



**CONTROL DATA®
CARTRIDGE DISK DRIVE
MODEL 9427H**

**GENERAL DESCRIPTION
OPERATION
INSTALLATION AND CHECKOUT
THEORY OF OPERATION
DIAGRAMS
MAINTENANCE
MAINTENANCE AIDS
PARTS DATA
WIRE LISTS**

MAGNETIC PERIPHERALS INC.
 a subsidiary of
CONTROL DATA CORPORATION

HARDWARE PRODUCT CONFIGURATOR
DOCUMENT PACKAGE AND
MANUAL TO EQUIPMENT LEVEL
CORRELATION

SCOPE

The documentation provided in this package supplements the Model 9427H Hardware Maintenance Manual and makes it unique to the equipment described below. This documentation package, when referenced, should be identified by the Hardware Product Configurator (HPC) number, and the title 'HPC Document Package', i.e., 83448215 HPC Document Package.

EQUIPMENT

HPC NUMBER 83448215
TOP MECHANICAL ASSEMBLY 75741190

PACKAGE CONTENTS

DEVICE SPEC AND SWITCH SELECTION 83449215
I-O DIAGRAM PACKAGE (RACK) 77834701
(SPD) DATA RECOVERY BD ASSEMBLY 77614937
(SPD) CONTROL BOARD ASSEMBLY 77614938
(SPD) SERVO MOD 77653387
SEEK TERM TO ADDRESS REGISTER (68698)75890887
INSTALL OF OPER RK MT (68748-2) 75896672
PARTS DATA CONFIGURATOR 75741190

OTHER INFORMATION

HARDWARE MAINT. MANUAL OEM (BP11) 77653380

REVISION RECORD

R E V	DATE	SHEETS AFFECTED	MANUAL/SECTION REVISION STATUS												CHANGE AUTHORITY
			1	2	3	4	5	6	7	8	9	10	11	12	
A	ISSUE <i>9/11/80 S. Wize</i>	ii thru xiii/xiv	D	B	F	B	A	A	C	A	C				9/11/80 Magdeburger
B	<i>90 OCT 7 S. Wize</i>	ii, vii, viii, ix	D	C	G	B	B	B	C	A	C				PL24597
C	<i>90 OCT 29 S. Wize</i>	ii, iv	D	C	G	B	C	B	C	A	C				PL 24638

PREFACE

This Manual provides the information needed to install, operate and maintain the Cartridge Disk Drive (Model 9427H) and is intended to be used as a guide by customer engineers and operators who require detailed information about the Cartridge Disk Drive's operations.

It is written to reflect the recommended service-replacement level of subassemblies and printed-circuit-board level by trained qualified customer engineers.

Certain adjustments must be made under dynamic conditions. If the Field Test Exerciser is not utilized for the adjustments appropriate provisions must be made in the computer system for such dynamic alignments.

Oscilloscope trace representations are typical waveforms. Some minor variations may be observed on individual units in actual practice.

The total content of the Manual is comprised of nine sections, each having a unique publication number, and is contained in one volume. The manual's publication number is that of the Table of Contents and front matter (77653380). This number, along with the unit HPC number, should be used when making reference to the Cartridge Disk Drive Product Manual.

The following table identifies the content of each volume:

	<u>SECTION NUMBER/TITLE</u>	<u>PUBLICATION NUMBER</u>
1	General Description	77614951
2	Operation	77614952
3	Installation & Checkout	77614953
4	Theory of Operation	77614954
5	Diagrams	77653381
6	Maintenance	77641952
7	Maintenance Aids	77614957
8	Parts Manual	77653386
9	Wire Lists	77614959

*The I/O board documentation, device specifications and option switch settings are contained in the Hardware Product Configuration (HPC) documentation package. The package is located in front of the product manual.

OPERATOR SAFETY INSTRUCTIONS

1. The power cord must be plugged into a power outlet. This outlet must be readily accessible to the operator in case of emergency.
2. To operate this unit, the operator must depress the start/stop pushbutton switch located at the front of the disk unit.
3. This unit must be serviced only by qualified technical personnel after removing power cord from outlet.
4. In case of emergency, operator must remove power cord from outlet and contact the proper technical service office.

SICHERHEITS - GEBRAUCHSANWEISUNG

1. Das Anschlusskabel ist in die Steckdose, die in der naehe des Geraetes montiert ist, einzustecken. Der Netzstecker muss leicht und gefahrlos zugaenglich sein.
2. Zur Inbetriebnahme, sowie zum Ausschalten des Geraetes, wird der Start-Stop Druck Schalter an der Vorderseite betaetigt.
3. Das Geraet darf nur von Fachpersonal nachdem Ziehen des Netzsteckers geoeffnet werden.
4. Im Falle eines technischen Defektes, ist der Netzstecker zu ziehen und der Technische Dienst zu verstaendigen.

WARNING

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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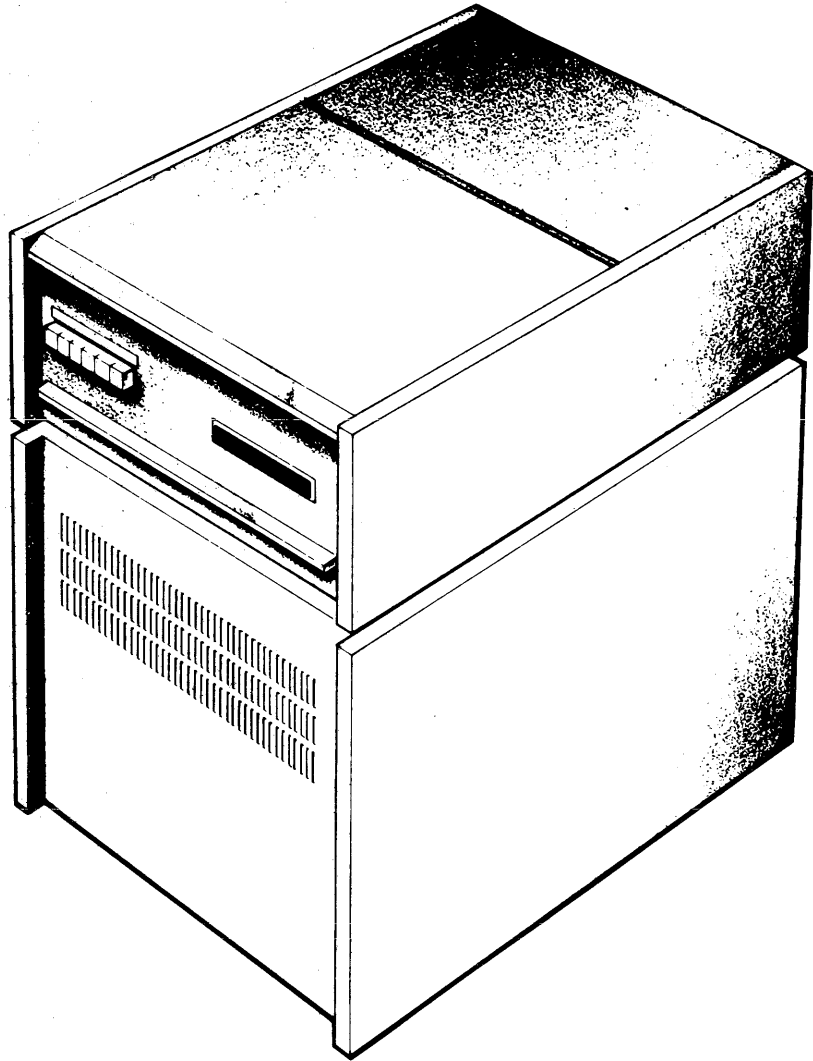


FIGURE 1-1. MODEL 9427 CARTRIDGE DISK DRIVE (CABINET MOUNT)

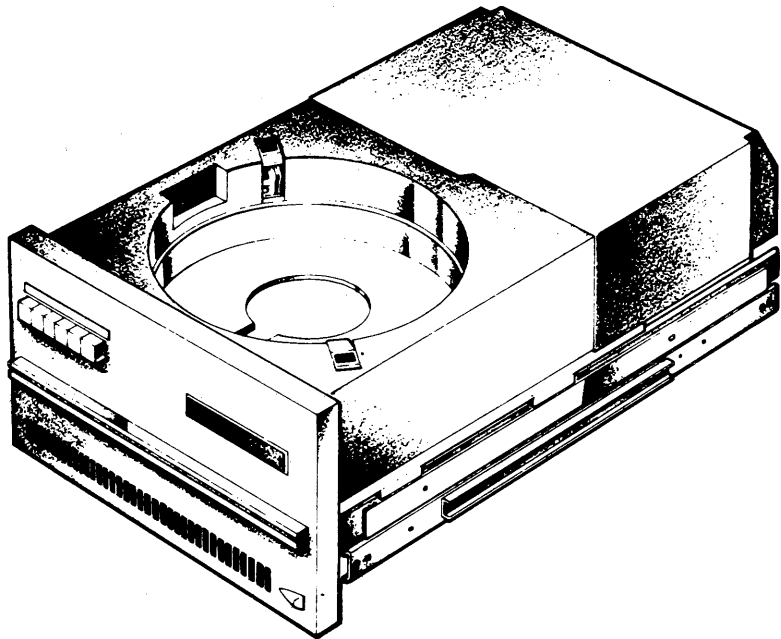


FIGURE 1-2. MODEL 9427 CARTRIDGE DISK DRIVE (RACK MOUNT)

1.1 INTRODUCTION

This manual applies to the CONTROL DATA MODEL 9427H Cartridge Disk Drive. The 9427H Cartridge Disk Drive is designed to interface with and provide peripheral storage capabilities for data processing systems.

1.2 PURPOSE AND USE OF EQUIPMENT

The baseline 9427H is a voice coil actuated cartridge disk drive unit that directs the read/write heads to a desired location on a spinning disk surface, data is written or retrieved by selection of an appropriate head and activating the read/write control circuitry. 9427H uses a single removable disk cartridge, CDC 848 type, and a fixed disk which doubles the data storage capacity.

The 9427H is suitable for mounting in a standard 19-inch (482.6 mm) rack with 10-1/2-inch (266.7 mm) panel space and is also available in a cabinet. The deck contains the voice coil, analog and digital circuit boards in the interface card cage, the power supply power amplifier, the cartridge receiver, the spindle and drive motor, filter, air blower and cooling system.

The 9427H can be configured to utilize single sectored or multisectored cartridges. The read recovery circuitry will allow operation with or without missing clock patterns, frequently found in variable sector formats.

1.3 EQUIPMENT CONFIGURATION

The equipment consists of the Baseline unit and its options.

1.3.1 BASELINE CONFIGURATION

The baseline 9427H includes the following features:

- Power supply, 60/50 Hz 100-250 VAC
- Multiple (hard) sectors or soft sector (missing Clock electronic sectoring) capability
- Sector addressing
- 200 tracks per inch
- Write protection
- Daisy chain interface
- Variable interface
- 2400 r/min spindle speed
- Straddle-erase heads
- Elco I/O cable connector

1.3.2 OPTIONS

The options available for the 9427H are as follows:

- Rack mounting
- Cabinet mounting
- 100 tracks per inch
- Fixed disk
- 1500 r/min spindle speed
- Fault (maintenance) board
- Pre-erase heads
- Elco, 3M, Winchester, and Amp I/O cable connector
- Brake Option

1.3.3 DISK FEATURES

- Cartridge Configuration

9427H uses a CDC 848 cartridge or any equivalent cartridge certified for 200 tpi operation or a CDC 847 or any approved equivalent IBM 5440 cartridge for 100 tpi heads.

- Disk Configuration

In addition to the removable cartridge, the standard 9427H also employs a fixed disk; thereby providing for storage of up to 12 million bytes unformatted and providing a total of 4 recording surfaces.

1.3.4 OPERATIONAL CHARACTERISTICS

Operational characteristics of the 9427H are listed in Table 1-1.

TABLE 1-1. OPERATIONAL CHARACTERISTICS

Characteristics	Values
TRACK DENSITY	100 tpi or 200 tpi
ACCESSING TIME	
Maximum access time	60 ms
Track-to-track access time	7.5 ms
Average access time	35 ms
SPINDLE SPEED	2400 r/min or 1500 r/min (+48 -67 r/min or +30 -42 r/min with input frequency +0.5 -1.0 Hz and input voltage +10% -15%)
LATENCY TIME	12.5 ms (at 2400 r/min) (20 ms at 1500 r/min)
RECORDING	
Mode	Double Frequency
Density (nominal)	1530 bpi (outer track) 2200 bpi (inner track)
Bit rate (nominal)	2.50 MHz (1.56 MHz at 1500 r/min)
Tracks per cylinder	2 (4 with fixed-disk option)
Cylinders per unit (200 TPI)	406 (numbered 0 through 405) 408 (numbered 0 through 407, optional)
Cylinder per unit (100 TPI)	203 (numbered 0 through 202) 204 (numbered 0 through 203, optional)
Sectors	1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 20, 24, 25, 29, 30, 32, 40, 48, 50, 60, 64 hard or missing-clock soft sectoring
Units per controller I/O channel	4 maximum, in daisy-chain configuration

TABLE 1-1. OPERATIONAL CHARACTERISTICS (CONTINUED)

Characteristics	Values
DATA CAPACITY	
Bits per track	62,500 nominal
Bits per cylinder	125,000 nominal (250,000 with fixed-disk option)
Bits per unit	50,000,000 nominal (1,000,000,000 with fixed-disk option)
CARTRIDGE DISK	
Disk per cartridge	1
Usable recording surfaces per disk cartridge	2
Disk surface diameter	14 inches
Recording diameters	Track 407 (inner), 9.067 in (230.3 mm)
	Track 0 (outer), 13.137 in (333.7 mm)
Disk surface coating	nominal Magnetic oxide
READ/WRITE HEADS	(Standard CDC ramp-loading straddle erase and pre-erase available)
PHYSICAL (RACK-MOUNTED UNIT)	
Panel height	10.31 in (261.9 mm) (mounts on 10.5 in (266.7 mm) centers in relay rack)
Panel width	18.94 in (481.1 mm) (for 19-inch (482.6 mm) rack)
Depth	30.63 in (778 mm) (see section 3 for required rack depth)
Weight	140-175 lbs (63.5-79.4 kg)
Shipping Weight	190-225 lbs (86.2-102.1 kg)
PHYSICAL (CABINET MOUNTED UNIT)	
Height	34 in (863.6 mm)
Width	18.5 in (469.9 mm)
Depth	29.75 in (755.7 mm)
Weight	220-255 lbs (99.8-115.7 kg)
Shipping Weight	250-285 lbs (113.4-129.3 kg)
AIR FILTER	0.3 Micron 99%
ELECTRICAL	
Input power source	
60-Hz units	100-250 Volts rms in 10-Volt increments (+10%, -15%, 59-60.6 Hz, single phase
50-Hz units	100-250 Volts rms in 10-Volt increments (+10%, -15%), 49-50.5 Hz, single phase

TABLE 1-1. OPERATIONAL CHARACTERISTICS (CONTINUED)

Characteristics	Values																																		
ELECTRICAL (cont'd)																																			
Input Current	<p>The following current readings are made at 50 Hz and nominal line voltage with accessor performing worst-case (maximum power) repeat seeks.</p> <table border="1"> <thead> <tr> <th>Volts</th> <th>Amps</th> </tr> </thead> <tbody> <tr><td>100</td><td>5.6</td></tr> <tr><td>110</td><td>5.0</td></tr> <tr><td>120</td><td>4.6</td></tr> <tr><td>130</td><td>4.3</td></tr> <tr><td>140</td><td>4.0</td></tr> <tr><td>150</td><td>3.8</td></tr> <tr><td>160</td><td>3.6</td></tr> <tr><td>170</td><td>3.3</td></tr> <tr><td>180</td><td>3.2</td></tr> <tr><td>190</td><td>3.0</td></tr> <tr><td>200</td><td>2.9</td></tr> <tr><td>210</td><td>2.7</td></tr> <tr><td>220</td><td>2.6</td></tr> <tr><td>230</td><td>2.5</td></tr> <tr><td>240</td><td>2.4</td></tr> <tr><td>250</td><td>2.3</td></tr> </tbody> </table> <p>Surge current during spindle start is 2.6 times the above value and lasts 5 seconds.</p>	Volts	Amps	100	5.6	110	5.0	120	4.6	130	4.3	140	4.0	150	3.8	160	3.6	170	3.3	180	3.2	190	3.0	200	2.9	210	2.7	220	2.6	230	2.5	240	2.4	250	2.3
Volts	Amps																																		
100	5.6																																		
110	5.0																																		
120	4.6																																		
130	4.3																																		
140	4.0																																		
150	3.8																																		
160	3.6																																		
170	3.3																																		
180	3.2																																		
190	3.0																																		
200	2.9																																		
210	2.7																																		
220	2.6																																		
230	2.5																																		
240	2.4																																		
250	2.3																																		
Power Factor	0.8																																		
Power (Nominal)	310 Watts, 1050 BTU/hr.																																		
Power (Maximum)	465 Watts, 1590 BTU/hr.																																		
INPUT/OUTPUT CONNECTIONS	<p>Two connectors on the I/O panel at the rear of the unit. Refer to applicable I/O board schematic in HPC Configuration for the pin assignments. A terminator is required if the unit is the last (or only) unit connected to the controller. The terminator consists of DIP-packaged register networks which plug into the I/O board or an optional plug-in terminator.</p>																																		
ENVIRONMENTAL (Operating)	<p>Temperature: 60 to 90°F (15.6 to 32.2° C) with 12°F/hr maximum rate of change Humidity: 10 to 80% (no condensation) Altitude: Zero to 10,000 feet (3048 m)</p>																																		

2.1 INTRODUCTION

This section provides the instructions and information required to operate the Model 9427H unit.

2.2 CONTROLS AND INDICATORS

Figure 2-1 depicts the locations of the controls and indicators. All switches and indicators are preassembled on a printed circuit board and mounted behind the control panel assembly. The control panel contains separate write protect switches and indicators for fixed and removable disks. ACTIVE (seeking, reading or writing) and READY indicators are also mounted on this panel. A functional description of the controls and indicators is given in Table 2-1.

2.3 OPERATING PRECAUTIONS

The following precautions and practices should be observed while operating unit to obtain best performance and reliability of the equipment:

1. Keep the access door closed to prevent unnecessary entry of atmospheric dust.
2. If a pinging or scratching sound (caused by head-to-disk contact) is heard and persists, stop the unit by using the Stop and Power Down procedure of this section and then call the customer service engineer.

NOTE: Appropriate steps should be taken to safeguard valuable data until the head-to-disk contact can be remedied. Such steps may include leaving the unit powered down, replacing the data cartridge with a scratch cartridge, and/or immediate transfer of the data that is on the fixed disk.

3. To prevent damage and/or data loss, follow the Disk Cartridge Installation procedure of this section.
4. The operator should not attempt to override any interlocks in the system.

2.3.1 POWER UP FOR ON-LINE OPERATION

NOTE: Steps 1, 2, 3, & 5 to be performed by maintenance personnel only.

1. Using a 5/32 Allen driver, place tool into holes of front and rear end panels and remove panels by loosening hardware.
2. Verify connection of all power and I/O cables.
3. Verify installation of properly jumpered voltage adjust plug, P12 (see Section III for jumper information).
4. Verify that START/STOP switch is in STOP position (out).
5. Using Figure 6-11, actuate DC circuit breakers CB2 and CB3. Actuate circuit breaker CB1 and verify operation of blower motor.
6. Depress START/STOP switch and verify START/STOP indicator illuminates.
7. Verify that FAULT indicator remains off.

NOTE: If FAULT indicator illuminates perform step 1 through 3 of Fault Operating Instruction Paragraph 2.4.

8. Approximately 65 seconds after START/STOP switch is depressed, READY is sent to the controller and the READY indicator illuminates. Disk drive is now ready to receive Seek, Read, Write and Erase commands from controller.

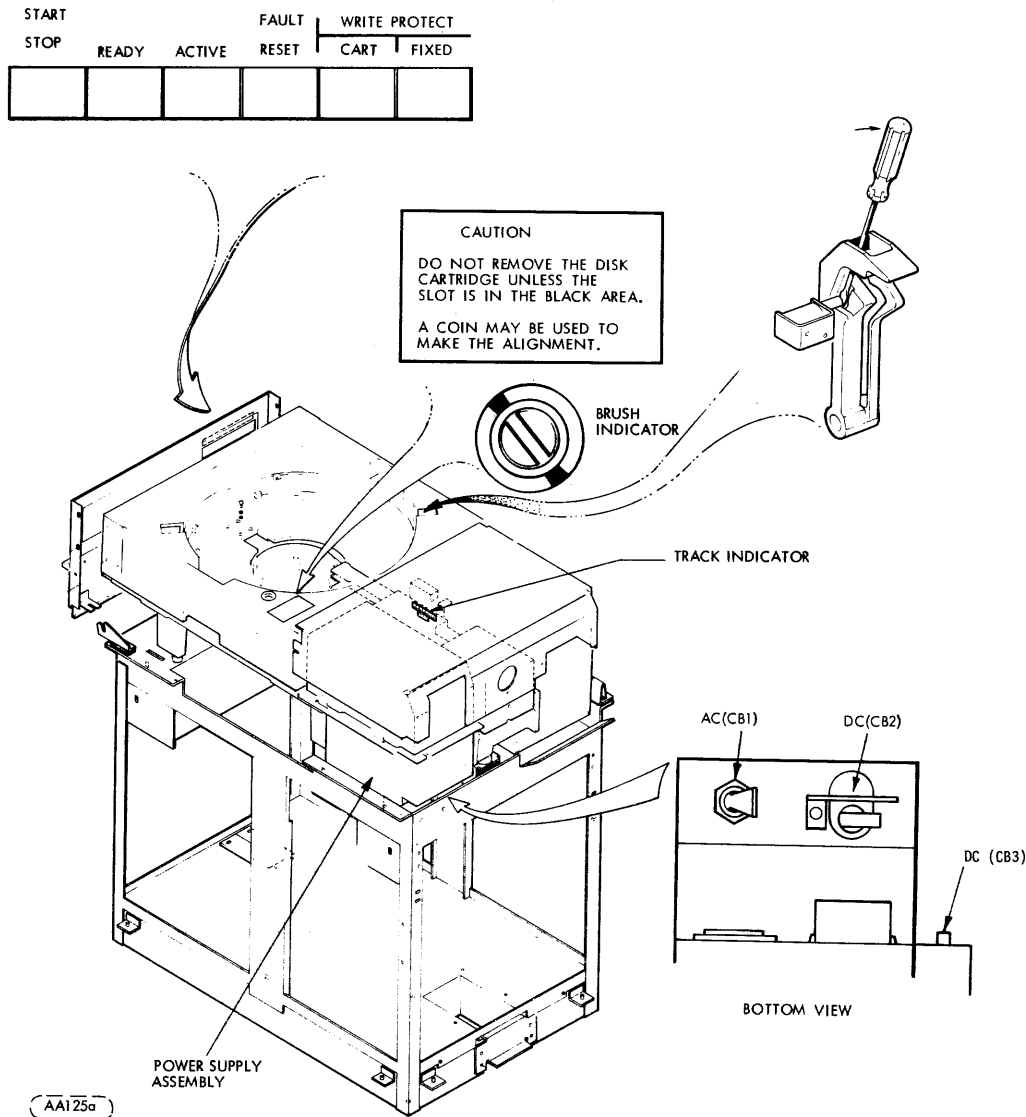


FIGURE 2-1. CONTROLS AND INDICATORS

2.3.2 WRITE PROTECT

Write protection can be initiated either by the operator or controller.

- a. Operator Initiated Write Protect - Depress desired W/PROT switch (W/PROT CART or W/PROT FIXED) and verify that appropriate W/PROT lamp illuminated. Selected disk is now protected against controller Write or Erase command.
- b. Controller Initiated Write Protect (optional) - A disk may be protected by the controller itself providing that the Unit Select and Write Protect lines are active. Whichever disk is selected by the high-order Head Select line will then be protected from Write or Erase commands.

TABLE 2-1. CONTROLS AND INDICATORS

Control or Indicator	Function
Power Assembly	
AC circuit breaker (CB1)	Provides AC power circuit protection, and main power switching.
DC circuit breaker (CB2)	Provides ± 35 VDC circuit protection along with thermal protection for all DC circuits.
DC circuit breaker (CB3)	Provides + 11 VDC logic circuit protection.
Power receptacles Voltage Adjust Plug, P12 (Refer to Installation and Checkout Section for adjustment connections)	Provides connection for input power Provides a means of selecting input voltage to transformer in power supply.
Control Panel	
START/STOP indicator/switch	<p>Start switch energizes spindle motor and initiates the first seek mode provided the following conditions are met:</p> <ol style="list-style-type: none"> 1. Circuit breakers are ON. 2. Disk cartridge cover properly installed. 3. Cartridge hold-down switches are closed. <p>Depressing the alternate action START/STOP switch at any time after the start cycle is initiated will cause the machine to stop unless a Stop Override signal is present from the controller. In this case, the machine will continue to run until the Stop Override signal is removed. (This is to prevent stopping during a read, write, or seek operation.)</p> <p>When the switch is depressed to stop machine, the indicator light remains illuminated until the disk rotation has stopped.</p>

TABLE 2-1. CONTROLS AND INDICATORS (CONTINUED)

Control or Indicator	Function
Control Panel	
	<p>The interlock solenoids energize at this time to permit access to the cartridge.</p>
	NOTE
	<p>The first seek mode is completely automatic and requires approximately 65 seconds to complete. The unit can be reset at any time after initiation of the start sequencing. In the event of a potentially damaging fault during this mode, the heads will automatically go into emergency retract and the machine will stop.</p>
READY indicator	<p>Illuminates when the unit is up to speed, the heads are loaded and the unit is ready for use. Extinguished during any fault, emergency retract, or stop operation.</p>
ACTIVE indicator	<p>Illuminates when the unit is actively engaged in any mode, i.e., direct (forward or reverse) seek, return to zero seek or read/write/erase.</p>
FAULT indicator/switch	<p>Indicator illuminates when any fault exists with the exception of a line power failure. In the event of a momentary line power drop, the unit heads will go into an emergency retract and the unit will stop. However, the unit will restart automatically when the power returns to normal. In the event of a non-damaging fault, i.e., more than one head selected, simultaneous read and write and etc., the fault indicator will be illuminated and the unit will report the condition to the controller.</p>

TABLE 2-1. CONTROLS AND INDICATORS (CONTINUED)

Control or Indicator	Function
Control Panel	
<p>FAULT indicator/switch (continued)</p>	<p>A Return-To-Zero-Seek command will reset the fault latch and extinguish the fault indicator. The unit can be reset by the FAULT switch if a momentary non-damaging fault has occurred. Pressing the FAULT switch clears the fault logic and extinguishes the indicator. A persistent fault, however, will not permit a reset.</p>
<p>W/PROT CART indicator/switch</p>	<p>This alternate-action switch remains slightly depressed, and is lit when on. When on, writing and erasing of data on the cartridge disk is inhibited.</p>
<p>W/PROT FIXED indicator/switch</p>	<p>This alternate-action switch remains slightly depressed and is lit when on. When on, writing and erasing of data on the fixed disk is inhibited.</p>
Cartridge Receiver	
<p>Brush indicator</p>	<p>Indicates the position of the brush motor.</p> <div style="text-align: center; border: 1px dashed black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>CAUTION</p> </div> <p>Do not remove the disk cartridge unless the slot is in the black area.</p> <p>A coin may be used to make the alignment.</p>
Carriage Assembly	
<p>Track indicator</p>	<p>Vernier scale located on the side of the carriage over read/write heads (see Figure 2-1). Readable only when electronics cover is removed. Movable zero mark identifies hundreds and tens digits of track number. The coincident moveable vernier identifies the units digit of the track number.</p>

2.3.3 STOP AND POWER DOWN

Disk drive can be stopped by front panel switches provided STOP OVERRIDE is not commanded by controller.

NOTE: In the event STOP OVERRIDE is commanded when the START/STOP switch is depressed to STOP, the disk drive will continue operating. When STOP OVERRIDE is dropped by the controller, the unit will execute a normal stop sequence.

1. Depress START/STOP switch and verify the following actions occur:
 - a. READY lamp extinguishes and controller Ready goes off.
 - b. START indicator extinguishes and pack locks open after spindle stops rotating.
2. Remove Cartridge (if desired) in accordance with Disk Cartridge Removal (Normal) procedure.

NOTE: Step 3 to be performed by maintenance personnel only.

3. Set main circuit breaker CB1 of "off,"

2.4 FAULT OPERATING INSTRUCTION

If FAULT indicator illuminates during operation or power up proceed as follows:

1. Depress FAULT switch. If lamp extinguishes, normal operation can be resumed. If FAULT lamp remains illuminated, proceed to step 2.
2. Depress START/STOP switch to STOP and allow spindle to stop rotating, then depress START/STOP switch to START. If FAULT lamp extinguishes, normal operation can be resumed. If lamp remains illuminated proceed to step 3.
3. Power down equipment in accordance with Stop and Power Down procedure. Call customer service engineer.

2.5 INPUT/OUTPUT LINES

Complete operations of the disk drive with the exception of power up, power down and start/stop can be performed by the controller. Input/Output signals exchanged between disk drive and controller and their functions are explained in Table 2-2.

2.6 DISK CARTRIDGE HANDLING AND STORAGE

The following practices should be observed when handling or storing disk cartridges. Refer to the manufacturer's instructions for more detailed maintenance and cleaning instructions, or refer to section 6 of this manual.

1. The cartridge dust cover should be on the cartridge while it is out of the disk receiver. This will insure a positive dust seal and immobilize the disk inside.
2. Cartridges can be stored flat or on the edge. Several can be stacked on top of one another. However, undue heavy loading should be avoided.

TABLE 2-2. INPUT/OUTPUT LINES

Signal	Function
Input Lines	
CYL STR (Cylinder Strobe)	Gates the cylinder address into the unit. The contents of the cylinder address lines are valid only when the Cylinder Strobe is true.
CYL AD/0 - CYL AD/8 (Cylinder Address Bits $2^0 - 2^8$)	Nine lines that carry the cylinder address to the track address when gated by the Cylinder Strobe.
RTZS (Return to Zero Seek)	Causes carriage to return to cylinder 000.
HS/0 - HS/1 (Head Select)	Selects one of the two recording heads (two lines for four heads with fixed disk option). The line(s) contain the binary address of the desired head and must be held constant during a read or write operation.
Wr (Write Data/Clock)	Transmits double frequency encoded data and clock signals to the unit.
Write Gate	Enables write current during a write operation.
Erase Gate	Enables the erase current during a write operation.
Read Gate	Enables read data and clock information during a read operation.
Unit Select	Four select lines (one per unit) are used to select a unit to be accessed. The appropriate lines must remain active during any exchange with the controller, except when monitoring interrupts such as seek complete or seek error lines. A unit may be continuously selected for test purposes by actuating the desired Unit Select switch (SW1-1 through SW1-4) on the I/O board.
Wr Prot (Write Protect)	Prevents accidental destruction of previously written data by never allowing write or erase current to be on when write protect line is true.

TABLE 2-2. INPUT/OUTPUT LINES (CONTINUED)

Signal	Function
Input Lines	
Stop Ov (Stop Override)	After the unit has been started, a STOP OVERRIDE command along with UNIT SELECT will maintain the unit in a selected ON-LINE condition until the UNIT SELECT falls, even if the front panel START/STOP switch is set to STOP.
Output Lines	
On Cyl (On Cylinder)	Indicates that heads have reached the desired address. The On Cylinder condition will also be indicated when a seek error occurs.
Rd Data (Read Data)	Transmits digital information read from the disk to controller.
Rd Clk (Read Clock)	Carries clock signals read from the disk.
Index	Provides a sector 0 reference pulse from the unit to the controller. This pulse occurs once for each revolution of the disk.
Sector	The gated sector is from the cartridge if heads 0 or 1 are selected and is from the fixed disk (if installed) when heads 2 or 3 are selected. Two separate sector transducers are used as in the case of index and only one driver is used.
Skerr (Seek Error)	Indicates that the unit was unable to complete a seek operation. A RTZS command from the controller clears the Seek Error condition and returns the heads to cylinder 00.
Ad Int. (Address Interlock)	Indicates that illegal address has been sent.
Ad Ack (Address Acknowledge)	Indicates that address received is legal.

TABLE 2-2. INPUT/OUTPUT LINES (CONTINUED)

Signal	Function
Output Lines	
Fault	<p>Indicates that the unit has one or more fault conditions. Write and erase currents are inhibited by the presence of any of the following conditions:</p> <ol style="list-style-type: none"> 1. More than one head selected. 2. Read and Write gates true at the same time. 3. Read and Erase gates true at the same time. 4. Erase and no write driver on. 5. Write and no erase driver on. 6. Write, or erase gate and not On Cylinder. 7. Low voltage situation that could cause a loss in control of write and erase currents. 8. Fixed disk heads are selected with no fixed disk option installed. 9. Emergency retract condition.
Ready	<p>Present if the disk cartridge is installed, spindle motor speed, heads loaded, DC voltages within margin, no fault condition exists, unit selected, and terminator is present and has power.</p>
Wr Stat	<p>Indicates the unit is inhibited from writing on the Disk. This signal is present whenever the control panel WRITE PROTECT switch is on and the associated disk is selected, or when the controller Write protect is true.</p>
SA/0 - SA/5 (Sector Address)	<p>Six lines that carry the sector address for the selected disk.</p>
Density (optional)	<p>When negative true, the unit is operating in a 200 tpi mode; when not, unit is operating in 100 tpi mode.</p>

2.7 DISK CARTRIDGE INSTALLATION

The disk cartridge must be stored in the same environment as the Model 9427H for 60 minutes immediately preceding its use. Make certain disk cartridge has been cleaned and maintained in accordance with accepted preventive maintenance procedures. Refer to Figure 2-2 for the following procedure.

1. Raise cartridge access door on cabinet.

NOTE: Power must be on and START/STOP lamp must be off to release lock on hold-down arms.

2. Pull back hold-down arms.
3. To separate dust cover from the disk cartridge, hold cover release button to left while lifting cartridge handle.
4. Disengage dust cover from disk cartridge. Set cover aside.

Do not make abusive contact between the disk cartridge and the spindle.

CAUTION

Make certain that the read/write heads are fully retracted and the disk cleaning brushes are completely out of the cartridge area. Remove any dust from magnetic chuck.

5. Place disk cartridge onto spindle hub (ensure head opening is toward read of machine).
6. Rotate cartridge slowly back and forth until cartridge detents.
7. Push handle down to seat cartridge.
8. Place dust cover (removed in step 4) open end down over cartridge.
9. Position hold-down arms over cartridge and dust cover.
10. Close cartridge access door.
11. Press START/STOP switch to apply power to spindle motor.

NOTE: If the spindle motor will not rotate, disk cartridge is not installed properly.

2.8 DISK CARTRIDGE REMOVAL

2.8.1 NORMAL REMOVAL

Refer to Figure 2-2 for the following procedure.

1. Depress START/STOP switch to STOP (in).
2. Raise cartridge access door after START/STOP indicator extinguishes.

CAUTION

If START/STOP lamp is still illuminated after 2 1/2 minutes and brushes are not fully retracted (brush indicator not retracted position) contact the Customer Engineer.

3. Pull back hold-down arms (arms will not move until cartridge is stopped).
4. Remove cartridge dust cover.
5. Push and hold cover release button to left with thumb and lift cartridge handle.
6. Lift cartridge clear of spindle.
7. Place dust cover in position on cartridge and fold over top handle.

NOTE: The handle may be swung out to carry the cartridge, but do not push the cover release button.

8. Close access door if another cartridge is not to be installed.

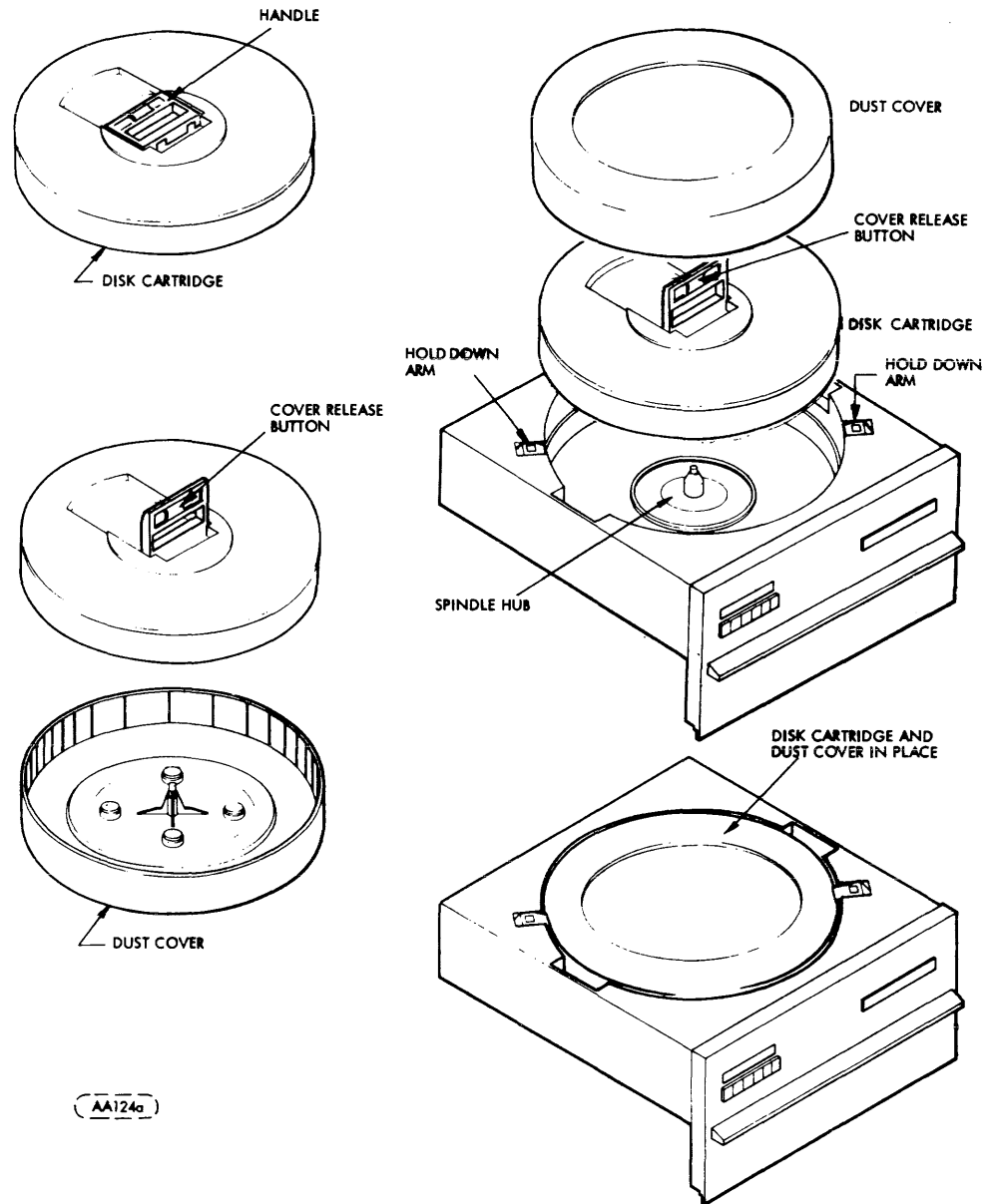


FIGURE 2-2. DISK CARTRIDGE INSTALLATION

2.9 POWER FAILURE OR EMERGENCY STOP REMOVAL

Refer to Figure 2-2 for the following procedure.

NOTE: This procedure to be performed only by the Customer Engineer.

1. Wait approximately 3 minutes for cartridge to stop spinning.
2. Raise cartridge access cover.

CAUTION If START/STOP lamp is not extinguished after waiting 3 minutes and brushes are not fully retracted, open top cover, and manually retract heads and brushes.

3. Release pack locks by inserting a flat head screwdriver (or similar object) into hole on top of pack lock. Press solenoid plunger into solenoid and tilt pack lock, (see Figure 2-1).

4. Remove cartridge dust cover.
5. Push and hold cover release button with thumb and lift cartridge handle.
6. Lift cartridge clear of spindle.
7. Place dust cover in position on cartridge and fold over top handle.

NOTE: The handle may be swung out to carry the cartridge but do not push the cover release button.

8. Close the access door if another cartridge is not to be installed.

3.1 INTRODUCTION

This section provides the information and procedures necessary to install and check-out the 9427H disk drive.

3.2 UNPACKING

During unpacking, exercise care so that any tools being used do not cause damage to the drive. As the drive is unpacked, inspect it for possible shipping damage. All claims for this type of damage should be filed promptly with the transporter involved. If a claim is filed for damages, save the original packing materials.

After the drive is unpacked perform the following procedure:

1. Clean the unit thoroughly.

CAUTION

While performing the following steps do not position the carriage manually. Such action could cause the Read/Write heads to load, causing damage to the heads and disk.

2. Remove four shipping brackets (5 pieces), cabinet mount only.
3. Remove three mounting bolts securing unit to plywood base, rack mount units only.
4. For those units that required AC and DC ground connected during shipping but separate during operation, remove green jumper wire on rear of unit. Jumper wire is connected between AC ground on power supply and electronics cover below velocity transducer cap.
5. Remove electronics cover.
6. Remove the carriage lock pin and store it on the magnet as shown in Figure 3-1.
7. Re-install electronic cover.

3.3 SPACE ALLOCATION

Figure 3-2 and 3-3 show base cabinet and rack mount unit overall dimensions for determining space allocation.

3.4 LEVELING AND ALIGNING BASE CABINET UNIT

Position the cabinet in its operational location and level as follows:

1. Install jack screws provided in plastic container.
2. Lower jack screws in base cabinet until casters no longer contact floor.
3. Adjust jack screws as necessary until unit is level.

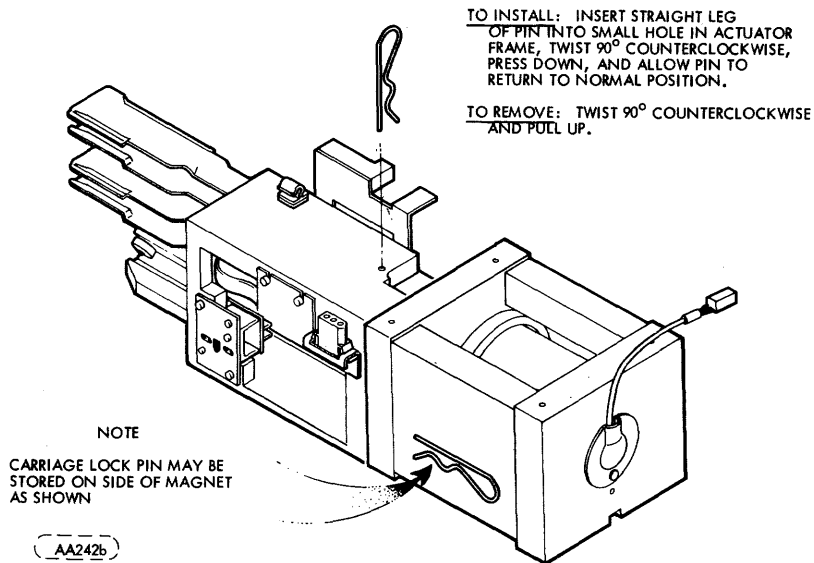


FIGURE 3-1. CARRIAGE LOCK PIN LOCATION

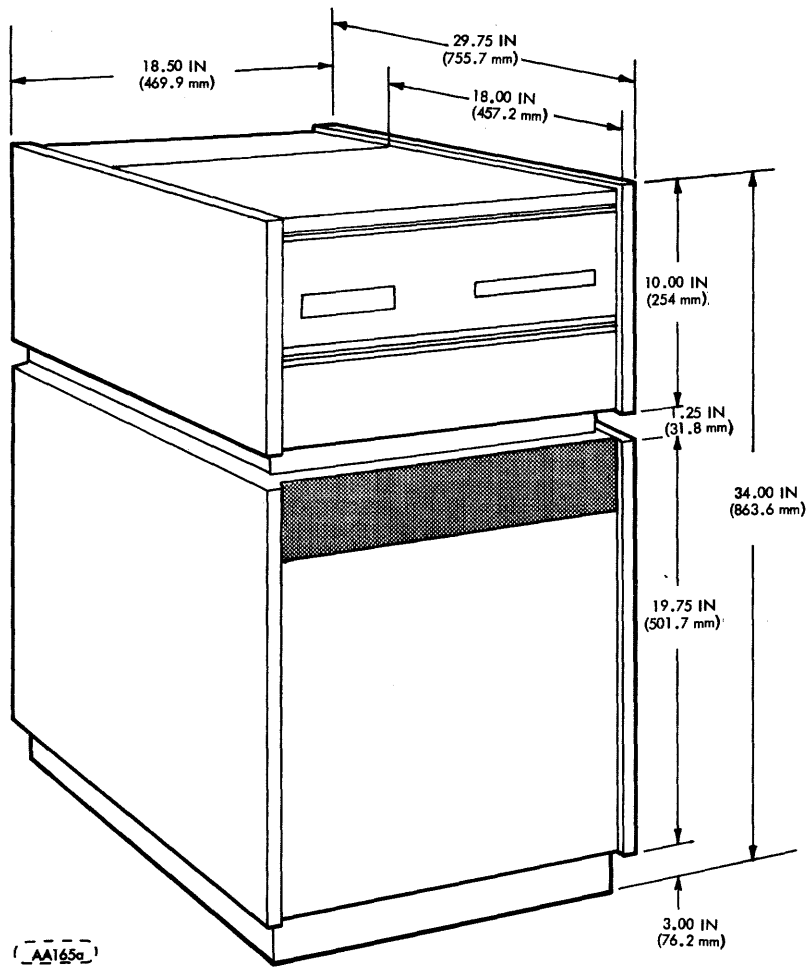


FIGURE 3-2. BASE CABINET DIMENSIONS

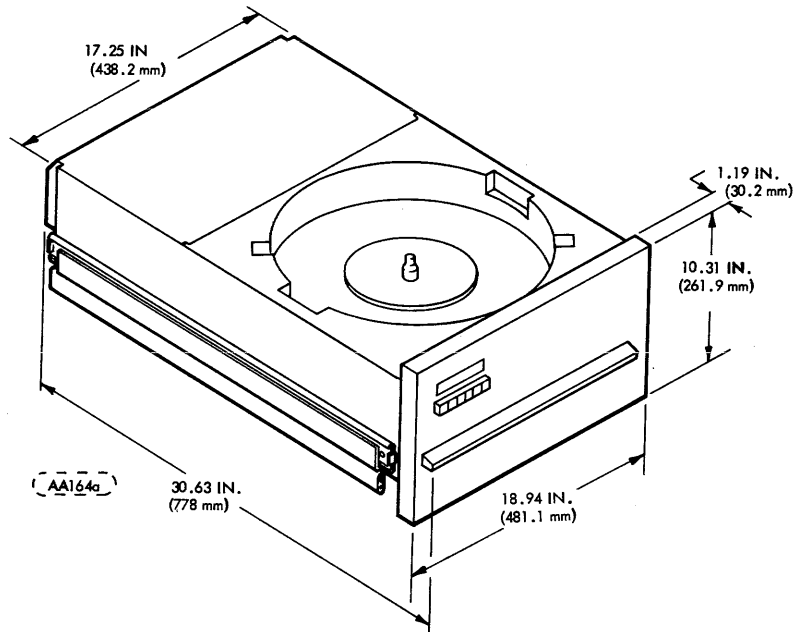
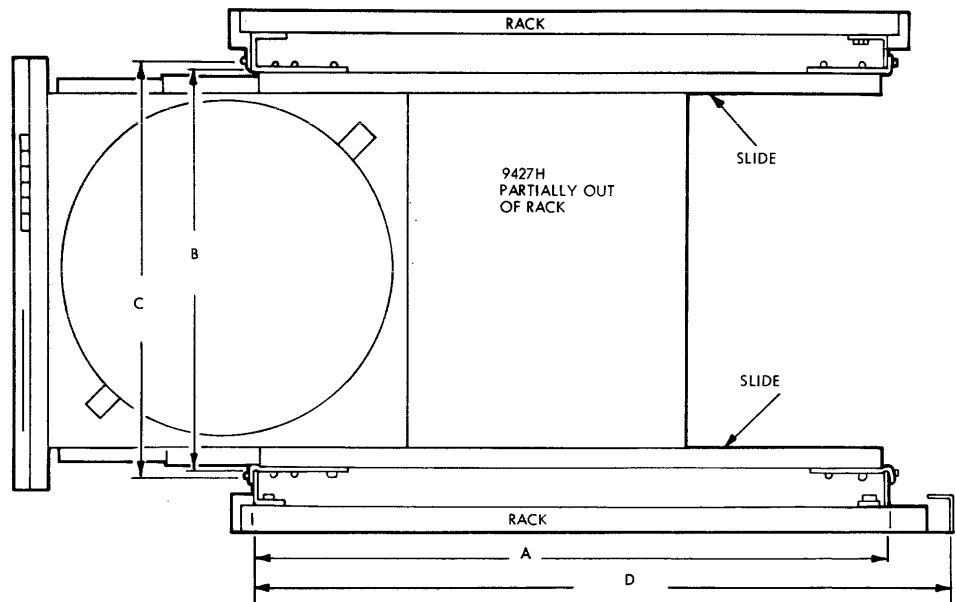


FIGURE 3-3. RACK MOUNT UNIT OVERALL DIMENSIONS



	ACCURIDE SLIDES
A. DISTANCE FROM FRONT MOUNTING RAILS TO REAR MOUNTING RAILS	21.25 - 22.12 OR 27.50 - 28.50 IN. (540-562 OR 699-724 mm) *
B. MINIMUM CLEARANCE BETWEEN MOUNTING RAILS (FRONT AND REAR)	17.625 IN. (447.7 mm)
C. DISTANCE BETWEEN MOUNTING HOLES (FRONT AND REAR)	17.86 - 18.56 IN. (454-471 mm)
D. MINIMUM LENGTH OF CABINET FROM FRONT MOUNTING RAILS (CABLE AND CONNECTOR CLEARANCE)	30.10 IN. (765 mm)

*These limits may be increased by 1.00 IN. (25.4 mm) on the high ends, but the slide extension will be correspondingly reduced.

AA167q

FIGURE 3-4. RACK MOUNT SLIDES DIMENSIONS

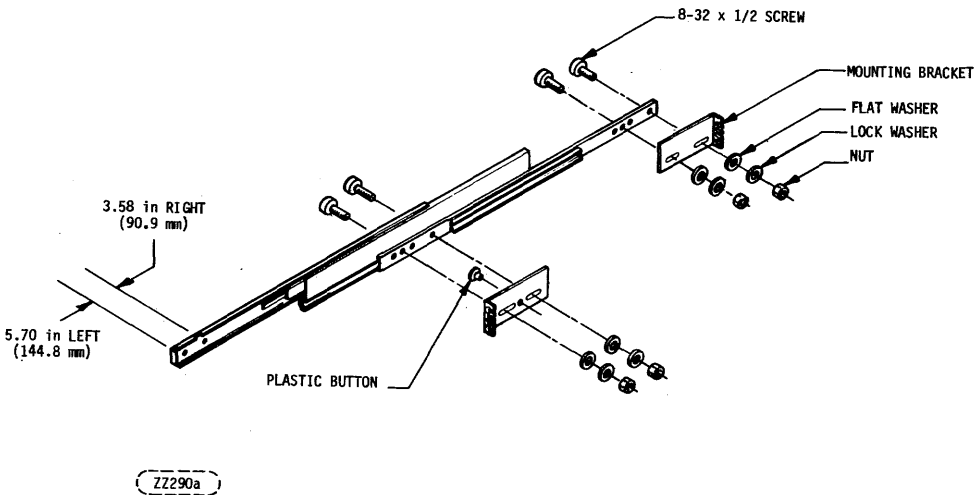


FIGURE 3-5. SLIDE AND BRACKET ASSEMBLY

3.5 INSTALLATION OF RACK MOUNT SYSTEM WITH ACCURIDE SLIDES

The Accuride slides are constructed of three longitudinal members forming two pairs of telescoping channels, one pair above the other. The intermediate member is a vertically double channel, such that it constitutes the moving member of the lower pair of channels as well as the stationary member of the upper pair. The slides and brackets plus attaching hardware and loose unit parts mentioned in the following steps make up an installation kit that is shipped with the unit. The installation kit for units equipped with Accuride slides includes a triangular or wedgeshaped knob that must be added to the unit as a means of releasing the latch mechanism that secures the unit into the rack. Read and understand these instructions before attempting assembly. Also verify that all hardware is included in the kit.

1. Install plastic slide mounts item (18) and plastic keyed slide mounts item (19) at the sides of the unit as shown in Figure 3-6. Mounting hardware for each of these items consists of two 8-32 x 5/8 inch (31.8 mm) pan head machine screws (4) and two No. 8 internal tooth lock washers (8). Place item (26) on ribbon cable directly behind keyed slide-mount on unit's left side.

NOTE

For correct orientation of the unkeyed mounts, the V Groove channels in the mounts should open downward. The flat side of the keyed mounts should be inboard and pointing downward, see Figure 3-6.

2. Install plastic stabilizers item (20) at the sides of the unit as shown in Figure 3-6. Mounting hardware for each of these items consists of two 8-32 x 1/2 in. (12.7 mm) pan head machine screws (24), two No. 8 internal tooth lock washers (8), and two No. 8 flat washers (17).

NOTE

The stabilizers should be mounted with their key extended downward. Leave the stabilizers slightly loose at this time.

3. Adjust then rack so that the dimensions correspond to those shown in Figure 3-4.
4. Accompanying each slide member is a bag of hardware consisting of two mounting brackets, four flat washers, four nuts and four binding-head slotted 8-32 x 1/2 screws. Using Figure 3-5, install mounting brackets to each slide. Slides can be identified by the distance from the front of the slide to the edge of the slot (Figure 3-5).
5. Adjust and secure the front mounting brackets such that the front of the flange of the bracket is flush with the front end of the slide.

NOTE

If necessary, the flanges may be located as much as one inch (25.4 mm) ahead of the slide ends in order to accommodate certain rack dimensions. Maximum extension of the unit out of the rack will be correspondingly reduced, however.

6. If necessary to meet cabinet dimensions, reverse the orientation of the rear mounting brackets of the slides. Adjust and secure the rear mounting brackets to agree with dimension "A" as set up in Step 3. In all cases, make sure that the white plastic button in each front bracket is inserted in one of the two holes provided that will be on top when bracket installation is complete. (The plastic button acts as a bearing between the stationary and moving parts of the slide. If necessary, remove buttons from incorrect holes and insert into the proper holes.)
7. Install the slides into the rack cabinet at the desired location (see Figure 3-4), making sure the slides are horizontal and equidistant from the base of the cabinet. Position the slides in the rack so that the distance between the insides of the uppermost sections of the slides is 16.45 ± 0.303 inches (418 ± 0.76 mm).

NOTE

The correct mounting hardware for the above step is twelve 10-32 x 5/8 inch (15.9 mm) pan head screws (6), twelve No. 10 flat washers (7), twelve 10-32 hex machine nuts (1), and twelve lock washers (21). Install the screws through the brackets and washers into the vertical rails, and then install nuts and lockwashers on the other side of the rails.

8. Pull the slides out to their full extension, approximately 29 inches (737 mm). The intermediate catch at 18 inches (457 mm) must be released on both slides. The slides will again lock at full extension.
9. Set the 9427H on top of the slides, making sure all four plastic mounts are resting on the uppermost edge of the slides and that the keys of the front mounts engage the notches in the slides.
10. Place Loctite (Grade C) on 8-32 x 5/16 (7.94 mm) pan head screws (12) and install through each slide into keyed mount-slide.
11. Adjust the stabilizers, installed in Step 2, as required to prevent wobbling and provide smooth operation of slides. Tighten the stabilizers securely.
12. Install knob assembly item (3) and latch assembly item (16) together and in the unit as shown in Figure 3-6.

NOTE

Hardware used to attach the knob assembly to the latch assembly consists of one each 8-32 x 5/8 inch (15.9 mm) pan head machine screw (4), No. 8 internal tooth lock washer (14), 8-32 x 1/4 inch (6.4 mm) spacer (9), and 8-32 hex machine nut (10). Reference: Figure 3-6.

Hardware for installation of the latch assembly in the unit consists of two 8-32 x 5/8 inch (15.9) pan head machine screws (4), two No. 8 lock washers (14), and two No. 8 flat washers (17). These screws should be left slightly loose at this time.

13. Adjust the latch so that it catches the front rail of the rack, securely holding the unit in the retracted position, when the drive is pushed completely into the rack, and so that the latch-releases easily when the knob is pushed to the left.

NOTE

By loosening the proper pair of screws on the latch assembly, the latch can be moved either forward and aft or left and right to meet this requirement.

14. Determine whether the installation requires use of a cable fender (13) at the rear of the unit. This fender is for the purpose of holding cables away from the ventilation outlet opening in the power supply and is not required if no cables threaten to encroach on the opening.

15. If required, install the fender of Step 14 using two 8-32 x 5/16 inch (7.9 mm) pan head machine screws (5), two No. 8 spring lock washers (14), and two 8-32 type U speed nuts (15) (attached to the electronics cover on either side of the power supply ventilation outlet).

CAUTION

The cable fender must not be used as a handle. It will break off!

3.6 SECTOR OPTION CONVERSION PROCEDURE

Adjust sensor mount for required sector option as follows:

1. Depress Start/Stop switch to Stop (out) and wait for spindle to stop rotating (Start/Stop lamp extinguished).
2. Set main circuit breaker to Off position.
3. Remove front door panel (base cabinet only).
4. Remove module bottom cover.
5. Loosen the sensor mount screw (see Figure 3-7).
6. Lift rear of sensor mount and place the guide pin in the sensor mount hole selected in Table 3-1.
7. Tighten the sensor mount screw.
8. Perform the fixed-disk Index/Sector Transducer Check and Adjustment in Section 6 of Maintenance Manual.
9. Install module bottom cover.
10. Install front door panel (base cabinet only).
11. Open top cover (base cabinet only).
12. Remove electronics cover.
13. Remove clamp and card cage cover.
14. Using card extractor, remove sector PWA.
15. Locate sector PWA diagram on Sheet 2 of your device specification and switch selections located in your HPC document package 83449XXX.
16. Using sector PWA diagram and Table 3-1, determine present setting of S4 switch. Press present switch setting to Off position and press switch setting for new requirement to On position. Only one switch of S4 one through six can be in the On position.
17. Change switch positions on sector PWA diagram.
18. Carefully install sector PWA insuring that all pins are engaged.
19. Install card cage cover and clamp.
20. Install electronics cover.
21. Close top cover (base cabinet only).
22. Place unit on-line and verify operation with system software.

TABLE 3-1. SECTOR OPTION CONVERSION

SECTORS REQUIRED						SENSOR MOUNT	RING
						HOLE #	HOLES
29 or SOFT SECTOR						1	29
40	20	10	5			2	40
48	24	12	6	3		3	48
50	25					4	50
60	30	15				5	60
64	32	16	8	4	2	6	64
56	28	14	7			7	56
72	36	18	9			8	72
÷1	÷2	÷4	÷8	÷16	÷32	DIVISION COUNT	
1	6	5	4	3	2	PWA SW4 SWITCH SETTING	

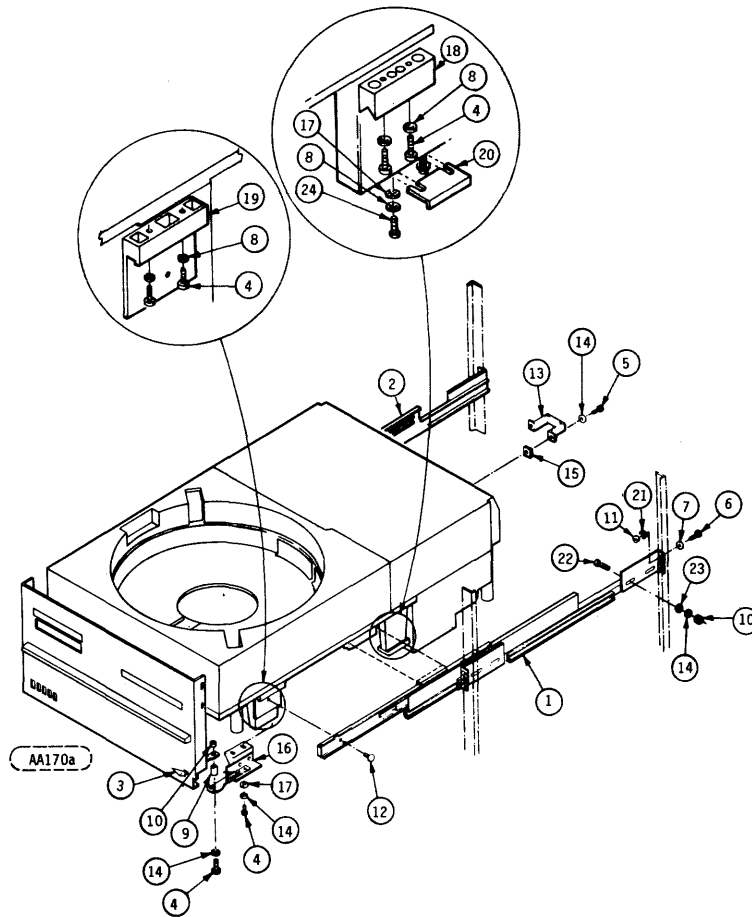


FIGURE 3-6. RACK ASSEMBLY MOUNTING

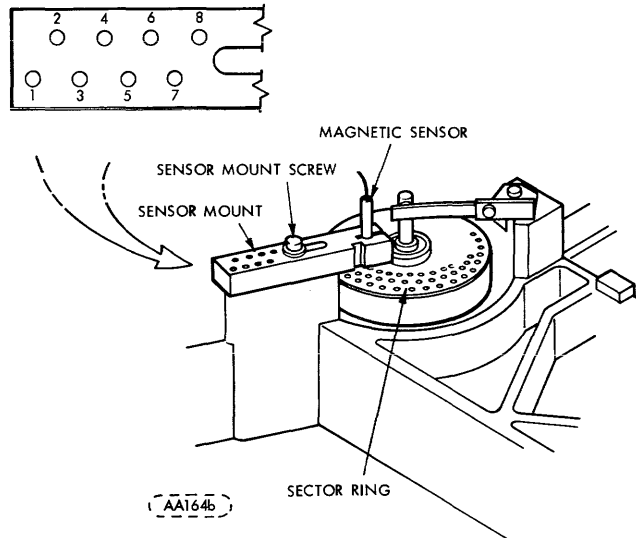


FIGURE 3-7. SECTOR OPTION CONVERSION

3.7 HZ-R/MIN CONVERSION

If Hz-r/min conversions are desired, they are available in standard option kits from the manufacturer. Depending on the specific conversion. Some or all of the following modifications may be required.

- a. Physical change of Drive Pulley and Belt.
- b. Physical change of R/W/E Board
- c. Physical change of Head Option Components.
- d. Physical relocation of jumpers in voltage adjust plug.

If Hertz conversion is required, refer to Table 3-2 for appropriate belt and pulley for desired Hertz. Refer to Maintenance Section 6.6.23 for conversion procedure.

TABLE 3-2. HZ CONVERSION PULLEY AND BELT CONFIGURATION

Hz	r/min	PULLEY NO.	PULLEY DIA.	BELT NO.	BELT LENGTH
50	2400	77599705	2.881 in. (73.2 mm)	75722940	30.375 in. (772 mm)
60	2400	77599706	2.404 in. (61.1 mm)	75722930	29.625 in. (753 mm)
50	1500	77599707	1.761 in. (44.7 mm)	75722920	28.625 in. (727 mm)
60	1500	77599708	1.479 in. (37.6 mm)	75722910	28.125 in. (714 mm)

3.8 CABLING ANC CONNECTION

Unit Intracabling - Inspect the cabling in the cabinet for agreement with Figure 3-2. Check for proper seating of connectors and logic cards.

3.8.1 INPUT/OUTPUT CABLES

All input/output cables exit at the rear of the disk drive. Refer to applicable I/O board schematic in HPC package located in front of manual for connector pin/signal assignments for these cables. If an external terminator assembly is used in A2J2, the DIP terminators must be removed from the I/O board. If daisy chaining is used, the terminator is installed in A2J2 or the DIP terminators are installed in the last unit of the chain. Refer to Figure 3-9. for a typical daisy chain configuration. The function of each signal name is described in Section 2, Table 2-2.

CAUTION

Refer to I/O option diagrams in HPC package located in front of manual for assignments of I/O signals to each terminal on the I/O board connector. Be sure the terminals on the I/O cable from the controller and/or daisy-chained unit have the correct configuration and the correct assignments. BE ESPECIALLY CAREFUL WHEN UTILIZING 3M TYPE I/O CABLES, SINCE THERE IS NO MECHANICAL "KEY" TO PREVENT PLUGGING THE CONNECTOR IN 180 DEGREES FROM THE PROPER POSITION, WHICH WILL RESULT IN DAMAGE TO THE CIRCUITRY. Check to make sure that the I/O cable lead terminating at terminal (1) on a 3M I/O board is a ground lead from the controller and/or daisy-chained unit. Terminal (1) on all 3M I/O board connectors is a ground lead, and is located as shown in Figure 3-10. Utilize the same precautions when relocating adapter boards for 3M to Elco, to 3M to Winchester connectors. Adapter boards with the blue strip lead are marked for proper connection into the 3M connectors on the I/O board. The connector designation and pin sequence is marked on one side of each connector.

3.8.2 GROUNDING OPTION

The disk drive is shipped with logic (DC) ground and chassis (AC) ground connected together--see Figure 3-11 (A)--at the front left hand corner of the power supply. If the system configuration requires the separation of these grounds, perform the following procedures.

1. Open top cover (base cabinet only).
2. Remove electronics cover.
3. Open power supply cover assembly.
4. Rearrange spacers to configuration shown in Figure 3-11(B).
5. Close power supply cover.
6. Install electronics cover.
7. Close top cover.

3.8.3 POWER CABLES

The AC power cable plugs into the bottom of the power supply assembly. On cabinet units, the power cable should exit the unit through the AC entry plate located on the bottom front area of the frame (see Figure 3-13).

3.9 INPUT POWER REQUIREMENTS

Refer to the equipment specification in HPC package listed in front of manual. Ascertain that P12 is jumpered according to Figure 3-12.

CAUTION

When units are field configured for any line voltage other than 120 V, 60 Hz, 4.6 Amp or 120/240 V, 60 Hz, 16 Amp, the CSA monogram must be removed because unit no longer complies with requirements of the Canadian Standards Association.

3.10 ENVIRONMENT

Operating and storage environment of the unit is as follows:

Operating status - 60 to 90°F (15.6 to 32.2°C) (12°F/hr maximum fluctuation)
10 to 80% relative humidity (provided there is no condensation)

Non-operating status - -30 to +150°F (-34.4 to 65.6°C)
5 to 95% relative humidity (providing there is no condensation)

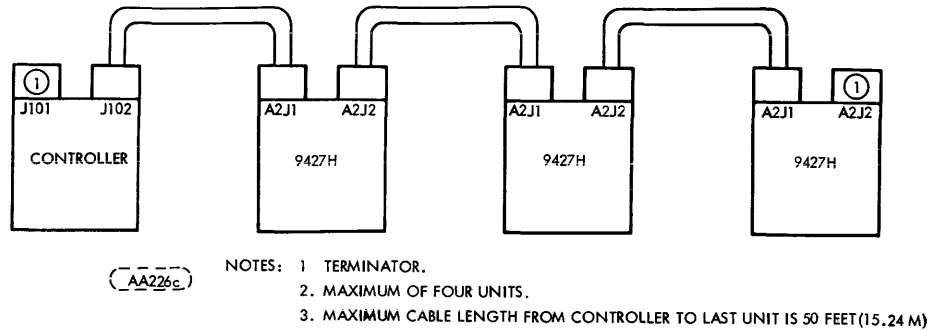
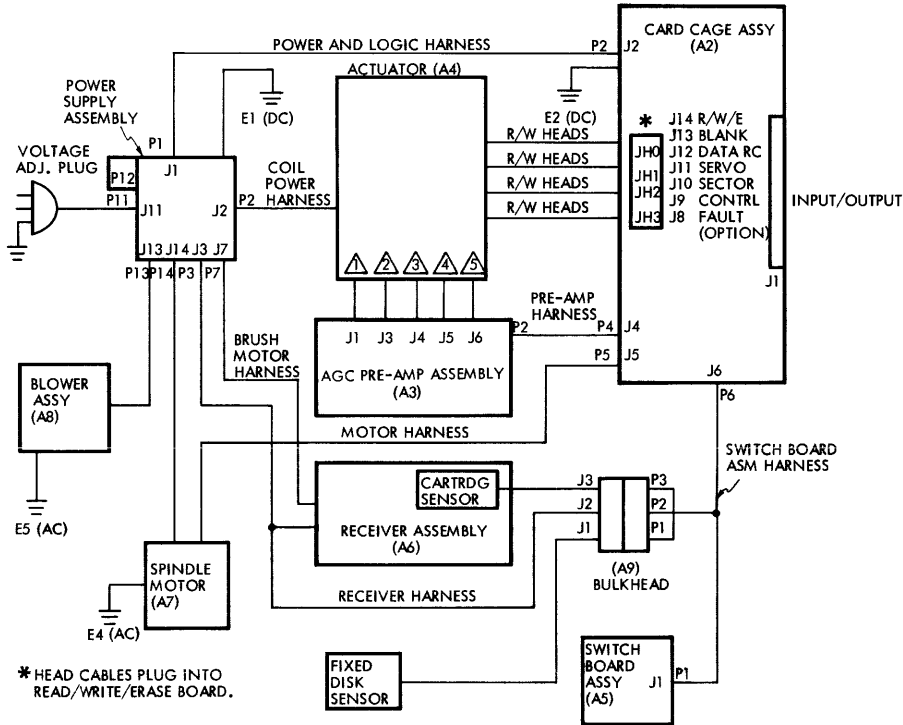


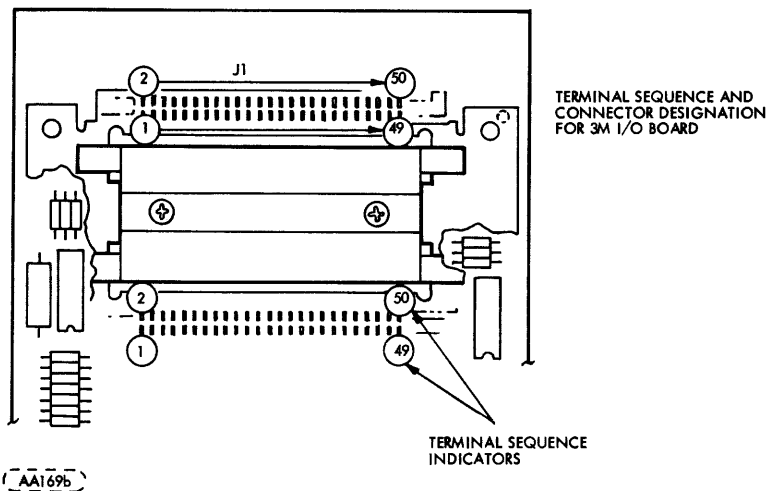
FIGURE 3-8. DAISY CHAIN CONFIGURATION

- ① EOT ASSEMBLY
- ② RETRACT
- ③ POSITION XDUCER SLIDER
- ④ VELOCITY XDUCER
- ⑤ POSITION XDUCER SCALE



AA232a

FIGURE 3-9. SIMPLIFIED INTRACABLING DIAGRAM



AA169b

FIGURE 3-10. 3M I/O BOARD CONNECTOR TERMINAL ASSIGNMENTS

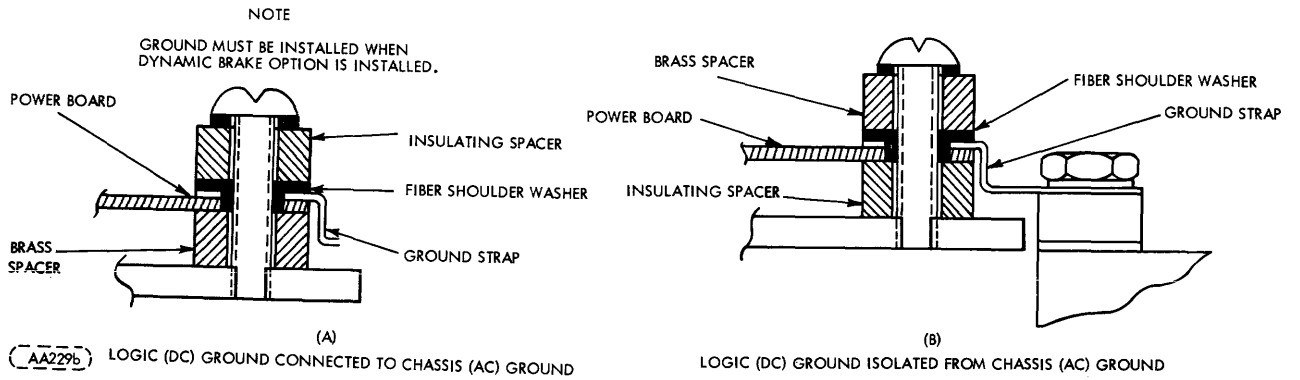
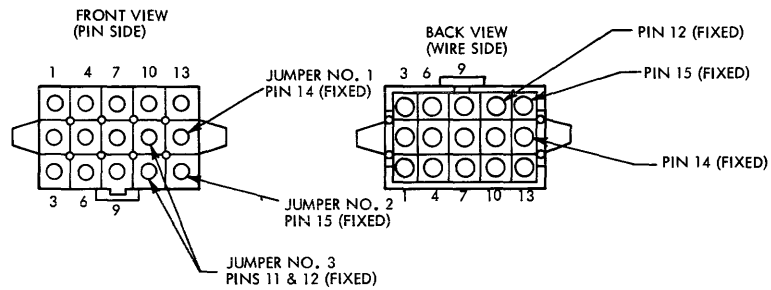


FIGURE 3-11. GROUNDING OPTION



NOTE: For proper pin configuration use above illustration. Ignore pin numbering on connector.

VOLTAGE	JUMPER #1		JUMPER #2	
	FIXED PIN	MOVEABLE PIN	FIXED PIN	MOVEABLE PIN
100	14	4	15	7
110	14	3	15	7
120	14	2	15	7
130	14	1	15	7
140	14	6	15	8
150	14	5	15	8
160	14	4	15	8
170	14	3	15	8
180	14	2	15	8
190	14	1	15	8
200	14	6	15	9
210	14	5	15	9
220	14	4	15	9
230	14	3	15	9
240	14	2	15	9
250	14	1	15	9

AA231a

FIGURE 3-12. VOLTAGE ADJUSTMENT PLUG P12 AND ADJUSTMENT TABLE

3.11 OPTION SWITCHES

Various modes of operation are made possible by option switches located on the Sector, Data Recovery, Control and I/O boards. These switches are factory set to customer requirements.

The unique settings of the switches (and their locations) are shown in the switch specifications in the HPC package located in the front of the manual.

3.12 INITIAL CHECKOUT AND STARTUP PROCEDURE

This procedure should be used to make the first power application to the unit. The procedure assumes that the preceding procedures and requirements of this section have been performed and satisfied.

1. Check that the power supply assembly circuit breakers is OFF.
2. Open top cover.
3. Grasp and turn spindle. Spindle should rotate with little resistance.
4. Wipe spindle surface and hub clean using gauze dampened with media cleaning solution.

CAUTION

Do not position the carriage manually. Such action could cause the read/write heads to load and be damaged.

5. Use a vacuum cleaner to remove any dust or dirt from interior of cartridge receiver.
6. Check that START/STOP switch is off.
7. Make certain that input power cable is connected to correct external AC power source, and P12 jumper plug is correctly jumpered and in place. (See Figure 3-12 for Jumper Installation information.)

NOTE

When units have a daisy chain configuration for AC power, prior to connecting the AC cable the proper phasing should be verified at device end for each device.

8. If external AC power to the unit is protected by circuit breaker, set circuit breaker to ON position.
9. Set power supply assembly circuit breakers to ON position and check that blower starts.
10. Pull back cartridge hold-down arms.
11. Install disk cartridge (refer to Disk Cartridge Installation procedure in Section 2).
12. Inspect and clean disk cartridge as specified in Preventative Maintenance portion of Section 6.
13. Press START switch to apply power to spindle motor.
14. Spindle drive motor and disk cleaner brush motor starts.
15. Assure READY light is illuminated in a maximum of 70 seconds.
16. Allow device and pack to reach thermal stabilization (20 minutes).
17. Run diagnostics.
18. If diagnostics fail, troubleshoot or make any necessary adjustments and rerun diagnostics. (See Section 6 for all Check and Adjustment procedures and Section 7 for Maintenance aids.)
19. Installation complete.

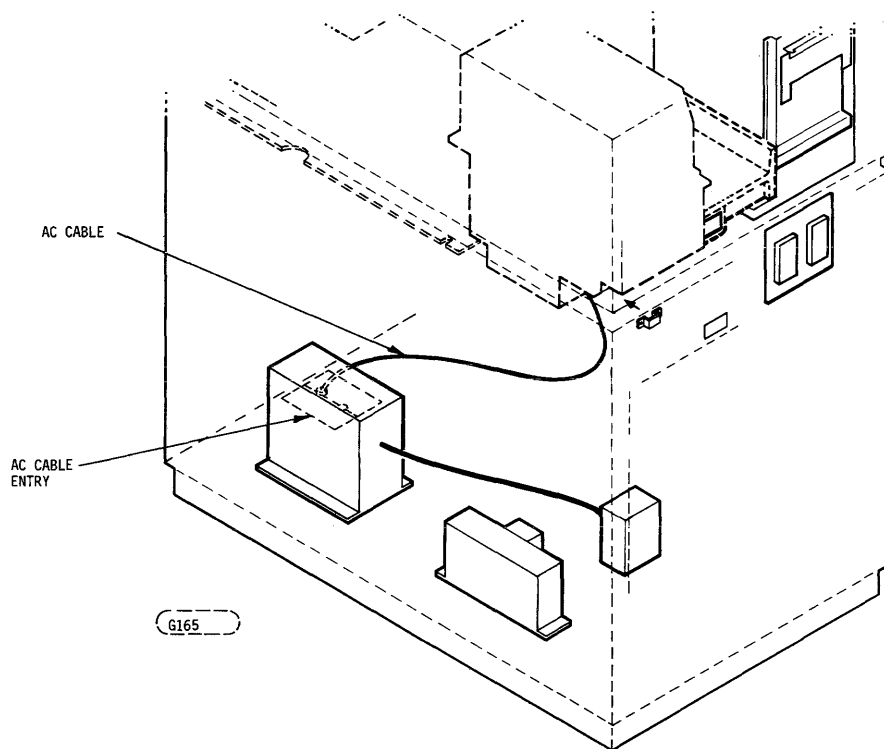
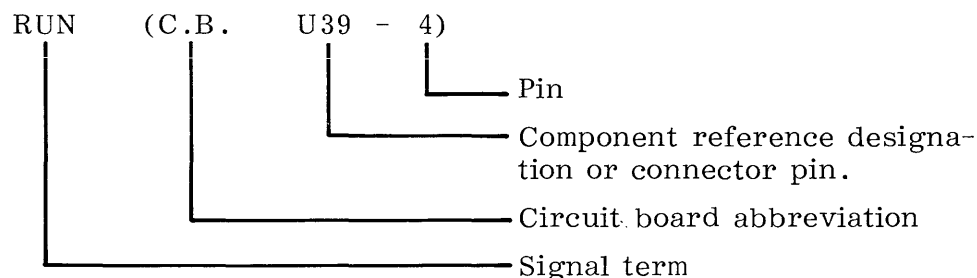


FIGURE 3-13. AC POWER CABLE EXIT

4.1 INTRODUCTION

The theory of operation is described in terms of the major junctions that the disk drive performs during normal and emergency operation and the circuitry and hardware involved in the performance of these functions. Signal origins and destinations and component locations are shown in parenthesis. For example, if the signal term RUN is referred to, it would appear as follows:



Circuit board abbreviations used in this description are as follows:

C.B. = Control Board	S.B. = Servo Board
S.C. = Sector Board	R/W/E = Read/Write/Erase Board
D.R. = Data Recovery Board	I.P. = Inductosyn Preamplifier Board
P.B. = Power Board	

4.1.1 DISK DRIVE

Disk drive is achieved through a belt driven spindle. The spindle is rotated at 1500 or 2400 r/min (depending on r/min option installed) by the disk drive motor.

4.1.2 ACTUATOR

The actuator consists of the carriage, carriage track, magnet assembly, and cam mount. The actuator is the device that supports and moves the read/write heads. Lateral forward and reverse movement of the carriage on the carriage track is controlled by the servo signal. (P.B. J2-1, J2-2) The basic signal is developed in the servo board and processed by a power amplifying stage mounted on the power amplifier board (power supply). The power amplifier output current is applied to the voice coil positioner (part of carriage). The signal causes an electric field about the voice coil positioner. This electric field interacts with the permanent magnetic field of the magnet assembly, which moves the voice coil either into or out of the permanent magnetic field. Current polarity to the voice coil determines the direction of motion, while current amplitude determines the acceleration and velocity of the motion.

The voice coil positioner is a bobbin-wound coil that is free to slide in and out of the forward face of the magnet assembly. Fastened to the positioner is a head/arm receiver which holds the two (four with fixed disk option) read/write heads. The head/arm receiver mounts on the carriage and bearing assembly that moves along the carriage track on ball bearing rollers. Movement of the positioner in or out of the magnet causes the same motion to be imparted to the entire carriage assembly. This linear motion is the basis for positioning the read/write heads to particular cylinder of tracks on the disk. (Refer to paragraph 4.6 for detailed information on read/write head loading and unloading.)

The actuator contains a optical switch for detecting each end of travel. A negative-going pulse is generated by these optical switches at forward and reverse end of travel.

4.1.3 HEAD/ARM ASSEMBLIES

Two head/arm assemblies (four with fixed disk option) are mounted on the carriage. A head/arm assembly consists of a read/write and erase coil package (head assembly) mounted at the end of a supporting arm structure. The head assembly, which includes a cable and plug, is mounted on a gimbal ring which in turn is mounted on a floating arm. This method of mounting allows the head assembly to pivot (independent of the arm) tangentially and radially relative to a data track on the disk surface. Such motion is required to compensate for possible irregularities in the disk surface.

The arm structure consists of a floating arm secured to a heavier fixed arm. The end of the fixed arm opposite the head installs in the carriage assembly. The floating arm is the mounting point for the head and is necessarily flexible so that it can respond during loading and unloading.

The freedom and mobility of the head are necessary elements to insure proper functioning with interchangeable disk cartridges. Vertical motion by a disk surface (due to warpage or imperfection) is countered by a move in the opposite direction by the gimballed head and/or floating arm. As a result, flight height remains nearly constant.

4.2 OPERATIONS

Refer to the applicable schematic, block diagram, intercabling diagram flow chart and timing charts for the following discussion.

4.2.1 POWER UP/FIRST SEEK

When the main circuit breaker, CB1 (power supply) is actuated, an initial reset, CLEAR (C.B. U39-12) is generated which clears all latches. After approximately 60 ms (+5 V supply settling time) CLEAR disappears. At this time, provided the pack locks are closed and no faults exist, the disk drive can be started by depressing the START/STOP push button.

Actuating the START/STOP pushbutton generates RUN (C.B. U39-4) which, in turn, energizes the spindle motor and start relay, starts the brush cycle, initiates the spindle motor start delay, illuminates the start indicator, and latches the disk cartridge in place. After approximately 4 seconds the start motor relay is de-energized and the start capacitor is removed from the motor start winding.

During the brush cycle, the disk brushes are passed across the entire surface of the disk to remove any foreign particles. When the brushes reach the end of travel, the motor is mechanically reversed and the brushes move outboard until they reach the home position, at which time the brush motor is de-energized by the closure of a SPDT switch (Cartridge Receiver A6SW3). The closure of this switch generates BRUSH CYCLE COMPLETE (C.B. U32-12). BRUSH CYCLE COMPLETE clocks K1 flip-flop control (C.B. U18) provided spindle speed is within 20% of nominal value.

The completion of the brush cycle is followed by a 50 second servo delay, after which Servo Enable (C.B. A10) initiates the operation called first seek. The function of first seek is to calibrate the disk cylinders or tracks with the track counter (S.B. U11, U12, U13). This is accomplished by driving the read/write heads inboard until they reach forward end of travel (FEOT) then out-board until the first even-numbered cylinder is crossed. The first even-numbered cylinder encountered is identified as track 408 and each succeeding track crossed decrements the track counter until track 000 is reached, at which time, ON CYL (S.B. B20) is generated. ON CYL initiates $\overline{\text{READY}}$ (C.B. A8) and assuming the unit is selected (reference daisy chain configuration) the controller is notified that first seek is complete.

4.2.2 OPERATIONAL SEEK

Refer to Figure 4-2 for the following discussion.

If, at the completion of first seek, data is to be read from or written on the disk, an operational seek is performed. To initiate an operational seek, the address of the desired track is strobed into the disk drive of nine (9) lines (S.B. B2-B10).

The number of tracks that the read/write head has to travel from its present track to the selected track is determined by calculating the difference between the track address (S.B. U4, U5, U6, U15) and the track counter (S.B. U18, U19, U20). The absolute value of this digital difference is applied to a D/A converter (S.B. U39) whose output provides an analog signal to the voice coil for movement of the read/write head to the desired track. Voice coil movement, hence read/write head movement during an operational seek consists of two modes: (1) coarse and (2) fine. During the coarse mode the voice coil is driven at a velocity determined by the number of tracks remaining in the seek.

The fine mode is employed to bring the carriage to a stop without overshoot when the desired cylinder is reached. Figure 4-3 shows the D/A converter output and the velocity profile for a typical long seek. During the first part of the seek the carriage is accelerated by the maximum output of amplifier AR4 (S.B.) until it reaches maximum velocity. From this point on, the carriage is driven at a constant velocity (coast) until it is 128 cylinders from the desired destination at which time it decelerates uniformly until it reaches the last track. Upon reaching the last track the system switches to the fine mode and the position signal from the encoder is utilized to bring the carriage to the center of the track. Approximately 2 ms after the head has settled within 200 microinches of the selected track center, ON CYL (S.B. B20) is generated. $\overline{\text{SKER}}$ (S.B. B16) is generated if the carriage goes beyond either end of travel (FEOT or REOT) or if ON CYL is not present 0.5 seconds after the initiation of SERVO EN, C.A. STROBE or RTZS. A SERVO INH automatically removes power from the voice coil by forcing an inhibit on the servo output multiplexer (S.B. U42).

4.2.3 RETURN-TO-ZERO SEEK (RTZS)

When RTZS is commanded by the controller, the track counter (S.B. U18, U19, U20) is set to 408 and the address register (S.B. U4, U5, U6, U15) is reset to zero. However, the invert line (U6-3) to the address register is set for non-inverting operation. As a result the address register indicates a cylinder address of 424. Consequently the difference between the track counter and address register is 16 (424-408). Since counting by the track counter and address register

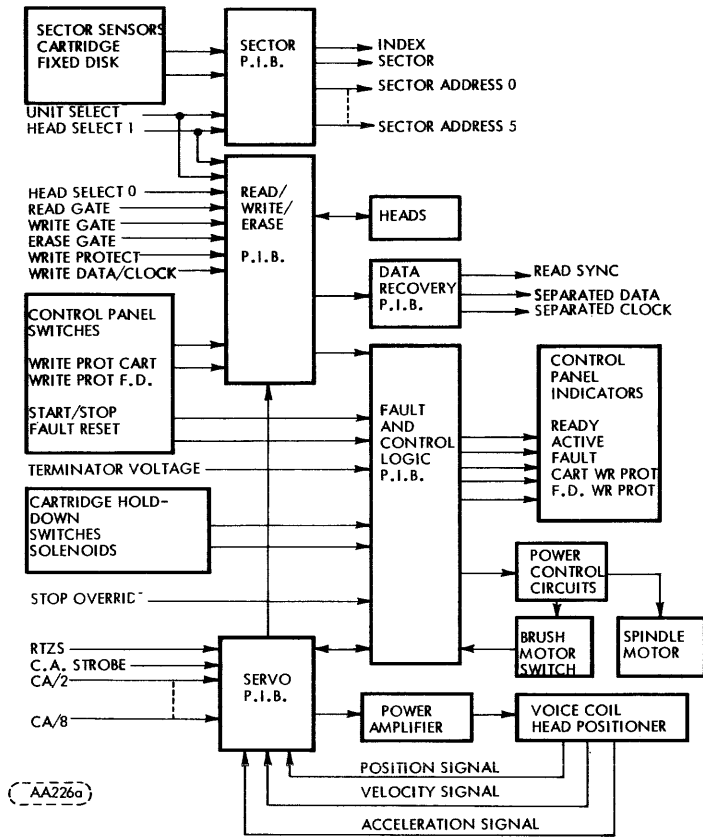


FIGURE 4-1. MODEL 9427H BLOCK DIAGRAM

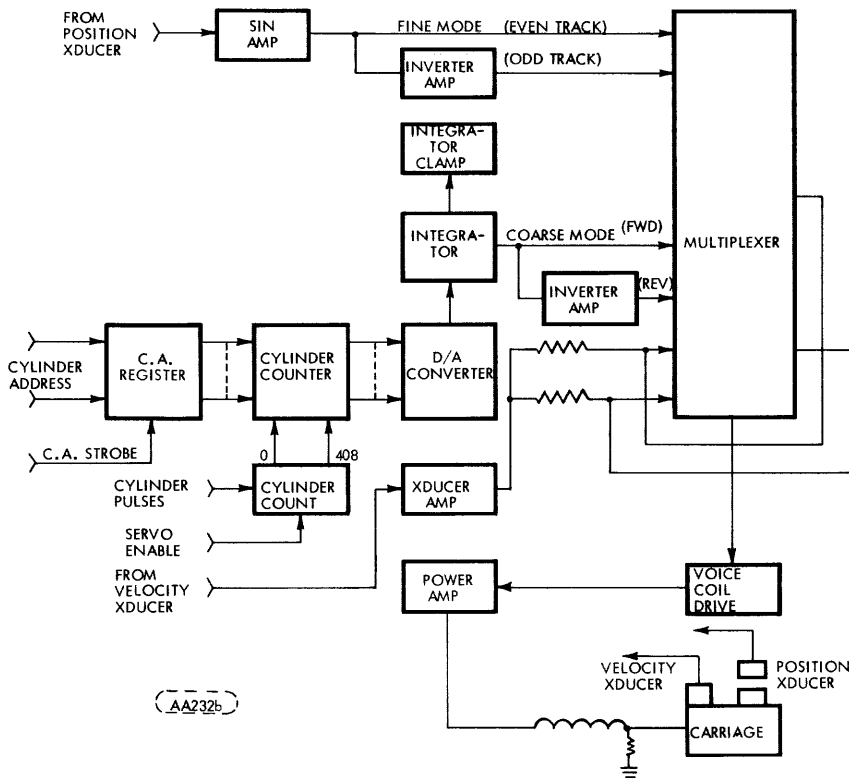


FIGURE 4-2. SERVO SYSTEM BLOCK DIAGRAM

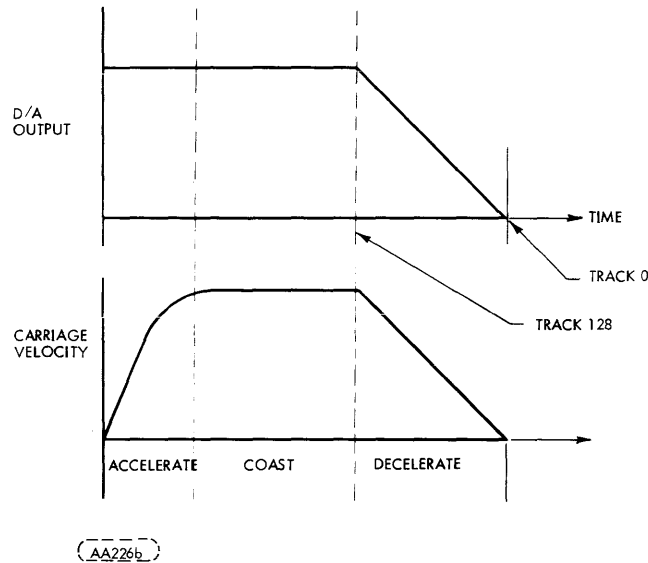


FIGURE 4-3. SEEK VELOCITY PROFILE

is inhibited, the difference is held constant, resulting in the carriage being driven at a constant speed of approximately 16 ips (406 mm/sec). When the forward end of travel (FEOT) is reached, the address register is shifted back to the normal inverter mode thereby establishing an address of 000. This causes the carriage to reverse direction and as soon as the first even-numbered track is encountered the count inhibit signal is removed from the track counter, allowing it to count down normally from 408 to 000 as described in First Seek.

4.2.4 WRITE/ERASE DATA

Writing on any one of four recording surface (2 cartridge and 2 fixed disk) requires that the disk drive be able to select the desired read/write head. Selections of the heads is accomplished by means of two input lines termed HS/0 and HS/1 (Head Select 0 and 1). The logic condition of HS1 determines whether the cartridge or fixed disk is selected while the logic condition of line HS0 determines whether the upper or lower surface of the disk is selected.

Once the disk surface and read/write head has been selected, a write function is initiated by the controller commanding UNIT SELECT and WRITE GATE. These two controller inputs generate a write line term W/E INA (R/W/E B4) and a write enable term WR EN (R/W/E B2). With the logic thus conditioned by these signals, WR DATA and CLOCK applied to the disk drive (R/W/E A3) then can be recorded. With WR EN at a high level, incoming data and clock pulses (R/W/E A3) will clock the write data flip-flop (R/W/E U10). As a result the outputs of the flip-flop will be a composite of frequency encoded data and clock which alternately switch a voltage dependent current source (R59-R70) through two power transistors (R/W/E Q6, Q7). The outputs of these transistors drive write current through one half of the head winding then the other via head select circuits (R/W/E U14, U16).

Recording on tracks 256 or greater requires a reduction in write current due to bit density. When the read/write head is moved to track 256 or greater for purposes of writing, ZONE (S.B. A20) is generated, causing (R/W/E U11-2) to go to ground thereby reducing the current to the read/write heads.

An erase function is initiated by the controller commanding a UNIT SELECT (C.B. B9) and ERASE GATE (C.B. A12). These two controller commands generate terms ER EN (C.B. B26) and W/E/INH (C.B. A24). Term ER EN turns on a transistor switch (R/W/E U11) in series with the selected erase winding via erase diodes (R/W/E U17 - Diode matrix) and the +15 V center tap voltage.

4.2.5 READ DATA

To initiate a read operation, READ GATE and UNIT SELECT are commanded by the controller. The read head output is processed by differentiation of the recorded flux reversals as follows: The signal is amplified by a linear low noise differential amplifier (R/W/E AR2) and differentiated by AR1 (R/W/E). The resulting differentiated signal simultaneously drives a cross-over detector (R/W/E U2) and isolation stage (R/W/E Q12, Q13) which provides a monitor for the differentiated analog signal at the I/O connector.

Cross-over detection is achieved by a dual differential receiver (R/W/E U2) which digitizes the differentiated signal by generating positive and negative edges for each analog zero cross-over point. This digitized double frequency information (R/W/E A6) is coupled to the data recovery circuitry where phase and frequency tracking is established.

Phase and frequency tracking of the double frequency data is accomplished by means of a digital phase lock loop (Figure 4-4). The loop is comprised of a comparator, current pump, voltage controlled oscillator, data window generator, reference signal generator and acquisition detector.

Initially, the comparator (D.R. U27) derives a phase error signal between the pulsed data (double frequency data) and the out-of-lock reference signal. This TTL signal is applied to the current pump (D.R. Q1, 2, 3, 10, 11, 12) where it is integrated to develop a DC level (V_c).

V_c passes the AC component which is controlled by the value of R38 and the current from the bidirectional pump (D.R. Q10, Q11). The resultant voltage, V_{re} , corresponds to the input data frequency and the superimposed square waveform is utilized for phase synchronism.

The current pump output corrects the VCO (D.R. Q4-Q9) bringing its output to a nominal 5 MHz for a 2.5 MHz data rate (2400 r/min disk speed). Since the phase locked oscillator is a closed loop, the current pump drives the DC level (V_c) to reach a steady state when the signal at the comparator is a square waveform. Frequency synchronism is achieved at this point. When the loop is locked at its center frequency, the component of V_c is symmetrical.

At the beginning of the lock procedure, the disparity between the data window (D.R. U23-2) and pulsed data (D.R. U23-1) triggers a fixed time out signal, FT TRACK (D.R. B23) which increases the current available in the current pump, thereby increasing the rate of VCO correction.

After frequency and phase synchronization have been achieved the double frequency pulse data is decoded into SEP DATA (D.R. A4, B4, A5, B5) and SEP CLOCK (D.R. A3, B3, A2, B2).

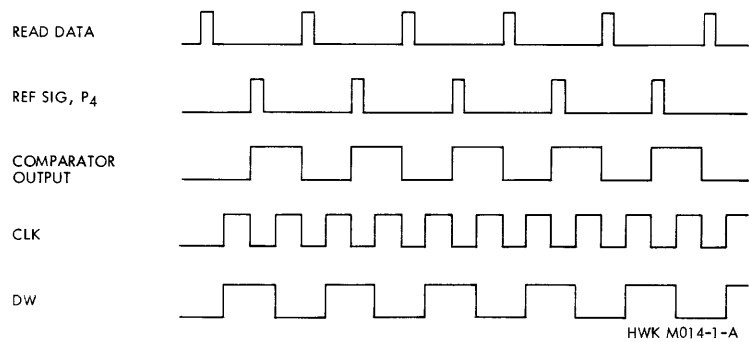
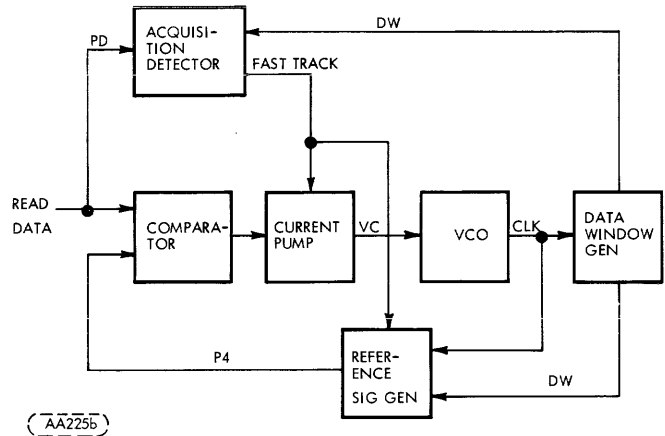


FIGURE 4-4. DIGITAL PHASE - LOCK LOOP AND TIMING DIAGRAM

4.3 SECTORING

The sectoring system is capable of producing all standard sectoring formats. This is accomplished by moving the sensor over the desired row of holes on the sector ring and selecting the desired prescaling factor using S3 (S.C.). Refer to Section 2 (Operation) for switch setting and resulting prescaling factor.

Refer to Figure 4-5 for the following discussion.

Monitoring the position of the disk comes under the function known as sectoring. Position information is derived from pulse trains generated by two magnetic sensors. One sensor (for reading cartridge sectors) is mounted in the receiver area and senses notches on the disk armature plate. The other sensor (for reading fixed disk sectors) is mounted beneath the drive motor pulley and senses chemically milled holes in the sector ring. Both sensors generate negative-going pulses which indicate the center of the notch or hole. The pulse trains generated by these two sensors are separated into index and sector pulses by the sector board.

4.3.1 FIXED DISK

Index pulses are separated from sector pulses by two NOR gates (S.C. U26-3 U26-4) and a one-shot multivibrator (S.C. U32). The separated pulses drive the prescaling counter (S.C. U33) and the sector address counter (S.C. U17). The counters are reset by receiving an index pulse and incremented by receiving a sector pulse. The count of the sector pulses is utilized to generate a six-bit sector address field (S.C. B2, B3, B6, B8, B11, B14). The sector address and index pulses are outputted upon command of the controller.

The index pulse can be transmitted at one of two times depending on the setting of SW1-1 and 2 (S.C.). If both switches are open, the index pulse output will appear simultaneously with the next sector pulse (DELAYED INDEX). If both switches are closed, the index pulse will appear at the output simultaneously with the input (DIRECT INDEX).

4.3.2 CARTRIDGE DISK

Cartridge disk index and sector pulse processing is handled, with minor exceptions, in the same manner as described for the fixed disk. Index and sector pulses are sensed from the Cartridge armature plate by the index/sector transducer and fed to the Sector board at A22. Index pulses are separated from sector pulses by two NOR gates (S.C. U19-3, U19-4) and a one-shot multivibrator (S.C. U25). The separated pulses drive the prescaling counter (S.C. U14) which divides the separated sector pulses by 32, 16, 8, 4, 2 or 1. The count of the sector pulses is utilized to generate a six-bit sector address field (S.C. B2, B3, B6, B8, B11, B14). The sector address and index pulses are output upon command of the controller. Delayed and direct index pulses are provided for the cartridge disk the same as the fixed disk.

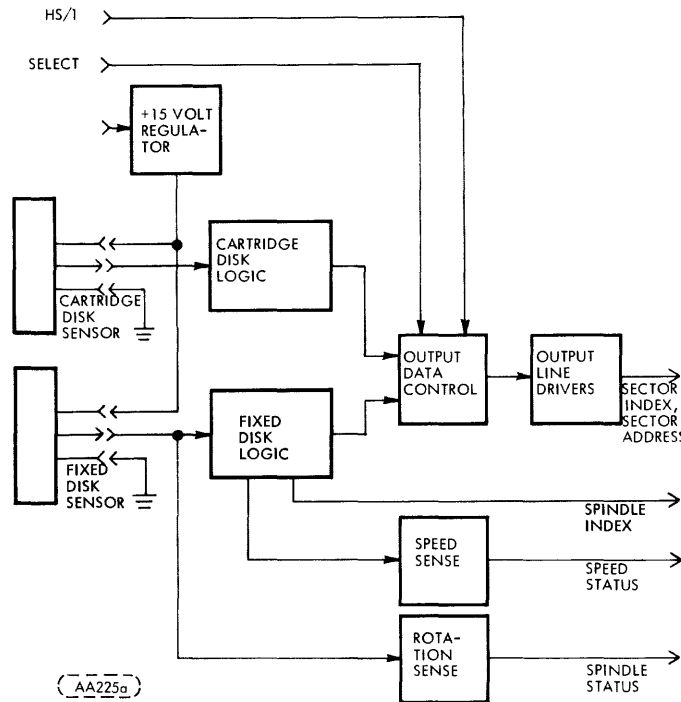


FIGURE 4-5. SECTOR SYSTEM BLOCK DIAGRAM

4.3.3 SOFT SECTOR

Under certain circumstances it is desirable to operate the disk drive with only a single sector. This mode of operation is called soft sector. Cartridges used for soft sector have only a single notch to be detected by the sensor. The single pulse generated each revolution by this notch will always be interpreted by the sector board as a sector pulse. The configuration of two switches SW1-2 and SW2-7 (S.C.) effectively substitutes this sector pulse for the missing index pulse.

Data received from the controller in the soft sector mode will be in a format containing a unique 8-bit pattern for identification of the start of a sector address.

4.4 FAULT DETECTION

Fault conditions in the disk drive are divided into two classes:

- (1) damaging and (2) non-damaging.

4.4.1 DAMAGING FAULTS

Damaging faults are those which will cause damage to the read/write head or to disk surfaces. These faults will occur as a result of subnormal spindle speed or supply voltage failure on the servo or inductosyn pre-amp boards.

To provide protection for the heads and media, the spindle speed (C.B. B8, U11-8) and the servo board supply voltages (C.B. A27, A30, B27, B30, U11-13) are continuously monitored. Any reduction in spindle speed below the set tolerance level or the occurrence of any non-transient voltage fault will set the emergency retract latch causes the disk drive to generate the term FAULT (C.B. U35-13, U14-10) illuminate the fault lamp (C.B. U15-6), retract the heads via K1 relay and switch the unit out of the run mode (C.B. U24-6, U31-9). The emergency retract latch can only be reset after the fault condition is cleared and the START/STOP switch is returned to the STOP position or with a power up clear (C.B. U18-10).

4.4.2 NON-DAMAGING FAULTS

Non-damaging faults are those that are not dangerous from the point of equipment safety but are those that will lead to degraded operation (i.e., read and write failures). These non-damaging faults are read/write head current faults, command faults and voltage failures.

A current fault (R/W/E B7) will occur under one of the following conditions:

1. Write current but no erase current
2. Erase current but no write current
3. More than one head selected for a write/erase operation
4. Excessive current leakage on the write driver output line during a read.

A current fault sets the fault latch (C.B. B20, U35-13). The fault latch will also set, if an attempt to write is made when the heads are not on cylinder or an attempt is made to read at the same time write or erase is enabled. Other conditions that will generate Fault signals are attempting to select heads 2 or 3 when there is no fixed disk or when there is a voltage failure in the read/write, data recovery or sectoring circuitry. The term, FAULT, generated by any of the above fault condition inhibits write and erase and disables the READY line (optional) to the controller. A FAULT will also illuminate a front panel indicator and enables a fault line to the controller. Non-damaging faults can be reset by the front panel FAULT RESET pushbutton, or by the controller RTZS command (option).

4.5 WRITE PROTECTION

Data on the cartridge or fixed disk may be protected by depressing the appropriate front panel WRITE PROTECT switch. The signal developed by WRITE PROTECT switch is gated with HS/1 (C.B. A20, U7-5, 6 or U7-1, 2) and assuming that the protected head is selected, write protected status (C.B. U21-6) will be enabled. This status will occur whether or not the unit is selected (reference daisy chaing configurations). If the unit is selected (C.B. U43-6) PROT STAT (C.B. B21) will be transmitted to the controller.

The controller can initiate write protection by commanding Unit Select and WR PROT (C.B. B23, U7-13). These signals condition the write protect logic and illuminate the appropriate WRITE PROTECT indicator. The indicator will remain illuminated as long as the unit is selected, the appropriate heads are selected and the controller initiated WR PROT is in effect.

4.6 HEAD LOADING

The read/write heads must be loaded to the disk surfaces before exchanging data with the controller. The heads must be retracted from load position and driven clear of the disk when power is removed from the unit or the disk velocity falls below a predetermined r/min.

Head loading amounts to allowing spring pressure of the floating arm (part of head/arm assembly) to move the aerodynamically shaped head face toward the disk surface. When the cushion of air caused by the spinning disk is encountered, it resists any further approach by the head. Spring pressure is designed to just equal the opposing cushion pressure (function of disk r/min) at the required height. As a result, the head flies. However, if the spring pressure exceeds the cushion pressure, which would happen if the disk cartridge lost enough speed, the head stops flying and contacts the disk surface, causing damage to the head and the disk surface.

The floating arm is designed to maintain a constant loading force. While the heads are retracted, head cams on the cam mount bear against the floating arm cam surfaces. The cams counter the loading force and force the heads to the unloaded position. As the carriage moves forward, the cam surface rides off the cam just after the read/write head moves out over the disk surface. The loading force now moves the head face toward the air layer on the surface of the spinning disk until the opposing forces achieve a state of equilibrium. The heads are thus loaded and the carriage is forced to continue toward the spindle until the forward end of travel (FEOT) signal occurs.

4.7 HEAD RETRACT

Two situations will cause the read/write heads to be moved back past the loading ramp. These two situations are normal and emergency retract.

4.7.1 NORMAL RETRACT

Normal retract will occur when the START/STOP switch is returned to the STOP position. This causes the disabling of SERVO EN (C.B. A10). When SERVO EN goes to zero, the address register (S.B. U4, U5, U6, U15) is set to 424 as in RTZS. However, the track counter (S.B. U18, U19, U20) is set to 440. Since counting is inhibited under this circumstance, the carriage will move outboard at a constant

rate of 16 ips (406 mm/sec). When the carriage contacts the reverse stop micro-switch, (A4SW1), REV STOP (P.A. J2-12) is generated. One-half second after the occurrence of REV STOP the power amplifier is disabled.

4.7.2 EMERGENCY RETRACT

In the event of a damaging power failure or the spindle motor velocity drops below the tolerance limit, an emergency retract is initiated. Either of these conditions de-energizes the voice coil relay (P.B. K1). The openings of K1 initiates a 0.5 second delay which allows the carriage, by means of spring loaded effect of the voice coil connections to move to a position away from the unloading ramp. After the delay, triac, Q5 (P.B.) discharges a 100,000 Uf Capacitor (P.B.) through the voice coil thus unloading and retracting the heads.

4.8 CYLINDER LOCATING AND POSITIONING

The system for locating and counting tracks (cylinders) on the disk is comprised of a position encoder or transducer and an up/down counters.

4.8.1 CYLINDER LOCATIONS

Cylinder locations are determined by counting the zero crossings of the COS signal from a reference point using an up/down counter system (S.B. U18, U19, U20). A cylinder is defined as the space between two transitions of COS. Whenever the transitions occur a clock pulse (S.B. U32-11 & 6) is generated, causing the cylinder counter to count up or down depending on the state of the up/down signal (S.B. U30-5 & 6). The state of the up/down signal is determined by the logical levels of SIN and COS just prior to the clock pulse. By examining the wave forms in Figure 4-6, it can be seen that whenever the expression SIN COS is true, the count will be down and whenever the expression is false, the count will be up. An odd numbered cylinder is defined as one where the slope of SIN signal is positive displacement and an even numbered track is one where the slope of SIN is negative for positive displacement. Initial location of the track is established during FIRST SEEK.

4.8.2 CYLINDER POSITIONING

The position encoder or transducer, schematically depicted in Figure 4-7 is a capacitively coupled linear displacement transducer. The encoder has two elements. One element (the scale) is rigidly mounted while the other element (the slider) is attached to the carriage-assembly and moves parallel to the scale as the read/write heads are moved in and out. Both the scale and the slider has 0.005 in (0.127 mm) strips of copper, spaced 0.005 in (0.127 mm) apart, which function as plates of a capacitor. The voltage is applied to the copper strips on the scale so that the voltage on adjacent strips is 180° out of phase.

As the slider moves parallel to the scale a sinusoidally 50 kHz signal is coupled to the slider. The amplitude of the sinusoid at any given point is a function of distance of the slider strips with respect to the scale strips with zero crossings occurring every 0.005 in (0.127 mm) (see Figure 4-8). This signal is phase demodulated and peak detected on the I.P. Board. The SIN & COS signal is used to generate clock pulses for counting tracks. The phase relationship of these signals determine the direction of travel of the carriage. The zero crossings of the SIN signal are aligned to coincide with the center of the cylinder locations on the disk.

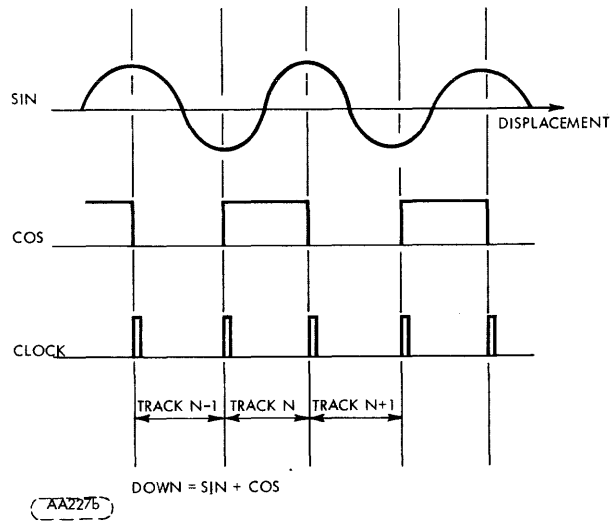
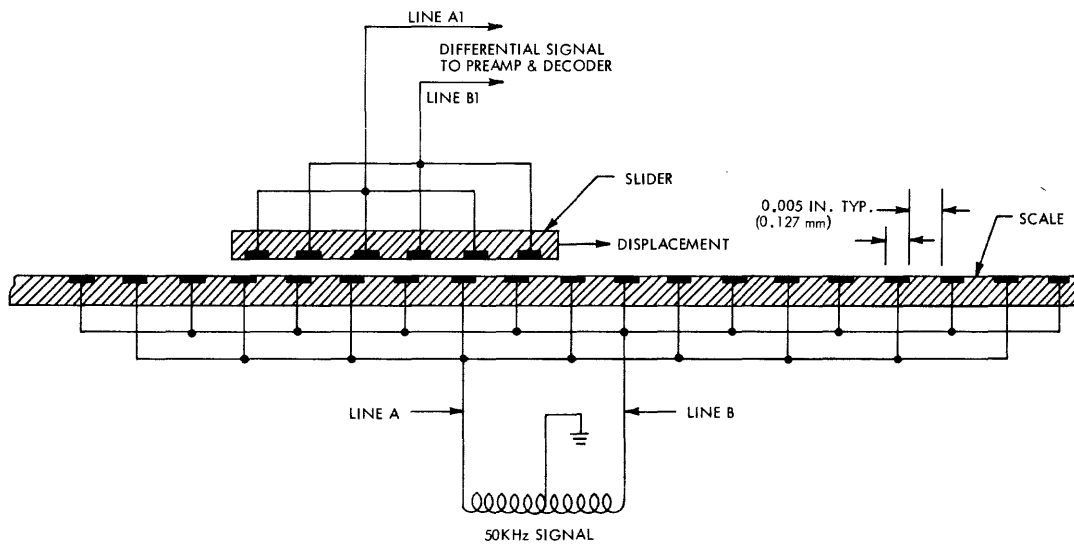
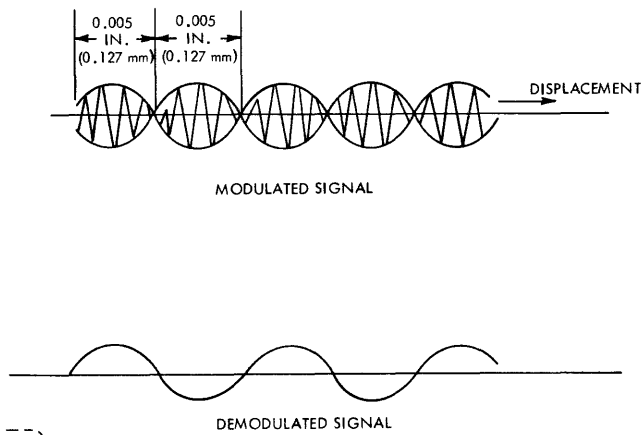


FIGURE 4-6. COUNTING LOGIC



AA229a

FIGURE 4-7. CAPACITIVELY COUPLED LINEAR DISPLACEMENT TRANSDUCER



AA228b

FIGURE 4-8. POSITION TRANSDUCER SIGNAL

5.1 INTRODUCTION

This section contains the intracabling diagram, a key to the logic diagram symbolology, a Table of commonly used Integrated Circuits, Printed Circuit Board documentation, and electrical schematics.

Input/Output (I/O) Board documentation is included in the Hardware Product Configurator (HPC) Document Package located in front of the manual. It may be desirable to insert the I/O Board portion in front of this Section.

Also included in the HPC package is a "Device Specification" which defines the correct switch settings for the option selection switches which are located on circuit boards and the terminator resistor values on the I/O Board. The value specified determines the Resistor Module (RM) installed on the I/O Board. The RM Part Numbers are listed in parts Data, Section 8. In addition, documentation describing Special Options, Special Printed Circuit Boards, and other customer unique features is included in the HPC package.

5.2 INTRACABLING DIAGRAM

The intracabling diagram (Figure 5-1) details the cable connection between each major assembly and the mother board. Sheet 2 of Figure 5-1 is to be used when tracing signals between the Fault Isolation Retention Module (FIRM) and the unit.

5.3 CIRCUIT BOARD DOCUMENTATION

Each of the following circuit board figures consists of an assembly drawing and parts list, a connector diagram, and a schematic diagram.

<u>CIRCUIT BOARD TITLE</u>	<u>BOARD IDENT. NO.</u>	<u>FIGURE NO.</u>
Control Board Assembly	95207509	5-15
Sector Board Assembly	75883201	5-16
Servo Board Assembly	77831401	5-17
Data Recovery Board Asm.	75297105	5-18
Data Recovery Board Asm.	75886537	5-18
Read/Write Erase (2400 r/min)	75891100	5-19
Read/Write Erase (1500 r/min)	75880500	5-19
AGC Servo Preamp Bd Asm	77658600	5-20
Power Supply Board No. 1	77830321	5-21
Power Supply Board No. 2	77830330	5-22
Spindle Motor Brake Asm	75866206	5-23
Switch Board Assembly	75299103	5-24
Switch Board Assembly	75299102	5-24
Component Board - Mother	75870203	(For reference only 5-1)

5.3.1 CONNECTION DIAGRAMS

Logic signals can be traced throughout the unit by using the circuit board connector diagrams. Each diagram lists the sheet number(s) of the accompanying schematic and the next connector diagram(s) figure number on which the signal can be found.

