XD88/01/05/20/30/35 MASS STORAGE F-KIT INSTALLATION

WARNING

The following installation instructions are for use by qualified personnel only. To avoid personal injury, do no' perform any servicing unless you are qualified to do so.

About This Manual

This manual contains the instruction procedures required to install one of the mass storage F-kits, F14, FMS, or FRT, into an XD88/01, 05, 20, 30, or 35. The headings for the procedures are listed here in the order in which they must be performed.

1. Backing Up the System
2. Removing the Compute Module Front Cover
3. Removing the Power Switch and EMI Shield
4. Removing the Mass Storage Subassembly
5. Installing the F-kits

When strapping any of the devices, refer to the heading "Device Strapping and Addressing" at the end of this manual.

Please read through the instructions in this manual and become familiar with the procedures before you begin. Unless a specific re-assembly procedure is given, re-assemble the workstation by reversing the disassembly procedure.

Related Documentation

The following manuals contain additional information related to these installation instructions:

• *XD88 Field Service Manual*
• *XD88 Series System Administrator's Guide*
• *XD88F42 Compute Module Expansion Upgrade Instructions*

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About the F-kits

The F-kits described here are the mass storage F-kits for the XD88 Workstations. The part numbers for the individual components of the kits are listed in the appropriate installation instructions later in this manual. Options available for all the F-kits are:

S0   Onsite product installation

49   Lease Option

Options unique to an F-kit are listed with the F-kit description.

XD88F14

This F-kit contains a 1.2-Mbyte flexible disk drive, flexible disk drive controller board, cabling and hardware. The installation instructions for this kit explain how to add a flexible disk drive to a workstation that did not previously have one.

XD88FMS

This F-kit contains a 300-Mbyte, 600-Mbyte, or 1-Gbyte hard disk, depending on the option chosen, and all the cabling and hardware required for any installation. The disk drive in this kit can be installed in place of the current hard disk, or in a diskless system to upgrade it to a stand-alone system. The installation instructions for this kit cover both cases.

XD88FMS options are:

01   300-Mbyte hard disk drive

02   600-Mbyte hard disk drive

03   1-Gbyte hard disk drive

XD88FRT

This F-kit contains a $1/4$" streaming tape drive with integral controller, cabling and mounting hardware. This installation instruction explains how to add a $1/4$" streaming tape drive to a workstation that did not previously have one.

NOTE
The FMS and FRT kits are set up for use with the entire XD88 family of workstations. This means that some of the cables and hardware packed in the kit will not be used when you install the kit in your workstation. You can discard any cables and hardware left over after the installation is complete.

Electrostatic Protection of Microcircuits

CAUTION

This product contains components that are highly sensitive to electrostatic discharge. To prevent damage to such components and to maintain product reliability, DO NOT touch or remove the circuit boards or components from the compute modules until you provide the proper electrostatic protection.

Safe Handling of Static-Sensitive Components

Handle all static-sensitive components and boards containing static-sensitive components (such as hard disk drives, floppy disk drives, or controller boards) in a static-safeguarded environment capable of controlling static charge on conductive materials, people, and non-conductive materials. Static-protected areas include non-static table tops, non-static floor mats, and grounding wrist straps for persons working with static-sensitive parts, boards, or equipment.

Transportation of Static-Sensitive Components

Transport all static-sensitive components and boards in static-shielded containers or packages. To be "static shielded," a container must protect its contents from static discharge and electrostatic fields.

Tool Requirements

The following tools are required:

- Tools common to a service repair kit
- #15 TORX™ screwdriver tip
- #10 TORX™ screwdriver tip

Backing Up the System

Before you turn off the XD88 workstation to install the F-kit, backup the workstation with a level 0 dump of the current file system. Refer to "File System Administration Procedures" in the *XD88 Series System Administrator's Guide*.

Removing the Front Cover

Use the following procedure to remove the compute module front cover. Reinstall the cover by reversing this procedure.

1. Shutdown the workstation. For the proper shutdown procedure, see "Processor Operations Procedures" in the *XD88 Series System Administrator's Guide* and any current product Release Notes or Manual Updates.

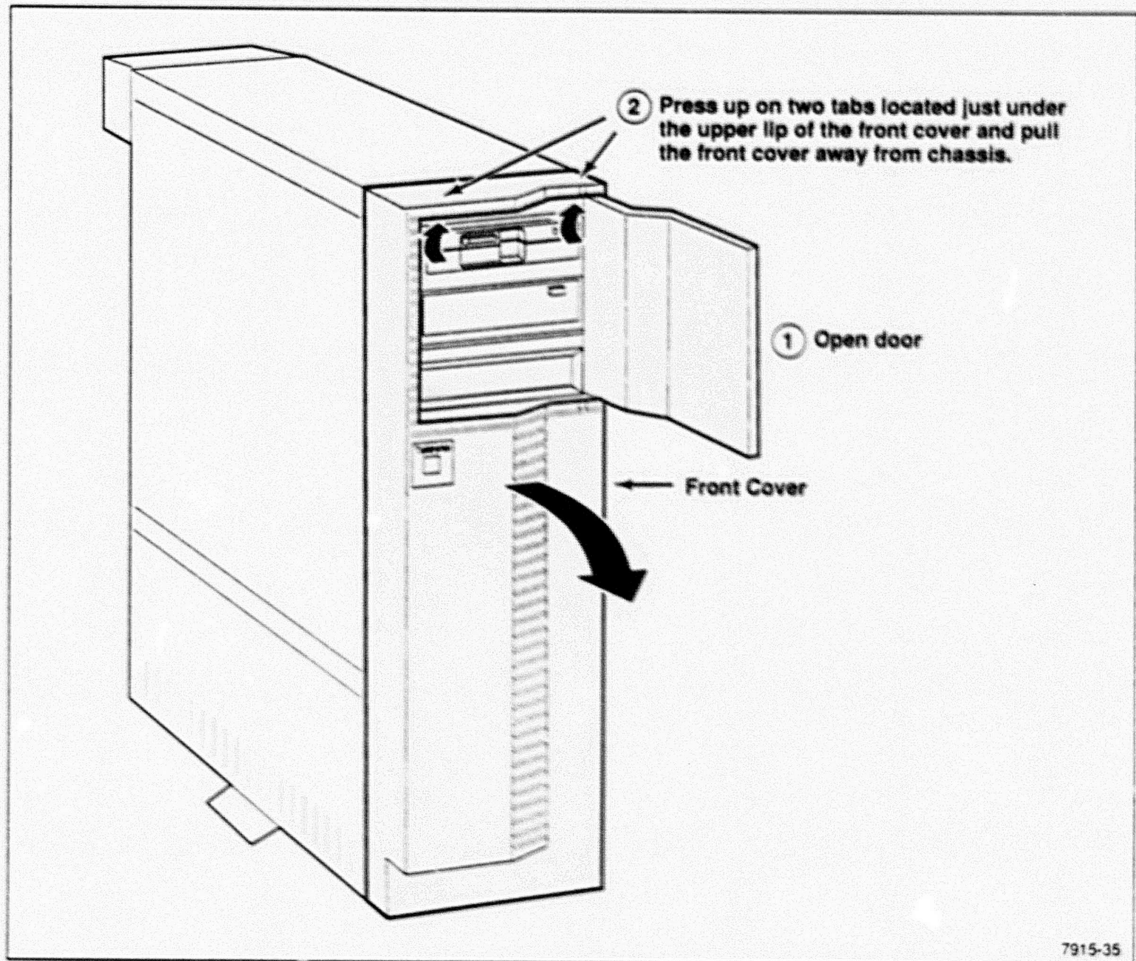2. Remove the front cover as shown in Figure 1.

