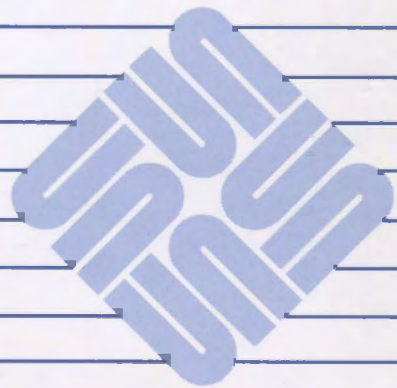


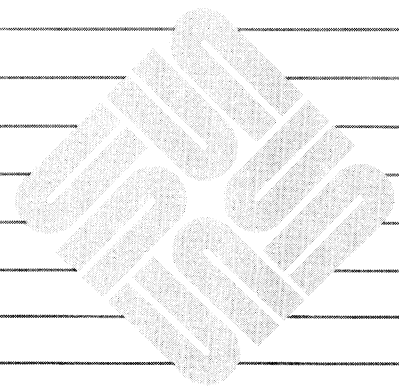


Installation and Service Manual *for the Sun™-3/180 Tape Drive Option*





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Preface

Purpose of the Manual. This manual is written for engineers, field service personnel, and users of Sun-3/180 rackmounted systems. It contains information about installing, maintaining, and using the Sun-3/180 Tape Drive Option within Sun-3/180 rackmounted systems.

Chapter 1 of this document contains a physical description of and specifications for the tape drive option.

Chapter 2 contains instructions for installing the tape drive option in the Sun-3/180 CPU enclosure.

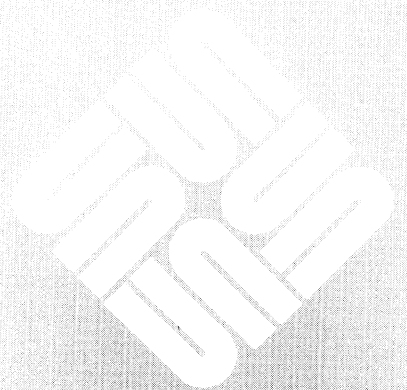
Chapter 3 contains a description of the tape drive option preventive maintenance procedures.

Applicable Documents. Documents which contain information necessary or helpful for the installation and operation of the tape drive option are listed below.

1. *Hardware Installation Manual for the Sun-3/160*, part number 800-1314-xx.
2. *Installation Manual Addendum for the Sun-3/180 Rackmounted System*, part number 800-1362-xx.
3. *Installing UNIX on the Sun Workstation*, part number 800-1158-xx.
4. *System Administration for the Sun Workstation*, part number 800-1323-xx.
5. *System Managers Manual for the Sun Workstation*, part number 800-1109-xx.
6. *Small Computer System Interface Configuration Procedures*, part number 813-2007-xx.
7. *Small Computer System Interface (SCSI) Hardware Installation Manual*, part number 813-1015-xx.
8. *Emulex MT02 Controller Configuration Procedures*, part number 813-2011-xx.
9. *MT02 (Titleist) Tape Controller Technical Manual*, Emulex part number MT0251001, revision B.

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Product Description

1.1. Tape Drive Option

The tape drive option is an optional 1/4" tape drive which may be installed in the Sun-3/180 rackmounted system. The tape drive option provides cartridge style backup and archive tapes.

The tape drive option is physically installed in the Sun-3/180 CPU enclosure. The tape drive option receives and transmits data to and from the system through a Small Computer System Interface (SCSI) circuit card. *The SCSI card must be present in the Sun-3/180 CPU to permit operation of the tape drive option.*

The tape drive option assembly consists of a tray containing a 1/4" cartridge tape drive, tape drive controller, and daisy-chained SCSI data connectors; and a control and data cable to connect the tape drive option to the SCSI circuit card. An internal power cable connects the tape drive option to the 3/180 CPU power supply.

1.2. Tape Drive Option Specifications

Data Storage Capacity

Formatted capacity = 45 or 60 megabytes, software selectable.

Tape length = 450 or 600 feet, software selectable.

Track capacity = 5 or 6.6 megabytes, software selectable.

Number of Tracks = 9 (tape drive can read a 4-track tape format).

Number of channels = 2 (defined as one write head gap followed by one read head gap).

Head type = Read after write with separate erase bar.

Recording Method

Recording Format = 9-track serpentine.

Recording Mode = NRZI.

Recording data density = 8,000 bits per inch (bpi).

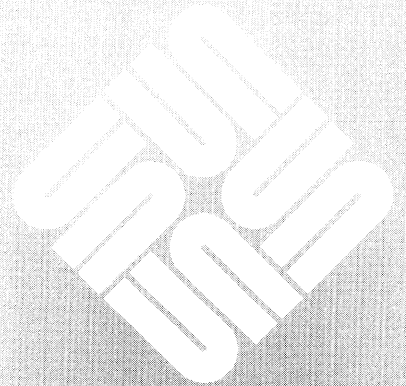
Recording format = QIC-11 or QIC-24, software selectable.

Block size = 512 bytes.

