83322150

CONTROL DATA CORPORATION

CDC® STORAGE MODULE DRIVE

BK4XX

BK5XX

INSTALLATION AND CHECKOUT
MAINTENANCE
PARTS DATA

Volume 1 of 2

HARDWARE MAINTENANCE MANUAL

REVISION RECORD

REVISION	DESCRIPTION
01	Preliminary manual released.
(9-29-76)	
02	Added electronic package repair and replacement information, additional parts
(10-26-76)	data information, and corrections.
03	Added corrections, test and adjustment information, and checkout information.
(12-1-76)	
A	Manual released including ECOs 48092, 48113C, 48151, 48155, 48196A, 48200,
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B	Manual updated to include technical and editorial changes.
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REVISION LETTERS ~~I~~, O, Q AND ~~X~~ ~~ARE~~ NOT USED

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MANUAL TO EQUIPMENT LEVEL CORRELATION

This manual reflects the equipment configurations listed below.

EXPLANATION: Locate the equipment type and series number, as shown on the equipment FCO log, in the list below. Immediately to the right of the series number is an FCO number. If that number and all of the numbers underneath it match all of the numbers on the equipment FCO log, then this manual accurately reflects the equipment.

This correlation sheet also applies to the following related manuals:

Publication No. 83322240 Rev. A Publication No. _____ Rev. _____

Publication No. 83322250 Rev. A Publication No. _____ Rev. _____

EQUIPMENT TYPE	SERIES	WITH FCO'S	COMMENTS
BK4XX/BK5XX	10	None	
	11	None	
	12	None	
	13	None	

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LIST OF EFFECTIVE PAGES

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PREFACE

This manual contains maintenance information applicable to all the Storage Module Drives (SMDs) listed in the configuration charts (found following the table of contents). The configuration charts define each of the equipments covered by this manual in terms of cabinet mounting styles, cabinet colors, and the various electronic features provided. Since this manual covers all of the various configurations available on the SMD; it is necessary to understand exactly which configuration you have, in order to know which procedures in this manual are applicable to your drive.

This manual provides information relating to the field level maintenance of the SMDs; that is, maintenance which can be performed on the SMD at the installation site. The manual assumes that the reader is already trained in the use of normal mechanical and electronic repair equipment; and it familiar with the basic maintenance procedures, such as soldering, wirewrapping, etc. Also, the procedures contained in this manual are written assuming that the reader knows where all the various parts of the drive are located, what they are called, and how to open the drive to get at them. Anyone not familiar with this type of information is referred to the General Maintenance Information in Section 2.

Information in this manual is divided into three sections:

- Section 1 - Installation and Checkout
- Section 2 - Maintenance
- Section 3 - Parts Data

Other manuals, also applicable to the SMDs covered in this manual, are as follows:

Publication No.	Title
83322250	Hardware Maintenance Manual Volume 2, Diagrams and Wire Lists. Applicable to BK4XX
83322240	Hardware Maintenance Manual Volume 2, Diagrams and Wire Lists. Applicable to BK5XX
83322200	Hardware Reference Manual, General Description, Operation, Theory of Operation, Discrete Component Circuits
83322440	Normandale Circuits Manual General Theory, Logic Symbology, Data Sheets

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CONFIGURATION CHART

EQUIP NO.	TLA	POWER		DATA CAPACITY (MB)	CHAN ACCESS	A CABLE CONFIG	PACK INTLK SOL	COLOR CODE *	CABINET MOUNTING STYLE
		VOLTS	Hz						
BK4A1A	47173102	120	60	40	Single	60-pin	No	A	30-inch rack
BK4A1B	47173103	220/240	50	40	Single	60-pin	No	A	30-inch rack
BK4A2A	47173104	120	60	40	Dual	60-pin	No	A	30-inch rack
BK4A2B	47173105	220/240	50	40	Dual	60-pin	No	A	30-inch rack
BK4A3A	47173106	120	60	40	Single	60-pin	No	B	36-inch rack
BK4A3B	47173107	220/240	50	40	Single	60-pin	No	B	36-inch rack
BK4A4A	47173108	120	60	40	Dual	60-pin	No	B	36-inch rack
BK4A4B	47173109	220/240	50	40	Dual	60-pin	No	B	36-inch rack
BK4A5A	47173116	120	60	40	Single	60-pin	No	C	pedestal cabinet
BK4A5B	47173117	220/240	50	40	Single	60-pin	No	C	pedestal cabinet
BK4A6A	47173118	120	60	40	Dual	60-pin	No	C	pedestal cabinet
BK4A6B	47173119	220/240	50	40	Dual	60-pin	No	C	pedestal cabinet
BK4A7A	47173120	120	60	40	Single	60-pin	No	D	acoustic drawer
BK4A7B	47173121	220/240	50	40	Single	60-pin	No	E	acoustic drawer
BK4A8A	47173122	120	60	40	Dual	60-pin	No	D	acoustic drawer
BK4A8B	47173123	220/240	50	40	Dual	60-pin	No	E	acoustic drawer
BK4A9A	47173124	120	60	40	Single	60-pin	No	F	acoustic cabinet
BK4A9B	47173125	220/240	50	40	Single	60-pin	No	G	acoustic cabinet
BK4B1A	47173126	120	60	40	Dual	60-pin	No	F	acoustic cabeint
BK4B1B	47173127	220/240	50	40	Dual	60-pin	No	G	acoustic cabinet
BK4B5A	47173134	120	60	40	Dual	50-pin	No	C	pedestal cabinet
BK4B5B	47173135	220/240	50	40	Dual	50-pin	No	C	pedestal cabinet
BK4B5C	47173136	120	60	40	Single	50-pin	No	C	pedestal cabinet
BK4B5D	47173137	220/240	50	40	Single	50-pin	No	C	pedestal cabinet
BK4B6C	47173140	120	60	40	Single	60-pin	No	K	pedestal cabinet
BK4B6D	47173141	220/240	50	40	Single	60-pin	No	K	pedestal cabinet
BK4B9A	47173110	120	60	40	Single	60-pin	No	L	pedestal cabinet
BK4B9B	47173111	220/240	50	40	Single	60-pin	No	L	pedestal cabinet
BK4B9C	47173112	120	60	40	Single	60-pin	No	M	acoustic cabinet
BK4B9D	47173113	220/240	50	40	Single	60-pin	No	M	acoustic cabinet
BK4B9E	47173114	120	60	40	Single	60-pin	No	N	acoustic drawer
BK4B9F	47173115	220/240	50	40	Single	60-pin	No	R	acoustic drawer

* SEE TABLE 3-1 COLOR CODE CHART

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CONFIGURATION CHART

EQUIP NO.	TLA	POWER		DATA CAPACITY (MB)	CHAN ACCESS	A CABLE CONFIG	PACK INTLK SOL	COLOR CODE *	CABINET MOUNTING STYLE
		VOLTS	Hz						
BK5A1A	47173002	120	60	80	Single	60-pin	No	A	30-inch rack
BK5A1B	47173003	220/240	50	80	Single	60-pin	No	A	30-inch rack
BK5A2A	47173004	120	60	80	Dual	60-pin	No	A	30-inch rack
BK5A2B	47173005	220/240	50	80	Dual	60-pin	No	A	30-inch rack
BK5A3A	47173006	120	60	80	Single	60-pin	No	B	36-inch rack
BK5A3B	47173007	220/240	50	80	Single	60-pin	No	B	36-inch rack
BK5A4A	47173008	120	60	80	Dual	60-pin	No	B	36-inch rack
BK5A4B	47173009	220/240	50	80	Dual	60-pin	No	B	36-inch rack
BK5A5A	47173016	120	60	80	Single	60-pin	No	C	pedestal cabinet
BK5A5B	47173017	220/240	50	80	Single	60-pin	No	C	pedestal cabinet
BK5A5C	47173048	120	60	80	Single	60-pin	No	J	pedestal cabinet
BK5A5D	47173049	220/240	50	80	Single	60-pin	No	J	pedestal cabinet
BK5A6A	47173018	120	60	80	Dual	60-pin	No	C	pedestal cabinet
BK5A6B	47173019	220/240	50	80	Dual	60-pin	No	C	pedestal cabinet
BK5A7A	47173020	120	60	80	Single	60-pin	No	D	acoustic drawer
BK5A7B	47173021	220/240	50	80	Single	60-pin	No	E	acoustic drawer
BK5A8A	47173022	120	60	80	Dual	60-pin	No	D	acoustic drawer
BK5A8B	47173023	220/240	50	80	Dual	60-pin	No	E	acoustic drawer
BK5A9A	47173024	120	60	80	Single	60-pin	No	F	acoustic cabinet
BK5A9B	47173025	220/240	50	80	Single	60-pin	No	G	acoustic cabinet
BK5B1A	47173026	120	60	80	Dual	60-pin	No	F	acoustic cabinet
BK5B1B	47173027	220/240	50	80	Dual	60-pin	No	G	acoustic cabinet
BK5B6A	47173036	120	60	80	Dual	S&I0BC	Yes	H	pedestal cabinet
BK5B6B	47173037	220/240	50	80	Dual	S&I0BC	Yes	H	pedestal cabinet
BK5B6C	47173038	120	60	80	Single	S&I0BC	Yes	H	pedestal cabinet
BK5B6D	47173039	220/240	50	80	Single	S&I0BC	Yes	H	pedestal cabinet
BK5B7A	47173040	120	60	80	Dual	50-pin	No	C	pedestal cabinet
BK5B7B	47173041	220/240	50	80	Dual	50-pin	No	C	pedestal cabinet
BK5B7C	47173042	120	60	80	Single	50-pin	No	C	pedestal cabinet
BK5B7D	47173043	220/240	50	80	Single	50-pin	No	C	pedestal cabinet
BK5B8C	47173046	120	60	80	Single	S&I0BC	No	K	pedestal cabinet
BK5B8D	47173047	220/240	50	80	Single	S&I0BC	No	K	pedestal cabinet
BK5B9A	47173010	120	60	80	Single	60-pin	No	L	pedestal cabinet
BK5B9B	47173011	220/240	50	80	Single	60-pin	No	L	pedestal cabinet
BK5B9C	47173012	120	60	80	Single	60-pin	No	M	acoustic cabinet
BK5B9D	47173013	220/240	50	80	Single	60-pin	No	M	acoustic cabinet
BK5B9E	47173014	120	60	80	Single	60-pin	No	N	acoustic drawer
BK5B9F	47173015	220/240	50	80	Single	60-pin	No	R	acoustic drawer
BK5C2A	47173050	120	60	80	Single	60-pin	No	P	nude
BK5C2B	47173051	220/240	50	80	Single	60-pin	No	P	nude

* SEE TABLE 3-1 COLOR CODE CHART

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ABBREVIATIONS

ABR	Absolute Reserve
ABV	Above
ADDR	Address
ADRS	Address
AGC	Automatic Gain Control
AM	Address Mark
AMPL	Amplifier
BLK	Black
BLW	Below
CAR	Cylinder Address Register
CH	Channel
CHAN	Channel
CNTLGL	Centrifugal
CNTR	Counter
COMP	Compensation
COMPTR	Comparitor
CONFIG	Configuration
CONT	Continued
CR REF	Cross Reference
CYL	Cylinder
D/A	Digital To Analog
DCDR	Decoder
DIFF	Difference
DLY	Delay
DRVR	Driver
DSBL	Disable
ECL	Emitter Coupled Logic
ECO	Engineering Change Order
EMER	Emergency
EN	Enable
EOT	End Of Travel
EQUIP	Equipment
EQUIV	Equivalent
FCO	Field Change Order
FF	Flip Flop
FIG	Figure
FLT	Fault
FREQ	Frequency
FTU	Field Test Unit
FWD	Forward
GND	Ground
HD	Head
I/O	Input-Output
INTLK	Interlock
LAP	Logical Address Plug
LD	Load
MAINT	Maintenance
MAX	Maximum
MB	Megabyte
MFM	Modified Frequency Modulation
MK	Mark
MULT	Multiple
NC	No Connection
NEG	Negative
NO	Number
NOM	Nominal
NORM	Normal
NRM	Normal
NRZ	Nonreturn To Zero
PC PT	Piece Part
PLO	Phase Lock Oscillator
PN	Part Number
POS	Positive
PWR	Power
RCVRS	Receivers
RD	Read
RDY	Ready
REC	Receiver
REF	Reference
REG	Register
REV	Reverse
RGTR	Register
RTM	Reserve Timer
RTZ	Return To Zero
S&IOBC	Sector and Index On B Cable
S/C	Series Code
SEC	Second
SEL	Select
SEQ	Sequence
SER	Servo
SH	Sheet
SOL	Solenoid
SR	Servo
SW	Switch
T	Track
TBS	To Be Supplied
TLA	Top Level Assembly
TP	Test Point
TRK	Track
TTL	Transistor Transistor Logic
UNREG	Unregulated
VCO	Voltage Controlled Oscillator
W+R	Write Or Read
W·R	Write and Read
W/	With
W/O	Without
WRT	Write
WT	White
XDUCER	Transducer
XMTR	Transmitter

SECTION 1

INSTALLATION AND CHECKOUT

INSTALLATION AND CHECKOUT 1

INTRODUCTION

This section provides information pertaining to the installation and checkout of the storage module drive. Prior to performing any of the procedures contained in this section, become thoroughly familiar with the information contained in Section 2A, General Maintenance Information.

The information in this section is divided into the following major areas:

- Site Preparation - providing information necessary to layout an installation site.
- Packaging - providing information regarding shipment of the drive.
- Installation - providing instructions on the installation and interconnection of the drives.
- Checkout - providing instructions to ensure that the drive is functional.

SITE PREPARATION

GENERAL

Site preparation information is provided to enable a user to layout an installation site. Consideration is given to:

- Space and Clearances
- Environment
- Power (ac)
- Grounding
- Interconnect Cables and Terminators

The Installation Instructions, provided later in this section, are based on the assumption that the requirements specified in this paragraph have been met.

SPACE AND CLEARANCE

In the process of laying out the site, consideration must be given to the clearances required around each drive for maintenance purposes. All normal maintenance can be performed without removing the drive from its installed position. If there is enough room to fully open the top cover, there is enough room to perform all normal maintenance operations. Figures 1-1 through 1-5 illustrate the required clearances for each of the various mounting configurations of the drive.

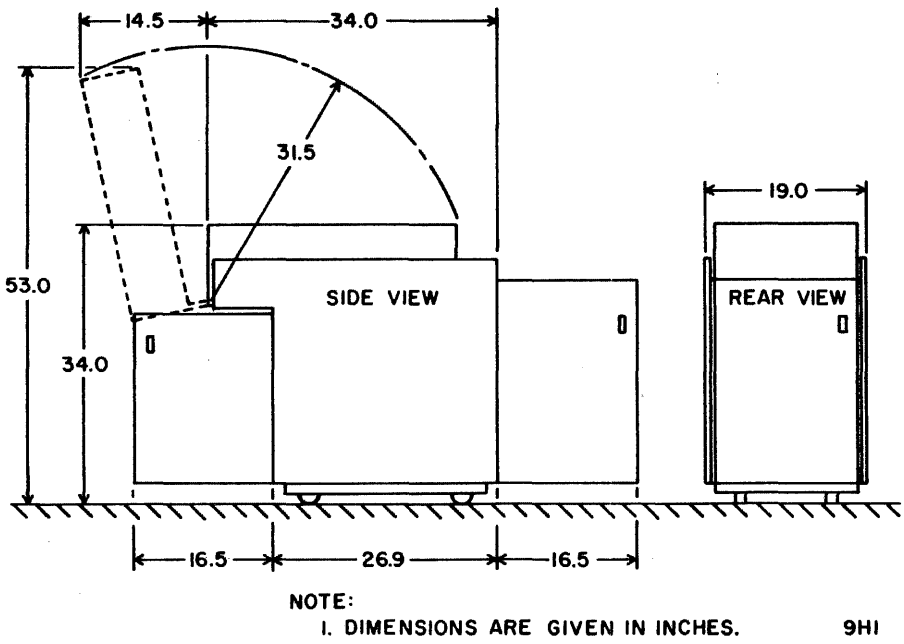


Figure 1-1. Clearances - Pedestal Cabinet

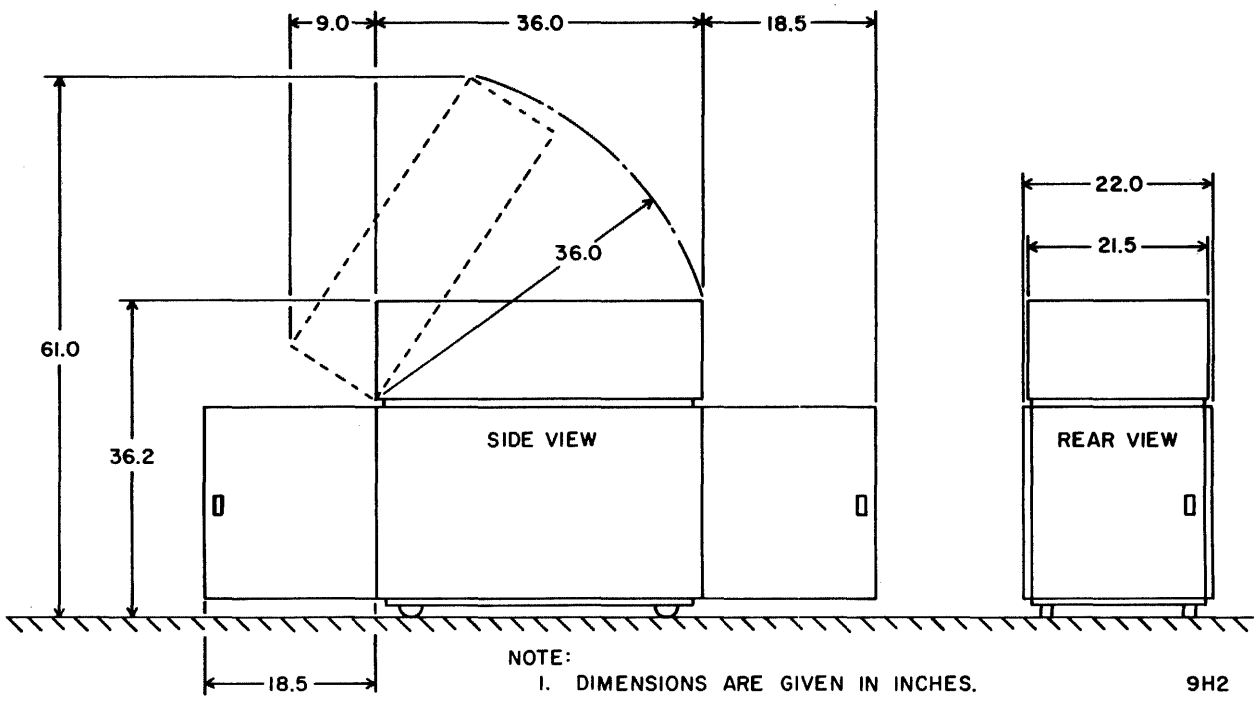


Figure 1-2. Clearances - Acoustic Cabinet

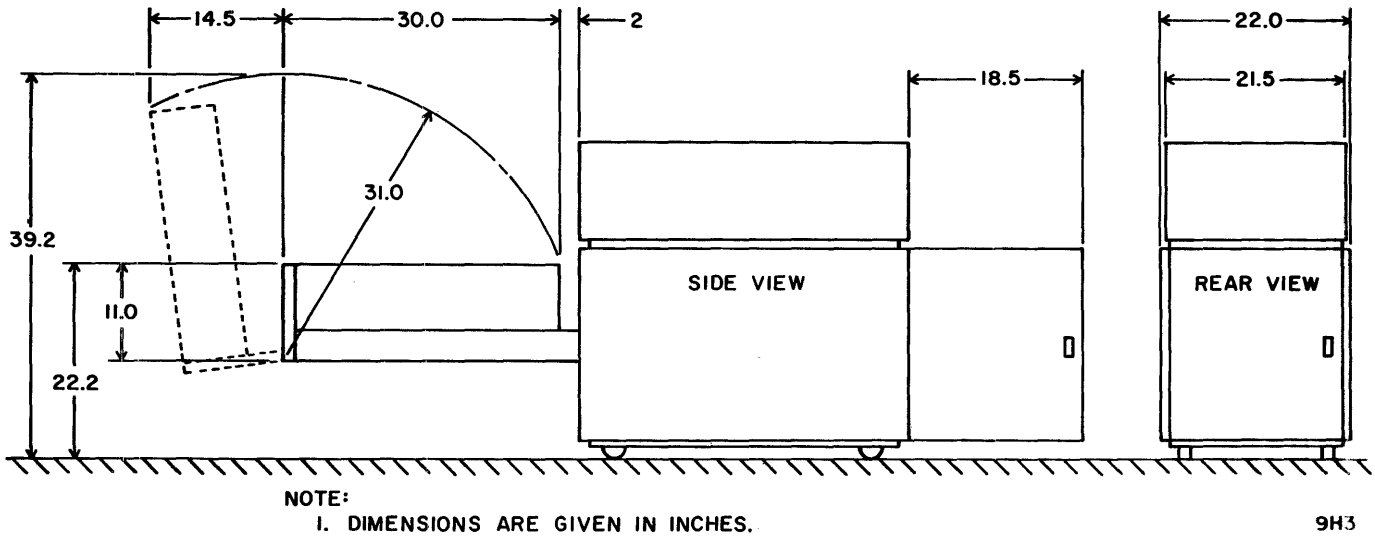


Figure 1-3. Clearances - Acoustic Drawer

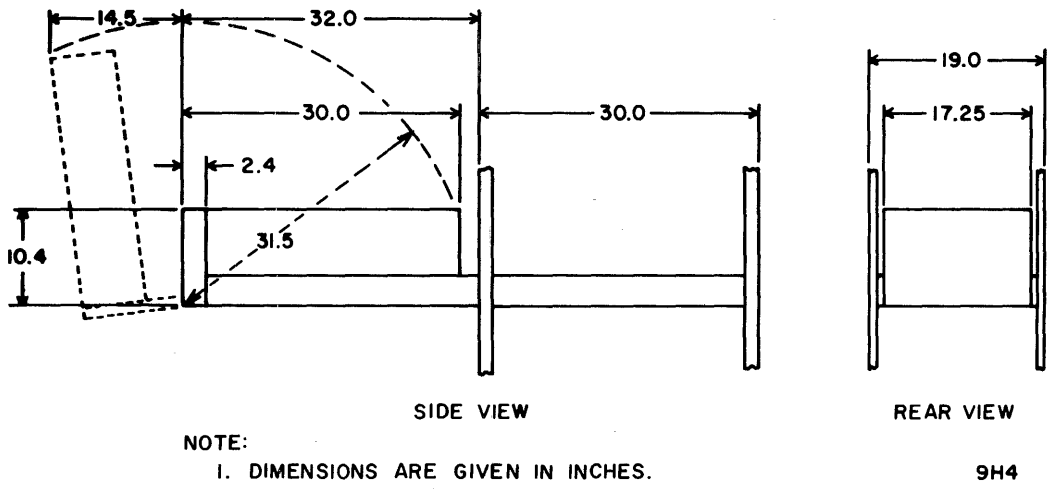


Figure 1-4. Clearances - 30-Inch Rack

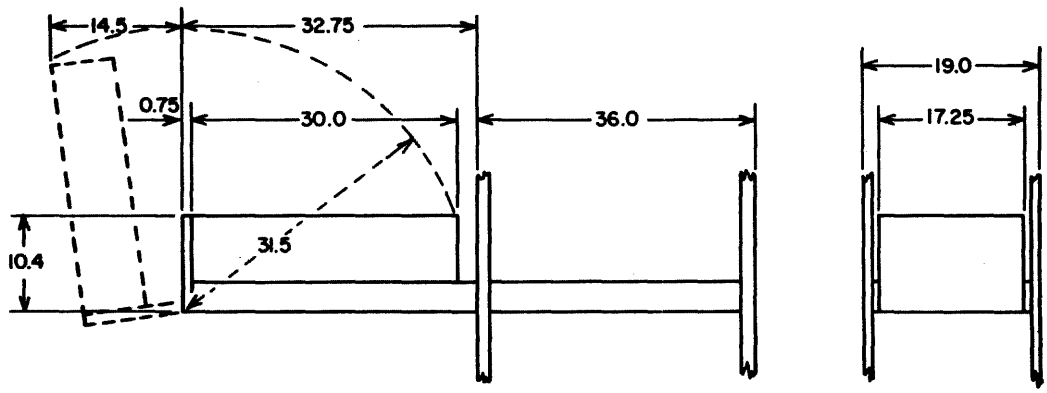


Figure 1-5. Clearances - 36-Inch Rack Mount

ENVIRONMENT

In laying out the site, consideration must be given to providing the proper environmental conditions. Environmental specifications for the drive are as specified in table 1-1.

TABLE 1-1. ENVIRONMENTAL SPECIFICATIONS

Characteristic	Condition	Specification
Temperature	Operating	59° to 90° F (15° to 32.2° C) with a maximum gradient of 12° F (6.7° C) per hour
	Transit*	-40° to +158° F (-40.4° to +70°C)
Relative Humidity (No condensation)	Operating	20% to 80%
	Transit*	5% to 95%
Altitude	Operating	-1000 to +6500 Feet (1305 to +2000 Meters)
	Transit*	-1000 to +15,000 Feet (-305 to +4572 Meters)
* Unit packed for shipment.		

POWER REQUIREMENTS

Consideration must be given to providing source ac power connections for each drive, when laying out the site. Provide an ac power source connection for each drive. The 60 Hz drives are supplied with 6-foot (1828 mm) long power cords which have connectors as shown in figure 1-6. The 50 Hz drives are supplied with 6-foot (1828 mm) long power cords which do not come with connectors. For 50 Hz drives, connect the green wire in the power cord to ground, and the other two wires phase to phase or phase to neutral. The acceptable voltage and frequency ranges are specified in table 1-2. Current source requirements for each of the indicated voltage/frequency combinations are specified in table 1-3. Start-up current is as specified in figure 1-7.