Figure 1. Removing the Compute Module Front Cover.

Removing the Front EMI Shield

1. Pull off the power switch knob as shown in Figure 2 and set it aside.

2. Remove the front EMI shield from the module by removing the six screws shown in Figure 3. Then carefully pull out on the handle while guiding the shield around the flexible disk and streamer tape drives.
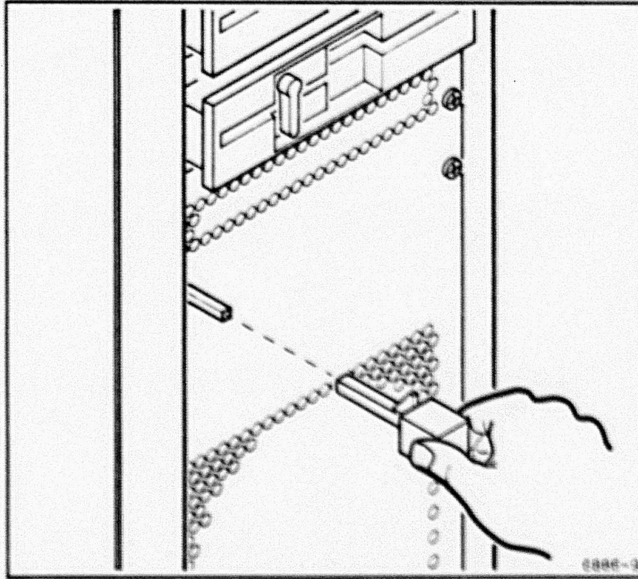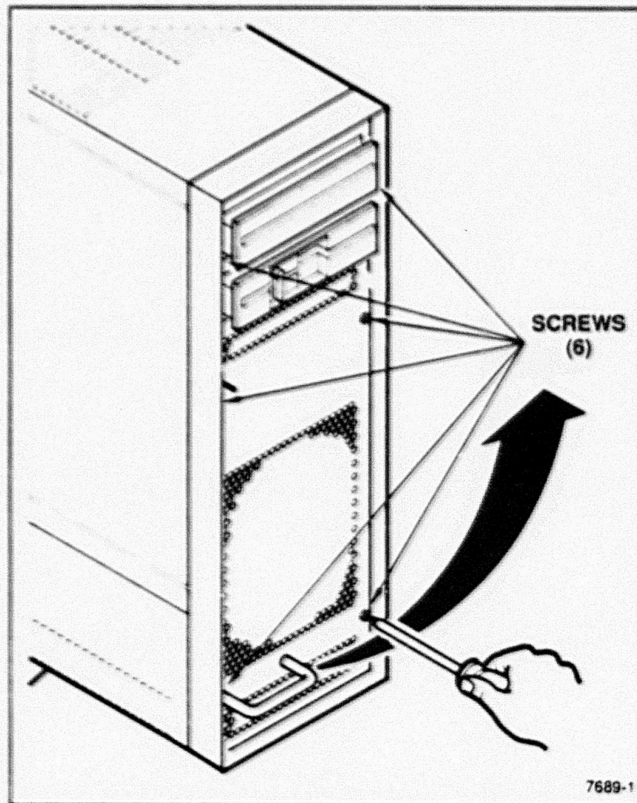
Figure 2. Removing the Power Switch Knob and Shaft.

SCREWS (6)

Figure 3. Removing the Front EMI Shield.

Removing the Mass Storage Subassembly

Perform the following steps to remove the mass storage subassembly from the compute module chassis. Reinstall the assembly by reversing this procedure.

CAUTION

If the subassembly contains a flexible disk drive, use caution during handling to avoid damage to the controller board, which is mounted directly beneath the flexible disk drive.

1. Remove the two screws that secure the hard disk cover at the rear of the compute module (see Figure 4), then remove the cover.