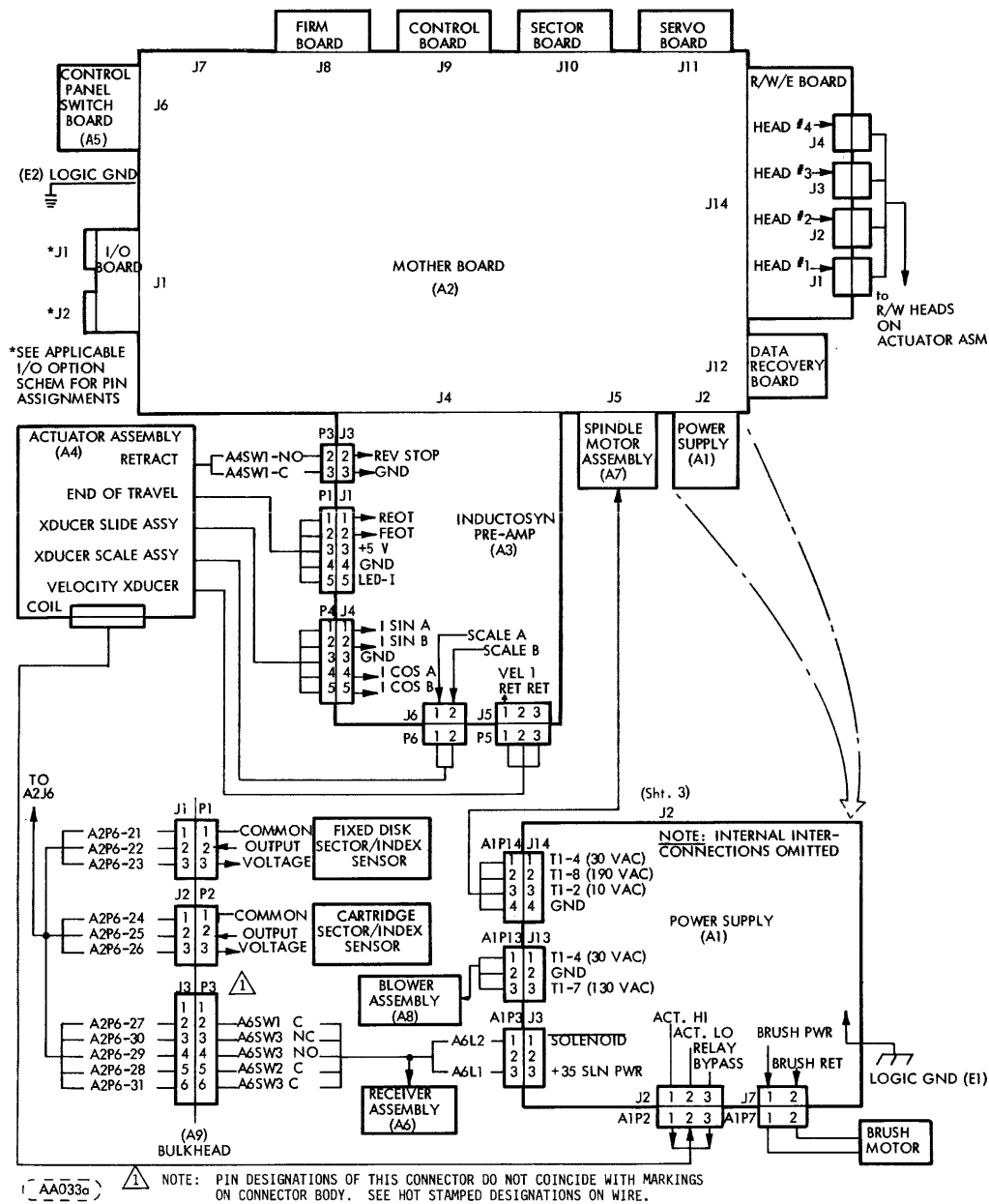
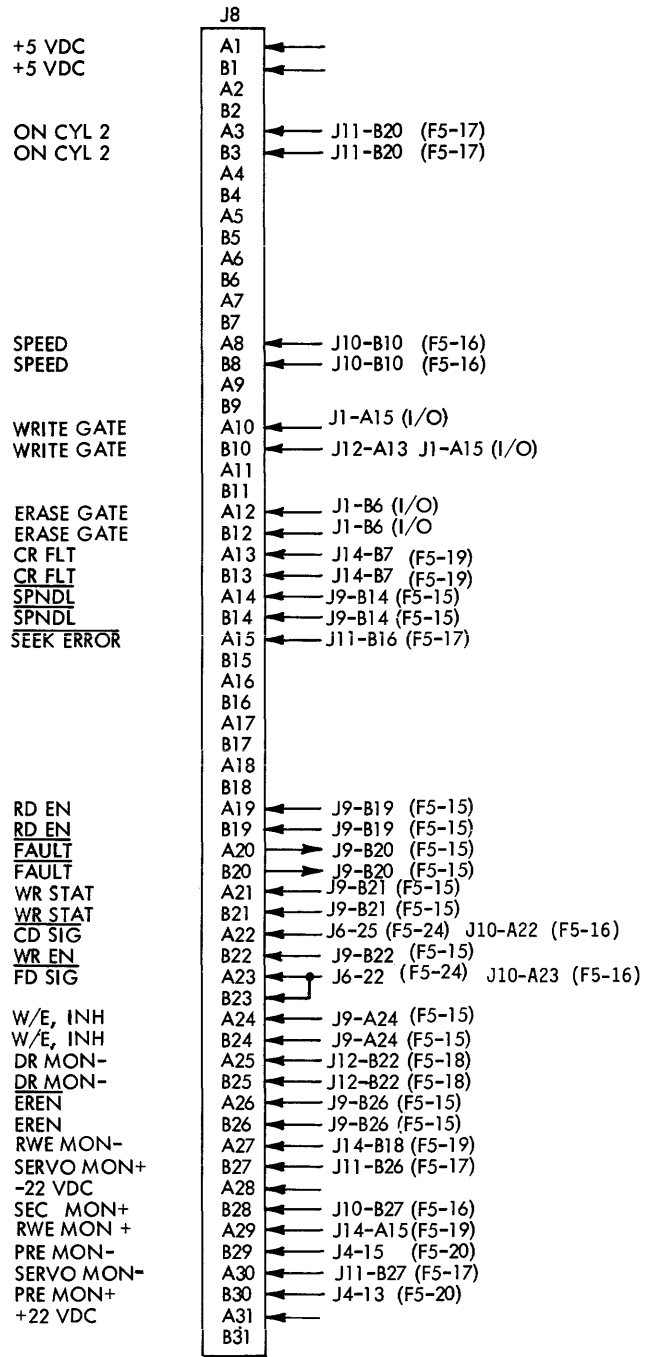


FIGURE 5-1. DETAILED INTRACABLING DIAGRAM (SHEET 1 OF 2)

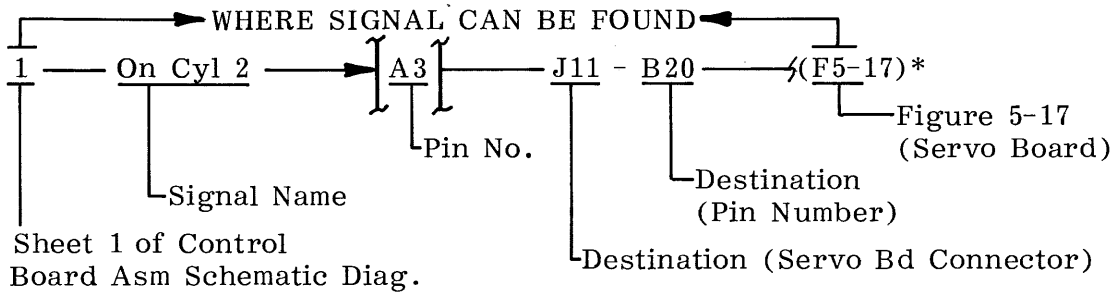
FIRM BOARD



AA053a

FIGURE 5-1. DETAILED INTRACABLING DIAGRAM (SHEET 2 OF 2)

EXAMPLE: Figure 5-15 Control Board Assembly



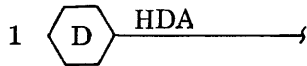
*(I/O)

I/O Board (refer to HPC package Located in front of manual)

5.3.2 SCHEMATIC DIAGRAMS

Multiple sheet (SET of pages) circuit board schematics are sequentially numbered (1,2,3 etc) in the upper right-hand corner of each schematic sheet. Symbology for sheet to sheet connections and board to board connections are as follows:

- Sheet to Sheet ON PAGE example:

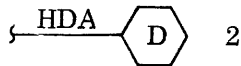


1 = Signal "from" sheet 1 of SET

D = ON sheet reference (from sht 1 of set)

HDA = Signal name (from sh 1 of set, location $\text{\textcircled{D}}$)

- Sheet to Sheet OFF PAGE example:

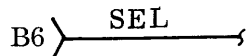


2 = Signal "to" sheet 2 of SET

D + OFF sheet reference (to sheet 2 of set)

HDA = Signal name (to sheet 2 of set, location $\text{\textcircled{D}}$)

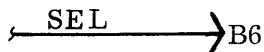
- Board to Board ON PAGE example:



B6 = Pin Location of board connector (Ref Para. 5.3.1)

SEL = Signal name (Ref Para. 5.3.1)

- Board to Board OFF PAGE example:



B6 = Pin location of board connector (Ref para. 5.3.1)

SEL = Signal name (Ref para. 5.3.1)

5.4 MAJOR ELECTRICAL DIAGRAMS

<u>Figure Title</u>	<u>Figure Number</u>
AC-DC Power Distribution:	
● Without Dynamic Brake	5-25
● With Dynamic Brake	5-26
● Without Dynamic Brake and Special RFI Filters	5-27
● Without Dynamic Brake and with Filters & Power Input Assembly	5-28
● With Dynamic Brake and Spl RFI Filters	5-29
Baseplate Electronics	5-30

5.5 LOGIC DIAGRAM SYMBOLOGY

5.5.1 GENERAL INFORMATION

Logic symbols are drawn with inputs on the left and outputs on the right whenever space and layout permit.

Power supply connections, discrete timing components, etc, may be shown connected to the top or bottom of the symbol. Unused pins and unused elements need not be shown. Figure 5-2 illustrates functionally equivalent symbols.

5.5.2 GENERAL SIGNAL ANNOTATION

S = Set input to bistable device

R = Reset (Clear) input to bistable device

G = Gate input has no direct action on circuit, but must be present before inputs (and/or outputs) are able to function. If more than one gate is used a numeric suffix is added (G1, G2, etc.)

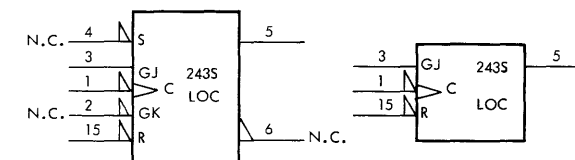
D = Identifies a signal which requires the presence of another signal to perform its function.

C = Strobe pulse. Usually used to gate "D" inputs into a bistable device.

T = Toggle input. Bistable device changes state each time "T" assumes its specified state.

J = J output conditioned by leading edge of dynamic toggle (G).

K = K output conditioned by leading edge of dynamic toggle (G).



BOTH SYMBOLS REPRESENT A BI-STABLE JK F/F CIRCUIT WITH SOME OF THE PINS UNUSED. (N.C. INDICATES "NOT CONNECTED")

(AA142a)

FIGURE 5-2. FUNCTIONALLY EQUIVALENT SYMBOLS

5.5.3 SYMBOLOGY

Logic Symbols are described in Table 5-1.

TABLE 5-1. LOGIC SYMBOLOGY

	INDICATES NON-STANDARD LOGIC LEVELS		A HIGH LEVEL ON THE LOWER INPUT "INHIBITS" THE BLOCK OUTPUT FROM ASSUMING ITS ACTIVE STATE
	INDICATES NON-LOGIC (ANALOG) SIGNALS		A LOW LEVEL ON THE LOWER INPUT "INHIBITS" THE BLOCK OUTPUT FROM ASSUMING ITS ACTIVE STATE
	TEST POINT		INPUTS TO THE COMMON CONTROL BLOCK AFFECT EVERY TERM IN THE ARRAY. INPUTS TO EACH TERM AFFECT ONLY THAT TERM.
	INDICATES TWO OR MORE LINES WHICH CARRY THE SAME INFORMATION (USUALLY DIFFERENTIALLY)		WIRED "AND" CIRCUIT
	DYNAMIC INPUT ACTIVE DURING THE TRANSITION FROM LOW TO HIGH STATE		LIGHT EMITTING DIODE
	DYNAMIC INPUT ACTIVE DURING THE TRANSITION FROM HIGH TO LOW STATE		TRIAC

(AA142c)

5.5.4 FUNCTION SYMBOLOGY

Function symbols are as described in Table 5-2.

TABLE 5-2. FUNCTION SYMBOLS

	GATE INPUT		DECODER
	OSCILLATOR		DIGITAL TO ANALOG CONVERTER
	AMPLIFIER		VOLTAGE REGULATOR OUTPUT VALUE "m"
	"AND" GATE		MULTIPLEXER
	"OR" GATE		SHIFT REGISTER
	"EXCLUSIVE OR"		COUNTER
	FUNCTION GENERATOR		ARITHMETIC LOGIC UNIT
	LEVEL CONVERSION		RECEIVER
	SCHMITT TRIGGER		ANNOTATION RESTRICTING THE NUMBER OF COINCIDENT INPUTS OR OUTPUTS GROUPED BELOW IT ACCORDING TO M. EXAMPLE: (≤ 1) MEANS ONLY ONE OR LESS COINCIDENT INPUT OR OUTPUT BELOW ALLOWED.
	SINGLE SHOT		
	SUMMING CIRCUIT		
	THRESHOLD (ANALOG OUTPUT) OR COMPARATOR (BINARY OUTPUT) PRODUCES A CHANGE IN THE OUTPUT SIGNAL WHEN INPUT EXCEEDS A PREDETERMINED LEVEL "m".		
	DATA INPUT		
	CONTROL or CLOCK INPUT		

(AA142d)

5.5.5 ABBREVIATIONS

ADR	=	ADDRESS
AMP	=	AMPLIFIER
CART	=	CARTRIDGE
CNT	=	COUNT
COM	=	COMMON
CUR	=	CURRENT
CYL	=	CYLINDER
DIFF	=	DIFFERENCE
E	=	ERASE
EN	=	ENABLE
EOT	=	END OF TRAVEL
FWD	=	FORWARD
HD	=	HEAD
LD	=	LOAD
NC	=	NORMALLY CLOSED
NO	=	NORMALLY OPEN
PWR	=	POWER
R	=	READ
REV	=	REVERSE
RTZS	=	RETURN TO ZERO SEEK
SEL	=	SELECT
T	=	TRACK
T.A.	=	TRACK ADDRESS
VEL	=	VELOCITY
W	=	WRITE

5.5.6 IC INDEX AND CROSS REFERENCE

Refer to Table 5-3 for a cross-reference between CDC element number and manufacturer type.

TABLE 5-3. INTEGRATED CIRCUIT INDEX & CROSS REFERENCE

CDC DESIGNATION		MANUFACTURING DESIGNATION	
ELEMENT	PART NUMBER	TYPE	FUNCTION
4001	15135000	4001	CMOS QUAD 2 INPUT NOR
4002	15133000	4002	CMOS DUAL 4 INPUT NOR
4008	15133100	4008	CMOS 4 BIT ADDER
4011	15133200	4011	CMOS QUAD 2 INPUT NAND
4012	15133300	4012	CMOS DUAL 4 INPUT NAND
4013	15133400	4013	CMOS DUAL "D" FLIPFLOP
4019	15133500	4019	CMOS QUAD AND-OR-SELECT
4023	15133700	4023	CMOS TRIPLE 3 INPUT NAND
4024	15133800	4024	CMOS 7 STAGE BINARY COUNTER
4029	15134100	4029	CMOS PRESETTABLE UP-DOWN COUNTER
4030	15134200	4030	CMOS QUAD EXCLUSIVE OR
4035	15134300	4035	CMOS SHIFT REGISTER
4047	15134600	4047	CMOS RESETTABLE RETRIGGERABLE ONE-SHOT
4049	15134700	4049	CMOS HEX INVERTER BUFFER
4050	15134800	4050	CMOS HEX BUFFER
4053	15135100	4053	CMOS BIDIRECTIONAL ANALOG MUX
4528	15135400	4528	CMOS DUAL RESETTABLE RETRIGGERABLE ONE-SHOT
195	15104300	9602	TTL DUAL RETRIGGERABLE ONE-SHOT
175	15104800	7474	TTL DUAL "D" FLIPFLOP
146S	15109200	74504	TTL HEX INVERTER
243S	15109400	745112	TTL DUAL J-K FLIPFLOP
175S	1519700	74574	TTL DUAL "D" FLIPFLOP
140L	15112300	74L00	TTL QUAD 2 INPUT NAND
146L	15112700	74L04	TTL HEX INVERTER
341	15126600	LM339	QUAD COMPARATOR
327	15132600	MC1468	DUAL 15 VOLT REGULATOR
195L	15150700	96L02	TTL DUAL RETRIGGERABLE ONE-SHOT
146	36187100	7404/9016	TTL HEX INVERTER
209	36187900	7453	TTL 4 WIDE 2 INPUT AND-OR-INVERT
140H	36188700	74H00	TTL QUAD 2 INPUT NAND
141	50250700	7410/9003	TTL TRIPLE 3 INPUT NAND
173H	50251700	3004	TTL QUAD 2 INPUT NAND
149H	50251800	3021	TTL QUAD EXCLUSIVE OR
140S	50254600	74500	TTL QUAD 2 INPUT NAND
141S	50254700	74510	TTL TRIPLE 3 INPUT NAND
208S	50254900	74520	TTL DUAL 4 INPUT NAND
140	51651900	7400/9002	TTL QUAD 2 INPUT NAND
146	51701800	7404/9016	TTL HEX INVERTER
158	51761500	74161/9316	TTL 4 BIT BINARY COUNTER

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5.5.7 CIRCUIT TYPES AND WAVEFORMS

Figure 5-3 illustrates a typical integrated circuit. Figures 5-4 through 5-14 illustrates the various types of circuits and associated waveforms.

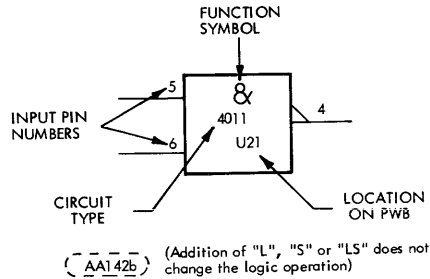


FIGURE 5-3. TYPICAL INTEGRATED CIRCUIT

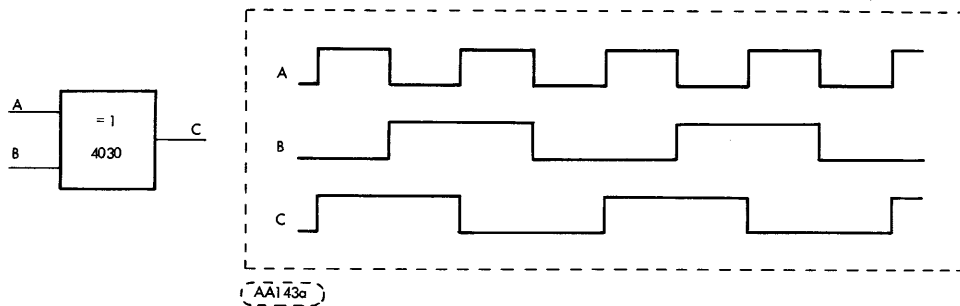


FIGURE 5-4. EXCLUSIVE OR

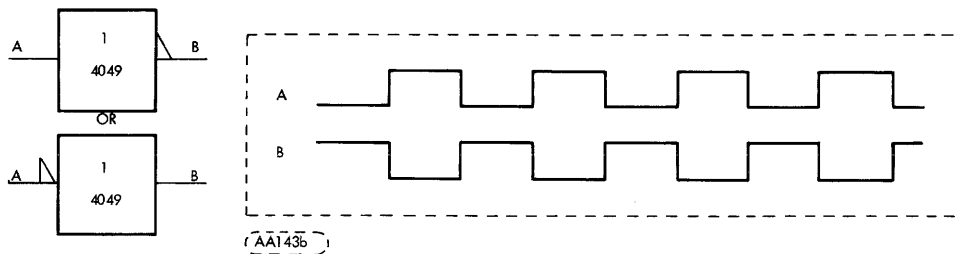


FIGURE 5-5. INVERT

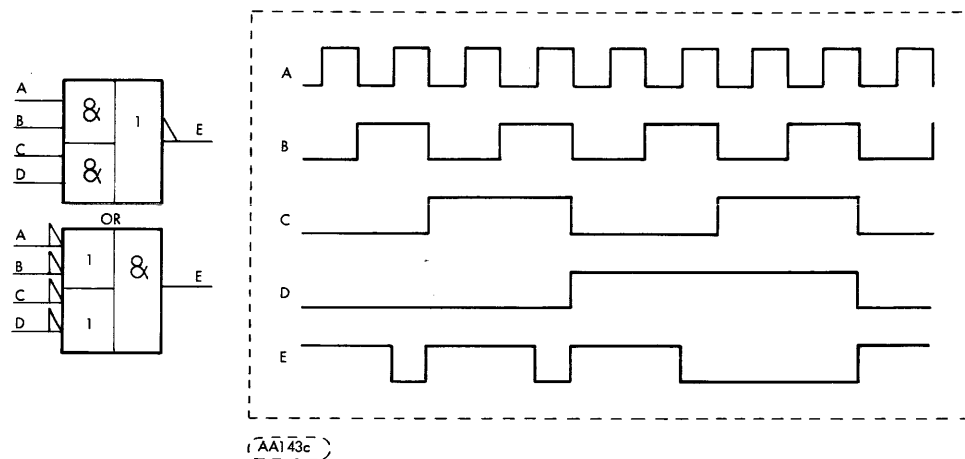


FIGURE 5-6. AND-OR-INVERT

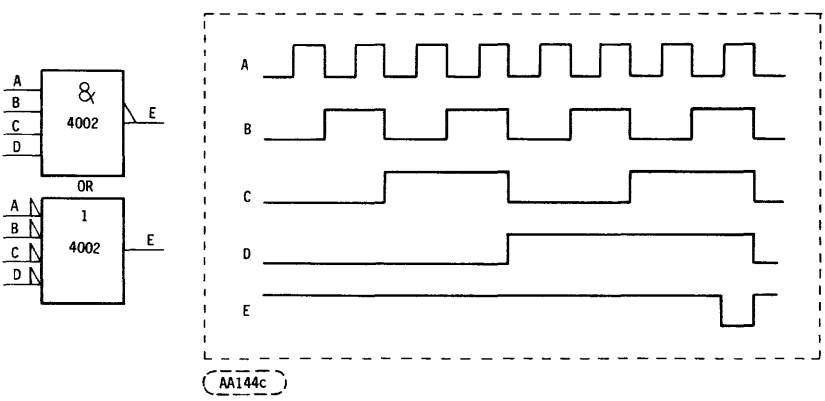
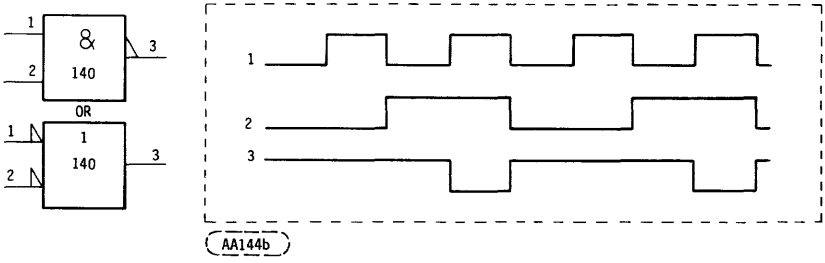
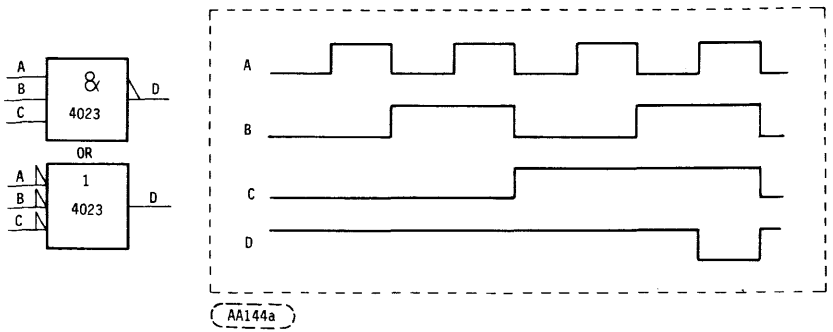


FIGURE 5-7 POSITIVE NAND NEGATIVE NOR

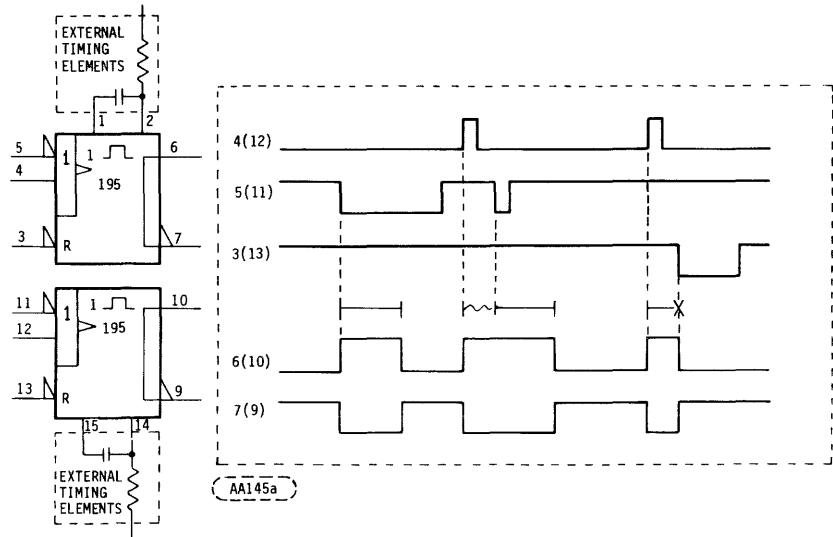


FIGURE 5-8. RETRIGGERABLE, RESETTABLE, MONOSTABLE MULTIVIBRATOR (ONE SHOT)

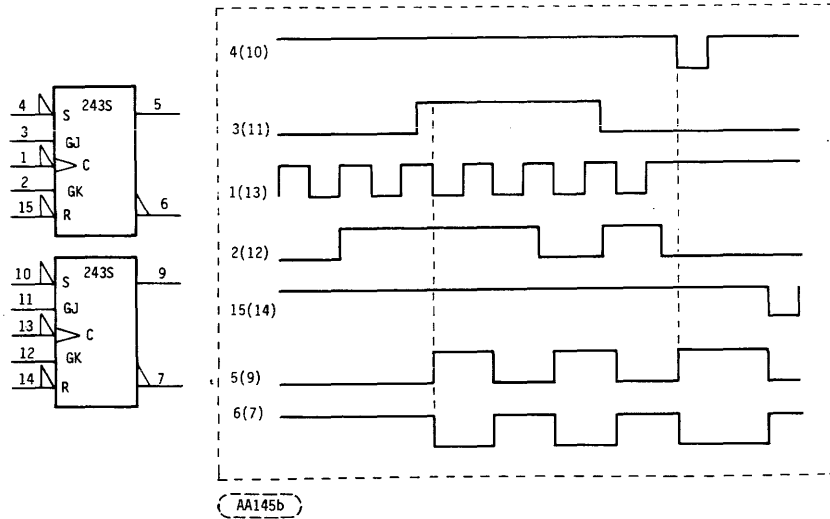


FIGURE 5-9. 'JK' TYPE F/F

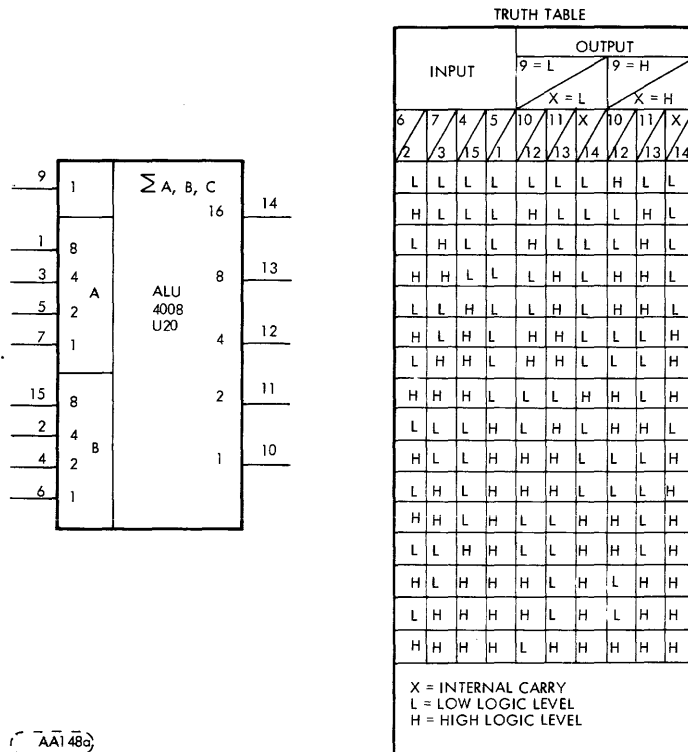


FIGURE 5-10. ADDER

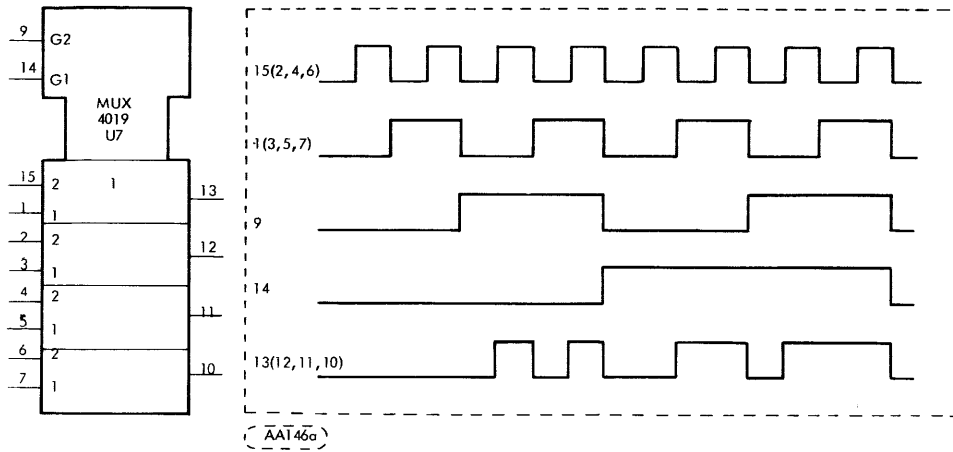


FIGURE 5-11. QUAD 2 X 1 MULTIPLEXER

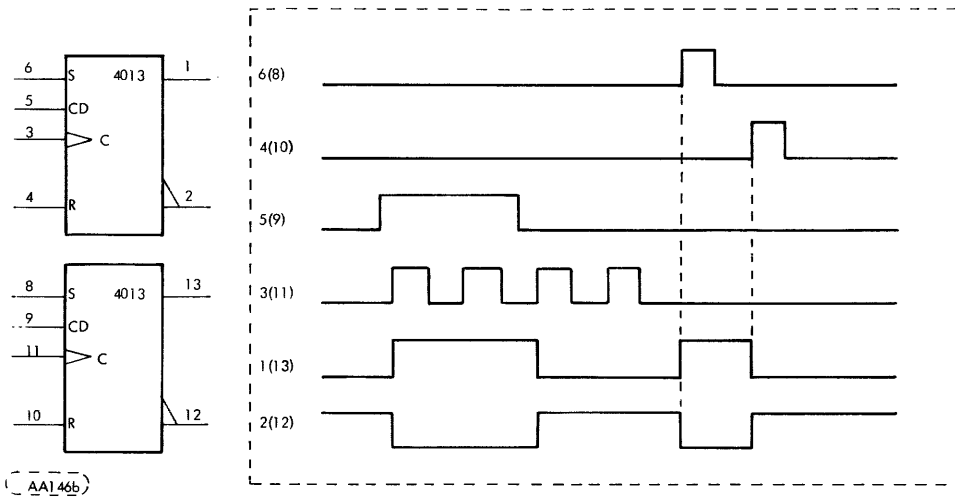


FIGURE 5-12. 'D' TYPE F/F

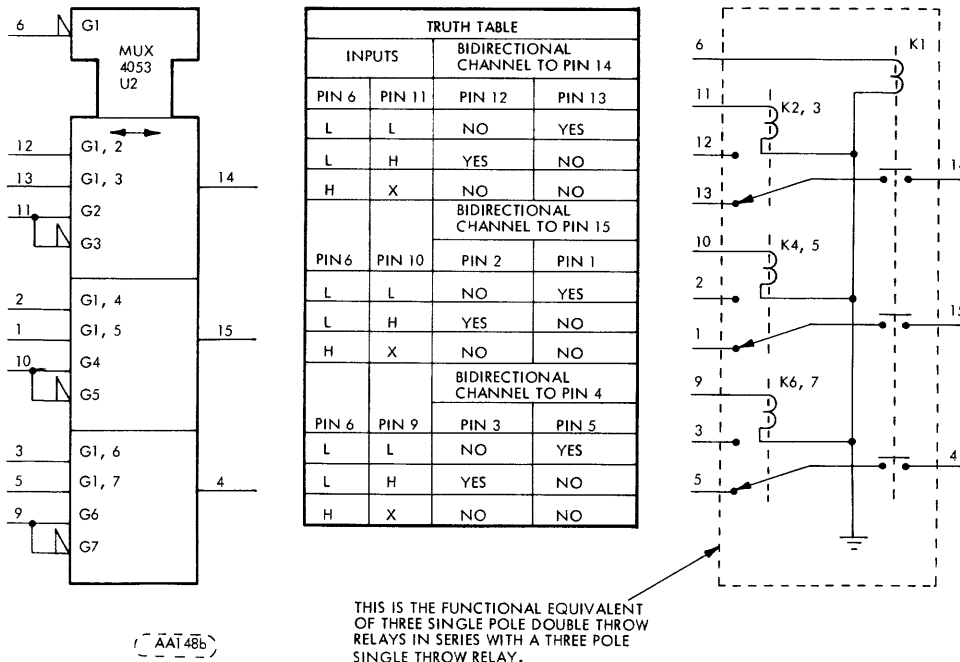
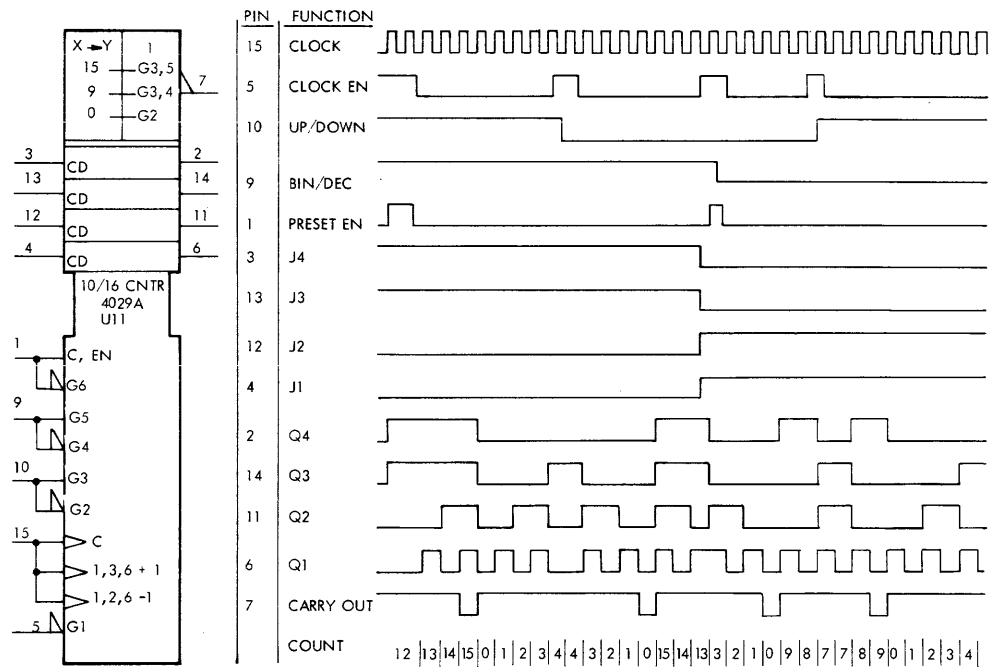


FIGURE 5-13. BIDIRECTIONAL ANALOG MULTIPLEXER

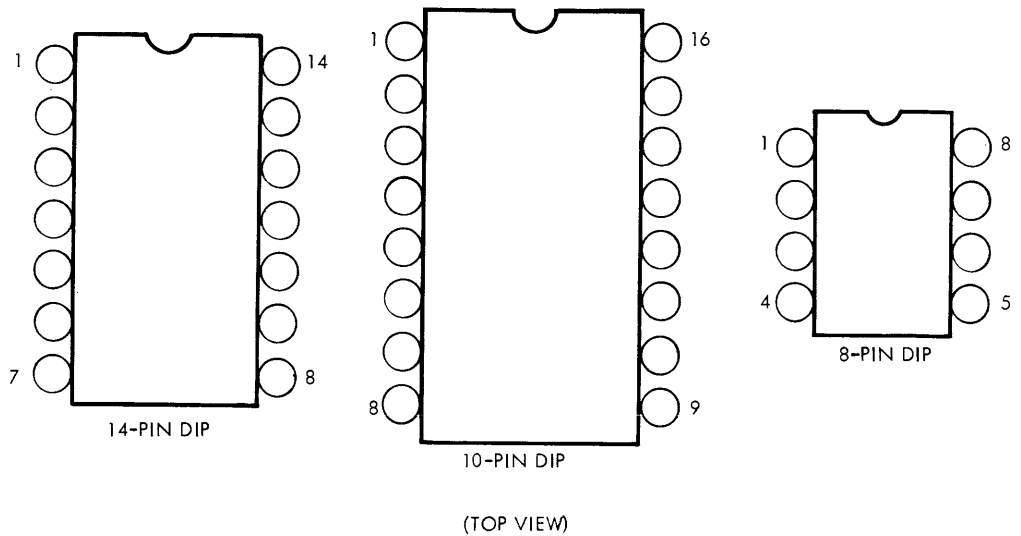


(AA149b)

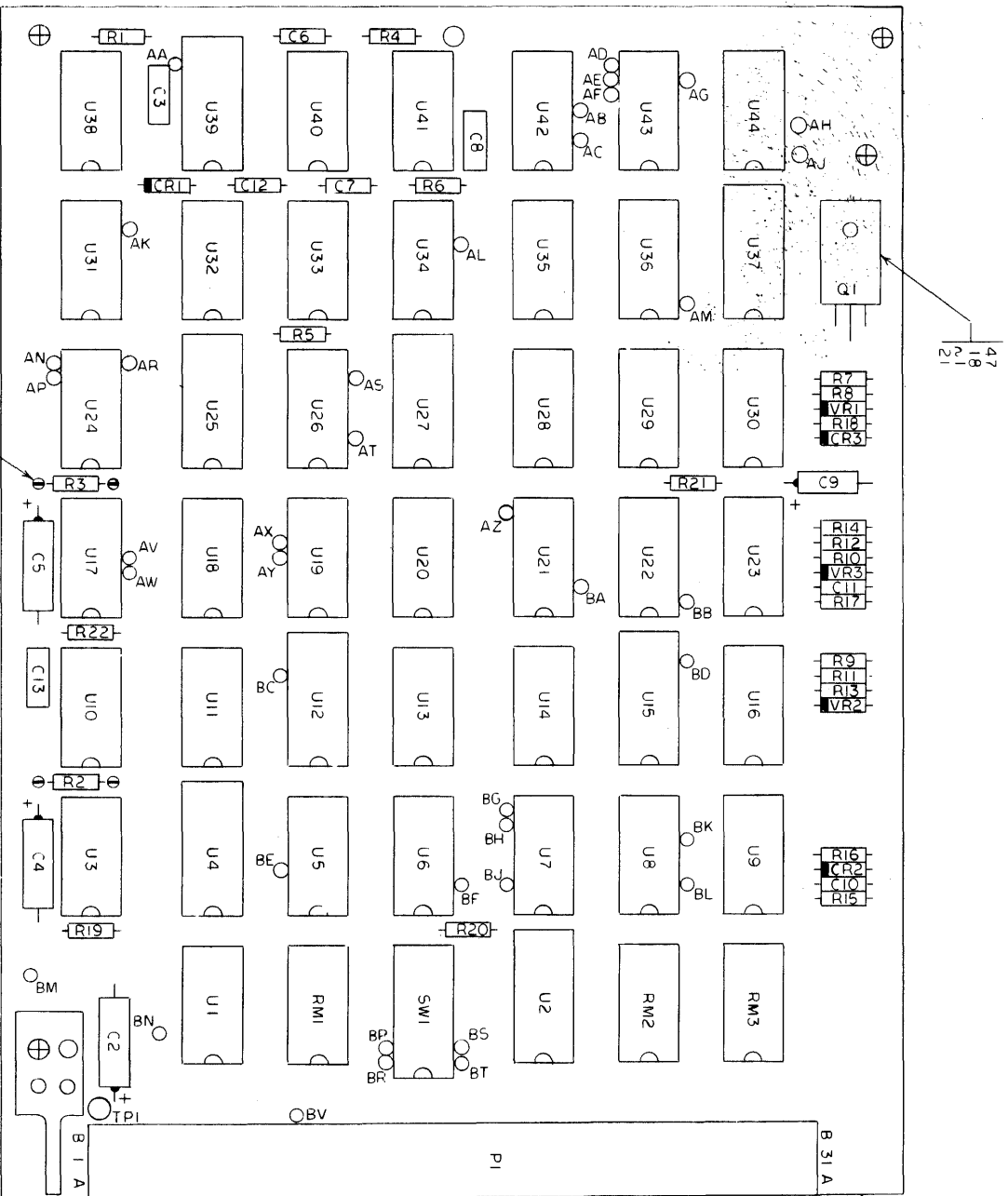
FIGURE 5-14. DECIMAL/BINARY UP/DOWN PRESETTABLE COUNTER

5.5.8 IC PACKAGE LAYOUT

The pin locations for typical Integrated Circuit (IC) packages are shown below.



(BB009a)



CAP	PL ITEM
C1	—
C2	32
C3	36
C4	32
C5	32
C6	37
C7	37
C8	36
C9	33
C10	34
C11	34
C12	34
C13	36
C14	—
C15	—
C16	—

REG	PL ITEM
VR1	16
VR2	17
VR3	17

TSTR	PL ITEM
Q I	18

RES	PL ITEM
R1	28
R2	43
R3	45
R4	30
R5	30
R6	31
R7	22
R8	22
R9	23
R10	23
R11	26
R12	26
R13	24
R14	24
R15	27
R16	29
R17	27
R18	29
R19	25
R20	25
R21	25
R22	38
R23	—
R24	—

DIODE	PL ITEM
CR1	13
CR2	13
CR3	13
CR4	—
CR5	—

IC	PL ITEM
U1	10
U2	3
U3	9
U4	4
U5	9
U6	9
U7	10
U8	9
U9	8
U10	5
U11	10
U12	3
U13	9
U14	9
U15	3
U16	8
U17	6
U18	11
U19	7
U20	11
U21	6
U22	10
U23	8
U24	5
U25	3
U26	10
U27	3
U28	10
U29	9
U30	8
U31	10
U32	11
U33	6
U34	6
U35	7
U36	10
U37	4
U38	11
U39	3
U40	5
U41	12
U42	7
U43	10
U44	10

RES MOD	PL ITEM
RM1	15
RM2	15
RM3	14

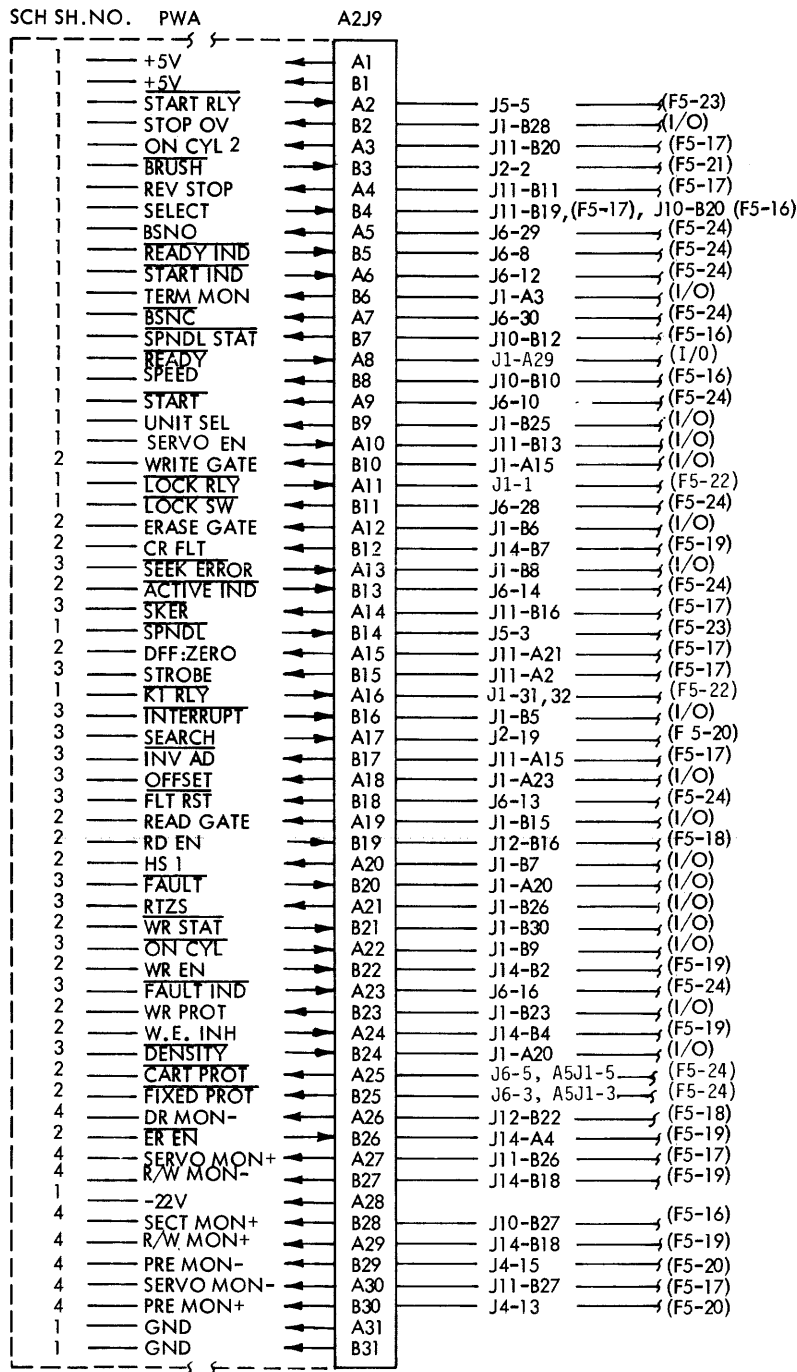
(G132a)

FIGURE 5-15. CONTROL BOARD ASSEMBLY (SHEET 1 OF 7)

<u>ITEM NO.</u>	<u>IDENTIFICATION NUMBER</u>	<u>DRAWING TITLE</u>
	75297509	PWA, Control Board
1	75892420	PWB, Control Board
2	77836070	PWB Socket Connector
3	15134700	IC CMOS 4049B
4	15134800	IC CMOS 4050B
5	15135000	IC CMOS 4001B
6	15133700	IC CMOS 4023B
7	15133300	IC CMOS 4012B
8	15126600	IC LM339
9	51768200	IC Dual
10	15133200	CMOS 4011B
11	15133400	CMOS 4013B
12	15134600	IC 4047 CMOS 1 Shot
13	51736700	Diode 1N914A
14	75009901	Res Pac 2% 1.0K (13)
15	75009993	Res Pac 2% 10K (7)
16	50240107	Volt Reg 5.6 V 5%
17	50240101	Diode Zener 3.3V
18	75752400	Transistor Power
19	83452205	Switch-8 Position
21	93640012	Stud-Self Clinching
22	94360344	Res 1/4W 1% 2.87K
23	94360187	Res 1/4W 1% 80.6
24	94360287	Res 1/4W 1% 806
25	94360300	Res 1/4W 1% 1.00K
26	94360317	Res 1/4W 1% 1.50K
27	94360346	Res 1/4W 1% 3.01K
28	94360596	Res 1/4W 1% 1.00 Meg
29	94360500	Res 1/4W 1% 100K
30	94360457	Res 1/4W 1% 39.2K
31	92512629	Res 2.2M Ohm 1/4W 1
32	24504353	Cap 10V 20% 33UF
33	24504329	Cap 35V 20% 1.0UF
34	92496211	Cap Non-Elect 470 PF
36	92496046	Capacitor .1UF .50V
37	92496219	Capacitor 2200 PF
38	94360532	Res 1/4W 1% 215K
39	92498021	Terminal, Swaged
40	83479901	Key, Inject. Mold
41	10125703	Scr Flat Hd
42	75312701	Spec-Adhesive, Epoxy
43	92512000	Resistor Test Sel.
44	77612165	Terminal, Slotted
44	75732602	Pin-Wire Wrap-Intch
45	94357500	Resistor Test Sel
47	92583002	Nut Lock

FIGURE 5-15. CONTROL BOARD ASSEMBLY (SHEET 2 OF 7)

CONTROL BOARD



AA092a

FIGURE 5-15. CONTROL BOARD

(SHEET 3 OF 7)

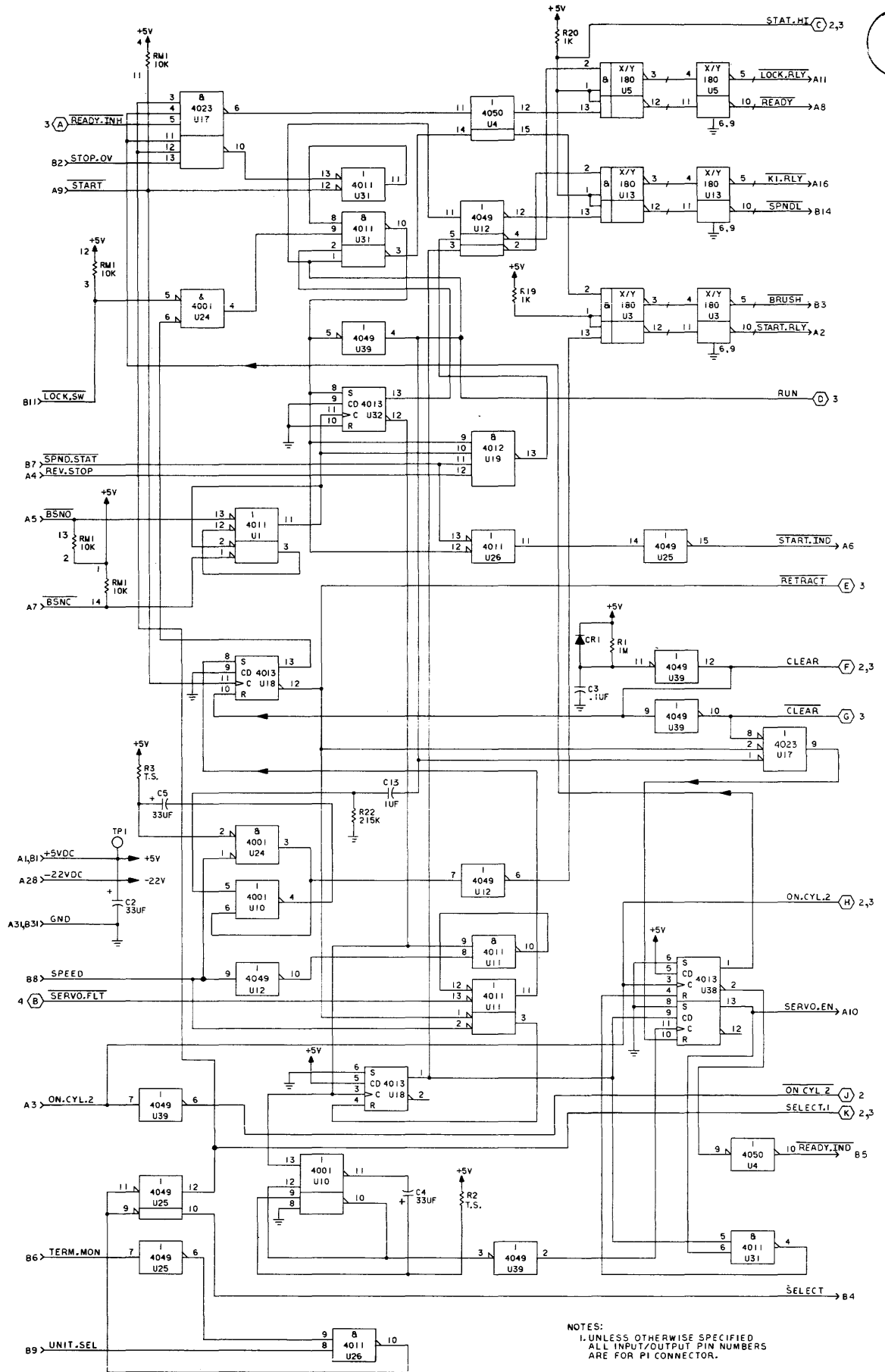


FIGURE 5-15. CONTROL BOARD ASSEMBLY (SHEET 4 OF 7)

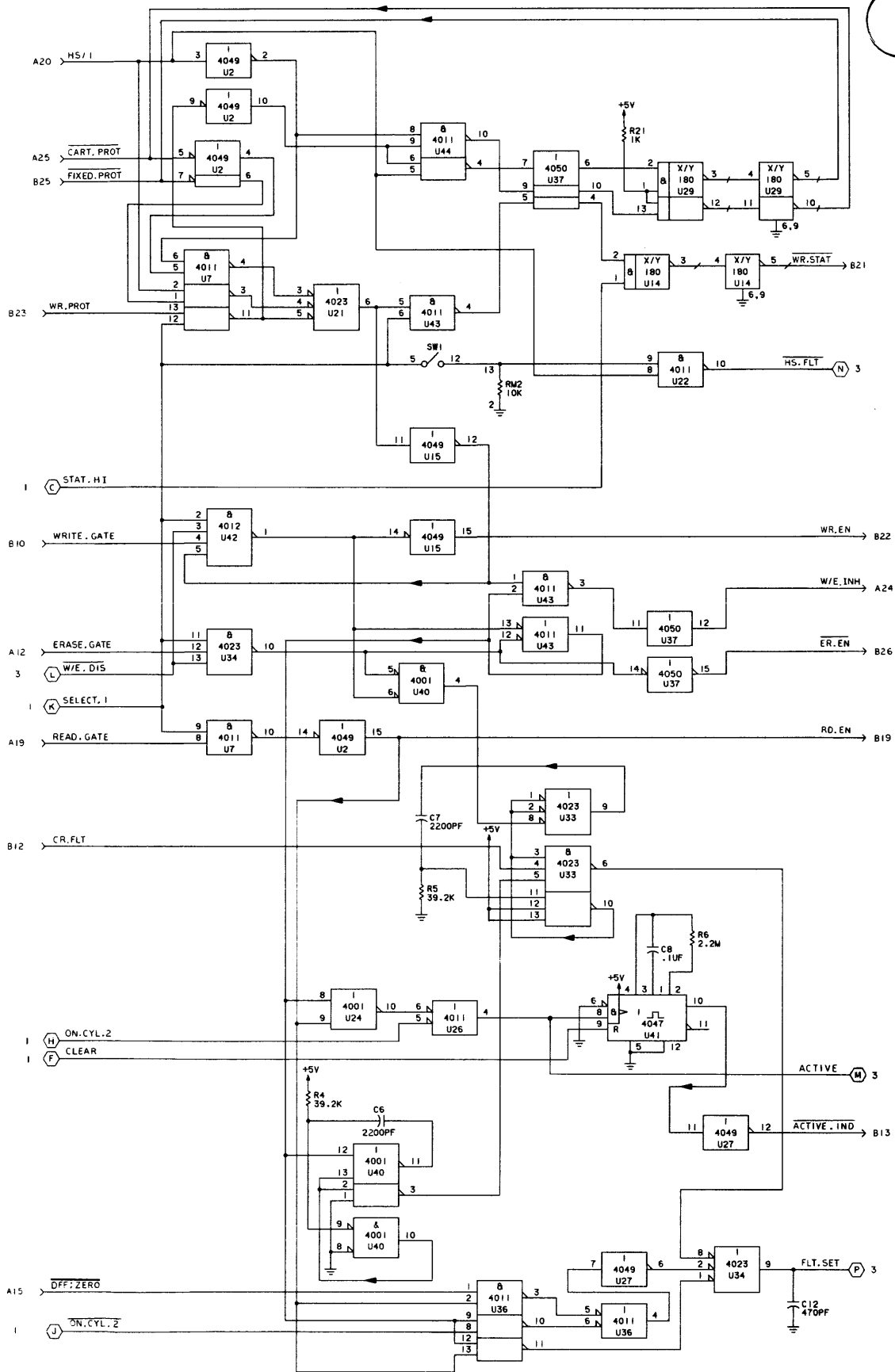


FIGURE 5-15. CONTROL BOARD ASSEMBLY (SHEET 5 OF 7)

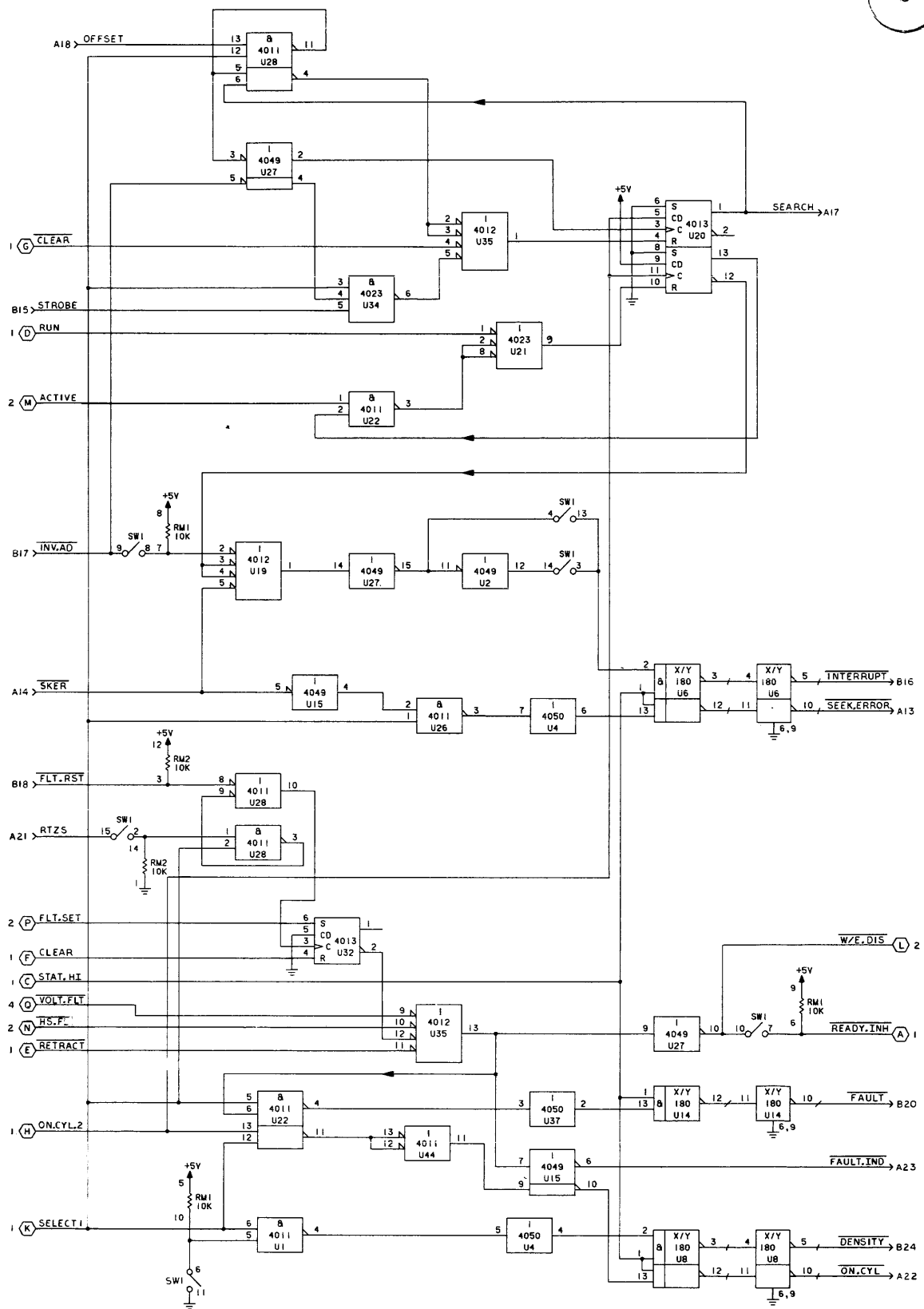


FIGURE 5-15. CONTROL BOARD ASSEMBLY (SHEET 6 OF 7)

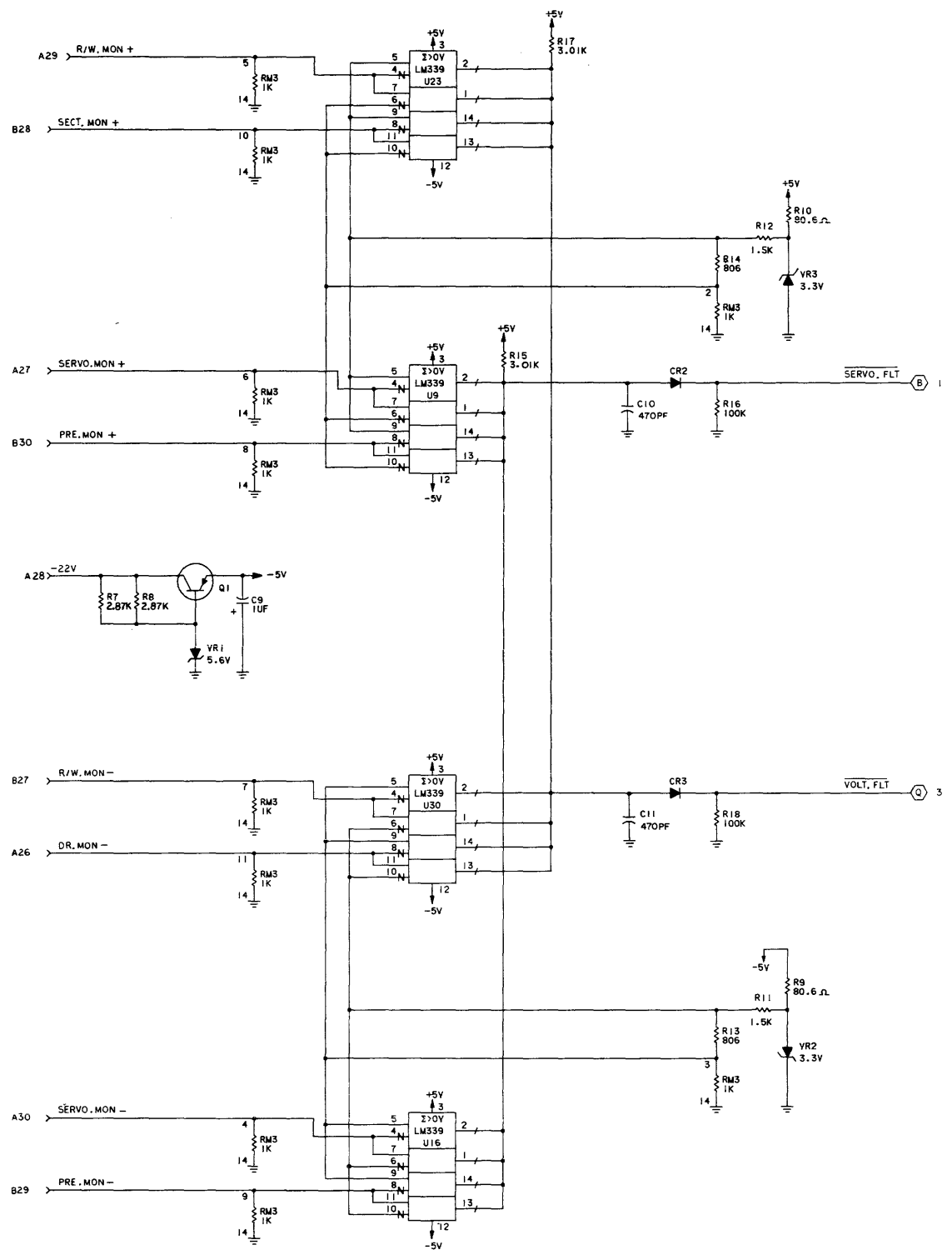


FIGURE 5-15. CONTROL BOARD ASSEMBLY (SHEET 7 OF 7)

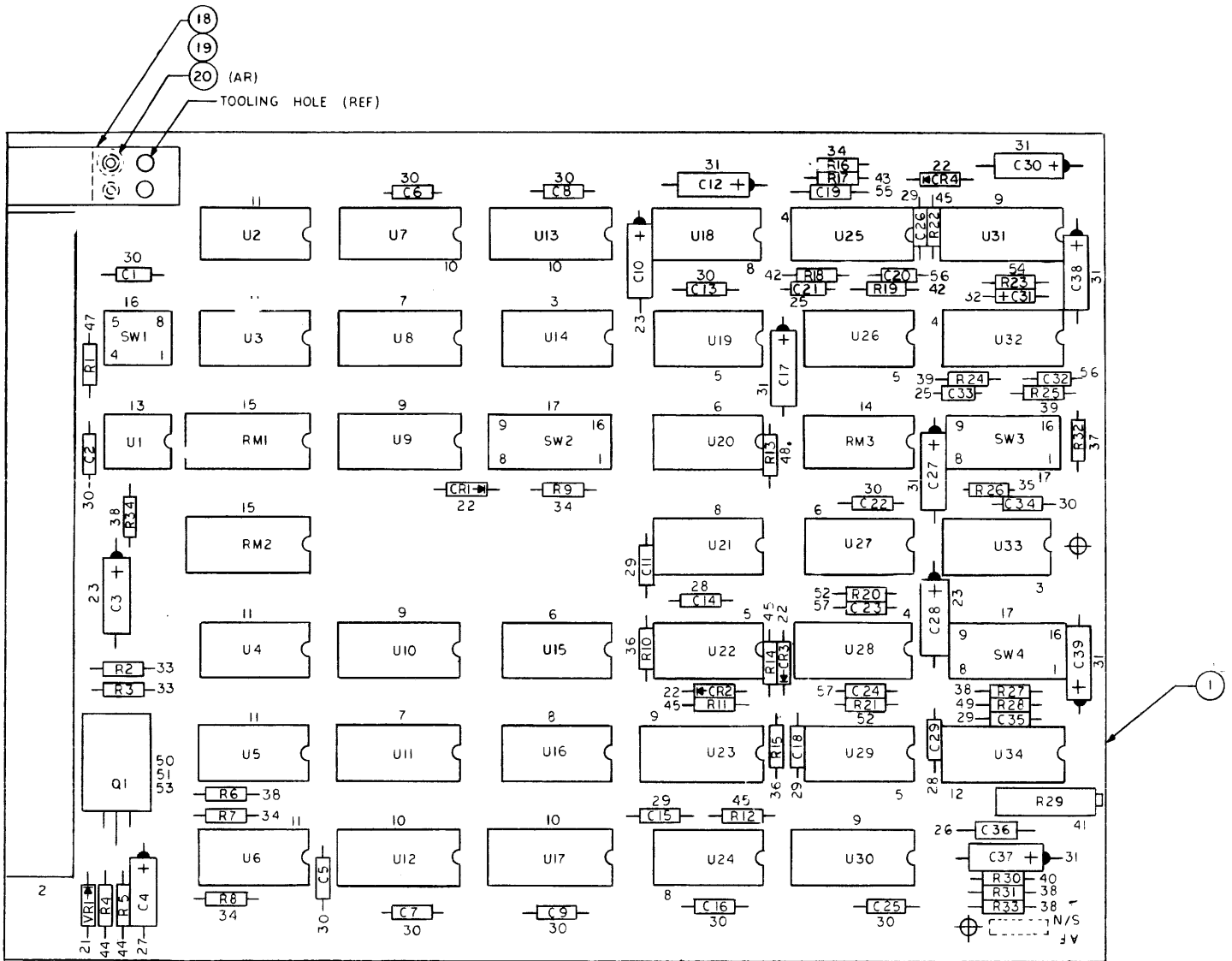


FIGURE 5-16. SECTOR BOARD ASSEMBLY (SHEET 1 OF 8)

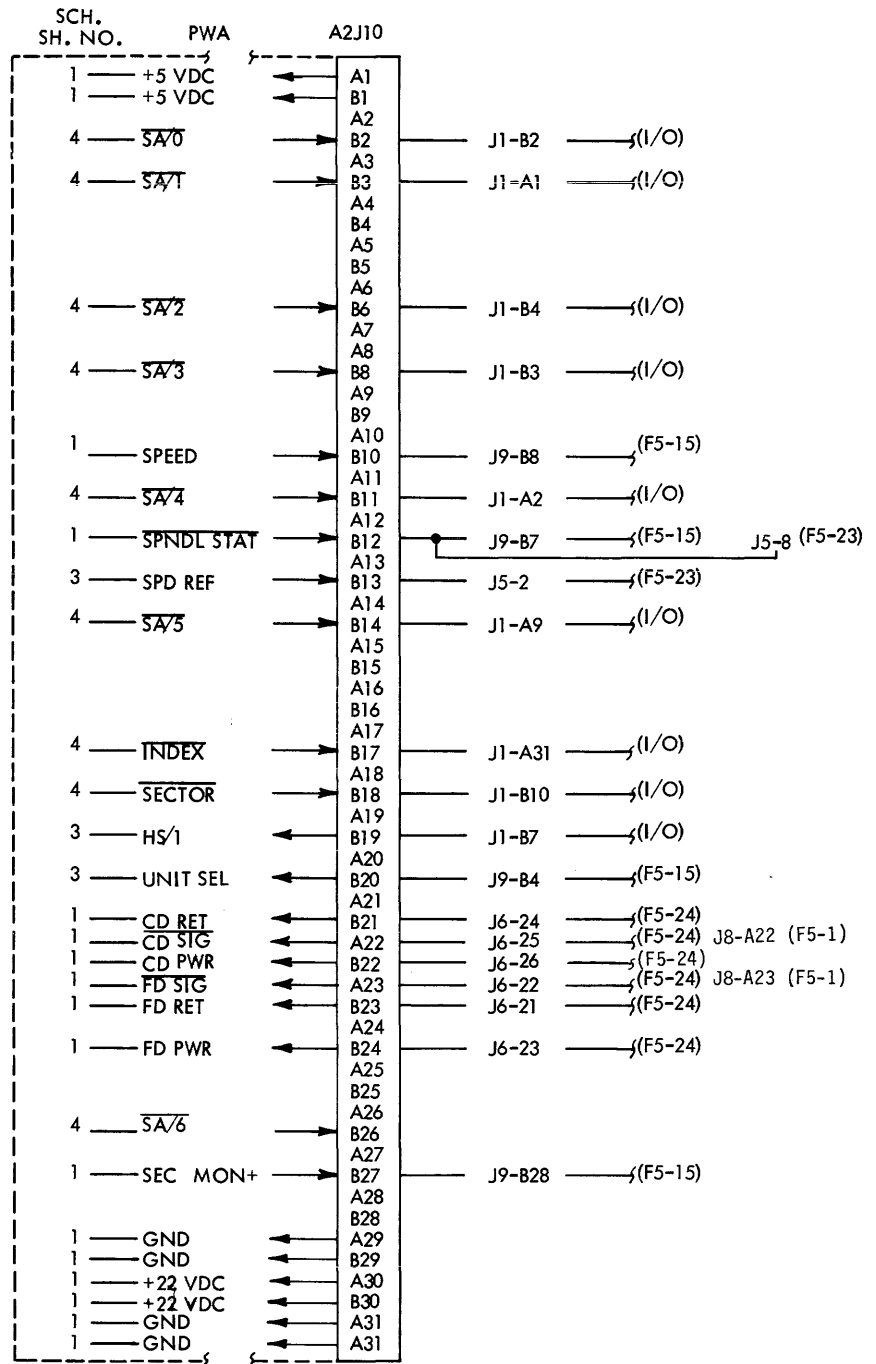
<u>ITEM NO.</u>	<u>IDENTIFICATION NO.</u>	<u>DRAWING TITLE</u>
	75883201-8	PWA, Sector Level 3
1	75883101-0	PWB Sector Level 3
2	77836070-1	PWB Socket Connector
3	15133800-1	IC CMOS 4024B
4	15164435-8	IC 4538B
5	15135000-6	IC CMOS 4001B
6	15133400-0	IC CMOS 4013B
7	15133500-7	IC CMOS 4019B
8	15133200-4	IC CMOS 4011B
9	15134700-2	IC CMOS 4049B
10	15134100-5	IC CMOS 4029B
11	51768200-1	IC Dual
12	15150700-1	IC, 96L02
13	15112100-1	IC NE555
14	75009993-9	Res Pac 2% 10K (7)
15	75738605-7	Resistor Module 150
16	83452201-3	Switch-4 Position
17	83452205-4	Switch-8 Position
18	83479701-1	Key, Inject Mold
19	10125703-8	Scr Flat Hd
20	75312701-8	Spec-Epoxy Adhesive
21	50240118-5	Diode Zener 16V
22	51736700-9	Diode 1N914A
23	24504353-4	Cap 10V 20% 33UF
25	94227256-8	Cap 500V 2% 2000
26	15164040-6	Cap 4700
27	24504329-4	Cap 35V 20% 1.0 UF
28	92496205-3	Cap 100V 10% 100
29	92496215-2	Cap 100V 10% 1000
30	92496227-7	Cap 100V 20% .01UF
31	92427039-0	Cap Electro 6.8MF 35
32	17706704-8	Cap 10V 10% 2.2UF
33	94360328-2	Res 1/4W 1% 1.96K
34	94360224-3	Res 1/4W 1% 178
35	94360534-5	Res 1/4W 1% 226K
36	94360416-5	Res 1/4W 1% 14.7K
37	17705946-6	Res 1/4W 5% 2.7Meg
38	24500067-4	Res 1/4W 5% 1.5K
39	94360458-7	Res 1/4W 1% 40.2K
40	94360420-7	Res 1/4W 1% 16.2K
41	77612042-0	Res VAR 3/4W 10% 100K

FIGURE 5-16. SECTOR BOARD ASSEMBLY (SHEET 2 OF 8)

<u>ITEM NO.</u>	<u>IDENTIFICATION NO.</u>	<u>DRAWING TITLE</u>
42	94360487-6	Res 1/4W 1% 80.6K
43	94360400-9	Res 1/4W 1% 10.0K
44	94360300-1	Res 1/4W 1% 1.00K
45	94360454-6	Res 1/4W 1% 36.5K
47	94360100-5	Res 1/4W 1% 10.0
48	17705936-7	Res 1/4W 5% 1.0 Meg
49	94360468-6	Res 1/4W 1% 51.1K
50	75752300-6	Transistor Power
51	93640012-6	Stud-Self Clinching
52	94360463-7	Res 1/4W 1% 45.3K
52	75732602-0	Pin-Wire Wrap, Intch
53	92583002-8	Nut Lock
54	94360447-0	Res 1/4W 1% 30.9K
55	94240429-4	Cap 50V 10% 820
56	94227261-8	Cap 500V 2% 3300
57	77612395-2	Cap 50V 5% 1000

FIGURE 5-16. SECTOR BOARD ASSEMBLY (SHEET 3 OF 8)

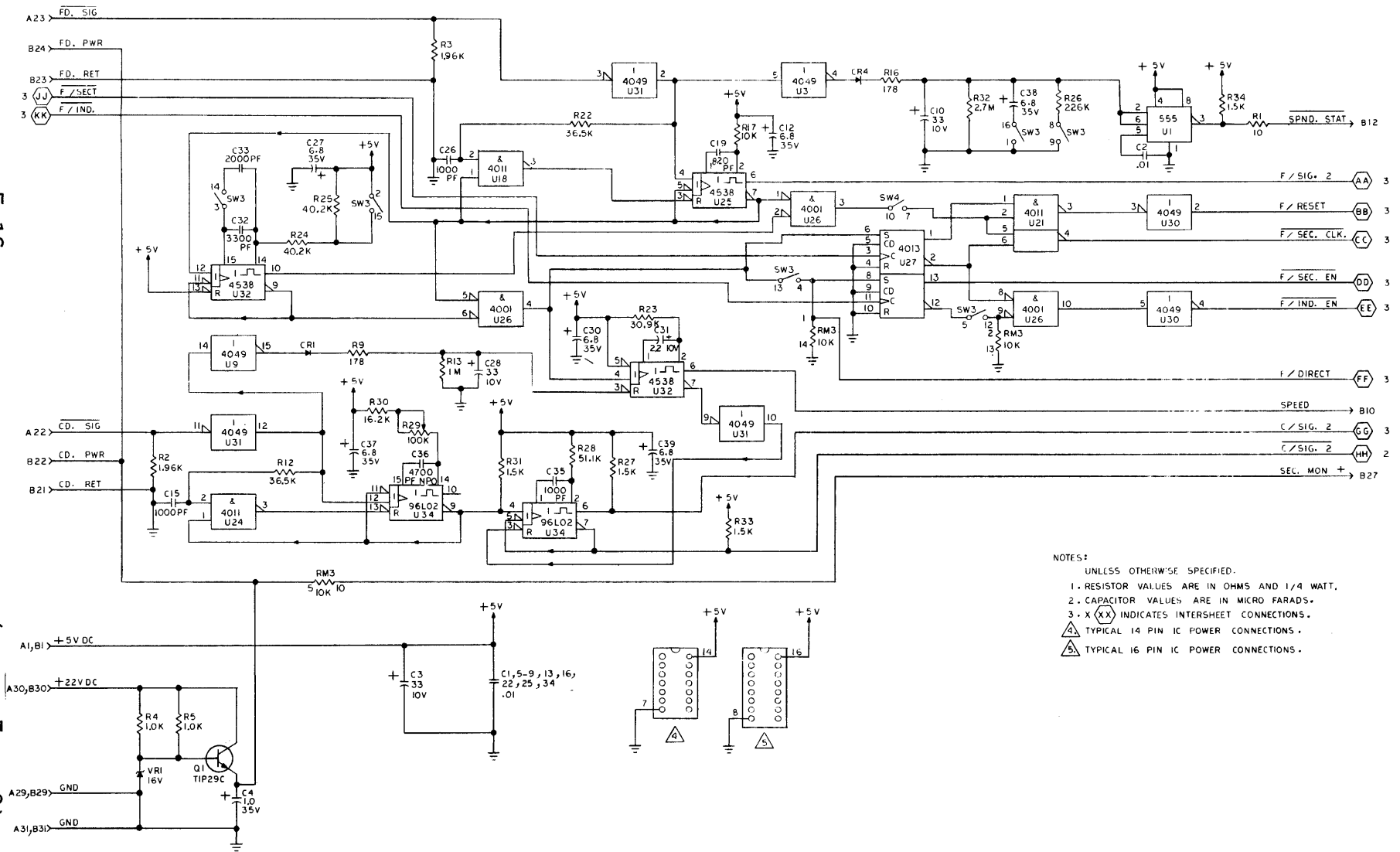
SECTOR BOARD



(AA091b)

FIGURE 5-16. SECTOR BOARD ASSEMBLY (SHEET 4 OF 8)

FIGURE 5-16. SECTOR BOARD ASSEMBLY (SHEET 5 OF 8)



- NOTES:
- 1. RESISTOR VALUES ARE IN OHMS AND 1/4 WATT.
 - 2. CAPACITOR VALUES ARE IN MICRO FARADS.
 - 3. X (XX) INDICATES INTERSHEET CONNECTIONS.
 - △ TYPICAL 14 PIN IC POWER CONNECTIONS.
 - ⊠ TYPICAL 16 PIN IC POWER CONNECTIONS.

FIGURE 5-16. SECTOR BOARD ASSEMBLY (SHEET 6 OF 8)

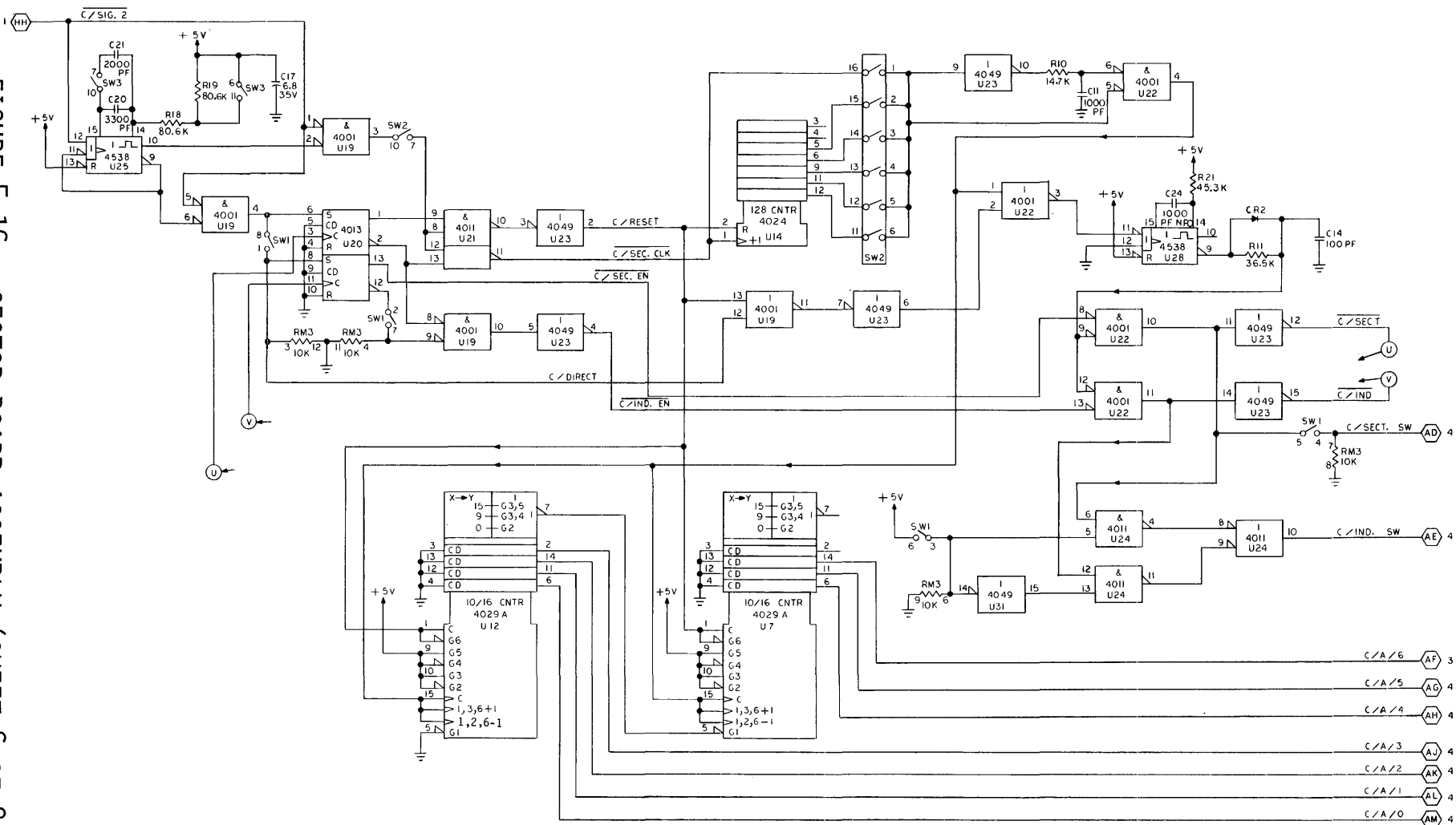


FIGURE 5-16. SECTOR BOARD ASSEMBLY (SHEET 7 OF 8)

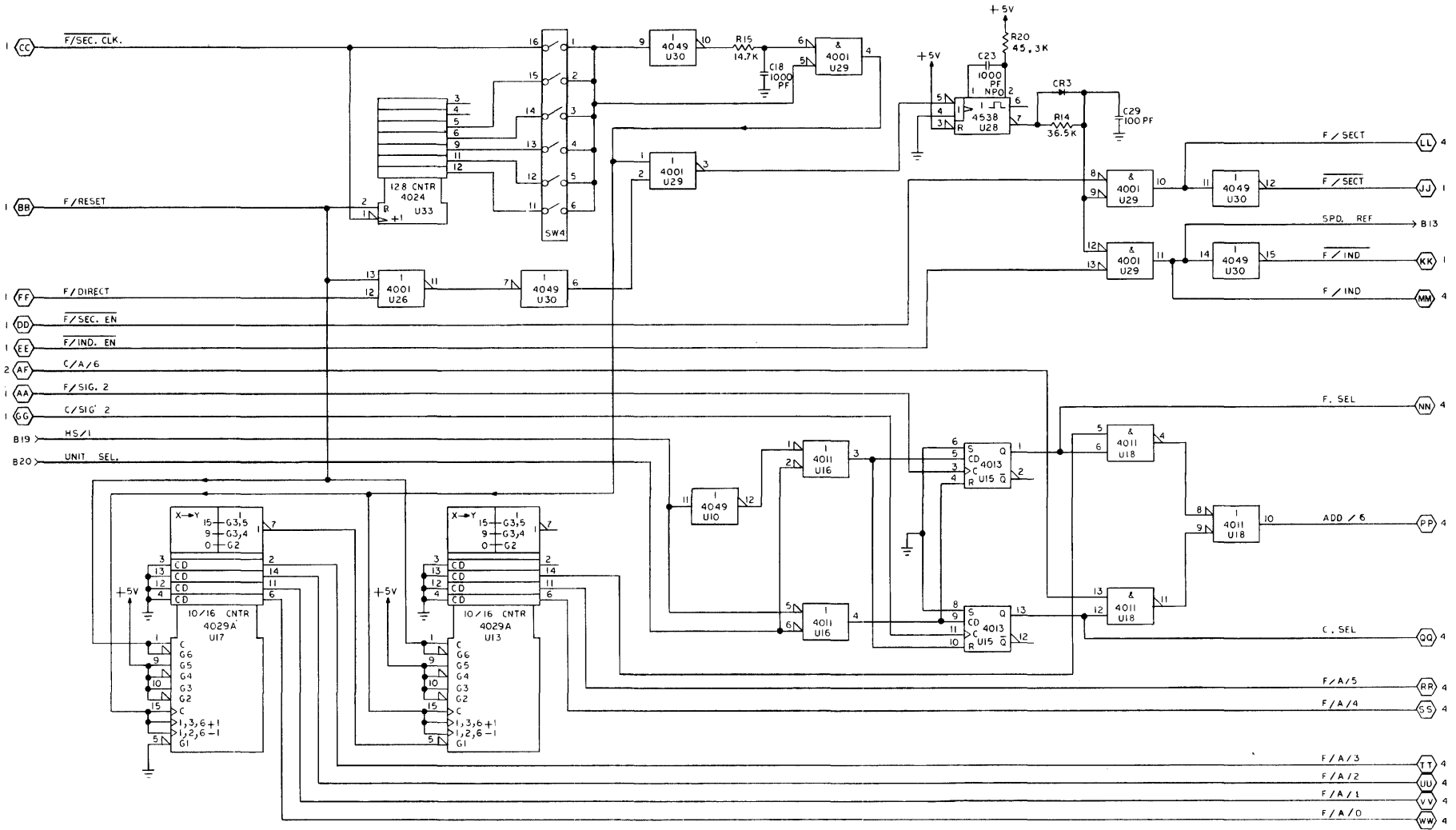
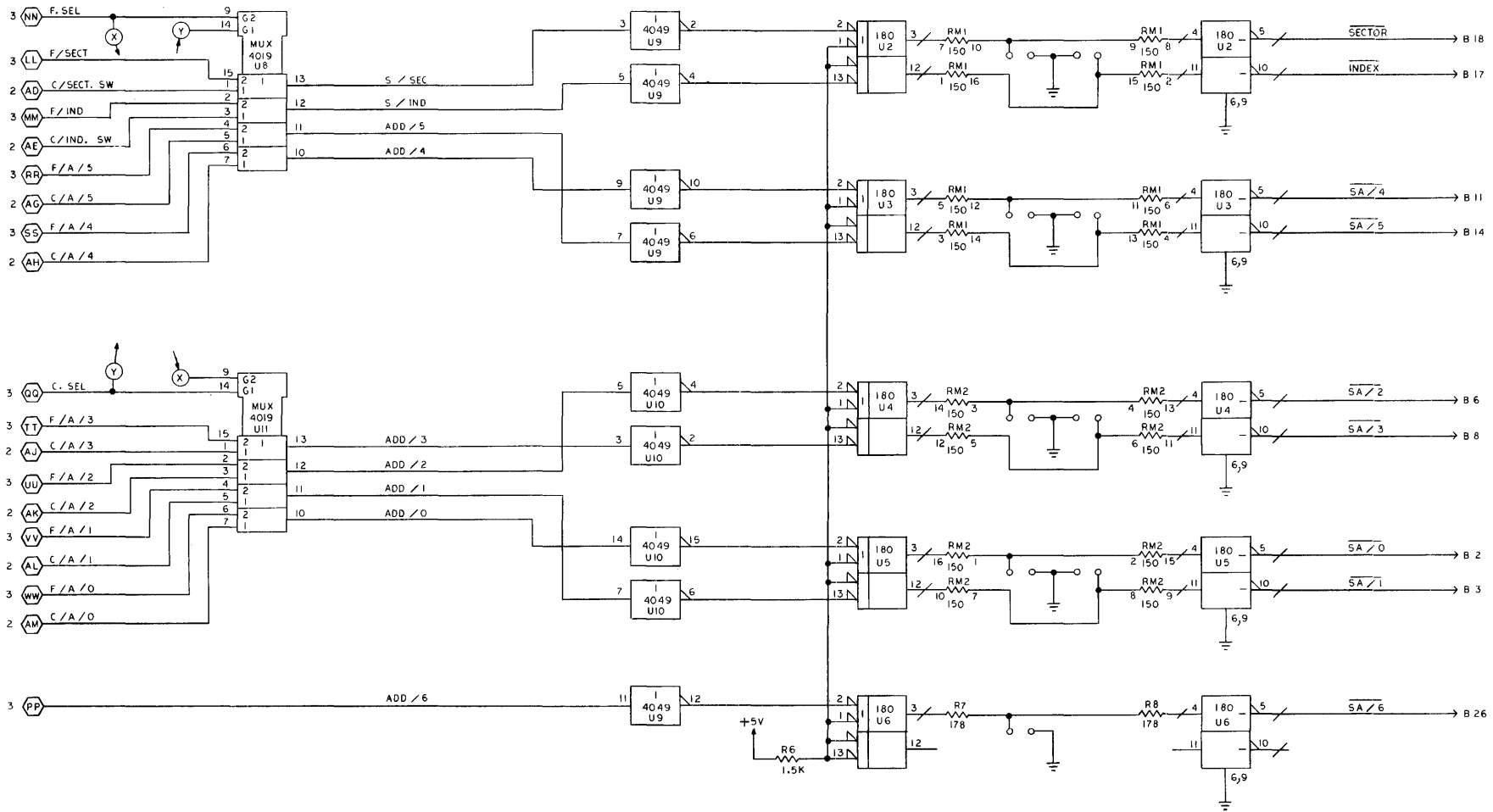


FIGURE 5-16. SECTOR BOARD ASSEMBLY (SHEET 8 OF 8)



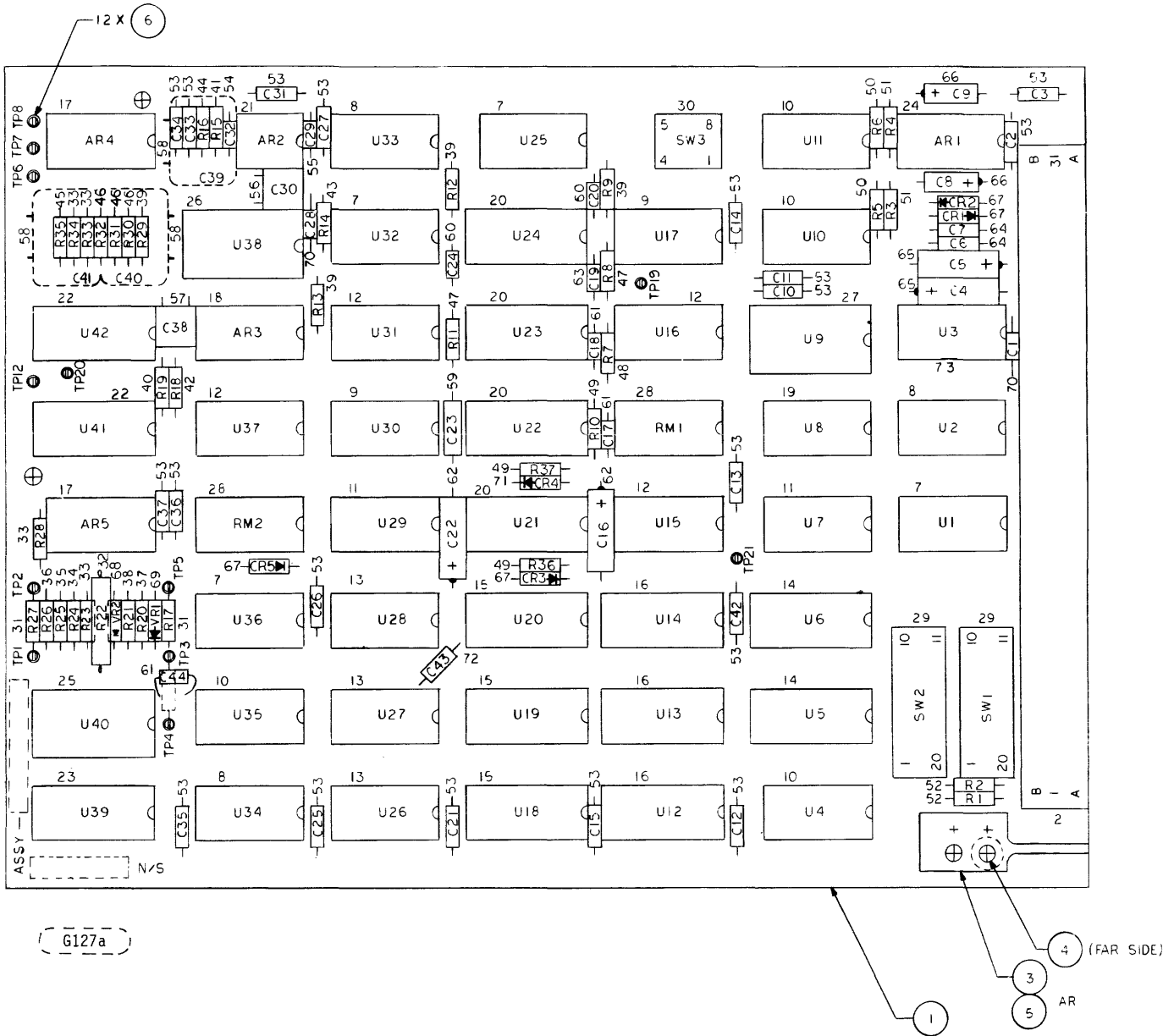


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 1 OF 10)

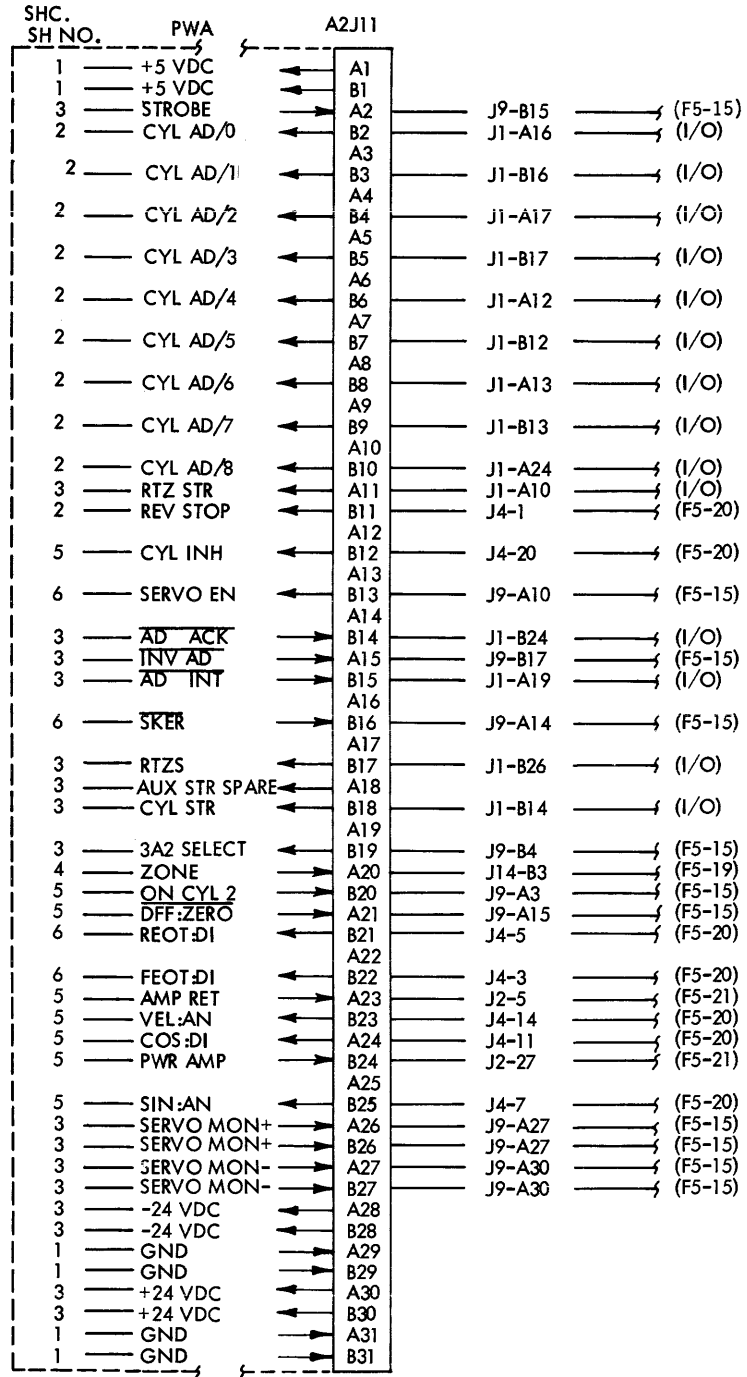
<u>ITEM NO.</u>	<u>IDENTIFICATION NO.</u>	<u>DRAWING TITLE</u>
	77831401-5	PWA Servo (OEM)
1	77831170-4	PWB Servo
2	77836070-1	PWB Socket Connector
3	83479901-7	Key, Inject, Mold
4	10125702-0	Scr Flat Hd
5	75312701-8	Spec-Epoxy Adhesive
6	77612165-9	Terminal, Slotted
6	75732602-0	Pin-Wire Wrap, Intch
7	15144900-6	IC 74LS00
8	15145000-4	IC 74LS02
9	15145100-2	IC 74LS04
10	15145400-6	IC 74LS08
11	15145600-1	IC 74LS10
12	15146300-7	IC 74LS74
13	15146400-5	IC 74LS86
14	15146900-4	IC 74LS175
15	15147000-2	IC 74LS193
16	15148200-7	IC 74LS283PC
17	51812800-4	IC Dual UA747
18	50252900-1	IC 75107
19	51768200-1	IC Dual
20	15150700-1	IC 96L02
21	15156600-7	IC 201A
22	15129400-6	IC AH 5012
23	15164442-4	IC 1408L-8
23	15132702-0	IC D to A Converter - Intch
24	15132600-6	IC Volt Regulator
25	75300900-0	ID Square Root Circu
26	75737000-2	ID Servo Input
27	75737200-8	ID Servo EOT
28	75009935-0	Res Pac 2% 5.1K (13)
29	83452207-0	Switch-10 Position
30	83452201-3	Switch-4 Position
31	94357500-1	Resistor Test Select
32	92577253-5	Res 1/2W 1% 357
33	94360384-5	Res 1/4W 1% 7.50K
34	94360443-9	Res 1/4W 1% 28.0K
35	94360446-2	Res 1/4W 1% 30.1K
36	94360452-0	Res 1/4W 1% 34.8K
37	94360487-6	Res 1/4W 1% 80.6K
38	94360284-7	Res 1/4W 1% 750
39	94360476-9	Res 1/4W 1% 61.9K
40	94360362-1	Res 1/4W 1% 4.42K
41	94360536-0	Res 1/4W 1% 237K
42	94360386-0	Res 1/4W 1% 7.87K
43	94360368-8	Res 1/4W 1% 5.11K
44	94360344-9	Res 1/4W 1% 2.87K
45	94360492-6	Res 1/4W 1% 90.9K
46	94360464-5	Res 1/4W 1% 46.4K
47	94360528-7	Res 1/4W 1% 196K

FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 2 OF 10)

ITEM NO.	IDENTIFICATION NO.	DRAWING TITLE
48	94360480-1	Res 1/4W 1% 68.1K
49	94360520-4	Res 1/4W 1% 162K
50	92512468-7	Res 1/4W 6.8 Ohm
51	94360400-9	Res 1/4W 1% 10.0K
52	94360300-1	Res 1/4W 1% 1.00K
53	92496227-7	Cap 100V 20% .01UF
54	75808520-3	Cap 100V 10% 390
55	75808506-2	Cap 100V 10% 27
56	94227244-4	Cap 100V 2% 560
57	94227247-7	Cap 100V 2% 750
58	94227257-6	Cap 500V 2% 2200
59	75808545-0	Cap 100V 10% 0.047UF
60	75808513-8	Cap 100V 10% 100
61	75808516-1	Cap 100V 10% 180
62	24504369-0	Cap 15V 20% 10UF
63	75808518-7	Cap 100V 10% 270
64	92496217-8	Cap 100V 20% 1500
65	24504339-3	Cap 35V 20% 6.8UF
66	24504329-4	Cap 35V 20% 1.0UF
67	51736700-9	Diode 1N914A
68	50240105-2	Diode, Silicon
69	50240106-0	Diode, Sil Zener 5.1V
70	75808533-6	Cap 100V 10% 4700
71	50241400-6	Diode Special
72	94240425-2	Cap 50V 10% 270
73	15148500-0	IC 74LS14

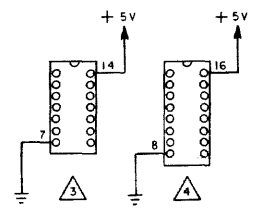
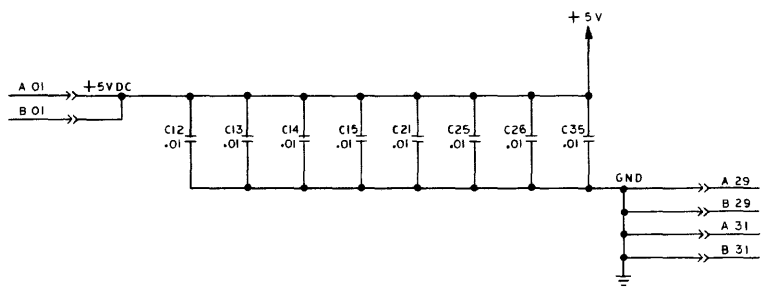
FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 3 OF 10)

SERVO BOARD



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FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 4 OF 10)



- NOTES:
- UNLESS OTHERWISE SPECIFIED
 - 1. RESISTOR VALUES ARE IN OHMS , 1/4 W , 1%
 - 2. CAPACITOR VALUES ARE IN MICROFARADS .
 - 3. TYPICAL POWER CONNECTIONS FOR 14 PIN DIPS.
 - 4. TYPICAL POWER CONNECTIONS FOR 16 PIN DIPS.
 - 5. XXX ○ INDICATES INTERSHEET CONNECTION BY SHEET NUMBER, ZONE AND SIGNAL IDENTIFIER.
 - 6. △ QUIET GROUND

FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 5 OF 10)

FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 6 OF 10)

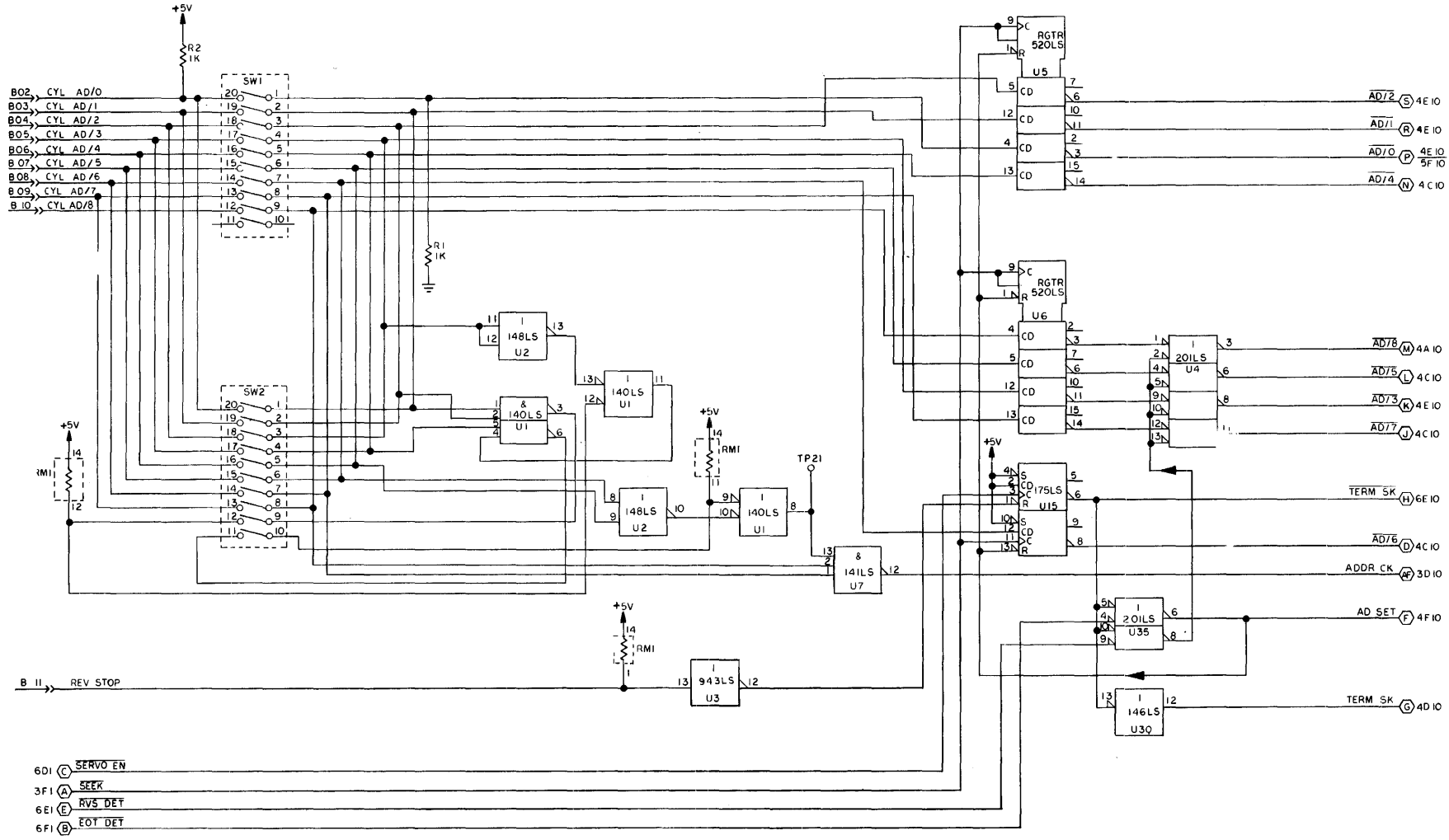


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 7 OF 10)

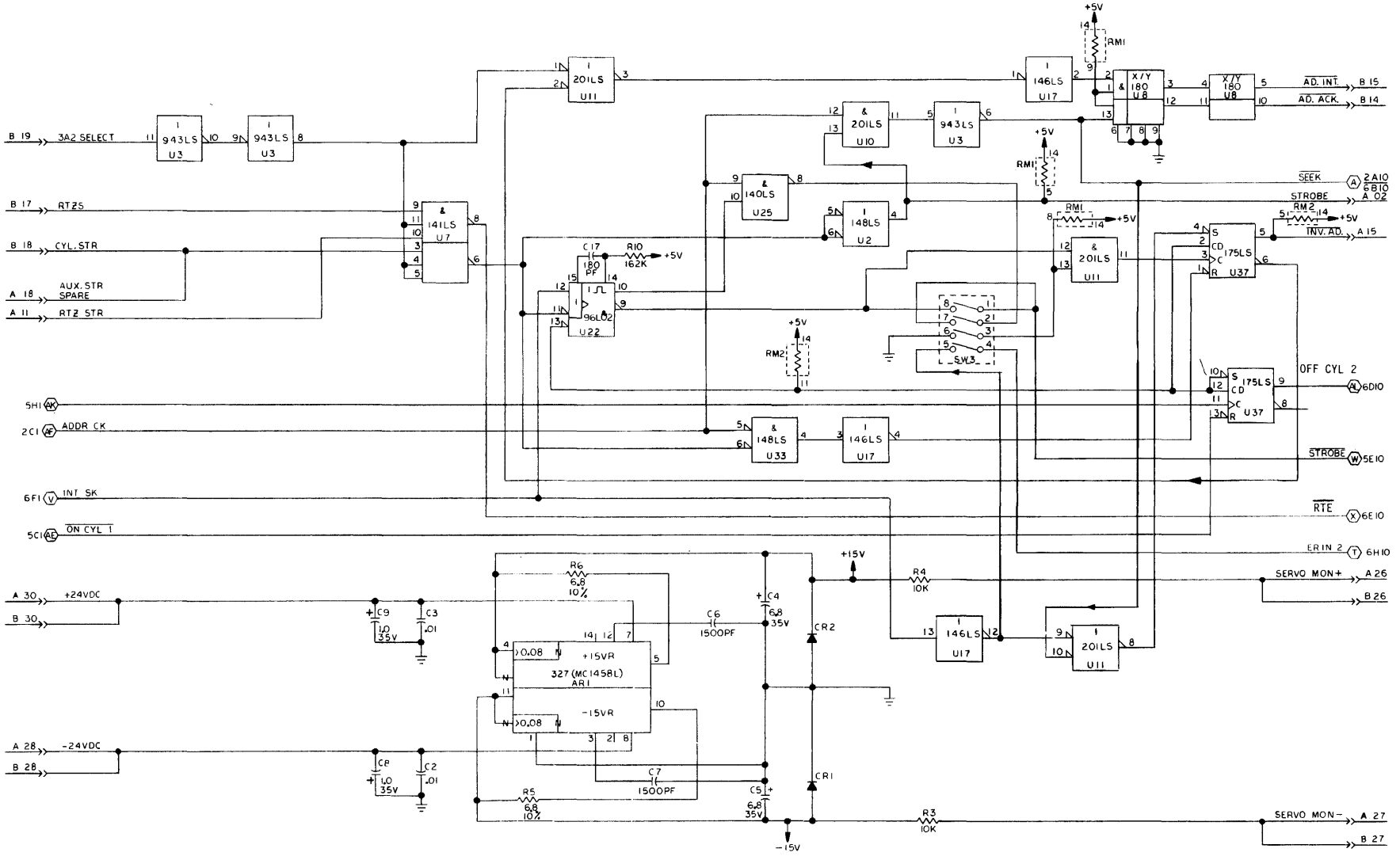


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 8 OF 10)

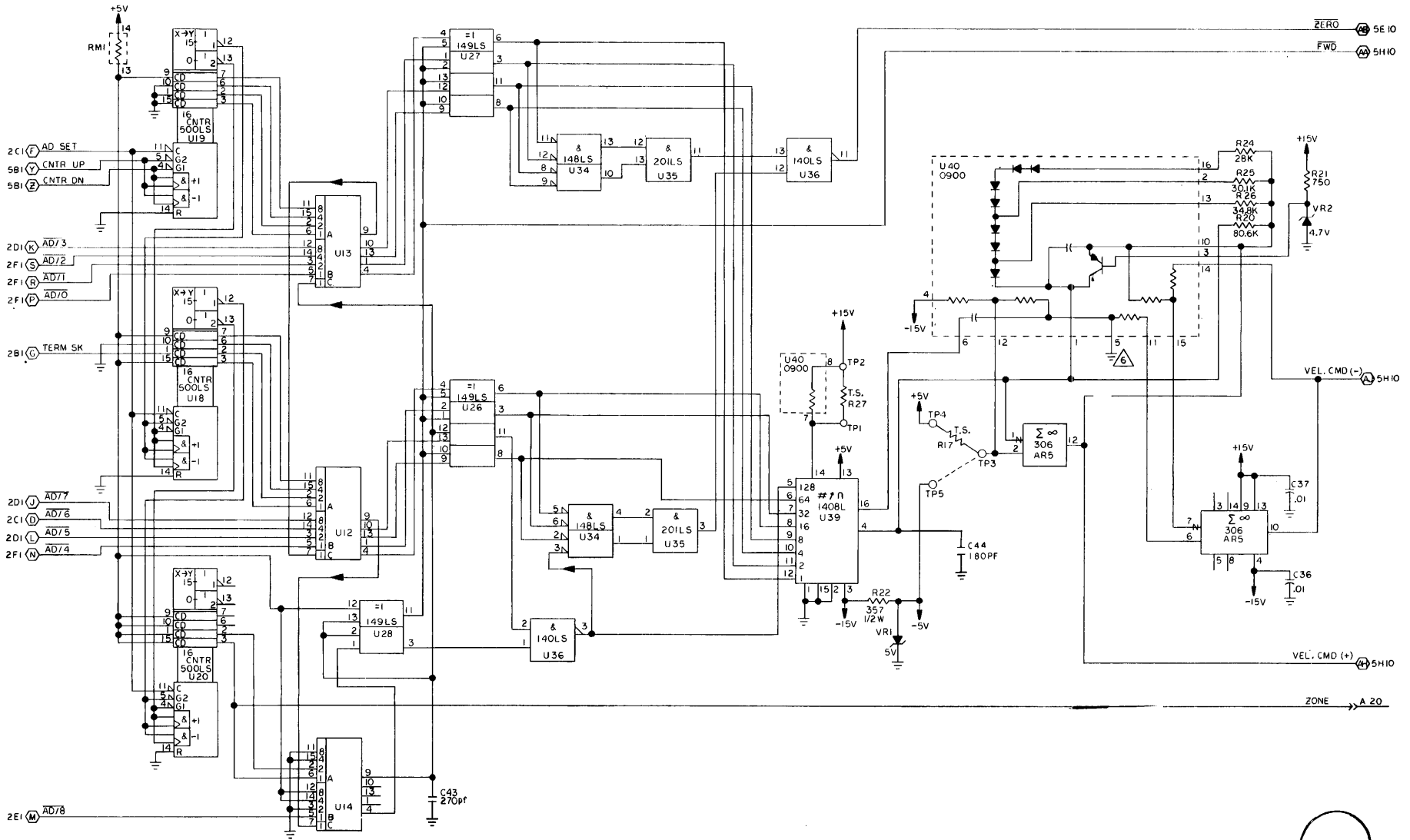


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 9 OF 10)