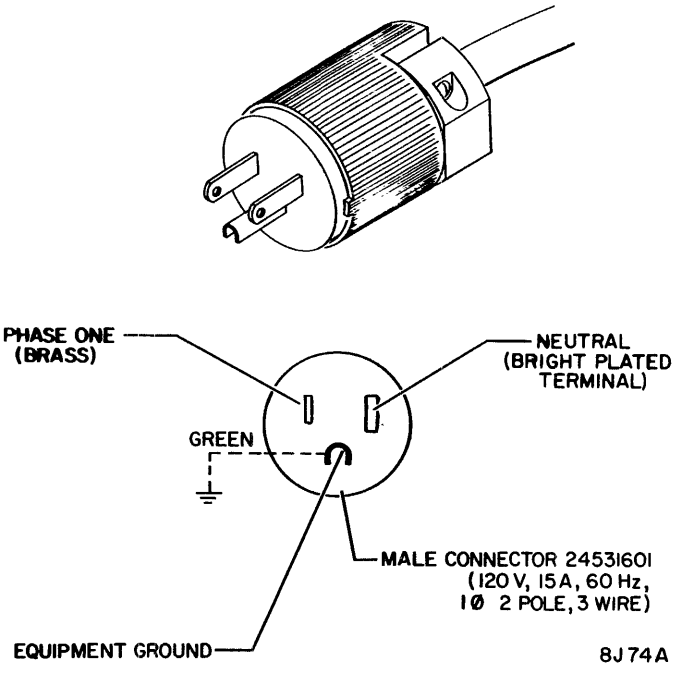


Figure 1-6. 60 Hz AC Power Connector

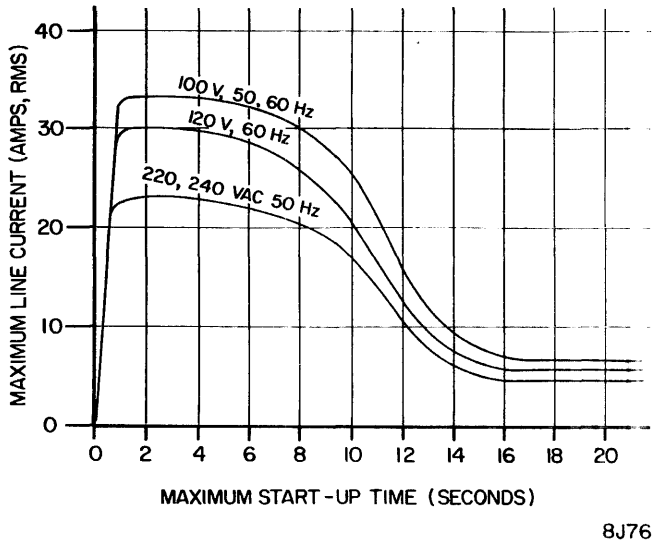


Figure 1-7. Start-up Current

TABLE 1-2. SOURCE POWER REQUIREMENTS

Voltage AC		Frequency Hz	
Nominal	Range	Nominal	Range
100	90 to 110	60	59.9 to 60.1
120	102 to 128	60	59.0 to 60.6
220	195 to 235	50	49.0 to 50.5
240	213 to 257	50	49.0 to 50.5

TABLE 1-3. MAXIMUM CURRENT SOURCE REQUIREMENTS

Power Source	Requirements					
VAC/HZ	Line Current In Amps		Power Factor		Consumption In KW (BTU/HR)	
	Operating	Standby	Operating	Standby	Operating	Standby
100/60	8.2	1.5	0.77	0.90	0.631 (2150)	0.135 (460)
120/60	8.2	1.5	0.77	0.90	0.757 (2580)	0.162 (553)
220/50	4.2	1.4	0.85	0.90	0.758 (2680)	0.277 (945)
240/50	5.0	1.5	0.75	0.90	0.900 (3070)	0.324 (1100)
Operating - Carriage and disks in motion. Standby - Disks not turning.						

GROUNDING

Consideration must be given to providing an adequate grounding system when laying out the site. Failure to provide proper grounding may cause a safety hazard or may cause excessive data errors. To be properly grounded, the drive must have two ground connections; a safety ground, and a system ground. Grounding materials and procedures are provided in the Installation section of this manual.

Safety Ground

A safety ground must be provided by the site ac power system. The green (or green and yellow striped) wire in the drives cord provides the safety ground connection between the drive and the power system. In turn, the site ac power system must tie this connection (safety ground) to earth ground. All site ac power connection points must be maintained at the same safety ground potential.

System Ground

In addition to the safety ground, a system ground connection is also required. There are three alternative system ground connection schemes.

- Grounded Floor Grid - This scheme ties each equipment to a grid located beneath a false floor. The grid consists of horizontal and vertical members which are mechanically secure and have ground straps (or their equivalent) joining the individual members. The ground straps ensure a constant ground potential at all points on the grid. The grid is then tied directly to earth ground. This is the preferred scheme.
- Ungrounded Floor Grid - This scheme also ties each equipment to a grid beneath a false floor. This grid is mechanically secure and tied together with ground straps as described in the grounded floor grid discussion. However, in this case the floor grid is tied to earth ground through a controller or some other piece of equipment.

NOTE

The daisy chain scheme of grounding is not recommended for strings of more than ten equipments.

- Daisy Chain - This scheme connects each drive to the next in a string. The string is not to exceed ten drives. The string is terminated by connecting one of the drives to the controller which then connects to earth ground.

INTERCONNECT CABLES AND TERMINATORS

In laying out the site, consideration must be given to providing interconnect cables and terminators for the drives. There are I/O cables designated as A cable and B cable. Figure 1-8 illustrates two I/O cable configurations. The Star system requires A and B cables directly from the drive to each controller. It also requires an A cable terminator assembly at each drive. The Daisy chain system requires one B cable from each drive to the controller. However, only one A cable runs from the controller, and it runs to the first drive in the string. The remainder of the drives have A cables strung from the first drive to the second, from the

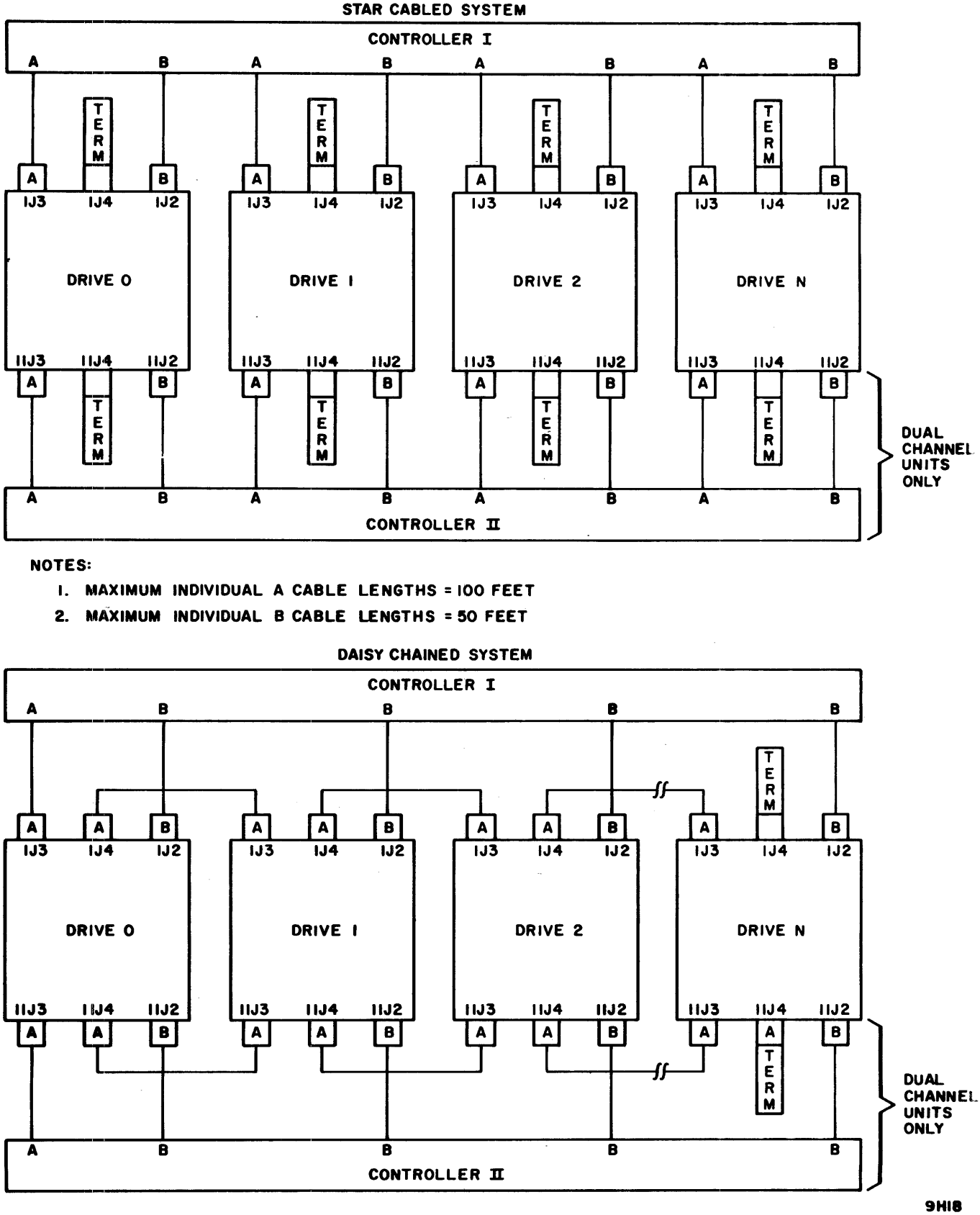


Figure 1-8. I/O Cable Configurations

second to the third, and so forth. In the Daisy chain system only the last drive in a string has an A cable terminator assembly.

Provide I/O cables and terminator assemblies for each drive consistent with the cabling configuration used. In figuring the length of the I/O cables, allow approximately 6 feet of cable as a service loop for each drawer mount or rack mount drive. This is to allow the drive to be extended on the rails for maintenance purposes. In addition also consider the length of cable required to run from the drive I/O panel to the floor. This length will depend on the type of mounting used. The part numbers for the various lengths of A and B cables are provided in table 1-4. Figures 1-9 and 1-10 define the A and B cable requirements.

PACKAGING

Packaging of the drive consist of an outer container (made up of corrugated cardboard and wood) and internal blocking and holddown bolts. Carefully remove the outer container. Set aside the packing material for use during reshipment of the drive. Refer to the unpackaging instruction slip, which is inside the pack shroud area, for instructions on removal of the internal blocking and holddown bolts.

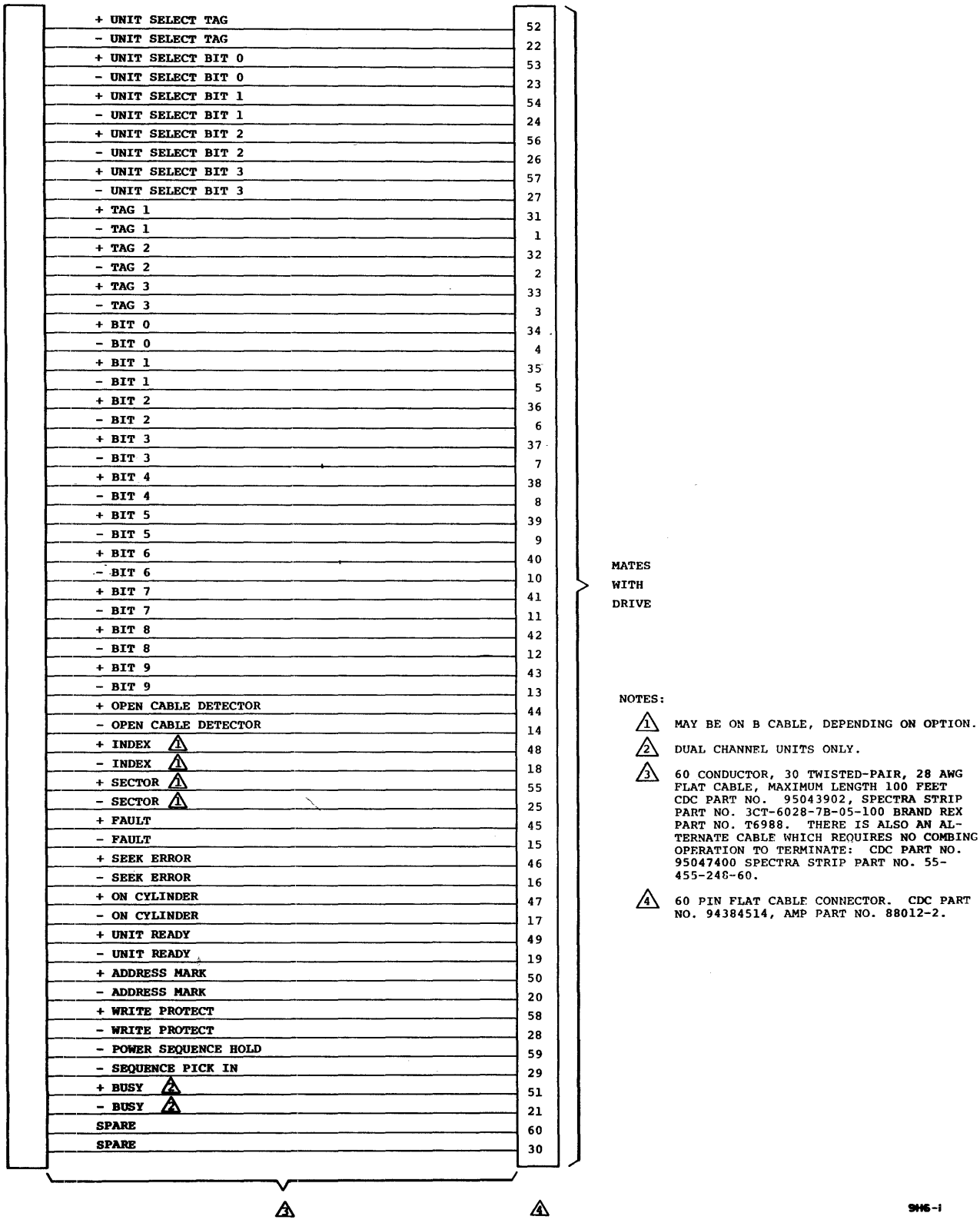
If it is necessary to reship the drive, obtain packaging instructions from:

Packaging Engineer,
Material Services Dept.
Normandale Division, MPI
7801 Computer Ave.
Minneapolis, Mn. 55435
Telephone Number 612/830-5462

When ordering packaging instructions, specify the exact equipment number and series code of the drive as shown on the equipment identification label.

TABLE 1-4. I/O CABLE LENGTHS VS PART NUMBERS

Cable Length FT (M)	Cable Type and Part Numbers	
	A Cable	B Cable
05 (1.52)	77564200	77564300
06 (1.83)	77564201	77564301
08 (2.44)	77564202	77564302
10 (3.05)	77564203	77564303
15 (4.57)	77564204	77564304
20 (6.10)	77564205	77564305
25 (7.62)	77564206	77564306
30 (9.14)	77564207	77564307
40 (12.20)	77564208	77564308
50 (15.20)	77564209	77564309



NOTES:

1. MAY BE ON B CABLE, DEPENDING ON OPTION.
2. DUAL CHANNEL UNITS ONLY.
3. 60 CONDUCTOR, 30 TWISTED-PAIR, 28 AWG FLAT CABLE, MAXIMUM LENGTH 100 FEET CDC PART NO. 95043902, SPECTRA STRIP PART NO. 3CT-6028-7B-05-100 BRAND REX PART NO. T6988. THERE IS ALSO AN ALTERNATE CABLE WHICH REQUIRES NO COMBING OPERATION TO TERMINATE: CDC PART NO. 95047400 SPECTRA STRIP PART NO. 55-455-248-60.
4. 60 PIN FLAT CABLE CONNECTOR. CDC PART NO. 94384514, AMP PART NO. 88012-2.

Figure 1-9. A Cable Requirements - Sheet 1 of 2

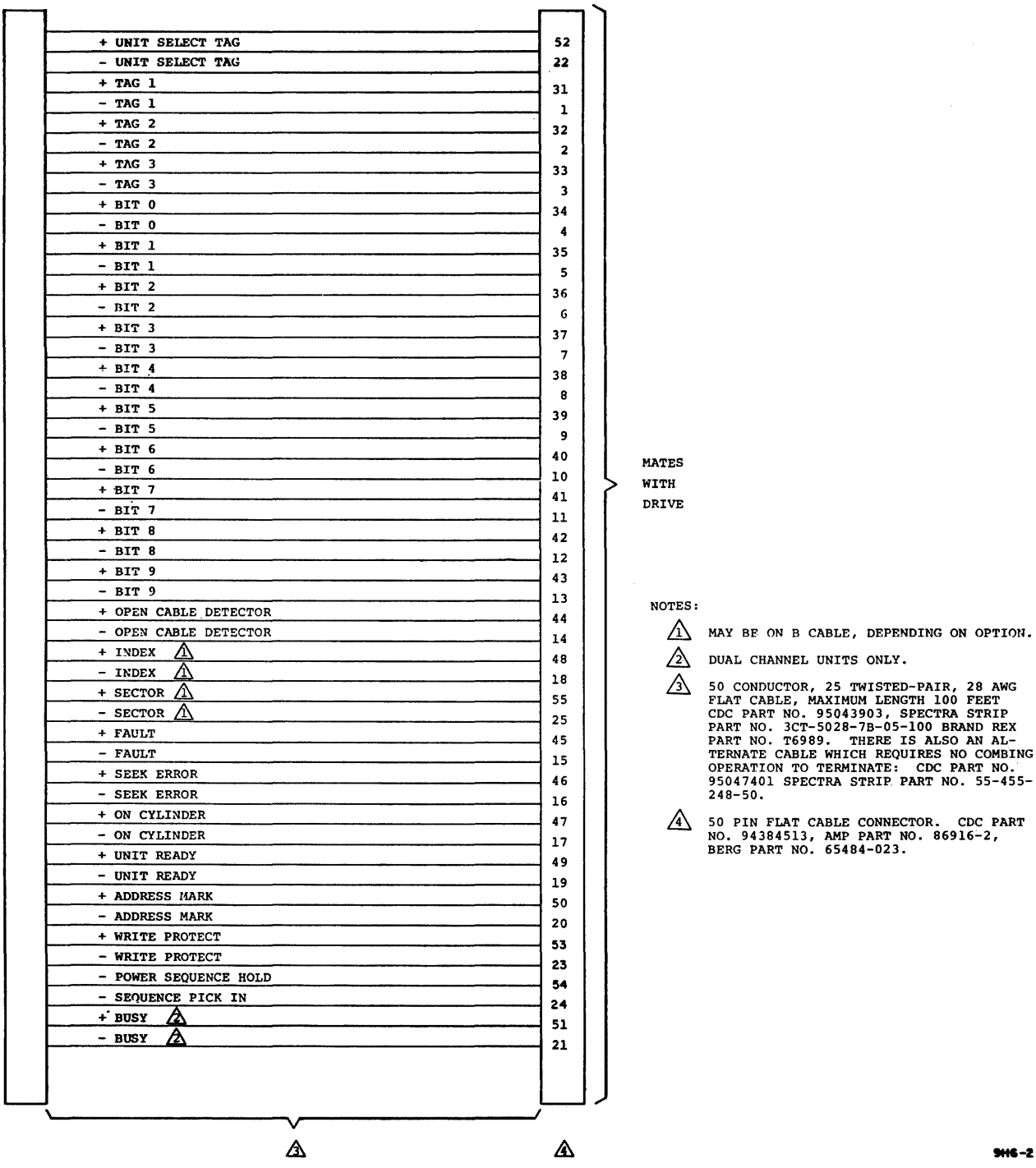


Figure 1-9. A Cable Requirements - Sheet 2

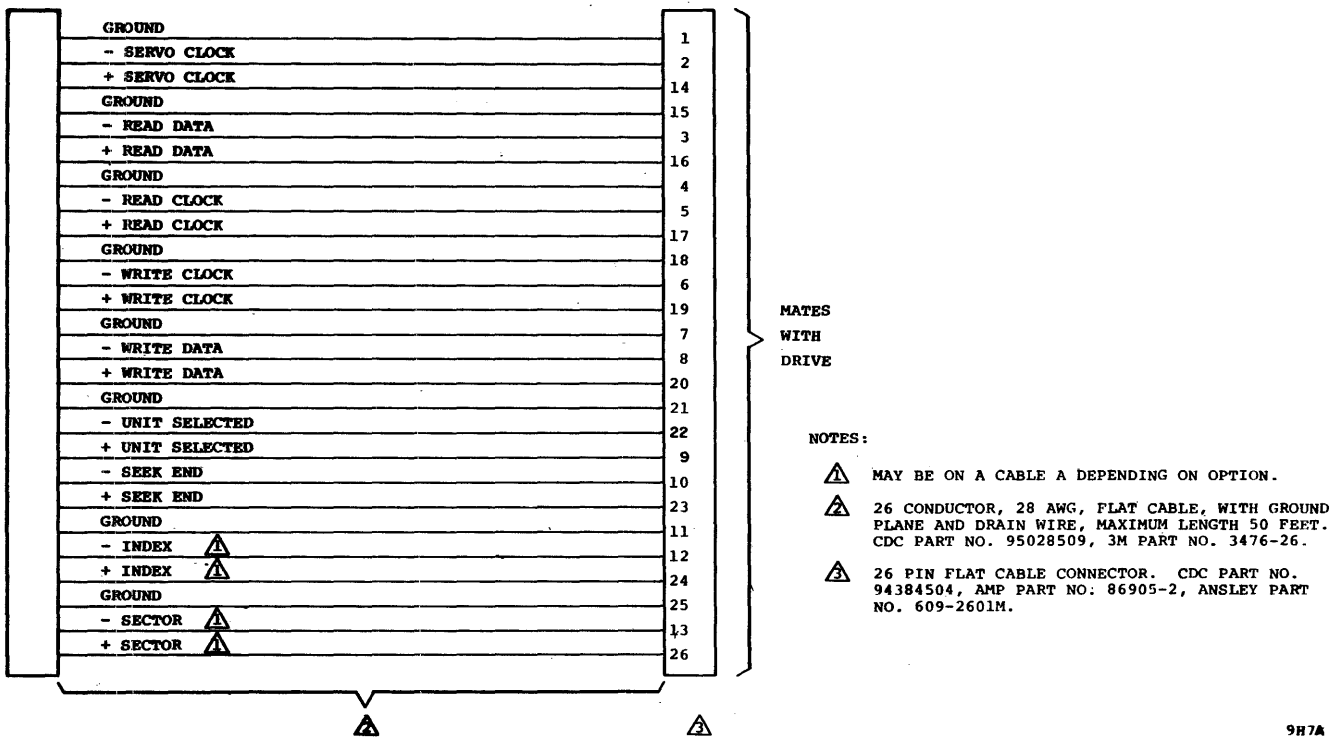


Figure 1-10. B Cable Requirements

INSTALLATION

GENERAL

Installation instructions are provided to enable the user to perform all necessary steps in the installation process. Within this section, reference is made to the opening and closing of various parts of the drive. Specific instructions as to how to do these procedures are given in Section 2A, General Maintenance. Likewise, removal and replacement information is not provided in this section. Instead, the reader is referred to the specific procedures providing this information in Section 2E, Repair and Replacement.

Since the specific order of the installation steps is largely dependent on the mounting configuration of the drives and how the site is layed out, it is not possible to exactly specify which order to follow. However, all necessary procedures for each configuration are specified in table 1-5. Generally, the procedures are listed in the order in which they should be performed.

INSTALLATION INSPECTION

Perform the following inspection prior to installing the drive.

1. Inspect drive for possible shipping damage. Any claim for this type of damage should be filed promptly with the transporter involved. If a claim is filed, save the original shipping materials.

2. Verify that all logic cards are firmly seated in logic chassis and power supply.

3. Verify that the control panel is firmly seated in shroud.

4. Verify that all connectors are firmly seated.

5. Raise deck and verify that all cabling is intact and that there are no broken or damaged wires.

TABLE 1-5. INSTALLATION PROCEDURES

Procedure	Mounting Configuration				
	Ped Cab	Acoustic Cab	Acoustic Drawer	30" Rack	36" Rack
Installation Inspection	X	X	X	X	X
Cabinet Leveling	X	X			
Cabinet Modification			X		
Slide Installation				X	X
Latch Installation				X	X
Cable & Terminator Installation	X	X	X	X	X
Setting Sector Switch	X	X	X	X	X

6. Check entire drive for presence of foreign material which could cause an electrical short.

7. Check actuator and pack area for presence of material which could obstruct movement of carriage and heads.

8. Ensure that carriage locking pin and ring assembly is moved from SHIPPING LOCK hole to PIN STORAGE hole.

CABINET LEVELING

Cabinet leveling should not be performed until drive is in final location and there is no further necessity to move it. It may be advantageous to install leveling pads prior to installation of other equipment in the cabinet or the connection of cabling.

Cabinet leveling consists of installing leveling pads (leveling pads are shipped in a plastic bag taped to inside of cabinet), placing drive in final location, screwing down leveling pads until drive in aligned with other equipments, and ensuring weight is off casters.

1. Install jam nut on each leveling pad and install a leveling pad at each corner of cabinet frame (see figure 1-11) by raising corner of cabinet and threading leveler into weld nut on frame.

2. Locate drive in final position.

3. Turn leveling pads down until they support drives' weight.

4. Adjust leveling pads until drive is aligned with adjacent equipment.

5. Place spirit level on drive case assembly and adjust leveling pads until drive is level within three angular degrees both front to back and side to side.

6. When drive is level in both directions, tighten jam nut against bottom of frame.

CABINET MODIFICATION

Cabinet modification is applicable only to an acoustic cabinet. This procedure provides the information necessary to install an acoustic drawer in an existing acoustic cabinet. It is assumed that all power, ground and signal cables have been removed from the top mounted drive; and that the drive has been moved to a work area where it can be approached from all sides.

1. Remove left and right side panels and set aside for future installation.

2. Disconnect fan connector P400.

3. Remove and discard rear door assembly.

4. Remove and discard front door assembly, upper and lower hinges, and keeper latch.

NOTE

A convenient support for ballast installation is made by laying two 2 x 4s flat on floor and covering them with a piece of 1/2 inch plywood.

