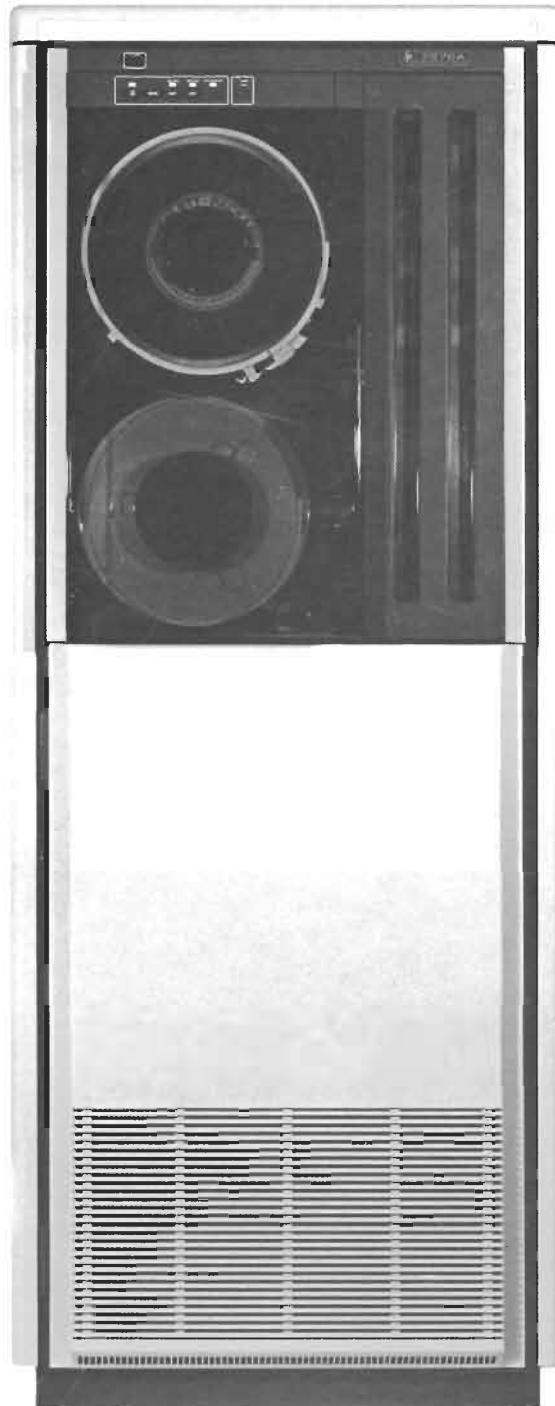


7976A

MAGNETIC
TAPE
SUBSYSTEM



INSTALLATION
& SERVICE

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7976A Magnetic Tape Subsystem Installation & Service Manual

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1-1. INTRODUCTION

The HP 7976A Magnetic Tape Unit Installation and Service Manual provides general information, installation, service, and replaceable parts information for the HP 7976A Magnetic Tape Subsystem. The service information includes maintenance and troubleshooting information. If additional information about the HP 7976A Subsystem is required, refer to the other HP 7976A subsystem manuals:

- *7976A Subsystem Operator's Manual* 07976-90901
- *7976A HP-IB Interface Controller Unit Installation and Service Manual* 07976-90903
- *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* 07976-90904
- *7976A Format Control Unit Field Engineering Maintenance Manual* 07976-90905
- *7976A Subsystem Diagnostic Manual* 07976-90906

Section I of this manual contains a general description of the HP 7976A subsystem, identification information, specifications, safety compliance information, and supplies and accessories.

1-2. GENERAL DESCRIPTION

The Hewlett-Packard 7976A Magnetic Tape Subsystem is a 75 ips, vacuum column tape drive, capable of reading or writing in 1600 cpi phase encoded (PE) or 6250 cpi group coded recording (GCR) formats. Other features of the HP 7976A subsystem are listed below.

- Autothread
- Dual 16 kilobyte buffer scheme allows "command queuing" during the execution of SYSDUMP, DBSTORE, RESTORE, and DBRESTOR commands. Command queuing allows high continuous data transfer rates resulting in streaming tape motion, using up to 16K data blocks. (Note: system loading and disc performance considerations may cause this high data rate to the tape subsystem to be reduced.)

SECTION I GENERAL INFORMATION



- Data transfer rates of up to 469K byte/sec. (burst), continuous transfer rate up to 320K byte/sec. (6250 GCR, using 16K byte data blocks on an HP 3000 Series 44 System, in backup mode.)
- 250 ips rewind speed.
- HP-IB (IEEE 488-1975) interface.
- Front Panel “go/no-go” interface self test capability.
- Subsystem service diagnostic for troubleshooting.
- Dual channel error correction (6250 cpi only).
- Dual gap read/write head with full width erase.

The HP 7976A subsystem (figure 1-1) consists of three major assemblies: the magnetic tape unit (MTU), the format control unit (FCU), and the interface controller unit (ICU).

The MTU provides the mechanism for reading and writing formatted data to and from the tape. Depending on the current format required by the tape unit, the FCU furnishes either 1600 cpi phase encoded (PE) or 6250 cpi group coded recording (GCR) formatted data to the tape unit during write operations and decodes the formatted data during read operations.

The FCU also monitors the data during read and write operations for error identification purposes. During a

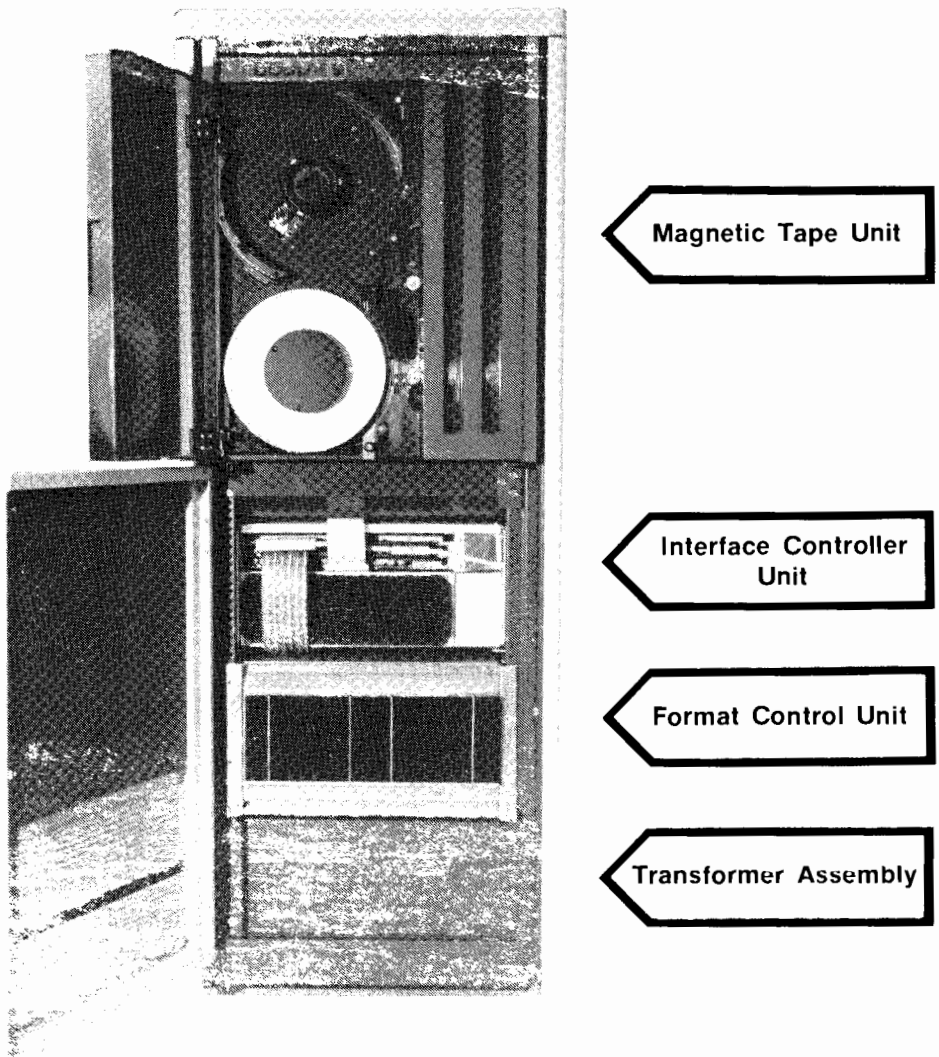


Figure 1-1. 7976A MTU, FCU, and ICU

read operation, the FCU corrects single track errors for PE format data and corrects two track errors for GCR format operations.

The ICU is responsible for interfacing the format control unit to the HP-IB bus. Data and command information from either the HP-IB bus or the formatter is structured to meet the required protocol and transmitted to the formatter or the HP-IB bus.

The HP 7976A subsystem is designed to connect directly to the general interface controller (GIC): 30079A-030 for the Series 30 or 30079A for the Series 33. The recommended configuration for the tape subsystem connection specifies one HP 7976A Magnetic

Tape Subsystem connected to its own general interface controller (GIC) with no other devices on that GIC.

1-3. IDENTIFICATION

Each HP 7976A Magnetic Tape Subsystem has an identification plate, below the rear panel door, attached to the rear panel of the power distribution assembly (figure 1-2). This identification plate lists the model number, serial number, and the power option. The model number (7976A) is an alphanumeric number which identifies the model. The serial number

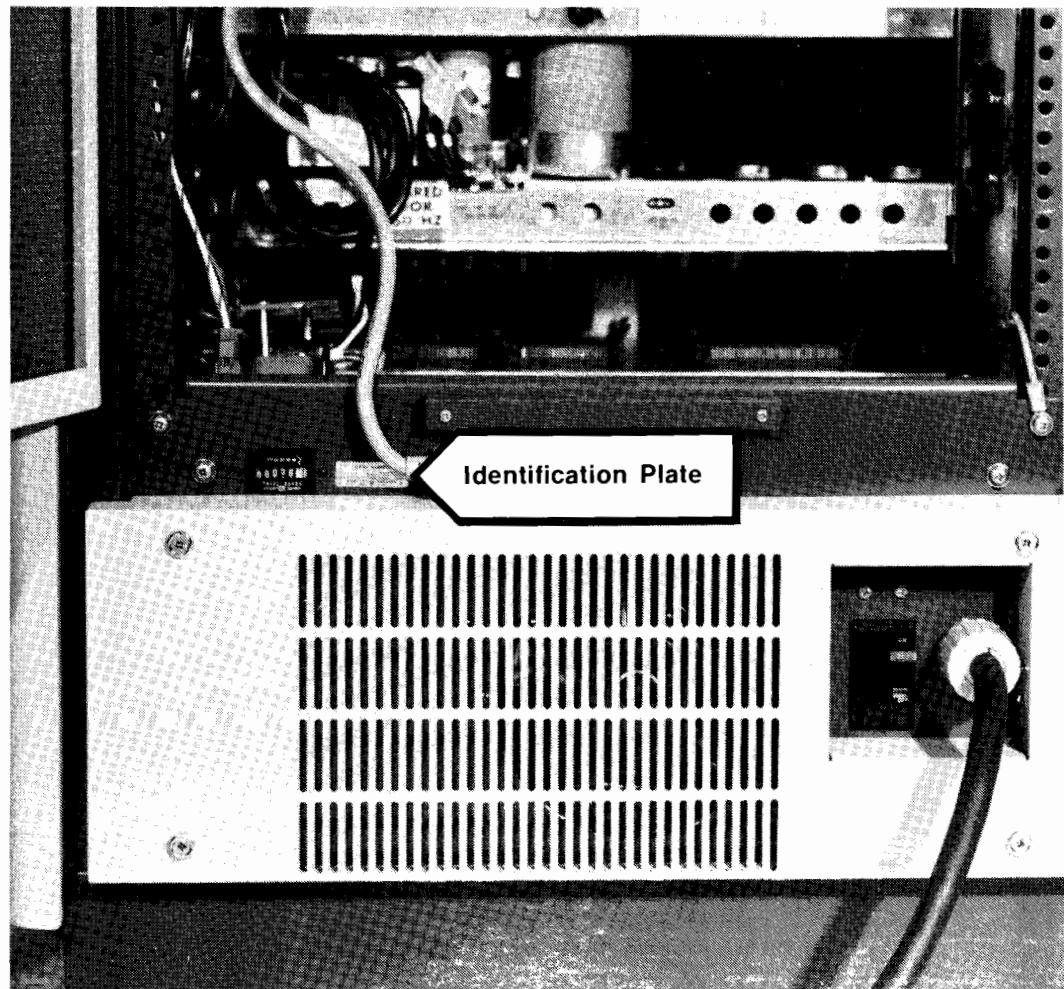


Figure 1-2. Identification Plate

consists of a four digit prefix, a letter, and a five digit suffix (0000A00000). The first four digits indicate design changes. The letter designates the country in which the subsystem was manufactured ("A" indicates the United States). The five digit suffix is a sequential number which increments with each tape unit shipped. The three digit option number establishes the factory installed options in that subsystem.

The identification plate also contains information regarding ac power line requirements for ac volts (VAC~), frequency (Hz), and current (A AC RMS), and provides the maximum wattage (W MAX) consumed by the subsystem.

The warranty period for the subsystem is indicated on the tag to the right of "WARRANTY".

1-4. SPECIFICATIONS

The specifications for the HP 7976A subsystem are listed below.

Physical Dimensions

| | |
|---------|------------------------|
| Height: | 158.5 cm (62.4 inches) |
| Width: | 62.3 cm (24.5 inches) |
| Depth: | 90.5 cm (35.6 inches) |
| Weight: | 254 kg (560 lbs) |

Voltage/Frequency Requirements

| |
|--|
| 100 Vac; +10%/-10%, 50 Hz and 60 Hz, ±5% |
| 117 Vac; +10%/-15%, 50 Hz and 60 Hz, ±5% |
| 220 Vac; +10%/-15%, 50 Hz and 60 Hz, ±5% |
| 240 Vac; +10%/-15%, 50 Hz and 60 Hz, ±5% |

NOTE

The tape subsystem will not tolerate power line drop-outs in excess of one-half cycle out of 10 cycles.

Line Current (at 117 volts)

| | |
|------------|--|
| Operating: | 13.0 Amperes, nominal 15.8 Amperes, maximum |
|------------|--|

| | |
|----------|---|
| Loading: | During a load operation, when the pneumatic system turns on, the peak line current is 32 amperes maximum (at 117 Vac) for 1.5 seconds. This decreases to the operating current after an additional 0.5 seconds. |
|----------|---|

Power Dissipation

| | |
|------------|--|
| Operating: | Approximately 1500 watts (5200 B.T.U.) |
|------------|--|

Temperature

| | |
|----------------|---|
| Operating: | +13° C to +29° C (+55° F to +84° F) |
| Standby: | +10° C to +38° C (+50° F to +100° F) |
| Non-operating: | +2° C to +50° C (+35° F to +122° F) |
| Shipping mode: | -40° C to +70° C (-40° F to +158° F) |

NOTE

Thermal change shall not be greater than eight degrees centigrade per hour.

Relative Humidity

| | |
|----------------|--------------------|
| Operating: | 25% to 60% |
| Non-operating: | Any non-condensing |

Altitude

The HP 7976A uses a vacuum column tape transport system which is sensitive to altitude, and requires a pulley change for operation in excess of 2500 feet.

| | |
|----------------|---|
| Operating: | 1 to 2500 feet — normal pulley 2500 to 6500 feet — high altitude pulley Above 6500 feet — not supported |
| Non-operating: | 0 to 50,000 feet — either pulley |

1-5. SAFETY COMPLIANCE

The HP 7976A Magnetic Tape Subsystem is listed by Underwriter's Laboratories, Inc. to UL 478 and certified by the Canadian Standards Association to CSA C22.2#154 for electronic data processing equipment. When equipped with option 011, the HP 7976A subsystem is compliant with IEC 435 and IEC 380 standards.

1-6. SUPPLIES AND ACCESSORIES

Some of the higher usage supplies recommended for use with the HP 7976A Subsystem are listed below. These supplies are available from your local Hewlett-Packard Sales and Service Office (Sales and Service Offices are listed at the back of this manual).