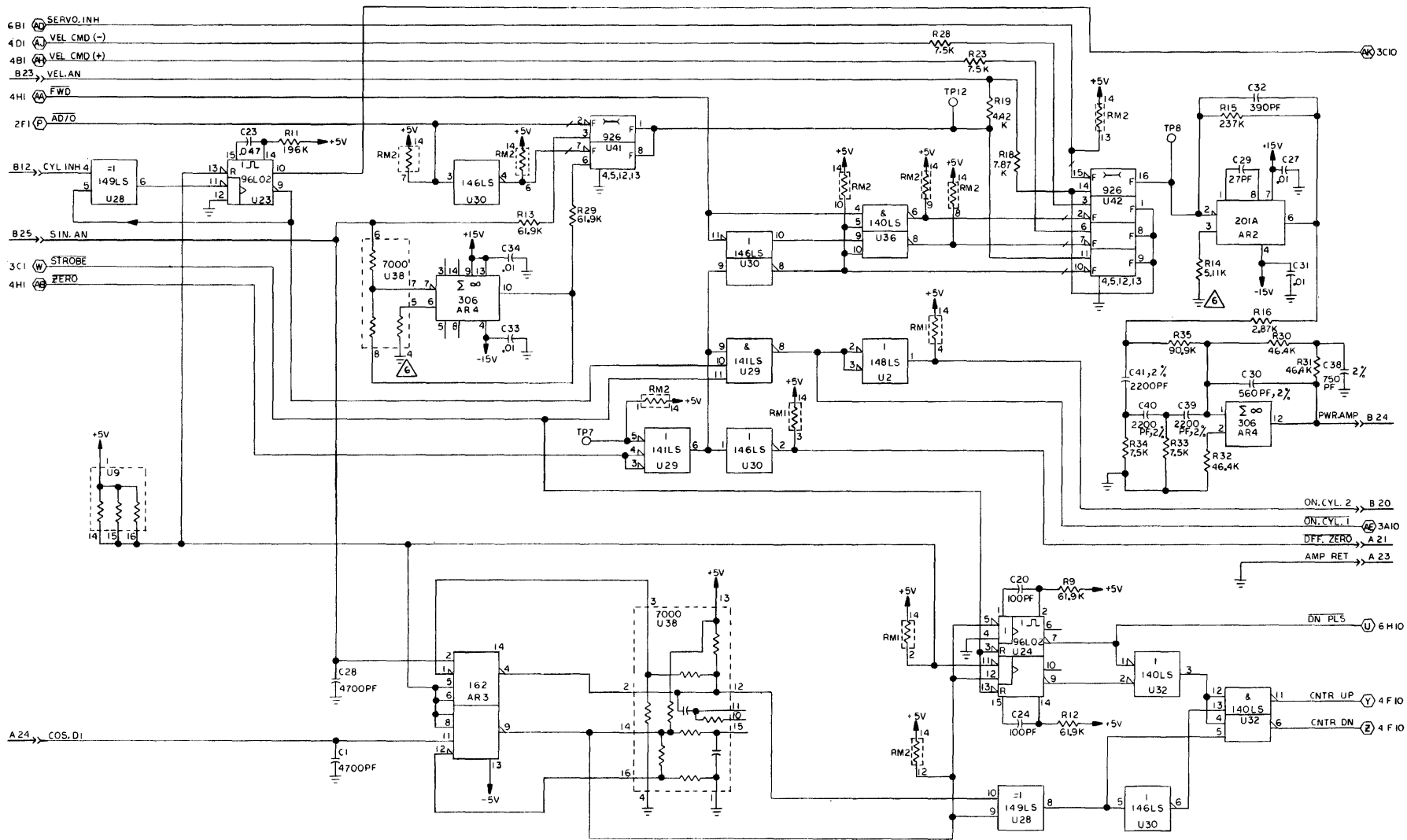
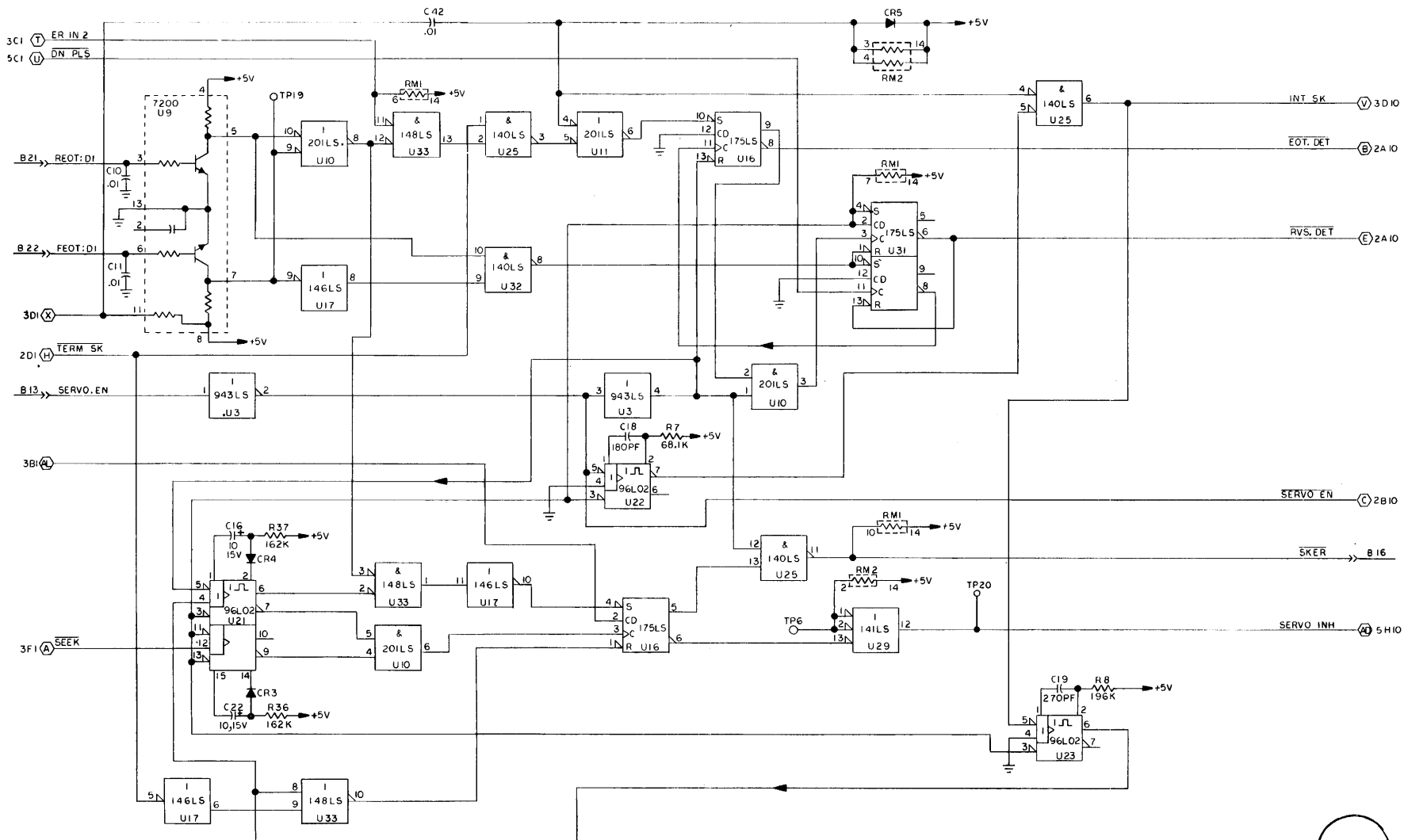


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 10 OF 10)



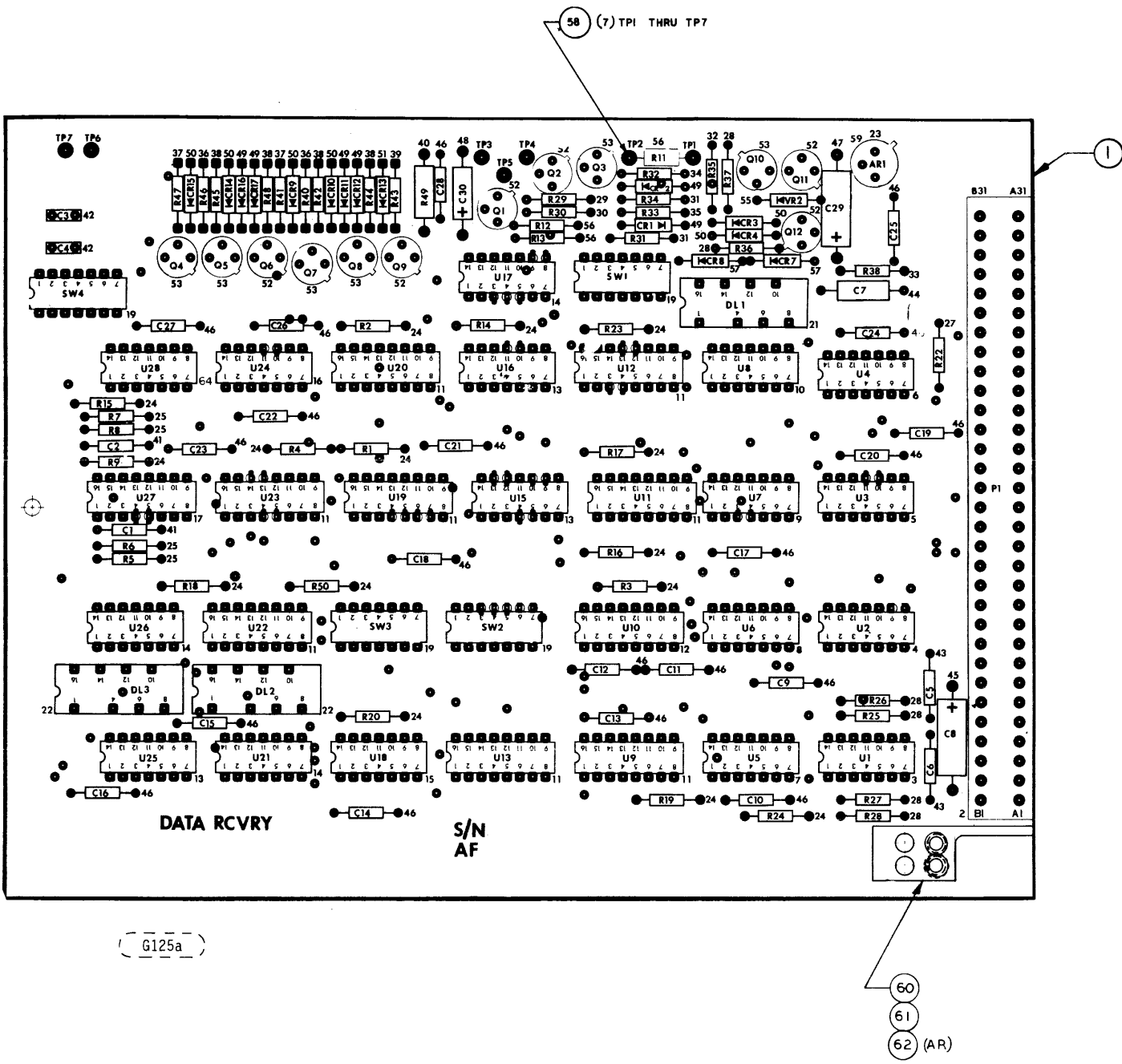


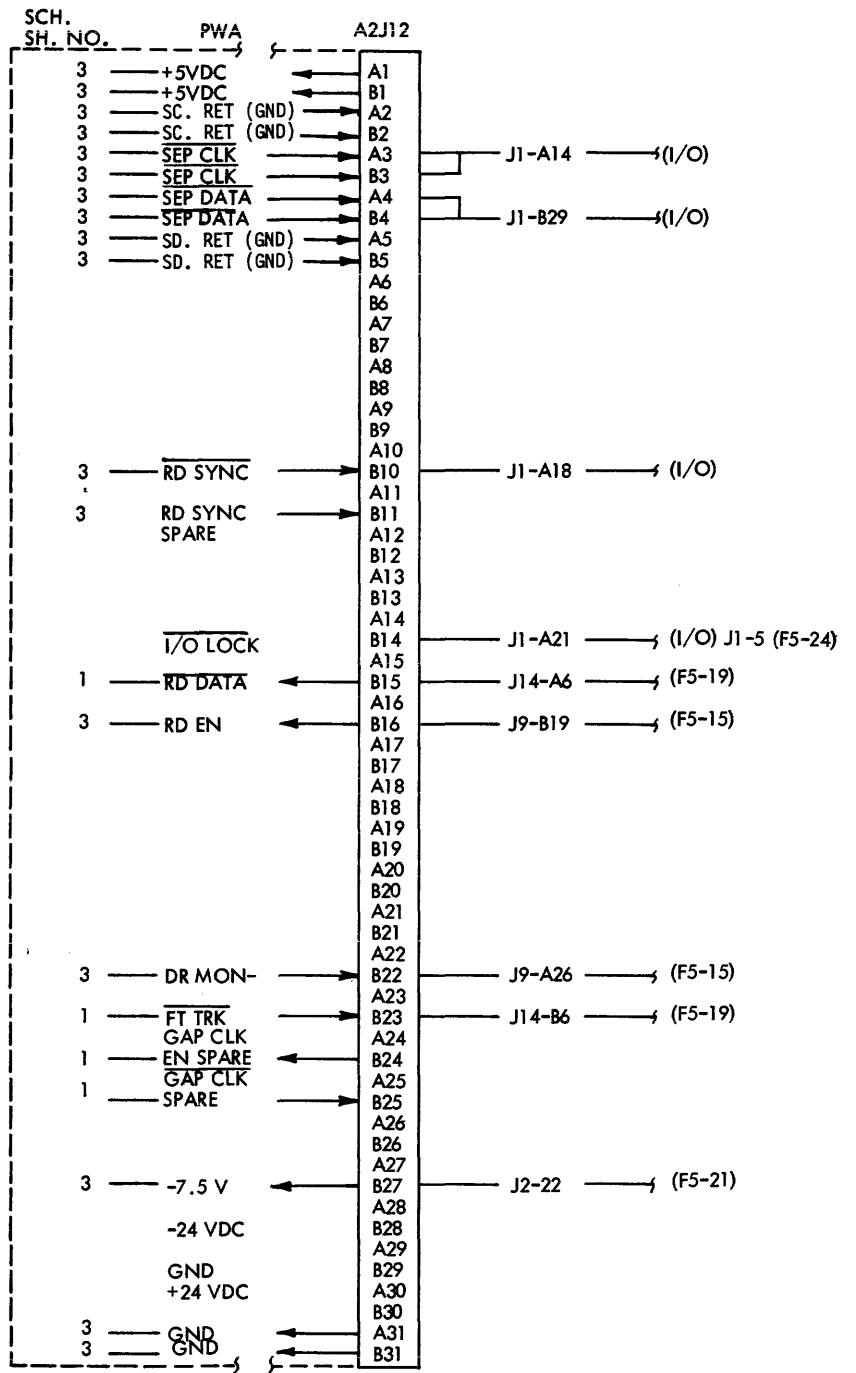
FIGURE 5-18, DATA RECOVERY BOARD ASM (SHEET 1 OF 7)

<u>ITEM NO.</u>	<u>IDENTIFICATION NUMBER</u>	<u>DRAWING TITLE</u>
	75297105	PWA Data Recovery
1	75297005	Board PC Data - Recovery
2	77836070	PWB Socket Connector
3	51768200	IC Dual
4	36187900	IC 7453
5	15112700	IC 75L04
6	15158700	IC 74S140
6	00005070	IC 500 HM Dual, Intch
7	15112300	IC 74L00
8	96744156	IC 7474
8	15104800	IC 7474, Intch
9	88882100	IC 74H00
9	36188700	IC CA 74H00 HS Quad, Intch
10	88885300	IC 74S20
10	50254900	IC Dual 4, Intch
11	15158600	IC 74S112
11	15109400	IC 74S112, Intch
12	15160600	IC 93L16
12	00005060	IC 4-Bit Counter, Intch
13	88884500	IC 74 S00
13	50254600	IC 74S00, Intch
14	88883700	IC 74S04
14	15109200	IC 74S04, Intch
15	88923000	IC 74S74
15	15109700	IC Dual D Flip-Flop, Intch
16	88884200	IC 74S10
16	50254700	IC Triple 3, Intch
17	15104301	IC 9602, Intch
17	88886500	IC 9602
18	88924500	IC 7404, Intch
18	36187100	IC 7404, Intch
19	83452204	Switch, 7 Position
21	83406502	Delay Line 100 NS
22	83406501	Delay Line 50 NS
23	15130400	Volt Regulator
24	94360300	Res 1/4W 1% 1.00K
25	94360430	Res 1/4W 1% 20.5K
27	94360335	Res 1/4W 1% 2.32K
28	94360224	Res 1/4W 1% 178
29	94360220	Res 1/4W 1% 162
30	94360359	Res 1/4W 1% 4.12K
31	94360232	Res 1/4W 1% 215
32	94360316	Res 1/4W 1% 1.47K
33	94360200	Res 1/4W 1% 100
34	94360257	Res 1/4W 1% 392
35	94360280	Res 1/4W 1% 681
36	94360168	Res 1/4W 1% 51.1
37	94360165	Res 1/4W 1% 47.5
38	94360264	Res 1/4W 1% 464
39	94360272	Res 1/4W 1% 562

FIGURE 5-18. DATA RECOVERY BOARD ASM (SHEET 2 OF 7)

<u>ITEM NO.</u>	<u>IDENTIFICATION NUMBER</u>	<u>DRAWING TITLE</u>
40	24500131	Res 1/2W 5% 47
41	92496147	Cap 200V 10% 1200
42	94227236	Cap 300V 2% 270
43	92496267	Cap Non 200V 10% 220
44	92496393	Cap Non 80V 10% 0.033 UF
45	24504353	Cap 10V 20% 33UF
46	92496227	Cap 100V 20% 0.01UF
47	24504339	Cap 35V 20% 6.8UF
48	24504329	Cap 35V 20% 1.0UF
49	51736700	Diode 1N914A
50	50241400	Diode Silicon
51	11801200	Spec Diode Germanium
52	50210310	TSTR, SNPN, 15V NN3646
53	50211510	TSTR, 2N4258 SPNP 12V
55	50240146	Diode Silicon
56		
57	24553500	Diode Silicon Planar
58	92498021	Terminal, Swaged
59	94335900	Pad-Transistor Mtg
60	83479801	Key, Inject, Mold
61	10125703	Scr Flat Hd
62	75312701	Spec-Epoxy Adhesive

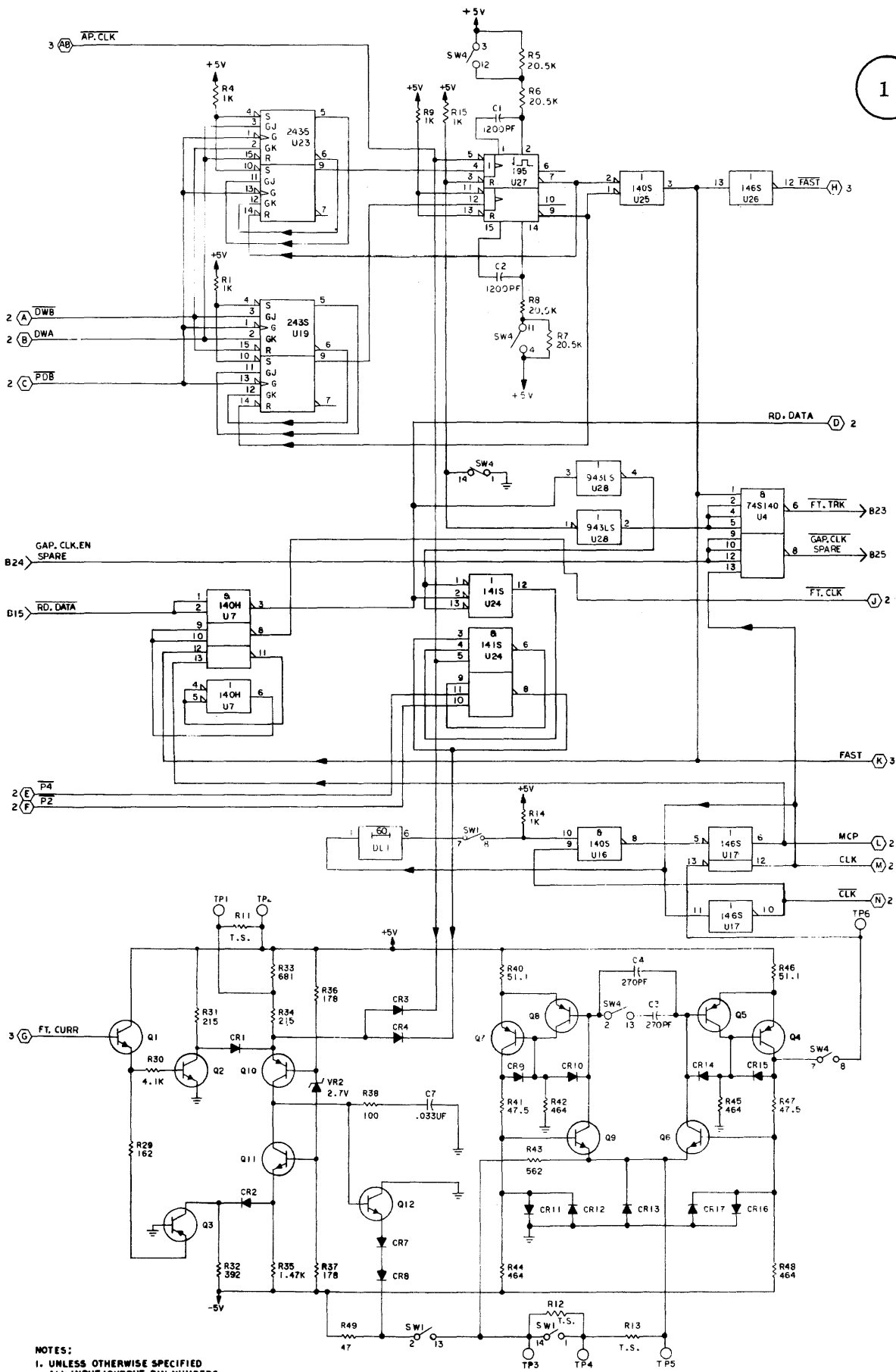
FIGURE 5-18. DATA RECOVERY BOARD ASM (SHEET 3 OF 7)



AA089c

FIGURE 5-18. DATA RECOVERY BOARD ASM (SHEET 4 OF 7)

1



NOTES:
 1. UNLESS OTHERWISE SPECIFIED
 ALL INPUT/OUTPUT PIN NUMBERS
 ARE FOR PI CONNECTOR.

FIGURE 5-18. DATA RECOVERY BOARD ASM (SHEET 5 OF 7)

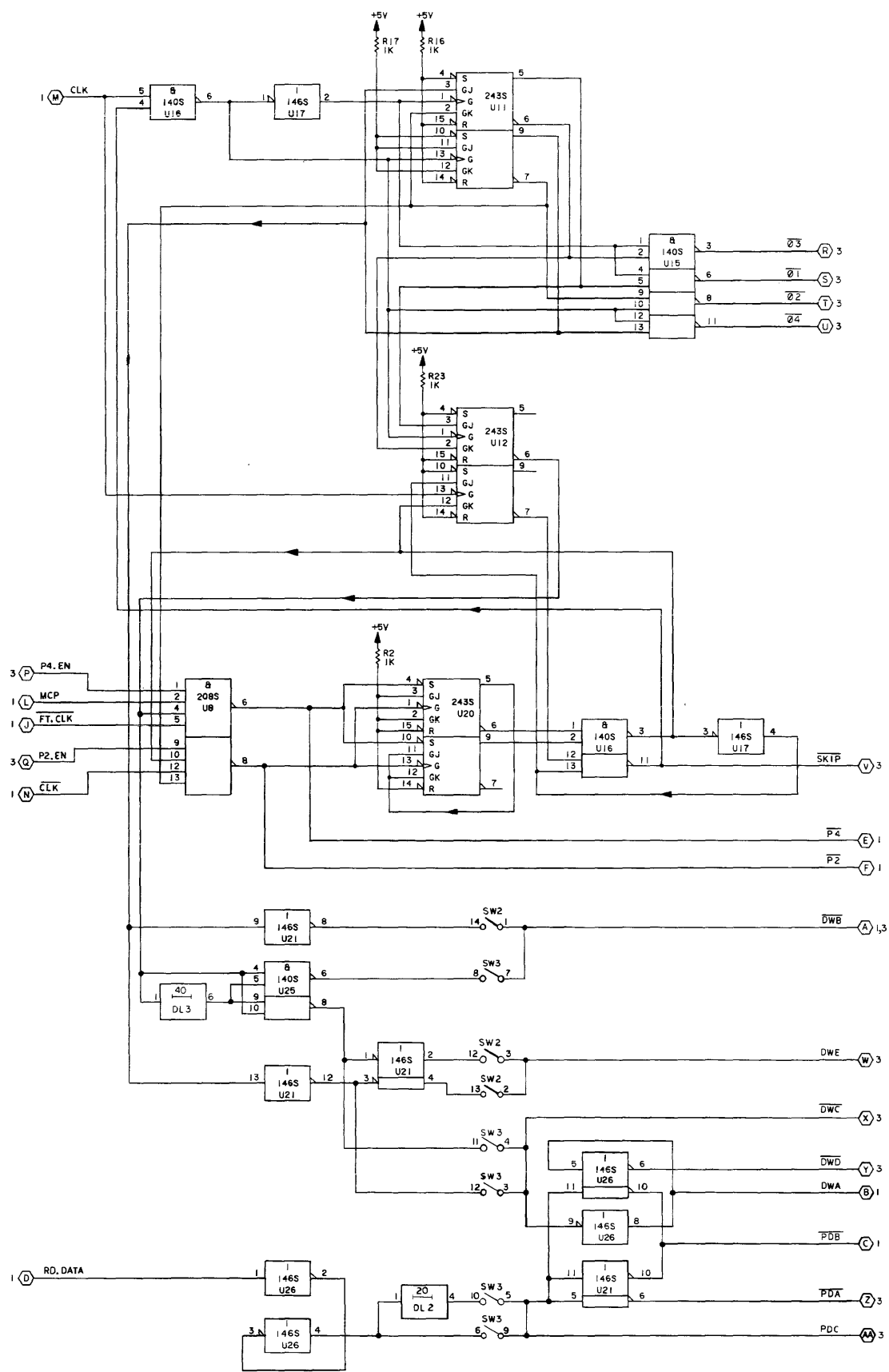


FIGURE 5-18. DATA RECOVERY BOARD ASM (SHEET 6 OF 7)

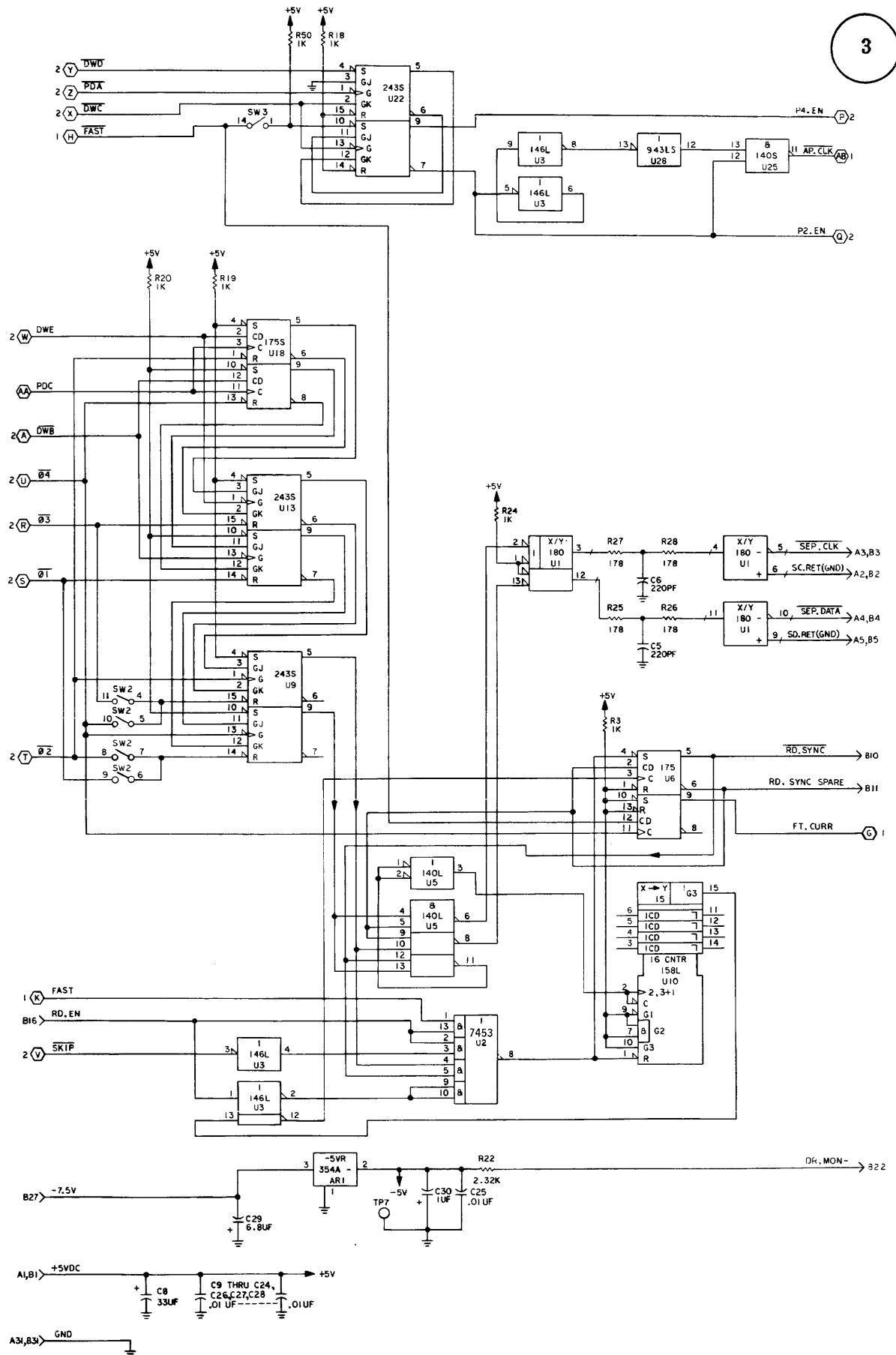
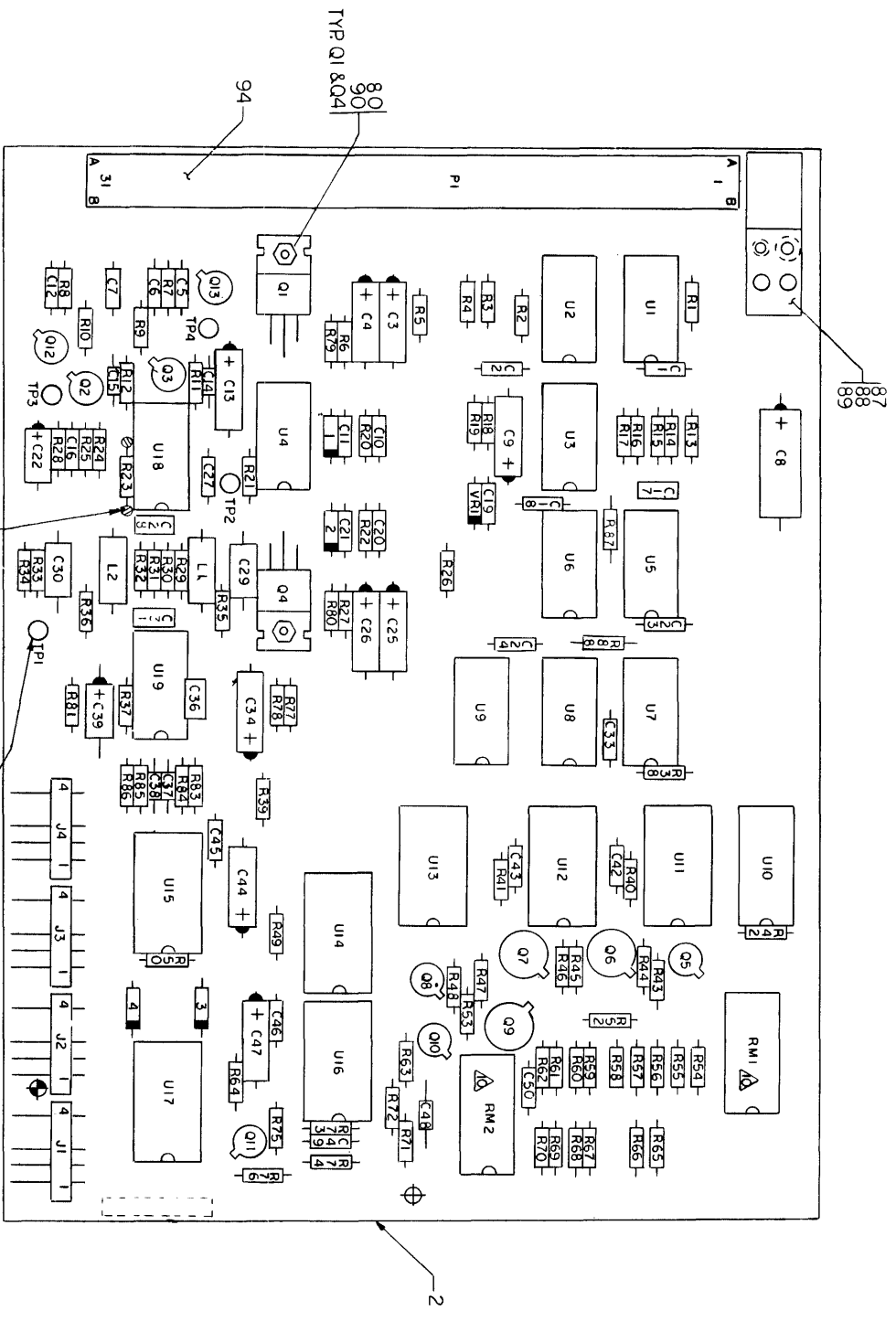


FIGURE 5-18. DATA RECOVERY BOARD ASM (SHEET 7 OF 7)



DIO	PL ITEM
CR1	25
CR2	25
CR3	26
CR4	26

REG	PL ITEM
VRI	27

CONN	PL ITEM
J1	93
J2	93
J3	93
J4	93
PI	94

TERM BD	PL ITEM
TP1	81
TP2	81
TP3	81
TP4	81

IND	PL ITEM
L1	95
L2	95

TSTR	PL ITEM
Q1	20
Q2	22
Q3	22
Q4	21
Q5	22
Q6	23
Q7	23
Q8	22
Q9	24
Q10	22
Q11	22
Q12	22
Q13	22

IC	PL ITEM
U1	13
U2	14
U3	15
U4	16
U5	17
U6	97
U7	19
U8	98
U9	18
U10	12
U11	7
U12	9
U13	8
U14	10
U15	5
U16	10
U17	6
U18	11
U19	11

RES MOD	PL ITEM
RM1	92
RM2	92

CAP	PL ITEM
C1	69
C2	69
C3	63
C4	63
C5	85
C6	68
C7	68
C8	60
C9	62
C10	69
C11	69
C12	85
C13	64
C14	66
C15	66
C16	67
C17	70
C18	69
C19	69
C20	69
C21	69
C22	65
C23	69
C24	69
C25	63
C26	63
C27	68
C28	71
C29	74
C30	74
C31	72
C32	-
C33	69
C34	64
C35	-
C36	73
C37	66
C38	66
C39	65
C40	-
C41	-
C42	85
C43	85
C44	61
C45	69
C46	69
C47	61
C48	76
C49	69
C50	85

RES	PL ITEM
R56	34
R57	34
R58	38
R59	33
R60	33
R61	33
R62	33
R63	51
R64	43
R65	34
R66	34
R67	33
R68	33
R69	33
R70	33
R71	44
R72	47
R73	39
R74	40
R75	38
R76	47
R77	32
R78	50
R79	91
R80	91
R81	50
R82	-
R83	51
R84	31
R85	31
R86	51
R87	44
R88	44

RES	PL ITEM
R1	39
R2	39
R3	35
R4	35
R5	47
R6	49
R7	47
R8	47
R9	37
R10	37
R11	31
R12	31
R13	34
R14	34
R15	34
R16	47
R17	47
R18	31
R19	31
R20	30
R21	50
R22	30
R23	29
R24	40
R25	40
R26	47
R27	49
R28	41
R29	31
R30	46
R31	31
R32	46
R33	50
R34	41
R35	31
R36	31
R37	48
R38	36
R39	31
R40	38
R41	38
R42	39
R43	42
R44	47
R45	36
R46	86
R47	44
R48	39
R49	31
R50	45
R51	-
R52	44
R53	44
R54	33
R55	33

G110a

FIGURE 5-19. READ/WRITE/ERASE BD ASM (SHEET 1 OF 7)

<u>ITEM NO.</u>	<u>IDENTIFICATION NUMBER</u>	<u>DRAWING TITLE</u>
	75891100	PWA - R/W/E (2400 r/min)
	75880500	PWA - R/W/E (1500 r/min)
2	75891120	PWB R/W/E
5	75300300	ID Read Matrix Special
6	75300400	Diode Matrix Special
7	75300500	Current Zone Special
8	75300600	ID R/W Fault Special
9	75300700	Write Switch Special
10	75300800	IC Head Select Special
11	15126900	IC 733C Video Amp
12	15158600	IC 74S112
13	88898200	IC 7410
14	50252900	IC 75107
15	88882200	IC 74H01
16	15132600	IC Volt Regulator
17	15146400	IC 74LS86
18	88924400	IC 7400
19	39389700	IC 7404
19	51701800	IC 7404, Intch
20	75752300	Transistor Power
21	75752400	Transistor Power
22	50210310	TSTR, SNPN, 15V NN3646
23	75722201	Transistor NPN 2N2219A
24	50211210	TSTR, SPNP, 60V NN3645
25	50241001	Diode Silicon
26	50241400	Diode Silicon
27	50240106	Diode, Sil Zener 5.1V
30	94360168	Res 1/4W 1% 51.1
31	94360216	Res 1/4W 1% 147
32	94360210	Res 1/4W 1% 127
33	94360240	Res 1/4W 1% 261
34	94360243	Res 1/4W 1% 280
35	94360252	Res 1/4W 1% 348
36	94360268	Res 1/4W 1% 511
37	94360288	Res 1/4W 1% 825
38	94360300	Res 1/4W 1% 1.00K
39	94360316	Res 1/4W 1% 1.47K
40	94360332	Res 1/4W 1% 2.15K
41	94360340	Res 1/4W 1% 2.61K
42	94360348	Res 1/4W 1% 3.16K
43	94360360	Res 1/4W 1% 4.22K
44	94360368	Res 1/4W 1% 5.11K
45	94360375	Res 1/4W 1% 6.04K
46	94360220	Res 1/4W 1% 162
47	94360400	Res 1/4W 1% 10.0K

FIGURE 5-19. READ/WRITE/ERASE BD ASM (SHEET 2 OF 7)

<u>ITEM NO.</u>	<u>IDENTIFICATION NUMBER</u>	<u>DRAWING TITLE</u>
48	94360160	Res 1/4W 1% 42.2
49	92512464	Resistor 3.3 Ohm 1/4
50	24500015	Res 1/4W 5% 10
51	94360329	Res 1/4W 1% 2000K
60	24504374	Cap 15V 20% 68UF
61	24504383	Cap 20V 20% 15UF
62	24504371	Cap 15V 20% 22UF
63	24504339	Cap 25V 20% 6.8 UF
64	24504379	Cap 20V 20% 3.3UF
65	24504346	Cap 10V 20% 4.7UF
66	94240433	Cap 50V 10% Used on 75891100 Only
67	94240401	Cap 50V 10% 1000 Used on 75891100 Only
67	94240409	Cap 50V 10% 1500 Used on 75880500 Only
68	94240411	Cap 50V 10% 0.01UF
69	92496227	Cap 100V 20% 0.01UF
70	94227218	Cap 500V +/-PF 47
71	94227236	Cap 300V 2% 270
71	94227241	Cap 100V 2% 430 Used on 75880500 Only
72	94227226	Cap 300V 2% 100
72	94227230	Cap 500V 2% 150 Used on 75880500 Only
73	94227252	Cap 100V 2% 1200
74	94240448	Cap 50V 10% 0.10 UF
75	94227248	Cap 100V 2% 820 Used on 75891100 Only
76	94240435	Cap 50V 10% 5600
80	95683502	Stud, Press
81	92498021	Terminal, Swaged
82	94335900	Pad-Transistor Mtg
85	94240400	Cap 50V 10% 470
86	94360344	Res 1/4W 1% 2.87
87	83479701	Key, Inject. Mold
88	10125703	Scr Flat Hd
89	75312701	Spec-Epoxy Adhesive
90	92583002	Nut, Lock
91	24500006	Res 1/4W 5% 4.3
92	94260301	Socket 16 Pin
93	75772401	Header 4 Pin Rt Angle
94	77836070	PWB Socket Connector
95	94356324	Inductor 10UH Used on 75891100 Only
95	94356326	Inductor 15UH Used on 75880500 Only
96	77612165	Terminal, Slotted
97	15145200	74LS03
98	88883700	IC 74S04

FIGURE 5-19. READ/WRITE/ERASE BD ASM (SHEET 3 OF 7)

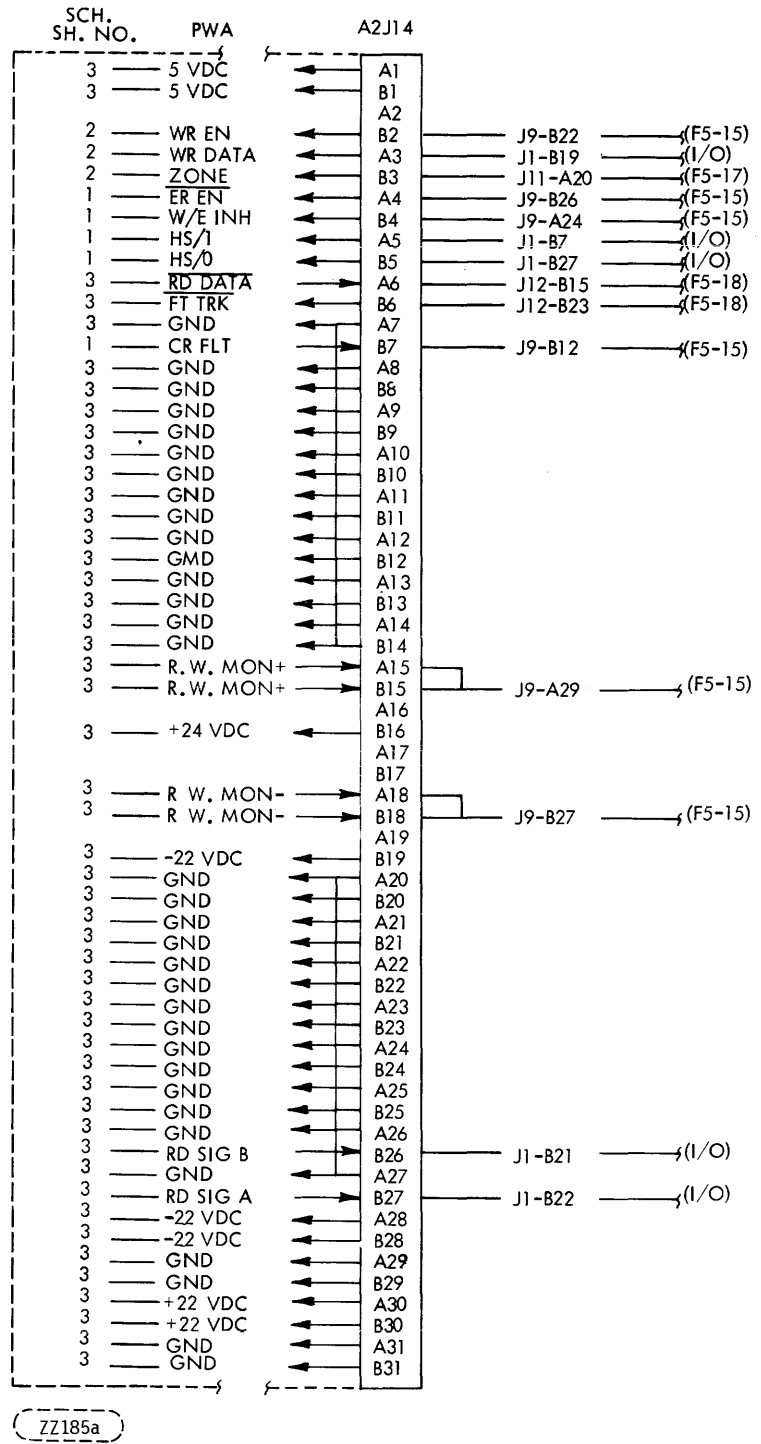
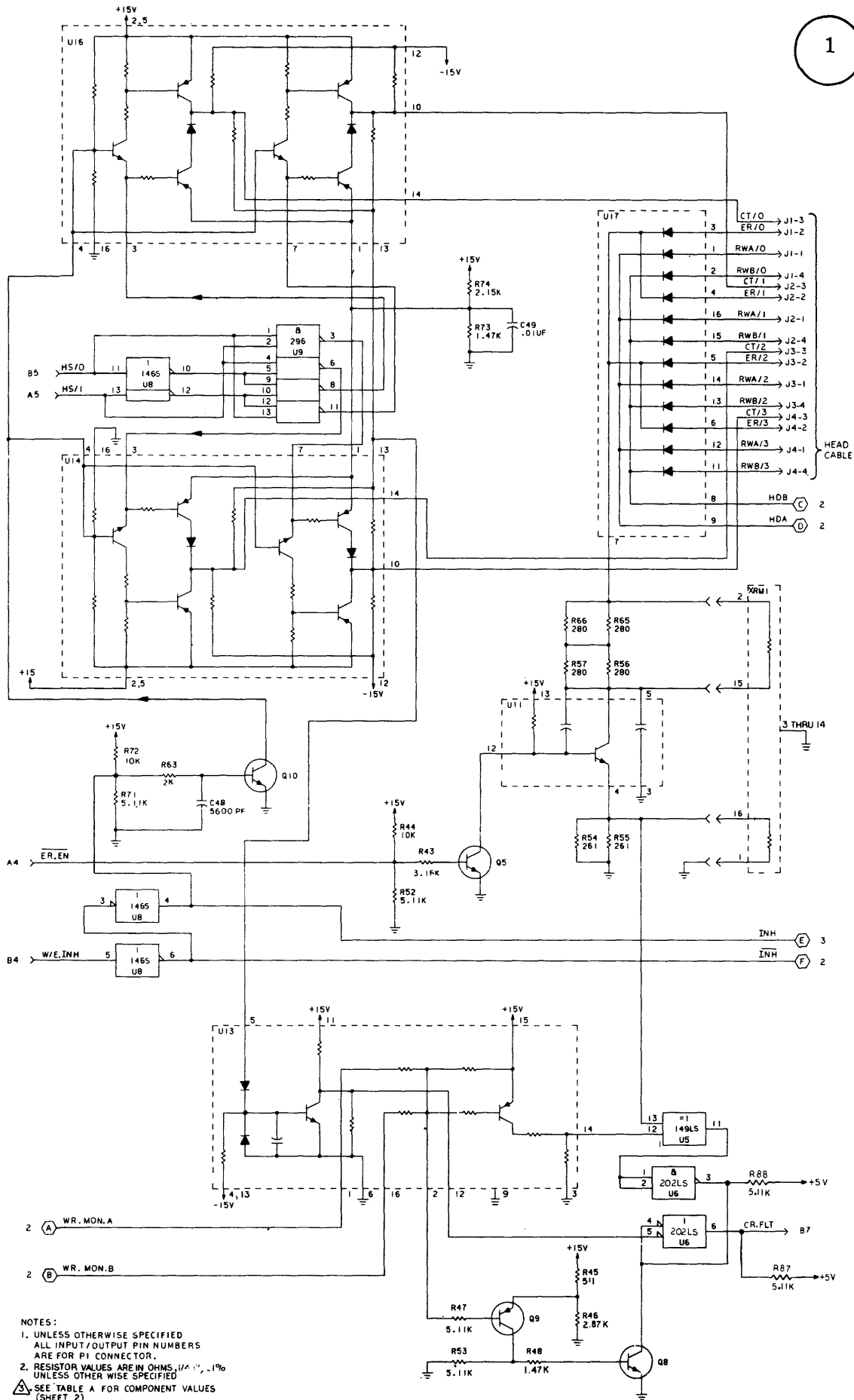


FIGURE 5-19. READ/WRITE/ERASE BD ASM (SHEET 4 OF 7)



NOTES:
 1. UNLESS OTHERWISE SPECIFIED
 ALL INPUT/OUTPUT PIN NUMBERS
 ARE FOR P1 CONNECTOR.
 2. RESISTOR VALUES ARE IN OHMS, 1/4%, -1%
 UNLESS OTHERWISE SPECIFIED
 SEE TABLE A FOR COMPONENT VALUES
 (SHEET 2)

FIGURE 5-19. READ/WRITE/ERASE BD ASM (SHEET 5 OF 7)

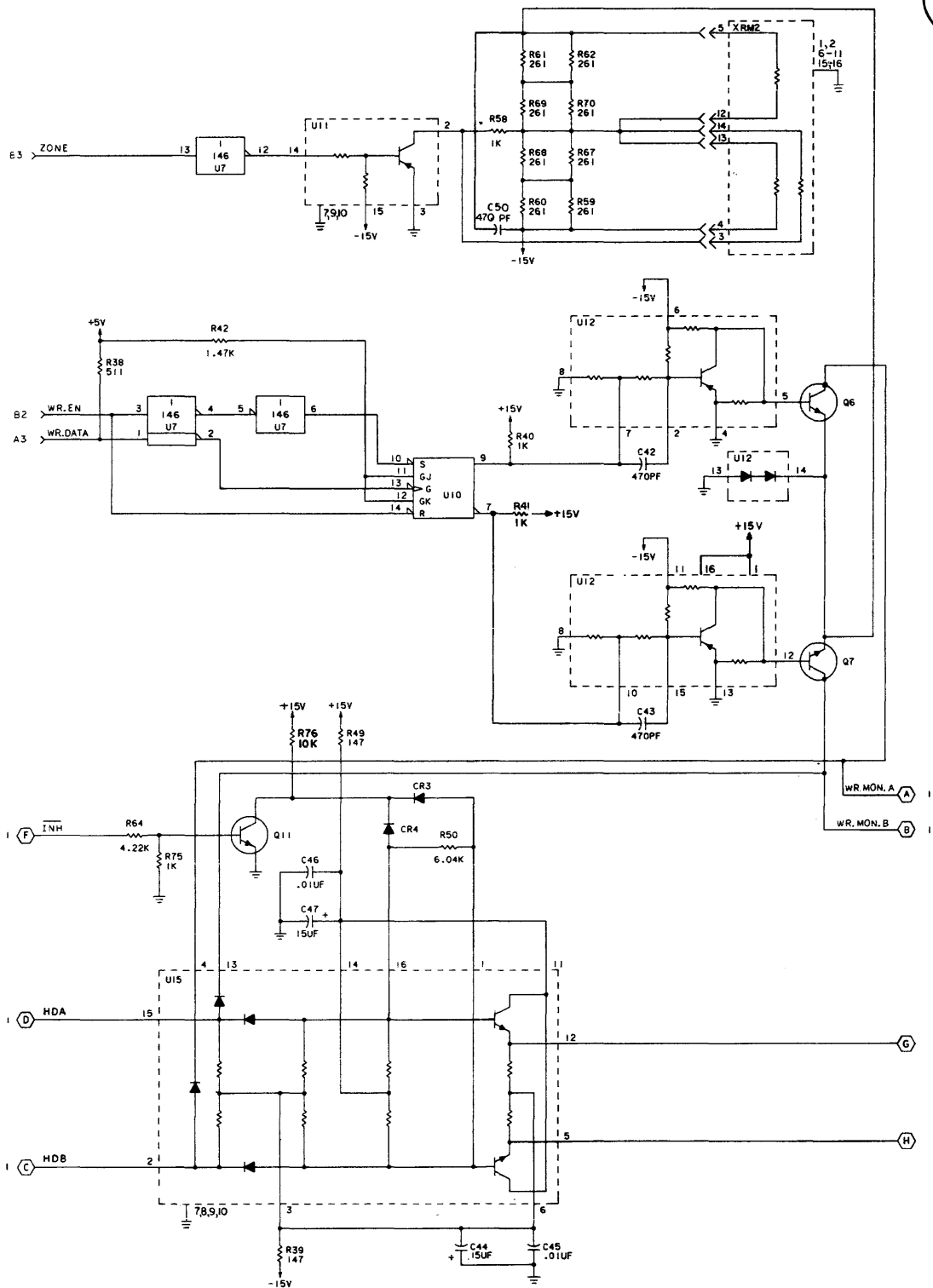


TABLE A Δ

ASM. NO.	C38	C37	C35	L2	L1	C28	C31	C15	C14	R23	
1500	75880500	5600pf	5600pf	820pf	15uh	15uh	430pf	150pf	5600pf	5600pf	T.S.
2400	75891100	3300pf	3300pf	—	10uh	10uh	270pf	100pf	3300pf	3300pf	T.S.

FIGURE 5-19. READ/WRITE/ERASE BD ASM (SHEET 6 OF 7)

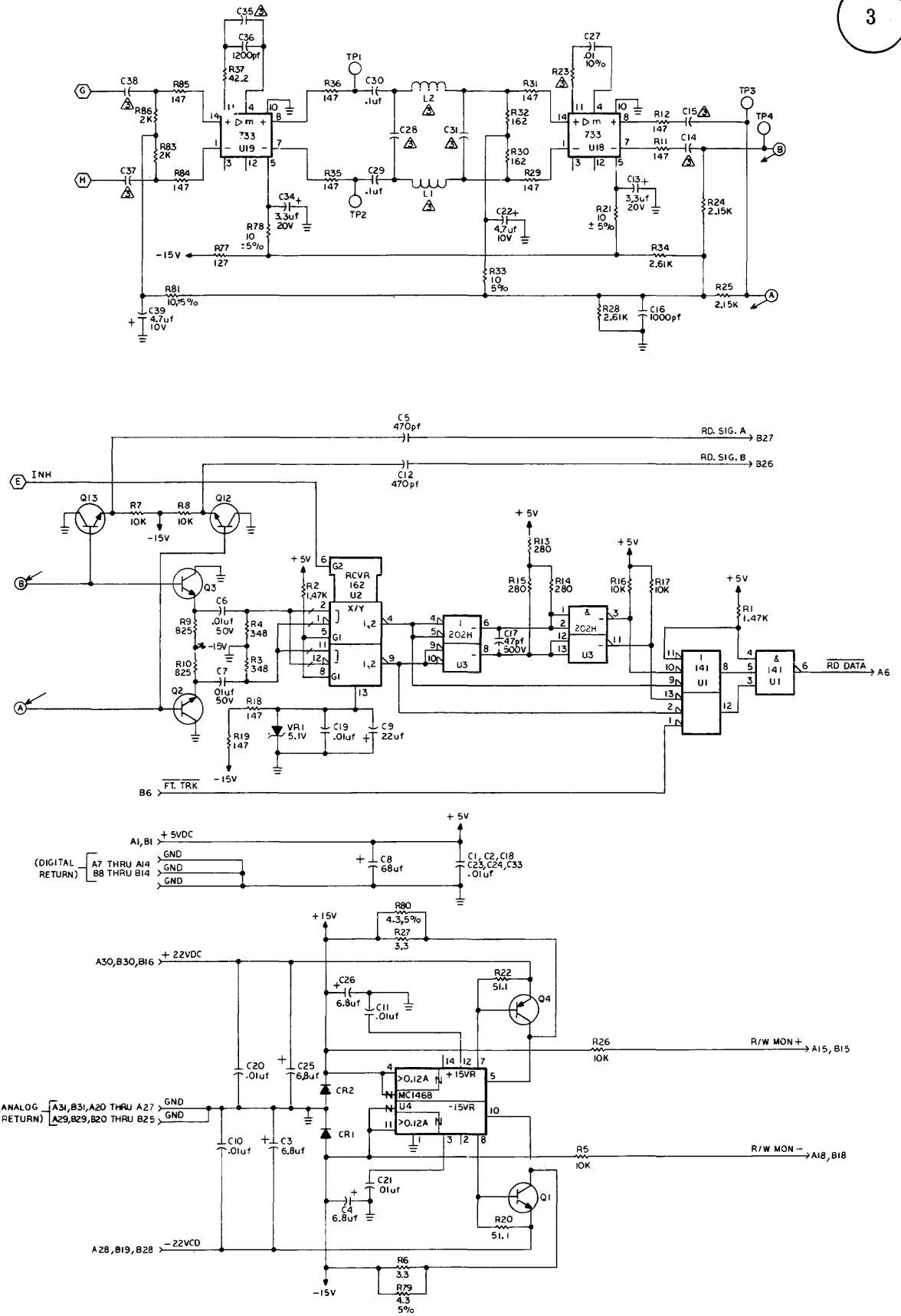
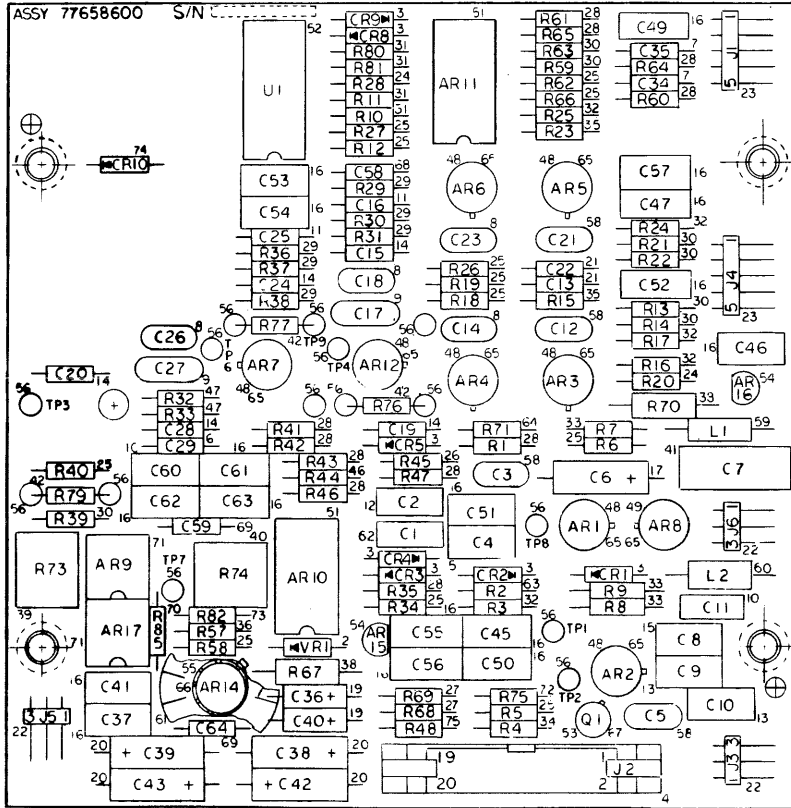


FIGURE 5-19. READ/WRITE/ERASE BD ASM (SHEET 7 OF 7)



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FIGURE 5-20. AGC SERVO PREAMP BD ASM (SHEET 1 OF 6)

<u>ITEM NO.</u>	<u>IDENTIFICATION NO.</u>	<u>DRAWING TITLE</u>
	77658600-0	PWA, AGC Servo Preamp
1	77831221-5	PC Bd, AGC Pre Amp
2	50240115-1	Diode Silicon
3	51736700-9	Diode 1N914A
4	94359510-8	Connector 3M 20 Pin
5	83453805-0	Cap 100V 10% 0.047 UF
6	75808526-0	Cap 100V 10% 1200
7	92496205-3	Cap 100V 10% 100
8	95593012-8	Capacitor 150 PF 1000
9	95593008-6	Capacitor Disk 1000V
10	94227244-4	Cap 100V 2% 560
11	92496215-2	Cap 100V 10% 1000
12	94227250-1	Cap 100V 2% 1000
13	83465070-7	Cap 600V 2% 0.0022UF
14	75808531-0	Cap 100V 10% 3300
15	93453801-9	Cap 100V 10% 0.022UF
16	83453835-7	Cap 200V 10% 0.010UF
17	24504382-3	Cap 20V 20% 10UF
19	24504329-4	Cap 35V 20% 1.0UF
20	24504339-3	Cap 35V 20% 6.8UF
21	92496227-7	Cap 100V 20% 0.01 UF
22	75743703-3	Header-Right Angle
23	75743705-8	Header-Right Angle
24	94360336-5	Res 1/4W 1% 2.37K
25	94360368-8	Res 1/4W 1% 5.11K
26	94360204-5	Res 1/4W 1% 110
27	94360384-5	Res 1/4W 1% 7.50K
28	94360400-9	Res 1/4W 1% 10.0K
29	94360429-8	Res 1/4W 1% 20.0K
30	94360468-6	Res 1/4W 1% 51.1K
31	94360500-6	Res 1/4W 1% 100K
32	94360529-5	Res 1/4W 1% 200K
33	94360596-4	Res 1/4W 1% 1.00Meg
34	94360328-2	Res 1/4W 1% 1.96K
35	17705946-6	Res 1/4W 5% 2.7 Meg
36	94360446-2	Res 1/4W 1% 30.1K
38	24500153-2	Res 1/2W 5% 390
39	94372604-2	Res Vari 20% 2.0K
40	94372606-7	Res Vari 20% 10K
41	83453809-2	Cap 100V 10% 0.10 UF
46	94360300-1	Res 1/4W 1% 1.00K
47	94360329-0	Res 1/4W 1% 2.00K
48	83452801-0	IC CA3130T
49	83452804-4	IC CA3080T
51	15126600-4	IC LM339
52	15135100-4	IC 4053B
53	16547200-2	Trans PNP 2N2907A
54	83452805-1	Volt Reg 78L12 AWC

FIGURE 5-20. AGC SERVO PREAMP BD ASM (SHEET 2 OF 6)

<u>ITEM NO.</u>	<u>IDENTIFICATION NO.</u>	<u>DRAWING TITLE</u>
55	83452806-9	Volt Reg 79M05
56	92498021-2	Terminal, Swaged
57	75738867-3	Spacer-Standoff
58	95593011-0	Capacitor 56 PF
59	94356358-5	Inductor 6800UH
60	94356356-9	Inductor 4700UH
61	51853102-5	Heatsink
62	94227240-2	Capacitor MICA 390 P
63	94360452-0	Res 1/4W 1% 34.8K
64	94360388-6	Res 1/4W 1% 8.25K
65	94335903-4	Pad-Transistor Mount
66	94335900-0	Pad-Transistor Mtg
67	94335901-8	Pad-Transistor Mount
68	75808504-7	Cap 100V 10% 18
69	75808506-2	Cap 100V 10% 27
70	17705953-2	Res 1/4W 5% 5.1 Meg
71	15156600-7	IC 201A
72	94360274-8	Res 1/4W 1% 590
73	17705944-1	Res 1/4W 5% 2.2 Meg
74	50241400-6	Diode, Silicon
75	94360361-3	Res 1/4W 4.32K 1%

FIGURE 5-20. AGC SERVO PREAMP BD ASM (SHEET 3 OF 6)

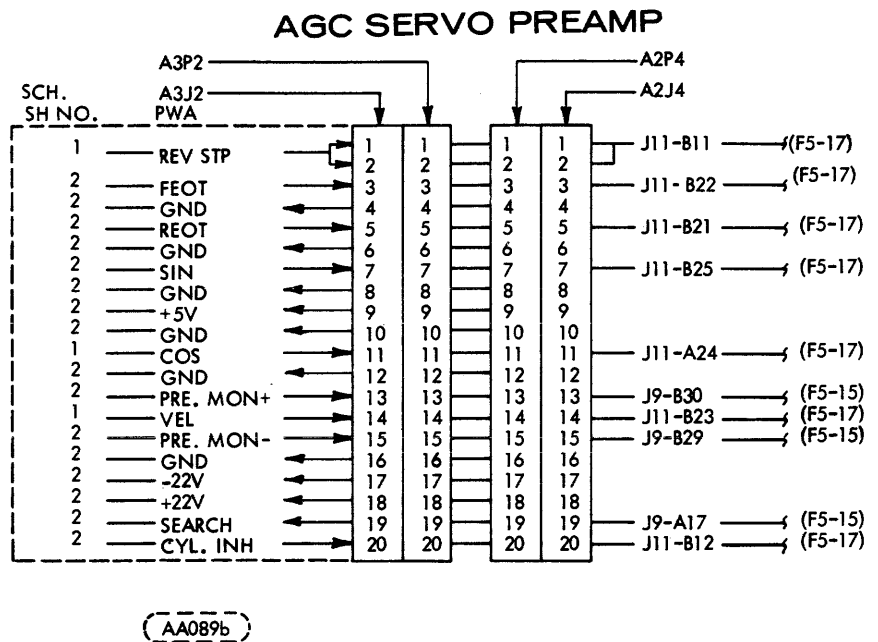


FIGURE 5-20. AGC SERVO PREAMP BD ASM (SHEET 4 OF 6)

FIGURE 5-20. AGC SERVO PREAMP BD ASM (SHEET 5 OF 6)

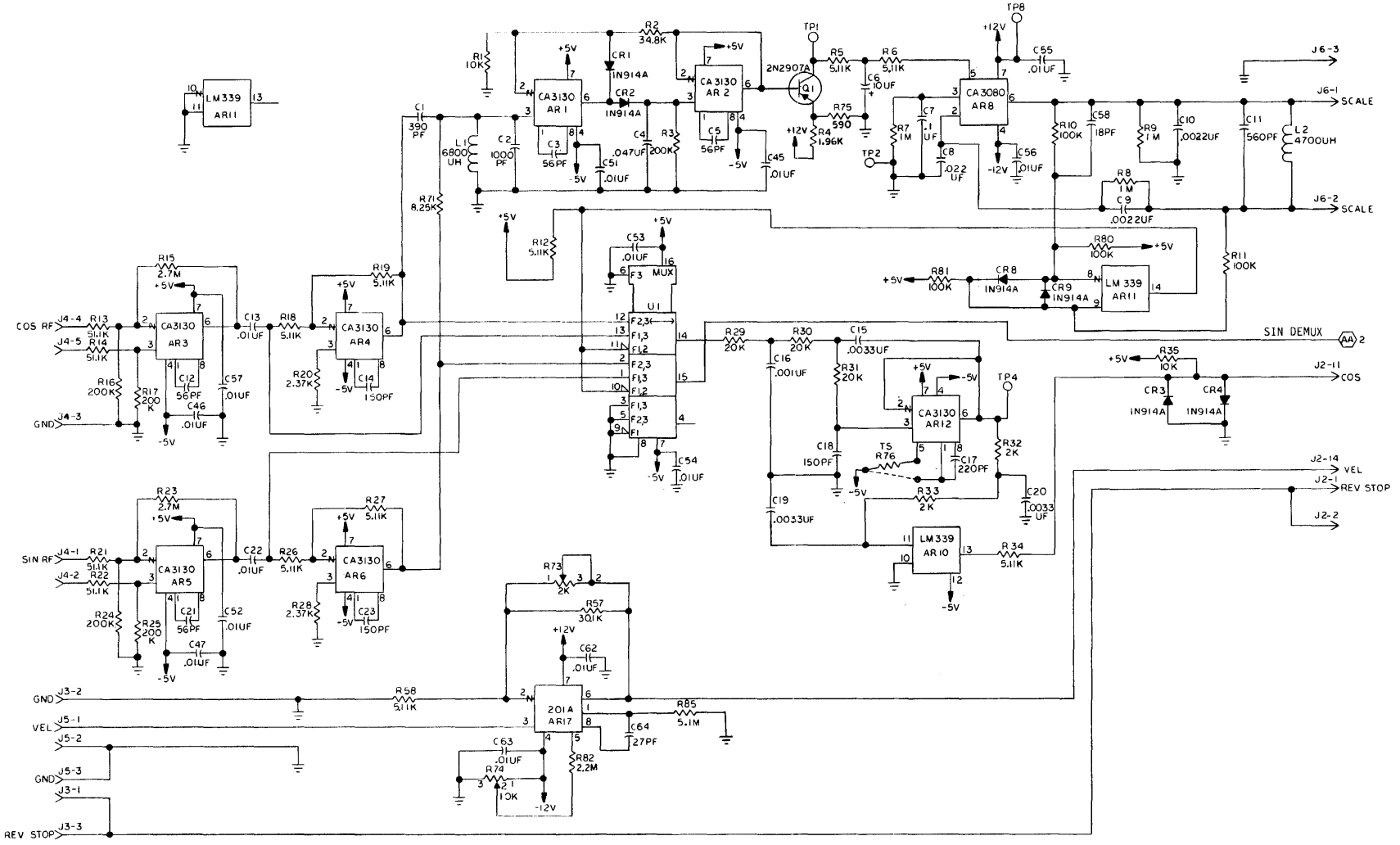
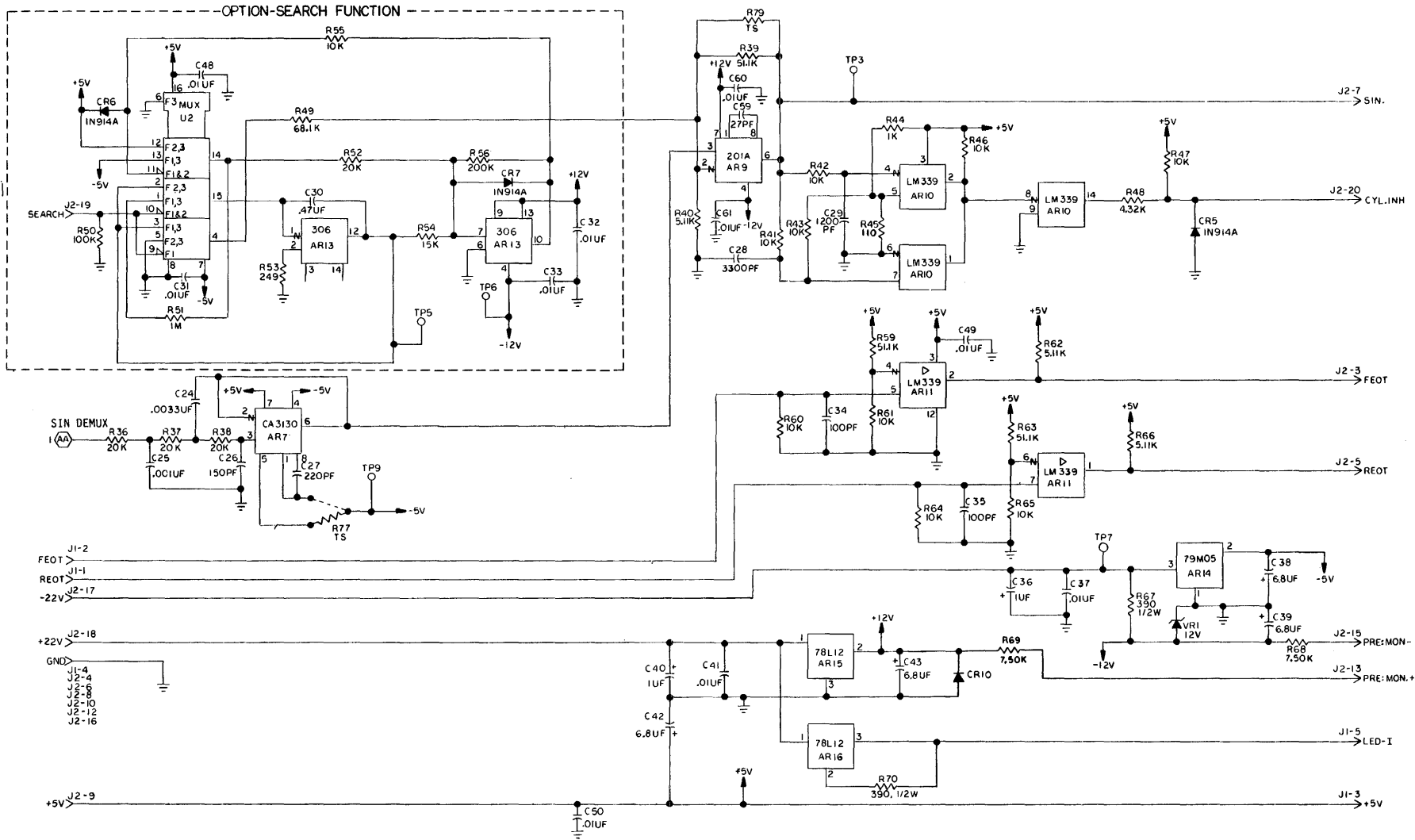
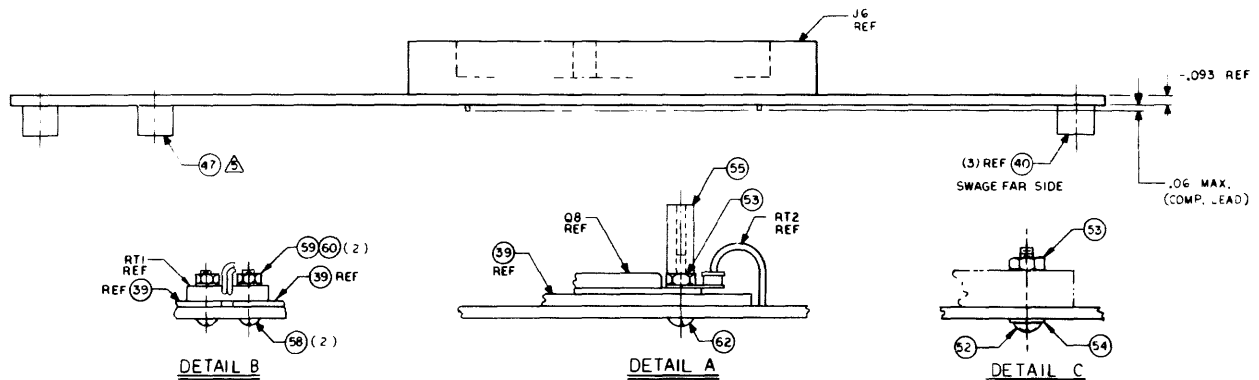
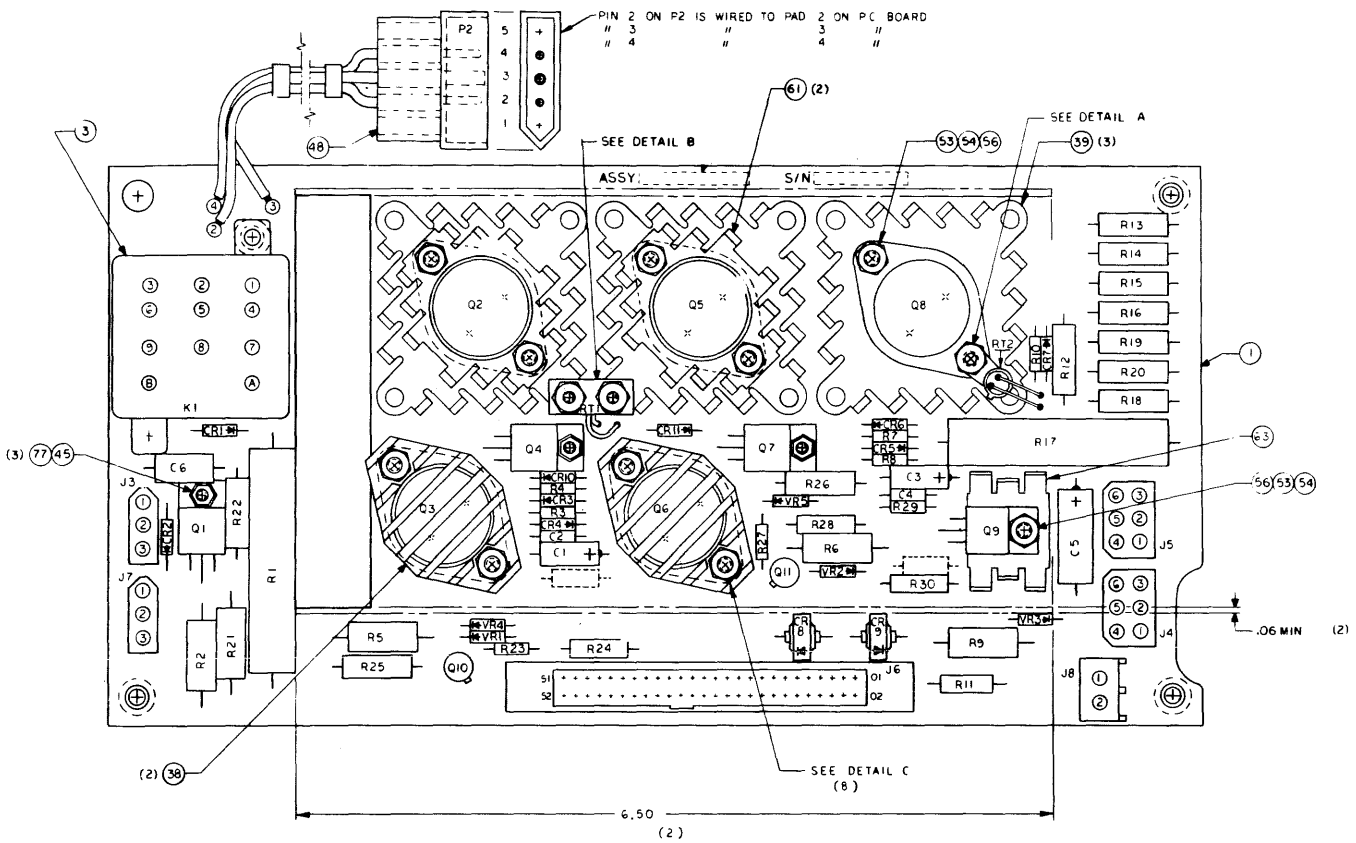


FIGURE 5-20. AGC SERVO PREAMP BD ASM (SHEET 6 OF 6)





DIODE ITEM	
CR1	9
CR2	9
CR3	10
CR4	9
CR5	10
CR6	9
CR7	74
CR8	12
CR9	12
CR10	9
CR11	9

CONN ITEM	
J3	33
J4	36
J5	35
J6	37
J7	32
J8	64

RELAY ITEM	
K1	2

VOLT REG ITEM	
VR1	11
VR2	11
VR3	46
VR4	67
VR5	67

THERM ITEM	
RT1	30
RT2	13

RES ITEM	
R1	28
R2	22
R3	18
R4	17
R5	23
R6	23
R7	18
R8	17
R9	49
R10	31
R11	19
R12	21
R13	27
R14	27
R15	27
R16	27
R17	29
R18	25
R19	26
R20	26
R21	24
R22	44
R23	70
R24	69
R25	68
R26	68
R27	70
R28	69
R29	80
R30	17

TSTR ITEM	
Q1	4
Q2	42
Q3	75
Q4	5
Q5	43
Q6	42
Q7	76
Q8	7
Q9	8
Q10	66
Q11	65

CAP ITEM	
C1	15
C2	14
C3	15
C4	14
C5	16
C6	41

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FIGURE 5-21. POWER SUPPLY BD NO. 1 (SHEET 1 OF 15)

<u>ITEM NO.</u>	<u>IDENTIFICATION NO.</u>	<u>DRAWING TITLE</u>
	77830321-4	PWA Pwr Sup #1
1	77830323-0	PWB Pwr Sup #1
2	22940804-2	Relay Gen Purp 3PDT
3	22940901-6	Relay Socket
4	75752300-6	Transistor Power
5	75752402-0	Transistor Power
7	50221700-3	Transistor MJ 4502
8	15151500-4	Volt Regulator
9	50241001-2	Diode Silicon
10	51736700-9	Diode 1N914A
11	50240920-4	Diode Zener
12	77832208-1	Diode Silicon
13	77612612-0	Thermistor Probe
13	83465304-0	Therm Sensor Switch-Intch
14	92496227-7	Cap 100V 20% .01 UF
15	17706043-1	Cap 50V 20% 4.7UF
16	24504386-4	Cap 20V 20% 47UF
17	94360236-7	Res 1/4W 1% 237
18	94360200-3	Res 1/4W 1% 100
19	24500139-1	Res 1/2W 5% 100
21	94318601-5	Resistor WW 3W 1.5
22	24507118-8	Res 1W 5% 51
23	24507139-4	Res 1W 5% 390
24	24507170-9	Res 1W 5% 2.0K
25	94318632-0	Resistor WW 3W 100
26	94318661-9	Resistor WW 3W 1000
27	94318697-3	Resistor WW 3W 0.5
28	62065805-4	Resistor
29	95594151-3	Res Fxd Wire WD 10W
30	77613025-4	Thermistor
31	94360100-5	Res 1/4W 1% 10.0
32	75808402-4	Conn Wafer 3-Pin
33	75808403-2	Conn Wafer 3-Pin MFM
35	75808448-7	Conn Wafer 6-Pin
36	75808451-1	Conn Wafer 6-Pin
37	97109269-7	Conn 32 Pin Male
38	75811802-0	Heatsink
39	95596205-5	Heatsink
40	75738874-9	Standoff
41	94240452-6	Cap 50V 10% 0.22MF
42	77830635-7	Motorola Tran 2N6030
43	94646506-0	Motorola Tran 2N5630
44	94318625-4	Res Wire WD 3W 50 OH
45	93650012-6	Stud-Self Clinching
46	50240108-6	Volt Reg 6.2V 5%
47	75738858-2	Standoff
48	83456701-8	Pwr Bd Harness Assy
49	92512399-4	Res 1W 1.2K 10
52	92743168-4	Screw SS Pan Hd 6-32

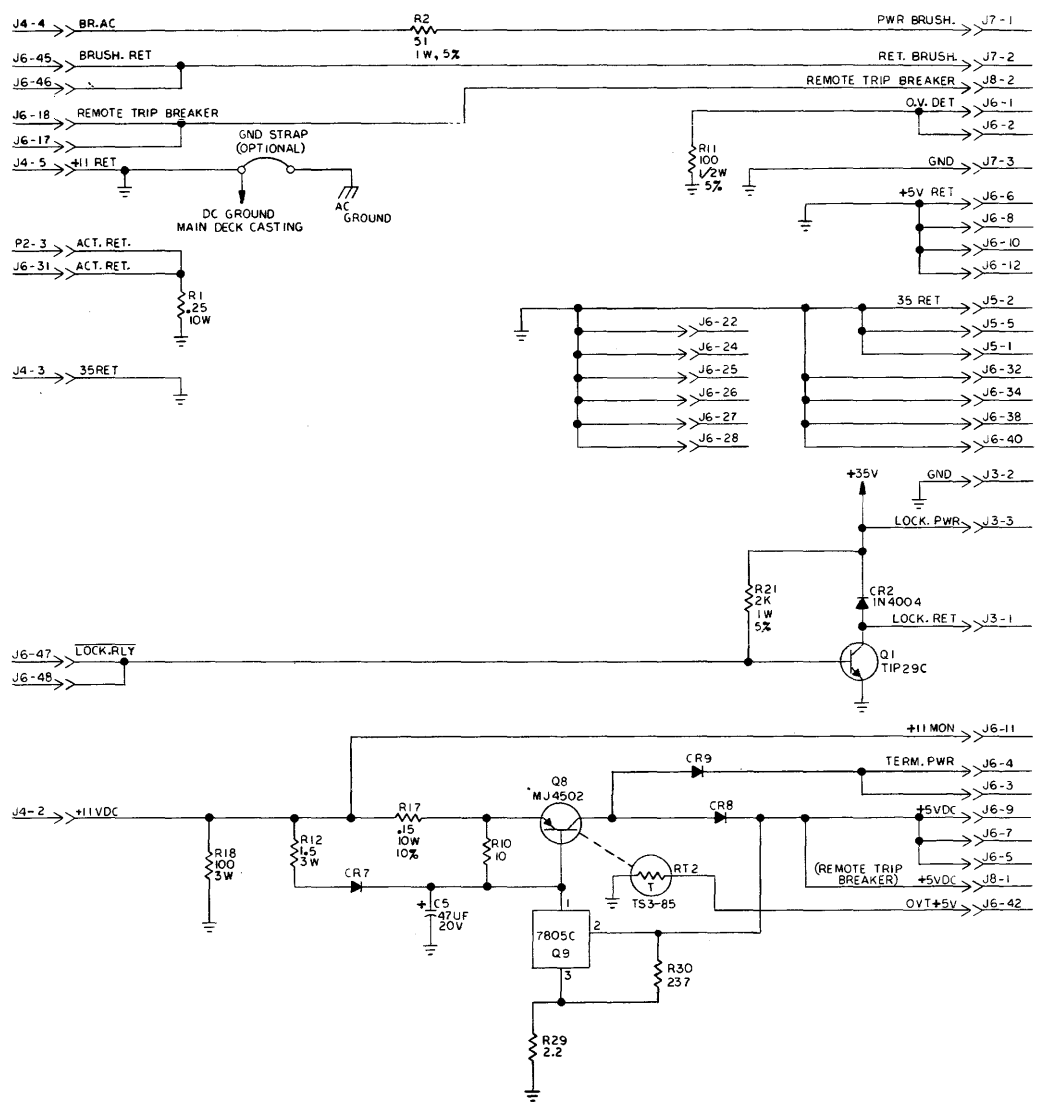
FIGURE 5-21. POWER SUPPLY BD NO. 1 (SHEET 2 OF 5)

ITEM NO.	IDENTIFICATION NO.	DRAWING TITLE
53	95510026-8	Nut Hex Mach Screw
54	10126103-0	Wash Int Tooth LK #6
55	83475701-5	Std Off-Wind Tunnel
56	92743164-3	Screw SS Pan Hd 6-32
58	92743088-4	Screw-Mach Hd SS 4-4
59	10126101-4	Wash Int Tooth Lock
60	10125103-1	Scr Nut-Hex Mach 4-4
61	77830638-1	Heat Dissipator
62	92743166-8	Screw-Pan Hd 6-32X5
63	94778801-4	Heatsink
64	95882700-8	Connector
65	75722200-5	Transistor NPN
66	16547200-2	Trans PNP 2N2907A
67	50240102-9	Diode-Zener 3.6V
68	94318604-9	Resistor 3 3W
69	24500174-8	Res 1/2W 5% 3.0K
70	94360368-8	Res 1/4W 1% 5.11K
74	83452901-8	Diode A14B
75	92162069-6	Transistor 2N3055
76	75752302-2	Transistor Power
77	92583002-8	Nut Lock
80	15164522-3	Res 1/4W 5% 2.2

CONNECTOR	DESTINATION (SCH)
J3	F5-31, BASEPLATE ELECTRONICS
J4 & J5	F5-26, F5-27, F5-28, F5-29 or F5-30, AC-DC POWER DISTRIBUTION.
J6	F5-22, POWER SUPPLY BD NO. 2
J7 & J8	F5-31, BASEPLATE ELECTRONICS
P2	DESTINATION NOT SHOWN - SIGNAL USED WHEN ADJUSTING HEADS TO BYPASS RELAY K1.

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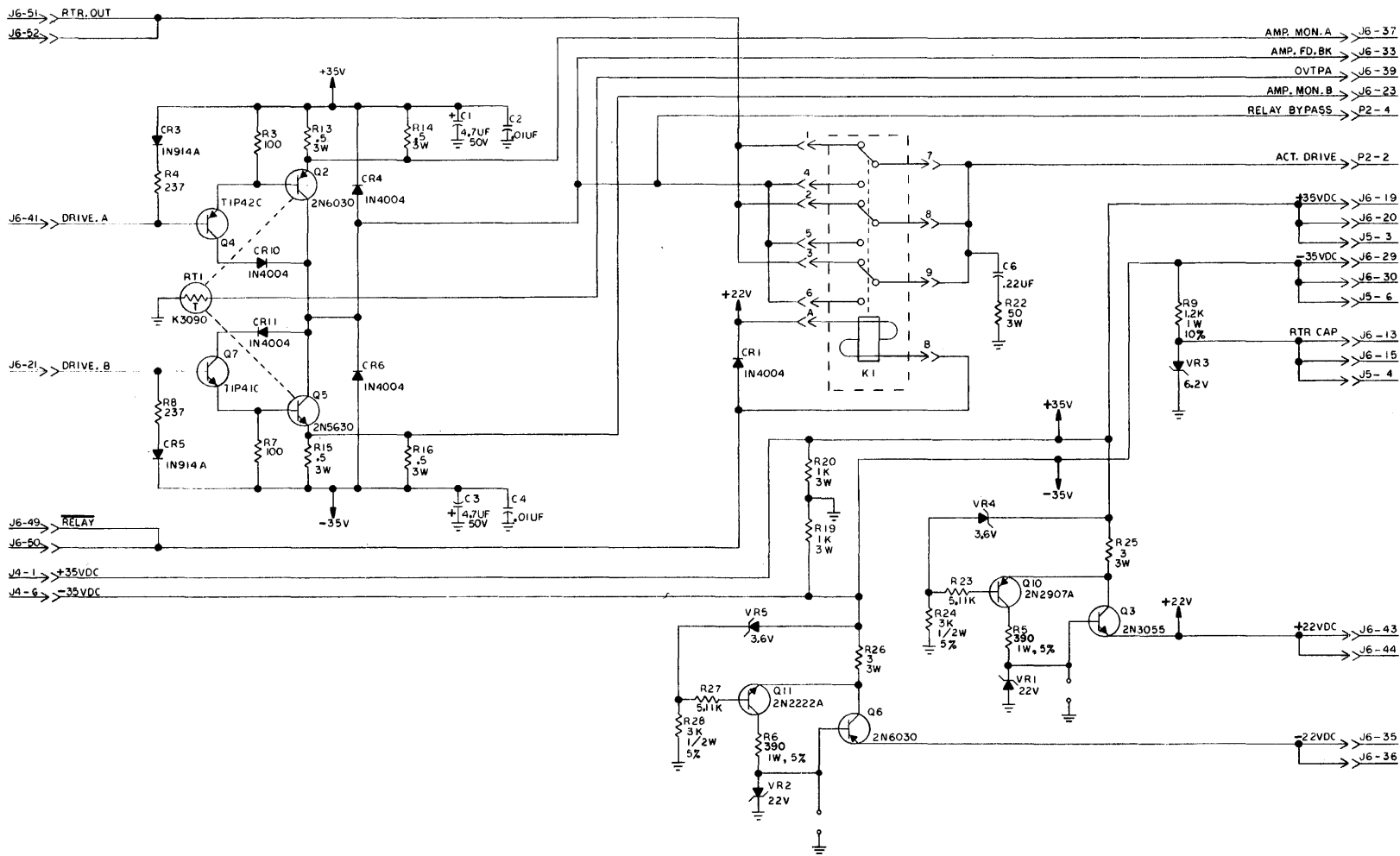
FIGURE 5-21. POWER SUPPLY BD NO. 1 (SHEET 3 OF 5)

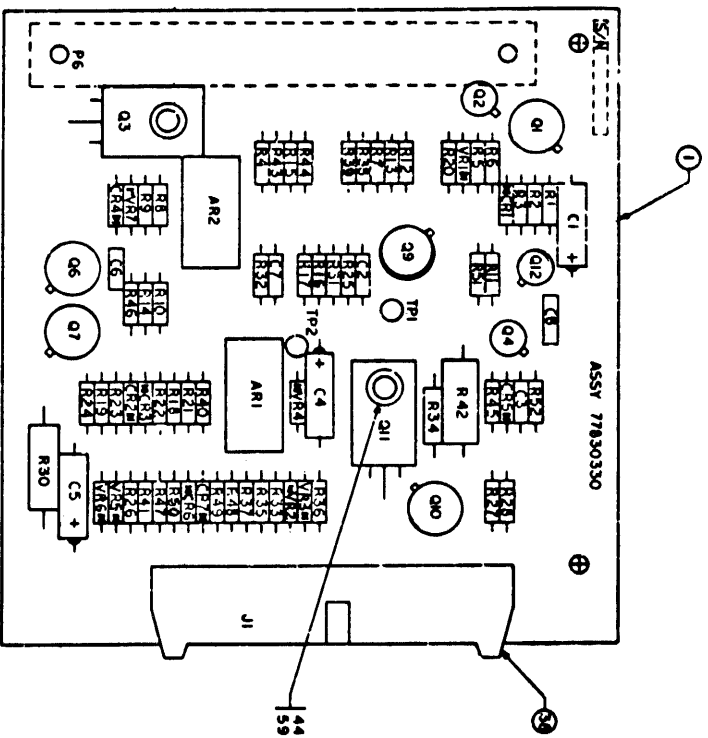


NOTES: UNLESS OTHERWISE SPECIFIED
 1. RESISTANCE VALUES ARE IN OHMS,
 1/4W, 1%.

FIGURE 5-21. POWER SUPPLY BD NO. 1 (SHEET 4 OF 5)

FIGURE 5-21. POWER SUPPLY BD NO. 1 (SHEET 5 OF 5)





TSTR	PL ITEM
Q1	8,45
Q2	5
Q3	36
Q4	6
Q5	—
Q6	7,45
Q7	4,45
Q8	—
Q9	9,45
Q10	20,45
Q11	2
Q12	3

DIO	PL ITEM
CR1	12
CR2	12
CR3	12
CR4	11
CR5	12
CR6	12
CR7	12

TERM	PL ITEM
TP1	40
TP2	40

IC	PL ITEM
ARI	10
AR2	55

CAP	PL ITEM
C1	18
C2	21
C3	17
C4	19
C5	19
C6	60
C7	56
C8	60

VOLT REG	PL ITEM
VR1	14
VR2	13
VR3	13
VR4	15
VR5	15
VR6	16
VR7	52

RES	PL ITEM
R31	30
R32	28
R33	28
R34	35
R35	28
R36	28
R37	24
R38	49
R39	50
R40	57
R41	24
R42	47
R43	51
R44	51
R45	54
R46	31
R47	58
R48	58
R49	58
R50	58
R51	61
R52	22

RES	PL ITEM
R1	22
R2	32
R3	22
R4	26
R5	27
R6	31
R7	30
R8	43
R9	43
R10	43
R11	23
R12	24
R13	23
R14	23
R15	23
R16	33
R17	27
R18	22
R19	22
R20	28
R21	29
R22	25
R23	25
R24	29
R25	42
R26	24
R27	26
R28	62
R29	—
R30	41

6116a

FIGURE 5-22. POWER SUPPLY BD NO. 2 (SHEET 1 OF 5)

ITEM NO.	IDENTIFICATION NO.	DRAWING TITLE
1	77830330-5	PWA Pwr Sup #2
1	77830334-7	PWB Pwr Sup #2
1	77830333-0	PWB Pwr Sup #2, Intch
2	75752300-6	Transistor Power
3	50219900-3	Transistor-Unijunction
4	95592700-9	Transistor 2N2905
5	75722200-5	Transistor NPN
6	16547200-2	Trans PNP 2N2907A
7	75722201-3	Transistor NPN 2N2219A
8	95327201-0	Silicon Triac
9	83464203-5	Sensitive Gate Triac
10	51812800-4	IC Dual UA 747
11	50241001-2	Diode Silicon
12	51736700-9	Diode 1N914A
13	50240102-9	Diode-Zener 3.6V
14	50240109-4	Diode Silicon
15	50240117-7	Diode Zener
16	50240110-2	Diode Silicon
17	92496227-7	Cap 100V 20% .01UF
18	24504337-7	Cap 35V 20% 4.7UF
19	24504339-3	Cap 35V 20% 6.8UF
20	83464202-7	IC
21	75808533-6	Cap 100V 10% 4700
22	94360200-3	Res 1/4W 1% 100
23	94360236-7	Res 1/4W 1% 237
24	94360280-5	Res 1/4W 1% 681
25	94360284-7	Res 1/4W 1% 750
26	94360300-1	Res 1/4W 1% 1.00K
27	94360329-0	Res 1/4W 1% 2.00K
28	94360368-8	Res 1/4W 1% 5.11K
29	94360380-3	Res 1/4W 1% 6.81K
30	94360385-2	Res 1/4W 1% 7.68K
31	94360400-9	Res 1/4W 1% 10.0K
32	94360448-8	Res 1/4W 1% 31.6K
33	94360568-3	Res 1/4W 1% 511K
35	24500170-6	Res 1/2W 5% 2.0K
36	75885251-1	Diode, Silicon Control
38	94359502-5	Header Flat Cable
39	97113325-1	Connector Header
40	92498021-2	Terminal, Swaged
41	94318633-8	Resistor WW 3W 110
42	94360550-1	Res 1/4W 1% 332K
43	94360240-9	Res 1/4W 1% 261
44	93640012-6	Stud-Self Clinching
45	94335900-0	Pad-Transistor Mtg
46	95694204-9	Spacer
47	24507118-8	Res 1W 5% 51
49	94360400-9	Res 1/4W 1% 10.0K

FIGURE 5-22. POWER SUPPLY BD NO. 2 (SHEET 2 OF 5)

ITEM NO.	IDENTIFICATION NO.	DRAWING TITLE
50	94360355-5	Res 1/4W 1% 3.74K
51	94360384-5	Res 1/4W 1% 7.50K
52	50240106-0	Diode Silicon, Zener, 5.1V
54	94360373-8	Res 1/4W 1% 5.76K
55	15126600-4	IC LM339
56	75808537-7	Cap 100V 10% 0.01 UF
57	94360311-8	Res 1/4W 1% 1.30K
58	94360325-8	Res 1/4W 1% 1.82K
59	92583002-8	Nut Lock
60	94354832-1	Capacitor Ceramic
61	94360304-3	Res 1/4W 1% 1.10K
62	94360429-8	Res 1/4W 1% 20.0K

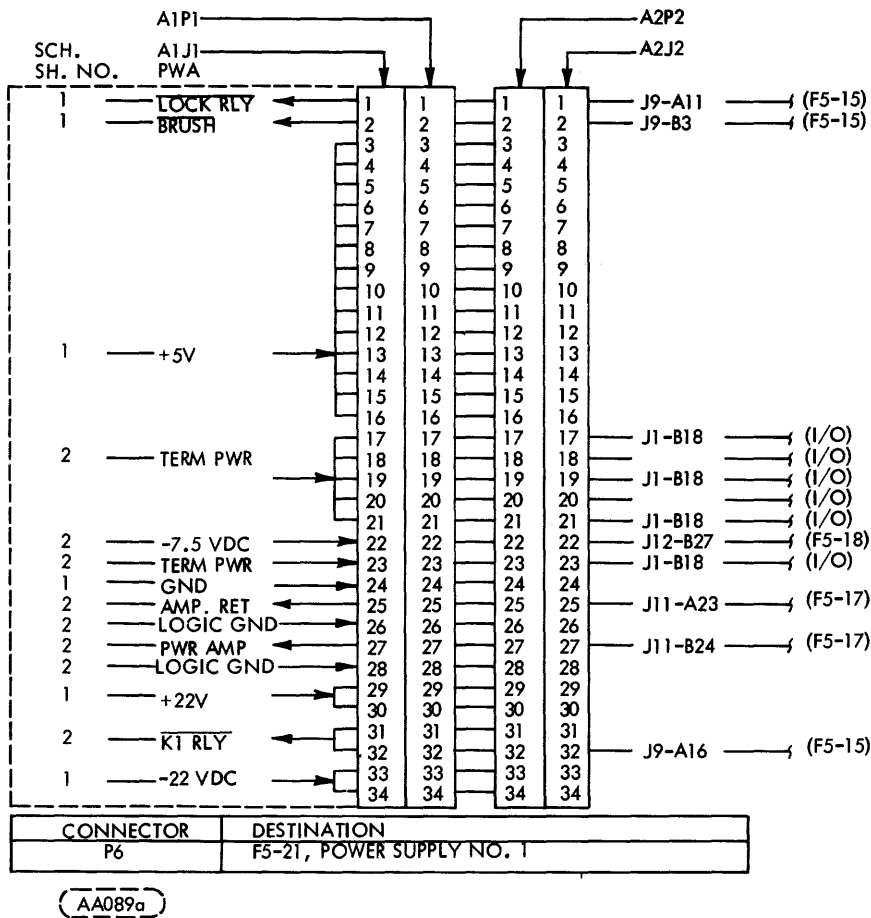


FIGURE 5-22. POWER SUPPLY BD NO. 2 (SHEET 3 OF 5)

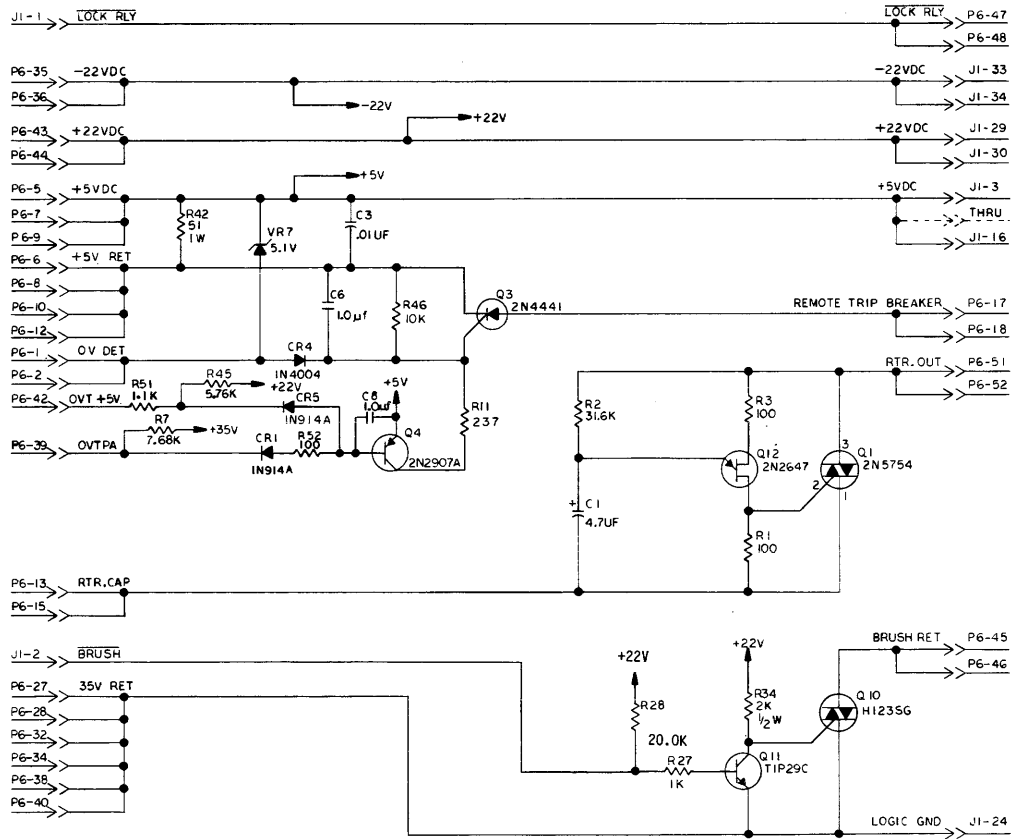


FIGURE 5-22. POWER SUPPLY BD NO. 2 (SHEET 4 OF 5)

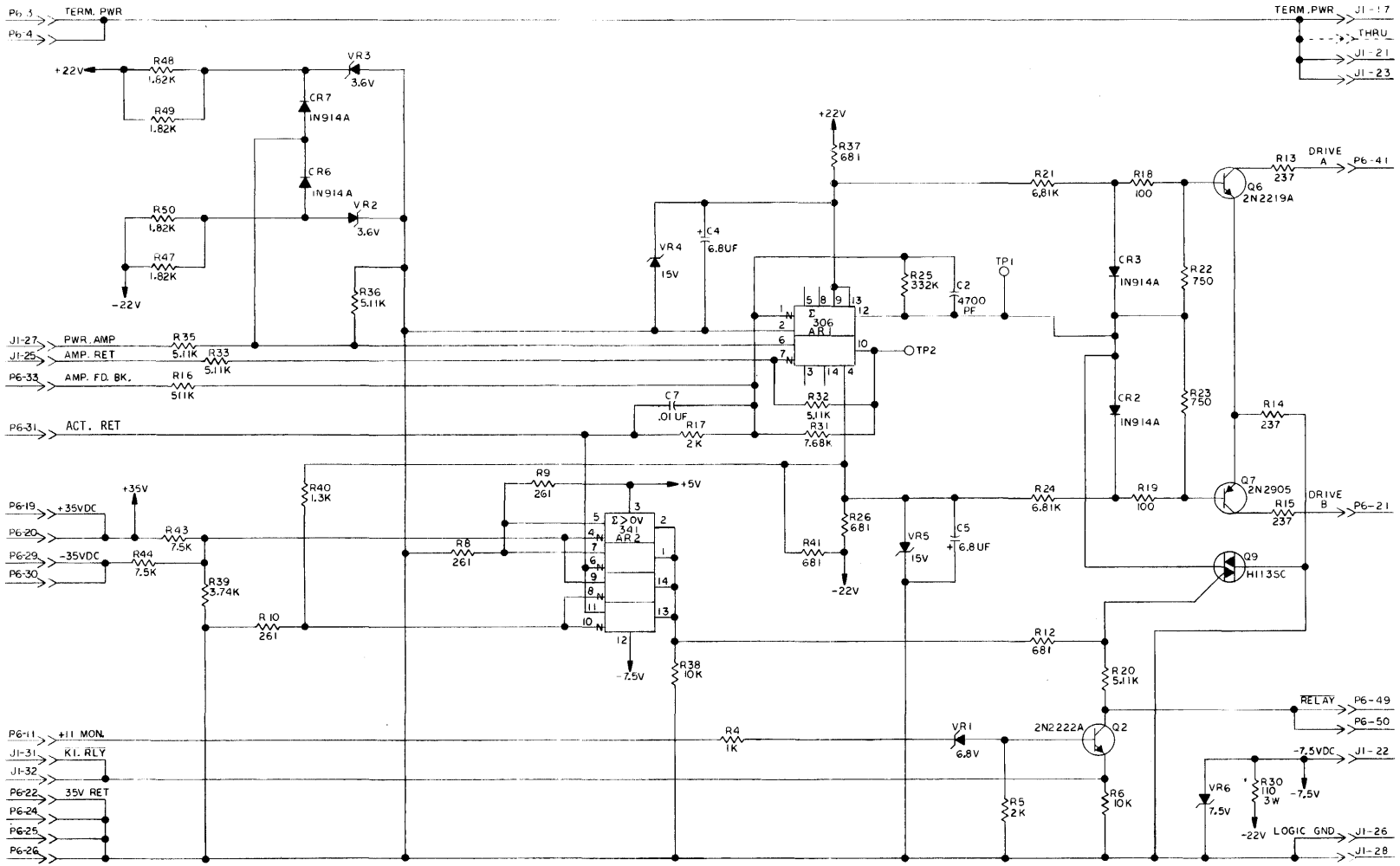
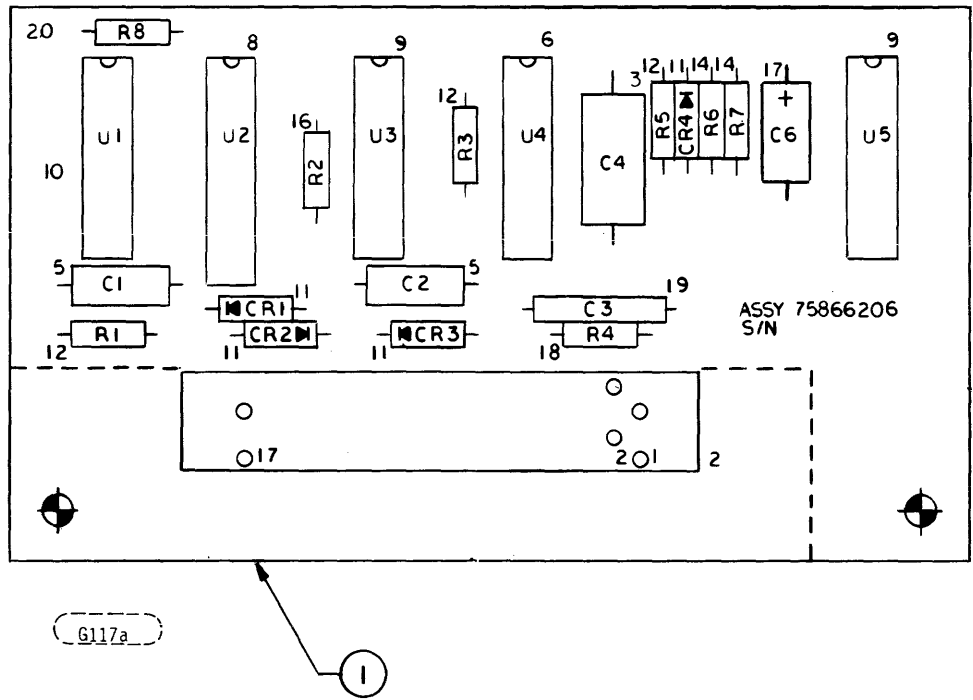


FIGURE 5-22. POWER SUPPLY BD NO. 2 (SHEET 5 OF 5)



<u>ITEM NO.</u>	<u>IDENTIFICATION NUMBER</u>	<u>DRAWING TITLE</u>
1	75866206	PWA, Spindle Mtr Brake
1	75866107	PWB, Spindle Mtr Brke
2	75885581	Connector PWB
2	00005184	Connector PR017579, Intch
3	94240452	Cap 50V 10% 0.22 MF
5	94240448	Cap 50V 10% 0.10 UF
6	15133200	IC CMOS 4011B
8	15134700	IC CMOS 4049B
9	15135000	IC CMOS 4001B
10	51768200	IC Dual
11	51736700	Diode 1N914A
12	17705953	Res 1/4W 5% 5.1Meg
14	24500087	Res 1/4W 5% 10K
16	94360500	Res 1/4W 1% 100K
17	24504346	Cap 10V 20% 4.7UF
18	17705951	Res 1/4W 5% 4.3Meg
19	83452013	Cap 100V 10% 0.22 UF
20	94360357	Res 1/4W 1% 3.92K

FIGURE 5-23. SPINDLE MOTOR BRAKE ASM (SHEET 1 OF 3)

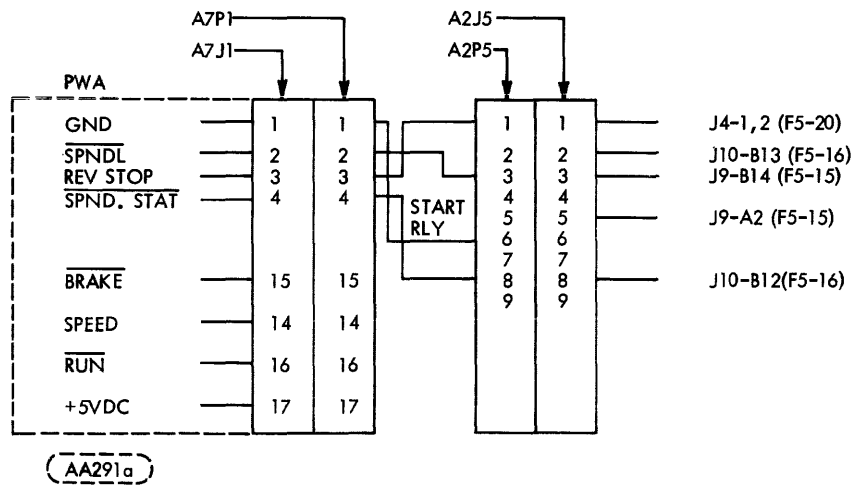


FIGURE 5-23. SPINDLE MOTOR BRAKE ASM (SHEET 2 OF 3)

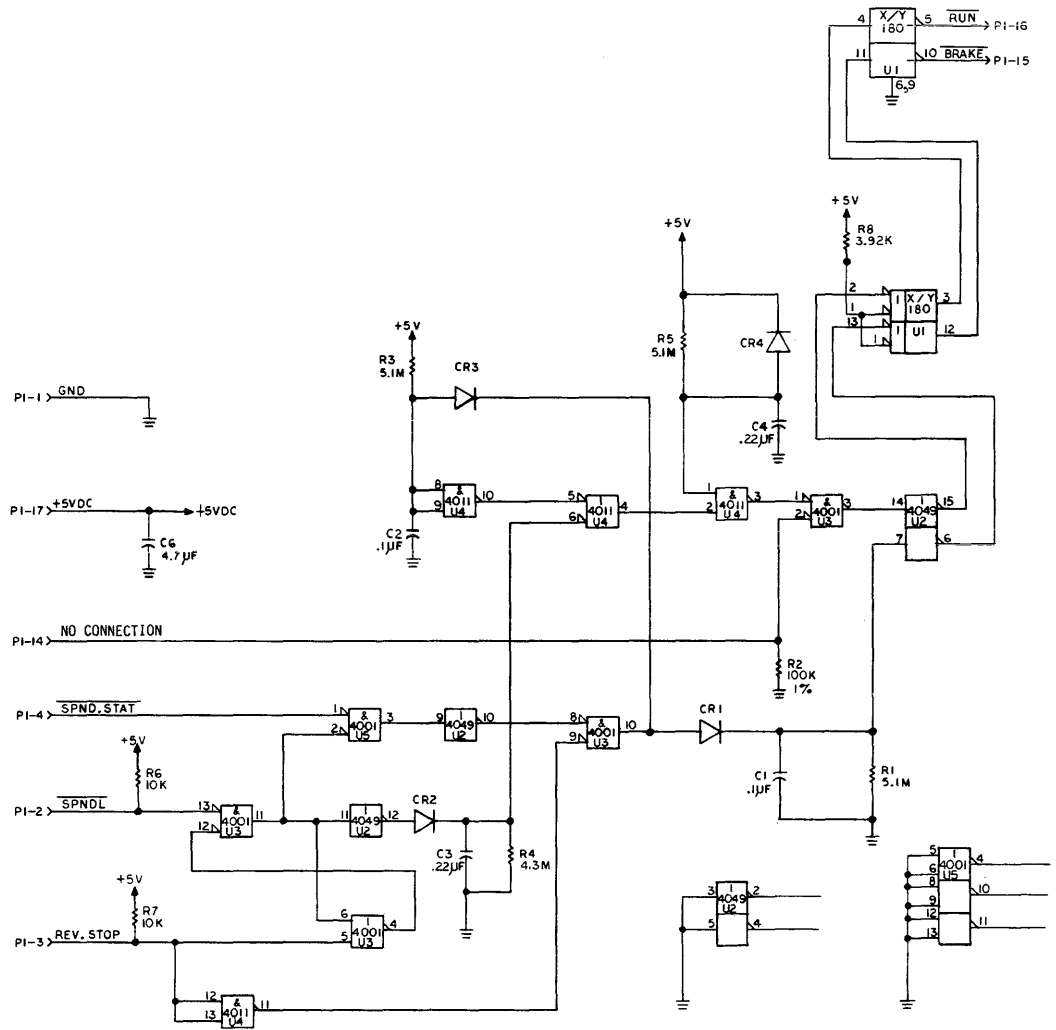


FIGURE 5-23. SPINDLE MOTOR BRAKE ASM (SHEET 3 OF 3)

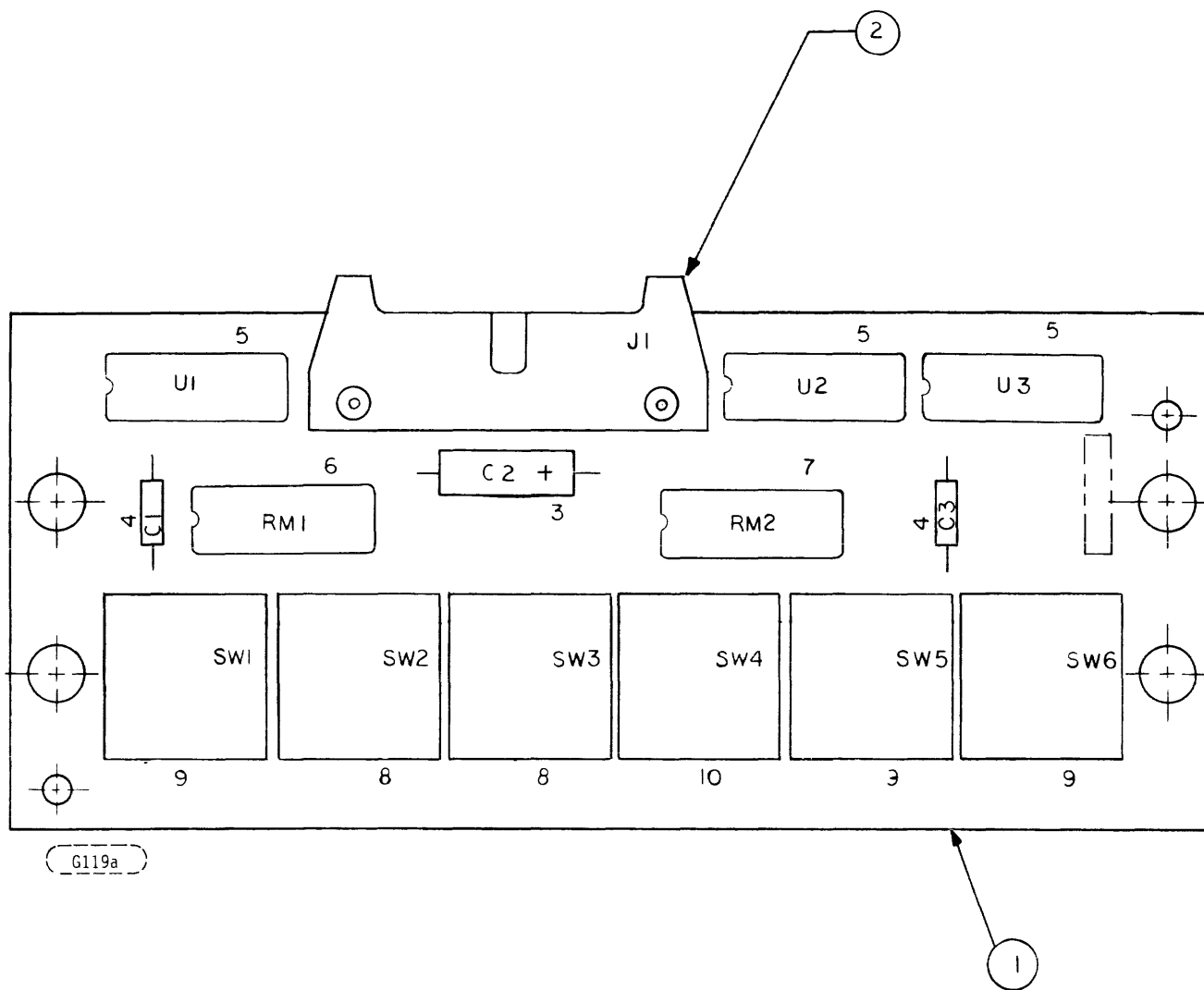
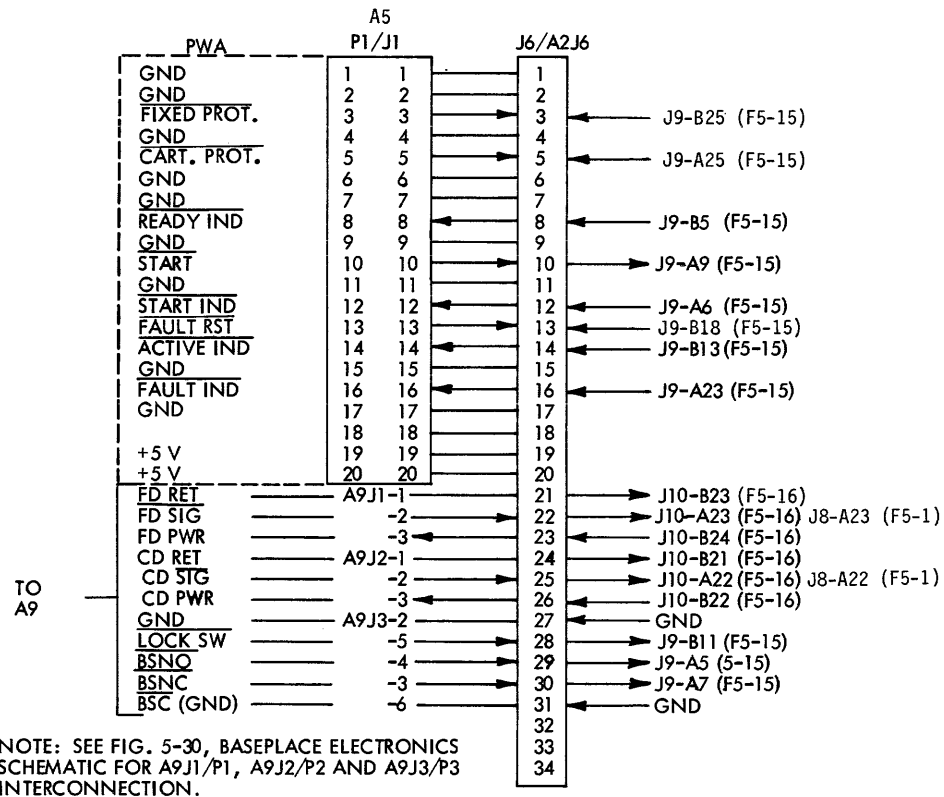