5. Position ballast beneath frame (see figure 3-4). Using four screws, lock washers, and flat washers, secure ballast to frame.

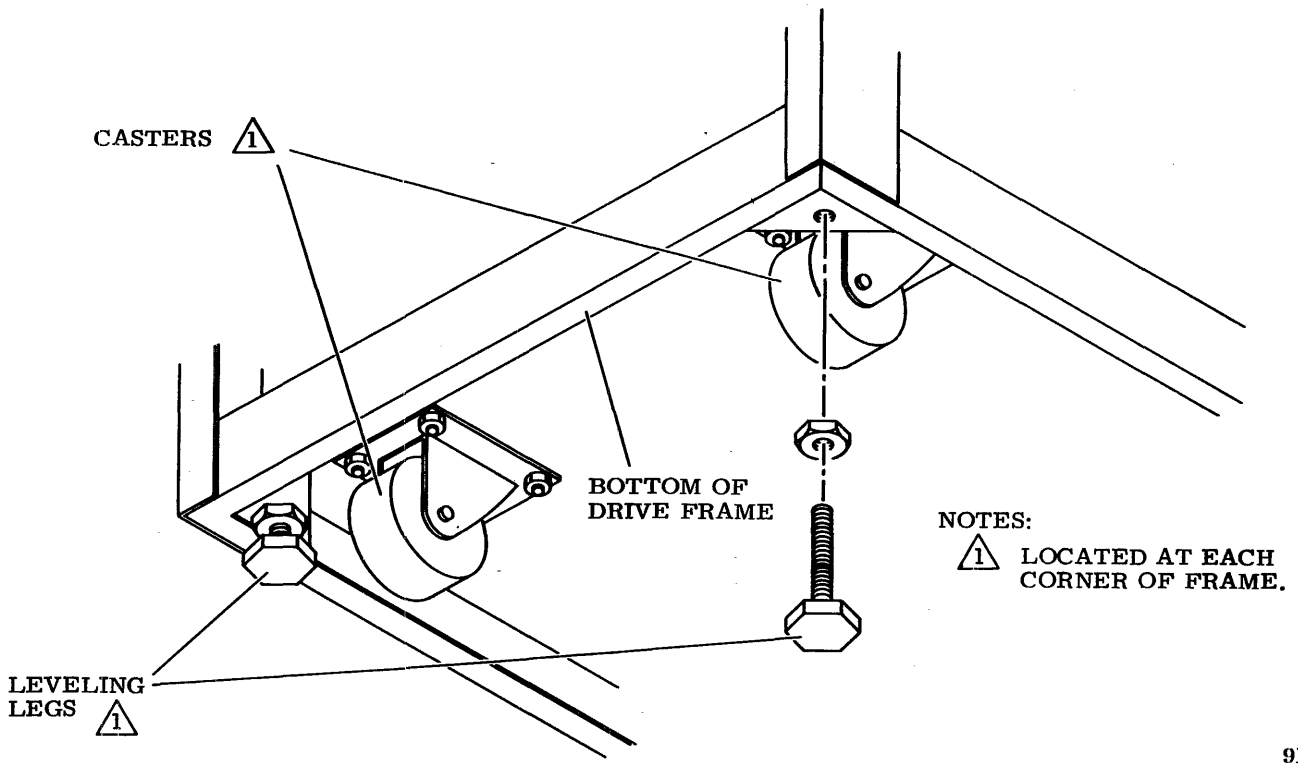


Figure 1-11. Leveling Pad Installation

6. Install upper and lower front panels using attaching hardware as shown in figure 3-4. Ensure that ground cable is attached to lower front panel.

7. Loosely install keeper latch using attaching hardware as shown in figure 3-4.

8. Perform Slide Installation Procedure (see Section 2D, Repair and Replacement) with the following exceptions: Before installing side panels, install case assembly and then slide drive to its closed position. Tighten hardware securing keeper latches. This ensures that latches are properly aligned to case. When keeper latches are tightened, install side panels.

9. Roll drive back to permanent location and perform Cabinet Leveling Procedure (this section).

10. Perform Cable and Terminator Installation Procedure and Setting Sector Switches Procedure (both this section).

SLIDE INSTALLATION

When installing drives in an equipment rack, it is first necessary to install the slide assemblies in the rack. Refer to the Slide Installation Procedure in Section 2E, Repair and Replacement, for all necessary instructions.

LATCH INSTALLATION

A set of keeper latches are required with each slide mounted drive. Install the keeper latches to the rack as illustrated in figure 3-5 or 3-6. Latch orientation, as well as attaching hardware, are shown in the illustration. No latch adjustment is required.

CABLE AND TERMINATOR INSTALLATION

Cable installation consists of connecting the system ground cable, connecting the drive to the site ac power system, and connecting the I/O cables and terminators. It is assumed that the site has been prepared in accordance with the site preparation information

provided earlier in this section. Refer to table 1-6 for grounding accessory part numbers and to figure 1-12 for parts location view. With the main site ac power turned off and with the drives AC POWER and POWER SUPPLY circuit breakers set to OFF, proceed as follows:

1. Open case assembly to gain access to power panel and I/O connectors.
2. Cut a piece of flat braided shielding to required length. Shielding must be long enough to run from drives ground lug to floor grid or next drive depending on system grounding scheme.
3. Crimp and solder terminal lug to each end of braided shielding to make ground cable.
4. Connect one end of completed ground cable to ground lug on rear on drive.
5. Connect opposite end of ground cable to floor grid (or next drive).
6. Referring to figure 2-3 for parts location, ensure that input power wiring to TB1 conforms to site ac power as shown in figure 1-13.
7. Connect drives power cord to site ac power source.

NOTE

Some systems may require that specific connectors on the controller relate to specific physical drives. Consult controller manual for information relating to I/O connections.

8. Connect B cable between controller and drive connector IJ2. For dual channel drives connect a second B cable between channel II controller and drive connector IIJ2.

NOTE

Steps 9 and 10 apply only to systems using star I/O cabling configuration.

9. Connect A cable from controller to drive connector IJ3. For dual channel drives connect a second A cable from channel II controller to drive connector IIJ3.

TABLE 1-6. GROUNDING ACCESSORIES

Description	CDC Part No.	Use
Flat Braided Shielding (50 ft)	93267009	Construct ground cable
Terminal Lug	40125601	Terminates ground cable to drive and floor grid.
Lockwasher, external tooth, No. 10	10126402	Attaching ground cable to floor grid.
Screw, Pan head, Cross Recessed, self tapping 10-32 x 1/2	17901524	Attaching ground cable to floor grid.

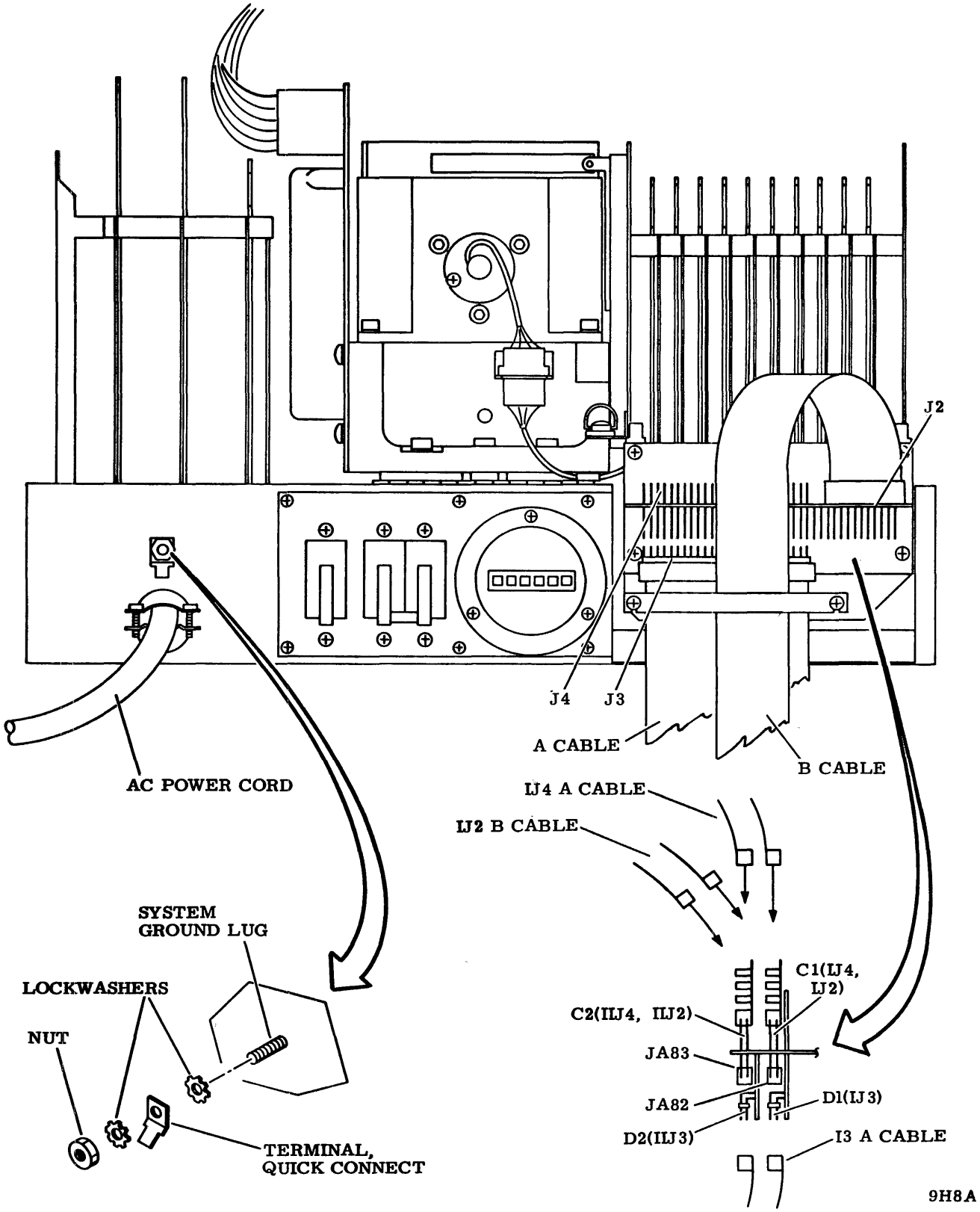


Figure 1-12. Cable Installation - Parts Location View

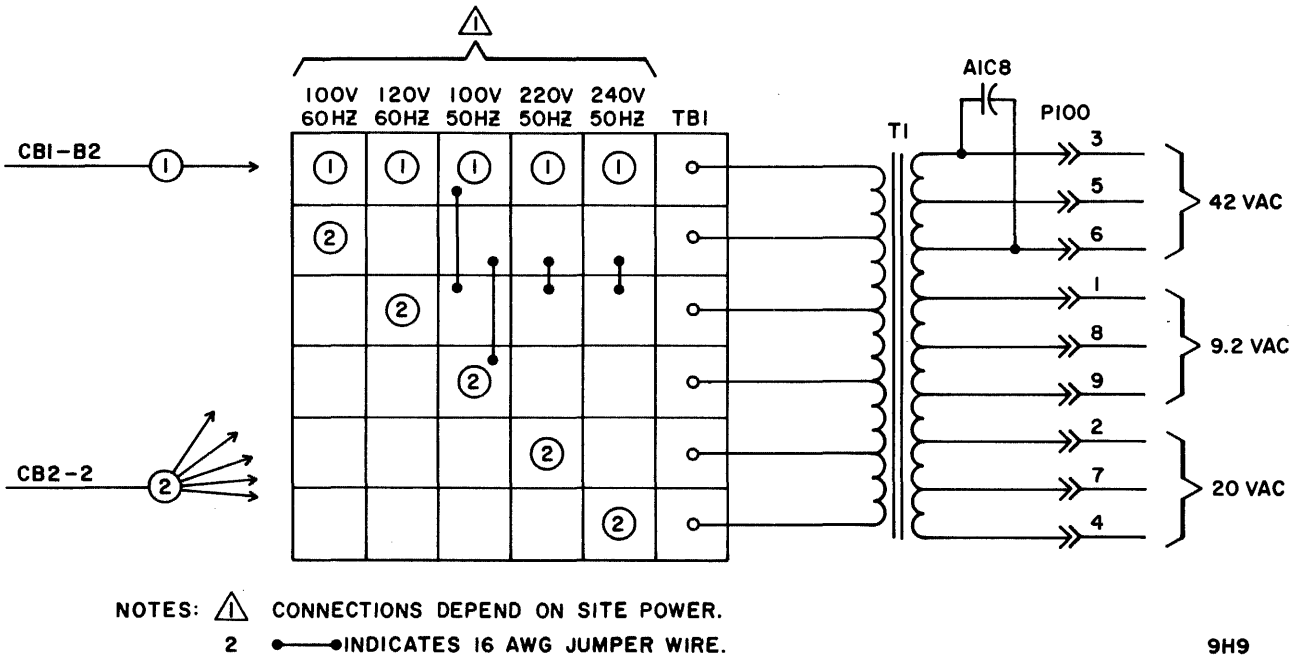


Figure 1-13. AC Power Wiring

10. Install terminator card in location C1. For dual channel drives install a second terminator card in location C2.

NOTE

Steps 11 through 13 apply only to systems using daisy chain I/O cabling configuration.

11. Connect A cable from controller or connector IJ4 on upstream drive (drive which is closer to controller on daisy chain) to drive connector IJ3. For dual channel drives connect a second A cable from channel II controller or upstream drive to drive connector IIJ3.

NOTE

If drive is not last in daisy chain string, perform step 12. If drive is last in daisy chain string, perform step 13.

12. Connect another A cable from drive connector IJ4 to down stream drives connector IJ3. For dual channel drives connect another A cable from drive connector IIJ4 to down stream drives connector IIJ3.

13. Install terminator card in location C1. For dual channel drives install a second terminator card in location C2.

SETTING SECTOR SWITCHES

The drive provides the capability of setting the number of sectors per disk revolution. Since the required number of sectors is a system function, refer to the system manual for the number of sectors used. Once the required number of sectors have been determined, it is necessary to determine:

- the length of each sector in dibits
- the preset value, which is the decimal number representing the switch settings
- which switches to set to the open position

Table 1-7 provides the values for each sector switch, figure 1-14 shows how to set the switches to the open position. Figure 1-15 provides a sample calculation. To set the sector switches proceed as follows:

1. Determine the length of each sector from the formula:

   SL = 13440/RS

   Where: SL = sector length in dibits

   13440 = total dibits per revolution

   RS = required number of sectors

2. Determine preset value from formula:

   PV = 4096 - SL

   Where: PV = preset value

   4096 = count by which sector counter divides

   SL = sector length in dibits (determined in step 2)

3. Using table 1-7 determine which switches to set to open position.

4. Using a sharp pointed object set switches (located on edge of card in logic chassis position B08) as determined in step 3.

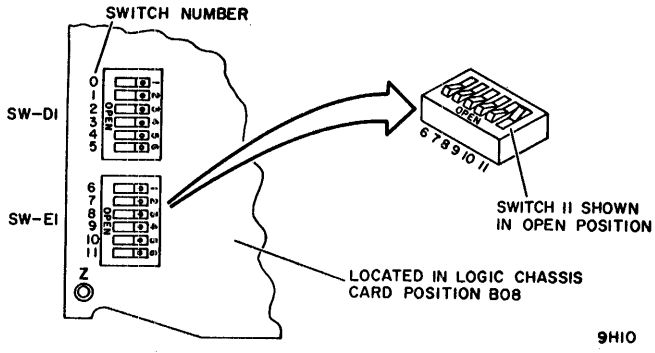


Figure 1-14. Sector Switch Positioning

TABLE 1-7. SECTOR SWITCH VALUES

Switch No.	Binary Value*	Decimal Value*
0	2^0	1
1	2^1	2
2	2^2	4
3	2^3	8
4	2^4	16
5	2^5	32
6	2^6	64
7	2^7	128
8	2^8	256
9	2^9	512
10	2^{10}	1024
11	2^{11}	2048

* Value when switch is set in open position.

CHECKOUT

When installation of drive is complete, perform the General Cleaning and the Clean Shroud and Spindle procedures found in the preventive maintenance section. Following the cleaning procedures, perform all the procedures in the tests and adjustments section.

Refer to system manuals for any system diagnostics which may be required.

NOTE

0 1 5 7 8 closed

Switches 2 3 4 6 9 10 11 open

(observed on Mar. 15/82 DKH)

SL = 420

RS = 32

STEP 1. DETERMINE SECTOR LENGTH FOR SYSTEM USING 63 SECTORS.

SL = 13440/63

SL = 213 PLUS REMAINDER 21 (1)

STEP 2. DETERMINE PRESET VALUE FOR SWITCHES.

PV = 4096 - 213 (REMAINDER IS IGNORED)

PV = 3883

STEP 3. DETERMINE WHICH SWITCHES TO SET TO OPEN POSITION.

```
PV = 3883
   - 2048  Switch 11 value
     1835
   - 1024  Switch 10 value
      811
   -  512  Switch 9 value
      299
   -  256  Switch 8 value
       43
   -   32  Switch 5 value
       11
   -    8  Switch 3 value
        3
   -    2  Switch 1 value
        1
   -    1  Switch 0 value
        0
```

STEP 4. SET SWITCH 0, 1, 3, 5, 8, 9, 10, and 11 TO OPEN.

NOTE (1) If a remainder exists, an additional sector (immediately preceeding index) is created. The remainder is equal to number of dibits in additional sector.

9HII

Figure 1-15. Sector Switch Calculation

SECTION 2

MAINTENANCE

INTRODUCTION

This section provides all the information necessary to maintain all models and all configurations of the drive. The maintenance discussed in this section is limited to that which can be performed in the field. Unless otherwise specified the information presented here applies to all equipments listed in the front of this manual.

The maintenance procedures defined in this section are to be performed only by qualified maintenance personnel. Maintenance is performed in accordance with the time schedules provided at the beginning of each subsection, or as needed in the case of corrective maintenance.

Information in this section is divided into the following major areas:

- General Maintenance Information - Provides information on safety precautions, maintenance tools and materials, controls and test points, standard test conditions, and accessing the drive for maintenance, be thoroughly familiar with the information in this section.
- Preventive Maintenance - Provides procedures for performing a regularly scheduled maintenance routine.
- Tests and Adjustments - Provides procedures for all the major drive level tests and adjustments which can be performed in the field.
- Repair and Replacement - Provides procedures and information on the replacement and adjustment of drive assemblies. This section assumes that the assembly was previously identified as malfunctioning.

SECTION 2A

GENERAL MAINTENANCE INFORMATION

GENERAL

This section contains general information relating to maintenance of the drive. A person performing maintenance on the drive should be familiar with this information in addition to the operating principles and procedures described in the hardware reference manual.

The information in this section is divided into the following areas:

- Safety Precautions - Lists safety precautions that must be observed when working on the drive.
- Maintenance Tools and Materials - Lists the tools and materials required to perform maintenance on the drive. This includes discussions on the type and handling of disk packs, the field test unit, the head alignment kit, and the use of system software, all of which are used for performing drive tests and adjustments.
- Maintenance Controls and Test Points - Identifies and describes the various controls and indicators and the test points which are provided for maintenance purposes.
- Standard Test Conditions - Describes and defines the basic conditions from which all the test procedures start. This includes defining the power on/off condition, online/offline condition, disconnecting the I/O, and manually positioning the carriage.
- Accessing Drive for Maintenance - Identifies the various parts of the drive electronics assembly and provides the procedures which describe opening and closing the various parts of the machine in order to gain access for maintenance purposes.

SAFETY PRECAUTIONS

Observe the following safety precautions at all times. Failure to do so may cause damage and/or personal injury.

- Use care while working with power supply. Line voltages are present inside the base (A1) in the area of the ac power supply.
- Keep hands away from actuator during seek operations and when reconnecting leads to voice coil. Under certain conditions, emergency retract voltage may be present, causing sudden reverse motion and head unloading.
- Use caution while working near heads. If heads are touched, fingerprints can damage them. Clean heads immediately if they are touched.
- Keep pack access cover closed unless it must be open for maintenance. This prevents entrance of dust into pack area. Do not open pack access cover while disk is spinning or attempt to slow disks by hand.
- Keep all watches, disk packs, meters, and other test equipment at least two feet away from voice coil magnet.
- Do not remove or install circuit cards while power is on. Circuit cards are easily damaged by transient voltage spikes which may be generated by removing or installing cards when power is on.
- Ensure that logic chassis is in normal operating position before raising deck. On rail mounted configurations, the logic chassis will be damaged by collision with the cabinet or frame. Also, since logic chassis cannot be secured in maintenance position, it may fall and be damaged as deck is raised.
- Do not open acoustic top case when drawer mounted drive has logic chassis in maintenance position. The top case and drawer unit's logic chassis will collide and damage will occur.
- Do not use customer disk pack for testing purposes, (see paragraph on disk packs).
- Do not use CE alignment disk pack unless specifically directed to do so. These packs contain prerecorded alignment data that can be destroyed if test procedure requires drive to write. This alignment data cannot be generated in the field.
- If drive fails to power down when START switch is pressed (to turn off indicator) disconnect voice coil leadwire (see paragraph on manual carriage positioning) and manually retract heads before troubleshooting malfunction.
- Make certain that heads are retracted before turning off power.
- If power to drive motor is lost while heads are loaded and not under servo control (during manual carriage positioning), immediately retract carriage. Otherwise heads will crash when disk speed is insufficient to enable heads to fly.
- Keep all metal tools away from flex leads while power is applied in order to prevent damage to the power amplifier.

MAINTENANCE TOOLS AND MATERIALS

GENERAL

The maintenance procedures described in this manual require the use of certain special tools, test equipment, and materials. These tools and test equipment are listed in table 2-1 along with the appropriate source part number. Note that the list only includes special tools. It is assumed that the user has at his disposal all the common hand tools such as wrenches, screw drivers, and the like.

Most of the items listed in the table require no explanation. The items listed in the table are called out in the specific procedures in which they are required. However, some of the items included in the list require further explanation.

Throughout this manual the procedures assume that the reader has a disk pack and some means of excercising the drive at his disposal. The procedures are written assuming the field test unit is available. However, if there is suitable system software available it may be used in place of the field test unit. Likewise, the head alignment kit is available either by itself or as a part of the field test unit. The following paragraphs discuss the disk packs, field test unit, head alignment kit, and system software.

DISK PACKS

The maintenance procedures refer to three types of disk packs: (1) customer (2) scratch and (3) CE. All three are physically identical, but are used for different purposes.

A customer disk pack refers to a pack used by the customer for data storage during normal online operations.

The CE pack contains special prerecorded information used during maintenance. Use care to ensure that this data is not destroyed or altered.

A scratch pack is simply a disk pack that does not contain customer or other information that must not be destroyed. Therefore, a scratch pack can be used in maintenance procedures where a danger exists that the pack could be damaged or its information altered.

Disk Pack Installation-Removal

Refer to the operation section of the hardware reference manual for information on disk pack installation and removal.

Disk Pack Handling

The positive pressure filtration system of the drive eliminates the need for periodic inspection and cleaning of the disk pack (media). However, should improper operating conditions of the pack be indicated by any of the following symptoms, immediately remove the pack from the drive.

1. A sudden increase in error rates related to one or more heads is observed.
2. An unusual noise such as pinging or scratching is heard.
3. A burning odor is smelled.
4. Contamination of the pack from dust, smoke, oil or the like is suspected.

If any doubt about the pack's functional condition exists, return it to the vendor, enclosing a description of the known or suspected malfunction.

CAUTION

Do not attempt to operate the media on another drive until full assurance is made that no damage or contamination has occurred to the media.

Do not attempt to operate the drive with another media until full assurance is made that no damage or contamination has occurred to the drive heads or to the shroud area.

Disk Pack Inspection and Cleaning

In some cases, the user may attempt to inspect and clean the disk pack rather than return it to the vendor. This task must be performed by properly trained personnel only, using the following procedure.

NOTE

Inspection and cleaning of disk packs in the field can cause additional problems for the following reasons:

- Exposure of the pack to non-cleanroom conditions during

TABLE 2-1. MAINTENANCE TOOLS AND MATERIALS

Description	CDC Part Number	Description	CDC Part Number
Adapter (3/16 Hex to 1/4 Sq)	CDC* 12262582	Lubricant Paste	CDC 95016101
Card Extender	CDC 54109700	Media Cleaning Solution	CDC 95033502
Card Extraction Tool	CDC 87399200	Non-Metalic Feeler Gage, 0.005 inch	CDC 12205633
Carriage Alignment Arm	CDC 75018400	Oscilloscope, Dual Trace	Tektronix 454 or equivalent
Chip Extender (Chipclip)	CDC 12212196	Oscilloscope Hood	Tektronix 016-0083-00
Computer Card	5084 or equiv.		
Deck Support Bracket	CDC 87073000	Pin Straightener	CDC 87369400
Disk Pack, CE (40 MB)	CDC 70439001 (876-51)	Push-Pull Gage	CDC 12210797
		RTV Adhesive Sealant	CDC 95045700
Disk Pack, CE (80 MB)	CDC 70438700 (877-51)	Rubber Silicone Sealant	CDC 95023500
Disk Pack, Data (40 MB)	CDC 70439500 (876)	Wirewrap Removal Tool, 20-30 Gage	CDC 13359183
Disk Pack, Data (80 MB)	CDC 70438000 (877)	Scope Probe Tip (Hatchet Type)	CDC 12212885
Dust Remover, Spray Dry	CDC 95047800	Sprayable Adhesive	CDC 95018602
Epoxy (Fast Cure)	To be supplied	Torque Screwdriver**	CDC 12218425
Field Test Unit (TB304)	CDC 77449300	Torque Screwdriver Bit**	CDC 87016701
Filter Coat	CDC 12210958	Torque Wrench, 1/4 inch	CDC 12263205
Gauze, Lint Free	CDC 12209713	Volt/ohmmeter	Ballantine 345 or equivalent digital voltmeter
Grease, Dielectric	CDC 95533600		
Head Adjustment Tool	CDC 75018803		
I/O Pin Removal Tool	CDC 12215759	Wire Wrap Bit, 30 Gage	CDC 12218402
Loctite, Grade C	Loctite Corp.	Wire Wrap Gun, Electric	CDC 12259111
Loctite Primer, Grade T	Loctite Corp.	Wire Wrap Sleeve, 30 Gage	CDC 12218403

* CDC is a registered trademark of Control Data Corporation.
** Torque screwdriver and bit are used for torqueing head clamping hardware.