Tape Motion	Tape speed = 90 inches per second (ips) during read or write operation. Tape speed variation = +/- 3% <i>short term</i> , +/- 7% <i>long term</i> during read or write operation. Tape start/stop time = 300 milliseconds maximum.
Dimensions	Overall 19.8 in. (50.4 cm) long x 7.2 in. (18.2 cm) high x 4.8 in. (12.1 cm) wide.
Weight	10.5 lb. (4.7 kg)
Environment	Temperature: +5 to +45 degrees C <i>operating</i> ; -30 to +60 degrees C <i>storage</i> Relative Humidity: 20% to 80% RH non-condensing @ +45 degrees C <i>operating</i> ; 0% to 99% RH <i>non-operating</i> . Altitude: minus 1,000 to 15,000 ft. (minus 300 to 4,500 m) <i>operating</i> ; minus 1,000 to 50,000 ft. (minus 300 to 15,000 m) <i>non-operating</i> .
Data Transfer Method	Data is transferred to and from the CPU through an SCSI circuit card and cable.
Data Transfer Rate	Data is transferred at 86.7 kilobytes/second.
Power Requirements	+5V +/-5% at 2.5 Amperes nominal. +12V +/-10% at 2.5 Amperes average, 4.6 Amperes peak. Power dissipation = 40 watts in start/stop mode.

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Installing The Tape Drive Option

This chapter describes how to install the tape drive option assembly and how to remove the assembly after it is installed.

2.1. Overview

The tape drive option assembly is installed in the Sun-3/180 workstation CPU enclosure. Installation sequence is shown in the exploded views of figures 2-1 thru 2-5.

2.2. Tools Needed

The following tools will be needed to install the tape drive option.

1. Set of hex (Allen) wrenches.
2. Flashlight.
3. Phillips screwdrivers, #1, #2.
4. Blade screwdrivers.
5. Wire cutters.

2.3. Installation Sequence

Perform the following steps to install the tape drive assembly.

CAUTION Turn off power at the Sun Workstation before you open the rack.

1. Refer to figure 2-1. Front bezel panel A covering the 3/180 CPU enclosure is held in place by snap fasteners. Remove the front bezel panel A by prying outward with a blade screwdriver.
2. Remove screws B securing the CPU enclosure front shield plate C and remove and save plate C.