FIGURE 5-24. SWITCH BD ASM (SHEET 1 OF 3)

<u>ITEM NO.</u>	<u>IDENT NO.</u>	<u>DRAWING TITLE</u>
	75299102	PWA Switch Board
1	75299001	PC Board, Switch
2	94359505	Header-Flat Cable
3	24504353	Cap 10V 20% 33UF
4	92496227	Cap 100V 20% .01UF
5	51768200	IC Dual
6	75009976	Res Pac 2% 2.0K (7)
7	75009955	Res Pac 2% 100 (7)
8	75299600	Switch Assy
9	75299700	Switch Assy
10	75299800	Switch Assy
11	83490700	Button-Switch Assy (on 75299103 only)
11	75299900	Button-Switch Assy (on 75299102 only)



(AA057c)

FIGURE 5-24. SWITCH BD ASM (SHEET 2 OF 3)

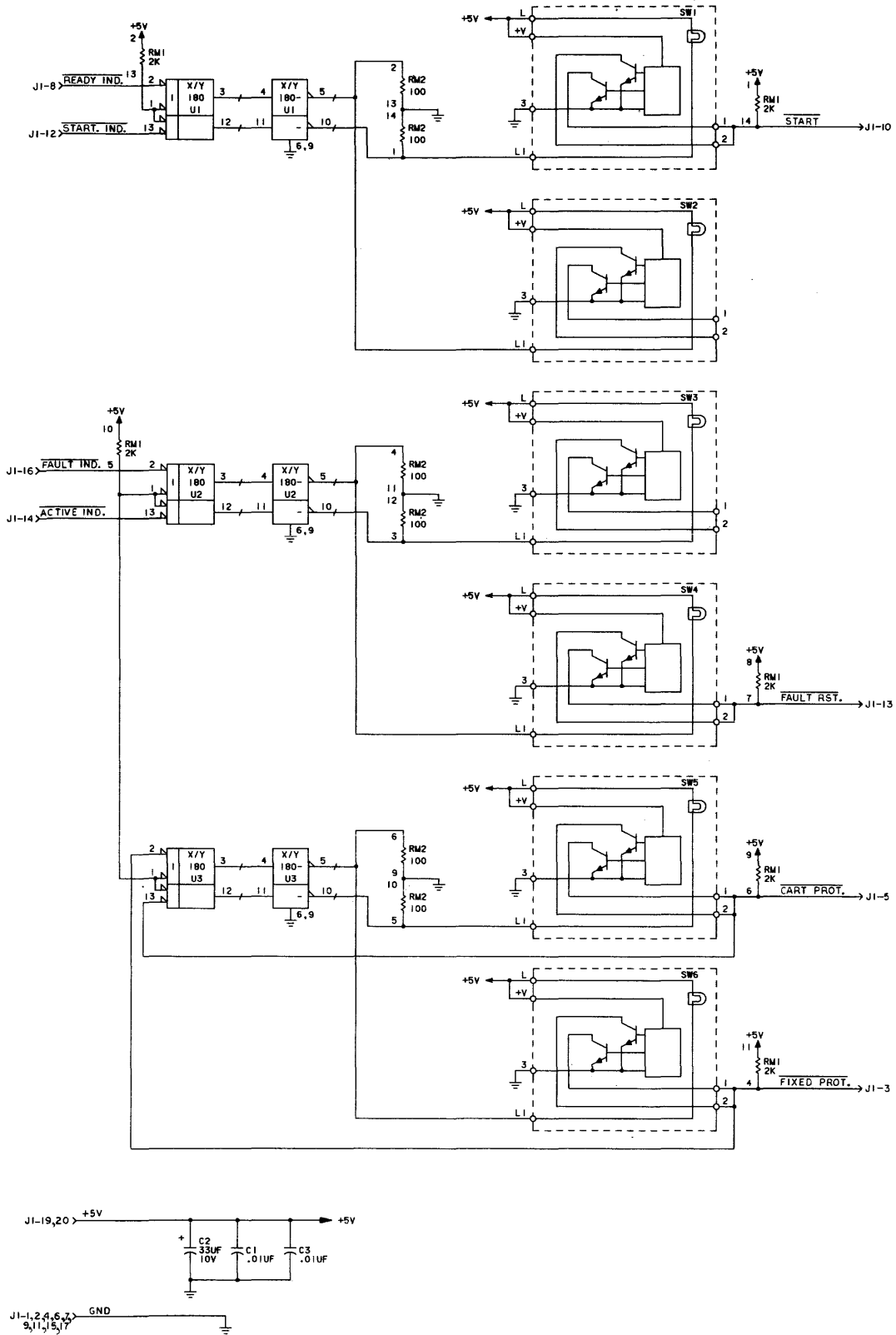


FIGURE 5-24. SWITCH BD ASM (SHEET 3 OF 3)

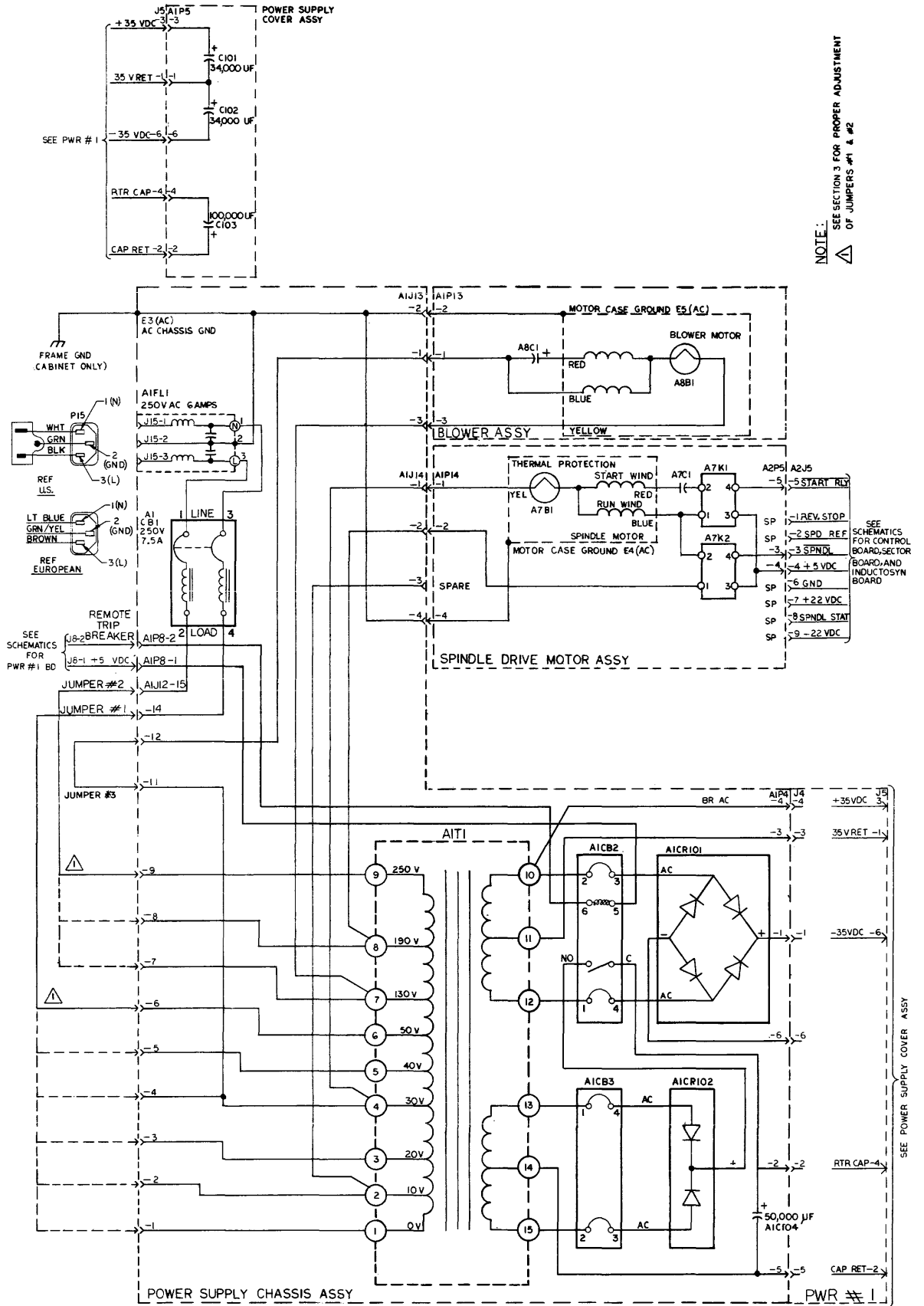


FIGURE 5-25. AC-DC WITHOUT DYNAMIC BRAKE

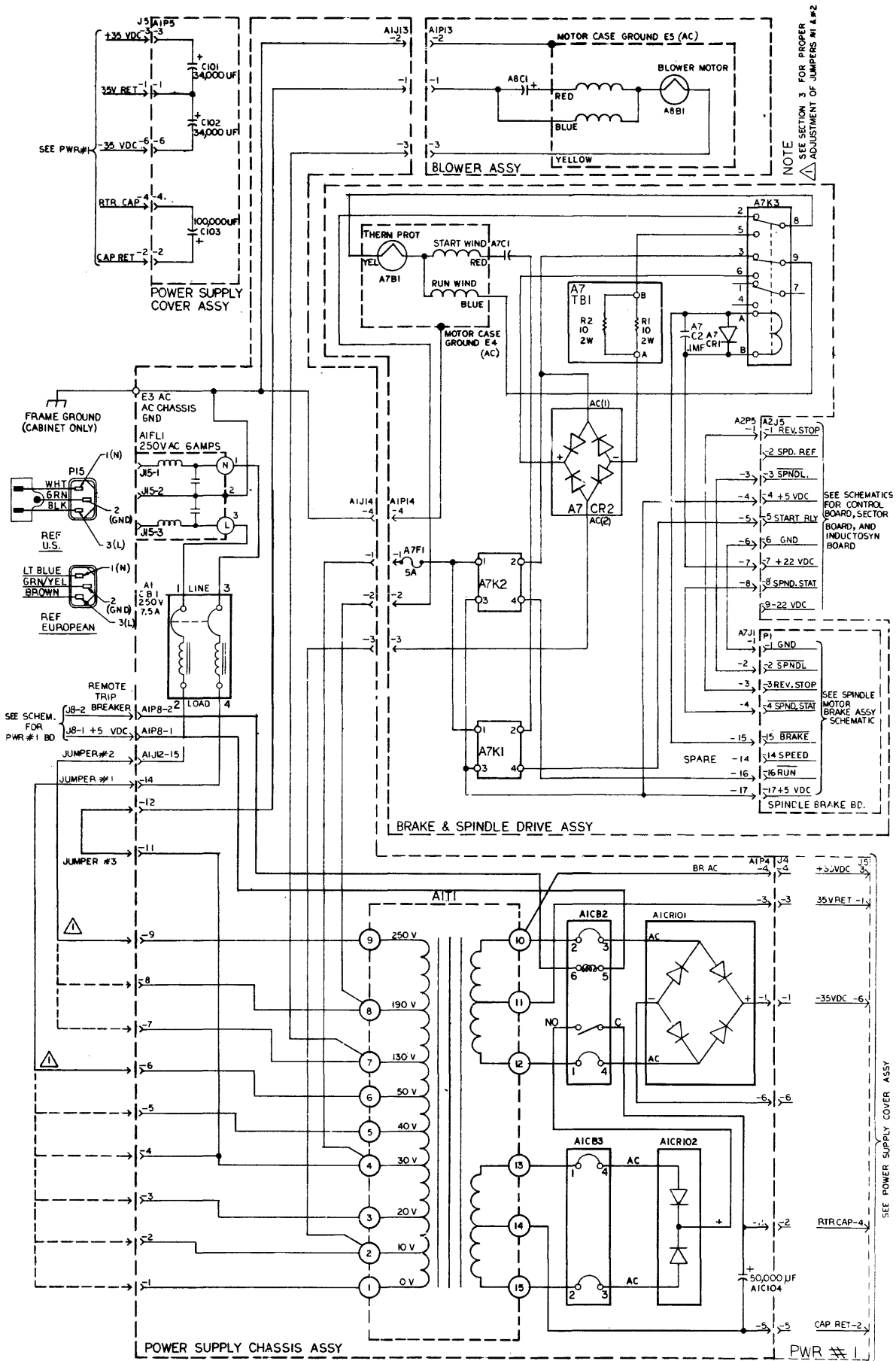


FIGURE 5-26. AC-DC WITH DYNAMIC BRAKE

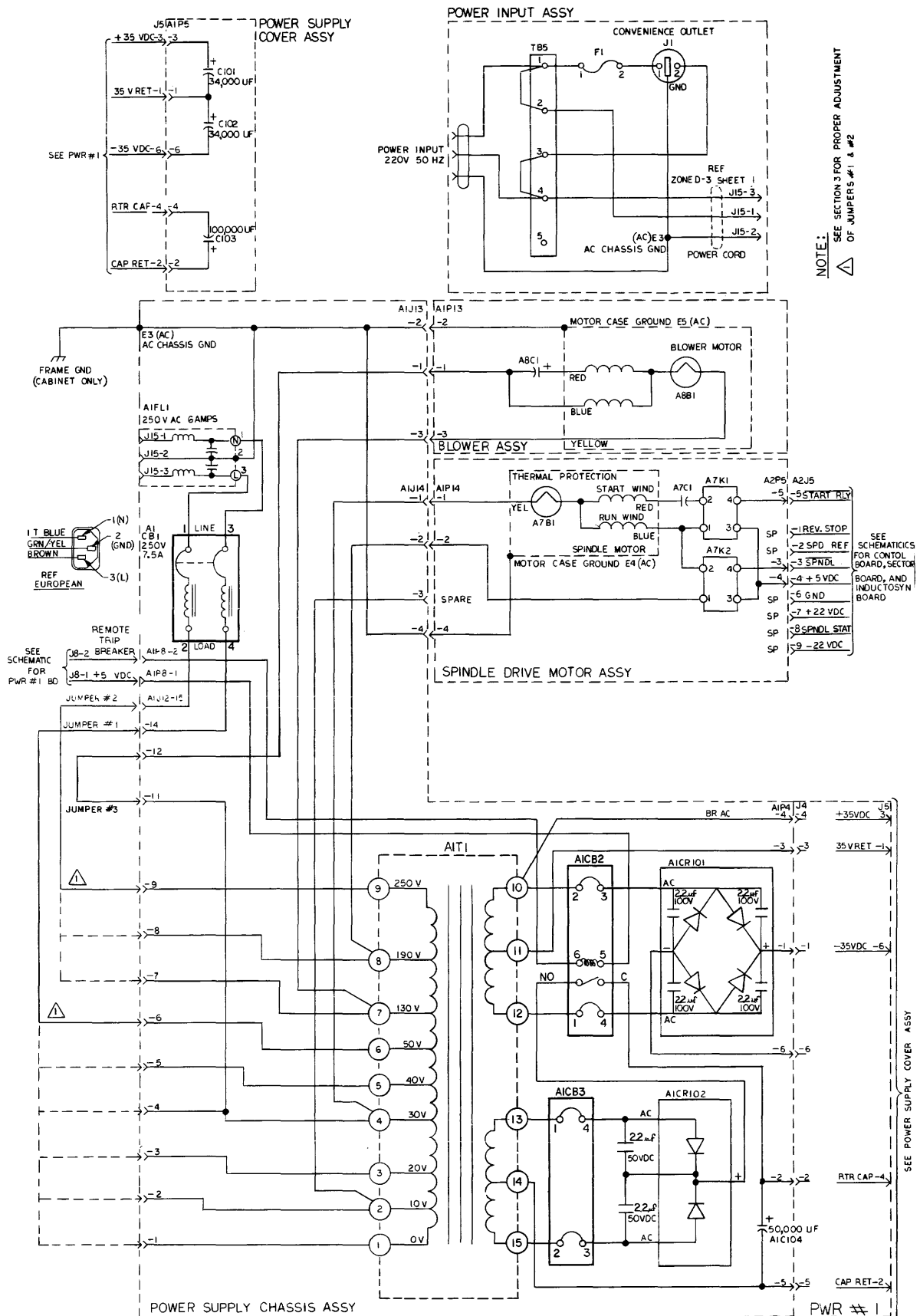


FIGURE 5-27. AC-DC WITHOUT BRAKE AND WITH FILTERS AND POWER INPUT ASSEMBLY

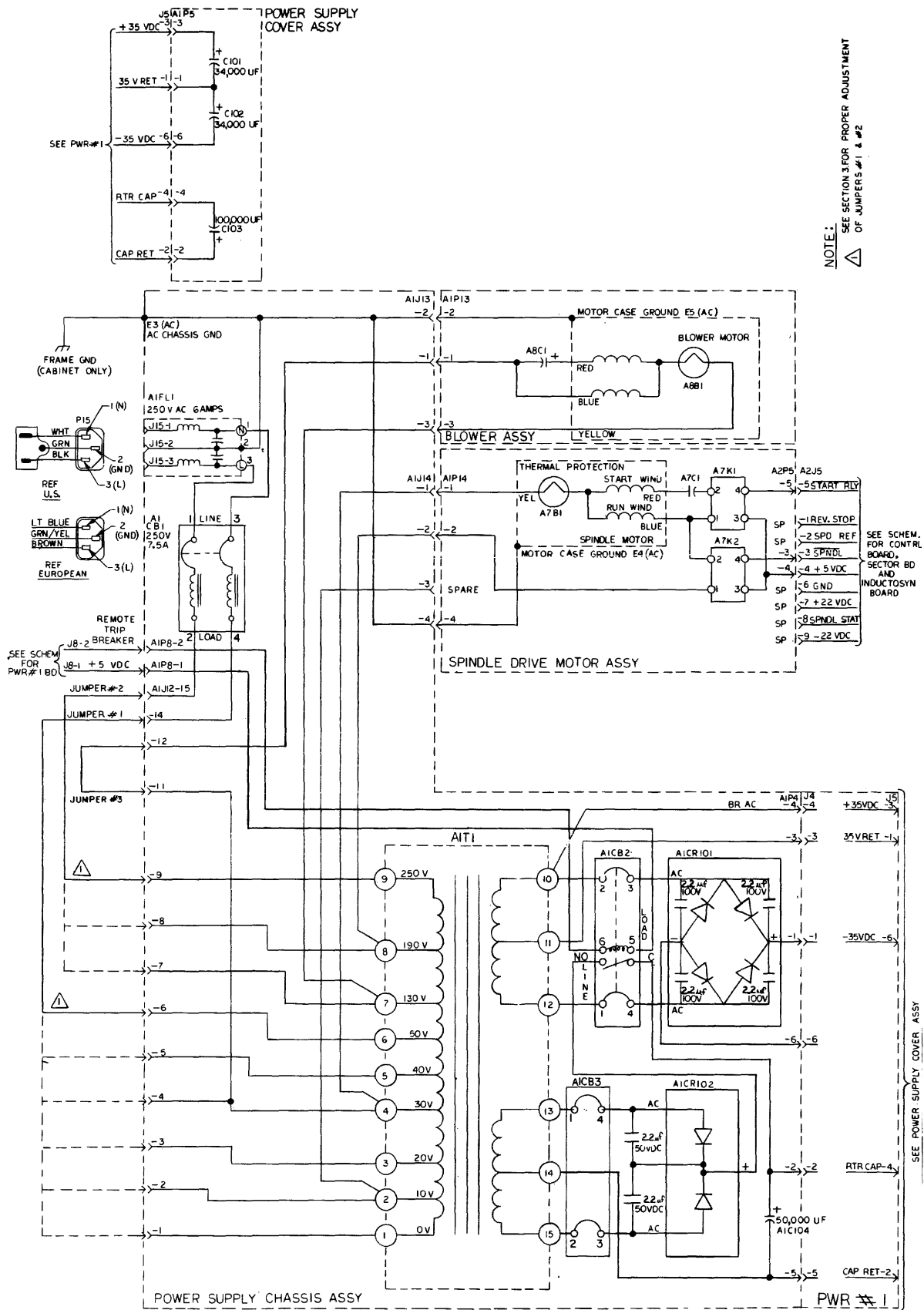


FIGURE 5-28. AC-DC WITHOUT DYNAMIC BRAKE - WITH FILTERS

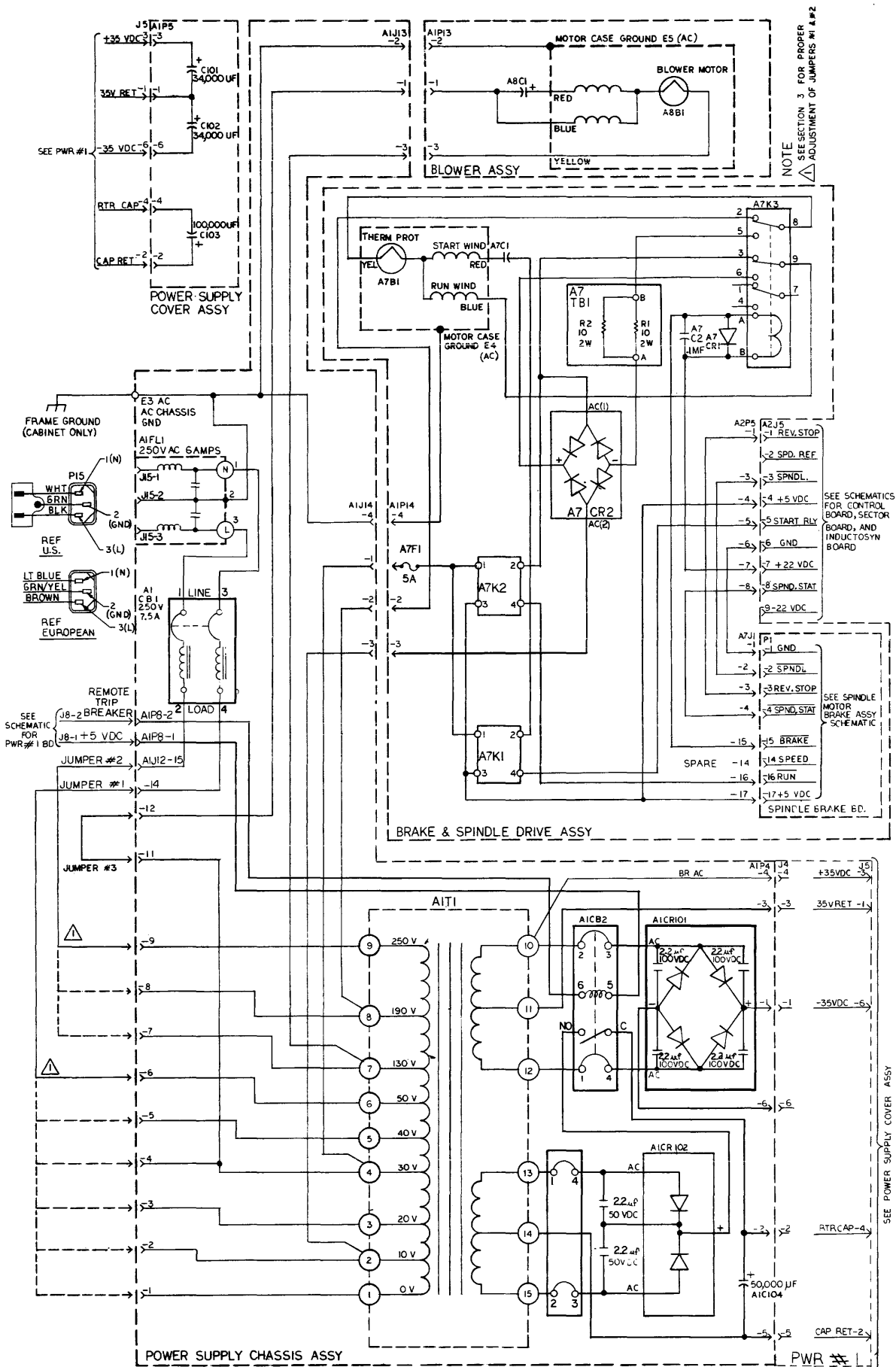


FIGURE 5-29. AC-DC WITH BRAKE AND FILTERS

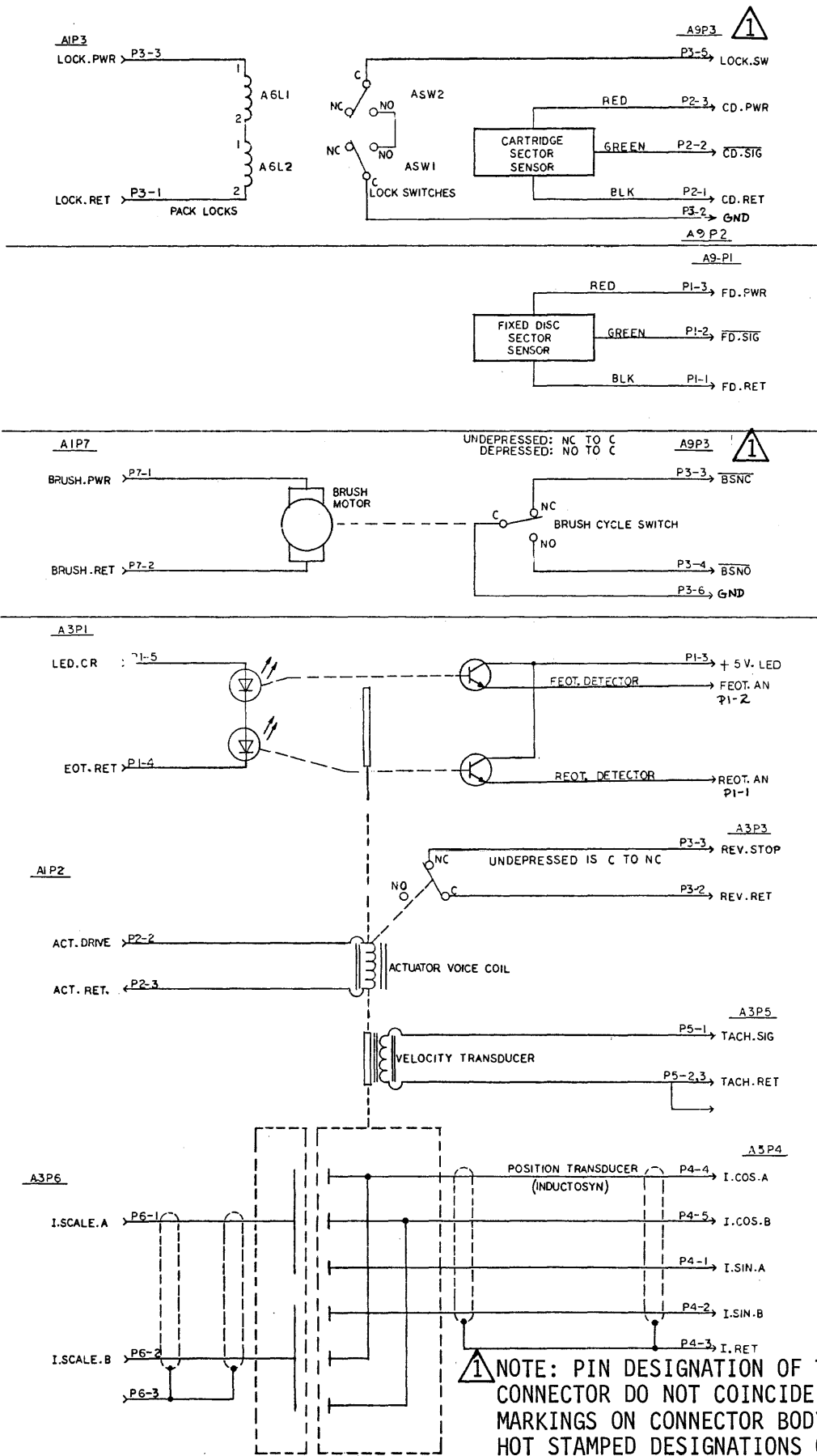


FIGURE 5-30. BASEPLATE ELECTRONICS

6.1 INTRODUCTION

This section contains the instructions required to maintain the Model 9427H Disk Drive. The information is provided in the form of preventive maintenance and corrective maintenance. All maintenance should be performed by qualified and trained service personnel, using procedures specified in this section.

6.2 MAINTENANCE TOOLS

The special tools required to maintain the disk drive are listed in Table 6-1.

6.3 MAINTENANCE MATERIALS

The materials used in the procedures of this section are listed in Table 6-2.

TABLE 6-1. MAINTENANCE TOOLS

DESCRIPTION	CDC PART NUMBER
Plastic Feeler Gauges	Commercially available plastic shim
Head Alignment Tool	75797900
Multimeter, Simpson 260 (or equivalent) Oscilloscope, Dual-Trace, Tektronix 453 (or equivalent)	
Ball Allen Drivers (1/16, 0.050, 9/64, 5/32, 3/32)	
CE Disk Cartridge Model 847-51	89296000
Card Extender	75861504
Card Extractor	83485801 (or equivalent)*
Fault Board Kit, including: Fault Board Instruction Manual	83457801 75863204 75535900
Armature Plate Simulator	83455500
Pin Extractor for Voltage Plug A1P12 Molex Products Corp. HT-2038 Extractor OEM Field Tester	77833135
Torque Screwdrivers 1-30 in./lbs & 1-100 in./lbs with Hex Bit Adapter and Phillips Adapter	Commercially available
Bulb Removal Tool	83439200
<p>* WARNING Exercise care to avoid damage to cards or to attached components, when using card extraction tool.</p>	

TABLE 6-2. MAINTENANCE MATERIALS

MATERIAL	SOURCE
Gauze, Lint-Free	Control Data 12209713
Media Cleaning Solution	Control Data 82365800
Loctite, Grade C or #242	Loctite Corporation
Loctite Primer, Grade N	Loctite Corporation
Tongue Depressors	Commercially available
Tape, Masking	Commercially available
Duco Cement (or Equivalent)	Commercially available
Adhesive (RTV 108)	Commercially available

6.4 MAINTENANCE INDEX AND SCHEDULE

The Model 9427H is designed to require minimal preventive maintenance. The preventive maintenance index provided in Table 6-3 is meant to be used only as a general guideline. The preventive maintenance index consists of seven levels based on a calendar period or on hours of operation (whichever comes first).

The corrective maintenance procedures listed in Table 6-3 are included to facilitate the replacement of malfunctioning assemblies. Adjustment procedures are provided to adjust the unit to the published specifications. Maintenance personnel should read the entire procedure prior to performing any of the steps. Steps of these procedures should be performed in sequence.

The check and adjustments procedures listed in Table 6-3 may be used to check for malfunctioning parts, to determine whether the disk drive is operating within published specifications, or to adjust the disk drive for proper operations.

6.5 PREVENTIVE MAINTENANCE PROCEDURES

6.5.1 CONTROL PANEL LAMP REPLACEMENT

CAUTION

Do not remove buttons from alternate action switches when they are in the depressed position or internal damage to the switch will occur.

1. Remove the Switch Button from the switch assembly by pulling the button outward from the switch. Note Orientation of metal bracket inside pushbutton cover for re-installation during Step 4.
2. Using the bulb removal tool, remove the lamp from the socket. (Do not turn the lamp since it is a plug-in device).
3. Install new lamp.
4. Re-install Switch Button. Care must be taken that the metal tabs on the push-button bracket do not come in contact with the metal clamps supplying voltage to the lamp or damage to the switch logic will occur.

6.5.2 INSPECT AND CLEAN READ/WRITE HEADS

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP light extinguished).
2. Open top cover.
3. Set main circuit breaker to off position.
4. Remove electronics cover.

TABLE 6-3. MAINTENANCE INDEX AND SCHEDULE

PREVENTIVE MAINTENANCE	<u>Schedule</u>
Control Panel Lamp Replacement	6
Inspect and Clean Read/Write Heads	3
Disk Cartridge Inspection and Cleaning	3
Fixed Disk Inspection and Cleaning	3
Absolute Filter Removal and Replacement (Office or Industrial Environment)	4
Absolute Filter Removal and Replacement (Compute Room Environment)	5
Pre-Filter Cleaning (Base Cabinet)	3
Pre-Filter Cleaning (Rack Mount Unit only)	3
Disk Brush-Check and Replacement	5
Inspect and Dry Magnetic Chuck	0
DEFINITION OF SCHEDULE	
Level 0 - Daily, depending on condition state Level 1 - Weekly or 150 hours (no preventive maintenance scheduled) Level 2 - Monthly or 500 hours (no preventive maintenance scheduled) Level 3 - Quarterly or 1500 hours Level 4 - Semi-annually or 3000 hours (no preventive maintenace scheduled) Level 5 - Annually or 6000 hours Level 6 - 15,000 hours	
CORRECTIVE MAINTENACE	
REMOVAL AND REPLACEMENT PROCEDURES (R&R)	
<u>Title</u>	<u>Paragraph No.</u>
Actuator Assembly R & R	6.6.1
Head R & R	6.6.2
EOT Assembly R & R	6.6.3
Fixed Disk R & R	6.6.4
Position Transducer Scale R & R	6.6.5
Velocity Transducer R & R	6.6.6
Velocity Transducer Magnet R & R	6.6.7
Spindle Assembly R & R	6.6.8
Cartridge Disk Index/Sector Transducer R & R	6.6.9
Fixed Disk Index/Sector Transducer R & R	6.6.10
Static Eliminator R & R	6.6.11
Sector Ring R & R	6.6.12
Cartridge On Switch R & R	6.6.13
Disk Brush Assembly R & R	6.6.14
Brush Motor R & R	6.6.15
Spindle Drive Motor Assembly R & R	6.6.16

TABLE 6-3. MAINTENANCE INDEX AND SCHEDULE (CONTINUED)

CORRECTIVE MAINTENANCE	
REMOVAL AND REPLACEMENT PROCEDURES (R&R) cont'd	
<u>Title</u>	<u>Paragraph No.</u>
Card Cage Printed Circuit Board R & R	6.6.17
Power Supply R & R	6.6.18
Piggyback Power Board R & R	6.6.19
Card Cage/Mother Board R & R	6.6.20
Blower Motor Assembly R & R (Base Cabinet)	6.6.21
Blower Motor Assembly R & R	6.6.22
Drive Motor and Belt R & R	6.6.23
Idler Motor and Belt R & R	6.6.24
Pack Lock Assembly or Pack Lock Solenoid R & R	6.6.25
CHECK AND ADJUSTMENT PROCEDURES (C&A)	
<u>Title</u>	<u>Paragraph No.</u>
Temperature Stabilization Check and Adjustment	6.7.1
AGC Servo Preamplifier and Inductosyn C & A	6.7.2
FEOT Check and Adjustment	6.7.3
Head Alignment Check and Adjustment	6.7.4
Head Skew and Index-to-Burst Period Check and Adjustment	6.7.5
Track Indicator Check and Adjustment	6.7.6
Cartridge-On Switch Check and Adjustment	6.7.7
Static Eliminator Check	6.7.8
Disk Brush Switch Check and Adjustment	6.7.9
Cartridge Index/Sector Transducer C & A	6.7.10
Fixed Disk Index/Sector Transducer C & A	6.7.11

5. Upper heads can be cleaned and removed without removal of actuator. To clean and remove lower heads, perform removal steps 1 through 21 of the actuator assembly removal and replacement procedure.

CAUTION

Do not smoke while cleaning heads. Do not touch head face. When cleaning or buffing, always move tongue depressor perpendicular to length of head/arm assembly. Do not leave residue or lint on head faces.

6. Inspect heads for dirt on head face. Clean heads, if required, as follows:
- Use lint-free gauze on a tongue depressor to lightly dry buff head face.
 - If dry buffing does not remove dirt, dampen (do not soak) gauze to lightly buff head face.
7. Install actuator by performing replacement steps 1 through 22 of Actuator Removal and Replacement procedure, if lower heads were cleaned.

6.5.3 DISK CARTRIDGE INSPECTION AND CLEANING

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove disk cartridge.
3. Using a bright, directional light, inspect both sides of disk. If disk is dirty, have disk cartridge cleaned.
4. If disk surface is scratched, cartridge should be replaced.

6.5.4 FIXED DISK INSPECTION AND CLEANING

Cleaning of fixed disk will not normally be necessary, if disk area is kept covered. Clean disk by performing the following procedure.

1. Perform removal steps 1 through 11 of fixed disk removal and replacement procedures.
2. Inspect fixed disk brushes for dust. If brushes are dirty and show excessive wear, replace all brushes.
3. Slowly rotate spindle by hand and inspect both sides of disk. If scratches are found, replace disk.
4. To clean disk, wrap a piece of lint free gauze around tongue depressor and dampen (do not soak) with media cleaning solution.
5. While rotating spindle by hand, move tip of spatula (applying moderate pressure) across disk to outer edge.
6. Repeat step 5 for both disk surfaces until gauze comes away clean from disk surface.
7. Wrap a clean, dry piece of gauze around spatula and repeat step 5 to remove any residue left by cleaning solution.
8. To complete installation, perform replacement steps 4 through 9 of fixed disk removal and replacement procedure.

6.5.5 ABSOLUTE FILTER R & R

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Open top cover (base cabinet only).
3. Set main circuit breaker to off position.
4. Using a 5/32 Allen driver, place tool into holes on end panels and remove front and rear end panels by loosening hardware base cabinet only).
5. Remove left side panel of unit (when received from rear of unit, base cabinet only).
6. Loosen filter clamp (Figure 6-1) and swing clamp clear of filter.
7. Remove filter expander bracket.
8. Slide blower expander forward until filter is free.
9. Remove filter.
10. Remove pre-filter (Rack Mount Units only).
11. Clean pre-filter (Rack Mount Units only).
12. Secure pre-filter to new absolute filter by applying Duco cement at the four corners.
13. Use old filter as a reference making sure pre-filter does not block unfiltered side of absolute filter (rack-mount units only).
Install replacement absolute filter and pre-filter.

NOTE: Insure that foam gasket between absolute filter and power supply are properly aligned. If not properly aligned, air flow can be restricted causing damage to power supply.

14. Install filter expander.

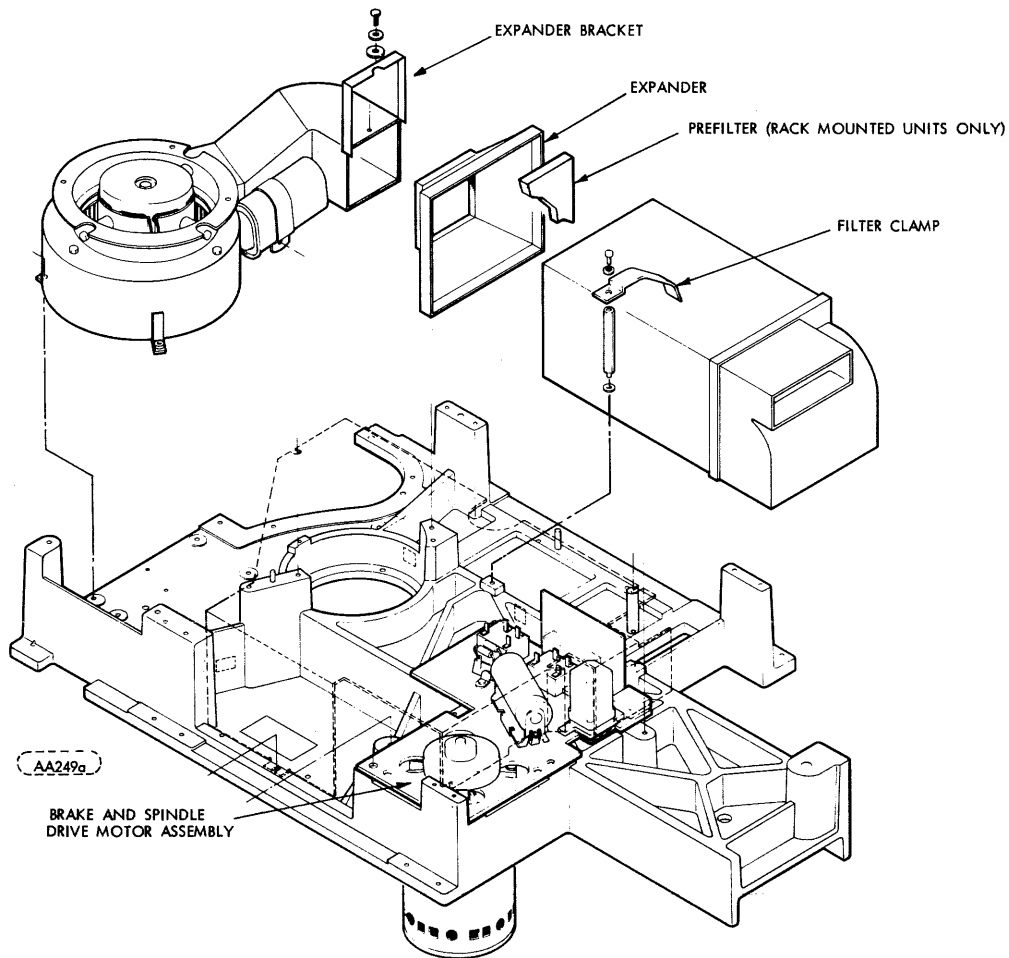


FIGURE 6-1. FILTER MOUNTING

15. Install expander bracket.
16. Install filter clamp.
17. Install cabinet side skin.
18. Close top cover.
19. Install front and rear end panels (base cabinet only).

6.5.6 PRE-FILTER CLEANING (BASE CABINET)

1. Using a 5/32 Allen driver, place tool into hole on front end panel and remove panel by loosening hardware.
2. Remove pre-filter from cabinet.
3. Remove pre-filter element from aluminum frame and clean by washing in warm water and soap.
4. Rinse and dry filter element and install in aluminum frame.
5. Install filter in cabinet. Insure that expanded metal screen is up.
6. Install front end panel.

6.5.7 PRE-FILTER CLEANING (RACK MOUNT UNIT ONLY)

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Set main circuit breaker to off position.
3. Loosen filter clamp (Figure 6-1) and swing clamp clear of filter.
4. Remove filter expander bracket.
5. Slide blower expander forward until filter is free.
6. Remove pre-filter.
7. Clean pre-filter by washing in warm water and soap.
8. Rinse and dry pre-filter.
9. Install pre-filter to absolute filter by applying Duco cement at the four corners, making sure pre-filter does not block unfiltered side of absolute filter.

NOTE: Insure that foam gasket between absolute filter and power supply is properly aligned. If not properly aligned, air flow can be restricted causing damage to power supply.

10. Install filter expander.
11. Install expander bracket.
12. Install filter clamp.

6.5.8 DISK BRUSH CHECK AND REPLACEMENT

1. Perform removal steps 1 through 11 of disk brush assembly R&R procedure.
2. If disk brushes are dirty and show excessive wear, replace all brushes. Pull brush horizontally to remove from holding bracket. The new brush snaps into place when seated properly.
3. Perform replacement steps 3 through 11 of disk brush assembly removal and replacement procedure.

6.5.9 INSPECT AND DRY MAGNETIC CHUCK

This procedure should be performed at least once each day, if device goes through dewpoint daily.

NOTE: If the Drive is stored or operated in environmental conditions outside the envelope in the Product Specification, condensation will form in the Drive. In order to prevent corrosion, use a soft absorbent cotton cloth and wipe dry the surface of the Chuck.

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove disk cartridge.
3. Inspect Magnetic Chuck for condensation.
4. If condensation is present use a soft absorbent cotton cloth and wipe dry.

6.6 CORRECTIVE MAINTENANCE PROCEDURES (R & R)

6.6.1 ACTUATOR ASSEMBLY R & R

The actuator assembly must be removed to clean or replace lower read/write heads.

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).

2. Remove Disk Cartridge.
3. Remove top cover by lifting cover straight up (base cabinet only).
4. Set main circuit breaker to off position.
5. Remove electronics cover from card cage.
6. Using a 5/32 Allen driver, place tool into hole on rear end panel and remove panel by loosening hardware (base cabinet only).
7. Remove power supply cover and disconnect A1P5.
8. Disconnect A3P1, A3P2, A3P3, A3P4, A3P5 and A3P6 from AGC Preamplifier.
9. Remove the four screws securing the AGC preamplifier to the magnet and remove preamplifier.
10. Between the two sets of upper and lower heads, and approximately half way along the length of the head arm assembly, insert a 1/16 inch (1.59 mm) thick, 1/2 inch (12.7 mm) wide rolled up masking tape (or similar spacer) to prevent the head pads from touching when actuator is removed.
11. Remove card cage, by performing removal Steps 1 through 13 of card cage removal and replacement procedure.
12. Remove velocity transducer end cap and velocity transducer (see Figure 6-2 and 6-10).
13. Remove two screws that fasten the magnet to the main deck. Screws are located underneath the base casting, one screw in back of magnet and one in front (see Figure 6-3).
14. Move carriage and voice coil assembly forward.
15. Lift magnet slightly and very carefully slide the magnet assembly out from the voice coil. Extreme care must be taken to avoid any bending stress to the velocity transducer magnet.
16. Unplug A2P2 (see Figure 6-13) connecting the voice coil flexible lead to the power supply.
17. Unlace A3P6 located on top of actuator frame.
18. Remove head harness clip for heads 3 and 4 located on front of voice coil.
19. Using 9/64 ball Allen driver, remove the three mounting bolts from the actuator frame securing the actuator to the deck (see Figure 6-3).
20. Lift rear of actuator frame to clear guide pin then pull actuator frame slightly back from eccentric screw located at front of actuator frame then lift actuator clear of unit.

CAUTION

Extreme care must be exercised to avoid damage to fixed disk, position transducer scale and position transducer slider.

21. Heads, velocity transducer magnet and EOT assembly can be replaced at this time, if required. When actuator is removed the heads should be cleaned.

● **REPLACEMENT**

1. To install new actuator assembly, align slot at front of actuator frame with eccentric screw and slide frame forward while clearing guide pin until holes for mounting screws are aligned.

CAUTION

Extreme care must be exercised to avoid damage to fixed disk, position transducer scale and position transducer slider.

2. Using 9/64 ball Allen drive, install the three mounting bolts securing the actuator to the disk (see Figure 6-3).
3. Install head harness clip for heads 3 and 4.
4. Relace A3P6 across top of actuator frame.

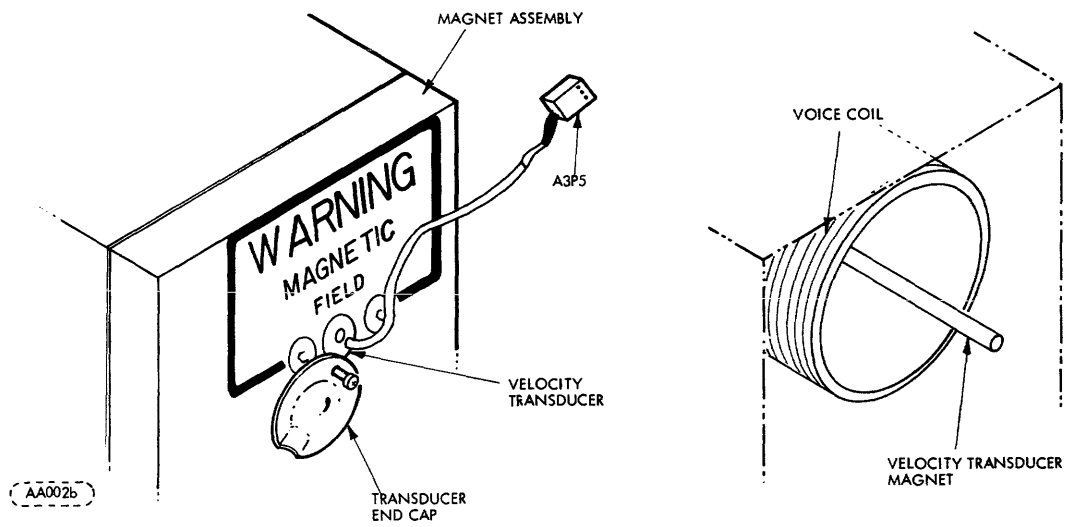


FIGURE 6-2. VELOCITY TRANSDUCER LOCATION

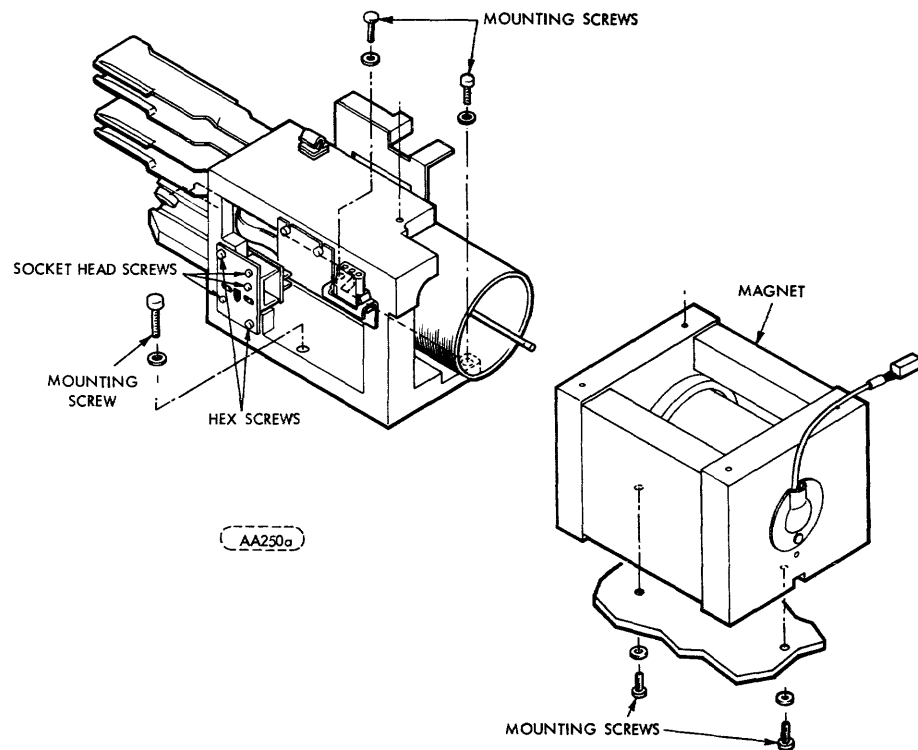


FIGURE 6-3. ACTUATOR, MAGNET AND EOT MOUNTING

5. Connect A1P2 (see Figure 6-13) connecting the voice coil flexible head to the power supply.
6. Very carefully slide magnet assembly onto the two guide pins. Extreme care must be taken to avoid any bending stress to the velocity transducer magnet.
7. Fasten magnet to the main deck with the two mounting screws (see Figure 6-3).
8. Install velocity transducer and velocity transducer end cap (see Figure 6-2).
9. Install card cage by performing replacements Steps 3 through 9 of card cage removal and replacement procedure.
10. Remove spacers from between heads.
11. Install AGC servo preamplifier to the top of magnet with the four mounting screws.
12. Connect A3P1, A3P2, A3P3, A3P4, A3P5.
13. Connect A1P5 and install power supply cover.
14. Install rear end panel (base cabinet only).
15. Connect field tester/exerciser to unit.
16. Perform AGC Servo Preamplifier and Inductosyn Check and Adjustment.
17. Perform FEOT Check and Adjustment.
18. Perform Head Alignment Check and Adjustment.
19. Perform Index-to-Burst Check and Adjustment.
20. Perform Track Indicator Check and Adjustment.
21. Install electronics cover.
22. Install top cover (Base Cabinet only).

6.6.2 HEAD R & R

● REMOVAL

a. Upper Heads

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP Lamp extinguished).
2. Remove top cover by lifting cover straightup (base cabinet only).
3. Remove disk cartridge.
4. Set main circuit breaker to off position.
5. Remove electronics cover. Remove cover from card cage.
6. Remove head harness clamp (Figure 6-4).
7. Remove quadraclip between head plugs and card cage.
8. Remove clip holding head lead springs to carriage assembly.
9. Remove power supply cover assembly.
10. Loosen upper head clamps (Figures 6-5 and 6-6).

CAUTION

Extreme care should be exercised when removing heads. Do not touch head face with fingers. Do not allow head to bang against anything.

11. Remove Head #0 or #1.

● REPLACEMENT

1. Install replacement head.
2. Tighten head clamps. (Note Torque Requirement during Head Alignment).
3. Install power supply cover assembly.

4. Install clip holding head lead springs to carriage assembly.
5. Install quadraclip.

CAUTION

Insure head cables are dressed such that the voice coil does not touch any cable when heads are loaded and extended to cylinder 405. This can be verified when doing head alignment check and adjustment.

6. Install head harness clamp.
7. Install card cage cover.
8. Install CE Disk Cartridge.
9. Perform Head Alignment Check and Adjustment.
10. Perform Index to Burst Check and Adjustment.
11. Install electronics cover.

- REMOVAL

- b. Lower Heads

1. Perform Removal Steps 1 through 21 of Actuator Assembly Removal and Replacement procedure.
2. Loosen lower head clamps (Figures 6-5 and 6-6).

CAUTION

Extreme care should be exercised when removing heads. Do not touch head face with fingers. Do not allow head to bang against anything.

3. Remove Head #2 or #3.

- REPLACEMENT

1. Install replacement head.
2. Tighten head clamps. (Not Torque Requirement during Head Alignment).
3. Install spacer between heads.
4. Perform replacement Steps 1 through 22 of Actuator Assembly Removal and Replacement procedure.

6.6.3 EOT ASSEMBLY R & R

- REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished). Remove cartridge.
2. Open top cover (base cabinet only).
3. Set main circuit breaker to off position.
4. Remove electronics cover.
5. Remove power supply cover and disconnect A1P5.
6. Remove Relay K1 from power supply board.
7. On EOT assembly bracket remove top and bottom mounting hex screws (see Figure 6-3).
8. Remove EOT assembly.

- REPLACEMENT

1. Install new EOT assembly.

CAUTION

Insure the EOT scale on carriage assembly does not rub against EOT assembly.

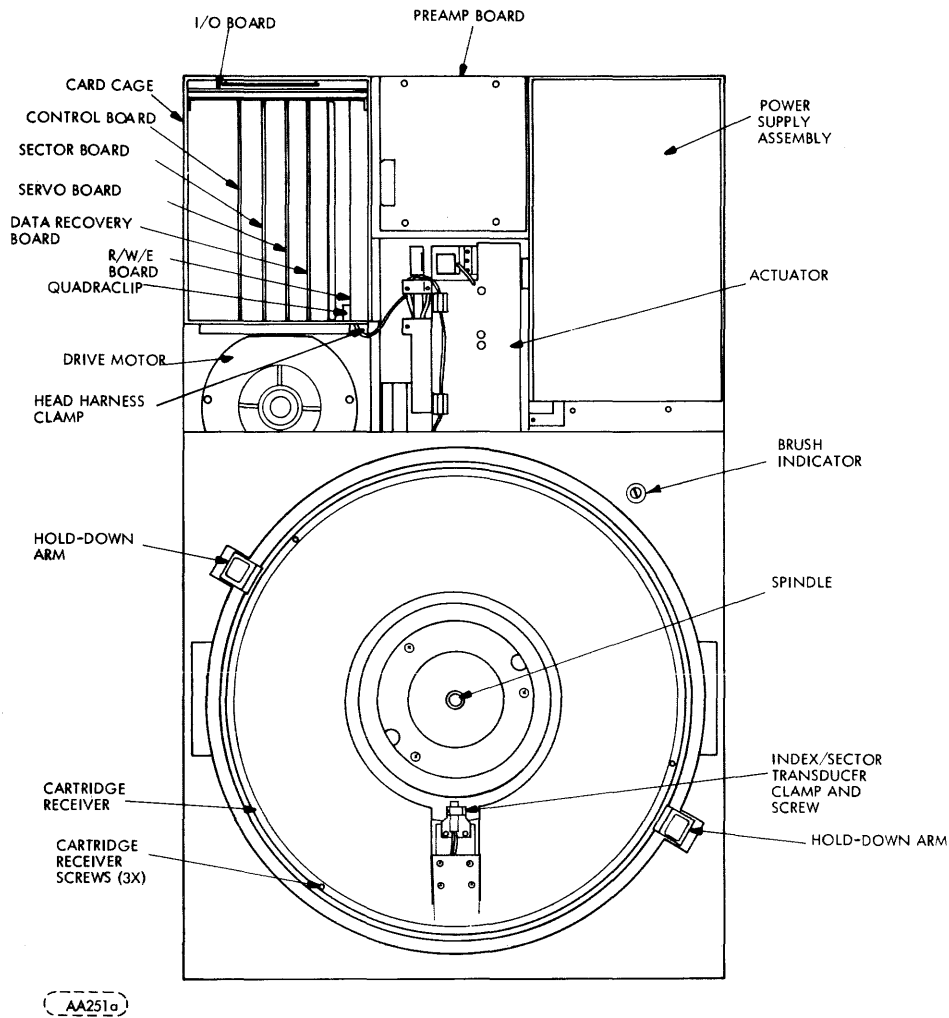


FIGURE 6-4. MODULE LOCATION (ABOVE DECK)

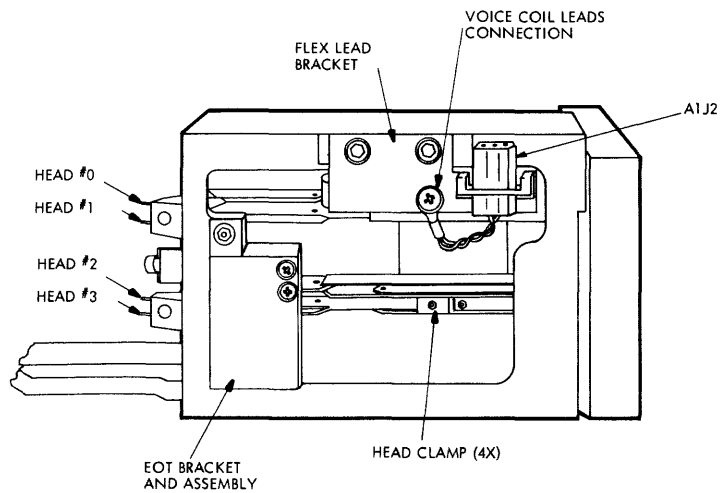


FIGURE 6-5. ACTUATOR ASSEMBLY-HEADS INSTALLED

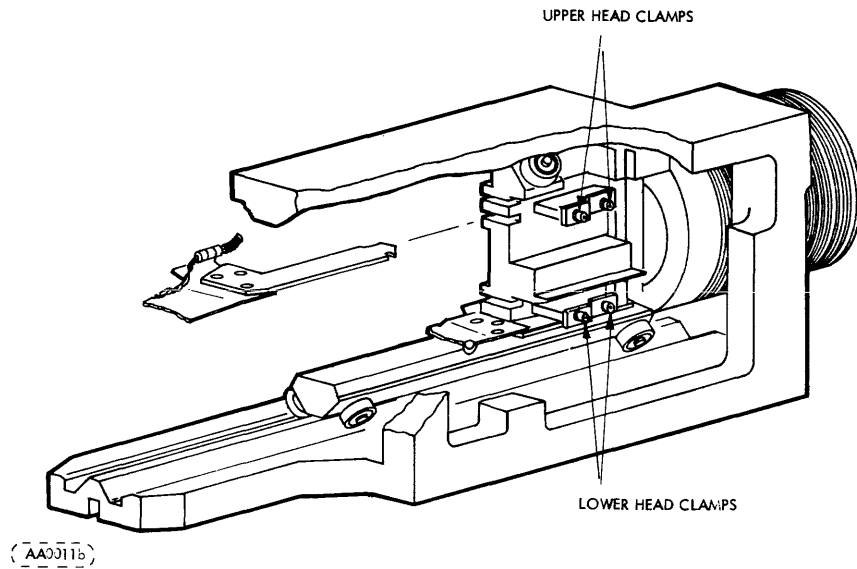


FIGURE 6-6. HEAD REMOVAL AND REPLACEMENT

2. Install relay K1.
3. Install power supply cover and connect A1P5.
4. Perform FEOT Check and Adjustment.
5. Perform Head Alignment Check and Adjustment.
6. Perform Index to Burst Period Check and Adjustment.
7. Perform Track Indicator Check and Adjustment.
8. Install electronics cover.
9. Close top cover (base cabinet only).

6.6.4 FIXED DISK R & R

● REMOVAL (See Figure 6-10)

1. Depress START/STOP pushbutton to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove top cover by lifting cover straight up (base cabinet only).
3. Remove disk cartridge.
4. Set main circuit breaker to off position.
5. Remove electronics cover.
6. Remove power supply cover and disconnect A1P5.
7. On rack mounted units with Accuride slides, remove coupling screw securing latch knob to latch mechanism (see Figure 6-7).
8. Disconnect ground straps from front panel (one on rack mounted units, two on base cabinet units is present).
9. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of panel (see Figure 6-7).
10. Remove the three screws from inside cartridge receiver.
11. Lift the cartridge receiver up until connector A9P2 can be unplugged (see Figure 6-7). After A9P2 is unplugged further remove cartridge receiver.

CAUTION While lifting cartridge receiver be extremely careful to avoid damage to the fixed disk.

12. Remove fixed disk clamp (see Figure 6-8).
13. Remove fixed disk.

● **REPLACEMENT**

1. Inspect replacement disk for defects, replace if required.
2. Install fixed disk and insure proper seating.
3. Install disk clamp. Torque screws to 12 in/lbs.
4. Install cartridge receiver by aligning it on the two small pins on the deck and connecting A9P2.

CAUTION While installing cartridge receiver be extremely careful to avoid damage to fixed disk and receiver harness.

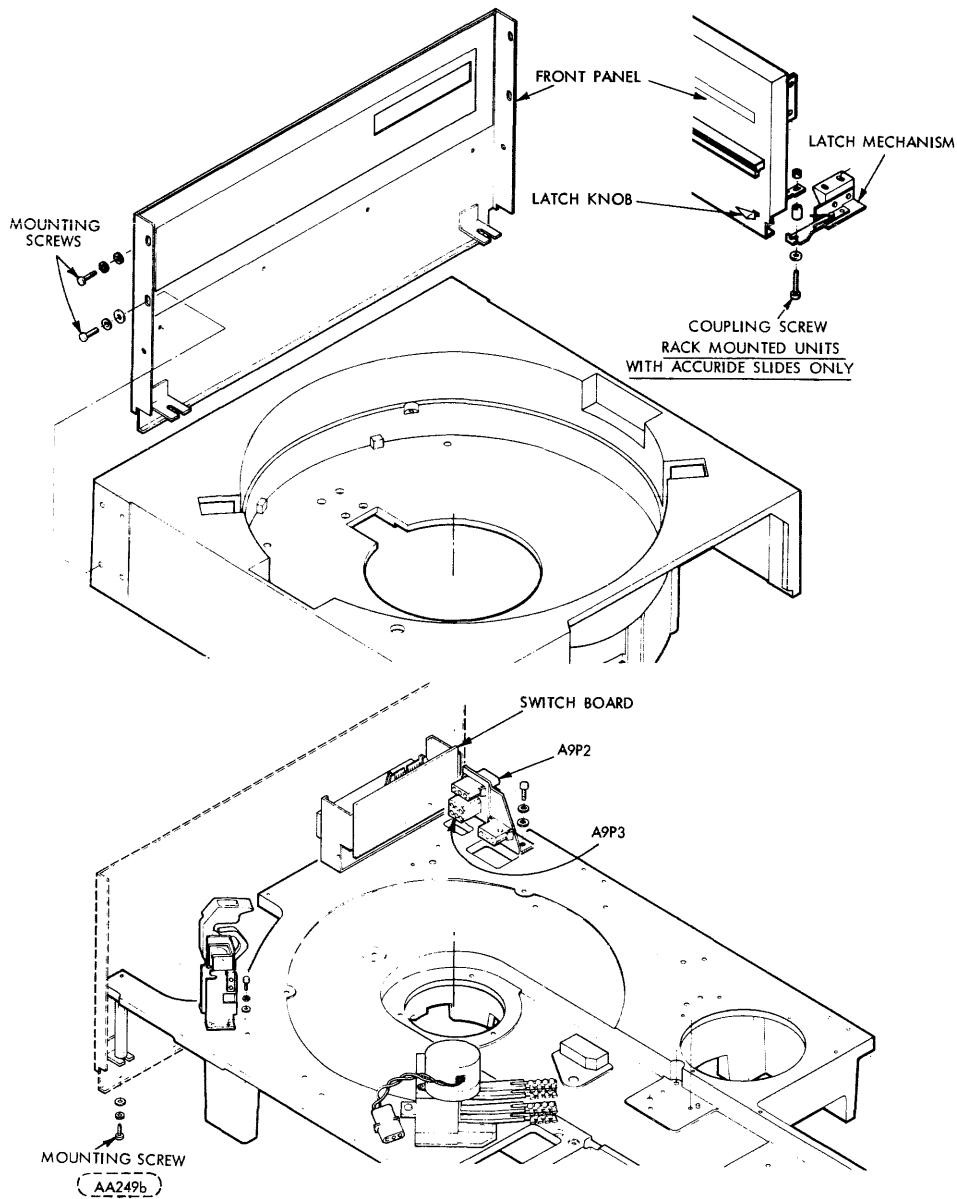


FIGURE 6-7. FRONT PANEL REMOVAL

5. Fasten cartridge receiver with three screws.
6. Install front panel and ground straps. Insure that insulating strips are still mounted to front panel and there is electrical isolation between front panel and deck.
7. Install latch assembly or knob as required.
8. Perform index to burst period check and adjustment procedure.
9. Install electronics cover.
10. Install top cover (base cabinet only).

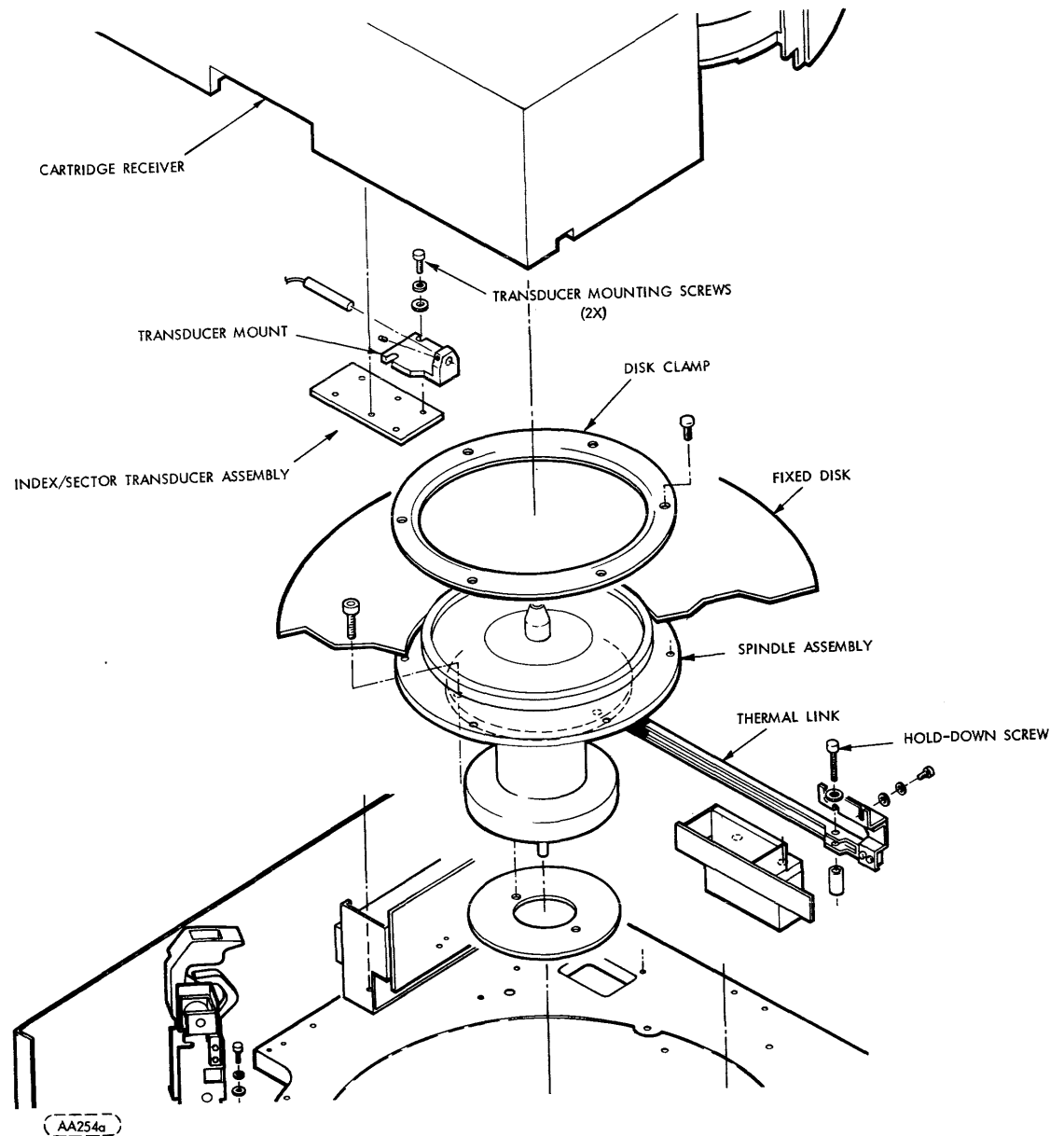


FIGURE 6-8. FIXED DISK REMOVAL

6.6.5 POSITION TRANSDUCER SCALE R & R

● REMOVAL

1. Depress START/STOP pushbutton to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove top cover by lifting cover straight up (base cabinet only).
3. Remove disk cartridge.
4. Set main circuit breaker to Off position.
5. Remove electronics cover.
6. Remove power supply cover and disconnect A1P5.
7. On rack mounted units with Accuride slides, remove coupling screw securing latch knob to latch mechanism (see Figure 6-7).
8. Disconnect ground straps from front panel (one on rack mounted units, two on base cabinet units).
9. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of panel (see Figure 6-7).
10. Remove the three screws from inside cartridge receiver.
11. Lift the cartridge receiver up until connector A9P2 can be unplugged (see Figure 6-7). After A9P2 is unplugged further remove cartridge receiver.

CAUTION

While lifting cartridge receiver be extremely careful to avoid damage to the fixed disk.

12. Perform removal Steps 1 through 11 of upper head removal and replacement procedure.
13. Loosen two screws in thermal link bracket (Figure 6-19).
14. Disconnect A3P6 from AGC preamp Board and unlace from actuator frame.
15. Remove transducer scale assembly by removing the two mounting screws (Item 3, Figure 6-10), which hold position transducer mount block to deck.

CAUTION

Extreme care must be exercised in preventing face of transducer from coming in contact with other parts.

● REPLACEMENT

1. Install replacement transducer scale assembly.
2. Verify that thermal link bracket is flush with top of transducer scale. If not, adjust thermal link hold-down screw (Figure 6-9).
3. Tighten screws in thermal link bracket.
4. Lace A3P6 over top of actuator frame and connect to AGC preamp board.
5. Perform Steps 1 through 8 of upper heads replacement procedure.
6. Install cartridge receiver by aligning it on the two small pins on the deck and connecting A9P2.

CAUTION

While installing cartridge receiver be extremely careful to avoid damage to fixed disk.

7. Fasten cartridge receiver with three screws.
8. Install front panel and ground straps.
9. Install latch assembly or knob as required.
10. Perform AGC Servo Preamplifier and Inductosyn Check and Adjustment.
11. Perform FEOT Check and Adjustment.
12. Perform Head Alignment Check and Adjustment.
13. Perform Index-to-Burst Check and Adjustment.
14. Perform Track Indicator Check and Adjustment.

15. Install electronics cover.
16. Install top cover (base cabinet only).

6.6.6 VELOCITY TRANSDUCER R & R

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP Lamp extinguished).
2. Open top cover (base cabinet).
3. Set main circuit breaker to Off position.
4. Remove electronics cover.
5. Disconnect connector A3P5 from Preamp Board.
6. Remove transducer and end cap from magnet assembly (Figure 6-2).
7. Loosen velocity transducer set screw (Figure 6-10) through hole in preamp and magnet assembly.
8. Remove transducer through rear of magnet assembly.

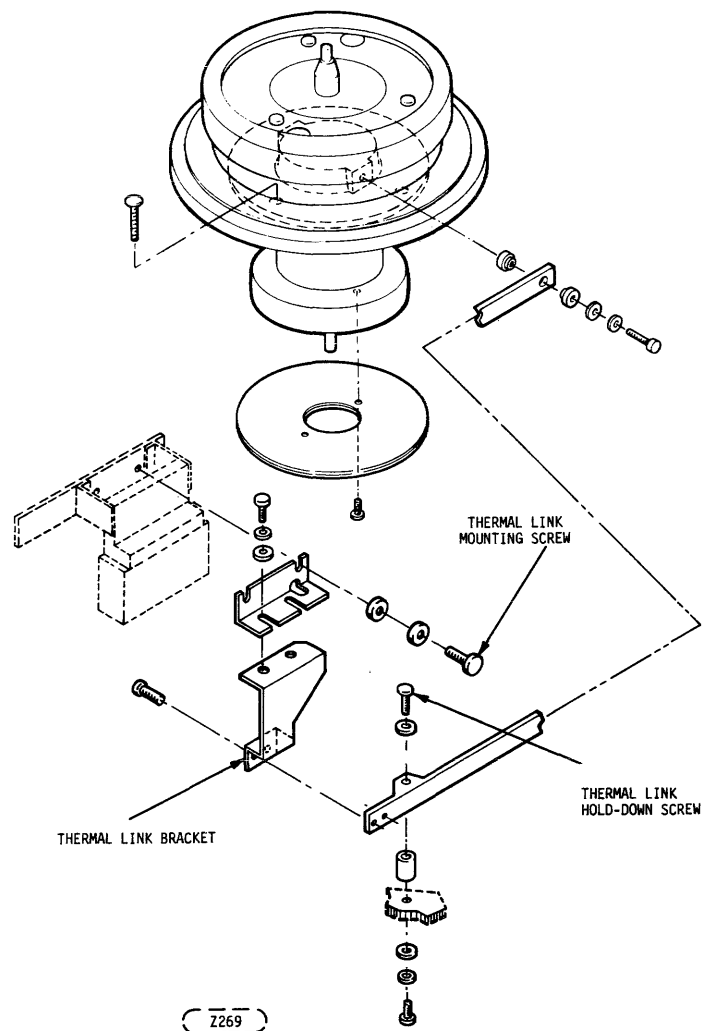
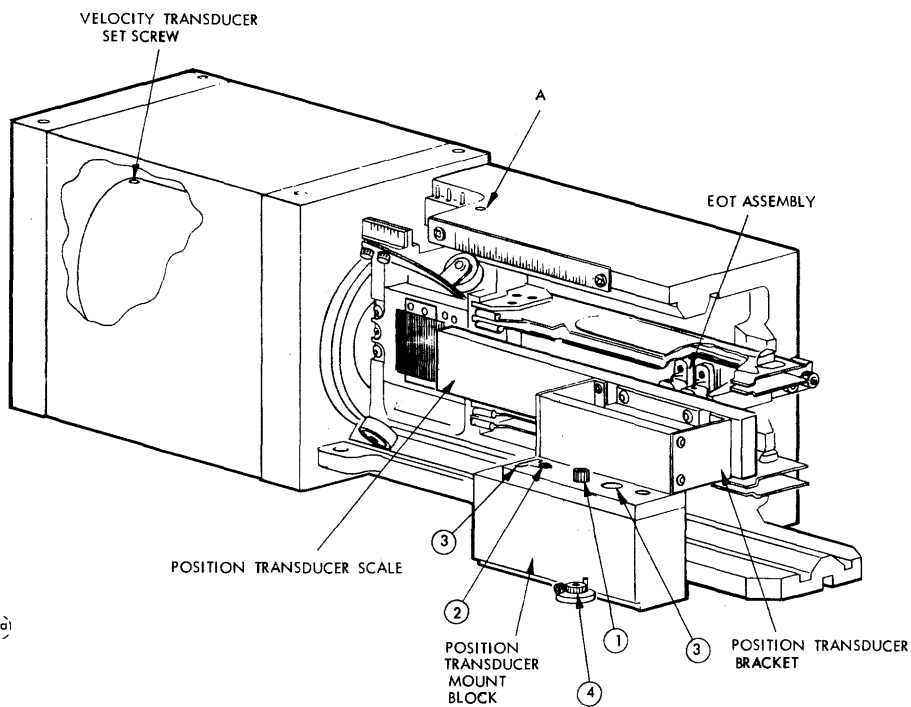
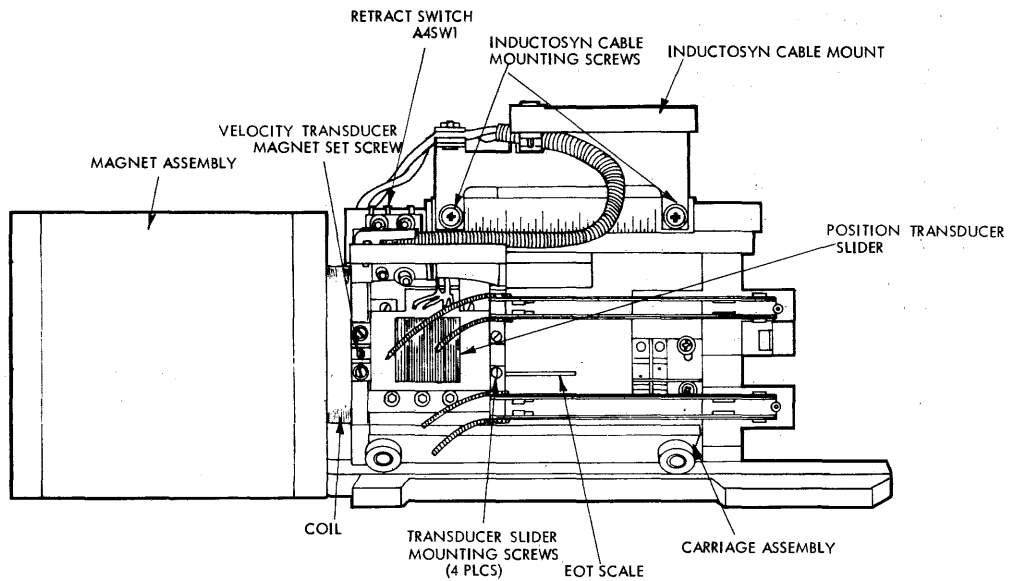


FIGURE 6-9. THERMAL LINK R & R



AA0013a

FIGURE 6-10. ACTUATOR ASSEMBLY

- REPLACEMENT

1. Insert replacement transducer into magnet assembly until flush with end of magnet.
2. Tighten set screw through hole in preamp Board.
3. Install velocity transducer and cap.
4. Connector A3P5 to preamp Board.
5. Connect Field Tester/Exerciser to Unit.
6. Install disk cartridge.
7. Remove A1P2 from the actuator and power up drive for normal operation. Insure that K1 has energized.
8. Manually load heads.
9. Move carriage by hand insuring that the velocity transducer magnet is not rubbing against velocity transducer. If rubbing occurs, unload heads, power down unit and reposition transducer or transducer magnet.
10. Push carriage forward so that carriage is at forward stop position.

CAUTION While performing Steps 11 and 12 keep hands clear of carriage.

11. Reconnect A1P2.
12. Execute RTZ command from field tester.
13. Perform temperature stabilization procedure.
14. Perform alternate seek between cylinders 293 and 405 (146 and 202 for 100 TPI units).
15. Monitor "on cylinder" signal from field tester and adjust velocity gain potentiometer (see Figure 6-14) for a seek time of 35 ± 1 milliseconds. (See Fig. 6-17b).
16. Install electronics cover.
17. Close top cover.

6.6.7 VELOCITY TRANSDUCER MAGNET R & R

- REMOVAL

CAUTION Keep replacement transducer magnet in its shipping container until ready for installation since contact between magnet and metal objects is harmful to magnet.

1. Depress Start/Stop switch to stop rotating (Start/Stop lamp extinguished).
2. Remove disk cartridge.
3. Open top cover.
4. Set main circuit breaker to off position.
5. Remove electronics cover.
6. Using a 5/32 Allen driver, place tool into hole on rear end panel and remove panel by loosening hardware (base cabinet only).
7. Remove power supply cover and disconnect A1P5.
8. Disconnect A3P1, A3P2, AeP3, A3P4, A3P5 and A3P6 from AGC Servo Preamplifier.
9. Remove AGC Servo Preamplifier.
10. Remove velocity transducer end cap and velocity transducer (see Figure 6-2).
11. Remove two screws that fasten the magnet to the main deck. Screws are located underneath the base casting (see Figure 6-3).
12. Lift the magnet slightly and very carefully slide the magnet assembly out from the voice coil. Extreme care must be taken to avoid any bending stress to the velocity transducer magnet.
13. Remove card cage by performing removal Steps 1 through 13 of card Cage removal and replacement procedure.
14. Loosen velocity transducer magnet set screw (Fig. 6-10) and remove magnet.

- REPLACEMENT

1. Install replacement velocity transducer magnet and tighten set screw.
2. Very carefully slide magnet assembly onto the two guide pins. Extreme care must be taken to avoid any bending stress to the velocity transducer magnet.
3. Fasten magnet to the main deck with the two mounting screws (see Figure 6-3).
4. Install card cage by performing Steps 3 through 9 of Card Cage removal and replacement procedure.
5. Install velocity transducer and velocity transducer end cap.
6. Install AGC Servo Preamplifier.
7. Connect A3P1, A3P2, A3P3, A3P4, A3P5 and A3P6 to AGC Servo Preamplifier.
8. Install power supply cover and connect A1P5.
9. Install rear door panel (base cabinet only).
10. Install disk cartridge.
11. Remove A1P2 from the actuator and power up drive for normal operation. Insure that K1 has energized.
12. Manually load heads.
13. Move carriage by hand insuring that the velocity transducer magnet is not rubbing against velocity transducer. If rubbing occurs, unload heads, power down unit and reposition transducer or transducer magnet.
14. Push carriage forward so that carriage is at forward stop position.

CAUTION While performing Steps 11 and 12 keep hands clear of carriage.

15. Reconnect A1P2.
16. Execute RTZ command from field tester.
17. Perform temperature stabilization procedure.
18. Perform alternate seek between cylinders 293 and 405 (146 and 202 for 100 TPI units).
19. Monitor "on cylinder" signal from field tester and adjust velocity gain potentiometer (see Figure 6-14) for a seek time of 35 ± 1 milliseconds.
20. Install electronics cover.
21. Close top cover.

6.6.8 SPINDLE ASSEMBLY R & R

- REMOVAL

1. Depress START/STOP pushbutton to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove top cover by lifting cover straight up (base cabinet only).
3. Remove disk cartridge.
4. Set main circuit breaker to off position.
5. Remove electronics cover.
6. Remove power supply cover and disconnect A1P5.
7. On rack mounted units with Accuride slides, remove coupling screw securing latch knob to latch mechanism (see Figure 6-7).
8. Disconnect ground straps from front panel (one on rack mounted units, two on base cabinet units if present).
9. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of panel (see Figure 6-7).
10. Remove the three screws from inside cartridge receiver.
11. Lift the cartridge receiver up until connector A9P2 can be unplugged (see Figure 6-7). After A9P2 is unplugged further remove cartridge receiver.

CAUTION While lifting cartridge receiver be extremely careful to avoid damage to the fixed disk.

12. Remove fixed disk clamp.
13. Remove fixed disk, carefully avoiding contact with recording surfaces. Place disk on soft clean surface.
14. Remove mounting screws from thermal link bracket (Figure 6-9).

CAUTION Do not perform Step 15 until Step 14 has been performed.

15. Remove thermal link hold-down screw (Figure 6-9).
16. Using a 5/32 Allen driver, place tool into hole on front end panel and remove panel by loosening hardware.
17. Remove cabinet panels from both sides (base cabinet only).
18. Remove Module bottom cover.
19. Unplug connector A9P1.
20. Perform removal Steps 1 through 6 of the sector ring removal and replacement procedure.
21. Remove spindle drive belt (Figure 6-11), by applying pressure to edge of drive-motor plate near A7TB1.
22. Rotate spindle to positions where spindle mounting bolts are visible through access hole and remove bolts through access hole.
23. Carefully lift spindle slightly.
23. Detach thermal link from spindle. Note sequence of fiber washers mounting bolt (Figure 6-9). Swing thermal link out of the way.
25. Remove spindle assembly.

REPLACEMENT

1. Attach thermal link to replacement spindle.
2. Install spindle with the mounting bolts.
3. Rotate spindle and verify that thermal link is not contacting spindle flange.
4. Install thermal link hold-down screw and tighten until thermal link bracket is flush with top of transducer scale. (Figure 6-9).

CAUTION Do not perform Step 5 until Step 4 has been performed.

5. Install thermal link bracket screws.
6. Install spindle drive belt (Figure 6-11) by applying pressure to edge of drive motor plate near A7TB1.
7. Install sector ring.
8. Install transducer mount assembly by performing replacement Steps 7 through 12 of the sector ring removal and replacement procedure.
9. Reconnect A9O1.
10. Clean spindle rim area with media cleaning solution.
11. Prior to installing fixed disk, inspect disk for scratches or defects. If disk is unacceptable, replace with new one.
12. Clean disk surface with lint-free gauze, dampened (not soaked) with media cleaning solution.
13. Install fixed disk and insure proper seating.
14. Install disk clamp. Torque screws to 12 in./lbs.
15. Install cartridge receiver by aligning it on the two small pins on the deck and connecting A9P2.

CAUTION While cartridge receiver be extremely careful to avoid damage to fixed disk and receiver harness.

16. Fasten cartridge receiver with three screws.
17. Install front panel and ground straps. Insure that insulating strips are still mounted to front panel and there is electrical isolation between front panel and deck.

18. Install latch assembly or knob as required.
19. Perform Fixed Disk Index/Sector Transducer Check and Adjustment.
20. Perform Static Eliminator Check.
21. Perform Cartridge Index/Sector Transducer Check and Adjustment.
22. Perform AGC Servo Preamplifier and Inductosyn Check and Adjustment.
23. Perform EOT Check and Adjustment.
24. Perform Head Alignment Check and Adjustment.
25. Perform Index to Burst Period Check and Adjustment procedure.
26. Install module bottom cover.
27. Install side panels (base cabinet only).
28. Install front end panel (base cabinet only).
29. Install electronics cover.
30. Install top cover (base cabinet only).

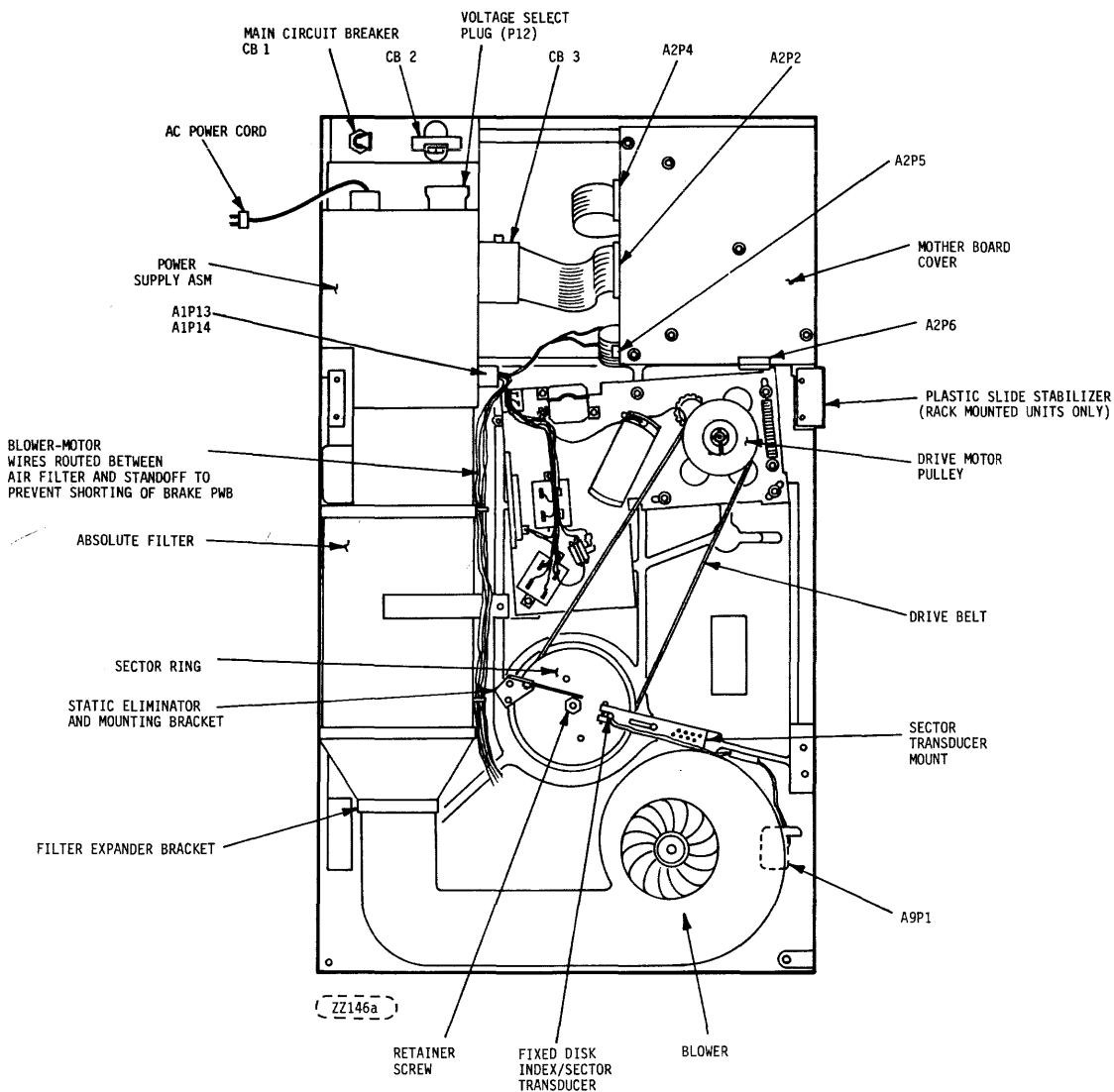


FIGURE 6-11. MODULE LOCATOR (BELOW DECK)

6.6.9 CARTRIDGE DISK INDEX/SECTOR TRANSDUCER R & R

● REMOVAL

1. Depress START/STOP pushbutton to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove top cover by lifting cover straightup (base cabinet only).
3. Remove disk cartridge.
4. Set main circuit breaker to off position.
5. Remove electronics cover.
6. Remove power supply cover and disconnect A1P5.
7. On rack mounted units with Accuride slides remove coupling screw securing latch knob to latch mechanism (see Figure 6-7).
8. Disconnect ground straps from front panel (one on rack mounted units, two on base cabinet units if present).
9. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of panel (see Figure 6-7).
10. Remove the three screws from inside cartridge receiver.
11. Lift the cartridge receiver up until connector A9P2 can be unplugged (see Figure 6-7). After A9P2 is unplugged further remove cartridge receiver.

CAUTION While lifting cartridge receiver be extremely careful to avoid damage to the fixed disk.

12. Remove transducer assembly from receiver by removing 4 screws (Figure 6-8).
13. Remove transducer from mount by loosening clamp Allen set screw.

● REPLACEMENT

1. Install new transducer into mount. Tighten Allen screw.
2. Install transducer assembly on receiver with four mounting screws making sure harness lies in groove.
3. Install cartridge receiver by aligning it on the two small pins on the deck and connecting A9P2.

CAUTION While installing cartridge receiver be extremely careful to avoid damage to fixed disk and receiver harness.

4. Fasten cartridge receiver with three screws.
5. Install front panel and ground straps. Insure that insulating strips are still mounted to front panel and there is electrical isolation between front panel and deck.
6. Install latch assembly or knob as required.
7. Perform Cartridge Index/Sector Transducer Check and Adjustment.
8. Perform Index-to-Burst period check and adjustment.
9. Install electronics cover.
10. Install top cover (base cabinet only).

6.6.10 FIXED DISK INDEX/SECTOR TRANSDUCER R & R

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove top cover by lifting cover straightup (base cabinet only).
3. Remove disk cartridge.

4. Set main circuit breaker to off position.
5. Using a 5/32 Allen driver, place tool into hole on front end panel and remove panel by loosening hardware.
6. Remove right side panel (when viewed from rear of unit, base cabinet only).
7. Remove module bottom cover.
8. On rack mounted units with Accuride slides, remove coupling screw securing latch knob to latch mechanism (see Figure 6-7).
9. Disconnect ground straps from front panel (one on rack mounted units, two on base cabinet units is present).
10. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of panel (see Figure 6-7).
11. Remove electronics cover.
12. Remove the three screws from inside cartridge receiver.
13. Lift the cartridge receiver up until connector A9P2 can be unplugged (see Figure 6-7). After A9P2 is unplugged further remove cartridge receiver.

CAUTION While lifting cartridge receiver be extremely careful to avoid damage to the fixed disk.

14. Disconnect A9P1 and unlace harness from around blower motor assembly.
15. Loosen index sector transducer clamp screw.
16. Remove transducer from mount.

● REPLACEMENT

1. Install new transducer in mount.
2. Connect A9P1 and lace harness around blower motor assembly.
3. Perform fixed disk index/sector transducer check and adjustment procedure.
4. Replace cartridge receiver by aligning it on the two small pins on the deck and connecting A9P2.

CAUTION While installing cartridge receiver be extremely careful to avoid damage to fixed disk and receiver harness.

5. Fasten cartridge receiver with three screws.
6. Install front panel and grounds straps. Insure that insulating strips are still mounted to front panel and there is electrical isolation between front panel and deck.
7. Install latch assembly or knob as required.
8. Install electronics cover.
9. Install module bottom cover.
10. Install cabinet side panel.
11. Install front end panel (base cabinet only).
12. Install top cover.

6.6.11 STATIC ELEMATOR AND RETAINER SCREW R & R

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove disk cartridge.
3. Set main circuit breaker to off position.
4. Using a 5/32 Allen driver, place tool into hole on front panel and remove panel by loosening hardware.
5. Remove right side panel (when viewed from rear of unit, base cabinet only).
6. Remove module bottom cover.
7. Remove static eliminator (Figure 6-11) by removing one screw.
8. At the cartridge receiver side, align one of the holes in the spindle assembly with one of the Allen head screws which mounts the spindle to the base deck. Insert the proper size wrench into the screw head. This will prevent the spindle turning while removing the retainer screw.
9. Remove retainer screw (Figure 6-11).

- REPLACEMENT

1. Apply Loctite to threads of replacement retainer screw and install.
2. Install replacement static eliminator.
3. Adjust static eliminator for contact with spindle shaft (retainer screw) to a spring deflection of approximately 1/32 in. (0.79 mm).
4. Perform Static Eliminator Check procedure.
5. Install module bottom cover.
6. Install cabinet side panel.
7. Install front end panel (base cabinet only).

6.6.12 SECTOR RING R & R

- REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Set main circuit breaker to off position.
3. Using a 5/32 Allen driver, place tool into holes on front end panel by loosening hardware.
4. Remove right side panel (when viewed from rear of unit, base cabinet only), and remove module bottom cover.
5. Remove transducer assembly mount (see Figure 6-11) by removing one screw (note orientation of sector option).
6. Remove static eliminator and its mounting bracket (see Figure 6-11).
7. Remove sector ring (see Figure 6-11) by removing two screws.

- REPLACEMENT

1. Install replacement sector ring.
2. Install static eliminator and bracket.
3. Install transducer and mount.
4. Perform Fixed Disk Index/Sector Transducer Adjustment Procedure.
5. Adjust static eliminator for contact with spindle shaft.
6. Perform Static Eliminator Check.
7. Install module bottom cover.
8. Install cabinet side panel.
9. Install front end panel (base cabinet only).

6.6.13 CARTRIDGE ON SWITCH R & R

- REMOVAL

1. Depress START/STOP pushbutton to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove top cover by lifting cover straightup (base cabinet only).
3. Remove disk cartridge.
4. Set main circuit breaker to off position.
5. Remove electronics cover.
6. Remove power supply cover and disconnect A1P5.
7. On rack mounted units with Accuride slides, remove coupling screw securing latch knob to latch mechanism (see Figure 6-7).
8. Disconnect ground straps from front panel (one on rack mounted units, two on base cabinet units if present).
9. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of panel (see Figure 6-7).
10. Remove the three screws from inside cartridge receiver.

11. Lift the cartridge receiver up until connector A9P2 can be unplugged (see Figure 6-7). After A9P2 is unplugged further remove cartridge receiver.

CAUTION

While lifting cartridge receiver be extremely careful to avoid damage to the fixed disk.

12. Disconnect wires from cartridge on switch.
13. Remove two screws, washers and nuts securing switch assembly to hold-down arm and remove switch. (Reference Figure 6-12).

● REPLACEMENT

1. Install replacement switch.
2. Close hold-down arms.
3. Check switch status with multimeter set on RX1 scale. Indication should be zero ohms.
4. With disk cartridge installed, check switch status with multimeter set to RX1 scale. Meter should indicate zero ohms.
5. If switch does not read zero ohms, adjust as follows:
 - a. Loosen hold-down arm adjustment screws (Figure 6-12).
 - b. Adjust hold-down arm for contact with cartridge disk cover.
 - c. Tighten adjustment screws.
6. Check switch status with multimeter for zero ohms. If switch does not indicate zero ohms, replace switch.
7. Connect wires to switch.
8. Override solenoid (see Figure 2-1) and open hold-down arms.
9. Install cartridge receiver by aligning it on the two small pins on the deck and connecting A9P2.

CAUTION

While installing cartridge receiver be extremely careful to avoid damage to fixed disk and receiver harness.

10. Fasten cartridge receiver with three screws.
11. Install front panel and ground straps. Insure that insulating strips are still mounted to front panel and there is electrical isolation between front panel and deck.
12. Install latch assembly or knob as required.
13. Perform index to burst period check and adjustment procedure.
14. Install electronics cover.
15. Install top cover (base cabinet only).

6.6.14 DISK BRUSH ASSEMBLY R & R

● REMOVAL

1. Depress START/STOP pushbutton to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove top cover by lifting cover straight up. (Base cabinet only)
3. Remove disk cartridge.
4. Set main circuit breaker to off position.
5. Remove electronics cover.
6. Remove power supply cover and disconnect A1P5.
7. On rack mounted units with Accuride slides, remove coupling screw securing latch knob to latch mechanism (see Figure 6-7).
8. Disconnect ground straps from front panel (one on rack mounted units, two on base cabinet units).

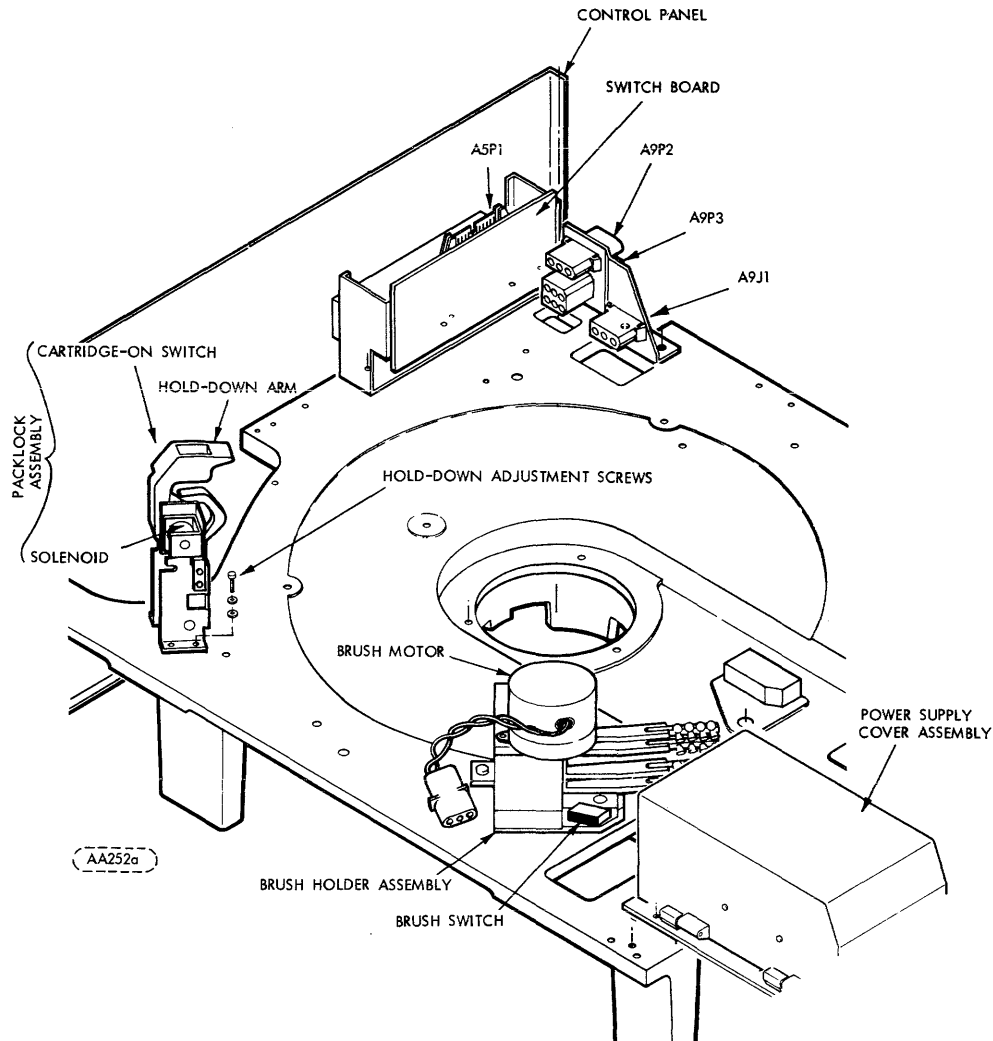


FIGURE 6-12. PACKLOCK AND BRUSH ASSEMBLIES

9. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of unit holding front panel to cartridge receiver (see Figure 6-7).
10. Remove the three screws from inside cartridge receiver.
11. Lift the cartridge receiver up until connector A9P2 can be unplugged (see Figure 6-7). After A9P2 is unplugged further remove cartridge receiver.

CAUTION While lifting cartridge receiver, be extremely careful to avoid damage to the fixed disk.

12. Disconnect A1P3 and A1P7.
13. Disconnect wires from brush retract switch (see Figure 6-12).
14. Remove three mounting screws from the brush assembly. One screw is countersunk.
15. Remove brush assembly.

- REPLACEMENT

1. Install new brush assembly with the 3 mounting screws.

NOTE: Verify that brushes are full retracted for the following check.

2. With a multimeter set on RX1 scale check that switch actuates when brushes are clear of disk area.
3. If switch actuation does not occur as indicated in previous step, replace switch.
4. Reconnect wires to brush retract switch.
5. Install cartridge receiver by aligning it on the two small pins on the deck and connecting A9P2.

CAUTION While installing cartridge receiver be extremely careful to avoid damage to fixed disk and receiver harness.

6. Fasten cartridge receiver with three screws.
7. Install front panel and ground straps. Insure that insulating strips are still mounted to front panel and there is electrical isolation between front panel and deck.
8. Install latch assembly or knob as required.
9. Connect A1P3 and A1P7.
10. Install power supply cover and reconnect A1P5.
11. Perform Index to Burst Period Check and Adjustment procedure.
12. Install electronics cover.
13. If necessary mark up label on cartridge receiver showing brush alignment when full retracted.
14. Install top cover (base cabinet only).

6.6.15 BRUSH MOTOR R & R

- REMOVAL

1. Perform removal Steps 1 through 12 of Disk brush removal procedure.
2. Remove the two mounting screws from the motor.
3. Remove brush motor.

- REPLACEMENT

1. Install new brush motor. Insure brushes are fully retracted. Turn motor as necessary until mounting holes are aligned and brushes are fully retracted. Brush indicator should align with indicator on cartridge receiver.
2. Perform replacement Steps 3 through 11 of Disk brush removal and replacement procedure to complete installation.

6.6.16 SPINDLE DRIVE MOTOR ASSEMBLY R & R

- REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Set main circuit breaker to off position.
3. Disconnect unit from main power source.

CAUTION Failure to disconnect or turn off main power source may result in injury to service personnel.

4. Using a 5/32 Allen driver, place tool into holes on end panels and remove front and rear end panels by loosening hardware (base cabinet only).
5. Remove both cabinet side panels (base cabinet only).
6. Remove module bottom cover.
7. Disconnect A2P5, A1P13 and A1P14 (Figure 6-11) from power supply.
8. Remove plastic slide stabilizer (rack mount unit only).

9. Remove spindle drive (Figure 6-11) by applying pressure to edge of drive-motor plate near A7TB1.
10. Remove nut and washers from stud of post-motor A (Figure 6-13.1).
11. Remove spring from post-motor A. Then remove post-motor and flat washers from stud.
12. Support motor assembly to prevent it from falling and remove the four mounting screws.

Note hardware buildup on mounting screws; also be careful not to lose the four shoulder washers between motor plate and base deck.

13. Carefully lower drive-motor assembly out of unit.
14. Remove locking collar on drive-motor pulley and remove pulley from shaft.

● REPLACEMENT

1. Install pulley on replacement drive-motor assembly. Insure that Woodruff key is still installed on motor shaft. Install locking collar and torque to 70 in/lbs. Pulley must be 0.031 ± 0.010 in. (0.79 ± 0.25 mm) above motor plate.
2. Place the four shoulder washers in the one mounting hole and three slots between the motor plate and base deck (Figure 6-11 and 6-13.1).
3. Install the assembly to the base deck. Tighten the four mounting screws far enough to hold the assembly so the other end of the spring can be installed.
4. Using Figure 6-13.1, place washers and post-motor A onto the stud.
5. Mount the spring into the post-motor slot.
6. Install washers and nut.
7. Torque the four mounting screws to 15 in/lbs. Insure that the motor plate moves freely on the Delrin washers.
8. Install the belt on the pulley.
9. Turn the pulley and belt by hand and verify that the belt and pulleys have proper clearance and the belt tracks properly.
10. Install the plastic slide stabilizer (rack mount only).
11. Connect A2P5, A1P13 and A1P14 (Figure 6-11).
12. Check the resistance between the drive-motor plate and the module casting. If DC ground is connected to AC ground, the resistance should be less than one ohm. If DC ground is isolated from AC ground, the resistance should be greater than 1000 ohms.
13. Install the module bottom cover.
14. Install the cabinet side panels.
15. Install front and rear end panels (base cabinet only).
16. Connect the unit to the main power source.

6.6.17 CARD CAGE PRINTED CIRCUIT BOARD R & R

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Set main circuit breaker to off position.
3. Open top cover (base cabinet only).
4. Remove electronics cover.
5. Remove clamp from card cage cover.
6. Remove card cage cover.
7. Using card extractor remove required circuit board. Not setting of any option switches (I/O Control, Sector and Data Recovery board). Set option switches on replacement board to same setting.

NOTE: If I/O Board is to be replaced, remove four board mounting screws. Also Terminator modules, if required, must be removed from old board and installed in new one.

NOTE: If R/W/E Board is replaced, head connectors must be disconnected and two resistor modules must be removed from old board and installed in new one.

CAUTION Insure head cables are dressed such that the voice coil does not touch any cable when heads are loaded and extended to cylinder 405.

8. Carefully install replacement board, insuring that all pins are engaged before completely installing board.
9. If the following circuit boards are replaced, the designated checks and adjustments must be performed.
 - A. Servo Preamp
 1. AGC Servo Preamplifier and Inductosyn Check and Adjustment.
 2. FEOT Check and Adjustment.
 3. Head Alignment.
 4. Index-to-Burst Period Check and Adjustment.
 - B. Servo Board
 1. Connect Field Tester/Exerciser to unit.
 2. Perform Temperature Stabilization.
 3. Perform Steps 19 through 27 of AGC Servo Preamplifier and Inductosyn Check and Adjustment.
 - C. Sector Board
 1. Index-to-Burst Period Check and Adjustment.
10. Install card cage cover and clamp.
11. Install electronics cover.

6.6.18 POWER SUPPLY R & R

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Open top cover (base cabinet only).
3. Set main circuit breaker to OFF position.
4. Disconnect unit from main power source.

CAUTION Failure to disconnect or turn off main power source may result in injury to service personnel.

5. Using a 5/32 Allen driver, place tool into hole on rear end panel and remove panel by loosening hardware (base cabinet only).
6. Remove electronics cover.
7. Remove AC line cord and bracket (see Figure 6-11).
8. Open power supply cover assembly, disconnect A1P5 and remove cover.
9. Disconnect A1P2, A1P3 and A1P7 (see Figure 6-13).
10. Disconnect A1P13 and A1P14 (see Figure 6-11).
11. Disconnect ribbon cable A2P2 from mother board (see Figure 6-11).
12. At rear of power supply, disconnect AC ground cable connected to base or rack frame.
13. Disconnect DC ground strap on deck plate (see paragraph 3.9.2 and note below).
14. Remove three screws holding power supply in place.
15. Remove power supply being very careful not to lose nylon isolation washers between power supply and deck plate.

● REPLACEMENT

NOTE: Power supply is shipped with logic (DC) ground and chassis (AC) ground connected together. Verify needed configuration from removed power supply or see paragraph 3.9.2 (Grounding Option) if Installation instructions.

1. Install new power supply so tht mounting holes are aligned.

CAUTION

Insure gasket between power supply and absolute filter is properly aligned. If not properly alighed, air flow can be restricted causing damage to power supply.

2. Reverse removal procedure to complete installation.

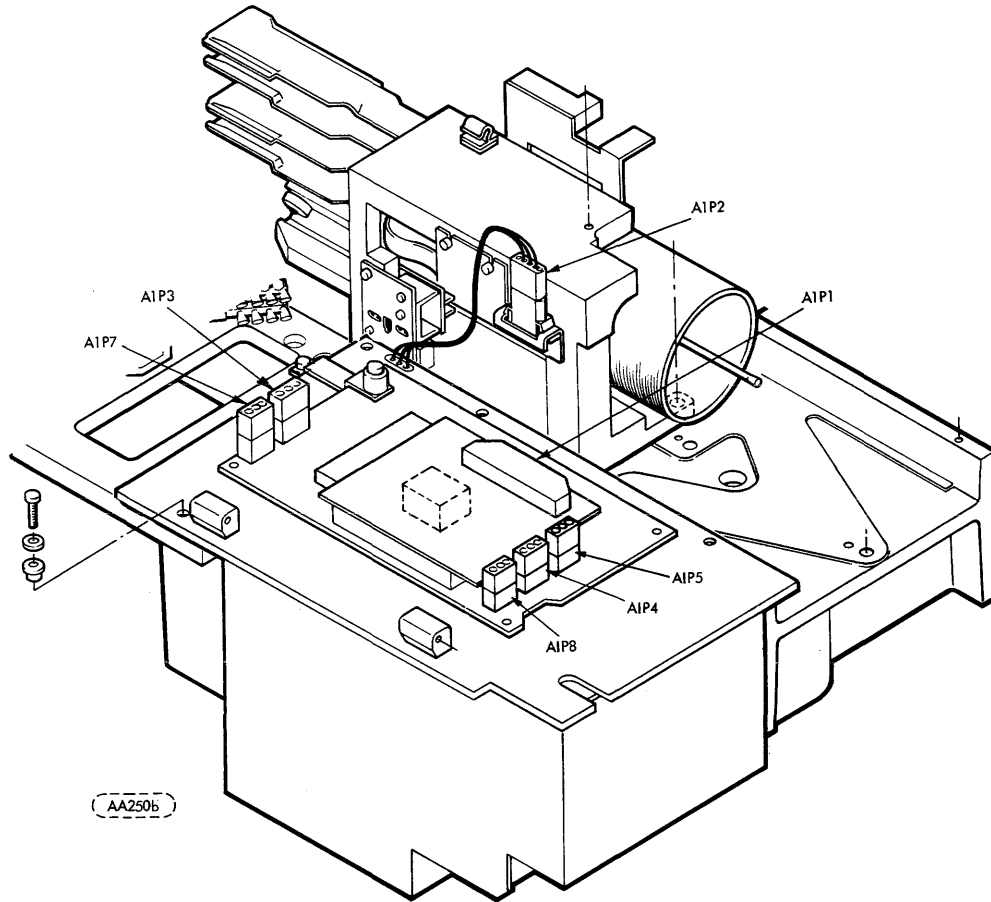


FIGURE 6-13. POWER SUPPLY ASSEMBLY

6.6.19 PIGGYBACK POWER BOARD R & R

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Open top cover (base cabinet only).
3. Set main current breaker to off position.
4. Disconnect unit from main power source.

CAUTION

Failure to disconnect or turn off main power source may result in injury to service personnel.

5. Remove electronics cover.
6. Open power supply cover assembly.
7. Disconnect AIP5 and remove power supply cover.

8. Disconnect A1P1, A1P2, A1P3, A1P4, A1P7 and A1P8 (see Figure 6-13).
9. Remove DC grounding screw noting assembly configuration.
10. Remove screw and insulating washer from wind tunnel located between relay K1 and power board #2.
11. Remove board assembly being careful not to lose spacers located under ground option (corner of board assembly).

● REPLACEMENT

1. Install new board assembly
2. Reverse removal procedure to complete installation.

6.6.20 CARD CAGE/MOTHER BOARD R & R

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Open top cover (base cabinet only).
3. Set main circuit breaker to off position.
4. Disconnect unit from main power source.

Failure to disconnect or turn off main power source may result in injury to service personnel.

5. Remove electronics cover.
6. Disconnect I/O connector ribbon cables.
7. Remove four screws holding I/O Board to card cage and remove Board. Disregard this step if card cage is only removed to facilitate other removal and replacement procedures.
8. Remove card page cover and clamp and quadraclip from head connectors on R/W/E board (see Figure 6-4).
9. Disconnect head connectors.
10. Using a 5/32 Allen driver, place tool into hole on rear end panel and remove panel by loosening hardware (base cabinet only).
11. Disconnect A2P2, A2P4, A2P5 and A2P6 from mother board (see Figure 6-11).
12. Disconnect ground strap from deck plate.
13. Remove three screws securing card cage and remove card cage.
14. Using card extractor, remove all boards.
15. Remove the 5 screws holding the mother cover and board together. Watch for fiber washer.
16. Separate mother cover and board from card cage. Do not lose star washers.

● REPLACEMENT

1. Attach mother cover and board to card cage assembly. Be careful not to overtighten, plastic bracket strips out easily.
2. Install all circuit boards.
3. Install card cage with three mounting screws.
4. Install connectors removed in Steps 9 and 11.

Insure head cables are dressed such that the voice coil does not touch any cable when heads are loaded and extended to bylinder 405.

5. Install quadraclip and head cable clamp.
6. Replace I/O Board if removed in Step 7. (Removal procedures).
7. Reconnect I/O Ribbon Cables.
8. Install ground strap.
9. Install carc cover and clamp.
10. Install electronics cover.
11. Install rear end panel (base cabinet only).
12. Connect unit to main power source.
13. Close top cover (base cabinet only).

6.6.21 BLOWER MOTOR ASSEMBLY R & R (BASE CABINET)

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Set main circuit breaker to off position.
3. Remove top cover by lifting cover straight up (base cabinet only).
4. Using a 5/32 Allen driver, place tool into holes on end panels and remove front and rear end panels by loosening hardware (base cabinet only).
5. Disconnect ground straps from front panel if present.
6. Remove both cabinet side panels (base cabinet only).
7. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of panel (see Figure 6-7).
8. Remove the pre-filter and disconnect A1P13 (Figure 6-11) from power supply assembly.
9. Remove filter expander bracket and absolute filter (Figure 6-1).
10. Remove nuts from studs that secure module to base frame (two nuts are in pre-filter area and one nut is below actuator magnet).
11. Unlace motor harness.
12. Support blower assembly to prevent it from falling and remove three screws securing blower assembly.
13. Remove blower assembly.