- Tape Head Cleaner 8500-1914
- Foam Swabs (1 package) 9300-0468
- Lint-Free Cloth 9310-4028
- Magnetic Tape 2400 ft. (Box of 10) 92150F
- Magnetic Tape 2400 ft. with Easy Load Cartridge (Box of 10) 92150P
- Tape Cutter/Crimper 92150R
- Easy Load Cartridge for 2400 ft. reel (Box of 10) 92150Q

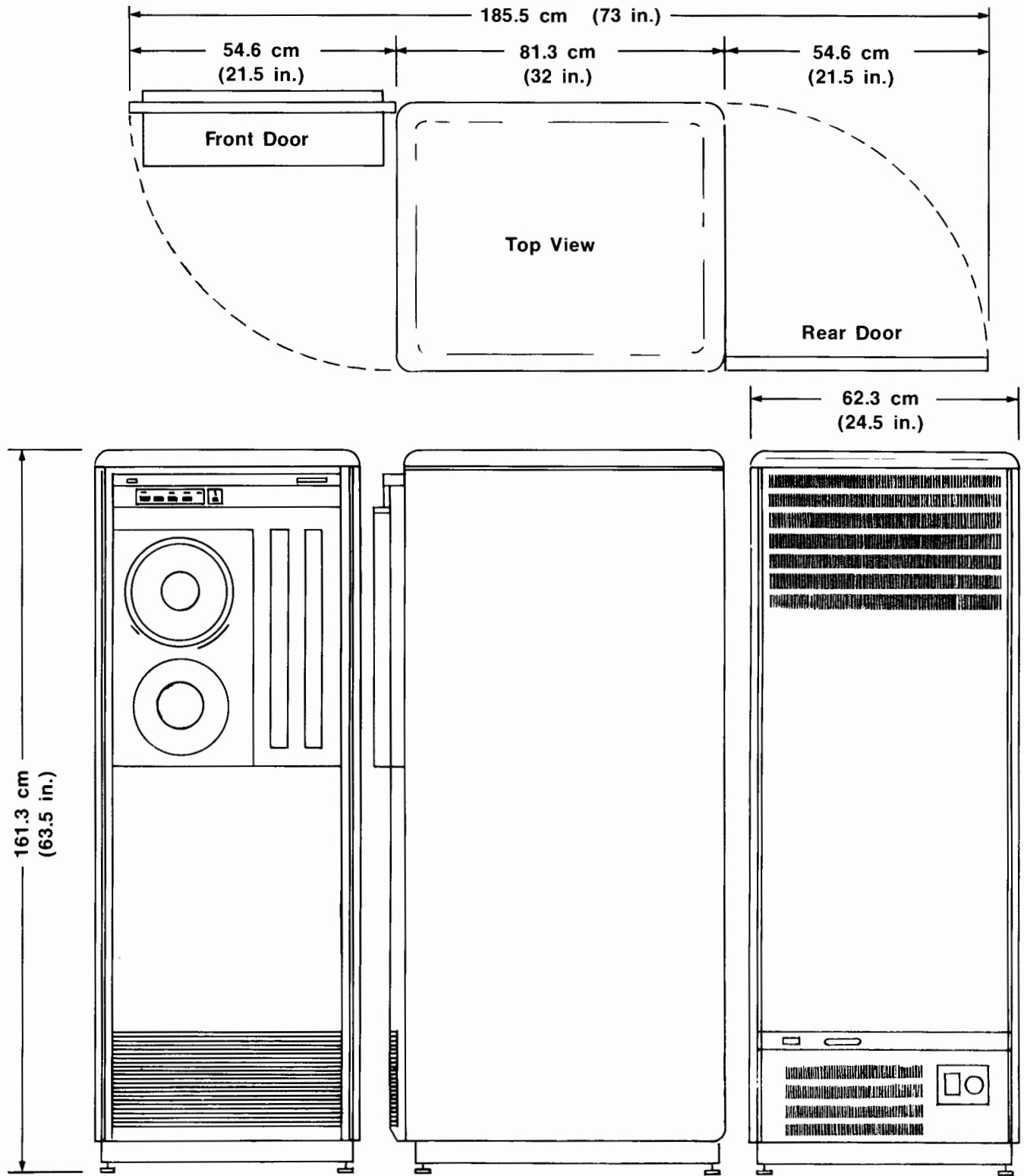


Figure 2-1. HP 7976A Subsystem Dimensions

7976-04-E

2-1. INTRODUCTION

This section contains information pertaining to site selection for the HP 7976A subsystem, unpacking and inspection, installation and connection, initial power-up and checkout, and HP-IB cable and HP-IB address selection procedures.

SECTION II INSTALLATION

2-2. SITE SELECTION

The HP 7976A Magnetic Tape Subsystem is designed for operation in a clean, traffic free environment, preferably an area not subject to excessive shocks, vibrations, or wide ranges of ambient temperature. The area does not have to be air-conditioned to ensure reliable operation, but the environmental specifications listed in paragraph 1-4 (Specifications).

The location of the unit must provide adequate space for opening the front and rear cabinet doors (figure 2-1) for servicing and for maintaining adequate air flow through the front and rear air vents for cooling the cabinet.

2-3. UNPACKING AND INSPECTION

The following instructions describe the uncrating procedure for the HP 7976A Magnetic Tape Subsystem (figure 2-2). This procedure requires a pair of diagonal pliers, an adjustable wrench, a flat-blade screwdriver, and at least two people for unloading the subsystem.

NOTE

Prior to unpacking the subsystem, inspect the shipping container for damage. If damage to the shipping container is evident, request that the carrier's agent be present when the subsystem is unpacked.

Do not destroy or discard the shipping container or shipping material. In case of a damage claim, the shipping container and packing material will be required for reshipment of the subsystem to the factory.

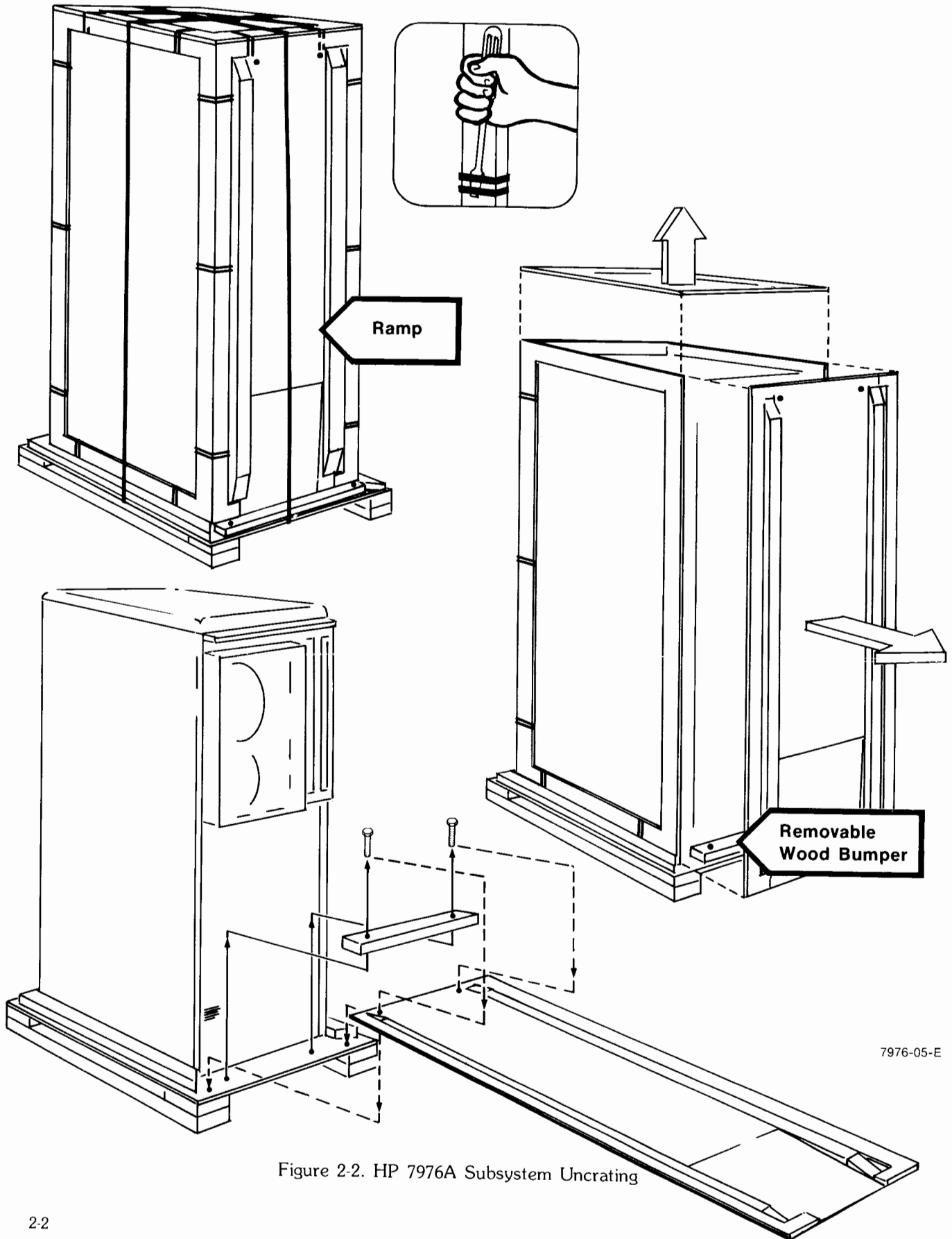


Figure 2-2. HP 7976A Subsystem Uncrating



WARNING

Protective glasses should be worn while cutting the strapping bands around the shipping crate. These straps are under tension and when cut will spring back potentially causing serious eye or other injury.

- a. Cut the strapping bands around the shipping container.
- b. Remove all the clips from around the top of the crate and remove the top cover. The clips can be removed by inserting the blade of a screwdriver under the clip and prying (see figure 2-2).

The shipping crate side panel with the two wood planks (2 by 4s) stapled to the length of the panel, doubles as a ramp. The outside of this panel/ramp is the top of the ramp (refer to figure 2-2).

- c. Remove the wire clips which secure the side panel /ramp to the other side panels and the shipping crate base. Remove the side panel/ramp.
- d. Remove the wire clips from around the base for the three remaining sides.
- e. Pull the three remaining sides, as a unit, away from the base.
- f. Remove the accessories, manuals, and packing material from the top of the cabinet.
- g. Remove the bolts from the wood bumper which secure it to the shipping crate base and remove the bumper. These bolts will be used later to secure the ramp to the crate base.
- h. Place the raised end of the ramp against the side of the base from which the bumper was removed. The ramp will overlap onto the side of the base.
- i. Align the holes in the top edge of the ramp with the holes in the edge of the crate base and insert the bolts removed from the wood bumper. This prevents the ramp from slipping when unloading the subsystem.

CAUTION

The leveler feet on the subsystem are lowered to provide stability during shipping. While unloading the subsystem the leveler feet must be raised, if not they could potentially catch on the crate base during unloading and cause the unit to tip over.

- j. Raise the leveler feet up, off the shipping crate base by turning them in a clockwise direction. Raise the two leveler feet on the ramp side of the unit first. To gain access to the two rear leveler feet push the subsystem, approximately, two inches in the direction of the ramp.

CAUTION

Because the subsystem is heavy and difficult to move, unloading it requires considerable care and two people: one pushing and one guiding.

- k. Carefully, roll the subsystem down the ramp.

If the subsystem appears to have been damaged in shipment, notify the carrier and the nearest Hewlett-Packard Sales and Service Office immediately. Sales and Service Offices are listed at the back of this manual.

2-4. INSTALLATION AND CONNECTION

The following procedure describes installation procedures for the HP 7976A Magnetic Tape Subsystem. After the subsystem has been unpacked and inspected, install the unit as described in the following steps.

- a. Move the HP 7976A subsystem to its operating site (refer to paragraph 2-2, Site Selection).

CAUTION

Move the HP 7976A slowly, if a castor becomes restricted, the momentum of the unit could cause the cabinet to tip over.

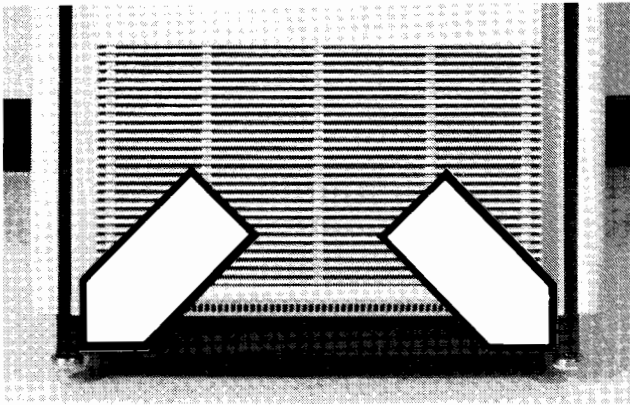


Figure 2-3. Leveler Feet

- b. Adjust the four leveler feet (figure 2-3) downward. When the leveler feet contact the floor use an adjustable wrench on the leveler nut and continue lowering the leveler feet. Raise the cabinet slightly, off its castors, keeping it level.
- c. Set the SYSTEM ON/OFF switch above the operator control panel to OFF.
- d. Set the MAIN POWER breaker on the rear panel to OFF (0).
- e. Connect the ac power cord to the ac power source. Ensure the power source matches the power configuration of the subsystem (refer to paragraph 1-3, Identification).

NOTE

The subsystem is equipped with a specific type of ac line plug as required by certain safety specifications. This plug (U.S. type plug shown below) must not be removed or altered.

NEMA 5-20
20 AMPS. 125 Volts



POWER LINE WIRE CONNECTIONS

| WIRES | USA | INTERNATIONAL |
|---------|-----------------------|---------------|
| LINE | Black | Brown |
| NEUTRAL | White | Blue |
| GROUND | Green or Green/Yellow | Green/Yellow |

Suggested power main breakers (U.S.A. only) are 20amp with type 62 delay curve, available from these vendors:

- SQUARE D QO 120 HM
- HEINEMANN CO1-G3-U-20-120/240/1
- GE THQL1120HM

- f. Connect the HP-IB cable to the interface controller unit and select the HP-IB address for the HP 7976A (refer to paragraph 2-6, HP-IB Cable and HP-IB Address).
- g. Perform the preliminary turn on procedures (refer to paragraph 2-5, Initial Power-Up and Checkout).

2-5. INITIAL POWER-UP AND CHECKOUT

After the HP 7976A subsystem is installed and the power and HP-IB interface cable connections are completed, the subsystem is ready for initial power-up and checkout. If the user is unfamiliar with the operation of the HP 7976A, refer to the *7976A Magnetic Tape Subsystem Operator's Manual* (Part No. 07976-90901). The initial power-up and checkout procedure is described below.

- a. Set the MAIN POWER breaker to ON (1).
- b. Set the SYSTEM ON/OFF switch to ON (the power ON position is indicated by the appearance of a green reflector in the SYSTEM ON/OFF switch pushbutton).
- c. Observe the Self Test indicators; both should flash in unison indicating power-up self test is executing. When self test completes, the PASS indicator should illuminate; if the FAIL indicator illuminates,

an error condition exists which requires servicing (refer to paragraph 3-16, Troubleshooting).

- d. Check and adjust all supply voltages. Refer to the respective (MTU, FCU, and ICU) service manual for the power supply adjustment procedures.
- e. With no tape on the reel, press LOAD on the operator control panel. The vacuum pump should come on. If there is no action, press RESET and then LOAD again. Pressing LOAD a second time, without resetting, turns off the pneumatics and a machine check is flashed on the operator panel SEL/CHK indicator.
- f. To ensure that the thread and load operations function properly, press RESET and LOAD alternately, repeat this cycle three times. The diverter valve on the pump should close when the unit is in the thread mode, and open when the unit is reset.
- g. Mount a scratch tape with a write enable ring inserted. There should be a BOT reflective marker within the first 18 feet (six metres) of the tape.
- h. Press LOAD to bring up the threading pneumatics and manually rotate the supply (file) reel clockwise to thread three to six inches of tape into the threading channel.
- i. Press LOAD again to activate the loading pneumatics. If there is a misload, check the threading path and press RESET and LOAD again. The columns should load and the tape should move forward for about 12 seconds as the unit searches for the BOT marker. If the BOT marker is not sensed after 12 seconds in the forward mode, the tape is searched in the backward mode. When BOT is sensed, the LOAD indicator should light. The loops of tape in the vacuum columns should be positioned approximately in the center of the column.
- j. With tape loaded, perform internal tester maintenance programs 2 and 3 (capstan velocity and capstan ramp checks). Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (07976-90904), section IV, Maintenance for internal tester maintenance programs.
- k. Press ON LINE; the ON LINE indicator should illuminate.
- l. Press LOAD; no tape motion should occur.
- m. Press REWIND; no tape motion should occur.

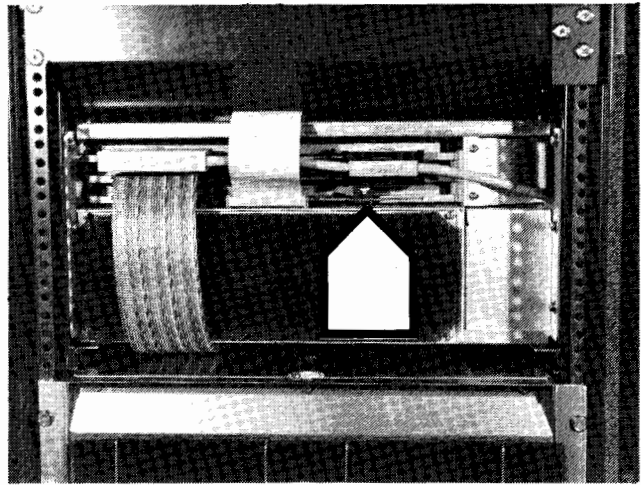


Figure 2-4. HP-IB Address Switch Location

- n. Press RESET; the ON LINE indicator should extinguish.
- o. Press REWIND; the tape should rewind (unload) onto the supply (file) reel.
- p. Perform the semiannual maintenance steps “g” through “o” (refer to paragraph 3-4, Semiannual (2100 hours) Preventive Maintenance).

2-6. HP-IB CABLE AND HP-IB ADDRESS

The HP 7976A subsystem is designed to use Hewlett-Packard interface bus (IEEE-488 1975, HP-IB) protocol. When a host computer using HP-IB protocol selects a bus device, it does so by means of an HP-IB address. HP-IB addresses are selected (by the user) on each bus device using the address switch. The HP 7976A subsystem HP-IB Interface Controller Unit contains an HP-IB address thumb switch, located in the ICU at the front right of the processor PCA (figure 2-4), which must be set to the required address (0 through 7) prior to operation of the subsystem. The HP-IB address switch is set to “1” at the factory. Set this switch for the required address.

The HP-IB interface cable connects the HP 7976A Magnetic Tape Subsystem to the system computer. To install the cable, open the rear cabinet door and secure the HP-IB cable connector to the system connector

using the thumb screws on the cable connector (figure 2-5). In addition, to connecting the cable, the I/O driver cable loading must be adjusted to compensate for the installed cable length.

When an HP-IB cable is connected to the HP 7976A subsystem interface, the cable presents a load to the interface I/O drivers. Various cable lengths present different loads to the I/O drivers. To eliminate possible data loss which can occur when the I/O driver load does not match the cable length load, the HP 7976A incorporates variable I/O driver loading. The I/O driver loading is changed by inserting different dual-in-line resistor packages (DIPs) into the HP-IB LOAD sockets (figure 2-6) contained on the ICU Buffer Memory PCA. The Buffer Memory PCA includes two load DIPs: a "1 LOAD" which furnishes one unit of load and a "2 LOAD" which furnishes two units of loading. One unit of load is designed to compensate for one metre of cable. One or both loads may be installed into either socket. When both loads are installed, the total loading is the sum of the installed loads (three in this case). The HP 7976A subsystem also contains one, fixed, internal design load which must be included when adding loads.

