Changer Commands	Syntax
Move Medium	tapeutil -f **f**.-o mov [-w w][-v] -s **s** -d **d**
Position To Element	tapeutil -f **f**.-o pos [-w w][-v] -s **s**
Element Information	tapeutil -f **f**.-o ele [-w w][-v]
Inventory	tapeutil -f **f**.-o inv [-w w][-v]

Figure 292 (Page 2 of 2). Medium Changer Commands and Syntax	
Medium Changer Commands	**Syntax**
Audit	tapeutil -f **f**.-o aud [-w w][-v]
Lock/Unlock Door	tapeutil -f **f**.-o lck [-w w][-v] -x **x**

Figure 293. Tape Drive Commands and Syntax	
Tape Drive Commands	**Syntax**
Read	tapeutil -f **f**.-o rea [-w w][-v] -b **b** -n **n** -m **m**
Write	tapeutil -f **f**.-o wri [-w w][-v] -b **b** -n **n** -m **m** [-r **r**] [-z **z**]
Write File Mark	tapeutil -f **f**.-o eof [-w w][-v] -c **c**
Erase Tape	tapeutil -f **f**.-o era [-w w][-v]
Rewind	tapeutil -f **f**.-o rew [-w w][-v]
Retension	tapeutil -f **f**.-o ret [-w w][-v]
Offline	tapeutil -f **f**.-o off [-w w][-v]
Load/Unload Tape	tapeutil -f **f**.-o lod [-w w][-v] -x **x**
Forward Space File	tapeutil -f **f**.-o fsf [-w w][-v] -c **c**
Backward Space File	tapeutil -f **f**.-o bsf [-w w][-v] -c **c**
Forward Space Record	tapeutil -f **f**.-o fsr [-w w][-v] -c **c**
Backward Space Record	tapeutil -f **f**.-o bsr [-w w][-v] -c **c**
Locate End of Data	tapeutil -f **f**.-o eod [-w w][-v]
Get Record Size	tapeutil -f **f**.-o grs [-w w][-v]
Set Record Size	tapeutil -f **f**.-o srs [-w w][-v]
Get Device Status	tapeutil -f **f**.-o gds [-w w][-v]
Get Device Information	tapeutil -f **f**.-o gdi [-w w][-v]
Get Media Information	tapeutil -f **f**.-o gmi [-w w][-v]
Get Position	tapeutil -f **f**.-o gpo [-w w][-v] -t **t**
Set Position	tapeutil -f **f**.-o spo [-w w][-v] -t **t** -x **x**
Get Parameter	tapeutil -f **f**.-o gpa [-w w][-v] -t **t**
Set Parameter	tapeutil -f **f**.-o spa [-w w][-v] -t **t** -x **x**
Sync Buffer	tapeutil -f **f**.-o syn [-w w][-v]
Display Message	tapeutil -f **f**.-o msg [-w w][-v] -t **t** -y **y1,y1**

Note: Invoking the *tapeutil* program with the **-h** flag (for example, **tapeutil -h**) or the **-?** flag (for example, **tapeutil -?**) will display the usage help information.

Flag Descriptions: The supported flags, their meanings, their associated operations, and their acceptable ranges are as follows:

Flag Description

-? Usage Help (stand-alone flag) {no value required}

-b Block Size (rea, wri) {0 < (block size x blocking factor) <2097152}

-c Operation Count (eof, fsf, fsr, bsf, bsr) {0 - 65535}

-d Destination Address (mov) {device specific, determine range from Element Info}

-f Device Special File Name (always required) {/dev/rmt/1st or similar}

-h Usage Help (stand-alone flag) {no value required}

-m Multiples to Read or Write (rea, wri) {0 - 2097152}

-n Blocking Factor (rea, wri) {0 > (block size x blocking factor) <2097152}

-o Operation (always required) {refer to previous list}

-r Random Seed (wri) {0 - 65535}

-s Source Address (mov, pos) {device specific, determine range from Element Info}

-t Type of Parameter Value

(gpo) {1=logical block, 2=physical block}
(spo) {1=logical block, 2=physical block}
(gpa) {1=block size, 2=compression, 3=buffering, 4=immediate, 5=trailer, 6=write protect, 7=acf mode, 8=capacity, 9=sili}
(spa) {1=block size, 2=compression, 3=buffering, 4=immediate, 5=trailer, 6=write protect, 8=capacity, 9=sili}
(msg) {1=display msg0, 2=display msg1, 3=flash msg0, 4=flash msg1, 5=alternate msg1/msg2}

-v Verbose Mode (optional for all commands, stand-alone flag) {no value required, absence of flag means quiet mode}

-w Open Mode (optional for all commands) {1=read/write, 2=read only (default), 3=write only, 4=append}

-x Parameter Value

(lck) {1=lock, 2=unlock}
(lod) {1=load, 2=unload}
(spo) {0 - 65535}
(spa) {0 - 65535}

-y Messages (msg) {message1,message2}

-z Input/Output File Name

(sdp) {path and name of the file in which to store dump}
(dmc) {path and name of the microcode image file}
(wri) {path and name of the file containing write data pattern}

Notes:

1. For read and write operations, the size of one buffer of data transferred during a single SCSI read or write command is determined by the product of the *Block Size* value and the *B Factor* value. The number of these buffers transferred is determined by *Multiplier* value. The actual total number of bytes transferred is then (Block Size) x (Blocking Factor) x (Multiplier). If the device is set to fixed block mode (block size not equal to zero), the product of *Block Size* and *Blocking Factor* must be a multiple of the device block size setting.

2. For further information on the Get Parameter (gpa) and Set Parameter (spa) operations, refer to the STIOC_GET_PARM and STIOC_SET_PARM ioctl commands described in the *Programming Reference*.

Examples: The following examples should help to demonstrate and clarify the command-line usage of the *tapeutil* program. For all examples, substitute the actual value of the special file associated with the target device.

To query the serial number of the device:

```
/opt/IBMtape/tapeutil -f /dev/rmt/ m -o qsn -v
```

To request inquiry data from the device:

```
/opt/IBMtape/tapeutil -f /dev/rmt/ m -o inq -v
```

To move a cartridge from cell 32 to the tape drive (16):

```
/opt/IBMtape/tapeutil -f /dev/rmt/ smc -o mov -s 32 -d 16 -v
```

To write 100 64K blocks of data to the tape device:

```
/opt/IBMtape/tapeutil -f /dev/rmt/ mn -w 1 -o wri -b 65535
-n 1 -m 1   -v
```

To write two file marks to the tape device:

```
/opt/IBMtape/tapeutil -f /dev/rmt/ mn -w 1 -o eof -c 2 -v
```

To rewind the tape device:

```
/opt/IBMtape/tapeutil -f /dev/rmt/ mn -o rew -v
```

To read 100 64K blocks of data from the tape device:

```
/opt/IBMtape/tapeutil -f /dev/rmt/ mn -o rea -b 65535
-n 1 -m 1    -v
```

TAPEUTIL in a Windows NT System Environment

NT Utility Program

The Magstar device is supported on Intel-based processors with a minimum processor level of Intel 486DX or Pentium with sufficient RAM and disk space for operation of the Microsoft Windows NT operating system.

The utility has these general characteristics:

1. Can be driven interactively or from a file (batch mode).
2. Allows specification of desired results from each step of the test so that the test can be self-checking.
3. Allows testing of all device driver interfaces with both valid and invalid parameters.

Invoking NTUTIL: The tool can be invoked as a command from the command line or from within a shell script:

```
ntutil <-f input-file> <-o output-file> <-d special-file> <-t>
```

The options are:

```
-f input-file      Specifies the input file for batch mode.
                 If a file is specified, NTUTIL will execute in
                 batch mode and read input from this file.
                 The default for this file is NTUTIL.in.

-o output-file     Specifies the output file.
                 The default for this file is NTUTIL.out.

-d special-file    Specifies the special file value
                 (for example, tape ) to substitute on the
                 "open" statement in the input file.

-t               Turns on internal tracing printouts in the
                 output file. Used only to debug the tool
                 itself.
```

NoteIf no parameters are specified, NTUTIL will operate in interactive mode.

Interactive Mode: When NTUTIL is invoked without the *-f* flag, it defaults to running in interactive or manual mode. This mode allows a developer to interactively determine the kind of testing to be done. When in interactive mode, NTUTIL provides a menu of functions that can be performed.

For a description of interactive modes, see Interactive Mode

The two modes are:

Base mode (LUN0) commands such as open/close/read/write

Library mode (LUN0 and LUN1) that supports open/close/read/write plus media mover commands such as read element status and move media.

The Magstar 3590 must be in Random 2 LUN mode and the other Magstar devices must be in Random mode both when booted and to operate NTUTIL in library mode.

| Base mode (only LUN 0 is accessed) is shown in Figure 294 on page APPENDA-17

| Library mode (LUN 0 and LUN 1 are accessed) is shown in Figure 295 on page APPENDA-18

Base Mode: The Base Mode menu follows:

```
MANUAL TEST MENU:
+-------------------------------------------------------------+
| 1: set device special file          2: display symbols      |
| 3: set block size R/W (now !  fixed)  4: set block count (R/W)|
| 5: set return error when fail       6: set/reset trace      |
| 7: set exit on unexpected result    8: Library Mode         |
+-------------------------------------------------------------+
|2 : open                          21: close                  |
|22: read                          23: write                  |
|24: read and display block           25: flush (buffer->media)|
|26: read block id                 27: erase                  |
|28: locate block id               29: display block data     |
+-------------------------------------------------------------+
|3 : write filemark(s)              31: rewind                |
|32: forward space filemark(s)       33: unload               |
|34: reverse space filemark(s)       35: load (359  Sys Mode) |
|36: forward space record(s)         37: return error         |
|38: reverse space record(s)         39: test unit ready      |
|43: set media parms (block size)     44: set dev parms (comp. |
|46: get device information                                   |
|48: get medium information          49: inquiry              |
|53: space EOD                     54: display message        |
+-------------------------------------------------------------+
|7 : system command                                           |
|                                                             |
+-------------------------------------------------------------+
|8 : Force Dump                    81: Read Dump              |
|82: Update Code                   83: Log Sense              |
|84: Get Last Sense                 85: Get Version           |
|86: Associative/Persistant WProtect   87: Read/Write Test    |
|88: Find Devices                  89: Get MTDevice info      |
+-------------------------------------------------------------+
|99: return to main menu                                      |
|                                                             |
+-------------------------------------------------------------+
enter selection:
```

Figure 294. Base Mode

Library Mode: The Library Mode menu follows:

```
MANUAL TEST MENU:
+-------------------------------------------------------------+
| 1: set device special file          2: display symbols      |
| 3: set block size R/W (now !  fixed)  4: set block count (R/W)|
| 5: set return error when fail       6: set/reset trace      |
| 7: set exit on unexpected result    8: Base Mode            |
+-------------------------------------------------------------+
|1 : ioctl return library inventory    11: ioctl move medium   |
|12: ioctl initialize element status                           |
+-------------------------------------------------------------+
|2 : open                          21: close                  |
|22: read                          23: write                  |
|24: read and display block           25: flush (buffer->media)|
|26: read block id                  27: erase                  |
|28: locate block id                29: display block data   |
+-------------------------------------------------------------+
|3 : write filemark(s)              31: rewind                 |
|32: forward space filemark(s)       33: unload                |
|34: reverse space filemark(s)       35: load (359  Sys Mode) |
|36: forward space record(s)         37: return error          |
|38: reverse space record(s)         39: test unit ready       |
|43: set media parms (block size)     44: set dev parms (comp.)|
|46: get device information                                    |
|48: get medium information          49: inquiry               |
|53: space EOD                     54: display message         |
+-------------------------------------------------------------+
|7 : system command                                            |
|                                                              |
+-------------------------------------------------------------+
|8 : Force Dump                    81: Read Dump              |
|82: Update Code                   83: Log Sense              |
|84: Get Last Sense                 85: Get Version           |
|86: Associative/Persistant WProtect   87: Read/Write Test     |
|88: Find Devices                  89: Get MTDevice info      |
+-------------------------------------------------------------+
|99: return to main menu                                       |
|                                                              |
+-------------------------------------------------------------+
enter selection:
```

Figure 295. Library Mode

AppendB

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The IBM Magstar MP 3570 Tape Subsystem

Attention

This section of the Appendix contains the START section which handles individual FRUs within the Model “C” drive. All areas except EMEA now replace the 3570 Model C drive as a single FRU. EMEA has chosen to maintain multiple FRUs and therefore should use this section when entering the MI.

THESE START PROCEDURES SHOULD BE USED ONLY BY SERVICE PERSONNEL IN EMEA.

Drive—Only Models

The IBM Magstar MP 3570 Tape Subsystem drive-only model is pictured in Figure 296. When procedures in this manual are unique for this particular model, you will be referred to **drive- only** or **non-library** procedures.

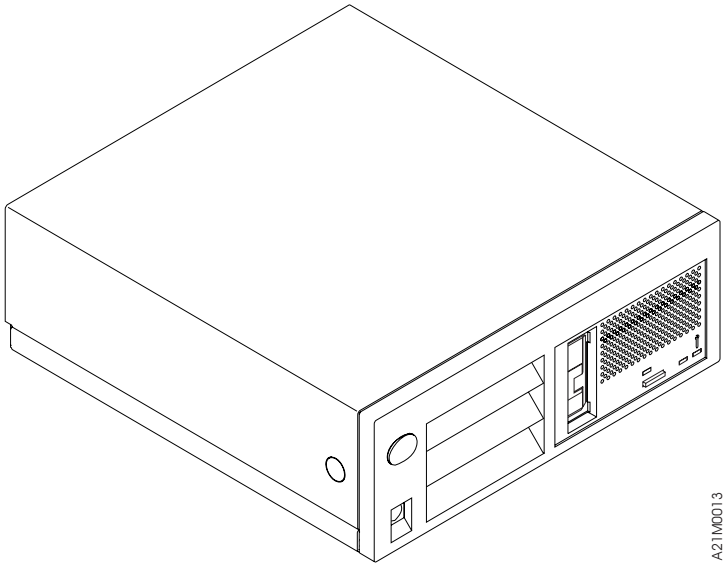

Figure 296. Drive-Only Models

Library Models

The IBM Magstar MP 3570 Tape Subsystem library model is pictured in Figure 297. When procedures in this manual are unique for library models, you will be referred to **library** procedures.

Note: In Models C02, C12 and C22, tape drive 1 is on the right and tape drive 2 is on the left, as you face the front of the library.

Figure 297. Library Models

Maintenance Starting Point

Begin all maintenance action here if you are in EMEA.

Select the table below that best describes the 3570 model that you are here to work on. The two major model types are shown in Figure 296 on page APPENDB-2 and Figure 297 on page APPENDB-3. For 3570 **drives without a library**, see Figure 298. For 3570 **library models**, see Figure 299 on page APPENDB-5. If you cannot find the reason you are here in these two tables, see Figure 300 on page APPENDB-7 which has other entries into the Maintenance Information that are common to both the library and drive-only machines. Find the reason you are here in the left column of the appropriate table and perform the stated action in the right column.

Note: If the service call is on a status 3 machine, see "General Instructions" in the INSP section, then return here to continue the service call.

Start Here For Drive-Only Models (EMEA only) without Library Attachments

Figure 298 (Page 1 of 2). Start—For All Drive-Only Models Without Library Attachments

If You Are Here For This Reason	Perform This Action
Are you repairing a **library model**?	Go to Figure 299 on page APPENDB-5.
FID message from the host.	Go to Figure 303 on page APPENDB-12 to fix the fault.
No FID message from the host, but the drive Maintenance, Busy, and Clean indicators are flashing in an attempt to pass on FID information.	Go to Figure 302 on page APPENDB-11.
ATTENTION DRIVE message in the host error log or displayed by LEDs.	Go to "Attention Drive Messages—EMEA Only" on page APPENDB-23 for further isolation.
Some drive LEDs do light, but the drive Maintenance LED never cycles on and off at power on. Bring-up diagnostics are not running.	Go to "Other Obvious Symptom Problems—EMEA Only" on page APPENDC-21 to perform further problem determination.
Some LEDs fail to light on the front panel of the drive during power on or when the drive is in use. The drive cooling fan **is running**.	Go to "Drive LED Problems—EMEA Only" on page APPENDC-9 for further isolation.
No LED indicators light on the front panel of the drive during power on. The drive cooling fan **is not running**.	Go to "Power Problems—EMEA Only" on page APPENDC-13 for further isolation.
The drive hangs with all three LED indicators on solid. **Note:** The three LEDs will stay on momentarily during power on. If it hangs with this condition, the drive has a problem.	Go to "Other Obvious Symptom Problems—EMEA Only" on page APPENDC-21 to perform further problem determination.
You have no FID number and there are no indicators lighted to aid in isolation. Looks like power may be missing from some or all components.	Go to "Power Problems—EMEA Only" on page APPENDC-13 and perform further problem determination.

Figure 298 (Page 2 of 2). Start—For All Drive-Only Models Without Library Attachments	
If You Are Here For This Reason	**Perform This Action**
A host or channel detected problem. (No FID message)	1. Run the Verify Fix diagnostics using a scratch cartridge to test the Read/Write function. See "Verify Fix—Drive-Only Models" on page PROC-7. If Verify Fix fails, use the FID to repair the drive. 2. If you have a SCSI Wrap Tool available, perform "SCSI Port Wrap Test" on page PROC-77. 3. Verify that the SCSI address is set correctly. See "Setting the SCSI Address—Drive-Only Model C00" on page INST-9.
Were you not able to find the reason you are here?	Try the **Common** entry points Figure 300 on page APPENDB-7.

Start Here For Library Models

Note: In Models C02, C12 and C22, tape drive 1 is on the right and tape drive 2 is on the left, as you face the front of the library.

Figure 299 (Page 1 of 2). Start—All Library Models	
If You Are Here For This Reason	**Perform This Action**
Are you repairing a **drive-only model without a library**?	Go to Figure 298 on page APPENDB-4.
FID is displayed on the library operator panel display, in the Error/FID log, or in a host error log entry.	Go to Figure 303 on page APPENDB-12 to fix the fault.
ATTENTION DRIVE message on library operator panel display or in the error log.	Go to "Attention Drive Messages—EMEA Only" on page APPENDB-23 for further isolation.
ATTENTION LIBRARY message on library operator panel display or in the error log.	Go to "Attention Library Messages—EMEA Only" on page APPENDB-24 for further isolation.
RECOVER status on library operator panel display.	Go to "Clearing Tape Drive Recover Status" on page PROC-28.
Library operator panel display hangs with two dark lines across the display. The library LEDs may or may not be flashing. **Note:** This is normal for the first 30 seconds during bring-up. If it hangs in this condition, the machine has a problem.	Go to "Other Obvious Symptom Problems—EMEA Only" on page APPENDC-21 to perform further problem determination.
Library operator panel display is blank or partial characters are indicated.	Go to "Library Operator Panel Problems—EMEA Only" on page APPENDC-3 for further isolation.
Some or all the LEDs fail to light on the front panel of a library machine.	Go to "Library LED Problems—EMEA Only" on page APPENDC-5 for further isolation.
You have no FID number and there are no indicators lighted. Looks like power is missing from some or all components.	Go to "Power Problems—EMEA Only" on page APPENDC-13 and perform further problem determination.

Figure 299 (Page 2 of 2). Start—All Library Models

If You Are Here For This Reason	Perform This Action
A host or channel detected problem. (No FID message)	1. Run the Verify Fix diagnostics using a scratch cartridge to test the Read/Write function. See "CE Verify Fix on Library Models" on page PROC-10. If Verify Fix fails, use the FID to repair the drive. 2. If you have a SCSI Wrap Tool available, perform "SCSI Port Wrap Test" on page PROC-77. 3. Verify that the SCSI address is set correctly. See "Setting the SCSI Address and Configuring the Library" on page INST-43.
You have a Model C02, C12 or C22 and the beginning of line three of the library operator panel display indicates an "N", or the library does not recognize that drive 2 is installed in the library.	Go to "Isolate Drive 1 / Drive 2 Communications Fault" on page PROC-35.
The tape drive status "INIT" is displayed on the operator panel for more than 5 minutes.	Go to "Isolate Drive 1 / Drive 2 Communications Fault" on page PROC-35.
The host displays a message that states: The cartridge cannot be found. The Volume ID does not match. Incorrect volume mounted in drive.	Go to "Resolving a Mismatch Between the Bar Code Label and VOLSER" on page PROC-26
The bar code reader cannot read the label on a tape cartridge.	Go to "Resolving Bar Code Reader Problems" on page PROC-24.
The tape drive status indicates "CODE LVL" on the operator panel display.	Tape drives 1 and 2 have different microcode levels installed. Update the microcode in the tape drives so that both drives have the same microcode installed. Select the appropriate update procedure below: 1. See "Updating Microcode from FMR Cartridge (Library Models)" on page PROC-34. 2. See "Updating Microcode from an AS/400" on page PROC-49. 3. See "Updating Microcode from RS/6000 by Using TAPEUTIL" on page PROC-50. 4. See "Updating Microcode from a Sun System by Using TAPEUTIL" on page PROC-54. 5. See "Updating Microcode from a HP-UX System by Using TAPEUTIL" on page PROC-56. 6. See "Updating Microcode From a Windows NT System Using NTUTIL" on page PROC-60.
Were you not able to find the reason you are here?	Try the **Common** entry points Figure 5 on page START-7.

Start For Library and Drive-Only Common Entries

Figure 300 (Page 1 of 3). Start—Here for Common Entries Not Previously Listed

If You Are Here For This Reason	Perform This Action
All three drive LED indicators are on solid or library LEDs flash continuously. **Note:** This is normal for a few seconds at power on. If this condition continues, the machine has a problem.	Go to "Other Obvious Symptom Problems—EMEA Only" on page APPENDC-21 to perform further problem determination.
Removal of cartridge from loader by hand.	Go to "Removing Tape Cartridge from Drive" on page PROC-18.
Run verification tests.	Go to "Verify Fix" on page PROC-7.
1. Obtain 3570 drive error information at the host 2. Obtain Service Information Message from a RS/6000. 3. Obtain Service Information Message from an AS/400. 4. Obtain Service Information Message from a Sun System. 5. Obtain Error Information from a HP/UX System. 6. Obtain Error Information from a Windows NT System. 7. Review Service Information Messages in general.	1. See "Obtaining 3570 Drive Error Information at the Host" on page MSG-3. 2. See "Error Log Analysis—RS/6000" on page MSG-4. 3. See "Error Log Analysis—AS/400" on page MSG-24. 4. See "Sun Error Logs" on page MSG-32. 5. See "Obtaining Error Information from an HP/UX System" on page MSG-32. 6. See "Obtaining Error Information from a Windows NT System" on page MSG-32. 7. See "Service Information Messages (SIMs) and Media Information Messages (MIMs)" on page MSG-2.
Clean message from the host, the Clean indicator is on at the drive, or a Clean message is displayed on the library operator panel display.	See "Drive Cleaning Procedure" on page PROC-22 for the procedure to use to clean the drive head.
1. SCSI problems-AS/400 Environment. 2. SCSI problems-AIX Environment. 3. SCSI problems-Sun Environment. 4. SCSI problems-HP/UX Environment. 5. SCSI problems-Windows NT Environment. 6. SCSI Port Wrap Test.	1. Go to "Checking the SCSI Attachment in an AS/400 Environment" on page PROC-65. 2. Go to "Checking the SCSI Attachment in an AIX Environment" on page PROC-69. 3. Go to "Checking the SCSI Attachment in a Sun Environment" on page PROC-73. 4. Go to "Checking the SCSI Attachment in a HP-UX Environment" on page PROC-76. 5. Go to "Checking the SCSI Attachment in a Windows NT Environment" on page PROC-76. 6. Go to "SCSI Port Wrap Test" on page PROC-77.
Installation of a machine.	Refer to the INST section.
Remove or relocate a 3570 machine.	See "Removing a 3570" on page INST-65.
Inspect a machine.	See "General Instructions" on page INSP-2.

Figure 300 (Page 2 of 3). Start—Here for Common Entries Not Previously Listed

If You Are Here For This Reason	Perform This Action
1. Microcode update-from FMR cartridge 2. Microcode update-from AS/400 3. Microcode update-from RS/6000 4. Microcode update-from Sun 5. Microcode update-from HP/UX 6. Microcode update-from Windows NT	1. See: a. “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34. b. “Updating Microcode from FMR Cartridge (Drive-Only Models)” on page PROC-37. 2. See “Updating Microcode from an AS/400” on page PROC-49. 3. See “Updating Microcode from RS/6000 by Using TAPEUTIL” on page PROC-50. 4. See “Updating Microcode from a Sun System by Using TAPEUTIL” on page PROC-54. 5. See “Updating Microcode from a HP-UX System by Using TAPEUTIL” on page PROC-56. 6. See “Updating Microcode From a Windows NT System Using NTUTIL” on page PROC-60.
Update FMR tape with latest microcode.	1. See “Making FMR Tape from Scratch Tape—Library Models” on page PROC-31. 2. See “Updating Microcode from FMR Cartridge (Drive-Only Models)” on page PROC-37.
Making FMR tape from scratch tape.	1. See “Making FMR Tape from Scratch Tape—Library Models” on page PROC-31. 2. See “Updating Microcode from FMR Cartridge (Drive-Only Models)” on page PROC-37.
Making scratch tape from FMR tape.	1. See “Making Scratch Tape from FMR Tape—Library Models (Unmaking FMR)” on page PROC-32. 2. See “Making Scratch Tape from FMR Tape—Drive-Only Models (Unmaking FMR)” on page PROC-33.
1. Perform a microcode dump to tape cartridge. 2. Off-loading dumps from 3570 attached to AS/400. 3. Off-loading dumps from 3570 to RS/6000. 4. Off-loading dumps from 3570 to a Sun System. 5. Off-loading dumps from 3570 to a HP/UX System. 6. Off-loading dumps from 3570 to a Windows NT System.	1. See: a. See “Off-loading Dumps from 3570 to Tape Cartridge (Library Models)” on page PROC-47. b. See “Off-loading Dumps from 3570 to Tape Cartridge (Drive-Only Models)” on page PROC-48. 2. See “Off-loading Dumps from 3570 Attached to AS/400” on page PROC-49. 3. See “Off-loading Dumps from 3570 to RS/6000 by Using TAPEUTIL” on page PROC-52. 4. See “Off-loading Dumps from 3570 to a Sun System by Using TAPEUTIL” on page PROC-55. 5. See “Off-loading Dumps from 3570 to a HP-UX System by Using TAPEUTIL” on page PROC-57. 6. See “Off-loading Dumps to a Windows NT System Using NTUTIL” on page PROC-61.
Microcode problem (FID E5).	See “FID E5—Microcode Problem” on page PROC-84.
You suspect a microcode problem, but no FID E5.	See “Suspected Microcode Problem” on page PROC-6.
Update or review microcode EC level history log.	See “Microcode EC Level History Log” on page PROC-38.

Figure 300 (Page 3 of 3). Start—Here for Common Entries Not Previously Listed	
If You Are Here For This Reason	**Perform This Action**
Repair a 3570 model without a FID number or ATTENTION message.	Go to “Other Obvious Symptom Problems—EMEA Only” on page APPENDC-21 to perform further problem determination.

Drive Indicators—Normal Operation for Drive-Only Models

For drive-only models without a library attachment, three LEDs indicate operator messages and error conditions under normal customer operations. Figure 301 shows the location of the operator panel indicators. See “Drive Indicators and Operator Controls” on page INTRO-39 for a description of the indicators.

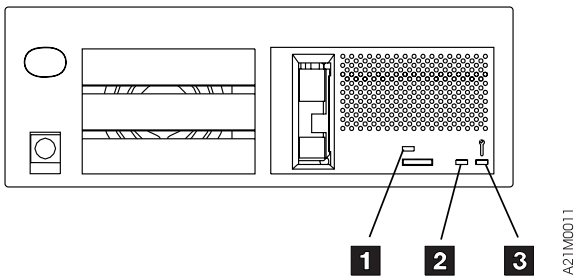

Figure 301. Drive Indicators for Drive-Only Models

Figure 302 on page APPENDB-11 shows the combination of the three indicators and their meanings under **normal customer operational conditions**. The Note column refers to an operator action or information.

For the meaning of these LEDs when in CE Mode, see Figure 246 on page PROC-9 for FID decode meanings and Figure 244 on page PROC-7 for meanings when displaying options.

Figure 302. Indicator Meaning During Normal Operational Conditions

Busy 1	**Clean** 2	**Maintenance** 3	**Note**	**Message**
Off	Off	Off	—	Inactive
Off	Off	Flashing	1	POST or write/read diagnostic test running
Off	Flashing	Off	2	Cleaning is required
Off	On	Off	2	The drive has been disabled until the Head Cleaning procedure is performed.
On	Off	Off	3	Busy, tape in motion for write, read or locate
On	On	Off	—	ATTENTION DRIVE message is indicated. See "Attention Drive Messages—EMEA Only" on page APPENDB-23.
On	On	On	4 & 5	On momentarily as a lamp test during power-on reset or during microcode recovery.
Flashing	Off	Off	3	Unloading, rewinding or cleaning
Flashing	Flashing	Flashing	5	A hard failure on drive
Off	Off	On	5	A hard failure on drive
Flashing	Flashing	On	5	A hard failure on drive

Notes:

1. Maintenance indicator flashing: a normal condition that occurs anytime diagnostics are running. The diagnostics run:

   At power-on time.
   After a system reset.
   When a Send Diagnostic command is sent from the initiator.
   When executed by the service representative.
   For more information on LED meanings in CE Mode, see Figure 244 on page PROC-7 and Figure 246 on page PROC-9.

2. Clean indicator flashing or ON solid: the 3570 determines that the read/write heads need cleaning.

   Note: If the Clean indicator is ON solid, the 3570 drive will be disabled until the cleaning operation has been performed.

   Load the cleaning cartridge into the 3570. See "Drive Cleaning Procedure" on page PROC-22. Cleaning is automatic: the Busy indicator is lighted and remains ON until the cleaning cartridge is unloaded. If the Clean indicator remains ON after cleaning or if the Clean indicator comes ON frequently, see "Other Obvious Symptom Problems—EMEA Only" on page APPENDC-21 for further isolation.

3. Busy indicator flashing or ON solid: a normal condition that indicates that the drive is executing either a read/write operation or is locating, rewinding, or unloading.

4. Busy, Clean and Maintenance indicators lighted: the LED test that occurs at power-on time, after a system reset or during microcode recovery.

5. Two major conditions may occur here:

   a. All three indicators flash quickly, then the Maintenance LED stays ON solid while the other two LEDs flash or stay OFF. This indicates a hard failure on the drive and the drive is sending a coded message of the associated FID. For more information on LED meanings in CE Mode, see Figure 244 on page PROC-7 and Figure 246 on page PROC-9.
   b. All three indicators flash quickly, then all three come ON solid for a time, then the three indicators flash quickly again. This pattern may repeat as many as four times. This indicates that the microcode has encountered problems, and is trying to recover. If the microcode fails to recover, it will then flash the three indicators continuously until the device is powered OFF or reset.

FID Entry Point—EMEA Only

Figure 303 lists each FRU identifier **(Reported FID)** and the field replaceable units (FRUs) to change, or problem areas to investigate under **FRU Name**. The figure (beginning with the Third Release) also contains the **Repair Sequence** you should follow in performing procedures or FRU replacements. Also included are **page Reference or Instruction** to the removal and replacement procedure for the FRU. Each FRU or problem is identified by name. The technical area code **(TAC)**, provided here and in the APPENDD section, is to assist you with call reporting. The **Duration in hours** is intended to give you some idea of how long each FRU removal and replacement procedure will take. These numbers, along with the time it takes to remove and replace decorative covers (see times given for covers in the APPENDD section) should give you a ball park estimate of what time you can expect to spend replacing the parts. These times do not include diagnose and checkout time.

FIDs are displayed on the operator/CE panel in a FID message and in the error log. For example, if the message is FID1 90, **1** is the severity and **90** is the FID. "Intervention Screens" on page PANEL-9 describes the different types of messages and their impact on 3570 availability. The FID relates to the FRUs that have the highest probability of causing the problem. Only the reported FID is displayed on the panel and in the FID log. See Figure 303 for the complete list of FIDs and associated FRUs. Always replace the FRU or perform the recommended procedure in the order of **Repair Sequence** which takes into consideration failure probability.

If the FID has cable FRUs in the FRU list, reseat the cable FRUs before replacing any FRU in the list.

If you are servicing a 3570 model that is **Rack** installed, two people are required to lift the device from the rack. Refer to "Installing the 3570 in a Rack (Models C11 and C12 Only)" on page INST-22 for the procedure to use the hoist in cases where you are alone.

The service information message (SIM) record, which the 3570 sends to the host, also has the reported FID information. See "Service Information Messages (SIMs) and Media Information Messages (MIMs)" on page MSG-2.

Figure 303 (Page 1 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
00	The drive serial number is the default value				
	1	Invalid drive serial number	—	—	Enter valid drive serial number. Go to "Drive Serial Number—Library Models Only" on page PROC-29.
01	The drive logic card serial number is the default value				
	1	Invalid drive logic card serial number. This number is set when the card is built and cannot be changed in the field.	—	—	Replace the drive logic card. The procedure is at "FID EA: Drive Logic Card" on page APPENDD-15. If this does not resolve the problem, call for support.
03	Invalid setup detected				
	1	Configuration problem	—	—	Ensure the config/install options are correct (library models only).