● REPLACEMENT

1. Install replacement blower motor assembly.
2. Reverse the removal procedure to complete the installation.

NOTE: Slightly tighten the three screws securing the blower motor then align the air chute with the absolute filter. Finish tightening the blower motor screws (do not over compress rubber washes on the three screws).

6.6.22 BLOWER MOTOR ASSEMBLY R & R

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Set main circuit breaker to off position.
3. Unlatch the latch assembly securing the unit in the cabinet.
4. Remove the front panel by loosening two screws at the bottom of the panel and removing two screws on each side of the panel (see Figure 6-7).
5. Disconnect plug A1P13 from power supply (see Figure 6-11).
6. Remove filter, expander, bracket and absolute filter (see Figure 6-1).
7. Unlace the motor harness from side of main deck.
8. Remove the air inlet cover (held in place by three screws).
9. Remove the three screws holding the blower motor in place and remove blower motor.

● REPLACEMENT

1. Install blower motor assembly.
2. Reverse the removal procedure to complete the installation.

NOTE: Slightly tighten the three screws securing the blower motor then align the air chute with the absolute filter. Finish tightening the blower motor screws (do not over compress rubber washers on the three screws).

6.6.23 DRIVE MOTOR PULLEY AND BELT R & R

o REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Set main circuit breaker to OFF position.
3. Disconnect unit from main power source.

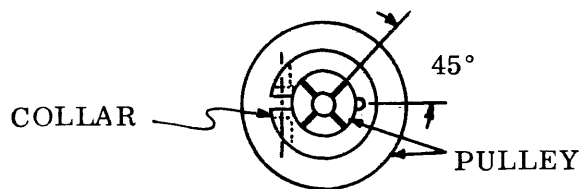
CAUTION

Failure to disconnect or turn off main power source may result in injury to service personnel.

4. Using a 5/32 Allen driver, place tool into holes on end panels and remove front and rear end panels by loosening hardware (base cabinet only).
5. Remove right side panel (when viewed from rear of unit, cabinet only).
6. Extend unit to its fully extended position (rack only).
7. Remove module bottom cover.
8. Remove mounting screw from fixed disk index sensor mount. Note hole orientation of dowel pin for sector option (see Figure 3-11).
9. Remove spindle drive belt (Figure 6-11) by applying pressure to edge of drive-motor plate near A7TB1.
10. Remove belt by guiding belt between static eliminator and retainer screw (see Figure 6-11).
11. Remove locking collar on drive motor pulley.
12. Remove drive motor pulley. Be careful not to lose Woodruff key.

● REPLACEMENT

1. Place Woodruff key into drive motor keyway.
2. Install new drive motor pulley. Insure that Woodruff key is properly placed in keyway.



3. Install locking collar per figure above and tighten to 70 in/lbs. Gap between drive motor plate and top of pulley must be 0.031 ± 0.01 in. (0.79 ± 0.25 mm).
4. Guide new drive belt between static eliminator and retainer screw.
5. Install spindle drive belt (Figure 6-11) by applying pressure to edge of drive-motor plate near A7TB1.
6. Replace fixed disk sensor mount.
7. Perform Fixed Disk Index/Sector Transducer Check and Adjustment.
8. Install module bottom cover.
9. Install side panel (base cabinet only).
10. Connect unit to main power source.
11. Install rear end panel (base cabinet only).

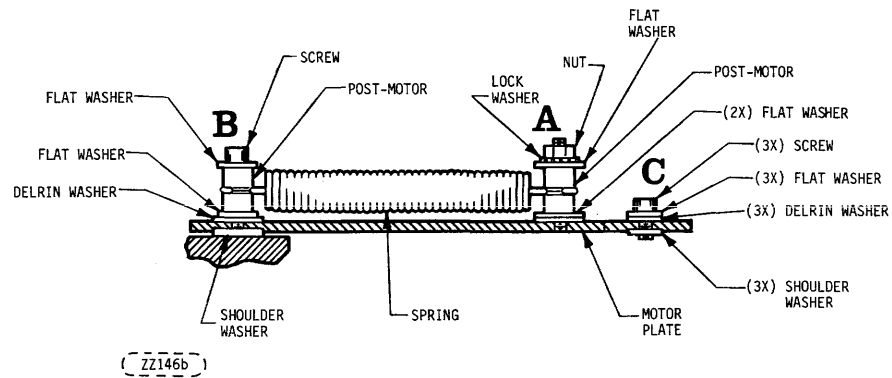


FIGURE 6-13.1. HARDWARE BUILDUP

6.6.24 PACK LOCK ASSEMBLY OR PACK LOCK SOLENOID R & R

● REMOVAL

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove top cover by lifting cover straight up (base cabinet only).
3. Extend unit to its fully extended position (rack only).
4. Remove disk cartridge.
5. Set main circuit breaker to Off position.
6. Remove electronics cover.
7. On rack mounted units, remove coupling screw securing latch knob to latch mechanism (see Figure 6-7).
8. Disconnect ground straps from front panel (one on rack-mounted units, two on base cabinet units if present).
9. Remove front panel by loosening two screws at bottom of panel and removing two screws on each side of unit holding front panel to cartridge receiver (see Figure 6-7).
10. Remove the three screws from inside cartridge receiver.
11. Lift the cartridge receiver up until connector A9P2 can be disconnected. After A9P2 is disconnected, further remove cartridge receiver.

CAUTION While lifting cartridge receiver be extremely careful to avoid damage to the fixed disk.

12. If not replacing solenoid only, proceed to Step 18. Remove solenoid from pack lock assembly and receiver harness.
13. Loosely install replacement solenoid on pack lock assembly.
14. With the pack lock in an open position, place a 0.015 in. (0.38 mm) shim between pack lock and solenoid plunger. Push solenoid toward pack lock as far as it will go (plunger touching rear of solenoid).
15. Tighten solenoid screws and remove shim.
16. Using a small screwdriver, push back plunger and verify clearance.

17. Reconnect receiver harness to solenoids. Proceed to Step 3 of Replacement Procedure.
18. Using a pencil, outline the outside edges of the bracket legs on the pack lock assembly to be removed.
19. Note orientation of the wires connected to the pack lock switch.
20. Disconnect receiver harness terminals connected to pack lock switch and pack lock solenoid.
21. Remove pack lock assembly from deck.

● **REPLACEMENT**

1. Install new pack lock assembly within outline on deck.
2. Connect receiver harness terminals to pack lock switch and pack lock solenoid.
3. Install cartridge receiver by aligning it on the two small pins on the deck and connecting A9P2.

CAUTION

While installing cartridge receiver be extremely careful to avoid damage to fixed disk and receiver harness.

4. Fasten cartridge receiver with three screws.
5. Install front panel to cartridge receiver. Insure that insulating strips are still mounted to brackets on front panel and there is electrical isolation between front panel and deck.
6. Connect ground straps.
7. Install latch assembly (rack only).
8. Perform Index to Burst Period Check and Adjustment.
9. Install electronics cover.
10. Install top cover (base cabinet only).

6.7 CHECK AND ADJUSTMENT PROCEDURES

This section contains procedures that may be used to check for malfunctioning parts, to determine whether disk drive is operating within published specifications, or to adjust disk drive for proper operations. Before any electronics checks or adjustment are performed, the disk drive must go through a temperature stabilization process.

6.7.1 TEMPERATURE STABILIZATION CHECK AND ADJUSTMENT

1. If disk unit has not been operating, or a CE disk cartridge has been installed, allow unit to exercise for twenty minutes. For an additional ten minutes, allow unit to sit in a heads loaded, unit ready condition. Perform this with electronic cover on. Perform needed checks and adjustments or;
2. If disk unit has been operating, allow unit to sit in a heads loaded, unit ready condition, for ten minutes (with electronic cover on), before proceeding with checks and adjustments.

6.7.2 AGC SERVO PREAMPLIFIER AND INDUCTOSYN CHECK AND ADJUSTMENT

NOTE 1: Prior to performing this adjustment perform Steps 12, 13 and 14. If Step 14 is within spec proceed with Step 15, if not, start with Step 1.

NOTE 2: Portions of the Inductosyn alignment must be made under dynamic conditions. If the Field Test Exerciser is not utilized appropriate provisions must be made in the computer system to cover these conditions.

CAUTION

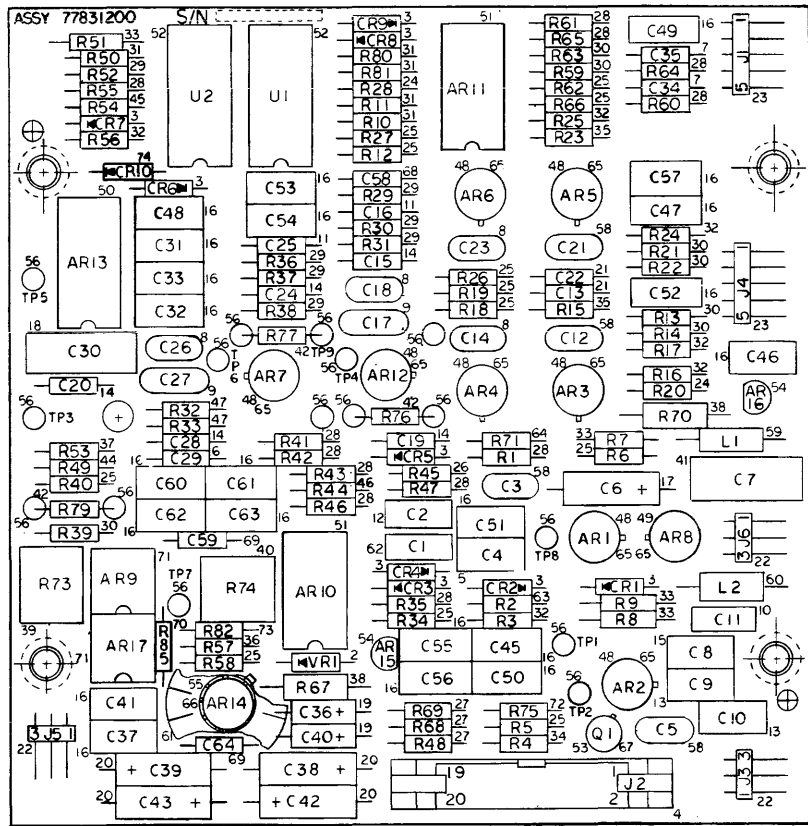
In performing this procedure, care must be exercised to prevent severe and extended contact between position transducer and slider.

1. If position transducer, AGC preamp, or Servo Board has been replaced, insure that all connectors are plugged into their respective receptacles.
2. Connect field tester/exerciser to unit.
3. Remove A1P2 from the actuator and power up drive for normal operation. It is necessary that a disk cartridge is installed in the drive and relay K1 on power board #1 has energized.
4. Install a jumper from TP1 to -5 V supply (TP9). See Figure 6-14.
5. Connect oscilloscope to C24 (point A of Figure 6-14). Set scope for internal trigger and auto sync.
6. Move carriage by hand, back and forth between cylinders 000 and 405 (000 and 202 for 100 TPI units) and observe waveform on oscilloscope.
7. If amplitude of waveform is 1.0 ± 0.05 volts peak to peak (see Figure 6-15), do not make any adjustment and proceed to Step 9, if not proceed to Step 8.
8. If waveform is not within above stated tolerances, loosen transducer mount block forward-most screw (right item 3, Figure 6-10), and adjust cam (item 4, Figure 6-10) for proper amplitude. If this adjustment is not sufficient, loosen transducer scale mounting screw (item 1, Figure 6-10). It may be necessary to make sequential adjustments of the cam and eccentric screw to obtain proper amplitude tolerances.
9. Tighten transducer scale mounting screw (item 1, Figure 6-10) to 20 in/lb.
10. Verify the waveform amplitude is still 1.0 ± 0.05 volts peak to peak between cylinders 000 and 405 (000 and 202 for 100 TPI units).
11. Remove jumper from TP1 and TP9.
12. Connect oscilloscope to TP3.
13. Move carriage by hand back and forth between cylinders 000 and 405 (000 and 202 for 100 TPI units) and observe waveform on oscilloscope.
14. Amplitude of waveform must be $5 \pm 0.6, -0.2$ volts peak to peak. If not, repeat Steps 4 through 10 again. If adjustment cannot be performed, replace AGC preamp. Waveform will be similar to Figure 6-15 except for difference in amplitude.
15. Push carriage forward so that carriage is at forward stop position.

CAUTION

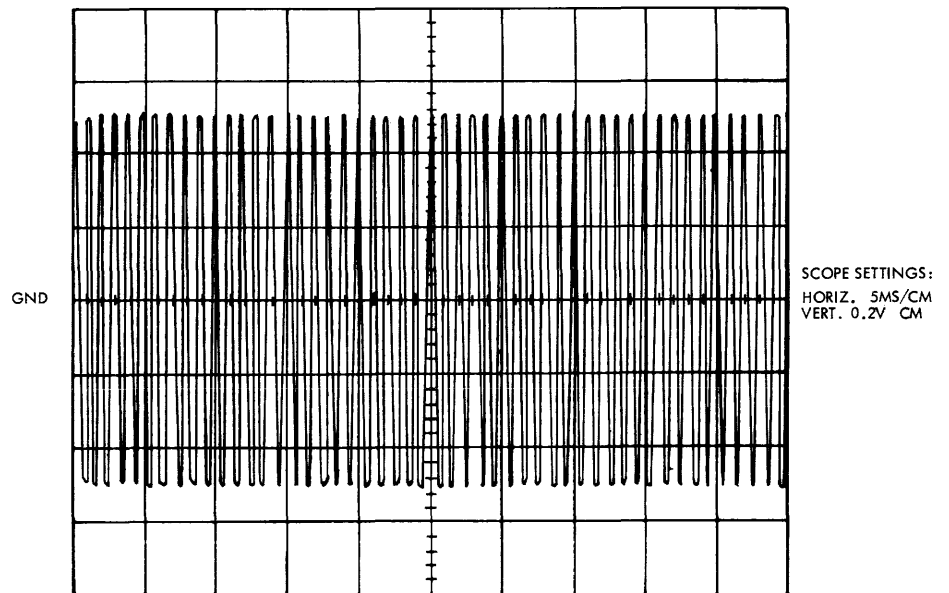
While performing Steps 16 and 17, keep hands clear of carriage.

16. Reconnect A1P2.
17. Execute RTZ Command from field tester.
18. Perform temperature stabilization procedure.
19. Perform alternate seek between cylinders 293 and 405 (146 and 202 for 100 TPI units).
20. Monitor "On Cylinder" signal from field tester and adjust velocity gain potentiometer R73 (see Figure 6-14) for a seek time of 35 ± 1 milliseconds (see Figure 6-17b). Adjust sync to get correct waveform.



XX244a

FIGURE 6-14. PREAMP BOARD ADJUSTMENT LOCATION



AA005b

FIGURE 6-15. POSITION TRANSDUCER WAVEFORM

21. Perform an alternate seek from cylinder 200 to 201 (100 to 101 for 100 TPI units). Sync oscilloscope with "On Cylinder" signal on exerciser. Monitor TP3 and adjust potentiometer R74 on preamp board (see Figure 6-14) so that the amplitudes are balanced (in relationship to each other) within ± 100 mV of logic ground. Figure 6-16a shows waveforms unbalanced and Figure 6-16b shows them balanced.
22. This adjustment should be repeated whenever the drive exceeds ± 150 mV from logic ground.
23. Verify the adjustment, seeking from cylinder 000 to 001, and from 400 to 401 (000 to 001 and 200 to 201 for 100 TPI units). It may be necessary to adjust R74 to bring all three locations into adjustment.
24. Verify the adjustment again seeking from cylinder 000 to 002 and 400 to 402 (000 to 002 and 200 to 202 for 100 TPI units). It may be necessary to adjust R74 to bring both locations into adjustment (see Figure 6-16c).
25. Perform alternate seek between cylinders 293 and 405 (146 and 202 for 100 TPI units).
26. Monitor waveform at TP3. The peak to peak amplitude of the last full sinewave before "On Cylinder" goes negative must be 5 ± 0.5 volts (see Figure 6-17). Figure 6-17 shows a forward seek.
27. By resyncing oscilloscope obtain a reverse seek waveform (see Figure 6-17b). The peak to peak amplitude of the last full sinewave before "On Cylinder" goes negative must be 5 ± 0.5 volts.
28. Perform EOT Check and Adjustment Procedure.
29. Perform Head Alignment Check and Adjustment Procedure.
30. Perform Index-to-Burst Check and Adjustment Procedure.

6.7.3 FEOT CHECK AND ADJUSTMENT

EOT adjustments must be made under dynamic conditions. Alternate seek to cylinder address 410 and 408 (205 and 204 on 100 TPI units) and cycle restarts and required to perform this adjustment.

NOTE:

Appropriate provisions must be made in the computer system for these conditions if the Field Test Exerciser is not utilized.

1. Set main circuit breaker to off position.
2. Connect Field Tester/Exerciser to unit.
3. Install servo board on card extender.
4. Set main circuit breaker to on position.
5. Depress START/STOP switch to START (in) and wait for completion of first seek.
6. Perform temperature stabilization procedure.
7. Unplug A1P2 on actuator.
8. On Servo Board, ground TP20 and TP21.
9. Set Actuator at forward stop and reconnect A1P2.
10. Perform RTZ function on Field/Tester Exerciser.
11. Insure that error halt switch is down on Field Tester/Exerciser.
12. Monitor TP19 on Servo board with channel A of oscilloscope and sync negative on this signal. Monitor TP3 (Figure 6-14) on AGC Preamp board with channel B of oscilloscope. Place channel B in uncalibrated vertical position and adjust until waveform is five centimeters in amplitude.

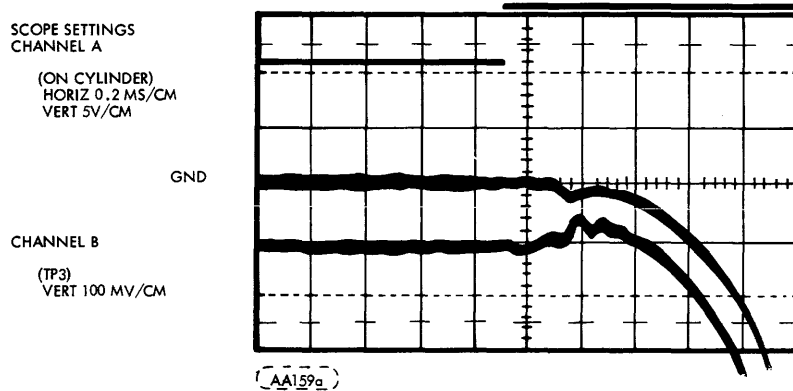


FIGURE 6-16A. ONE TRACK SEEK UNBALANCED

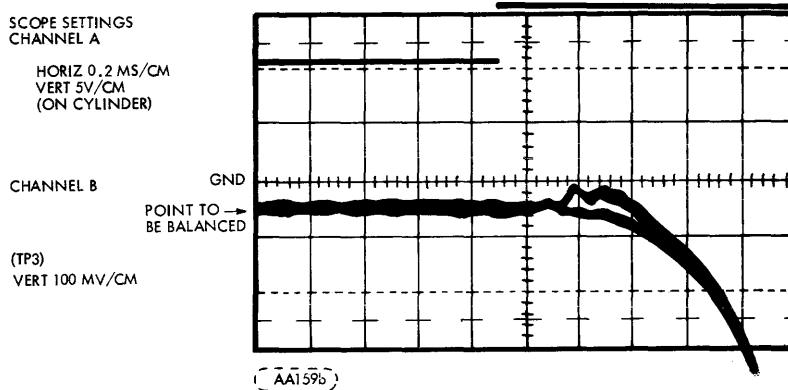


FIGURE 6-16B. ONE TRACK SEEK BALANCED

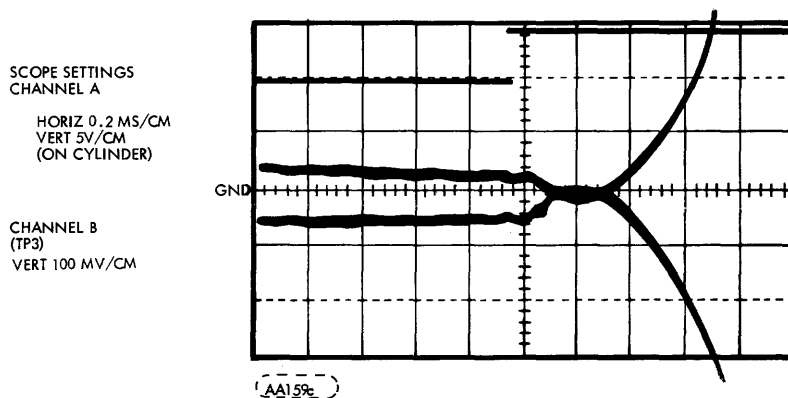


FIGURE 6-16C. TWO TRACK SEEK WITHIN TOLERANCE

13. Perform alternate seek in the access mode between cylinders 408 and 410 (204-205 for 100 TPI). Alternate seek in the access mode is defined as movement of the heads back and forth between cylinders without performing a read operation.

NOTE: Horizontal sweep time of Figure 6-18a and 6-18b depends upon switch settings on the I/O board.

14. Adjust oscilloscope until waveform looks similar to Figure 6-18a or 6-18b. Place crossover of signals A and B in middle of screen and place horizontal sweep time to 10X. Waveform should be similar to Figure 6-18c depending on sweep time.
15. If waveform is not within limits shown in Figure 6-18c, slightly loosen two socket head screws (Phillips on early units) on EOT Detector (Figure 6-3). Place screw driver in slot and adjust detector horizontally to limits shown in Figure 6-18c.

NOTE: Limits are defined as signal A must go Positive within ± 1 vertical centimeter of signal B ground along slope of signal B.

16. Tighten screws and verify that adjustment has not changed.
17. Unplug A1P2 on actuator.
18. On Servo Board, remove grounds from TP20 and TP21.
19. Set actuator at forward stop and reconnect A1P2.
20. Perform RTZ function on Field/Tester Exerciser.
21. Perform Head Alignment Check and Adjustment.
22. Perform Index to Burst Period Check and Adjustment procedure.

6.7.4 HEAD ALIGNMENT CHECK AND ADJUSTMENT

NOTE: Refer to HPC package located in front of manual for option switch and terminator locations.

1. Depress START/STOP switch to STOP and wait for spindle to stop rotating (START/STOP LAMP extinguished).
2. Remove disk cartridge and install CE disk cartridge. Refer to disk cartridge removal and installation procedure in section 2.
3. Open top cover (base cabinet only).
4. Set main circuit breaker to off position.
5. Remove electronics cover.
6. Record setting of all switches on I/O board.
7. Verify that resistor modules are installed on I/O board. If not, install terminator plug in I/O board connector J1 if required.
8. Install OEM field tester. If no OEM field tester or system is available to perform the required functions refer to HPC package to star select unit and terminator power.

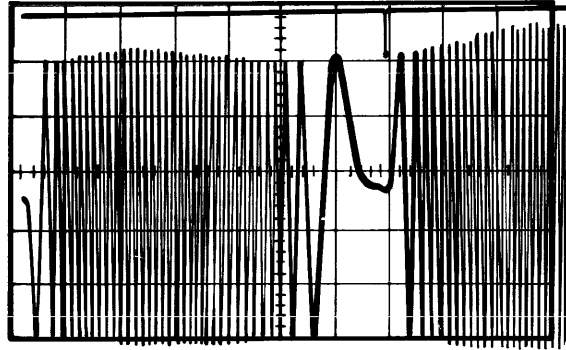
CAUTION K1 should not be removed until main circuit breaker is in off position. With K1 removed, emergency retract is disabled. Consequently, heads must be manually retracted if spindle slows down below tolerance limit.

9. Open power supply cover and remove relay K1 to provide access to heads.
10. Disconnect A1P2 (Note Orientation).
11. Set main circuit breaker to on position.
12. Depress W/PROT CART and W/PROT FIXED switches to ON (in).

SCOPE SETTINGS
CHANNEL A
ON CYLINDER

HORIZ 5MS/CM
VERT 5V/CM

CHANNEL B
TP3
VERT 1V/CM

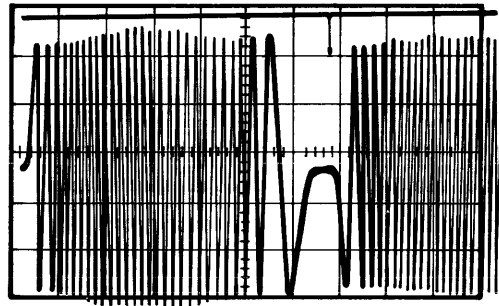


(AA180a) A. FWD SEEK

FIGURE 6-17A. FORWARD SEEK

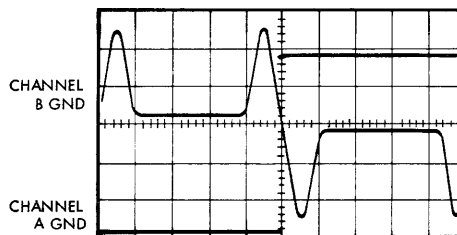
SCOPE SETTINGS
CHANNEL A
ON CYLINDER
HORIZ 5MS/CM
VERT 1V/CM

CHANNEL B
TP3
VERT 1V/CM



(AA180b) B. RVS SEEK

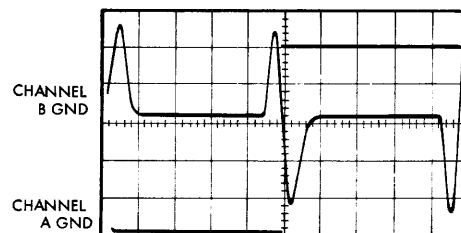
FIGURE 6-17B. REVERSE SEEK



SCOPE SETTINGS:
HORIZ 2MS/CM
VERT "B" UNCAL-
ADJUST FOR
5 CM HIGH
VERT "A" 1V/CM

(BB036)

FIGURE 6-18A. EOT WAVEFORMS



SCOPE SETTINGS
HORIZ 5MS/CM
VERT "B" UNCAL
ADJUST FOR
5 CM HIGH
VERT "A" 1V/CM

(BB036)

FIGURE 6-18B. EOT WAVEFORMS

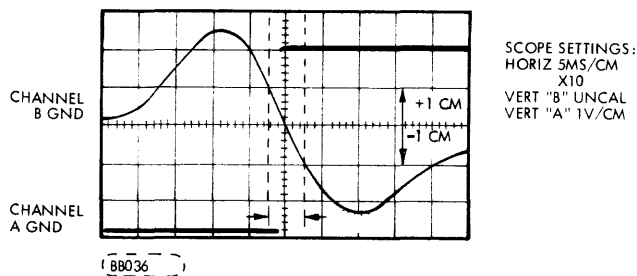


FIGURE 6-18C. EOT WAVEFORMS

13. Depress START/STOP switch to start (in) and allow spindle to attain operating speed.
14. Reconnect A1P2, but reverse orientation as noted in Step 10, immediately upon completion of brush cycle.
15. Perform temperature stabilization procedure.
16. Select upper head of disk cartridge and command unit to seek to cyl 146₁₀ (73₁₀ for 100 TPI units). For units without OEM tester proceed to Step 17. For other units proceed to Step 19.
17. If no OEM field tester or system is available to perform required functions. Refer to HPC package for proper switch settings.
18. After switches have been set to select head and cylinder desired, momentarily toggle cylinder address strobe switch on then off. This must be performed quickly or a seek error might occur.
19. Actuator should move to cylinder #146 (#73 for 100 TPI units).
20. Place oscilloscope external sync on Sector (P1-B10 on I/O Board for multi-sector units, index (P1-A31 I/O Board) for single-sector units without field tester and index (on field tester) for single-sector units with field tester.
21. Also monitor this signal and set up oscilloscope to indicate one complete revolution. Horizontal setting will be 2 ms/cm uncalibrated (see Figure 6-19A).
22. Monitor TP1 and TP2 on I/O board with channels A and B of the oscilloscope.
23. Set Oscilloscope to add signals and invert one channel.

This alignment procedure must be performed entirely with the oscilloscope calibrated for a sweep of 10 divisions equals one spindle revolution. (See Step 21 of this procedure.)

NOTE: Ideal head alignment occurs when the length of a single "cat eye" pattern equals one half of a spindle revolution or 5.0 oscilloscope divisions when calibrated to Step 21. Pattern crossover points are not necessarily coincident with the sweep start (index) and the position of these points relative to the index has no effect on proper head alignment. Pattern amplitude relationships are of no importance and should not be considered when aligning the heads.

24. Using the horizontal position control, move the display so that an accurate measurement between two consecutive crossover points can be obtained. (See Figure 6-19b.) The head is in alignment if this measurement does not exceed 5 ± 0.8 divisions. If this head meets the alignment requirements proceed to Step 28 and repeat this procedure. If not aligned to specification, continue.
25. Loosen upper head clamp if adjustment is required. (See Figure 6-6).
26. Using head alignment tool (CDC #75797900) adjust head to 5 ± 0.5 divisions. (See Figure 6-19b.)
27. Tighten upper head clamp and torque to 6 ± 0.5 in./lbs. Verify head alignment meets 5 ± 0.5 divisions after tightening.
28. Select lower head of disk cartridge. If no OEM field tester and no system is available to perform selection, refer to the HPC package for proper switch

- setting. After head selection follow the procedure outlines in Step 24.
29. Loosen lower head clamp if adjustment is required.
 30. Using head alignment tool (CDC #75797900) adjust head to 5 ± 0.5 divisions. (See Figure 6-19b.)
 31. Tighten lower head clamp and torque to 6 ± 0.5 in.lbs. Verify head alignment meets 5 ± 0.5 divisions after tightening.
 32. If new heads have been installed or actuator has been removed, proceed to Step 16 of index-to-burst period check and adjustment. Otherwise continue procedure.
 33. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
 34. Remove CE disk cartridge.
 35. Set main circuit breaker to off position.
 36. Disconnect A1P2, reverse plug, and reconnect.
 37. Install K1 and close power supply cover.
 38. Set all switches on I/O board back to original positions noted in Step 6.
 39. Disconnect oscilloscope.
 40. Install electronics cover.
 41. Close top cover (base cabinet only).

6.7.5 HEAD SKEW AND INDEX-TO-BURST PERIOD CHECK AND ADJUSTMENT

NOTE: Refer to HPC package located in front of manual for option switch and terminator locations.

1. Depress START/STOP switch to STOP and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove disk cartridge and install CE disk cartridge. Refer to disk cartridge removal and installation procedure in section 2.
3. Set main circuit breaker to off position.
4. Open top cover.
5. Remove electronics cover.
6. Record setting of all switches on I/O board.
7. Verify that resistor modules are installed on I/O board. If not, install terminator plug in I/O board connector J1 if required.
8. Install OEM field tester. If no OEM field tester or system is available to perform the required functions refer to HPC package to star select unit and terminator power.

CAUTION

K1 should not be removed until main circuit breaker is in off position. With K1 removed, emergency retract is disabled. Consequently, heads must be manually retracted if spindle slows down below tolerance limit.

9. Open power supply cover and remove relay K1 to provide access to heads.
10. Disconnect A1P2 (note orientation).
11. Set main circuit breaker to on position.
12. Depress W/PROT CART and W/PROT FIXED switches to on (in).
13. Depress START/STOP switch to start (in) and allow spindle to attain operating speed.
14. Reconnect A1P2, but reverse orientation as noted in Step 10, immediately upon completion of brush cycle.
15. Perform temperature stabilization procedure.
16. Select upper head of disk cartridge and command unit to seek to cyl 10₁₀ (5₁₀ for 100 TPI units). For units without OEM tester proceed to Step 17. For other units proceed to Step 19.
17. If no OEM field tester or system is available to perform required functions, refer to HPC package for proper switch settings.
18. After switches have been set to select head and cylinder desired, momentarily toggle cylinder address strobe switches on then off. This must be performed quickly or a seek error might occur.

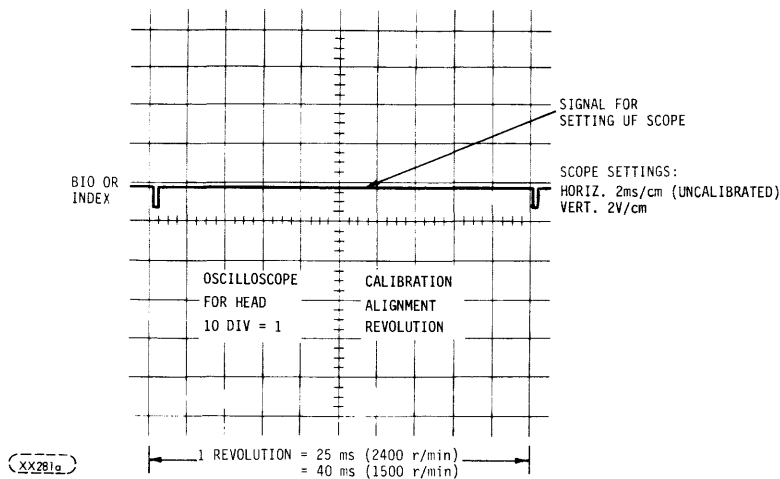


FIGURE 6-19A. HEAD ALIGNMENT SCOPE SETTING

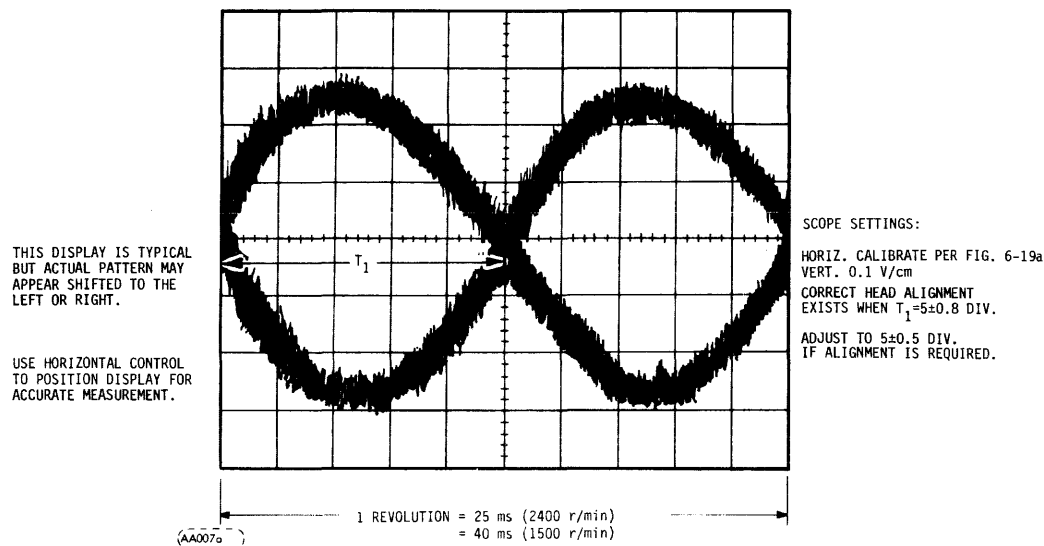


FIGURE 6-19B. HEAD ALIGNMENT WAVEFORM

19. Actuator should move to cylinder #10 (#5 for 100 TPI units).
20. Place oscilloscope external sync and channel A on sector (P1-B10 on I/O Board) for multi-sector units, index (P1-A31 I/O board) for single-sector units without field tester and index (on field tester) for single-sector units with field tester (see Figure 20).
21. Connect oscilloscope channel B to TPI on I/O Board.

Head-skew check (Steps 22 through 24) should only be performed if a head has been replaced. If the check fails specification, keep replacing that head until the check passes specification. All measurements are to be made on the peak of the leading pulse derived by the CE pack regardless of polarity. To measure head skew with reliable accuracy, the index-to-data burst should be observed on a delayed sweep having a time base of 1 μ s per division for straddle-erase heads and 5 μ s per division for pre-erase heads. An alternate procedure is to change the index-to-burst timing so the pulse can be centered on the scope screen having the above horizontal time base (Figure 6-20b).

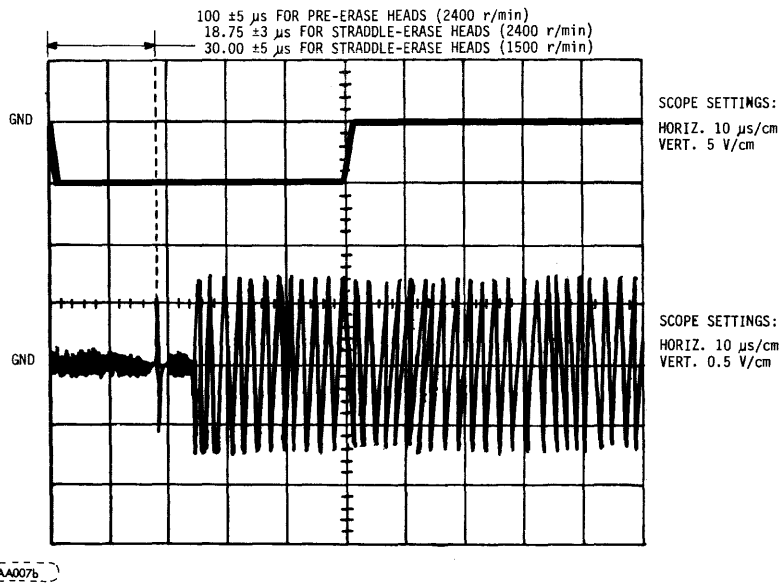
NOTE:

22. With the upper head of the disk cartridge selected, place the burst pulse in the center of the scope (Figure 6-20b).
23. Next select the lower head of the disk cartridge. If no OEM field tester or system is available to perform the selection, refer to the HPC package for the proper switch settings.

24. With the lower head of the disk cartridge selected, measure the difference between the burst point of the upper head to the burst point of the lower head. The head to head difference must be within the following limits:
 - 3 μ s maximum for straddle-erase heads (2400 r/min)
 - 4 μ s maximum for straddle-erase heads (1500 r/min)
 - 4 μ s maximum for pre-erase heads (2400 r/min)
25. Select the upper head of the disk cartridge. If no OEM field tester or system is available to perform the required functions, refer to the HPC package for the proper switch settings.
26. Check and record the index-to-burst period as shown in Figure 6-20a.
27. Select the lower head of the disk cartridge. If no OEM field tester or system is available to perform the selection, refer to the HPC package for the proper switch settings.
28. Check and record the index-to-burst period as shown in Figure 6-20a.
29. Determine which head has the lowest index-to-burst period and verify that it meets the following limits:
 - 100.0 \pm 5 μ s for pre-erase heads (2400 r/min)
 - 18.8 \pm 3 μ s for straddle-erase heads (2400 r/min)
 - 30.0 \pm 5 μ s for straddle-erase heads (1500 r/min)
- If the check meets the above limits, go to Step 31, if not, continue procedure.
30. If the head with the lowest index-to-burst period does not fall within the above limits, select that head and adjust the potentiometer on the sector board to the following:
 - 100.0 \pm 1 μ s for pre-erase heads (2400 r/min)
 - 18.8 \pm 0.1 μ s for straddle-erase heads (2400 r/min)
 - 30.0 \pm 0.5 μ s for straddle-erase heads (1500 r/min)
- If the potentiometer is not present or if the adjustment range of the potentiometer does not reach far enough, depress the START/STOP pushbutton to STOP and perform the cartridge index/sector transducer check and adjustment. Then repeat Steps 26 through 30.
31. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
32. Remove CE disk cartridge.
33. Set main circuit breaker to Off position.
34. Disconnect A1P2, reverse plug, and reconnect.
35. Install K1 and close power supply cover.
36. Set all switches on I/O board back to original positions noted in step 6.
37. Disconnect oscilloscope.
38. Install electronics cover.
39. Close top cover (base cabinet only).

6.7.6 TRACK INDICATOR CHECK AND ADJUSTMENT

1. Open top cover (base cabinet only).
2. Remove electronics cover.
3. Set main circuit breaker to on position.
4. Install disk cartridge.
5. Depress START/STOP switch to START (in) and wait for unit to complete FIRST SEEK.



NOTE: Measurement to be made at the peak of the leading pulse regardless of polarity. Some CE modes produce pulses inverted to pulse shown in Figure.

FIGURE 6-20A. INDEX-TO-BURST PERIOD WAVEFORMS

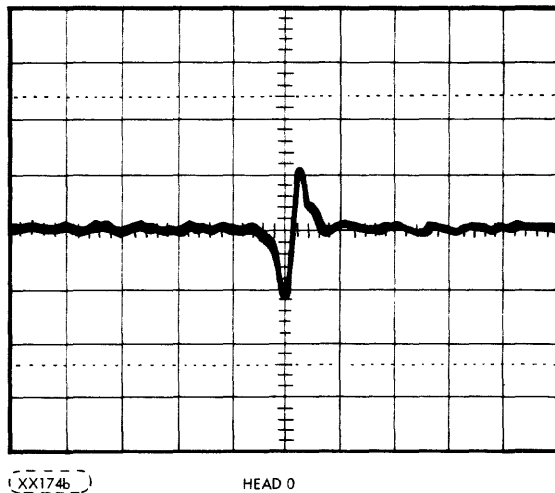


FIGURE 6-20B. INDEX-TO-BURST WAVEFORMS

6. Check that zero marks on fixed and movable sections of track indicators (Figure 6-21) are lined up.
7. If marks are not aligned, loosen fixed section of track indicator and position for alignment with movable section.
8. Check that gap between the fixed and movable sections of track indicator is 0.1 to 0.3 inches (2.54 to 7.62 mm).
9. Install electronics cover.

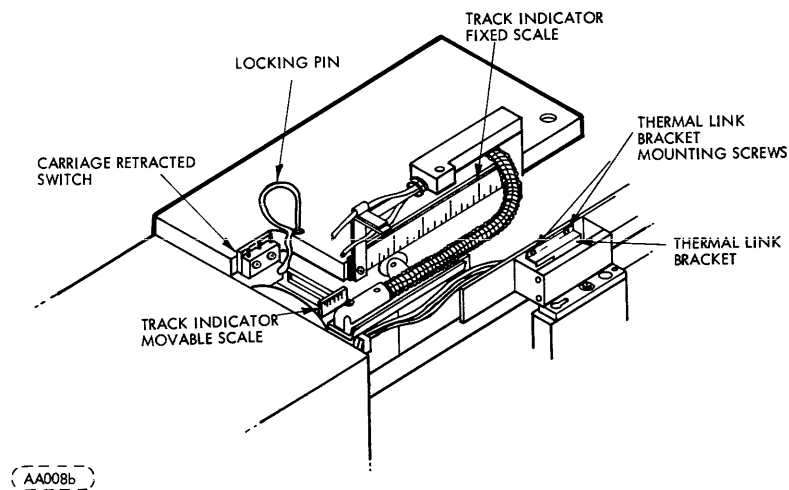


FIGURE 6-21. TRACK INDICATOR

6.7.7 CARTRIDGE-ON SWITCH CHECK AND ADJUSTMENT

There are two cartridge-on switches, one on each Hold-Down arm.

NOTE: Perform cartridge-on switch removal and replacement procedure except for actual removal of switches.

6.7.8 STATIC ELIMINATOR CHECK

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Remove disk cartridge.
3. Open top cover (base cabinet only).
4. Set main circuit breaker to off position.
5. Using multimeter check for five ohms or less between module ground and side of rotating spindle cone while turning spindle by hand.
6. If resistance is above five ohms clean static eliminator and perform Step 5 again.
7. If multimeter indicates no continuity or high resistance after cleaning replace static eliminator by following Static Eliminator Removal and Replacement procedure.

6.7.9 DISK BRUSH SWITCH CHECK AND ADJUSTMENT

Perform disk brush assembly removal and replacement procedure except for actual removal of brush assembly.

6.7.10 CARTRIDGE INDEX/SECTOR TRANSDUCER CHECK AND ADJUSTMENT

1. Depress START/STOP switch to STOP (out) and wait for spindle to stop rotating (START/STOP lamp extinguished).
2. Open top cover (base cabinet only).
3. Remove disk cartridge.

4. Set main circuit breaker to off position.
5. Install armature plate simulator onto spindle as shown in Figure 6-22.
6. Using plastic shim stock, adjust clearance A to 0.030 ± 0.005 inch (0.76 ± 0.13 mm) for 2400 r/min units and $0.018 \pm 0.005, -0.000$ inch ($0.46 \pm 0.13, -0.00$ mm) for 1500 r/min units. The adjustment is made by loosening the clamp screw and sliding the transducer in or out for proper clearance. Tighten the clamp screw.
7. After the transducer is properly adjusted, perform the Index to Burst Period Check and Adjustment procedure.

6.7.11 FIXED DISK INDEX/SECTOR TRANSDUCER CHECK AND ADJUSTMENT

1. Depress START/STOP switch to STOP(out) and wait for spindle to stop rotating (START/STOP lamp extinguish).
2. Set main circuit breaker to Off position.
3. Using a 5/32 Allen driver, place tool into hole on front end panel and remove panel by loosening hardware (base cabinet only).
4. Remove left side panel (when viewed from rear of unit, cabinet only).
5. Remove module bottom cover.
6. Using plastic shim stock, check clearance A (Figure 6-23). Clearance should be between $0.010 + 0.003, -0.000$ inch ($0.25 + 0.076, -0.000$ mm). If clearance is out of tolerance, loosen transducer clamp and slide transducer in or out to adjust for proper clearance.
7. Tighten transducer clamp.
8. Install module bottom cover.
9. Install side panel (base cabinet only).
10. Install rear end panel (base cabinet only).

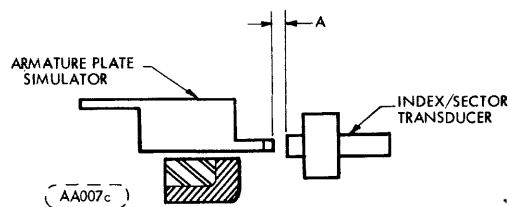


FIGURE 6-22. INDEX/SECTOR TRANSDUCER ADJUSTMENT

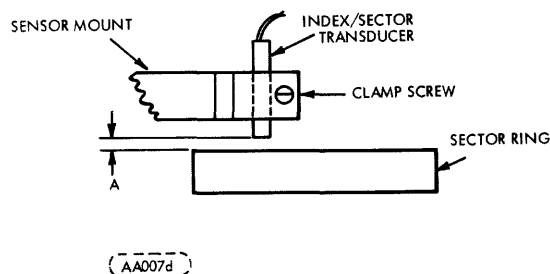


FIGURE 6-23. FIXED DISK INDEX/SECTOR TRANSDUCER ADJUSTMENT

7.1 GENERAL

This section contains information useful for maintaining the 9427H Disk Drive.

7.2 CIRCUIT BOARD DESCRIPTION

All disk drive electronics is contained on printed circuit boards. Six of the boards (R/W/E, Data Recovery, Sector, Servo, Control & I/O) measure 6 in. X 8 in. (152 X 203 mm) and are plugged into the card cage assembly mother board. The Inductosyn Pre-amp board measures 5 in. X 8 in. (127 X 203 mm) and is mounted on top of the magnet assembly. The Power board measures 4.75 in. X 7.50 in. (121 X 191 mm) and is part of the power supply assembly. Both integrated and discrete circuit are used on the boards.

7.3 CIRCUIT BOARD LOCATIONS

The Printed Circuit Boards are located in the Card Cage as shown in Figure 7-1.

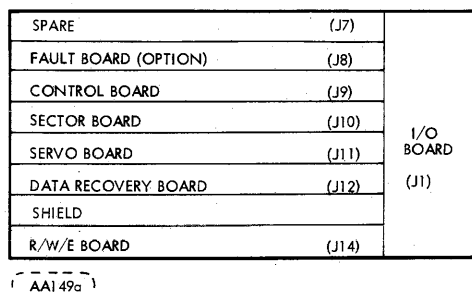


FIGURE 7-1. CIRCUIT BOARD LOCATION

7.4 TROUBLESHOOTING DIAGRAMS

The following diagrams are intended to guide service personnel to the probable cause of malfunctions in the 9427H disk drive.

The first series of diagrams illustrate the normal sequence of events when everything is functioning properly. However, at certain intervals during the normal sequential flow, service personnel are directed to specific flow chart locations if a malfunction does occur (refer to paragraph 7.5).

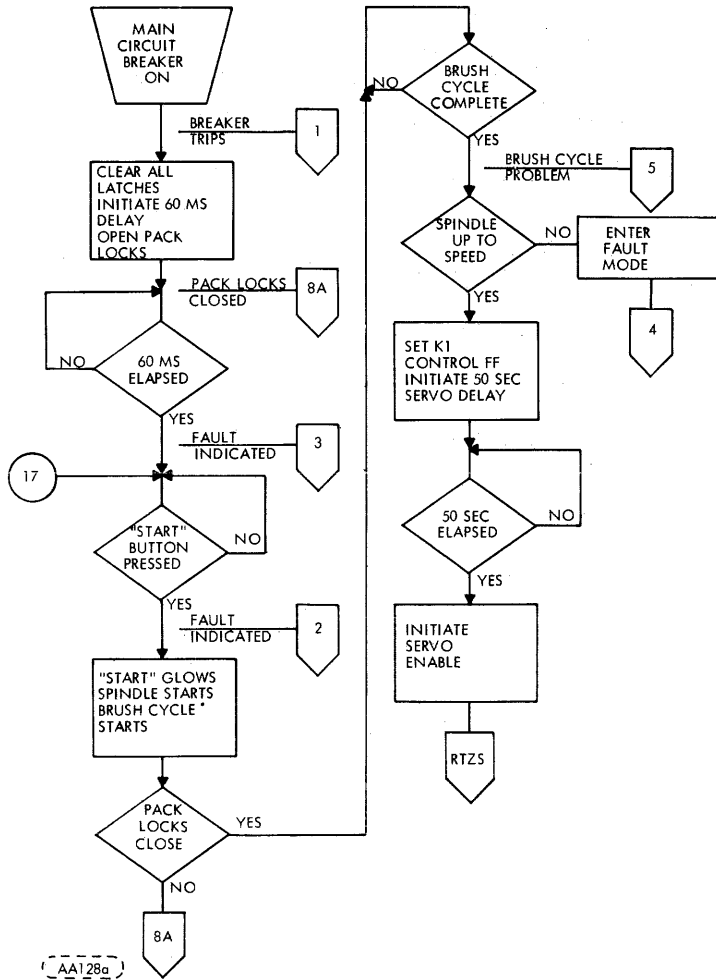
NOTE: In the flowcharts, imperative instructions (e.g. replace control board) are intended only to suggest a possible cause of the malfunction and the recommended solution.

7.5 FLOW DIAGRAM REFERENCES

Each diagram page is sequentially page numbered in the upper right-hand corner of the page. When the diagram flow is interrupted (**3**), the page location, where the flow will be continued is referenced in the Lower right-hand corner of the page.



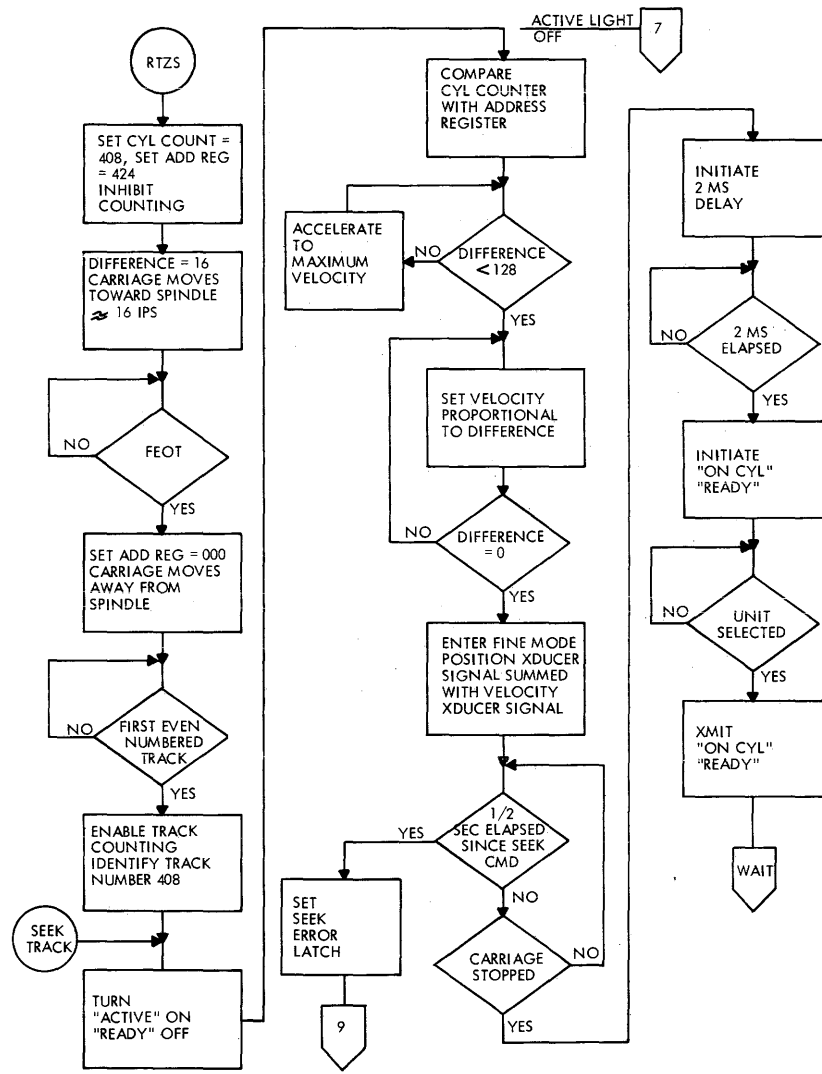
This indicates that the flow will continue on another page or a Fault has occurred. and on page 18 the flow will start at **3** .



(AA128a)

LOCATION

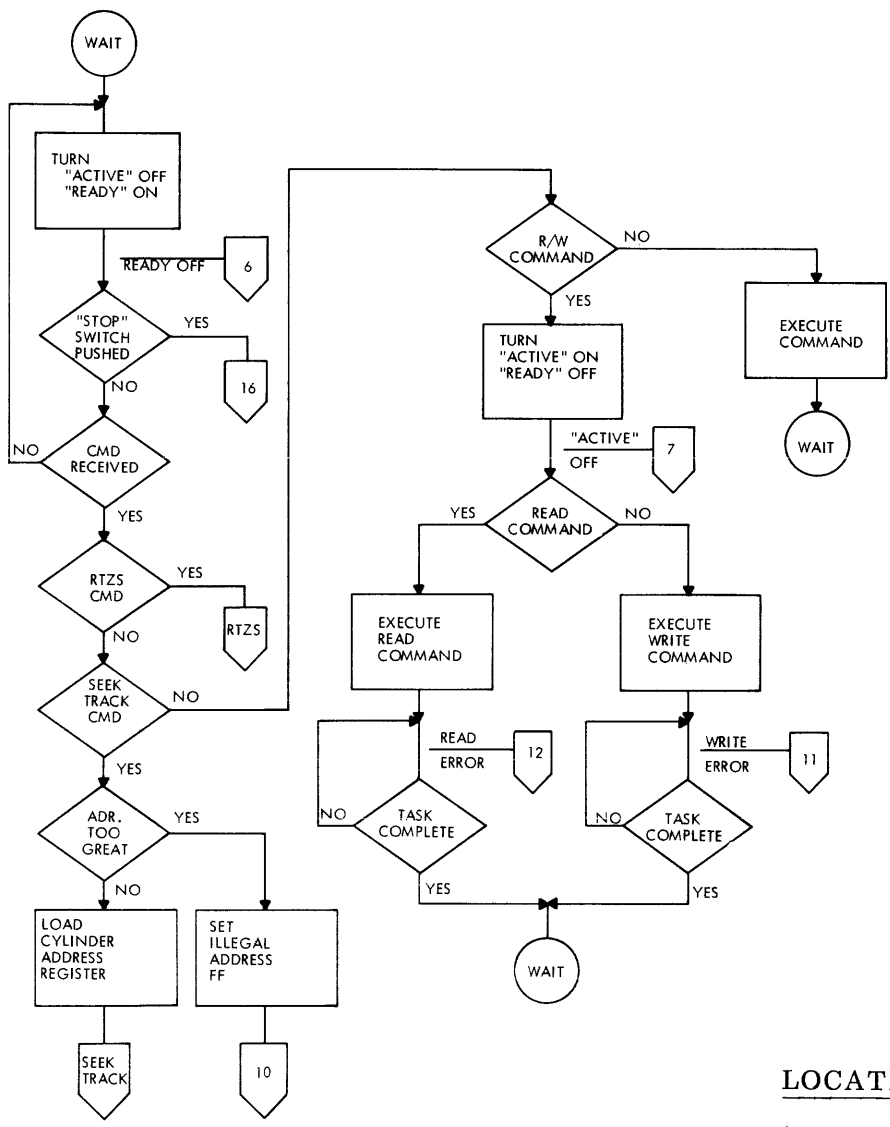
- 1 → 7
- 2 → 11
- 3 → 11
- 4 → 11
- 5 → 8
- 8A → 5
- RTZS → 2



AA128b

LOCATION

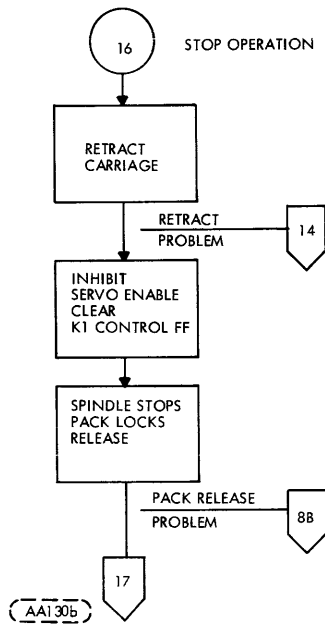
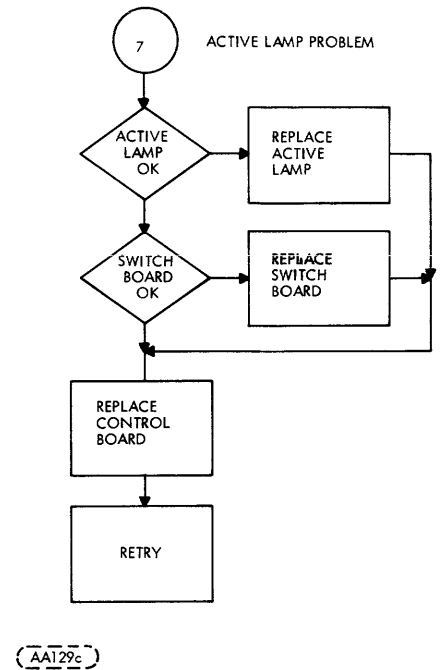
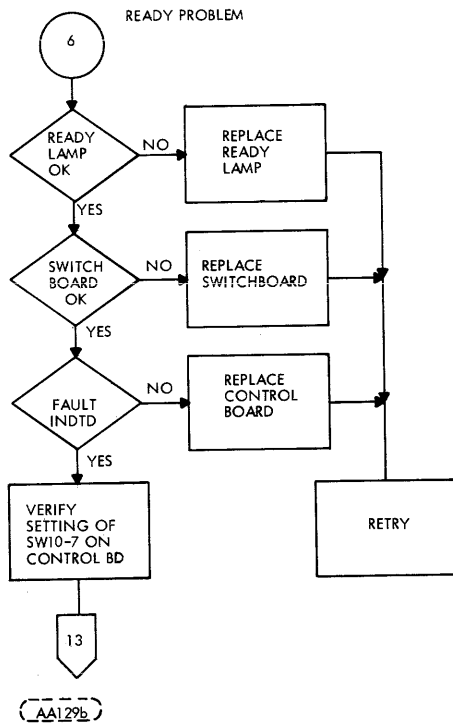
- 7 —————> 4
- 9 —————> 14
- WAIT —————> 3



(AA129a)

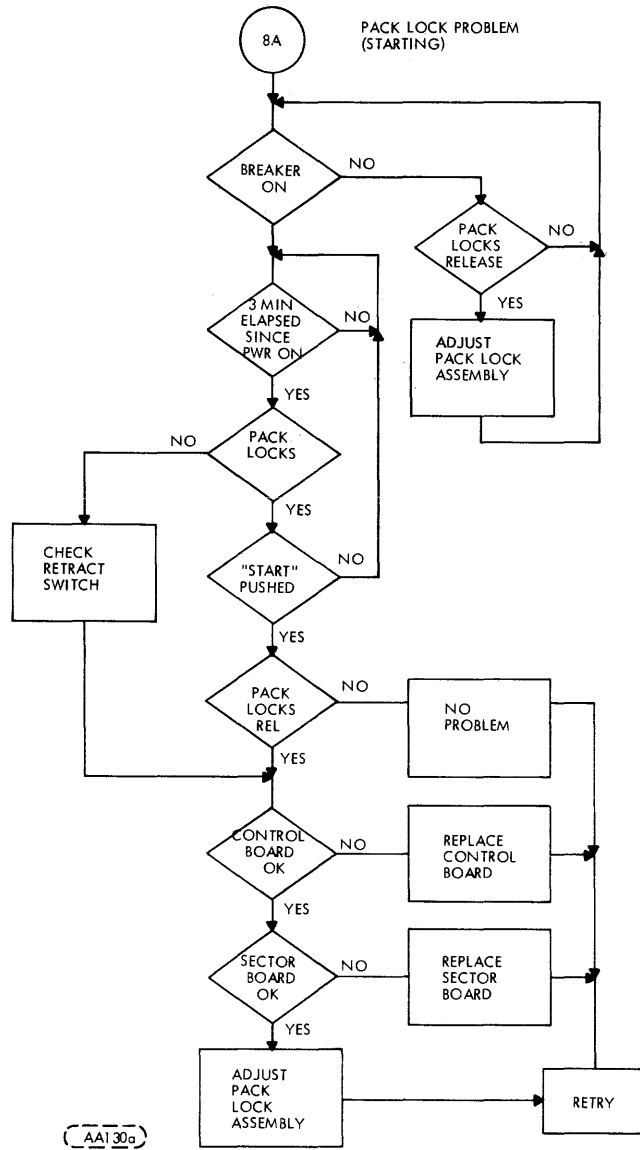
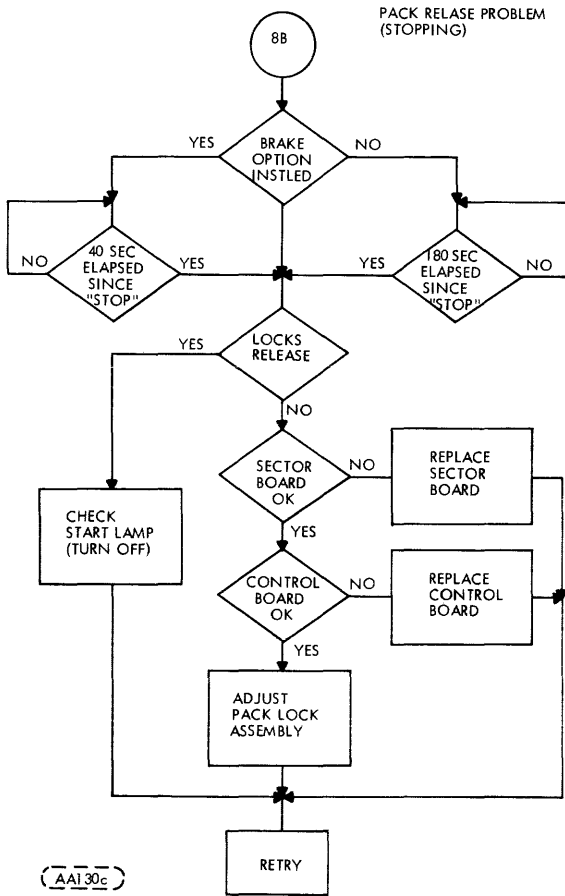
LOCATION

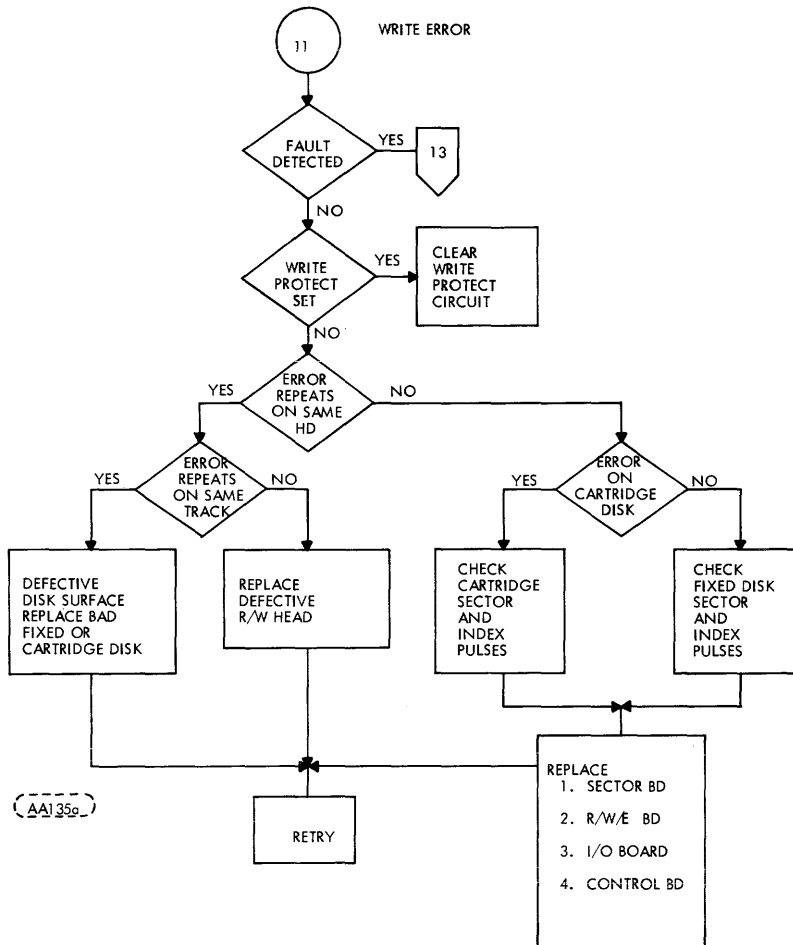
- 6 → 4
- 7 → 4
- 10 → 10
- 11 → 6
- 12 → 6
- 16 → 4
- SEEK TRACK → 2
- RTZS → 2



LOCATION

- 8B → 5
- 13 → 12
- 14 → 11
- 17 → 1





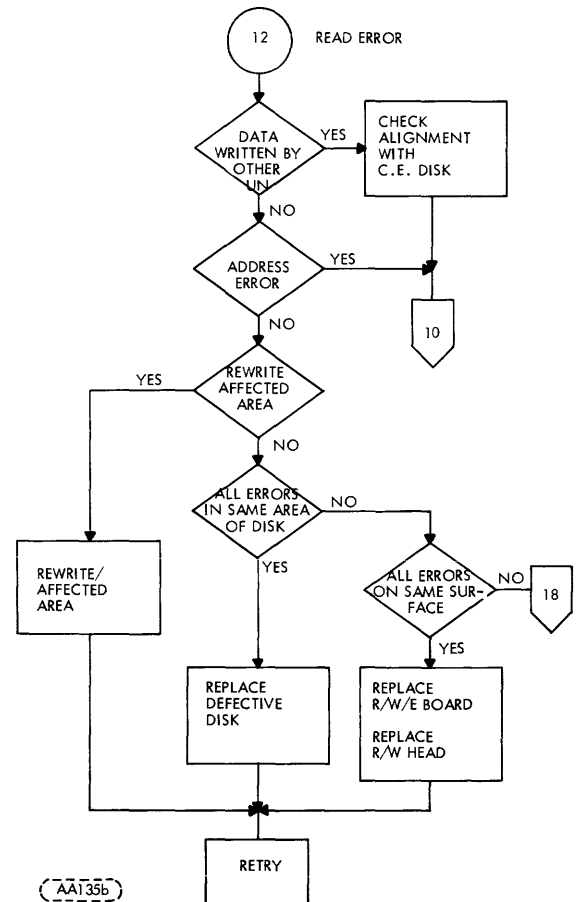
LOCATION

13 → 12

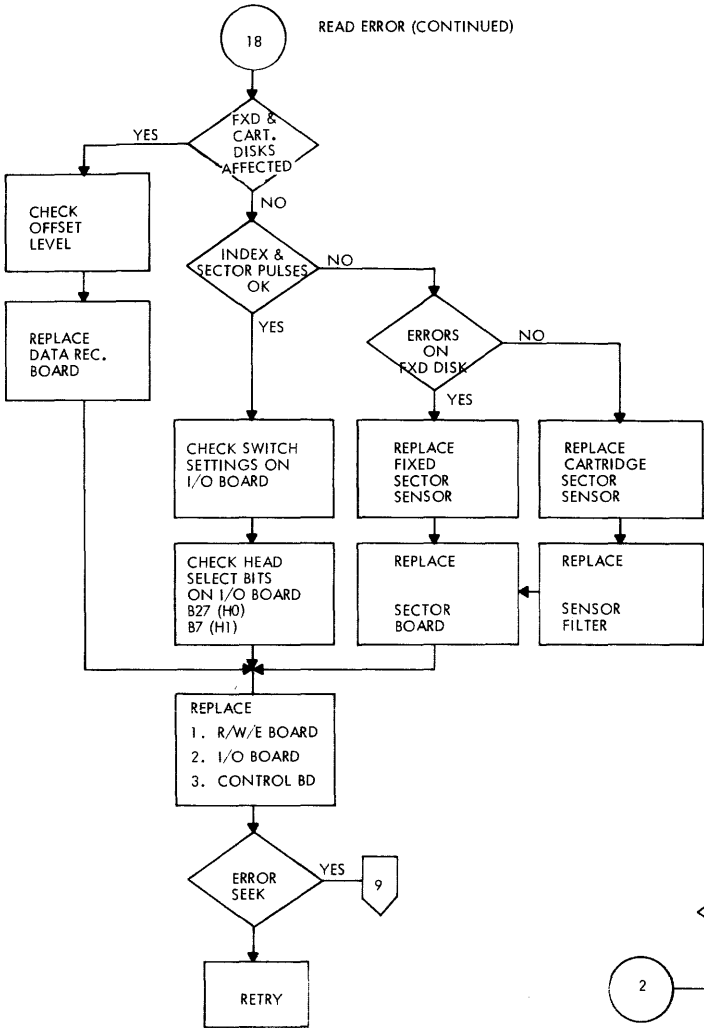
LOCATION

10 → 10

18 → 7



READ ERROR (CONTINUED)



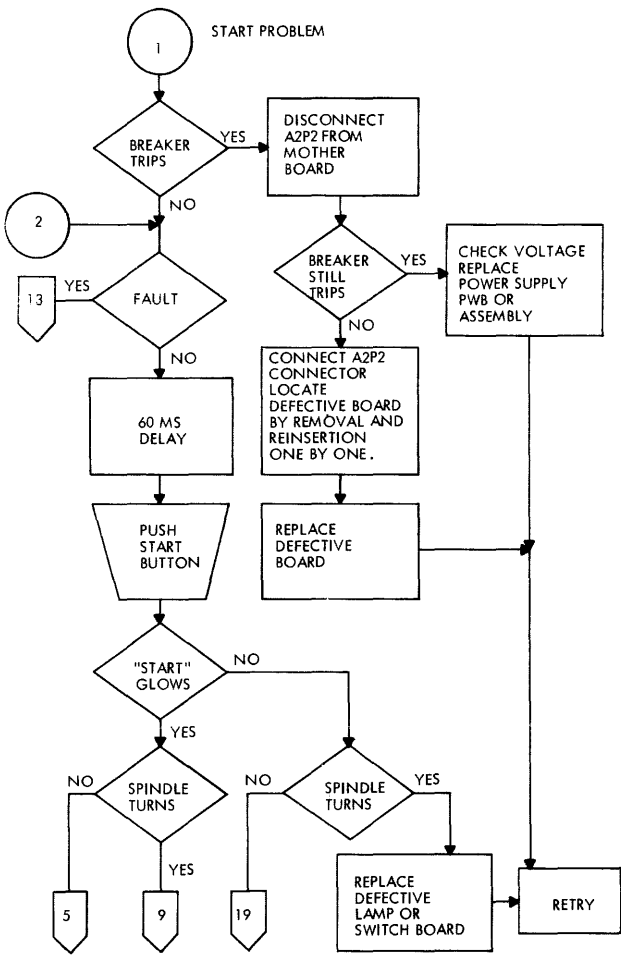
LOCATION

9 → 14

(AA136a)

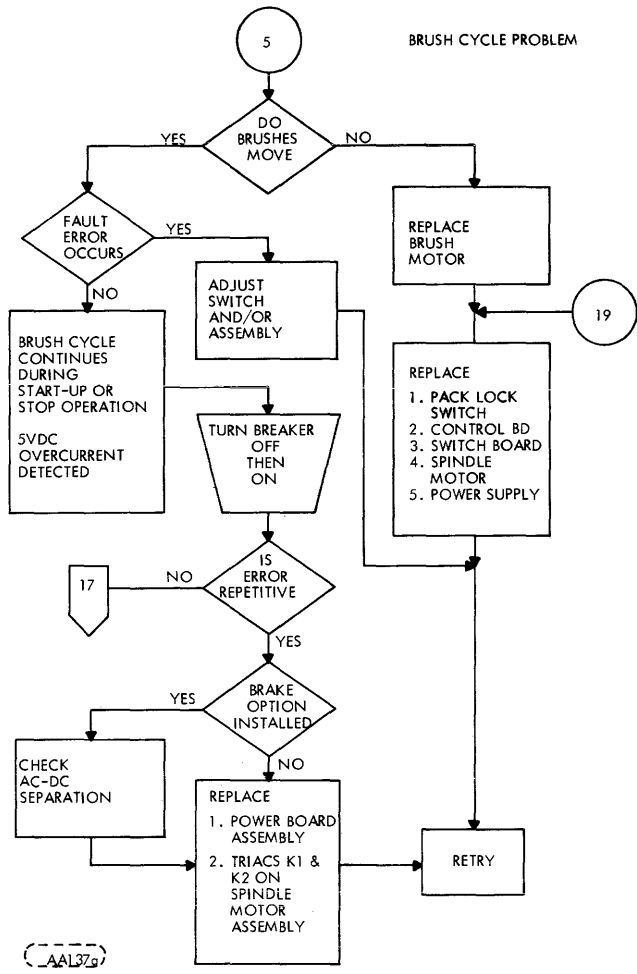
LOCATION

5 → 8
 9 → 14
 13 → 12
 19 → 8



(AA136b)

BRUSH CYCLE PROBLEM



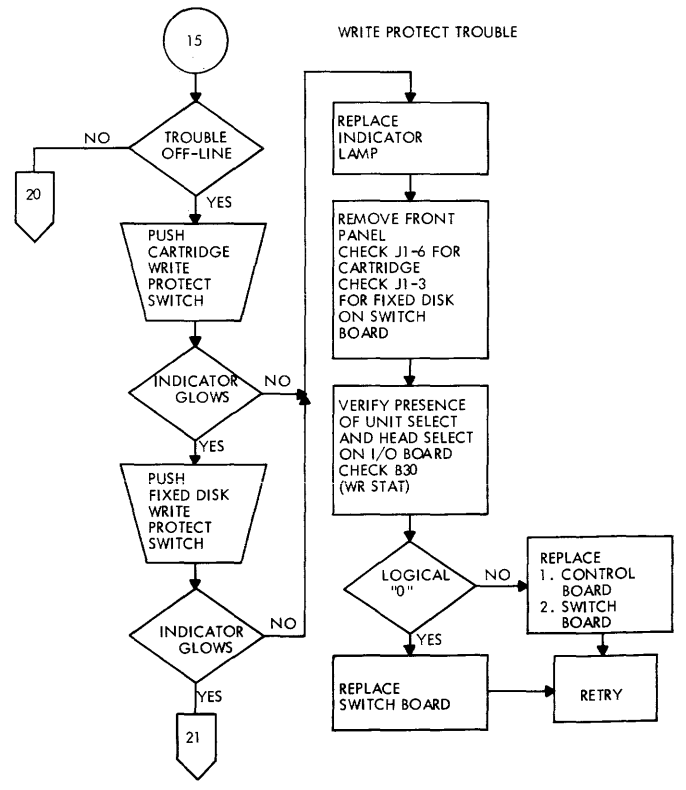
LOCATION

17 → 1

AAL37a

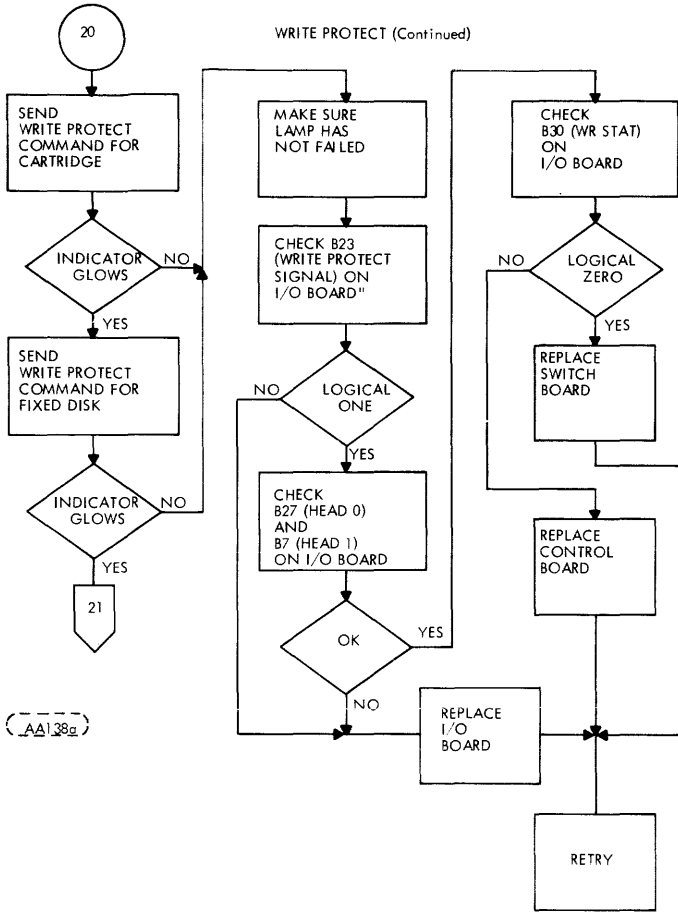
LOCATION

21 → 9



AAL37b

WRITE PROTECT (Continued)

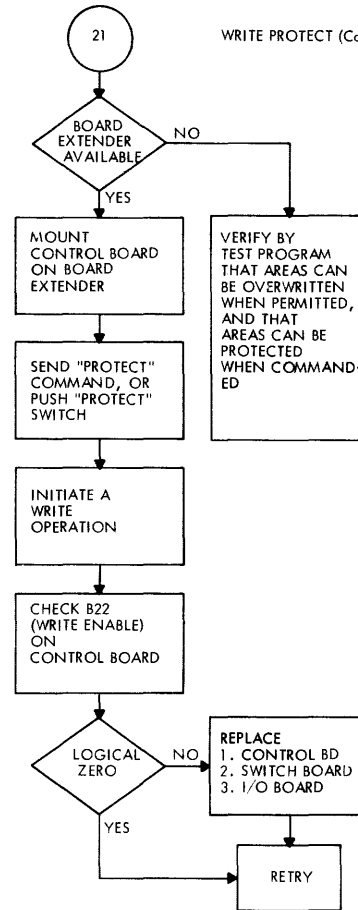


AA138g

LOCATION

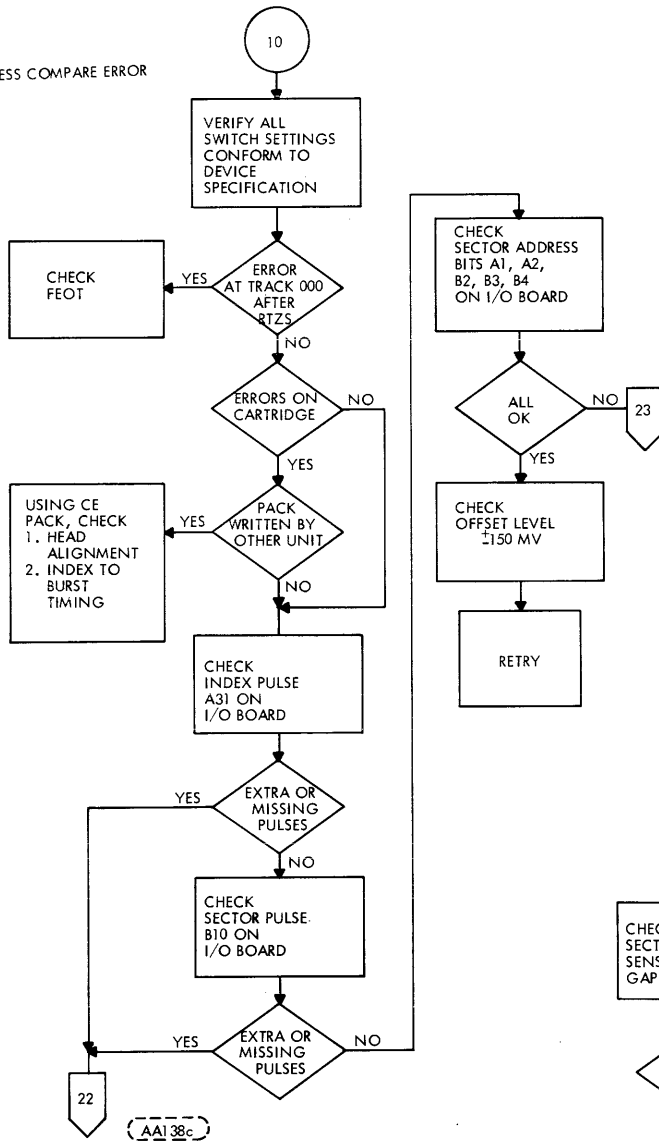
21 → 9

WRITE PROTECT (Continued)



AA138b

ADDRESS COMPARE ERROR

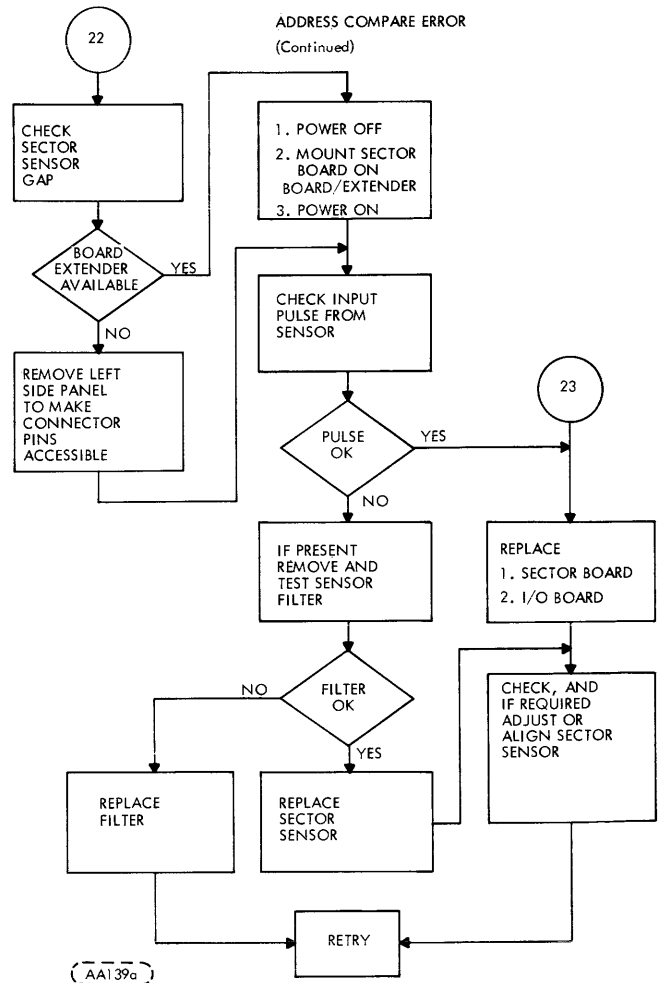


LOCATION

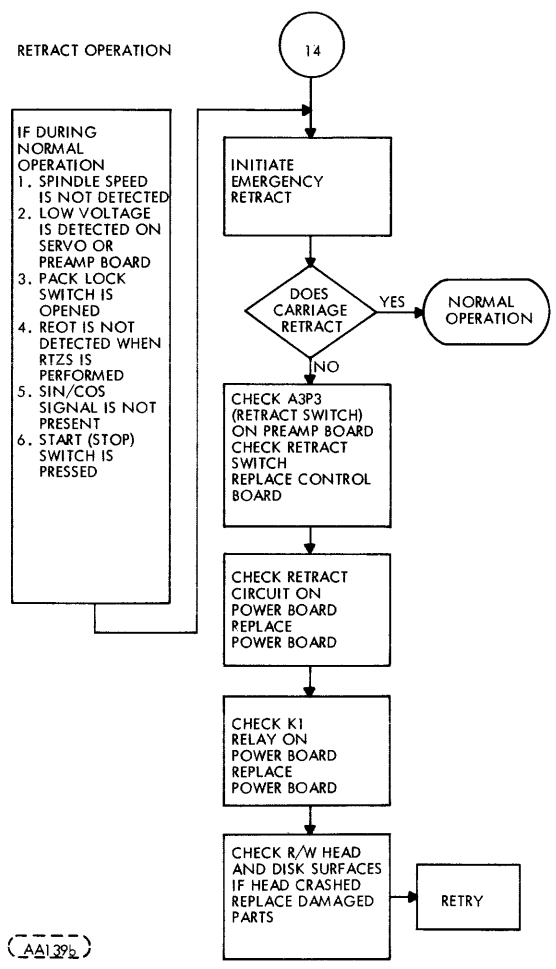
22 → 10

23 → 10

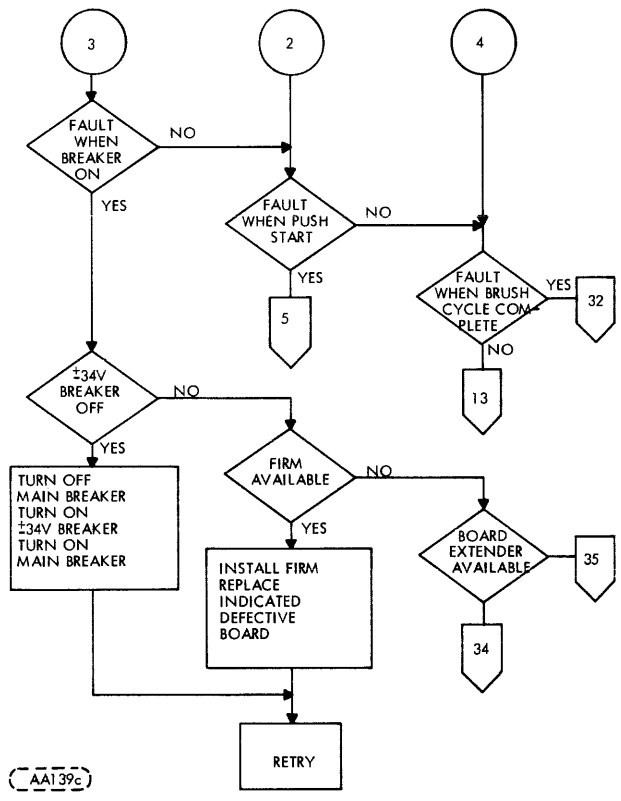
ADDRESS COMPARE ERROR
(Continued)



RETRACT OPERATION



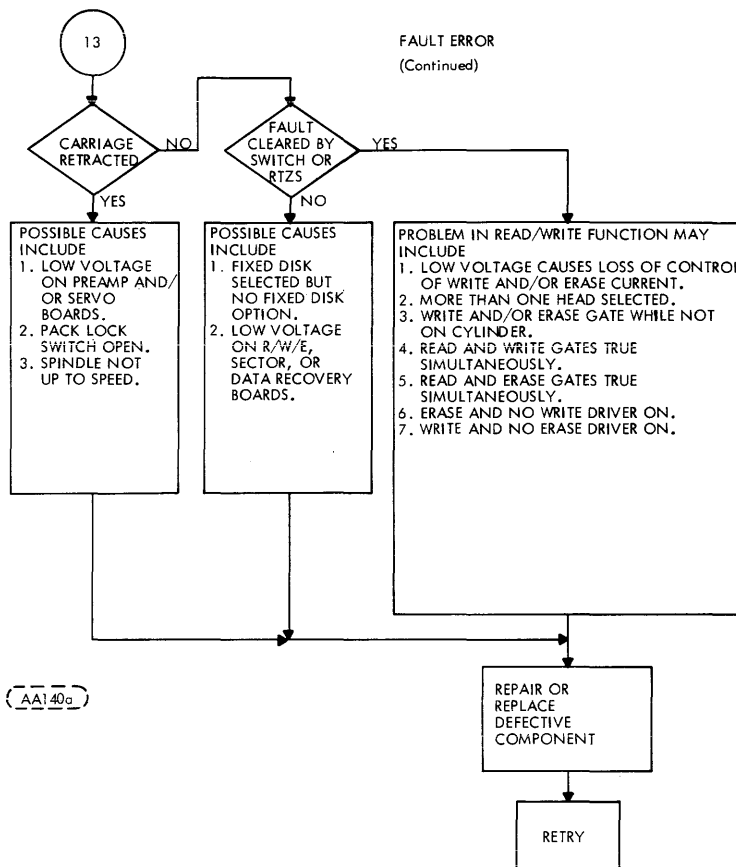
FAULT ERROR



LOCATION

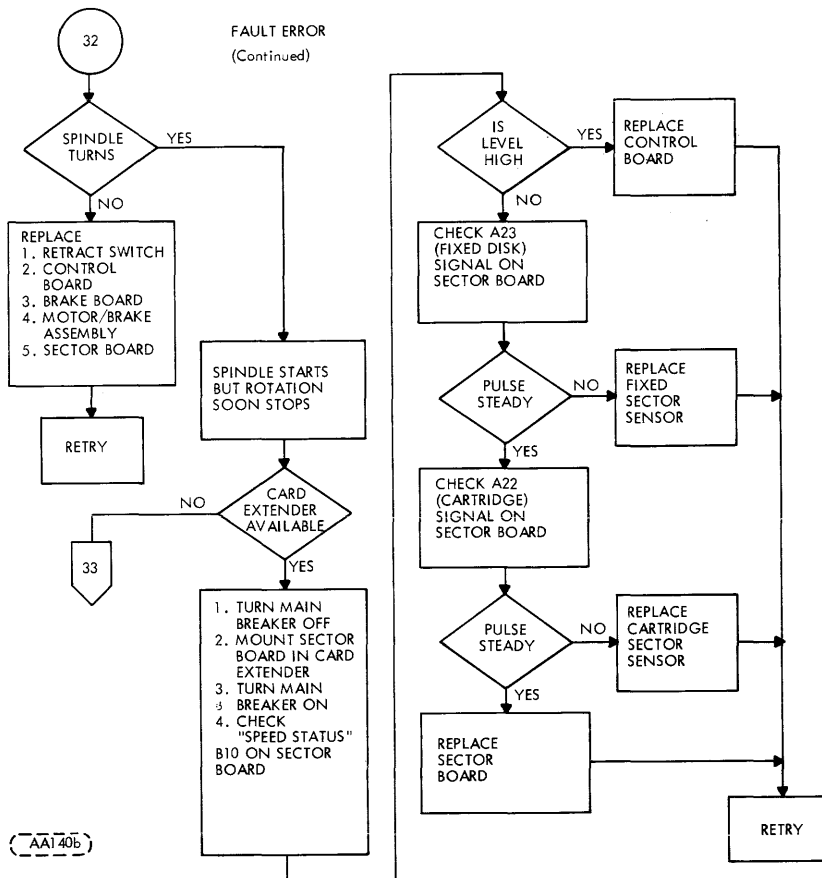
- 5 —————> 8
- 13 —————> 12
- 32 —————> 12
- 34 —————> 13
- 35 —————> 13

FAULT ERROR
(Continued)



AA140a

FAULT ERROR
(Continued)

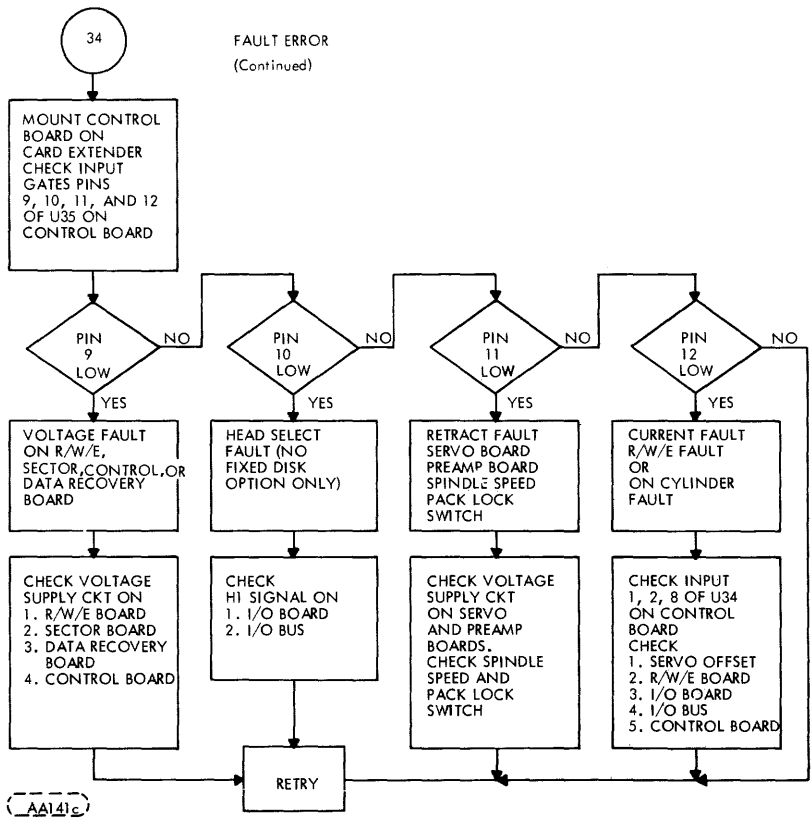


AA140b

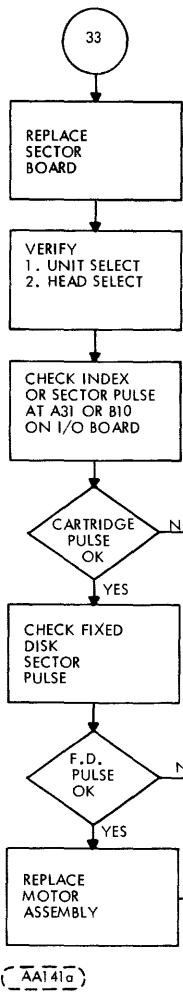
LOCATION

33 → 13

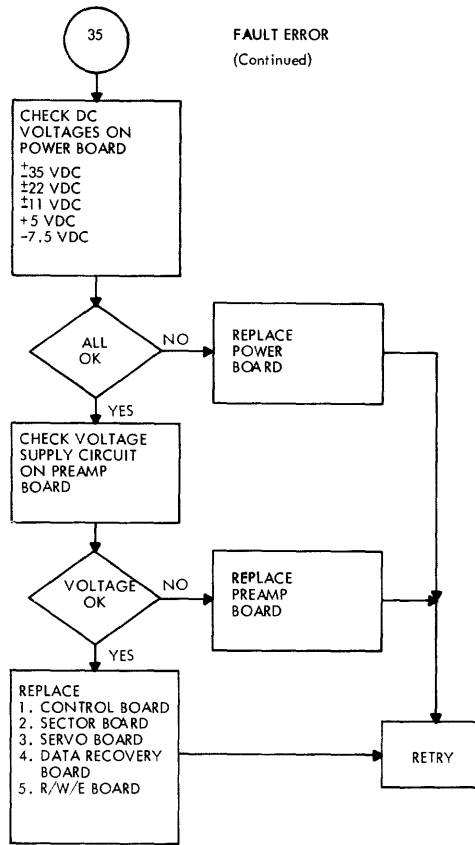
FAULT ERROR
(Continued)

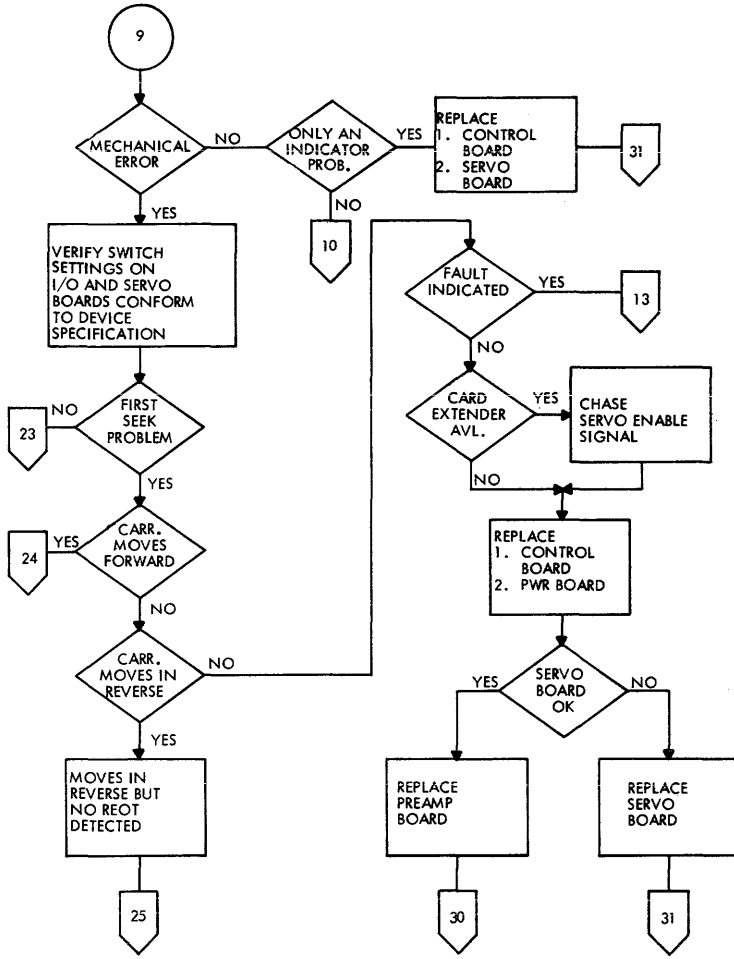


FAULT ERROR
(Continued)



FAULT ERROR
(Continued)

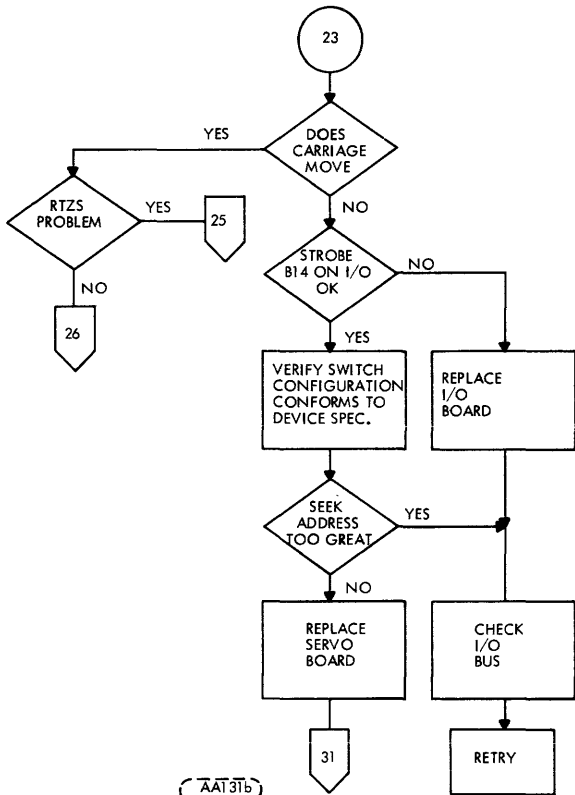




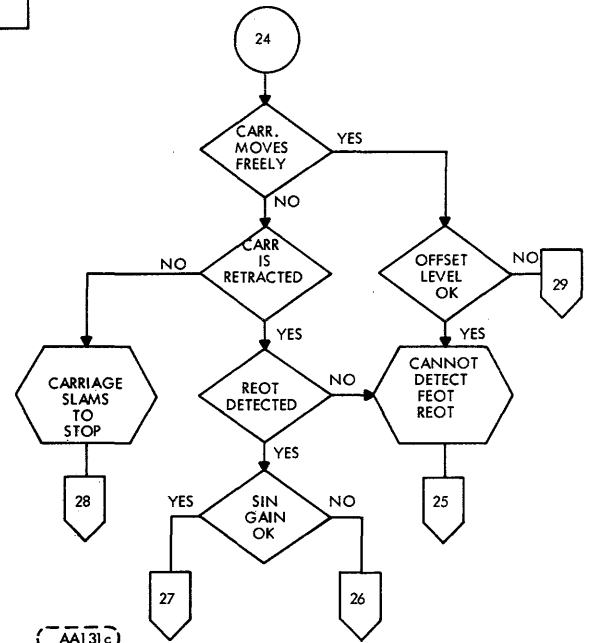
LOCATION

- 10 → 10
- 13 → 12
- 23 → 14
- 24 → 14
- 25 → 15
- 30 → 18
- 31 → 19

AAI31a



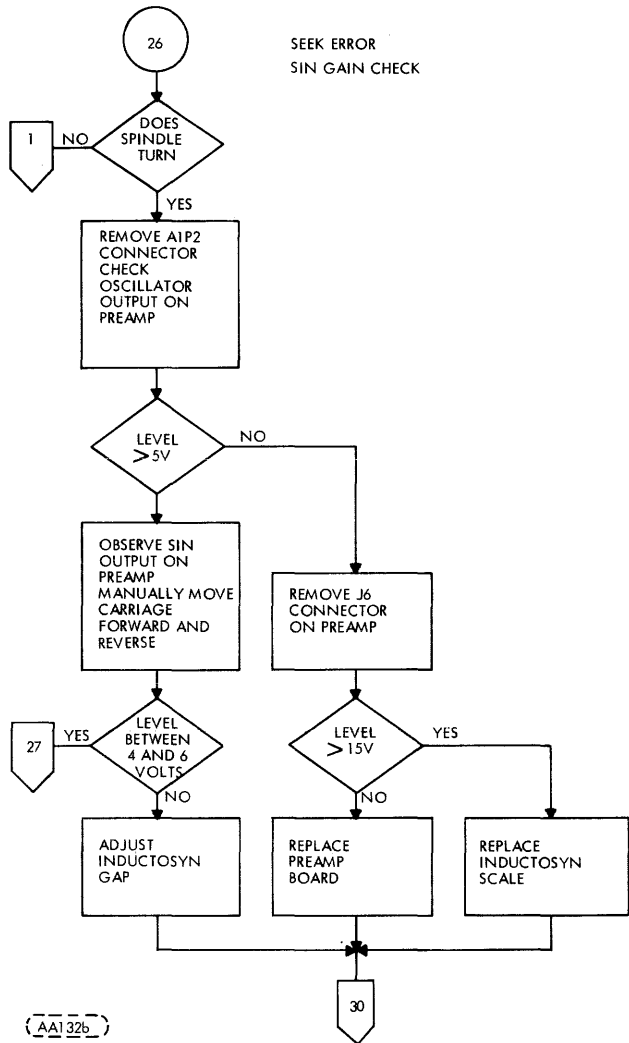
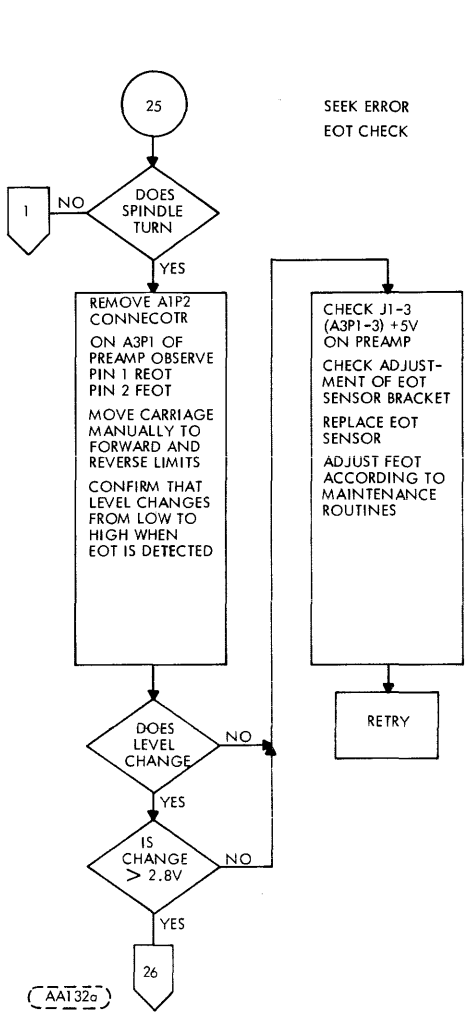
AAI31b



AAI31c

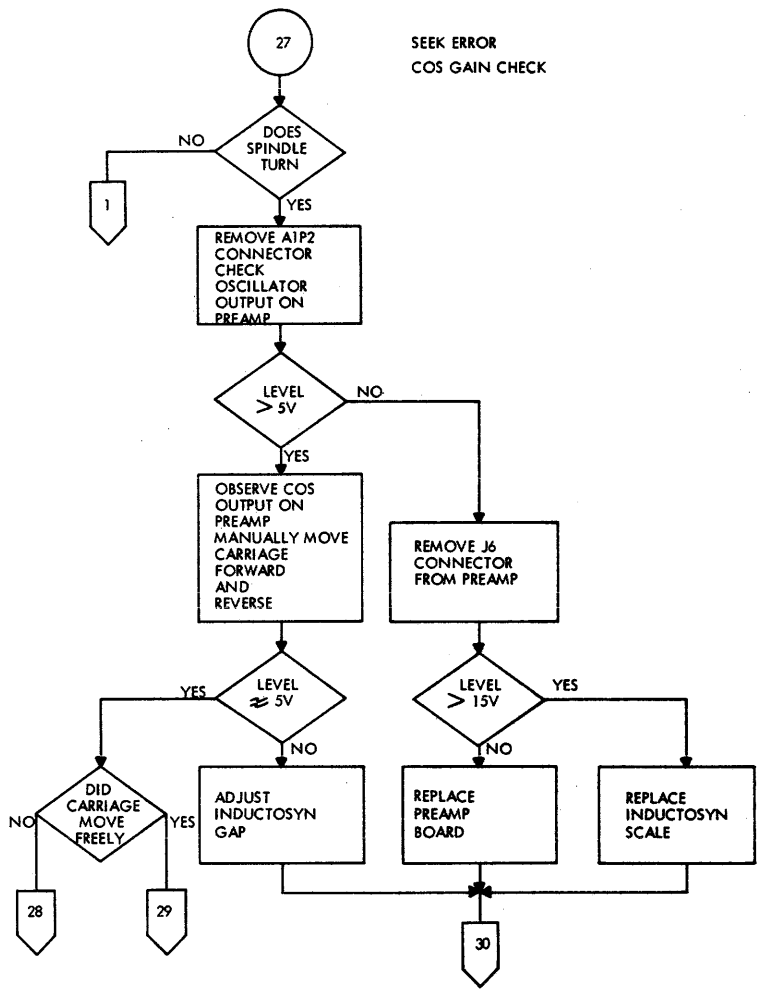
LOCATION

- 25 → 15
- 26 → 15
- 27 → 16
- 28 → 16
- 29 → 17
- 31 → 19



LOCATION

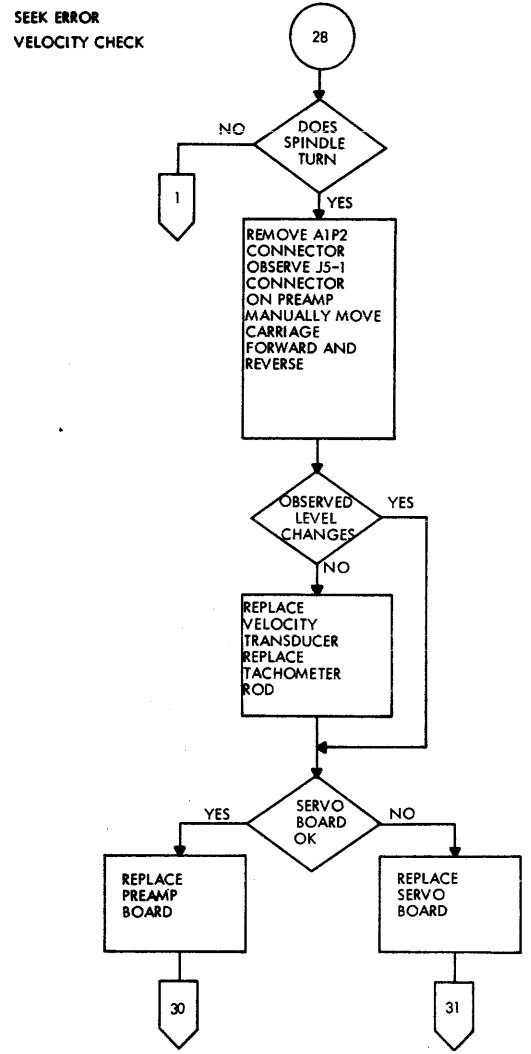
- 1 —————> 7
- 26 —————> 15
- 27 —————> 16
- 30 —————> 18



AA132c

LOCATION

1	→	7
28	→	16
29	→	17
30	→	18

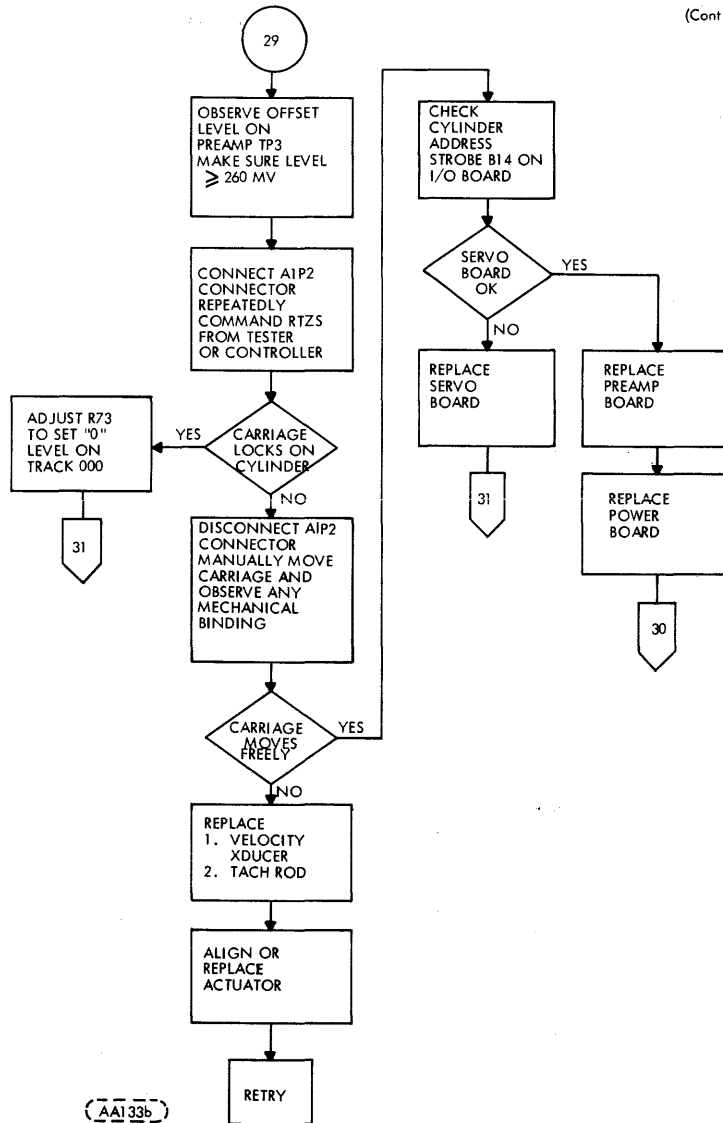


AA133a

LOCATION

1	→	7
30	→	18
31	→	19

SEEK ERROR
(Continued)

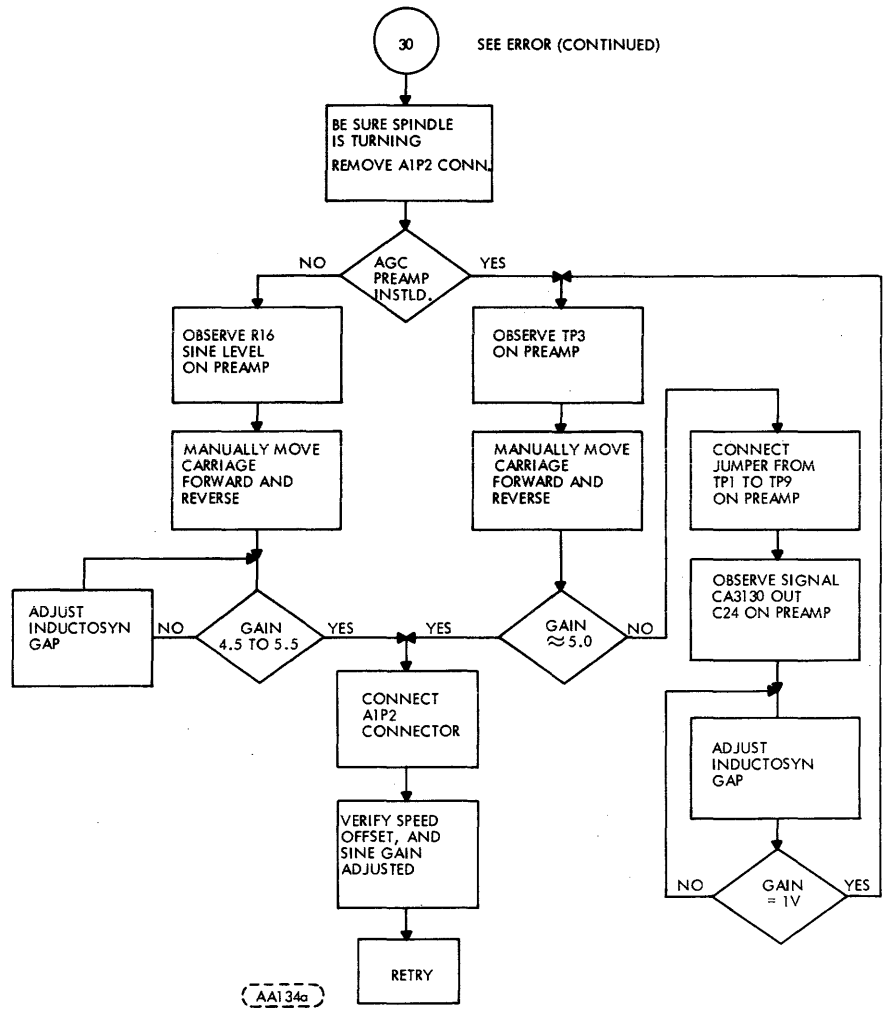


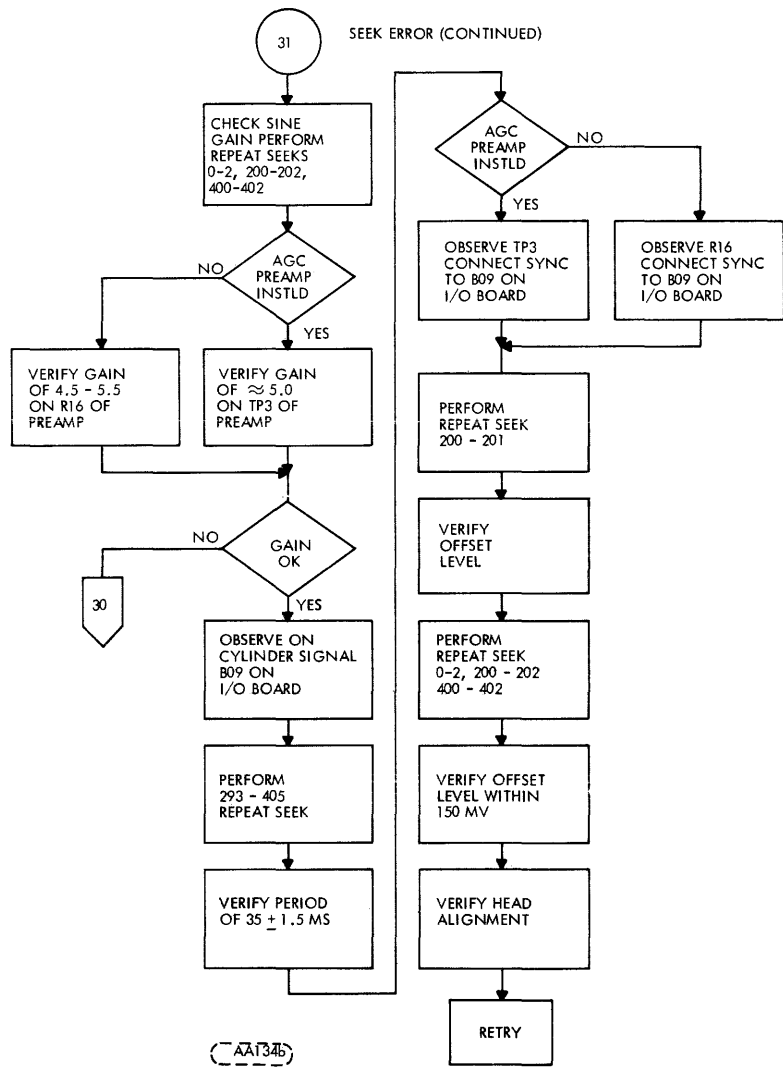
AA133b

LOCATION

30 → 18

31 → 19





AA134b

LOCATION

30 → 18

8.1 INTRODUCTION

This section contains an illustrated parts breakdown that details the different variations of the Model 9427H Disk Storage Drive. In general, parts are in dis-assembly of parts in the field.