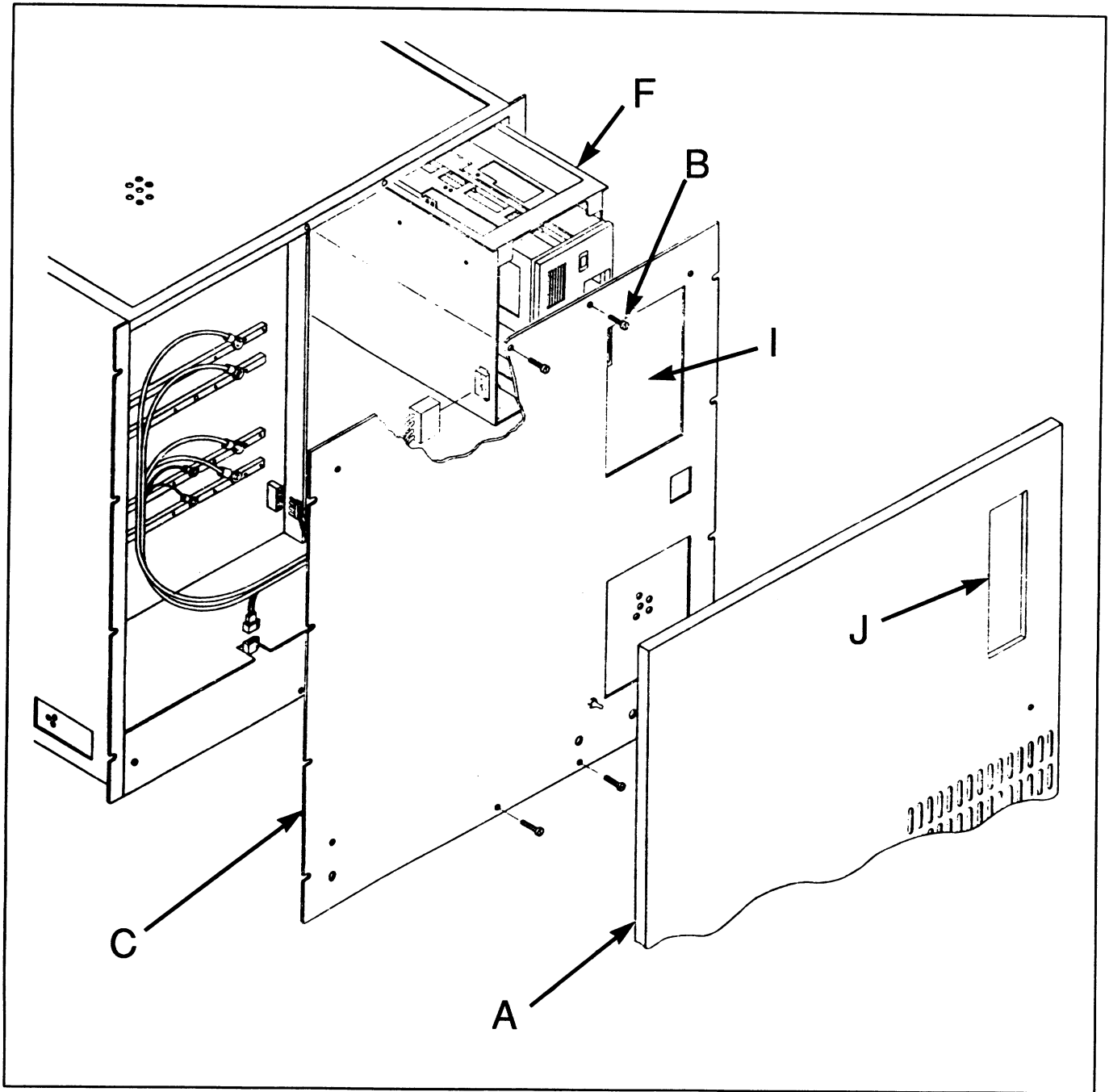


Figure 2-1 Front Panel Removal

3. Refer to figure 2-3. The rear of the rack is closed by a bezel panel (not shown) held in place by four twist-lock fasteners. Unlock the twist-lock fasteners and remove the bezel panel.
4. Remove four screws **D** holding filler plate **E** at the rear of the CPU enclosure. Save four screws **D**. Filler plate **E** will fall inside CPU enclosure on power supply shelf. Remove filler plate **E** and tape to wall or floor of rack.
5. Verify that the tape controller shunts and switch settings are correct. Refer to *Emulex MT02 Controller Configuration Procedures*, part number 813-2011-xx for correct settings.

NOTE *If an additional SCSI peripheral device is to be connected to the SCSI OUT connector, it is necessary to remove the SCSI bus termination resistors U5 and U45 from the tape controller. Perform step 6 to remove the termination resistors only if an additional SCSI peripheral device is to be installed.*

6. *Optional.* SCSI bus termination resistors are shown in figure 2-2 as viewed from the top right hand side of the tape drive tray. Use a small screwdriver to remove DIP resistors U5 and U45.
7. Refer to figure 2-1. Insert the tape drive option tray **F** into CPU enclosure above power supply shelf. Slide tape drive option tray **F** into CPU enclosure.
8. Refer to figure 2-4. Align tape drive option tray **F** with the four screw holes. Install four screws **D** removed in step 4 to secure the tape drive option tray **F** to rear of CPU enclosure.