2. Remove the front cover and EMI shield as previously described to gain access to the Backplane.

3. Pull the subassembly tray part way out of the front of the frame, until the fan is exposed (see Figure 5).

4. Unplug the fan power cables from the Backplane board at J5.

5. Unplug all cables connecting the subassembly to the Backplane board. Note cable placement.

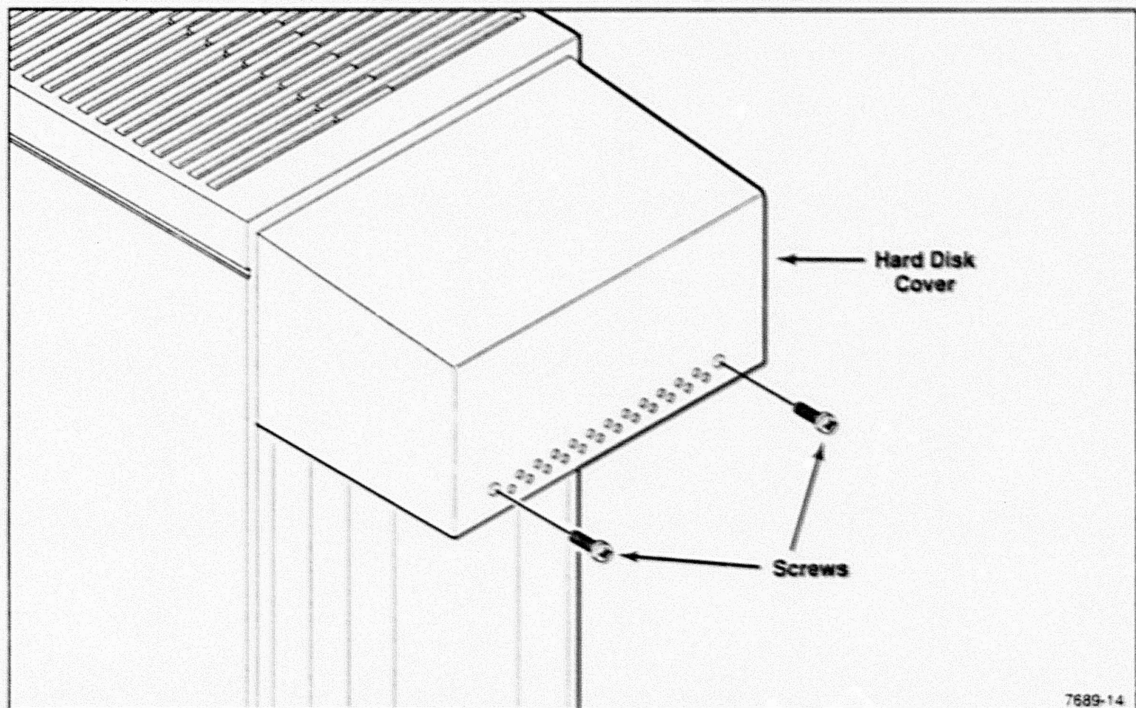6. Pull the subassembly completely out of the chassis and lay it top down on a bench.
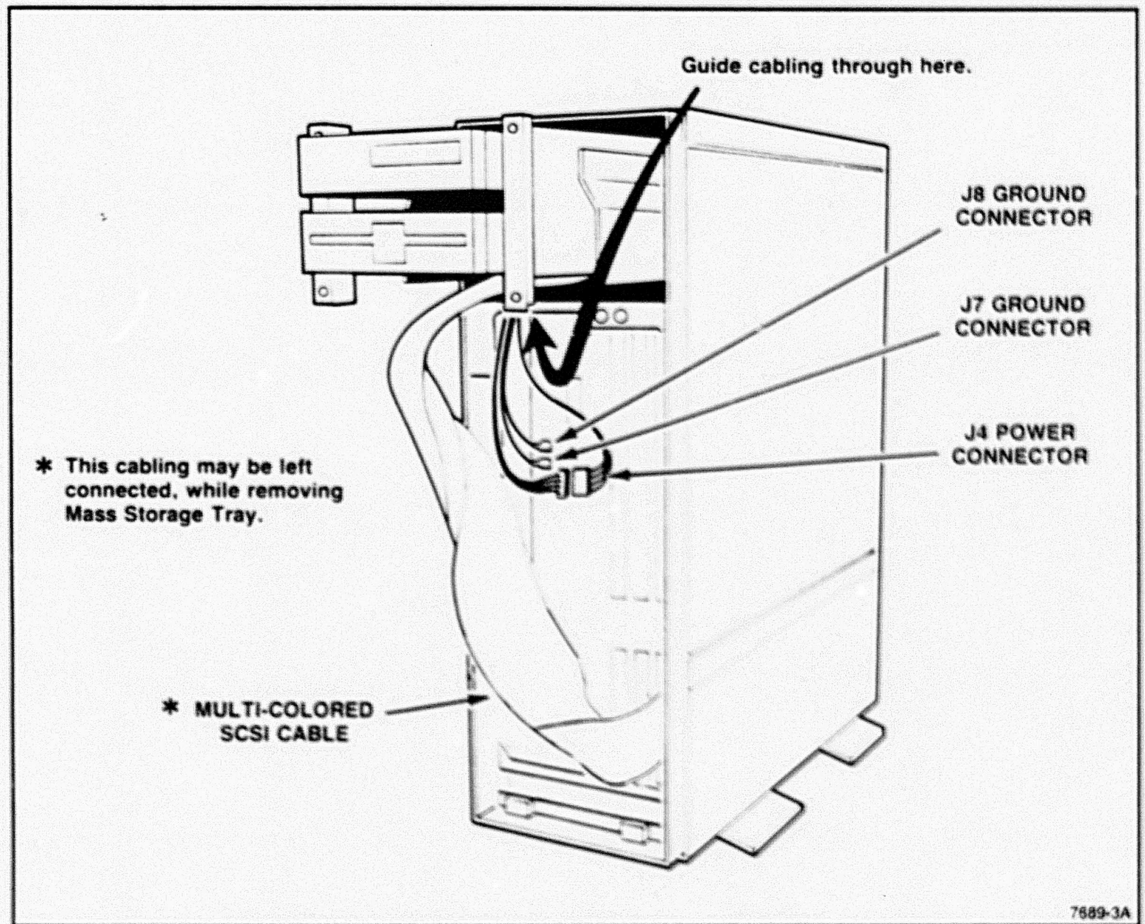

Figure 4. Mass Storage Subassembly Rear Mounting Screws.

Figure 5. Detaching the Mass Storage Subassembly Cables.

Installing the XD88F14

Refer to Figure 6 when performing this procedure.

CAUTION
Be careful not to pinch or damage wires.

NOTE
The flexible disk drive in this F-kit will have a part-number of 119-2400-02 or 119-2400-03. Although they are interchangeable, they are not identical. The signal straps have different locations due to the different circuit boards on the drives. Refer to Figures 9 and 10 later in this manual for the strap locations and settings.

1. Verify that the address jumpers on the flexible disk controller board are set to SCSI address 01. See Figure 8 in the discussion "Device Strapping and Addressing" later in this manual.

2. Verify that the jumpers on the flexible disk drive are set as shown in Figure 9 or Figure 10 in the discussion "Device Strapping and Addressing" later in this manual.

3. Verify that the terminators are removed from the flexible disk controller board (unless no other devices are present on the SCSI bus — see "SCSI Bus Termination Rules" later in this manual).

4. Turn the mass storage subassembly upside down on your workbench.

5. Attach the insulator for the flexible disk controller board (342-0877-xx) to the subassembly. See Figure 6 for the flexible disk drive location.

6. Slide the flexible disk drive controller board (670-9804-xx) between the two fingers on the front edge of the subassembly and position it over the appropriate standoffs.

7. Attach the flexible disk controller board to the chassis with two screws (211-0722-xx) at the rear of the board. The fingers on the subassembly secure the front of the board.

8. Turn the mass storage subassembly on its side with the streamer tape drive to your left.

9. Attach the power cable (174-1029-xx) to the flexible disk drive (orange connector to the flexible disk drive).

10. Attach the 3M cable (174-1340-xx) to the flexible disk drive.

11. Position the flexible disk drive (119-2400-xx) in the appropriate chamber and secure with four screws (211-0294-xx).

12. Attach the cables from the flexible disk drive to the flexible disk controller board.

13. Attach the SCSI cable that is coming from the streamer tape drive to the controller board. Pin 1 goes to pin 1.

14. Re-install the mass storage subassembly in the compute module.

15. Re-install the front EMI shield and front cover.

16. To test the flexible disk drive:

    a.   Insert a new 1.2-Mbyte diskette (119-2329-01) into the disk drive and secure the latch.