8.2 GENERAL INSTRUCTIONS

8.2.1 ILLUSTRATIONS

Item numbers within a circle ① indicate an assembly (group of parts). Item numbers without a circle, 1, indicate a single part; a group of parts that are pinned or press fitted together; or a group of parts which is normally replaced as an assembly.

8.2.2 PARTS LISTS

In addition to the accompanying parts list on each illustration, two additional Parts Lists are available; the Top-Down Assembly/Component Parts List and the Cross Reference Index. Instruction for the use of all parts lists in paragraph 8.3.

8.2.3 ASSEMBLY LOCATOR

Figure 8-1 depicts and identifies the major assemblies within the device and references, by sheet number, where each assembly is broken down.

8.2.4 TOP MECHANICAL ASSEMBLY

The content of all 9427H variations are depicted and listed in Figure 8-2. To determine the Top Mechanical Assembly (TMA) and applicable parts and assemblies, refer to the Hardware Product Configurator document package (Parts Data Configurator) located in front of the manual. Instructions for its use are included. The TMA number referenced in the Parts Data configuration table represents the last three digits in TMA number 75741???.

NOTE

It may be desirable to insert the Parts Data Configurator in front of this section.

8.2.5 MODULE ASSEMBLY

The Content of each Module Assembly configuration is depicted and listed in Figure 8-3. Refer to the Parts Data Configurator for Module Assembly part number and applicable parts.

8.2.6 NOTES

Special instructions clarifying parts breakdown, replacement, references, unique parts usage, etc, are included on each sheet, as required, throughout this section.

8.2.7 PART REPLACEMENT

When ordering replacement parts for the 9427H, the inclusion of the following information for each part ordered will ensure positive identification:

- * {
 1. Device Serial Number
 2. TMA# (75741???)
 3. Parts Data # and Rev. Status (77653386-?)
 4. Figure #
 5. Item #
 6. Part Identification #
 7. Part Description}

8.3 PARTS LIST INSTRUCTIONS

8.3.1 ILLUSTRATION PARTS LIST

The parts list for each illustration is an extract from the Master Top-Down Assembly/Component Parts List, and contains only the parts depicted.

8.3.2 TOP-DOWN ASSEMBLY/COMPONENT PARTS LIST

- Starts at TMA level and lists all parts in Item Number sequence.
- Correlates Item numbers with part Identification numbers and the Description of each.
- Identifies where each part is used (where used column) within the device by listing the item number(s) of the next higher assembly.

NOTE

Where used data for Figures 8-2 and 8-3 are labeled TMA and MOD respectively. Refer to Parts Data Configuration for correct application of parts (ref paragraphs 8.2.4 and 8.2.5).

- Defines the location of each part by listing the sheet number(s) where depicted.

NOTE

The same part may be used in any number of assemblies or sheet locations.

*Before ordering replacement parts refer to paragraph 8.4.

8.3.3 CROSS REFERENCE INDEX

- Lists all parts in numeric sequence (by Identification Number).
- In conjunction with the referenced sheet number (third column) and illustrations defines the physical location of each item identified.

8.3.4 SHEET NUMBER REFERENCES

Sheet number reference on Parts Lists and Illustrations refers to sheet locations in this section. Example: Sheet reference 3 represents sheet 8-3, sheet 4 represents sheet 8-4, etc.

8.4 SPARE PARTS (SP)

This Illustrated Parts Breakdown is complete to the extent that all parts and assemblies are depicted and identified. Replacement part availability depends on the materials and provisioning operation of the supplier.

To assist the service representative in selecting replacement parts with minimum requisitioning lead times, engineering recommended spare parts which reflect the intended service level of the device are identified with the letters SP adjacent to the item number on the face of each illustration. Replaceable non-spared items will require longer requisitioning lead times.

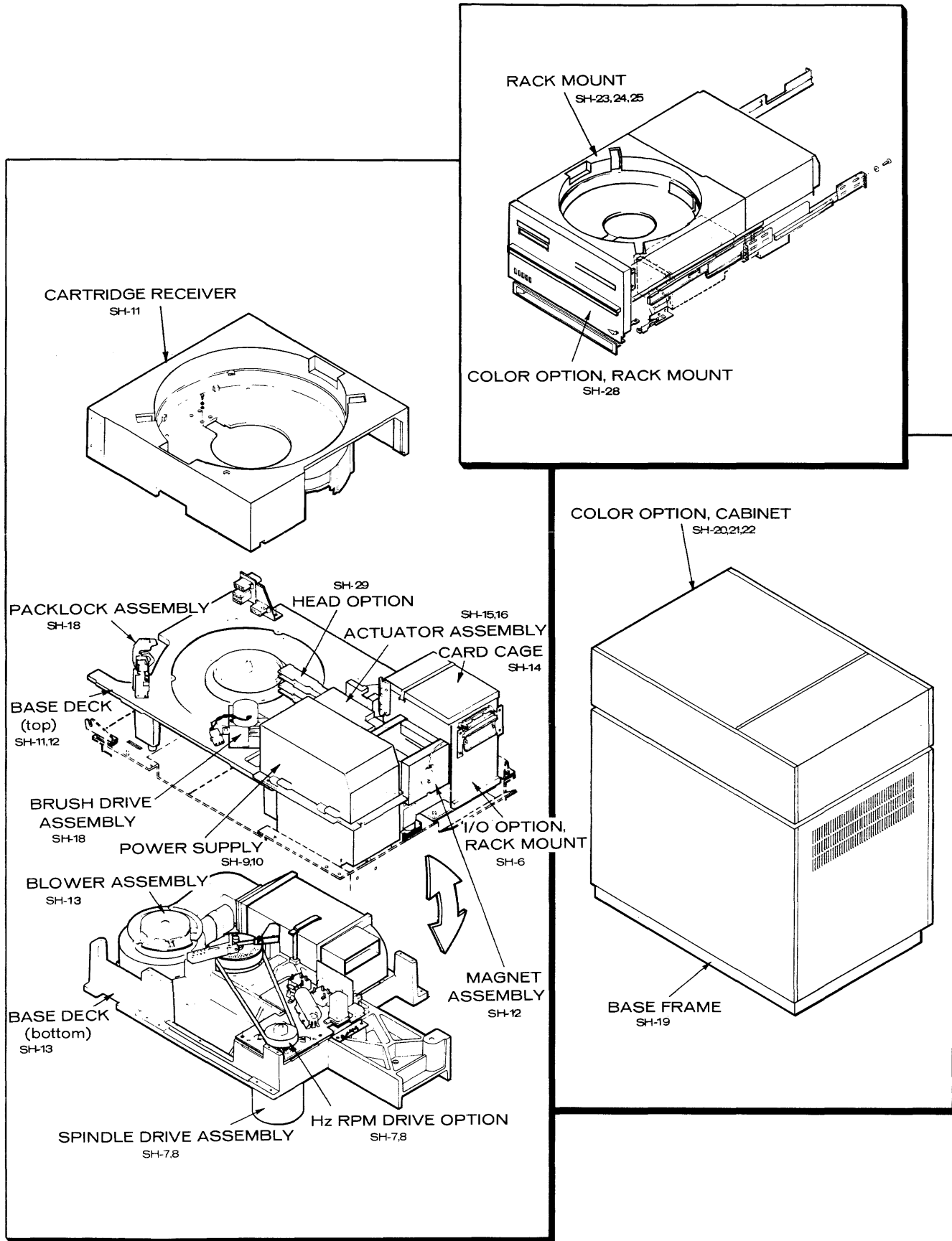


FIGURE 8-1. ASSEMBLY LOCATORS

*FOR ALL PWA'S SEE DIAGRAM SECTION OF MANUAL FOR CORRECT CIRCUIT BOARD IDENTIFICATION AND BREAKDOWN

**SEE SHEET 30 FOR SPARE PARTS PROVISIONING

NOTE: REFER TO PARTS DATA CONFIGURATOR (SHEET 8A-1), LOCATED IN HPC DOCUMENT PACKAGE FOR TMA NUMBER AND APPLICABLE PARTS.

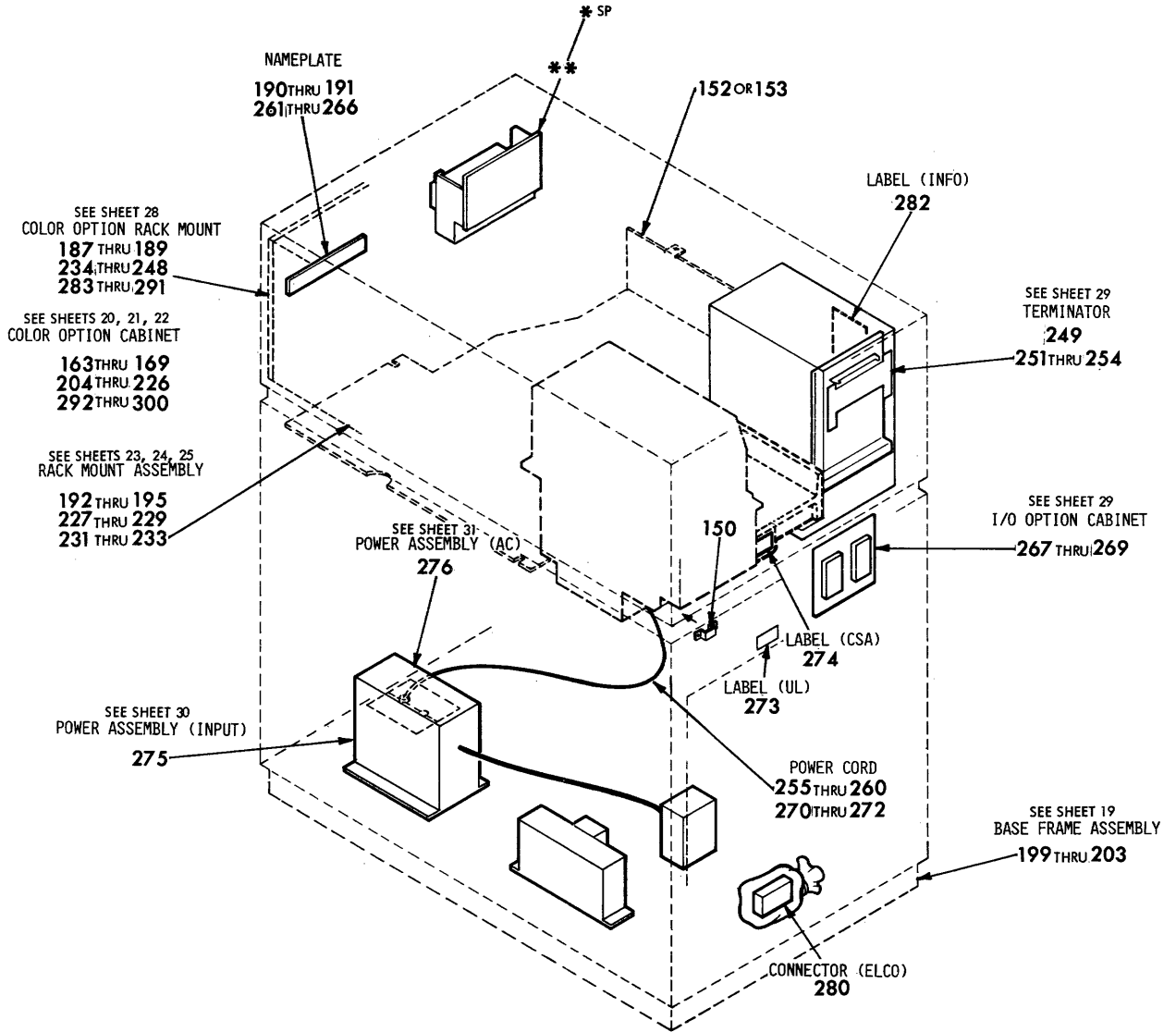
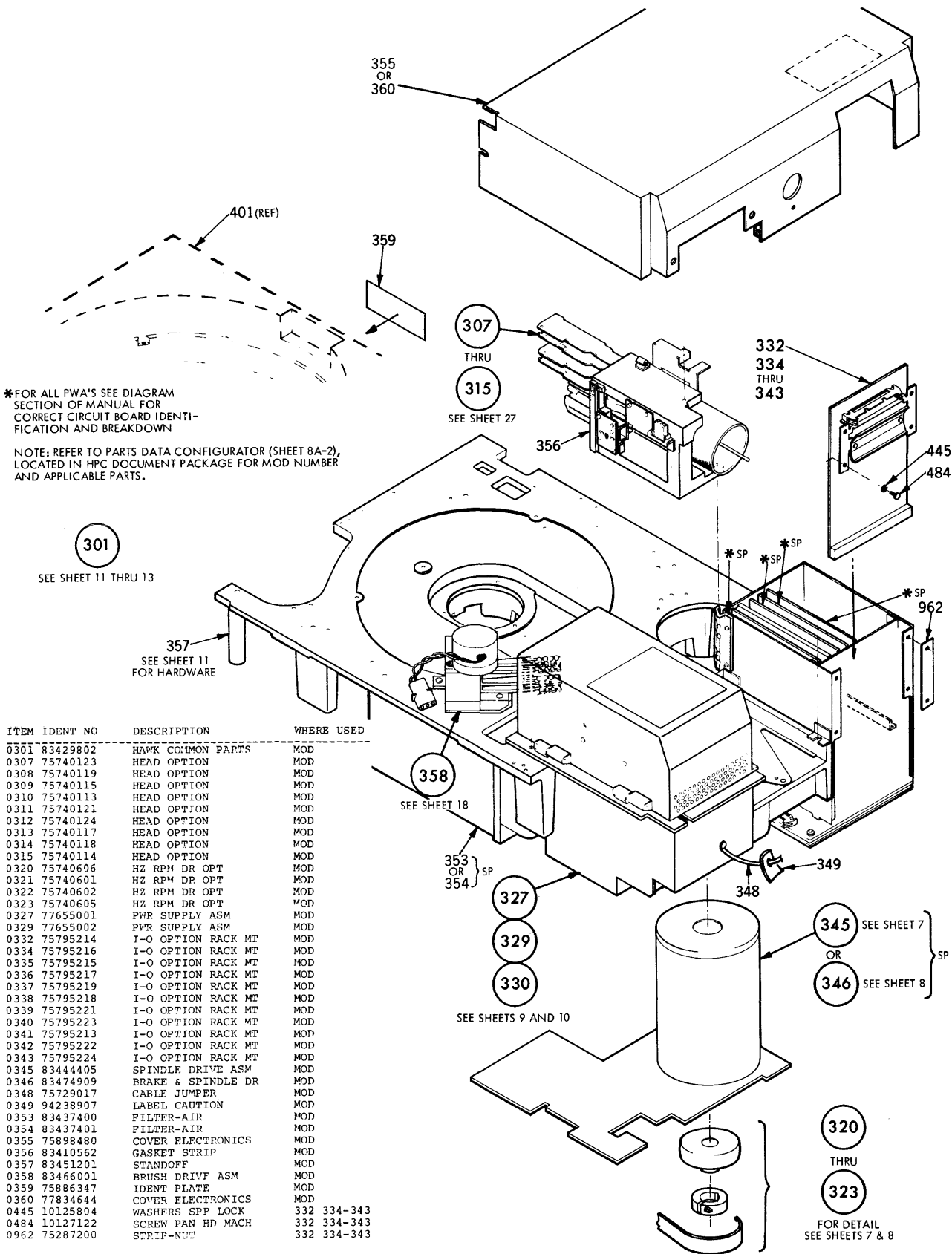
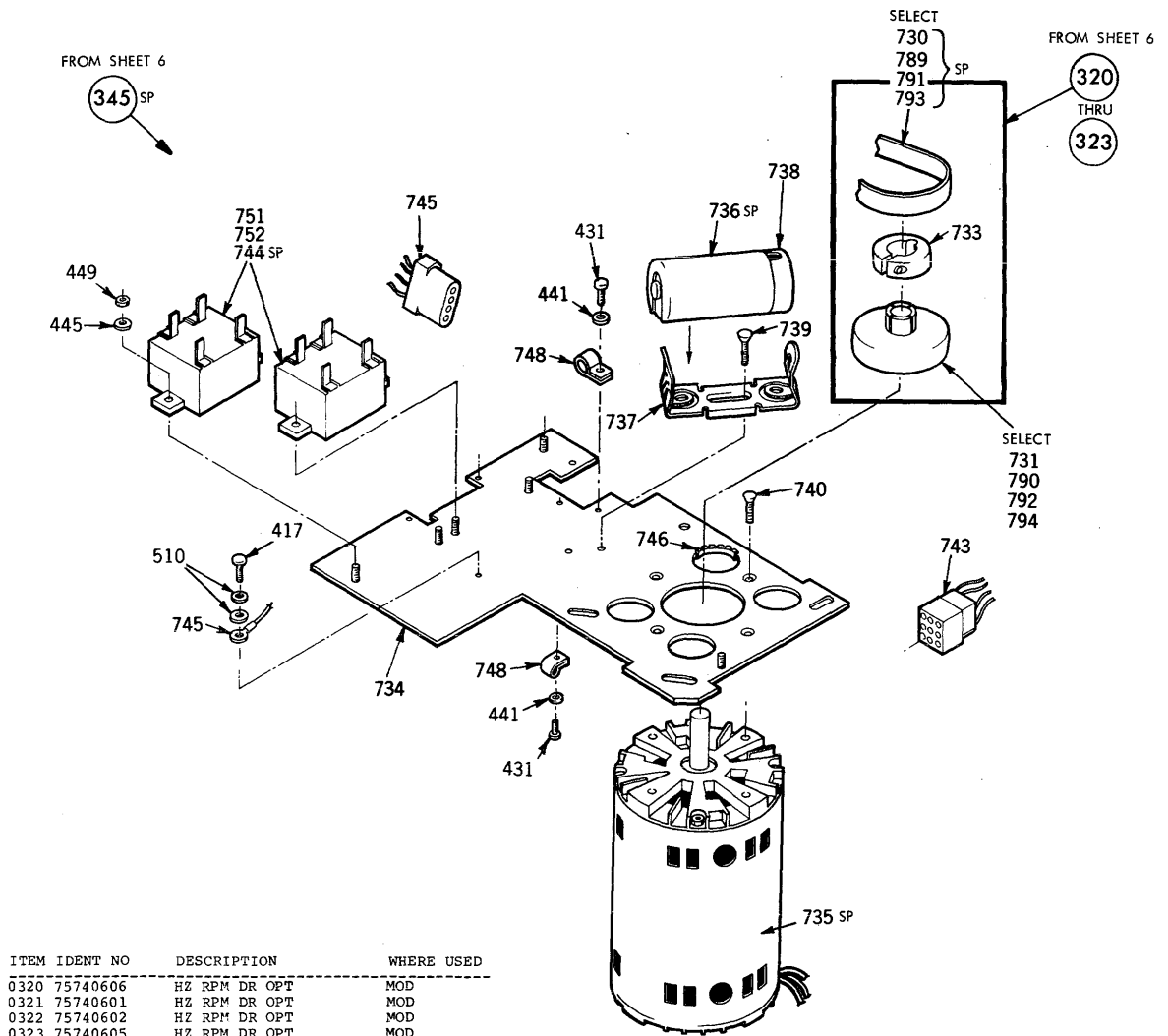


FIGURE 8-2. TOP MECHANICAL ASSEMBLY



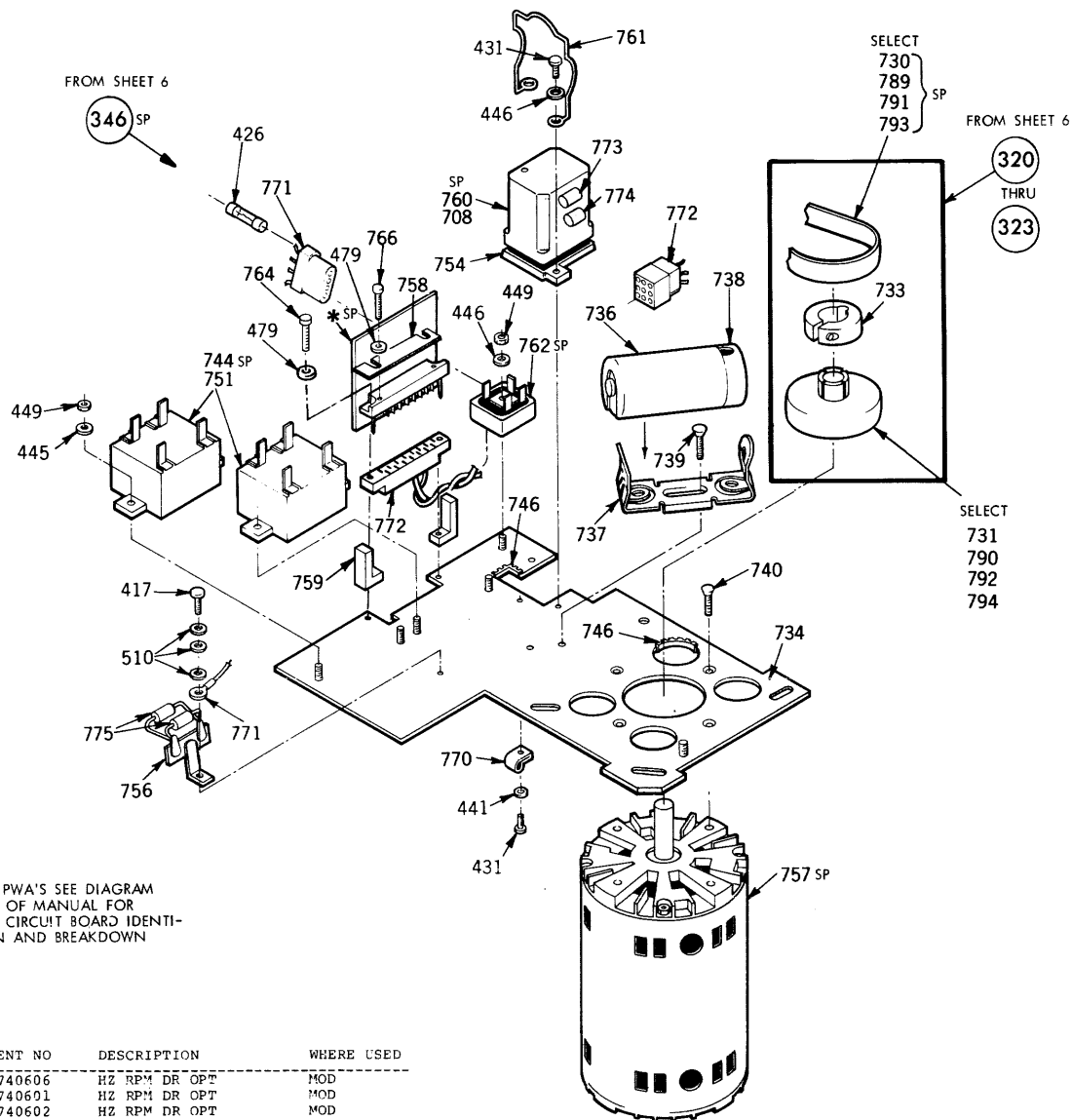
ITEM IDENT NO	DESCRIPTION	WHERE USED
0301 83429802	HAWK COMMON PARTS	MOD
0307 75740123	HEAD OPTION	MOD
0308 75740119	HEAD OPTION	MOD
0309 75740115	HEAD OPTION	MOD
0310 75740113	HEAD OPTION	MOD
0311 75740121	HEAD OPTION	MOD
0312 75740124	HEAD OPTION	MOD
0313 75740117	HEAD OPTION	MOD
0314 75740118	HEAD OPTION	MOD
0315 75740114	HEAD OPTION	MOD
0320 75740696	HZ RPM DR OPT	MOD
0321 75740601	HZ RPM DR OPT	MOD
0322 75740602	HZ RPM DR OPT	MOD
0323 75740605	HZ RPM DR OPT	MOD
0327 77655001	PWR SUPPLY ASM	MOD
0329 77655002	PWR SUPPLY ASM	MOD
0332 75795214	I-O OPTION RACK MT	MOD
0334 75795216	I-O OPTION RACK MT	MOD
0335 75795215	I-O OPTION RACK MT	MOD
0336 75795217	I-O OPTION RACK MT	MOD
0337 75795219	I-O OPTION RACK MT	MOD
0338 75795218	I-O OPTION RACK MT	MOD
0339 75795221	I-O OPTION RACK MT	MOD
0340 75795223	I-O OPTION RACK MT	MOD
0341 75795213	I-O OPTION RACK MT	MOD
0342 75795222	I-O OPTION RACK MT	MOD
0343 75795224	I-O OPTION RACK MT	MOD
0345 83444405	SPINDLE DRIVE ASM	MOD
0346 83474909	BRAKE & SPINDLE DR	MOD
0348 75729017	CABLE JUMPER	MOD
0349 94238907	LABEL CAUTION	MOD
0353 83437400	FILTER-AIR	MOD
0354 83437401	FILTER-AIR	MOD
0355 75898480	COVER ELECTRONICS	MOD
0356 83410562	GASKET STRIP	MOD
0357 83451201	STANDOFF	MOD
0358 83466001	BRUSH DRIV ASM	MOD
0359 75886347	IDENT PLATE	MOD
0360 77834644	COVER ELECTRONICS	MOD
0445 10125804	WASHERS SPP LOCK	332 334-343
0484 10127122	SCREW PAN HD MACH	332 334-343
0962 75287200	STRIP-NUT	332 334-343

FIGURE 8-3. MODULE ASSEMBLY



ITEM IDENT NO	DESCRIPTION	WHERE USED
0320 75740606	HZ RPM DR OPT	MOD
0321 75740601	HZ RPM DR OPT	MOD
0322 75740602	HZ RPM DR OPT	MOD
0323 75740605	HZ RPM DR OPT	MOD
0345 83444405	SPINDLE DRIVE ASM	MOD
0417 10127112	SCREW PAN HD MACH	345
0431 10127113	SCREW PAN HD MACH	345
0441 10125605	WASHERS PLAIN	345
0445 10125804	WASHERS SPR LOCK	345
0449 10125105	NUT HEX MACH	345
0510 10126401	WASH EXT TOOTH LO	345
0730 75722910	BELT-DRIVE NEOPRENF	323
0731 77599708	PULLEY-DRIVE MOTOR	323
0733 77613625	COLLAR-MOTOR PULLEY	320-323
0734 75891472	PLATE-DYNAMIC MOTOR	345
0735 83456001	DRIVE MTR HARNESS AS	345
0736 94255105	CAPACITOR-MOTOR AC 2	345
0737 94260500	ACCESSORIES-CAPACITOR	345
0738 94260503	ACCESSORIES-CAPACITOR	345
0739 10125747	SCR FLAT HD	345
0740 10125725	SCR FLAT HD	345
0743 83457401	DC SPINDLE HARN ASM	345
0744 77612677	SW SOLID STATE	345
0745 83457601	AC SPINDLE HARN ASM	345
0746 00845503	GROMMET-CATERPILLAR	345
0748 92602002	CLAMP, CABLE-NYLON	345
0751 94309802	POD, TERMINAL INSULAT	345
0752 93154948	TUBING, SHRINKING	345
0789 75722930	BELT-DRIVE NEOPRENE	321
0790 77599706	PULLEY-DRIVE MOTOR	321
0791 75722940	BELT-DRIVE NEOPRENE	322
0792 77599705	PULLEY-DRIVE MOTOR	322
0793 75722920	BELT-DRIVE NEOPRENE	320
0794 77599707	PULLEY-DRIVE MOTOR	320

FIGURE 8-4. SPINDLE DRIVE ASSEMBLY

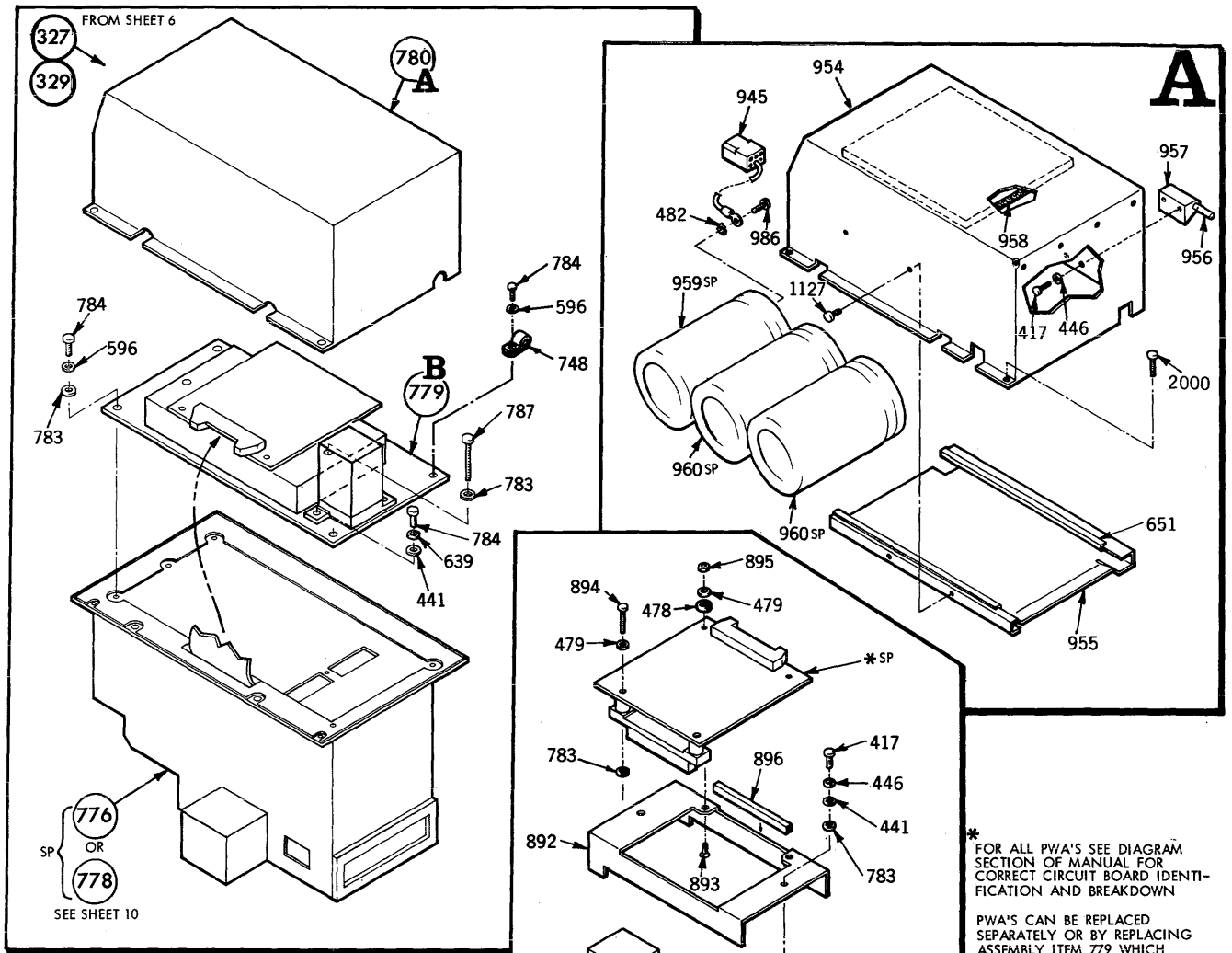


* FOR ALL PWA'S SEE DIAGRAM SECTION OF MANUAL FOR CORRECT CIRCUIT BOARD IDENTIFICATION AND BREAKDOWN

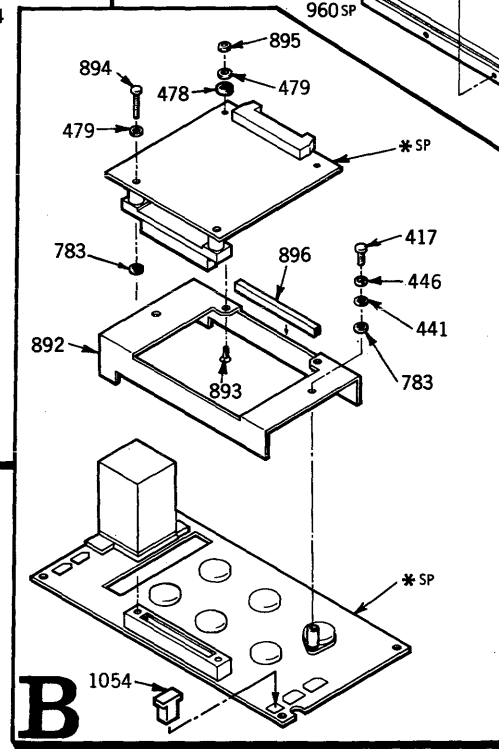
ITEM IDENT NO	DESCRIPTION	WHERE USED
0320 75740606	HZ RPM DR OPT	MOD
0321 75740601	HZ RPM DR OPT	MOD
0322 75740602	HZ RPM DR OPT	MOD
0323 75740605	HZ RPM DR OPT	MOD
0346 83474909	BRAKE & SPINDLE DR	MOD
0417 10127112	SCREW PAN HD MACH	346
0426 75885069	FUSP	346
0431 10127113	SCREW PAN HD MACH	346
0441 10125605	WASHERS PLAIN	346
0445 10125804	WASHERS SPR LOCK	346
0446 10125803	WASHERS SPR LOCK	346
0449 10125105	NUT HEX MACH	346
0479 10125801	WASHERS SPR LOCK	346
0510 10126401	WASH EXT TOOTH LO	346
0708 24534709	SLEEVING	346
0730 75722910	BELT-DRIVE NEOPRENE	323
0731 77599708	PULLEY-DRIVE MOTOR	323
0733 77613625	COLLAR-MOTOR PULLEY	320-323
0734 75891472	PLATE-DYNAMIC MOTOR	346
0736 94255105	CAPACITOR-MOTOR AC 2	346
0737 94260500	ACCESSORIES-CAPACITOR	346
0738 94260503	ACCESSORIES-CAPACITOR	346
0739 10125747	SCR FLAT HD	346
0740 10125725	SCR FLAT HD	346
0744 77612677	SW SOLID STATE	346
0746 00845503	GPOMMET-CATERPILLAR	346
0751 94309802	POD, TERMINAL INSULAT	346
0754 22940902	RELAY SOCKET	346
0756 84686903	TERMINAL STRIP	346
0757 83467401	BRAKE MOTOR ASM	346
0758 83474702	BAR-LOCKING	346
0759 83474800	BLOCK-SPACFR	346
0760 77612660	RELAY	346
0761 22940903	SPRING-RETAINER SOCK	346
0762 95582007	RECT BRIDGE	346

ITEM IDENT NO	DESCRIPTION	WHERE USED
0764 10127106	SCREW PAN HD MACH	346
0766 95655503	SCREW	346
0770 92602003	CLAMP, CABLE-NYLON	346
0771 83467502	A.C. BRAKE HARNESS	346
0772 83467701	D.C. BRAKE HARNESS	346
0773 50241001	DIODE SILICON	346
0774 75808549	CAP 100V 10R .10UF	346
0775 92512142	RESISTOR	346
0789 75722930	BELT-DRIVE NEOPRENE	321
0790 77599706	PULLEY-DRIVE MOTOR	321
0791 75722940	BELT-DRIVE NEOPRENE	322
0792 77599705	PULLEY-DRIVE MOTOR	322
0793 75722920	BELT-DRIVE NEOPRENE	320
0794 77599707	PULLEY-DRIVE MOTOR	320

FIGURE 8-5. BRAKE AND SPINDLE DRIVE ASSEMBLY



ITEM IDENT NO	DESCRIPTION	WHERE USED
0327	77655001	PWR SUPPLY ASM MOD
0329	77655002	PWR SUPPLY ASM MOD
0417	10127112	SCREW PAN HD MACH 780
0417	10127112	SCREW PAN HD MACH 779
0441	10125605	WASHERS PLAIN 779
0441	10125605	WASHERS PLAIN 327 329
0446	10125803	WASHERS SPR LOCK 779
0446	10125803	WASHERS SPR LOCK 780
0478	10125603	WASHERS PLAIN 779
0479	10125801	WASHERS SPR LOCK 779
0482	10126403	WASH EXT TOOTH LO 780
0596	75806503	WASHER 327 329
0639	10126103	WASH INT TOOTH LK 327 329
0651	94862902	GROMMET STRIP 780
0748	92602002	CLAMP, CABLE-NYLON 327 329
0776	83484110	POWER SUPPLY CHASSIS A 329
0778	83484109	POWER SUPPLY CHASSIS A 327
0779	83475105	PWR BD ASM PIGGYBACK 327 329
0780	83484002	COVER ASM -PWR SPY 2 327 329
0783	92980003	WASHER, FIBER 779
0783	92980003	WASHER, FIBER 327 329
0784	10127115	SCREW PAN HD MACH 327 329
0787	92742176	SCREW M-C PAN HD 327 329
0892	83495300	TUNNEL WIND 779
0893	10125704	SCR FLT HD 779
0894	10127108	SCR PN HD MACH 779
0895	10125103	SCR NUT HEX MACH 779
0896	94862901	GROMMET STRIP 779
0945	75799001	CAP HARNESS 780
0954	83495101	COVER PWR SPLY 780
0955	83495200	BRKT 780
0956	83495500	PIN HNG 780
0957	83495600	HNG CVR 780
0958	75798800	PAD CAPACITOR 780
0959	75774406	CAPACITOR 780

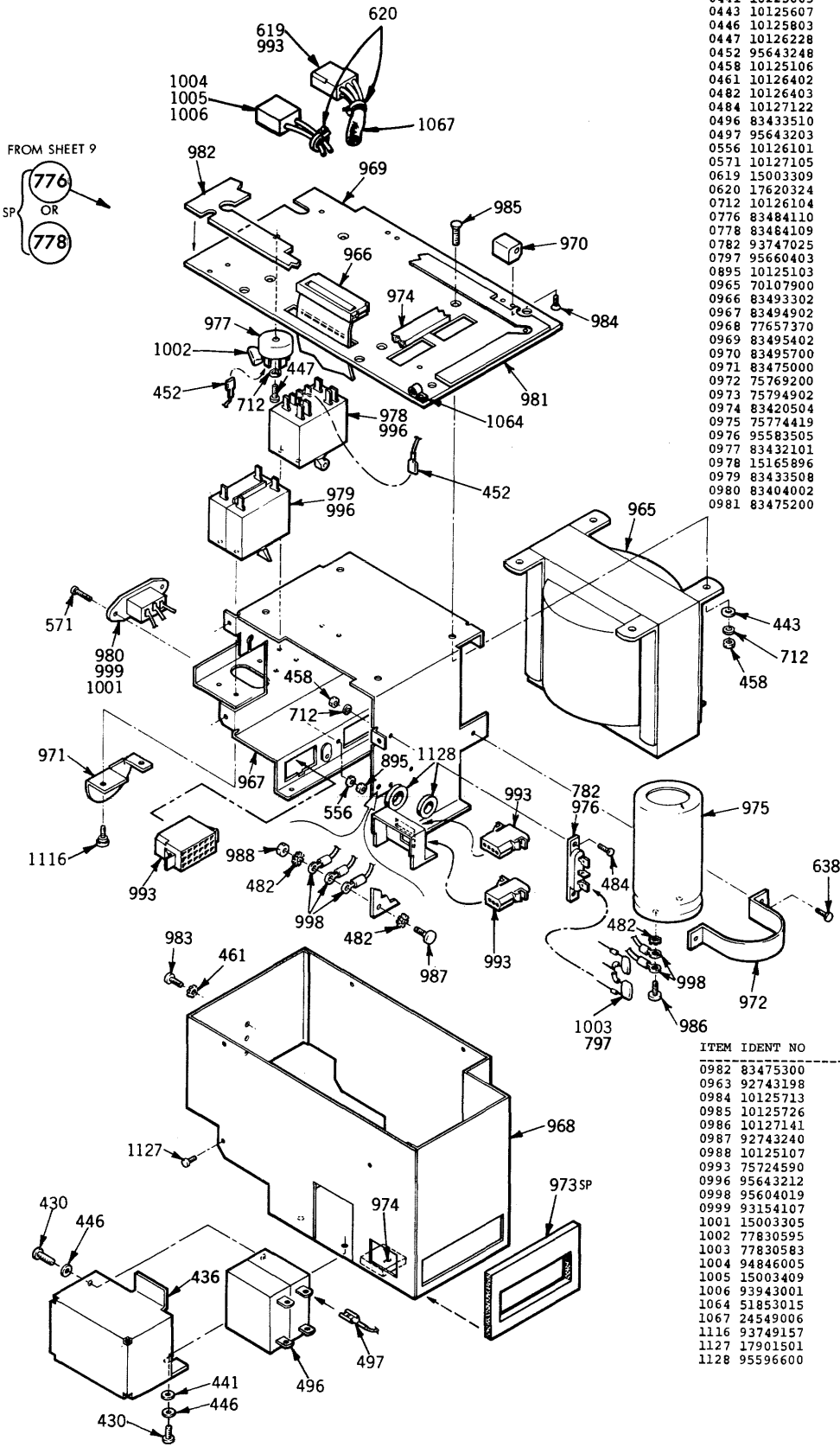
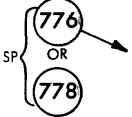


ITEM IDENT NO	DESCRIPTION	WHERE USED
0960	75774466	CAPACITOR 780
0986	10127141	SCR PH MACH 780
1054	75884153	JUMPER PLUG 779
1127	17901501	SCREW THREAD FORM 780
2000	75887326	SCREW CAPTIVE 780

FIGURE 8-6. POWER SUPPLY (SHEET 1 OF 2)

DISASSEMBLY NOT RECOMMENDED
HOWEVER, ITEMS 973, 978, 979, 1002
& 1003 ARE REPLACEABLE AS SEPARATE
PARTS

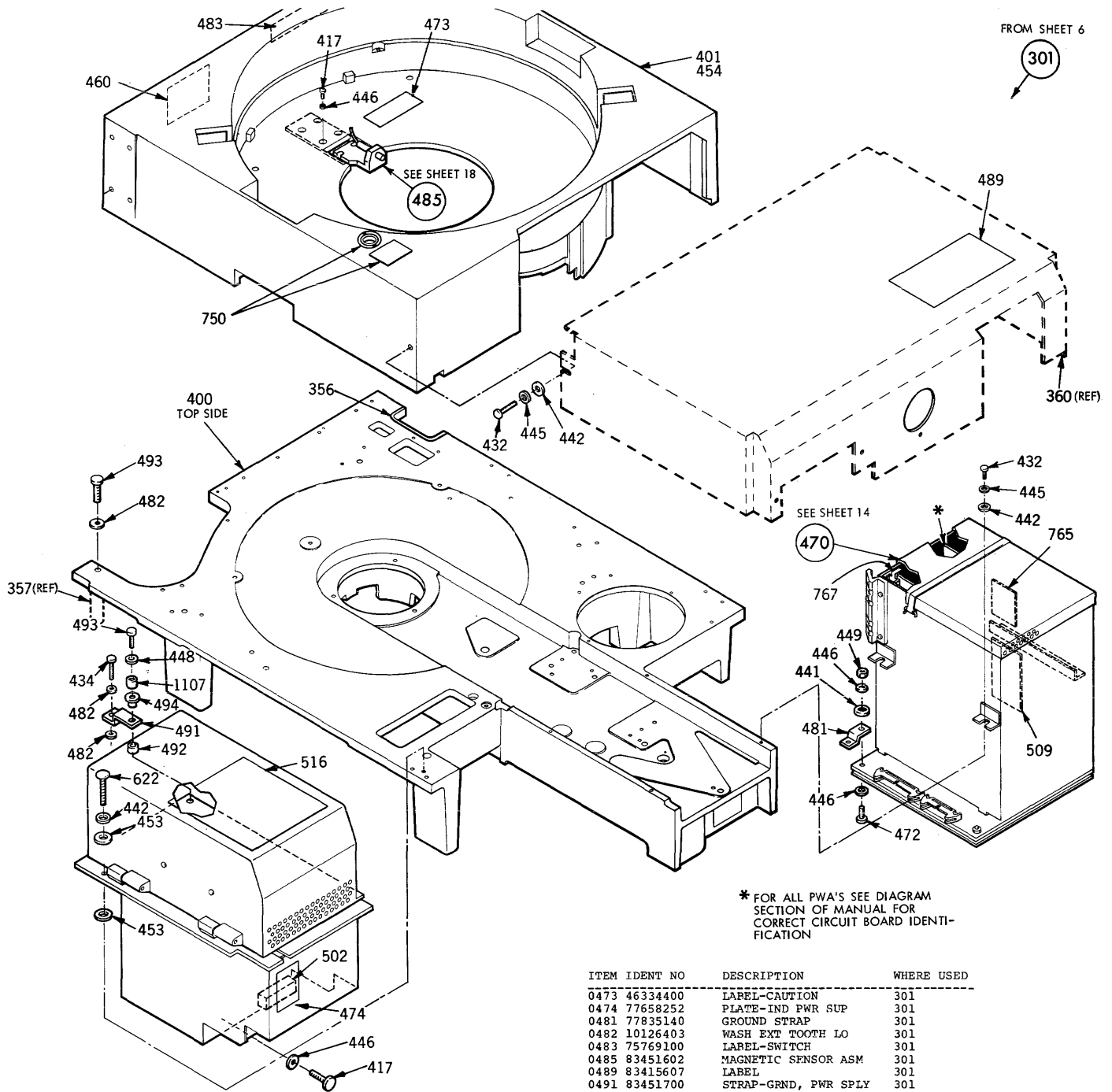
FROM SHEET 9



ITEM IDENT NO	DESCRIPTION	WHERE USED
0430 10127111	SCREW PAN HD MACH	776 778
0436 77657375	CIRCUIT BRKR BOX	776 778
0441 10125605	WASHERS PLAIN	776 778
0443 10125607	WASHERS PLAIN	776 778
0446 10125803	WASHERS SPR LOCK	776 778
0447 10126228	SCR HEX SOC HD	776 778
0452 95643248	TERM INSULATOR	776 778
0458 10125106	NUT HEX MACH	776 778
0461 10126402	WASH EXT TOOTH LO	776 778
0482 10126403	WASH EXT TOOTH LO	776 778
0484 10127122	SCREW PAN HD MACH	776 778
0496 83433510	CIRCUIT BRKR	776 778
0497 95643203	CONNECTOR	776 778
0556 10126101	WASH INT TOOTH LK	776 778
0571 10127105	SCREW PAN HD MACH	776 778
0619 15003309	WIRE 18 WHITE	776 778
0620 17620324	CABLE TIE	776 778
0712 10126104	WASH INT TOOTH LK	776 778
0776 83484110	POWER SUPPLY CHASSIS A 329	776 778
0778 83484109	POWER SUPPLY CHASSIS A 327	776 778
0782 93747025	RECEPTACLE, SLIDE ON	776 778
0797 95660403	TAPE	776 778
0895 10125103	SCR NUT-HEX MACH	776 778
0965 70107900	TRANSFORMER-AUTO	776 778
0966 83493302	PWR LOGIC HARNESS	776 778
0967 83494902	CHASSIS-AC	776 778
0968 77657370	COVER-BOTTOM	776 778
0969 83495402	PLATE-CHASSIS	776 778
0970 83495700	HINGE-POWER SUPPLY	776 778
0971 83475000	PLATE	776 778
0972 75769200	CLAMP-CAPACITOR	776 778
0973 75794902	GASKET-SUPPLY DIVERT	776 778
0974 83420504	GASKET STRIP	776 778
0975 75774419	CAPACITOR	776 778
0976 95583505	RECTIFIER BLOCK	776 778
0977 83432101	BRIDGE, RECTIFIER	776 778
0978 15165896	CIRCUIT BREAKER	776 778
0979 83433508	CIRCUIT BREAKER	776 778
0980 83404002	FILTER	776 778
0981 83475200	GASKET-PWR SPLY	776 778

ITEM IDENT NO	DESCRIPTION	WHERE USED
0982 83475300	GASKET	776 778
0963 92743198	SCREW PAN ED MACH	776 778
0984 10125713	SCREW	776 778
0985 10125726	SCREW	776 778
0986 10127141	SCR PH MACH	776 778
0987 92743240	SCREW PAN ED MACH	776 778
0988 10125107	SCR NUT-HEX MACH	776 778
0993 75724590	CONNECTOR-PANEL MTG	776 778
0996 95643212	CONNECTOR	776 778
0998 95604019	CONN, RING TONGUE	776 778
0999 93154107	TUBING, HEAT SHRINK	776 778
1001 15003305	WIRE-GRN	776 778
1002 77830595	CAP 100V	776
1003 77830583	CAP 50V	776
1004 94846005	CONNECTOR, 2 PIN	776 778
1005 15003409	WIRE WHT	776 778
1006 93943001	CONTACT, SOCKET	776 778
1064 51853015	CLAMP CABLE	776 778
1067 24549006	CEL WRAP	776 778
1116 93749157	SCREW	776 778
1127 17901501	SCREW THREAD FORM	776 778
1128 95596600	BUSHING	776 778

FIGURE 8-6. POWER SUPPLY (SHEET 2 OF 2)



ITEM IDENT NO	DESCRIPTION	WHERE USED
0301 83429802	HAWK COMMON PARTS	MOD
0356 83410562	GASKET STRIP	301
0400 83456502	BASE DECK-MACHINED	301
0401 83451403	CARTRIDGE REC	301
0417 10127112	SCREW PAN HD MACH	301
0432 10127121	SCREW PAN HD MACH	301
0434 10127123	SCREW PAN HD MACH	301
0441 10125605	WASHERS PLAIN	301
0442 10125606	WASHERS PLAIN	301
0445 10125804	WASHERS SPR LOCK	301
0446 10125803	WASHERS SPR LOCK	301
0448 10125805	WASHERS SPR LOCK	301
0449 10125105	NUT HEX MACH	301
0453 51568605	WASHER	301
0454 92742222	SCREW PH HD MACH	301
0460 24547502	PLATE, WARNING	301
0470 75308012	CARD CAGE ASM	301
0472 10127114	SCR PAN HD	301

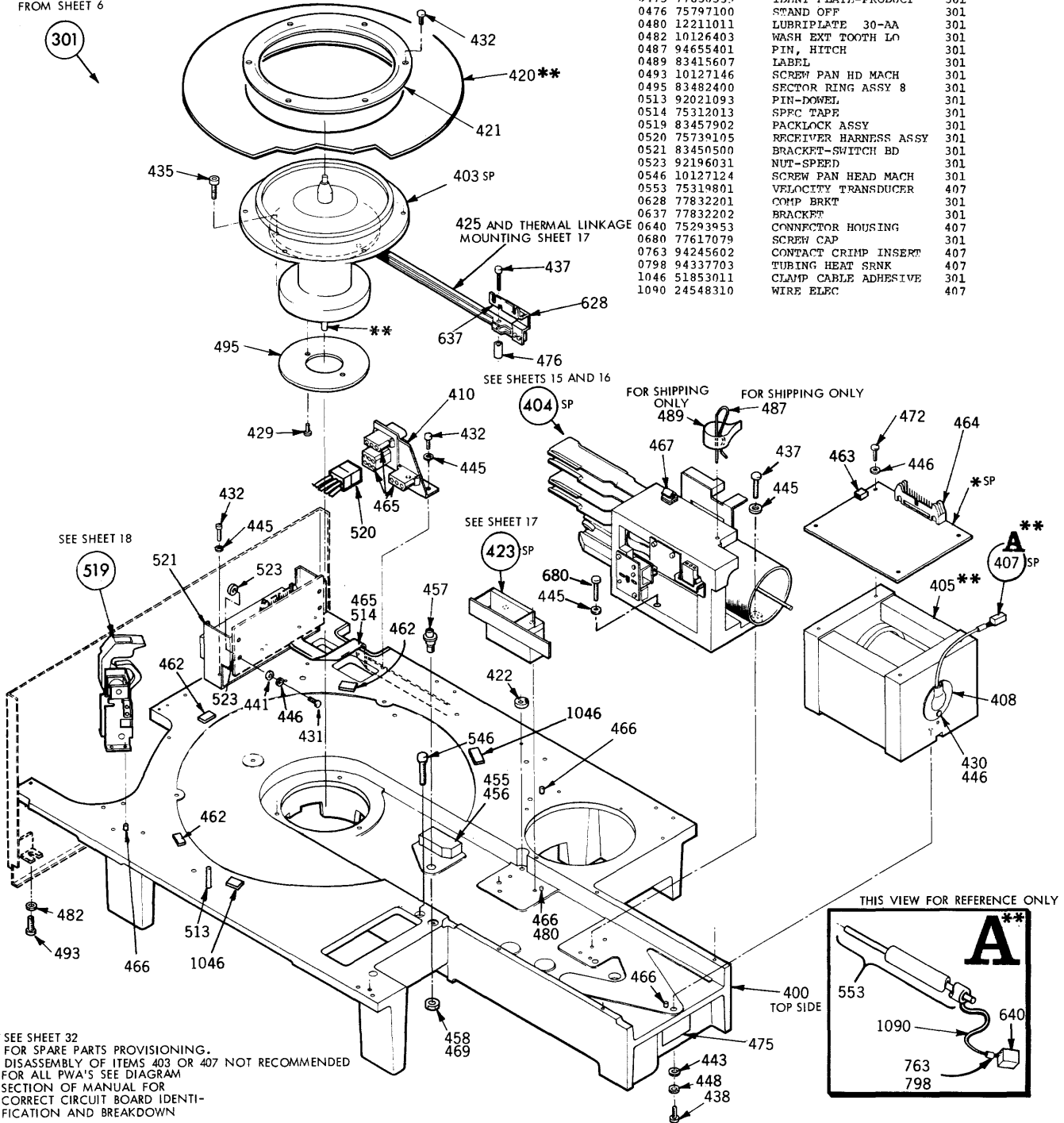
ITEM IDENT NO	DESCRIPTION	WHERE USED
0473 46334400	LABEL-CAUTION	301
0474 77658252	PLATE-IND PWR SUP	301
0481 77835140	GROUND STRAP	301
0482 10126403	WASH EXT TOOTH LO	301
0483 75769100	LABEL-SWITCH	301
0485 83451602	MAGNETIC SENSOR ASM	301
0489 83415607	LABEL	301
0491 83451700	STRAP-GRND, PWR SPLY	301
0492 95694202	SPACER-BRASS	301
0493 10127146	SCREW PAN HD MACH	301
0494 92615012	WASHER-SHOULDER FIBR	301
0502 75802302	VOLTAGE ADJUST PLUG	301
0509 73669601	LABEL-CONFIG	301
0516 72959300	LABEL-FIELD CHANGE L	301
0622 77610636	SCREW SELF LK	301
0750 77830734	LABEL-SWITCH	301
0765 77834781	WARNING LABEL	301
0767 83484400	QUADRACLIP	301
1107 95694206	SPACER	301

FIGURE 8-7. COMMON PARTS (SHEET 1 OF 3)

ITEM IDENT NO	DESCRIPTION	WHERE USED
0301 83429802	HAWK COMMON PARTS	MOD
0400 83456502	BASE DFCK-MACHINED	301
0403 75286701	SPINDLE	301
0404 75316008	ACTUATOR ASM	301
0405 75319001	MAGNET ASM	301
0407 75317102	TRANSDUCER-CONN ASM	301
0408 46317900	CAP-TRANSDUCER END	301
0410 77598300	BRACKET-CONNECTOR	301
0420 89293100	DISK FIXED, RECORDING	301
0421 75288900	CLAMP - DISC	301
0422 75797301	TRANSDUCER CAM ASM	301
0423 75315405	TRANSDUCER SCALE ASM	301
0425 75797700	BAR EXPANSION MACHINE	301
0429 93788082	SCREW SELF LOCKING 4	301
0430 10127111	SCREW PAN HD MACH	301
0431 10127113	SCREW PAN HD MACH	301
0432 10127121	SCREW PAN HD MACH	301
0435 10126255	SCR SOC HD	301

ITEM IDENT NO	DESCRIPTION	WHERE USED
0437 92815197	SCREW CAP SOC HD	301
0438 92815229	SCREW CAP SOC HD	301
0441 10125605	WASHERS PLAIN	301
0443 10125607	WASHERS PLAIN	301
0445 10125804	WASHERS SPR LOCK	301
0446 10125803	WASHERS SPR LOCK	301
0448 10125805	WASHERS SPR LOCK	301
0455 75796902	DAMPER-OSCILLATION	301
0456 75313921	ADHESIVE RUBBER BASE	301
0457 75800400	PIN-ACTUATOR ALIGNMENT	301
0458 10125106	NUT HEX MACH	301
0462 51853006	CLAMP, CABLE ADHESIVE	301
0463 75800602	RETRACT HARNESS ASSY	301
0464 75739501	PRE-AMP HARNESS ASSY	301
0465 75739701	SWITCH BOARD HARNESS	301
0466 92021004	PIN, DOWEL	301
0467 51853005	CLAMP	301
0469 95125305	LOCTITE GRADE C	301
0472 10127114	SCR PAN HD	301
0475 77830539	IDENT PLATE-PRODUCT	301
0476 75797100	STAND OFF	301
0480 12211011	LUBRIPLATE 30-AA	301
0482 10126403	WASH EXT TOOTH LO	301
0487 94655401	PIN, HITCH	301
0489 83415607	LABEL	301
0493 10127146	SCREW PAN HD MACH	301
0495 83482400	SECTOR RING ASSY 8	301
0513 92021093	PIN-DOWEL	301
0514 75312013	SPFC TAPE	301
0519 83457902	PACKLOCK ASSY	301
0520 75739105	RECEIVER HARNESS ASSY	301
0521 83450500	BRACKET-SWITCH BD	301
0523 92196031	NUT-SPEED	301
0546 10127124	SCREW PAN HEAD MACH	301
0553 75319801	VELOCITY TRANSDUCER	407
0628 77832201	COMP BRKT	301
0637 77832202	BRACKET	301
0640 75293953	CONNECTOR HOUSING	407
0680 77617079	SCREW CAP	301
0763 94245602	CONTACT CRIMP INSERT	407
0798 94337703	TUBING HEAT SRNK	407
1046 51853011	CLAMP CABLE ADHESIVE	301
1090 24548310	WIRE ELECC	407

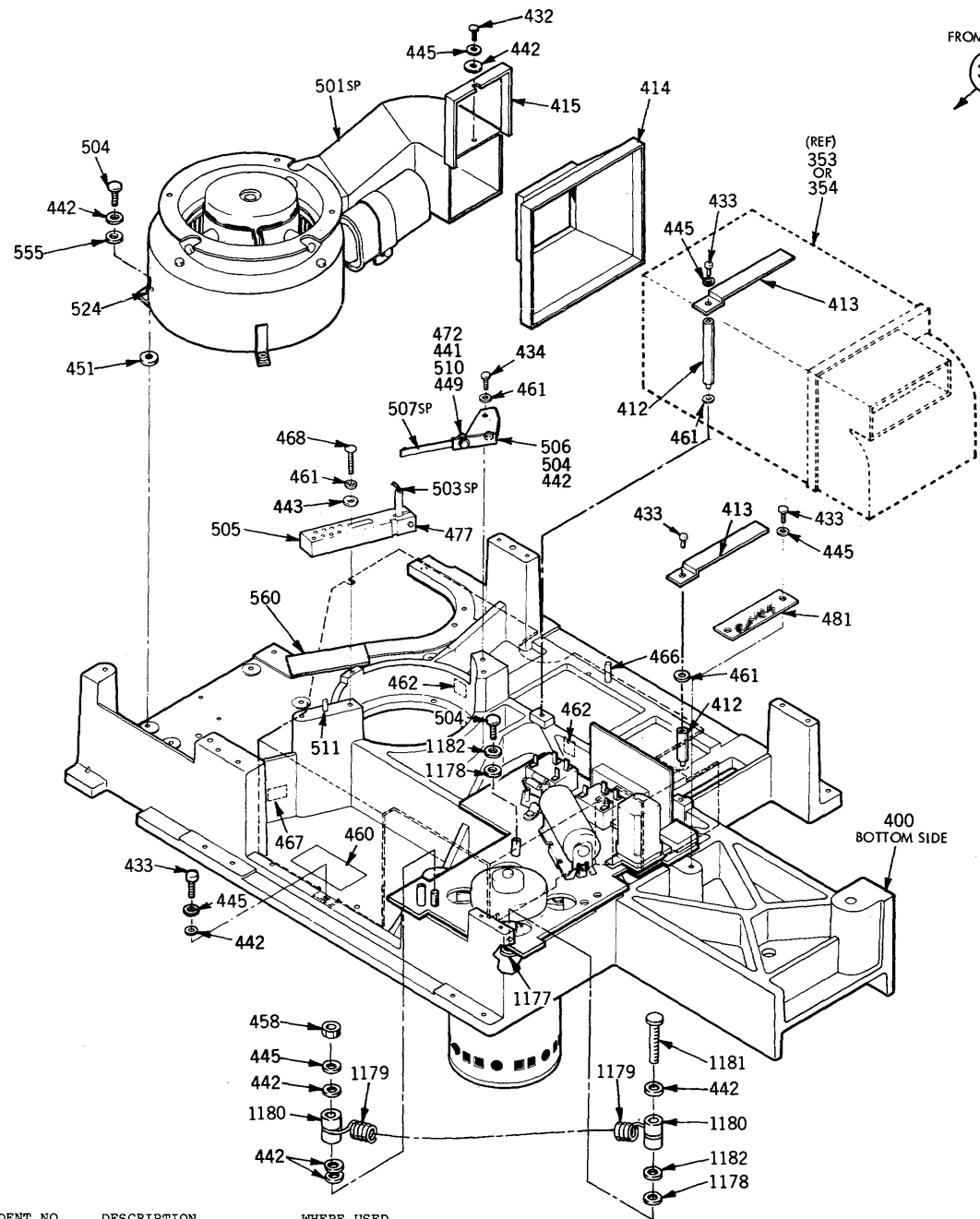
FROM SHEET 6



** SEE SHEET 32 FOR SPARE PARTS PROVISIONING. DISASSEMBLY OF ITEMS 403 OR 407 NOT RECOMMENDED
 * FOR ALL PWA'S SEE DIAGRAM SECTION OF MANUAL FOR CORRECT CIRCUIT BOARD IDENTIFICATION AND BREAKDOWN

FIGURE 8-7. COMMON PARTS (SHEET 2 OF 3)

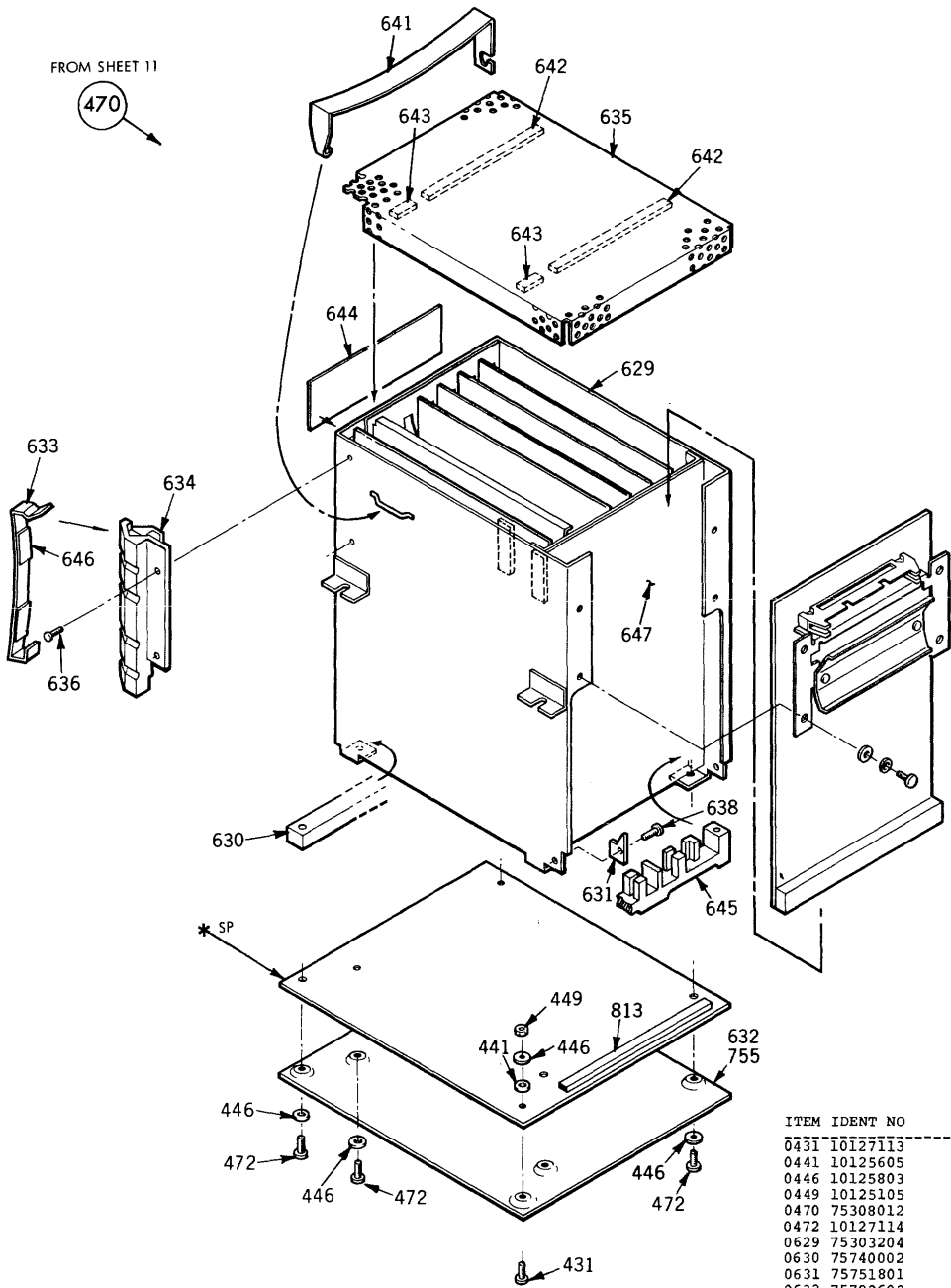
301



ITEM IDENT NO	DESCRIPTION	WHERE USED
0301 83429802	HAWK COMMON PARTS	MOD
0400 83456502	BASE DECK-MACHINED	301
0412 75749000	STANDOFF CLAMP	301
0413 75748903	CLAMP FILTER	301
0414 75308100	EXPANDER-BLOWER	301
0415 75749201	BRACKET-EXPANDER	301
0432 10127121	SCREW PAN HD MACH	301
0433 92742201	SCREW PAN HD MACH	301
0434 10127123	SCREW PAN HD MACH	301
0441 10125605	WASHERS PLAIN	301
0442 10125606	WASHERS PLAIN	301
0443 10125607	WASHERS PLAIN	301
0445 10125804	WASHERS SPR LOCK	301
0449 10125105	NUT HEX MACH	301
0451 75806504	WASHER-REDUCED	301
0460 24547502	PLATE, WARNING	301
0461 10126402	WASH EXT TOOTH LO	301
0462 51853006	CLAMP, CABLE ADHESIVE	301
0466 92021004	PIN, DOWEL	301
0467 51853005	CLAMP	301
0468 10127125	SCRFW PAN HD MACH	301
0472 10127114	SCR PAN HD	301

ITEM IDENT NO	DESCRIPTION	WHERE USED
0477 10126215	SCREW CAP SOC HD	301
0481 77835140	GROUND STRAP	301
0501 83457101	BLOWER ASM	301
0503 75793803	SENSOR CABLE ARM	301
0504 93115287	SCREW PAN	301
0505 83445800	MOUNT-SENSOR	301
0506 83445900	BRACKET-STATIC GRND	301
0507 40054700	SPRING STATIC GROUND	301
0510 10126401	WASH EXT TOOTH LO	301
0511 92021001	PIN-DOWEL .125X.38	301
0524 95649726	GROMMET-BLOWER MTG	301
0555 75887562	SPACER	301
0560 83451810	INSULATOR	301
1177 75892866	WASHER SHOULDER	301
1178 75062400	WASHER FLAT	301
1179 75889099	SPRING	301
1180 75881538	POST, MOTOR	301
1181 93115291	SCREW	301
1182 77830612	WASHER FLAT	301

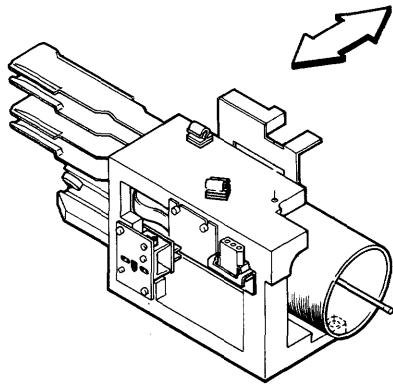
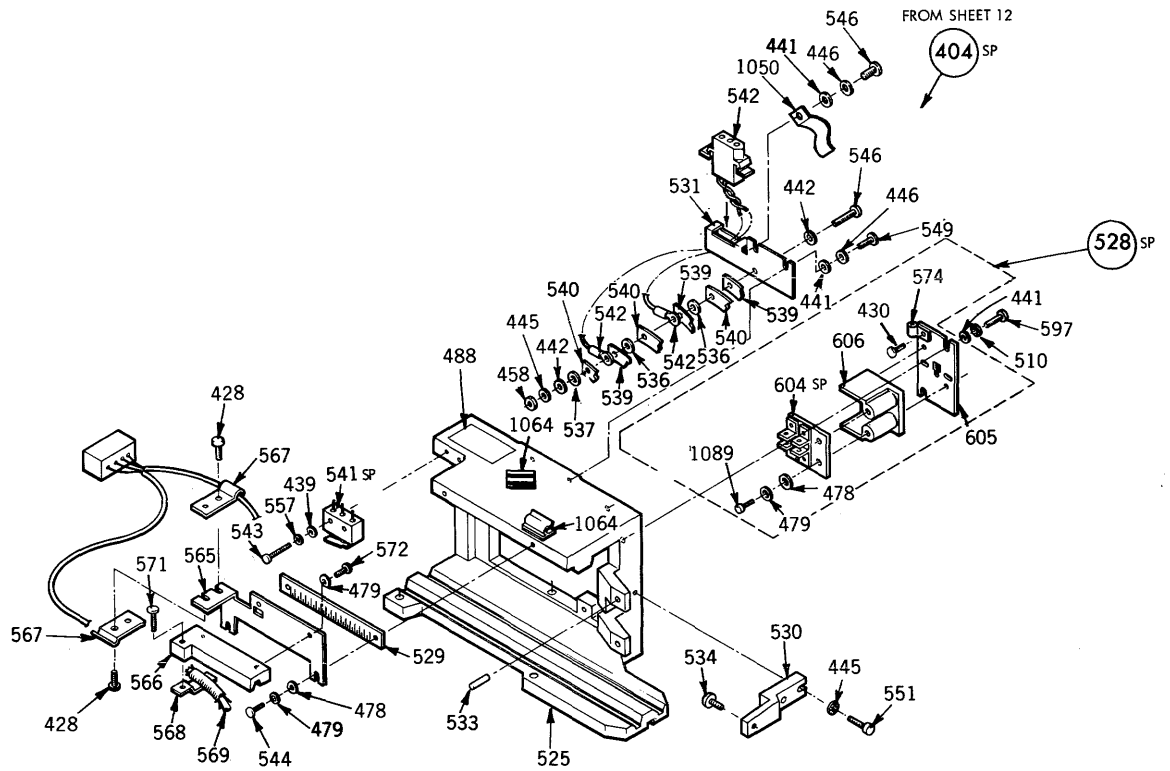
FIGURE 8-7. COMMON PARTS (SHEET 3 OF 3)



ITEM	IDENT NO	DESCRIPTION	WHERE USED
0431	10127113	SCREW PAN HD MACH	470
0441	10125605	WASHERS PLAIN	470
0446	10125803	WASHERS SPR LOCK	470
0449	10125105	NUT HEX MACH	470
0470	75308012	CARD CAGE ASM	301
0472	10127114	SCR PAN HD	470
0629	75303204	CARD CAGE	470
0630	75740002	STOP-CIRCUIT BOARD	470
0631	75751801	GUIDE-CIRCUIT	470
0632	75792602	COVER MOTHER	470
0633	75799402	CLIP-HEAD CABLE, QUAL	470
0634	83445400	GUIDE WIRE	470
0635	75739900	COVER-CARD CAGE	470
0636	95655501	SCREW SHEET METAL	470
0638	95655500	SCREW SHEET METAL	470
0641	75803301	CLAMP-CAGE COVER	470
0642	75803500	STRIP-CORK RUBBER	470
0643	75803501	STRIP-CORK RUBBER	470
0644	75802700	LABEL-CARD LOCATION	470
0645	83479600	STOP-KEYED INJ MOLD	470
0646	75803503	STRIP-PRESSURE	470
0647	83451814	INSULATOR	470
0755	83455800	INSULATOR MOTHER COV	470
0813	75287700	GASKET	470

FIGURE 8-8. CARD CAGE ASSEMBLY

THIS VIEW FOR REFERENCE ONLY.
DISASSEMBLY NOT RECOMMENDED.
HOWEVER ITEMS 528, 530, & 541
CAN BE REPLACED.



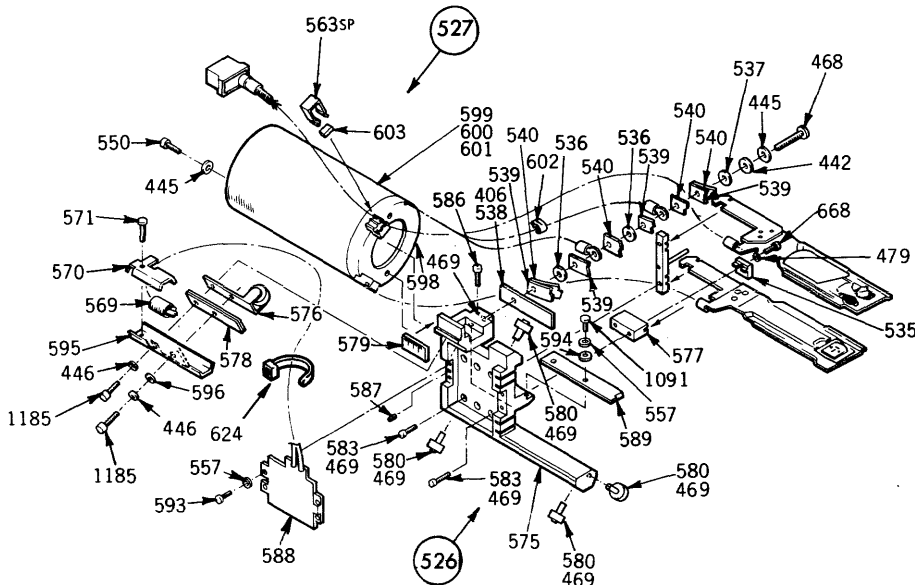
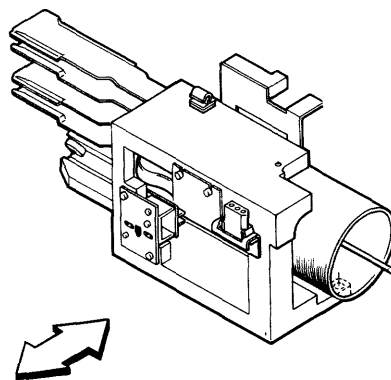
ITEM	IDENT NO	DESCRIPTION	WHERE USED
0404	75316008	ACTUATOR ASM	301
0428	92815096	SCREW CAP SOC HD	404
0430	10127111	SCREW PAN HD MACH	528
0439	10125602	WASHERS PLAIN	404
0441	10125605	WASHERS PLAIN	404
0442	10125606	WASHERS PLAIN	404
0445	10125804	WASHERS SPR LOCK	404
0446	10125803	WASHERS SPR LOCK	404
0458	10125106	NUT HEX MACH	404
0478	10125603	WASHERS PLAIN	404
0478	10125603	WASHERS PLAIN	528
0479	10125801	WASHERS SPR LOCK	404
0479	10125801	WASHERS SPR LOCK	528
0488	83415603	LABEL	404
0510	10126401	WASH EXT TOOTH LO	404
0525	75316104	FRAME-ACTUATOR MACH	404
0528	83447302	DETECTOR ASM-END TR	404
0529	75317900	SCALE-VERNIER FIXED	404
0530	75797400	BRACKET-BUMPER, CAST	404
0531	75317501	STRIP-BACKUP ACTUATOR	404
0533	75317200	CAM-HEAD ARM	404
0534	93623000	BUMPER, RUBBER	404
0536	75296101	WASHER PHENOLIC	404
0537	75296201	SPACER PHENOLIC	404
0539	75797500	LEAD-FLEX COIL PR	404
0540	73555101	INSULATOR-FLEX LEAD	404
0541	92549007	SW SUBMINIATURE BASI	404
0542	75800502	COIL POWER HARNESS	404
0543	10127169	SCREW PAN HD MACH	404
0544	10126213	SCREW PAN HD MACH	404
0546	10127124	SCREW PAN HD MACH	404
0549	92815160	SCREW CAP SOC HD	404
0551	92815195	SCREW CAP SOC HD	404
0557	10126100	WASH INT TOOTH LK	404
0565	83493900	BRACKET-CHANNEL	404
0566	83493800	CHANNEL-UPPER	404
0567	83494200	CLAMP-WIRE	404
0568	83494001	CLAMP-SPIRAL GUIDE	404
0569	83454400	STIFFNER	404
0571	10127105	SCREW PAN HD MACH	404
0572	10127102	SCREW PAN HD	404
0574	00863701	CLAMP CABLE	528
0597	10125015	SCR PAN HD	404
0604	77612607	OPTICAL SWITCH ASM	528
0605	83447401	PLATE-DETECTOR MFG	528
0606	83447500	ADAPTER-HORIZ POS	528
1050	77613869	CLIP	404
1064	51853015	CLAMP CABLE	404
1089	10126214	SCREW HFX	528

FIGURE 8-9. ACTUATOR WITH DETECTOR ASSEMBLY

THIS VIEW FOR REFERENCE ONLY.
DISASSEMBLY NOT RECOMMENDED.
HOWEVER ITEMS 535, & 563 CAN BE REPLACED.

FROM SHEET 12

404 SP



ITEM IDENT NO	DESCRIPTION	WHERE USED
0404 75316008	ACTUATOR ASSY	301
0406 95125324	LOCTITE	404
0442 10125606	WASHERS PLAIN	404
0445 10125804	WASHERS SPR LOCK	404
0446 10125803	WASHERS SPR LOCK	526
0468 10127125	SCREW PAN HD MACH	404
0469 95125305	LOCTITE GRADE C	526
0469 95125305	LOCTITE GRADE C	404
0479 10125801	WASHERS SPR LOCK	404
0526 83475501	CARRIAGE ASSY	404
0527 75319603	COIL ASSY	404
0535 73228200	PLATE-ARM CLAMP	404
0536 75296101	WASHER PHENOLIC	404
0537 75296201	SPACER PHENOLIC	404
0538 73555300	STRIP-BACKUP	404
0539 75797500	LEAD-FLEX COIL PR	404
0540 73555101	INSULATOR-FLEX LEAD	404
0550 92815193	SCREW CAP SOC HD	404
0557 10126100	WASH INT TOOTH LK	404
0557 10126100	WASH INT TOOTH LK	526
0563 83490600	CLIP-CLAMP	404
0569 83454400	STIFFNER	404
0570 83494500	CLAMP-CHANNEL	404
0571 10127105	SCREW PAN HD MACH	404
0575 75316600	CARRIAGE ACTUATOR	526
0576 73197400	SPR-BEARING ASSY	526
0577 73584400	BASE-ARM CLAMP	526
0578 73197000	SPRING BEARING	526
0579 75317700	SCALE-VERNIER MOVING	526
0580 92054251	BALL BEARING	526
0583 92815097	SCREW CAP SOC HD	526

ITEM IDENT NO	DESCRIPTION	WHERE USED
0586 93344096	SCREW NYLON	526
0587 93071163	SCREW SET SOC HD	526
0588 83475401	POS TRANSDUCER SL-CO	526
0589 75314202	SCALE-END	526
0593 10127311	SCREW SLOTTED	526
0594 75806501	WASHER-REDUCED O.D.	526
0595 83494400	CHANNEL-MODULE	526
0596 75806503	WASHER	526
0598 83441700	CAP-COIL MACHINED	527
0599 94258205	WIRE-MAGNET	527
0600 95280500	EPOXY, IMPREGNATING	527
0601 75786000	INSULATION MAT	527
0602 93355001	MARKER, WIRE NUMBER 1	527
0603 75803502	STRIP-PRESSURE	527
0624 94277416	TIE WRAP	404
0668 10126212	SCR HEX SOC HD CAP	404
1091 10127310	SCREW SLOTTED	526
1185 92815161	SCREW	526

FIGURE 8-10. ACTUATOR WITH CARRIAGE AND COIL ASSEMBLIES

ITEM IDENT NO	DESCRIPTION	WHERE USED
0406 95125324	LOCTITE	423
0423 75315405	TRANSDUCER SCALE ASM	301
0424 75276203	SPACER NYLON	301
0425 75797700	BAR EXPANSION MACHINE	301
0427 10126209	SCR-SOC HP CAP	301
0428 92815096	SCREW CAP SOC HD	301
0429 93788082	SCRW SELF LOCKING 4	301
0435 10126255	SCR SOC HD	301
0437 92815197	SCREW CAP SOC HD	301
0439 10125602	WASHERS PLAIN	301
0444 10125800	WASHERS SPR	301
0444 10125800	WASHERS SPR	423
0445 10125804	WASHERS SPR LOCK	301
0447 10126228	SCR HEX SOC HD	301
0450 75792800	IDLER	416
0451 75806504	WASHER-REDUCED	301
0459 92054227	CR BEARING BALL	416
0466 92021004	PIN, DOWEL	423
0469 95125305	LOCTITE GRADE C	301
0471 92824097	SCREW CAP	423
0476 75797100	STAND OFF	301
0477 10126215	SCREW CAP SOC HD	301
0478 10125603	WASHERS PLAIN	301
0479 10125801	WASHERS SPR LOCK	301
0490 75312751	SPEC-EPOXY ADHESIVE	301
0495 83482400	SECTOR RING ASM 8	301
0517 75886381	LUBRICANT	301
0581 93115168	SCR HEX SOC HD	301
0591 77617072	SCREW CAP	423
0613 75315501	SCALE-FLEX MOUNT	423
0614 75315600	MOUNT-TRANSDUCER	423
0615 75315901	POS TRANS SCALE	423
0616 75797001	BASE TRANSDUCER MOUNT	423
0617 75797200	PIN XDUCER ALIGNMENT	423
0621 10126208	SCREW BUTTON ED	423
0623 93651029	WASHER, BELLEVILLE	423
0626 95010890	GREASE-LUBRIPLATE	423
0628 77832201	COMP BRKT	301
0637 77832202	BRACKET	301
0668 10126212	SCR HEX SOC HD CAP	423
0680 77616079	SCREW CAP	423
0891 95125322	LOCTITE	301
1061 95125317	LOCTITE PRIMER	301
1076 10125608	WASHER	301
1115 95125311	LOCTITE PRIMER	423

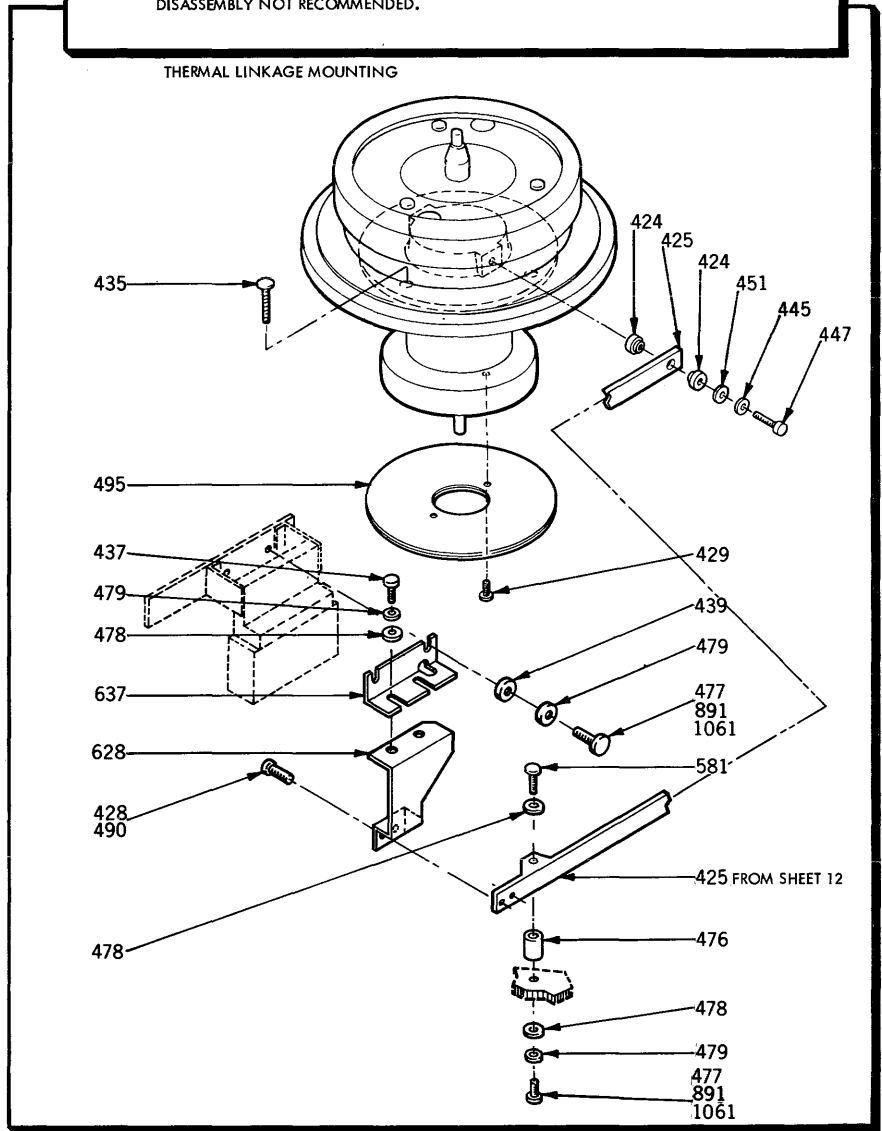
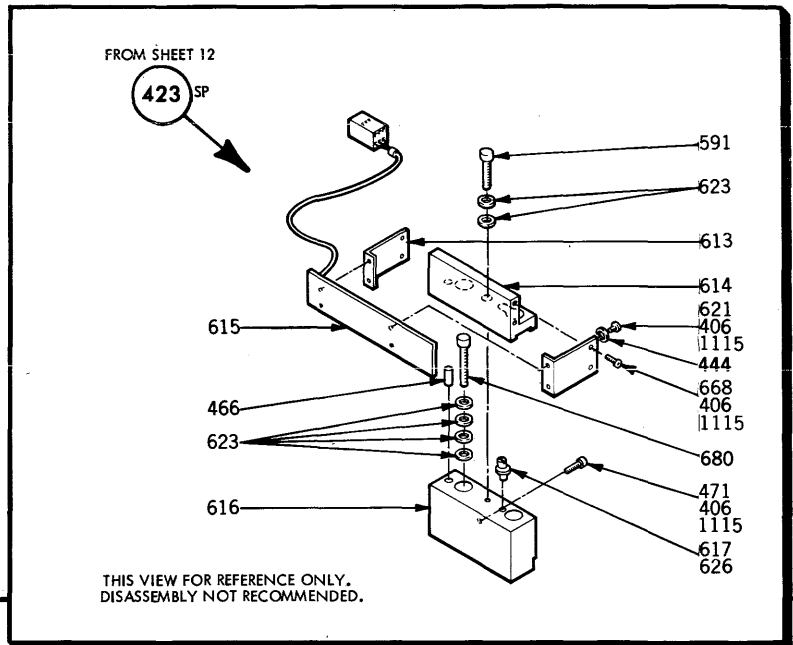
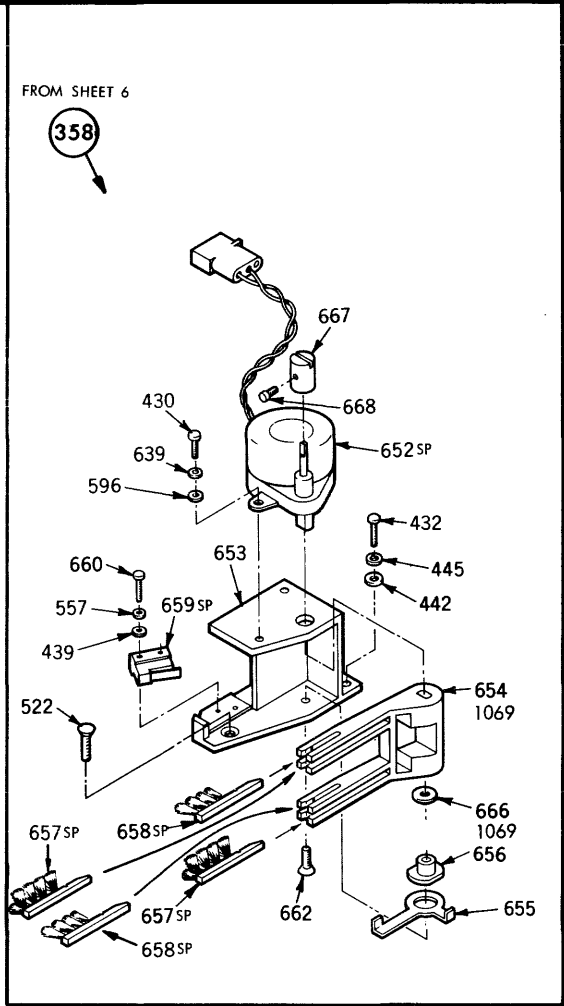
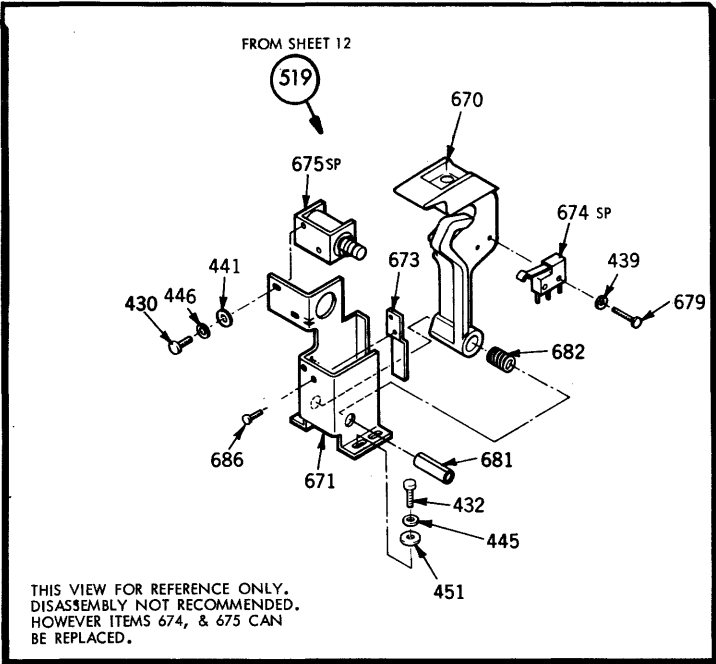
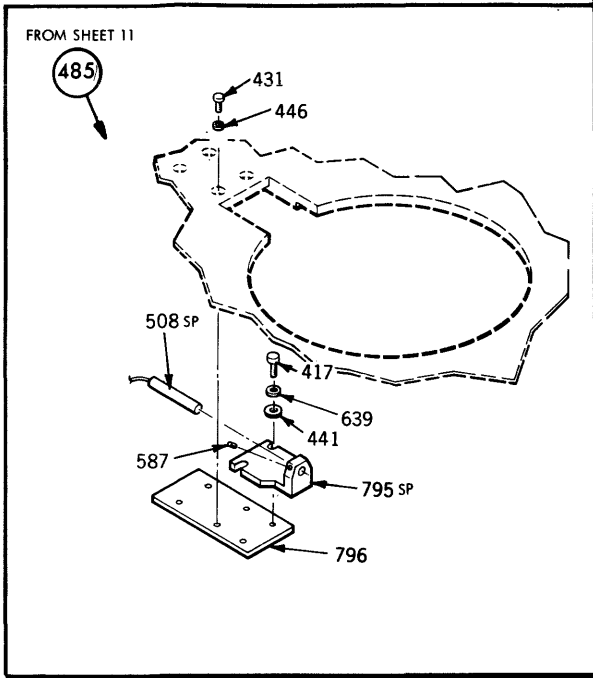
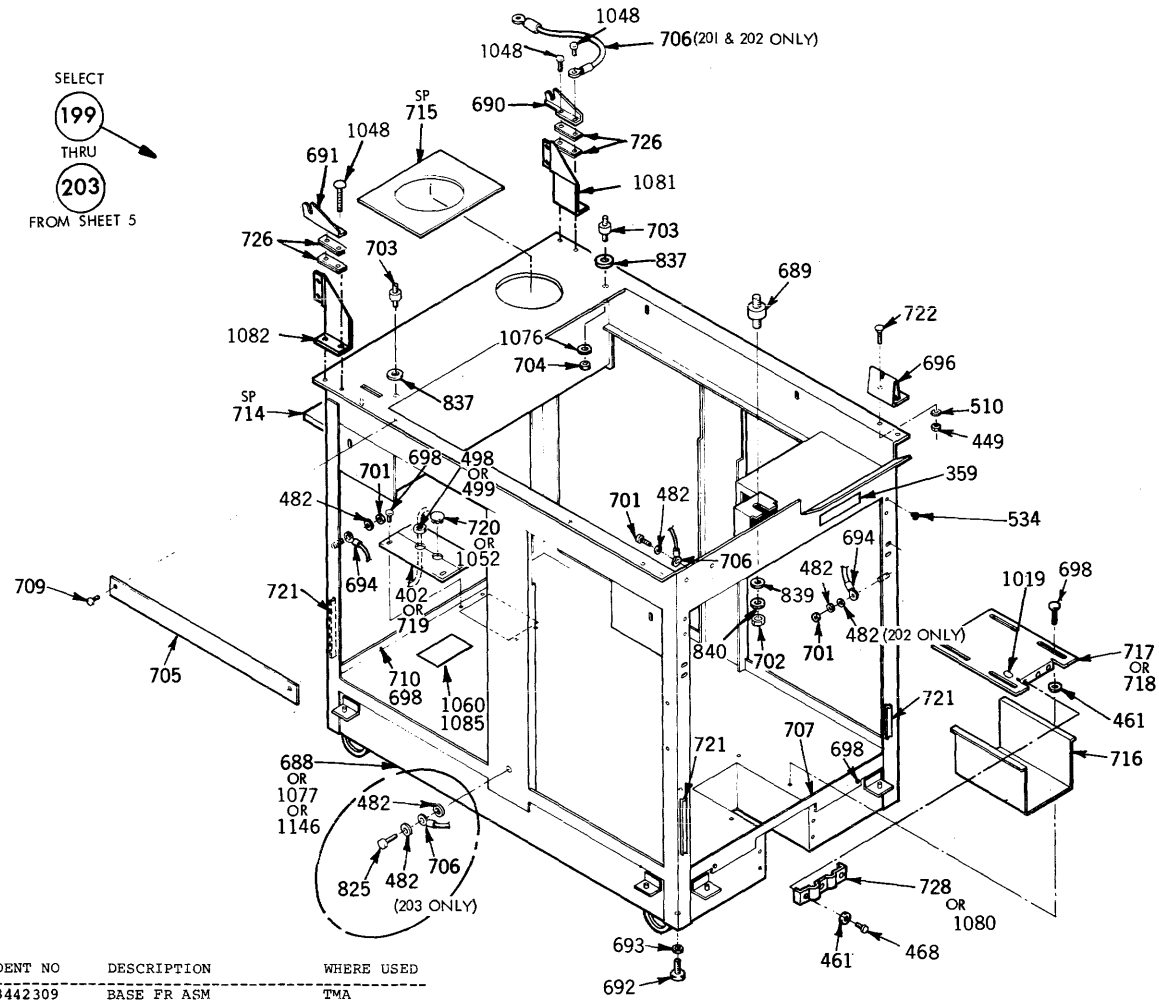


FIGURE 8-11. COMMON PARTS SUB ASSEMBLIES (SHEET 1 OF 2)



ITEM IDENT NO	DESCRIPTION	WHERE USED
0358 83466001	BRUSH DRIVE ASM	MOD
0417 10127112	SCREW PAN HD MACH	485
0430 10127111	SCREW PAN HD MACH	358 519
0431 10127113	SCREW PAN HD MACH	485
0432 10127121	SCREW PAN HD MACH	519
0432 10127121	SCREW PAN HD MACH	301
0439 10125602	WASHERS PLAIN	519
0439 10125602	WASHERS PLAIN	358
0441 10125605	WASHERS PLAIN	519
0441 10125605	WASHERS PLAIN	485
0442 10125606	WASHERS PLAIN	301
0445 10125804	WASHERS SPR LOCK	301
0446 10125803	WASHERS SPR LOCK	485
0446 10125803	WASHERS SPR LOCK	519
0451 75806504	WASHER REDUCED	519
0485 83451602	MAGNETIC SENSOR ASM	301
0508 75793802	SENSOR CABLE ASM	485
0519 83457902	PACKLOCK ASM	301
0522 10125920	SCREW FL HD	301
0557 10126100	WASH INT TOOTH LK	358
0587 93071163	SCREW SET SOC HD	485
0596 75806503	WASHER	358
0639 10126103	WASH INT TOOTH LK	358
0639 10126103	WASH INT TOOTH LK	485
0652 75740701	BRUSH MOTOR ASM	358
0653 83466100	BRUSH DRIVE MOUNT	358
0654 83466200	BRUSH HOLDER	358
0655 83466300	DELAY ARM	358
0656 83466400	BRUSH HOLDER STUD	358
0657 40024501	BRUSH, DISK	358
0658 40024502	BRUSH, DISK	358
0659 36159806	SWITCH-PIVOT LEVER	358
0660 92742011	SCREW M-C PAN HD	358
0662 10125919	SCREW FLAT HD	358
0666 93529003	WASHER, SPRING WAVE	358
0667 83467100	BRUSH INDICATOR	358
0668 10126212	SCR HEX SOC HD CAP	358
0670 83457201	ARM LOCK MOLDER	519
0671 83457302	PACK LOCK BRACKET	519
0673 77598701	SPRING ARM	519
0674 77598501	SWITCH SUBMINIATURE	519
0675 94357804	SOLENOID DC	519
0679 18607916	SCREW THD CUTTING	519
0681 93530436	ROLL PIN	519
0682 75779867	SPRING	519
0686 10127120	SCREW PAN HD MACH	519
0795 83451104	UPPER SENSOR HOLDER	485
0796 83450000	PLATE-SENSOR MTG	485
1069 95016100	LUBRICANT	358

FIGURE 8-11. COMMON PARTS SUB ASSEMBLIES (SHEET 2 OF 2)



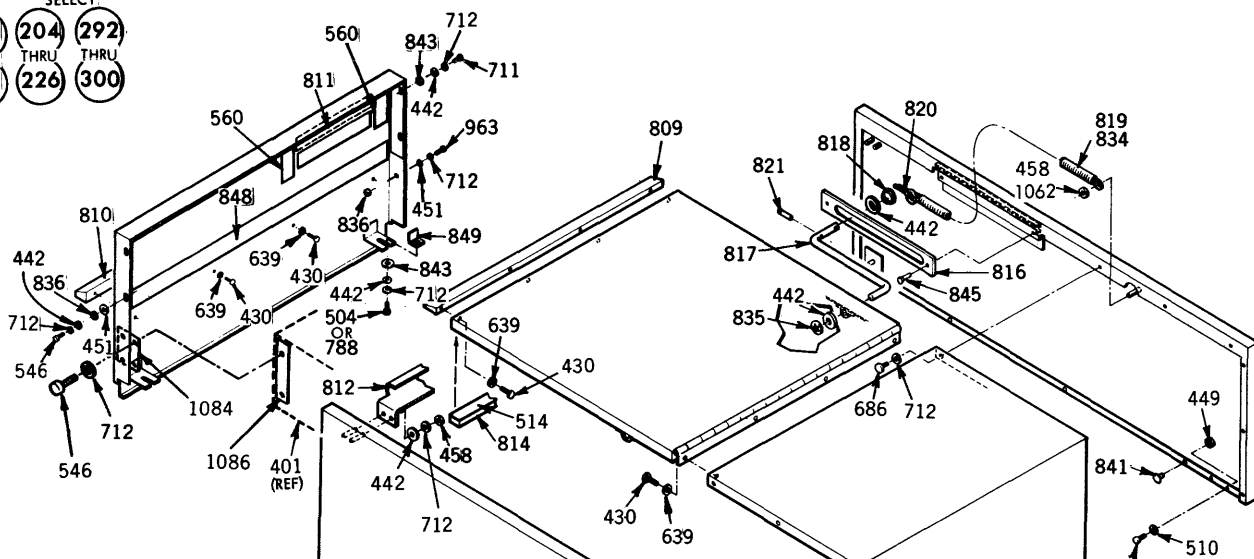
ITEM IDENT NO	DESCRIPTION	WHERE USED
0199	83442309	BASE FR ASM TMA
0200	83442310	BASE FR ASM TMA
0201	83442311	BASE FR ASM TMA
0202	83442312	BASE FR ASM TMA
0203	83442313	BASE FR ASM TMA
0356	83410562	GASKET STRIP 199-203
0359	75886347	IDENT PLATE 203
0402	83494802	PLATE-AC CABLE 201
0443	10125607	WASHERS PLAIN 202 203
0445	10125804	WASHERS SPR LOCK 519
0449	10125105	NUT HEX MACH 199-203
0461	10126402	WASH EXT TOOTH LO 199 200 202 203
0468	10127125	SCREW PAN HD MACH 202 203
0482	10126403	WASH EXT TOOTH LO 199-203
0498	95596604	BUSHING 199-203
0499	95596601	BUSHING 201
0510	10126401	WASH EXT TOOTH LO 199-203
0518	10125030	SCREW HEX HD 199-203
0534	93623000	BUMPR, RUBBER 199-203
0688	83445709	FRAME CABINET 199 200
0689	75884516	SHOCK MOUNT-LORD 199-203
0690	73469100	PIVOT-COVER 199-203
0691	73469101	PIVOT-COVER 199-203
0692	93697013	LEVELER 199-203
0693	93006033	NUT JAM HEX 199-203
0694	75730805	CABLE ASM GROUND 199-203
0696	83444100	GROUND WIPER 199-203
0698	93592200	SCR TPG HEX PNL 199-203
0701	10125108	NUT HEX MACH 199-203
0702	10125303	NUT HEXAGON 199-203
0703	75884517	SHOCK MOUNT-LORD 199-203
0704	10125301	NUT HEXAGON 199-203
0705	83492800	PLATE-COVER 199-203
0706	94281426	BR CABLE, GROUND 199-203
0707	83474601	FIRE-STOP, REAR 199-203
0709	92723234	SCREW BUTTON SOC HD 199-203
0710	77831951	FIRE-STOP, FRONT 199-203
0714	75804800	AIR FILTER 199-203
0715	77599600	GASKET BLOWER CAB 199-203
0716	83478200	COVER 199-203
0717	83478700	CLAMP 200 201

ITEM IDENT NO	DESCRIPTION	WHERE USED
0718	83478701	CLAMP 202 203
0719	83494801	PLATE, AC CABLE 199-203
0720	93522008	PLUG-SNAP BUTTON 200
0722	92932206	SCR FLAT HD SST 199-203
0726	83444900	SHIM PLATE 199-203
0728	77832300	CLAMP 202
0825	17901516	SCR THD ROLL 202 203
0837	10125806	SPRING LK WSHR 199-203
0839	10125610	WSHR PLAIN 199-203
0840	10125808	SPRING LK WSHR 199-203
1019	75731301	SYMBOL GRND (DECAL) 203
1048	17901519	SCR THD ROLL PAN HD 199-203
1052	93522009	PLUG-SNAP BUTTON 201
1060	77658250	LABEL, RATING 199 200 202 203
1076	10125608	WASHER 199-203
1077	83445710	FRAME CABINET 201
1080	77832301	CLAMP 203
1081	75884875	GR FLEXIBLE 199 200 203
1082	75884876	GR FLEXIBLE 199 200 203
1085	77658251	LABEL, RATING 201
1146	83445711	FRAME CABINET 199 202 203

FIGURE 8-12. BASE FRAME ASSEMBLY

FROM SHEET 5
SELECT:

(163) (204) (292)
THRU THRU THRU
(169) (226) (300)

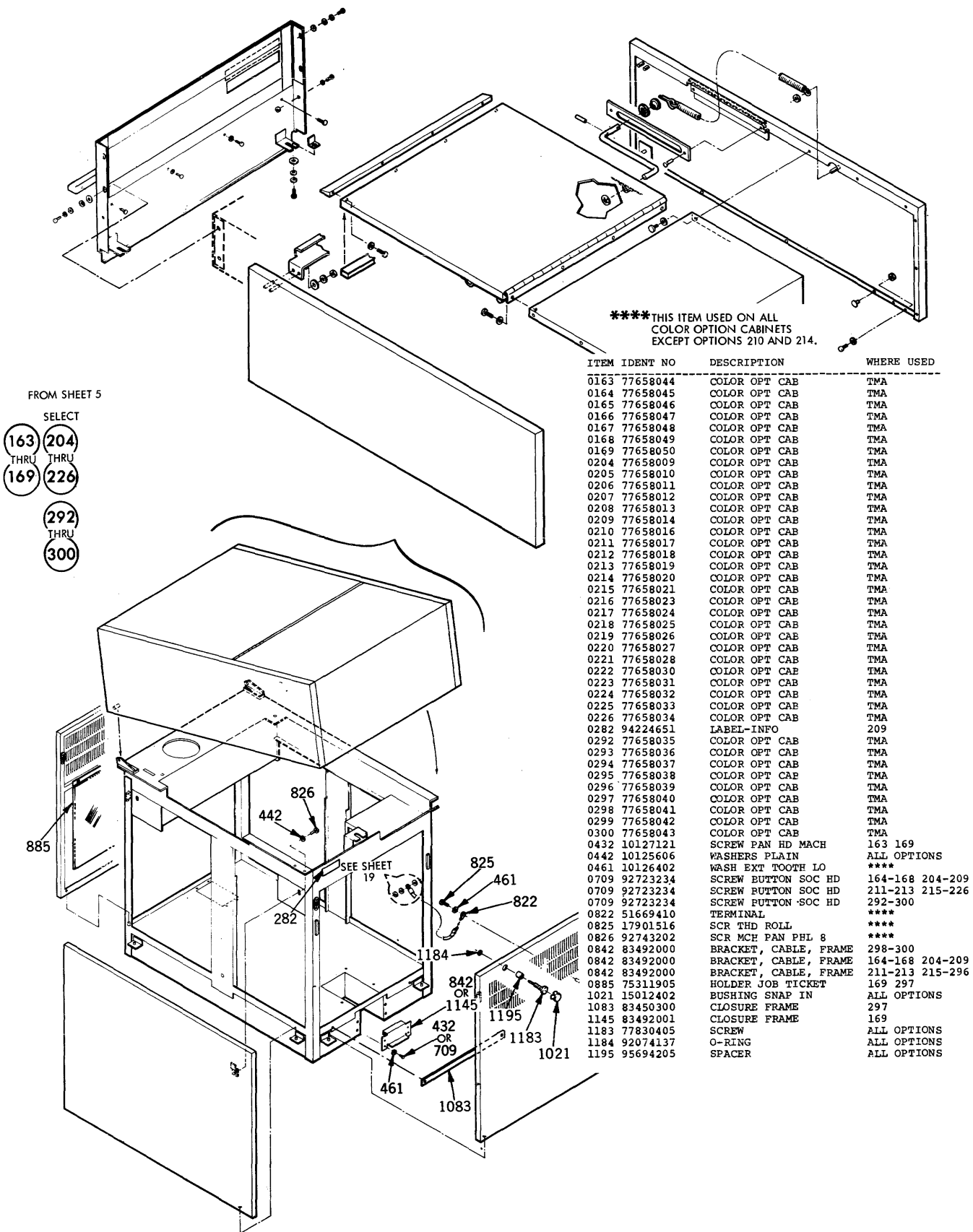


**** THIS ITEM USED ON ALL
COLOR OPTION CABINETS
EXCEPT OPTIONS 210 AND 214.

ITEM IDENT NO	DESCRIPTION	WHERE USED
0163 77658044	COLOR OPT CAB	TMA
0164 77658045	COLOR OPT CAB	TMA
0165 77658046	COLOR OPT CAB	TMA
0166 77658047	COLOR OPT CAB	TMA
0167 77658048	COLOR OPT CAB	TMA
0168 77658049	COLOR OPT CAB	TMA
0169 77658050	COLOR OPT CAB	TMA
0204 77658009	COLOR OPT CAB	TMA
0205 77658010	COLOR OPT CAB	TMA
0206 77658011	COLOR OPT CAB	TMA
0207 77658012	COLOR OPT CAB	TMA
0208 77658013	COLOR OPT CAB	TMA
0209 77658014	COLOR OPT CAB	TMA
0210 77658016	COLOR OPT CAB	TMA
0211 77658017	COLOR OPT CAB	TMA
0212 77658018	COLOR OPT CAB	TMA
0213 77658019	COLOR OPT CAB	TMA
0214 77658020	COLOR OPT CAB	TMA
0215 77658021	COLOR OPT CAB	TMA
0216 77658023	COLOR OPT CAB	TMA
0217 77658024	COLOR OPT CAB	TMA
0218 77658025	COLOR OPT CAB	TMA
0219 77658026	COLOR OPT CAB	TMA
0220 77658027	COLOR OPT CAB	TMA
0221 77658028	COLOR OPT CAB	TMA
0222 77658030	COLOR OPT CAB	TMA
0223 77658031	COLOR OPT CAB	TMA
0224 77658032	COLOR OPT CAB	TMA
0225 77658033	COLOR OPT CAB	TMA
0226 77658034	COLOR OPT CAB	TMA
0292 77658035	COLOR OPT CAB	TMA
0293 77658036	COLOR OPT CAB	TMA
0294 77658037	COLOR OPT CAB	TMA
0295 77658038	COLOR OPT CAB	TMA
0296 77658039	COLOR OPT CAB	TMA
0297 77658040	COLOR OPT CAB	TMA
0298 77658041	COLOR OPT CAB	TMA
0299 77658042	COLOR OPT CAB	TMA
0300 77658043	COLOR OPT CAB	TMA

ITEM IDENT NO	DESCRIPTION	WHERE USED
0430 10127111	SCREW PAN HD MACH	ALL OPTIONS
0442 10125606	WASHERS PLAIN	ALL OPTIONS
0449 10125105	NUT HEX MACH	ALL OPTIONS
0451 75806504	WASHER-REDUCED	ALL OPTIONS
0458 10125106	NUT HEX MACH	****
0504 93115287	SCREW PAN	282-296 298-300
0504 93115287	SCREW PAN	164-168 204-226
0510 10126481	WASH EXT TOOTH LO	****
0514 75312013	SPEC TAPE	****
0546 10127124	SCREW PAN HD MACH	ALL OPTIONS
0560 83451810	INSULATOR	163 169 297
0639 10126103	WASH INT TOOTH LK	ALL OPTIONS
0686 10127120	SCREW PAN HD MACH	****
0711 10127347	SCREW PAN HD MACH	****
0712 10126104	WASH INT TOOTH LK	ALL OPTIONS
0788 93342193	SCREW	163 169 297
0809 75283200	BAR-HANDLE	****
0810 75283100	BAR-TRIM	ALL OPTIONS
0811 75793301	LABEL SWITCH	214-244 296-300
0811 75793301	LABEL SWITCH	164-168 204-212
0811 75793301	LABEL SWITCH	292 294 296-300
0812 75284001	BAR-COVER	****
0814 75288300	MAGNETIC STRIP	****
0816 75794101	SLIDE-LID	****
0817 75794205	ROD-SLIDE	****
0818 75794001	SPACER-FLANGED	ALL OPTIONS
0819 75794700	SPRING-EXTENSION	****
0820 92649009	PIN, COTTER	****
0821 93530007	PIN, ROLL HCS BLACK	****
0834 24528646	SLEEVING-VINYL	****
0835 93539004	FASTENER-PUSH ON	****
0836 83446400	BUMPER NYLON	ALL OPTIONS
0838 92743158	SCREW SS PAN HD	****
0841 75774702	CLIP-PUSH IN	****
0843 94347104	SHOULDER WASHER THER	ALL OPTIONS
0845 10125712	SCR FLAT HD	****
0848 83451804	INSULATOR ADHESIVE	ALL OPTIONS
0849 83451805	INSULATOR ADHESIVE	ALL OPTIONS
0963 10127348	SCREW PAN HD	163-169 204-209
0963 10127348	SCREW PAN HD	211-226 292-300
1062 95125301	LOCTITE	ALL OPTIONS
1084 75885150	NUT PLATE	163 169 297
1086 83451802	INSULATOR	****

FIGURE 8-13. COLOR OPTION CABINET (SHEET 1 OF 3)



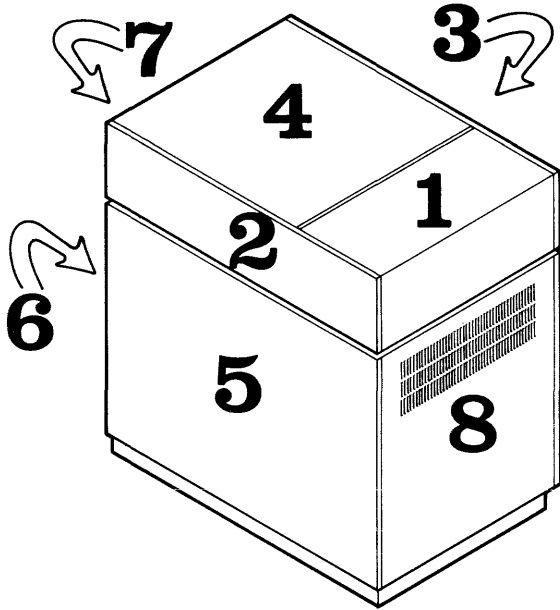
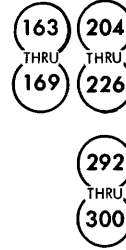
FROM SHEET 5
 SELECT
 (163) (204)
 THRU THRU
 (169) (226)
 (292)
 THRU
 (300)

**** THIS ITEM USED ON ALL
 COLOR OPTION CABINETS
 EXCEPT OPTIONS 210 AND 214.

ITEM IDENT NO	DESCRIPTION	WHERE USED
0163 77658044	COLOR OPT CAB	TMA
0164 77658045	COLOR OPT CAB	TMA
0165 77658046	COLOR OPT CAB	TMA
0166 77658047	COLOR OPT CAB	TMA
0167 77658048	COLOR OPT CAB	TMA
0168 77658049	COLOR OPT CAB	TMA
0169 77658050	COLOR OPT CAB	TMA
0204 77658009	COLOR OPT CAB	TMA
0205 77658010	COLOR OPT CAB	TMA
0206 77658011	COLOR OPT CAB	TMA
0207 77658012	COLOR OPT CAB	TMA
0208 77658013	COLOR OPT CAB	TMA
0209 77658014	COLOR OPT CAB	TMA
0210 77658016	COLOR OPT CAB	TMA
0211 77658017	COLOR OPT CAB	TMA
0212 77658018	COLOR OPT CAB	TMA
0213 77658019	COLOR OPT CAB	TMA
0214 77658020	COLOR OPT CAB	TMA
0215 77658021	COLOR OPT CAB	TMA
0216 77658023	COLOR OPT CAB	TMA
0217 77658024	COLOR OPT CAB	TMA
0218 77658025	COLOR OPT CAB	TMA
0219 77658026	COLOR OPT CAB	TMA
0220 77658027	COLOR OPT CAB	TMA
0221 77658028	COLOR OPT CAB	TMA
0222 77658030	COLOR OPT CAB	TMA
0223 77658031	COLOR OPT CAB	TMA
0224 77658032	COLOR OPT CAB	TMA
0225 77658033	COLOR OPT CAB	TMA
0226 77658034	COLOR OPT CAB	TMA
0282 94224651	LABEL-INFO	209
0292 77658035	COLOR OPT CAB	TMA
0293 77658036	COLOR OPT CAB	TMA
0294 77658037	COLOR OPT CAB	TMA
0295 77658038	COLOR OPT CAB	TMA
0296 77658039	COLOR OPT CAB	TMA
0297 77658040	COLOR OPT CAB	TMA
0298 77658041	COLOR OPT CAB	TMA
0299 77658042	COLOR OPT CAB	TMA
0300 77658043	COLOR OPT CAB	TMA
0432 10127121	SCREW PAN HD MACH	163 169
0442 10125606	WASHERS PLAIN	ALL OPTIONS
0461 10126402	WASH EXT TOOTH LO	****
0709 92723234	SCREW BUTTON SOC HD	164-168 204-209
0709 92723234	SCREW BUTTON SOC HD	211-213 215-226
0709 92723234	SCREW BUTTON SOC HD	292-300
0822 51669410	TERMINAL	****
0825 17901516	SCR THD ROLL	****
0826 92743202	SCR MCH PAN PHL 8	****
0842 83492000	BRACKET, CABLE, FRAME	298-300
0842 83492000	BRACKET, CABLE, FRAME	164-168 204-209
0842 83492000	BRACKET, CABLE, FRAME	211-213 215-296
0885 75311905	HOLDER JOB TICKET	169 297
1021 15012402	BUSHING SNAP IN	ALL OPTIONS
1083 83450300	CLOSURE FRAME	297
1145 83492001	CLOSURE FRAME	169
1183 77830405	SCREW	ALL OPTIONS
1184 92074137	O-RING	ALL OPTIONS
1195 95694205	SPACER	ALL OPTIONS

FIGURE 8-13. COLOR OPTION CABINET (SHEET 2 OF 3)

FROM SHEET 5
SELECT

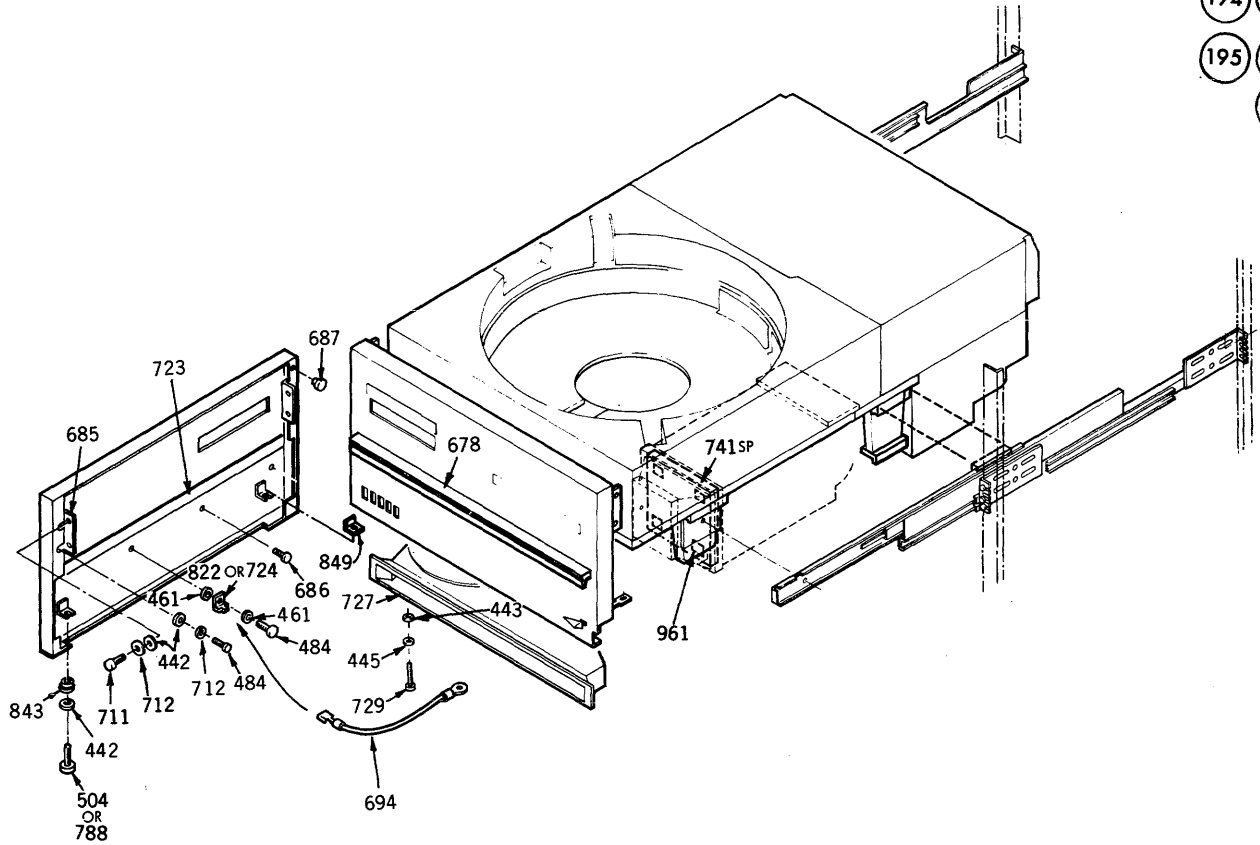


NOTE: REFER TO ASSEMBLY - COMPONENT PARTS LIST
FOR PANEL IDENTIFICATION.