Figure 303 (Page 2 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
90	Electronic fault. See also “Library Operator Panel Problems—EMEA Only” on page APPENDC-3.				
	1	Library operator panel display	50%	L05 (0.2)	APPENDD-39
	2	Library operator panel display cable	40%	C03 (0.1)	APPENDD-39
	3	Library control card	10%	T15 (0.2)	APPENDD-42
94	Bar code reader failure. Perform the procedure at “Resolving Bar Code Reader Problems” on page PROC-24 before replacing any of the following FRUs.				
	1	Bar code reader	70%	T18 (0.1)	APPENDD-40
	2	Library control card	20%	T15 (0.1)	APPENDD-42
	3	Picker assembly	3%	T12 (0.1)	APPENDD-43
	4	Picker cable	3%	C03 (0.1)	APPENDD-43
	5	Library interface cable	2%	C03 (0.1)	APPENDD-53
	6	Drive logic card	2%	L01 (0.5)	APPENDD-15
95	Did not detect accessor movement. 1. Check for anything that might obstruct picker movement. 2. Ensure that cartridges are positioned in the magazines properly. If the picker does not place the cartridges fully into the magazines, replace the picker assembly before replacing any other FRUs. 3. This failure can also be caused by infrared light reflecting from the picker belts onto the Cartridge Present sensor. If the picker belts are shiny and you suspect this is the cause, clean the picker belts with alcohol on a lint-free cloth. 4. If the above checks don't fix the problem, cycle the power off then on to the 3570 and observe the accessor assembly before replacing FRUs: a. If the accessor motor assembly can move the picker back and forth, replace the accessor assembly before replacing any of the other FRUs. b. If accessor motor assembly cannot move the picker back and forth, replace the FRUs in the order listed below.				
	1	Accessor motor assembly	75%	T17 (0.2)	APPENDD-41
	2	Library control card	15%	T15 (0.1)	APPENDD-42
	3	Library sensor cable	5%	T04 (0.4)	APPENDD-54
	4	Accessor assembly	5%	T14 (0.6)	APPENDD-40
96	Timeout trying to extract a cartridge from a drive. 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred. Look for physical defects. Have the customer replace the cartridge if it is damaged. 2. A false 96 error can occur when the library door is opened when the library is attempting to put a cartridge away as part of the power-up sequence. If you believe this occurred, do not replace FRUs at this time. 3. Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu. 4. Ensure that the drive door is not binding or sticking.				
	1	Loader assembly	30%	T45 (1.6)	APPENDD-30
	2	Picker assembly	20%	T12 (0.1)	APPENDD-43
	3	Picker cable	20%	C03 (0.1)	APPENDD-43
	4	Library control card	10%	T15 (0.1)	APPENDD-42
	5	Drive logic card, see Note 1 on page APPENDB-22.	8%	L01 (0.5)	APPENDD-15
	6	Loader home sensor	8%	T31 (0.1)	APPENDD-36
	7	Library sensor cable	4%	T04 (0.4)	APPENDD-54

Figure 303 (Page 3 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
97	Electronic-detected fault				
	1	Library control card	70%	T15 (0.1)	APPENDD-42
	2	Drive logic card	25%	L01 (0.5)	APPENDD-15
	3	Library interface cable	3%	C03 (0.1)	APPENDD-53
	4	Power supply	2%	P04 (0.1)	APPENDD-35
98	Load or unload error while moving cleaner cartridge between the library cleaner cartridge cell and the drive. Sensor did not change state. **Notes:** 1. Check the cleaner cartridge for physical damage. 2. Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Picker assembly	70%	T12 (0.1)	APPENDD-43
	2	Cleaner cartridge-present sensor	25%	T31 (0.1)	APPENDD-54
	3	Library control card	4%	T15 (0.1)	APPENDD-42
	4	Library sensor cable	1%	T04 (0.4)	APPENDD-54
9A	One of the sensors in the library did not change states. **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Picker assembly	70%	T12 (0.1)	APPENDD-43
	2	Picker cable	20%	C03 (0.1)	APPENDD-43
	3	Library control card	7%	T15 (0.1)	APPENDD-42
	4	Library sensor cable	3%	T04 (0.4)	APPENDD-54
9B	Sensor in an invalid condition. **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Drive global sensor pair	90%	T31 (0.2)	APPENDD-45
	2	Library control card	9%	T15 (0.1)	APPENDD-42
	3	Library sensor cable	1%	T04 (0.4)	APPENDD-54
9C	Sensor in an invalid condition. **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Magazine global sensor pair	90%	T31 (0.2)	APPENDD-46
	2	Library control card	7%	T15 (0.1)	APPENDD-42
	3	Library sensor cable	3%	L01 (0.4)	APPENDD-54

Figure 303 (Page 4 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
9E	Sensor did not change state. **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Priority cell cartridge-present sensor	90%	T31 (0.1)	APPENDD-52
	2	Library sensor cable	5%	L01 (0.4)	APPENDD-54
	3	Library control card	5%	T15 (0.1)	APPENDD-42
9F	Load or unload error when moving a cartridge between the drive and the library (a sensor did not change state). 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred. Look for physical defects. Have the customer replace the cartridge if it is damaged. 2. A false 9F error can occur when the library door is opened when the library is attempting to put a cartridge away as part of the power-up sequence. If you believe this occurred, do not replace FRUs at this time. 3. Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu. 4. Ensure that the drive door is not binding or sticking.				
	1	Picker assembly	30%	T12 (0.1)	APPENDD-43
	2	Loader assembly	20%	T45 (1.6)	APPENDD-30
	3	Picker cable	20%	C03 (0.1)	APPENDD-43
	4	Library control card	10%	T15 (0.1)	APPENDD-42
	5	Drive logic card, see Note 1 on page APPENDB-22.	8%	L01 (0.5)	APPENDD-15
	6	Loader home sensor	8%	T31 (0.1)	APPENDD-36
	7	Library sensor cable	4%	T04 (0.4)	APPENDD-54
A0	Sensor did not change state. **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Magazine 2 sensor	90%	T31 (0.2)	APPENDD-53
	2	Library control card	7%	T15 (0.1)	APPENDD-42
	3	Library sensor cable	3%	T04 (0.4)	APPENDD-54
A1	Sensor did not change state. **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Magazine 1 sensor	90%	T31 (0.1)	APPENDD-53
	2	Library control card	7%	T15 (0.1)	APPENDD-42
	3	Library sensor cable	3%	T04 (0.4)	APPENDD-54
A3	Sensor did not change state **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Cleaner cartridge-present sensor	90%	T31 (0.1)	APPENDD-54
	2	Library control card	7%	T15 (0.1)	APPENDD-42
	3	Library sensor cable	3%	T04 (0.4)	APPENDD-54

Figure 303 (Page 5 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
A7	Picker or priority slot error. **Note:** Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged.				
	1	Library magazine	50%	Q05 (0.1)	Customer purchase item. Try another magazine before replacing any FRUs below.
	2	Picker assembly	40%	T12 (0.1)	APPENDD-43
	3	Picker cable	5%	C03 (0.1)	APPENDD-43
	4	Library control card	5%	T15 (0.1)	APPENDD-42
A8	Picker or magazine error. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged.				
	1	Library magazine	50%	Q05 (0.1)	Customer purchase item. Try another magazine before replacing any FRUs below.
	2	Picker assembly	40%	T12 (0.1)	APPENDD-43
	3	Picker cable	5%	C03 (0.1)	APPENDD-43
	4	Library control card	5%	T15 (0.1)	APPENDD-42
A9	Picker feed error. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged.				
	1	Library magazine	50%	Q05 (0.1)	Customer purchase item. Try another magazine before replacing any FRUs below.
	2	Picker assembly	40%	T12 (0.1)	APPENDD-43
	3	Picker cable	5%	C03 (0.1)	APPENDD-43
	4	Library control card	5%	T15 (0.1)	APPENDD-42
AA	Library door open sensor **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Library door open sensor	80%	T31 (0.2)	APPENDD-55
	2	Library control card	14%	T15 (0.1)	APPENDD-42
	3	Library sensor cable	6%	T04 (0.4)	APPENDD-54
B1	Drive LED fault detected				
	1	Drive LED card	81%	L05 (0.1)	APPENDD-34
	2	Drive logic card	10%	L01 (0.5)	APPENDD-15
	3	Drive sensor cable	9%	T04 (1.1)	APPENDD-32
B9	Cartridge is not fully seated in the loader. **Note:** This could be an operator problem in drive-only machines without a library. 1. Ensure that the cartridge is not damaged. 2. Ensure that the cartridge is a 3570 type cartridge.				
	1	Tape cartridge	40%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge before replacing the FRUs below.
	2	Loader assembly	35%	T45 (1.6)	APPENDD-30
	3	Picker assembly (For library only)	25%	T12 (0.1)	APPENDD-43

Figure 303 (Page 6 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
BA	Loader asm or servo card				
	1	Loader assembly	50%	T45 (1.6)	APPENDD-30
	2	Drive servo card	45%	T53 (1.0)	APPENDD-28
	3	Drive logic card	3%	L01 (0.5)	APPENDD-15
	4	Mother board	2%	L02 (1.0)	APPENDD-29
BB	Loader asm, servo card, or tape cartridge. 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged. 2. Also ensure that the cartridge is a 3570 type cartridge.				
	1	Tape cartridge (check first)	20%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge before replacing the FRUs below.
	2	Loader assembly	50%	T45 (1.6)	APPENDD-30
	3	Drive servo card	30%	T53 (1.0)	APPENDD-28
BC	Load or unload failure. 1. Before replacing any FRUs below, inspect the cartridge that was being used when the error occurred for physical defects. Have the customer replace the cartridge if it is damaged. 2. Ensure that the cartridge is a 3570 type cartridge. 3. Ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Tape cartridge (check first)	20%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge before replacing the FRUs below.
	2	Loader assembly	55%	T45 (1.6)	APPENDD-30
	3	Drive servo card	20%	T53 (1.0)	APPENDD-28
	4	Drive logic card	5%	L01 (0.5)	APPENDD-15
BF	Thermal error. The tripped thermal is located on the drive logic card. Causes of a thermal trip can be overheating of the logic card circuits, a missing front drive bezel which is needed to deflect airflow to the drive logic card, a failing drive fan, or blockage of airflow in the fan area. If the cooling system appears to be adequate, replace the drive logic card.				
	1	Drive logic card	75%	L01 (0.5)	APPENDD-15
	2	Drive cooling fan	25%	A03 (0.3)	APPENDD-11
C1	Plus 5 or plus 12 volts not within specification. This FID is also reported when the drive detects a power outage.				
	1	Power supply	90%	P04 (0.1)	APPENDD-35
	2	Drive servo card	10%	T53 (1.0)	APPENDD-28
C5	Tape cartridge or cartridge type sensor **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Tape cartridge (Check first)	90%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge.
	2	Cartridge type sensor, see Note 3 on page APPENDB-22.	6%	T31 (1.6)	APPENDD-30
	3	Drive servo card	4%	T53 (1.0)	APPENDD-28

Figure 303 (Page 7 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
CA	Sensor failed to change state **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Loader home sensor	55%	T31 (0.1)	APPENDD-36
	2	Drive servo card	41%	T53 (1.0)	APPENDD-28
	3	Drive sensor cable	9%	T04 (1.1)	APPENDD-32
CD	Sensor failed to change state **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	Drive logic card, see Note 1 on page APPENDB-22.	92%	T31 (0.5)	APPENDD-15
	2	Drive logic card, see Note 4 on page APPENDB-22.	8%	L01 (N/A)	APPENDD-15
D0	Read or write failure, servo error, or IPS calibration error.				
	1	Head-actuator assembly (D08=clean only, T22=replace)	80%	D08/ T22	APPENDD-26
	2	Drive servo card	12%	T53 (1.0)	APPENDD-28
	3	Loader assembly	4%	T45 (1.6)	APPENDD-30
	4	Drive analog card	2%	T21 (0.6)	APPENDD-18
	5	Mother board	2%	L02 (1.0)	APPENDD-29
D1	Calibration error; possible interface problem between the head and the servo card				
	1	Head-actuator assembly (D08=clean only, T22=replace)	55%	D08/ T22 (0.8)	APPENDD-26
	2	Drive servo card	40%	T53 (1.0)	APPENDD-28
	3	Drive logic card	5%	L01 (0.5)	APPENDD-15
D2	The head did not move. Head asm, servo card, analog card, or mother board				
	1	Head-actuator assembly (D08=clean only, T22=replace),	45%	D08/T22 (0.8)	APPENDD-26
	2	Drive servo card	25%	T53 (1.0)	APPENDD-28
	3	Drive analog card	25%	T21 (0.6)	APPENDD-18
	4	Mother board	5%	L02 (1.0)	APPENDD-29
D3	Servo error while moving tape. Head asm (D08=clean only, T22=replace), cartridge, servo card, analog card, or mother board				
	1	Tape cartridge (check first)	45%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge before replacing the FRUs below.
	2	Head-actuator assembly	20%	D08/ T22 (0.8)	APPENDD-26
	3	Drive servo card	15%	T53 (1.0)	APPENDD-28
	4	Drive analog card	15%	T21 (0.6)	APPENDD-18
	5	Mother board	5%	L02 (1.0)	APPENDD-29

Figure 303 (Page 8 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
D8	Read/write error. (D08=clean only, T22=replace)				
	1	Drive servo card	54%	T53 (1.0)	APPENDD-28
	2	Head-actuator assembly	36%	D08/ T22 (0.8)	APPENDD-26
	3	Drive logic card	7%	L01 (0.5)	APPENDD-15
	4	Mother board	3%	L02 (1.0)	APPENDD-29
DD	Fault detected in loader sensors or the sensors are in an invalid combination. **Note:** Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	1	File protect, and cartridge type sensors. See Note 4 on page APPENDB-22.	37%	T45 (1.6)	APPENDD-30
	2	Loader home sensor	18%	T31 (0.1)	APPENDD-36
	3	Drive servo card	26%	T53 (1.0)	APPENDD-28
	4	Drive logic card, see Note 1 on page APPENDB-22.	15%	L01 (0.5)	APPENDD-15
	5	Drive logic card, see Note 4 on page APPENDB-22.	5%	L01 (N/A)	APPENDD-15
	6	Drive sensor cable	3%	T04 (1.1)	APPENDD-32
	7	Mother board	1%	L02 (1.0)	APPENDD-29
E0	Tape motion error				
	1	Tape cartridge (check first)	77%	D07 (0.1)	Customer item. Inspect for damage. Try another cartridge before replacing the FRUs below.
	2	Loader assembly	20%	T45 (1.6)	APPENDD-30
	3	Drive servo card	3%	T53 (1.0)	APPENDD-28
E4	Electronic-detected fault				
	1	Drive logic card	23%	L01 (0.5)	APPENDD-15
	2	Drive analog card	23%	T21 (0.6)	APPENDD-18
	3	Drive servo card	23%	T53 (1.0)	APPENDD-28
	4	Mother board	23%	L02 (1.0)	APPENDD-29
	5	Power supply	8%	P04 (0.1)	APPENDD-35
E5	Microcode detected a fault with the microcode				
	1	Microcode (known or unknown) (M01 = known, M02 = new)	100%	M01/ M02	PROC-84
E6	Timing problem in the microcode or the electronics, or multiple check-1 errors occurred				
	1	Microcode (known or new) (M01 = known, M02 = new)	50%	M01/M02	PROC-84 and PROC-86
	2	Drive logic card	20%	L01 (0.5)	APPENDD-15
	3	Drive analog card	15%	T21 (0.6)	APPENDD-18
	4	Drive servo card	10%	T53 (1.0)	APPENDD-28
	5	Mother board	5%	L02 (1.0)	APPENDD-29

Figure 303 (Page 9 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
E7	Timing problem in the microcode or the electronics				
	1	Microcode (known or new) (M01 = known, M02 = new)	50%	M01/ M02	PROC-84 and PROC-86
	2	Drive logic card	25%	L01 (0.5)	APPENDD-15
	3	Drive analog card	25%	T21 (0.6)	APPENDD-18
E8	Timing problem while writing and/or reading				
	1	Set a microcode trap based on the expert systems data, get a dump , and contact your next level of support.	—	—	PROC-44
EA	Electronic failure				
	1	Drive logic card	60%	L01 (0.5)	APPENDD-15
	2	Drive analog card	15%	T21 (0.6)	APPENDD-18
	3	Drive servo card	10%	T53 (1.0)	APPENDD-28
	4	Power supply	10%	P04 (0.1)	APPENDD-35
	5	Mother board	5%	L02 (1.0)	APPENDD-29
EB	Electronic failure				
	1	Drive analog card	60%	T21 (0.6)	APPENDD-18
	2	Drive servo card	15%	T53 (1.0)	APPENDD-28
	3	Drive logic card	10%	L01 (0.5)	APPENDD-15
	4	Power supply	10%	P04 (0.1)	APPENDD-35
	5	Mother board	5%	L02 (1.0)	APPENDD-29
EC	Electronic failure				
	1	Drive servo card	60%	T53 (1.0)	APPENDD-28
	2	Drive analog card	15%	T21 (0.6)	APPENDD-18
	3	Drive logic card	10%	L01 (0.5)	APPENDD-15
	4	Power supply	10%	P04 (0.1)	APPENDD-35
	5	Mother board	5%	L02 (1.0)	APPENDD-29
ED	Electronic failure— drive logic card, drive analog card or mother board				
	1	Drive logic card	55%	L01 (0.5)	APPENDD-15
	2	Drive analog card	35%	T21 (0.6)	APPENDD-18
	3	Mother board	10%	L02 (1.0)	APPENDD-29
EE	Electronic failure— drive logic card, drive servo card or mother board				
	1	Drive logic card	55%	L01 (0.5)	APPENDD-15
	2	Drive servo card	35%	T53 (1.0)	APPENDD-28
	3	Mother board	10%	L02 (1.0)	APPENDD-29

Figure 303 (Page 10 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
F0	Read error— drive logic card, drive analog card, tape cartridge, head-actuator assembly, or mother board				
	1	Tape cartridge	60%	D07 (0.1)	Customer supply
	2	Head-actuator assembly	15%	T22 (0.8)	APPENDD-26
	3	Drive analog card	10%	T21 (0.6)	APPENDD-18
	4	Drive logic card	5%	L01 (0.5)	APPENDD-15
	5	Drive sensor cable	5%	T04 (1.1)	APPENDD-32
	6	Mother board	5%	L02 (1.0)	APPENDD-29
F1	Read error— drive logic card, drive analog card, tape cartridge, head-actuator assembly, or mother board				
	1	Tape cartridge	60%	D07 (0.1)	Customer supply
	2	Head-actuator assembly	15%	T22 (0.8)	APPENDD-26
	3	Drive analog card	10%	T21 (0.6)	APPENDD-18
	4	Drive logic card	5%	L01 (0.5)	APPENDD-15
	5	Mother board	5%	L02 (1.0)	APPENDD-29
	6	Drive sensor cable	5%	T04 (1.1)	APPENDD-32
F2	Read-back check error.				
	1	Tape cartridge or hardware	60%	D07 (0.1)	"FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
	2	Head-actuator assembly	15%	T22 (0.8)	APPENDD-26
	3	Drive analog card	10%	T21 (0.6)	APPENDD-18
	4	Drive logic card	10%	L01 (0.5)	APPENDD-15
	5	Mother board	5%	L02 (1.0)	APPENDD-29
F3	Servo error				
	1	Tape cartridge or hardware	60%	D07 (0.1)	"FID FE—Isolate Fault between Media and Hardware" on page PROC-89.
	2	Head-actuator assembly	15%	D08/T22 (0.8)	APPENDD-26
	3	Drive servo card	10%	T53 (1.0)	APPENDD-28
	4	Drive analog card	5%	T21 (0.6)	APPENDD-18
	5	Mother board	5%	L02 (1.0)	APPENDD-29
	6	Drive sensor cable	5%	T04 (1.1)	APPENDD-32
F4	RS-422 bus error (drive logic card or RS-422 cables)				
	1	RS-422 interface problem	—	—	Run the RS-422 wrap test. See "RS-422 Port Wrap Test" on page PROC-78. If problem re-occurs, replace the following FRUs. If that does not fix the problem, get a microcode dump and contact your next level of support.
	2	Drive logic card	80%	L01 (0.5)	APPENDD-15
	3	RS-422 cable—internal to drive	20%	C04 (0.1)	APPENDD-38

Figure 303 (Page 11 of 11). FIDs, FRUs, and TACs

Reported FID	Repair Sequence	FRU Name	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
F5	SCSI bus error (drive logic card or SCSI cables)				
	1	SCSI interface, operator procedural, or host problem	—	—	Run the SCSI wrap test. See "SCSI Port Wrap Test" on page PROC-77. If problem re-occurs, replace the following FRUs. If that does not fix the problem, get a microcode dump and contact your next level of support.
	2	Drive logic card	80%	L01 (0.5)	APPENDD-15
	3	Internal SCSI cable	20%	C04 (0.2)	APPENDD-37
F6	Informational message—Cleaning required due to performance.				
	1	Operator, procedural, or host problem	100%	—	See Note 5 below.
FE	Read/write error. See "FID FE—Isolate Fault between Media and Hardware" on page PROC-89.				
	1	Tape cartridge or hardware	100%	D07 (0.1)	"FID FE—Isolate Fault between Media and Hardware" on page PROC-89
FF	Informational or non-hardware related status or error				
	1	Operator, procedural, or host problem	100%	—	See Note 5 below.

Notes:

1. The cartridge-present sensor is part of the drive logic card.
2. The cartridge type sensor is part of the drive loader assembly.
3. These parts are all part of the drive loader assembly.
4. This line item is for failures in the drive logic card itself.
5. Information FID F6 or FF with FSCs 7036, 7037, 7038 and C559 are normal. These FSCs are generated when a drive requires cleaning or when a drive has been cleaned.

Attention Drive Messages—EMEA Only

Library machines:

1. Some attention messages (ATTENTION DRIVE) have an associated FID that is not displayed until you press the Enter push button.
2. Use Figure 304 for ATTENTION DRIVE messages without an associated FID.
3. If ATTENTION DRIVE is displayed, press the Enter push button. If a FID appears, go to “FID Entry Point—EMEA Only” on page APPENDB-12.
4. If no FID is presented, use Figure 304 to find the fault.

Drive-only machines:

1. On drive-only installations the drive Busy and Clean LED indicators will be on solid to show that a ‘ATTENTION DRIVE’ is being presented. This may apply to all ATTENTION DRIVE messages except FSC Trap Taken.
2. See “Drive Indicators—Normal Operation for Drive-Only Models” on page APPENDB-10 for the meaning of these flashing LEDs.

Figure 304. ATTENTION DRIVE Messages

Message Meaning	FRUs	FRU Name	Prob-ability	TAC Code& (Duration in hours)	Page Reference
Load Unload Error	1. Ensure that the cartridge and tape are not broken. 2. Ensure that the cartridge is a 3570 compatible-type cartridge. 3. Before replacing FRUs below, ensure that the loader sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	FE	Tape cartridge	50%	D07 (0.1)	Customer supply
	BC	Loader asm	40%	T45 (1.6)	APPENDD-30
	EC	Drive servo card	7%	T53 (1.0)	APPENDD-28
	EA	Drive logic card	2%	L01 (0.5)	APPENDD-15
	E9	Mother board	1%	L02 (1.0)	APPENDD-29
FSC Trap Taken	The microcode encountered the trap address set from a CE panel menu. This is valid only for library models.				
	—	Not a fault	—	—	—
Tension Dropped	Tape motion error (velocity or tape slipping error). Check the tape cartridge before replacing any FRUs.				
	FE	Tape cartridge	70%	D07 (0.1)	Customer supply
	BC	Loader asm	27%	T45 (1.6)	APPENDD-30
	EC	Drive servo card	3%	T53 (1.0)	APPENDD-28
Invalid cartridge	1. Ensure that the cartridge and tape are not broken. 2. Ensure that the cartridge is a 3570 compatible-type cartridge. 3. Before replacing FRUs below, ensure that the loader sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	FE	Tape cartridge	60%	D07 (0.1)	Customer supply
	BC	Loader asm	30%	T45 (1.6)	APPENDD-30
	EA	Drive logic card	4%	L01 (0.5)	APPENDD-15
	EC	Drive servo card	4%	T53 (1.0)	APPENDD-28
	E9	Mother board	2%	L02 (1.0)	APPENDD-29

Attention Library Messages—EMEA Only

Some attention messages (ATTENTION LIBRARY) have an associated FID that is not displayed until you press the Enter push button. Use Figure 305 for ATTENTION LIBRARY messages without an associated FID.

1. If ATTENTION LIBRARY is displayed, press the Enter push button. If a FID appears, go to "FID Entry Point—EMEA Only" on page APPENDB-12.
2. If no FID is presented, use Figure 305 to find the fault.

Figure 305 (Page 1 of 5). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Move Error	Ensure that the cartridge is not damaged or the tape broken, and that the cartridge is a 3570 cartridge. Also ensure that at least one magazine is installed and that there is no global obstruction in the picker path.				
	9A	Picker assembly	50%	T12 (0.1)	APPENDD-43
	FD	Magazine	20%	Q05 (0.1)	Customer-purchased
	BC	Loader assembly	10%	T45 (1.6)	APPENDD-30
	CA	Loader-home sensor	6%	T31 (0.1)	APPENDD-36
	EA	Cartridge-present sensor (on drive logic card)	5%	T31 (0.5)	APPENDD-15
	97	Library control card	3%	T15 (0.1)	APPENDD-42
	99	Picker cable	3%	C03 (0.1)	APPENDD-43
	A5	Library sensor cable	3%	T04 (0.4)	APPENDD-54
Timeout Error	An operation timed out or did not complete in the allotted time-frame. This is usually caused by a hardware failure.				
	9A	Picker assembly	50%	T12 (0.1)	APPENDD-43
	FD	Magazine	20%	Q05 (0.1)	Customer-purchased
	BC	Loader assembly	10%	T45 (1.6)	APPENDD-30
	CA	Loader-home sensor	6%	T31 (0.1)	APPENDD-36
	EA	Cartridge-present sensor (on drive logic card)	5%	T31 (0.5)	APPENDD-15
	97	Library control card	3%	T15 (0.1)	APPENDD-42
	99	Picker cable	3%	C03 (0.1)	APPENDD-43
	A5	Library sensor cable	3%	T04 (0.4)	APPENDD-54
Clear Picker Path A	The device detected the presence of a possible blockage in the cartridge path, such as in the magazine or in the priority cell. 1. Check the position of all cartridges to ensure they are properly positioned in the magazine and in the priority cell. A cartridge that extends too far into the magazine in the import position or a damaged cartridge can cause this error. 2. Check for a binding or sticking cartridge door. 3. Remove the magazine and look for any obvious obstructions. 4. Try another magazine in the library. 5. Before replacing FRUs below, ensure that the global and priority cell sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9C	Magazine global sensor pair	90%	T31 (0.2)	APPENDD-46
	97	Library control card	6%	T15 (0.1)	APPENDD-42
	A5	Library sensor cable	4%	T04 (0.4)	APPENDD-54

Figure 305 (Page 2 of 5). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Clear Picker Path B	The device detected the presence of a possible blockage in the cartridge path between the drive and the picker, or between the cleaner cell and the picker. 1. Check the position of the cleaner cartridge and ensure that it is fully seated within the cleaner cell. If the cleaner cartridge is not fully seated in the cleaner cell, replace the cleaner cell retention spring (P/N 05H2912). 2. Ensure that no cartridges or other obstacles are in the picker path between the drive and the picker. 3. Check for a binding or sticking cartridge door. 4. Before replacing FRUs below, ensure that the global, picker and loader sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9B	Drive global sensor pair	90%	T31 (0.2)	APPENDD-45
	97	Library control card	6%	T15 (0.1)	APPENDD-42
	A5	Library sensor cable	4%	T04 (0.4)	APPENDD-54
Wrong Mode	An operation was requested from the initiator which cannot be run with the current mode setting.				
	—	—	100%	Q05	Change mode to Auto, Random, or Manual as needed.
No Magazine 1, 2, or Both	1. Ensure that the appropriate magazine is properly installed and latched in place. If the ATTENTION LIBRARY message persists, try a different magazine. If a different magazine fails to correct the problem, replace the FRUs below: **HINT: If both magazines are present, but neither is being sensed, the problem is not likely to be the sensor or cable.** 2. Before replacing FRUs below, ensure that the magazine sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	A0	Magazine 2 sensor	44%	T31 (0.2)	APPENDD-53
	A1	Magazine 1 sensor	44%	T31 (0.1)	APPENDD-53
	97	Library control card	6%	T15 (0.1)	APPENDD-42
	A5	Library sensor cable	4%	T04 (0.4)	APPENDD-54
No cartridge	The device detects the presence of cartridges, but cannot find a cartridge in the **import** position in the magazine or the priority cell. 1. Check the position of all the cartridges to ensure they are properly positioned in the import position of the magazine and the priority cell. If this condition is not cleared, remove and replace the magazine. 2. Press Start. 3. Before replacing FRUs below, ensure that the magazine and priority cell sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9A	Picker assembly	50%	T12 (0.1)	APPENDD-43
	9E	Priority cell cartridge-present sensor	30%	T31 (0.1)	APPENDD-52
	97	Library control card	10%	T15 (0.1)	APPENDD-42
	A5	Library sensor cable	7%	T04 (0.4)	APPENDD-54

Figure 305 (Page 3 of 5). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Extra cartridge	The device loaded a cartridge from the magazine and detected that another cartridge was placed in its home position. The device attempts to place the now-displaced cartridge in the priority cell to await operator action. If the priority cell is full, it ejects the cartridge when the priority slot is unloaded or when the Enter push button is pressed. 1. Ensure that no cartridge has been inserted into an 'in use' cell. 2. Before replacing FRUs below, ensure that the appropriate sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9E	Priority cell cartridge-present sensor	40%	T31 (0.1)	APPENDD-52
	9A	Picker assembly	30%	T12 (0.1)	APPENDD-43
	97	Library control card	20%	T15 (0.1)	APPENDD-42
	A5	Library sensor cable	5%	T04 (0.4)	APPENDD-54
No Cleaner cartridge	A request was made to clean the head, but the device cannot find a cleaner cartridge in the cleaner cell. 1. Check the cleaner cell to ensure that a cleaner cartridge is present in the cell. 2. Ensure that it is a **cleaner cartridge** and not just a data cartridge. The holes in the casing are different and the media in the cleaner cartridge does not fill the entire cartridge Cleaner cartridges have a gray file protect lever. 3. Before replacing FRUs below, ensure that the cleaner cartridge present sensor is operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	A3	Cleaner cartridge-present sensor	64%	T31 (0.1)	APPENDD-54
	9A	Picker assembly	18%	T12 (0.1)	APPENDD-43
	A5	Library sensor cable	10%	T04 (0.4)	APPENDD-54
	97	Library control card	5%	T15 (0.1)	APPENDD-42
Tach Error	A tach error was detected during an accessor motor operation. 1. Check for anything that might obstruct picker movement. 2. Ensure that cartridges are positioned in the magazine properly. 3. If the above checks don't fix the problem, cycle the power off then on to the 3570 and observe the accessor assembly before replacing FRUs. a. If the accessor motor assembly can move the picker back and forth, replace the accessor assembly before replacing any of the other FRUs. b. If accessor motor assembly cannot move the picker back and forth, replace the FRUs in the order listed below.				
	95	Accessor motor assembly	80%	T17 (0.2)	APPENDD-41
	97	Library control card	10%	T15 (0.1)	APPENDD-42
	A5	Library sensor cable	6%	T04 (0.4)	APPENDD-54
	99	Picker cable	2%	C03 (0.1)	APPENDD-43
	92	Accessor assembly	2%	T14 (0.6)	APPENDD-40
Library IRQ Fault	A library interrupt is on solid. Insure that the power cable from the power supply to the library control card is plugged and not loose. A drawing of this cable with expected voltages is located at Figure 308 on page APPENDC-29. If the power is OK to the library control card, replace the following FRUs in the order listed:				
	97	Library control card	90%	T15 (0.1)	APPENDD-42
	C1	Power supply	10%	P04 (0.1)	APPENDD-35

Figure 305 (Page 4 of 5). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Magazine Full	The magazine is full of cartridges. The device detected that the magazine cannot hold any more cartridges. **Note:** Before replacing FRUs below, ensure that the priority cell, picker, and cartridge present sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	FD	Cartridge magazine	95%	Q05 (0.1)	Remove the magazine and replace the cartridges or insert another full magazine.
	9A	Picker assembly	4%	T12 (0.1)	APPENDD-43
	97	Library control card	1%	T15 (0.1)	APPENDD-42
Library Not Enabled	Ensure there are cartridges in the library and that they are seated in the import position.				
	9E	Priority cell cartridge-present sensor	48%	T31 (0.1)	APPENDD-52
	9A	Picker assembly	34%	T12 (0.1)	APPENDD-43
	A5	Library sensor cable	10%	T04 (0.4)	APPENDD-54
	97	Library control card	5%	T15 (0.1)	APPENDD-42
Feed Over-current	An over-current condition was detected in the library feed motor circuitry.				
	97	Library control card	60%	T15 (0.1)	APPENDD-42
	9A	Picker assembly	20%	T12 (0.1)	APPENDD-43
Pinch Over-current	An over-current condition was detected in the library pinch motor circuitry.				
	97	Library control card	60%	T15 (0.1)	APPENDD-42
	9A	Picker assembly	20%	T12 (0.1)	APPENDD-43
Picker Over-current	An over-current condition was detected in the library picker motor circuitry.				
	97	Library control card	60%	T15 (0.1)	APPENDD-42
	9A	Picker assembly	20%	T12 (0.1)	APPENDD-43
Transport Full	The picker attempted to unload a cartridge but had no place to put it. A tape cartridge is present in slot that the device tried to unload to, or it appears to the machine that the slot is full. Could be a full slot or a sense error. The tape cartridge was left in the transport. 1. Ensure that a cartridge was not placed in an **in use** cell, causing this failure. 2. Before replacing FRUs below, ensure that the priority cell, picker, and cartridge present sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	FE	Tape cartridge	70%	— (0.1)	Remove the cartridge
	9A	Picker assembly	20%	T12 (0.1)	APPENDD-43
	97	Library control card	6%	T15 (0.1)	APPENDD-42
	FD	Magazine	4%	Q05 (0.1)	Check magazine for defect.

Figure 305 (Page 5 of 5). ATTENTION LIBRARY Messages

Message Meaning	FRUs	FRU Name or Description	Prob-ability	TAC Code & (Duration in hours)	Page Reference or Instruction
Library Door Open	The device detected that the library door was opened. **Note:** Before replacing FRUs below, ensure that the library door sensor is operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	—	Library door open is a normal condition if the operator has been adding or removing cartridges without using the priority cell position. If the door was not opened, but the machine thinks it was, replace the FRUs that follow until the problem is fixed.	—	—	Close the library door.
	AA	Library door open sensor	90%	T31 (0.2)	APPENDD-55
	97	Library control card	6%	T15 (0.1)	APPENDD-42
	A5	Library sensor cable	4%	T04 (0.4)	APPENDD-54
Target Cell Full	The device detected that the destination cell was full. **Note:** Before replacing FRUs below, ensure that the priority cell, picker, and cartridge present sensors are operating correctly. See Figure 128 on page PANEL-26 and select **UTILITIES** from the CE OPTIONS Menu, then select **DISP SENSORS** from the CE UTILITIES Menu.				
	9E	Priority cell cartridge present sensor	70%	T31 (0.1)	APPENDD-52
	A5	Library sensor cable	20%	T04 (0.4)	APPENDD-54
	97	Library control card	10%	T15 (0.1)	APPENDD-42

Appendix C

Contents

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Library Operator Panel Problems—EMEA Only

This procedure helps you isolate library operator panel failures.
See the APPENDD section for check, adjustment, removal, and replacement procedures for all machines located within EMEA.
See “Operator Panel” on page PANEL-1 for a description of the operator panel.
Unless otherwise directed, run **Fix Verify** from the CE Options Menu to test the drive after a FRU replacement.
If the recommended repair actions do not fix the problem, call your next level of support.

The table below may send you to another MAP. If not, continue with this MAP.

Figure 306. Library LED Type Failures and Where To Go First

If You Have the Following Symptoms	Go Here First
Library LEDs flash continuously	Go to Library LED Problems—EMEA Only step 005 on page APPENDC-5.
Some or all library LEDs fail to switch ON during the power-on cycle.	Go to Library LED Problems—EMEA Only step 008 on page APPENDC-6.
Not all library LEDs switch ON during the power-on cycle.	Go to Library LED Problems—EMEA Only step 023 on page APPENDC-7.
None of these symptoms were noted	Go to Step 001.

001

(From page APPENDC-3)

Have the customer vary the drive off-line, if not done before.

Perform “Prepare the Tape Device for Service” on page PROC-5.

Switch ON power to the library device.

Can you see any display on the library operator panel display?
Yes **No**

002

Switch the library power OFF then ON and observe the three LEDs that normally indicate that the two magazines and priority cell are busy. The LEDs should flash ON and OFF during the power-on cycle, then switch OFF after the power-on diagnostics complete execution.
(Step **002** continues)

002 (continued)

Did any of the library operator panel LEDs switch ON?
Yes **No**

003

A power problem is causing the operator panel to fail. Go to “Power Problems—EMEA Only” on page APPENDC-13 for further isolation. Return to this procedure if the power supply is OK.

004

3570 power is good to the library control card which drives the library operator panel LEDs.

– Refer to “CE Verify Fix Menu” on page PANEL-30 and run the Panel Test Option of the diagnostic test. The test should allow you to see if each pixel switches ON at the panel display.

(Step **004** continues)

004 (continued)

Did the test fail?
Yes **No**

005

Go to Step 011.

006

– Switch power OFF and check that the library operator panel display cable connector from the library operator panel display to the library control card is seated properly.

If the library operator panel display cable connector is seated, replace the following FRUs:

1. “FID 90: Library Operator Panel Display” on page APPENDD-39 (90%)
2. “FID 97: Library Control Card” on page APPENDD-42 (8%)
3. “FID A5: Library Sensor Cable” on page APPENDD-54 (2%)

Note: An alternative to replacing the library sensor cable is to perform a continuity check of the cable. If it checks OK, don't replace it.

007

A display is seen, but may not be correct.

Does the data on the display seem to be correct?
Yes **No**

008

Refer to “CE Verify Fix Menu” on page PANEL-30 and run the Panel Test Option of the diagnostic test. The test should allow you to see if each pixel switches ON at the panel display.

Did the test fail?
Yes **No**

009

(Step **009** continues)

009 (continued)

Go to Step 011.

010

Replace the following FRUs in the order listed:

1. “FID 90: Library Operator Panel Display” on page APPENDD-39 (90%)
2. “FID 97: Library Control Card” on page APPENDD-42 (8%)
3. “FID A5: Library Sensor Cable” on page APPENDD-54 (2%)

Note: An alternative to replacing the library sensor cable is to perform a continuity check of the cable. If it checks OK, don't replace it.

011

(From Library LED Problems—EMEA Only step 013 on page APPENDC-6)
(From steps 005 and 009)

The display appears to be working for now. If the problem appears again, replace the following FRUs in the order listed:

1. “FID 90: Library Operator Panel Display” on page APPENDD-39 (90%)
2. “FID 97: Library Control Card” on page APPENDD-42 (8%)
3. “FID A5: Library Sensor Cable” on page APPENDD-54 (2%)

Note: An alternative to replacing the library sensor cable is to perform a continuity check of the cable. If it checks OK, don't replace it.

Library LED Problems—EMEA Only

This procedure helps you isolate library LED failures.
See the AppendB section for check, adjustment, removal, and replacement procedures.
See “Operator Panel” on page PANEL-1 for a description of the operator panel.
Unless otherwise directed, run **Fix Verify** from the CE Options Menu to test the drive after a FRU replacement.
If the recommended repair actions do not fix the problem, call your next level of support.

001

Perform “Prepare the Tape Device for Service” on page PROC-5.

Switch ON power to the library device and observe the 3 LEDs that normally switch ON when the magazines or priority cell are busy. The 3 LEDs should flash ON and OFF during power-on diagnostics, then switch OFF when the library is initialized.

Did any of the three library LEDs switch ON?
Yes No

002

None of the three library LEDs switched ON during the power-on cycle. Continue at Step 008 on page APPENDC-6.

003

At least one library LED switched ON. The library LEDs should flash for a short while, then switch OFF. If they continue to flash indefinitely, a problem with library initialization has occurred.

Do the library LEDs flash ON and OFF continuously (more than one minute)?
Yes No

004

Continue at Step 023 on page APPENDC-7.

005

(From page APPENDC-3)
(From step 029)

When the library LEDs flash ON and OFF continuously, the library operator panel display usually has only 2 blank (dark) lines displayed. The library device was never initialized by the microcode.
(Step **005** continues)

005 (continued)

Since this is a library problem, perform removal of the following:

1. “Library Chassis Covers” on page APPENDD-4.
2. “FID B2: Cooling Pack” on page APPENDD-11.
3. “Drive Assembly Top Cover” on page APPENDD-10.