    b.   Format the diskette by using the SCSI format program:

```
/etc/scsifmt /dev/rdsk/fdsk
```
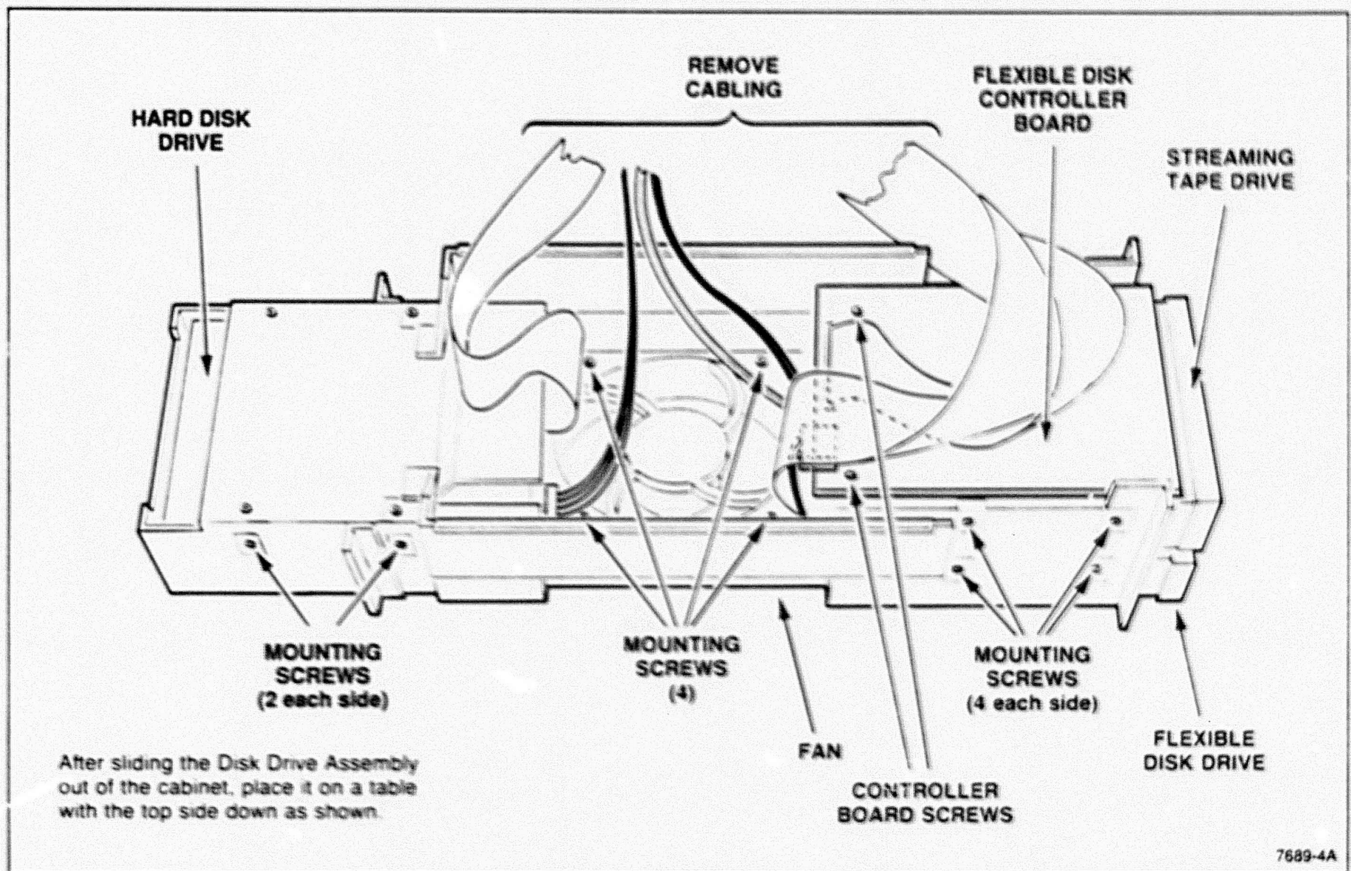
Follow the menu commands to format the diskette.

Figure 6. Device Locations in the Mass Storage Subassembly.

Installing the XD88FMS

This discussion includes two procedures:

- Installing the XD88FMS in place of the current disk drive
- Installing the XD88FMS in a diskless system

Select the one that suits your situation.

Installing the XD88FMS in Place of the Current Disk Drive

Refer to Figure 6 when performing this procedure.

CAUTION
Be careful not to pinch or damage wires.

1. Verify that the address jumpers on the hard disk drive are set to SCSI address 00. See Figure 11 (for the 300-Mbyte drive), Figure 12 (for the 600-Mbyte), or Figure 13 (for the 1-Gbyte drive) in the discussion "Device Strapping and Addressing" later in this manual.

2. Verify that the terminators **have not** been removed. The hard disk drive must have the terminators installed.

3. Turn the mass storage subassembly upside down on your workbench.

4. To remove the currently installed hard disk from the subassembly:

   a. Disconnect the SCSI and power cables from the hard disk drive.

   b. Remove the four mounting screws, two on each side of the housing (see Figure 6).

   c. Lift the subassembly off of the hard disk.

5. Position the new hard disk drive in the appropriate chamber and secure with four screws (211-0722-xx).

NOTE
The part number for the 300-Mbyte hard disk is 119-3123-01.
The part number for the 600-Mbyte hard disk is 119-3607-00.
The part number for the 1-Gbyte hard disk is 119-4016-00.

6. Connect the power cable.

7. Connect the SCSI cable to the hard disk drive, with the brown wire toward the power connector.

8. Dress the SCSI and power cables to the left of the subassembly chassis and secure the cables with a cable tie.

9. Re-install the mass storage subassembly in the compute module.

10. Re-install the front EMI shield and front cover.

11. Restore the 0 level backup.

Installing the XD88FMS in a Diskless System

1. Verify that the hard disk address jumpers are set to SCSI address 00. See Figure 12 (for the 300-Mbyte drive) or Figure 13 (for the 600-Mbyte and 1-Gbyte drives) in the discussion "Device Strapping and Addressing" later in this manual.

2. Verify that the terminators **have not** been removed. The hard disk drive must have the terminators installed.

3. Remove the mass storage subassembly from the compute module.

4. Turn the subassembly upside down on your workbench.

5. Position the hard disk in the appropriate chamber (see Figure 6) and secure with eight screws (211-0722-xx).

6. Connect the SCSI cable (174-1291-xx) to the hard disk, with the brown wire toward the power connector.

7. Connect the power cable (174-1762-xx) to the hard disk.

8. Dress the SCSI and power cables to the left of the subassembly chassis.

9. Install the mass storage subassembly into the compute module (see Figure 5).

10. Connect the power cable at the appropriate jack on the compute module Backplane board.

11. Remove the terminator resistors from the terminator board. The terminator board is plugged into the front of the Backplane opposite the I/O board (see Figure 7).

12. Plug the SCSI cable into the socket on the terminator board.

13. Re-install the front EMI shield and front cover to the compute module.
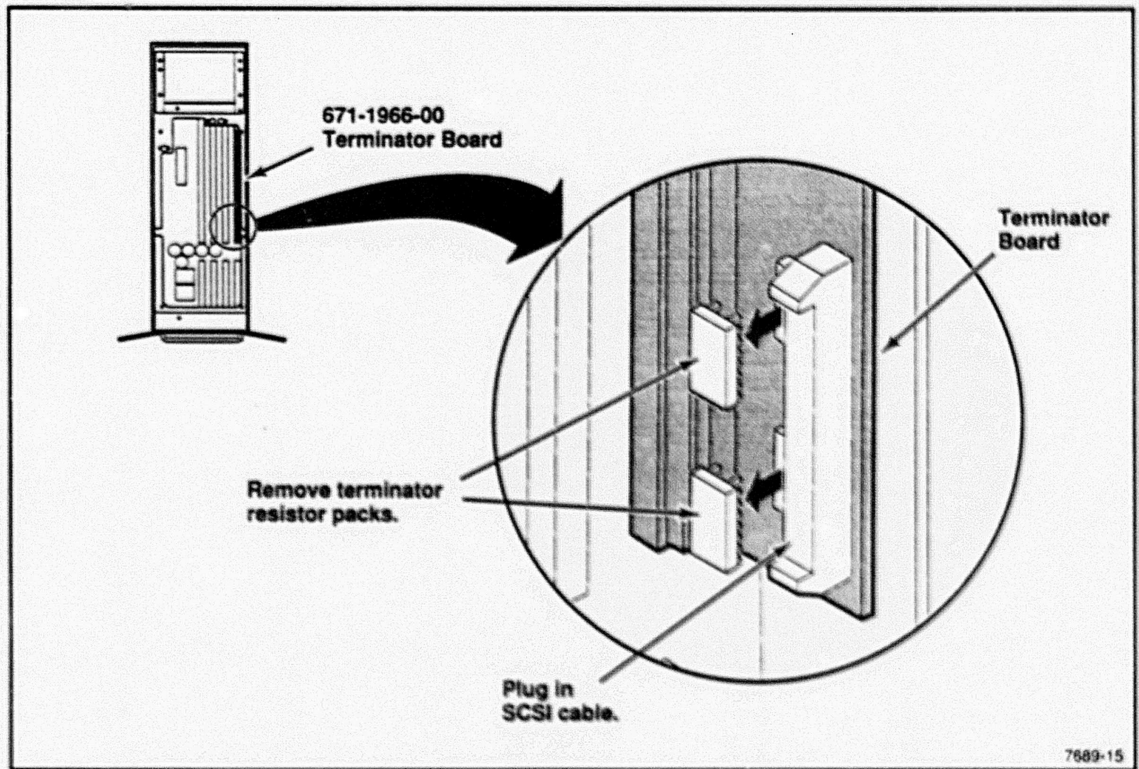
14. Restore the 0 level backup.