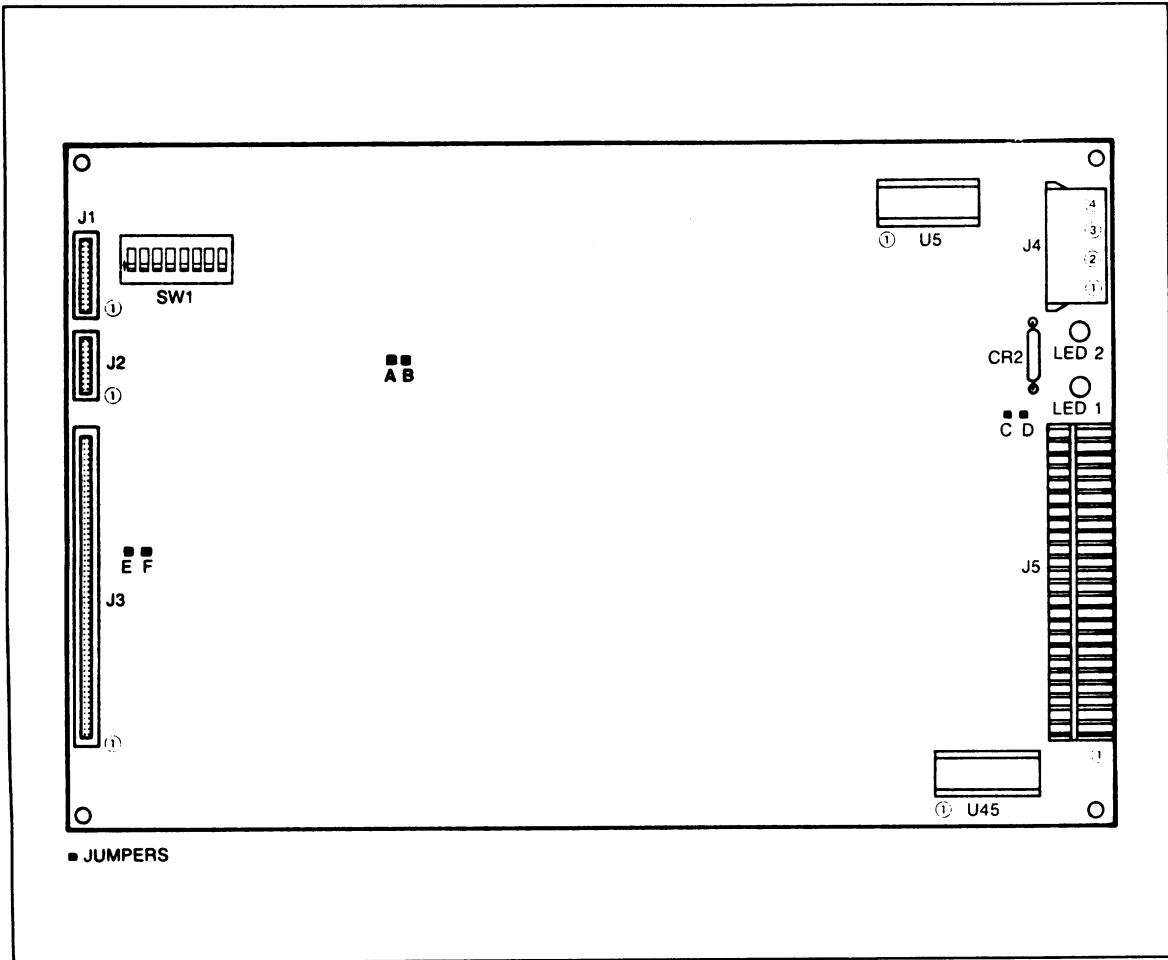


Figure 2-2 Tape Controller SCSI Bus Termination Resistors

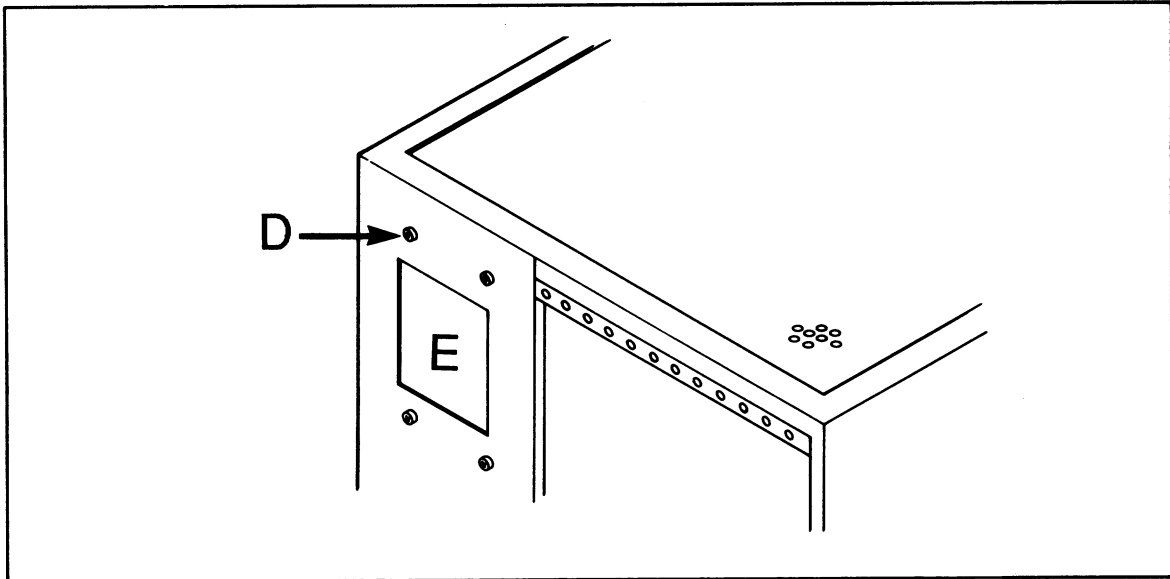


Figure 2-3 *Rear Filler Panel*

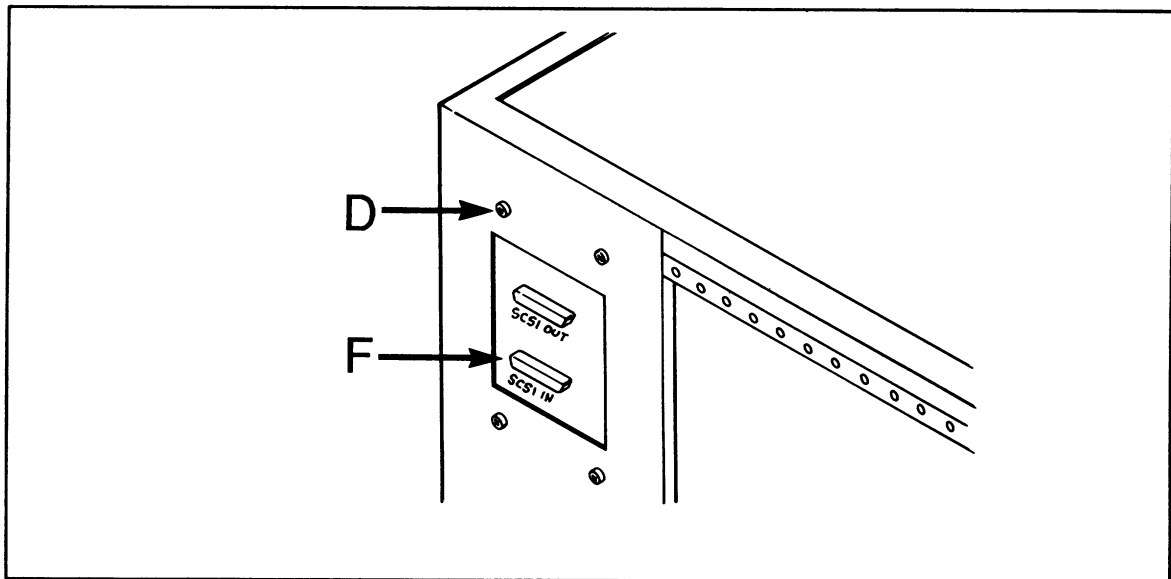


Figure 2-4 *Tape Drive Rear Screws*

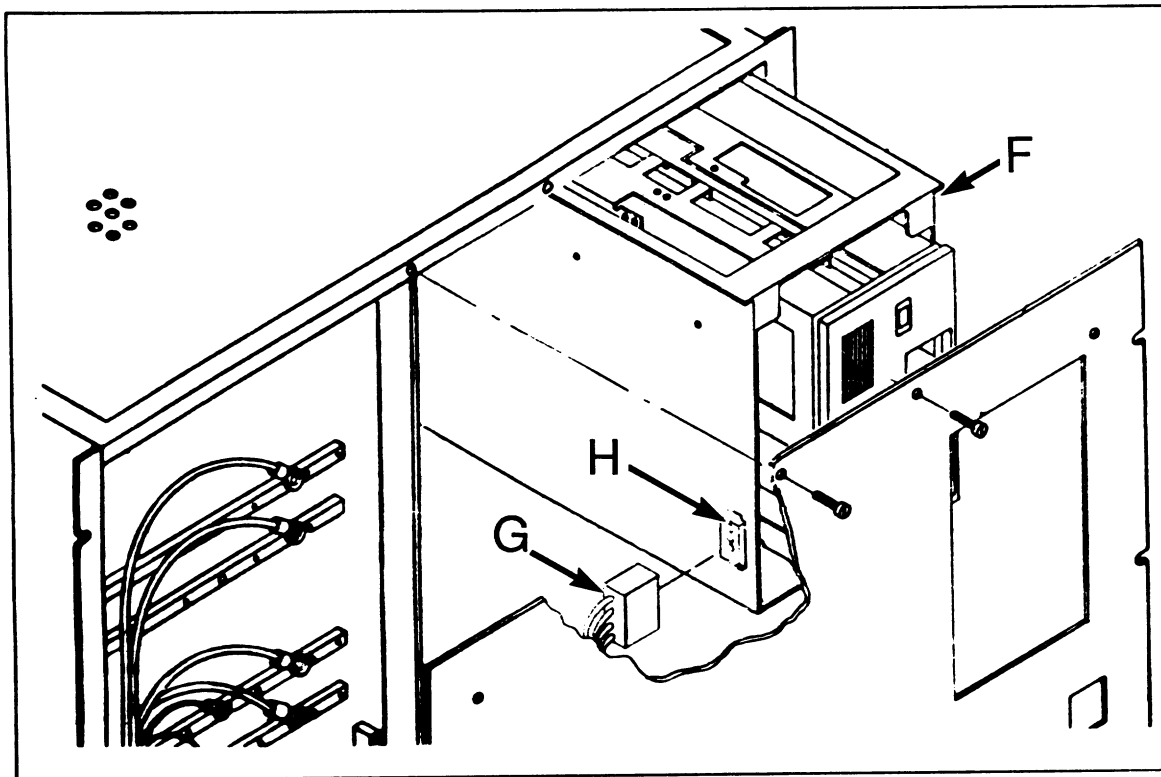


Figure 2-5 *Power Cable Connection*

9. Refer to figure 2-5. The tape drive option power cable is part of the CPU power harness and is stowed in the CPU enclosure. Locate the *Molex* type power connector (P14) G and cut the wire wraps securing the power cable. Connect power connector (P14) G to power input connector H at the front of the tape drive option tray.
10. Refer to figure 2-1. Remove filler plate I from front shield plate C.
11. Install front shield plate C using screws B removed in step 2.
12. Remove filler plate J from front bezel panel A. Install front bezel panel A by snapping in place over the CPU enclosure.
13. Refer to figure 2-6. Connect SCSI data and control cable K to SCSI IN connector on the tape drive assembly. Connect the other end of the cable to the SCSI circuit card in slot 7 of the CPU.