TABLE 2-1. MAINTENANCE TOOLS AND MATERIALS

Description	CDC Part Number	Description	CDC Part Number
Adapter (3/16 Hex to 1/4 Sq)	CDC* 12262582	Lubricant Paste	CDC 95016101
Card Extender	CDC 54109700-1	Media Cleaning Solution	CDC 95033502
Card Extraction Tool	CDC 87399200	Non-Metalic Feeler Gage, 0.005 inch	CDC 12205633
Carriage Alignment Arm	CDC 75018400	Oscilloscope, Dual Trace	Tektronix 454 or equivalent
Chip Extender (Chipclip)	CDC 12212196	Oscilloscope Hood	Tektronix 016-0083-00
Computer Card	5084 or equiv.		
Deck Support Bracket	CDC 87073000	Pin Straightener	CDC 87369400
Disk Pack, CE (40 MB)	CDC 70439001 (876-51)	Push-Pull Gage	CDC 12210797
		RTV Adhesive Sealant	CDC 95045700
Disk Pack, CE (80 MB)	CDC 70438700 (877-51)	Rubber Silicone Sealant	CDC 95023500
Disk Pack, Data (40 MB)	CDC 70439500 (876)	Wirewrap Removal Tool, 20-30 Gage	CDC 13359183
Disk Pack, Data (80 MB)	CDC 70438000 (877)	Scope Probe Tip (Hatchet Type)	CDC 12212885
Dust Remover, Spray Dry	CDC 95047800	Sprayable Adhesive	CDC 95018602
~~Epoxy (Fast Cure)~~	To be supplied	Torque Screwdriver**	CDC 12218425
Field Test Unit (TB304)	CDC 77449300	Torque Screwdriver Bit**	CDC 87016701
Filter Coat	CDC 12210958	Torque Wrench, 1/4 inch	CDC 12263205
Gauze, Lint Free	CDC 12209713	Volt/ohmmeter	Ballantine 345 or equivalent digital voltmeter
Grease, Dielectric	CDC 95533600		
Head Adjustment Tool	CDC 75018803		
I/O Pin Removal Tool	CDC 12215759	Wire Wrap Bit, 30 Gage	CDC 12218402
Loctite, Grade C	Loctite Corp.	Wire Wrap Gun, Electric	CDC 12259111
Loctite Primer, Grade T	Loctite Corp.	Wire Wrap Sleeve, 30 Gage	CDC 12218403

* CDC is a registered trademark of Control Data Corporation.
** Torque screwdriver and bit are used for torqueing head clamping hardware.

With 01

inspection and cleaning may additionally contaminate the pack.

- Disk surfaces may be scratched by using contaminated or improper cleaning equipment.
- The pack may be damaged while the covers are removed.
- Deposits of cleaning solution residue may be left on disk surface if improperly cleaned or if commercial grade solutions are used.

CAUTION

Disk pack cleaning should never be attempted with the pack mounted on the drive, since this setup can introduce contamination into the drive itself.

1. Mount the pack on a commercially available pack inspection fixture.
2. Dampen, but do not soak, a lint-free swab-paddle with media cleaning solution (refer to the list of Maintenance Tools and Materials), or with a solution of 91% reagent grade isopropyl alcohol and 9% deionized water by volume.
3. Using a sweeping motion, insert the damp swab-paddle between the disks and manually rotate the pack while applying the swab-paddle lightly to the disk surface to be cleaned.
4. After the swab-paddle has been applied for one full cleaning rotation, withdraw it with a sweeping motion while maintaining contact with the disk surface (do not lift the swab-paddle from the surface).
5. If oxide or contaminants are observed on the swab-paddle, repeat steps 2, 3, and 4, using a clean swab-paddle for each pass, until no oxide or contaminants are observed on the swab-paddle.
6. Repeat steps 3 and 4 using a dry swab-paddle to remove all cleaning solution residue.
7. Repeat steps 2 through 6 for each surface.

FIELD TEST UNIT

The Field Test Unit (FTU) is basically an offline tester. This means that the drive cannot be selected or used by the controller while the FTU is in use. The one exception to this is that the FTU can be used to monitor head off-set while a test software routine is performing the head alignment check.

The FTU is connected to the drive in one of two ways: (1) through the standard I/O connectors on the I/O card(s) (On dual channel units the FTU may be connected to either channel I or channel II, depending on which I/O is to be checked.) or (2) through the I/O bypass connection.

The standard I/O connection requires that the system I/O cables be disconnected and that the FTU I/O cables be connected in their place. This also requires that the FTU flat cable adapter cables be used. When the FTU is connected to a drive through the standard I/O connections, the drive (on channel) to which the FTU is connected, must have an I/O terminator card installed. When the FTU is connected through the I/O the drive must be set to Online operation. However, the Local/Remote switch A10S1 may be set to either position depending on whether or not the drive is to be powered on from the FTU.

The I/O bypass connection leaves the system I/O cables in place and connects the I/O bypass cable between the FTU and connector A2J2 on the logic chassis backpanel. When the FTU is connected through the I/O bypass connection, the drive must be set to Offset operation.

Specific instructions for interconnecting the drive and the FTU are contained in the preliminary set-up instructions in the FTU manual. Likewise, the procedures for causing the drive to perform various operations (access, read, write, head selection) required for testing are contained in the FTU manual. When performing the preliminary set-up procedure the drive oriented switches located on the FTU panel shall be set as follows:

- RPM to 3600 (HI)
- TPI to 200 (LO) for BK4XX and to 400 (HI) for BK5XX
- HEADS to 5 (LO)
- BPI to 6000

The FTU also contains the head alignment card. The head alignment card, used in conjunction with the meter on the FTU, performs the same function as the head alignment kit. Refer to the following paragraph for details on the head alignment kit.

HEAD ALIGNMENT KIT

The head alignment kit contains the head alignment card, the head alignment cable, and the associated null meter (refer to figure 2-1). The head alignment card develops an output voltage which is derived from the output of the servo and read/write preamplifiers. When a CE disk pack is installed in the drive, this output voltage will be proportional to the distance a selected head is offset from the track centerline. The head alignment card plugs into card location A02 in the logic chassis.

The following toggle switches, located on the card edge, control the cards operation:

S1 - Changes the polarity of the alignment signal and is used in aligning both servo and read/write heads. Refer to paragraph on calculating offset in Head Alignment procedure. (See Tests and Adjustments Section.)

S2 - When switch is in S position, the card selects the servo head as an input to the card. When switch is in R/W position it selects a data head input to the card.

S3 - Changes sensitivity of card. When in X.1 position, the cards sensitivity is reduced by a factor of 10. When in X1 position, the cards sensitivity is not reduced. This switch must be in X1 position when making measurements for use in calculating head alignment error.

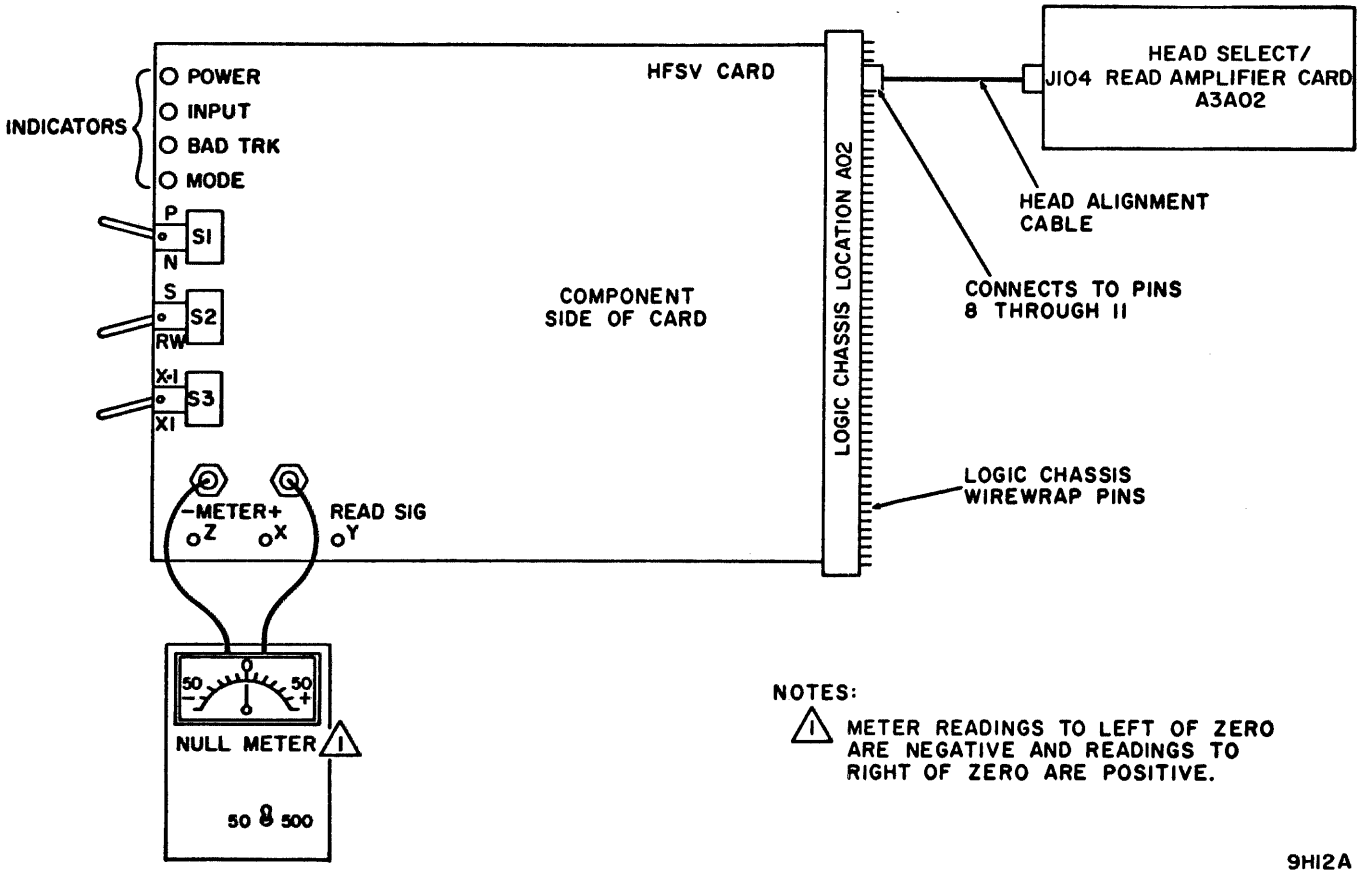


Figure 2-1. Head Alignment Kit

Four indicators are provided as monitors to ensure the card is operating properly and is receiving the proper data. These indicators are as follows:

Power - When lighted it indicates power is applied to card.

Input - When lighted, it indicates the input signals are too low for the alignment card circuits to operate.

Bad Track - When lighted, it indicates a short duration loss of input. A one shot maintains the lighted condition for at least four seconds. Note that this indicator lights when the position of switch S1 is changed.

Mode - When lighted it indicates that either S2 is in the S (servo) position or S3 is in the X.1 position. When either of these conditions exists, read/write head alignment error cannot be measured.

The card receives its inputs through the connector in logic chassis card position A02. The Servo Dibits signal is wirewraped to this connector. The ground and Head Alignment Output signals are provided through the head alignment cable which is part of the head alignment kit. This cable connects between card slot A2 (pins 08 through 11) on the wirewrap side of the logic chassis, and connector J104 located on the head select/read amplifier card A3A02.

The output voltage of the card is measured by a null meter which connects through test leads to test points X and Z on the card. This meter is either part of the head alignment kit or is located on the FTU panel.

The switch on the meter's front panel changes the sensitivity of the meter. When in the 50 position, the meter reads 50mV full scale. When the switch is in the 500 position, the meter reads 500mV full scale. The switch must be in the 50 position when making measurements for use in calculating head alignment error.

SYSTEM SOFTWARE

The drive may also be tested by use of microdiagnostic test routines (system software). This requires use of the controller and the appropriate software. In this type of testing the drive communicates with the controller as during normal online operations and no special I/O connections are necessary.

When system software is used to test the drive; it must be set to online operation, have power applied, have the correct disk pack installed, and have the appropriate logical address plug installed.

Refer to manuals or other documentation applicable to the specific system or subsystem for information concerning the system software routines.

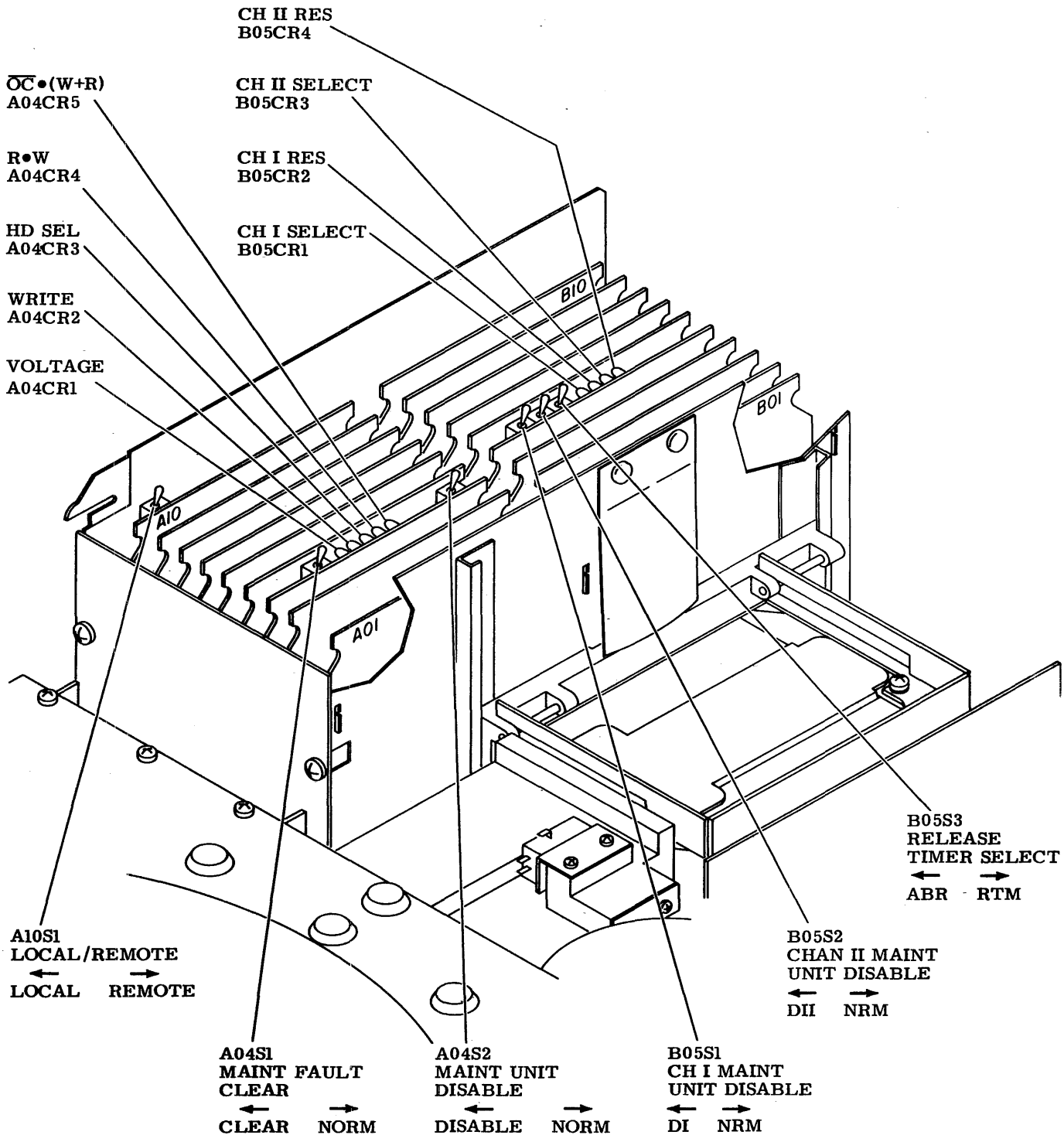
MAINTENANCE CONTROLS AND TEST POINTS

GENERAL

Throughout this manual references are made to switches, indicators, and test points. The material contained in the following two paragraphs identify and define these controls. Since much of the information is based on the physical location code of the control or test point, refer to the General paragraph under Accessing Drive For Maintenance for a discussion of the codes.

MAINTENANCE CONTROLS

In addition to the operator panel and power panel switches and indicators described in the Operation section of the Hardware Reference Manual, the drive has a number of controls used primarily for maintenance. All these controls are located on the edges of cards in the logic chassis. Figure 2-2 illustrates these controls and indicates the switch positions. Table 2-2 describes the function of each control. For single channel drives disregard all references to logic card B05.



NOTE: DUAL CHANNEL CARD COMPLEMENT SHOWN.

9H13A

Figure 2-2. Maintenance Switches and Indicators

TABLE 2-2. MAINTENANCE SWITCHES AND INDICATORS

Physical Location Code	Name	Description
A04CR1	Voltage	Lights to indicate a below normal voltage existed.
A04CR2	Write	Lights to indicate a write fault existed.
A04CR3	HD SEL	Lights to indicate a multiple head select occurred.
A04CR4	R·W	Lights to indicate that both write and read were selected simultaneously.
A04CR5	$\overline{OC}$ · (W + R)	Lights to indicate that a write or read was selected during a seek operation (not on cylinder).
A04S1	Maint Fault Clear	CLEAR position clears out Fault Latch and five Fault Status Latches. When switch is actuated fault indicators on edge of Fault card go out and remain out unless condition causing fault still exists. NORM is normal operating position for switch and position to which it returns when released (spring loaded).
A04S2	Maint Unit Disable	Although switch exists on both single and dual channel drives, it is only used on single channel units. Dual channel units use switches B05S1 and S2 for same purpose. DISABLE position prevents Unit Selected from being sent to controller and disables transmitters and receivers. NORM is normal operating position and position switch must always be in for all dual channel drives.
A10S1	Local/Remote	LOCAL position prevents control of power sequencing by controller. Drive is powered on and off by START switch assuming circuit breakers are set to On. REMOTE position allows controller to command power sequencing. Drive cannot be started until a ground is applied via subsystem Power Sequence Pick and Hold lines.
B05CR1	CH I Select	Lights to indicate channel I has selected drive.
B05CR2	CH I Res	Lights to indicate Channel I has drive reserved.
B05CR3	CH II Select	Lights to indicate channel II has selected drive.
B05CR4	CH II Res	Lights to indicate channel II has drive reserved.

Table continued on next page

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TABLE 2-2. MAINTENANCE SWITCHES AND INDICATORS (Contd)

Physical Location Code	Name	Description
B05S1/S2	Channel I/II Maint Unit Disable	Switches apply only to dual channel units. They perform same function as switch A04S2. In DI position switch S1 disables Unit Selected signal, transmitters, and receivers to channel I controller. Switch S2 disables Unit Selected signal, transmitters, and receivers to channel II controller when set to DII position. NORM is normal operating position for switches. When performing maintenance on drive both switches should be set to their disable position.
B05S3	Release Timer Select	Switch applies only to dual channel drives. Used to select between an absolute reserve and a reserve timer condition to control selection of drive by controller. In ABR (absolute reserve) position, controller selecting drive has control until it issues a release command. During this time opposite channel controller is unable to select drive except by using disable command (see reference manual). In RTM (Reserve Timer) position, first controller to select drive, holds it reserved for nominally 500 ms following time Unit Select Tag is dropped. During this time, opposite channel controller cannot select drive except by using disable command (see reference manual).

TEST POINTS

Throughout the drive there are a number of test points which are used in the various stages of maintenance. Table 2-3 lists these test points. The table is arranged in alpha-numeric order by physical location codes of the cards. Refer to the General paragraph under Accessing Drive For Maintenance for a description of the physical location codes.

Table 2-3 also lists the card type(s) that may be in any given physical location. If the test point information is true for a number of card types, then all the types are listed. If the information changes between different card types in a given physical location, then there are individual listings for each card type.

Test points "A" and "Z" on all cards are always ground and are therefore not listed in the table. The test points are listed alphabetically for each card type. The alphabetical identification for the test point also appears next to the test point on the card. The table identifies those test points which are on the card edge and can be reached while the card is in the logic chassis. The remainder of the test points can only be accessed with the card on a card extender.

The last column in the table provides the cross reference number for the logic page in the logic diagrams that show that test point.

TABLE 2-2. MAINTENANCE SWITCHES AND INDICATORS (Contd)

Physical Location Code	Name	Description
B05S1/S2	Channel I/II Maint Unit Disable	Switches apply only to dual channel units. They perform same function as switch A04S2. In DI position switch S1 disables Unit Selected signal, transmitters, and to channel I controller. Switch S2 disables Unit Selected signal, transmitters, and receivers to channel II controller when set to DII position. NORM is normal operating position for switches. When performing maintenance on drive both switches should be set to their disable position.
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The last column in the table provides the cross reference number for the logic page in the logic diagrams that show that test point.

TABLE 2-3. TEST POINTS

Physical Location Code/Card Type	Test Point	Title	Cross Ref	Comments
A2A01/CLSV	T	+ 9.67 MHz Clock	012	
	U	- Dibit Strobe Pulse	012	
	V	- Dibit OSC Window	012	
	W	+ Write Clock Strobe	013	
	X	+ Write Clock Window	013	
	Y	+ 19.34 MHz Clock	013	
A2A03/HFRV GFRV	E	+ Sensing Dibits	032	
	F	+ CYL Detect A	034	
	G	+ CYL Detect B	034	
	H	+ Track Servo Signal	034	
	J	- Analog Servo Detect	033	
	K	- Attenuator Output	032	
	L	+ Analog Servo Detect	034	
	M	+ Attenuator Output	032	
	N	+ 14 V	031	
	P	- 14 V	031	
	Q	+ AGC	034	
	R	- Peak Detector	033	
	S	+ Peak Detector	033	
	T	+ AGCed Servo Signal	033	
	U	- AGCed Servo Signal	033	
	V	- Trigger	034	
	W	+ 50% Detector	034	
	X	- 50% Detector	034	
	Y	+ Timer	034	
A2A04/DKFV	B *	+ Up To Speed	044	
	C *	Not Used	-	
	D *	Not Used	-	
A2A05/HLRV	B *	+ Strobe Pulse	052	
	C *	+ Missing Address (ECL)	053	
	D *	+ Data Window	052	
	E *	- AM Disable	053	
	F *	+ Missing Address (TTL)	053	
	G *	- Lock to Data + AM Pulse	053	
	H *	- Missing Address Pulse	053	
	J *	+ Read Gate	053	
	X	+ Low Frequency Filter Output	052	
	Y	- Low Frequency Filter Output	052	
A2A06/BLZV	W	+ VCO Input	063	
	X	+ Data Window Divide By 2	064	
	Y	+ Data Strobe	062	
A2A07/BLQV	B *	+ INTEG Velocity	072	
	C *	+ Summing AMP Output	072	
	D *	+ Desired Velocity	072	
	E *	+ Coarse Position Error	073	
	F *	+ Velocity	072	
	W	- Coarse Position Error	073	
	X	- D/A Bits 0 - 6	073	
	Y	+ Summing Amp Notch Amplifier	072	

Table continued on next page

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TABLE 2-3. TEST POINTS (Contd)

Physical Location Code/Card Type	Test Point	Title	Cross Ref	Comments
A2A07/JLQV	B *	+ INTEG Velocity	072	
	C *	+ Coarse Position Error	073	
	D *	+ Desired Velocity	072	
	E *	+ Summing AMP Output	072	
	F *	+ Velocity	072	
	T	+ Buffered Velocity	072	
	U	- D/A Bits 0 - 5	073	
	V	+ D/A Bits 0 - 7	073	
	W	- Coarse Position Error	073	
	X	- D/A Bits 6, 7	073	
	Y	+ Summing Amp Notch Amplifier	072	
A2A08/ELUV FLUV	B *	- EOT Integrator Clamp	082	
	C *	+ EOT Integrated Velocity	082	
	D *	Offset Analog	084	
	E *	+ Fine Position Notch Amplifier	085	ELUV only
	E *	FWD + REV Offset Analog	084	FLUV only
	F *	+ Fine Position Analog	084	
A2A09/FLPV	W	- Fine Position Analog	092	
	X	- Summing Amplifier	092	
	Y	+ Power AMP Driver	093	
A2A10/6SGV	B *	Speed Analog	103	
	C *	+ Remote Start	102	
	D *	- Speed Pulses	104	
	E *	+ Up To Speed Enable	104	
	F *	+ Delayed Up To Speed Enable	104	
A2B01/FTVV GTVV	B *	+ CH I Unit SEL Bit 2	113	
	C *	+ CH I Unit SEL Bit 3	113	
A2B02/JRVV	B *	+ Control Select	124	
	C *	- CH I Open Cable Detect	124	
	D *	+ Tie High	124	
A2B03/FTVV GTVV	B *	+ CH II Unit SEL Bit 2	133	
	C *	+ CH II Unit SEL Bit 3	133	
A2B04/JRVV	B *	+ Control Select	144	
	C *	- CH II Open Cable Detect	144	
B	D *	+ Tie High	144	
A2B05/AKHV	B *	~~+ Tie High~~ + Reserve Timer	153	
	C *	+ Selected ~~Pulse~~ Clock	~~153~~ 152	
	D *	+ CH II Select Compare	154	
A2B06/FLWV	B *	- Carry Interrupt	163	
A2B07/DLXV ELXV	B *	+ Strobe Data	172	
	C *	- Uncompensated MFM Data	173	
	D *	+ Write Gate	172	
	E *	+ Data Buffer	172	
A2B08/FLTV	B *	+ Reverse EOT Pulse	184	
	C *	+ Index	182	

Table continued on next page

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TABLE 2-3. TEST POINTS (Contd)