Now that you have access to the cable that runs from the power supply to the mother board, power OFF the device and remove the end that is plugged into connector CD3. A diagram is located at Figure 309 on page APPENDC-29. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the mother board.

Does the voltage check OK?
Yes No

006

Replace the following FRUs in the order listed.

1. Power supply (80%) at “FID C1: Power Supply” on page APPENDD-35.
2. Cable from the power supply to the mother board (20%)

007

Power is OK to the mother board. Replace the following FRUs in the order listed.

1. Drive logic card (60%) at “FID EA: Drive Logic Card” on page APPENDD-15.
2. Library control card (30%) at “FID 97: Library Control Card” on page APPENDD-42.
3. Mother board (5%) at “FID E9: Mother Board” on page APPENDD-29.

(Step **007** continues)

007 (continued)

4. Library interface cable (3%) at "FID A2: Library Interface Cable" on page APPENDD-53.
5. Library sensor cable (2%) at "FID A5: Library Sensor Cable" on page APPENDD-54.

008

(From page APPENDC-3)
(From steps 002 and 025)

Some or all library LEDs failed to switch ON during the power-on cycle.

Is the library operator panel display completely blank?

Yes **No**

009

Continue at Step 011.

010

The library operator panel display is completely blank. Continue at Step 018 on page APPENDC-7.

011

(From step 009)

Display is not blank.

Does the library operator panel display have 2 dark lines showing continuously?

Yes **No**

012

– Refer to "CE Verify Fix Menu" on page PANEL-30 and run the Panel Test Option of the diagnostic loop routine. This option should allow you to determine if all the pixels are working correctly in the operator panel display.

Did the Panel Test fail?

Yes **No**

013

Go to Library Operator Panel Problems—EMEA Only step 011 on page APPENDC-4.

014

Perform the following remove procedures:

1. "Library Chassis Covers" on page APPENDD-4.

Replace the following FRUs in the order listed:

1. Library control card (40%) at "FID 97: Library Control Card" on page APPENDD-42.
2. Library operator panel display (40%) at "FID 90: Library Operator Panel Display" on page APPENDD-39.
3. Library sensor cable (20%) at "FID A5: Library Sensor Cable" on page APPENDD-54.

015

Two dark lines on the library operator panel display indicate that the microcode is not running properly. With power OFF, perform the following remove procedures:

1. "Library Chassis Covers" on page APPENDD-4.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Now that you have access to the cable that runs from the power supply to the mother board, power OFF the device and remove the end that is plugged into connector CD3. A diagram is located at Figure 309 on page APPENDC-29. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the mother board.

Does the voltage check OK?

Yes **No**

016

Replace the following FRUs in the order listed:

1. Power supply (80%)

(Step **016** continues)

016 (continued)

2. Cable from the power supply to the mother board (20%)

017

Power is OK to the library control card which drives the library operator panel LEDs and library operator panel display. Replace the following FRUs in the order listed:

1. Library control card (50%) at “FID 97: Library Control Card” on page APPENDD-42.
2. Drive logic card (40%) at “FID EA: Drive Logic Card” on page APPENDD-15.
3. Mother board (5%) at “FID E9: Mother Board” on page APPENDD-29.
4. Library sensor cable (3%) at “FID A5: Library Sensor Cable” on page APPENDD-54.
5. Library interface cable (2%) at “FID A2: Library Interface Cable” on page APPENDD-53.

018

(From step 010)

With power OFF, perform the remove procedure at “Library Chassis Covers” on page APPENDD-4.

Now that you have access to the cable that runs from the power supply to the library control card, power OFF the device and remove the end of the cable that is plugged into connector CD5 on the library control card. A diagram is located at Figure 308 on page APPENDC-29. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the library control card.

Does the voltage check OK?

Yes **No**

019

Replace the following FRUs in the order listed:

1. Power supply (80%) at “FID C1: Power Supply” on page APPENDD-35.
2. Cable from the power supply to the library control card (20%)

020

(Step **020** continues)

020 (continued)

Power is OK to the library control card. Observe the drive LEDs while switching power OFF then ON. They should all switch ON for a short time, then switch OFF, then the Maintenance LED should flash while the drive diagnostics are running.

Did the drive LEDs all switch ON and stay ON?

Yes **No**

021

Replace the following FRUs in the order listed:

1. Library control card (80%) at “FID 97: Library Control Card” on page APPENDD-42.
2. Library interface cable (10%) at “FID A2: Library Interface Cable” on page APPENDD-53.
3. Library sensor cable (10%) at “FID A5: Library Sensor Cable” on page APPENDD-54.

022

Perform the following remove procedures:

1. “Library Chassis Covers” on page CARR-3.
2. “FID B2: Cooling Pack” on page CARR-12.
3. “Drive Assembly Top Cover” on page CARR-11.

Replace the following FRUs in the order listed:

1. Drive logic card (80%) at “FID EA: Drive Logic Card” on page APPENDD-15.
2. Library control card (10%) at “FID 97: Library Control Card” on page APPENDD-42.
3. Drive servo card (5%) at “FID EC: Drive Servo Card and FID E9: Mother Board” on page APPENDD-28.
4. Mother board (5%) at “FID E9: Mother Board” on page APPENDD-29.

023

(From page APPENDC-3)
(From step 004)

Some of the library LEDs are working OK, some may not be working properly. During the power-on cycle, the 2 magazine and priority cell LEDs should flash ON and OFF until the power-on

diagnostics are completed. Switch power OFF then ON, and observe the library LEDs.

Do all of them flash ON and OFF?

Yes

027

All the library LEDs flash ON and OFF. They should flash ON and OFF for a short time until power-on diagnostics are complete. Then they should switch OFF.

Do they flash ON and OFF continuously?

Yes

029

Continue isolation at Step 005 on page APPENDC-5.

No

028

This is a normal situation. The machine is working as it should.

No

024

Do any of the 3 LEDs flash ON and OFF?

Yes

026

Replace the following FRUs in the order listed:

1. Library LED card (80%) at “FID A6: Library LED Card” on page APPENDD-55.
2. Library sensor cable (20%) at “FID A5: Library Sensor Cable” on page APPENDD-54.

No

025

Continue at Step 008 on page APPENDC-6.

Drive LED Problems—EMEA Only

This procedure helps you isolate Drive LED failures.

See Figure 302 on page APPENDB-11 for a description of the Drive LEDs and their meaning during **normal operational conditions.**

See "Operator Panel" on page PANEL-1 for a description of the operator panel.

See the AppendB section for check, adjustment, removal, and replacement procedures.

Unless otherwise directed, run **Fix Verify** from the CE Options Menu to test the drive after a FRU replacement.

If the recommended repair actions do not fix the problem, call your next level of support.

001

Have the customer vary the drive off-line, if not done before.

Perform "Prepare the Tape Device for Service" on page PROC-5.

Note: It is possible to see the drive LEDs on a library model without removing the library top cover. Remove a tape cartridge from the priority cell location and look in toward the drive to see the LEDs.

Switch ON power to the device and observe the 3 LEDs. The LEDs should all switch ON for a few seconds during the power-on diagnostics. When the first phase of the diagnostics are complete, the microcode will switch OFF all three LEDs momentarily. Then the Maintenance LED should flash during the next phase of the diagnostics. When all the tests complete successfully, all three LEDs will switch OFF.

Switch power ON and observe the drive LEDs.

Did any of the drive LEDs switch ON?

Yes **No**

002

Continue at Step 012 on page APPENDC-10.

003

At least some drive LEDs switched ON. The LEDs should have switched OFF after completion of the power-on diagnostics.

Did the drive LEDs switch ON and stay ON solid?

Yes **No**

004

(Step **004** continues)

004 (continued)

Continue at Step 015 on page APPENDC-11.

005

The drive LEDs switch ON and stay ON during the power-on cycle.

Is this a library model?

Yes **No**

006

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page APPENDD-6.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Replace the following FRUs in the order listed:

1. Drive logic card (80%) at "FID EA: Drive Logic Card" on page APPENDD-15.
2. Drive servo card (10%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
3. Mother board (5%) at "FID E9: Mother Board" on page APPENDD-29.
4. Drive sensor cable (3%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.
5. Drive LED card (2%) at "FID B1: Drive LED Card" on page APPENDD-34.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

007

(Step **007** continues)

007 (continued)

This is a library model. Power OFF then ON, and observe the 3 LEDs on the library operator panel. They should flash ON and OFF until the power-on diagnostics are complete.

Did any of the library LEDs flash ON and OFF?
Yes No

008

Perform the following remove procedures:

1. "Library Chassis Covers" on page APPENDD-4.

For this step, refer to Figure 308 on page APPENDC-29, then power OFF the library and remove the power cable plugged into the top of the library control card at connector CD5. The other end goes to the power supply. Power ON and check for proper voltages at the CD5, as defined in the referenced figure.

Do the voltages check OK?
Yes No

009

One or more voltages are missing. Replace the following FRUs in the order listed.

1. Power supply (80%) at "FID C1: Power Supply" on page APPENDD-35.
2. Cable from the power supply to the library control card (20%)

010

Voltages were OK. Perform the following remove procedures:

1. "Library Chassis Covers" on page APPENDD-4 if not done before.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Replace the following FRUs in the order listed.

(Step **010** continues)

010 (continued)

1. Drive logic card (60%) at "FID EA: Drive Logic Card" on page APPENDD-15.
2. Library control card (20%) at "FID 97: Library Control Card" on page APPENDD-42.
3. Drive servo card (10%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
4. Mother board (5%) at "FID E9: Mother Board" on page APPENDD-29.
5. Drive sensor cable (3%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.
6. Drive LED card (2%) at "FID B1: Drive LED Card" on page APPENDD-34.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

011

Library operator panel LEDs flash ON and OFF. Replace the following FRUs in the order listed.

1. Drive logic card (80%) at "FID EA: Drive Logic Card" on page APPENDD-15.
2. Drive servo card (10%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
3. Mother board (5%) at "FID E9: Mother Board" on page APPENDD-29.
4. Drive sensor cable (3%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.
5. Drive LED card (2%) at "FID B1: Drive LED Card" on page APPENDD-34.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

012

(From step 002)

The drive LEDs did not switch ON at Power-on.

1. If this is a library model, perform the following removal procedures:
   a. "Library Chassis Covers" on page APPENDD-4.
   b. "FID B2: Cooling Pack" on page APPENDD-11.

(Step **012** continues)

012 (continued)

c. “Drive Assembly Top Cover” on page APPENDD-10.

2. If this is a drive-only model, perform the following removal procedures:

   a. “Decorative Cover—Drive-Only Models” on page APPENDD-6.
   b. “FID B2: Cooling Pack” on page APPENDD-11.
   c. “Drive Assembly Top Cover” on page APPENDD-10.

You now have access to the power cable going from the power supply to the mother board. Also, refer to Figure 309 on page APPENDC-29 for a power diagram. Unplug the power cable from mother board at connector CD3, and switch power ON. Check for the appropriate voltages at the cable pins shown in the referenced figure.

Does power check OK at the cable end?

Yes **No**

013

Power is missing at the cable. Replace the following FRUs in the order listed.

1. Power supply (80%) at “FID C1: Power Supply” on page APPENDD-35.
2. Power cable from the power supply to the mother board (20%)

014

Power to the mother board checks OK. Replace the following FRUs in the order listed.

1. Drive logic card (80%) at “FID EA: Drive Logic Card” on page APPENDD-15.
2. Drive servo card (10%) at “FID EC: Drive Servo Card and FID E9: Mother Board” on page APPENDD-28.
3. Mother board (5%) at “FID E9: Mother Board” on page APPENDD-29.
4. Drive sensor cable (3%) at “FID DA: Drive Sensor Cable” on page APPENDD-32.
5. Drive LED card (2%) at “FID B1: Drive LED Card” on page APPENDD-34.

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

015

(From step 004)

At least some drive LEDs switched ON.

Do all 3 LEDs switch ON for a few seconds when power switches ON?

Yes **No**

016

At least one LED failed to switch ON.

1. If this is a library model, perform the following removal procedures:

   a. “Library Chassis Covers” on page APPENDD-4.
   b. “FID B2: Cooling Pack” on page APPENDD-11.
   c. “Drive Assembly Top Cover” on page APPENDD-10.

2. If this is a drive-only model, perform the following removal procedures:

   a. “Decorative Cover—Drive-Only Models” on page APPENDD-6.
   b. “FID B2: Cooling Pack” on page APPENDD-11.
   c. “Drive Assembly Top Cover” on page APPENDD-10.

Replace the following FRUs in the order listed:

1. “FID B1: Drive LED Card” on page APPENDD-34 (50%)
2. “FID EC: Drive Servo Card and FID E9: Mother Board” on page APPENDD-28 (20%)
3. “FID EA: Drive Logic Card” on page APPENDD-15 (20%)
4. “FID DA: Drive Sensor Cable” on page APPENDD-32 (5%)
5. “FID E9: Mother Board” on page APPENDD-29 (5%)

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

017

The drive LEDs appears to be working now. The problem may be intermittent. If the LED failure returns, perform the following:

1. If this is a library model, perform the following removal procedures:
   a. “Library Chassis Covers” on page APPENDD-4.
   b. “FID B2: Cooling Pack” on page APPENDD-11.
   c. “Drive Assembly Top Cover” on page APPENDD-10.
2. If this is a drive-only model, perform the following removal procedures:
   a. “Decorative Cover—Drive-Only Models” on page APPENDD-6.
   b. “FID B2: Cooling Pack” on page APPENDD-11.
   c. “Drive Assembly Top Cover” on page APPENDD-10.

Now replace the following FRUs in the order listed until the problem is resolved.

1. “FID B1: Drive LED Card” on page APPENDD-34 (88%)
2. “FID EC: Drive Servo Card and FID E9: Mother Board” on page APPENDD-28 (5%)
3. “FID EA: Drive Logic Card” on page APPENDD-15 (5%)
4. “FID DA: Drive Sensor Cable” on page APPENDD-32 (1%)
5. “FID E9: Mother Board” on page APPENDD-29 (1%)

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

Power Problems—EMEA Only

This procedure helps you isolate power failures.
See the AppendB section for check, adjustment, removal, and replacement procedures.
See "Power Supply" on page INTRO-16 for a description of 3570 power.
Unless otherwise directed, run **Fix Verify** from the CE Options Menu to test the drive after a FRU replacement.
If the recommended repair actions do not fix the problem, call your next level of support.

001

Have the customer vary the drive off-line, if it was not already done.

"Prepare the Tape Device for Service" on page PROC-5.

Perform necessary Remove/Replace procedures as follows:

1. For drive-only models, perform removal of the "Decorative Cover—Drive-Only Models" on page APPENDD-6 to expose the power supply for further service, then return here.
2. For library models, perform removal of the "Library Chassis Covers" on page APPENDD-4 to expose the power supply for further service, then return here.
3. If more than one drive is installed in the library device, answer the following questions for both drives. When a distinction needs to be made between the two drives, they will be called Drive 1 and Drive 2.
4. If your device has only one drive, this MAP will call it drive 1.
5. If power was switched OFF to perform the above procedures, switch power ON now.

Does a power supply fan fail to rotate?
Yes **No**

002

The fan or fans are rotating. Power is getting to the fan motors. Continue at Step 021 on page APPENDC-15.

003

Unplug the 3570 power cord from the source outlet. Measure the ac voltage at the source outlet.
(Step **003** continues)

003 (continued)

Is ac voltage at the source outlet correct?
Yes **No**

004

Inform the customer that ac power is unavailable at the customer-provided outlet.

005

Disconnect the power cord from the 3570. Check the power cord for continuity.

Is the power cord OK?
Yes **No**

006

Replace the 3570 power cord (no FID).

007

Is there only 1 drive in this device?
Yes **No**

008

This is a library with 2 drives. Continue at Step 016 on page APPENDC-14.

009

(From step 017)

Power OFF the device, refer to Figure 309 on page APPENDC-29, and disconnect the cable from the mother board connector CD3 of drive 1.

Note: If you have only one drive, it is drive 1.

The other end of the cable goes to the power supply. This cable has four heavy wires and plugs into the mother board at the rear of the drive near the cooling assembly.

Switch power ON and observe the cooling fan.
(Step **009** continues)

009 (continued)

Does the cooling fan switch ON now?
Yes **No**

010

Is this a library device?
Yes **No**

011

Replace the "FID C1: Power Supply" on page CARR-16.

012

Switch power OFF, refer to Figure 308 on page APPENDC-29, and disconnect the cable from the library control card connector CD5. The other end of the cable goes to the power supply. This cable has four heavy wires and plugs into the library control card at the top of the card.

Switch power ON and observe the cooling fan.

Does the cooling fan switch ON now?
Yes **No**

013

Replace the "FID C1: Power Supply" on page APPENDD-35.

014

Replace the "FID 97: Library Control Card" on page APPENDD-42.

015

Replace the following FRUs in the order listed below. Replace each FRU one at a time until the cooling fan turns on with the power connected to the drive. Reinstall all of the original drive parts that did not correct the problem.

1. "FID E9: Mother Board" on page APPENDD-29. (60%)
2. "FID EA: Drive Logic Card" on page APPENDD-15. (10%)

(Step **015** continues)

015 (continued)

3. Drive Servo Card, see "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28. (5%)
4. "FID EB: Drive Analog Card" on page APPENDD-18. (5%)
5. "FID C1: Power Supply" on page APPENDD-35. (20%)

016

(From step 008)

This device is a library with two drives.

Is drive 2 failing?
Yes **No**

017

Drive 1 or library power is failing. Continue at Step 009 on page APPENDC-13.

018

Drive 2 is failing. Switch power OFF, refer to Figure 309 on page APPENDC-29, and disconnect the cable from the mother board connector CD3. The other end of the cable goes to the power supply. This cable has four heavy wires and plugs into the mother board at the rear of the drive near the cooling assembly.

Switch power ON and observe the cooling fan.

Does the cooling fan switch ON now?
Yes **No**

019

Replace the "FID C1: Power Supply" on page APPENDD-35.

020

Replace the following FRUs in the order listed below. Replace each FRU one at a time until the cooling fan switches ON with the power connected to the drive. Reinstall all of the original drive parts that did not correct the problem.

1. "FID E9: Mother Board" on page APPENDD-29. (60%)
2. "FID EA: Drive Logic Card" on page APPENDD-15. (10%)

(Step **020** continues)

020 (continued)

3. Drive Servo Card, see “FID EC: Drive Servo Card and FID E9: Mother Board” on page APPENDD-28. (5%)
4. “FID EB: Drive Analog Card” on page APPENDD-18. (5%)
5. “FID C1: Power Supply” on page APPENDD-35. (20%)

021

(From step 002)

Is this a library Model?

Yes **No**

022

This is a drive-only model.

Continue at Step 034 on page APPENDC-16.

023

This is a library model. Power the library OFF then ON and observe the library operator panel. Look at the library LEDs and the operator panel display.

Does the library operator panel show any signs of power being ON?

Yes **No**

024

The library operator panel LEDs and display show no power to them.

Perform the following removals if not done before:

1. “Library Chassis Covers” on page APPENDD-4.

Find the cable that runs from the power supply to the library control card, switch power OFF and remove the end that is plugged into connector CD5. A diagram is located at Figure 308 on page APPENDC-29. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the library control card.

(Step **024** continues)

024 (continued)

Does the voltage check OK?

Yes **No**

025

Replace the following FRUs in the order listed.

1. Power supply (80%) at “FID C1: Power Supply” on page APPENDD-35.
2. Cable from the power supply to the library control card (20%)

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

026

Replace the following in the order listed:

1. Library control card (80%) at “FID 97: Library Control Card” on page APPENDD-42.
2. Mother board (10%) at “FID E9: Mother Board” on page APPENDD-29.
3. Power supply (10%) at “FID C1: Power Supply” on page APPENDD-35.

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

027

The library operator panel has power. Power to the library is probably OK. Power OFF the library and wait a few seconds. Power ON the library while observing the drive LEDs on the front of the drive pack.

Do any of the drive LEDs in each installed drive switch ON at all during the power-on cycle?

Yes **No**

028

Perform the following removals on the failing drive if not done before:

(Step **028** continues)

028 (continued)

1. "Library Chassis Covers" on page APPENDD-4.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Find the cable that runs from the power supply to the mother board, switch power OFF and remove the end that is plugged into connector CD3. A diagram is located at Figure 309 on page APPENDC-29. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was removed from the mother board.

Does the voltage check OK?

Yes **No**

029

Replace the following FRUs, associated with the failing drive, in the order listed.

1. Power supply (80%) at "FID C1: Power Supply" on page APPENDD-35.
2. Cable from the power supply to the mother board (20%)

030

Power checks OK to the mother board. Replace the following FRUs from the failing drive in the order listed.

1. Mother board (60%) at "FID E9: Mother Board" on page APPENDD-29.
2. Drive servo card (15%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
3. Drive logic card (15%) at "FID EA: Drive Logic Card" on page APPENDD-15.
4. Drive sensor cable (5%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.
5. Drive LED card (5%) at "FID B1: Drive LED Card" on page APPENDD-34.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

031

Drive LEDs switch ON, but a power problem may still exist.

Does the drive pack fan rotate in each installed drive with power ON?

Yes **No**

032

Replace the following FRUs in the order listed:

1. "FID C1: Power Supply" on page APPENDD-35 90%).
2. "FID BE: Drive Cooling Fan" on page APPENDD-11 (9%).
3. Cable from the power supply to the drive pack fan (no FID assigned) (1%).

   Note: An alternative to replacement of this cable is to disconnect both ends and continuity check the cable. If it checks OK, do not replace it.

033

The power supply appears to be OK, but there may be an intermittent failure or a failure in the cable from the power supply to the electronic controls. If unable to determine the failure, call the support center.

034

(From step 022)

This is a drive-only model with a power problem. Power the drive OFF then ON and observe the drive LEDs on the front of the drive pack.

Do any of the LEDs switch ON at all during the power-on cycle?

Yes **No**

035

(Step **035** continues)

035 (continued)

Does the drive pack fan rotate with power ON?
Yes **No**

036

Replace the following FRUs in the order listed:

1. "FID BE: Drive Cooling Fan" on page APPENDD-11 (90%).
2. "FID C1: Power Supply" on page APPENDD-35 (9%).
3. Cable from the power supply to the drive pack fan (no FID) (1%).

   Note: An alternative to replacement of this cable is to disconnect both ends and continuity check the cable. If it checks OK, do not replace it.

037

Both the power supply fan and the drive fan are rotating with power ON, but the drive LEDs fail to switch ON.

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page APPENDD-6.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

You now have access to the power cable going from the power supply to the mother board. Also, refer to Figure 309 on page APPENDC-29 for a power diagram. Unplug the power cable from mother board at connector CD3, and switch power ON. Check for the appropriate voltages at the cable pins shown in the referenced figure.

Does power check OK at the cable end?
Yes **No**

038

(Step **038** continues)

038 (continued)

Power is missing at the cable. Replace the following FRUs in the order listed.

1. Power supply (80%) at "FID C1: Power Supply" on page APPENDD-35.
2. Power cable from the power supply to the mother board (20%)

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

039

Power to the mother board checks OK. Replace the following FRUs in the order listed.

1. Mother board (60%) at "FID E9: Mother Board" on page APPENDD-29.
2. Drive logic card (25%) at "FID EA: Drive Logic Card" on page APPENDD-15.
3. Drive servo card (10%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
4. Drive sensor cable (3%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.
5. Drive LED card (2%) at "FID B1: Drive LED Card" on page APPENDD-34.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

040

Drive LEDs switch ON and the power supply fan rotates, but a power problem may still exist.

Does the drive pack fan rotate with power ON?
Yes **No**

041

Replace the following FRUs in the order listed:

1. Drive cooling fan (80%) at "FID BE: Drive Cooling Fan" on page APPENDD-11.

(Step **041** continues)

041 (continued)

2. Power supply (15%) at “FID C1: Power Supply” on page APPENDD-35.
3. Cable from the power supply to the drive pack fan (no FID) (5%).

   Note: An alternative to replacement of this cable is to disconnect both ends and continuity check the cable. If it checks OK, do not replace it.

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

042

The power supply appears to be OK, but there may be an intermittent failure or a failure in the cable from the power supply to the electronic controls. Perform “Verify Fix” on page PROC-7 and if a failure occurs, restart into the MAPs from the START section. If unable to get the failure to occur, but the customer is getting failures, call the support center.

Notes

Other Obvious Symptom Problems—EMEA Only

This MAP is intended to assist in repairing problems that are **not** your normal **FID display**, **ATTENTION DRIVE** or **ATTENTION LIBRARY** message. The device may be hung or have an unusual LED display.

Refer to Figure 307 and attempt to find the failure symptom. Some columns have more than one symptom listed. If they all do not apply, but **one** does, try the recommended **MAP Entry**.

Figure 307. Symptoms, Comments, and Where To Go

One or More Symptoms That Brought You Here	Comments and Directions	MAP Entry
Library attachment not recognized Library never calibrates on Power On Library operator panel display has two dark lines	Drive or drive to library interface failure	Go to Step 001.
The three drive LEDs stay ON solid and the device appears to be hung.	Drive or library circuit failure.	Go to Step 004 on page APPENDC-22.
The library operator panel display has a *Recovery Started* message with a FSC number, but the device appears to be hung.	Microcode or drive logic card failure.	Go to Figure 303 on page APPENDB-12 and follow the FID E6 entry in the table.
The library or drive-only device hangs.	Drive or library circuit failure	Go to Step 004 on page APPENDC-22.
A drive's LEDs all switch ON at power-on, then switch OFF, but the device is hung. The library LEDs all switch ON but the library operator panel display appears to be hung (library models).	Drive or library circuit failure.	Go to Step 024 on page APPENDC-26.
The library device doesn't recognize that a magazine is present.	Library magazine sensor circuit failure.	Go to Step 018 on page APPENDC-25.
The library device doesn't recognize a cartridge is present in the priority cell.	The cartridge not in **import** position. The priority cell cartridge-present sensor may be failing.	Go to Step 021 on page APPENDC-26.
The Maintenance LED is ON solid, and none of the other drive LEDs are ON.	Drive logic card failure	Go to Step 035 on page APPENDC-28.
A drive Clean LED is ON solid, or comes on frequently.	Drive failure	Go to Step 009 on page APPENDC-23.

001

(From page APPENDC-21)

You are here for **one or more** of the following reasons:

(Step **001** continues)

001 (continued)

1. The machine does not recognize the fact that it is a library machine.
2. The library never calibrates itself during the power-on cycle.

(Step **001** continues)

001 (continued)

3. The Library Operator Panel Display has only two dark lines displayed.

With power ON, inspect the library LEDs, the drive fan that exhausts through the rear of the device, and any other part you can see, hear or feel (the drive LEDs are visible through the priority cell), to ensure that power is ON.

Is some power ON in the device?

Yes **No**

002

This is a power problem that is handled by another MAP. Go to "Power Problems—EMEA Only" on page APPENDC-13 and continue isolation.

003

Power appears to be OK in the device.

Perform the following remove procedures:

1. "Library Chassis Covers" on page APPENDD-4.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Replace the following FRUs in the failing drive in the order listed:

1. Drive logic card (55%) at "FID EA: Drive Logic Card" on page APPENDD-15.
2. Library control card (35%) at "FID 97: Library Control Card" on page APPENDD-42.
3. Mother board (5%) at "FID E9: Mother Board" on page APPENDD-29.
4. Library interface cable (5%) at "FID A2: Library Interface Cable" on page APPENDD-53.

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

004

(From page APPENDC-21)
(From page APPENDC-21)
(Step **004** continues)

004 (continued)

You are here for **one or more** of the following reasons:

1. Three LEDs of a drive stay on all the time.
2. A drive appears to be hung.
3. The library appears to be hung.
4. The library operator panel display has a *Recovery Started* message, but the device appears to be hung.

Is this a library machine?

Yes **No**

005

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page APPENDD-6.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

This is a drive-only device without a library.

Replace the following FRUs in the order listed:

1. Drive logic card (45%) at "FID EA: Drive Logic Card" on page APPENDD-15.
2. Drive servo card (45%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
3. Mother board (4%) at "FID E9: Mother Board" on page APPENDD-29.
4. Drive LED card (4%) at "FID B1: Drive LED Card" on page APPENDD-34.
5. Drive sensor cable (2%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.

When the repair is complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

006

This is a library machine. Inspect the drive LEDs with power ON. They should all switch ON for awhile, then switch OFF or flash.
(Step **006** continues)

006 (continued)

Are any drive LEDs ON solid continuously?
Yes **No**

007

Drive LEDs are working correctly. The problem must be only with the library LEDs.

Perform the following remove procedures:

1. "Library Chassis Covers" on page APPENDD-4.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Replace the following FRUs in the order listed:

1. Library control card (90%) at "FID 97: Library Control Card" on page APPENDD-42.
2. Library sensor cable (6%) at "FID A5: Library Sensor Cable" on page APPENDD-54.
3. Library LED card (2%) at "FID A6: Library LED Card" on page APPENDD-55.
4. Library interface cable (2%) at "FID A2: Library Interface Cable" on page APPENDD-53.

When the repair is complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

008

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page APPENDD-6.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Replace the following FRUs in the failing drive in the order listed:

1. Drive logic card (45%) at "FID EA: Drive Logic Card" on page APPENDD-15.
2. Drive servo card (45%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.

(Step **008** continues)

008 (continued)

3. Mother board (4%) at "FID E9: Mother Board" on page APPENDD-29.
4. Drive LED card (4%) at "FID B1: Drive LED Card" on page APPENDD-34.
5. Drive sensor cable (2%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.

When the repair is complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

009

(From page APPENDC-21)

You are here because a drive Clean LED is ON solid, or comes ON too frequently.

Does the Clean LED in the failing drive act the same with different tape cartridges?
Yes **No**

010

The problem is likely a defective or worn-out tape cartridge. Install a cleaner cartridge into the failing drive and perform a clean cycle. If this does not improve the situation, ask your customer to retire that tape cartridge and begin to use another one. Go to "End of Call" on page PROC-12.

011

The failure is probably not caused by any one tape cartridge.

Does a Clean LED stay ON all the time?
Yes **No**

012

When a drive has been cleaned, a record of the cleaning is saved in non-volatile memory (which is updated once every 8 hours). If the drive has been cleaned but is powered OFF before the cleaning is recorded in non-volatile memory, the record of the drive cleaning is lost and the drive may require cleaning again when it is powered ON.

To force the non-volatile memory to be updated immediately (instead of waiting for the 8 hour update), select the save statistics menu option after cleaning the drive. The save statistics option is reached from the

Operator Options menu by selecting SERVICES, and then STATISTICS.

Too frequent clean requests may be caused by too many errors occurring during R/W operations. Ensure that the customer cleaner cartridge is not worn out. If it has not been replaced recently, you may want to try cleaning the failing drive with a new cleaner cartridge. If this does not fix the problem, do the following:

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page APPENDD-6.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Now replace the following FRUs in the failing drive in the order listed:

1. Head-actuator assembly (30%) at "FID D0: Head-Actuator Assembly" on page APPENDD-26.
2. Drive analog card (20%) at "FID EB: Drive Analog Card" on page APPENDD-18.
3. Drive logic card (20%) at "FID EA: Drive Logic Card" on page APPENDD-15.
4. Drive servo card (20%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
5. Mother board (10%) at "FID E9: Mother Board" on page APPENDD-29.

When complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

013

If the Clean LED is ON solid, and the Busy and Maintenance LEDs are OFF, the drive may have been disabled due to lack of cleaning.

– Clean the drive with the cleaning cartridge.

Is the Clean LED still ON solid?

Yes **No**

014

The problem was caused by failure to clean the drive when the Clean LED was flashing.

015

There may be a failure to reset the Clean LED. Power OFF then ON and observe the Clean LED. It should switch ON solid, then switch OFF while the drive microcode performs the power-on self tests.

Does the Clean LED switch OFF after switching ON for a short time during the power-on cycle?

Yes **No**

016

The Clean LED is ON solid. It may not be getting a reset from the electronics.

Perform the following removal procedures:

1. "Decorative Cover—Drive-Only Models" on page APPENDD-6.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Replace the following FRUs in the failing drive in the order listed:

1. Drive LED card (30%) at "FID B1: Drive LED Card" on page APPENDD-34.
2. Drive servo card (20%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
3. Drive logic card (20%) at "FID EA: Drive Logic Card" on page APPENDD-15.
4. Mother board (20%) at "FID E9: Mother Board" on page APPENDD-29.
5. Drive sensor cable (10%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.

When complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

017

The Clean LED does switch OFF. This is normal operation. The LED is not ON solid at this time. The problem may be intermittent. If the problem comes back, do the following:

Perform the following removal procedures:

(Step **017** continues)

017 (continued)

1. "Decorative Cover—Drive-Only Models" on page APPENDD-6.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Replace the following FRUs in the failing drive in the order listed:

1. Drive logic card (40%) at "FID EA: Drive Logic Card" on page APPENDD-15.
2. Drive servo card (40%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
3. Mother board (10%) at "FID E9: Mother Board" on page APPENDD-29.
4. Drive sensor cable (10%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.

When complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

018

(From page APPENDC-21)

You are here because your library device does not recognize that one or more magazines are installed.

During calibrate, the library should sense that a magazine is present and then inventory the cartridges that are in the magazine. It should then mark each cartridge present or absent on the library operator panel display. With the current failure on the machine, the library device is not able to sense the presence of the magazine, with or without tape cartridges installed.

Does the machine fail to recognize both magazines?

Yes **No**

019

Only one magazine is not recognized. Inspect the failing magazine lock lever and ensure that it is not broken, and that it is in the locked position. If it **is** in the locked position, do the following:

Perform the following remove procedures:

(Step **019** continues)

019 (continued)

1. "Library Chassis Covers" on page APPENDD-4.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Now replace the following FRUs in the order listed:

1. Magazine 2 sensor (left) or Magazine 1 sensor (right) (90%) at "FID A0: Magazine 2 Sensor" on page APPENDD-53.
2. Library sensor cable (4%) at "FID A5: Library Sensor Cable" on page APPENDD-54.
3. Library control card (2%) at "FID 97: Library Control Card" on page APPENDD-42.
4. Drive logic card (2%) at "FID EA: Drive Logic Card" on page APPENDD-15.
5. Library interface cable (1%) at "FID A2: Library Interface Cable" on page APPENDD-53.
6. Mother board (1%) at "FID E9: Mother Board" on page APPENDD-29.

When repairs are complete, go to "Verify Fix" on page PROC-7 then go to "End of Call" on page PROC-12.

020

Neither magazine is recognized as being installed. Inspect the failing magazine lock levers and ensure that they are not broken, and are in the locked position. If they **are** in the locked position, do the following:

Perform the following remove procedures:

1. "Library Chassis Covers" on page APPENDD-4.
2. "FID B2: Cooling Pack" on page APPENDD-11.
3. "Drive Assembly Top Cover" on page APPENDD-10.

Replace the following FRUs in the order listed:

1. Library control card (40%) at "FID 97: Library Control Card" on page APPENDD-42.
2. Drive logic card (40%) at "FID EA: Drive Logic Card" on page APPENDD-15.

(Step **020** continues)

020 (continued)

3. Mother board (5%) at “FID E9: Mother Board” on page APPENDD-29.
4. Library interface cable (5%) at “FID A2: Library Interface Cable” on page APPENDD-53.

When repairs are complete, go to “Verify Fix” on page PROC-7 then go to “End of Call” on page PROC-12.

021

(From page APPENDC-21)

You are here because your library device does not recognize that a cartridge is in the priority cell.

Inspect the cartridge and ensure that it is far enough into the priority cell to be detected.

Was the cartridge in far enough to be detected?

Yes **No**

No → **022**

The cartridge not being installed far enough into the priority cell was probably the problem. Go to “End of Call” on page PROC-12.

Yes → **023**

Sensing of the cartridge in the priority cell is failing.

Perform the following remove procedures as needed:

1. “Library Chassis Covers” on page APPENDD-4.
2. “FID B2: Cooling Pack” on page APPENDD-11.
3. “Drive Assembly Top Cover” on page APPENDD-10.

Replace the following FRUs in the order listed:

1. Priority cell cartridge-present sensor (60%) at “FID 9E: Priority Cell Cartridge-Present Sensor” on page APPENDD-52.
2. Library control card (15%) at “FID 97: Library Control Card” on page APPENDD-42.
3. Drive logic card (15%) at “FID EA: Drive Logic Card” on page APPENDD-15.

(Step **023** continues)

023 (continued)

4. Mother board (5%) at “FID E9: Mother Board” on page APPENDD-29.
5. Library sensor cable (5%) at “FID A5: Library Sensor Cable” on page APPENDD-54.

When repairs are complete, go to “Verify Fix” on page PROC-7 then go to “End of Call” on page PROC-12.

024

(From page APPENDC-21)

You are here for one of two reasons:

The drive appears to hang during the power-on cycle.
The library appears to hang during the power-on cycle.

Observe the power supply fan and the drive pack fan in each drive installed in this device. They should all be ON with power to each drive.

Are all fans running?

Yes **No**

No → **025**

Continue isolation at “Power Problems—EMEA Only” on page APPENDC-13.

Yes → **026**

Power to the fans is OK.

Are you here because a drive may be hung?

Yes **No**

No → **027**

The library may be hung.