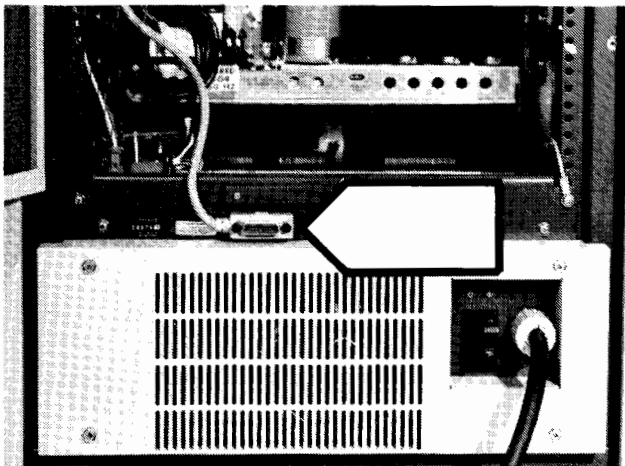


Figure 2-5. HP-IB Cable Connector

When calculating loading and cable length for a system, both the HP 7976A subsystem and the general interface controller (GIC) loading and internal cable lengths must be included. The HP 7976A contains one unit of internal load and two internal metres of cable while the GIC (HP 3000 Series 44) contains seven units of internal design load.

For example, with both the "1 LOAD" and the "2 LOAD" installed, in the HP 7976A subsystem, up to but no more than, nine metres of HP-IB interface cable can be used to connect the HP 7976A subsystem to the system controller. This value is obtained by adding the total units of load and then subtracting the number of internal metres of cable to obtain the maximum metres of HP-IB interface cable.

For example:

| HP 7976A Internal Design Load | | HP 7976A Installed Load (2+1) | | GIC Internal Design Load | | HP 7976A Internal Design Metres | |
|-------------------------------------|---|--|---|--------------------------------|---|---------------------------------------|-----|
| 1 | + | 3 | + | 7 | - | 2 | = 9 |

Up to 9 metres of cable can be added to compensate those nine loads. It is not necessary to use the maximum cable length (nine metres in this case) to compensate the total useable loads in an installation. Any number of metres may be used with the limitation that the cable length, in metres, should not exceed the number of total available loads. For the above example, one metre of cable is acceptable.

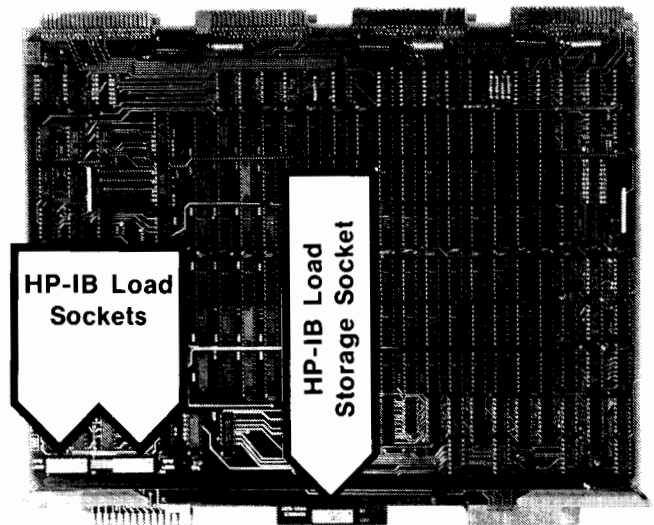


Figure 2-6. Buffer Memory PCA Cable Loading

3-1. INTRODUCTION

This section contains information on preventive maintenance, removal and replacement procedures, subsystem maintenance, and troubleshooting information.

SECTION III MAINTENANCE

3-2. PREVENTIVE MAINTENANCE

In addition to the operator maintenance, described in the *7976A Operator's Manual* (Part No. 07976-90901), the HP 7976A requires more comprehensive preventive maintenance to maintain the subsystem. This additional service maintenance is performed by a Hewlett-Packard service representative and consists of two procedures: a bimonthly (700 hour) preventive maintenance, and a semiannual (2100 hour) preventive maintenance. These procedures are performed at 700 and 2100 hour intervals of subsystem power-on time. To determine power-on time, the HP 7976A is equipped with a run-time meter. This meter indicates, in hours, the subsystem power-on time and is located at the rear of the cabinet panel just below the cabinet door on the power distribution assembly panel (figure 3-1).

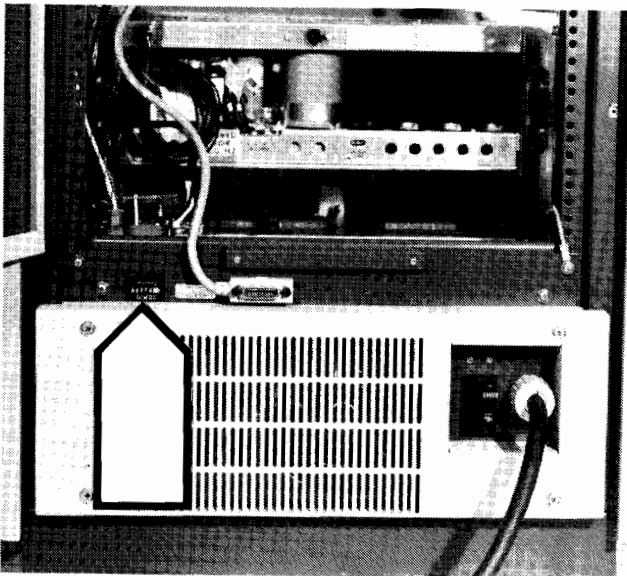


Figure 3-1. Run-Time Meter

The bimonthly and semiannual preventive maintenance procedures are explained in the following paragraphs.

3-3. Bimonthly (700 Hour) Preventive Maintenance

Bimonthly preventive maintenance (PM) includes procedures for cleaning, inspecting, and adjusting the magnetic tape subsystem. Bimonthly preventive maintenance is performed following each 700 hours (as indicated by the run-time meter) of operation. The bimonthly PM procedures are explained below.

- a. Remove power from the subsystem by setting the SYSTEM ON/OFF switch to OFF.
- b. Perform the operator maintenance as described in the *7976A Operator's Manual* (Part No. 07976-90901).

CAUTION

Do NOT use HP Head Cleaner (Trichlorotrifluoroethane) on the hub rubber ring as it will cause the ring to deteriorate.

- c. Clean the hub rubber ring using a lint-free cloth moistened with soap and water and rotate it to a new position. Check the file reel hub for free operation and for the proper distance between the hub and deck. Refer to the *7976A Magnetic Tape Unit (MTU) Field Engineering Maintenance Manual* (Part No. 07976-90904; section 5.5.3, File Reel Adjustment) for the adjustment procedure.
- d. Remove and clean the fixed tape guide components. Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (paragraph 6.6.2, Fixed Tape Guide Components Replacement) for the replacement procedure. Also, inspect tape guide flanges for excessive wear.
- e. Remove the tape cleaner block and clean it with HP Head Cleaner. Check the block for damage in the form of scratches or grooves in the cleaner surface; replace the block if damaged. Refer to the *MTU Field Engineering Maintenance Manual* (section 6.6.7, Cleaner Block Replacement) for the replacement procedures.
- f. Inspect the pneumatics drive belt for folds or cracks and replace it if defective. Refer to the *MTU Field Engineering Maintenance Manual* (sec-

tion 6.9.3, Pneumatics Drive Belt Replacement) for the replacement procedure.

- g. Apply power to the HP 7976A subsystem.
- h. Check all fans for operation. The subsystem contains seven fans: one in the cabinet power distribution assembly, three in the format control unit, two in the interface controller unit, and one at the bottom of the tape unit (refer to the respective service or maintenance manuals for fan locations).
- i. Perform the HP 7976A subsystem diagnostic. For information on HP 7976A subsystem diagnostic refer to the *7976A Subsystem Diagnostic Manual* (Part No. 07976-90906).

3-4. Semiannual (2100 Hours) Preventive Maintenance

Semiannual preventive maintenance is performed at 2100 hour intervals (as indicated by the run-time meter). This maintenance involves cleaning the HP 7976A subsystem and making the following adjustments.

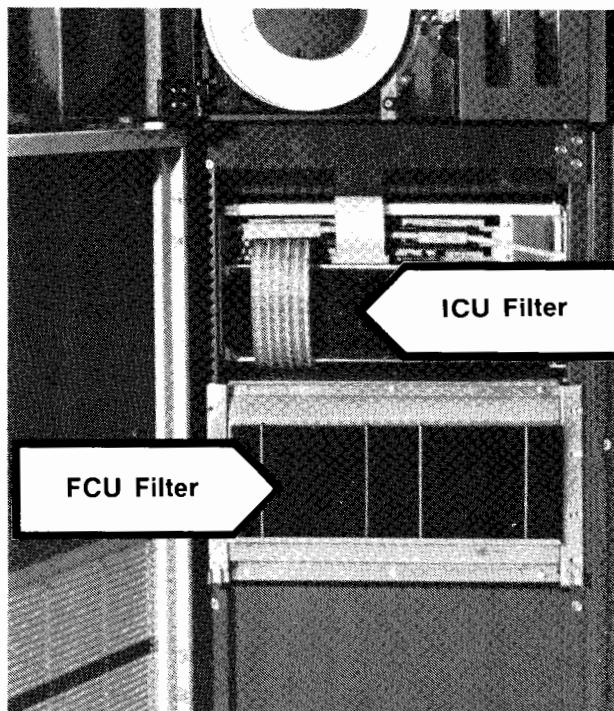


Figure 3-2. HP 7976A Filter Locations

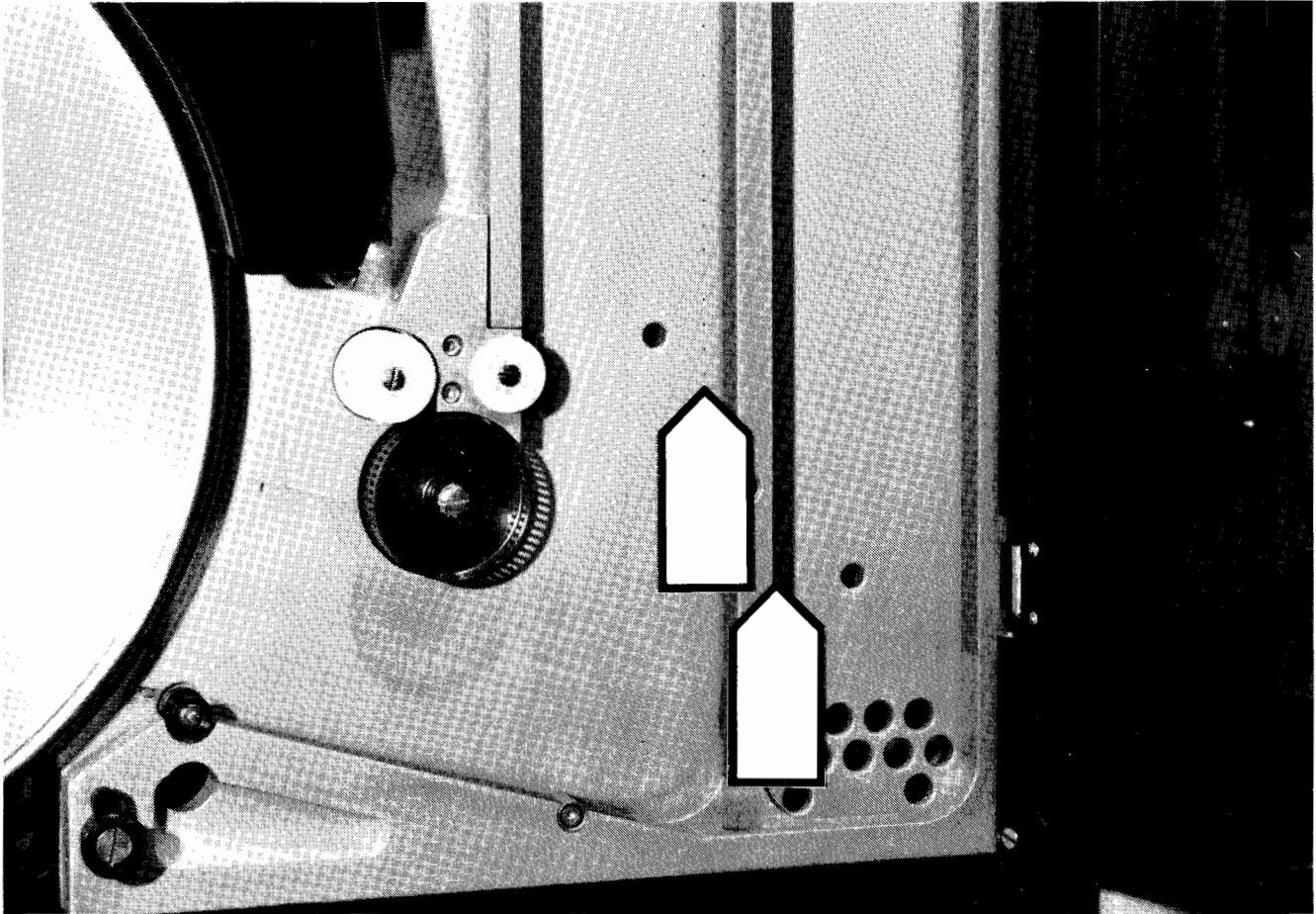


Figure 3-3. Vacuum Column Ports

- a. Remove ac power from the subsystem by setting the SYSTEM ON/OFF switch to OFF.
- b. Perform the bimonthly preventive maintenance procedures (refer to paragraph 3-3, Bimonthly (700 Hour) Preventive Maintenance).
- c. Clean all subsystem filters (figure 3-2).
- d. Clean the vacuum column ports (small holes inside the vacuum columns, see figure 3-3) using a small piece of 30-gauge wire. Moisten the wire with HP Head Cleaner and carefully, insert it into each port. After all ports have been cleaned, clean the column around the ports using a lint-free cloth moistened with HP Head Cleaner and then dry the columns with a lint-free cloth.
- e. Check the pneumatics drive belt tension and adjust as necessary Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.4.2, Pneumatics Drive Belt Tension Adjustment) for the adjustment procedure.
- f. Apply power to the subsystem.

CAUTION

When cleaning the vacuum column port holes, be careful not to damage them. If they are scratched, or the hole diameter changed in any way, the operation of the pneumatics may be adversely affected.

- g. Check the power supply output levels for the MTU, FCU, and ICU and adjust as necessary. For voltage adjustment procedures refer to the unit's service manual: the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.4.1, Power Supply Checks and Adjustments), for the magnetic tape unit; the *FCU Field Engineering Maintenance Manual* (section 5.3.1, Power Supply Adjustment) for the format control unit; and the *ICU Service Manual* (section 3-9, Power Supply Adjustment) for the interface controller unit.
- h. Check the pneumatics operating levels and adjust as necessary. Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.4.3, Pneumatics Adjustments) for the adjustment procedure.
- e. Check the EOT/BOT sensor adjustment and adjust as necessary. Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.4.4, EOT/BOT Sensor Adjustment) for this procedure.
- j. Check the reel servo operating levels and adjust as necessary. Refer to *7976A Magnetic Tape Unit Field* (section 5.4.5, Reel Servo Adjustment) for this procedure.
- k. Required at initial installation only: Check the reel threading and unloading speed, and capstan forward and backward motion by performing the MTU internal tester programs 2, 3, and 4 with no tape loaded. Refer to *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.3.2, Maintenance Programs) for internal tester program procedures.
- l. Check the capstan velocity and ramp, and adjust as necessary. Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.4.6, Capstan Adjustment) for adjustment procedures.
- m. Check the file protect mechanism for proper operation and adjust as required. Refer to the *MTU Field Engineering Maintenance Manual* (section 5.5.5, steps 8 and 9) for the adjustment procedure.
- n. Check the rewind function for proper operation.
- o. Check for proper alignment of the capstan and readjust if required. Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.4.7, Capstan Alignment) for the alignment and adjustment procedure.
- p. Check the read/write head for proper alignment and adjust skew as necessary. Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.4.8, Read/Write Head Alignment) for procedure. This check is crucial if capstan realignment was required in the preceding step.
- q. Read 3200 flux reversals per inch (all 1s in PE mode) and connect an oscilloscope across the read preamp test points. Replace the read/write head if the read signal amplitude falls below 0.5 volts peak-to-peak (1.0 volt is nominal). Replace the read/write head if the forward/backward signal amplitude ratio exceeds 2 to 1.
- r. Check the recording envelopes. Refer to the *7976A Magnetic Tape Unit Field Engineering Maintenance Manual* (section 5.4.8.3, Envelope Check) for this procedure.
- s. Perform the HP 7976A subsystem diagnostic. For more information on the HP 7976A subsystem diagnostic refer to the *7976A Subsystem Diagnostic Manual* (Part No. 07976-90906).

3-5. REMOVAL AND REPLACEMENT PROCEDURES

This section covers removal and replacement procedures for the cabinet doors and side panels, power switch panel, power distribution assembly, tape unit exhaust assembly, interface controller unit, and the format control unit. Disassembly of the tape unit, format control unit, and the interface controller unit are explained in their respective service manuals.

Removal of the tape unit from the cabinet is not recommended because of the weight of the unit and the extreme difficulty involved in maneuvering it from the cabinet.

3-6. Doors and Side Panels

The cabinet doors, front and rear, are removed by removing the screw(s) (one for the front door and two



for the rear door) from the door, opening the door 90 degrees, and lifting straight up (approximately one and one-half inch). To remove the cabinet side panels (figure 4-1, item 8) proceed as described below.

a. Remove power from the subsystem by setting the SYSTEM ON/OFF switch to OFF.

b. Open the tape unit casting. To open the casting, open the tape unit front cover door, locate the latch screw access hold (figure 3-4), and with a straight-blade screwdriver, rotate the tape unit latch screw counterclockwise until the casting latch-screw is free, allowing the casting to open.