Physical Location Code/Card Type	Test Point	Title	Cross Ref	Comments
A2A07/JLQV	B *	+ INTEG Velocity	072	
	C *	+ Coarse Position Error	073	
	D *	+ Desired Velocity	072	
	E *	+ Summing AMP Output	072	
	F *	+ Velocity	072	
	T	+ Buffered Velocity	072	
	U	- D/A Bits 0 - 5	073	
	V	+ D/A Bits 0 - 7	073	
	W	- Coarse Position Error	073	
	X	- D/A Bits 6, 7	073	
	Y	+ Summing Amp Notch Amplifier	072	
A2A08/ELUV	B *	- EOT Integrator Clamp	082	
FLUV	C *	+ EOT Integrated Velocity	082	
	D *	Offset Analog	084	
	E *	+ Fine Position Notch Amplifier	085	ELUV only
	E *	FWD + REV Offset Analog	084	FLUV only
	F *	+ Fine Position Analog	084	
A2A09/FLPV	W	- Fine Position Analog	092	
	X	- Summing Amplifier	092	
	Y	+ Power AMP Driver	093	
A2A10/6SGV	B *	Speed Analog	103	
	C *	+ Remote Start	102	
	D *	- Speed Pulses	104	
	E *	+ Up To Speed Enable	104	
	F *	+ Delayed Up To Speed Enable	104	
A2B01/FTVV	B *	+ CH I Unit SEL Bit 2	113	
GTVV	C *	+ CH I Unit SEL Bit 3	113	
A2B02/JRVV	B *	+ Control Select	124	
	C *	- CH I Open Cable Detect	124	
	D *	+ Tie High	124	
A2B03/FTVV	B *	+ CH II Unit SEL Bit 2	133	
GTVV	C *	+ CH II Unit SEL Bit 3	133	
A2B04/JRVV	B *	+ Control Select	144	
	C *	- CH II Open Cable Detect	144	
	D *	+ Tie High	144	
A2B05/AKHV	B *	+ Tie High	153	
	C *	+ Selected Pulse	153	
	D *	+ CH II Select Compare	154	
A2B06/FLWV	B *	- Carry Interrupt	163	
A2B07/DLXV	B *	+ Strobe Data	172	
ELXV	C *	- Uncompensated MFM Data	173	
	D *	+ Write Gate	172	
	E *	+ Data Buffer	172	
A2B08/FLTV	B *	+ Reverse EOT Pulse	184	
	C *	+ Index	182	

Table continued on next page

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TABLE 2-3. TEST POINTS (Contd)

Physical Location Code/Card Type	Test Point	Title	Cross Ref	Comments
A2B09/MLVV	B *	- Seek Pulse	193	
NLVV	C *	- Start Seek	193	
	D *	- Power Up Delay	194	
A2B10/6SMV	B *	- Disable CH II	202	
	C *	- Disable CH I	202	
	D *	DIFF Output	202	
	E *	DIFF Output	202	
	F *	- Seek Interrupt	202	
A3A02/NZJN	A *	Read Preamplifier	263	
PZJN	B *	Read Preamplifier	263	
	E *	+ AGC REF Voltage	263	
	F *	AGC Output	263	
	G *	AGC Output	263	
	H	- 6 Volts	261	
	H0	Head Select 0	262	
	H1	Head Select 1	262	
	H2	Head Select 2	262	
	H3	Head Select 3	262	
	H4	Head Select 4	262	
	J	+ Read Enable	262	
	K	+ 6 Volts	261	
	L	Rectifier Output	263	
	M	+ Missing Address	263	
	N	+ Read Address Mark Enable	263	
	P	+ Address Mark Detect	263	
	Q *	+ Multiple Head Select Fault	262	
	R	- Analog Data	263	
	S	+ Analog Data	263	
A3A03/CZKN	A *	- MFM Data Pulses	272	
EZKN	B	Write Voltage Sense Reference	273	
	C	Write Data Voltage Translator Output	272	
	D	Write Data Voltage Translator Output	272	
	E *	- Write Data	272	
	F *	- AC Write Fault	273	
	G *	+ Write Protect Clamp	272	
	H *	Write Current	272	
	J	Write Current Fault Reference	272	
	K	- Writer Turn Off Fault	273	
	L *	- Write Current Fault	272	
	M *	- Turn On Fault Inhibit Delay	273	
	N *	- Turn Off Fault Inhibit Delay	273	
	P	+ Write Gate	272	
	Q	Write Current D/A Output	272	
	R *	Write Voltage Regulator Output	271	
A1A03/ASHV	- 5V	- 5 Volt (Unregulated)	332	
	+ 5V	+ 5 Volt (Unregulated)	333	

* Test point on edge of card.

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STANDARD TEST CONDITIONS

GENERAL

Unless otherwise specified all drive tests start with power removed from the drive and the drive set to offline operation. Some tests require that the FTU be installed which may require that the I/O cables be disconnected. Also some special tests require that the carriage be manually positioned. The following paragraphs define these standard test conditions. All procedures throughout this manual assume the reader is familiar with these conditions.

POWER ON/POWER OFF

The drive may be either online or offline when it is powered on or off. In order to apply power the following interlocks must be closed:

- Deck Interlock Switch - Deck in normal operating position
- Pack Cover Switch - Pack access cover closed

In addition to the interlocks, the LOCAL/REMOTE switch A10S1 and the Power Sequence Pick and Hold lines must also be considered in the power on sequence. During normal maintenance the LOCAL/REMOTE switch is set to LOCAL, and therefore when all other conditions are satisfied the drive starts. Following is the definition of the power on condition, power off is the reverse of these conditions:

- AC POWER circuit breaker set to ON
- POWER SUPPLY circuit breaker set to ON
- START switch pressed such that it is lighted

It should be noted that for operations such as changing packs, it is not necessary to turn off the circuit breakers. It is only necessary to stop the drive motor by pressing the START switch (indicator not lighted).

When it is necessary to turn off power for one particular drive in a daisy chain string, it is recommended that the entire string be powered off (at least by pressing the START switch). This is necessary in order to prevent error conditions.

ONLINE/OFFLINE

The drive may be set offline (with respect to the system) as necessary to accomplish maintenance procedures. If it is required that the interface cables be disconnected for any reason refer to the paragraph on Disconnecting I/O Cables. While it is not necessary to remove power from the drive in order to set it offline, it is necessary to remove power in order to connect an FTU or similar test equipment (refer to paragraph on Power on/Power Off). Whenever the drive is taken offline for any reason, inform the system operator beforehand. The following two procedures (single and dual channel) describe setting the drive offline. Setting the drive online is simply the opposite condition.

Single Channel

1. Set Local/Remote switch A10S1 to LOCAL.
2. Set Maintenance Unit Disable switch A04S2 to DISABLE.

Dual Channel

1. Set Local/Remote switch A10S1 to LOCAL.
2. Set Channel I Maintenance Unit Disable switch B05S1 to DI.
3. Set Channel II Maintenance Unit Disable switch B05S2 to DII.

DISCONNECTING I/O CABLES

There are two I/O cable configurations: (1) star, (2) daisy chain. Refer to the Interconnect Cables and Terminators paragraph in Section 1 for further information. If the system uses a star cable configuration it may or may not need to have power removed prior to disconnecting the I/O cables. Refer to system manual for details. If the system uses the daisy chain cable configuration it must have power removed before the I/O cables are disconnected. The following procedure defines disconnecting I/O cables. Reconnecting the I/O is performed in the reverse order.

NOTE

Inform system operator that drive(s) are being taken offline.

1. Remove power from drive (from all drives if in a daisy chain string).

2. Referring to figure 3-20, remove I/O clamp securing I/O cables.

3. Remove A cables from connectors J3 and J4. Remove B cable from connector J2.

4. If system operation is required during time drive is removed from daisy chain, patch I/O cables around drive under test.

5. Perform required maintenance on drive.

MANUAL CARRIAGE POSITIONING

Certain tests require manual positioning of the carriage and coil assembly. This procedure should only be performed as required by specific tests later in this manual, or as a trouble shooting procedure when the drive does not respond under normal logic control. It should be noted that improper carriage positioning causes servo fault conditions. Typical examples of improper carriage positioning are such things as: loading heads too slowly, hitting forward stop with carriage, or positioning carriage in loading zone. If a servo fault does occur, unload heads, clear the fault, and repeat the operation being performed.

1. Press START switch to stop drive motor and unload heads. Set POWER SUPPLY circuit breaker to OFF.

2. Disconnect yellow voice coil leadwire from faston on edge of power amplifier assembly.

3. Set POWER SUPPLY circuit breaker to ON and press START switch to start drive motor.

4. Remove magnet cover by snapping it out of place.

CAUTION

Wait 30 seconds for drive motor to come up to speed then load heads. Avoid having heads in partially loaded condition.

5. Carefully grasp voice coil and load heads. Use care not to apply a downward force. Move carriage at approximately same speed it moves under logic control.

6. Position carriage as required to accomplish test being performed.

7. When tests are completed, manually unload heads to fully retracted position.

8. Press START switch to stop drive motor and set POWER SUPPLY circuit breaker to OFF.

WARNING

Be certain fingers are clear of positioner before connecting voice coil leadwire.

9. Reconnect yellow leadwire to faston on power amplifier assembly.

ACCESSING DRIVE FOR MAINTENANCE

GENERAL

The material in this section deals with gaining access to the drive electronics assembly to perform routine maintenance procedures. Figure 2-3 shows all of the functional electronics in the drive and indicates the physical location codes assigned to each. Alongside some of the location codes there is another identifier in parenthesis. This indicates the mating connectors identifier.

Table 2-4 is in alpha-numeric listing of all the physical location codes. The table also provides the title for each entry, and cross references to the parts data illustration and the sheet in the logic diagram set.

The number listed in the parts column of the table is the figure number which shows the listed item. In some cases there is a third part to the number (3-30-3), this third part (-3) indicates the sheet number of a multi-sheet illustration.

The number in the diagrams column of the table is the cross reference number of the diagram sheet which shows the listed item. In some cases an "X" appears as the third digit of the cross reference number. This indicates that the listed item is scattered over a number of sheets within the specified cross reference set (see introduction to logic diagrams for explanation of cross reference numbering system).

The procedures which follow in this section deal with opening and closing the various parts of the drive and cabinet. Many operations, such as opening and closing doors, are obvious and require no explanation. Other operations, such as sliding out the rail-mounted drive, only require the location of parts. Determine these things by looking at the appropriate illustration in the Parts Data section. Should it be necessary to remove any of the components of the drive, refer to Section 2D, Repair and Replacement for the appropriate procedure.

The following procedures are included to explain details which are not obvious in themselves or by looking at the associated illustrations. Procedures contained throughout this manual assume that the reader is familiar with the information presented here.

PACK ACCESS COVER OPENING AND CLOSING

The pack access cover should only be opened to change packs or perform a maintenance procedure. Do not allow the cover to stand open more than necessary. The open cover allows dust to enter the pack area, and the dust is potentially damaging to the disk pack and heads. Never open the pack access cover while the disks are turning.

Some drives have a pack cover interlock feature installed. On these machines the pack access cover can only be opened when the ac and dc circuit breakers are set to ON and the disks are not turning. If power is applied to the machine and the READY light on the control panel is lighted or blinking, the pack access cover cannot be opened.

CASE ASSEMBLY OPENING AND CLOSING

Although there are several types of case assemblies, for the purpose of opening and closing procedures there are only two types: (1) acoustic top case (2) normal case.

Acoustic Top Case Opening

1. Open rear door assembly and release two 1/4-turn fasteners securing case assembly to frame.
2. Lift case assembly up from rear until support rod reaches end of travel.
3. Allow case assembly to drop back a few inches so that support rod drops down against stop. Leave case assembly resting on support rod.

Acoustic Top Case Closing

1. Push case assembly forward slightly, removing weight from support rod.
2. Lift up on support rod until it clears stop, then carefully lower case to closed position.
3. Reach in from rear of drive and secure 1/4-turn fasteners.

Normal Case Opening

1. Press in on top cover release catches located on bottom outside corners of hinged panel at rear of drive. While holding in release catches, lift up on cover.
2. When cover has been raised a short distance, swing hinged panel back away from drive in order to clear rear of actuator assembly.
3. Pivot top cover up until it rests against case support arms.

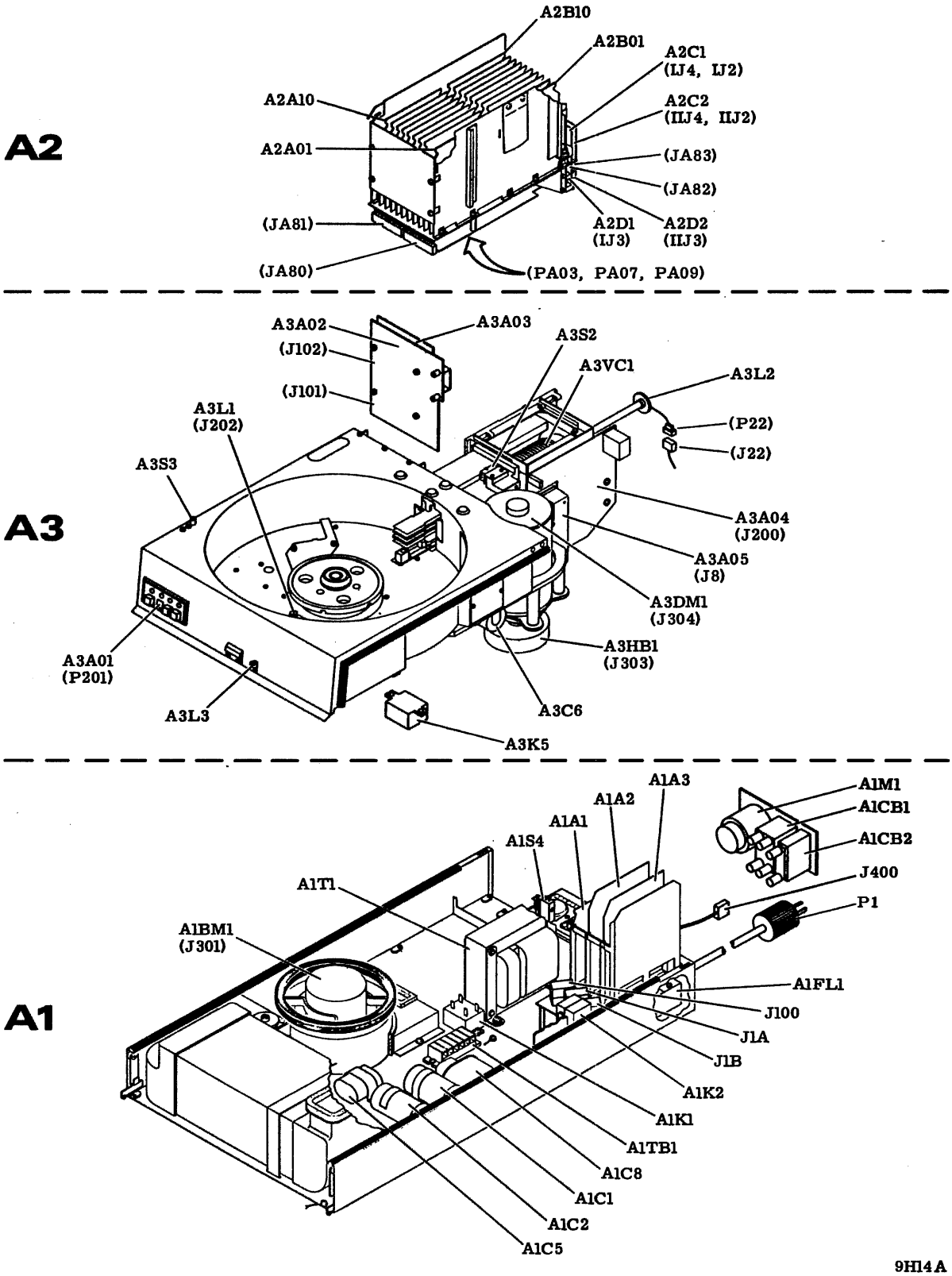

Figure 2-3. Physical Location Codes

TABLE 2-4. PHYSICAL LOCATION CODES

Physical Location Code	Title	Parts	Diagrams
A1	Base Assembly (AC Power System)	3-30	302
A1A1	Plus and Minus 42V Supply and Emergency Retract	3-31	31X
A1A2	Plus and Minus 20V, Plus and Minus 12V Supplies	3-31	32X
A1A3	Plus and Minus 5V Supply	3-31	33X
A1BM1	Blower Motor	3-30-2	302
A1C1	Servo Capacitor (+)	3-30-2	312
A1C2	Servo Capacitor (-)	3-30-2	312
A1C5	Blower Motor Start Capacitor	3-30-2	302
A1C8	Transformer Tuning Capacitor	3-30-2	302
A1CB1	AC Power Circuit Breaker	3-30-3	302
A1CB2	Power Supply Circuit Breaker	3-30-3	302
A1FL1	Line Filter	3-30-3	302
A1K1	Run Triac	3-30-1	302
A1K2	Emergency Retract Relay	3-31	312
A1M1	Elapsed Time Meter	3-30-3	302
A1S4	Deck Interlock Switch	3-30-1	302
A1T1	AC Power Transformer	3-30-1	302
A1TB1	Terminal Board	3-30-1	302
A1J1A	Power Supply Connector	3-31	31X
A1J1B	Power Supply Connector	3-31	32X
A1J100	Power Supply Connector	3-31	33X
A1J400	Fan Connector (Acoustic Top Mount Only)	3-16 3-17	302
A1P1	AC Power Connector	3-30-3	302
A2XXX	Logic Chassis - Logic chassis and associated cards are shown on figure 3-20, sheet 1. Part number information for each card is presented on Card Interchangability Chart at rear of Diagrams section in Maintenance Manual Volume 2. Logic diagrams for each card are also presented in that manual.		
A3	Deck Assembly	3-23	--

Table continued on next page

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TABLE 2-4. PHYSICAL LOCATION CODES (Contd)

Physical Location Code	Title	Parts	Diagrams
A3A01	Control Panel	3-20-1	25X
A3A02	Head Select and Read Amplifier	3-23-4	26X
A3A03	Writer	3-23-4	27X
A3A04	Power Amplifier	3-23-1	28X
A3A05	Track Servo Preamplifier	3-23-1	29X
A3C6	Drive Motor Capacitor	3-23-5	302
A3DM1	Drive Motor	3-23-5	302
A3HB1	Hysteresis Brake	3-23-5	302
A3K5	Start Triac	3-23-5	302
A3L1	Speed Transducer	3-23-3	103
A3L2	Velocity Transducer	3-27	072
A3L3	Pack Cover Solenoid (optional)	3-23-3	102
A3S2	Heads Loaded Switch	3-25	302
A3S3	Pack Cover Switch	3-23-1	252
A3VC1	Voice Coil	3-26	312

Normal Case Closing

1. Pivot case assembly down toward drive while lifting hinged panel out in order to clear rear of actuator assembly.

2. With case assembly still raised slightly, push hinged panel into place against back of drive.

CAUTION

Do not drop case assembly all the way down and then push in on hinged panel. This causes damage to top cover release catches.

3. While holding in on hinged panel, push down on case assembly from top. Release catches should snap into place.

RAISING AND LOWERING DECK

There are two positions the deck can be in: (1) normal operating (2) maintenance. In the normal operating position the deck is secured to the shock mounts on the base by two holddown screws inside the shroud and next to the spindle. While in this position, the rear deck holddown screw (center of three screws at rear of deck casting) and associated spacer are stored in the keeper hole at the rear of the deck casting. The following procedure assumes that power is removed from the drive and that the disk pack is removed from the spindle. This procedure describes raising the deck to the maintenance position. Returning the deck to the normal operating position is performed in the reverse order.

1. Remove (and set aside for future use) deck holddown screws from inside shroud (refer to figure 2-4).

2. Remove rear deck holddown screw and spacer from keeper hole on back of deck casting.

3. Insert spacer between deck and base hinge (refer to inset on figure 2-4). Insert rear deck holddown screw through deck and spacer and secure to base hinge.

4. Lift up deck from front of drive and install deck support bracket. Bracket is inserted into shock mounts on base and into holddown screw holds in bottom of deck casting.

RAISING AND LOWERING LOGIC CHASSIS

There are two positions for the logic chassis; (1) normal operating (2) maintenance. In the normal operating position the logic chassis sits alongside the actuator and the 1/4-turn fastener at the rear is secured to the deck casting. The following procedure describes raising the logic chassis to the maintenance position. It also describes removal of the logic chassis protective panel. Returning the logic chassis to the normal operating position is performed in the reverse order. This procedure assumes that power is removed from the drive.

1. Release 1/4-turn fastener securing logic chassis to rear of deck casting. Ensure that ring on 1/4-turn fastener does not interfere with logic chassis bracket when chassis is raised.

2. Slide logic chassis toward rear of drive to disengage chassis ears from logic chassis support rod.

3. Lift up on chassis until flat spring pops into place.

4. Pivot chassis 90 degrees and slide it over top of magnet assembly.

5. Remove attaching hardware securing logic chassis protective panel.

CAUTION

Use care not to damage cables or connectors when removing logic chassis cover.

6. Carefully slide logic chassis protective panel toward front of drive enough to disengage rear of panel from slot. Carefully slide panel along cables far enough to access back panel.

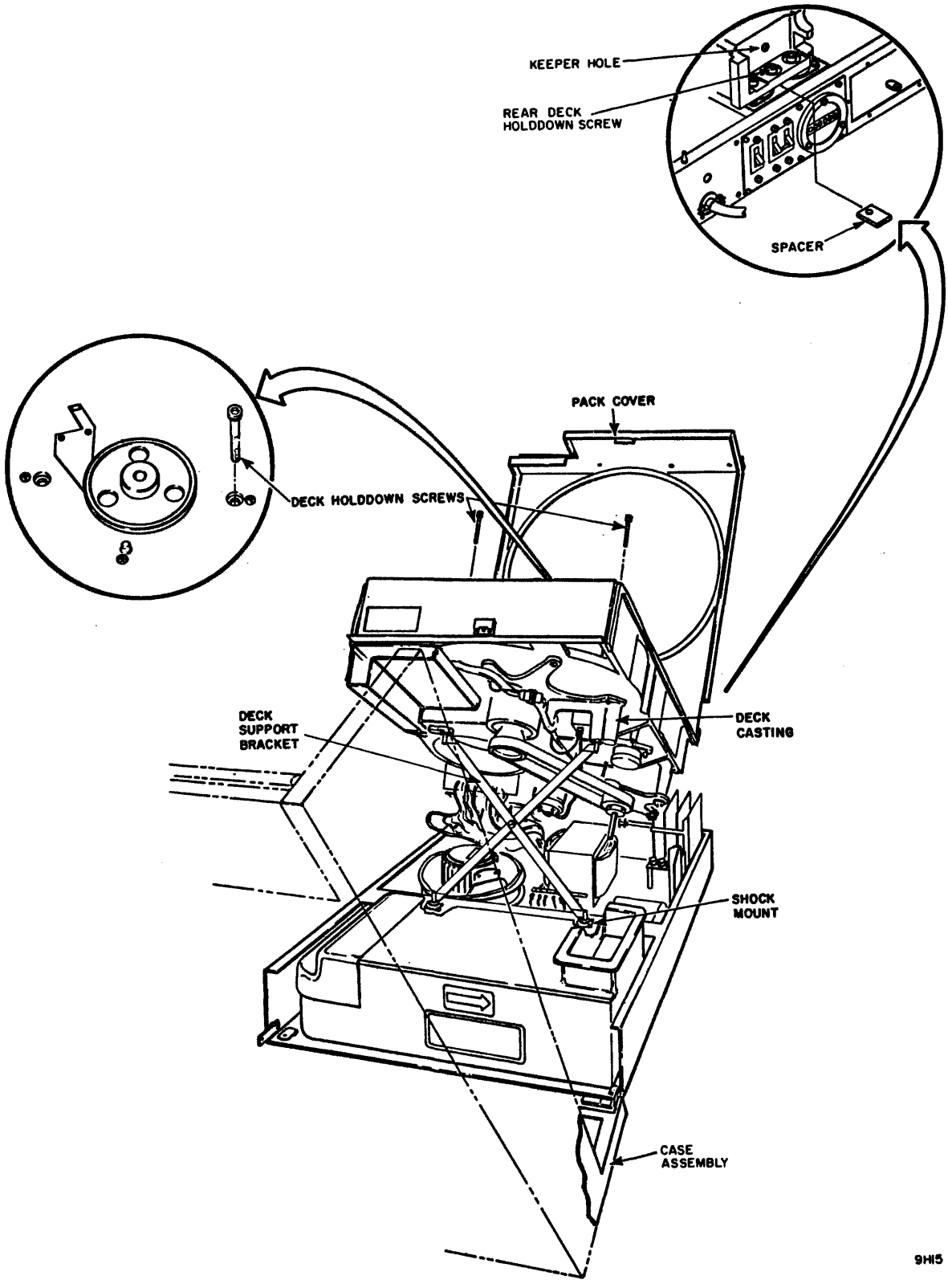

Figure 2-4. Deck Maintenance Position

SECTION 2B

PREVENTIVE MAINTENANCE

GENERAL

This section provides all information necessary to perform the required preventive maintenance on a drive in the field. Proper performance of the drive is dependent on adequate and timely execution of preventive maintenance routines. Many potential drive problems can be caught and corrected by strict adherence to the preventive maintenance schedule.

Procedures in this section assume the reader is familiar with the information provided in Section 2A General Maintenance Information. Refer to section 2A for information on safety precautions, maintenance tools and materials, test point locations, and accessing information (the opening and closing procedures for the various components of the drive).

Table 2-5 provides the preventive maintenance index. The index consists of six levels of maintenance based on a calendar period or hours of operation, whichever comes first.

The index assumes that the drives are installed in a computer room environment, and as such has scheduled maintenance consistent with that assumption. If the installation site is something other than a computer room environment, the maintenance schedule needs to be adjusted accordingly. The main factor in setting maintenance intervals is the cleanliness of the installation site. Under no circumstances should the maintenance intervals exceed those specified in table 2-5.