With power OFF, perform the remove procedure at “Library Chassis Covers” on page APPENDD-4.

Now that you have access to the cable that runs from the power supply to the library control card, remove the end of the cable that is plugged into connector CD5. on the library control card. A diagram is located at Figure 308 on page APPENDC-29. Switch power ON and measure for the proper voltages between the voltage pins and ground pins at the cable end that was

removed from the library control card.

Does the voltage check OK?
Yes No

028

Replace the following FRUs in the order listed:

1. Power supply (80%) at “FID C1: Power Supply” on page APPENDD-35.
2. Cable from the power supply to the library control card (20%)

029

Power is OK to the library control card. Observe the drive LEDs while switching power OFF then ON. They should all switch ON for a short time, then switch OFF, then the Maintenance LED should flash while the drive diagnostics are running.

Did the drive LEDs all switch ON and stay ON?
Yes No

030

Perform the following remove procedures as needed:

1. “Library Chassis Covers” on page APPENDD-4.
2. “FID B2: Cooling Pack” on page APPENDD-11.
3. “Drive Assembly Top Cover” on page APPENDD-10.

Replace the following FRUs in the order listed:

1. Library control card (80%) at “FID 97: Library Control Card” on page APPENDD-42.
2. Library interface cable (10%) at “FID A2: Library Interface Cable” on page APPENDD-53.
3. Library sensor cable (10%) at “FID A5: Library Sensor Cable” on page APPENDD-54.

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

031

Perform the following remove procedures as needed:

1. “Library Chassis Covers” on page APPENDD-4.
2. “FID B2: Cooling Pack” on page APPENDD-11.
3. “Drive Assembly Top Cover” on page APPENDD-10.

Replace the following FRUs in the order listed:

1. Drive logic card (55%) at “FID EA: Drive Logic Card” on page APPENDD-15.
2. Library control card (35%) at “FID 97: Library Control Card” on page APPENDD-42.
3. Mother board (5%) at “FID E9: Mother Board” on page APPENDD-29.
4. Library interface cable (5%) at “FID A2: Library Interface Cable” on page APPENDD-53.

At the completion of repairs, go to “Verify Fix” on page PROC-7, then go to “End of Call” on page PROC-12.

032

A drive may be hung.

1. If this is a library model, perform the following removal procedures:
   a. “Library Chassis Covers” on page APPENDD-4.
   b. “FID B2: Cooling Pack” on page APPENDD-11.
   c. “Drive Assembly Top Cover” on page APPENDD-10.
2. If this is a drive-only model, perform the following removal procedures:
   a. “Decorative Cover—Drive-Only Models” on page APPENDD-6.
   b. “FID B2: Cooling Pack” on page APPENDD-11.
   c. “Drive Assembly Top Cover” on page APPENDD-10.

You now have access to the power cable going from the power supply to the mother board. Also, refer to Figure 309 on page APPENDC-29 for a

power diagram. Unplug the power cable from mother board at connector CD3, and power the device on. Check for the appropriate voltages at the cable pins shown in the referenced figure.

Does power check OK at the cable end?
Yes **No**

033

Power is missing at the cable. Replace the following FRUs in the order listed.

1. Power supply (80%) at "FID C1: Power Supply" on page APPENDD-35.
2. Power cable from the power supply to the mother board (20%)

At the completion of repairs, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

034

Power to the mother board checks OK. Replace the following FRUs in the failing drive in the order listed.

1. Drive logic card (80%) at "FID EA: Drive Logic Card" on page APPENDD-15.
2. Drive servo card (10%) at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.
3. Mother board (5%) at "FID E9: Mother Board" on page APPENDD-29.
4. Drive sensor cable (3%) at "FID DA: Drive Sensor Cable" on page APPENDD-32.
5. Drive LED card (2%) at "FID B1: Drive LED Card" on page APPENDD-34.

When the repair is complete, go to "Verify Fix" on page PROC-7, then go to "End of Call" on page PROC-12.

035

(From page APPENDC-21)

You are here because a drive-only device has a Maintenance LED ON solid, but none of the other drive LEDs are ON. This is an indication that the drive logic card has had a catastrophic failure.

Observe the power supply fan and the drive pack fan. They should both be running with power ON. (Step **035** continues)

035 (continued)

Are both fans running with power ON?
Yes **No**

036

The failure was probably caused by overheating of the drive logic card components.

Is the power supply fan running?
Yes **No**

037

Continue isolation at "Power Problems—EMEA Only" on page APPENDC-13. If the symptom continues after fixing the power problem, return to the beginning of this MAP and begin again.

038

The drive cooling fan must be failing. Replace the following FRUs in the order listed:

1. Drive cooling fan (90%) at "FID BE: Drive Cooling Fan" on page APPENDD-11.
2. Cable-drive fan to power supply (10%)

When the fan problem is corrected, check to see if the same symptom is on the machine that brought you here. If the machine is still failing the same way, replace the drive logic card card (100%). Refer to "FID EA: Drive Logic Card" on page APPENDD-15 for the removal and replacement procedure.

039

Since the fans are both running, the failure of the drive logic card is probably not caused by overheating. Replace the drive logic card. (100%) Refer to "FID EA: Drive Logic Card" on page APPENDD-15 for the removal and replacement procedure.

Diagrams Referred to by MAPs

Note: All voltage tolerances are ±5%.

Figure 308. Library Electronic Power Diagram

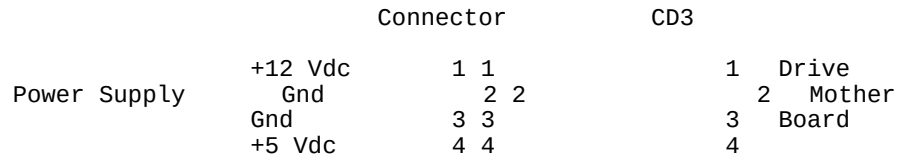

Figure 309. Drive Electronics Power

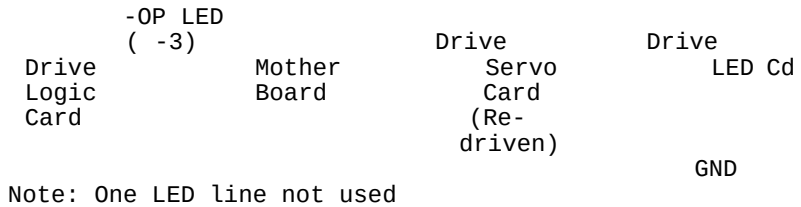

Figure 310. Drive LED Circuitry

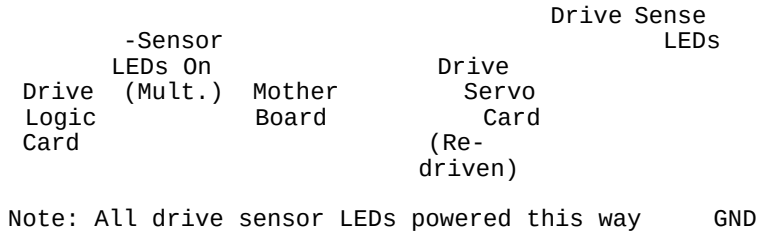

Figure 311. Drive Sensor LED Circuitry

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Introduction

Attention

This section of the Appendix contains the CARR section which handles individual FRUs within the Model “C” drive. All areas except EMEA now replace the 3570 Model C drive as a single FRU. EMEA has chosen to maintain multiple FRUs and therefore should use this section when pointed to by other MI sections.

THESE CARR PROCEDURES SHOULD BE USED ONLY BY SERVICE PERSONNEL IN EMEA.

This section contains the information necessary to find, check, adjust if necessary, and exchange the failing field replaceable unit (FRU).

The FID (FRU identifier) numbers are listed in hexadecimal ascending order in Figure 303 on page APPENDB-12. You may be directed to the **START** section, and then to this section, when a FID number is presented in one of the following ways:

By the LED indicators flashing a FID code through the front bezel of the Model C00 Drive.

On the operator panel display of library Models C01, C02, C11 and C12.

At the host console from the service information message (SIM) for any 3570 Tape Subsystem.

From the MAPs.

Removal and Replacement Procedures—External Covers

Note: When you are removing a cover to access FRUs inside the machine, you may want to complete your testing prior to replacement of these covers, in case the FRU you replaced did not fix the problem.

Library Chassis Covers

Removal of Library Chassis Covers: Figure 312 on page APPENDD-5 shows an exploded view of the Model C01 machine with its decorative covers and internal components.

To remove the library chassis covers follow the steps below:

1. If not already done, “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. For the stand-alone Models C01 and C02, remove the decorative chassis cover as follows:
   a. Open the magazine door and remove two screws from the front and two screws in the rear securing the library top decorative chassis cover, item 1 .
   b. Slide the top cover clear to expose the top protective cover.
   c. Remove the top protective cover, item 2 by removing two screws in the rear, and two screws on the sides of the cover.
   d. Lift the rear of the cover and pull toward the rear of the device to clear the front tab from the library front decorative cover.
   e. If necessary, remove the rear cover 15 from the library. The cover is attached using plastic snap-in retainers. Rotate the plastic retainers one-quarter turn in either direction to release the cover.
3. For the rack-mounted Models C11 C12 and C22, there is no decorative chassis cover.
   a. Open the library front cover. (Unlock the door if necessary.)
   b. Remove screw P/N 1624778 on the left front of the library. This screw attaches the library front plate to the rack.
   c. Extend the slide and tray assembly all the way out so it is locked in the extended position.

      C5 **CAUTION**
      When you are sliding the 3570 drive tray assembly in or out, make sure you do not get your hand caught between the drive and the rack. Also, when you are servicing the 3570, make sure the slide and tray assembly is fully extended and locked.

      Note: This notice is translated into selected languages. See **C5** in the INSP section.

   d. Remove the top protective cover by removing two screws in the rear and two screws on the sides of the cover. Lift the rear of the cover and pull toward the rear of the device to clear the front tab from the library front decorative cover.

Replacement of Library Chassis Covers

1. Perform the removal procedure in the reverse order, then return here.
2. Return to the procedure that sent you here.

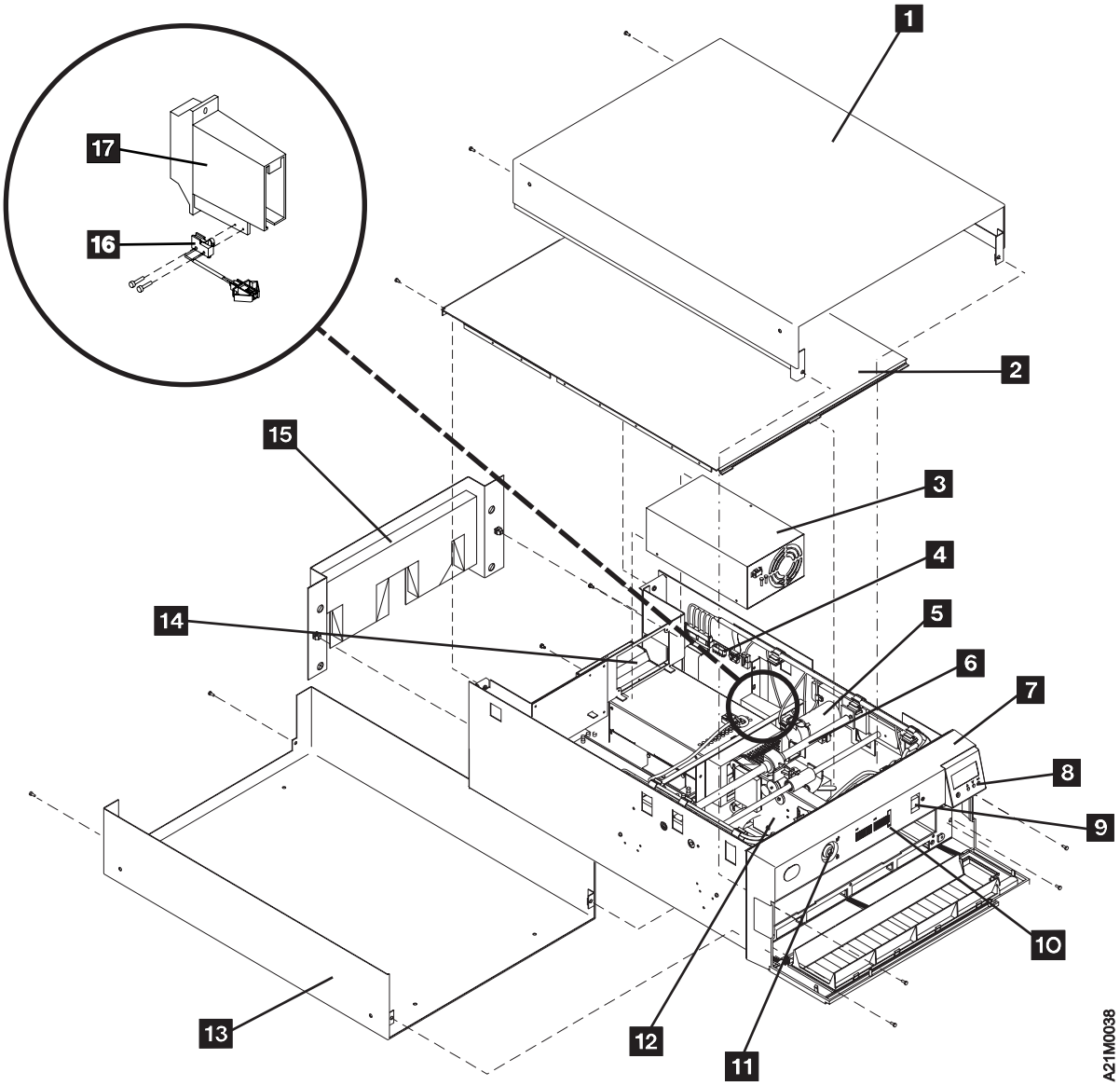

Figure 312. Library Model C01—Exploded View

Decorative Cover—Drive-Only Models

The decorative cover 2 of drive-only models must be removed for access to most FRUs in the drive. See Figure 271 on page CARR-5.

Removing the Decorative Covers—Drive-Only Models

1. From the rear of the unit, remove and save the 3 screws, items 3 (two screws not shown), that hold the decorative cover 2 to the chassis.
2. From the front of the unit, depress the tabs 1 on both sides of the cover and carefully pull the drive front cover away from the chassis. Be sure to observe the detents in the chassis as you pull on this cover.
3. From the front of the unit, grip the cover at the sides and push backward to clear two holding hooks, then lift clear of the chassis.
4. If removal of the drive pack is required, go to “Drive Pack, Drive-Only Models” on page APPENDD-8.
5. Return to the procedure that sent you here.

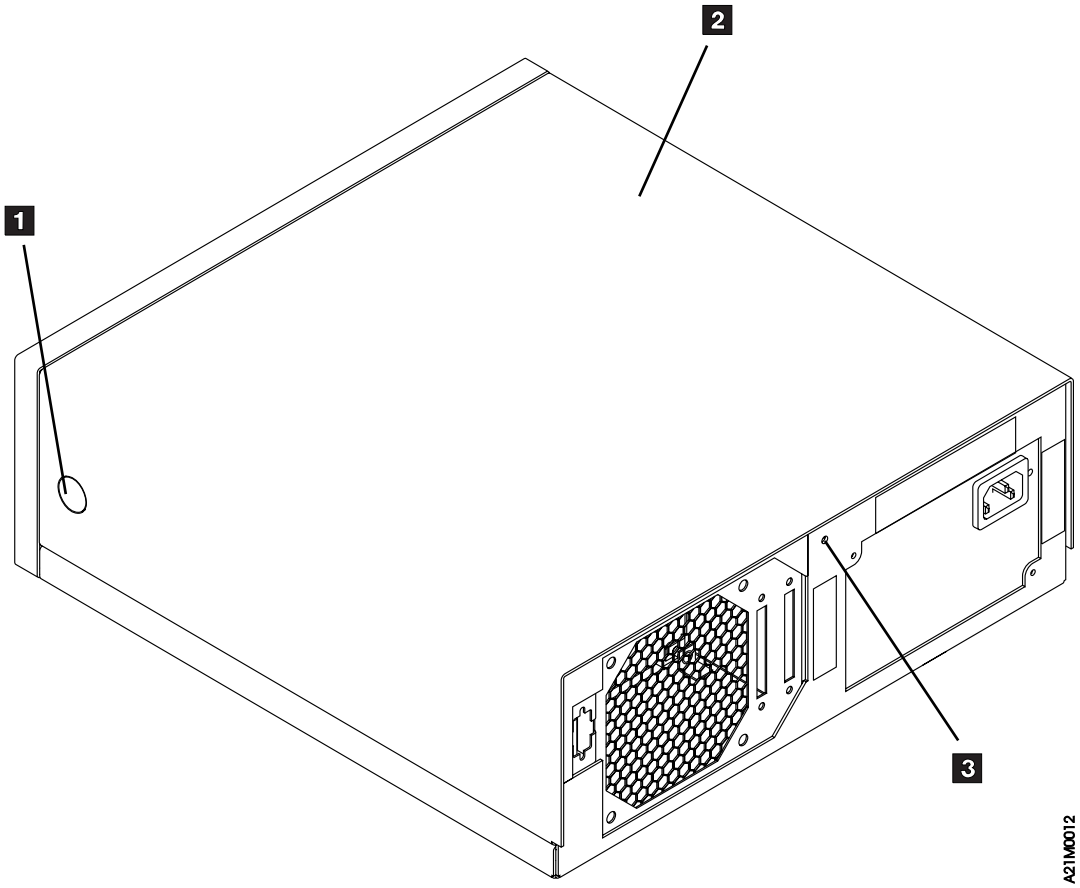

Figure 313. Decorative Cover for Model C00 Drive

Replacing the Decorative Covers—Drive-Only Models

1. Place the decorative cover 2 on the chassis by fitting it to the rear of the chassis first and then moving it forward to the front.
2. Replace and tighten the 3 cover screws, item 3 (two screws not shown).
3. Reattach the drive front cover. Observe the detents in the front of the chassis as the front cover is engaged to the top cover with tabs 1 .

Removal and Replacement Procedures—Drive Pack

Drive Pack, Library Models

Removal of Drive Pack from Chassis: To remove the physical drive follow the steps below:

1. “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. Perform removal of the “Library Chassis Covers” on page APPENDD-4.
3. Remove the 4 screws that hold the rear plate to the library frame and remove the plate.
4. Remove the following electrical connections from the drive:
   a. The ac power cord to power supply
   b. 4-wire power connection between the drive and power supply
   c. 2-wire fan power connection between the drive and power supply
   d. Ribbon cable (Library Interface/RS-422) between the drive and library control card (library models, drive 1 only)

      Note: To remove the cable connector from the drive and control card connectors, depress the tension clips on either side of the cable connectors.

   e. SCSI cable(s)
   f. SCSI terminator if installed
   g. The RS-422 cable connecting drive 1 to drive 2 (Models C02, C12 and C22 only)
5. Refer to Figure 312 on page APPENDD-5 for a view of the drive pack within a typical library model environment.
6. Remove the two screws on either side of the drive pack 14 and remove the drive assembly from the library chassis.

Replacement of Drive Pack into Library Chassis

1. Perform the removal procedure in the reverse order, then return here.
2. Return to the procedure that sent you here.

Drive Pack, Drive-Only Models

Removal of Drive Pack from Chassis: To remove the physical drive follow the steps below:

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. Perform removal of the "Decorative Cover—Drive-Only Models" on page APPENDD-6.
3. Remove the following electrical connections from the drive:
   a. The ac power cord to power supply
   b. 4-wire power connection between the drive and power supply
   c. 2-wire fan power connection between the drive and power supply
   d. SCSI cable(s)
   e. SCSI terminator if installed
4. Refer to Figure 315 on page APPENDD-9 for a view of the drive pack as it looks within all the models.
5. Remove the two screws on the right hand side as you face the front of the drive (not shown).
6. Remove the two screws on the left hand side as you face the front of the drive. These screws secure the left holding bracket to the base.
7. Lift and remove the drive assembly from the chassis.

Replacement of Drive Pack into Chassis

1. Perform the removal procedure in the reverse order, then return here.
2. Return to the procedure that sent you here.

Figure 314. Basic Drive Components

Component	**Key (Refer to Figure 315 on page APPENDD-9)**
Drive assembly top cover	1
Drive logic card	2
Spacer	3
Drive analog card	4
Head-actuator assembly thin-film cables	5
Rubber compression block	6
Shield	7
Drive servo card	8
Loader assembly mounting plate	9
Head-actuator assembly	1
Mother board	11
Loader assembly	12
Drive assembly front cover	13
Cable, Drive logic card to Drive analog card	14

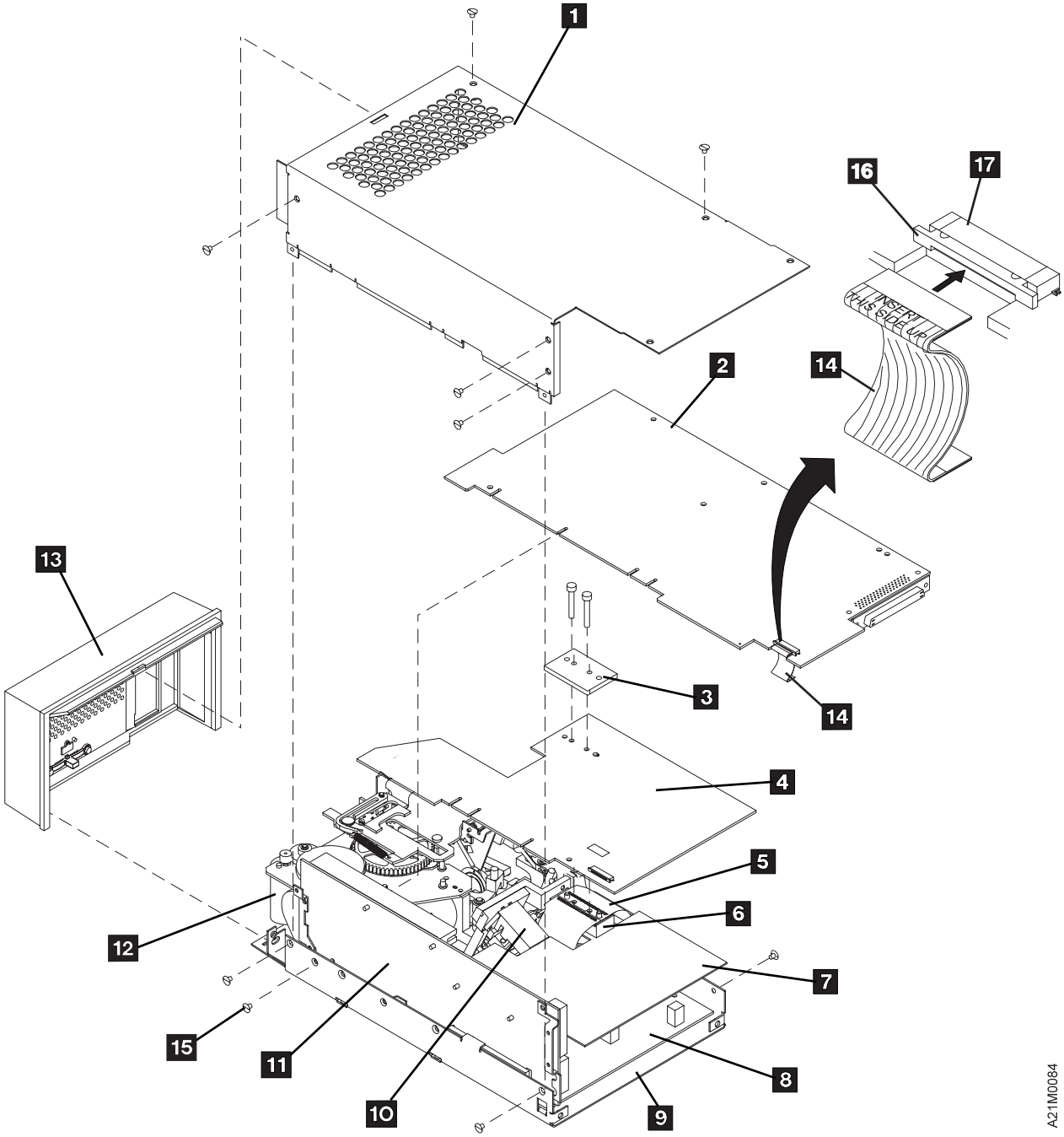

Figure 315. Basic Drive—All Models

Removal and Replacement Procedure—Drive Pack Covers

Drive Assembly Front Cover

Removal of Drive Assembly Front Cover: See Figure 317 on page APPENDD-14 for an exploded view of the drive pack. To remove the drive assembly front cover, item 13 , follow the steps below if not done before:

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. Perform removal of the "Library Chassis Covers" on page APPENDD-4 for library machines, **or** "Decorative Cover—Drive-Only Models" on page APPENDD-6 for drive-only machines.
3. Perform removal of the "Drive Pack, Library Models" on page APPENDD-7 for library machines, **or** "Drive Pack, Drive-Only Models" on page APPENDD-8 for drive-only machines.
4. Press down on the top center of the drive assembly front cover and tilt it forward and off the drive assembly.

   Note: Be sure to install the cover back on the drive pack before the call is completed. The cover is required to get proper air flow to the drive logic card.

Replacement of Drive Assembly Front Cover

1. Perform the removal procedure in the reverse order.

   Attention

   Be sure to insert the bottom of the bezel first before attempting to tilt the top of the bezel into its proper latching position. Damage may occur to components on the drive logic card that are in close proximity to the top of the bezel, if the top of the bezel is inserted first.

2. Return to the procedure that sent you here.

Drive Assembly Top Cover

Removal of Drive Assembly Top Cover: See Figure 317 on page APPENDD-14 for an exploded view of the drive pack. To remove the drive assembly top cover 1 follow the steps below if not done before:

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. Perform removal of the "Library Chassis Covers" on page APPENDD-4 for library machines, **or** "Decorative Cover—Drive-Only Models" on page APPENDD-6 for drive-only machines.
3. Perform removal of the "Drive Pack, Library Models" on page APPENDD-7 for library machines, **or** "Drive Pack, Drive-Only Models" on page APPENDD-8 for drive-only machines.
4. Perform removal of the "Drive Assembly Front Cover."
5. Remove 2 top cover screws that attach the top cover and the top cover extension to the cooling pack fan.
6. Remove the top cover extension.
7. Remove 2 top cover screws, 5 right side screws, and 2 left side screws that attach the top cover 1 to the drive pack. (Use a number 0 or number 1 phillips screwdriver.)
8. Carefully lift the top cover clear of the drive unit.

Replacement of Drive Assembly Top Cover

1. Perform the replacement procedure in the reverse order.
2. Return to the procedure that sent you here.

Removal and Replacement Procedure—Cooling Pack

Note: When you are removing the cooling pack to access parts inside the drive, you may want to complete your testing prior to replacement of the cooling pack, in case the FRU you replaced did not fix the problem. You can run the drive for a short period of time without the cooling pack to verify, for testing purposes, that the FRU you just replaced, was the failing FRU. Long term running without the cooling pack may damage the machine or shorten component life.

FID B2: Cooling Pack

Removal of the Cooling Pack: For location of the cooling pack in a drive-only model, see Figure 25 on page INTRO-15 item 6 . For location of the cooling pack in a library model, see Figure 312 on page APPENDD-5 item 14 .

1. "Prepare the Tape Device for Service" on page PROC-5 and then return here.
2. Perform removal of the "Library Chassis Covers" on page APPENDD-4 for library machines, **or** "Decorative Cover—Drive-Only Models" on page APPENDD-6 for drive-only machines.
3. Perform removal of the "Drive Pack, Library Models" on page APPENDD-7 for library machines, **or** "Drive Pack, Drive-Only Models" on page APPENDD-8 for drive-only machines.
4. Perform removal of the "FID B2: Cooling Pack" as follows:
   a. Perform removal of the "Drive Assembly Front Cover" on page APPENDD-10.
   b. Perform removal of the "Drive Assembly Top Cover" on page APPENDD-10.
   c. Remove one screw in the rear of the drive pack (not shown) that holds the cooling pack to the drive assembly. The other side of the cooling pack is held in place by a holding stud.
   d. Squeeze the holding springs and disconnect the small flat cable (RS-422) from the Mother board.
   e. Disconnect the large flat cable (internal SCSI cable) from the Drive logic card.
   f. Remove the cooling pack from the drive pack.

Replacement of the Cooling Pack

Note: Be careful to route the SCSI cable so that it does not contact the cooling fan blades.

1. Perform the removal procedure in the reverse order.
2. Perform "End of Call" on page PROC-12.
3. The cooling pack (FID B2) is not a FRU. The drive cooling fan (FID BE) and the internal SCSI connector (FID CB) are FRUs. If one of these two FRUs is replaced, use the FID and TAC code for the FRU that is replaced.
4. Return to the procedure that sent you here.

FID BE: Drive Cooling Fan

Removal of Drive Cooling Fan

1. Prepare the drive for service.
2. Preform “Drive Pack, Library Models” on page APPENDD-7 for library models, or “Drive Pack, Drive-Only Models” on page APPENDD-8 for drive-only models.
3. Perform “FID B2: Cooling Pack” on page APPENDD-11 then return here.
4. Remove the four plastic inserts and insert clamps from the back of the cooling pack and remove the drive cooling fan.

Replacement of Drive Cooling Fan

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **A03** for the area of failure.
4. Return to the procedure that sent you here.

Removal and Replacement Procedures—Base Drive Components

Before performing any recommended removal or replacement procedures, you should complete the following procedures that apply to the model of 3570 you are here to repair:

Note: The removal and replacement Time Estimate in the last column of the table may be used, along with the FID removal and replacement durations given in the START section to help you determine how much time you will need to repair the device. Diagnose and test time are not included in the estimates.

Figure 316. Prerequisite Procedures

3570 Model	Service Procedure Description	Procedure Location	Time Estimate
C00	1. Prepare the tape drive for service	1. "Prepare the Tape Device for Service" on page PROC-5	1. (0.1)
	2. Decorative Cover—Drive-Only Models	2. "Decorative Cover—Drive-Only Models" on page APPENDD-6	2. (0.1)
	3. Drive Pack, Drive-Only Models	3. "Drive Pack, Drive-Only Models" on page APPENDD-8	3. (0.2)
	4. Drive Assembly Front Cover	4. "Drive Assembly Front Cover" on page APPENDD-10	4. (0.1)
	5. Drive Assembly Top Cover	5. "Drive Assembly Top Cover" on page APPENDD-10	5. (0.1)
	6. FID B2: Cooling Pack	6. "FID B2: Cooling Pack" on page APPENDD-11	6. (0.1)
C01, C02, C11, C12, C21 and C22	1. Prepare the tape drive for service	1. "Prepare the Tape Device for Service" on page PROC-5	1. (0.1)
	2. Library Chassis Covers	2. "Library Chassis Covers" on page APPENDD-4	2. (0.2)
	3. Drive Pack, Library Models	3. "Drive Pack, Library Models" on page APPENDD-7	3. (0.2)
	4. Drive Assembly Front Cover	4. "Drive Assembly Front Cover" on page APPENDD-10	4. (0.1)
	5. Drive Assembly Top Cover	5. "Drive Assembly Top Cover" on page APPENDD-10	5. (0.1)
	6. FID B2: Cooling Pack	6. "FID B2: Cooling Pack" on page APPENDD-11	6. (0.1)

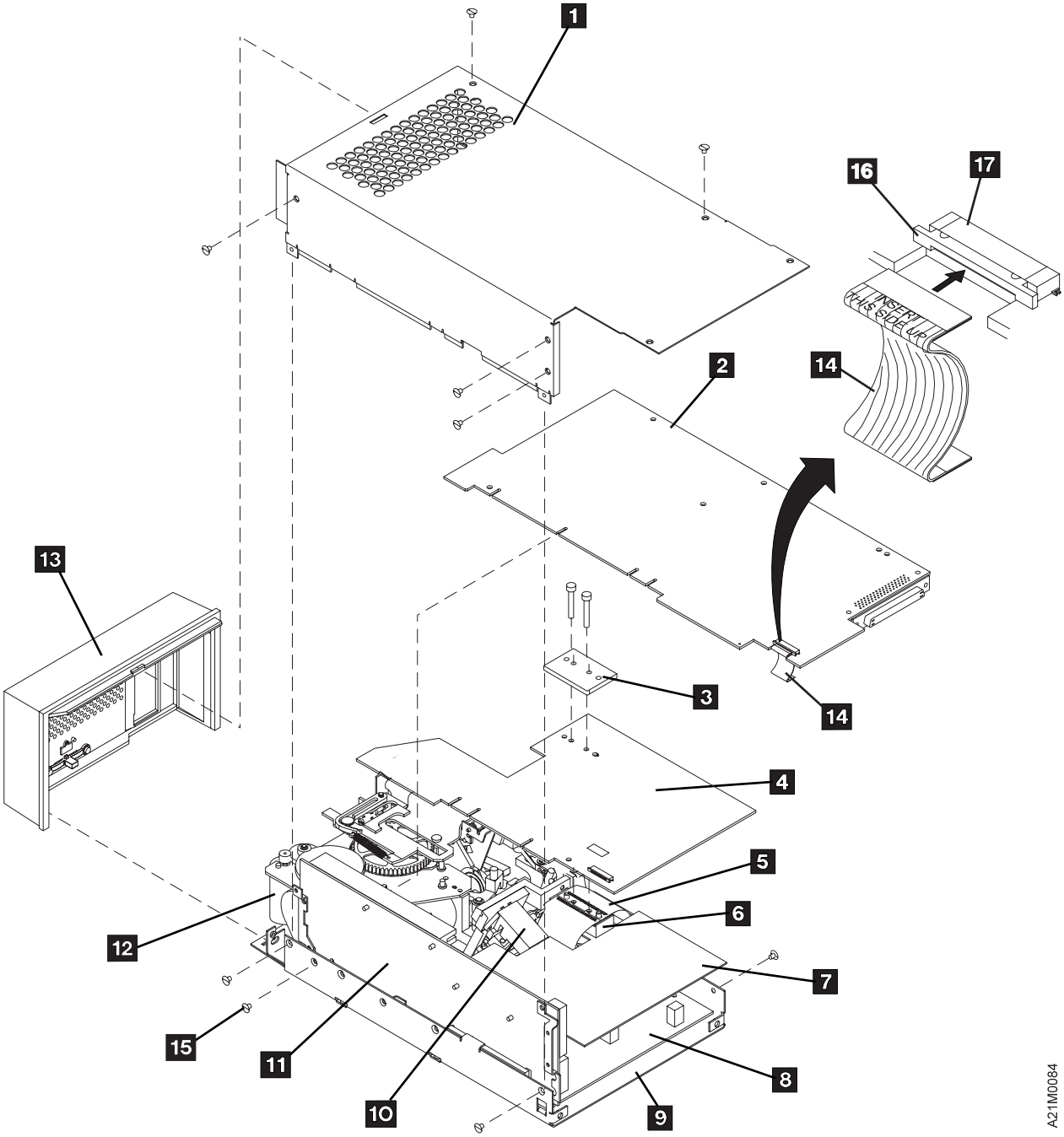

Figure 317. Base Drive FRU Breakout

The following base drive removal and replacement procedures apply to all 3570 Cxx Models located in EMEA, and are listed in the most logical order of a typical repair action:

FID EA: Drive Logic Card

Removal of Drive Logic Card: To remove the drive logic card, item 2 in Figure 317 on page APPENDD-14, follow the steps below if not done before:

Note: If you are removing the drive logic card only to gain access to another FRU blocked by the drive logic card, go to step 3. If you plan to **replace** the drive logic card with a **new** part, you should **attempt** to recover the microcode EC and link level of the drive logic card with the following procedures.

1. For library models, do the following:
   a. Attempt to display the EC level and link level:
      1) Press the Mode push button if the operator Options menu is not displayed.
      2) Select the drive number that you are working on.
      3) Select **Services** from the Options menu and press Enter.
      4) Select **Microcode Level** from the Services menu and press Enter.
   b. If the microcode EC level was displayed in the previous step, write the EC level, link level and date in "Microcode EC Level History Log" on page PROC-38; and then return here.
   c. If you have access to an FMR tape at the microcode EC and link level, go to step 3.
   d. If you don't have access to this level of FMR tape, but your machine failure **will** allow you to create a FMR tape, do so following the procedure on "Making FMR Tape from Scratch Tape—Library Models" on page PROC-31 or "Making FMR Tape from Scratch Tape—Drive-Only Models" on page PROC-31, then go to step 3.
   e. If the microcode EC level cannot be displayed, go to step 3.
2. For drive-only machines, there is no current way to read the microcode EC level unless that can be gathered by the host system. Continue with step 3.
3. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.

   Note: Attention: The logic cards are ESD sensitive. Special care must be used when handling ESD parts. See "Working with Electrostatic Discharge (ESD) Parts" on page PROC-3.
4. See Figure 317 on page APPENDD-14. Disconnect the flat cable, item 14 , from the drive logic card. Pull the cable retainer 16 away from the connector housing 17 far enough to release the flat cable 14 . Leave the flat cable connected to the drive analog card unless you are going to install a new drive analog card or flat cable.

   Note: The flat cable should be folded as shown in Figure 317 on page APPENDD-14. This will prevent it from being damaged when installing or removing the cooling pack.
5. Remove the drive logic card, item 2 , from the mother board, item 11 .