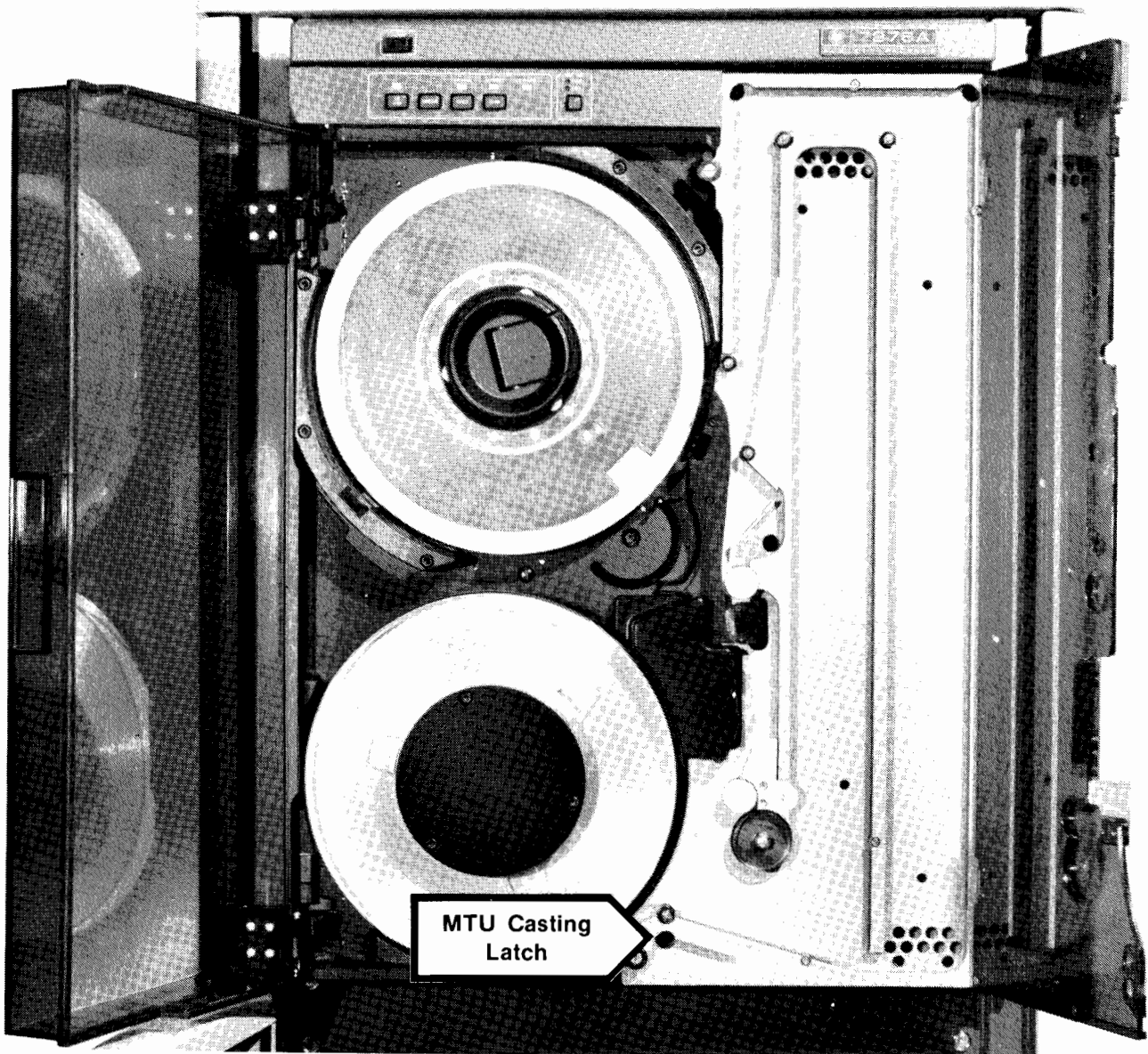


Figure 3-4. HP 7976A Magnetic Tape Unit Casting Latch

- c. Remove the MTU side panels (figure 4-1, item 14) by removing the two screws on the inside edge of the panels.
- d. Open the front and rear cabinet doors.
- e. Remove the fan grill cover (figure 4-1, item 33) from the rear of the cabinet by removing the screws at the four corners of the grill.
- f. Remove the six side panel screws from each panel to free the panels. Three of the screws are in the front inside edge of the panel and three are in the rear inside edge.

Replace these side panels in reverse order of the above removal procedure. When replacing these panels, two people may be required, as the panels are heavy.

3-7. Power Switch Panel

To remove the power switch panel (figure 4-1, item 32), proceed as described below.

- a. Disconnect the power to the subsystem by removing the ac power cord from the power receptacle.
- b. Open the MTU casting (refer to paragraph 3-6, Doors and Side Panels, step b.).
- c. Remove the two screws on the inside edge of each MTU side panel (figure 4-1, item 14). and remove the panels.

WARNING

Line voltage is present at the SYSTEM ON/OFF switch. When working in this area make certain the subsystem ac power cord is removed from the ac receptacle or the circuit breaker is in the OFF position to avoid shock hazard.

- d. Remove the two screws from either side of the power switch panel and disconnect the power switch cable connector to free the power switch panel.

Replace the power switch panel in reverse order of the above removal procedure. When replacing this panel, push it upward while tightening the panel screws to ensure that the panel clears the MTU casting.

3-8. Power Distribution Assembly

To remove the Power Distribution Assembly (07976-60019), proceed as described below.

- a. Disconnect ac power from the subsystem by unplugging the ac power cord from the ac receptacle.
- b. Open the rear cabinet door.
- c. Use a 9/64 inch hex key to remove the two hex nuts which secure the power distribution terminal block shield (clear plastic cover) to the shield standoffs (see figure 3-5) and remove the shield.

WARNING

The ac power cord must be removed from the ac power receptacle to avoid possible potential shock. Switching the SYSTEM ON/OFF switch or Main Power Circuit breaker to OFF does not remove power from all locations in the power distribution assembly.

- d. Remove the three nuts from the terminal posts on the power distribution terminal block which secure the MTU, FCU, and ICU power cord lugs. Disconnect the three power cords from the terminal block.
- e. Disconnect the braided ground strap (see figure 3-5), secured to the cabinet frame on the right side of the power distribution assembly, by removing the screw from the cabinet main frame.
- f. Disconnect the HP-IB cable connector by removing the two thumb screws which secure it to the power distribution assembly (figure 3-5).
- g. Unplug the SYSTEM ON/OFF switch cable connector (see figure 3-5) from the distribution assembly.
- h. Remove the fan grill cover (figure 4-1, item 33) by removing the fan grill cover screws at the four corners of the grill cover (see figure 3-5).
- i. Remove the power distribution assembly by removing the Power Distribution Assembly screws at the four corners of the assembly (see figure 3-5) and pulling the assembly from the cabinet.

Replace the power distribution assembly in reverse order of the above removal procedure. Ensure that the ground strap is reconnected prior to operation of the unit.

3-9. MTU Exhaust Assembly

To remove the MTU Exhaust Assembly (figure 4-1, items 2, 3, 12, 23, and 35), proceed as described below.

- a. Remove power from the subsystem by setting the subsystem MAIN POWER breaker to OFF (0).
- b. Open the MTU casting and the front and rear cabinet doors (refer to paragraph 3-6, Doors and Side Panel, step b.).

- c. Free the end of the exhaust hose, fastened to the MTU diverter valve, by loosening the hose clamp around the hose.
- d. Remove the two screws which secure the exhaust output box (figure 4-1, item 23) at the top left corner of the rear cabinet door opening.
- e. Remove the four screws which secure the exhaust muffler bracket (figure 4-1, item 12) to the right front and right rear of the cabinet frame, then drop the bracket with the muffler and hoses down and pull it from the cabinet.

Replace the assembly in reverse order of the above removal procedure.

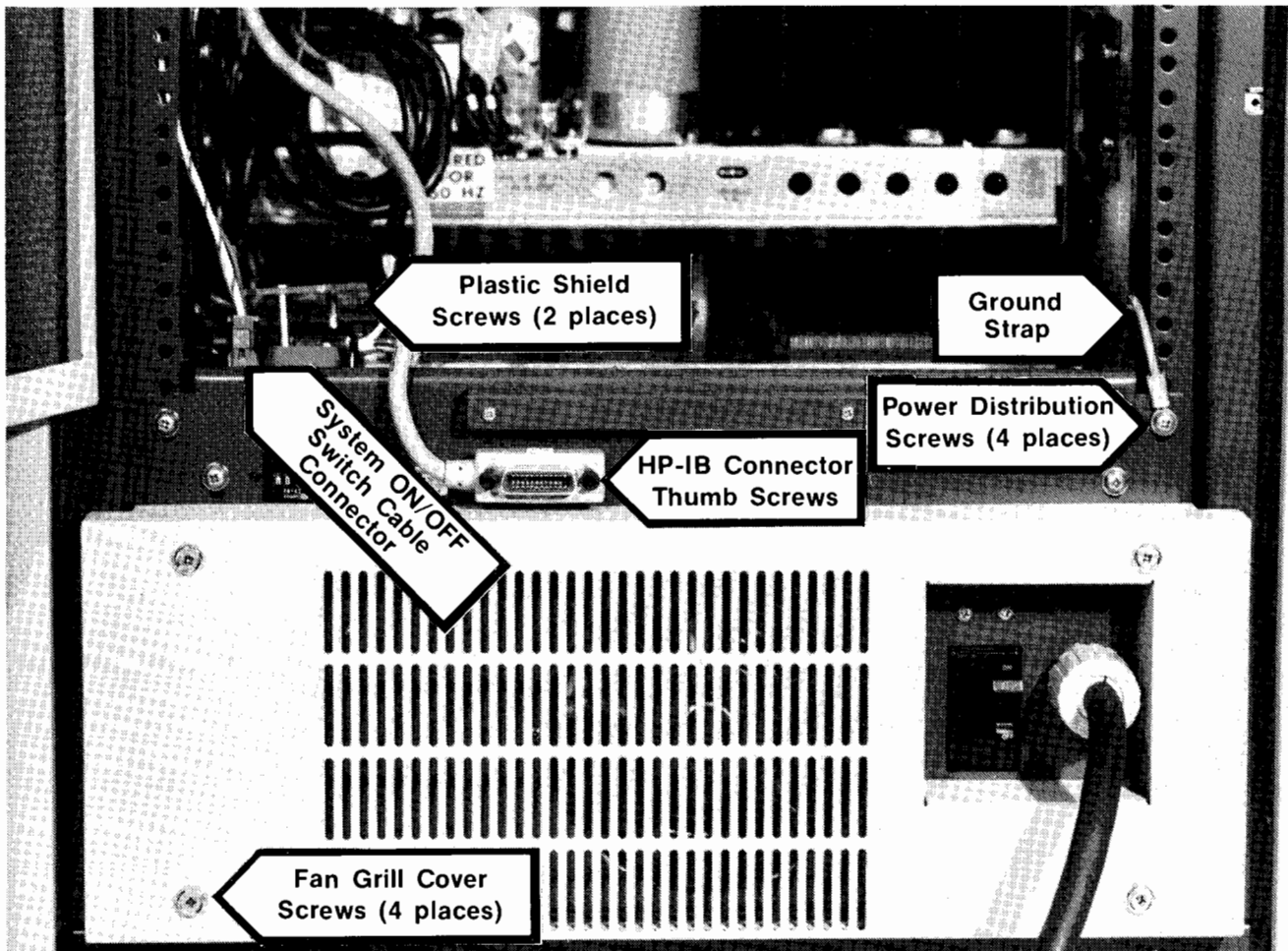


Figure 3-5. Power Distribution Assembly

3-10. HP-IB Interface Controller Unit

To remove the HP-IB Interface Controller Unit (07976-60016), proceed as described below (see figure 4-1).

- a. Remove power from the subsystem by setting the MAIN POWER breaker to OFF (0).

WARNING

The power must be removed from the system when working around the power distribution assembly to avoid potential shock hazard.

- b. Open the cabinet front and rear doors.
- c. Disconnect the ICU power cord from the power distribution terminal block (refer to paragraph 3-8, Power Distribution Assembly, steps b, c, and d).
- d. Unplug the HP-IB cable and the ribbon cable from the front of the HP-IB interface controller unit.
- e. Remove the 12 screws, three at each corner, which secure the interface controller to the cabinet mainframe. Once these screws are removed, the ICU will rest on the format control unit brackets and can be slid out of the cabinet.

Replace the Interface Controller Unit in reverse order of the above removal procedure.

3-11. Format Control Unit

To remove the format control unit from the HP 7976A subsystem, proceed as described below (see figure 4-1).

- a. Remove power from the subsystem by switching the MAIN POWER breaker to OFF (0).
- b. Open the rear cabinet door (refer to paragraph 3-6, Doors and Side Panels).

WARNING

AC power must be removed from the subsystem when working around the power distribution assembly to avoid potential shock hazard.

- b. Disconnect the FCU power cord from the power distribution terminal block (refer to paragraph 3-8, Power Distribution Assembly, steps b, c, and d)
- c. Unplug the ribbon cables from the rear of the format control unit.
- d. Open the front cabinet door and remove the four screws from the front of the format control unit.

WARNING

The FCU is heavy. When removing it from the subsystem cabinet, it is advisable for two persons to perform the removal procedure.

- e. Pull the FCU out the front of the cabinet as far as it will come. To release the FCU from its side rails, press in on the two side rail catches (figure 3-6) and carefully pull the unit free from the side rails.

Reinstall the FCU in the reverse order of the above removal steps. Also, when pushing the FCU back into the rack be careful not to pinch the FCU cables.

3-12. SUBSYSTEM MAINTENANCE

This section covers maintenance requirements for the power distribution assembly, the magnetic tape unit (MTU) operator control panel, subsystem cabling, and

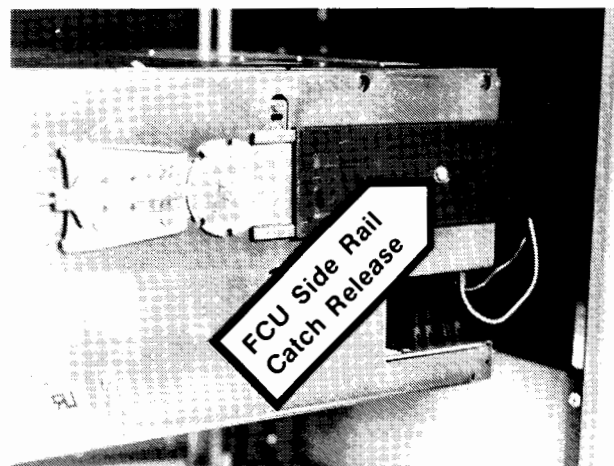


Figure 3-6. FCU Side Rail Latch Release Location

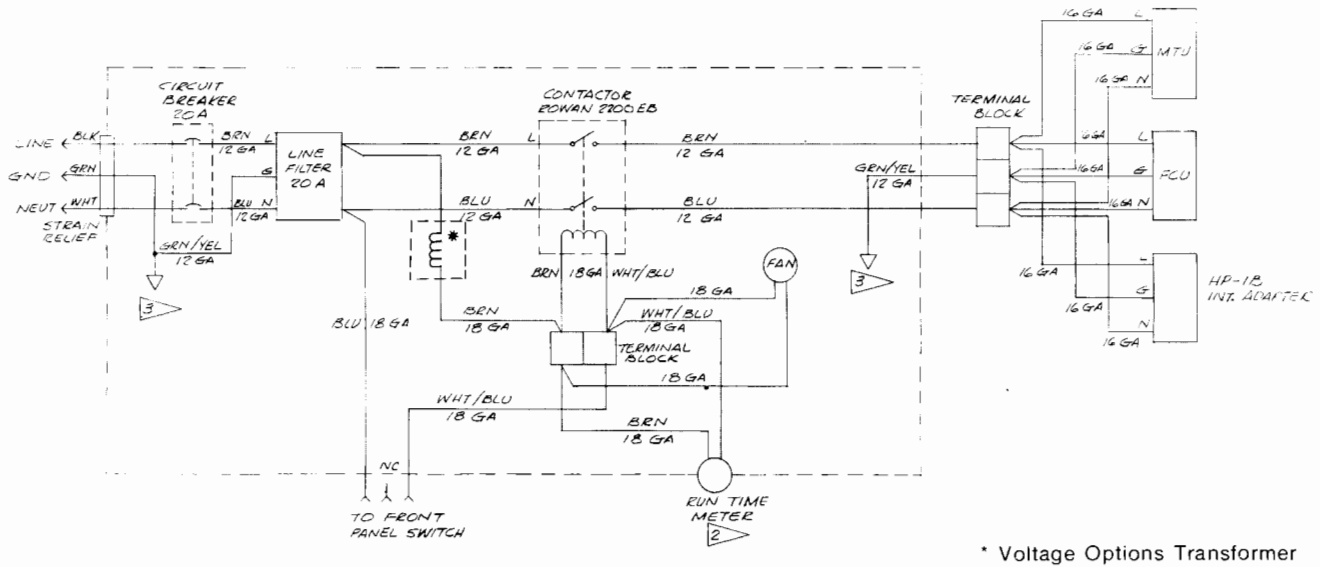


Figure 3-7. Power Distribution Circuitry

troubleshooting information. Maintenance information for the magnetic tape unit (MTU), the format control unit (FCU), and the interface controller unit (ICU) is covered in their respective service manuals.

3-13. Power Distribution Assembly

The HP 7976A Power Distribution Assembly provides switching and distribution of ac line voltage from the ac power input to the HP 7976A subsystem electronics (MTU, FCU, and ICU). This assembly includes a 20 ampere circuit breaker (see figure 3-7) for current overload protection, a line filter for reducing noise reflected back to the ac line, and a remote activated contactor switch for switching power through the distribution assembly. The contactor switch is enabled by operation of the SYSTEM ON/OFF switch on the operator panel. When the SYSTEM ON/OFF switch is in the

ON position, the circuit for the contactor relay coil is completed. This energizes the coil, making the contactor connection which completes the ac power connection through the distribution assembly. In addition to completing the contactor coil circuit the SYSTEM ON/OFF switch also completes the circuit for the run-time meter and the cabinet fan.

The HP 7976A subsystem options #011 (220v, 50Hz), #015 (220v, 60Hz), and #017 (240v, 60Hz) contain an additional transformer (see figure 3-7) located between the line filter contactor and fan and run-time meter to reduce the higher line voltages to the required voltage level for operation of the contactor relay, run-time meter, and cabinet fan. The line voltage selection for the MTU, FCU, and ICU is accomplished within each unit's power supply. Refer to the specific service manual for the line voltage selection procedure.