671-1966-00
Terminator Board

Terminator
Board

Remove terminator
resistor packs.

Plug in
SCSI cable.

7689-15

Figure 7. Removing Terminator Resistors From the Terminator Board.

Installing the XD88FRT in a Diskless System

This F-kit is designed to be installed in conjunction with the XD88FMS hard disk drive kit. If for some reason you are installing only this kit in a system that does not have any other internal SCSI device, you will need to order the SCSI cable (174-1915-xx) in addition to the F-kit.

Refer to Figure 6 when performing this procedure.

CAUTION
Be careful not to pinch or damage wires.

1. Verify that the address jumpers on the streamer tape drive are set to SCSI address 02. See Figure 14 or Figure 15 in the discussion "Device Strapping and Addressing" later in this manual.

2. Verify the proper status for the three terminators inside the tape drive.

   If the streamer tape drive is the only mass storage device installed in the workstation, the terminators **must be installed.**

   If the tape drive is installed along with a hard disk, however, the terminators **must be removed**. To remove these terminators:

   a. Remove the two screws on the rear of the drive and remove the top cover. (Some covers have holes above the terminator resistor packs, which make removal of the cover unecessary.)

   b. The terminators are located at the rear of the drive on the very back part of the circuit board.

3. Turn the mass storage subassembly upside down on your workbench.

4. Position the streamer tape drive (119-3650-xx or 119-4120-xx) in the appropriate chamber (refer to Figure 6) and secure with four screws (211-0461-xx).

5. Attach the power cable (174-0873-xx) to the streamer tape drive.

6. Attach the SCSI cable to the streamer tape drive. Pin 1 goes to pin 1.

NOTE
If the streamer tape drive is the only mass storage device installed in the workstation, attach the end connector of the SCSI cable to the tape drive.

7. Dress the SCSI and power cables to the left of the subassembly chassis.

8. Install the mass storage subassembly in the compute module (see Figure 5).

9. Connect the power cable at the appropriate jack on the compute module Backplane board.

10. Remove the terminator resistors from the terminator board plugged into the front of the Backplane opposite the I/O board (see Figure 7).

11. Plug the SCSI cable into the socket on the terminator board.

12. Re-install the front EMI shield and front cover to the compute module.

13. Restore the 0 level backup.

Device Strapping and Addressing

UTek V allows SCSI (device) addresses 01 through 06 to be arbitrarily assigned to auxiliary hard disk, flexible disk, streaming tape, and cartridge tape drives. There can be a combination of up to six auxiliary devices on this system; see Table 1.

Table 1
Standard UTek V Device Addresses

SCSI (Device) Address	Device Description
00 [1]	System hard disk drive
01 [2]	System flexible disk drive (1.2-Mbyte)
02 [2]	System streaming tape drive
03 [2]	First auxiliary hard disk drive
04 [2]	Second auxiliary hard disk drive
05 [2]	9-track tape drive
06 [2]	8 mm cartridge tape drive
07 [1]	System (host)

[1] Reserved SCSI (device) addresses.

[2] Factory default addresses. These addresses can be used as auxiliary device addresses if not used by the system for the devices listed in this table.

All releases of the UTek V operating system include the device drivers to support several mass storage devices. The workstation's operating-system device drivers are preset to recognize the auxiliary device assignments listed in Table 1. Refer to the *XD88 Series System Administrator's Guide* for information on how to format and initialize hard disks, and on how to create device special files.

SCSI Bus Termination Rules

Each mass storage device that attaches to the SCSI bus has removable resistors for bus termination. The general rule that applies is this: any device attached to the end of the SCSI bus cable always has the terminators installed, and any other devices attached to the bus have the terminators removed.

Here are the other rules that you should follow:

- When a hard disk drive is present, it is connected to the end bus connector.
- When there is no hard disk present but there is a streamer tape drive (with or without a flexible disk drive), the streamer tape drive is connected to the end bus connector.
- When only a flexible disk drive is present, the flexible disk drive controller board is connected to the end bus connector.

In XD88 Workstations, the end of the SCSI bus which is not terminated with a disk or tape drive is terminated with a termination plug at the back panel of the workstation or at the backpanel of an auxiliary mass storage unit.
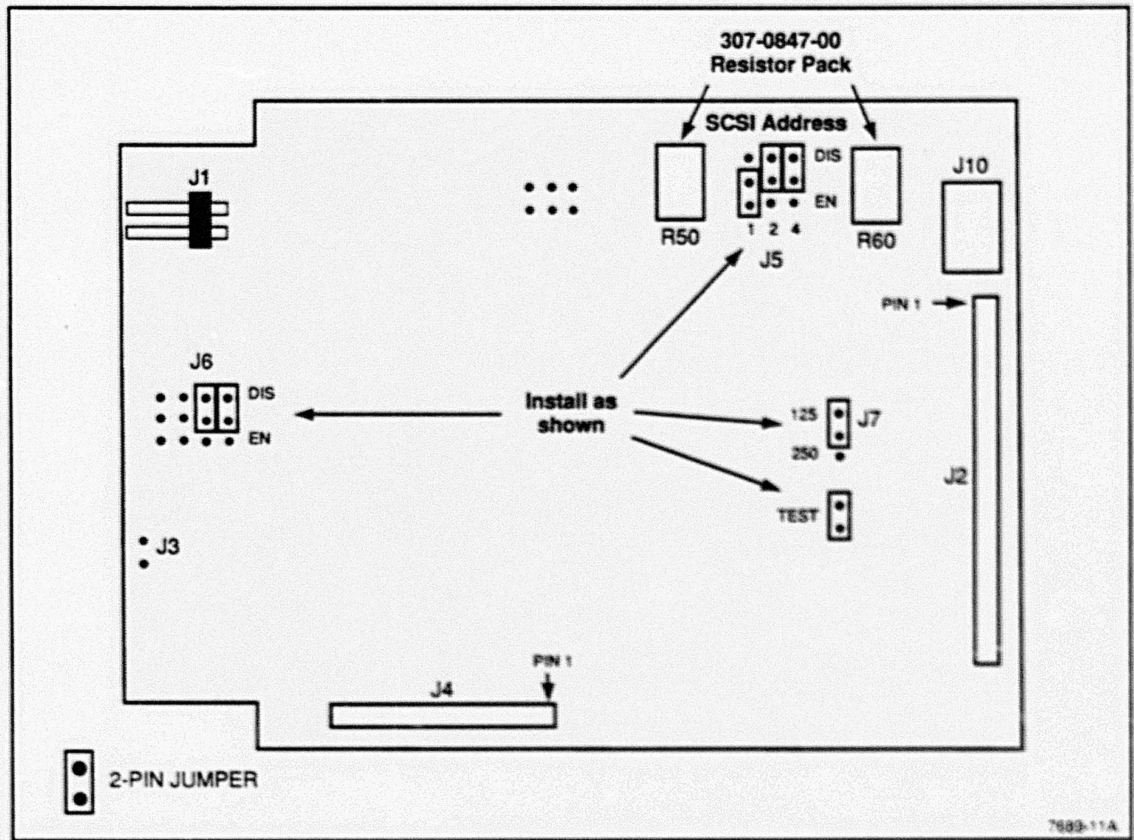
Figure 8. Strap Settings for the Flexible Disk Controller Board.