   Note: You may need to lightly pry the card away from the mother board at each end of the connector to loosen the drive logic card for removal.

Replacement of Drive Logic Card—Library Models

Note: Before replacing the drive into the library frame, write down the drive serial number that is located on the drive frame, on the left side when you are facing the front of the drive assembly. You will need this number in one of the following steps, if you are installing a **new** drive logic card.

1. Perform the removal procedure in the reverse order, then return here.

Note: Do not forget to reconnect the flat cable, item 14 , between the drive logic card and the drive analog card.

2. After installing the new card, restore power to the 3570 Tape Subsystem.
3. If the power-on test completed successfully, go to step 4.
   Or, if the power-on test did not complete successfully, repair as needed, then go to step 4.
4. Perform the “Drive Serial Number—Library Models Only” on page PROC-29 procedure.
5. Perform the “Set Drive Options—Library Models” on page INST-42 procedure.
6. To ensure the EC level of the microcode on the new card is not down level, do the following:
   a. Press the Mode push button if the operator Options menu is not displayed.
   b. Select **Services** from the Options menu and press Enter.
   c. Select **Microcode Level** from the Services menu and press Enter to display the EC level and link level of the microcode on the new card.
   d. Look at the latest EC level and link level written in “Microcode EC Level History Log” on page PROC-38.

      Note: The latest EC level is determined by the link level (LL), as the EC level may not always increment to a higher number. The following example shows that the second entry is the latest level microcode.

      ```
      EC Level   Link Level
      6C56789    4D D
      3C56789    5B 2  (highest EC level)
      ```

      Compare the displayed EC level of the new card to the latest EC level and link level recorded in the history log. If they compare, go to step 6.
   e. If they **do not** compare, continue with step 7.
7. Select **Cancel** to return to the CE Options menu.
8. Select **Microcode Update** from the FMR Tape menu and press Enter. (See “Updating Microcode from FMR Cartridge (Library Models)” on page PROC-34 for details.)
9. After you load the FMR tape when prompted, the Select EC Level menu displays a series of EC levels.

   Note: If the card has an EC level of microcode that is not on the FMR tape, that level of microcode is automatically written onto the FMR tape and is also displayed.

   If the level of microcode on the card was up-level from the FMR tape, record the new level in “Microcode EC Level History Log” on page PROC-38, unload the tape, then go to step 7 on page CARR-9.

   If the level of microcode on the card was down-level from the FMR tape, continue with step 10 to update the microcode on the card.
10. Find the EC level on the menu that matches the EC level written in “Microcode EC Level History Log” on page PROC-38.
11. Select the **EC level and link level** from the menu that matches the written level and press Enter.
12. After the microcode is written into the card, unload the tape and perform a reset (see “Hardware Reset” on page PROC-12) to activate the code.
13. Perform “End of Call” on page PROC-12.
14. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **L01** for the area of failure.

15. Return to the procedure that sent you here.

Replacement of Drive Logic Card—Drive-Only Models

1. Perform the removal procedure in the reverse order, then return here.
2. After installing the new card, restore power to the 3570 Tape Subsystem.
3. If the power-on test completed successfully, go to step 4.
   Or, If the power-on test did not complete successfully, repair as needed, then go to step 4.
4. Perform the “Verify Fix—Drive-Only Models” on page PROC-7 procedure, then return here.
5. Perform the “Updating Microcode from FMR Cartridge (Drive-Only Models)” on page PROC-37 procedure, then return here.
6. After the microcode is written into the card, unload the tape and perform a reset (see “Hardware Reset” on page PROC-12) to activate the code.
7. Perform “End of Call” on page PROC-12.
8. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **L01** for the area of failure.
9. Return to the procedure that sent you here.

FID EB: Drive Analog Card

Removal of Drive Analog Card:

ATTENTION

The head-actuator assembly and logic cards are ESD sensitive. Special care must be used when handling ESD sensitive parts to be sure that no ESD damage occurs. See "Working with Electrostatic Discharge (ESD) Parts" on page PROC-3 for details.

DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES). MAGNETIZED TOOLS WILL DAMAGE THE HEAD!

See Figure 318 on page APPENDD-19 for the location of the drive analog card, item 4 . To remove it, follow the steps below if not done before:

1. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.
2. Perform removal of the "FID EA: Drive Logic Card" on page APPENDD-15.
3. Refer to Figure 318 on page APPENDD-19. Remove the 2 screws 1 that hold the retainer 2 to the drive analog card 4 and in turn to the head-actuator assembly 8 . When removing the 2 screws, first loosen 1 screw slightly and then the other. Continue to repeat loosening first one screw slightly and then the other until the screws are removed.

   Note: When installing these screws again, it is important that they be tightened evenly. Alternate back and forth between the two screws, and **do not over tighten**. Tighten with your fingers, then put just enough pressure on the screws to depress the rubber compression block slightly. Too much torque may cause the screws to be stripped or uneven torque may cause poor contact between the thin-film cables and the contacts on the bottom of the analog card. If a torque drive is available, tighten both screws to a torque of 0.18Nm (25.4 oz.in).
4. Remove retainer, item 2 .
5. Remove the insulator 3 .
6. Remove the drive analog card 4 .

   Notes:

   a. You may need to lightly pry the card away from the mother board at each end of the connector to loosen the drive analog card for removal.

   b. When the drive analog card is removed, the head-actuator thin-film cables 5 and 9 will come off the rubber compression block 6 . See "Replacement of Drive Analog Card" on page APPENDD-20 for detailed instructions for putting the cables back on during the replacement process.

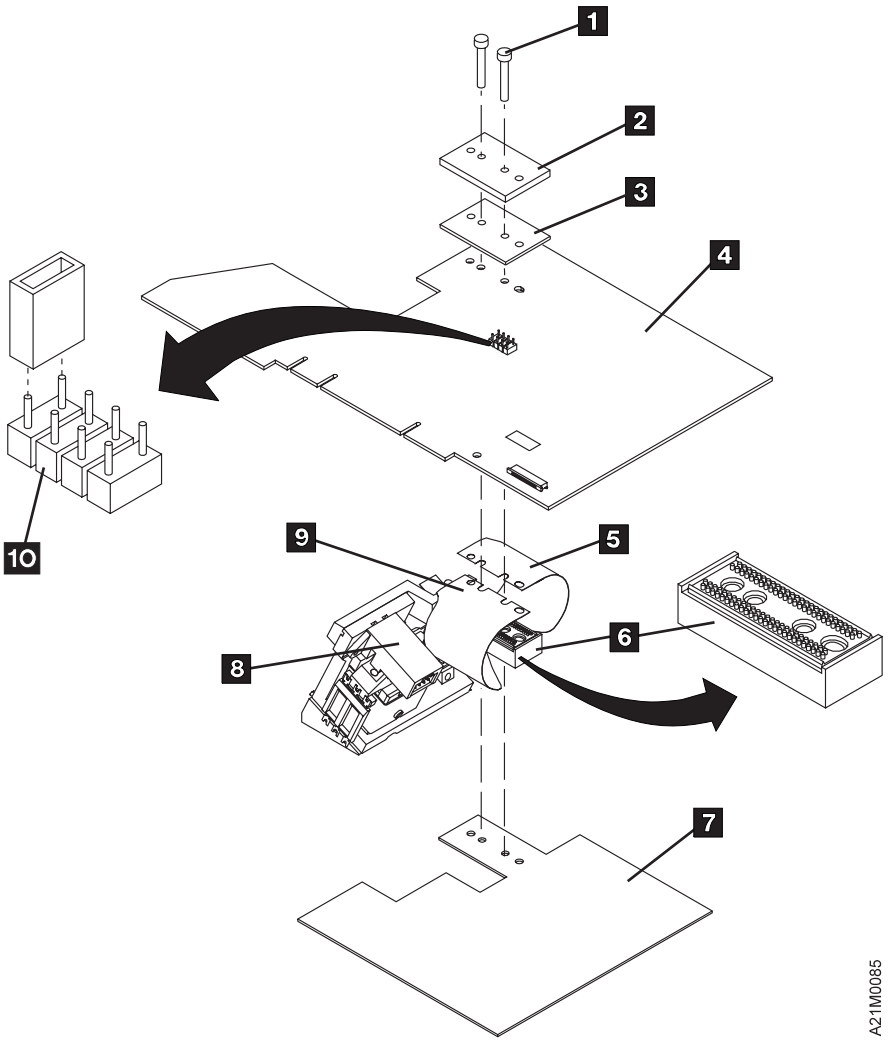

Figure 318. Base Drive Head-Actuator Assembly Close-up

Replacement of Drive Analog Card:

ATTENTION

The head-actuator assembly and logic cards are ESD sensitive. Special care must be used when handling ESD sensitive parts to be sure that no ESD damage occurs. See "Working with Electrostatic Discharge (ESD) Parts" on page PROC-3 for details.

DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES). MAGNETIZED TOOLS WILL DAMAGE THE HEAD!

See Figure 319. There should be a Head Cable Installation tool, P/N 08L6270, included with any FRU that requires removal of the drive analog card.

Use Head Cable Installation tool, P/N 08L6270, to help with the installation of the thin-film cables onto the locating pins of the rubber compression block. Also use this tool to hold the thin-film cables in place while the drive analog card is being installed.

Note: If the Head Cable Installation tool is not available, a tool can be made from a piece of heavy paper or light weight cardboard. See "Head-Actuator Cable Holding Tool Template" on page APPENDD-23 to make a tool, if necessary.

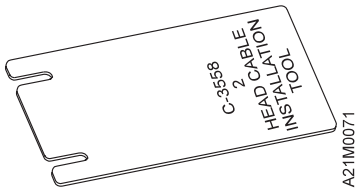

Figure 319. Head Cable Installation Tool P/N 08L6270

Attention: See Figure 320. The gold contacts 1 on the ends of the thin-film cables are not insulated. **DO NOT** touch these contacts because static discharge will damage the head-actuator assembly, and fingerprints will cause short circuits or poor contact.

It is okay to touch the **insulated** portion of the thin-film cables, but **DO NOT** touch in the non-insulated gold contact area 1 .

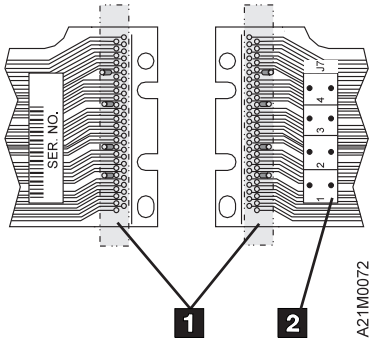

Figure 320. Head-Actuator Cables

Drive Analog Card jumpers

There is a shunt (jumper) block on the top of the drive analog card near the thin-film cable connector. See Figure 317 on page APPENDD-14, item 1 . These jumpers must be set to match the label on the outer (right) head cable. See Figure 320, item 2 .

1. Before starting the thin-film head cable installation procedure, record the shunt (jumper) settings from the label 2 .
2. Ensure that the jumpers on the shunt (jumper) block on the drive analog card are plugged to match the label on the thin-film head cable.

End of Drive Analog Card jumpers

Note: The following is the **recommended** procedure for installing the thin-film cables on the locating pins of the rubber compression block.

1. See Figure 321. With one hand, move the **inner (left)** cable so the contacts are just above the locating pins on the rubber compression block, as shown.

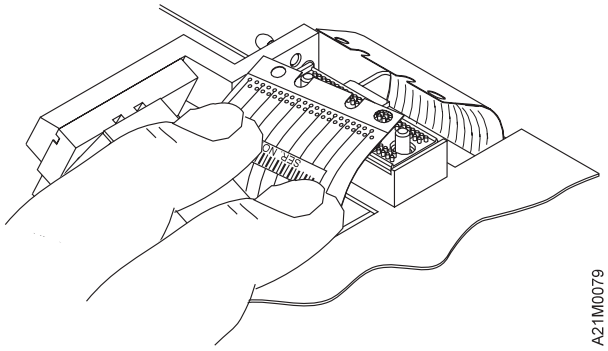

Figure 321. Thin-film cable installation

2. With the head cable installation tool in the other hand, use the edge or corner of the tool to push the cable down onto the locating pins.
3. See Figure 322. Maintain a slight amount of pressure on the edge of the inner (left) thin-film cable with one finger, as shown, so the end of the cable will stay on the locating pins without being held down.

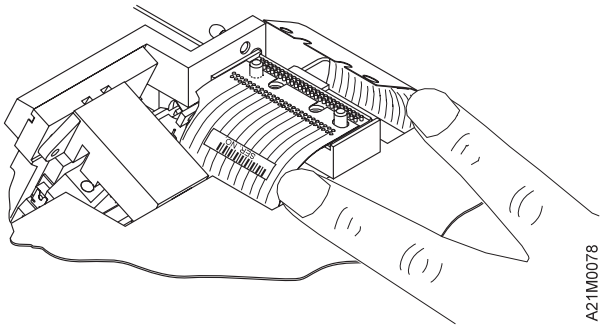

Figure 322. Thin-film cable installation

4. Use another finger on the same hand, as shown in Figure 322, to guide the **outer (right)** thin-film cable so it is just above the locating pins. Use the installation tool to push the **outer (right)** thin-film cable down onto the locating pins.
5. See Figure 323 on page APPENDD-22. Use the flat portion of the installation tool, as shown, to hold the cables down on the locating pins of the rubber compression block.

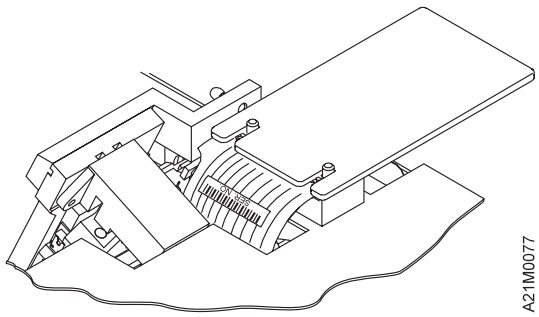

Figure 323. Thin-film cable installation

6. While holding the cables in place with the installation tool, plug the drive analog card into the mother board connector.

   HINT: When the drive analog card is in position over the connector, you can let go of the installation tool and it will stay in place by itself. You can then use both hands to insert the card into the mother board connector. Be careful not to let the card lift up enough to allow the installation tool to fall out before you get the card plugged in.

7. Press down lightly on the outside edge of the card while aligning the holes in the card with the pins on the block, then remove the head cable installation tool.

8. Refer to “Removal of Drive Analog Card” on page APPENDD-18 and perform the removal procedure in the reverse order.

   Notes:

   a. When installing the retainer, make sure the insulator is between the retainer and the circuit card.

   b. When installing the two screws that hold the drive analog card, it is important that they be tightened evenly. Alternate back and forth between the two screws, and **do not over tighten**. Tighten with your fingers, then put just enough pressure on the screws to depress the rubber compression block slightly. Too much torque may cause the screws to be stripped or uneven torque may cause poor contact between the thin-film cables and the contacts on the bottom of the analog card. If a torque driver is available, tighten both screws to a torque of 0.18Nm (25.4 oz.in).

9. Perform “End of Call” on page PROC-12.

10. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T21** for the area of failure.

11. Return to the procedure that sent you here.

Head-Actuator Cable Holding Tool Template

The following templates may be used by the service person to use as a pattern to cut out from moderately thin cardboard (.040 to .060 inches) a tool that may be used to keep the head-actuator cables in place when removing the drive analog card.

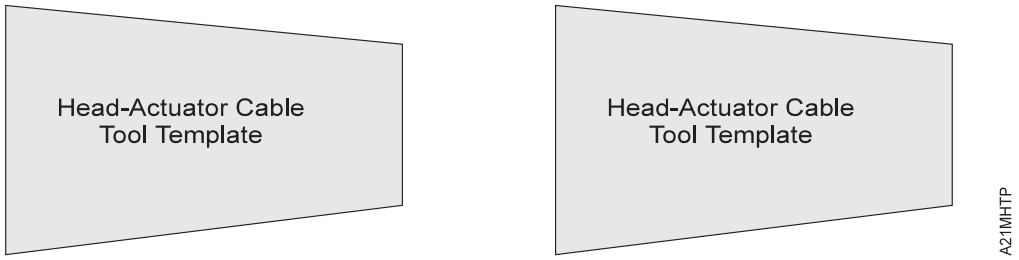

Figure 324. Head-Actuator Cable Holding Tool Template

If you are replacing a FRU that requires removal of the drive analog card, a special head cable installation tool, P/N 08L6270, will be packaged with the new FRU. If the special tool is available, use it instead of the cardboard cutout to hold the head cables in place. See “Replacement of Drive Analog Card” on page APPENDD-20 for detailed instructions.

Head-Actuator Cable Holding Tool Template

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FID D0: Head-Actuator Assembly

This procedure uses a 2.5 mm Allen Wrench.

Removal of Head-Actuator Assembly:

ATTENTION

The head-actuator assembly and logic cards are ESD sensitive. Special care must be used when handling ESD sensitive parts such as the head-actuator assembly to be sure that no ESD damage occurs to the head you are removing or the head you are replacing. See "Working with Electrostatic Discharge (ESD) Parts" on page PROC-3 for details.

DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES). MAGNETIZED TOOLS WILL DAMAGE THE HEAD!

See Figure 317 on page APPENDD-14 and Figure 318 on page APPENDD-19 for the location of the head-actuator assembly and associated FRUs.

To remove the head-actuator assembly, item 1 , follow the steps below if not done before:

1. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.
2. Perform removal of the "FID EA: Drive Logic Card" on page APPENDD-15.
3. Perform removal of the "FID EB: Drive Analog Card" on page APPENDD-18.
4. Remove the two head-actuator assembly cables, item 5 and item 15 from the small rubber compression block, item 6 .

   Notes:

   a. The **order** in which the head cables are removed should be maintained when they are re-installed. The proper order to reinstall is:

      1) Item 15
      2) Item 5

   b. The small rubber compression block, item 6 , located between the head-actuator assembly thin film cables and the metallic shield, item 7 must go back in the same orientation that it was removed. **The rubber portion must be up, and the elongated hole must be to the rear of the drive.** as shown in Figure 318 on page APPENDD-19.
5. Remove the small rubber compression block, item 6 by pulling straight up.
6. Remove the metallic shield, that has plastic attached to the top side, item 7 and set aside for now.
7. Remove the small 2-wire cable from the drive servo card that goes to the head-actuator assembly.
8. Remove the small 8-wire flat cable from the drive servo card that goes to the head-actuator assembly.
9. Remove the 2.5 mm hex head screw (not shown) holding the head-actuator assembly to the bottom plate. The hex head screw may be accessed through the hole on the bottom of the drive assembly base. Carefully remove the head-actuator assembly as follows:

   a. Slide the head-actuator assembly back toward the rear to clear the two locating pins.
   b. The loader assembly contains an arm that engages with a slot on the cleaner brush portion of the head actuator assembly. Rotate the loader assembly gears to move the arm so that it is moved to its **leftmost** position. In this position, the pin on the arm will engage with the slot on the head cleaner brush.
   c. Next, slide the head-actuator assembly toward the mother board to clear the drive servo card.

Note: Use the same precautions when handling the head-actuator assembly that you removed from the drive. When the repair is complete, pack the defective head-actuator assembly in the same way that the FRU was packaged, and return the head-actuator assembly using the UPR process.

Replacement of Head-Actuator Assembly:

ATTENTION

The head-actuator assembly and logic cards are ESD sensitive. Special care must be used when handling ESD sensitive parts such as the head-actuator assembly to be sure that no ESD damage occurs to the head you are removing or the head you are replacing. See "Working with Electrostatic Discharge (ESD) Parts" on page PROC-3 for details.

DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES). MAGNETIZED TOOLS WILL DAMAGE THE HEAD!

Drive Analog Card jumpers

There is a shunt (jumper) block on the top of the drive analog card near the thin-film cable connector. See Figure 318 on page APPENDD-19, item 1 . These jumpers must be set to match the label on the outer (right) head cable. See Figure 320 on page APPENDD-20, item 2 .

1. Before starting the thin-film head cable installation procedure, record the shunt (jumper) settings from the label 2 .
2. Ensure that the jumpers on the shunt (jumper) block on the drive analog card are plugged to match the label on the thin-film head cable.

End of Drive Analog Card jumpers

1. Perform the removal procedure in the reverse order.
2. Perform "End of Call" on page PROC-12.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **D08/T22** for the area of failure.
4. Return to the procedure that sent you here.

FID EC: Drive Servo Card and FID E9: Mother Board

Removal of the Drive Servo Card and Mother Board:

ATTENTION

The head-actuator assembly and logic cards are ESD sensitive. Special care must be used when handling ESD sensitive parts to be sure that no ESD damage occurs. See "Working with Electrostatic Discharge (ESD) Parts" on page PROC-3 for details.

DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES). MAGNETIZED TOOLS WILL DAMAGE THE HEAD!

Because of limited removal space and obstructions in the drive pack, the drive servo card and mother board should be removed together before either is replaced.

See Figure 317 on page APPENDD-14, item 8 for location of the drive servo card and item 11 for the mother board.

To remove the drive servo card and mother board follow the steps below if not done before:

1. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.
2. Perform removal of the "FID EA: Drive Logic Card" on page APPENDD-15.
3. Refer to Figure 318 on page APPENDD-19 and perform removal of the "FID EB: Drive Analog Card" on page APPENDD-18.
4. The **order** in which the head cables are removed should be maintained when they are re-installed. The proper order to reinstall is:
   a. Item 15
   b. Item 5
5. The small rubber compression block, item 6 , located between the head-actuator assembly thin film cables and the metallic shield must go back in the same orientation that it was removed. **The rubber portion must be up, and the elongated hole must be to the rear of the drive.** as shown in Figure 318 on page APPENDD-19.
6. Remove the flat head cables, items 5 and 15 , rubber compression block, item 6 , and metal shield, item 7 .
7. Disconnect the four cables that run from the loader assembly to the drive servo card.
8. Disconnect the cable going to the IPS Sensor on the head actuator assembly. (You may need to remove the mother board to access the cable.)
9. Tilt the drive unit up so that the bottom of the bottom loader plate, item 9 is showing. Refer to Figure 325 on page APPENDD-29, and remove two screws, item 1 , from the bottom of the loader plate.
10. Refer back to Figure 317 on page APPENDD-14 and remove the remaining screw, item 14 that secures the drive servo card and mother board to the bottom loader plate.
11. Remove the drive servo card and mother board together.
12. Remove the drive servo card from the mother board.

    Note: You may need to lightly pry the card away from the mother board connector, item 11 at each end of the connector to loosen the drive servo card for removal.

Replacement of Drive Servo Card and Mother Board:

ATTENTION

The head-actuator assembly and logic cards are ESD sensitive. Special care must be used when handling ESD sensitive parts to be sure that no ESD damage occurs. See "Working with Electrostatic Discharge (ESD) Parts" on page PROC-3 for details.

DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES). MAGNETIZED TOOLS WILL DAMAGE THE HEAD!

1. Perform the removal procedure in the reverse order.
2. Perform "End of Call" on page PROC-12.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T53** for the drive servo card and **L02** for the mother board depending on the area of failure.
4. Return to the procedure that sent you here.

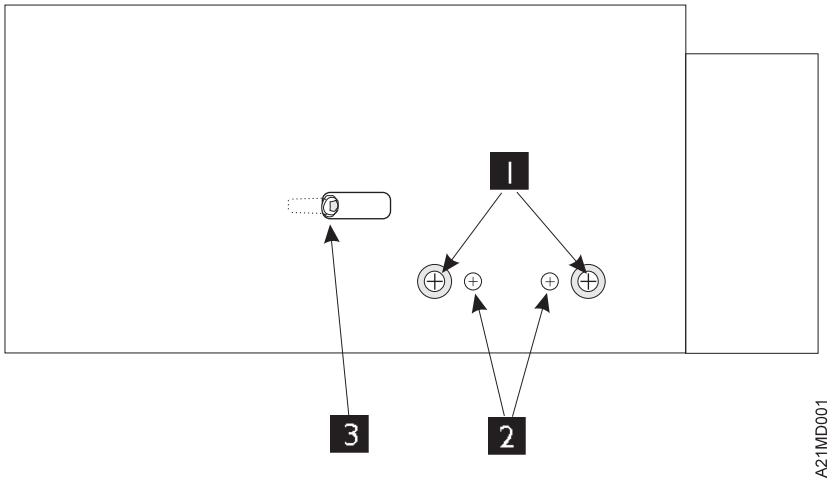


Figure 325. Bottom View of Bottom Loader Plate

FID E9: Mother Board

Removal of the Mother Board: See Figure 317 on page APPENDD-14, item 11 for location of the mother board, and 8 for location of the drive servo card. The mother board and drive servo card must be removed together before either may be replaced.

To remove the mother board, follow the procedure at "FID EC: Drive Servo Card and FID E9: Mother Board" on page APPENDD-28.

FID BC: Loader Assembly

Removal of the Loader Assembly:

ATTENTION

DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES). MAGNETIZED TOOLS WILL DAMAGE THE HEAD!

Note: DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES) AS THEY WILL DESTROY THE HEAD!

See Figure 317 on page APPENDD-14, item 12 for location of the loader assembly, which is permanently mounted on the bottom plate, item 9 .

To remove the loader assembly follow the steps below if not done before:

1. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.
2. Perform removal of the “FID EA: Drive Logic Card” on page APPENDD-15.
3. Perform removal of the “FID EB: Drive Analog Card” on page APPENDD-18.
4. Perform removal of the “FID D0: Head-Actuator Assembly” on page APPENDD-26.
5. Perform removal of the “FID EC: Drive Servo Card and FID E9: Mother Board” on page APPENDD-28.
6. Perform removal of the “FID E9: Mother Board” on page APPENDD-29.
7. With all the above removed, what is left is the loader assembly attached to the drive bottom chassis. This is all one FRU.
8. Using a permanent felt tip marker, copy the drive serial number from the old loader assembly to the blank label on the new loader assembly. The serial number is located on the left side when you are facing the front of the loader assembly.

Replacement of Loader Assembly:

ATTENTION

DO NOT USE ANY MAGNETIZED TOOLS ON OR NEAR THE HEAD ASSEMBLY (INCLUDING THIN FILM CABLES). MAGNETIZED TOOLS WILL DAMAGE THE HEAD!

1. Perform the removal procedure in the reverse order.
2. Perform “End of Call” on page PROC-12.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T45** for the area of failure.
4. Return to the procedure that sent you here.

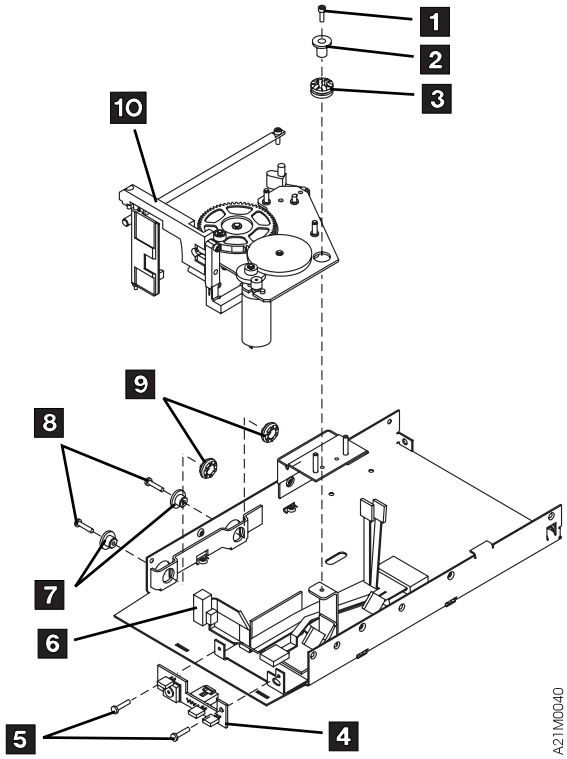


Figure 326. Drive Loader Assembly Exploded View

FID DA: Drive Sensor Cable

Removal of the Drive Sensor Cable: To remove the drive sensor cable follow the steps below if not done before:

1. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.
2. Perform removal of the “FID EA: Drive Logic Card” on page APPENDD-15.
3. Perform removal of the “FID EB: Drive Analog Card” on page APPENDD-18.
4. Perform removal of the “FID D0: Head-Actuator Assembly” on page APPENDD-26.
5. Perform removal of the “FID EC: Drive Servo Card and FID E9: Mother Board” on page APPENDD-28.
6. Perform removal of the “FID E9: Mother Board” on page APPENDD-29.
7. With all the above removed, what is left is the loader assembly attached to the drive bottom chassis. The drive sensor cable is hidden by the loader assembly, so the loader assembly must be tilted up to expose the drive sensor cable for removal.

Refer to Figure 326 on page APPENDD-31 and follow the steps below:

1. Remove the side bracket held by two screws that normally holds the drive pack to the base frame. This will allow access to the two side screws, items 8 inside bushings, items 7 that fit into the side rubber shock mounts, items 9 .
2. Remove the two screws.
3. Remove the top screw, item 1 inside bushing, item 2 . Now all the screws that hold the loader assembly to the bottom plate via rubber shock mounts are removed.
4. Carefully move the loader assembly away from the vertical bracket and at the same time tilt the loader assembly up on end to gain access to the drive sensor cable.
5. Disconnect the cable from the reel motors.
6. Unplug the drive sensor cable from the drive LED card, item 4 and remove from the machine.

Replacement of Drive Sensor Cable

1. Perform the removal procedure in the reverse order.
2. Perform “End of Call” on page PROC-12.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T04** for the area of failure.
4. Return to the procedure that sent you here.

FID B0: Loader Door

Removal of Loader Door

1. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.

   Note: The loader door may be removed without removing the cooling pack.

2. Pull the front cover forward. It should slide off.

   Note: Be sure to install the cover back on the drive pack before the call is completed. The cover is required to get proper air flow to the drive logic card.

Refer to Figure 327 and perform the following procedures:

1. Loosen screws, item 8 , and remove the screw that is nearest the door, item 4 .
2. Lift bar, item 7 that holds the door in place and remove spring, item 3 .
3. Remove door.

Replacement of Loader Door

1. Perform the removal procedure in the reverse order.
2. Perform “End of Call” on page PROC-12.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T42** for the area of failure.
4. Return to the procedure that sent you here.

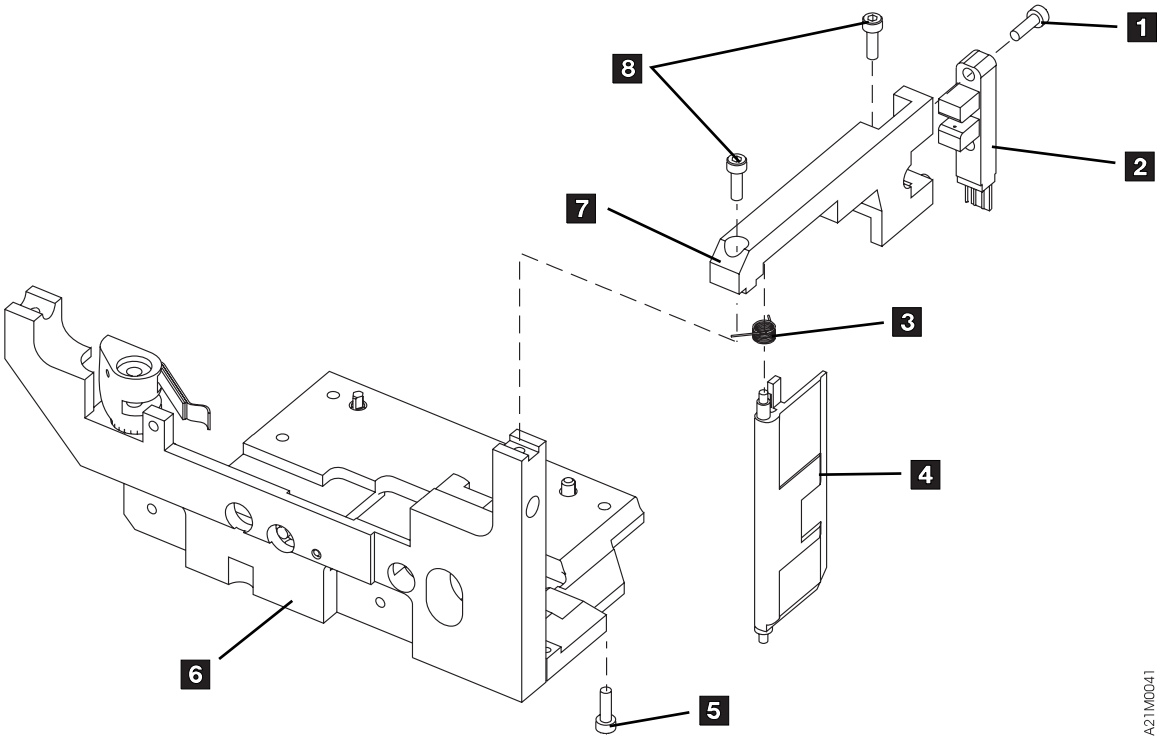


Figure 327. Drive Loader Front Components Exploded View

FID B1: Drive LED Card

Removal of Drive LED Card

1. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.

   Note: The drive LED card may be removed without removing the drive pack and cooling pack.

   a. For library models, perform removal of the “Library Chassis Covers” on page APPENDD-4 and “Drive Assembly Front Cover” on page APPENDD-10.

   b. For Stand-alone drives, perform removal of the front decorative cover and removal of the “Drive Assembly Front Cover” on page APPENDD-10.

   Note: Be sure to replace the drive front cover before the call is ended as the cover must be in place to get proper air flow to the drive logic card.

2. Remove the two screws that secure the drive LED card to the mounting bracket.
3. Slowly pull the drive LED card out far enough to disconnect the cable connector from the backside of the card.
4. Remove the drive LED card from the machine.

Replacement of Drive LED Card

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **L05** for the area of failure.
4. Return to the procedure that sent you here.

FID C1: Power Supply

Removal of the Power Supply: Electrical shock potential in this area. Ensure that the 3570 power cord is removed from the customer power source before proceeding.

1. Perform the “Prepare the Tape Device for Service” on page PROC-5 procedure, then return here.
2. Perform the “Library Chassis Covers” on page APPENDD-4 for library machines, **or** the “Decorative Cover—Drive-Only Models” on page APPENDD-6 for drive-only machines.
3. Disconnect the cooling fan cable connector.
4. If replacing the power supply for drive 1 in 3570 Models C01, C02, C11, C12, C21 or C22, disconnect the power cable at terminal CD5 on the library control card.
5. Disconnect the power cable to the drive (mid-cable connector).

   Note: Removal of the two screws in the next step, will allow the back of the power supply to drop. Hold the back of the power supply while removing the two screws.
6. Remove the two screws from the back side of the power supply that secure the power supply to the mounting bracket.
7. Slide the power supply forward and unhook the power supply from the front mounting bracket.
8. Remove the power supply from the machine.

Replacement of Power Supply

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **P04** for the area of failure.
4. Return to the procedure that sent you here.

FID C9: Loader Door Open Sensor

Removal of Loader Door Open Sensor

1. Perform the prerequisite procedures for your 3570 model listed on Figure 316 on page APPENDD-13.

   Note: The loader door open sensor may be removed without removing the cooling pack.

2. Pull the front cover forward. It should slide off.

   Note: Be sure to install the cover back on the drive pack before the call is completed. The cover is required to get proper air flow to the drive logic card.

Refer to Figure 327 on page APPENDD-33 and perform the following procedures:

1. Loosen screws that hold the loader door open sensor that is activated by the loader door, item 4 .
2. Remove screws and loader door open sensor.

Replacement of Loader Door Open Sensor

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID CA: Loader Home Sensor

Removal of Loader Home Sensor

1. Prepare the drive for service.
2. For drive-only machines:
   a. Remove the “Decorative Cover—Drive-Only Models” on page APPENDD-6.
   b. Remove the “Drive Assembly Front Cover” on page APPENDD-10.
3. For library machines:
   a. Perform the “Library Chassis Covers” on page APPENDD-4.
   b. Remove the “Drive Assembly Front Cover” on page APPENDD-10.
4. Refer to Figure 327 on page APPENDD-33 and remove screw, item 1 .
5. **Carefully** remove the cable attached to the bottom of the loader home sensor, item 2 and remove loader home sensor.

   Notes:

   a. Be careful when disconnecting and reconnecting the loader home sensor cable from the loader home sensor. If the cable is not plugged correctly, the connector can get damaged.
   b. Be careful not to lose the ESD tab when removing the sensor.

Replacement of Loader Home Sensor

Note: Remember to install the ESD tab when installing the sensor.

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.

3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID CB: Internal SCSI Cable

Removal of Internal SCSI Cable

1. Prepare the drive for service.
2. Perform “Drive Pack, Library Models” on page APPENDD-7 for library models, or “Drive Pack, Drive-Only Models” on page APPENDD-8 for drive-only models.
3. Perform “FID B2: Cooling Pack” on page APPENDD-11 then return here.
4. Remove four screws holding the internal SCSI cable to the cooling pack sheet metal.

Replacement of Internal SCSI Cable

Note: Be careful to route the SCSI cable so that it does not contact the cooling fan blades.

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. Use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C04** for the area of failure.
4. Return to the procedure that sent you here.