3-14. MTU Operator Control Panel

All operator interface with the HP 7976A subsystem is accomplished through the operator control panel. The operator control panel, located at the top, front of the MTU casting, consists of two printed circuit assemblies (PCAs) and the cover panel. The PCAs contain the operator switches, light emitting diodes (LEDs) and other circuitry necessary to perform the subsystem operator MTU and self test interface operations.

The operator control panel circuitry (figure 3-8) can be divided into two sections. One section controls the operator Self Test interface function with the ICU and the other section controls the operator MTU interface functions with the MTU. The MTU electronics on the operator control panel PCAs include four pushbutton switches (ON LINE, REWIND, RESET, and LOAD) and four LED indicators (ON LINE, SEL/CHK, BOT/EOT, and FILE PROTECT). Signals generated by the switches on the operator LED/switch panel PCA (07976-60005) are fed directly through the operator panel control PCA (07976-60008) to the MTU. The MTU will, if able, execute the operator panel LEDs. The LED signals are applied to the LEDs through a peripheral driver circuit (U4) to provide additional drive current. A low on the LED signal line illuminates the corresponding LED. For more information on the MTU operator control signals, refer to the *Magnetic Tape Unit (MTU) Field Engineering Maintenance Manual* (Part No. 07976-90904).

The self test control electronics consist of the self test switch, PASS and FAIL LEDs, and associated circuitry. The operator self test electronics connect to the HP-IB interface controller unit (ICU) which controls the self test operation. The ICU reads and writes data to the operator panel via the panel bus (PBUS). Data written to the PBUS includes the loopback bit and the pass and fail self test status; data read from the bus includes self test switch state and the loopback bit. To write data to the operator control panel, the ICU processor sets the control panel read/write control lines PADDR0 = 0, PADDR1 = 0, RDPNL = 1, and toggles WRPNL from 0 to 1. This allows the PBUS data, LED signals and loopback bit (PBUS7), to be input into latch U5 on the rising edge of WRPNL signal. The pass and fail signals are then fed to their respective LEDs through driver U4. The loopback bit is looped from the output

of U5 pin 9 to the input of buffer U6 pin 2, thus, during a read operation the loopback bit can be read. By writing alternate states on the PBUS7 (loopback bit) and reading after each write, the ICU can check the continuity of the PBUS bus.

The data read from the PBUS by the ICU includes the operator panel self test switch state and the loopback bit. The self test state is fed from the Operator LED/Switch Panel PCA (07976-60005) to tristate buffer U6 on the Operator Panel Control PCA (07976-60008). The loopback bit from the output of the write latch is also fed to the buffer. To read data the ICU sets PADDR0 = 0, PADDR1 = 0, \sim RDPNL = 0, and \sim WRPNL = 1. This enables decoder U3 to place the data onto the panel bus (PBUS).

The ICU monitors the operator panel for changes in the self test switch state by reading the PBUS. When the self test switch is enabled the ICU will run self test. One of the self test routines checks the PBUS by writing and reading the loopback bit to and from the bus to check for bus continuity. At the completion of self test the ICU writes the pass and fail status to the PASS and FAIL LEDs.

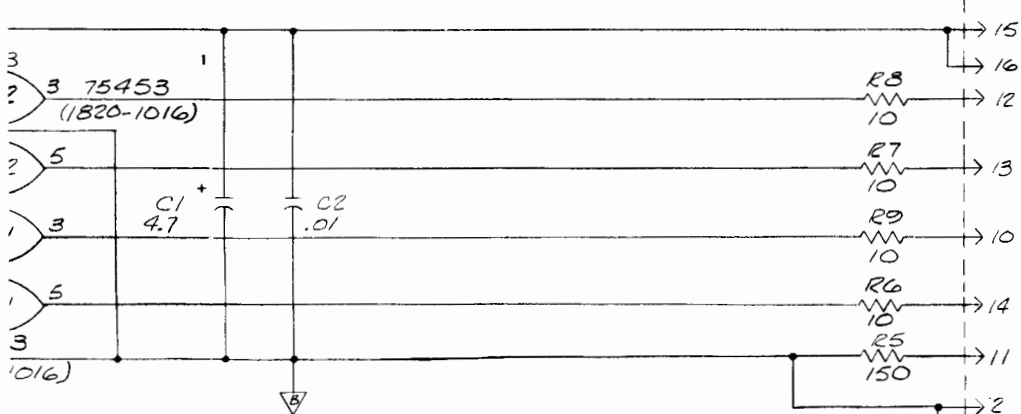
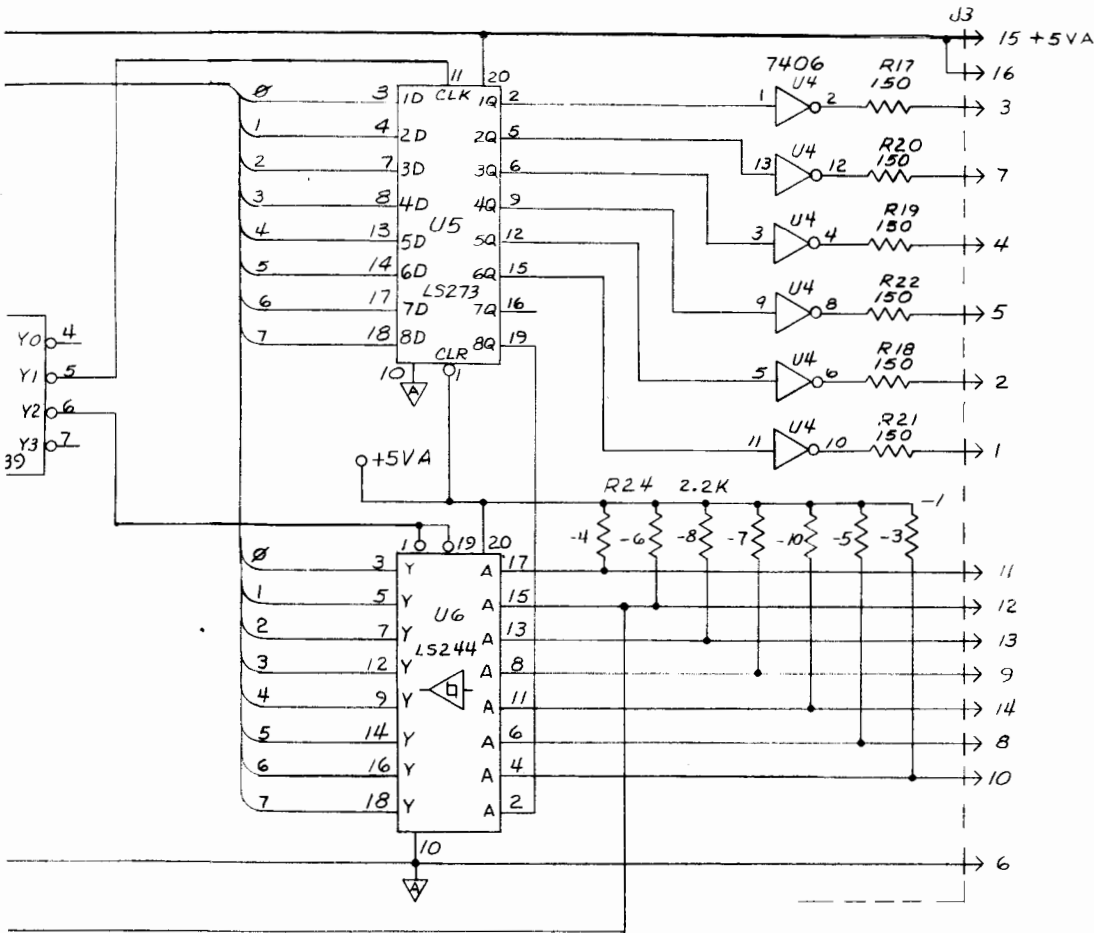
3-15. Cabling

The HP 7976A subsystem internal cabling diagram is illustrated in figure 3-9.

3-16. TROUBLESHOOTING

Troubleshooting the HP 7976A subsystem is accomplished primarily with off-line diagnostic programs. Two programs, the subsystem diagnostic and the self test diagnostic, identify subsystem (MTU, FCU, and ICU) circuit failures. These programs are designed to locate the circuit board on which the circuit failure is most likely to occur. The HP 7976A subsystem troubleshooting techniques have been designed to locate circuit malfunctions down to a circuit board level only. Once a bad circuit board has been identified that board is replaced with a known good assembly. Both the self test and diagnostic programs identify the PCA which has failed.

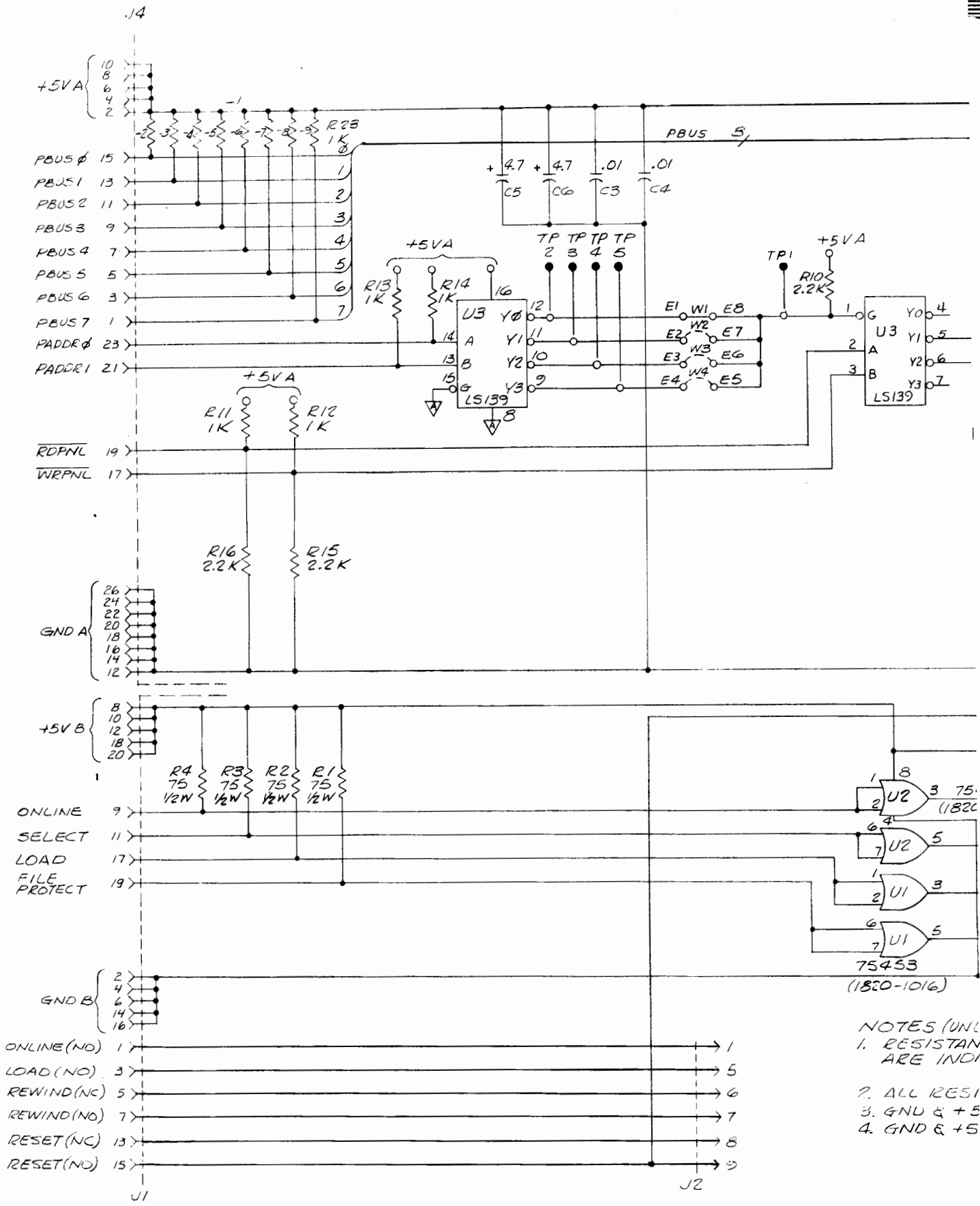
The self test program checks the circuitry in the interface controller unit, while the subsystem diagnostic checks the magnetic tape unit and the format control



RES (UNLESS OTHERWISE SPECIFIED):
 RESISTANCE & CAPACITANCE VALUES
 AS INDICATED IN OHMS & MICROFARADS

ALL RESISTORS ARE 1/4 W, 5%
 1D & +5V A PROVIDED BY HP FRONT PANEL & INTERFACE
 1D & +5V B PROVIDED BY STC FORMATTER UNIT

Figure 3-8. Operator Control Panel Schematic



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 2. ALL RESI
 3. GND & +5
 4. GND & +5

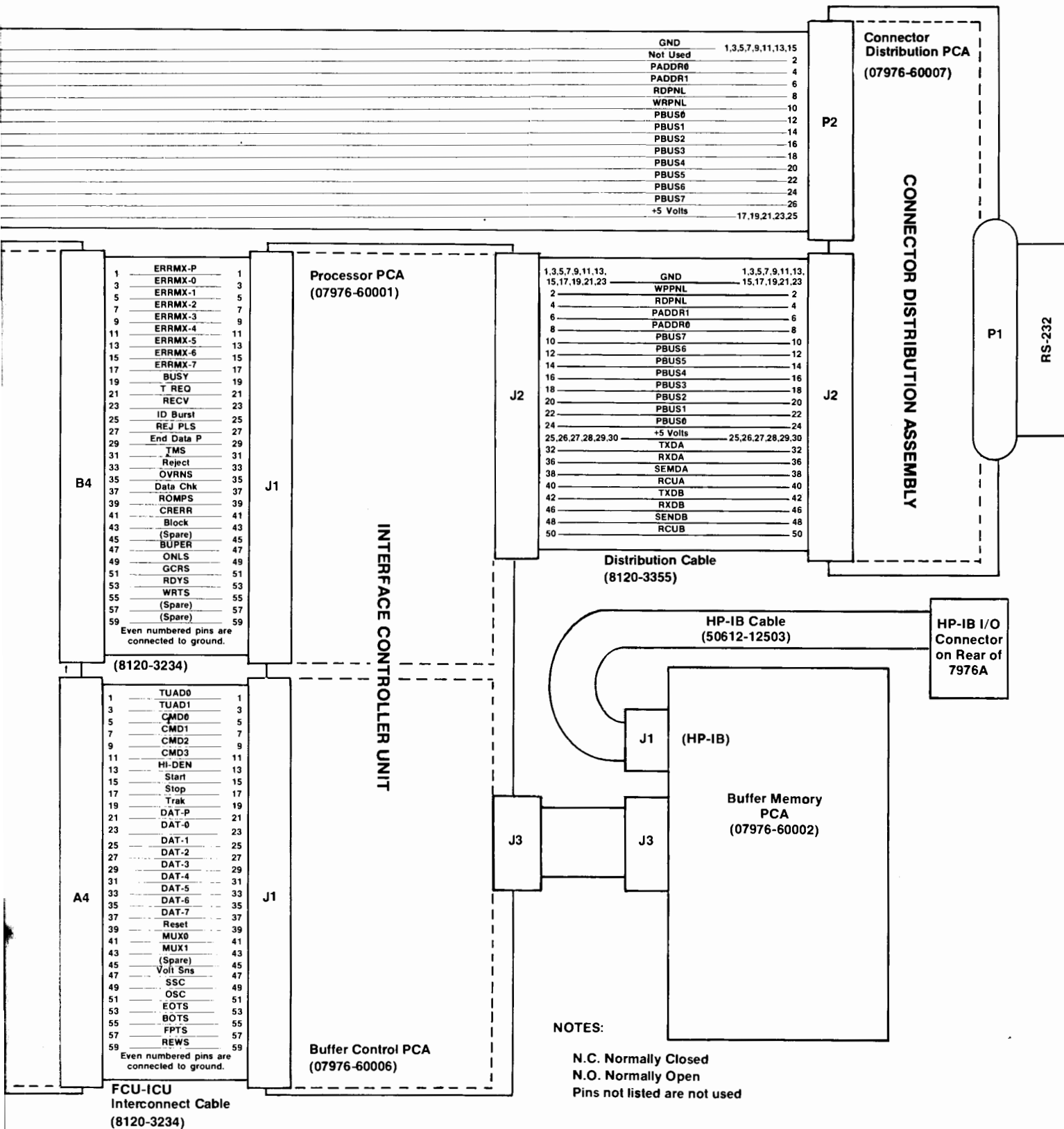
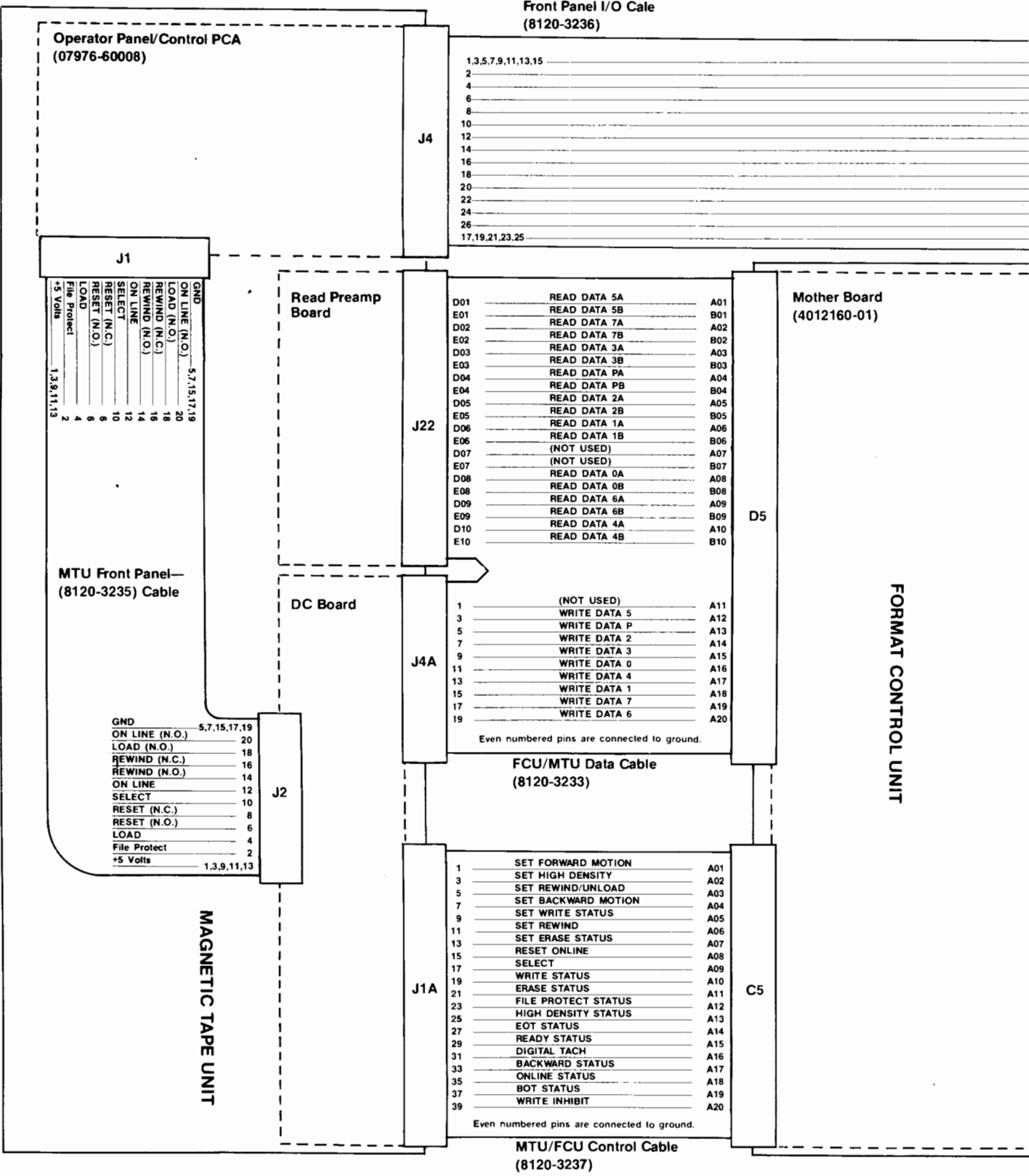


Figure 3-9. HP 7976A Internal Cabling Diagram



4-1. INTRODUCTION

This section of the manual provides listing of replaceable parts and illustrated parts breakdowns for these parts for the magnetic tape subsystem. Parts ordering information is also covered in this section.