Table 2
Flexible Disk Controller SCSI Address Settings

Pin Position[1]			SCSI	Pin Position[1]			SCSI
1	2	4	Address	1	2	4	Address
0	0	0	00	0	0	1	04
1	0	0	01	1	0	1	05
0	1	0	02	0	1	1	06
1	1	0	03	1	1	1	07

[1] A "1" in the Pin Position column indicates a jumper
installed in the "EN" (enable) position; a "0" indicates
a jumper in the "DIS" (disable) position.
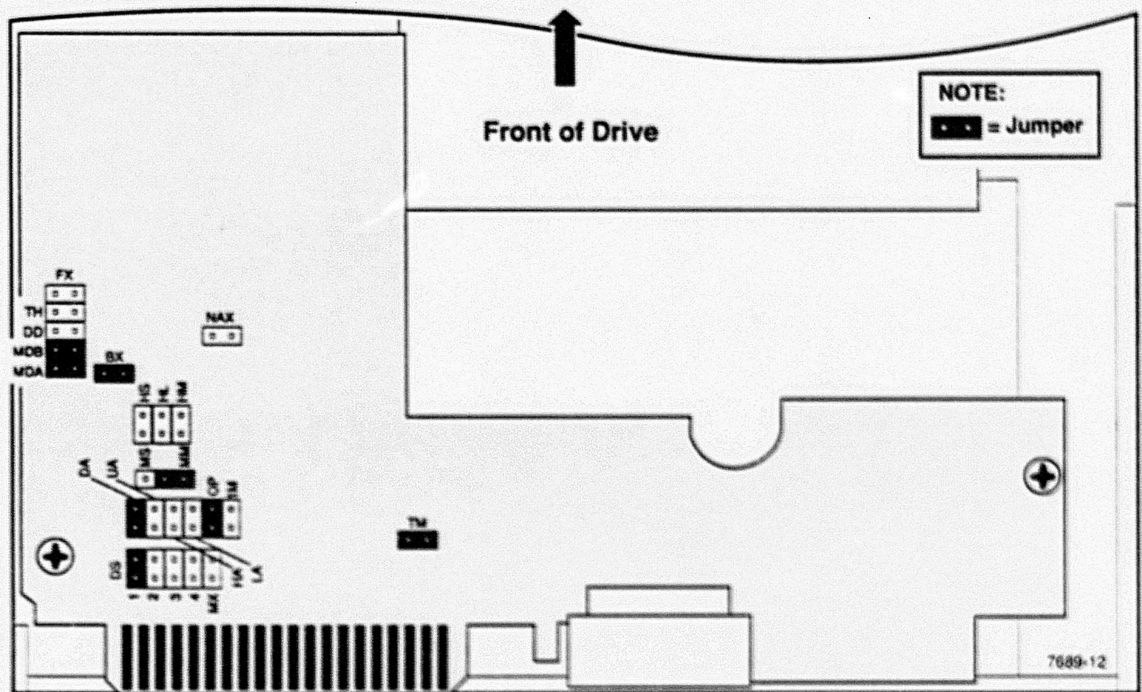
Figure 9. Strap Settings for Flexible Disk Drive 119-2400-02.
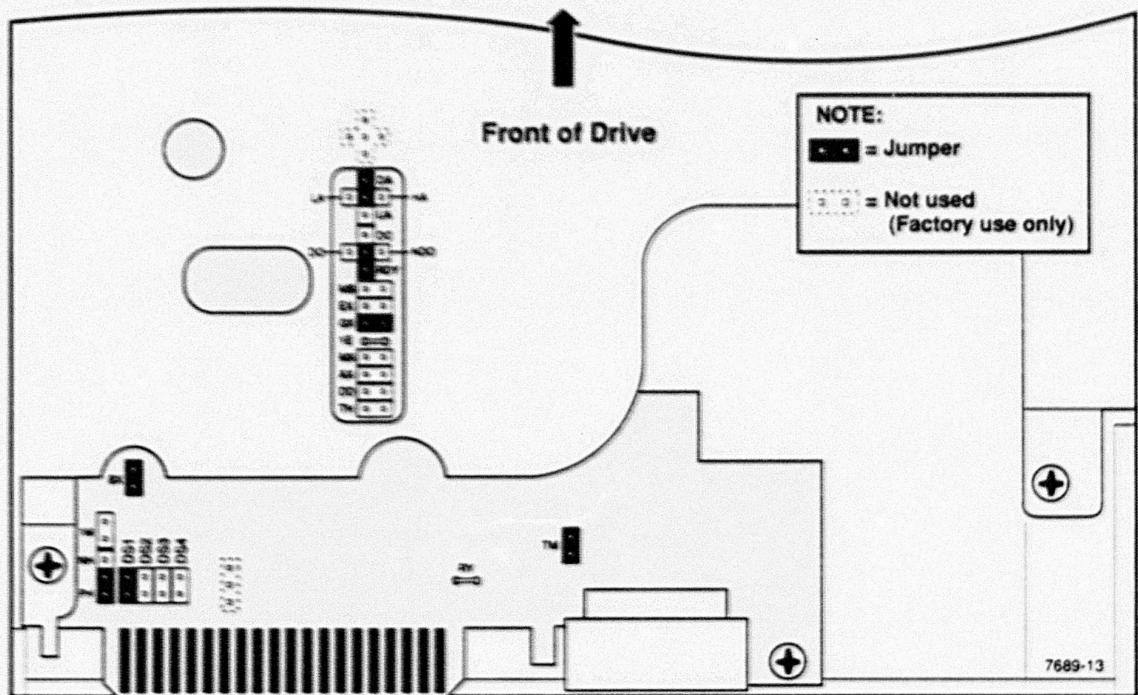
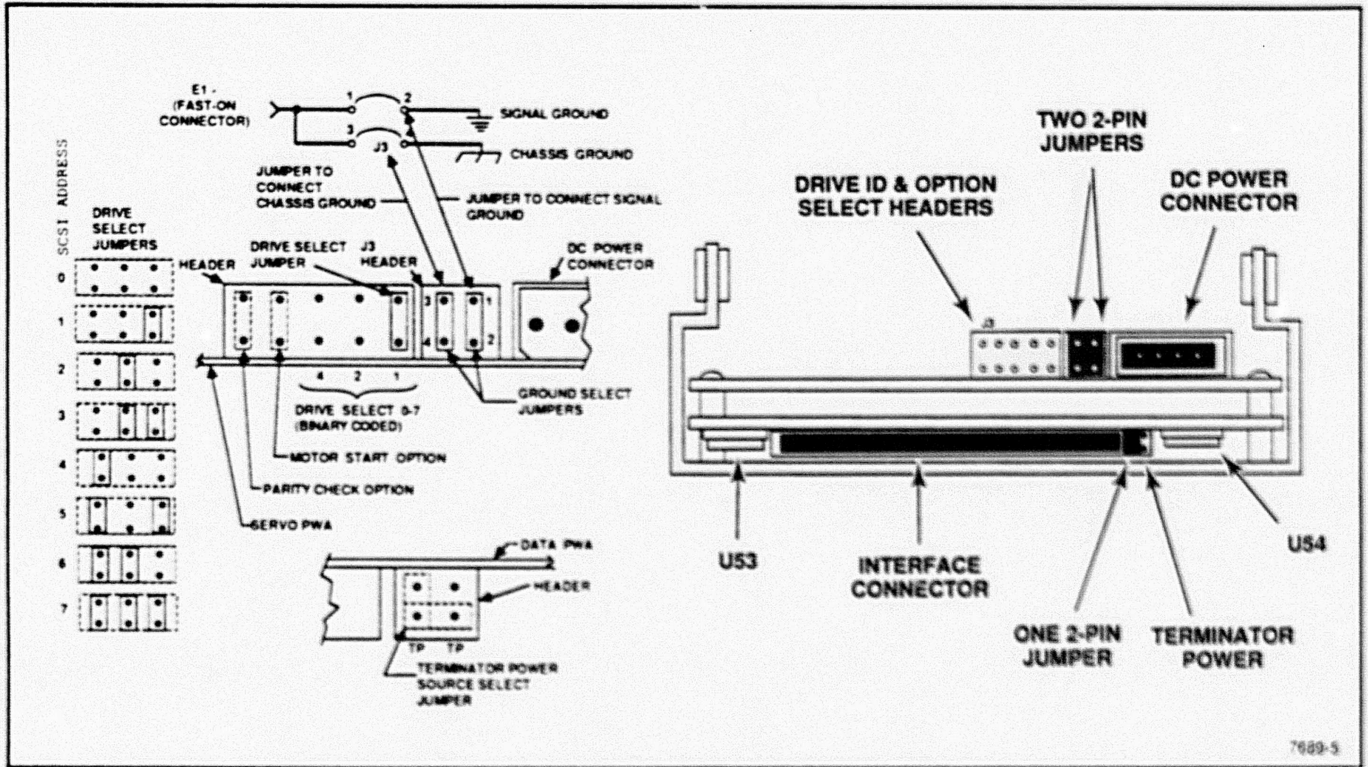Figure 10. Strap Settings for Flexible Disk Drive 119-2400-03.