FID DD: Loader Sensors

Removal of loader sensors

1. The file protect, and cartridge type sensors are part of the loader assembly. Refer to “FID BC: Loader Assembly” on page APPENDD-30 for removal procedures.
2. The loader door open sensor is replaceable. Refer to “FID C9: Loader Door Open Sensor” on page APPENDD-36 for removal procedures.
3. The loader home sensor is replaceable. Refer to “FID CA: Loader Home Sensor” on page APPENDD-36 for removal procedures.
4. The cartridge-present sensor is replaceable as part of the drive logic card. Refer to “FID EA: Drive Logic Card” on page APPENDD-15 for removal procedures.

Replacement of loader sensors

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. Return to the procedure that sent you here.

FID DE: RS-422 Cable—Internal to Drive

Removal of RS-422 Cable—Internal to Drive

1. Perform the “Removal of Library Chassis Covers” on page APPENDD-4.
2. Remove the RS-422 cable connecting drive 1 to drive 2 (Models C02, C12 and C22 only).
3. Remove two screws that hold the RS-422 cable to the cooling pack.
4. Unplug the cable connector at the mother board and remove the RS-422 cable—internal to drive (Models C02 and C12, drive 2 only).
5. Unplug the cable connector at the mother board and at the library control card, then remove the RS-422 cable—internal to drive (all library models, drive 1 only).

Replacement of RS-422 Cable—Internal to Drive

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C04** for the area of failure.
4. Return to the procedure that sent you here.

Removal and Replacement Procedures for the Library

The following removal and replacement procedures are for all models of the library that are in EMEA and are listed by FID order.

FID 90: Library Operator Panel Display

Removal of Library Operator Panel Display

1. “Prepare the Tape Device for Service” on page PROC-5.

   Note: **Attention:** The logic cards are ESD sensitive. Special care must be used when handling ESD parts. See “Working with Electrostatic Discharge (ESD) Parts” on page PROC-3.

2. Remove the library operator panel display from the front panel by pushing down on the top of the library operator panel display, and using both thumbs, pivoting the assembly out. When replacing, put the bottom in first, and pivot the top up and into the front cover assembly.
3. Remove the cable that goes from the back of the library operator panel display to the library control card at the display end by squeezing the two retaining springs in the cable connector.
4. Remove the three screws holding the LCD card to the panel.
5. Remove the LCD card.

Replacement of Library Operator Panel Display

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **L05** for the area of failure.
4. Return to the procedure that sent you here.

FID 91: Library Operator Panel Display Cable

Removal of Library Operator Panel Display Cable

1. “Prepare the Tape Device for Service” on page PROC-5.

   Note: **Attention:** The logic cards are ESD sensitive. Special care must be used when handling ESD parts. See “Working with Electrostatic Discharge (ESD) Parts” on page PROC-3.

2. Remove the library operator panel display from the front panel.
3. Remove the cable that goes from the back of the library operator panel display to the library control card at the display end.
4. Remove the cable at the library control card end. The connector at that end is shown as item E on Figure 329 on page APPENDD-42 and can be removed by squeezing the two holding springs and lifting up.
5. Unlace cable from cable retention hardware and remove cable.

Replacement of Library Operator Panel Display Cable

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C03** for the area of failure.
4. Return to the procedure that sent you here.

FID 92: Accessor Assembly

Removal of Accessor Assembly

1. Perform the “FID 9A: Picker Assembly” on page APPENDD-43 removal procedure, then return here.
2. Refer to Figure 276 on page CARR-22, item F, and remove the cable between the library control card and accessor motor assembly (CD6) from the library control card end, and release the cable from the cable retention hardware.
3. Remove the motor tach cable from the accessor motor assembly.
4. Remove the three inside screws on the right side of the machine, and the three inside screws on the left side of the machine that secure the accessor assembly to the side plates. The assembly should now rest on the side wall support pins.
5. Lift and remove the accessor assembly, lead screw, and accessor motor assembly out of the machine.
6. Remove the accessor motor assembly from the accessor assembly and install it on the new accessor assembly. See “FID 95: Accessor Motor Assembly” on page APPENDD-41.

   Note: When installing the accessor motor assembly, make sure that the gear on the motor shaft fully meshes with the gear on the accessor assembly. Also note the orientation of the accessor motor assembly tach cable connector. The tach cable connector should face the rear of the machine.

Replacement of Accessor Assembly

1. Perform the removal procedure steps in the reverse order except for the step concerning the accessor motor assembly.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T14** for the area of failure.
4. Return to the procedure that sent you here.

FID 94: Bar Code Reader

Removal of Bar Code Reader

1. Refer to Figure 328 on page APPENDD-41.
2. Refer to “FID 9A: Picker Assembly” on page APPENDD-43 and remove the picker assembly.
3. Disconnect the bar code reader cable 1 .

   Note: The top of connector has a locking tab.

   Slide the tab up and disconnect the cable.
4. The bar code reader is held in place by 4 snap connectors. With the blade of a screwdriver, pry up at 2 to disengage the first connector.
5. Pry up at the picker end of each mounting post, items 3 and remove the reader.
6. Remove the bar code reader interface card from the library control card. See G in Figure 329 on page APPENDD-42.

Replacement of Bar Code Reader

1. Replace the bar code interface card by plugging it on the library control card.
2. Refer to Figure 328 on page APPENDD-41. The gear on the bar code reader has an arrow that must be aligned with the arrow on the picker assembly gear 4 . Align the arrows and snap in place 2 .
3. Snap the three remaining connectors in place 3 .

4. Reconnect the connector 1 .

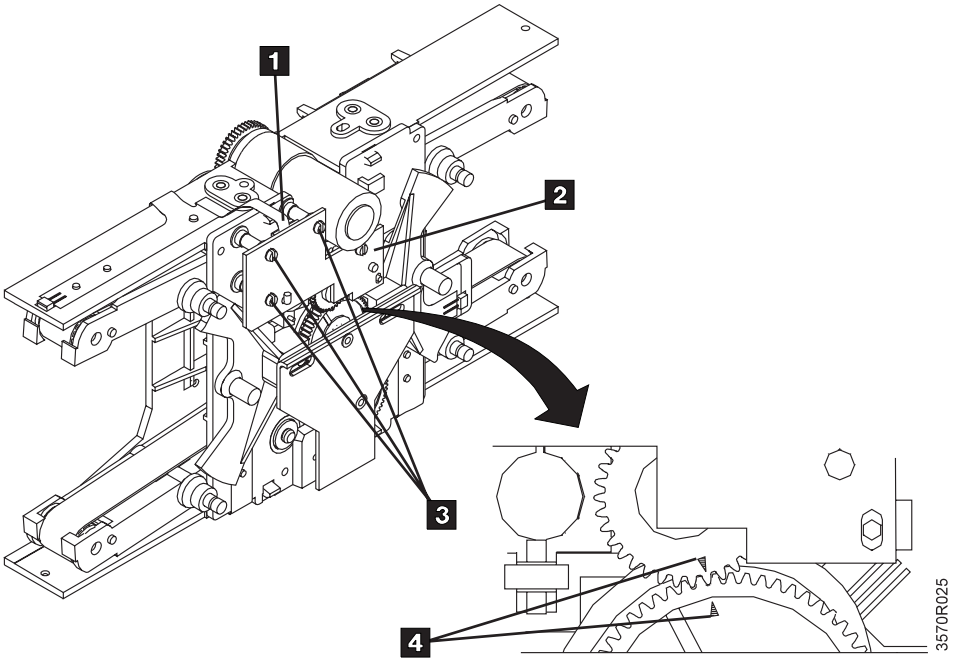


Figure 328. Barcode Reader

FID 95: Accessor Motor Assembly

Removal of Accessor Motor Assembly

Note: Shiny picker belts can cause FID 95 failures due to infrared light reflecting from the belts onto the Cartridge Present sensor. If the picker belts must be cleaned for FID 95 problems, use a lint-free cloth and some alcohol to clean the belts. Be sure to wait until the belts have completely dried before using the library.

1. Refer to Figure 329 on page APPENDD-42, item F, and remove the cable between the library control card and accessor motor assembly (CD6) from the library control card end.
2. Remove the motor tach cable from the accessor motor assembly.
3. Loosen the set screw and remove the small pulley on the accessor motor assembly shaft.
4. Remove the four outside screws on the right side of the machine, and the four outside screws on the left side of the machine, that hold the accessor motor assembly to the accessor assembly.
5. Remove the accessor motor assembly.

   Note: Observe the orientation of the accessor motor assembly. When replacing the unit, the tach cable connector should face the rear of the machine.

Replacement of Accessor Motor Assembly

1. Perform the removal procedure steps in the reverse order.

   Note: When installing the accessor motor assembly, make sure that the gear on the motor shaft fully meshes with the gear on the accessor assembly.

2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T17** for the area of failure.
4. Return to the procedure that sent you here.

FID 97: Library Control Card

Removal of Library Control Card

Note: **Attention:** The logic cards are ESD sensitive. Special care must be used when handling ESD parts. See “Working with Electrostatic Discharge (ESD) Parts” on page PROC-3.

Refer to Figure 329 for a pictorial of the cable connections for the following steps:

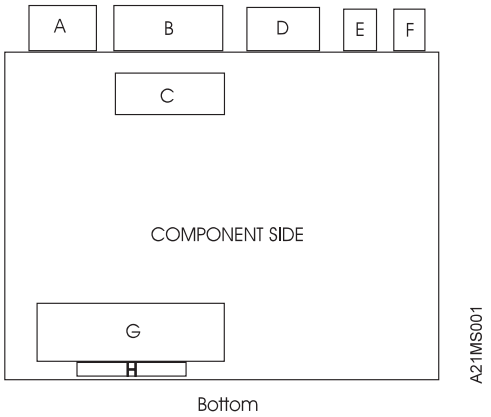


Figure 329. Library Control Card Cable and Bar Code Reader Card Layout

1. Prepare the drive for service.
2. Remove the six cables from the library control card:
   a. CD1=A, Library interface cable (squeeze springs)
   b. CD2=B, Library sensor cable (pivot out plastic retainers)
   c. CD3=C, Picker cable (lock is under connector)
   d. CD4=D, From Power supply
   e. CD5=E, Library operator panel display cable (squeeze springs)
   f. CD6=F, Accessor motor assembly drive
   g. G, Bar Code Reader Card
   h. H, Bar Code Reader Connector
3. Remove top retaining bracket and screw that holds the library control card in place. The screw is located on the right outside of the machine.
4. Lift and remove the library control card from the machine.
5. Remove the Bar Code Reader card, item G in Figure 329 from the old card and install it on the new card.

Replacement of Library Control Card

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T15** for the area of failure.
4. Return to the procedure that sent you here.

FID 99: Picker Cable

Removal of Picker Cable

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Refer to Figure 329 on page APPENDD-42, item C, and disconnect the cable connector (CD3) from the library control card by releasing the lock on the bottom of the connector.
3. Disconnect the picker cable from the picker assembly.
4. Slide the cable out from under the existing hardware, and remove.

   Note: The cable will be secured to the base with adhesive. Carefully pull the cable upward from either end until it comes free.

Replacement of Picker Cable

1. Use the old cable as a pattern to fold the new cable.
2. Perform the removal procedure steps in the reverse order.
3. Prepare the drive for customer operation.
4. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C03** for the area of failure.
5. Return to the procedure that sent you here.

FID 9A: Picker Assembly

Note: Cleaning of the picker belts is not recommended to correct cartridge slipping problems. If the cartridges are slipping on the belts, the picker assembly should be replaced.

Shiny picker belts can cause FID 95 failures due to infrared light reflecting from the belts onto the Cartridge Present sensor.

If the picker belts must be cleaned for FID 95 problems, or because a FRU is not readily available, use a lint-free cloth and some alcohol to clean the belts. Be sure to wait until the belts have completely dried before using the library.

Removal of Picker Assembly

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the four screws on top that secure the picker assembly to the accessor assembly.
3. Disconnect the picker cable (flex cable) from the library control card to the picker assembly, at the picker assembly end only.
4. Remove the picker assembly from the machine.

   Note: Observe the orientation of the picker assembly. The springs are to the right, and the gears are to the left, facing from the front of the machine.

5. Remove the Bar Code Reader from the old picker assembly and install it on the new one. See “FID 94: Bar Code Reader” on page APPENDD-40 for procedure.

Replacement of Picker Assembly

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T12** for the area of failure.
4. Return to the procedure that sent you here.

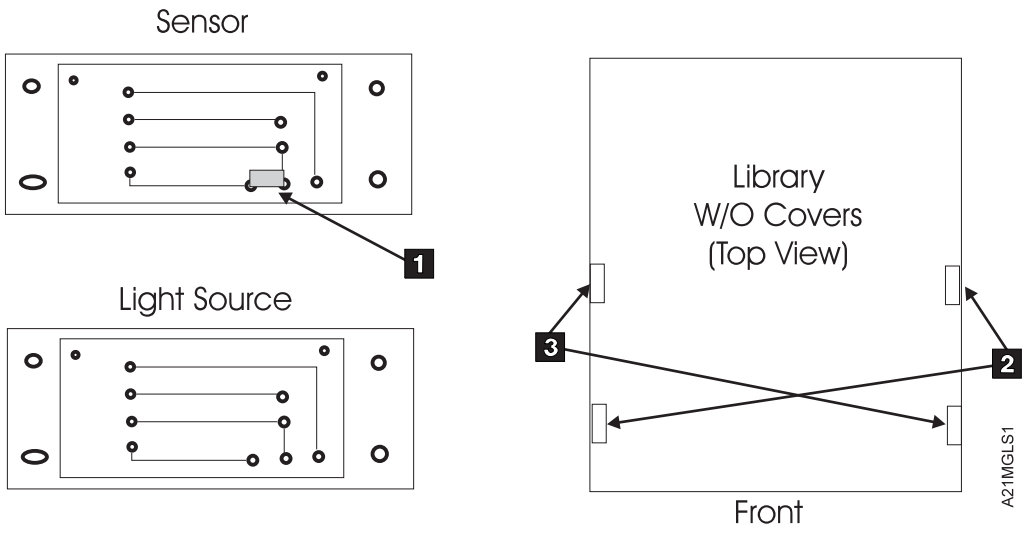


Figure 330. Library Global Sensor Component Identification and Locations

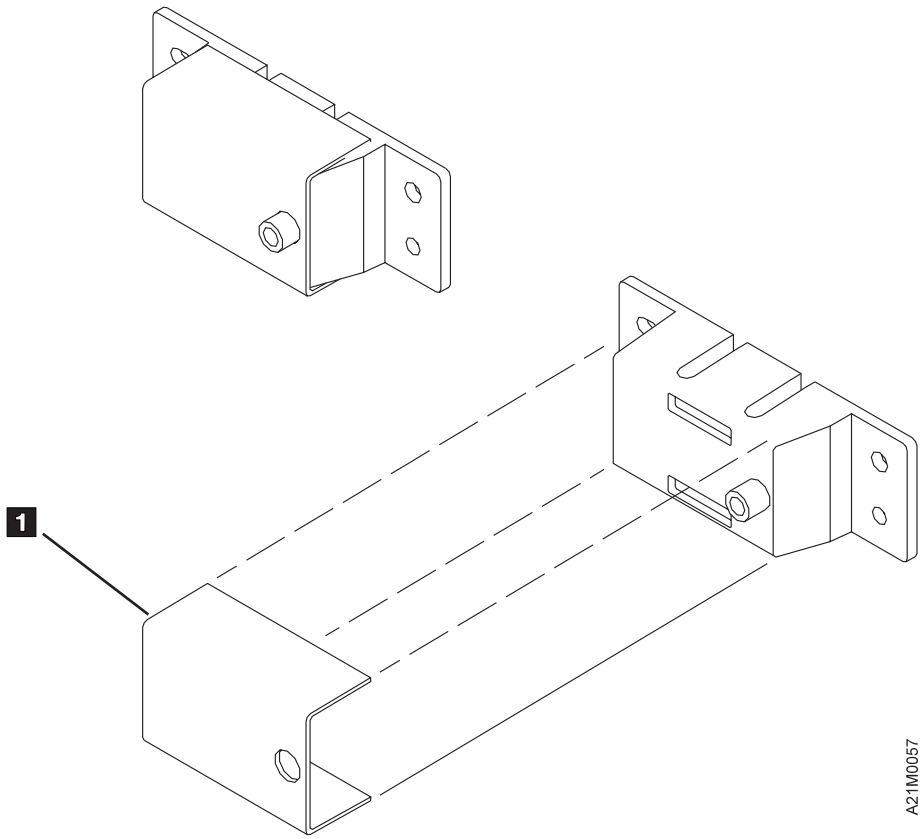


Figure 331. Library Global Sensor Component Plastic Covers

FID 9B: Drive Global Sensor Pair

Removal of Drive Global Sensor Pair

Note: When replacing any part of the drive global sensor pair, replace both the sensor and the light source at the same time. Be aware that the two parts **look very much alike** and will not work if interchanged. Refer to Figure 330 on page APPENDD-44 and note that the sensor has a small component, item 1 , soldered on the circuit board while the light source is missing this component. Also note from the figure where the light sources, item 3 and sensors, item 2 are located in the library.

1. “Prepare the Tape Device for Service” on page PROC-5.
2. You may have to push the picker assembly out of the way to gain access to the sensor.

   Note: On some libraries, there may be plastic snap-on covers installed on the global sensor and light source. If so, pull the covers off to install them on the new sensor pair. See Figure 331 on page APPENDD-44, item 1 .

   Left side light source
   a. Disconnect the light source cable at the light source.
   b. Remove the two screws that secure the light source to the left side chassis,
   c. Remove the light source.

   Right side sensor
   a. Disconnect the sensor cable at the sensor.
   b. Remove the two screws that secure the sensor to the right side chassis.
   c. Remove the sensor.

Replacement of Drive Global Sensor Pair

1. Perform the removal procedure steps in the reverse order.
2. Position the sensor and light source over their respective alignment pins, then secure with screws.
3. If you removed plastic snap-on covers from the sensor and light source, re-install the covers.

   Note: Be sure that the hole in the cover aligns with the sensor and the light source.

4. Prepare the drive for customer operation.
5. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
6. Return to the procedure that sent you here.

FID 9C: Magazine Global Sensor Pair

Removal of Magazine Global Sensor Pair

Note: When replacing any part of the magazine global sensor pair, replace both the sensor and the light source at the same time. Be aware that the two parts **look very much alike** and will not work if interchanged. Refer to Figure 330 on page APPENDD-44 and note that the sensor has a small component, item 1 , soldered on the circuit board while the light source is missing this component. Also note from the figure where the light sources, item 3 and sensors, item 2 are located in the library.

1. "Prepare the Tape Device for Service" on page PROC-5.
2. Remove the magazines if present.

   Note: On some libraries, there may be plastic snap-on covers installed on the global sensor and light source. If so, pull the covers off to install them on the new sensor pair. See Figure 331 on page APPENDD-44, item 1 .

   Left side sensor
   a. Disconnect the cable from the sensor on the left side.
   b. Remove the two screws securing the sensor to the left side chassis.
   c. Remove the sensor.

   Right side light source
   a. Disconnect the cable at the light source.
   b. Remove the two screws securing the light source to the right side chassis.
   c. Remove the light source.

Replacement of Magazine Global Sensor Pair

1. Perform the removal procedure steps in the reverse order.
2. Position the sensor and light source over their respective alignment pins, then secure with screws.
3. If you removed plastic snap-on covers from the sensor and light source, re-install the covers.

   Note: Be sure that the hole in the cover aligns with the sensor and the light source.

4. Prepare the drive for customer operation.
5. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
6. Return to the procedure that sent you here.

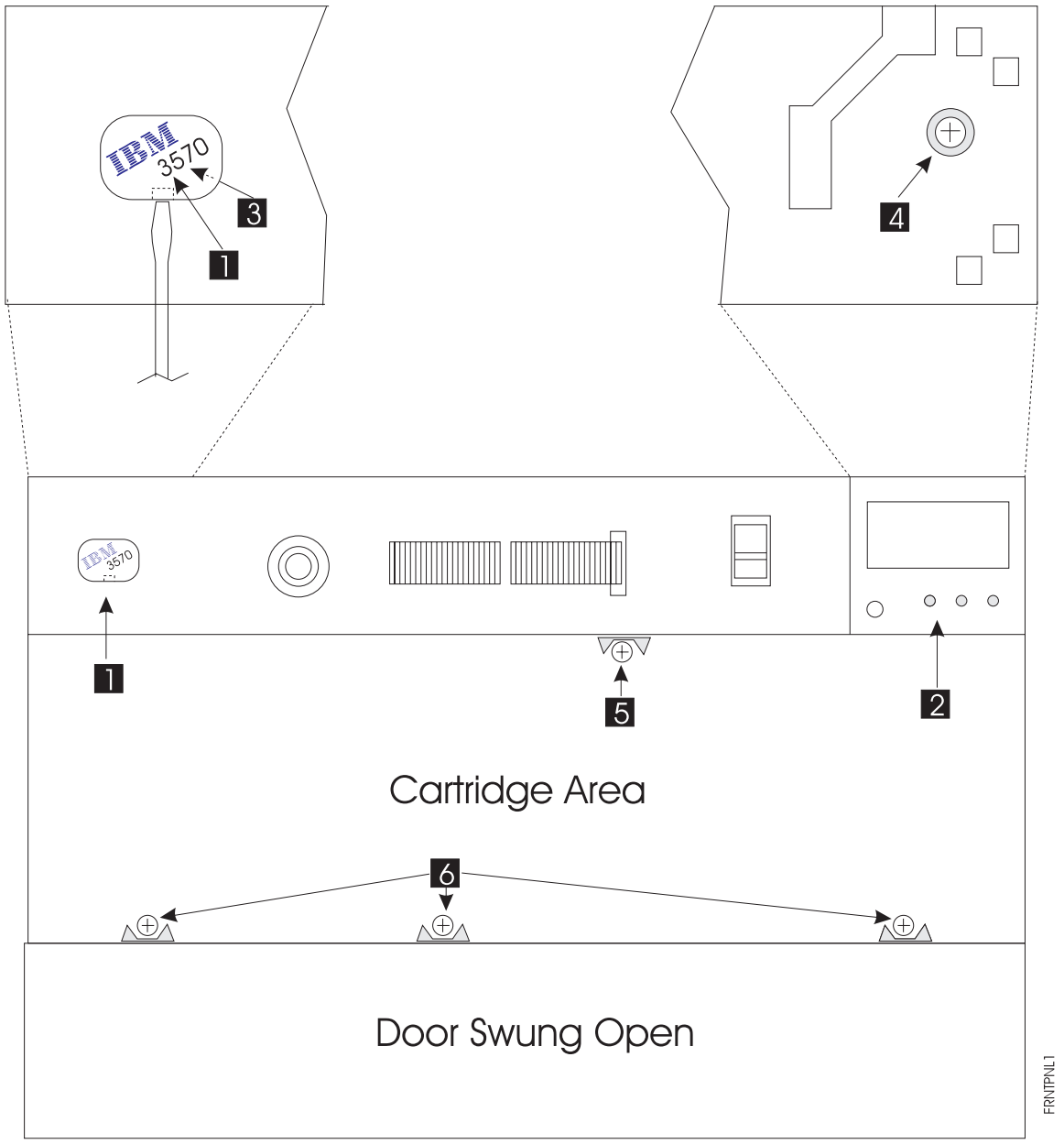
FID 9D: Library Front Cover Assembly

| There are at least 3 styles of hinges and 2 styles of library front cover assemblies. Removal and replacement is different on each one. Study the drawings at Figure 332 on page APPENDD-48, Figure 333 on page APPENDD-49 and Figure 334 on page APPENDD-49, and decide which style front cover assembly is on the problem machine. Here's how you can tell.

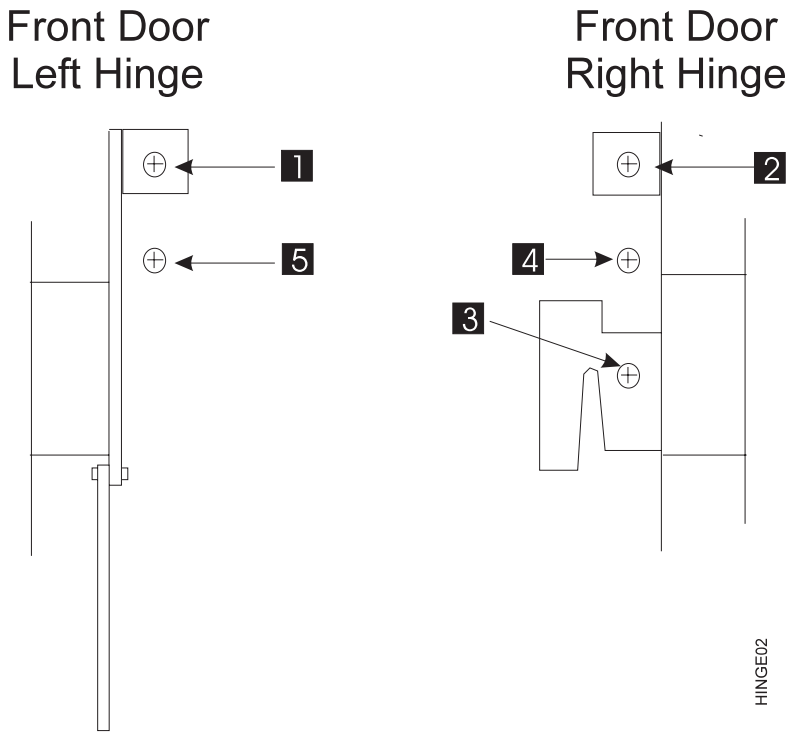
| Oldest style — Look behind the removable operator panel, item 2 on Figure 332 on page APPENDD-48. Remove the library operator panel display assembly by pushing down and tilting out from the top. If there is no access hole to a screw behind the library operator panel display, you have the old style front cover assembly. Follow the procedure at “Removal of Library Front Cover Assembly (Old Style)” on page APPENDD-50.

| Newer style — Look at Figure 333 on page APPENDD-49 and if your hinges match that type, you have a newer style. Follow the procedure at “Removal of Library Front Cover Assembly (Newer Style)” on page APPENDD-50 but watch for notes concerning hinge removal unique to this style.

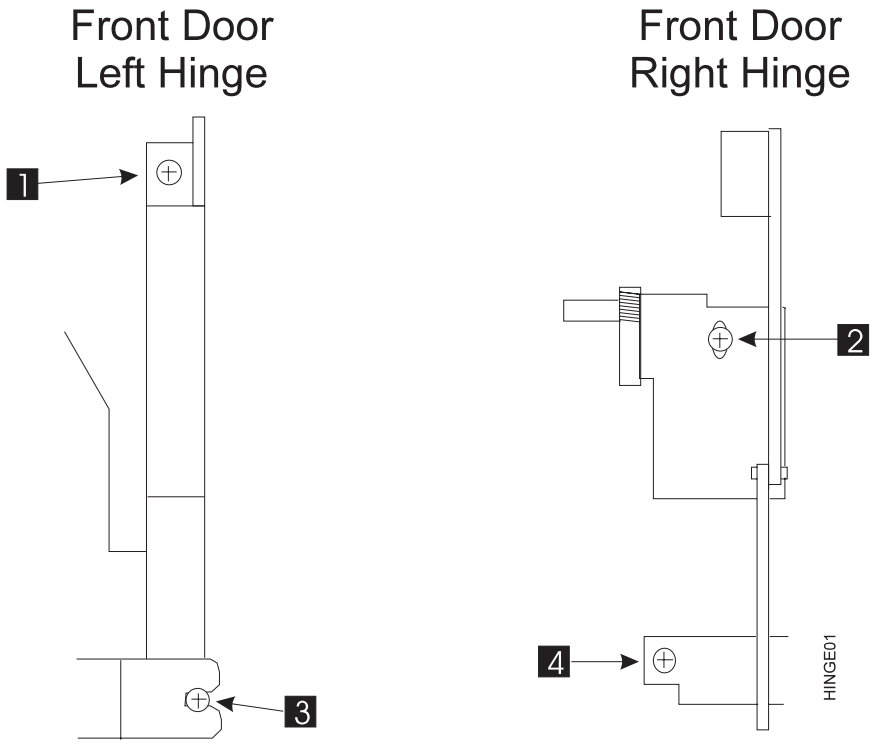
| Newest style — Look at Figure 334 on page APPENDD-49 and if your hinges matche that type, you have the newest style. Follow the procedure at “Removal of Library Front Cover Assembly (Newer Style)” on page APPENDD-50 but watch for notes concerning hinge removal unique to this style.



| *Figure 332. Library Front Door Assembly—Holding Screws*



| *Figure 333. Library Front Door Assembly—Newer Style Hinges*



| *Figure 334. Library Front Door Assembly—Newest Style Hinges*

Removal of Library Front Cover Assembly (Old Style)

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the library operator panel display assembly by tilting out from the top.
3. Disconnect the library operator panel display cable from the library operator panel display.
4. Set the library operator panel display and library operator panel display cable aside for now.
5. Remove any magazines that are installed.

Notes:

a. Read the rest of this procedure carefully before continuing. The Library front cover assembly has many screws, but only six secure the front cover and three screws for each hinge. Pay close attention to the next few steps and it will save you some time.

b. The front cover and the metal mounting plate are separate parts, and the metal mounting plate is not removed.

6. Refer to Figure 335 on page APPENDD-51, and remove three screws, item 1 , on the inside near the top of the front cover assembly. The library operator panel display cable hole, item 2 and rear of key lock, item 3 are shown as reference.
7. From the front of the library, open the library door.
8. Refer to Figure 336 on page APPENDD-51, and remove the three screws, item 1 that line up with the raised “channels” which give strength to the cover assembly, and are located in the front cover assembly, near the bottom.
9. Remove two screws, item 2 , on both sides of the library door that secure the bottom bracket of the door stops.
10. Slowly pull on the front cover assembly enough to gain access to the cables leading to the library LED card and the library door open sensor.
11. Disconnect the cable connectors and remove the library front cover assembly.

Note: It may be easier to remove the library door open sensor from its bracket than to disconnect the connector.

Removal of Library Front Cover Assembly (Newer Style)

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Refer to Figure 332 on page APPENDD-48 and remove the library operator panel display assembly, item 2 , by pushing down and tilting out from the top.
3. Disconnect the library operator panel display cable from the library operator panel display.
4. Set the library operator panel display and library operator panel display cable aside for now.
5. Remove any magazines that are installed.

Notes:

a. Read the rest of this procedure carefully before continuing. The Library front cover assembly has many screws, but only six secure the front cover and two to four secure the hinges depending on the style that your machine has. Pay close attention to the next few steps and it will save you some time.

b. The front cover (plastic) and the metal mounting plate are separate parts, and the metal mounting plate is not removed.

6. Refer to Figure 332 on page APPENDD-48, locate the access hole and screw, item 4 , and remove the screw.
7. Carefully place a small flat blade screw driver at the **bottom** of the IBM logo, item 1 , insert the screw driver under the logo and at a slight angle, and pry it up and out. The logo should come out easily, and provide access to one of the holding screws. Remove the screw, item 3 which was hidden by the logo.

| 8. Remove upper screw, item 5 and the three lower screws, item 6 . The upper and lower screws are
| partially surrounded by a plastic “channel” that provides strength to the assembly.
| 9. If you have a set of hinges that look similar to those in Figure 333 on page APPENDD-49, remove
| screws 1 , 2 (if it exists), and 3 . **Do not** remove screws 4 and 5 . They do not need to be
| removed.
| 10. If you have a set of hinges that look similar to those in Figure 334 on page APPENDD-49, remove
| screws 1 and 2 . **Do not** remove screws 3 or 4 . They do not need to be removed.
| 11. Slowly pull on the front cover assembly enough to gain access to the cables leading to the library LED
| card and the library door open sensor.
| 12. Disconnect the cable connectors and remove the library front cover assembly.

| **Note:** It may be easier to remove the library door open sensor from its bracket than to disconnect the
| connector.

| *Replacement of Library Front Cover Assembly (All Styles)*

1. Perform the removal procedure steps in the reverse order.
| 2. When re-installing the front cover assembly, ensure that the Power On/Off switch does not bind when
| tightening the cover holding screws. Alignment of the front cover assembly is critical.
3. Prepare the drive for customer operation.
4. Return to the procedure that sent you here.

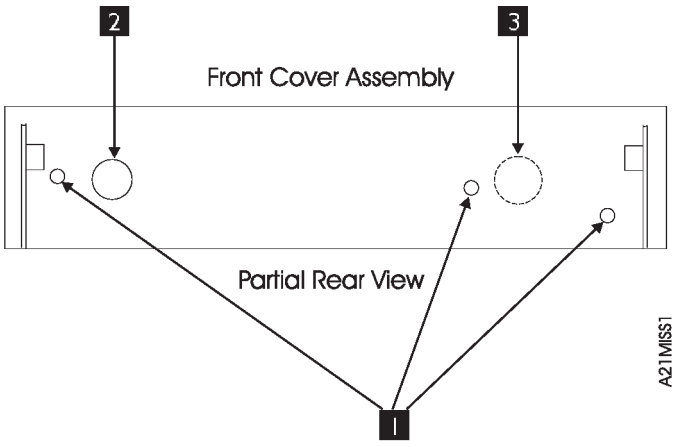


Figure 335. Library Front Door Assembly—Rear View Holding Screws

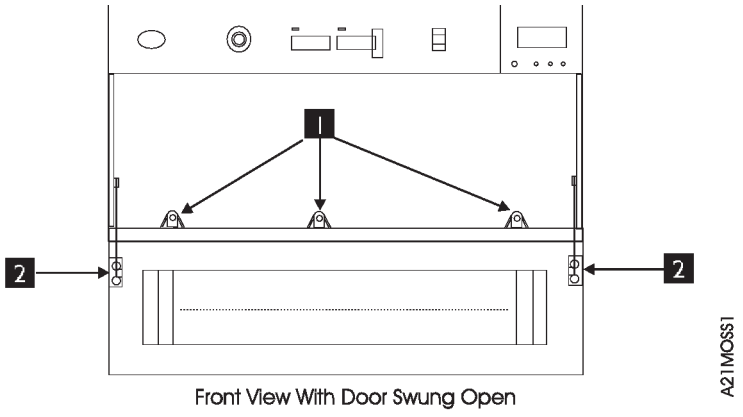


Figure 336. Library Front Door Assembly—Front View Holding Screws

FID 9E: Priority Cell Cartridge-Present Sensor

Removal of Priority Cell Cartridge-Present Sensor

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the magazine if present.
3. Disconnect the cable from the sensor.
4. Remove the two screws securing the sensor to the mounting plate.
5. Remove the sensor.

Replacement of Priority Cell Cartridge-Present Sensor

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID A0: Magazine 2 Sensor

Removal of Magazine 2 Sensor

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the magazine if present.
3. Disconnect the cable from the sensor.
4. Remove the screw securing the sensor to the mounting plate.
5. Remove the sensor.

Replacement of Magazine 2 Sensor

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID A1: Magazine 1 Sensor

Removal of Magazine 1 Sensor

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the magazine if present.
3. Disconnect the cable from the sensor.
4. Remove the screw securing the sensor to the mounting plate.
5. Remove the sensor.

Replacement of Magazine 1 Sensor

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID A2: Library Interface Cable

Removal of Library Interface Cable

1. “Prepare the Tape Device for Service” on page PROC-5.

   Note: Removal of the SCSI connector may disrupt the host system if the 3570 is not the last drive in the string, and is not terminated.

2. Remove the SCSI cable and terminator if the last drive in a string, or both cables if in the middle of the string.
3. Remove 4 screws that secure a cover in the back of the machine.
4. Remove the cover and expose access to the library interface cable.
5. Remove one end of the library interface cable from the rear of the drive pack, and the other from the library control card.

Replacement of Library Interface Cable

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C03** for the area of failure.

4. Return to the procedure that sent you here.

FID A3: Cleaner Cartridge-Present Sensor

Removal of Cleaner Cartridge-Present Sensor

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Remove the two screws securing the cleaner cell to the bracket. These screws may be seen easily from the front of the machine.
3. Pull the cleaner cell far enough to disconnect the sensor cable.
4. Remove the two screws securing the micro-switch (sensor) to the cleaner cell.
5. Remove the micro-switch (sensor).

Replacement of Cleaner Cartridge-Present Sensor

1. Install the new micro switch.
2. Install a cartridge into the cleaner-cartridge holder and adjust the micro switch until there is continuity between the two pins. Adjust further until there is no free play in the micro switch actuator.

   Note: Do not adjust the switch beyond the point of free play or you may bend or otherwise damage the actuator.

3. Tighten the switch holding screws.
4. Remove the cartridge and re-install the wires removed earlier.
5. Reinstall the cleaner cartridge holder into the library.
6. Prepare the drive for customer operation.
7. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
8. Return to the procedure that sent you here.

FID A5: Library Sensor Cable

Removal of library sensor cable

1. “Prepare the Tape Device for Service” on page PROC-5.
2. Refer to Figure 329 on page APPENDD-42, item B, and disconnect the cable connector (CD2) from the library control card.
3. Perform the removal procedure for “FID 9D: Library Front Cover Assembly” on page APPENDD-47.
4. Disconnect the cable connectors from the following sensors and LEDs:
   a. Cleaner cartridge-present sensor
   b. Accessor motor calibrate sensor
   c. Drive global sensor pair (right side)
   d. Magazine global sensor pair (right side)
   e. Priority cell cartridge-present sensor
   f. Library LED card
   g. Library door open sensor
   h. Drive global sensor pair (left side)
   i. Magazine global sensor pair (left side)
5. Open the cable clamps as required to remove the cable from the machine.