Following are the definitions of the six preventive maintenance levels:

Level 1 - Weekly or 150 hours

Level 2 - Monthly or 500 hours

Level 3 - Quarterly or 1500 hours

Level 4 - Semiannually or 3000 hours

Level 5 - Annually or 6000 hours

Level 6 - Biennially or 9000 hours

TABLE 2-5. PREVENTIVE MAINTENANCE INDEX

Level	Est Time (Minutes)	Procedure
4	10	General Cleaning
4	5	Clean Primary Filter
6	20	Replace Absolute Filter
4	1	Clean Shroud and Spindle
4	2	Clean and Lubricate Lockshaft
4	5	Inspect and Clean Rails and Bearings
4	2	Check Power Supply Output
5	120	Check Head Alignment

PREVENTIVE MAINTENANCE PROCEDURES

GENERAL

Perform preventive maintenance in accordance with the time or calendar schedule as specified in table 2-5. The following procedures are contained in this section in the order specified.

- General Cleaning
- Clean Primary Filter
- Replace Absolute Filter
- Clean Shroud and Spindle
- Clean and Lubricate Lockshaft
- Inspect and Clean Rails and Bearings
- Check Power Supply Output
- Check Head Alignment

GENERAL CLEANING

Since the drive is a precision machine and built to close tolerances, good housekeeping is essential to proper operation. A thorough cleaning on a regular basis prevents many problems. This procedure assumes that power is removed from the drive.

1. Carefully vacuum interior of cabinet and case, paying particular attention to flat surfaces where dust accumulates.
2. With deck in normal operating position, vacuum exterior surfaces of electronic assembly. Use a soft cloth dampened in a mild detergent solution to remove any greasy residue.
3. Raise deck to maintenance position and vacuum underside of deck and base assembly. Again, use a dampened cloth to remove any residue.
4. Inspect cables and connections for any sign of damage and correct as necessary.
5. Inspect drive belt for signs of fraying or cracking. Replace belt as necessary.
6. Return deck to normal operating position and close case and door assemblies.
7. Using a soft cloth dampened in a mild detergent solution, carefully wipe all cabinet surfaces. Use care not to allow moisture to run into drive.

CLEAN PRIMARY FILTER

The primary filter must be kept clean in order to allow sufficient passage of air to keep the drive cool. If the filter cannot be cleaned by the following procedure, it must be replaced. This procedure assumes that power has been removed from the drive.

1. Remove primary filter from drive:
   - For non-acoustic drives see figure 3-7, 3-10, or figure 3-11, depending on drives mounting configuration.
   - For acoustic drives see figure 3-3, sheet 2.
2. Clean filter by agitating in mild detergent solution.
3. Rinse thoroughly in clean running water. Shake vigorously to remove excess water and allow to dry.
4. Spray filter thoroughly with filter coat or suitable substitute.
5. Replace filter in drive.

REPLACE ABSOLUTE FILTER

An adequate supply of clean air to the pack area is essential to proper operation of the drive. Replacement of the absolute filter is required once every two years if the drive is operated in a computer room environment. If the drive is operated in something other than a computer room environment, absolute filter replacement is required more often. In a non-computer room environment it is suggested that the absolute filter be replaced every year or whenever there is doubt regarding the ability of the filter to pass air into the shroud area. The following procedure assumes that power is removed from the drive.

1. Raise deck to maintenance position.
2. Remove screw and lockwasher securing filter retaining bracket (see figure 3-30, sheet 1).
3. Remove bracket by pivoting it toward front of drive and disengaging flange on bracket from slot in base pan.
4. Remove absolute filter by pulling it toward front of drive. It may be necessary to jiggle filter to disengage it from blower motor outlet.

5. Wipe base pan clean in area under absolute filter and around blower motor outlet.

6. Install new filter by sliding it in from front of drive and engaging it in blower motor outlet.

7. Install filter retaining bracket and secure with screw and lockwasher.

8. Return deck to normal operating position.

CLEAN SHROUD AND SPINDLE

In order to prevent head-to-disk contact, it is imperative that the pack area be kept clean. The following procedure assumes that power is removed from the drive and that the disk pack is removed from the spindle.

1. Carefully vacuum entire pack area.

2. Using a wad of adhesive type tape, remove any particles not removed during vacuuming.

3. Using a piece of lint free gauze dampened in media cleaning solution, wipe all surfaces of the shroud. Remove all smudges and dirt. Carefully clean all surfaces of spindle.

4. Close pack access cover immediately after cleaning to ensure that dust does not enter pack area.

CLEAN AND LUBRICATE LOCKSHAFT

In order to prevent damage to the lockshaft and the disk pack it is necessary to keep the threads in the top of the lockshaft clean. This procedure assumes that power is removed from the drive and that the disk pack is removed from the spindle.

1. Using a stiff brush or a sharp pointed instrument, remove old lubricant paste from threads in lockshaft.

2. Using a piece of lint free gauze dampened in media cleaning solution, wipe all surfaces of spindle to remove traces of lubricant paste.

3. Apply a thin coat of new lubricant paste to threads of lockshaft.

INSPECT AND CLEAN RAILS AND BEARINGS

In order to ensure that the carriage is able to move freely along the rails, it is essential that the rail and bearing surfaces be kept clean. Any obstruction to free movement of the carriage may cause cylinder address errors. This procedure assumes that power is removed from the drive and that the disk pack is removed from the spindle.

1. Remove magnet cover (see figure 3-27) by grasping edge of cover and snapping it out of place.

2. Grasp coil through opening in top of magnet assembly. Carefully and slowly push coil forward to extend heads.

3. Once head arms have cleared cams, gently slide carriage and coil assembly back and forth along full length of rails. While moving coil, be aware of any posible irregularity (bumps or jerks) in movement. A sudden irregularity indicates dirt on rails or bearings. Do not confuse pressure of flex leads and head leads with a sudden irregularity in motion. Pressure from leads is a smooth change.

4. If a sudden irregularity in motion was noted in previous step proceed to next step. If no sudden irregularity in motion was noted, cleaning is not required. Terminate procedure by returning carriage to heads unloaded position (fully retracted) and replace magnet cover.

5. Using a cotton swab dampened (not soaked) in media cleaning solution, clean rail and bearing surfaces. Access front portion of lower rail from interior of pack area. Access rear position of lower rail and all of top rail from sides of actuator. Raise logic chassis as required to gain access from left side of actuator. Move carriage back and forth while cleaning in order to ensure all surfaces are reached.

6. When rail and bearing cleaning is completed, repeat step 3 to ensure that carriage moves freely without sudden irregularities in its motion. If carriage now moves smoothly throughout its travel, proceed to step 7. If sudden irregularities persist, visually inspect rails and bearings using a strong light. Look for deterioration of rail or bearing surfaces. Surface deterioration requires replacement of defective parts. Since neither carriage nor rails are field replaceable, contact factory maintenance representative.

7. Return carriage to heads unloaded position (fully retracted) and replace magnet cover.

CHECK POWER SUPPLY OUTPUT

Perform the Plus and Minus 5 Volt Adjustment procedure contained in Section 2C Tests and Adjustments.

CHECK HEAD ALIGNMENT

Perform the Head Alignment procedure contained in Section 2C, Tests and Adjustments.

SECTION 2C

TESTS AND ADJUSTMENTS

GENERAL

This section provides information on all the electrical test and adjustments which can be performed in the field. The adjustments contained here are limited to those which can be performed at the drive level. These tests should only be performed as required elsewhere in this manual, or when there is suspicion that the drive is not functioning properly. A drive that passes all the requirements in this section may be considered operationally acceptable. If any of the adjustments, contained in this section, cannot be completed satisfactorily, terminate the procedure and perform trouble analysis.

Mechanical adjustments are contained in the Repair and Replacement section. A person performing these tests and adjustments should already be familiar with the information contained in the General Maintenance Information section. Refer to that section for information on safety precautions, maintenance tools and materials, test point locations, and information on opening and closing of the various components of the drive.

These procedures assume that an FTU is connected to the drive (or that suitable software is available), that a scratch pack is installed (or CE pack where noted), and that the drive is powered on. All the following tests are written, providing first a check procedure, and then the adjustment. If the drive meets the criteria of the check, there is no need of the adjustment.

The following procedures are contained in this section, in the order specified:

- Plus and Minus 5 Volt Adjustment
- Head Arm Alignment
- Velocity Gain Adjustment (40 MB)
- Velocity Gain Adjustment (80 MB)

PLUS AND MINUS 5 VOLT ADJUSTMENT

This procedure checks the output of the plus and minus 5-volt power supplies while the drive is doing repeat seeks. Power supply outputs are checked at the logic chassis backpanel. Therefore, the supplies are being checked in a manner to account for both line loss and loading.

This procedure assumes that the FTU is connected to the drive, a scratch pack is installed, and power is applied.

CAUTION

Drive should not be operated for extended period with logic chassis in maintenance position. Loss of cooling air (when logic chassis is raised) could cause drive to overheat.

1. Raise logic chassis to maintenance position.
2. Connect digital volt/ohmmeter between GND and +5 V fastons on logic chassis backpanel.
3. Command drive to do repeat seeks between cylinders 0 and 32.
4. Plus 5-volt output should be +5.10 ±0.05 volts. If not, adjust +5 V potentiometer on card A1A3 (see figure 2-5) until output is within specification.
5. Move volt/ohmmeter leads to -5 V faston.

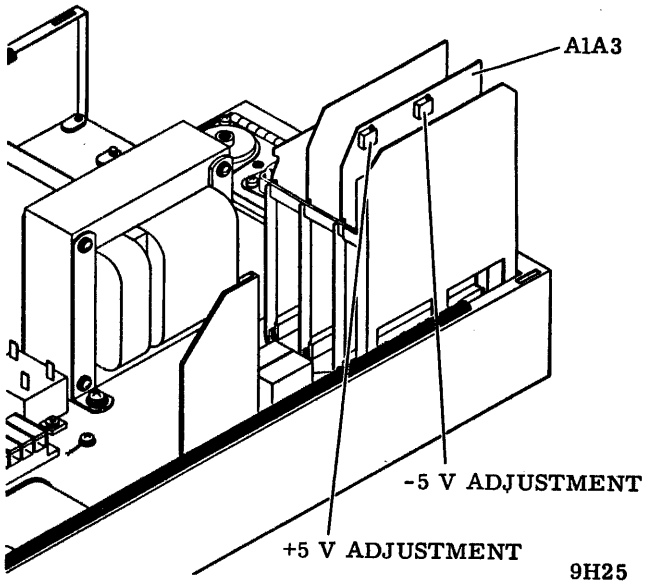

Figure 2-5. Power Supply Adjustment Locations

6. Minus 5-volt output should be -5.10 ±0.05 volts. If not, adjust -5 V potentiometer on card A1A3 (see figure 2-5) until output is within specification.
7. If any adjustment was necessary in preceeding steps, recheck both outputs.
8. When both power supply outputs are within specification, restore drive to normal operation.

HEAD ARM ALIGNMENT

Before performing the head arm alignment procedure, read and understand the concepts which follow. These are important for accurate head alignment, and they are only referenced in the procedure.

Thermal Stabilization - In order to ensure accuracy during head alignment, it is important that the drive, CE pack, and FTU be at their normal operating temperature. This requires that all three be connected and allowed to operate (pack turning and heads loaded to cylinder zero) for a minimum of 60 minutes. If head alignment is being performed on more than one drive, and provided pack was taken immediately from a previous drive, and provided drive under test has been operating with heads loaded for a minimun of 60 minutes preceding test; then CE pack only requires a 15-minute stabilization.

Alignment Tool - Use only the head alignment tool specified in the maintenance tools and materials table. Use of a different tool may cause damage to head-arm or carriage. Always inspect the adjustment end of tool prior to use. Tool must be free of nicks and scratches, and must have a polished surface. If any aluminum deposits are present, polish tool surface with crocus cloth. Any other polishing medium will damage the tool. Do not use a defective tool; repair or replace tool if damage exists. When using tool, position alignment tool so that pin in end of tool engages adjustment slot in head arm. Ensure that alignment tool is kept perpendicular to hole in carriage at all times. Tool should turn freely in hole. If it doesn't, recheck end of tool for damage or aluminum build up.

Calculating Offset - The formula for calculating head offset is (P) - (N) = Offset, where P is equal to the meter reading with the head alignment card P/N switch in the P position, and N is equal to the reading with the switch in the N position. All meter readings to the left of zero are negative. Following are examples of offset calculation:

1. P = +20 mV, N = +15 mV:

   (P) - (N) = (+20) - (+15) = +5 mV

2. P = +20 mV, N = -15 mV:

   (P) - (N) = (+20) - (-15) = +35 mV

3. P = -20 mV, N = +15 mV:

   (P) - (N) = (-20) - (+15) = -35 mV

Seek Error Prevention - When the alignment tool is used to position the heads, a small amount of sideways pressure on the tool can cause the carriage to move. This relatively minor amount of movement generates an error voltage which is sensed by the logic as a seek error. The end result is that the logic clears the Slope flip-flop and causes the drive to seek to the next even cylinder. In order to prevent this nuisance error, the head alignment procedure recommends that the Not On Cylinder signal be grounded at backpanel pin A2B09 03B.

CAUTION

Do not install ground until instructed to do so by procedure.

The ground is installed after the heads are at the alignment cylinder, and it must be removed before another seek can be performed.

Excessive Misalignment - Occasionally, during the alignment check, a badly misaligned head(s) (in excess of 200 mv offset for 40 mb drives or 300 mv for 80 mb drives) may be discovered. If this is so, the head(s) should not be realigned until all packs written by that drive have been dumped (data transfered from pack to other storage). Failure to dump the packs before realignment of the heads will mean that the data is not recoverable.

Carriage Locking - During the alignment procedure (when the heads are over the alignment track) the carriage locking pin and ring assembly is installed in the ALIGN TRACK LOCK hole in the rail bracket assembly. This locks the carriage in place. Failure to install the pin and ring assembly would allow the carriage to retract if any emergency retract signal were generated. Since your hands are in the actuator during the head alignment procedure, the retract could be dangerous. It should also be noted that should a retract condition be generated, the carriage locking pin and ring assembly must be immediately removed to allow the heads to retract before a head crash occurs. Carefully observe the instructions regarding the installation and removal of the carriage locking pin and ring assembly.

CE Pack - The CE pack has odd-even dibits written on tracks 000 through 330 only, on the servo surface. Do not attempt to access beyond track 330.

The following procedure first checks the alignment of the servo head and then checks the alignment of the read-write heads (which are aligned in relation to the servo head).

Alignment instructions are provided if any head exceeds the allowable offset. Throughout the procedure, the first value specified is for 40 megabyte drives, the value specified in parenthesis applys to the 80 megabyte drives, numbers specified in brackets are hexadecimal values for the cylinder address.

1. With heads fully retracted, raise logic chassis to maintenance position and note position of servo head adjustment slot in relation to hole in carriage. The adjustment slot should be approximately centered in carriage alignment hole (see figure 2-6).

NOTE

If drive has been used to write data packs, servo head should not be realigned until all read-write heads have been checked and it is known that excessive misalignment does not exist on any of them. Reference introductory paragraph.

2. If servo head is misaligned, loosen mounting screw and (using alignment tool) position adjustment slot as shown in figure 2-6. When servo head is properly positioned, tighten head mounting screw to a torque of 12 ±1/2 pound-force-inch. Lower logic chassis to normal operating position.

NOTE

If servo head is adjusted, all read write heads must be adjusted.

3. With CE pack installed and oscilloscope connected to head alignment card test points Y and Z, load heads to cylinder 000 [00] and perform thermal stabilization.

CAUTION

Do not attempt to access beyond cylinder 330 [14A].

4. When thermal stabilization is completed, command continuous seeks between cylinders 240 [F0] and 245 [F5] for 30 seconds minimum. This allows head gimbal springs to settle to a normal operating position, and also settles any binding between head arm and head mounting screw.

5. Stop continuous seeks and command a direct seek to cylinder 245 [F5].

NOTE

When using head alignment kit, set sensitivity switch on meter to 50 position and use X.1/X1 switch on head alignment card to control sensitivity.

6. On head alignment card, set S/RW (servo/read write) switch to S position, set X.1/X1 switch to X.1 position.

7. Balanced dibit pattern, similar to figure 2-7, should be observable on oscilloscope. If pattern is not balanced, terminate head arm alignment and refer to servo checks in trouble analysis section.

NOTE

When calculating head offset, if both P and N readings are less than 100 mv, set X.1/X1 switch on head alignment card to X1 position. Return switch to X.1 position before proceing to next head.

8. If balanced dibit pattern was observed in previous step, calculate head offset for servo head. Servo head offset must be 0 ±30 mv. If offset is greater than 30 mv terminate procedure and trouble shoot servo system.

9. On head alignment card, set S/RW switch to RW position. Select head 0.

10. Calculate and record offset for head 0.

11. Repeat previous step for all remaining heads.

CAUTION

If any read-write head exceeded 200 mv (300 mv) offset, excessive misalignment exists. Refer to introductory paragraph.

12. If calculated offset for any read-write head exceeded 100 mv (150 mv) proceed to next step. If all heads were within the offset requirements, restore drive to normal operation.

13. Command a return-to-zero seek. Press START switch to stop drive motor and unload heads.

14. Raise logic chassis to maintenance position and loosen head mounting screw for any head which exceeded the offset specification. Then retighten each loosened

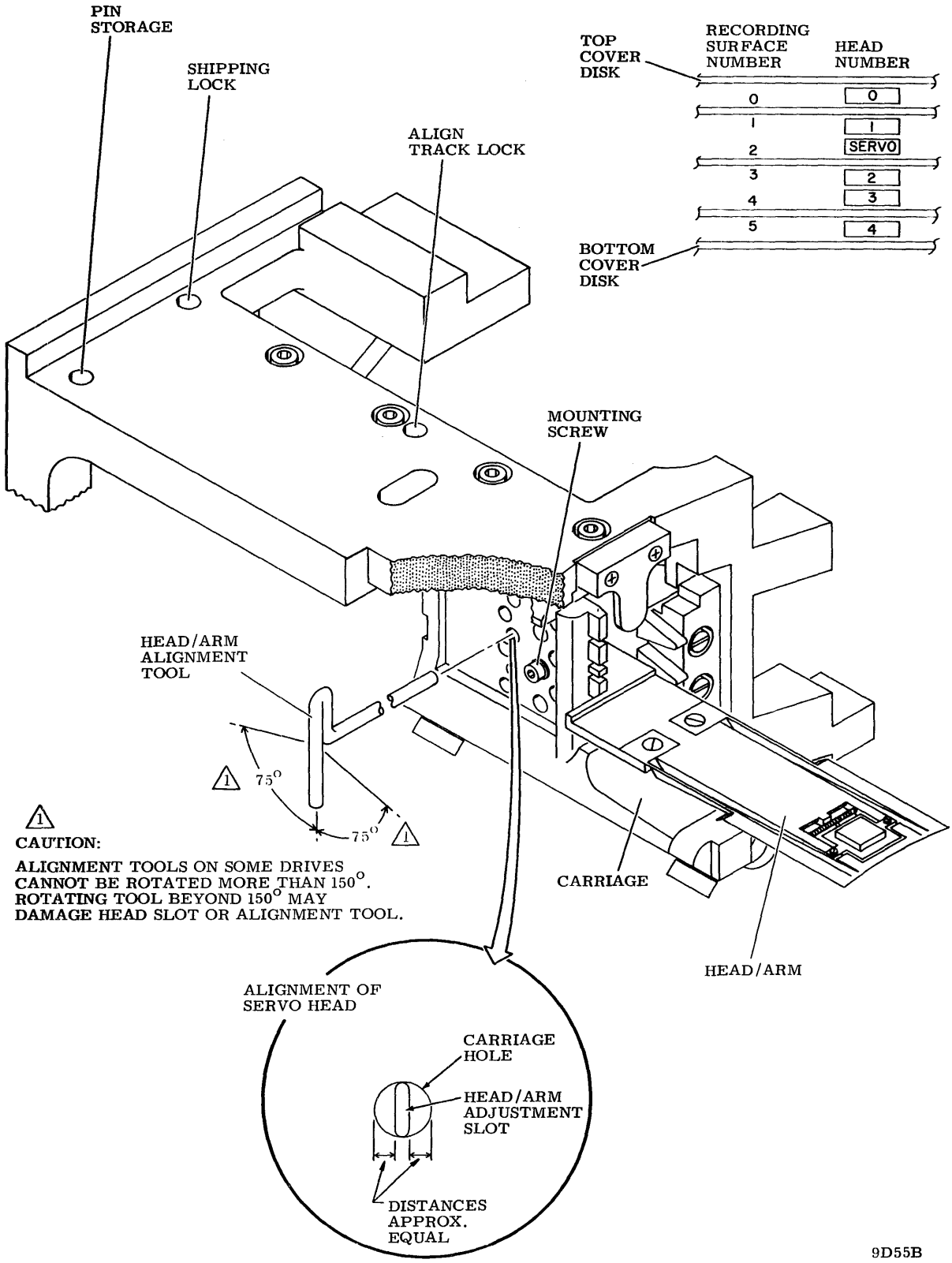

Figure 2-6. Head Arm Alignment

OSCILLOSCOPE SETTINGS

LOGIC GND TO SCOPE GND

VOLTS / DIV
CH 1 - 2V
CH 2 - NOT USED

TIME / DIV
A- 2 μSEC
B - NOT USED

TRIGGERING
A- INTERNAL POSTIVE
B- NOT USED

PROBE CONNECTIONS (USE X10PROBE)
CH 1 TO FTU DIBITS JACK
CH 2 - NOT USED

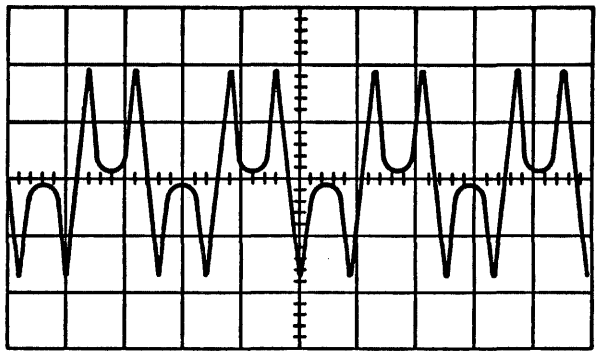

Figure 2-7. Balanced Dibit Pattern

screw to a torque of 4 ±1/2 pounds-force-inch. Remove connector support bracket from head arm connectors. This prevents possible electrical contact between alignment tool and bracket. Contact could cause a short circuit which would damage power amplifier.

15. Press START switch to start drive motor and load heads. Command continuous seeks between cylinders 240 [F0] and 245 [F5] for 30 seconds minimum.

16. Stop continuous seeks and command a direct seek to cylinder 245[F5].

WARNING

Use care not to cause any short circuits when moving logic chassis to install locking pin. Failure to install locking pin could cause personal injury.

17. Swing down logic chassis and install carriage locking pin and ring assembly in ALIGN TRACK LOCK hole. Return logic chassis to maintenance position.

18. Ground backpanel pin A2B09 03B (Not On Cylinder) to prevent nuisance errors. Ensure that head alignment card X.1/X1 switch is set to X.1 position and select head to be aligned.

19. Using recommended head alignment tool, perform coarse adjustment as follows:

    a. Adjust head until balanced dibit pattern is visible on oscilloscope.

    b. Continue to adjust head for minimum deflection of null meter with respect to zero.

    c. While changing position of P/N switch, continue to adjust head until calculated offset is less than 100 mv.

    NOTE

    If head cannot be aligned to less than 100 mv, it is possible read-write head is at its end of travel. Recheck servo head alignment.

20. Repeat previous step for all heads to be aligned.

21. On head alignment card, set X.1/X1 switch to X1 position.

22. Perform fine adjustment same as coarse adjustment except adjust until calculated offset is less than 50 mv (75 mv). Perform fine head adjustment for all heads to be aligned.

NOTE

Failure to remove ground wire will prevent any seek from being accomplished.

23. Remove ground from backpanel pin A2B09 03B.

24. Move carriage locking pin and ring assembly to PIN STORAGE hole.

25. Perform a return-to-zero seek.

26. For each head adjusted, tighten head mounting screw to a torque of 12 ±1/2 pounds-force-inch.

27. Command continuous seeks between cylinders 240 [F0] and 245 [F5] for 30 seconds minimum.

28. Stop continuous seeks and command a direct seek to cylinder 245 [F5].

WARNING

Use care not to cause any short circuits when moving logic chassis to install locking pin. Failure to install locking pin could cause personal injury.

29. Swing down logic chassis and install carriage locking pin and ring assembly in ALIGN TRACK LOCK hole. Return logic chassis to maintenance position.

30. Ground backpanel pin A2B09 03B to prevent nuisance errors.

31. Ensure that head alignment card X.1/X1 switch is in X1 position.

32. Check alignment of each head that was adjusted to assure that tightening screws did not change alignment.

CAUTION

Use care when using alignment tool on heads which have been tightened to torque of 12 ±1/2 pounds-force-inch. Misuse of tool will damage head arm or carriage.

33. If calculated offset for any head exceeds 75 mv (110 mv) repeat fine adjustment procedure until offset is less than 50 mv (75 mv).

NOTE

Failure to remove ground wire will prevent any seek from being accomplished.

34. Remove ground from backpanel pin A2B09 03B.

35. Move carriage locking pin and ring assembly to PIN STORAGE hole.

36. Restore drive to normal operation.

VELOCITY GAIN ADJUSTMENT (40 MB)

This procedure provides information on the checking and, if necessary, adjusting of the 40 megabyte servo system velocity signals. Because of the interaction between the three adjustments (velocity transducer gain, coarse velocity, and fine velocity), it is necessary to perform the adjustments as specified in the procedure. If any of the adjustments cannot be completed satisfactorily, the procedure must be terminated. If this happens, perform trouble analysis. The following procedure assumes that the FTU is connected, and that a scratch pack is installed on the drive.

1. With the drive case closed, command random seeks for 10 minutes minimum in order to thermally stabilize drive.

2. Stop random seeks and set up oscilloscope per figure 2-8. Oscilloscope ground references must be as shown.

3. Command 410 (hex 19A) cylinder continuous seeks and adjust oscilloscope trigger level to obtain waveform shown in figure 2-8.

4. Measure amplitude of Velocity signal (displayed on channel 2) and null-to-null time of Fine Position Analog signal (displayed on channel 1). Amplitude of Velocity signal and null-to-null time of Fine Position Analog signal must correspond as shown in table 2-6.

TABLE 2-6. 40 MB VELOCITY VOLTAGE VS NULL TIME

NOTE

Voltage readings in column A are ±.1 volt. Null-to-null readings in column B are ±4 µsec.