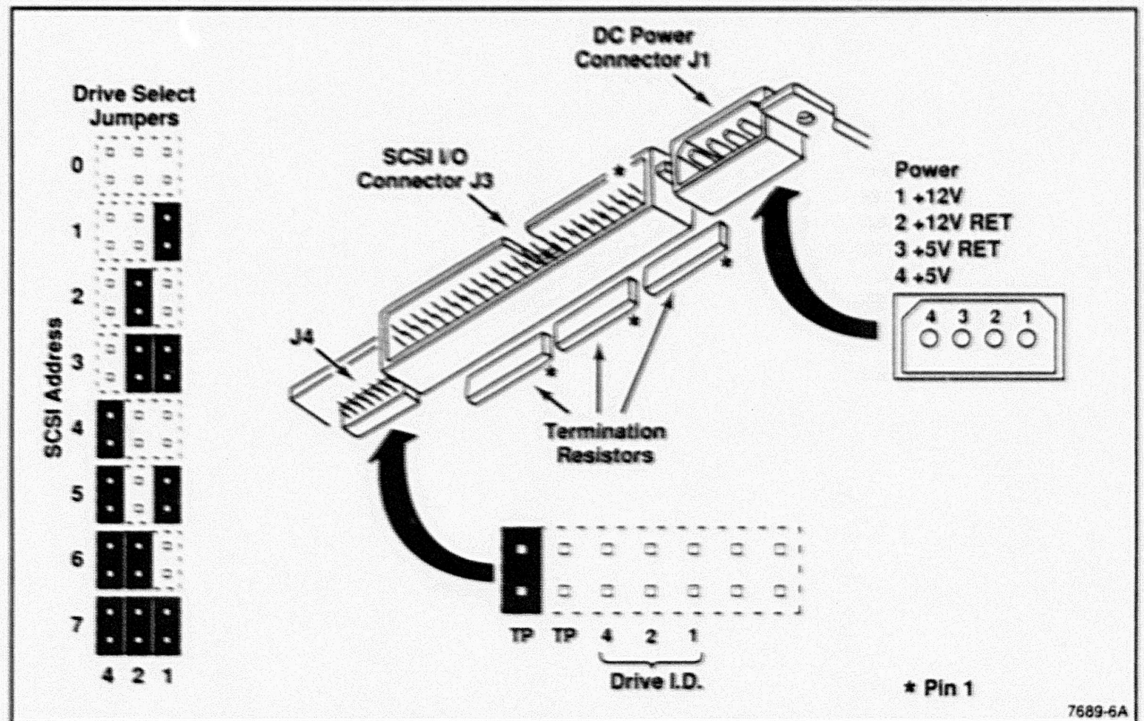Figure 11. Strap Locations for the 300-Mbyte Hard Disk Drive.