Replacement of Library Sensor Cable

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C03** for the area of failure.
4. Return to the procedure that sent you here.

FID A6: Library LED Card

Removal of Library LED Card

1. “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. Perform removal of the “Library Chassis Covers” on page APPENDD-4.
3. Perform removal of the “FID 9D: Library Front Cover Assembly” on page APPENDD-47.
4. With the front cover lying face down on a soft surface, remove the two screws holding the library LED card card to the front cover.
5. Lift and remove the library LED card and holding frame out of the Library front cover.

Replacement of Library LED Card

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **T31** for the area of failure.
4. Return to the procedure that sent you here.

FID AA: Library Door Open Sensor

Removal of Library Door Open Sensor

1. “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. Perform removal of the “Library Chassis Covers” on page APPENDD-4.
3. Perform removal of the “FID 9D: Library Front Cover Assembly” on page APPENDD-47.
4. With the front cover lying face down on a soft surface, remove the library door open sensor assembly from its bracket.

Replacement of Library Door Open Sensor

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **L05** for the area of failure.
4. Return to the procedure that sent you here.

FID DB: AC Switch and Cable Assembly

Removal of Library Door Open Sensor

1. “Prepare the Tape Device for Service” on page PROC-5 and then return here.
2. Perform removal of the “Library Chassis Covers” on page APPENDD-4.
3. Perform removal of the “FID 9D: Library Front Cover Assembly” on page APPENDD-47.
4. Set the front cover aside for now.
5. Remove the AC On/Off switch cable from the power supply that supplies power to drive 1.
6. If you are working on a Model C02, C12 or C22, remove the AC On/Off power extension cable that supplies power to drive 2 power supply from the rear of the AC On/Off switch.
7. Open the cable clamps as necessary to remove the cable from the trough.
8. Remove the AC On/Off switch feed-through cable from the mounting bracket.
9. Remove the two screws that secure the AC On/Off switch to the front chassis mounting bracket.
10. Remove the AC switch and cable from the machine.

Replacement of AC Switch and Cable Assembly

1. Perform the removal procedure steps in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C02** for the area of failure.
4. Return to the procedure that sent you here.

FID DC: AC Power Cord

Removal of AC Power Cord

1. Prepare the drive for service.
2. Remove power from the device.
3. Remove the power connection from the customer wall outlet.
4. Remove the power connection from the device.

Replacement of AC Power Cord

1. Perform the removal procedure in the reverse order.
2. Prepare the drive for customer operation.
3. If this part is being replaced with a new part, use your local procedures to report the FRU part number for the FID and use technical area code (TAC) **C02** for the area of failure.
4. Return to the procedure that sent you here.

Parts Catalog

How to Use This Parts Catalog

SIMILAR ASSEMBLIES: If two assemblies contain a majority of identical parts, they are broken down on the same list. Common parts are shown by one index number. Parts peculiar to one or the other of the assemblies are listed separately and identified by description.

AR: (As Required) in the Units column indicates the quantity of the part is used as required.

NP: (Non-Procurable) in the Units column indicates that the part is non-procurable and that the individual parts or the next higher assembly should be ordered.

NR: (Not Recommended) in the Units column indicates that the part is procurable but not recommended for field replacement, and that the next higher assembly should be ordered.

R: (Restricted) in the Units column indicates the part has a restricted availability.

INDENTURE: The indenture is marked by a series of dots located before the parts description. The indenture indicates the relationship of a part to the next higher assembly. For example:

Indenture	Relationship of Parts
(No dots)	MAIN ASSEMBLY
(One dot)	Detail parts of a main assembly
(One dot)	Subassembly of the main assembly
(Two dots)	Detail part of a one-dot subassembly
(Two dots)	Subassembly of a one-dot subassembly
(Three dots)	Detail part of a two-dot subassembly

Assembly *n*: Cover Assembly

Asm–Index	Part Number	Units	Description
n–	2512667	1	Cover Assembly, Rear, Red
–	2512668	1	Cover Assembly, Rear, Yellow
–	2512669	1	Cover Assembly, Rear, Blue
–	2512670	1	Cover Assembly, Rear, Gray
–	2513714	1	Cover Assembly, Rear, White
			For Next Higher Assembly, See 1-2 on page 15
–1	5373637	1	Seal, Top
–2	5356429	2	Clip, Retaining
–3	2513013	3	Liner, Cover
–4	5373727	1	Seal, Left Side
–5	5356429	3	Clip, Retaining
–6	513668	2	Catch,Cover
–7	81693	4	Screw, Mach Bind Hd- 6–32, X 0.375 Long
–8	1847630	R	Finger Stock Assembly
–9	1847602	NR	Channel, Finger Stock
–10	1847604	NR	Finger Stock, 2.00 Long
–11	5373639	AR	Seal, Bottom
–12	5356429	2	Clip, Retaining
–13		NP	Cover, Rear, without Paint

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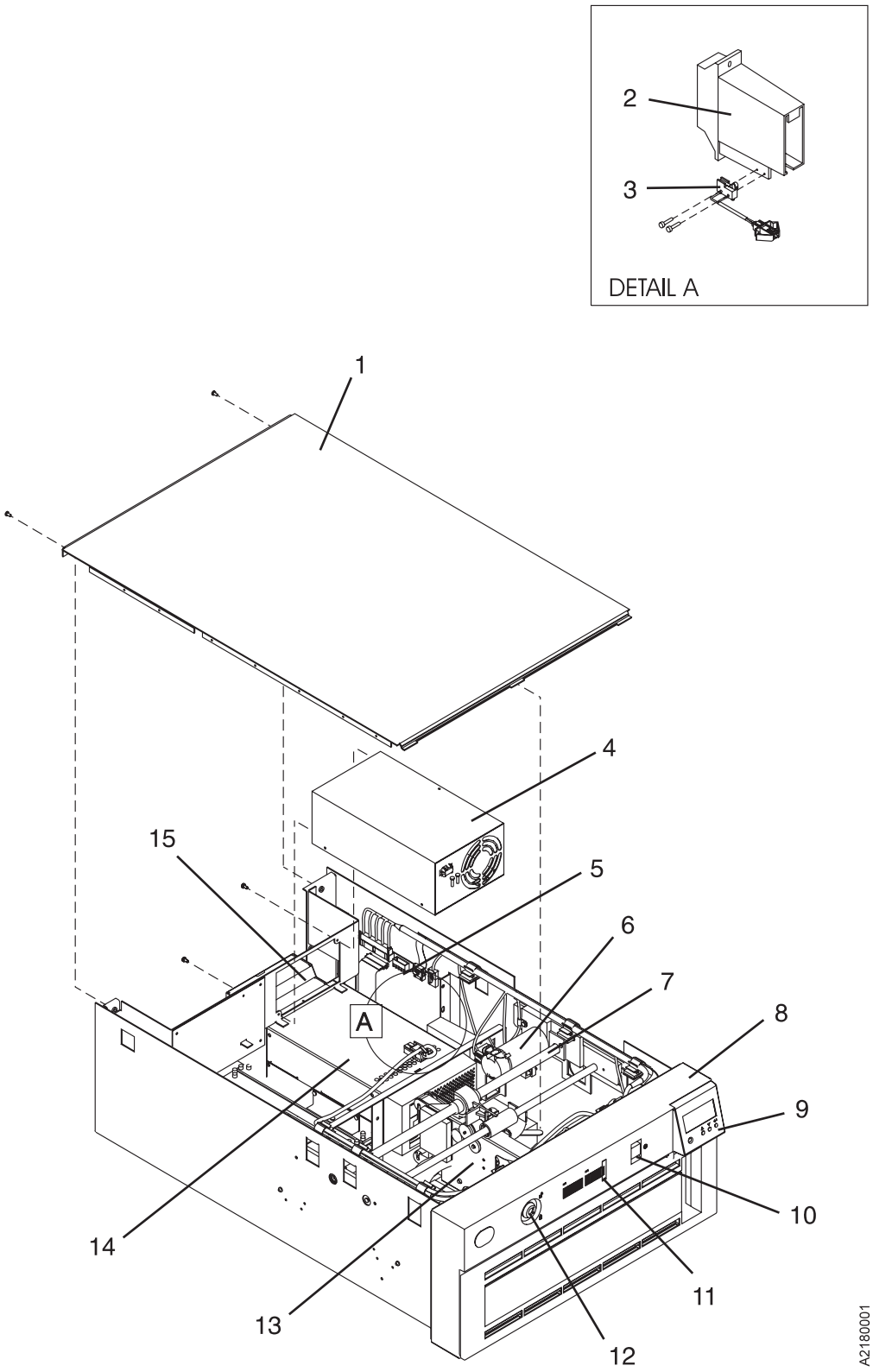
Assemblies List

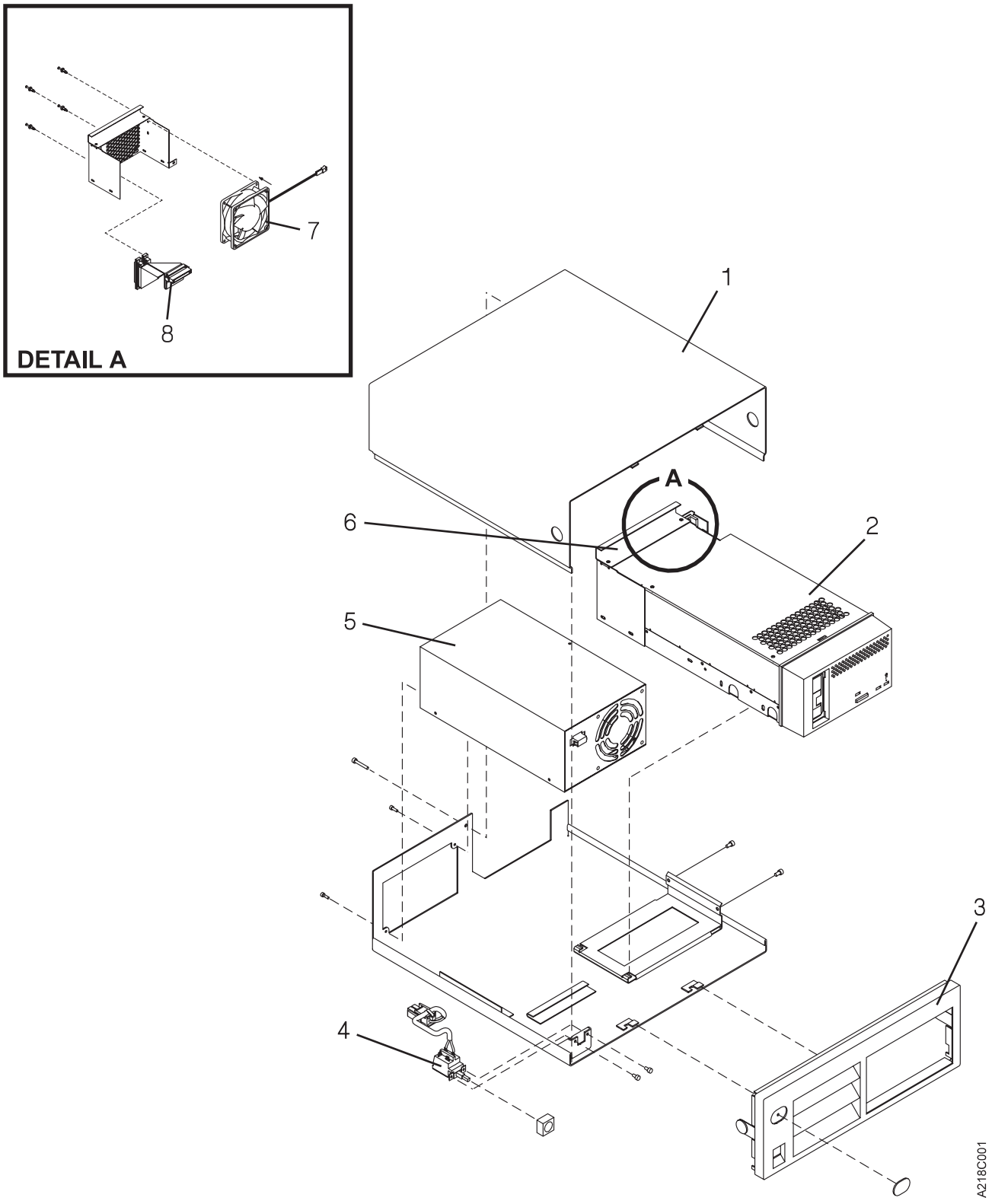
Base Drive All Models PARTS-24
Desktop Drive Model C00 . . . . . PARTS-6
Desktop Library Assembly, Model C01 . . . . . PARTS-8
Desktop Library Assembly, Model C02 . . . . . PARTS-14
Rackmount Library Assembly, Model C11 . . . . . PARTS-4
Rackmount Library Assembly, Model C12 . . . . . PARTS-10
Rackmount Library Assembly, Model C21 . . . . . PARTS-18
Rackmount Library Assembly, Model C22 . . . . . PARTS-20

Assembly 1: Rackmount Library Assembly, Model C11



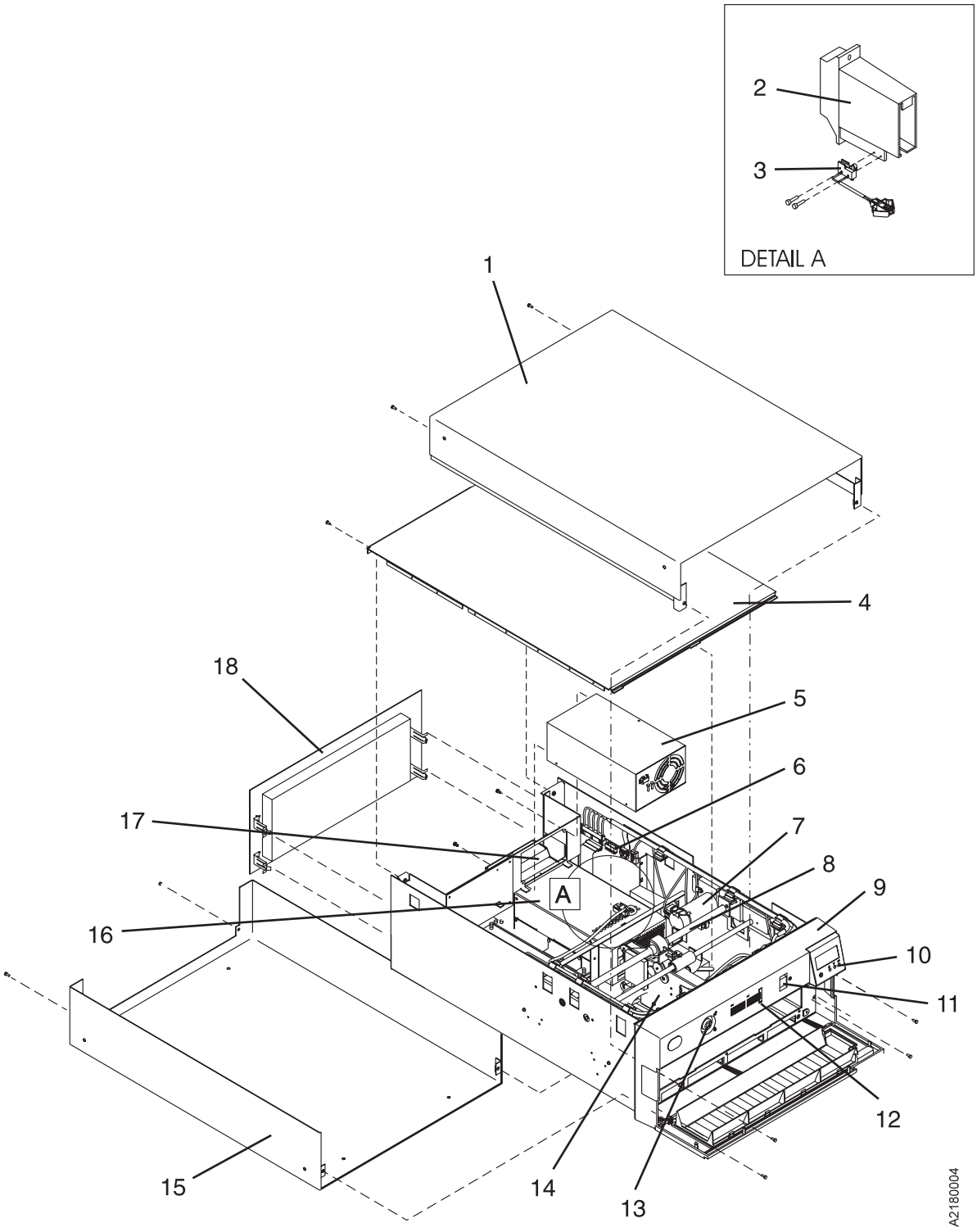
Asm–Index	Part Number	Units	Description
1–		NP	Rackmount Library Assembly, Model C11
–1		1	Cover, Top (no color)
–2		1	Cleaner Cartridge Storage
–2	05H2912	1	Cleaner Cartridge Retention Spring (not shown)
–3	65F5407	1	Micro Switch, Cleaner Cartridge-Present Sensor
–4	50G0322	1	Power Supply
–5	05H9386	1	Library Control Card **Note:** Remove the bar code reader card from the old card and install it on the new card.
–5	05H9449	1	Bar Code Reader (kit contains reader & card)
–6	34G7550	1	Accessor Motor Assembly
–7	34G7539	1	Accessor Assembly
–8	05H4547	1	Front Assembly, Raven Black
			The following sensors are not shown but are listed for reference.
–8	45G0277	1	Magazine 1 Sensor
–8	45G0277	1	Magazine 2 Sensor
–8	45G0277	1	Priority Cell-Cartridge Present Sensor
–8		1	Library Door Open Sensor (replace front assembly)
–8	05H4595	1	Drive Global Sensor Pair
–8	05H4595	1	Magazine Global Sensor Pair
–9	62G0673	1	Library Operator Panel Display
–9	34G7801	1	Cover, Operator Panel, Raven Black
–10	65F5411	1	AC Switch and Cable Assembly
–11	09G8933	1	Library LED Card
–12		1	Key, Lock Assembly Not a FRU. Part of Front Assembly.
–13	34G7571	1	Picker Assembly **Note:** Remove the bar code reader from the old picker assembly and install it on the new one.
–13	05H9449	1	Bar Code Reader (kit contains card and reader)
–13	65F5402	1	Picker Cable
			The following cables are not shown but are listed for reference.
–13	65F5403	1	Library Operator Panel Display Cable
–13	65F5398	1	Library Interface/RS-422 Cable
–13	05H4539	1	Library Sensor Cable
–14	05H4558	1	Drive Pack Assembly
–15		NP	Cooling Pack Not a FRU. For detailed breakdown, see “Assembly 2: Desktop Drive Model C00” on page PARTS-6. **Note:** See Figure 201 on page INST-14 for a detailed listing of the rack mounting hardware.

Assembly 2: Desktop Drive Model C00



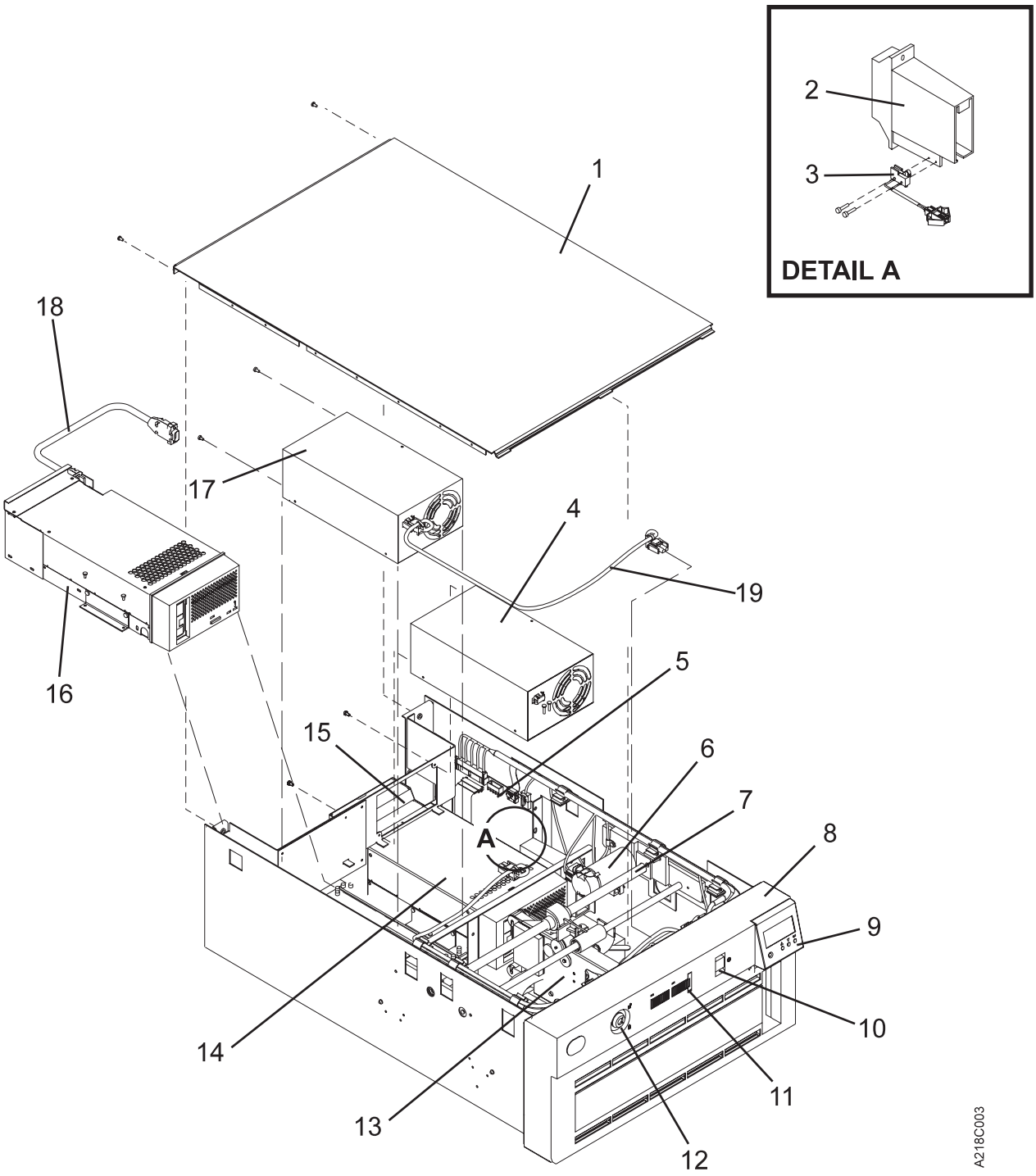
Asm–Index	Part Number	Units	Description
2–		NP	Desktop Drive Model C00
–1	34G7753	1	Cover, Top
–2	05H4558	1	Drive Pack
–3	34G7752	1	Front External Drive Bezel
–4	65F5410	1	Power On/Off Switch Assembly
–5	50G0322	1	Power Supply
–6		NP	Fan/SCSI Assembly
–7	05H4559	1	Drive Cooling Fan
–8	05H3062	1	Internal SCSI Cable

Assembly 3: Desktop Library Assembly, Model C01



Asm–Index	Part Number	Units	Description
3–		NP	Desktop Library Assembly, Model C01
–1	34G7791	1	Top Cover-Raven Black
–2		1	Cleaner Cartridge Storage
–2	05H2912	1	Cleaner Cartridge Retention Spring (not shown)
–3	65F5407	1	Micro Switch, Cleaner Cartridge-Present Sensor
–4		1	Cover, Top (no color)
–5	50G0322	1	Power Supply
–6	05H9386	1	Library Control Card
			Note: Remove the Bar Code Reader card from the old library control card and install it on the new card.
–6	05H9449	1	Bar Code Reader (kit contains reader and card)
–7	34G7550	1	Accessor Motor Assembly
–8	34G7539	1	Accessor Assembly
–9	05H4547	1	Front Assembly, Raven Black
			The following sensors are not shown but are listed for reference.
–9	45G0277	1	Magazine 1 Sensor
–9	45G0277	1	Magazine 2 Sensor
–9	45G0277	1	Priority Cell-Cartridge Present Sensor
–9		1	Library Door Open Sensor (replace front assembly)
–9	05H4595	1	Drive Global Sensor Pair
–9	05H4595	1	Magazine Global Sensor Pair
–10	62G0673	1	Library Operator Panel Display
–10	34G7801	1	Cover, Operator Panel - Raven Black
–11	65F5411	1	AC Switch and Cable Assembly
–12	09G8933	1	Library LED Card
–13		1	Key, Lock Assembly Not a FRU. Part of Front Assembly.
–14	34G7571	1	Picker Assembly
			Note: Remove the Bar Code Reader from the old picker assembly and install it on the new one.
–14	05H9449	1	Bar Code Reader (kit contains reader and card)
–14	65F5402	1	Picker Cable
			The following cables are not shown but are listed for reference.
–14	65F5398	1	Library Interface/RS-422 Cable
–14	65F5403	1	Library Operator Panel Display Cable
–14	05H4539	1	Library Sensor Cable
–15	34G7789	1	Bottom Cover-Raven Black
–16	05H4558	1	Drive Pack Assembly
–17		NP	Fan/SCSI Assembly Not a FRU. For detailed breakdown, see “Assembly 2: Desktop Drive Model C00” on page PARTS-6.
–18	34G7557	1	Acoustic Cover Assembly

Assembly 4: Rackmount Library Assembly, Model C12

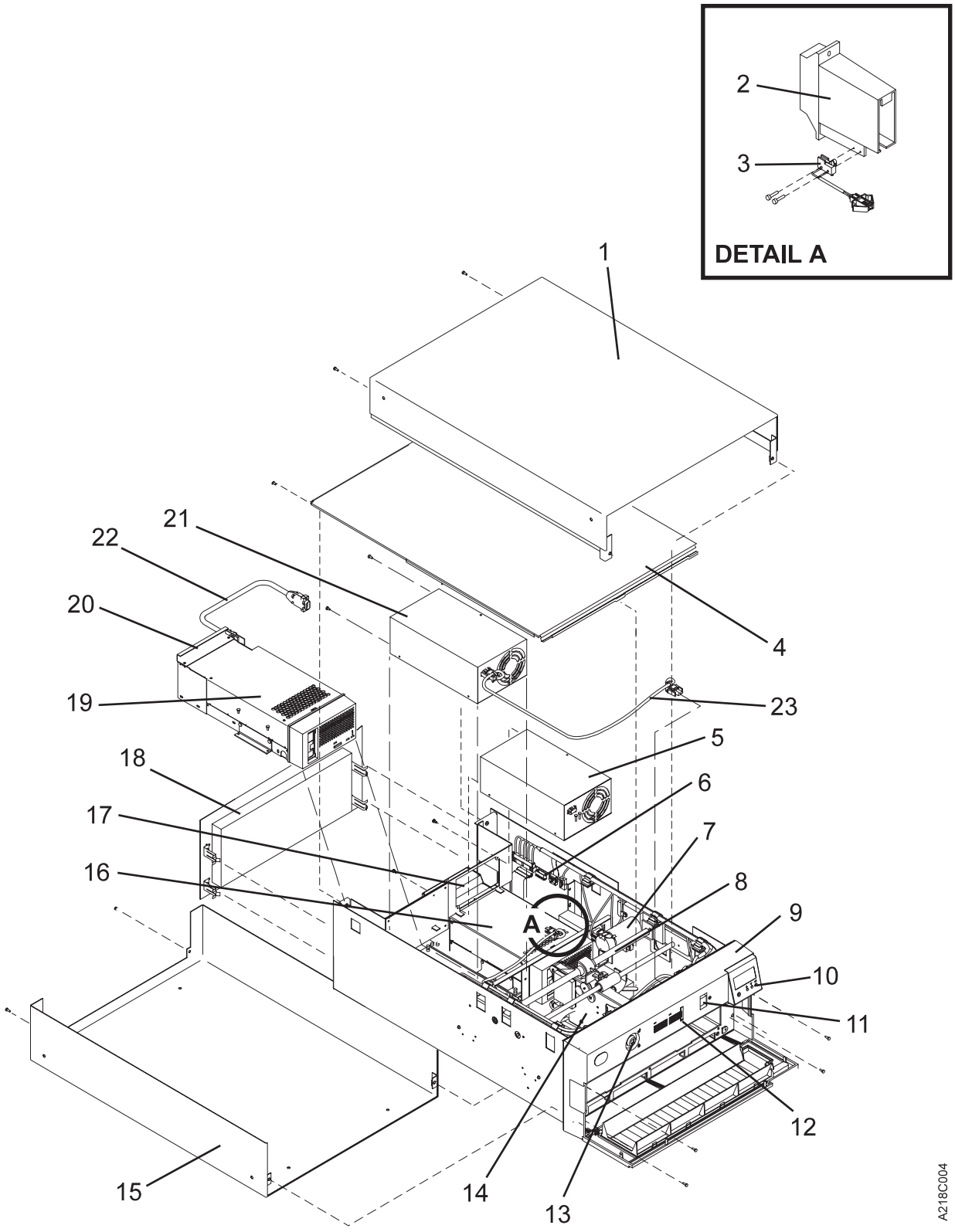


Asm–Index	Part Number	Units	Description
4–		NP	Rackmount Library Assembly, Model C12
–1		1	Cover, Top (no color)
–2		1	Cleaner Cartridge Storage
–2	05H2912	1	Cleaner Cartridge Retention Spring (not shown)
–3	65F5407	1	Micro Switch, Cleaner Cartridge-Present Sensor
–4	50G0322	1	Power Supply Power supply for Drive 1
–5	05H9386	1	Library Control Card **Note:** Remove the Bar Code Reader card from the old card and install it on the new card.
–5	05H9449	1	Bar Code Reader (kit contains reader and card)
–6	34G7550	1	Accessor Motor Assembly
–7	34G7539	1	Accessor Assembly
–8	05H4547	1	Front Assembly, Raven Black The following sensors are not shown but are listed for reference.
–8	45G0277	1	Magazine 1 Sensor
–8	45G0277	1	Magazine 2 Sensor
–8	45G0277	1	Priority Cell-Cartridge Present Sensor
–8		1	Library Door Open Sensor (replace front assembly)
–8	05H4595	1	Drive Global Sensor Pair
–8	05H4595	1	Magazine Global Sensor Pair
–9	62G0673	1	Library Operator Panel Display
–9	34G7801	1	Cover, Operator Panel, Raven Black
–10	65F5411	1	AC Switch and Cable Assembly
–11	09G8933	1	Library LED Card
–12		1	Key, Lock Assembly Not a FRU. Part of Front Assembly.
–13	34G7571	1	Picker Assembly **Note:** Remove the Bar Code Reader from the old picker assembly and install it on the new one.
–13	05H9449	1	Bar Code Reader (kit contains reader and card)
–13	65F5402	1	Picker Cable The following cables are not shown but are listed for reference.
–13	65F5403	1	Library Operator Panel Display Cable
–13	65F5398	1	Library Interface/RS-422 Cable (Drive 1)
–13	05H4539	1	Library Sensor Cable
–14	05H4558	1	Drive Pack Assembly (Drive 1)
–15		NP	Cooling Pack (Drive 1) Not a FRU. For detailed breakdown, see “Assembly 2: Desktop Drive Model C00” on page PARTS-6.
–16	05H4558	1	Drive Pack Assembly (Drive 2)
–17	50G0322	1	Power Supply Power supply for Drive 2
–18	65F5399	1	RS-422 Cable, DU0 to DU1. Shown attached to rear of Drive 2.

–18	65F5397	1	RS-422 Cable Internal to Drive. Drive 2 only and not shown.
–19	65F5406	1	AC Cable to power supply 2.

Note: See Figure 201 on page INST-14 for a detailed listing of the rack mounting hardware.

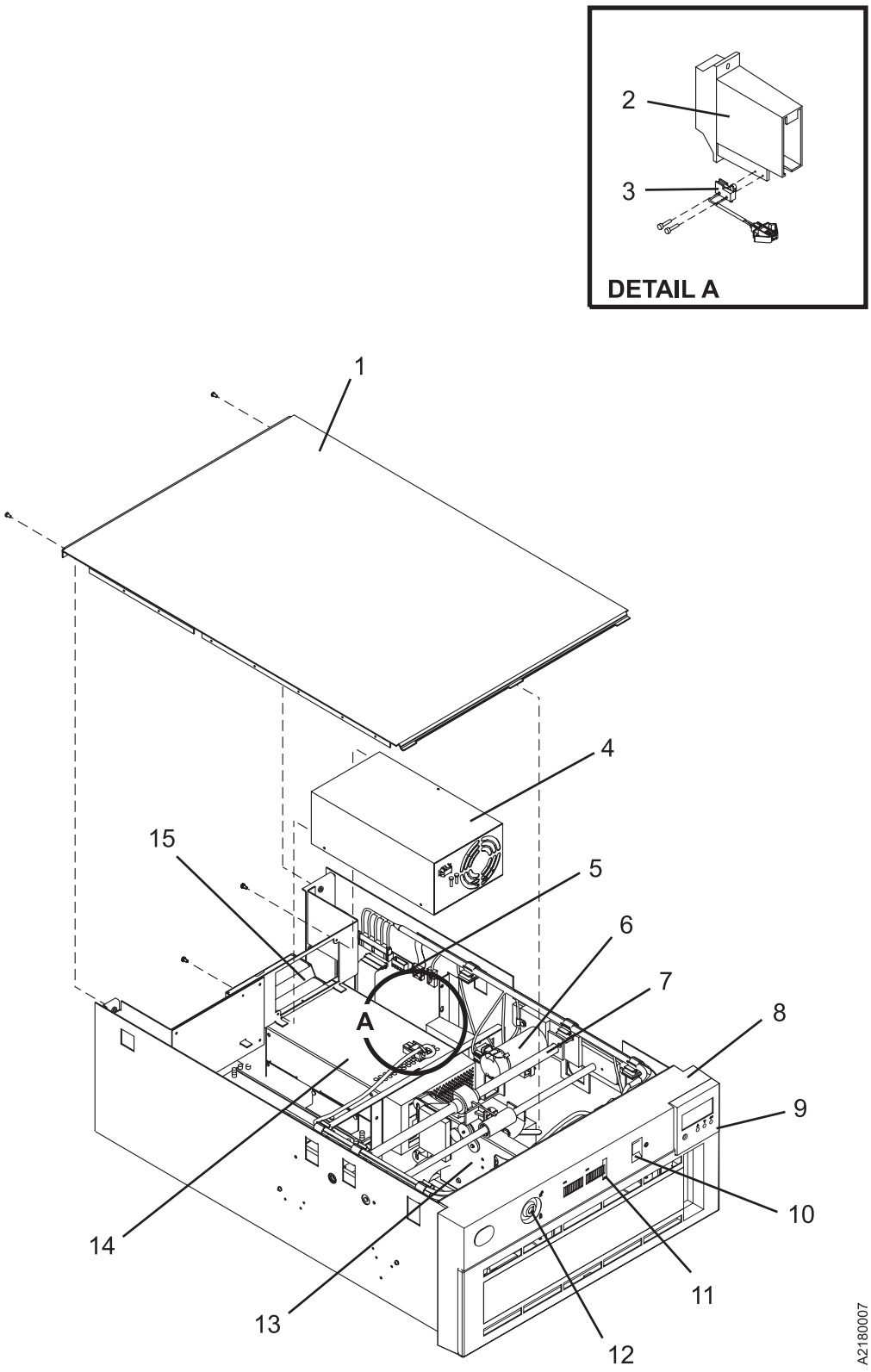
Assembly 5: Desktop Library Assembly, Model C02



Asm–Index	Part Number	Units	Description
5–		NP	Desktop Library Assembly, Model C02
–1	34G7791	1	Top Cover-Raven Black
–2		1	Cleaner Cartridge Storage
–2	05H2912	1	Cleaner Cartridge Retention Spring (not shown)
–3	65F5407	1	Micro Switch, Cleaner Cartridge-Present Sensor
–4		1	Cover, Top (no color)
–5	50G0322	1	Power Supply (Power Supply for Drive 1)
–6	05H9386	1	Library Control Card
			Note: Remove the bar code reader card from the old card and install it on the new card.
–6	05H9449	1	Bar Code Reader (kit contains reader and card)
–7	34G7550	1	Accessor Motor Assembly
–8	34G7539	1	Accessor Assembly
–9	05H4547	1	Front Assembly, Raven Black
			The following sensors are not shown but are listed for reference.
–9	45G0277	1	Magazine 1 Sensor
–9	45G0277	1	Magazine 2 Sensor
–9	45G0277	1	Priority Cell-Cartridge Present Sensor
–9		1	Library Door Open Sensor (replace front assembly)
–9	05H4595	1	Drive Global Sensor Pair
–9	05H4595	1	Magazine Global Sensor Pair
–10	62G0673	1	Library Operator Panel Display
–10	34G7801	1	Cover, Operator Panel - Raven Black
–11	65F5411	1	AC Switch and Cable Assembly
–12	09G8933	1	Library LED Card
–13		1	Key, Lock Assembly Not a FRU. Part of Front Assembly.
–14	34G7571	1	Picker Assembly
			Note: Remove the bar code reader from the old picker assembly and install it on the new one.
–14	05H9449	1	Bar Code Reader (kit contains reader and card)
–14	65F5402	1	Picker Cable
			The following cables are not shown but are listed for reference.
–14	65F5398	1	Library Interface/RS-422 Cable (Drive 1)
–14	65F5403	1	Library Operator Panel Display Cable
–14	05H4539	1	Library Sensor Cable
–15	34G7789	1	Bottom Cover-Raven Black
–16	05H4558	1	Drive Pack Assembly (Drive 1)
–17		NP	Fan/SCSI Assembly (Drive 1) Not a FRU. For detailed breakdown, see “Assembly 2: Desktop Drive Model C00” on page PARTS-6.
–18	34G7557	1	Acoustic Cover Assembly
–19	05H4558	1	Drive Pack Assembly (Drive 2)
–20		NP	Fan/SCSI Assembly (Drive 2) Not a FRU. For detailed breakdown, see “Assembly 2: Desktop Drive Model C00” on page PARTS-6.