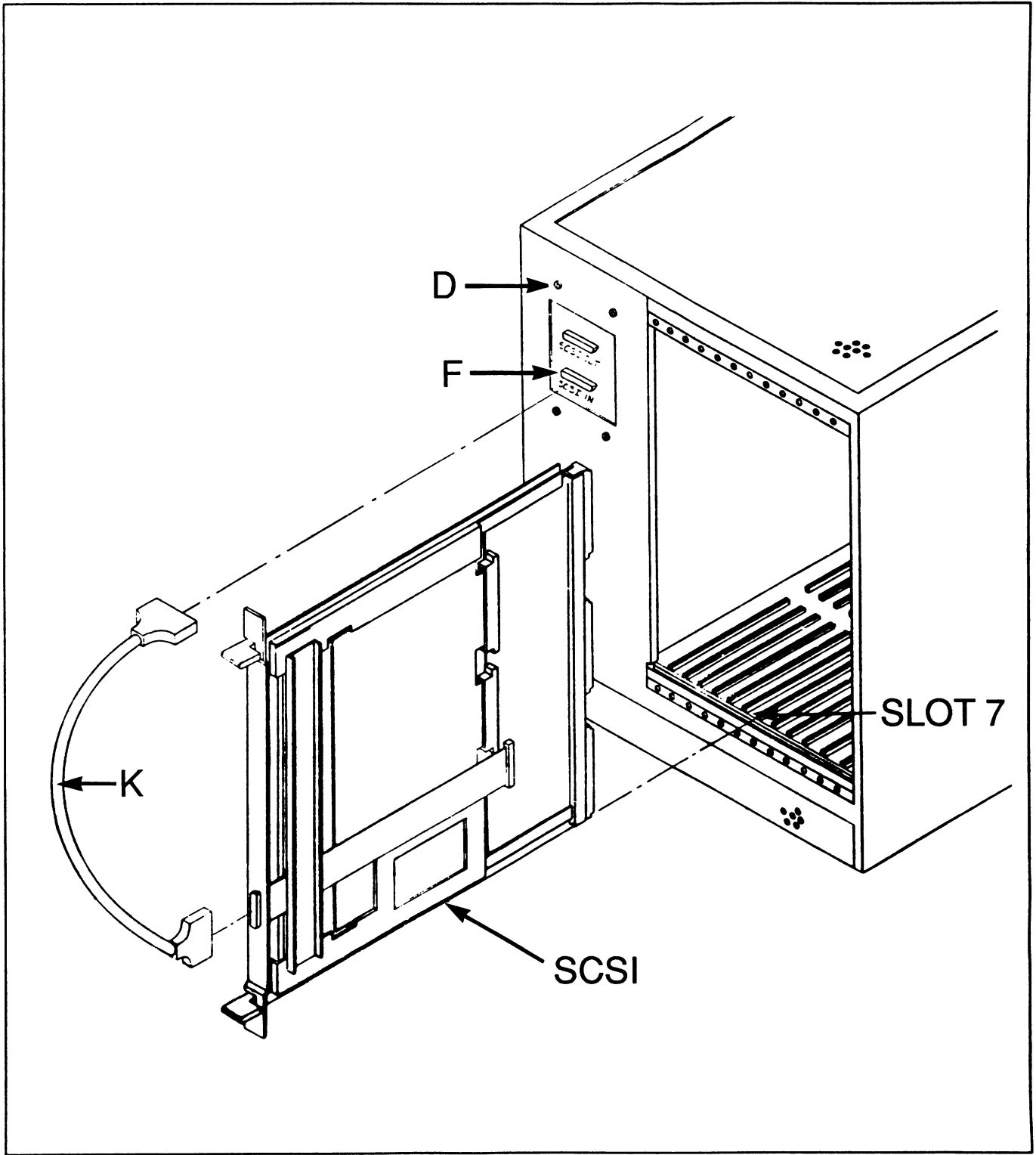


Figure 2-6 Cable Connection

14. Refer to *Small Computer System Interface Hardware Installation Manual*, part number 813-1015-01, for SCSI circuit card installation instructions.
15. Refer to *Small Computer System Interface Configuration Procedure*, part number 813-2007-01, for SCSI configuration switch settings.
16. *Optional.* Connect SCSI cable for other SCSI peripherals (if present) to SCSI OUT connector on rear of tape drive assembly. Connect cable to peripheral(s).

NOTE *The SCSI bus is normally terminated in the tape drive controller. Ensure that terminating resistors in the tape drive controller have been removed (optional step 6) before connecting additional SCSI peripherals.*

17. Install rear bezel panel on rear of rack. Lock the four twist-lock fasteners.

2.4. Removing The Tape Drive Option Assemblies

To remove the tape drive assembly for any reason, such as reconfiguration or repair, perform the following steps:

CAUTION Turn off power at the Sun Workstation before you open the rack.

1. Refer to figure 2-1. Front bezel panel A covering the 3/180 CPU is held in place by snap fasteners. Remove the front bezel panel A by prying outward with a blade screwdriver.
2. Remove screws B securing the CPU enclosure front shield plate C and remove plate C.
3. Refer to figure 2-6. Remove rack rear bezel panel (not shown) by unlocking four twist lock connectors.
4. Disconnect SCSI peripheral cable (if installed) from SCSI OUT connector. Disconnect SCSI control and data cable K from SCSI circuit card and from the SCSI IN connector of tape drive option assembly F.
5. Remove four screws D securing tape drive assembly F. Save the screws.
6. Refer to figure 2-5. Disconnect power cable connector G from tape drive power input connector H.
7. Slide tape drive option assembly out of CPU enclosure.
8. A simplified exploded view of the tape drive option assembly is shown in figure 2-7. Refer to figure 2-7 for tape drive option internal parts replacement.
9. Install new or repaired tape drive option assembly per paragraph 2.3, steps 5 and up.
10. *Optional Procedure.* Perform the following steps only if the tape drive option is to be permanently removed from the workstation.
11. Locate rear filler panel E removed during paragraph 2.3, step 4. Install rear filler panel E with four screws D.