4-2. DESCRIPTION OF PARTS LISTS

The parts lists contain three columns which furnish the following information for each replaceable part.

- a. REF. DES./INDEX NO. This column lists the reference designator or index number (item callout number) which identifies each part in the appropriate illustrated parts breakdown (IPB). Asterisks are entered to the left of any entry which varies from the basic parts list or is changed in later versions of the magnetic tape subsystem. Entries are arranged alphanumerically
- b. DESCRIPTION. This column gives the name and a brief description of the part.
- c. HP PART NO. This column lists the Hewlett-Packard part number for each part.



4-3. PARTS ORDERING PROCEDURE

To order parts from Hewlett-Packard, or to obtain further information about parts, address the order or inquiry to the nearest Hewlett-Packard Sales and Service Office. Sales and Service Offices are listed at the back of this manual. When ordering parts from Hewlett-Packard, give the following information on each part:

- a. Model and serial number of the subsystem
- b. Hewlett-Packard part number
- c. Description of the part
- d. Circuit reference designator or index number, if applicable
- e. If the part is installed on a PCA, include the series code which is stamped or etched on the PCA

4-4. ILLUSTRATED PARTS BREAKDOWNS AND PARTS LISTS

Illustrated parts breakdowns and replaceable parts lists are provided on the following pages.

SECTION IV REPLACEMENT PARTS

TABLE 4-1. 7976A TOP LEVEL ASSEMBLY PARTS LIST

| INDEX NO./REF. DES. | DESCRIPTION | HP PART NO. |
|---------------------|-------------------|-------------|
| 1 | NIPPLE-MALE | 0100-0629 |
| 2 | TUBING-FLX CORR | 0890-1404 |
| 3 | NUT-RIGID CONDUIT | 0570-1177 |
| 4 | SCREW-MAC 4-40 | 2200-0762 |
| 6 | WSHR CUP #10 | 3050-0007 |
| 7 | WSHR FLR CUP #10 | 3050-0248 |
| 8 | CABINET | 29431C |
| 9 | PNL:FRNT LWR | 07976-00022 |
| 10 | PNL:FRNT UPPER | 07976-00023 |
| 11 | BKT:AIR DIVERTER | 07976-00026 |
| 12 | BKT:AIR DEFLTR | 07976-00027 |
| 13 | BKT:MTU MNTNG RT | 07976-00028 |
| 16 | PANEL: FRONT | 07976-00031 |
| 17 | BRACKET: TRIM | 07976-00032 |
| 18 | MNTNG BKT RIGHT | 07976-00034 |
| 19 | MNTNG:BKT LEFT | 07976-00033 |
| 20 | MNTNG SPACER | 07976-00041 |
| 21 | AIR SHIELD REAR | 07976-00043 |
| 22 | ACUSTIC FOAM | 07976-00052 |
| 23 | BOX: EXHAUST | 07976-00060 |
| 24 | LBL:NAMEPLATE | 07976-00065 |
| 25 | BAR: MOUNTING | 07976-20002 |
| 26 | BAR:MOUNTING MTU | 07976-20006 |
| 27 | ASY:MTU CNTL PNL | 07976-60010 |
| 28 | ASSY: FINAL HPIB | 07976-60016 |
| 29 | ASSY:PWR DIST | 07976-60019 |
| | 220V 50HZ | 07976-60056 |
| | 240V 60HZ | 07976-60057 |
| | 100V 50HZ | 07976-60058 |
| 30 | ASSY: FRONT DOOR | 07976-60022 |
| 32 | ASSY: PWR SW PNL | 07976-60029 |
| 33 | ASSY:FAN GRILL | 07976-60036 |
| 36 | NUT-SHEETMETAL | 0590-0804 |
| 37 | SCR:#10-32X.625 | 2680-0106 |
| 39 | SCR:POZ1 10-32 | 2680-0105 |
| 40 | WASHER:LOCK #10 | 2190-0034 |
| 41 | WSHR:FLAT #10 | 3050-0019 |
| 43 | SCREW:SKT HD CAP | 3020-0012 |
| 44 | WASHER:FLAT 1/4 | 2190-0421 |
| 45 | NUT-HEX 1/4-28D | 2950-0135 |
| 46 | WSHR:FLAT #8 | 3050-0001 |
| 47 | SCR:8-32 .75 PAN | 2510-0111 |
| 48 | WASHER LOCK | 2190-0010 |
| 49 | SCR:4-40 .25 PAN | 2200-0139 |
| 50 | WSHR:LOCK #4 | 2190-0003 |
| 51 | SCR:6-32 .375PAN | 2360-0197 |
| 52 | WSHR:LOCK HEL #6 | 2190-0851 |
| 53 | WSHR #6 FLAT | 3050-0010 |
| 54 | PCA:CONN DIST | 07976-60007 |

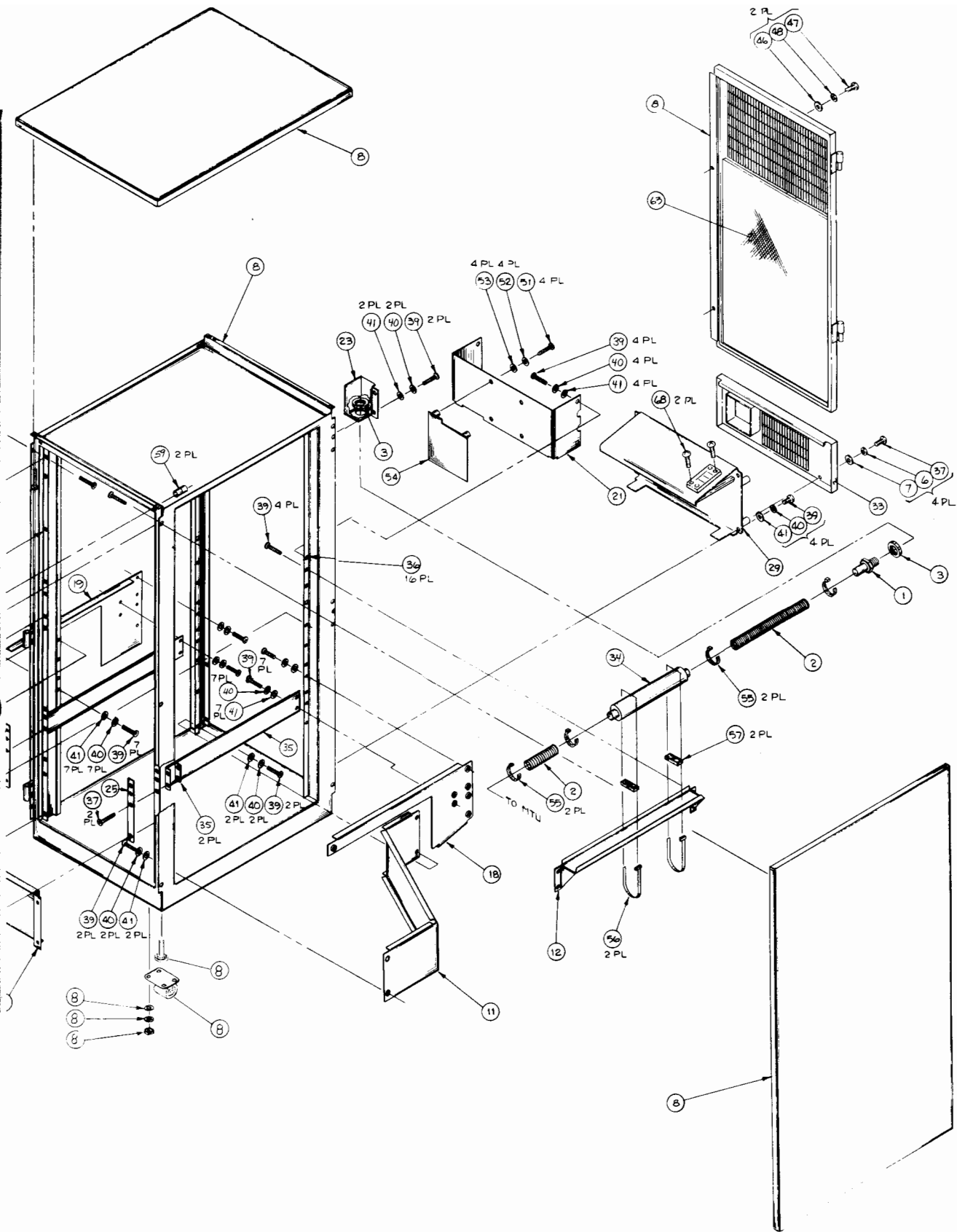


Figure 4-1. HP 7976A Top Level Assembly, Exploded View

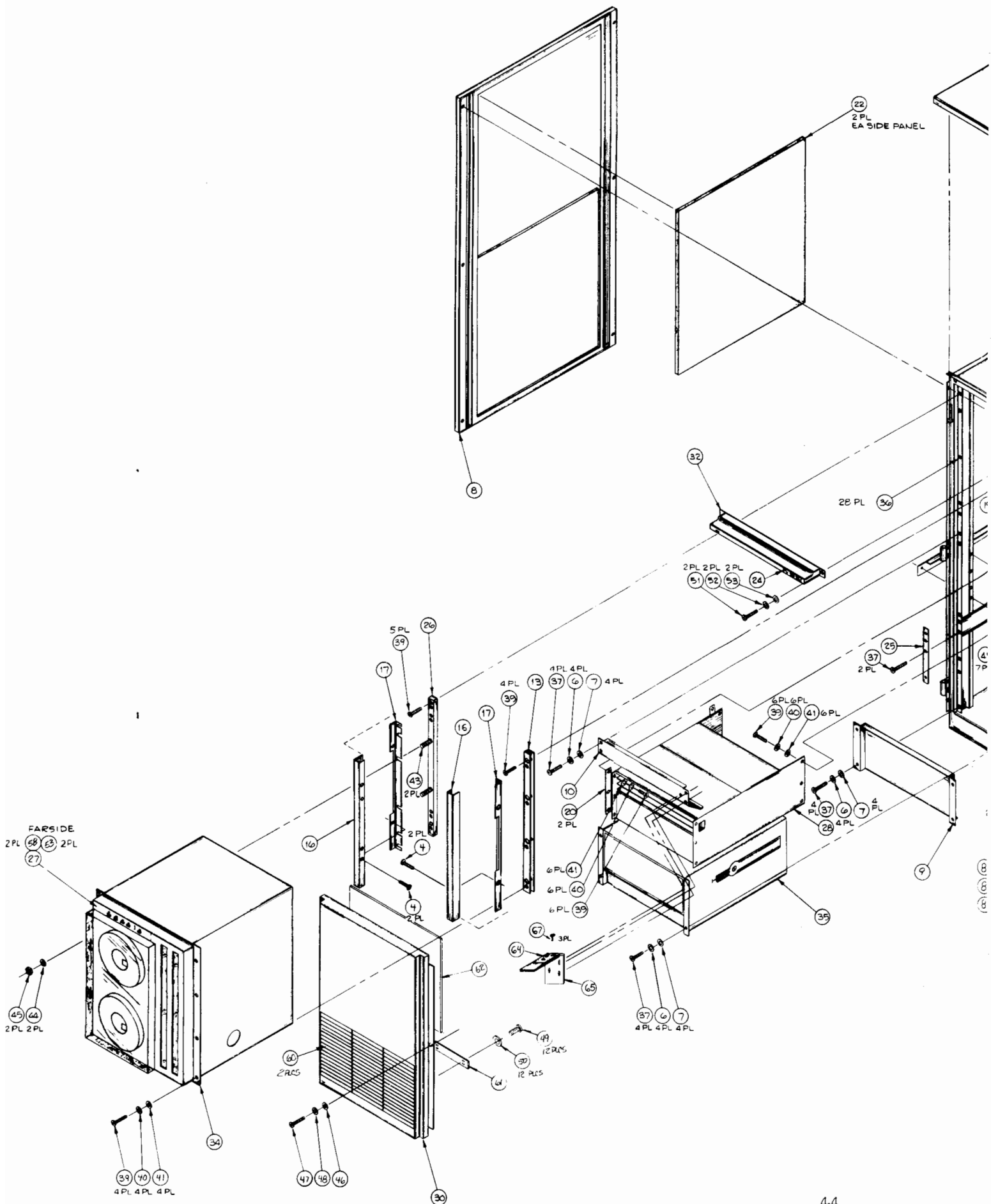


TABLE 4-1. 7976A TOP LEVEL ASSEMBLY PARTS LIST (continued)

| INDEX NO./REF. DES. | DESCRIPTION | HP PART NO. |
|---------------------|------------------|-------------|
| 55 | CLP:WORM GR HOSE | 1400-0563 |
| 56 | CABLE TIE | 1400-0776 |
| 57 | TAPE:SPONGE RBR | 0460-1482 |
| 58 | TS 6-32 .500LG | 0624-0208 |
| 59 | THREADED INSERT | 0590-1334 |
| 60 | FRNT DR VENT | 07976-40001 |
| 61 | BRACE:FT DR VNT | 07976-00067 |
| 62 | FOAM:FRT DOOR | 07976-00004 |
| 63 | FOAM:REAR DOOR | 07976-00007 |
| 64 | PAD:LIFTER | 07976-20012 |
| 65 | BRKT:LIFTER | 07976-20011 |
| 67 | SCR:MACH M2.5X6 | 0515-0150 |
| 68 | SCR:MACH 10-32 | T-2680-0071 |

TABLE 4-2. POWER DISTRIBUTION ASSEMBLY (07976-60019) PARTS LIST

| INDEX NO./REF. DES. | DESCRIPTION | HP PART NO. |
|---------------------|------------------|-------------|
| 2 | METER; HOUR | 1120-1589 |
| 3 | FAN-TUBEAXIAL | 3160-0364 |
| 4 | PNL:PWR DIST | 07976-00020 |
| 5 | PWR DIST HNDL | 07976-00021 |
| 6 | INSULATOR | 07976-00063 |
| 7 | TERM BLK SHIELD | 07976-00064 |
| 8 | SUPPORT ROD | 07976-20001 |
| 9 | STANDOFF FAN FLT | 07976-20007 |
| 10 | POWER CORD | 8120-1921 |
| 11 | FILTER:LINE | 9135-0156 |
| 12 | CIRCUIT BREAKER | 3105-0113 |
| 13 | 2X3 TERM BLOCK | 0360-2043 |
| 14 | FITTING:LOCKNUT | 0100-0541 |
| 15 | CORD CONN GRIP M | 0100-0529 |
| 16 | GROMMET-ROUND | 0400-0240 |
| 17 | SPACER .50 LG | 0380-0008 |
| 18 | SPACER .750 LG | 0380-0011 |
| 19 | NUT:HEX 6-32 | 2420-0001 |
| 20 | SCR:6-32X.500L | 2360-0201 |
| 21 | NUT:10-32 HEX | 2740-0002 |
| 23 | SCR:8-32 .375PAN | 2510-0103 |
| 24 | WSHR:FLAT #8 | 3050-0001 |
| 25 | SCR 6-32X.750L | 2360-0205 |
| 26 | NUT:HEX 8-32 | 2580-0004 |
| 28 | WSHR:FLAT #10 | 3050-0019 |
| 31 | SCR 10-32 .5 | 2680-0103 |
| 32 | WASHER:LOCK #10 | 2190-0034 |
| 33 | SCR:8-32 .75 PAN | 2510-0111 |
| 34 | SCR 6-32X1.7 PAN | 2510-0065 |
| 36 | WSHR:EXT #10 | 2190-0012 |
| 37 | FINGER GUARD | 3160-0357 |
| 38 | 2X2 TERM BLOCK | 0360-0522 |
| 39 | CONTACTOR | 0490-1299 |
| 40 | CONN:3 PIN F UTL | 1251-5106 |
| 49 | FAN CABLE ASSY | 8120-1478 |
| 50 | WSHR:LK HLCL#8 | 2190-0017 |