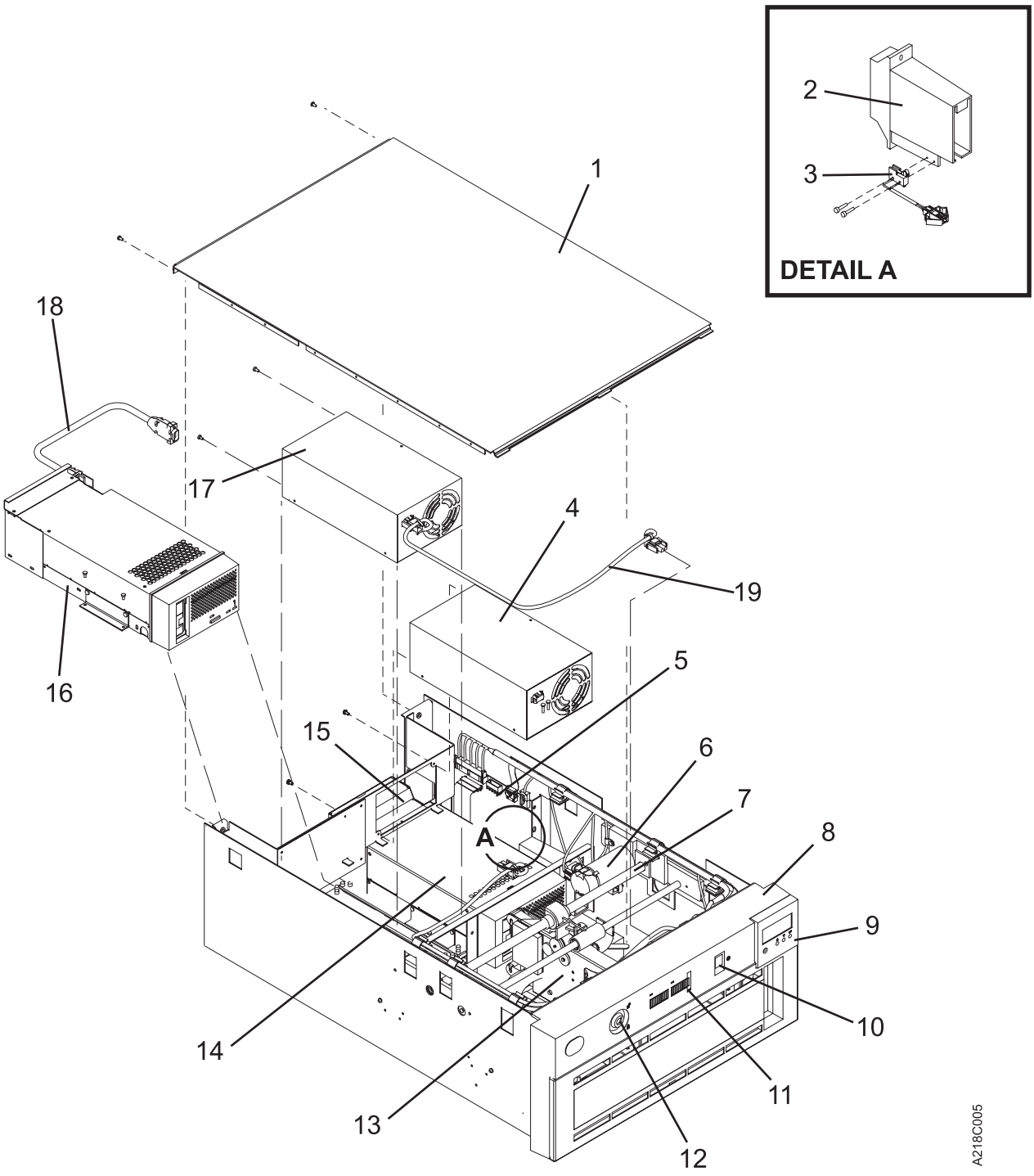
–21	50G0322	1	Power Supply (Power supply for Drive 2).
–22	65F5399	1	RS-422 Cable, DU0-DU1. Shown attached to rear of Drive 2
–22	65F5397	1	RS-422 Cable, Internal to Drive. Drive 2 only and not shown.
–23	65F5406	1	AC Cable to power supply 2.

Assembly 6: Rackmount Library Assembly, Model C21



Asm–Index	Part Number	Units	Description
6–		NP	Rackmount Library Assembly, Model C21
–1		1	Cover, Top (no color)
–2		1	Cleaner Cartridge Storage
–2	05H2912	1	Cleaner Cartridge Retention Spring (not shown)
–3	65F5407	1	Micro Switch, Cleaner Cartridge-Present Sensor
–4	50G0322	1	Power Supply
–5	05H9386	1	Library Control Card **Note:** Remove the bar code reader card from the old card and install it on the new card.
–5	05H9449	1	Bar Code Reader (kit contains reader & card)
–6	34G7550	1	Accessor Motor Assembly
–7	34G7539	1	Accessor Assembly
–8	08L6481	1	Front Assembly, Raven Black The following sensors are not shown but are listed for reference.
–8	45G0277	1	Magazine 1 Sensor
–8	45G0277	1	Magazine 2 Sensor
–8	45G0277	1	Priority Cell-Cartridge Present Sensor
–8		1	Library Door Open Sensor (replace front assembly)
–8	05H4595	1	Drive Global Sensor Pair
–8	05H4595	1	Magazine Global Sensor Pair
–9	62G0673	1	Library Operator Panel Display
–9	34G7801	1	Cover, Operator Panel, Raven Black
–10	65F5411	1	AC Switch and Cable Assembly
–11	09G8933	1	Library LED Card
–12		1	Key, Lock Assembly Not a FRU. Part of Front Assembly.
–13	34G7571	1	Picker Assembly **Note:** Remove the bar code reader from the old picker assembly and install it on the new one.
–13	05H9449	1	Bar Code Reader (kit contains card and reader)
–13	65F5402	1	Picker Cable The following cables are not shown but are listed for reference.
–13	65F5403	1	Library Operator Panel Display Cable
–13	65F5398	1	Library Interface/RS-422 Cable
–13	05H4539	1	Library Sensor Cable
–14	05H4558	1	Drive Pack Assembly
–15		NP	Cooling Pack Not a FRU. For detailed breakdown, see “Assembly 2: Desktop Drive Model C00” on page PARTS-6. **Note:** See Figure 201 on page INST-14 for a detailed listing of the rack mounting hardware.

Assembly 7: Rackmount Library Assembly, Model C22

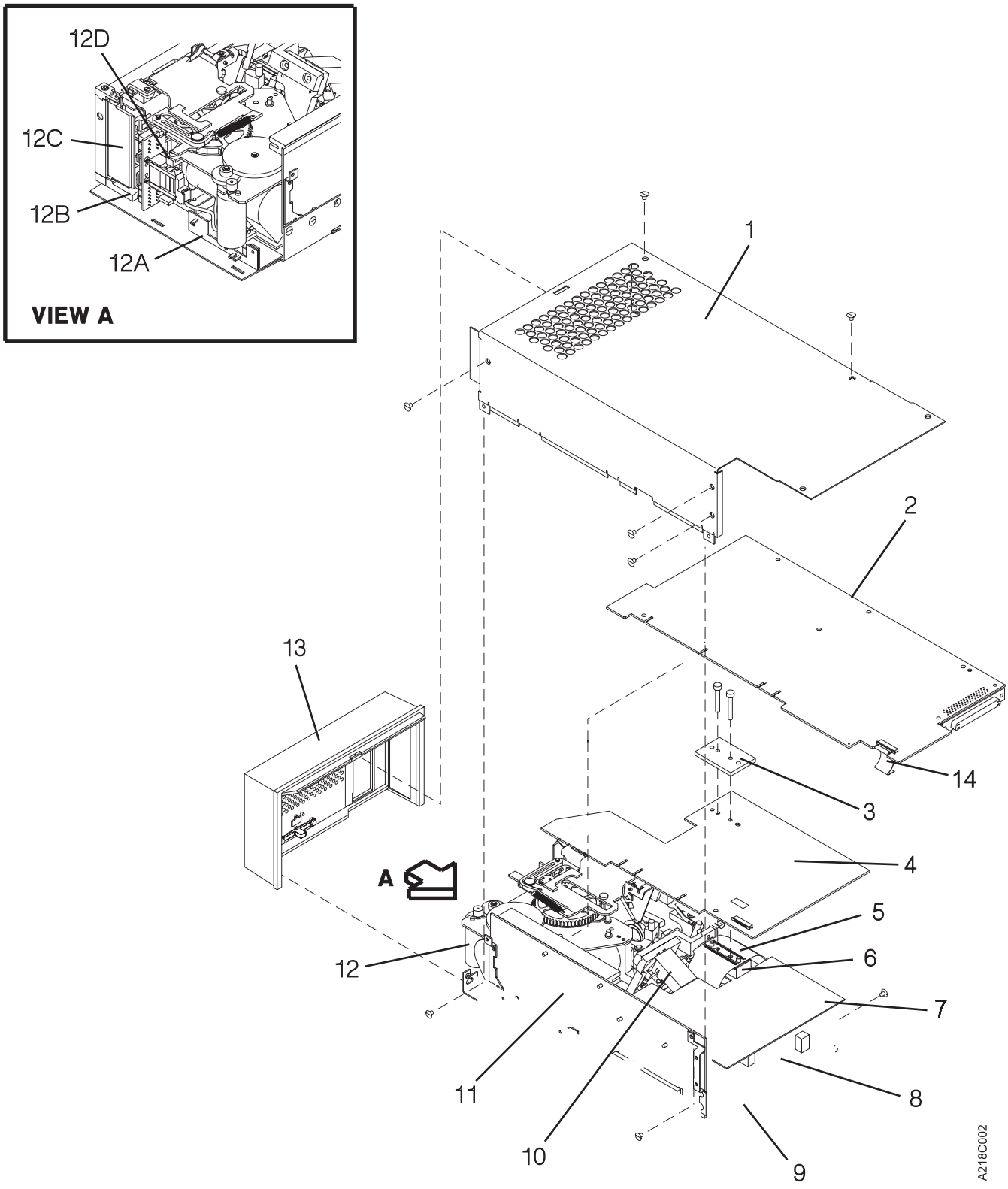


Asm–Index	Part Number	Units	Description
7–		NP	Rackmount Library Assembly, Model C22
–1		1	Cover, Top (no color)
–2		1	Cleaner Cartridge Storage
–2	05H2912	1	Cleaner Cartridge Retention Spring (not shown)
–3	65F5407	1	Micro Switch, Cleaner Cartridge-Present Sensor
–4	50G0322	1	Power Supply Power supply for Drive 1
–5	05H9386	1	Library Control Card **Note:** Remove the Bar Code Reader card from the old card and install it on the new card.
–5	05H9449	1	Bar Code Reader (kit contains reader and card)
–6	34G7550	1	Accessor Motor Assembly
–7	34G7539	1	Accessor Assembly
–8	08L6481	1	Front Assembly, Raven Black The following sensors are not shown but are listed for reference.
–8	45G0277	1	Magazine 1 Sensor
–8	45G0277	1	Magazine 2 Sensor
–8	45G0277	1	Priority Cell-Cartridge Present Sensor
–8		1	Library Door Open Sensor (replace front assembly)
–8	05H4595	1	Drive Global Sensor Pair
–8	05H4595	1	Magazine Global Sensor Pair
–9	62G0673	1	Library Operator Panel Display
–9	34G7801	1	Cover, Operator Panel, Raven Black
–10	65F5411	1	AC Switch and Cable Assembly
–11	09G8933	1	Library LED Card
–12		1	Key, Lock Assembly Not a FRU. Part of Front Assembly.
–13	34G7571	1	Picker Assembly **Note:** Remove the Bar Code Reader from the old picker assembly and install it on the new one.
–13	05H9449	1	Bar Code Reader (kit contains reader and card)
–13	65F5402	1	Picker Cable The following cables are not shown but are listed for reference.
–13	65F5403	1	Library Operator Panel Display Cable
–13	65F5398	1	Library Interface/RS-422 Cable (Drive 1)
–13	05H4539	1	Library Sensor Cable
–14	05H4558	1	Drive Pack Assembly (Drive 1)
–15		NP	Cooling Pack (Drive 1) Not a FRU. For detailed breakdown, see “Assembly 2: Desktop Drive Model C00” on page PARTS-6.
–16	05H4558	1	Drive Pack Assembly (Drive 2)
–17	50G0322	1	Power Supply Power supply for Drive 2
–18	65F5399	1	RS-422 Cable, DU0 to DU1. Shown attached to rear of Drive 2.

–18	65F5397	1	RS-422 Cable Internal to Drive. Drive 2 only and not shown.
–19	65F5406	1	AC Cable to power supply 2.

Note: See Figure 201 on page INST-14 for a detailed listing of the rack mounting hardware.

Assembly 8: Base Drive All Models



Asm–Index	Part Number	Units	Description
8–		NP	Base Drive All Models
–1		1	Cover, Drive Top
–2	08L6371	1	Drive Logic Card
–3		1	Retainer
–4	05H4022	1	Drive Analog Card
–5		1	Thin Film Head Cable
–6		1	Cable Mounting Block
–7		1	Shield
–8	08L6273	1	Drive Servo Card
–9		1	Bottom Plate
–10	05H4562	1	Head-Actuator AssemblyW/Brush
–11	49G6515	1	Mother Board
–12	34G7611	1	Loader Assembly
–12A	34G7690	1	Drive LED Card
–12B	45G0277	1	Door Open Sensor (late machines)
–12C	34G7705	1	Loader Door
–12D	45G0277	1	Loader Home Sensor
–12	65F5400	1	Cable, Drive Sensor (not shown)
–13	05H4560	1	Front Internal Drive Bezel
–14	08L6335	1	Cable, Logic Card to Drive Analog Card

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Glossary

This glossary defines the special terms, abbreviations, and acronyms that are used in this publication. If you do not find the term you are looking for, refer to the index or to the *Dictionary of Computing,* New York: McGraw-Hill, 1994.

A

ac. Alternating current.

access method. A technique for moving data between main storage and input or output devices.

ACF. Automatic cartridge facility.

adj. Adjustment.

AEN. Asynchronous event notification.

AIX. Advanced Interactive Executive. IBM's implementation of the UNIX operating system. The RS/6000 system, among others, runs the AIX operating system.

alter. To change.

ANSI. American National Standards Institute.

ASCII. American National Standard Code for Information Interchange. A 7-bit coded character set (8 bits including parity check) that consists of control characters and graphic characters.

assigning a device. The establishing of the relationship of a device to a running task, process, job, or program.

assignment. The naming of a specific device to perform a function.

assistance. Aid.

asynchronous. Pertaining to two or more processes that do not depend upon the occurrence of specific events such as common timing signals.

attention (notice). A word for calling attention to the possibility of danger to a program, device, or system, or to data. Contrast with *caution* and *danger*.

ATTN. Attention.

B

backhitch. Magnetic tape that makes a slight backward motion just prior to moving forward.

backup. To make additional copies of documents or software for safekeeping.

BCR. Buffer channel remainder register.

BCSE. Buffer channel status/error register.

BDSE. Buffer device status/error register.

beginning-of-tape (BOT). The location on a magnetic tape that indicates the start of the permissible recording area.

bezel. Decorative and safety cover.

bi-colored. Having two colors.

BM or bill of materials. A list of specific types and amounts of direct materials expected to be used to produce a given job or quantity of output.

BOB. Beginning-of-block.

BOT. Beginning-of-tape.

buffer. A routine or storage used to compensate for a difference in rate of flow of data or time of occurrence of events, when transferring data from one device to another.

bus. A facility for transferring data between several devices located between two end points, only one device being able to transmit at a given moment.

C

caution (notice). A word to call attention to possible personal harm to people. Contrast with *attention* and *danger*.

CCW. Channel command word.

CCW chain. A list of channel command words to be performed in sequence.

CE. Customer engineer; field engineer; service representative.

CEM. customer engineering memorandum.

CER. Channel error register.

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channel command. An instruction that directs a data channel, control unit, or device to perform an operation or set of operations.

char. Character.

CHK. Check.

cm. Centimeter.

command. A control signal that initiates an action or the start of a sequence of actions.

concurrent. Refers to diagnostic procedures that can be run on one control unit while the rest of the subsystem remains available for customer applications.

contingent connection. A connection between a channel path and a drive caused when a unit check occurs during an I/O operation.

controller. A device that provides the interface between a system and one or more tape drives.

CP. Circuit protector.

CRC. Cyclic redundancy check.

CRR. Channel request register.

ctrl. Control.

CU. Control unit.

D

danger (notice). A word to call attention to possible lethal harm to people. Contrast with *attention* and *caution*.

data. Any representations such as characters or analog quantities to which meaning is or might be assigned.

data buffer. The storage buffer in the control unit. This buffer is used to increase the data transfer rate between the control unit and the channel.

data check. A synchronous or asynchronous indication of a condition caused by invalid data or incorrect positioning of data.

dc. Direct current.

degradation. A decrease in quality of output or throughput or an increase in machine error rate.

degraded. Decreased in quality of output or throughput or increased machine error rate.

deserialize. To change from serial-by-bit to parallel-by-byte.

detented. A part being held in position with a catch or lever.

DEV. Device.

DIAG. Diagnostic section of maintenance information manual.

direct access storage. A storage device in which the access time is independent of the location of the data.

DRAM. Dynamic random-access memory.

drive, magnetic tape. A mechanism for moving magnetic tape and controlling its movement.

DRV. Drive.

E

EBCDIC. Extended binary-coded decimal interchange code.

EC. Edge connector. Engineering change.

ECC. Error correction code.

EEPROM. Electrically erasable programmable read-only memory.

EIA. Electronics Industries Association.

EIA unit. A unit of measure, established by the Electronic Industries Association, equal to 44.45 millimeters (1.75 inches).

end-of-block (EOB). A code that marks the end of a block of data.

end-of-file (EOF). A code that marks the end of a file of data.

end-of-tape (EOT). The end of the recording area on a tape.

EOB. End-of-block.

EOF. End-of-file.

EOT. End-of-tape.

EPO. Emergency power off.

EPROM. Erasable programmable read only memory.

EQC. Equipment check.

equipment check. An asynchronous indication of a malfunction.

EREP. Environmental recording, editing, and printing.

Error log. A dataset or file in a product or system where error information is stored for later access.

ESD. Electrostatic discharge.

F

fault symptom code (FSC). A hexadecimal code generated by the drive or the control unit microcode in response to a detected subsystem error.

FC. Feature code.

FCC. Federal communications commission.

FE. Field engineer, customer engineer, or service representative.

FID. FRU identifier (may be more than one FRU). For additional information, see “FID Entry Point” on page START-12.

field replaceable unit (FRU). An assembly that is replaced in its entirety when any one of its components fails.

FID entry point. A place in the START section that lists all the FID numbers and suggested directions to the service representative to accomplish a repair.

file. A named set of records stored or processed as a unit. Also referred to as a dataset.

file protection. The processes and procedures established in an information system that are designed to inhibit unauthorized access to, contamination of, or deletion of a file.

FLASH EEPROM. An electrically erasable programmable read-only memory (EEPROM) that can be updated.

FMR. Field microcode replacement.

format. The arrangement or layout of data on a data medium.

formatter. Part of a magnetic tape subsystem that performs data conversion, speed matching, encoding, first level error recovery, and interfaces to one or more tape drives.

FP. File protect.

frayed. Damaged as if by an abrasive substance.

FRU. Field replaceable unit.

FSC. Fault symptom code.

FSI. Fault symptom index.

functional microcode. Microcode that is resident in the machine during normal customer operation.

G

g. Gram.

gnd. Ground.

H

hertz (Hz). Unit of frequency. One hertz equals one cycle per second.

hex. Hexadecimal.

Hz. Hertz (cycles per second).

I

ID. Identifier.

identifier (ID). (1) In programming languages, a lexical unit that names a language object; for example, the names of variables, arrays, records, labels, or procedures. An identifier usually consists of a letter optionally followed by letters, digits, or other characters. (2) One or more characters used to identify or name data element and possibly to indicate certain properties of that data element. (3) A sequence of bits or characters that identifies a program, device, or system to another program, device, or system.

IDRC. Improved Data Recording Capability.

IML. Initial microprogram load.

Improved Data Recording Format. An improved data recording mode that can increase the effective data capacity and the effective data rate when enabled and invoked.

initial microprogram load (IML). The action of loading a microprogram from an external storage to writable control storage.

initiator. The component that executes a command. The initiator can be the host system or the tape control unit.

INST. Installation.

interblock gap (IBG). An area on a data medium to indicate the end of a block or physical record.

interface. A shared boundary. An interface might be a hardware component to link two devices or it might be a portion of storage or registers accessed by two or more computer programs.

interposer. The part used to convert a 68-pin connector to a 50-pin D-shell connector.

intervention required. Manual action is needed.

INTRO. Introduction.

I/O. Input/output.

IOP. Input/output processor.

IPL. Initial program load.

IPS. Independent Position Sensor.

IOCDS. I/O configuration data set.

IOCP. I/O Configuration Program.

ITST. Idle-time self-test.

K

km. kilometer.

L

LAN. Local area network. A computer network within a limited area.

LED. Light-emitting diode.

loadable. Having the ability to be loaded.

LUN. Logical unit.

LZ-1. Lempel-Ziv electronic data compactor.

M

Magazine. A container of 10 cartridges that is loaded into the Library.

magnetic tape. A tape with a magnetical surface layer on which data can be stored by magnetic recording.

MAP. Maintenance analysis procedure.

mask. A pattern of characters that controls the retention or elimination of portions of another pattern of characters. To use a pattern of characters to control the retention or elimination of portions of another pattern of characters.

master file. A file used as an authority in a given job and that is relatively permanent, even though its contents may change. Synonymous with main file.

media capacity. The amount of data that can be contained on a storage medium, expressed in bytes of data.

micro. One millionth of.

microcode. (1) One or more micro instructions. (2) A code, representing the instructions of an instruction set, implemented in a part of storage that is not program-addressable. (3) To design, write, and test one or more micro instructions. (4) See also *microprogram*.

microdiagnostic routine. A program that runs under the control of a supervisor, usually to identify field replaceable units.

microdiagnostic utility. A program that is run by the customer engineer to test the machine.

microinstruction. A basic or elementary machine instruction.

microprogram. A group of microinstructions that when executed performs a preplanned function.

The term microprogram represents a dynamic arrangement or selection of one or more groups of microinstructions for execution to perform a particular function. The term microcode represents microinstructions used in a product as an alternative to hard-wired circuitry to implement certain functions of a processor or other system component.

Migration. Going from one tape subsystem to a different tape subsystem.

MIM. Media information message.

mm. Millimeter.

modifier. That which changes the meaning.

mount a device. To assign an I/O device with a request to the operator.

MP. Microprocessor.

ms. Millisecond.

MSG. Message.

multipath. Pertaining to using more than one path.

N

N/A. Not applicable.

node. In a network, a point at which one or more functional units connect channels or data circuits.

NVS. Nonvolatile storage. A storage device whose contents are not lost when power is cut off.

O

OEM. Original equipment manufacturer.

offline. Pertaining to the operation of a functional unit without the continual control of a computer. Contrast with *online*.

online. Pertaining to the operation of a functional unit that is under the continual control of a computer. Contrast with *offline*.

OPER. Operation.

ov. Over voltage.

overrun. Loss of data because a receiving device is unable to accept data at the rate it is transmitted.

overtightening. To tighten too much.

P

parameter. A variable that is given a constant value for a specified application and that may denote the application.

PCC. Power control compartment.

PE. Product engineer.

PGID. Path group identification.

PM. Preventive maintenance.

POR. Power-on reset.

port. A physical connection for communication between the 3570 and the host processor. The 3570 has one SCSI port.

POST. Power-on self-test.

Power-on self-test (POST). A series of diagnostic tests that are run automatically by a device when the power is turned on.

PROM. Programmable read only memory.

PS. Power supply.

PTF. Program temporary fix.

PWR. Power.

R

RACL. Random access cartridge loader.

RAM. Random access memory.

Random access memory. A storage device into which data is entered and from which data is retrieved in a non-sequential manner.

RAS. Reliability, availability, and serviceability.

record. A collection of related data or words, treated as a unit.

recording density. The number of bits in a single linear track measured per unit of length of the recording medium.

recoverable error. An error condition that allows continued execution of a program.

ref. Reference.

reg. Register.

reinventory. To inventory again.

retension. The process or function of tightening the tape onto the cartridge or cassette if it is sensed that the tape has a loose wrap on the cartridge or cassette.

RPQ. Request for price quotation.

R/W. Read/write.

S

s. Seconds of time.

SCSI. Small computer system interface.

segment. A part.

sel. Select.

serialize. To change from parallel-by-byte to serial-by-bit.

serializer. A device that converts a space distribution of simultaneous states representing data into a corresponding time sequence of states.

SIM. Service information message.

small computer system interface (SCSI). An input and output bus that provides a standard interface between the host system and the 3570.

SNS. Sense.

special feature. A feature that can be ordered to enhance the capability, storage capacity, or performance of a product, but is not essential for its basic work.

SR. Service representative, see also *CE*.

SRAM. Static random access memory.

SS. Status store.

ST. Store.

standard feature. The significant design elements of a product that are included as part of the fundamental product.

START. Start maintenance.

Stoplock. A position-hold mode used when the tape is in a stopped position and under tension.

subsystem. A secondary or subordinate system, usually capable of operating independently of, or asynchronously with, a controlling system.

SUPP. Support.

sync. Synchronous, synchronize. Occurring with a regular or predictable time relationship.

T

TAC. Technical area code.

tachometer, tach. A device that emits pulses that are used to measure/check speed or distance.

tape cartridge. A container holding magnetic tape that can be processed without separating it from the container.

tape cassette. A container holding magnetic tape that can be processed without separating it from the container.

tape void. An area in the tape in which no signal can be detected.

TCU. Tape control unit.

TH. Thermal.

thread/load operation. A procedure that places tape along the tape path.

TM. Tapemark.

U

UART. Universal asynchronous receiver/transmitter.

unload. Prepare the tape cartridge or cassette for removal from the drive.

utilities. Utility programs.

utility programs. A computer program in general support of the processes of a computer; for instance, a diagnostic program.

uv. Under voltage.

V

VOLSER. Volume serial number.

volume. A certain portion of data, together with its data carrier, that can be handled conveniently as a unit.

VPD. Vital product data. The information contained within the tape drive that requires nonvolatile storage used by functional areas of the drive, and information required for manufacturing, RAS, and engineering.

W

word. A character string that is convenient for some purpose to consider as an entity.

Write. Write command.

WT. world trade.

X

XR. External register.

XRA. External register address register.

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FROZ	A21M1PRC	PROC-91 No Response from Operator/CE Panel and No Message
LOCCAR1	A21M1CRC	CARR-1 Checks, Adjustments, Removals, and Replacements
RACLC	A21M1CRC	CARR-3 Library Chassis Covers MAPS-5, MAPS-6, MAPS-6, MAPS-7, MAPS-7, MAPS-9, MAPS-10, MAPS-10, MAPS-11, MAPS-11, MAPS-13, MAPS-15, MAPS-15, MAPS-20, MAPS-20, MAPS-22, MAPS-22, MAPS-23, MAPS-23, MAPS-24, MAPS-24, MAPS-24, PROC-18, CARR-7, CARR-11, CARR-11, CARR-12, CARR-14, CARR-16, CARR-34, CARR-34, CARR-35, APPENDC-7
REMLCC	A21M1CRC	CARR-3 Removal of Library Chassis Covers

CARR-18, CARR-18

NRACLC A21M1CRC

CARR-5 Decorative Cover—Drive-Only Models
MAPS-9, MAPS-10, MAPS-11, MAPS-11, MAPS-13, MAPS-17, MAPS-20, MAPS-21, MAPS-21, MAPS-22, MAPS-22, MAPS-24, PROC-18, CARR-10, CARR-11, CARR-11, CARR-12, CARR-14, CARR-16

FIDB3 A21M1CRC

CARR-7 Removal and Replacement Procedures—Drive Pack
START-12, START-20, MAPS-25, MAPS-25, PROC-79, PROC-80, PROC-80, PROC-81, PROC-90, PROC-90

DRIVP A21M1CRC

CARR-7 FID B3—Drive Pack, Library Models
START-13, START-14, START-14, START-16, START-18, START-18, START-18, START-19, START-19, START-19, START-19, START-19, START-20, START-20, START-20, START-20, START-20, START-20, START-20, START-20, START-21, START-21, START-21, START-21, START-21, START-21, START-21, START-21, START-21, START-22, START-22, START-22, START-22, START-23, START-24, START-24, START-24, START-25, START-26, START-26, MAPS-5, MAPS-7, MAPS-7, MAPS-10, MAPS-10, MAPS-11, MAPS-11, MAPS-14, MAPS-14, MAPS-15, MAPS-16, MAPS-17, MAPS-20, MAPS-21, MAPS-21, MAPS-22, MAPS-23, MAPS-23, MAPS-24, MAPS-25, MAPS-25, CARR-11, CARR-11, CARR-12, CARR-13, CARR-14, CARR-17

NDRIVP A21M1CRC

CARR-10 FID B3—Drive Pack, Drive-Only Models
START-18, START-18, START-18, START-19, START-19, START-19, START-19, START-19, START-20, START-20, START-20, START-20, START-20, START-20, START-20, START-20, START-21, START-21, START-21, START-21, START-21, START-21, START-21, START-21, START-21, START-22, START-22, START-22, START-22, START-23, START-24, START-24, START-24, MAPS-9, MAPS-11, MAPS-11, MAPS-14, MAPS-14, MAPS-20, MAPS-21, MAPS-22, MAPS-22, MAPS-25, MAPS-25, CARR-5, CARR-11, CARR-11, CARR-12, CARR-13, CARR-14, CARR-17

DRIVB A21M1CRC

CARR-11 Drive Assembly Front Cover
PROC-18, PROC-18, CARR-11, CARR-12, CARR-14, CARR-14

DRIVC A21M1CRC

CARR-11 Drive Assembly Top Cover
MAPS-5, MAPS-6, MAPS-10, MAPS-10, MAPS-15, MAPS-17, MAPS-24, MAPS-24, MAPS-24, MAPS-24, CARR-12, CARR-14, CARR-14, APPENDC-7

FIDB2A A21M1CRC

CARR-12 Removal and Replacement Procedure—Cooling Pack

FIDB2 A21M1CRC

CARR-12 FID B2: Cooling Pack
MAPS-5, MAPS-6, MAPS-10, MAPS-10, MAPS-15, MAPS-17, MAPS-24, MAPS-24, MAPS-24, MAPS-24, CARR-12, CARR-13, CARR-14, CARR-14, CARR-17, APPENDC-7

FIDBE A21M1CRC

CARR-12 FID BE: Drive Cooling Fan
START-19, MAPS-16, MAPS-16, MAPS-16, MAPS-16, MAPS-17, MAPS-25

DRVFRUS A21M1CRC

CARR-14 Removal and Replacement Procedures—Base Drive Components

FIDC1 A21M1CRC

CARR-16 FID C1: Power Supply
START-14, START-19, START-21, START-21, START-21, START-21, START-28, MAPS-5, MAPS-6, MAPS-7, MAPS-10, MAPS-10, MAPS-14, MAPS-14, MAPS-14, MAPS-14, MAPS-14, MAPS-14, MAPS-14, MAPS-15, MAPS-15, MAPS-16, MAPS-16, MAPS-16, MAPS-16, MAPS-16, MAPS-17, MAPS-17, MAPS-24, MAPS-25, APPENDC-14

FIDCB A21M1CRC

CARR-17 FID CB: Internal SCSI Cable
START-23

FIDDE A21M1CRC

CARR-18 FID DE: RS-422 Cable—Internal to Drive

START-22

RS422E A21M1CRC

CARR-18 RS-422 Cable, Drive to Drive
START-22

FID90 A21M1CRC

CARR-19 FID 90: Library Operator Panel Display
START-13, MAPS-4, MAPS-4, MAPS-4, MAPS-6, INST-25

FID91 A21M1CRC

CARR-19 FID 91: Library Operator Panel Display Cable
START-13

FID92 A21M1CRC

CARR-20 FID 92: Accessor Assembly
START-13, START-28

FID94 A21M1CRC

CARR-20 FID 94: Bar Code Reader
START-13, CARR-23

FID95 A21M1CRC

CARR-21 FID 95: Accessor Motor Assembly
START-13, START-28, CARR-20

FID97 A21M1CRC

CARR-22 FID 97: Library Control Card
START-13, START-13, START-13, START-14, START-14, START-14, START-15, START-15, START-15, START-15, START-16, START-16, START-16, START-16, START-17, START-17, START-18, START-18, START-25, START-26, START-26, START-26, START-27, START-27, START-27, START-28, START-28, START-28, START-29, START-29, START-29, START-29, START-29, START-29, START-30, MAPS-4, MAPS-4, MAPS-4, MAPS-5, MAPS-6, MAPS-7, MAPS-7, MAPS-7, MAPS-10, MAPS-14, MAPS-15, MAPS-20, MAPS-20, MAPS-22, MAPS-22, MAPS-23, MAPS-24, MAPS-24

FID99 A21M1CRC

CARR-23 FID 99: Picker Cable
START-13, START-14, START-15, START-16, START-17, START-17, START-18, START-25, START-26, START-28

FID9A A21M1CRC

CARR-23 FID 9A: Picker Assembly
START-13, START-14, START-14, START-15, START-16, START-17, START-17, START-18, START-18, START-25, START-26, START-26, START-27, START-27, START-28, START-28, START-29, START-29, START-29, START-29, START-29, START-30, PROC-24, CARR-20, CARR-20

FID9B A21M1CRC

CARR-25 FID 9B: Drive Global Sensor Pair
START-14, START-14, START-15, START-18, START-25, START-26, START-26

FID9C A21M1CRC

CARR-26 FID 9C: Magazine Global Sensor Pair
START-14, START-14, START-15, START-17, START-17, START-18, START-25, START-26, START-26

FID9D A21M1CRC

CARR-27 FID 9D: Library Front Cover Assembly
CARR-33, CARR-34, CARR-34, CARR-35

NEWNEWR A21M1CRC

CARR-27 Removal of Library Front Cover Assembly (Newer Style)
CARR-27, CARR-27

OLDSTYL A21M1CRC

CARR-30 Removal of Library Front Cover Assembly (Old Style)
CARR-27

FID9E A21M1CRC

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TAPEUT	A21M1MGC		
		MSG-4	(no text)
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		MSG-19	(no text)
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ERRPT	A21M1MGC		
		MSG-19	(no text)
			MSG-4

Processing Options

Runtime values:

Document fileid	A21M1CTC SCRIPT
Document type	USERDOC
Document style	IBMXAGD
Profile	EDFPRF40
Service Level	0030
SCRIPT/VS Release	4.0.0
Date	98.10.27
Time	11:26:55
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Number of Passes	4
Index	YES
SYSVAR D	YES
SYSVAR R	A21M1CTC
SYSVAR W	A21M1CTC
SYSVAR X	YES

Formatting values used:

Annotation	NO
Cross reference listing	YES
Cross reference head prefix only	NO
Dialog	LABEL
Duplex	YES
DVCF conditions file	(none)
DVCF value 1	(none)
DVCF value 2	(none)
DVCF value 3	(none)
DVCF value 4	(none)
DVCF value 5	(none)
DVCF value 6	(none)
DVCF value 7	(none)
DVCF value 8	(none)
DVCF value 9	(none)
Explode	NO
Figure list on new page	YES
Figure/table number separation	NO
Folio-by-chapter	NO
Head 0 body text	(none)
Head 1 body text	(none)
Head 1 appendix text	Appendix
Hyphenation	NO
Justification	NO
Language	ENGL
Keyboard	395
Layout	OFF
Leader dots	YES
Master index	(none)
Partial TOC (maximum level)	4
Partial TOC (new page after)	INLINE
Print example id's	NO
Print cross reference page numbers	YES
Process value	(none)
Punctuation move characters	.,
Read cross-reference file	A21M1CTC
Running heading/footing rule	NONE
Show index entries	NO
Table of Contents (maximum level)	2
Table list on new page	YES
Title page (draft) alignment	NO
Write cross-reference file	A21M1CTC

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