12. Locate power cable connector G and tape to CPU cable harness.
13. Locate filler plate I removed in paragraph 2.3, step 8, and install in front shield plate C.
14. Install front shield plate C using screws B removed in step 2.
15. Locate filler plate J removed in paragraph 2.3, step 10, and install in front bezel panel A. Install front bezel panel A by snapping in place over the CPU enclosure.
16. Install rear bezel panel and lock four twist lock fasteners.

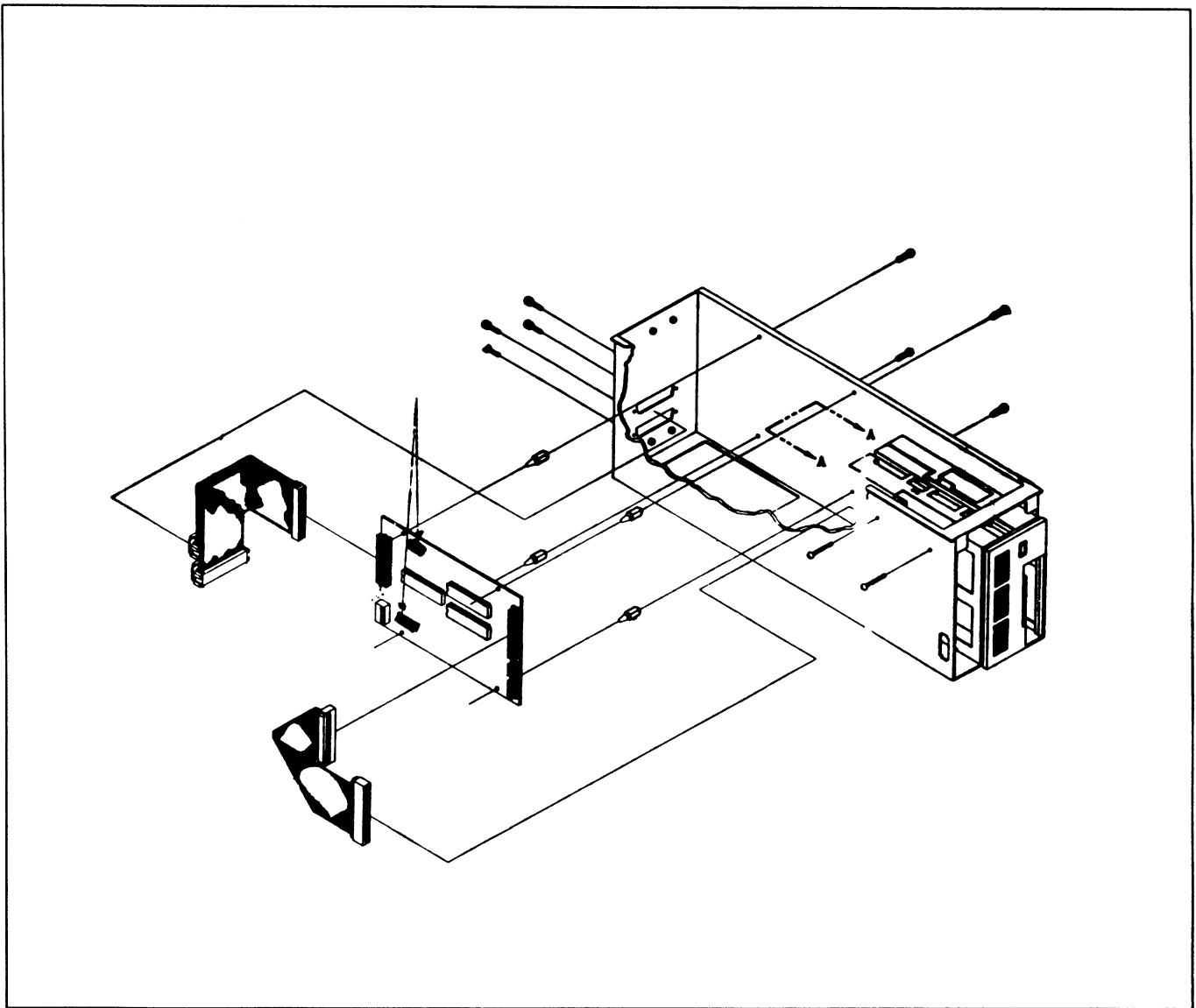
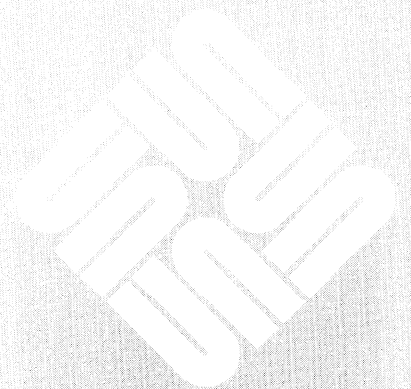


Figure 2-7 *Tape Drive Option Assembly Exploded View*



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User Preventive Maintenance

3.1. Description

This chapter describes the user performed preventive maintenance procedures required for the tape drive option. Preventive maintenance of the tape drive consists of cleaning the Read/Write head assembly and the tape hole sensor assembly at periodic intervals.