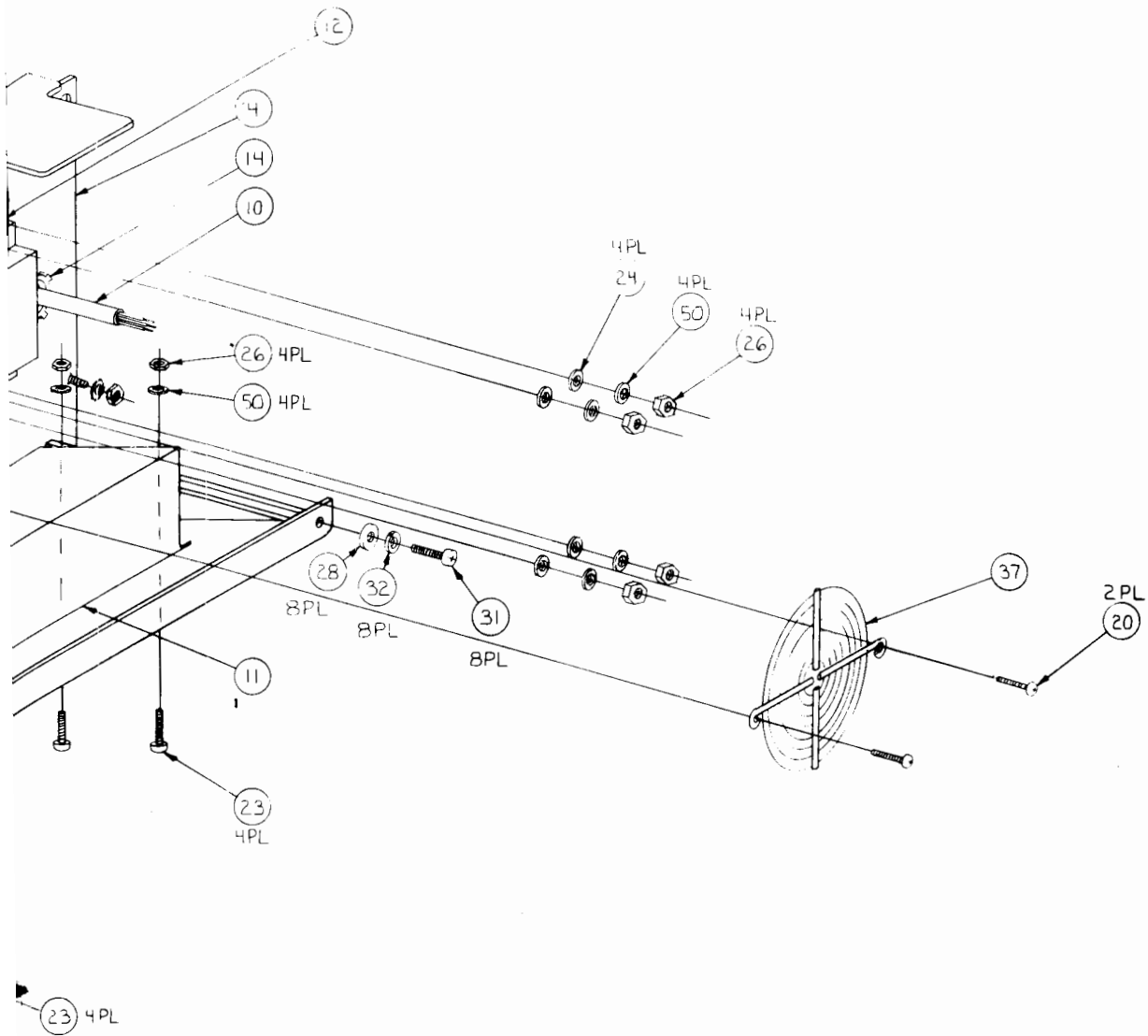


Figure 4-2. Power Distribution Assembly (07976-60019), Exploded View

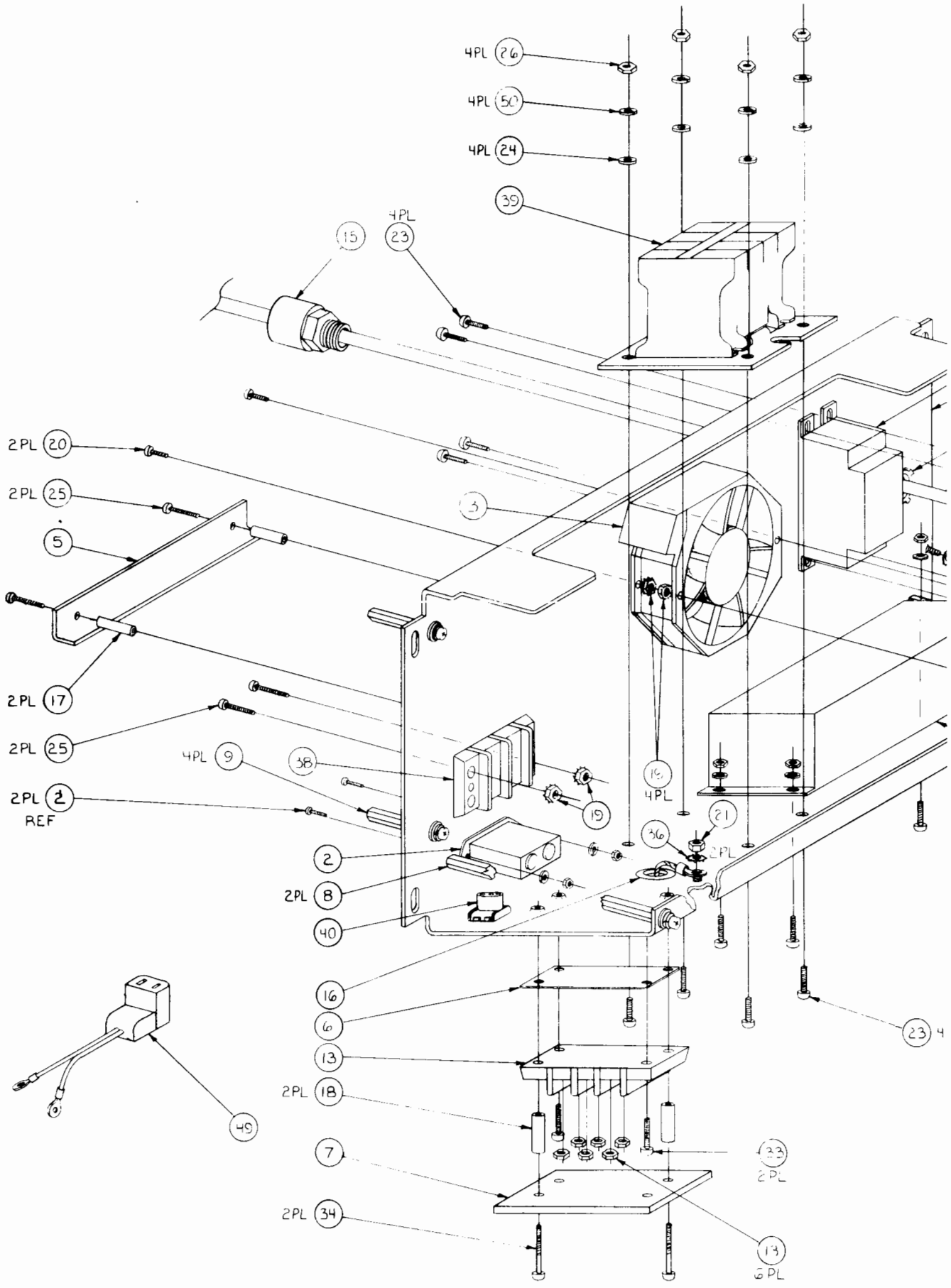


TABLE 4-3. OPERATOR CONTROL PANEL ASSEMBLY (07976-60010) PARTS LIST

| INDEX NO./REF. DES. | DESCRIPTION | HP PART NO. |
|---------------------|-----------------------------------|------------------------|
| 1 | WASHER-FLAT | 2190-0419 |
| 2 | SCR:MACH 2-56 | 0520-0130 |
| 4 | BRKT:RT MTG | 07976-00058 |
| 5 | BRKT:LT MTG | 07976-00059 |
| 7 | CNTR PNL:MTU | 07976-20004 |
| 8 | PCA:OPER/ST PNL | 07976-60005 |
| 9 | PCA:OPR PNL/CNTL | 07976-60008 |
| 11 | CABLE ASSEMBLY | 8120-3235 |
| 12 | CABLE ASSEMBLY | 8120-3236 |
| 13 | STANDOFF-HEX | 0380-1313 |
| 14 | WSHR-LK HLCL | 2190-0045 |
| 15 | SCR:4-40 .5 PAN | 2200-0147 |
| 16 | WSHR:LOCK #4 | 2190-0003 |
| 17 | WSHR:FLAT #4 | 3050-0229 |
| 18 | NUT-HEX | 2260-0005 |
| 19 | SCREW - MACHINE TS 6-32 .500LG | 0520-0128 0624-0208 |

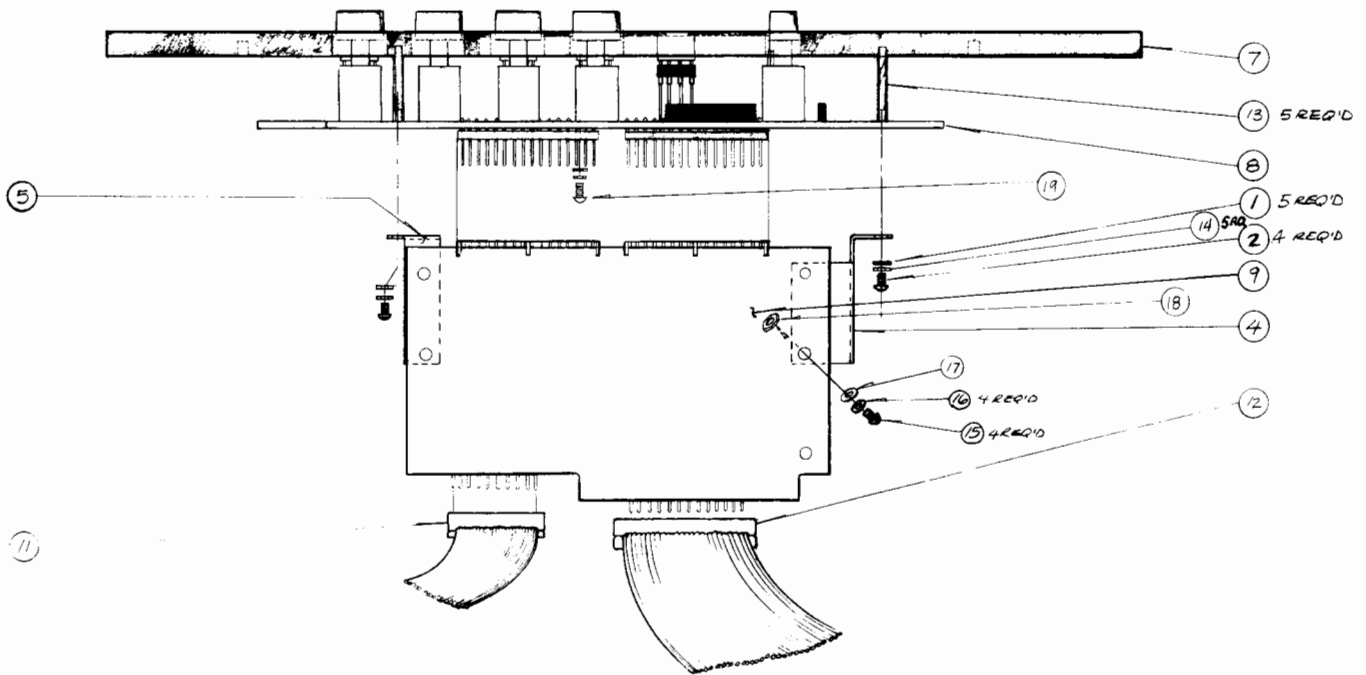


Figure 4-3. Operator Control Panel Assembly (07976-60010) Parts Location Diagram

TABLE 4-4. HP 7976A OPERATOR PANEL/CONTROL PCA (07976-60008) PARTS LIST

| INDEX NO./REF. DES. | DESCRIPTION | HP PART NO. |
|---------------------|------------------|-------------|
| 1 | PCB:OPR PNL/CNT | 07976-80008 |
| J1 | CONNECTOR | 1251-6892 |
| J4 | CONNECTOR | 1251-6893 |
| U3 | IC: SN74LS139N | 1820-1281 |
| U4 | IC:SN7406N | 1820-0471 |
| U5 | IC:SN74LS273N | 1820-1730 |
| U6 | IC:SN74LS244N | 1820-2024 |
| R23 | RES:NETWK 1K OHM | 1810-0275 |
| R24 | RES:2.2K ARRAY | 1810-0277 |
| R6,7,8,9 | R:F 10 5% .25W | 0683-1005 |
| R5,17-22 | R:F 150 5% .25 | 0683-1515 |
| R10,15,16 | R:F 2.2K5% .25W | 0683-2225 |
| J2,3 | CONNECTOR | 1251-6568 |
| R1-4 | R:F 75 1% .5W | 0757-0795 |
| U1,2 | IC: SN75453BP | 1820-1016 |
| C1,5,6 | C:F4.7UF 20% 35V | 0180-2683 |
| C2,3,4 | C:F .01UF 100V | 0160-2055 |
| R11-14 | R:F 1K5% .25W CC | 0683-1025 |

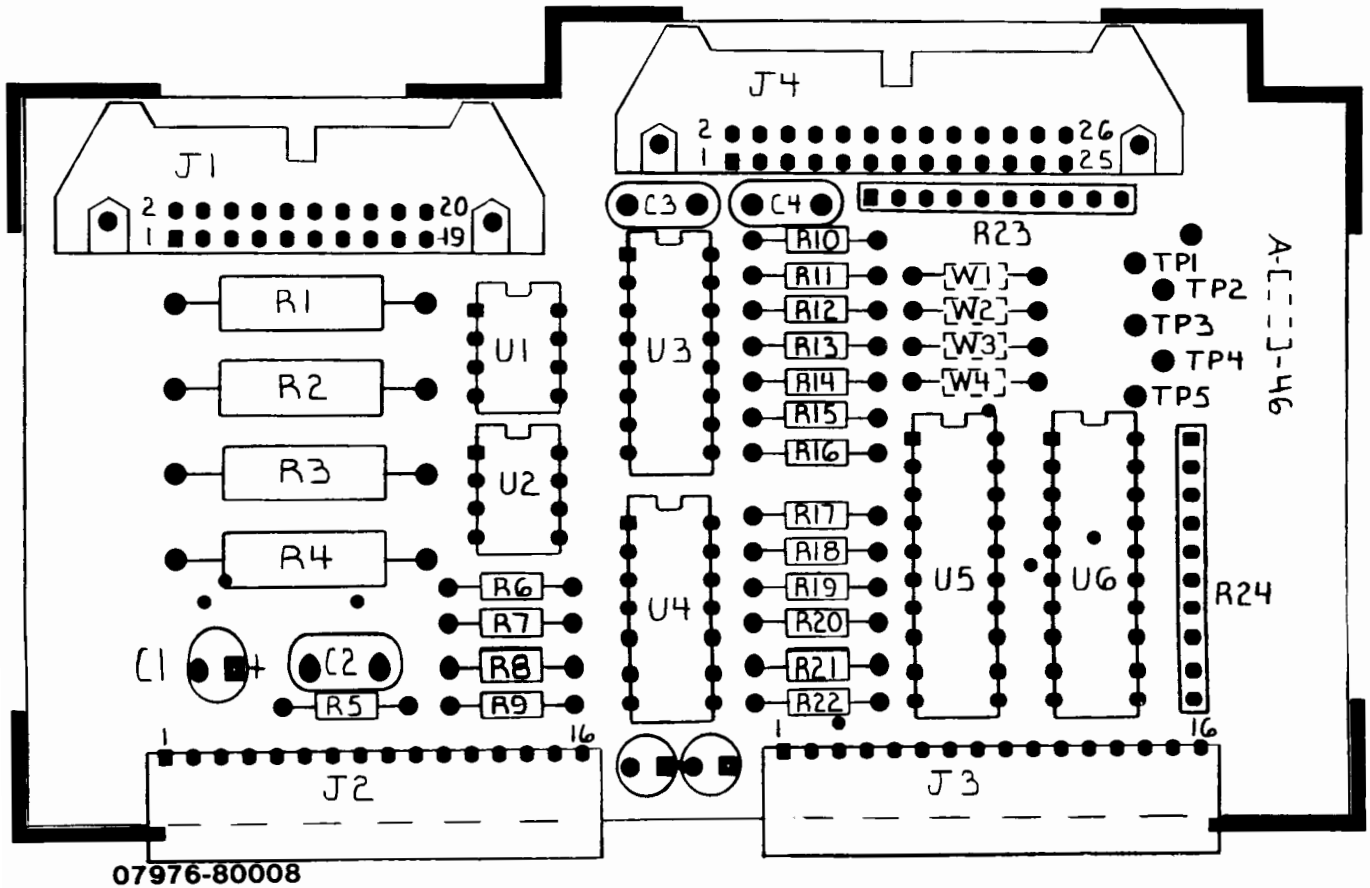


Figure 4-4. Operator Panel/Control PCA (07976-60008) Parts Location Diagram

TABLE 4-5. HP 7976A OPERATOR/SELF TEST PANEL PCA (07976-60005) PARTS LIST

| INDEX NO./REF. DES. | DESCRIPTION | HP PART NO. |
|---------------------|-------------------|-------------|
| 1 | PCB:OPER/ST PNL | 07976-80005 |
| 2 | KEYCAP, ONLINE | 5041-2055 |
| 3 | KEYCAP, REWIND | 5041-2056 |
| 4 | KEYCAP, RESET | 5041-2054 |
| 5 | KEYCAP-LOAD | 5041-2057 |
| 6 | KEYCAP-SLF-TST | 5041-0366 |
| 7 | TUBING FLEX .032 | 0890-0212 |
| DS5 | DS5 LED-SML GREEN | 1990-0485 |
| DS6 | DS6 LED-SML RED | 1990-0486 |
| XD | SOCKET-IC | 1200-0580 |
| P1,2 | CONNECTOR | 1251-6569 |
| R1,2 | NETWORK-RESISTOR | 1810-0382 |
| S1-5 | SWTCH-PUSHBUTTON | 3101-2317 |
| DS1-4 | LED-MODULE-YEL | 1990-0784 |