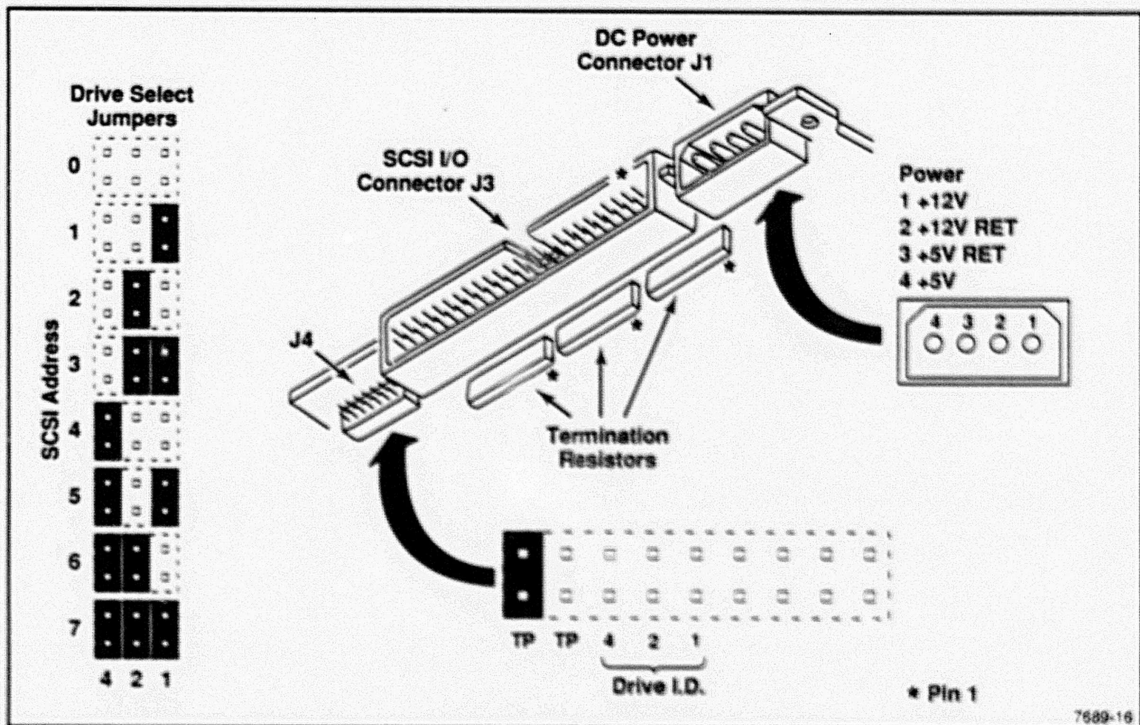Figure 12. Strap Locations for the 600-Mbyte Hard Disk Drive.

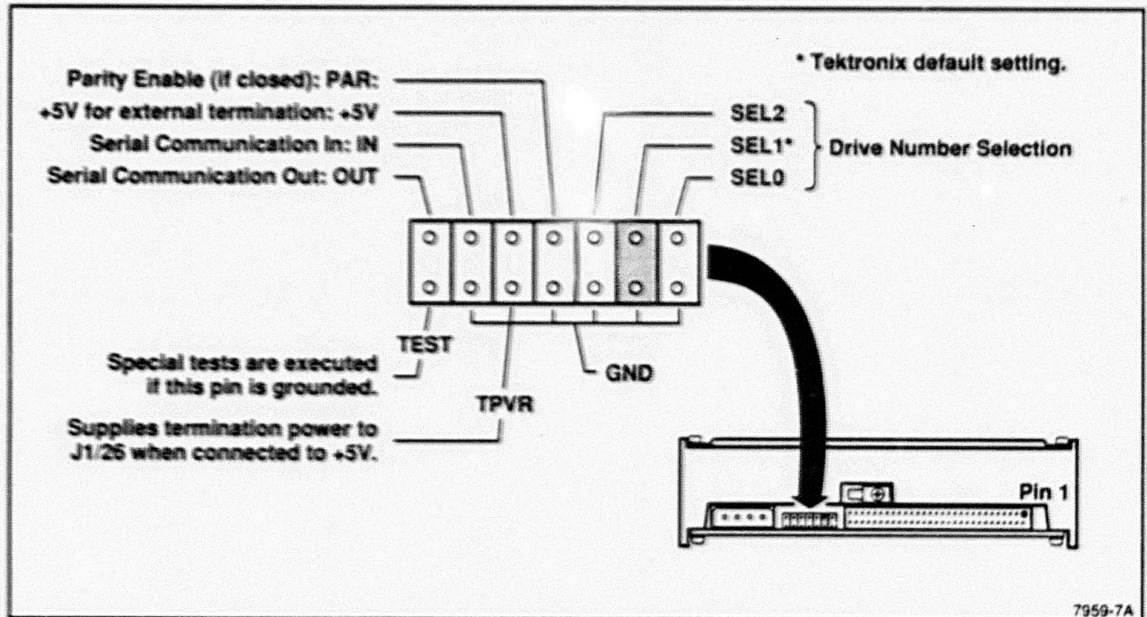Figure 13. Strap Locations for the 1-Gbyte Hard Disk Drive.

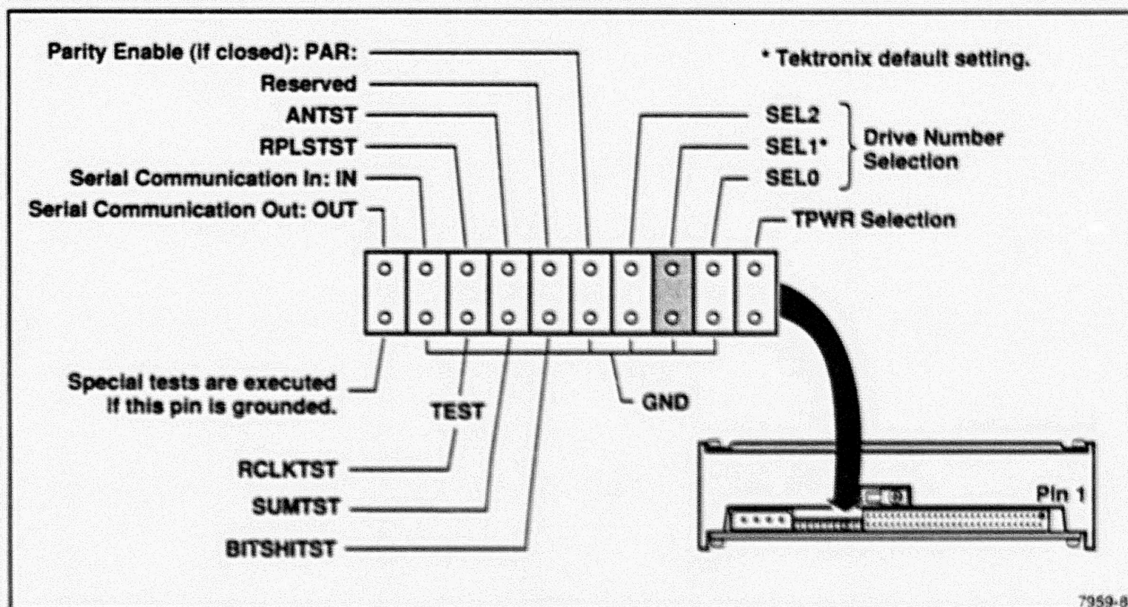Figure 14. ¼" Streaming Tape (119-3650-xx) Jumper Settings.

Figure 15. ¼" Streaming Tape (119-4120-xx) Jumper Settings.

Table 3
¼" Streaming Tape Drive
Address Selections

Jumper/Strap			SCSI
SEL2	SEL1	SEL0	Address
0	0	0	00 [1]
0	0	1	01 [2]
0	1	0	02 [2]
0	1	1	03 [2]
1	0	0	04 [2]
1	0	1	05 [2]
1	1	0	06 [2]
1	1	1	07 [1]

0 = OFF (no strap), 1 = ON (strap connected)

[1] Reserved for host devices; see Table 2.

[2] Factory default SCSI addresses; see Table 2.