Cleaning Frequency

Perform the cleaning procedures contained in the following paragraphs according to tape drive use:

Previously used tapes. Perform the cleaning procedure after each eight hours of *actual tape motion*.

New tapes. Perform the cleaning procedure after an initial pass of a new tape cartridge. Perform the cleaning procedure after each two hours of *actual tape motion* if only new cartridges are used.

3.2. Required Materials

The following materials are required for preventive maintenance cleaning.

1. Cotton swabs (Johnson & Johnson "Q-Tips" or equal).
2. Head cleaning solution, IBM or equal (or isopropyl alcohol solution).

3.3. Procedures

Perform the following cleaning procedure at intervals recommended under "Cleaning Frequency". It is recommended that, if possible, power be removed from the tape drive prior to cleaning.

1. Refer to figure 3-1. Moisten a clean, lintless swab with head cleaning solution. Avoid excessive amounts of solution.
2. Rub cleaning solution over face of Read/Write head assembly. Use a dry swab to remove all residue and excess solution. Do not allow solution to flow on adjacent parts of the tape drive.
3. Rub cleaning solution over sensor opening of tape hole sensor block. Use a dry swab to remove all residue and excess solution.

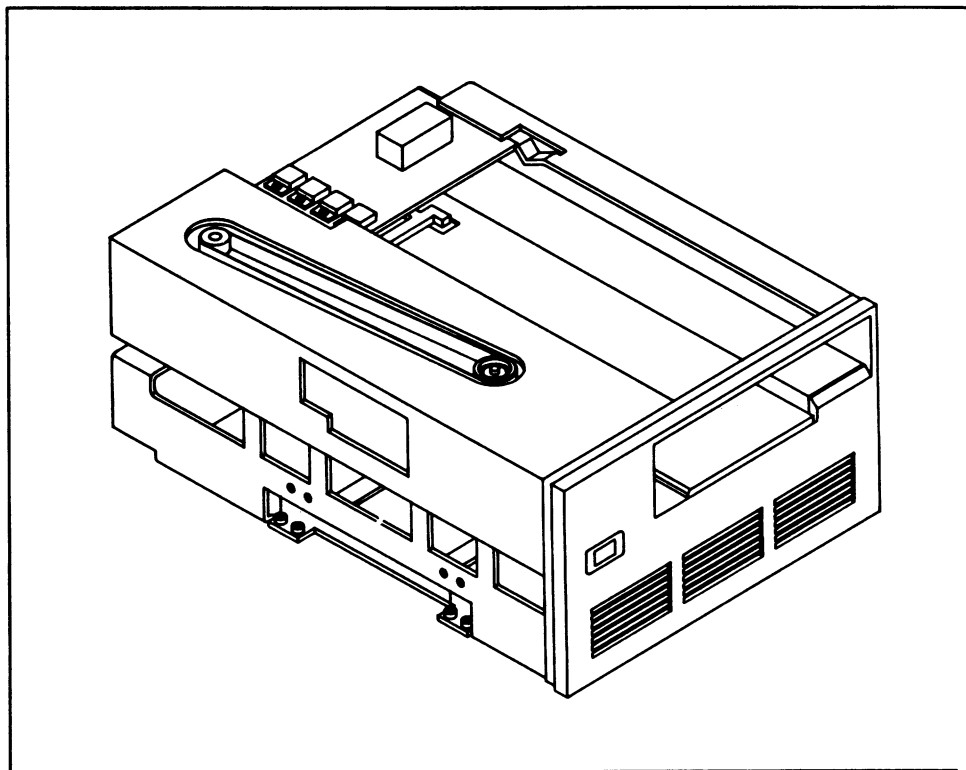


Figure 3-1 *Tape Drive Internal View*

3.4. Tape Storage and Handling

The following general rules for use and handling of tape cartridges should be followed.

Use *qualified* tape cartridges.

Do not touch the tape recording surface. Do not manually wind the tape from one hub to the other.

Store tape in protective case in an area within the environmental specifications of ANSI STANDARD X3.55-1977 when not in use.

Rewind the tape to the beginning before removal from the tape drive.

Retension the tape cartridge prior to use if any of the following conditions apply: 1) previous use in start/stop mode; 2) Prolonged storage; 3) storage at a high or low temperature extreme; 4) physical shock; or 5) excessive read/write errors occur.

3.5. Diagnostic Procedures

Diagnostic procedures for the tape drive option consist of running the *tape top* portion of *sysdiag* procedures.

Revision History

Revision	Date	Comments
01-51	31 March 1986	Engineering release
02-A	31 May 1986	Production release.

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