A(volts)	B(µsec)	A(volts)	B(µsec)
5.2	100	6.7	77
5.3	98	6.8	76
5.4	96	6.9	75
5.5	94	7.0	74
5.6	93	7.1	73
5.7	91	7.2	72
5.8	89	7.3	71
5.9	88	7.4	70
6.0	86	7.5	69
6.1	85	7.6	68
6.2	84	7.7	67
6.3	82	7.8	67
6.4	81	7.9	66
6.5	80	8.0	65
6.6	79		

OSCILLOSCOPE SETUP

	VOLTS / DIV	TEST POINT	SIGNAL NAME
CH 1 – (USE X 10 PROBE)	0.2 V	A2A08 TPF	+ FINE POSITION ANALOG
CH 2 – (USE X 10 PROBE)	0.1 V	A2A07 TPF	+ VELOCITY

	SLOPE / SOURCE	TEST POINT	SIGNAL NAME
TRIGGER A – (USE X 10 PROBE)	+/EXT	A2B09 14B	-T ≥ 128
TRIGGER B – (USE X PROBE)	NOT USED		

TIME / DIV: 20 µs MODE TRIGGER: CHOP

ADDITIONAL SETTINGS: NONE

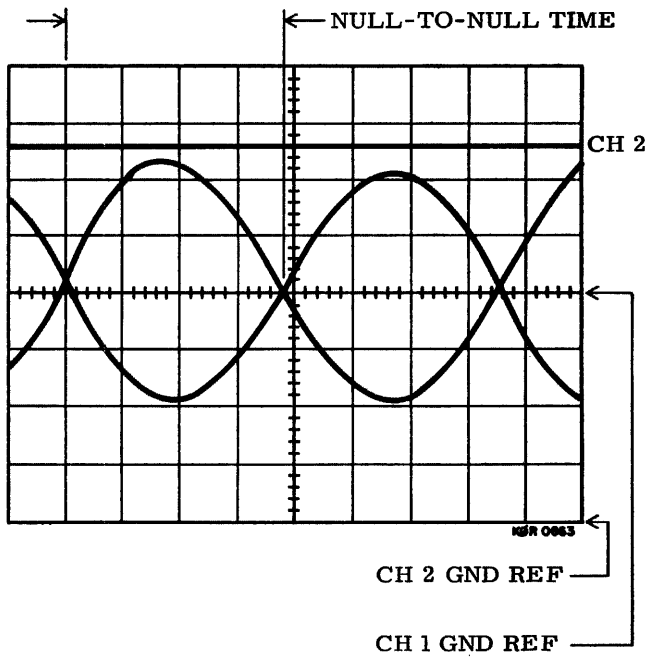

Figure 2-8. 40 MB Velocity Transducer Gain Waveforms

NOTE

Velocity amplitude changes as null-to-null time of Fine Position Analog signal is adjusted. Be sure to check both measurements while performing adjustment.

5. If time versus voltage relationship, measured in previous step, was not as specified in table, perform velocity transducer gain adjustment. On card A2A07, adjust potentiometer E2R6 (see figure 2-9) until relationship between time and voltage is as specified in table 2-6.

6. When velocity transducer gain adjustment is correct, change oscilloscope setup to that shown in figure 2-10.

7. Measure full length seek time. Time between On Cylinder Sense pulses (displayed on channel 2) should be 50 to 52 milliseconds.

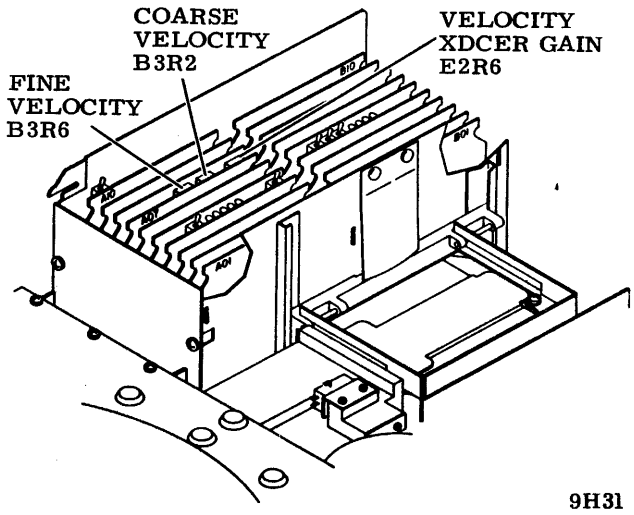

Figure 2-9. 40 MB Velocity Gain Adjustment Locations

OSCILLOSCOPE SETUP

	VOLTS / DIV	TEST POINT	SIGNAL NAME
CH 1 – (USE X 10 PROBE)	0.5 V	A2A08 TPF	+ FINE POSITION ANALOG
CH 2 – (USE X 10 PROBE)	0.5 V	A2B09 15A	+ ON CYLINDER SENSE
	SLOPE / SOURCE	**TEST POINT**	**SIGNAL NAME**
TRIGGER A– (USE X 10 PROBE)	+/EXT	A2B09 16B	- COURSE
TRIGGER B– (USE X PROBE)	NOT USED		

TIME / DIV: 10 ms **MODE TRIGGER:** CHOP

ADDITIONAL SETTINGS: NONE

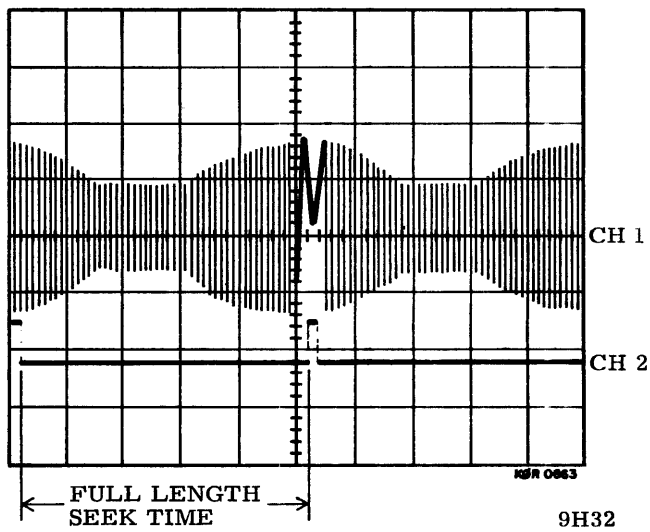

Figure 2-10. 40 MB Coarse Velocity Waveform

8. If full length seek time is not as specified, perform coarse velocity adjustment. On card A2A07, adjust coarse velocity potentiometer B3R2 (see figure 2-9) until time between On Cylinder Sense pulses is 50 to 52 milliseconds.

NOTE

Position of oscilloscope probe connections does not change between coarse and fine velocity adjustments.

9. When coarse velocity adjustment is correct, change oscilloscope setup to that shown in figure 2-11.

10. Command random seeks.

11. Fine Position Analog signal (displayed on channel 1) should show a slight ripple just as it is nulling out. Also, there could be a slight overshoot of the forward and reverse signals. On Cylinder Sense signal should be relatively stable. Referring to figure 2-11, note difference between Velocity Too Fast, Velocity Too Slow, and Correct Velocity.

12. If overshoot of Fine Position Analog signal and jitter of On Cylinder Sense signal are not approximately as shown in figure 2-11, (correct velocity) perform fine velocity adjustment. On card A2A07, adjust fine velocity potentiometer B3R6 (see figure 2-9) until velocity is as fast as possible without excessive overshoot or breakup of On Cylinder Sense waveform.

13. If fine velocity adjustment was required in previous step, repeat coarse velocity adjustment. Continue to perform adjustments until both coarse and fine velocity adjustments meet specifications.

14. Return drive to normal operation.

OSCILLOSCOPE SETUP

	VOLTS / DIV	TEST POINT	SIGNAL NAME
CH 1 – (USE X 10 PROBE)	0.5 V	A2A08 TPF	+ FINE POSITION ANALOG
CH 2 – (USE X 10 PROBE)	0.5 V	A2B09 15A	+ ON CYLINDER SENSE
	SLOPE / SOURCE	**TEST POINT**	**SIGNAL NAME**
TRIGGER A – (USE X 10 PROBE)	+/EXT	A2B09 16B	- COARSE
TRIGGER B – (USE X PROBE)	NOT USED		

TIME / DIV: 0.5 ms **MODE TRIGGER:** CHOP

ADDITIONAL SETTINGS: NONE

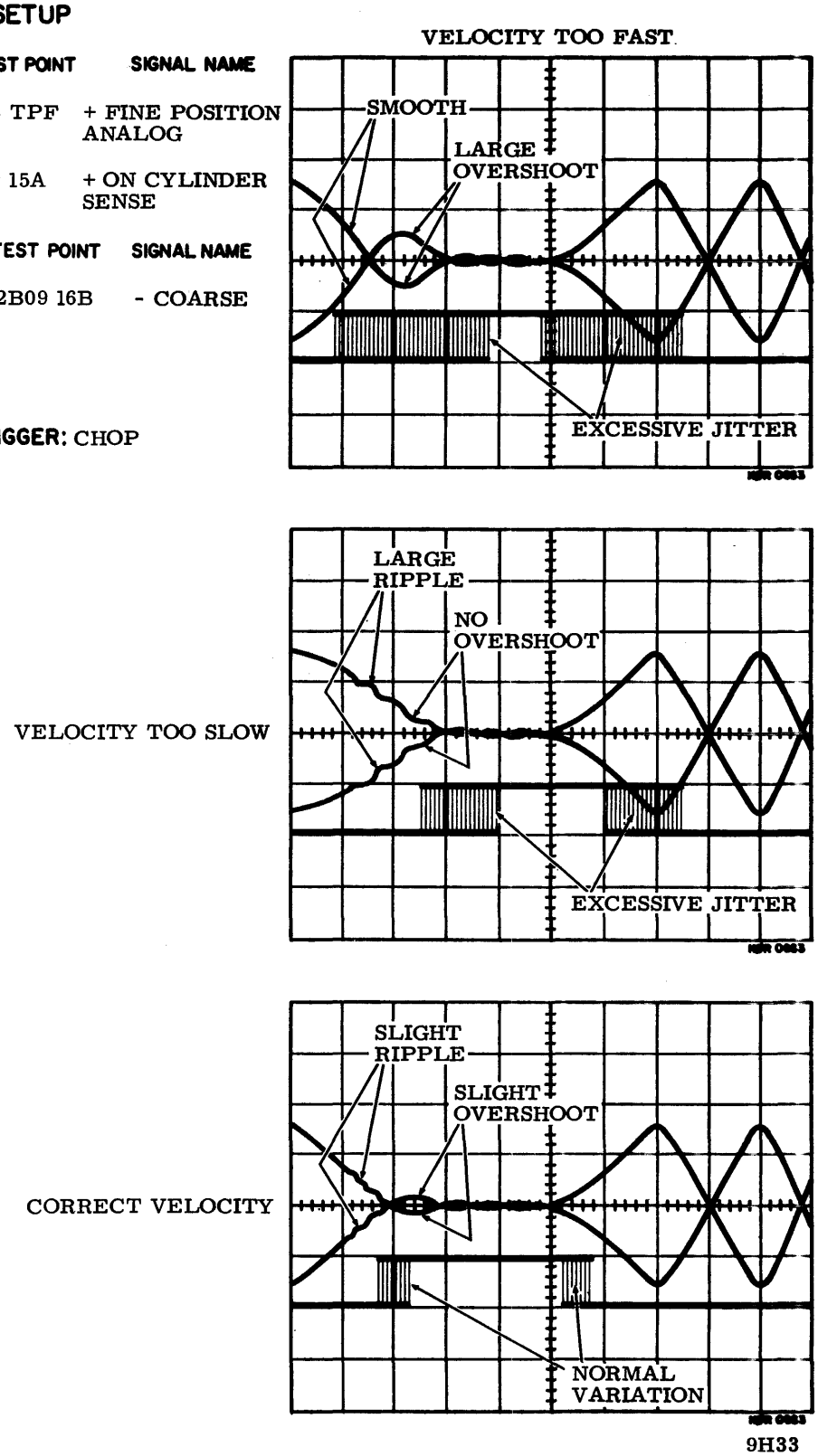

Figure 2-11. 40 MB Fine Velocity Waveforms

VELOCITY GAIN ADJUSTMENT (80 MB)

This procedure provides information on the checking and, if necessary, adjusting of the 80 megabyte servo system velocity signal. If the adjustment cannot be completed satisfactorily, the procedure must be terminated. If this happens, perform trouble analysis. The following procedure assumes that the FTU is connected, and that a scratch pack is installed on the drive.

1. With the drive case closed, command random seeks for 10 minutes minimum in order to thermally stabilize drive.
2. Stop random seeks and set up oscilloscope per figure 2-12. Oscilloscope ground references must be as shown.
3. Command 822 (hex 336) cylinder continuous seeks and adjust oscilloscope trigger level to obtain waveform shown in figure 2-12.
4. Measure full length seek time. Time between On Cylinder pulses should be 52 to 54 milliseconds.
5. If full length seek time is not as specified, perform velocity gain adjustment. On card A2A07, adjust velocity gain potentiometer E2R6 (see figure 2-13) until time between leading edges of On Cylinder pulses is 52 to 54 milliseconds.
6. Return drive to normal operation.

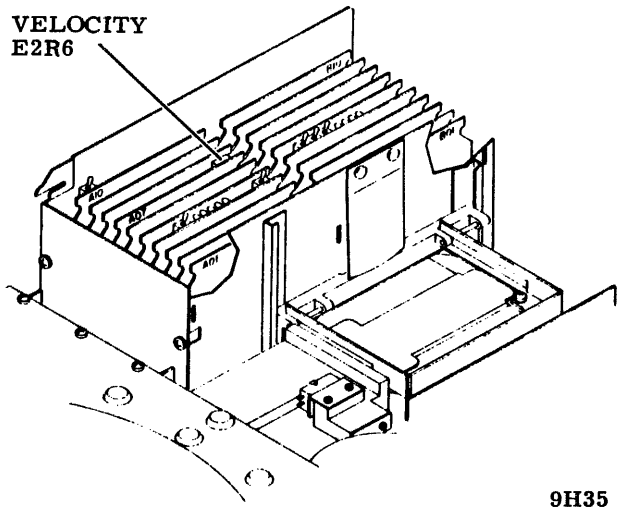

Figure 2-13. 80 MB Velocity Gain Adjustment Location

OSCILLOSCOPE SETUP

	VOLTS / DIV	TEST POINT	SIGNAL NAME
CH 1 – (USE X 10 PROBE)	0.2 V	A2B09 03A	+ ON CYLINDER
CH 2 – (USE X PROBE)	NOT USED		
	SLOPE / SOURCE	**TEST POINT**	**SIGNAL NAME**
TRIGGER A – (USE X 10 PROBE)	+/EXT	A2B09 07A	- FORWARD SEEK
TRIGGER B – (USE X PROBE)	NOT USED		

TIME / DIV: 10 ms **MODE TRIGGER:** CH 1

ADDITIONAL SETTINGS: NONE

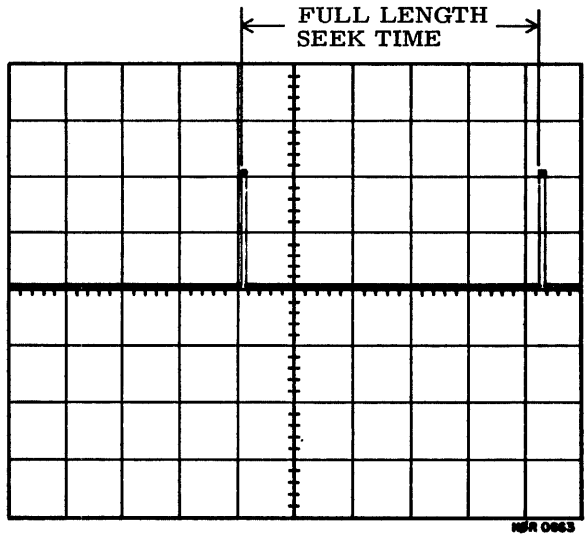

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Figure 2-12. 80 MB Velocity Gain Waveform

SECTION 2D

REPAIR AND REPLACEMENT

GENERAL

This section assumes that the particular assembly has previously been identified as malfunctioning. It then provides all necessary procedures pertaining to the adjustment, replacement, and repair of field replaceable parts of the drive. In addition, it identifies what to do when a particular part of the drive cannot be replaced in the field.

Information contained in this section assumes that the reader is thoroughly familiar with the information presented in the General Maintenance Information section of this manual. Also, this section relies heavily on the illustrations contained in the Parts Data section of this manual. These illustrations show the assembly and disassembly relationship of all the parts in the various assemblies. Individual procedures make specific references to the parts data illustrations.

Throughout the section, procedures for the various components or assemblies provide information on adjustment, removal-replacement, and repair in that order. If an adjustment procedure is included, and if there is some doubt as to the need for replacement, the adjustment procedure should be attempted before the final decision to replace the part is made.

Unless otherwise specified, all procedures in this section assume that the drive is powered down and that the customer disk pack is removed. Also, unless otherwise specified, all procedures can be performed with the drive installed in its normal operating position (in line with other drives, or in an equipment rack). Procedures for opening and closing the various cabinet components, and for raising and lowering the deck and logic chassis are included in the General Maintenance section under Access Drive For Maintenance.

CABINET REPAIR

GENERAL

Cabinet repair is limited to the removal and replacement of the various assemblies and their subcomponents, and to the adjustment of those assemblies for proper seating. Information is presented for all of the various mounting configurations of the drive. For this reason, ensure that the procedure is applicable to your drive (acoustic, non-acoustic, cabinet mounted, slide rail mounted, etc.).

Information is presented in the following order:

- Case Assemblies
- Pack Access Cover Assemblies
- Door Assemblies
- Side Panel Assemblies
- Slide Assemblies

CASE ASSEMBLIES

The case assemblies applicable to the various mounting configurations of the drive are illustrated in figures 3-7 through 3-11.

Adjustment

There are two adjustments applicable to the case assemblies: (1) Alignment to pack access cover (applicable to all mounted configurations), (2) Alignment to 1/4-turn fasteners (applicable only to acoustic top mount drives).

Alignment To Pack Access Cover - The case assembly must be parallel to, and centered around, the pack access cover. Before making this adjustment, ensure that the pack access cover is properly adjusted. Adjust the case assembly by carefully bending the pivot pin tabs on the base assembly (A1). The case assembly is properly adjusted when the gap between the case and pack access cover (with cover installed and closed) is approximately equal on all sides and the edges are approximately parallel.

Alignment To 1/4-Turn Fasteners - When the case assembly is closed, the case must align with the 1/4-turn fasteners such that the fasteners can engage and secure the case to the frame. Before making this adjustment, ensure that the pack access cover is properly adjusted and that the case is properly aligned to the pack access cover. Adjust the case by loosening all four sets of attaching hardware (see figure 3-3, Sheet 1) which secure the drive electronics assembly to the frame. Move the drive electronics assembly in relation to the frame, until the case can be secured by the 1/4-turn fasteners. When adjustment is complete and case can be secured, tighten the attaching hardware securing the drive electronics assembly to the frame.

Removal-Replacement

Although the various case assemblies are distinctive, the following procedure (with differences noted) applies to all case assemblies. Replacement is simply performed in the reverse order of removal.

1. Open case assembly from rear and pivot it forward on case pivot pin until it rests on case support arm (or support rod).
2. Remove ground cable by pulling it from quick disconnect terminal.
3. Disengage two halves of case support arm (or disengage support rod from slot in frame) while supporting case.
4. While still supporting case, slide case pivot pins (both sides) towards center of drive to disengage pivot pins from brackets.
5. Lift off case assembly.

Repair

Case assembly repair consists of removing and replacing broken or damaged parts. Section 3 lists all parts of the case assemblies which are field replaceable. There are no special tools required for case repair. The following items require the use of special materials:

- When replacing the support arm on all except the acoustic top case, put a light coat of Loctite grade C on threads of attaching screw.

CAUTION

Spray adhesive may get into drive if sprayed into air in computer room .

- When replacing acoustical foam panels on acoustic case assemblies, use a light coat of sprayable adhesive. First remove paper backing from foam. Then spray the adhesive around all edges of panel approximately one inch from edge. Also apply adhesive in an "X" pattern across center of panel. Place panel in position on case and press firmly into position.

PACK ACCESS COVER ASSEMBLIES

The non-acoustic and acoustic pack access cover assemblies are illustrated in figures 3-12 and 3-13 respectively.

Adjustment

Pack access cover adjustment is required if the gasket on the bottom of the cover does not seal on the shroud. Check the sealing by placing a piece of paper on the shroud and closing the cover. If the paper can be easily pulled out, the cover needs adjustment. Check the sealing at a minimum of four points around the shroud.

There are three points of adjustment on the pack access cover: (1) left hinge bracket (2) right hinge bracket (3) cover catch. The hinge brackets provide enough play to allow an up and down adjustment which controls the sealing of the gasket at the rear of the pack access cover. The cover catch also provides up and down adjustment. The cover catch controls the sealing of the gasket at the front of the cover.

In addition to pack access cover sealing adjustment, the cover must also be aligned parallel to and centered between the edges of the case assembly. Center cover on shroud by using pack cover spacers (as required) between bracket and bearing as shown on final assembly figure (3-2 through 3-6). Spacers may go on either side of cover as necessary to center cover. It may be necessary to readjust cover centering in order to complete case assembly centering adjustment.

Removal-Replacement

The following procedure applies to both the non-acoustic and acoustic pack access cover. Cover replacement is simply the reverse order of removal

1. Open pack access cover and remove ground strap by pulling loose quick disconnect on left side under shroud.
2. Remove retaining ring from pin securing gas spring to pack access cover.
3. While supporting pack access cover, pull out pin securing gas spring to cover.
4. Carefully loosen screws securing right-side hinge bracket. When screws have been loosened sufficiently, disengage hinge bracket and remove pack access cover.

Repair

Pack access cover repair consists of replacing broken and damaged parts. Section 3 lists all field replaceable parts of the covers. There are no special tools or materials required for pack access cover repair.

DOOR ASSEMBLIES

The door assemblies for the various mounting configurations of the drive are illustrated in figures 3-14 through 3-17.

Adjustment

The only adjustment required for the door assemblies is that they be aligned to the rest of the cabinet, and that they not rub on other cabinet members through the arc of their swing. All adjustment is accomplished by positioning the hinge members. Once the door is properly aligned, some adjustment of the keeper latch may be required to ensure proper latching.

Removal-Replacement

Removal and replacement procedures for the door assemblies depend on the style of the cabinet: non-acoustic or acoustic. The following procedures describe door removal; replacement is accomplished in the reverse order or removal.

Non-Acoustic Door - Door removal is accomplished by first opening the door and pulling the ground strap from the quick-disconnect terminal. The door is then removed by removing the lower hinge bracket and disengaging the door from the top hinge.

Acoustic Door - Door removal is accomplished by first opening the door and removing the attaching hardware securing the ground strap (and unplugging connector P400 on rear doors). The door is then removed by pulling out the hinge pin in the lower hinge and lifting the door from the upper hinge.

Repair

Door repair is limited to replacing broken or damaged parts. Section 3 lists all field replaceable parts of the doors. There are no special tools required for door repair.

The only special material required is sprayable adhesive. This is used in attaching the acoustical foam panels to acoustic door assemblies. Procedure for using the adhesive is the same as that listed under case assembly repair

SIDE PANEL ASSEMBLIES

The non-acoustic and acoustic side panels are illustrated in figures 3-18 and 3-19 respectively. All work on the side panels requires that the drive be accessible on all sides.

Adjustment

Side panel adjustment is required only on acoustic cabinets. Adjustment is required in three directions (see figure 2-14). The four brackets on the side panel (A in figure 2-14) control the up-down adjustment for the side panel. The four brackets on the frame (B in figure 2-14) control the front-back and in-out adjustment of the side panel.

Perform the up-down adjustment to cause the top of the side panel to be parallel and flush with the top of the cabinet frame. Perform the front-back adjustment to cause the front edge of the side panel to be parallel to, and approximately 1-1/2 inches (38.1 mm) in front of the front cabinet frame member (see figure 2-14). For this adjustment also ensure that front edge of side panel is flush with the front door when it is installed. Perform the in-out adjustment to cause the acoustic seals on the side panel to be in in contact with the cabinet frame. This adjustment should be snug enough to cause a slight squashing of the seals when the side panel is secured in place.