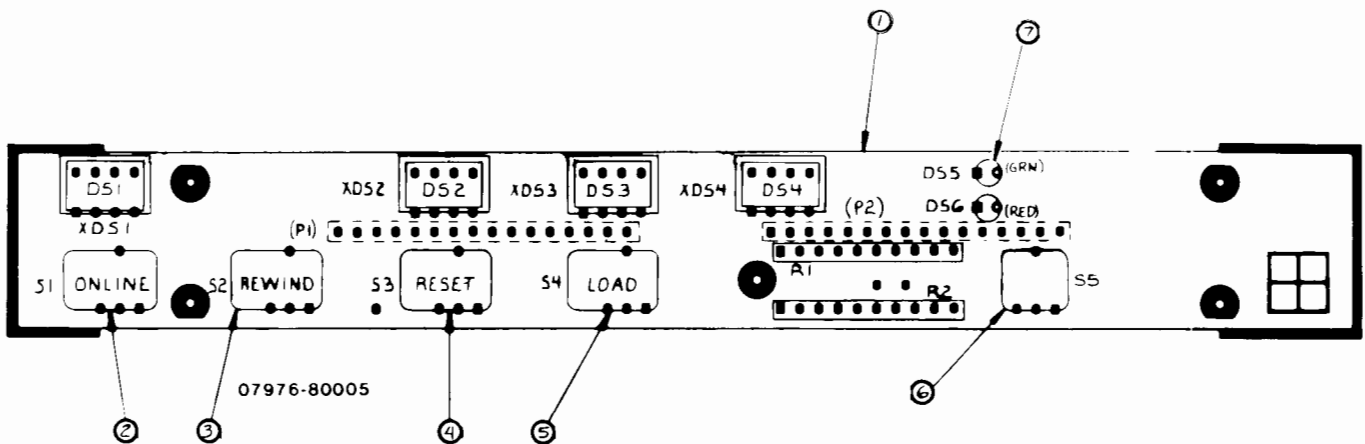


Figure 4-5. Operator/Self Test Panel PCA (07976-60005) Parts Location Diagram

TABLE 4-6. CONNECTOR DISTRIBUTION (07976-60007) PCA PARTS LIST

| INDEX NO./REF. DES. | DESCRIPTION | HP PART NO. |
|---------------------|------------------|-------------|
| 1 | PCB:CONN DISTRI | 07976-80007 |
| 2 | SCR: TPG 4-24 | 0624-0017 |
| 3 | SPCR:RVT #6X.250 | 0380-0111 |
| J2 | CABLE: Z80 | 8120-3355 |
| P1 | CONNECTOR | 1251-4946 |
| P2 | CONNECTOR | 1251-6706 |

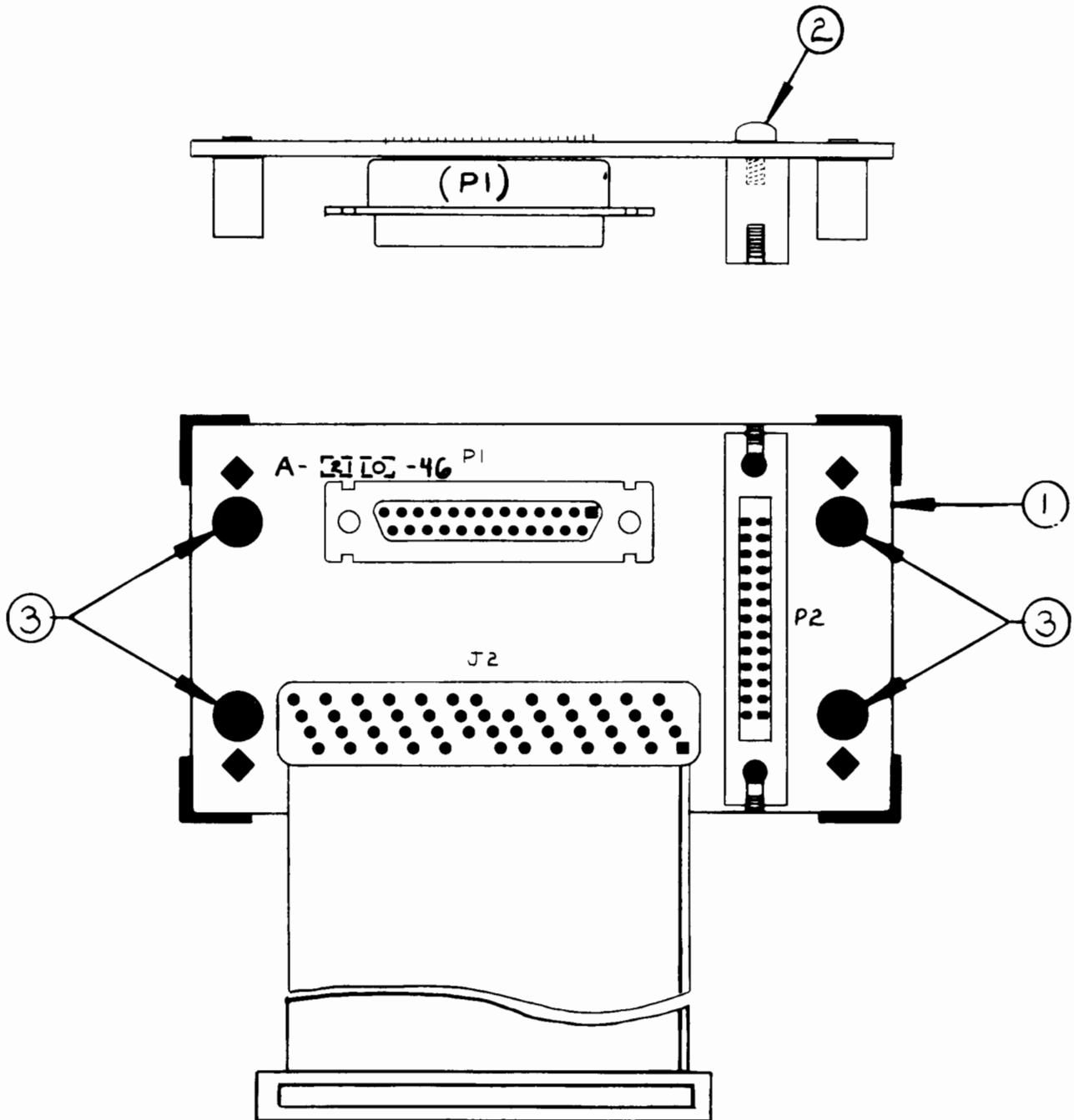
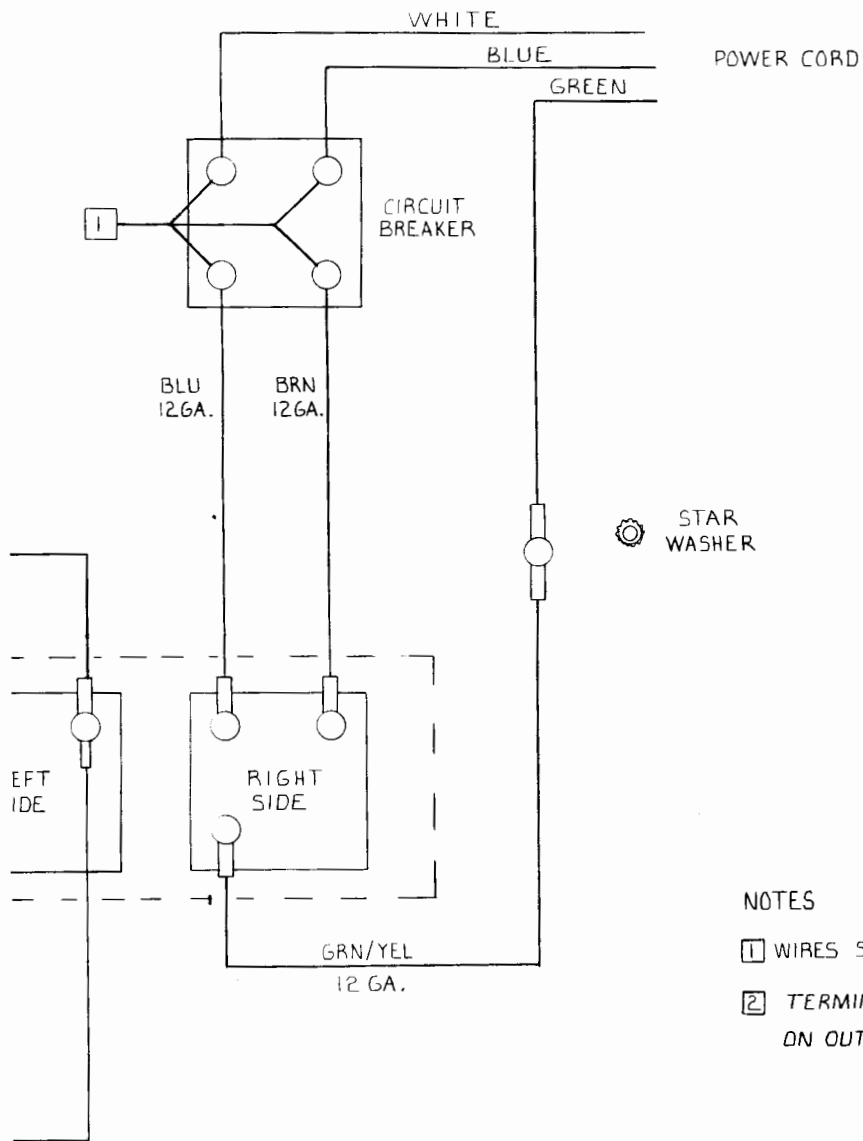


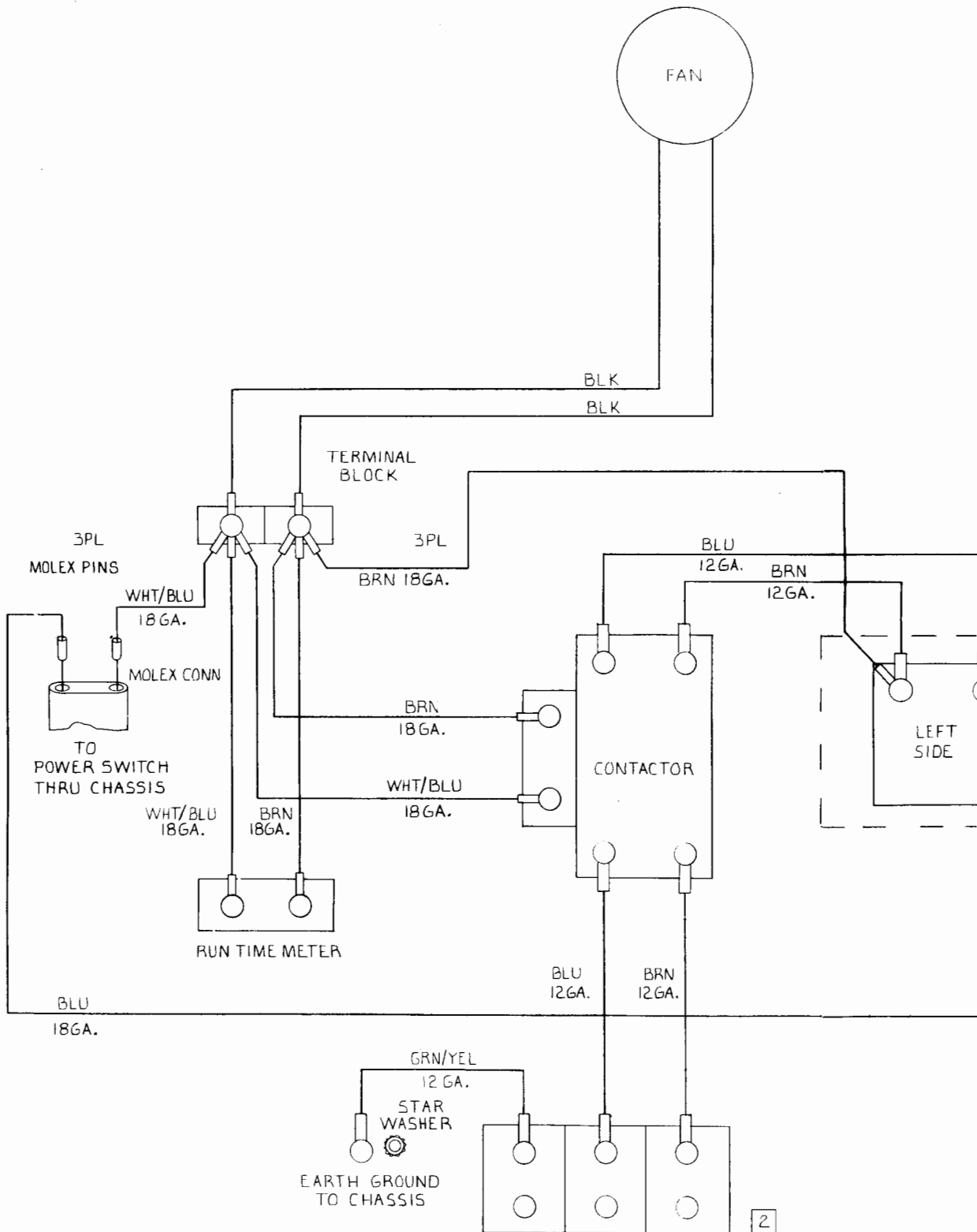
Figure 4-6. Connector Distribution PCA (07976-60007) Parts Location Diagram



NOTES

- 1 WIRES STRIPPED.
- 2 TERMINAL BLOCK MOUNTED ON OUTSIDE OF CHASSIS.

Figure 4-8. Power Distribution Wiring Diagram



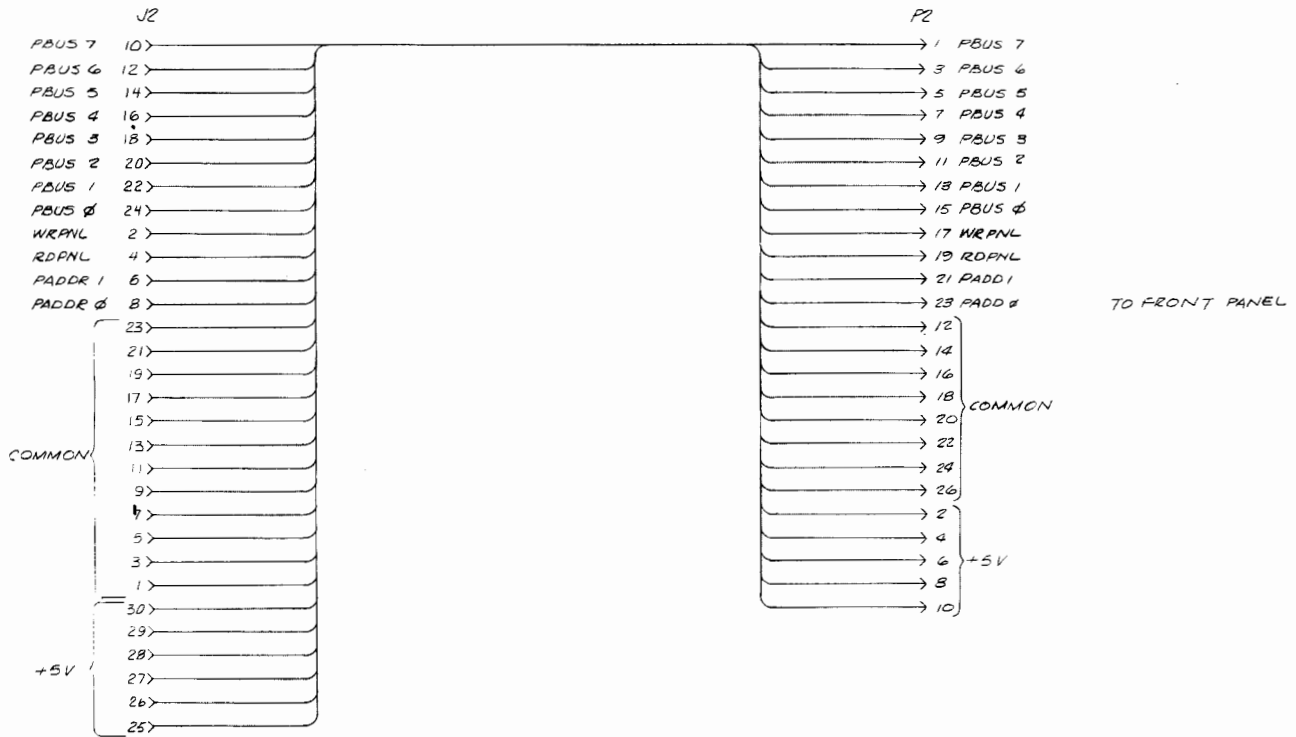
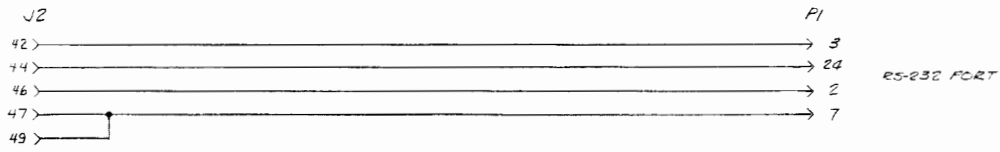


Figure 4-7. Connector Distribution (07976-60007) Schematic