COLOR OPTION DESCRIPTION TABLE

COLOR OPT ITEM NO.	#1	#2	#3	#4	#5	#6	#7	#8
	TOP COVER REAR	TOP COVER R.H.	TOP COVER L.H.	DOOR AC- CESS	PANEL SIDE PTD	PANEL END REAR	PANEL CON- TROL	PANEL END REAR
163	1147	989	990	991	992	997	1143	1144
164	1156	1157	1158	1159	1160	1161	1162	
165	1148	1149	1150	1151	1152	1153	1154	1155
166	1163	803	1165	1166	806	1168	1169	
167	1156	1157	1158	1159	1160		1162	1161
168	1163	1164	804	1166	806	1168	512	
169	1189	1190	1191	991	1192	997	1143	
204	802	803	804	805	806	807	808	
205	1058	852	853	854	855	856	857	
206	858	803	804	859	806	860	861	
207	862	863	864	865	866	867	868	
208	869	870	871	872	873	874	875	
209	802	803	804	805	806	807	808	
210							808	
211	898	899	900	901	902	903	904	
212	905	906	907	908	909	910	911	
213	912	913	914	915	906	917	918	
214							861	
215	919	920	921	922	923	924	925	
216	851	934	935	936	937	953	876	
217	938	939	940	941	942	943	944	
218	946	947	948	949	950	951	952	
219	862	863	864	865	866	867	868	
220	926	927	928	929	930	931	932	1113
221	1057	886	887	888	933	1078	1079	
222	548	552	554	683	700	753	890	
223	1093	1094	1095	1096	1097	1098	1099	
224	802	803	804	805	806		808	807
225	1100	1101	1102	1103	1104		1105	1106
226	858	803	804	859	806		861	860
292	964	1008	1030	1059	1109	1110	1111	
293	1057	886	887	888	933		1079	1078
294	1117	1118	1119	1120	1121		861	807
295	1117	1122	1123	1120	1124		1125	1126
296	1129	1130	1131	1132	1133		1134	1142
297	877	769	781	880	785	882	786	884
298	1058	799	800	854	801	833	844	846
299	1058	799	800	854	801	846	857	
300	1087	1112	1114	1136	1137	1138	1139	

FIGURE 8-13. COLOR OPTION CABINET (SHEET 3 OF 3)



RACK MOUNT ASSY ITEM#	INSTALLATION KIT	
	ITEM#	DETAIL
194	564	SHEET 27
195	713	SHEET 26
229	713	SHEET 26
231	713	SHEET 26
232	NONE	
233	713	SHEET 26

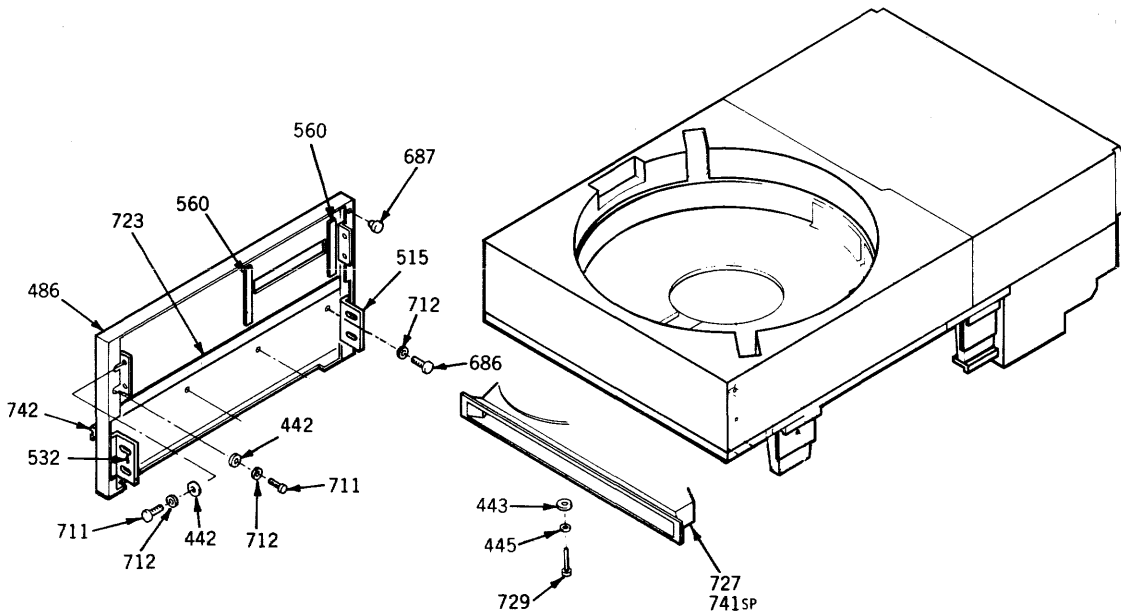
ITEM IDENT NO	DESCRIPTION	WHERE USED
0194 83443513	RACK MT ASM	TMA
0195 83443514	RACK MT ASM	TMA
0229 83443504	RACK MT ASM	TMA
0231 83443506	RACK MT ASM	TMA
0232 83443507	RACK MT ASM	TMA
0233 83443509	RACK MT ASM	TMA
0442 10125606	WASHERS PLAIN	194 195 229
0443 10125607	WASHERS PLAIN	194 195 229 233
0445 10125804	WASHERS SPR LOCK	194 195
0445 10125804	WASHERS SPR LOCK	229 231-233
0461 10126402	WASH EXT TOOTH LO	194 229 231 232
0484 10127122	SCREW PAN HD MACH	194 229 231 232
0504 93115287	SCREW PAN	194 229 231 232
0546 10127124	SCREW PAN HD MACH	229 231 232
0564 83447808	INSTLN KIT-RACK MT	194
0678 75284701	HANDLE PULL RACK	194 195
0678 75284701	HANDLE-PULL RACK	229 231 232
0685 83444200	ANGLE-FRT PANEL	194 195
0685 83444200	ANGLE-FRT PANEL	229 231 232
0686 10127120	SCREW PAN HD MACH	194 195
0686 10127120	SCREW PAN HD MACH	229 231 232
0687 92172000	BUMPER RUBBER	194 195
0687 92172000	BUMPER RUBBER	229 231 232
0694 75730805	CABLE ASM GROUND	194 229 231 232
0711 10127347	SCREW PAN HD MACH	194 195 229
0712 10126104	WASH INT TOOTH LK	194 195
0712 10126104	WASH INT TOOTH LK	229 231 232
0713 83447805	INSTLN KIT-RACK MT	195 229 231 233
0723 83451806	INSULATOR ADHESIVE	194 195
0723 83451806	INSULATOR ADHESIVE	229 231 232
0724 51669404	TERMINAL	231
0727 83457001	AIR INTAKE	194 195 229 233
0729 10127128	PAN HD MACH SCR	194 195 229 233
0741 77604000	PRE-FILTER-FILTER	194 195
0741 77604000	PRE-FILTER-FILTER	229 231 233
0788 93342193	SCREW	195
0822 51669410	TERMINAL	194 229
0843 94347104	SHOULDER WASHER THER	194 195
0843 94347104	SHOULDER WASHER THER	229 231 232
0849 83451805	INSULATOR ADHESIVE	194 195
0849 83451805	INSULATOR ADHESIVE	229 231 232
0961 77611443	CEMENT	194 195
0961 77611443	CEMENT	229 231-233

FIGURE 8-14. RACK MOUNT ASSEMBLY (SHEET 1 OF 3)

FROM SHEET 5

228

RACK MOUNT ASSY ITEM#	INSTALLATION KIT	
	ITEM#	DETAIL
228	749	SHEET 26



ITEM	IDENT NO	DESCRIPTION	WHERE USED
0228	75884907	RACK MT ASSY	TMA
0442	10125606	WASHERS PLAIN 8	228
0443	10125607	WASHERS PLAIN 10	228
0445	10125804	WASHERS SPR LOCK	228
0486	75880261	FRONT PANEL	228
0515	75884887	BRKT ASSY L.H.	228
0532	75884902	BRKT ASSY R.H.	228
0560	83451810	INSULATOR	228
0686	10127120	SCREW PAN HD MACH	228
0687	92172000	BUMPER, RUBBER	228
0711	10127347	SCREW PAN HD MACH	228
0712	10126104	WASH INT TOOTH LOCK	228
0723	83451806	INSULATOR, ADH BACK	228
0727	83457001	AIR INTAKE	228
0729	10127128	PAN HEAD MACH SCREW	228
0741	77604000	PRE-FILTER-FILTER	228
0742	75284702	HANDLE-PULL RACK	228
0749	83447806	INSTLN KIT-RACK MT	228

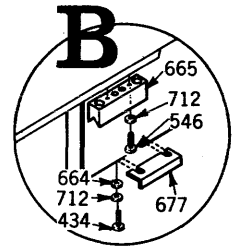
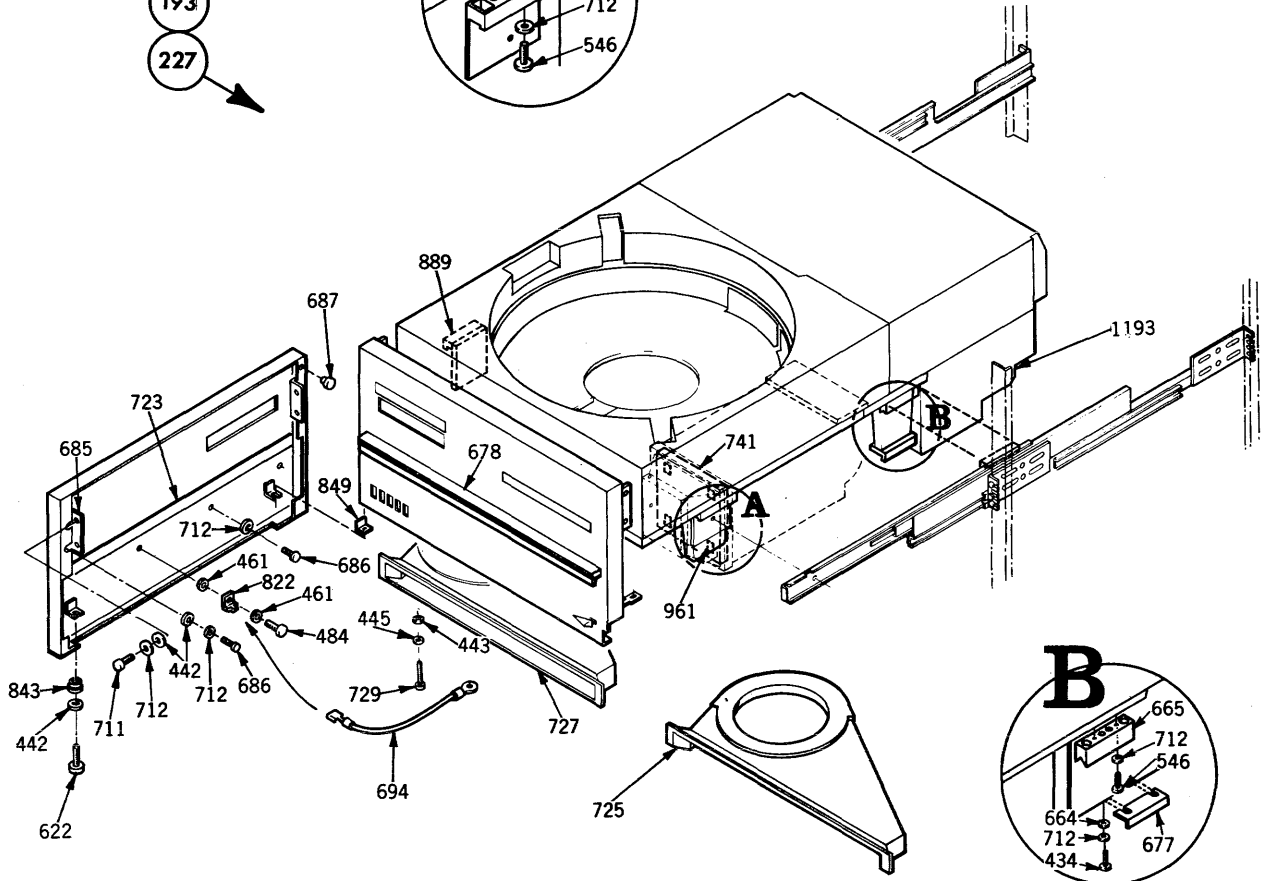
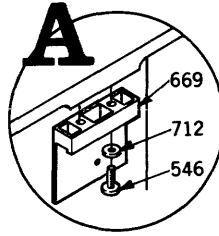
FIGURE 8-14. RACK MOUNT ASSEMBLY (SHEET 2 OF 3)

FROM SHEET 5

192

193

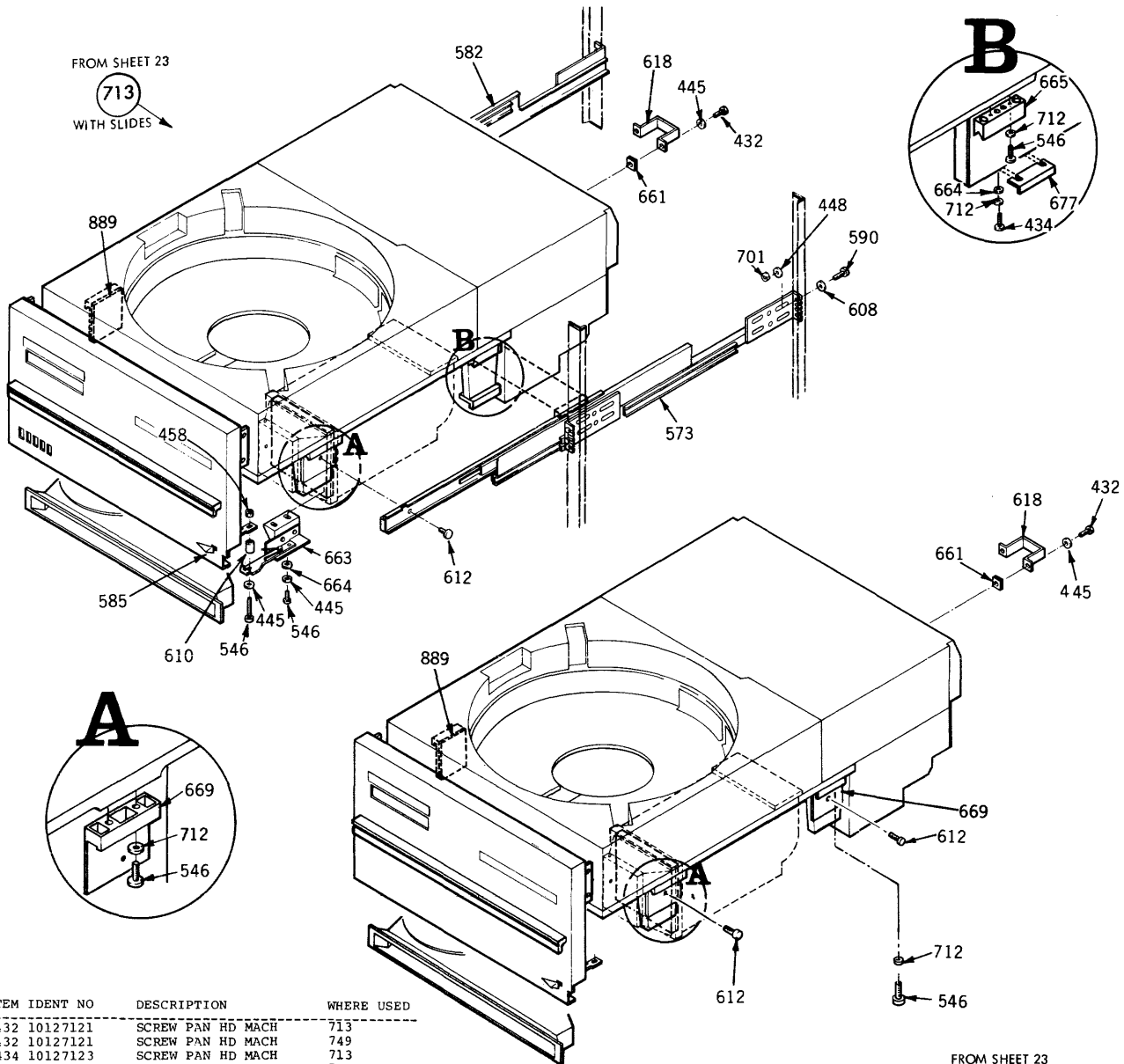
227



RACK MOUNT ASSY ITEM#	INSTALLATION KIT	
	ITEM#	DETAIL
192	NONE	---
193	NONE	---
227	1007	SHEET 27

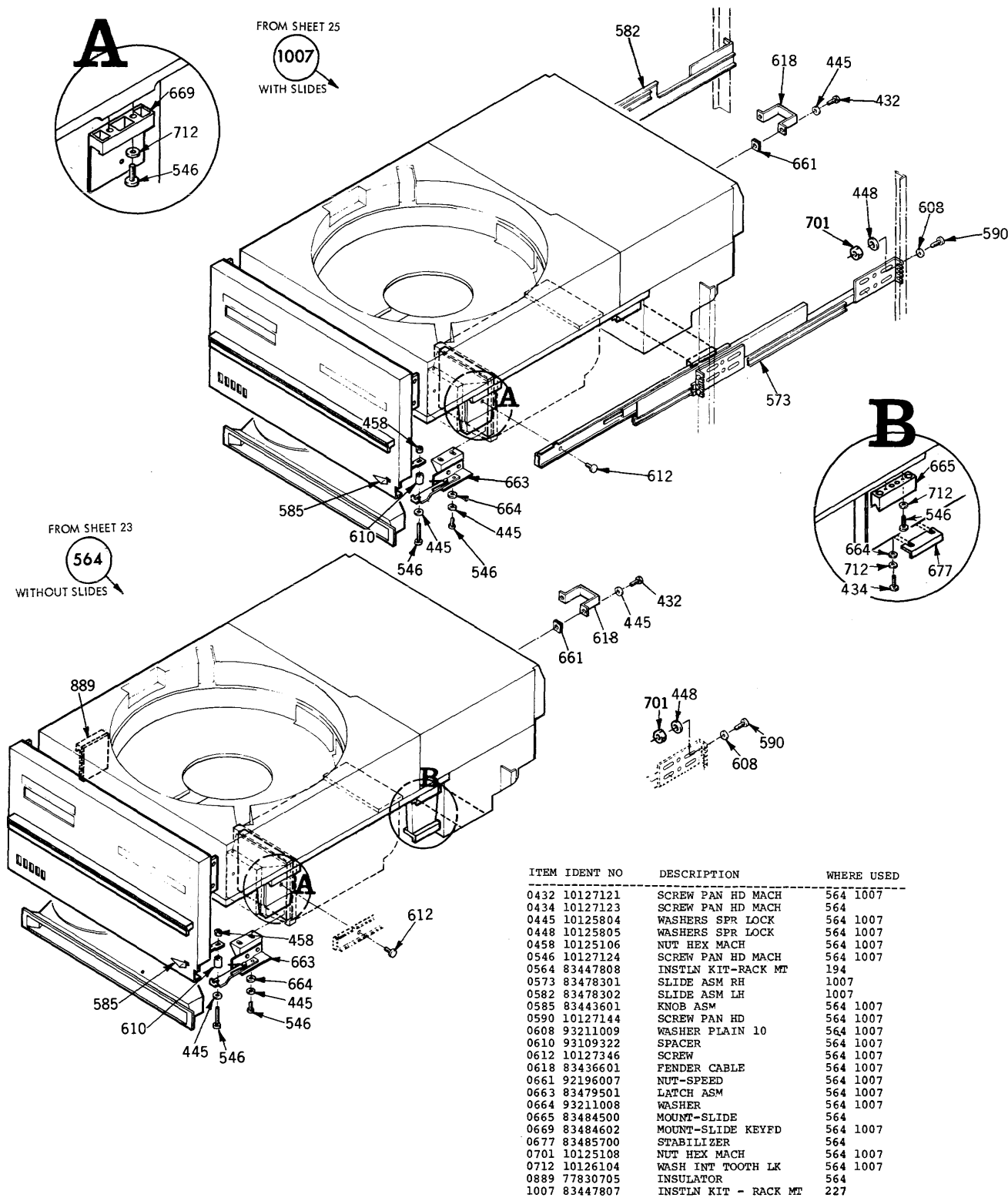
ITEM IDENT NO	DESCRIPTION	WHERE USED
0192 83443511	RACK MT ASM	TMA
0193 83443512	RACK MT ASM	TMA
0194 83443513	RACK MT ASM	TMA
0195 83443514	RACK MT ASM	TMA
0227 83443510	RACK MT ASM	TMA
0434 10127123	SCREW PAN HD MACH	227
0442 10125606	WASHERS PLAIN	193 227
0443 10125607	WASHERS PLAIN	193 227
0445 10125804	WASHERS SPR LOCK	227
0461 10126402	WASH EXT TOOTH LO	227
0484 10127122	SCREW PAN HD MACH	227
0546 10127124	SCREW PAN HD MACH	227
0622 77610636	SCREW, MACH, SELF-LOCK	227
0664 93211008	WASHER	227
0665 83484500	MOUNT-SLIDE	227
0669 83484602	MOUNT-SLIDE KEYED	227
0677 83485700	STABILIZER	227
0678 75284701	HANDLE-PULL RACK	227
0685 83444200	ANGLE-FRT PNL	227
0686 10127120	SCREW PAN HD MACH	227
0687 92172000	BUMPER, RUBBER	227
0694 75730805	CABLE ASM GROUND	192 193 227
0711 10127347	SCREW PAN HD MACH	227
0712 10126104	WASH INT TOOTH LK	227
0723 83451806	INSULATOR, ADH BACK	227
0725 83456900	AIR INTAKE	192
0727 83457001	AIR INTAKE	193 227
0729 10127128	PAN HEAD MACH SCREW	192 193 227
0741 77604000	PRE-FILTER-FILTER	192 193 227
0822 51669410	TERMINAL	227
0843 94347104	SHOULDER WASHER THER	227
0849 83451805	INSULATOR, ADH BACK	227
0889 77830705	INSULATOR	227
0961 77611443	CEMENT	192 193 227
1007 83447807	INSTLN KIT-RACK MT	227
1193 94238905	LABEL, CAUTION	227

FIGURE 8-14. RACK MOUNT ASSEMBLY (SHEET 3 OF 3)



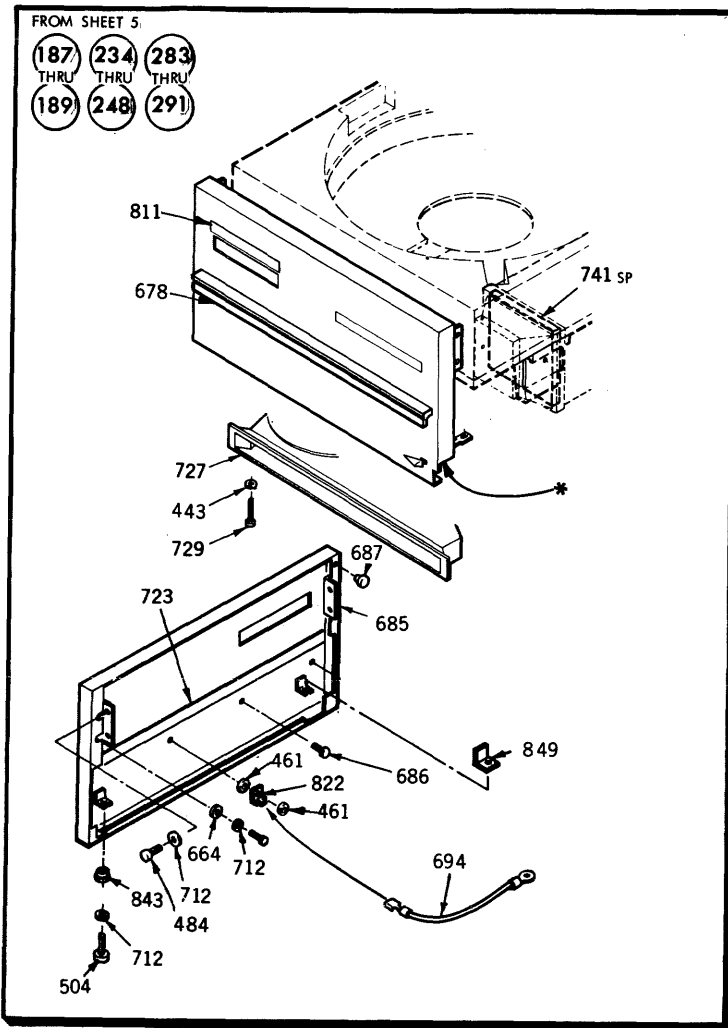
ITEM	IDENT NO	DESCRIPTION	WHERE USED
0432	10127121	SCREW PAN HD MACH	713
0432	10127121	SCREW PAN HD MACH	749
0434	10127123	SCREW PAN HD MACH	713
0445	10125804	WASHERS SPR LOCK	713
0445	10125804	WASHERS SPR LOCK	749
0448	10125805	WASHERS SPR LOCK	713
0458	10125106	NUT HEX MACH	713
0546	10127124	SCREW PAN HD MACH	713
0546	10127124	SCREW PAN HD MACH	749
0573	83478301	SLIDE ASM RH	713
0582	83478302	SLIDE ASM LH	713
0585	83443601	KNOB ASM	713
0590	10127144	SCREW PAN HD	713
0608	93211009	WASHER PLAIN 10	713
0610	93109322	SPACER	713
0612	10127346	SCREW	713 749
0618	83436601	FENDER CARLF	713
0618	83436601	FENDER CABLE	749
0661	92196007	NUT-SPPED	713
0661	92196007	NUT-SPEED	749
0663	83479501	LATCH ASM	713
0664	93211008	WASHER	713
0665	83484500	MOUNT-SLIDE	713
0669	83484602	MOUNT-SLIDE KEYED	713
0669	83484602	MOUNT-SLIDE KFYFD	749
0677	83485700	STABILIZER	713
0701	10125108	NUT HEX MACH	713
0712	10126104	WASH INT TOOTH LK	713
0712	10126104	WASH INT TOOTH LK	749
0713	83447805	INSTLN KIT-RACK MT	229 231
0749	83447806	INSTLN KIT-RACK MT	230
0889	77830705	INSULATOR	749
0889	77830705	INSULATOR	713

FIGURE 8-15. INSTALLATION KIT (SHEET 1 OF 2)



ITEM	IDENT NO	DESCRIPTION	WHERE USED
0432	10127121	SCREW PAN HD MACH	564 1007
0434	10127123	SCREW PAN HD MACH	564
0445	10125804	WASHERS SPR LOCK	564 1007
0448	10125805	WASHERS SPR LOCK	564 1007
0458	10125106	NUT HEX MACH	564 1007
0546	10127124	SCREW PAN HD MACH	564 1007
0564	83447808	INSTLN KIT-RACK MT	194
0573	83478301	SLIDE ASM RH	1007
0582	83478302	SLIDE ASM LH	1007
0585	83443601	KNOB ASM	564 1007
0590	10127144	SCREW PAN HD	564 1007
0608	93211009	WASHER PLAIN 10	564 1007
0610	93109322	SPACER	564 1007
0612	10127346	SCREW	564 1007
0618	83436601	FENDER CABLE	564 1007
0661	92196007	NUT-SPEED	564 1007
0663	83479501	LATCH ASM	564 1007
0664	93211008	WASHER	564 1007
0665	83484500	MOUNT-SLIDE	564
0669	83484602	MOUNT-SLIDE KEYFD	564 1007
0677	83485700	STABILIZER	564
0701	10125108	NUT HEX MACH	564 1007
0712	10126104	WASH INT TOOTH LK	564 1007
0889	77830705	INSULATOR	564
1007	83447807	INSTLN KIT - RACK MT	227

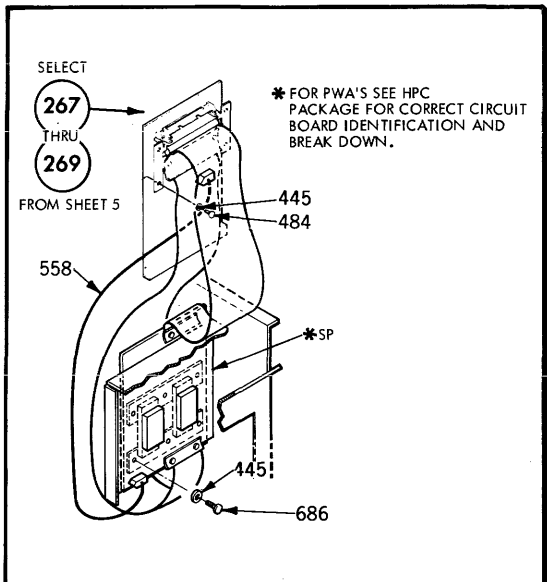
FIGURE 8-15. INSTALLATION KIT (SHEET 2 OF 2)



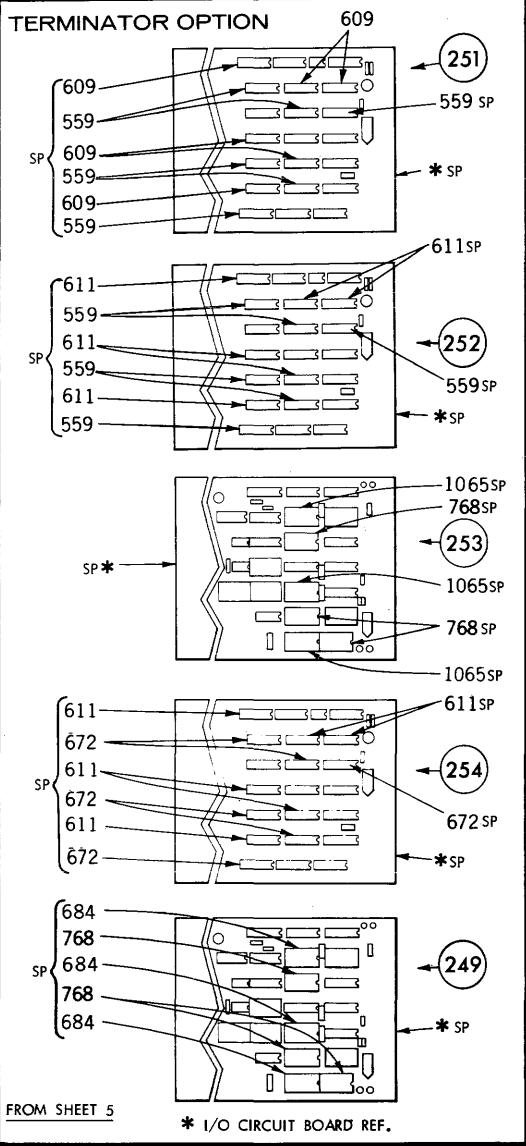
* IDENTIFICATION OF COLOR OF EACH RACK MOUNT OPTION IS PROVIDED BY AN ITEM NUMBER WHICH APPEARS IN PARENTHESES IN THE "DESCRIPTION" COLUMN ON THIS SHEET. REFER TO ASSEMBLY COMPONENT PARTS LIST, SHEETS 33 THRU 39, USING THIS ITEM NUMBER, TO DETERMINE IDENTIFICATION NUMBER OF PANEL PAINT.

ITEM	IDENT NO	DESCRIPTION	WHERE USED
0187	83442530	COLOR OPT RACK MT(1188)	TMA
0188	83442529	COLOR OPT RACK MT(0416)	TMA
0189	83442528	COLOR OPT RACK MT(0409)	TMA
0234	83442501	COLOR OPT RACK MT(1066)	TMA
0235	83442502	COLOR OPT RACK MT(0545)	TMA
0236	83442503	COLOR OPT RACK MT(0547)	TMA
0237	83442505	COLOR OPT RACK MT(0547)	TMA
0238	83442506	COLOR OPT RACK MT(0625)	TMA
0239	83442507	COLOR OPT RACK MT(0627)	TMA
0240	83442508	COLOR OPT RACK MT(0561)	TMA
0241	83442509	COLOR OPT RACK MT(0649)	TMA
0242	83442510	COLOR OPT RACK MT(0650)	TMA
0243	83442511	COLOR OPT RACK MT(0545)	TMA
0244	83442527	COLOR OPT RACK MT(0847)	TMA
0245	83442513	COLOR OPT RACK MT(0562)	TMA
0246	83442514	COLOR OPT RACK MT(1063)	TMA
0247	83442504	COLOR OPT RACK MT(0418)	TMA
0248	83442516	COLOR OPT RACK MT(1088)	TMA
0283	83442525	COLOR OPT RACK MT(0994)	TMA
0284	83442524	COLOR OPT RACK MT(0995)	TMA
0285	83442517	COLOR OPT RACK MT(1092)	TMA
0286	83442518	COLOR OPT RACK MT(1108)	TMA
0287	83442526	COLOR OPT RACK MT(0897)	TMA
0288	83442521	COLOR OPT RACK MT(1141)	TMA
0289	83442520	COLOR OPT RACK MT(0607)	TMA
0290	83442522	COLOR OPT RACK MT(1140)	TMA
0291	83442523	COLOR OPT RACK MT(0547)	TMA
0409	83440314	FRONT PNL RACK	189
0416	83442121	FRONT PNL RACK	188
0418	83442103	FRONT PNL RACK	247
0443	10125607	WASHERS PLAIN	237 243
0461	10126402	WASH EXT TOOTH LO	237 243
0484	10127122	SCREW PAN HD MACH	237 243
0504	93115287	SCREW PAN	237 243
0545	83442106	FRONT PNL RACK PAINT	235 243
0547	83442109	FRONT PNL RACK	236 237 291
0561	83442143	FRONT PNL RACK PAINT	240
0562	77834340	FRONT PNL RACK PAINT	245
0607	83442178	FRONT PNL RACK PAINT	289
0625	83466801	PNL CNTL RACK SLKSCN	238
0627	83442123	FRONT PNL RACK PAINT	239
0649	83442166	FRONT PNL RACK PAINT	241
0650	83442154	FRONT PNL RACK PAINT	242
0678	75284701	HANDLE PULL RACK	237 243
0685	83444200	ANGLE-FRT PANEL	237 243
0686	10127120	SCREW PAN HD MACH	237 243 247
0687	92172000	BUMPER RUBBER	237 243
0694	75730805	CABLE ASM GROUND	237 243
0712	10126104	WASH INT TOOTH LK	237 243
0723	83451806	INSULATOR ADHESIVE	237 243
0727	83457001	AIR INTAKE	237 243
0729	10127128	PAN HD MACH SCR	237 243
0741	77604000	PRE-FILTER-FILTER	237 243
0811	75793301	LABEL SWITCH	287-290 295
0811	75793301	LABEL SWITCH	187 188 248 285
0811	75793301	LABEL SWITCH	234-237 239-245
0822	51669410	TERMINAL	237
0843	94347104	SHOULDER WASHER THER	237 243
0847	83442108	FRONT PNL RACK	244
0849	83451805	INSULATOR ADHESIVE	237 243
0897	83442110	FRONT PNL RACK	287
0994	83442197	FRONT PNL RACK PAINT	0283
0995	83442198	FRONT PNL RACK PAINT	0284
1063	83442165	FRT PNL RCK PNT	246
1066	83442104	FRONT PNL RACK PAINT	234
1088	83442136	FRONT PNL RACK PAINT	248
1092	83442172	FRONT PNL RACK PAINT	285
1108	83442170	FRONT PNL RACK PAINT	286
1140	83442190	FRONT PNL	290
1141	83442189	FRONT PNL RACK	288
1188	83442157	FRONT PANEL RACK	187

FIGURE 8-16. TOP MECHANICAL ASSEMBLY OPTIONS



ITEM IDENT NO	DESCRIPTION	WHERE USED
0249 75305707	TERMINATOR	TMA
0251 75305703	TERMINATOR	TMA
0252 75305704	TERMINATOR	TMA
0253 75305706	TERMINATOR	TMA
0254 75305705	TERMINATOR	TMA
0267 75795309	I-O OPT CAB	TMA
0268 75795307	I-O OPT CAB	TMA
0269 75795308	I-O OPT CAB	TMA
0307 75740123	HEAD OPTION	MOD
0308 75740119	HEAD OPTION	MOD
0309 75740115	HEAD OPTION	MOD
0310 75740113	HEAD OPTION	MOD
0311 75740121	HEAD OPTION	MOD
0312 75740124	HEAD OPTION	MOD
0313 75740117	HEAD OPTION	MOD
0314 75740118	HEAD OPTION	MOD
0315 75740114	HEAD OPTION	MOD
0445 10125804	WASHERS SPR LOCK	267-269
0445 10125804	WASHERS SPR LOCK	267-269
0485 83451602	MAGNETIC SENSOR ASM	267-269
0558 83444701	JUMPER ASM	267-269
0559 75738604	RESISTOR MODULE 110	251 252
0609 75738610	RESISTOR MODULE 1K	251
0611 75738607	RESISTOR MODULE 330	252 254
0672 75738608	RESISTOR MODULE	254
0684 75738654	RESISTOR MODULE 220	249
0686 10127120	SCREW PAN HD MACH	267-269
0768 75738655	RESISTOR MODULE 330	249 253
0815 75037504	HEAD ASM (LOWER)	307 312 314
0823 75037505	HEAD ASM (UPPER)	307 312
0824 75300200	RESISTOR MODULE	307 311 312
0827 70590208	HEAD ASM (LOWER)	308
0828 70590209	HEAD ASM (UPPER)	308
0829 75300100	RESISTOR MODULE	308 310 313 315
0830 70590306	HEAD ASM (LOWER)	309
0831 70590307	HEAD ASM (UPPER)	309
0832 73460700	CARRIAGE WEIGHT	312 314 315
1065 75738652	RESISTOR MODULE	253
1070 75037506	HEAD ASM (LOWER)	311
1071 75037507	HEAD ASM (UPPER)	311
1072 70590304	HEAD ASM (LOWER)	313 314
1073 70590305	HEAD ASM (UPPER)	313 314
1074 70590206	HEAD ASM (LOWER)	310 315
1075 70590207	HEAD ASM (UPPER)	310 315



HEAD OPTION

FROM SHEET 6

307	308	309	310	311	312	313	314	315
815	827	829	829	824	815	1072	1072	829
823	828	830	1074	1070	823	1073	1073	1074
824	829	831	1075	1071	824	829	829	1075
					832		832	832

** REFER TO R/W/E BOARD LOCATED IN HPC DOCUMENT PACKAGE. (SHEET 55-7)

** 824
829

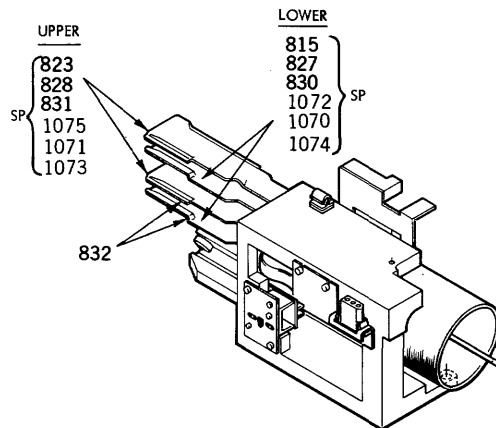
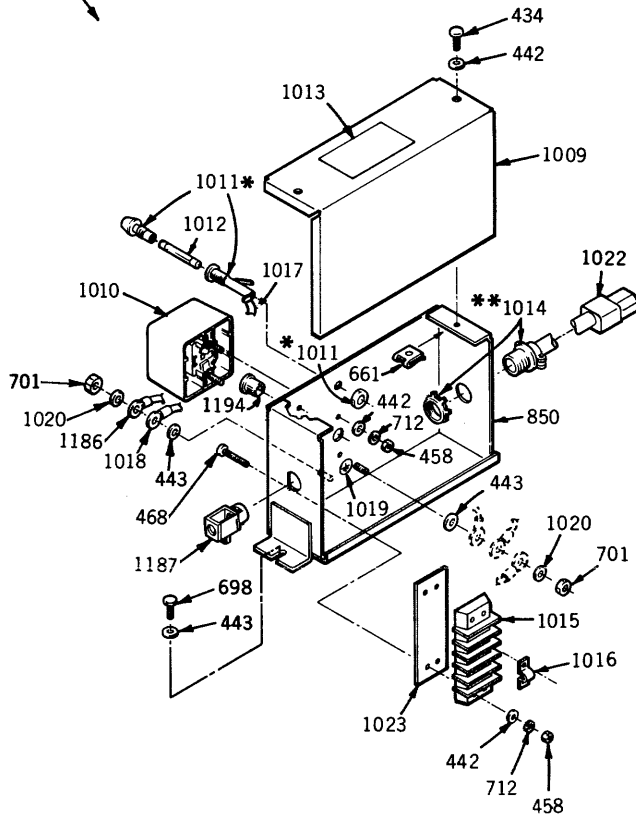


FIGURE 8-17. OPTIONS

FROM SHEET 5

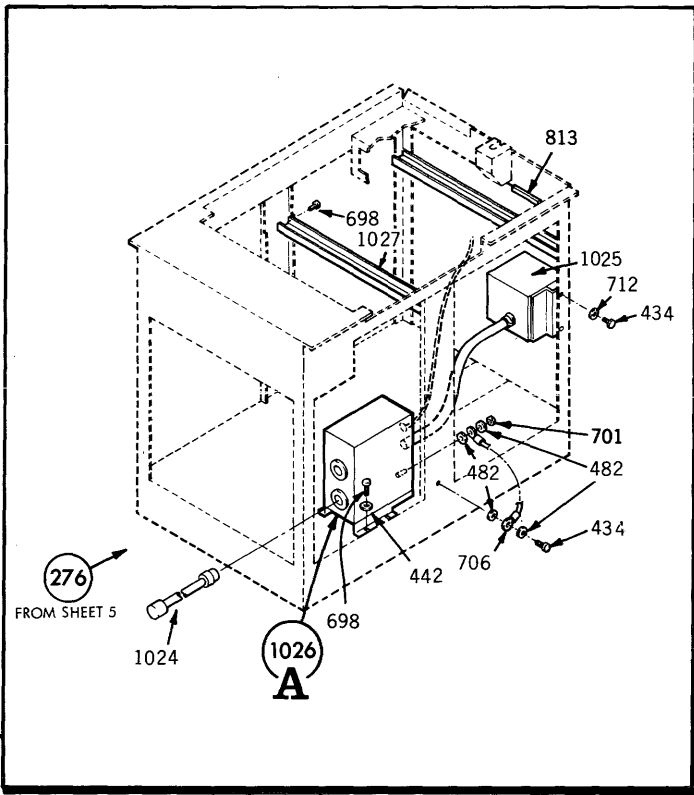
275



* SUPPLIED AS ONE PART
 ** SUPPLIED AS ONE PART

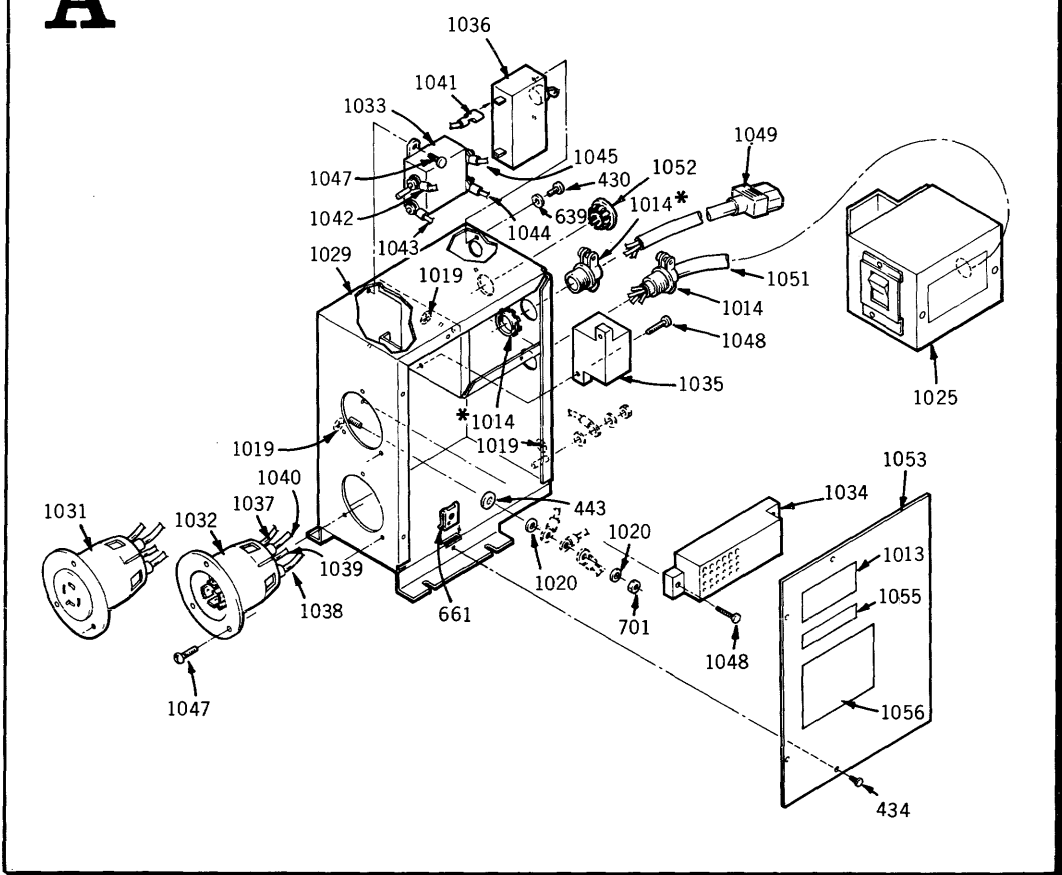
ITEM IDENT NO	DESCRIPTION	WHERE USED
0275 77599402	PWR ASM (INPUT)	TMA
0434 10127123	SCREW PAN HD MACH	275
0442 10125606	WASHERS PLAIN	275
0443 10125607	WASHERS PLAIN	275
0458 10125106	NUT HEX MACH	275
0468 10127125	SCREW PAN ED MACH	275
0661 92196007	NUT-SPEED	275
0698 93592200	SCR TPG HEX PNL	275
0701 10125108	NUT HEX MACH	275
0712 10126104	WASH INT TOOTH LK	275
0850 75730603	CHASSIS AC BOX 220V	275
1009 75730701	CVR CHASSIS AC INP	275
1010 75731001	CONVENIENCE OUTLET	275
1011 92411002	FUSE HOLDER	275
1012 92371016	FUSE QK ACTING 5 AMP	275
1013 77610304	PLATE, WARNING	275
1014 92801001	CLAMP, CABLE	275
1015 93041205	STRIP TERMINAL	275
1016 93067003	JUMPER, BARRIER ST	275
1017 75731104	CABLE-JUMPER BLACK	275
1018 75730806	CABLE ASM GRND	275
1019 75731301	SYMBOL GRND (DECAL)	275
1020 10126105	WASH INT TOOTH LK	275
1022 77599501	POWER CORD ASM	275
1023 93105305	MARKER STRIP	275
1186 75730807	CABLE GND	275
1187 92491020	STRAIN RELIEF	275
1194 15012410	EUSHING SNAP IN	ALL OPTIONS

FIGURE 8-18. POWER INPUT ASSEMBLY



ITEM	IDENT NO	DESCRIPTION	WHERE USED
0276	83492901	PWR ASM (A.C. OPT)	TMA
0430	10127111	SCREW PAN HD MACH	1026
0434	10127123	SCREW PAN HD MACH	1026
0434	10127123	SCREW PAN HD MACH	276
0442	10125606	WASHERS PLAIN	276
0443	10125607	WASHERS PLAIN	1026
0482	10126403	WASH EXT TOOTH LO	276
0639	10126103	WASH INT TOOTH LK	1026
0661	92196007	NUT-SPEED	1026
0698	93592200	SCR TPG HFX PNL	276
0701	10125108	NUT HFX MACH	276 1026
0706	94281426	BR CABLE GROUND	276
0712	10126104	WASH INT TOOTH LK	276
0813	75287700	GASKET - DOOR	276
1013	77610304	PLATE, WARNING	1026
1014	92801001	CLAMP, CABLE	1026
1019	75731301	SYMBOL GRND (DECAL)	1026
1020	10126105	WASH INT TOOTH LK	1026
1024	83415900	POWER CORD	276
1025	83492701	AC SWCH BX ASM NCR	276
1026	83428902	AC DISTR BX COMMON	276
1027	83442800	CHANNEL-CONTRL NCR	276
1029	83428601	CHASSIS-AC DISTR BX	1026
1031	94806900	RECEPTACLE FEMALE	1026
1032	94807000	RECEPTACLE MALE	1026
1033	62071534	FILTER RFI	1026
1034	75726813	TERMINAL BLOCK	1026
1035	75726812	TERMINAL BLOCK	1026
1036	94241102	CKT BKR-OVERCURRENT	1026
1037	75729011	CABLE-JUMPER GREEN	1026
1038	75729007	CABLE-JUMPER BLACK	1026
1039	75729003	CABLE-JUMPER WHITE	1026
1040	75729001	CABLE-JUMPER YELLOW	1026
1041	75729012	CABLE-JUMPER BLACK	1026
1042	75729022	CABLE-JUMPER WHITE	1026
1043	75729023	CABLE-JUMPER BLACK	1026
1044	75729024	CABLE-JUMPER BLACK	1026
1045	75729025	CABLE-JUMPER WHITE	1026
1047	17901515	SCR THD ROLL	1026
1048	17901519	SCR THD ROLL PAN HD	1026
1049	83478002	LINECORD MODULE STD	1026
1051	75752203	CABLE-CIRCUIT BRKR	1026
1052	93522009	PLUG-SNAP BUTTON	1026
1053	83428700	COVER-CHASSIS	1026
1055	83407505	LABEL, SELF ADHERING	1026
1056	83407518	LABEL, SELF ADHERING	1026

A



* SUPPLIED AS ONE PART

FIGURE 8-19. POWER ASSEMBLY (AC OPTION)

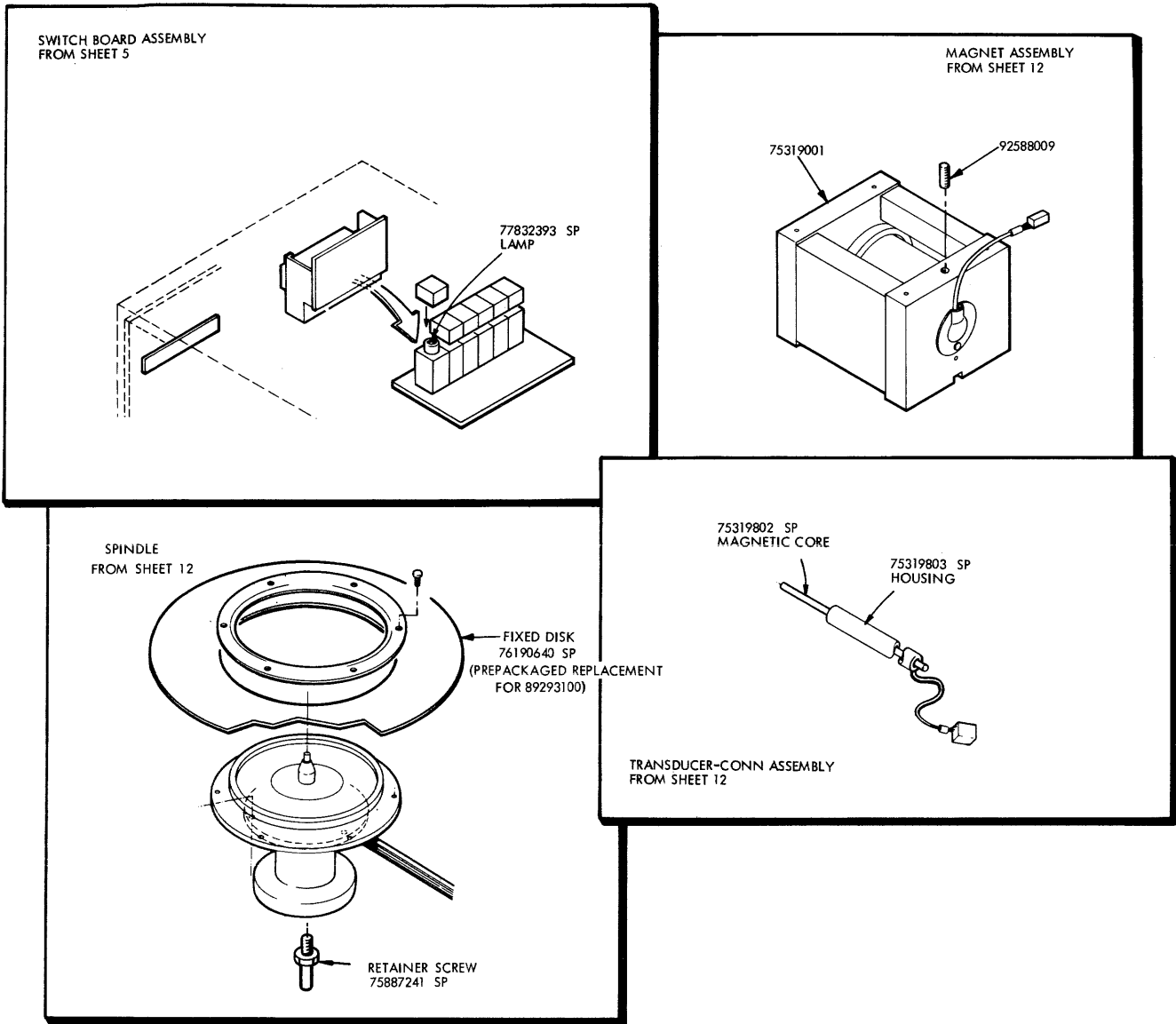


FIGURE 8-20. SPARE PARTS PROVISIONING

ASSEMBLY - COMPONENT PARTS LIST

ITEM IDENT NO	DESCRIPTION	WHERE USED	SHEET	ITEM IDENT NO	DESCRIPTION	WHERE USED	SHEET
0150 75306101	TETHER LINE	TMA	S5	0215 77658021	COLOR OPT CAB	TMA	S5
0152 75895231	UNDERCOVER ASSY	TMA	S5	0215 77658021	COLOR OPT CAB	TMA	S21
0153 77830701	UNDERCOVER ASSY	TMA	S5	0215 77658021	COLOR OPT CAB	TMA	S20
0163 77658044	COLOR OPT CAB	TMA	S5	0215 77658021	COLOR OPT CAB	TMA	S22
0163 77658044	COLOR OPT CAB	TMA	S21	0216 77658023	COLOR OPT CAB	TMA	S5
0163 77658044	COLOR OPT CAB	TMA	S20	0216 77658023	COLOR OPT CAB	TMA	S21
0163 77658044	COLOR OPT CAB	TMA	S22	0216 77658023	COLOR OPT CAB	TMA	S20
0164 77658045	COLOR OPT CAB	TMA	S5	0216 77658023	COLOR OPT CAB	TMA	S22
0164 77658045	COLOR OPT CAB	TMA	S21	0217 77658024	COLOR OPT CAB	TMA	S5
0164 77658045	COLOR OPT CAB	TMA	S22	0217 77658024	COLOR OPT CAB	TMA	S21
0164 77658045	COLOR OPT CAB	TMA	S5	0217 77658024	COLOR OPT CAB	TMA	S20
0165 77658046	COLOR OPT CAB	TMA	S21	0217 77658024	COLOR OPT CAB	TMA	S22
0165 77658046	COLOR OPT CAB	TMA	S22	0218 77658025	COLOR OPT CAB	TMA	S5
0165 77658046	COLOR OPT CAB	TMA	S5	0218 77658025	COLOR OPT CAB	TMA	S21
0165 77658046	COLOR OPT CAB	TMA	S21	0218 77658025	COLOR OPT CAB	TMA	S20
0165 77658046	COLOR OPT CAB	TMA	S22	0218 77658025	COLOR OPT CAB	TMA	S22
0166 77658047	COLOR OPT CAB	TMA	S5	0219 77658026	COLOR OPT CAB	TMA	S5
0166 77658047	COLOR OPT CAB	TMA	S21	0219 77658026	COLOR OPT CAB	TMA	S21
0166 77658047	COLOR OPT CAB	TMA	S22	0219 77658026	COLOR OPT CAB	TMA	S20
0166 77658047	COLOR OPT CAB	TMA	S5	0219 77658026	COLOR OPT CAB	TMA	S22
0167 77658048	COLOR OPT CAB	TMA	S21	0220 77658027	COLOR OPT CAB	TMA	S5
0167 77658048	COLOR OPT CAB	TMA	S22	0220 77658027	COLOR OPT CAB	TMA	S21
0167 77658048	COLOR OPT CAB	TMA	S5	0220 77658027	COLOR OPT CAB	TMA	S20
0168 77658049	COLOR OPT CAB	TMA	S21	0220 77658027	COLOR OPT CAB	TMA	S22
0168 77658049	COLOR OPT CAB	TMA	S22	0221 77658028	COLOR OPT CAB	TMA	S5
0168 77658049	COLOR OPT CAB	TMA	S5	0221 77658028	COLOR OPT CAB	TMA	S21
0168 77658049	COLOR OPT CAB	TMA	S21	0221 77658028	COLOR OPT CAB	TMA	S20
0168 77658049	COLOR OPT CAB	TMA	S22	0221 77658028	COLOR OPT CAB	TMA	S22
0169 77658050	COLOR OPT CAB	TMA	S5	0222 77658030	COLOR OPT CAB	TMA	S5
0169 77658050	COLOR OPT CAB	TMA	S21	0222 77658030	COLOR OPT CAB	TMA	S20
0169 77658050	COLOR OPT CAB	TMA	S22	0222 77658030	COLOR OPT CAB	TMA	S21
0169 77658050	COLOR OPT CAB	TMA	S5	0222 77658030	COLOR OPT CAB	TMA	S22
0187 83442530	COLOR OPT RACK MT(1188)	TMA	S28	0223 77658031	COLOR OPT CAB	TMA	S5
0187 83442530	COLOR OPT RACK MT(1188)	TMA	S5	0223 77658031	COLOR OPT CAB	TMA	S21
0188 83442529	COLOR OPT RACK MT(0416)	TMA	S28	0223 77658031	COLOR OPT CAB	TMA	S20
0188 83442529	COLOR OPT RACK MT(0416)	TMA	S5	0223 77658031	COLOR OPT CAB	TMA	S22
0189 83442528	COLOR OPT RACK MT(0409)	TMA	S28	0224 77658032	COLOR OPT CAB	TMA	S5
0189 83442528	COLOR OPT RACK MT(0409)	TMA	S5	0224 77658032	COLOR OPT CAB	TMA	S21
0189 83442528	COLOR OPT RACK MT(0409)	TMA	S21	0224 77658032	COLOR OPT CAB	TMA	S20
0189 83442528	COLOR OPT RACK MT(0409)	TMA	S22	0224 77658032	COLOR OPT CAB	TMA	S22
0190 75890915	NAMEPLATE	TMA	S5	0225 77658033	COLOR OPT CAB	TMA	S5
0191 77611483	NAMEPLATE	TMA	S5	0225 77658033	COLOR OPT CAB	TMA	S21
0192 83443511	RACK MT ASM	TMA	S25	0225 77658033	COLOR OPT CAB	TMA	S20
0192 83443511	RACK MT ASM	TMA	S5	0225 77658033	COLOR OPT CAB	TMA	S22
0193 83443512	RACK MT ASM	TMA	S25	0226 77658034	COLOR OPT CAB	TMA	S5
0193 83443512	RACK MT ASM	TMA	S5	0226 77658034	COLOR OPT CAB	TMA	S21
0194 83443513	RACK MT ASM	TMA	S25	0226 77658034	COLOR OPT CAB	TMA	S20
0194 83443513	RACK MT ASM	TMA	S24	0226 77658034	COLOR OPT CAB	TMA	S22
0194 83443513	RACK MT ASM	TMA	S23	0227 83443510	RACK MT ASM	TMA	S5
0195 83443514	RACK MT ASM	TMA	S25	0227 83443510	RACK MT ASM	TMA	S25
0195 83443514	RACK MT ASM	TMA	S24	0228 75884907	RACK MT ASM	TMA	S5
0195 83443514	RACK MT ASM	TMA	S23	0229 75884907	RACK MT ASM	TMA	S24
0199 83442309	EASE FR ASM	TMA	S19	0229 83443504	RACK MT ASM	TMA	S5
0199 83442309	EASE FR ASM	TMA	S19	0231 83443504	RACK MT ASM	TMA	S23
0200 83442310	EASE FR ASM	TMA	S19	0231 83443506	RACK MT ASM	TMA	S5
0200 83442310	EASE FR ASM	TMA	S19	0232 83443507	RACK MT ASM	TMA	S5
0201 83442311	EASE FR ASM	TMA	S19	0232 83443507	RACK MT ASM	TMA	S23
0201 83442311	EASE FR ASM	TMA	S19	0233 83443509	RACK MT ASM	TMA	S5
0202 83442312	EASE FR ASM	TMA	S19	0233 83443509	RACK MT ASM	TMA	S23
0202 83442312	EASE FR ASM	TMA	S5	0234 83442501	COLOR OPT RACK MT(1066)	TMA	S5
0203 83442313	EASE FR ASM	TMA	S19	0234 83442501	COLOR OPT RACK MT(1066)	TMA	S28
0203 83442313	EASE FR ASM	TMA	S5	0235 83442502	COLOR OPT RACK MT(0545)	TMA	S5
0204 77658009	COLOR OPT CAB	TMA	S21	0235 83442502	COLOR OPT RACK MT(0545)	TMA	S28
0204 77658009	COLOR OPT CAB	TMA	S20	0236 83442503	COLOR OPT RACK MT(0547)	TMA	S5
0204 77658009	COLOR OPT CAB	TMA	S22	0236 83442503	COLOR OPT RACK MT(0547)	TMA	S28
0205 77658010	COLOR OPT CAB	TMA	S5	0237 83442505	COLOR OPT RACK MT(0547)	TMA	S5
0205 77658010	COLOR OPT CAB	TMA	S21	0237 83442505	COLOR OPT RACK MT(0547)	TMA	S28
0205 77658010	COLOR OPT CAB	TMA	S22	0238 83442506	COLOR OPT RACK MT(0625)	TMA	S5
0206 77658011	COLOR OPT CAB	TMA	S5	0238 83442506	COLOR OPT RACK MT(0625)	TMA	S28
0206 77658011	COLOR OPT CAB	TMA	S21	0239 83442507	COLOR OPT RACK MT(0627)	TMA	S5
0206 77658011	COLOR OPT CAB	TMA	S22	0239 83442507	COLOR OPT RACK MT(0627)	TMA	S28
0207 77658012	COLOR OPT CAB	TMA	S5	0240 83442508	COLOR OPT RACK MT(0561)	TMA	S5
0207 77658012	COLOR OPT CAB	TMA	S21	0240 83442508	COLOR OPT RACK MT(0561)	TMA	S28
0207 77658012	COLOR OPT CAB	TMA	S22	0241 83442509	COLOR OPT RACK MT(0649)	TMA	S5
0207 77658012	COLOR OPT CAB	TMA	S20	0241 83442509	COLOR OPT RACK MT(0649)	TMA	S28
0207 77658012	COLOR OPT CAB	TMA	S22	0242 83442510	COLOR OPT RACK MT(0650)	TMA	S5
0208 77658013	COLOR OPT CAB	TMA	S5	0242 83442510	COLOR OPT RACK MT(0650)	TMA	S28
0208 77658013	COLOR OPT CAB	TMA	S21	0243 83442511	COLOR OPT RACK MT(0545)	TMA	S5
0208 77658013	COLOR OPT CAB	TMA	S22	0243 83442511	COLOR OPT RACK MT(0545)	TMA	S28
0208 77658013	COLOR OPT CAB	TMA	S5	0244 83442527	COLOR OPT RACK MT(0847)	TMA	S5
0209 77658014	COLOR OPT CAB	TMA	S21	0244 83442527	COLOR OPT RACK MT(0847)	TMA	S28
0209 77658014	COLOR OPT CAB	TMA	S20	0245 83442513	COLOR OPT RACK MT(0562)	TMA	S5
0209 77658014	COLOR OPT CAB	TMA	S22	0245 83442513	COLOR OPT RACK MT(0562)	TMA	S28
0210 77658016	COLOR OPT CAB	TMA	S5	0246 83442514	COLOR OPT RACK MT(1063)	TMA	S5
0210 77658016	COLOR OPT CAB	TMA	S21	0246 83442514	COLOR OPT RACK MT(1063)	TMA	S28
0210 77658016	COLOR OPT CAB	TMA	S20	0247 83442504	COLOR OPT RACK MT(0418)	TMA	S5
0210 77658016	COLOR OPT CAB	TMA	S22	0247 83442504	COLOR OPT RACK MT(0418)	TMA	S28
0211 77658017	COLOR OPT CAB	TMA	S5	0248 83442516	COLOR OPT RACK MT(1088)	TMA	S5
0211 77658017	COLOR OPT CAB	TMA	S21	0248 83442516	COLOR OPT RACK MT(1088)	TMA	S28
0211 77658017	COLOR OPT CAB	TMA	S20	0249 75305707	TERMINATOR	TMA	S5
0211 77658017	COLOR OPT CAB	TMA	S22	0249 75305707	TERMINATOR	TMA	S29
0212 77658018	COLOR OPT CAB	TMA	S5	0251 75305703	TERMINATOR	TMA	S5
0212 77658018	COLOR OPT CAB	TMA	S21	0251 75305703	TERMINATOR	TMA	S29
0212 77658018	COLOR OPT CAB	TMA	S20	0252 75305704	TERMINATOR	TMA	S5
0212 77658018	COLOR OPT CAB	TMA	S22	0252 75305704	TERMINATOR	TMA	S29
0213 77658019	COLOR OPT CAB	TMA	S5	0253 75305706	TERMINATOR	TMA	S5
0213 77658019	COLOR OPT CAB	TMA	S21	0253 75305706	TERMINATOR	TMA	S29
0213 77658019	COLOR OPT CAB	TMA	S20	0254 75305705	TERMINATOR	TMA	S5
0213 77658019	COLOR OPT CAB	TMA	S22	0254 75305705	TERMINATOR	TMA	S29
0214 77658020	COLOR OPT CAB	TMA	S5	0255 75778701	LINECORD	TMA	S5
0214 77658020	COLOR OPT CAB	TMA	S21	0255 75778701	LINECORD	TMA	S28
0214 77658020	COLOR OPT CAB	TMA	S20	0256 75778705	LINECORD	TMA	S5
0214 77658020	COLOR OPT CAB	TMA	S22	0257 75778710	LINECORD	TMA	S5
				0258 75778721	LINECORD	TMA	S5
				0259 75892986	LINECORD	TMA	S5

ASSEMBLY - COMPONENT PARTS LIST

ITEM IDENT NO	DESCRIPTION	WHERE USED	SHEET	ITEM IDENT NO	DESCRIPTION	WHERE USED	SHEET
1188 53442157	FRONT PANEL RACK	167	S28				
1189 83425114	PANEL-TOP COVER REAR	169	S22				
1190 83443714	PANEL-TOP COVER RH	169	S22				
1191 83443814	PANEL-TOP COVER LH	169	S22				
1192 83478614	PANEL-SIDE	169	S22				
1193 94238905	LABEL, CAUTION	227	S25				
1194 15012410	PUSHING SNAP IN	ALL OPTIONS	S30				
1195 95694205	SPACEP	ALL OPTIONS	S21				
2000 75887326	SCREW CAPTIVE	780	S9				

CROSS REFERENCE INDEX

ITEM IDENT NO	SHEET	ITEM IDENT NO	SHEET	ITEM IDENT NO	SHEET	ITEM IDENT NO	SHEET	
1121	83478606	S22	0709	92723234	S21	0626	95010890	S17
1137	83478608	S22	0709	92723234	S21	1069	95016100	S18
0855	83478613	S22	0709	92723234	S19	1062	95125301	S20
1192	83478614	S22	0709	92723234	S21	0469	95125305	S16
0992	83478615	S22	0660	92742011	S18	0469	95125305	S12
0866	83478617	S22	0787	92742176	S9	0469	95125305	S16
1160	83478620	S22	0433	92742201	S13	0469	95125305	S17
0873	83478625	S22	0454	92742222	S11	1115	95125311	S17
1152	83478628	S22	0838	92743158	S20	1061	95125317	S17
0923	83478637	S22	0963	92743198	S10	0891	95125322	S17
0942	83478638	S22	0826	92743202	S21	0406	95125324	S17
0700	83478643	S22	0987	92743240	S10	0406	95125324	S16
0916	83478648	S22	1014	92801001	S31	0600	95280500	S16
0937	83478653	S22	1014	92801001	S30	0762	95582007	S8
0785	83478654	S22	0428	92815096	S17	0976	95583505	S10
0909	83478655	S22	0428	92815096	S15	1128	95596600	S10
0950	83478658	S22	0583	92815097	S16	0499	95596601	S19
0930	83478663	S22	0549	92815160	S15	0498	95596604	S19
0933	83478668	S22	1185	92815161	S16	0998	95604019	S10
1104	83478669	S22	0550	92815193	S16	0497	95643203	S10
1097	83478672	S22	0551	92815195	S15	0996	95643212	S10
1109	83478677	S22	0437	92815197	S12	0452	95643248	S10
1124	83478686	S22	0437	92815197	S17	0524	95649726	S13
1133	83478698	S22	0438	92815229	S12	0638	95655500	S14
0717	83478700	S19	0471	92824097	S17	0636	95655501	S14
0718	83478701	S19	0722	92932206	S19	0766	95655503	S8
0663	83479501	S26	0783	92980003	S9	0797	95660403	S10
0663	83479501	S27	0783	92980003	S9	0492	95694202	S11
0645	83479600	S14	0693	93006033	S19	1195	95694205	S21
0495	83482400	S12	1015	93041205	S30	1107	95694206	S11
0495	83482400	S17	1016	93067003	S30			
0780	83484002	S9	0587	93071163	S18			
0778	83484109	S10	0587	93071163	S16			
0778	83484109	S9	1023	93105305	S30			
0776	83484110	S10	0610	93109322	S26			
0776	83484110	S9	0610	93109322	S27			
0767	83484400	S11	0581	93115168	S17			
0665	83484500	S25	0504	93115287	S28			
0665	83484500	S27	0504	93115287	S13			
0665	83484500	S26	0504	93115287	S20			
0669	83484602	S26	0504	93115287	S23			
0669	83484602	S25	0504	93115287	S20			
0669	83484602	S27	1181	93115291	S13			
0669	83484602	S26	0999	93154107	S10			
0677	83485700	S26	0752	93154948	S7			
0677	83485700	S27	0664	93211008	S25			
0677	83485700	S25	0664	93211008	S27			
0563	83490600	S16	0664	93211008	S26			
0842	83492000	S21	0608	93211009	S26			
0842	83492000	S21	0608	93211009	S27			
0842	83492000	S21	0788	93342193	S20			
1145	83492001	S21	0788	93342193	S23			
1025	83492701	S31	0586	93344096	S16			
0705	83492800	S19	0602	93355001	S16			
0276	83492901	S5	0720	93522008	S19			
0276	83492901	S31	1052	93522009	S31			
0966	83493302	S10	1052	93522009	S19			
0566	83493800	S15	0666	93529003	S18			
0565	83493900	S15	0821	93530007	S20			
0568	83494001	S15	0681	93530436	S18			
0567	83494200	S15	0835	93539004	S20			
0595	83494400	S16	0698	93592200	S19			
0570	83494500	S16	0698	93592200	S30			
0719	83494801	S19	0698	93592200	S31			
0402	83494802	S19	0534	93623000	S15			
0967	83494902	S10	0534	93623000	S19			
0954	83495101	S9	0623	93651029	S17			
0955	83495200	S9	0692	93697013	S19			
0892	83495300	S9	0782	93747025	S10			
0969	83495402	S10	1116	93749157	S10			
0956	83495500	S9	0429	93788082	S17			
0957	83495600	S9	0429	93788082	S12			
0970	83495700	S10	1006	93943001	S10			
0756	84686903	S8	0282	94224651	S5			
0420	89293100	S12	0282	94224651	S21			
0511	92021001	S13	1193	94238905	S25			
0466	92021004	S12	0349	94238907	S6			
0466	92021004	S17	1036	94241102	S31			
0466	92021004	S13	0763	94245602	S12			
0513	92021093	S12	0736	94255105	S7			
0459	92054227	S17	0736	94255105	S8			
0580	92054251	S16	0599	94258205	S16			
1184	92074137	S21	0737	94260500	S7			
0687	92172000	S24	0737	94260500	S8			
0687	92172000	S23	0738	94260503	S8			
0687	92172000	S23	0738	94260503	S7			
0687	92172000	S28	0624	94277416	S16			
0687	92172000	S25	0706	94281426	S19			
0661	92196007	S27	0706	94281426	S31			
0661	92196007	S30	0751	94309802	S8			
0661	92196007	S31	0751	94309802	S7			
0661	92196007	S26	0798	94337703	S12			
0661	92196007	S26	0843	94347104	S25			
0523	92196031	S12	0843	94347104	S20			
1012	92371016	S30	0843	94347104	S23			
1011	92411002	S30	0843	94347104	S28			
1187	92491020	S30	0843	94347104	S23			
0775	92512142	S8	0675	94357804	S18			
0541	92549007	S15	0487	94655401	S12			
0748	92602002	S7	1031	94806900	S31			
0748	92602002	S9	1032	94807000	S31			
0770	92602003	S8	1004	94846005	S10			
0494	92615012	S11	0896	94862901	S9			
0820	92649009	S20	0651	94862902	S9			

9.1 INTRODUCTION

The following paragraphs contain the Harness Assembly wire lists for the Disk Cartridge Drive Model 9427H.

9.2 PRE AMP

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length Inches</u>	<u>Remarks</u>
Red	A2P4-1	A3P2-1	11	
Gray	-2	-2		
	-3	-3		
	-4	-4		
	-5	-5		
	-6	-6		
	-7	-7		
	-8	-8		
	-9	-9		
	-10	-10		
	-11	-11		
	-12	-12		
	-13	-13		
	-14	-14		
	-15	-15		
	-16	-16		
	-17	-17		
	-18	-18		
	-19	-19		
Gray	A2P4-20	A3P2-20	11	

9.3 RECEIVER

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length Inches</u>	<u>Remarks</u>
White	A9P3-6	A6SW-3	26.2	Closed
	A9P3-5	A6SW-2	16.8	Closed
	A9P3-4	A6SW-3	27.8	Normally Open
	A9P3-3	A5SW-3	27.8	Normally Closed
	A9P3-2	A5SW-1	17.5	Closed
	A9P3-1	-	-	Not Used
	A6SW-1	A6SW-2	32.5	Normally Open
	A6L1-1	A6L2-1	30.5	
	A1P3-1	A6L2-2	20.3	
	A1P3-3	A6L1-2	45.0	
White	A1P3-2	-	-	Not Used

9.4 RETRACT

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length Inches</u>	<u>*Remarks</u>
White	A3P3-3	A4SW1	6	Normally Open
White	A3P3-2	A4SW1	6	Closed

*Twisted Pair

9.5 CAPACITOR

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length Inches</u>	<u>Remarks</u>
White	A1C101-(+)	A1P5-3	13 1/2	
	A1C101-(-)	A1C102-(+)	7.8	
	A1C102-(+)	A1P5-1	10.8	
	A1C102-(-)	A1P5-6	10.8	
	A1C103-(+)	A1P5-2	8	
	A1C103-(-)	A1P5-4	8	

9.6 SWITCH BOARD

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length Inches</u>	<u>Remarks</u>
Red	A2P6-1	A5P1-1	36	Switch Board
Gray	A2P6-2	A5P1-2	36	Switch Board
	-3	-3		
	-4	-4		
	-5	-5		
	-6	-6		
	-7	-7		
	-8	-8		
	-9	-9		
	-10	-10		
	-11	-11		
	-12	-12		
	-13	-13		
	-14	-14		
	-15	-15		
	-16	-16		
	-17	-17		
	-18	-18		
	-19	-19		
Gray	A2P6-20	A5P1-20	36	Switch Board

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length Inches</u>	<u>Remarks</u>
Gray ↑ ↓ Gray	A2P6-21	A9J1-1	36 ↑ ↓ 36	Lower Sensor
	-22	A9J1-2		Lower Sensor
	-23	A9J1-3		Lower Sensor
	-24	A9J2-1		Upper Sensor
	-25	A9J2-2		Upper Sensor
	-26	A9J2-3		Upper Sensor
	-27	A9J3-2		Receiver Harness
	-28	A9J3-5		Receiver Harness
	-29	A9J3-4		Receiver Harness
	-30	A9J3-3		Receiver Harness
	-31	A9J3-6		Receiver Harness
	-32			Not Used
	-33			Not Used
	A2P6-34			Not Used

9.7 DC SPINDLE (NO BRAKE)

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
White ↑ ↓	A2P5-3	A7K2-4	13.5	
	A2P5-4	A7K1-3	10.7	
	A7K1-3	A7K2-3	5.0	
	A2P5-5	A7K1-4	11.4	
	A2P5-6			Not Used
	A2P5-7			Not Used
	A2P5-8			Not Used
	A2P5-1			Not Used

9.8 AC SPINDLE (NO BRAKE)

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
White	A1P14-2	A7K2-1	9.5	
Green	A1P1-4	E4AC (GND)	10.0	
White	A7K1-2	A7C1-TOP	7.5	
White	A7K1-1	A7K2-2	5.3	

9.9 DRIVE MOTOR AND CONNECTOR (NO BRAKE)

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
Red	A7B1	A7C1-B	10 1/2	
Blue	A7B1	A7K2-2	10 1/2	
Yellow	A7B1	A1P14-1	14 1/2	
White	A1P14-2	A7K2-1	6	
	A1P14-3			Spare
Green	A1P14-4	E4 (AC)	5 1/2	Mot Plate - GND

9.10 AC BRAKE

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
	A7TB1-A	A7CR2-NG	8.8	
	A7K3-6	A7CR2-PS	6.5	
	A7K3-3	A7CR2-AC1	6.5	
	A7K2-2	A7CR2-AC1	8.8	
	A7TB1-B	A7K3-5	10.2	
	A7K1-2	A7C1-TOP	6.5	
	A7F01-2	A7K1-1	2.0	
	A7K2-1	A7K1-1	4.5	
	A1P14-2	A7K3-2	7.5	
	A1P14-3	A7CR2-AC2	4.2	
	A1P14-4	E4 (AC GND)	10.2	
	A1P14-1	A7FO1-1	3.2	

9.11 DC BRAKE

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
	A2P5-1	A7J1-3	8.8	
	A2P5-3	A7K1-2	8.8	
	A2P5-4	A7K1-3	14.5	
	A7K2-3	A7K1-3	3.8	
	A7K2-3	A7K1-17	4.3	
	A2P5-5	A7K1-4	13.5	
	A2P5-6	A7K1-1	8.8	
	A2P5-7	A7K3-B	6.5	
	A2P5-8	A7H1-4	8.8	
	A7J1-15	A7K3-A	6.5	
	A6J1-16	A7K2-4	5.3	

9.12 POWER AND LOGIC

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
	A1P1-1	A2P2-1	12	
	-2	-2		
	-3	-3		
	-4	-4		
	-5	-5		
	-6	-6		
	-7	-7		
	-8	-8		
	-9	-9		
	-10	-1		
	-11	-11		
	A1P1-12	A2P2-12	12	

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
Gray	A1P1-13	A2P2-13	12	
	↑ -14	↑ -14	↑	
	-15	-15		
	-16	-16		
	-17	-17		
	-18	-18		
	-19	-19		
	-20	-20		
	-21	-21		
	-22	-22		
	-23	-23		
	-24	-24		
	-25	-25		
	-26	-26		
	-27	-27		
	-28	-28		
	-29	-29		
	-30	-30		
	-31	-31		
	-32	-32		
	↓ -33	↓ -33	↓	
Gray	A1P1-34	A2P2-34	12	

9.13 POWER SUPPLY CHASSIS II

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
Brown	A1T1-1	A1J12-1	9	
Red	A1T1-2	A1J12-2	8 1/2	
Red	A1T1-2	A1J14-3	10	
Orange	↑ -3	A1J12-3	8	
Yellow	-4	A1J12-4	7 3/4	
Yellow	-4	A1J12-11	6 1/2	
Yellow	-4	A1J14-1	7 1/2	
Green	-5	A1J12-5	7 1/2	
Blue	-6	A1J12-6	7	
Violet	-7	A1J12-7	6	
Violet	-7	A1J13-3	6	
Gray	-8	A1J12-8	6 1/2	
Gray	-8	A1J14-2	5 3/4	
White	-9	A1J12-9	7 3/4	
White	-9	Not Used	7	Not Used
W/Black	-10	A1CB2-2	10	
W/Black	-10	A1P4-4	15	
W/Brown	-11	A1P4-3	14	
W/Red	-12	A1CB2-1	10	
W/Orange	-13	A1CB3-1	3 1/2	
W/Yellow	↓ -14	A1C104-(-)	6	

<u>Wire Color</u>	<u>Origin</u>	<u>Destination</u>	<u>Approximate Length (Inch)</u>	<u>Remarks</u>
W/Green	A1T1-15	A1CB3-2	5 1/2	
White	A1CB1-2	A1J12-14	15	
	A1CB1-4	A1J12-15	14	
	A1CR101-AC	A1CB2-3	4	
	A1CR101-AC	A1CB2-4	4 1/2	
	A1CR101-(+)	A1P4-1	7 1/2	
	A1CR101-(-)	A1P4-6	7 1/2	
	A1J12-12	A1J13-1	11	
	A1C104-(+)	A1P4-2	18 1/4	
	A1C104-(-)	A1P4-5	18 1/2	
White	A1J13-2	E3 (AC)	6 1/2	
Green	A1J14-4	E3 (AC)	6 1/2	
Green	A1FL1-2	E3 (AC)	9	
White	A1FK1-3	A1CB1-1	12 3/4	
White	A1FL1-1	A1CB1-2	13 1/2	
White	A1CB2-5	A1P8-1	8 1/2	
White	A1CB2-6	A1P8-2	8 1/2	
White	A1CB3-4	A1CR102-AC	12	
White	A1CB3-3	A1CR102-AC	12	
White	A1CR102-(+)	A1CB2-AUX NO.	15	
White	A1CB2-AUX	A1C104-(+)	14 1/2	

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 DEVICE SPECIFICATIONS
 AND SWITCH SELECTIONS

SCOPE

This document defines the unique mechanical/electrical requirements and switch adjustment selections for the 9427H Disk Storage Drive Hardware Product Configurator (HPC) number 83448215.

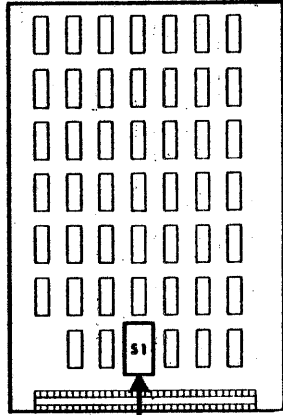
The following is a summary of customer selected items. This configuration has been prepared to meet the requirements of the HPC specified above. Immediately following the summary are the Printed Circuit Board switch selections.

 DEVICE SPECIFICATION SUMMARY

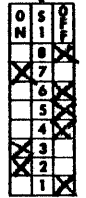
INPUT VOLTAGE:	110 Volts, 5.0 Amps
SECTORING (HARD):	20 Sectors, Mt Hole #2, divided by 2
MOUNTING:	Rack
TERMINATOR:	110-330 Ohms
REVOLUTIONS PER MINUTE:	2400
HEADS:	200 Tracks Per Inch
HEADS:	Straddle Erase
HEADS:	Fixed Disk
FREQUENCY:	60 Hz
SPINDLE DRIVE:	With Dynamic Brake
CONTROLLER INTERFACE:	Non-Standard
I-O CONNECTOR:	Winchester
MAXIMUM TRACK:	407
TERMINATOR POWER:	Unit
INDEX ANGLE:	5 degrees 30 minutes
INDEX TIMING:	Single Sector or Index prior to '0' degrees
ADDRESS ACKNOWLEDGE:	Pulse
HEAD & DISK SELECT:	Numbered Bottom Up
UNIT SELECT:	Daisy Chain
DRIVE TRACKS PER INCH:	200
LOGICAL ADDR INTERLOCK:	OR'd with Seek Error
ACTIVE INTERRUPT:	High
FEATURE:	Write Protect
FEATURE:	ON Cyl Independent of Seek Error
FEATURE:	Density Status
FEATURE:	Drop Ready with Fault
FEATURE:	RTZS Resets Fault
FEATURE:	ON Cyl goes false during strobe for Seek
:	to current Cyl but not for Illegal Addr.

INDICATES SWITCH POSITION

CONTROL BOARD

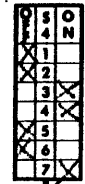
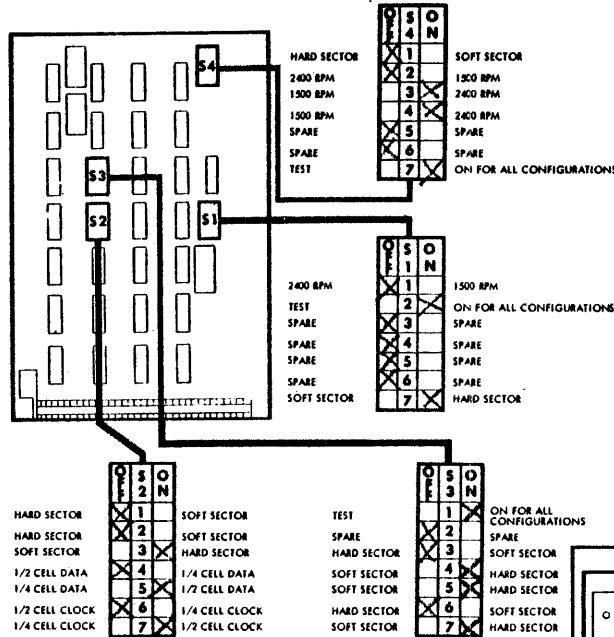


- INVALID CYL. ADD. INTERRUPT
- DROP READY WITH FAULT (DENSITY STATUS) 100 TPI
- NO FIXED DISC
- ACTIVE LOW INTERRUPT
- ACTIVE HIGH INTERRUPT
- R.T.Z.S., RESETS FAULT
- SPARE

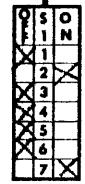


- READY STAYS TRUE DURING FAULT CONDITION 200 TPI
- FIXED DISC
- ACTIVE HIGH INTERRUPT
- ACTIVE LOW INTERRUPT
- R.T.Z.S. DOESN'T RESET FAULT
- SPARE

DATA RECOVERY BOARD



- HARD SECTOR 2400 RPM
- 1500 RPM
- 1500 RPM
- SPARE
- TEST
- SOFT SECTOR 1500 RPM
- 2400 RPM
- SPARE
- ON FOR ALL CONFIGURATIONS

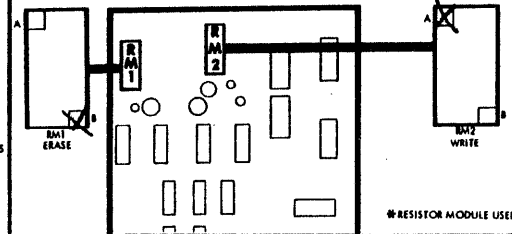


- 2400 RPM
- TEST
- SPARE
- SPARE
- SPARE
- SPARE
- SOFT SECTOR
- 1500 RPM
- ON FOR ALL CONFIGURATIONS
- SPARE
- SPARE
- SPARE
- SPARE
- HARD SECTOR



- HARD SECTOR
- HARD SECTOR
- SOFT SECTOR
- 1/2 CELL DATA
- 1/2 CELL DATA
- 1/2 CELL DATA
- 1/4 CELL CLOCK
- 1/2 CELL CLOCK
- SOFT SECTOR
- ON FOR ALL CONFIGURATIONS
- SPARE
- SOFT SECTOR
- HARD SECTOR
- HARD SECTOR
- SOFT SECTOR
- HARD SECTOR

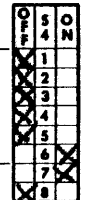
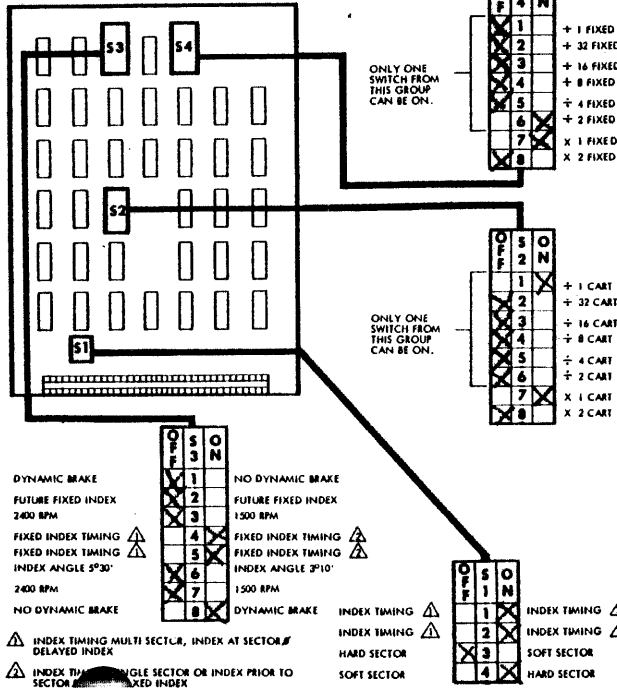
R/W/E BOARD



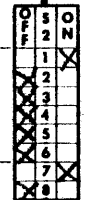
RESISTOR MODULE USED INDICATED BY (X).

#	DESCRIPTION	RM1 - (ERASE)		RM2 - (WRITE)	
		MOD. TYPE	PIN 1	MOD. TYPE	PIN 1
100	PRE-ERASE	75300100	B	75300100	A
100	STRADDLE ERASE	NONE		75300100	A
200	PRE-ERASE	75300100	A	NONE	
200	STRADDLE ERASE	75300200	B	75300200	A

SECTOR BOARD - SYNCHRONOUS SECTOR COUNTER



- + 1 FIXED
- + 32 FIXED
- + 16 FIXED
- + 8 FIXED
- + 4 FIXED
- + 2 FIXED
- X 1 FIXED
- X 2 FIXED

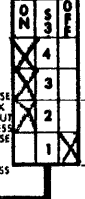
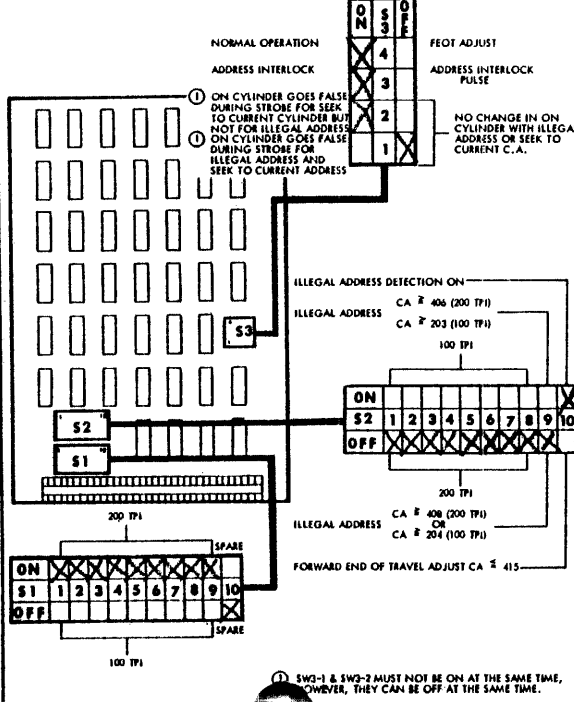


- + 1 CART
- + 32 CART
- + 16 CART
- + 8 CART
- + 4 CART
- + 2 CART
- X 1 CART
- X 2 CART

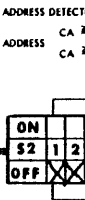


- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- HARD SECTOR
- SOFT SECTOR
- HARD SECTOR

SERVO BOARD



- FEET ADJUST
- NO CHANGE IN ON CYLINDER WITH ILLEGAL ADDRESS OR SEEK TO CURRENT C.A.

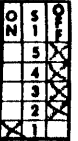
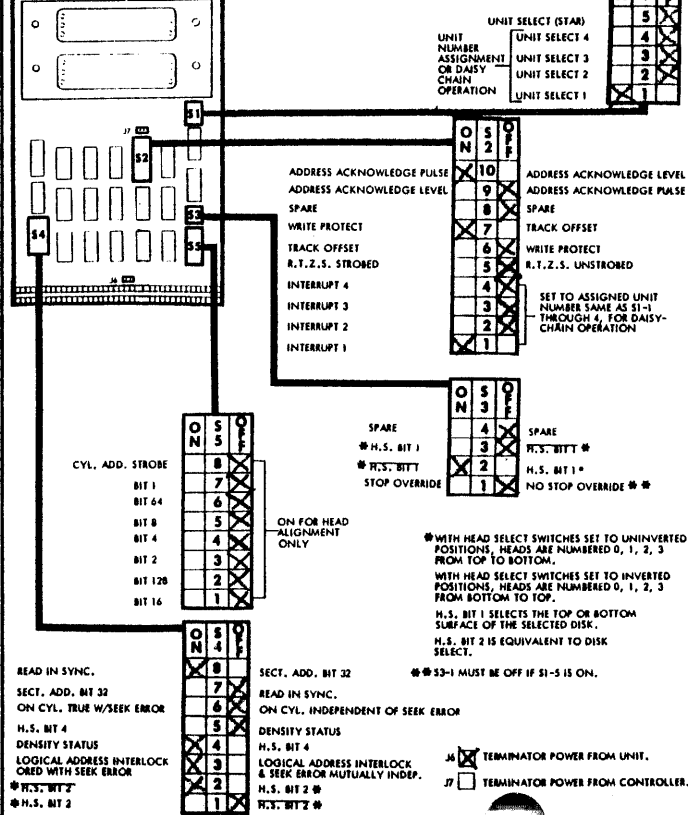


- ILLEGAL ADDRESS DETECTION ON
- ILLEGAL ADDRESS CA # 406 (200 TPI)
- ILLEGAL ADDRESS CA # 203 (100 TPI)
- 100 TPI
- 200 TPI
- ILLEGAL ADDRESS CA # 406 (200 TPI) OR CA # 204 (100 TPI)
- FORWARD END OF TRAVEL ADJUST CA # 415

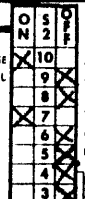


- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- INDEX TIMING
- INDEX TIMING

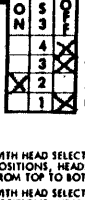
WINCHESTER I/O BOARD



- UNIT SELECT (STAR)
- UNIT SELECT 4
- UNIT SELECT 3
- UNIT SELECT 2
- UNIT SELECT 1



- ADDRESS ACKNOWLEDGE PULSE
- ADDRESS ACKNOWLEDGE LEVEL
- ADDRESS ACKNOWLEDGE PULSE
- ADDRESS ACKNOWLEDGE LEVEL
- WRITE PROTECT
- TRACK OFFSET
- WRITE PROTECT
- R.T.Z.S. UNSTROBED
- R.T.Z.S. UNSTROBED
- SET TO ASSIGNED UNIT NUMBER SAME AS S1-1 THROUGH 4, FOR DAISY-CHAIN OPERATION



- SPARE
- H.S. BIT 1
- H.S. BIT 7
- STOP OVERRIDE
- NO STOP OVERRIDE

- READ IN SYNC.
- SECT. ADD. BIT 32
- ON CYL. TRUE W/SEEK ERROR
- H.S. BIT 4
- DENSITY STATUS
- LOGICAL ADDRESS INTERLOCK
- OR'ED WITH SEEK ERROR
- H.S. BIT 2

- SECT. ADD. BIT 32
- READ IN SYNC.
- ON CYL. INDEPENDENT OF SEEK ERROR
- DENSITY STATUS
- H.S. BIT 4
- LOGICAL ADDRESS INTERLOCK & SEEK ERROR MUTUALLY INDEP.
- H.S. BIT 2
- H.S. BIT 2

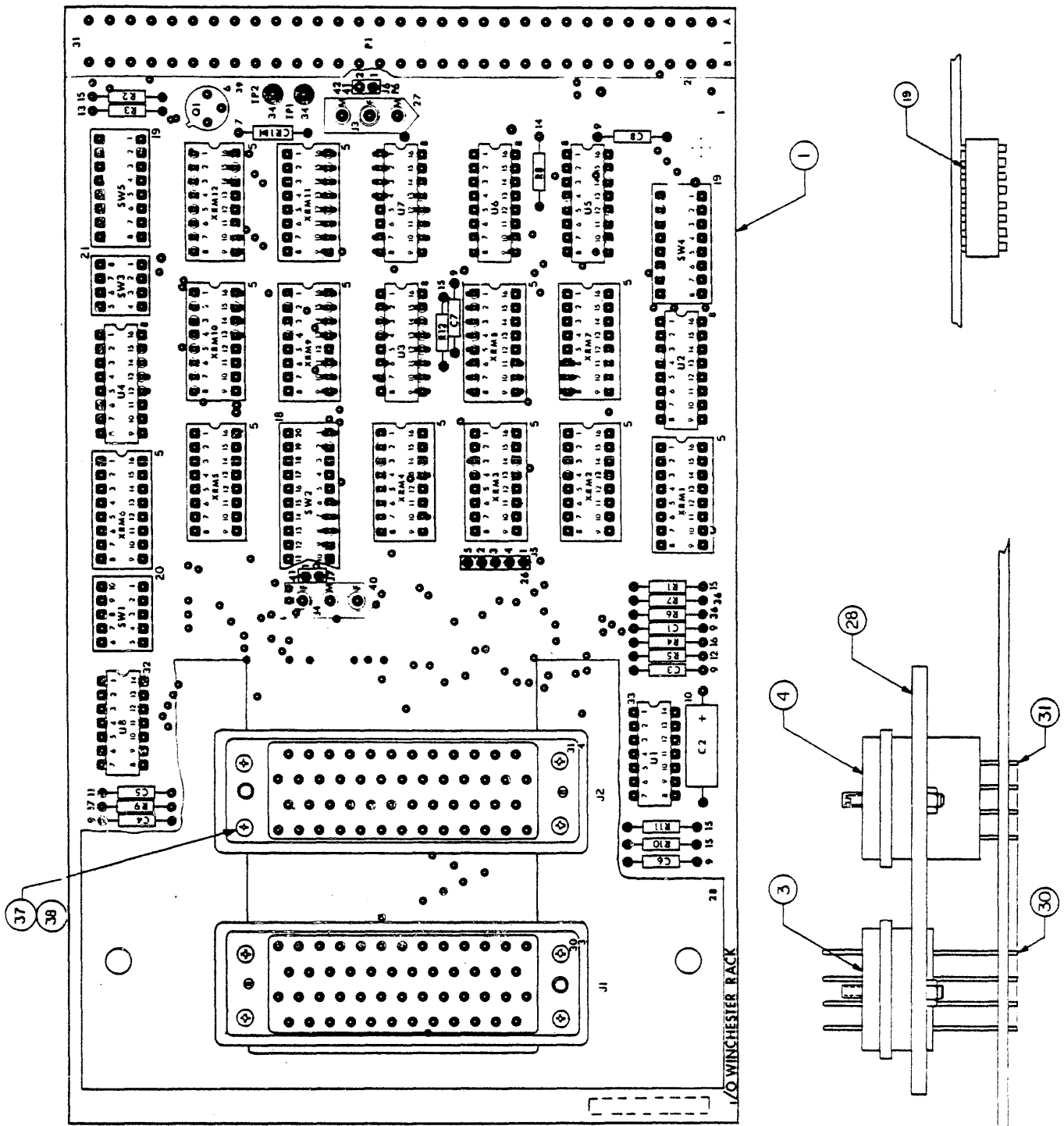
- WITH HEAD SELECT SWITCHES SET TO UNINVERTED POSITIONS, HEADS ARE NUMBERED 0, 1, 2, 3 FROM TOP TO BOTTOM.
- WITH HEAD SELECT SWITCHES SET TO INVERTED POSITIONS, HEADS ARE NUMBERED 0, 1, 2, 3 FROM BOTTOM TO TOP.
- H.S. BIT 1 SELECTS THE TOP OR BOTTOM SURFACE OF THE SELECTED DISK.
- H.S. BIT 2 IS EQUIVALENT TO DISK SELECT.
- S3-1 MUST BE OFF IF S1-5 IS ON.
- TERMINATOR POWER FROM UNIT.
- TERMINATOR POWER FROM CONTROLLER.

VA DIAGRAMS (I/O PACKAGE)

SCOPE

This publication, when used with the 9427H Product Manual makes the manual unique to a specific equipment configuration. The following data pertains to the Winchester I/O Rack printed circuit board and is to be used as part of Section 5 of the manual.

- Sheet 5A-2 Circuit Board Assembly (75857706)
- Sheet 5A-4 Interconnection Diagram
- Sheet 5A-5 Schematic (75857805)

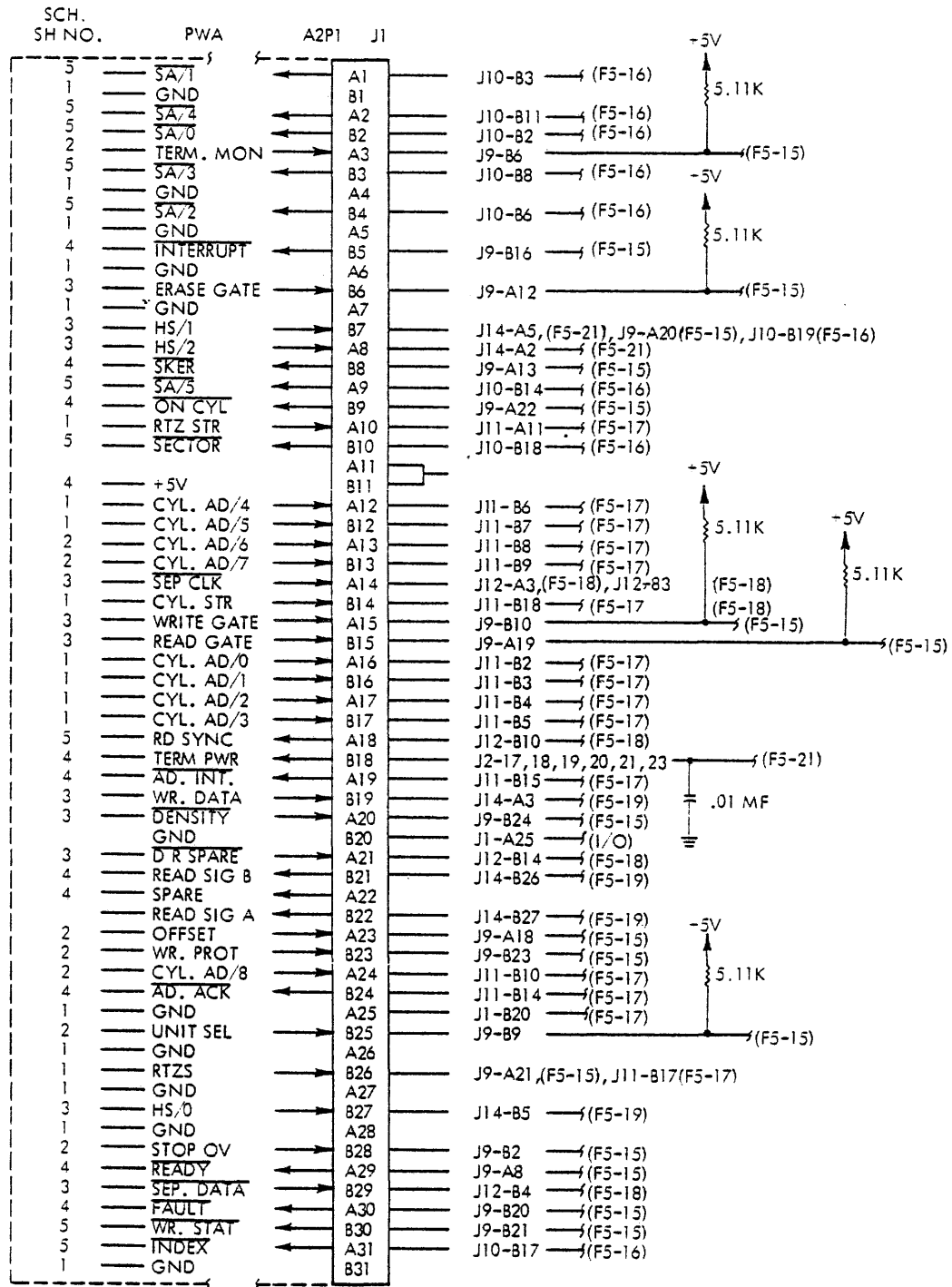


Circuit Board Assembly

<u>ITEM NO.</u>	<u>IDENTIFICATION NUMBER</u>	<u>DRAWING TITLE</u>
	75857706	Comp Bd Assy - I/O Rack
1	75857604	Bd P.C. - I/O Rack WNH
2	94243400	Conn-Card Mtd 62Sock
3	75770501	Connector
4	75770502	Connector
5	94260301	Socket 16 Pin
6	75722201	Transistor NPN
7	50241001	Diode Silicon
8	50254500	IC Rec2
9	92496227	Cap 100V 20% .01UF
10	24504353	Cap 10V 20% 33UF
11	75808521	Cap 100V 10% 470
12	94360467	Res 1/4W 1% 49.1K
13	94360264	Res 1/4W 1% 464
14	94360400	Res 1/4W 1% 10.0K
15	94360368	Res 1/4W 1% 5.11K
16	94360328	Res 1/4W 1% 1.96K
17	94360377	Res 1/4W 1% 6.34K
18	83452207	Switch-10 Position
19	83452205	Switch-8 Position
20	83452202	Switch-5 Position
21	83452201	Switch-4 Position
22	75300006	Switch Cover 10-Sect
23	75300004	Switch Cover 8-Sect
24	75300001	Switch Cover 5-Sect
25	75300000	Switch Cover 4-Sect
26	76379303	Header-Straight 5 PI
27	75808403	Conn Wafer 3-Pin
28	75798902	Plate-Winchester Fac
30	75771101	Pin Contact
31	75771201	XX
32	51718600	IC TTL Adnr MV-A
33	51768200	IC Dual
34	92498021	Terminal, Swaged
36	94360500	Res 1/4W 1% 100K
37	95125309	Loctite
38	93728082	Screw Fil Hd Mach 4-
39	94335900	Pad-Transistor Mtg
40	75808406	Conn Molex F-M-F
41	76379300	Header-Straight 2 PI
42	83433002	Shunt Assembly

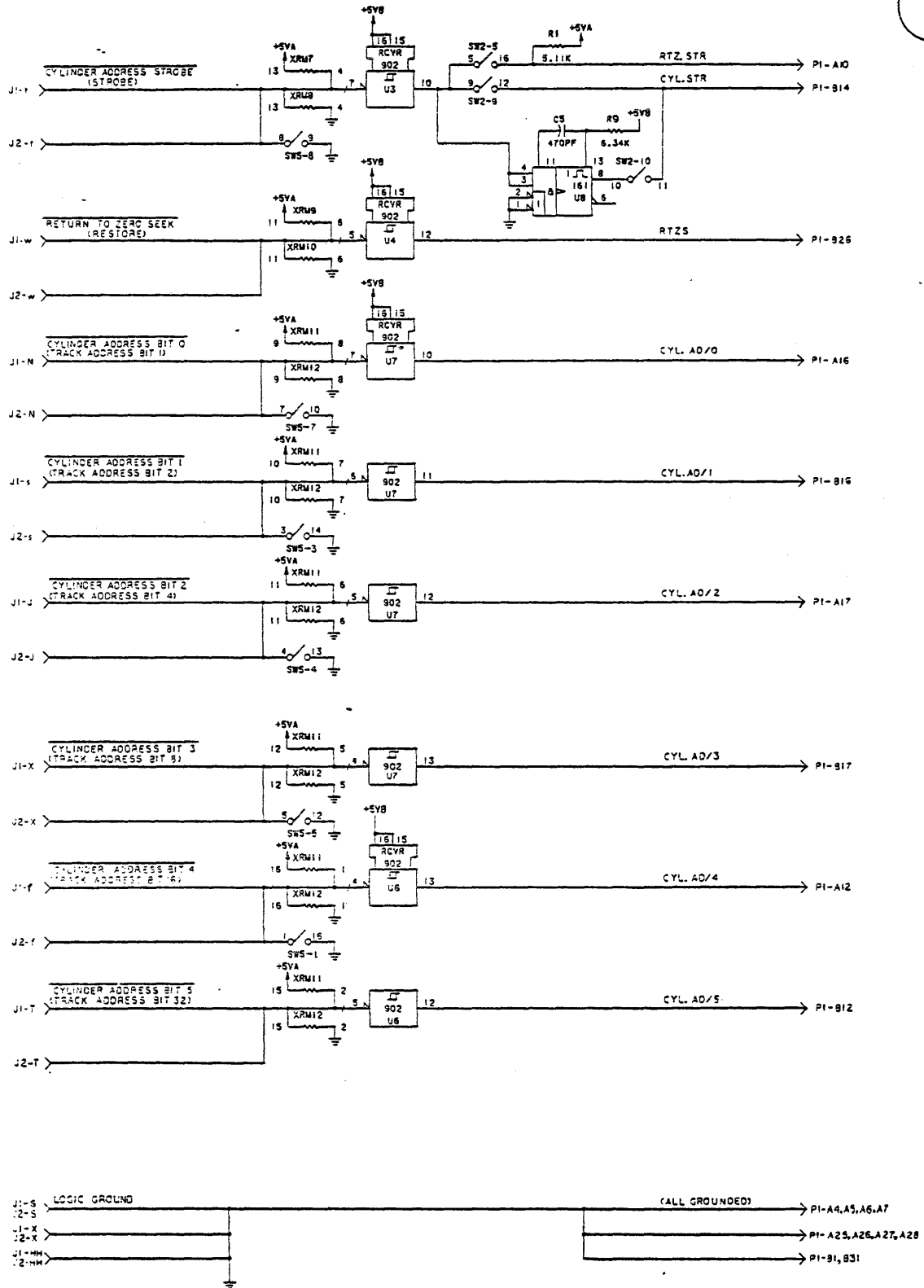
Circuit Board Assembly

I/O CARD

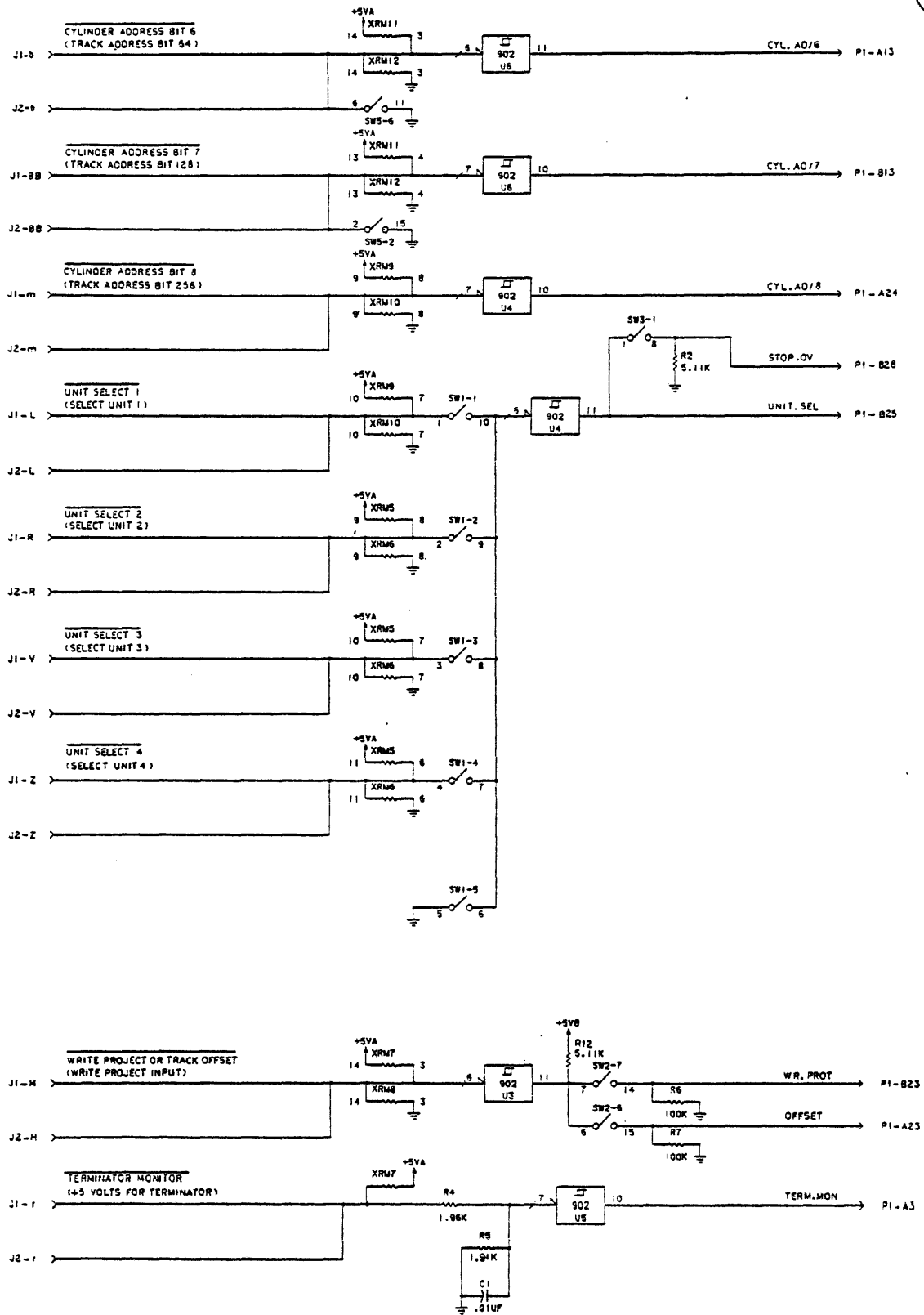


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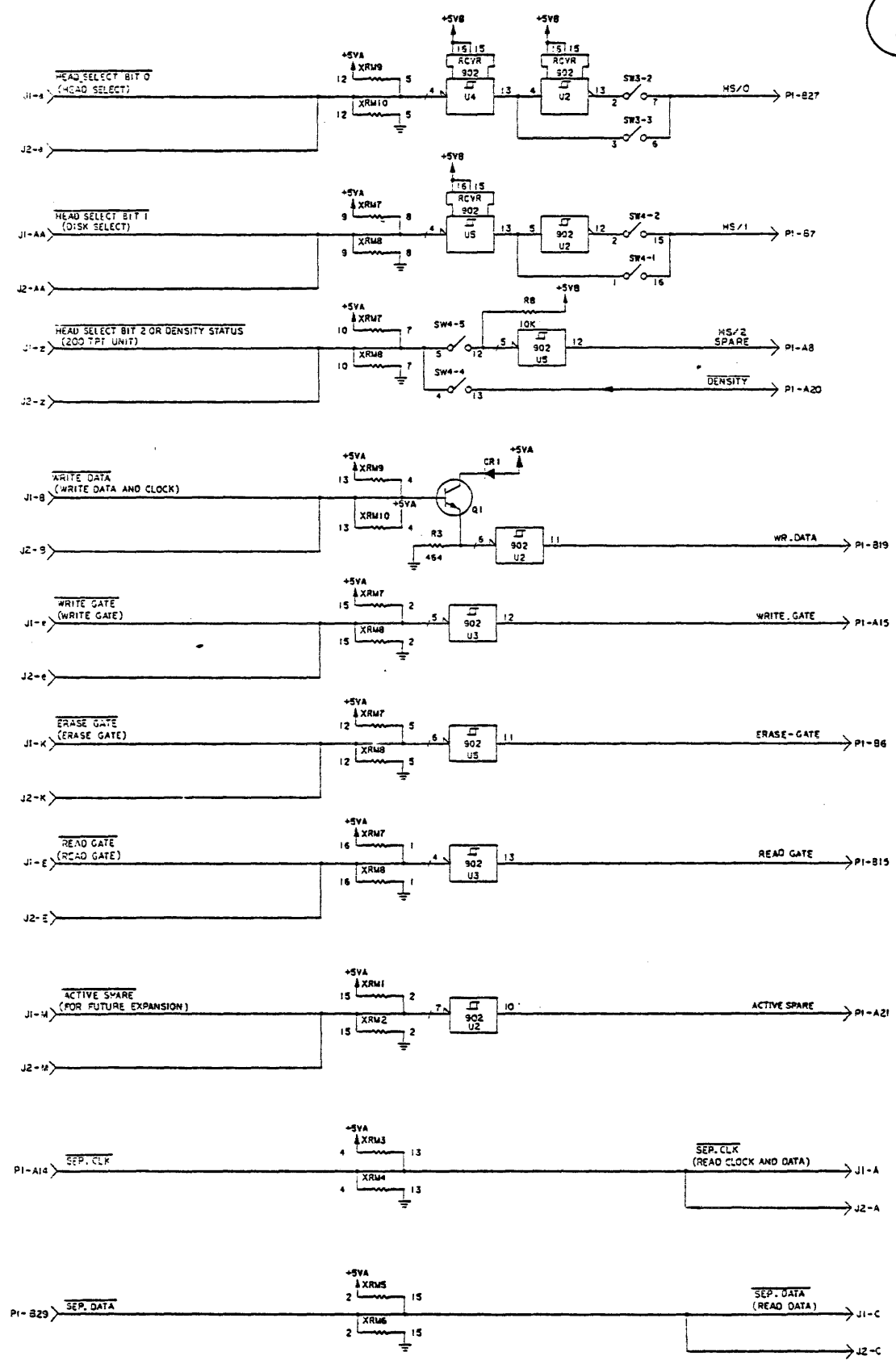
Interconnection Diagram



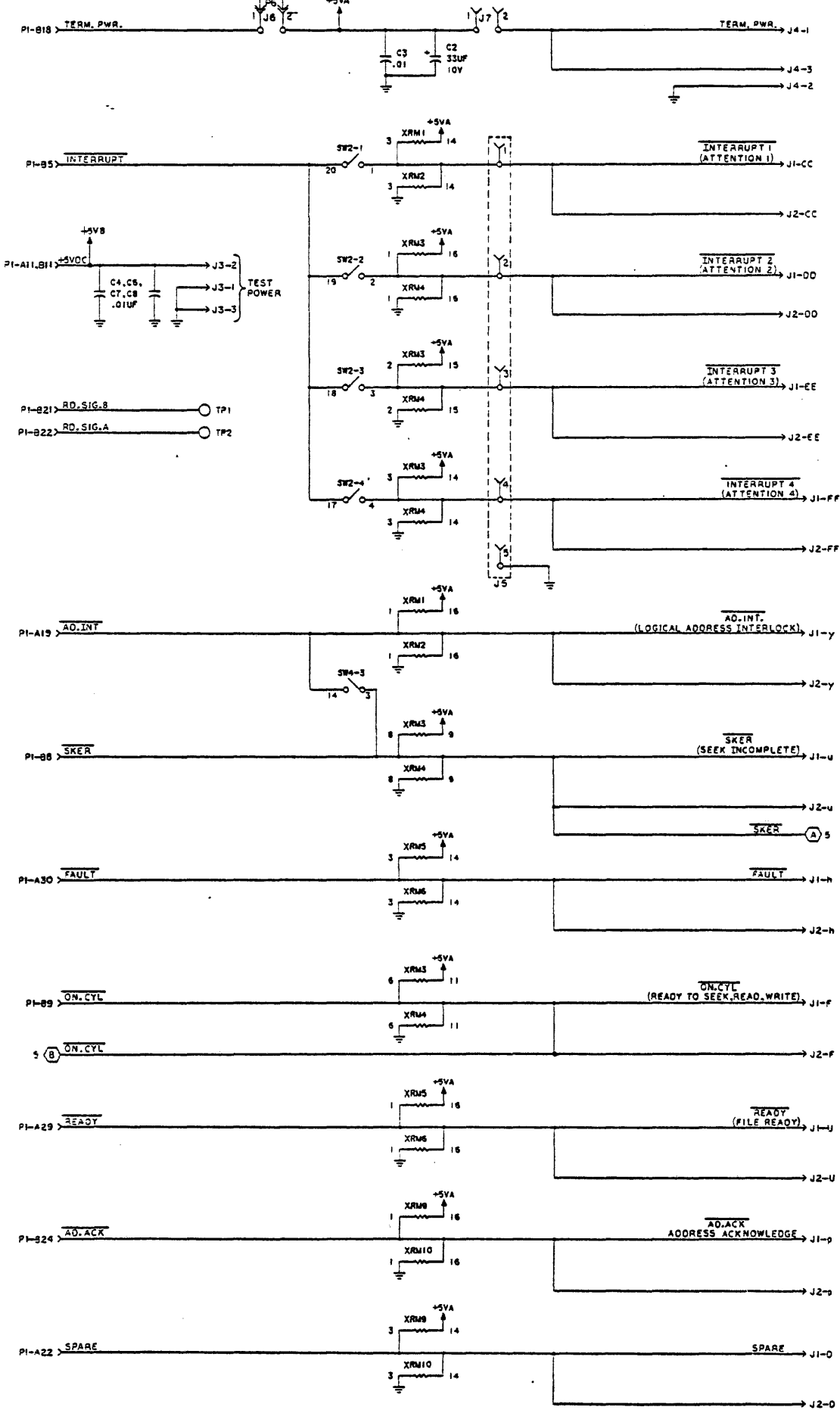
Schematic



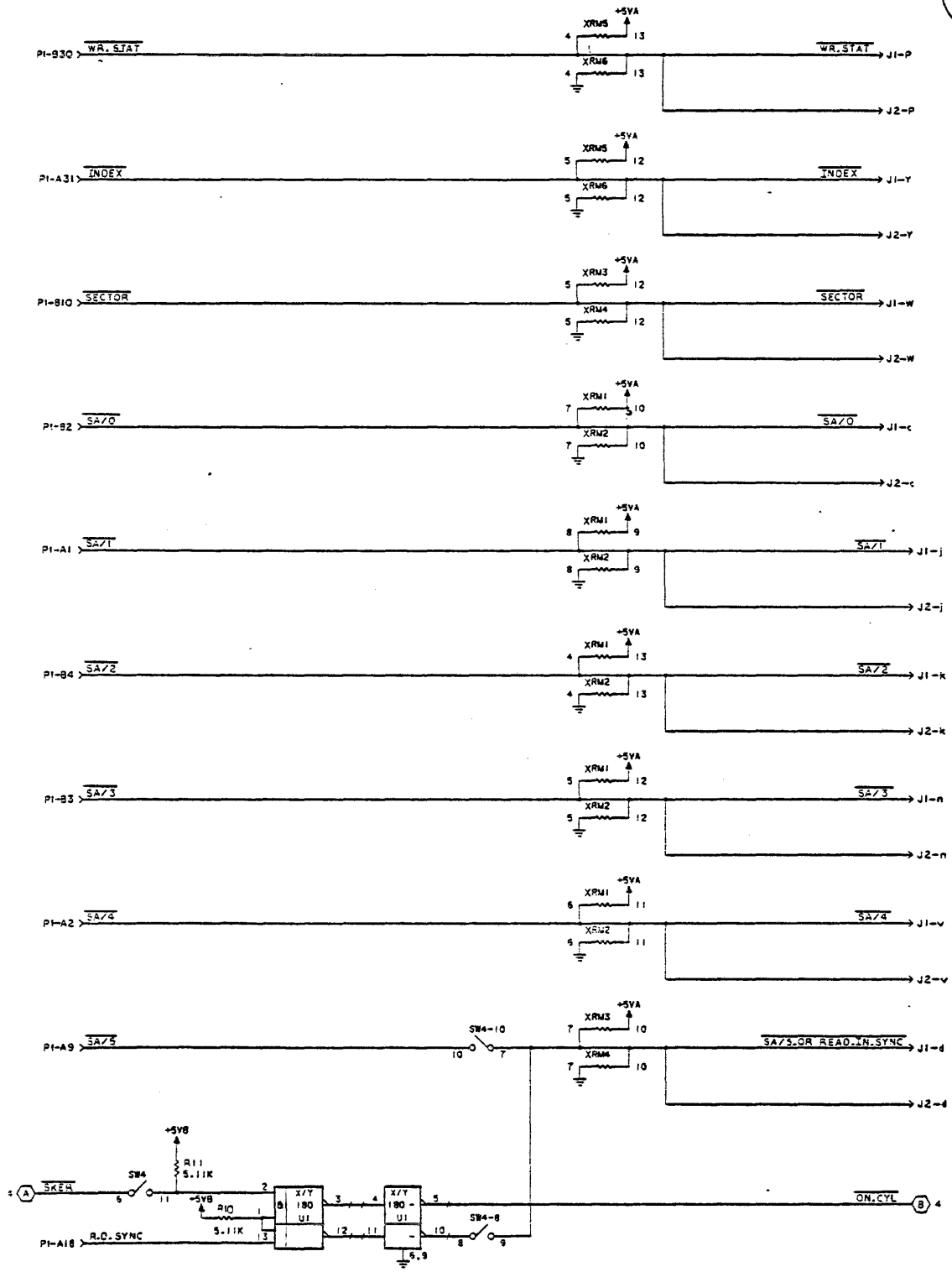
Schematic



Schematic



Schematic

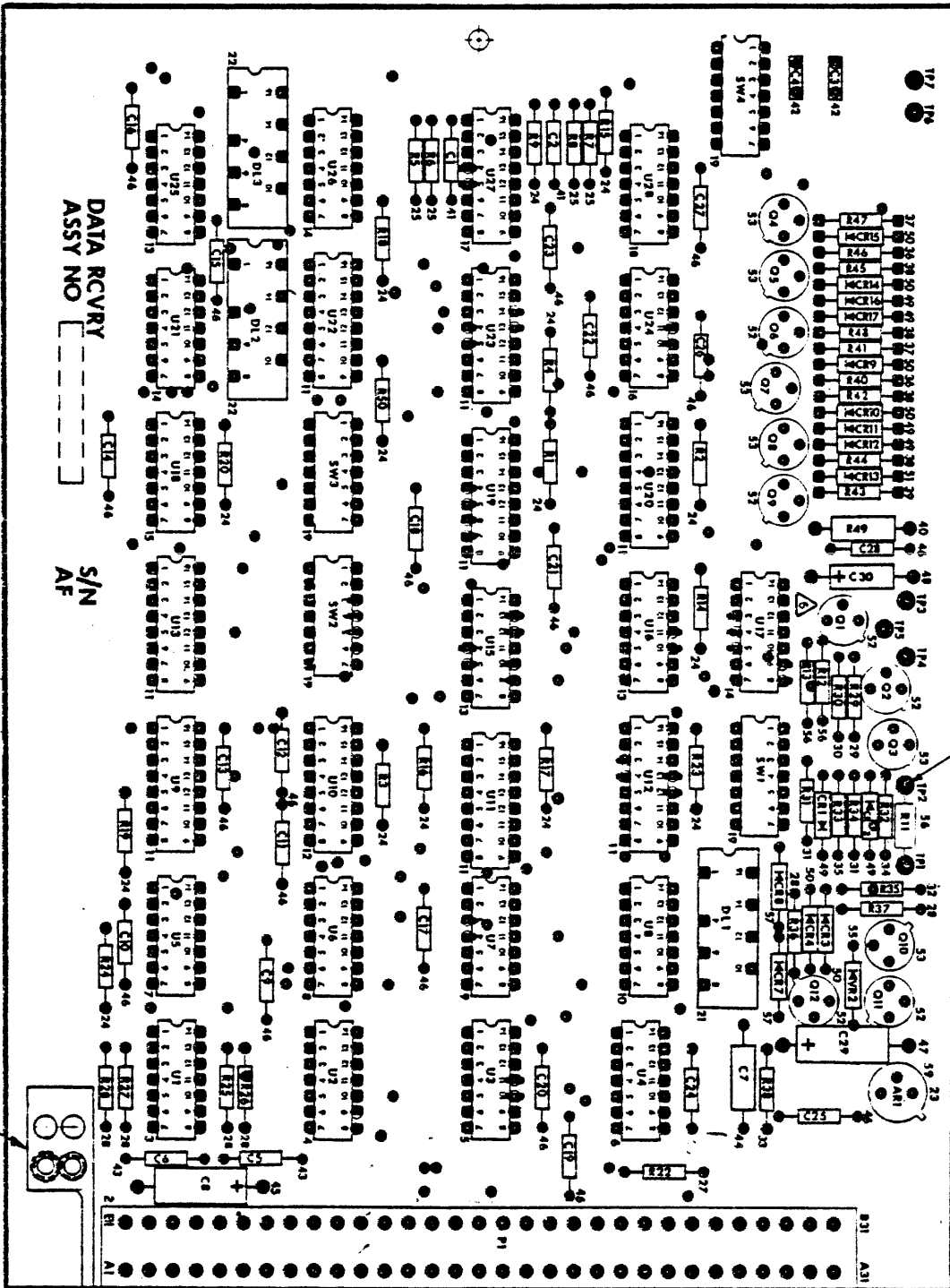


Schematic

SPECIAL EQUIPMENT DOCUMENTATION

This publication, when used with the 9427H Hardware Maintenance Manual, will support specific equipment configurations. The data contained herein physically describes the DATA RECOVERY circuit board assembly (75886537) and includes the circuit board component layout, interconnection and schematic diagrams. Circuit board functional description however, is contained in the Theory of Operation section of the Hardware Maintenance Manual.

This documentation replaces the corresponding circuit board figure in section 5 of the Hardware Maintenance manual. It is recommended that this document be inserted in an appropriate location in section 5.



DATA RCVRY
 ASSY NO []
 S/N []
 AF []

(XX223a)

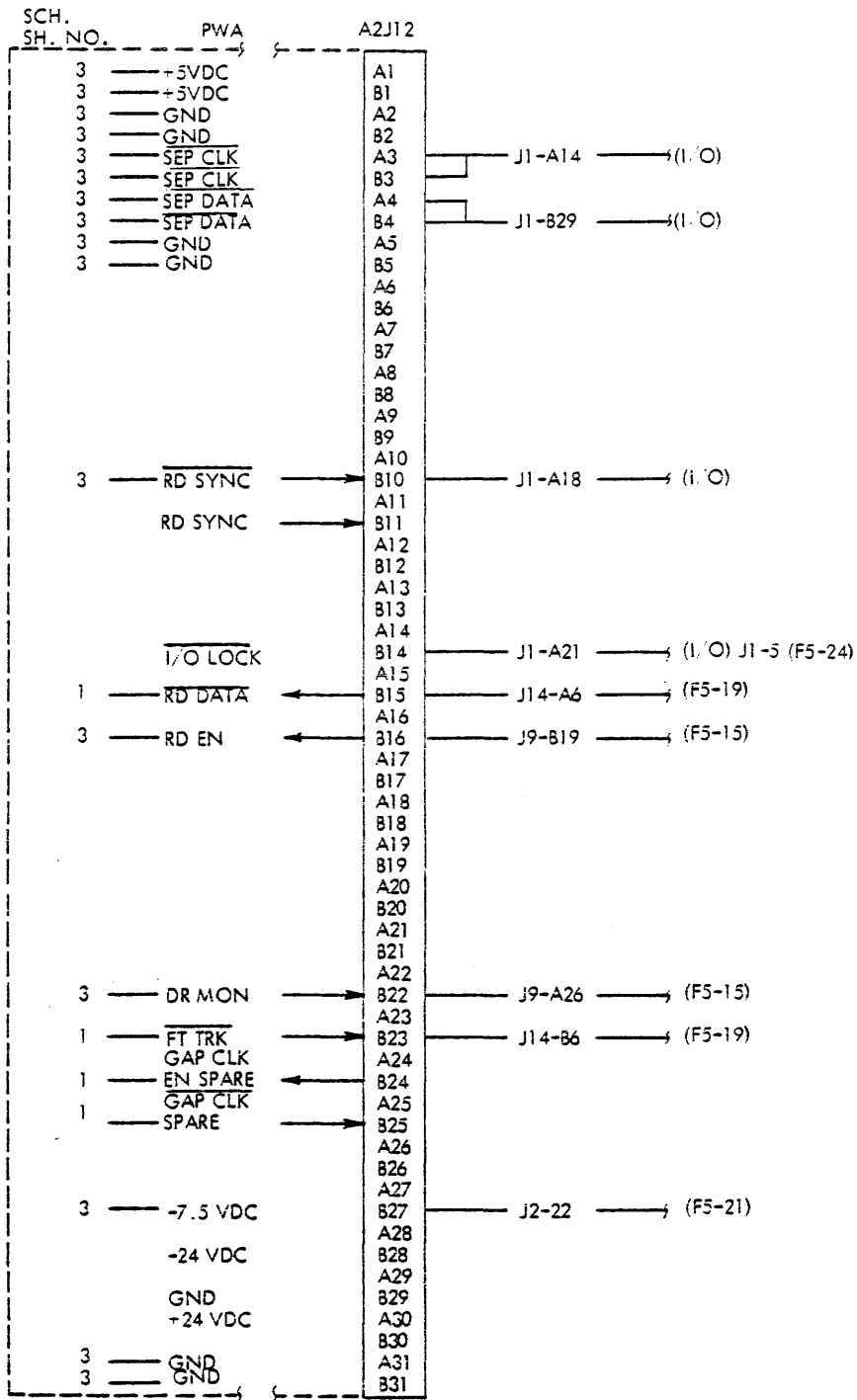
Circuit Board Assembly

ITEM	IDENT NO	DESCRIPTION	REMARKS
	75886537	PWA-DATA RECOVERY	
1	75297005-3	BOARD PC DATA-RECOVE	TAB 1
2	77836070-1	PWB SOCKET CONNECTOR	TAB 1
3	51768200-1	I C DUAL	TAB 1
4	36187900-0	I.C. 7453	TAB 1
5	15112700-8	I.C. 74L04	TAB 1
6	15158700-3	I.C. 74S140	TAB 1
7	15112300-7	I.C. 74L00	TAB 1
8	96744156-9	I.C. 7474	TAB 1
9	88882100-6	IC 74H00	TAB 1
10	88885300-9	I.C. 74S20	TAB 1
11	15158600-5	I.C. 74S112	TAB 1
12	15160600-1	I.C. 93L16	TAB 1
13	88884500-5	I.C. 74S00	TAB 1
14	88883700-2	I.C. 74S04	TAB 1
15	88923000-9	I.C. 74S74	TAB 1
16	88884200-2	I.C. 74S10	TAB 1
17	88886500-3	I.C. 9602	TAB 1
18	88924500-7	I.C. 7404	TAB 1
19	83452204-7	SWITCH-7 POSITION	TAB 1
21	83406502-1	DELAY LINE 100 NS	TAB 1
22	83406501-3	DELAY LINE 50 NS	TAB 1
23	15130400-3	VOLT REGULATOR	TAB 1
24	94360300-1	RES 1/4W 1% 1.00K	TAB 1
25	94360430-6	RES 1/4W 1% 20.5K	TAB 1
27	94360335-7	RES 1/4W 1% 2.32K	TAB 1
28	94360224-3	RES 1/4W 1% 178	TAB 1
29	94360220-1	RES 1/4W 1% 162	TAB 1
30	94360359-7	RES 1/4W 1% 4.12K	TAB 1
31	94360232-6	RES 1/4W 1% 215	TAB 1
32	94360316-7	RES 1/4W 1% 1.47K	TAB 1
33	94360200-3	RES 1/4W 1% 100	TAB 1
34	94360257-3	RES 1/4W 1% 392	TAB 1
35	94360280-5	RES 1/4W 1% 681	TAB 1
36	94360168-2	RES 1/4W 1% 51.1	TAB 1
37	94360165-8	RES 1/4W 1% 47.5	TAB 1
38	94360264-9	RES 1/4W 1% 464	TAB 1
39	94360272-2	RES 1/4W 1% 562	TAB 1
40	24500131-8	RES 1/2W 5% 47	TAB 1
41	92496147-7	CAP 200V 10% 1200	TAB 1
42	94227236-0	CAP 300V 2% 270	TAB 1
43	92496267-3	CAP 200V 10% 220	TAB 1
44	92496393-7	CAP 80V 10% .033UF	TAB 1
45	24504353-4	CAP 10V 20% 33UF +	TAB 1
46	92496227-7	CAP 100V 20% .01UF	TAB 1
47	24504339-3	CAP 35V 20% 6.8UF +	TAB 1
48	24504329-4	CAP 35V 20% 1.0UF +	TAB 1
49	51736700-9	DIODE IN914A	TAB 1
50	50241400-6	DIODE SPECIAL	TAB 1

Circuit Board Assembly

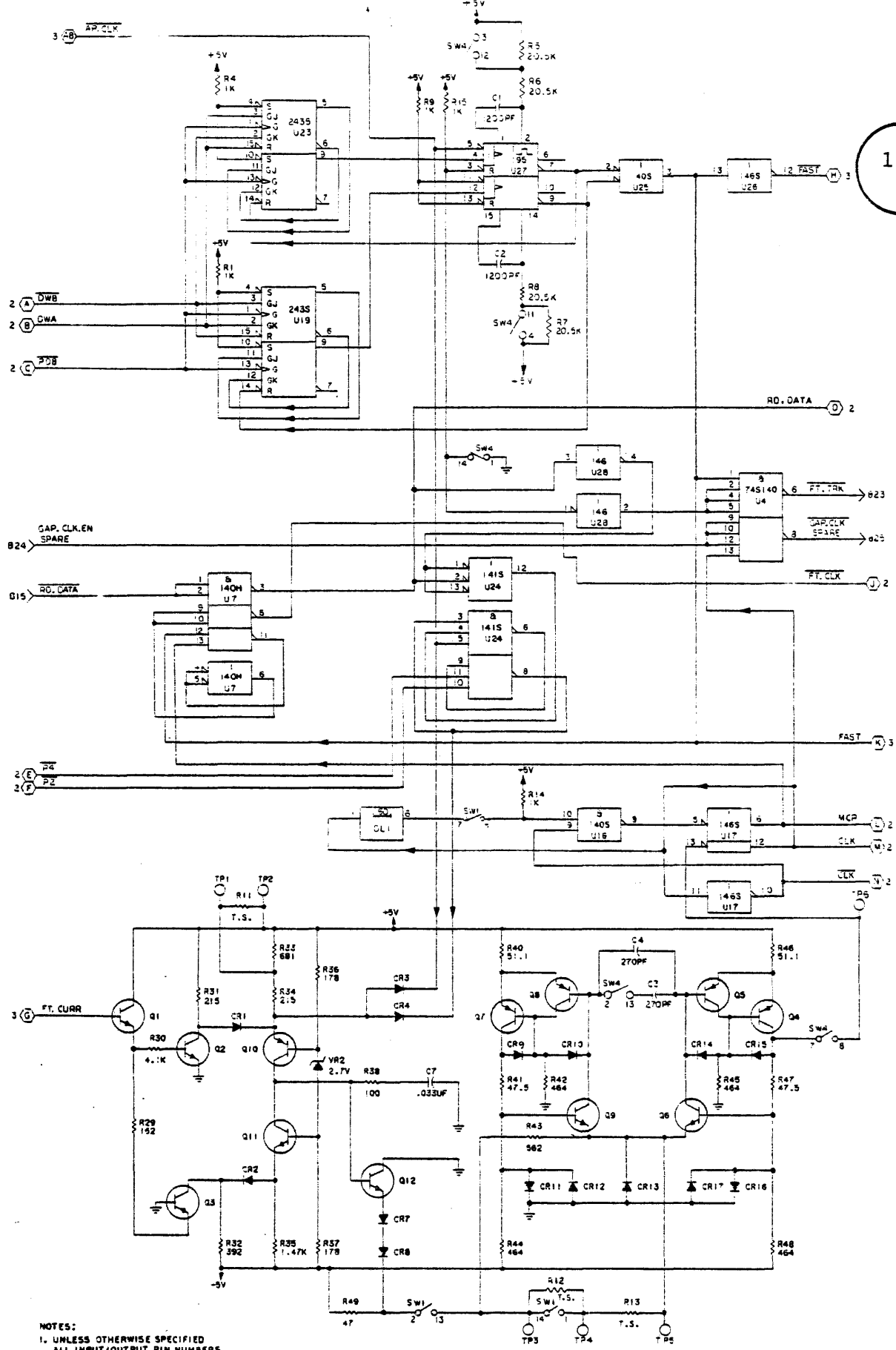
ITEM	IDENT NO	DESCRIPTION	REMARKS
51	11801200-4	SPEC DIODE GERMANIUM	TAB 1
52	50210310-4	TSTR,SNPN,15V NN3646	TAB 1
53	50211510-8	TSTR,SPNP,12V NN4258	TAB 1
55	50240146-6	DIODE SILICON	TAB 1
56	94357500-1	RESISTOR TEST SELECT	TAB 1
57	24553500-0	DIODE SI PLANAR	TAB 1
58	92498021-2	TERMINAL SWAGED	TAB 1
59	94335900-0	PAD-TRANSISTOR MTG	TAB 1
60	83479801-9	KEY,INJECT.MOLD	TAB 1
61	10125703-8	SCR FLAT HD	TAB 1
62	75312701-8	SPEC-EPOXY ADHESIVE	TAB 1
66	94243731-0	WIRE AWG 30 BLUE	TAB 1

Circuit Board Assembly



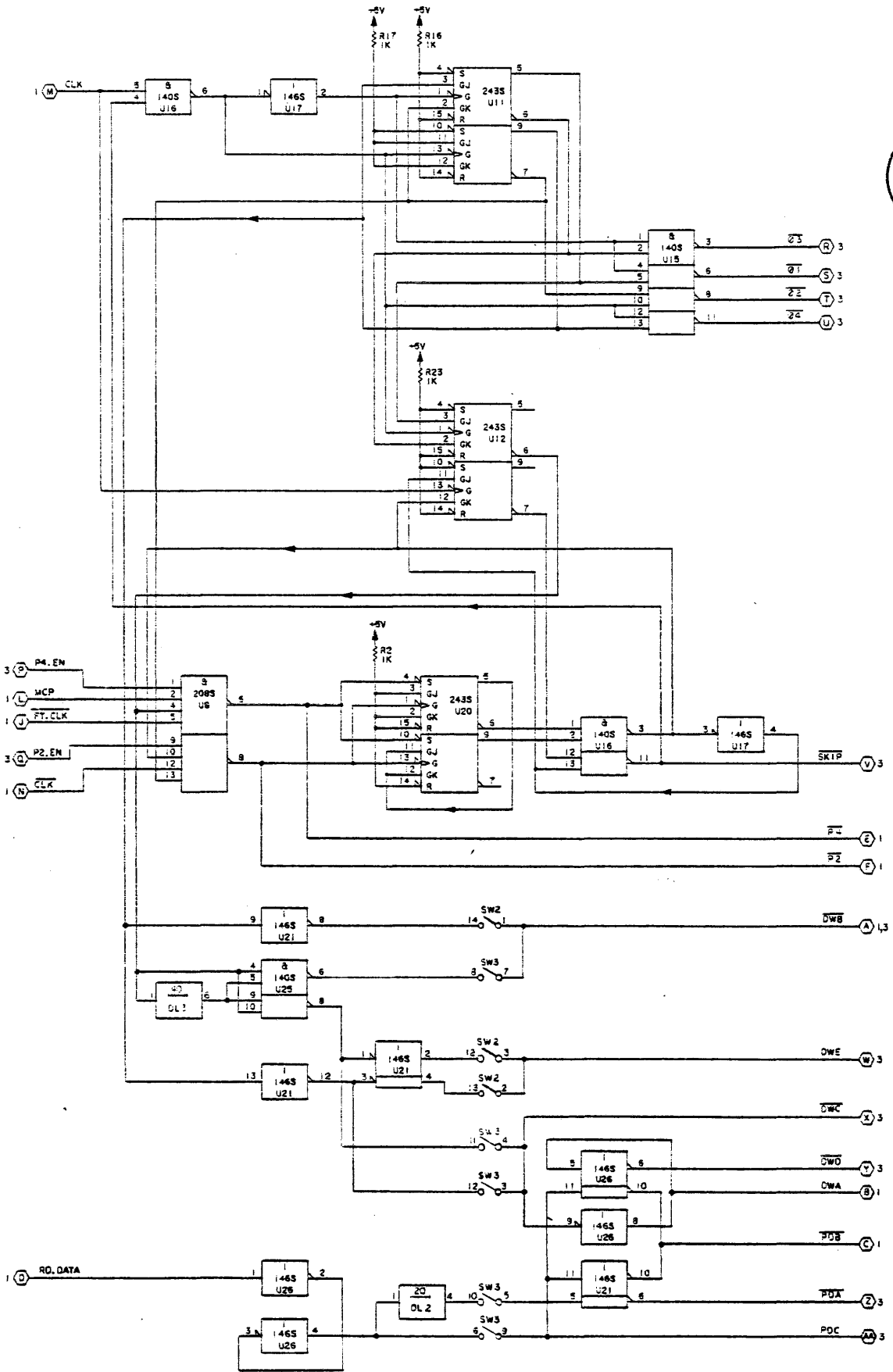
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Interconnection Diagram

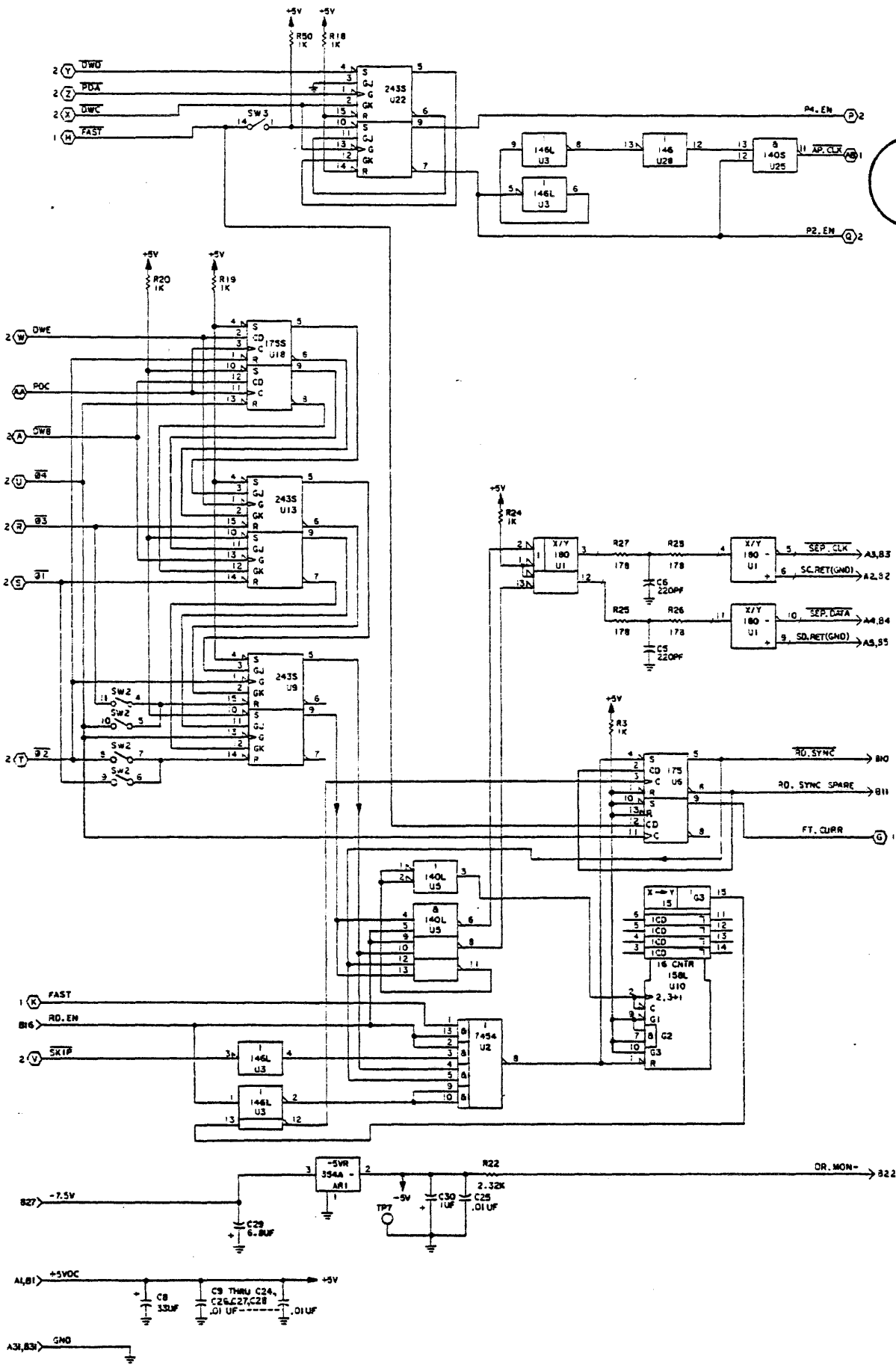


NOTES:
 1. UNLESS OTHERWISE SPECIFIED
 ALL INPUT/OUTPUT PIN NUMBERS
 ARE FOR PI CONNECTOR.

Schematic



Schematic

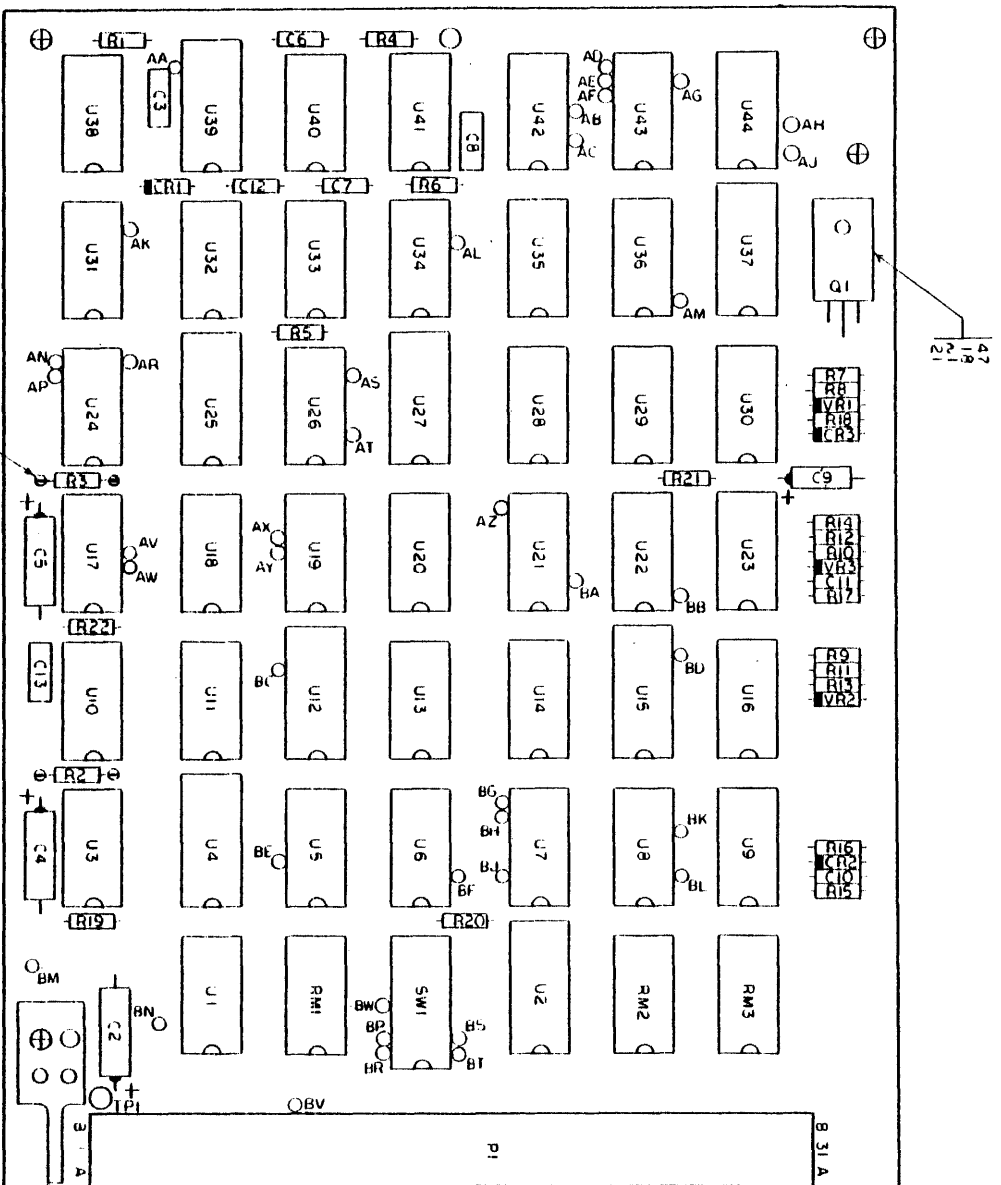


Schematic

SPECIAL EQUIPMENT DOCUMENTATION

This publication, when used with the 9427H Hardware Maintenance Manual, will support specific equipment configurations. The data contained herein physically describes the CONTROL circuit board assembly (75891658) and includes the circuit board component layout, interconnection and schematic diagrams. Circuit board functional description however, is contained in the Theory of Operation section of the Hardware Maintenance Manual.

This documentation replaces the corresponding circuit board figure in section 5 of the Hardware Maintenance manual. It is recommended that this document be inserted in an appropriate location in section 5.



RES	PL ITEM
R1	28
R2	43
R3	45
R4	30
R5	30
R6	31
R7	22
R8	22
R9	23
R10	23
R11	26
R12	26
R13	24
R14	24
R15	27
R16	29
R17	27
R18	29
R19	25
R20	25
R21	25
R22	38
R23	---
R24	---

DIODE	PL ITEM
CR1	13
CR2	13
CR3	13
CR4	---
CR5	---

RES MOD	PL ITEM
RM1	15
RM2	15
RM3	14

IC	PL ITEM
U1	10
U2	3
U3	9
U4	4
U5	9
U6	9
U7	10
U8	9
U9	8
U10	5
U11	10
U12	3
U13	9
U14	9
U15	3
U16	8
U17	6
U18	11
U19	7
U20	11
U21	6
U22	10
U23	8
U24	5
U25	3
U26	10
U27	3
U28	10
U29	9
U30	8
U31	10
U32	11
U33	6
U34	6
U35	7
U36	10
U37	4
U38	11
U39	3
U40	5
U41	12
U42	7
U43	10
U44	10

CAP	PL ITEM
C1	---
C2	32
C3	36
C4	32
C5	32
C6	37
C7	37
C8	36
C9	33
C10	34
C11	34
C12	34
C13	36
C14	---
C15	---
C16	---

REG	PL ITEM
VR1	16
VR2	17
VR3	17

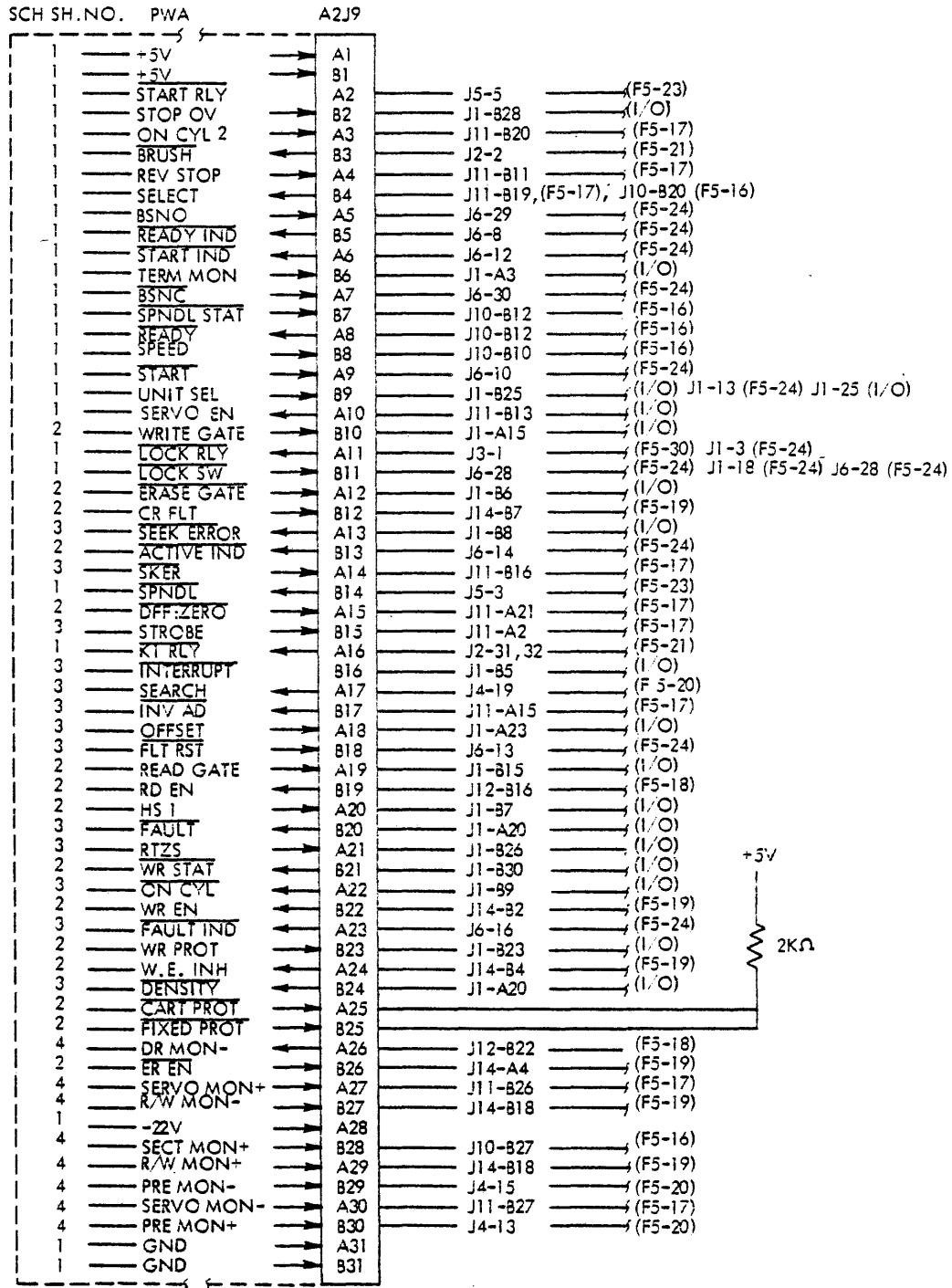
TSTR	PL ITEM
Q1	18

XX225a

Circuit Board Assembly

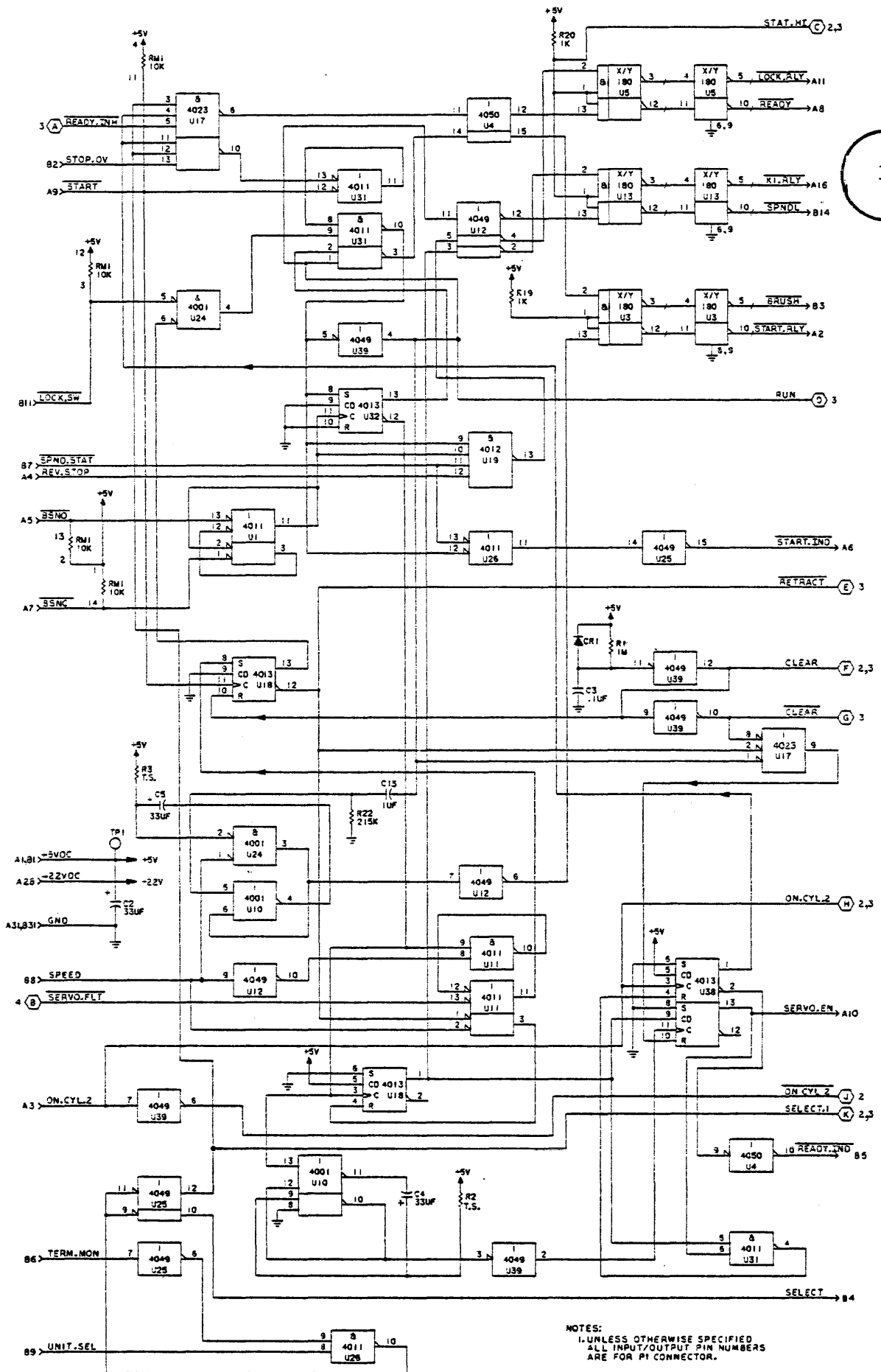
ITEM	IDENT NO	DESCRIPTION	REMARKS
	75891658	PWA-CONTROL	
1	75892420-3	PWB, CONTROL BOARD	TAB 1
2	77836070-1	PWB SOCKET CONNECTOR	TAB 1
3	15134700-2	I.C. CMOS 4049B	TAB 1
4	15134800-0	I.C. CMOS 4050B	TAB 1
5	15135000-6	I.C. CMOS 4001B	TAB 1
6	15133700-3	I.C. CMOS 4023B	TAB 1
7	15133300-2	I.C. CMOS 4012B	TAB 1
8	15126600-4	I.C. LM339	TAB 1
9	51768200-1	I C DUAL	TAB 1
10	15133200-4	I.C. CMOS 4011B	TAB 1
11	15133400-0	I.C. CMOS 4013B	TAB 1
12	15134600-4	IC 4047 CMOS 1 SHOT	TAB 1
13	51736700-9	DIODE IN914A	TAB 1
14	75009901-2	RES PAC 2% 1.0K (13)	TAB 1
15	75009993-9	RES PAC 2% 10K (7)	TAB 1
16	50240107-8	VOLT REG 5.6V 5%	TAB 1
17	50240101-1	DIODE ZENER 3.3V	TAB 1
18	75752400-4	TRANSISTOR POWER	TAB 1
19	83452205-4	SWITCH-8 POSITION	TAB 1
21	93640012-6	STUD-SELF CLINCHING	TAB 1
22	94360344-9	RES 1/4W 1% 2.87K	TAB 1
23	94360187-2	RES 1/4W 1% 80.6	TAB 1
24	94360287-0	RES 1/4W 1% 806	TAB 1
25	94360300-1	RES 1/4W 1% 1.00K	TAB 1
26	94360317-5	RES 1/4W 1% 1.50K	TAB 1
27	94360346-4	RES 1/4W 1% 3.01K	TAB 1
28	94360596-4	RES 1/4W 1% 1.00MEG	TAB 1
29	94360500-6	RES 1/4W 1% 100K	TAB 1
30	94360457-9	RES 1/4W 1% 39.2K	TAB 1
31	92512629-4	RES 2.2M OHM 1/4W 1=	TAB 1
32	24504353-4	CAP 10V 20% 33UF +	TAB 1
33	24504329-4	CAP 35V 20% 1.0UF +	TAB 1
34	92496211-1	CAP 100V 10% 470	TAB 1
36	92496046-1	CAP 50V 20% .1UF	TAB 1
37	92496219-4	CAP 100V 20% 2200	TAB 1
38	94360532-9	RES 1/4W 1% 215K	TAB 1
39	92498021-2	TERMINAL SWAGED	TAB 1
40	83479901-7	KEY, INJECT. MOLD	TAB 1
41	10125703-8	SCR FLAT HD	TAB 1
42	75312701-8	SPEC-EPOXY ADHESIVE	TAB 1
43	92512000-8	RESISTOR TEST SEL	TAB 1
44	77612165-9	TERMINAL, SLOTTED	TAB 1
45	94357500-1	RESISTOR TEST SELECT	TAB 1
47	92583002-8	NUT LOCK	TAB 1
50	94243731-0	WIRE AWG 30 BLUE	TAB 1

Circuit Board Assembly



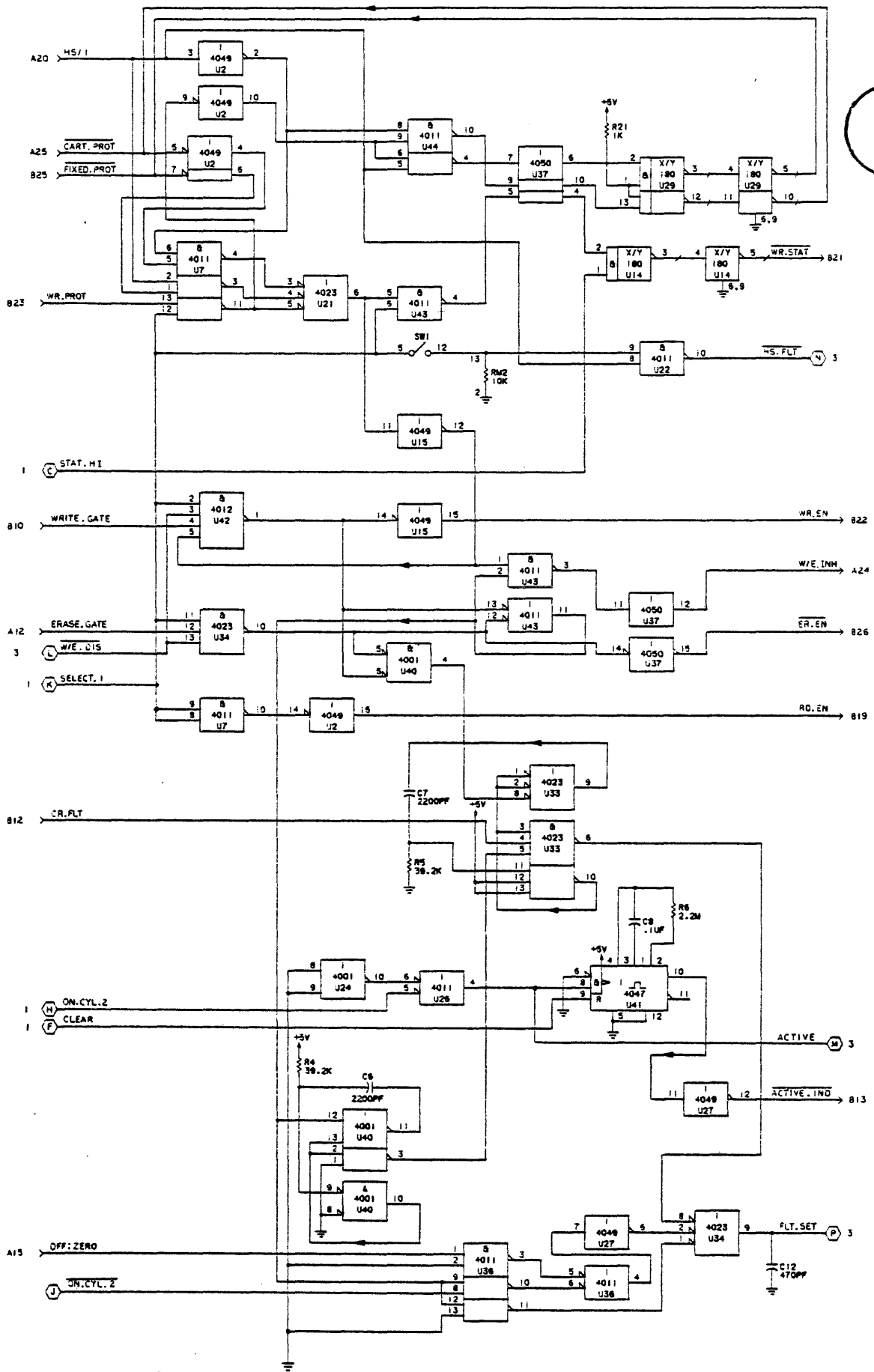
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Interconnection Diagram

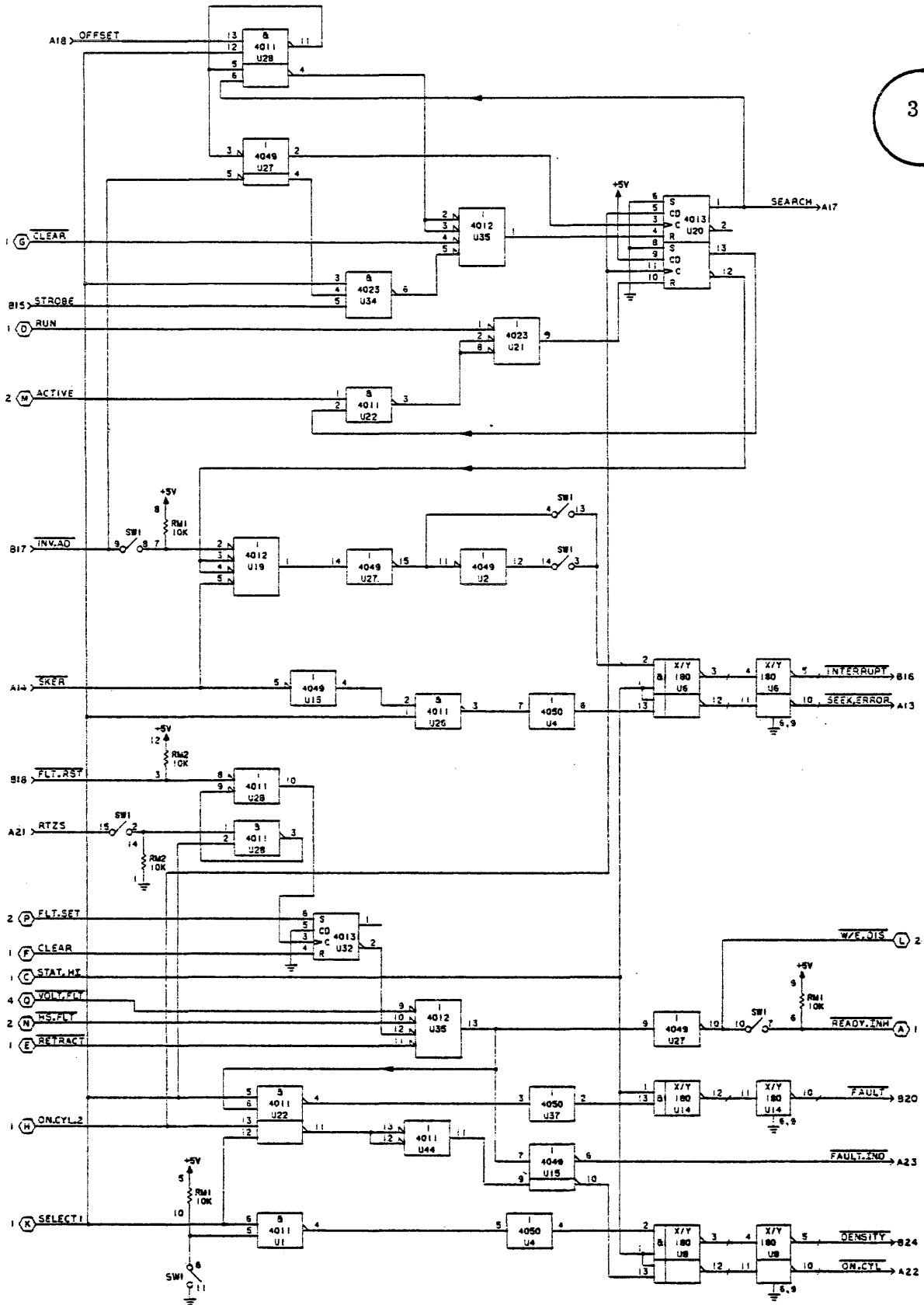


NOTES:
 1. UNLESS OTHERWISE SPECIFIED
 ALL INPUT/OUTPUT PIN NUMBERS
 ARE FOR PI CONNECTOR.

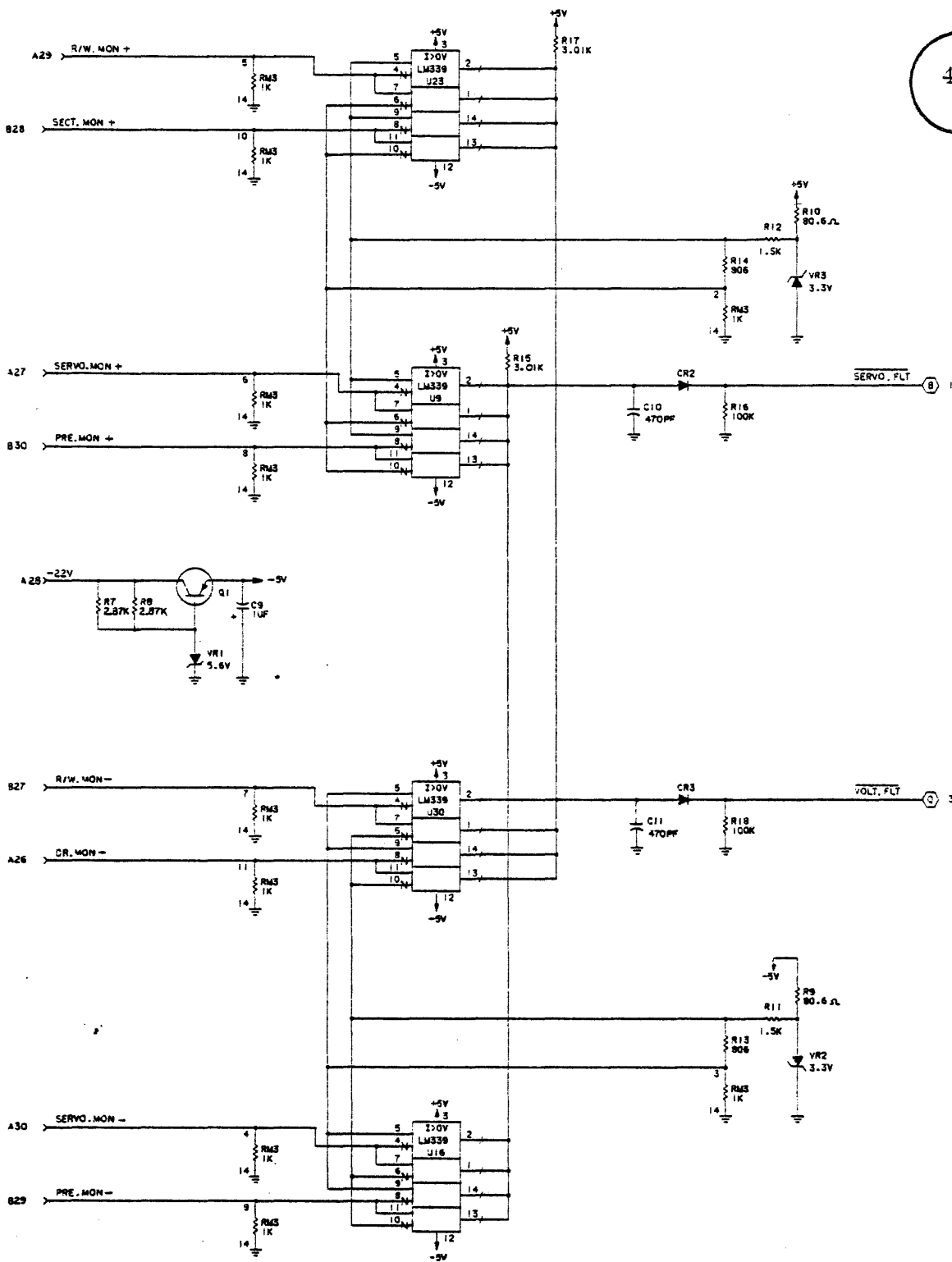
Schematic



Schematic



Schematic



Schematic

SPECIAL DOCUMENTATION PACKAGE

This publication when used with the 9427H Hardware Maintenance Manual will support specific equipment configurations. The data contained herein physically describes the following circuit board:

77664400 SERVO MOD T

and includes the circuit-board component layout, parts list and schematic diagram. The functional description for the circuit board is contained in the Theory of Operations (Section 4) of the Hardware Maintenance Manual.

This documentation replaces the corresponding circuit-board figures in Section 5 of the Hardware Maintenance Manual. It is recommended that this document be inserted in the appropriate location in Section 5.

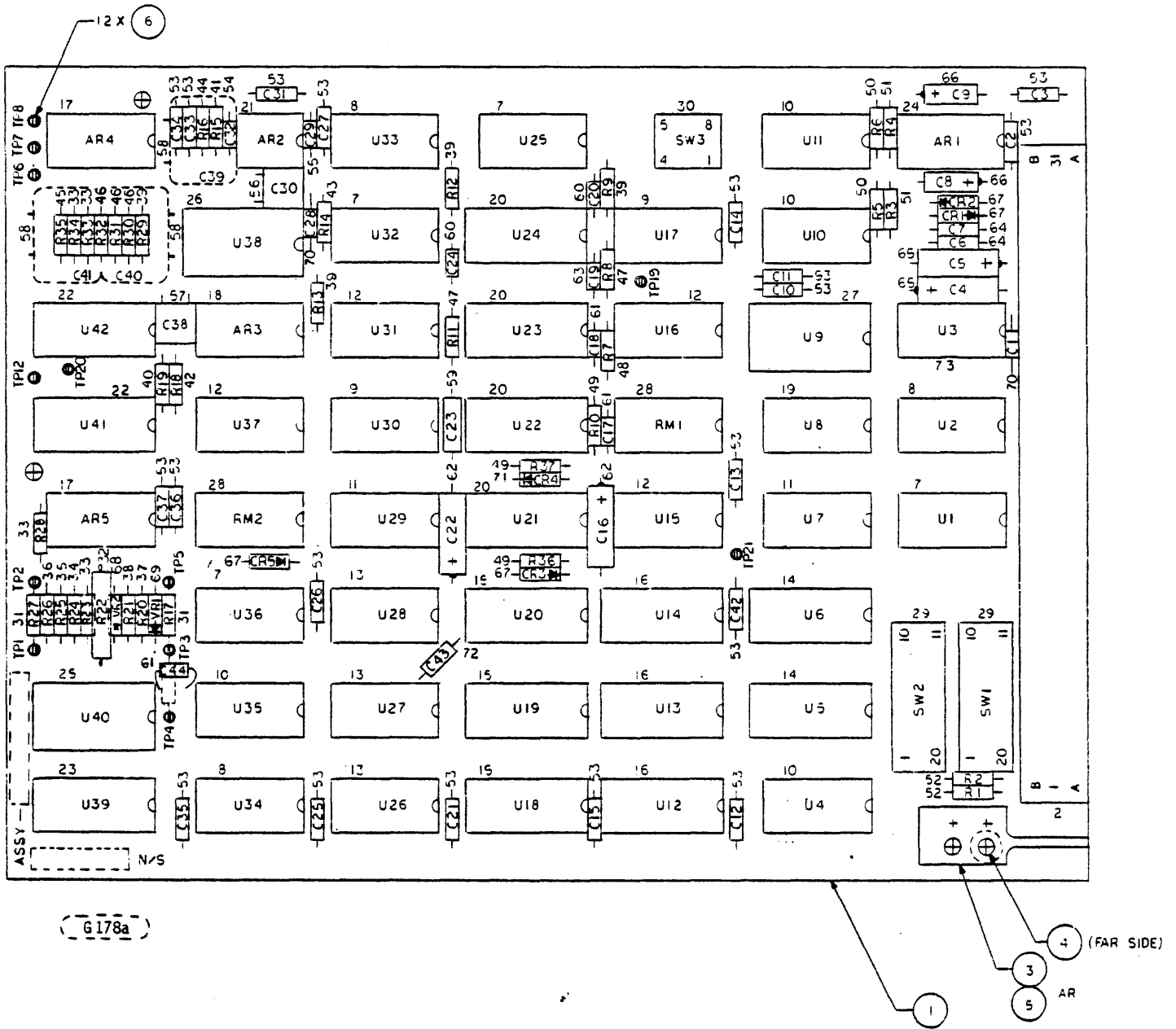


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 1 OF 10)

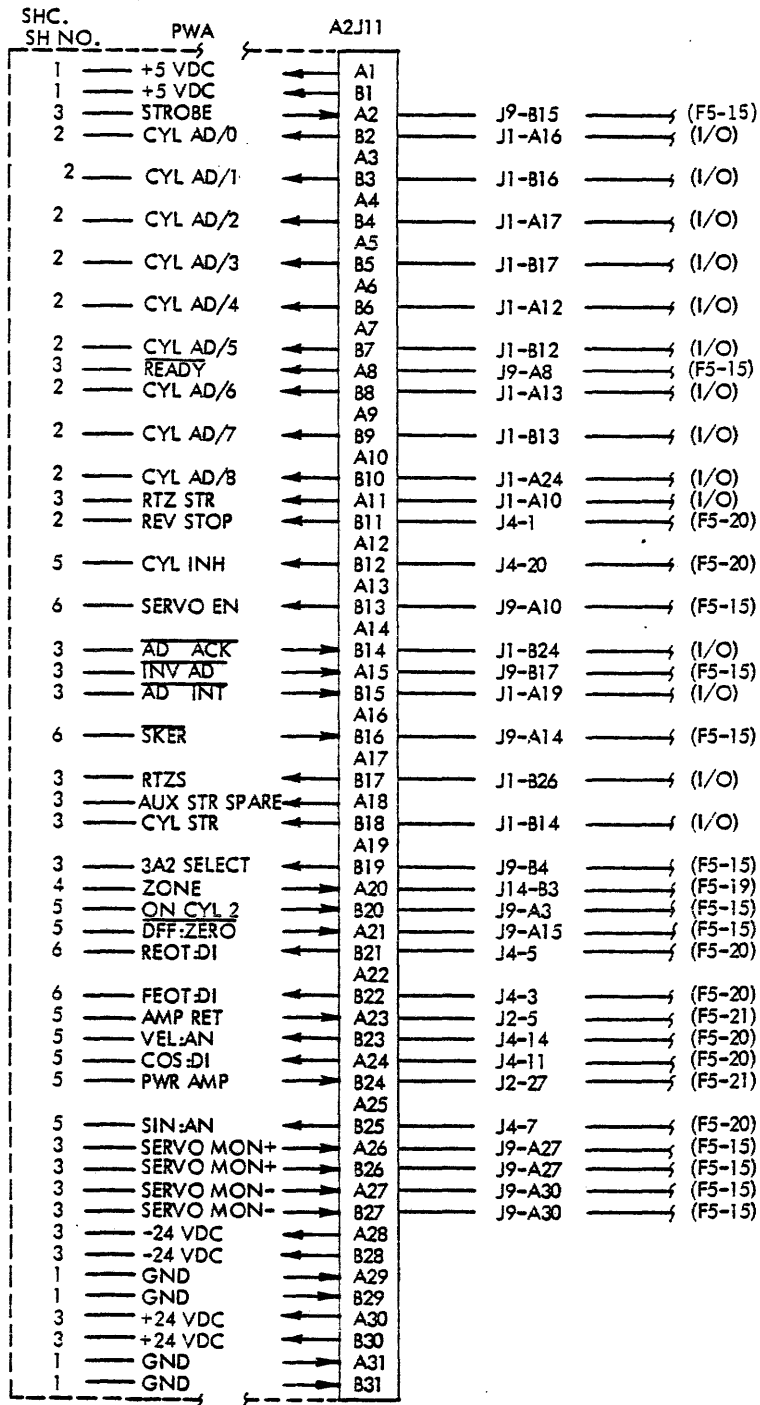
<u>ITEM NO.</u>	<u>IDENTIFICATION NO.</u>	<u>DRAWING TITLE</u>
	77664400-7	PWA, Servo MOD T
1	77664420-5	PWB, Servo MOD T
2	77836070-1	PWB Socket Connector
3	83479901-7	Key, Inject Mold
4	10125702-0	Scr Flat Hd
6	77612165-9	Terminal, Slotted
6	75732602-0	Pin-Wire Wrap Intch
7	15144900-6	I.C. 74LS00
8	15145000-4	I.C. 74LS02
9	15145100-2	I.C. 74LS04
10	15145400-6	I.C. 74LS08
11	15145600-1	I.C. 74LS10
12	15146300-7	I.C. 74LS74
13	15146400-5	I.C. 74LS86
14	15146900-4	I.C. 74LS175
15	15147000-2	I.C. 74LS193
16	15148200-7	I.C. 74LS283
17	51812800-4	I.C. Dual UA747
18	50252900-1	I.C. 75107
19	51768200-1	I.C. Dual
20	15150700-1	I.C. 96L02
21	15156600-7	I.C. 201A
22	15129400-6	I.C. AH 5012
23	15164442-4	I.C. 1408-8
23	15132702-0	I.C. D to A Converter Intch
24	15132600-6	I.C. Volt Regulator
25	75300900-0	ID Square Root Circu
26	75737000-2	ID Servo Input
27	75737200-8	ID Servo E.O.T.
28	75009935-0	Res Pac 2% 5.1K (13)
29	83452207-0	Switch-10 Position
30	83452201-3	Switch-4 Position
31	94357500-1	Resistor Test Select
32	92577253-5	Res, 1/2W 1% 357
33	94360384-5	Res 1/4W 1% 7.50K
34	94360443-9	Res 1/4W 1% 28.0K
35	94360446-2	Res 1/4W 1% 30.1K
36	94360452-0	Res 1/4W 1% 34.8K
37	94360487-6	Res 1/4W 1% 80.6K
38	94360284-7	Res 1/4W 1% 750
39	94360476-9	Res 1/4W 1% 61.9K
40	94360362-1	Res 1/4W 1% 4.42K
41	94360536-0	Res 1/4W 1% 237K
42	94360386-0	Res 1/4W 1% 7.87K
43	94360368-8	Res 1/4W 1% 5.11K
44	94360344-9	Res 1/4W 1% 2.87K
45	94360492-6	Res 1/4W 1% 90.9K
46	94360464-5	Res 1/4W 1% 46.4K

FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 2 OF 10)

ITEM NO.	IDENTIFICATION NO.	DRAWING TITLE
47	94360528-7	Res 1/4W 1% 196K
48	94360480-1	Res 1/4W 1% 68.1K
49	94360520-4	Res 1/4W 1% 162K
50	94402104-7	Res 1/4W 5% 6.8
50	92512468-7	Res 1/4W 6.8 OHM Intch
51	94360400-9	Res 1/4W 1% 10.0K
52	94360300-1	Res 1/4W 1% 1.00K
53	92496227-7	Cap 100V 20% 0.01UF
54	75808520-3	Cap 100V 10% 390
55	75808506-2	Cap 100V 10% 27
56	94227244-4	Cap 100V 2% 560
57	94227247-7	Cap 100V 2% 750
58	94227257-6	Cap 500V 2% 2200
59	75808545-0	Cap 100V 10% 0.047UF
60	75808513-8	Cap 100V 10% 100
61	75808516-1	Cap 100V 10% 180
62	24504369-0	Cap 15V 20% 10UF
63	75808518-7	Cap 100V 10% 270
64	92496217-8	Cap 100V 20% 1500
65	24504339-3	Cap 35V 20% 6.8UF
66	24504329-4	Cap 35V 20% 1.0UF
67	51736700-9	Diode 1N914A
68	50240105-2	Diode Silicon
69	50240106-0	Diode, Sil Zener 5.1V
70	75808533-6	Cap 100V 10% 4700
71	50241400-6	Diode Special
72	94240425-2	Cap 50V 10% 270
73	15148500-0	I.C. 74LS14

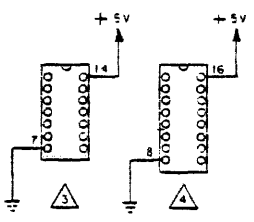
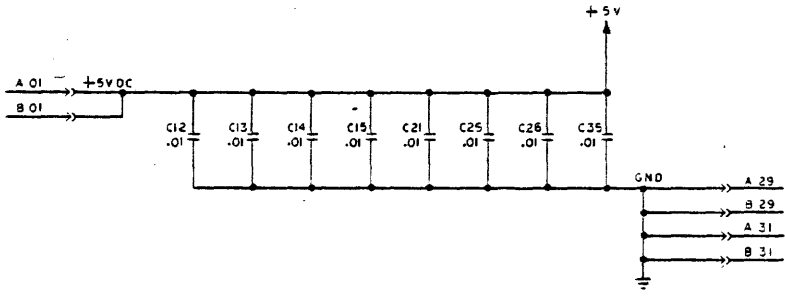
FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 3 OF 10)

SERVO BOARD



AA091a

FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 4 OF 10)



- NOTES:
- UNLESS OTHERWISE SPECIFIED
 - 1. RESISTOR VALUES ARE IN OHMS, 1/4 W, 1%.
 - 2. CAPACITOR VALUES ARE IN MICROFARADS.
 - 3. TYPICAL POWER CONNECTIONS FOR 14 PIN DIPS.
 - 4. TYPICAL POWER CONNECTIONS FOR 16 PIN DIPS.
 - 5. XXX ○ INDICATES INTERSHEET CONNECTION BY SHEET NUMBER, ZONE AND SIGNAL IDENTIFIER.
 - 6. △ QUIET GROUND

FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 5 OF 10)

FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 6 OF 10)

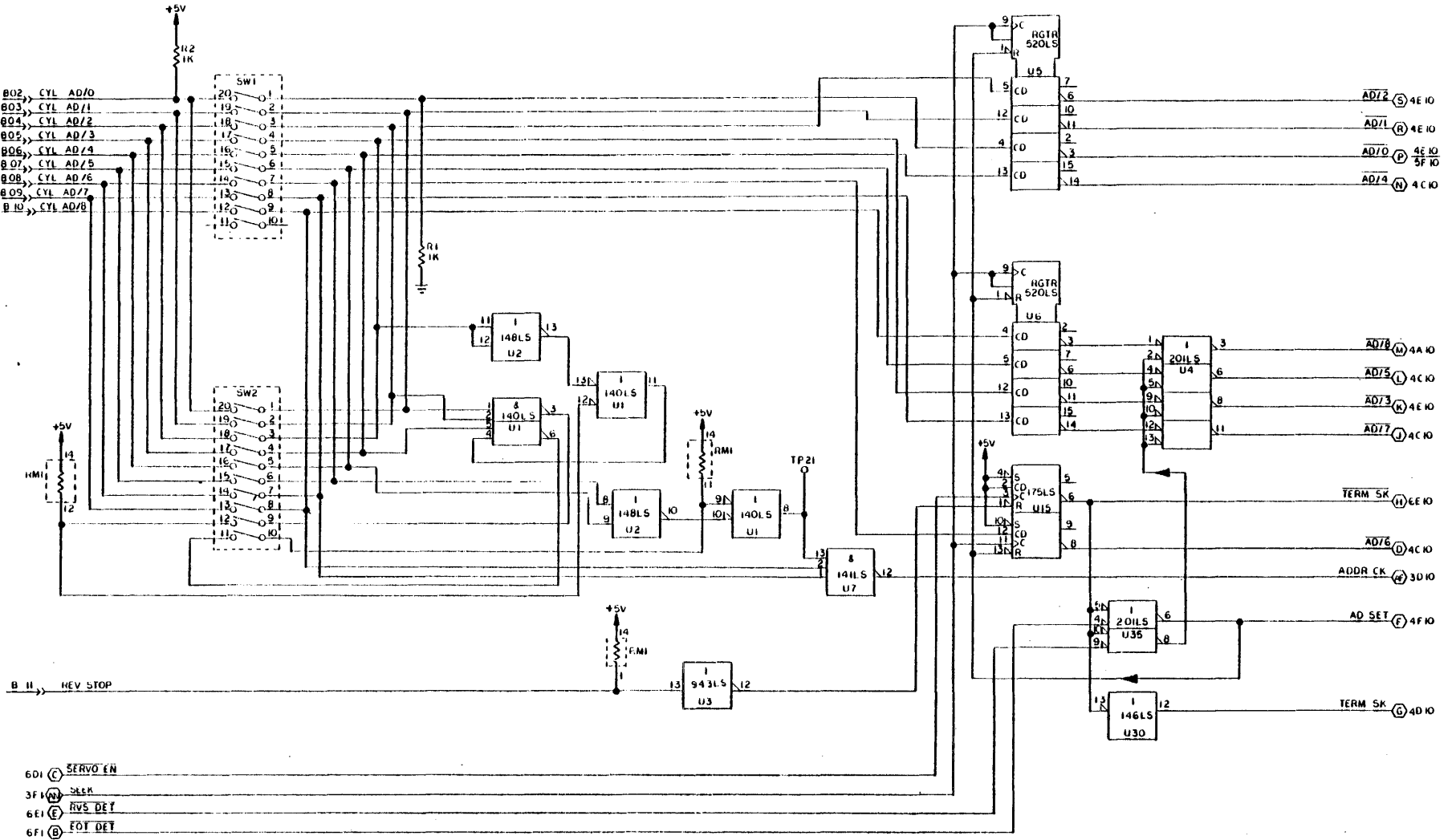


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 7 OF 10)

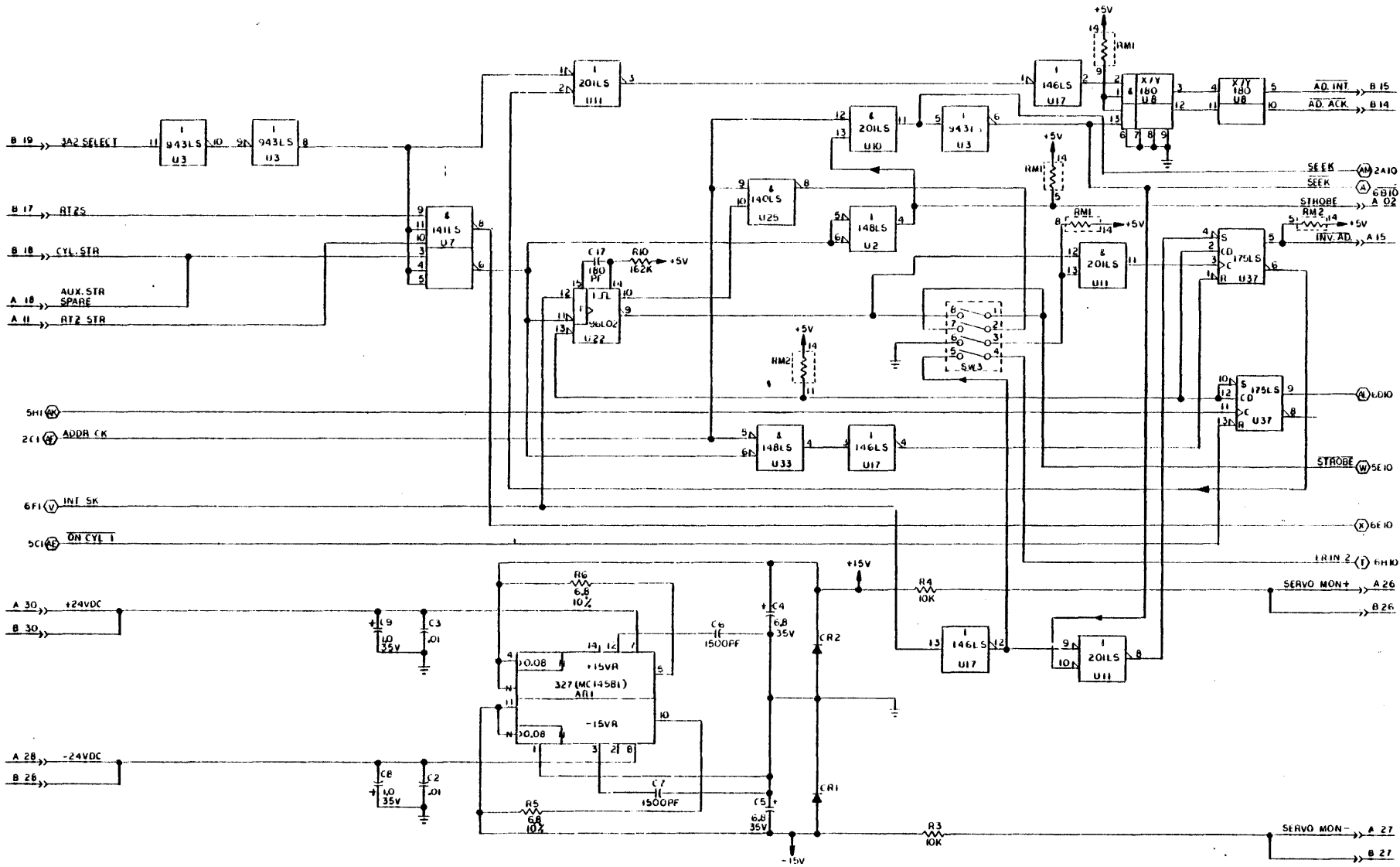


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 8 OF 10)

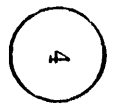
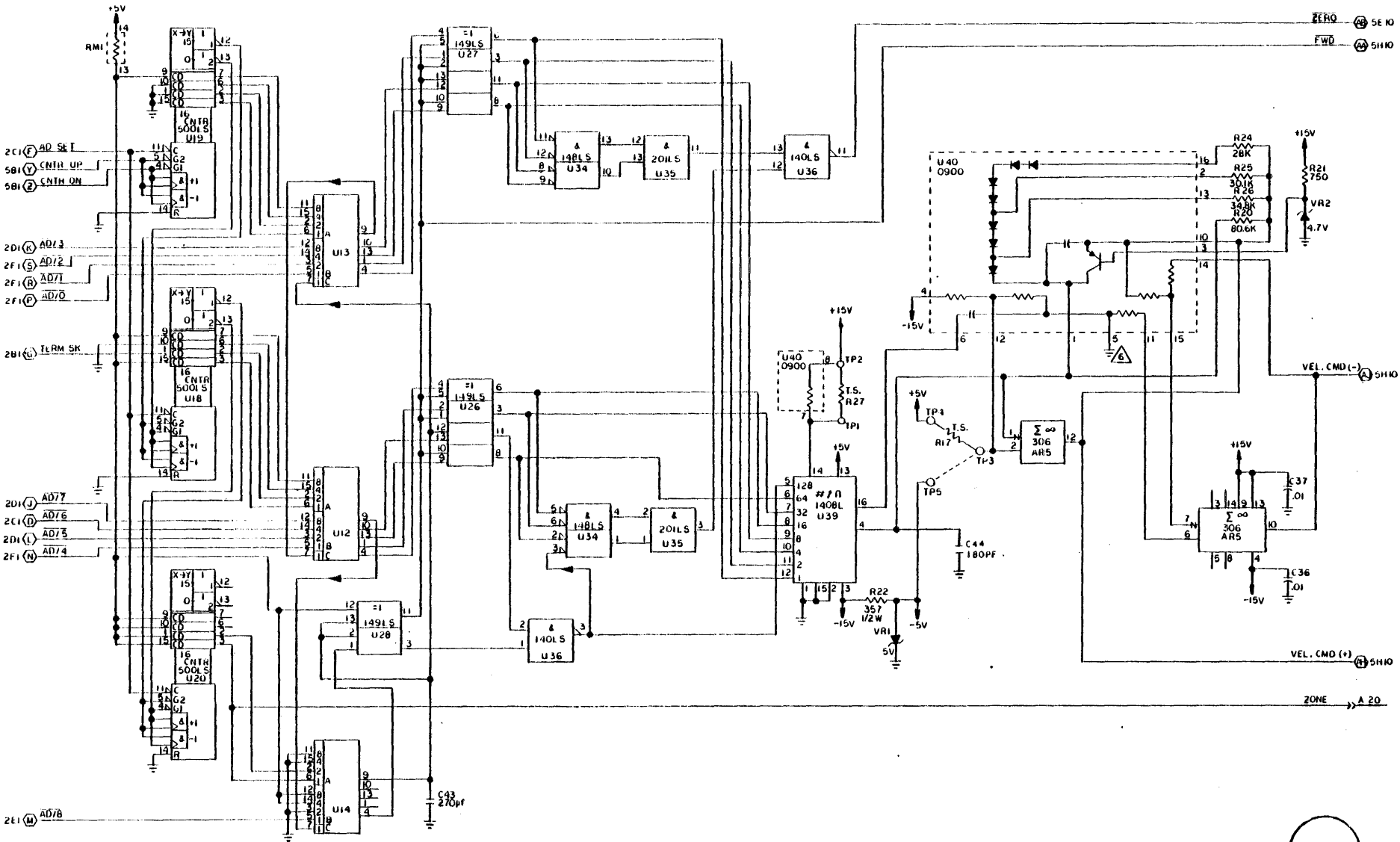


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 9 OF 10)

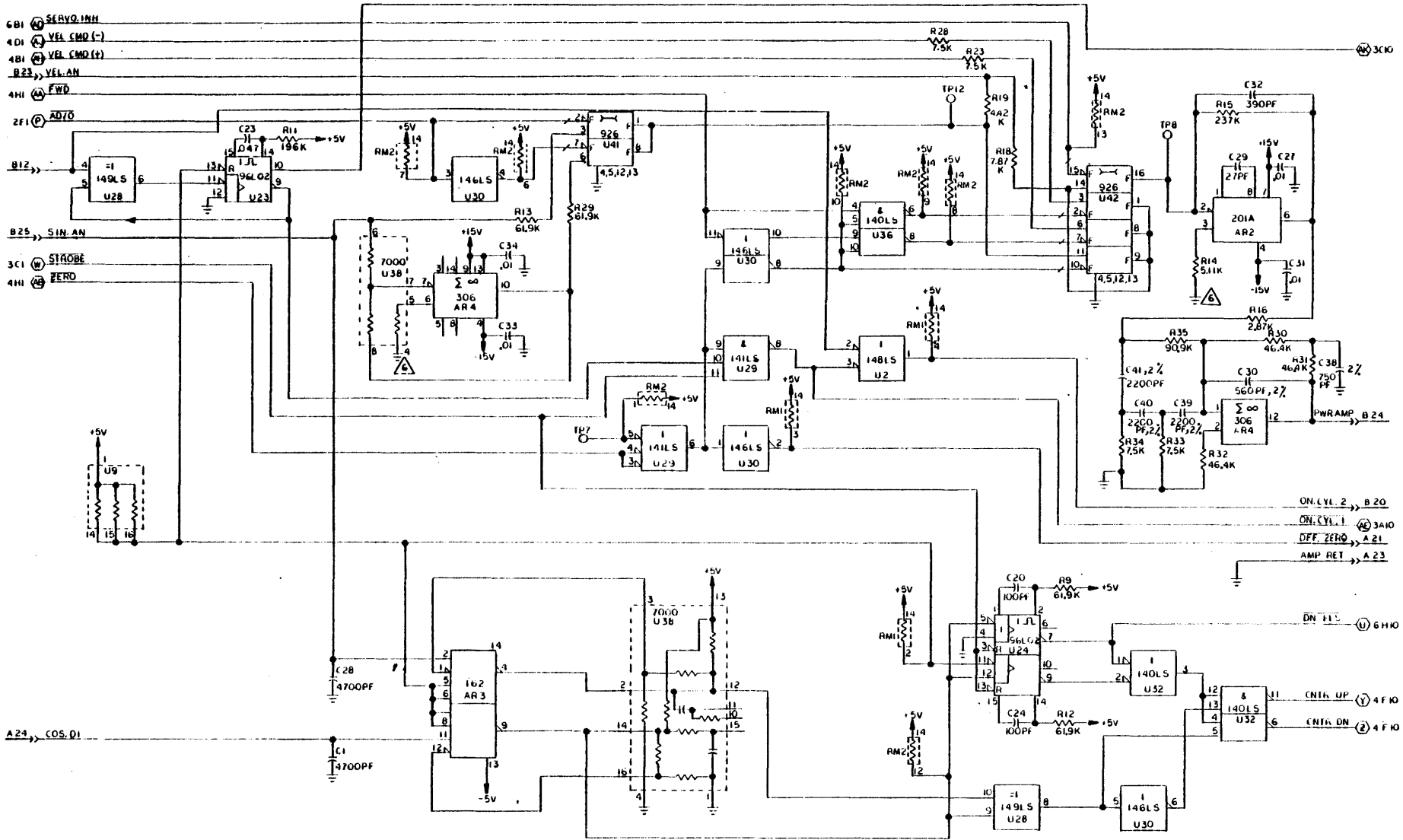
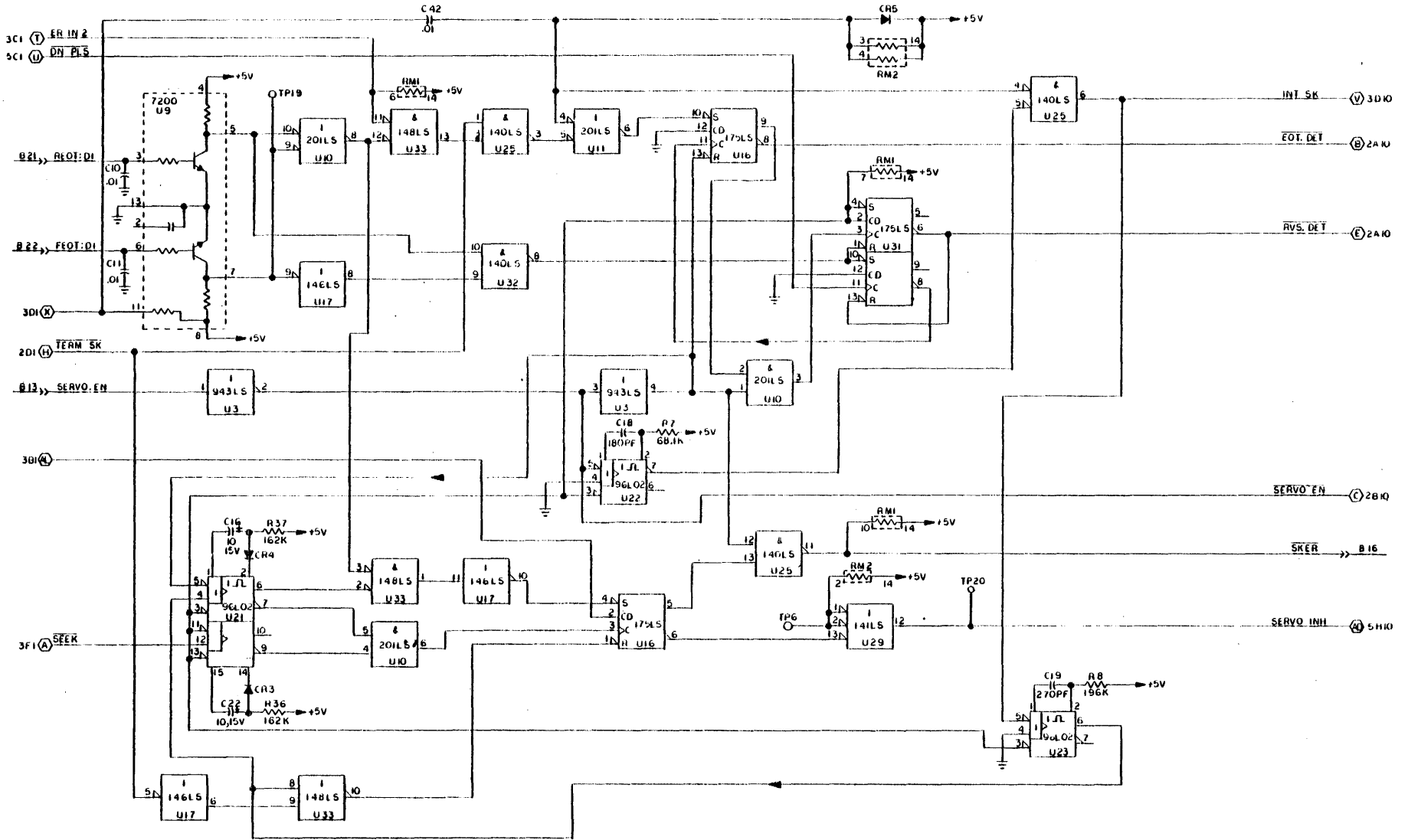


FIGURE 5-17. SERVO BOARD ASSEMBLY (SHEET 10 OF 10)



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A 75890885-9 THRU
75890892-5

REV	AUTHORITY	DATE			SIGNATURE	DWG SHT						PL						ASSY							
		YR	MO	DAY		1	2	3	4	5	6	86	87	88	89	90	91	92	86	87	88	89	90	91	92
A	ISSUED	77	JUL	27	J. Gubuckle	A	A	A	A	A	A	A							A						
B	PL19779	78	JUN	29	T. Crandale	A	B	A	A	A	A	A							B						

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Loc OKLA CITY, OKLA - USA

MADE BY *E. Barrett* 20 Jul 77

APPROVED *[Signature]* 7/25/77

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TITLE
SPECIAL OPTION 68698-1

P.C. A	REVISION STATUS FOR 75890885 75890892 THRU	SHEET 1/1	REV B
-----------	--	--------------	----------

DISTR Δ2-5015

REFERENCE SPECIFICATION NUMBER

	900
	901
	902
	903

REVISION RECORD

REV	ECO	DESCRIPTION	DRFT	DATE	CHKD	AP
-----	-----	-------------	------	------	------	----

SPECIAL OPTION 68698
 FIRST USED ON BR7K6A
 (TABS 132, 195)

UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE IN INCHES

TOLERANCES

3 PLACE	2 PLACE	ANGLES
±	±	±

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 OKLAHOMA CITY, OKLAHOMA

TITLE

SPECIAL OPTION 68698

DO NOT SCALE DRAWING

MATERIAL

FINISH

DWN	<i>E. Barrett</i>	22 Jul 77
CHKD	<i>D. [Signature]</i>	7/26/77
ENGR		
MFG		
APPR	<i>[Signature]</i>	7/25/77

SIZE	DRAWING NUMBER	CD	REV
A	75890885 THRU	9	A
	75890892	5	
SCALE	SHEET		
NONE	1	6	

NOTES:

1. DESCRIPTION:

THIS SPO SUPPLIES A KIT TO MODIFY THE 9427H "HAWK" TO IMPLEMENT A LOGIC CHANGE THAT INVERTS THE SEEK TERM TO THE ADDRESS REGISTER.

2. PARTS:

PARTS SHALL BE PACKAGED IN KIT FORM AND IDENTIFIED AS PART NUMBER 75890886-7.

3. INSTALLATION:

- A. POWER DOWN THE UNIT BY OPENING CB-1.
- B. REMOVE UNIT TOP COVER AND ELECTRONICS COVER.
- C. REMOVE SERVO BOARD FROM CARD CAGE.
- D. CUT ETCH ON SOLDER SIDE U6-09 TO FEED THROUGH WEST. (FIG. 1)
- E. CUT ETCH ON COMPONENT SIDE TO U21-12. (FIG. 2)
- F. ADD 2 JUMPERS (30GA WIRE) ON COMPONENT SIDE U6-09 TO U10-11 AND U21-12 TO U8-13. (FIG. 3)
- G. REIDENTIFY MODIFIED SERVO BOARD AS 75890887 REV. "A"
- H. INSTALL THE MODIFIED SERVO BOARD IN ITS PROPER SLOT IN THE CARD CAGE ON AN EXTENDER CARD AND POWER UP THE UNIT.

4. CHECKOUT:

- A. ISSUE AN ALTERNATE SEEK CYL 0 TO CYL 64 WITH A FIELD TESTER OR ON LINE.
- B. CONNECT SCOPE CHAN. 1/SYNC TO B-18 (CYL. STR)
CONNECT SCOPE CHAN. 2 TO U15-08 (AD/6)
- C. VERIFY U15-08 CHANGES STATE AFTER THE RISING EDGE AND BEFORE THE FALLING EDGE OF B-18.
- D. POWER DOWN THE UNIT, REMOVE THE EXTENDER CARD AND INSTALL THE MODIFIED SERVO BOARD IN ITS PROPER SLOT.

5. INSTALL COVERS FROM STEP B. UNIT IS READY FOR NORMAL OPERATION.

6. LOG SPO NUMBER 68698 ON UNIT FEATURE LIST.

7. SPARE PARTS:

WHEN ORDERING REPLACEMENT FOR SERVO BOARD WITH SPO 68698-1 INSTALLED, ORDER PART NUMBER 75890887-5.

8. PWB TEST (MANUFACTURING USE ONLY)

VERIFY OUTPUTS OF U5, U6 AND U15-8 CHANGE STATE ON RISING EDGE OF B-18.

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A

DRAWING NUMBER

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75890892

CD

9

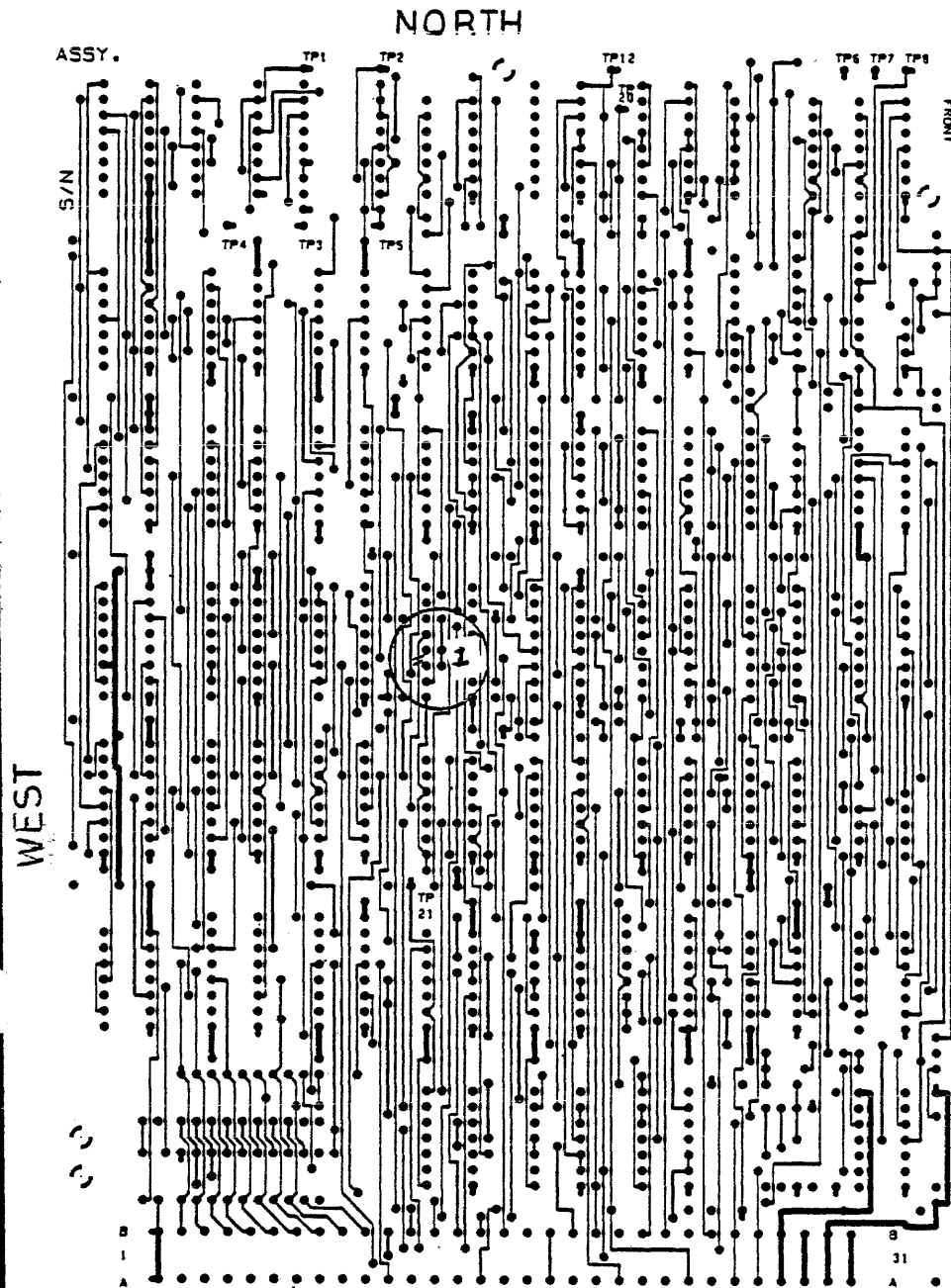
5

SH

2

REV

B



SOUTH
FIGURE 2 - COMPONENT SIDE

CUT RUN LIST

NO	FROM	TO
1	U21-12	SEEK $\text{\textcircled{A}}$ 3F1

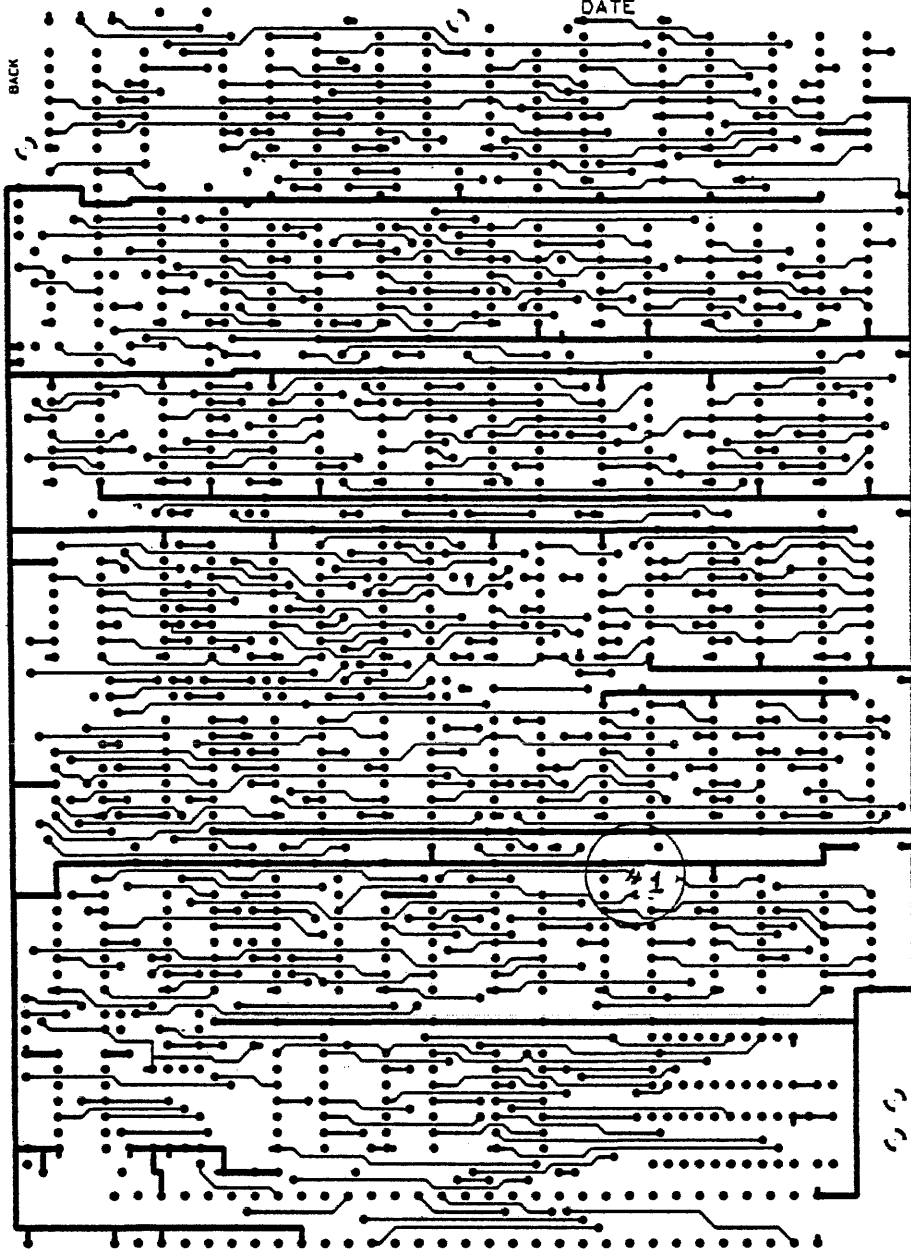
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SIZE DRAWING NUMBER
A 75890885 THRU
 75890892

CD	SH	REV
9	3	A
5		

NORTH

DATE




SOUTH
FIGURE I - SOLDER SIDE

CUT RUN LIST

NO	FROM	TO
1	U6-9	SEEK $\text{\textcircled{A}}$ 3F1

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SIZE

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DRAWING NUMBER

75890885 THRU

75890892

CD

9

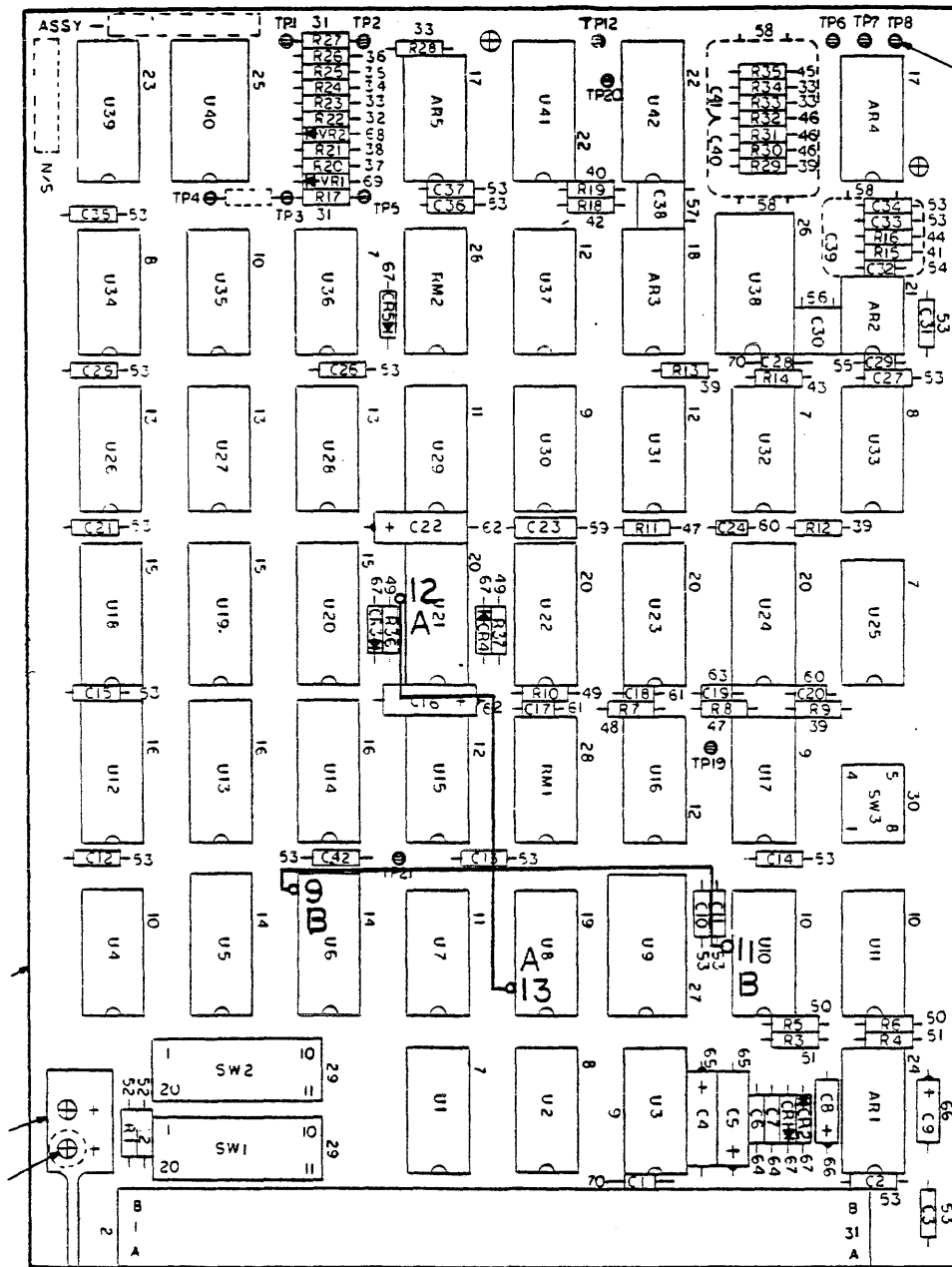
5

SH

4

REV

A



JUMPER LIST

NO	FROM	TO
AA	U21-12	U8-13
BB	U6-9	U10-11


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SIZE DRAWING NUMBER
A 75890885 THRU
 75890892

CD	SH	REV
9	5	A
5		

3G3  SEEK

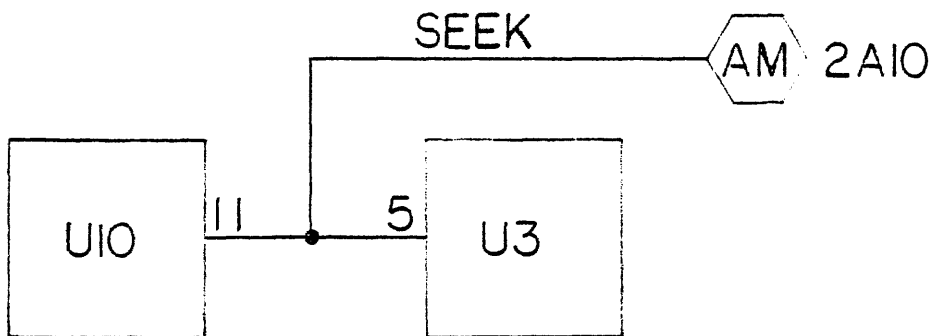
SH2 - A10

FIGURE 1

SEEK  6B10

SH3 - F1

FIGURE 2



SH3 - G3

FIGURE 3

SCHEMATIC

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SIZE

A

DRAWING NUMBER

75890885 THRU

75890892

CD

9

5

SH

6F

REV

A

.1/77 A

75890886-7

1/ 1 A

001 002 003 004 005 006 007 008

*	1 1A	94243731-0	P WIRE AWG 30 BLUE	12								IN
*	2 0A	75890885-9	D SPECIAL OPTION 68698	1								EA

SP0 68698-1 KIT

USA

A 75890886-7 1/ 1 A

1/77 A

75890887-5

1/ 1 A

	001	002	003	004	005	006	007	008	
* 1 OD 77831400-5 A PWA SERVØ (ØEM)	1								EA
* 2 OA 75890886-7 A SPØ 68698-1 KIT	1								EA
* 3 OA 75890885-9 D SPECIAL OPTION 68698	REF								EA

SPARE ASSY SPØ 68698

USA

A 75890887-5 1/ 1 A

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A 75896 72-5

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	YR	MO	DAY		72																							
ISSUED	79	Nov	8	P. Franklin	A																							

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TITLE *SPO 68748-2 KIT*
 P.C. *A* REVISION STATUS FOR *75896672-5* SHEET *1/1* REV *A*

10/23/79 A

75896672-5

1/ 1 A

	QTY	SPC			
* 1 OD 77624812-2	A	FILTER FRAME ASSY	1		EA
* 2 1A 83410501-7	P	GASKET STRIP	46		IN
* 3 0A 75896671-7	D	SPC 68748-2	X		EA

SPC 68748-2 KIT

USA

A 75896672-5 1/ 1 A

9427H
PARTS DATA CONFIGURATOR

SCOPE

This document defines the unique mechanical requirements for the Model 9427H Disk Storage Drive Top Mechanical Assembly (TMA) number 75741190.

When used with Section 8 of the Hardware Maintenance Manual, the table below physically describes the above TMA based on customer selected items. This table must be used with Figures 8-2 and 8-3 of Section 8. It is recommended that this document be inserted in an appropriate location within the Section.

ITEM IDENT NO	DESCRIPTION	REMARKS
75741190	TOP MECHANICAL ASSEMBLY	FIG 8-2
0150 75306101	TETHER LINE	FIG 8-2
0152 75895231	UNDERCOVER ASSY	FIG 8-2
0229 83443504	RACK MT ASM	FIG 8-2
0252 75305704	TERMINATOR	FIG 8-2
0255 75778701	LINECORD	FIG 8-2
0286 83442518	COLOR OPT RACK MT(1108)	FIG 8-2
83429721	MODULE ASSEMBLY	FIG 8-3
0301 83429802	HAWK COMMON PARTS	FIG 8-3
0307 75740123	HEAD OPTION	FIG 8-3
0321 75740601	HZ RPM DR OPT	FIG 8-3
0327 77655001	PWR SUPPLY ASM	FIG 8-3
0334 75795216	I-O OPTION RACK MT	FIG 8-3
0346 83474909	BRAKE & SPINDLE DR	FIG 8-3
0353 83437400	FILTER-AIR	FIG 8-3
0357 83451201	STANDOFF	FIG 8-3
0358 83466001	BRUSH DRIVE ASM	FIG 8-3
0360 77834644	COVER ELECTRONICS	FIG 8-3