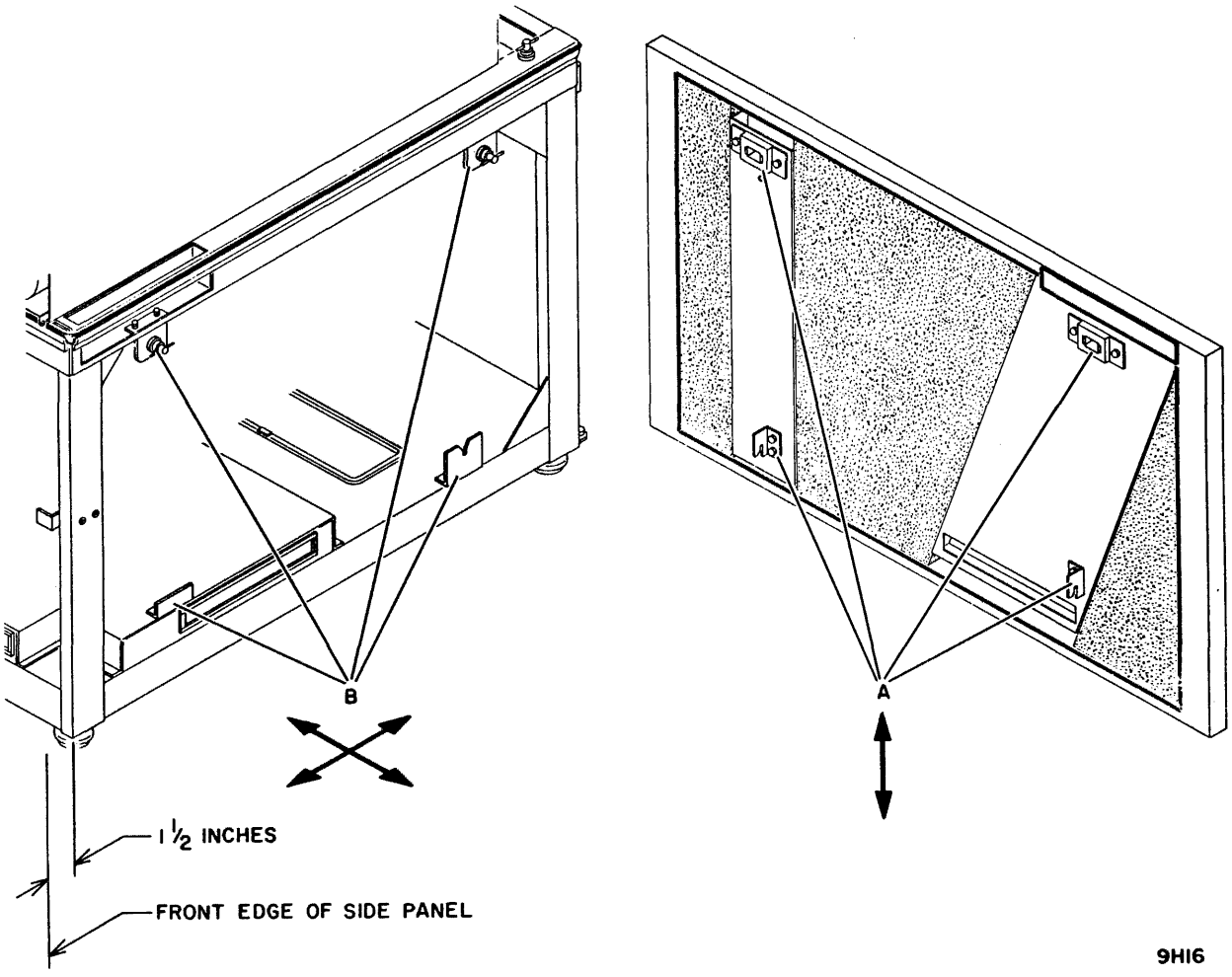


Figure 2-14. Side Panel Adjustment

A complete side panel adjustment is performed in the following order:

1. Adjust lower two brackets on side panel until panel meets up-down adjustment requirements.

2. Adjust lower two brackets on frame until panel meets front-back and in-out adjustment requirements. Lower rear bracket on frame governs exact front-back placement, while lower front bracket needs only an approximate placement.

3. Adjust top two brackets on frame so that 1/4-turn fasteners line up with side panel in front-back direction and that side panel meets in-out requirements.

4. Adjust top two brackets on side panel so that they line up with 1/4-turn fasteners.

Removal-Replacement

Removal and replacement procedures for the side panel assemblies depend on the style of the cabinet: non-acoustic or acoustic. The following procedures describe side panel removal. Replacement is accomplished in the reverse order of removal.

Non-Acoustic Side Panel - Remove side panel as follows:

1. Open front door and remove ground cable(s) from side Panel(s) by pulling cable from quick-disconnect.

2. Remove front attaching hardware from side panel(s).

3. Open rear door and remove rear attaching hardware while supporting side panel(s).

4. Lift side panel up to clear side panel brackets.

Acoustic Side Panel - Remove side panel as follows:

1. Open rear door and remove ground cable from side panel(s) by removing screw and lock washer.

2. Release rear 1/4-turn fastener(s).

3. Open front door (or fully extend lower drive on its slides) and release front 1/4-turn fastener(s) while supporting side panel.

4. Lift side panel up to clear side panel brackets.

Repair

Side panel repair is limited to replacing broken or damaged parts. Section 3 lists all field replaceable parts of the side panels. There are no special tools required for side panel repair.

The only special material required is sprayable adhesive. This is used in attaching the acoustical foam panels to acoustic side panels. Procedure for using the adhesive is the same as that listed under case assembly repair.

SLIDE ASSEMBLIES

The slide assembly relationship to the drive and frame is illustrated in figures 3-4 through 3-6. Identification of the various slide parts is shown in figure 2-15.

Adjustment

Adjustment of the slide assemblies is covered in the replacement procedure.

Removal-Replacement

The following procedures (with differences noted) apply to all drive configurations which use slide assemblies.

Removal - Remove slide assembly as follows:

1. Pull drive out to its fully extended position by pressing full extension releases.

2. Disconnect I/O cables, power cable, and system ground.

3. Loosen nuts securing quick-disconnect catches and slide catches toward front of drive.

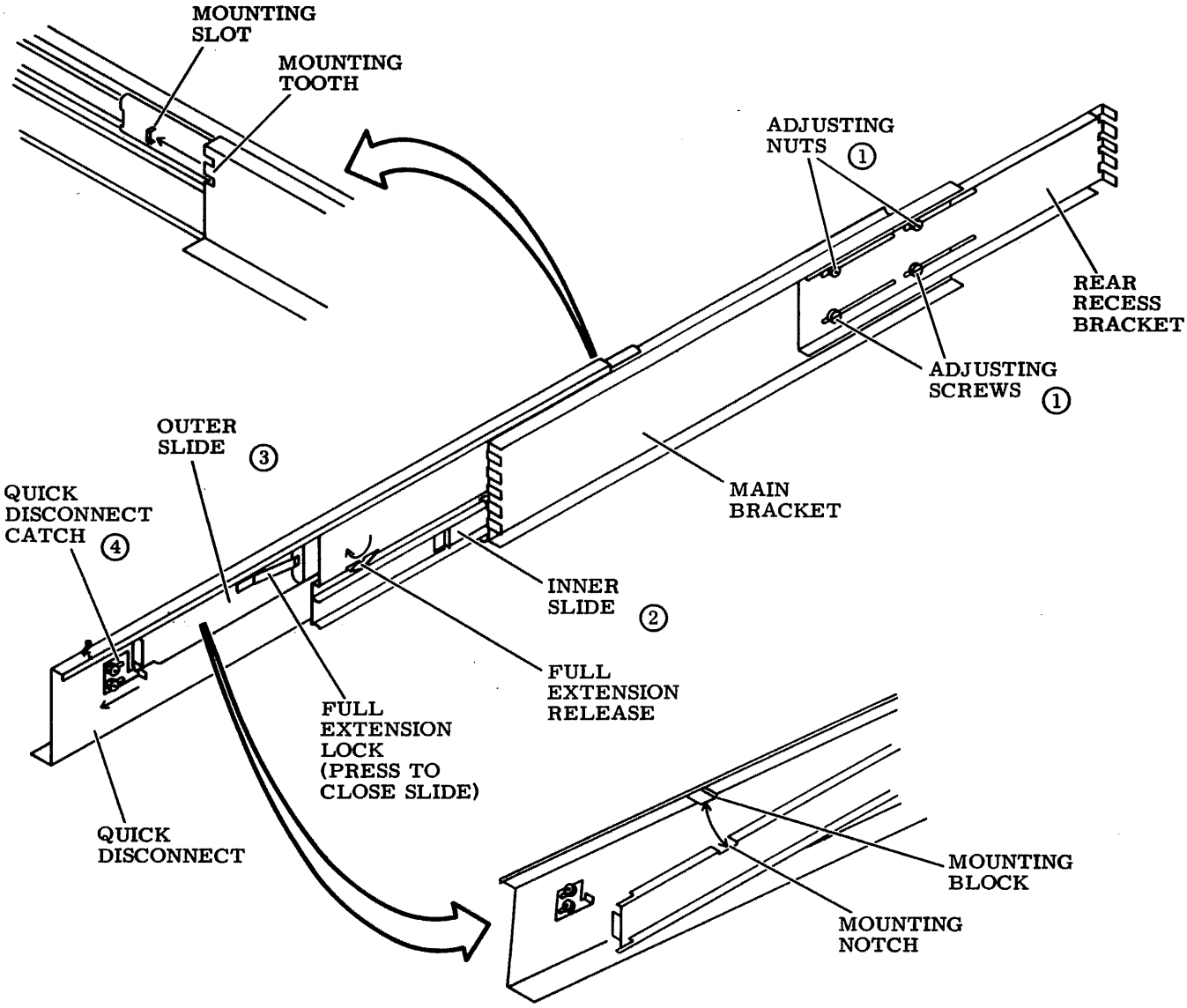
CAUTION

Two people are required to lift drive off slide assemblies.

4. Carefully lift drive (with quick disconnects attached to drives base assembly) from slide assemblies and set on a solid support.

5. Remove quick disconnects from drives base assembly by removing attaching screws and washers.

6. Push slide assemblies to fully closed position by pressing in full extension releases and pushing in slide assemblies.



NOTES:

(1) ALLOW REAR RECESS BRACKET ADJUSTMENT.

(2) LOCKS IN EXTENDED POSITION WHEN OUTER SLIDE IS FULLY EXTENDED.

(3) EXTENDED BY PRESSING FULL EXTENSION RELEASE. FULL EXTENSION LOCK SNAPS OUT WHEN THIS SLIDE IS FULLY EXTENDED.

(4) LOOSENING NUTS ALLOWS CATCH TO MOVE IN DIRECTION OF ARROW THUS ALLOWING QUICK DISCONNECT TO BE REMOVED.

5 ASSEMBLY SHOWN IS FOR RIGHT SIDE OF DRIVE.

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Figure 2-15. Slide Assembly Parts Location

7. Loosen mounting hardware securing slide assemblies to frame or rack.

8. Disengage slide assemblies from frame or rack by pulling slotted ends of slides out from between nut plate and frame.

Replacement - Install slide assemblies as follows:

1. Loosen adjusting screws and adjusting nuts on slide assemblies such that rear recess bracket can slide back and forth.

2. Push slide assemblies into fully closed position.

3. Loosely attach screws, lock washers, and nut plates to frame or rack. Leave hardware loose enough so that slotted ends of slide assembly can be inserted between nut plate and frame or rack.

4. Adjust position of rear recess bracket such that slide assemblies can be positioned in frame or rack. Position slide assemblies in frame with quick disconnect flanges at bottom and facing one another.

5. Tighten mounting hardware securing slide assemblies to frame. Tighten adjusting screws and adjusting nuts securing rear recess bracket to main bracket.

6. Ensure that slide assemblies are aligned both horizontally and vertically and that they are parallel.

7. Pull both slide assemblies to their fully extended position by pressing full extension releases.

8. Separate quick disconnects from slide assemblies by loosening nuts securing quick disconnect catch and sliding catch forward.

9. Remove rubber mounting pads from bottom of drive (some units may not have mounting pads).

NOTE

For ease of assembly and to prevent damage to case assembly, remove case before installing drive on slide assemblies.

10. Using four countersunk flat-head screws and countersunk washers on each side, attach quick disconnects to drives base assembly.

CAUTION

Before mounting drive ensure that all slide assembly mounting hardware is secure. Use two people to lift drive on to slides. When installing drawer mounted drive, use care not to exert undue downward pressure or frame may tip forward.

11. Carefully lift drive over fully extended slide assemblies. Engage mounting tooth on quick disconnects with mounting slot on outer slide. Ensure that mounting block is properly seated in mounting notch.

12. Slide quick disconnect catch into position under outer slide and tighten nuts.

13. Press in to release full extension locks and then slide drive in and out several times to ensure that it slides freely and that binding does not occur. If binding occurs, slide assemblies are not properly aligned.

14. Connect I/O cables, power cable, and system ground.

15. When slide installation is complete, install side panels (drawer mounted drives only) and then install case assembly.

Repair

No repair of the slide assemblies is possible at the field level. If a slide assembly is damaged, the entire assembly must be replaced.

ELECTRONIC PACKAGE REPAIR

GENERAL

Electronic package repair is limited to the removal and replacement of the various assemblies and parts of the drive, and to the adjustment of those components. The illustrations in section 3 show all the field replaceable parts of the drive and their interrelationship to one another. Most parts of the drive can be replaced simply by studying the parts list illustrations. However, there are some procedures which are not obvious or which require the use of special tools or materials. These procedures are arranged in alpha-numeric order according to their physical location codes. The mechanical assemblies, which do not have physical location codes (drive belt), are located next to a part with which they logically associate (drive motor). The following procedures are included in the order stated:

- 42 Volt Supply/Emergency Retract Assembly (A1A1)
- 12 And 20 Volt Supply (A1A2)
- 5 Volt Supply (A1A3)
- Blower Motor (A1BM1)
- Start Triac (A1K1)
- Logic Chassis (A2)
- Control Panel Assembly (A3A01)
- Power Amplifier Assembly (A3A04)
- Track Servo Preamplifier (A3A05)
- Drive Belt
- Drive Motor and Brake Assemblies (A3DM1, A3HB1)
- Spindle Assembly
- Static Ground Spring
- Speed Transducer (A3L1)
- Velocity Tranducer (A3L2)
- Pack Cover Solenoid (A3L3)
- Rail Bracket Assembly
- Carriage and Coil Assembly
- Heads Loaded Switch (A3S2)
- Flex Lead Assembly
- Magnet Assembly
- Head Arm Assemblies
- Cable Assemblies (W1 through W4, W11, W12)

42 VOLT SUPPLY/EMERGENCY RETRACT ASSEMBLY (A1A1)

The plus and minus 42 volt power supply, emergency retract assembly is illustrated in figure 3-32.

Adjustment

There are no adjustments applicable to the 42 volt power supply. If the output does not meet specification, repair or replace the card.

Removal-Replacement

There are no special procedures for removing the card. Simply remove the power supply cover and lift the card straight out of the power supply chassis.

Repair

Repair of the 42 volt power supply card consists of removing and replacing the electrical components in accordance with the parts data information. In replacing resistors R1 and R2, use RTV adhesive sealant, or a suitable substitute, to cement the resistor body to the board blank.

12 AND 20 VOLT SUPPLY (A1A2)

The plus and minus 12 volt and plus and minus 20 volt power supply is illustrated in figure 3-33.

Adjustment

There are no adjustments applicable to the 12 and 20 volt power supply. If the output does not meet specification, repair or replace the card.

Removal-Replacement

There are no special procedures for removing the card. Simply remove the power supply cover and lift the card straight out of the power supply chassis.

Repair

Repair of the 12 and 20 volt power supply consists of removing and replacing the electrical components in accordance with the parts data information. In replacing voltage regulator diodes VR1 and VR2, apply a thin coat of dielectric grease between the base of the diode and the heatsink.

5 VOLT SUPPLY (A1A3)

The plus and minus 5 volt power supply is illustrated in figure 3-34.

Adjustment

Adjustment of the 5 volt power supply is covered in Section 2C, Test and Adjustment.

Removal-Replacement

There are no special procedures for removing the card. Simply remove the power supply cover and lift the card straight out of the power supply chassis.

Repair

Repair of the 5 volt power supply consists of removing and replacing the electrical components in accordance with the parts data information. In replacing resistor R20, use RTV adhesive sealant (or a suitable substitute) to cement the resistor body to the board blank. In replacing transistors Q4, Q9, and Q10, apply a thin coat of dielectric grease between the base of the transistor and the heatsink.

BLOWER MOTOR ASSEMBLY (A1BM1)

The blower motor is illustrated in figure 3-30, sheet 2.

Adjustment

There is no adjustment applicable to the blower motor.

Removal-Replacement

Removal and replacement of the blower motor assembly is accomplished in accordance with the information in the parts data section. Before removing the blower motor, first remove the absolute filter and the logic chassis air plenum. If the square shoulder grommets between the base and the blower motor are removed or need to be replaced, ensure that the wide shoulder on the grommet is installed toward the blower. The foam tape gasket between the blower and the logic chassis air plenum is not part of the blower motor assembly. Refer to Repair for the replacement of the gasket.

Repair

Repair of the blower motor assembly is limited to the replacement of connectors, pins, quick connect terminals, insulating pods, and the foam gasket next to the logic chassis air plenum. Refer to the paragraph on cable assembly removal-replacement and repair for information concerning the electrical terminals.

Gasket replacement requires approximately 12 to 13 inches (305 to 330 mm) of foam tape. Proceed as follows:

1. Cut two lengths of foam tape, each 5-1/2 inches (139.7 mm) long.
2. Place logic chassis air plenum on base next to blower motor and align hold-down holes. Mark position of each end of plenum on blower motor with a pencil.
3. Remove backing from one 5-1/2 inch (139.7 mm) length of tape to expose adhesive. Position edge of tape against base (to seal space under blower) and center around two marks made on blower motor. Press tape firmly into position against blower and base.
4. Remove backing from second length of foam tape to expose adhesive. Position tape above upper edge of cutout in blower, edge of tape must be even with edge of cutout. Align ends of tape with first piece of tape and press into place on blower.
5. Cut two lengths of foam tape to length required to fill space between two lengths of tape already installed. Remove backing from tape and position with outer edges of tape even with ends of installed tape. Press into position.

NOTE

Use care not to damage gasket when installing logic chassis air plenum.

START TRIAC (A1K1)

The start triac is illustrated in figure 3-30, sheet 1.

Adjustment

There is no adjustment applicable to the start triac.

Removal-Replacement

Removal and replacement of the start triac is performed in accordance with the information in the parts data section. When replacing the start triac, apply a light coat of dielectric grease to the base of the triac.

Repair

No repair of the start triac is possible. If the triac fails it must be replaced.

LOGIC CHASSIS ASSEMBLY (A2)

The logic chassis assembly is illustrated in figure 3-22.

Adjustment

There is no adjustment applicable to the logic chassis assembly.

Removal-Replacement

The following procedure covers removal of the the entire logic chassis from the drive and removal of the wirewrap assembly from the logic chassis. However, the most common repair of the logic chassis is the changing of wires or the straightening or replacement of pins on the wirewrap panel. For these procedures it is not necessary to remove the entire logic chassis assembly. Replacement of the logic chassis is performed in reverse order of removal.

1. Disconnect I/O cables in accordance with procedure listed under Standard Test Conditions.
2. Remove I/O card(s) from locations D1 (and D2).
3. If terminators are installed, remove them from locations C1(and C2).
4. Remove all cards from logic chassis.
5. Raise logic chassis to maintenance position and remove all connectors, power and ground leads, and logic chassis cover from back of wirewrap panel (refer to figure 3-20, sheet 2).
6. With logic chassis in maintenance position, press in on flat spring and slide logic chassis off hinge.
7. Remove parts of logic chassis as necessary, in accordance with illustration in parts data section.
8. If it is necessary to remove wirewrap assembly from logic chassis, use a pliers to open crimp on end of each guide rail. When all crimps have been opened and each guide rail member is sufficiently straight, guide rails can be pulled out of wirewrap assembly.

Repair

Logic chassis repair is limited to the removal and replacement of broken or damaged parts in accordance with the parts data section, and to the repair of wires and replacement of wirewrap panels pins. The following procedures provide information on wirewrap replacement and pin straightening/replacement.

Wirewrap Replacement - This procedure describes removal and replacement of backpanel wirewrap connections.

1. Using end of wirewrap tool with notch opposing direction of wires wrap, slide tool over pin and carefully turn tool to unwrap wire.

CAUTION

Do not attempt to rewrap a previously wrapped wire. Cut off old wrap and restrip wire, or replace with new wire.

2. If wire is being replaced, cut new wire to proper length and strip approximately 1-1/8 inch (28.5 mm) of insulation from each end of wire.
3. Insert one end of wire into wirewrap tool until insulation rests against stop.
4. Slide tool over backpanel pin, leaving a small gap between bottom of post or lower wrap level and new wire.
5. Hold wire securely (allow small amount of slack to assure one turn of insulation) and twist tool to wrap wire around pin. As tool is twisted, wire wrapping around pin forces tool up and off wire.

6. When wire is completely wrapped, remove tool and inspect connection. Each connection must have one turn of insulation and six to seven turns of bare wire around pin.

Pin Straightening/Replacement - Wirewrap panel pin straightening is accomplsihed using the pin straightener listed in maintenance tools and materials. This procedure describes removing a damaged pin from the wirewrap panel and replacing it with a new one.

1. Remove card from logic chassis position associated with pin removal.

NOTE

Remove wires from pin, noting levels from which removed. When reinstalling wires, follow procedures in wirewrap replacement paragraph.

2. Remove all wires from subject pin.

3. Slide I/O pin removal tool over pin from wirewrap side of panel and apply pressure toward panel until bond breaks and pin starts to slide out.

4. Grasp shank of pin (with long nose pliers or similar tool) from card side of panel and pull it out. If collar (see figure 2-16) comes out with pin, proceed to step 5. If collar remains secure in panel, proceed to step 6.

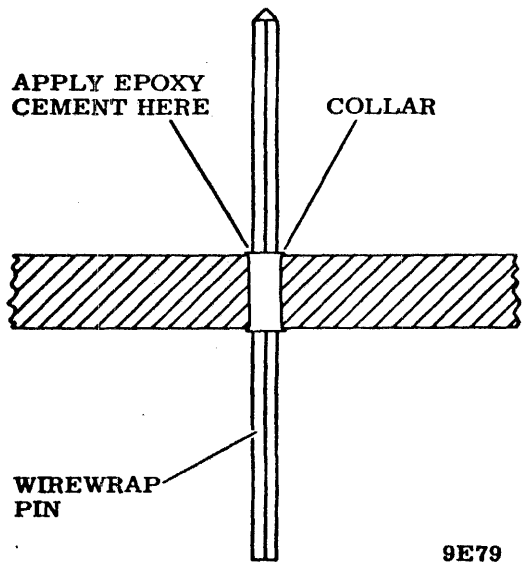

Figure 2-16. Wirewrap Pin Replacement

5. Coat collar of replacement pin (not hole) with fast cure epoxy and insert pin and collar into panel from wirewrap side. Proceed to step 7.

6. Insert replacement pin (with collar removed) into panel from wirewrap side until it is same length as adjacent pins.

CAUTION

Any epoxy on shaft of pin will prevent an electrical connection.

7. Carefully apply a (obtain commercially) fast cure epoxy around pin on wirewrap side of panel. ~~Allow epoxy to cure for~~

8. Following epoxy cure, reconnect wires and replace logic card in card slot.

CONTROL PANEL ASSEMBLY (A3A01)

The control panel assembly is illustrated in figures 3-20 and 3-21.

Adjustment

There is no adjustment applicable to the control panel assembly.

Removal-Replacement

Remove the control panel from the shroud by reaching behind the shroud and carefully pressing on the back of the panel. Lift the panel out the front of the shroud and disconnect connector P201. Replacement is performed in reverse order.

Repair

Repair of the control panel is limited to the removal and replacement of broken or damaged parts in accordance with the parts data information. When replacing any of the switches or lens diffused LEDs, ensure that they are properly aligned to clear the bezel before they are soldered in place. It is especially important that the switches not bind on the bezel after assembly.

POWER AMPLIFIER ASSEMBLY (A3A04)

The power amplifier is illustrated in figure 3-23, sheet 1 and in figure 3-29.

Adjustment

There is no adjustment applicable to the power amplifier assembly.

6. When wire is completely wrapped, remove tool and inspect connection. Each connection must have one turn of insulation and six to seven turns of bare wire around pin.

Pin Straightening/Replacement - Wirewrap panel pin straightening is accomplsihed using the pin straightener listed in maintenance tools and materials. This procedure describes removing a damaged pin from the wirewrap panel and replacing it with a new one.

1. Remove card from logic chassis position associated with pin removal.

NOTE

Remove wires from pin, noting levels from which removed. When reinstalling wires, follow procedures in wirewrap replacement paragraph.

2. Remove all wires from subject pin.

3. Slide I/O pin removal tool over pin from wirewrap side of panel and apply pressure toward panel until bond breaks and pin starts to slide out.

4. Grasp shank of pin (with long nose pliers or similar tool) from card side of panel and pull it out. If collar (see figure 2-16) comes out with pin, proceed to step 5. If collar remains secure in panel, proceed to step 6.

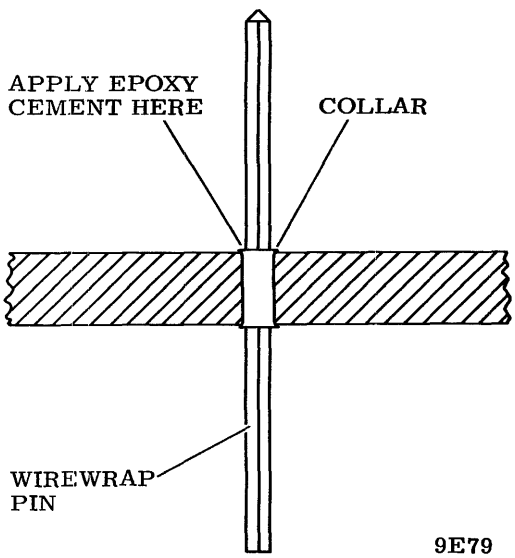

Figure 2-16. Wirewrap Pin Replacement

5. Coat collar of replacement pin (not hole) with fast cure epoxy and insert pin and collar into panel from wirewrap side. Proceed to step 7.

6. Insert replacement pin (with collar removed) into panel from wirewrap side until it is same length as adjacent pins.

CAUTION

Any epoxy on shaft of pin will prevent an electrical connection.

7. Carefully apply fast cure epoxy around pin on wirewrap side of panel. Allow epoxy to cure for _____.

8. Following epoxy cure, reconnect wires and replace logic card in card slot.

CONTROL PANEL ASSEMBLY (A3A01)

The control panel assembly is illustrated in figures 3-20 and 3-21.

Adjustment

There is no adjustment applicable to the control panel assembly.

Removal-Replacement

Remove the control panel from the shroud by reaching behind the shroud and carefully pressing on the back of the panel. Lift the panel out the front of the shroud and disconnect connector P201. Replacement is performed in reverse order.

Repair

Repair of the control panel is limited to the removal and replacement of broken or damaged parts in accordance with the parts data information. When replacing any of the switches or lens diffused LEDs, ensure that they are properly aligned to clear the bezel before they are soldered in place. It is especially important that the switches not bind on the bezel after assembly.

POWER AMPLIFIER ASSEMBLY (A3A04)

The power amplifier is illustrated in figure 3-23, sheet 1 and in figure 3-29.

Adjustment

There is no adjustment applicable to the power amplifier assembly.

Removal-Replacement

The following procedure removes the power amplifier from the drive. Replacement is performed in reverse order.

1. Remove quick connect terminal (yellow leadwire) from faston on upper left hand corner of assembly.
2. Loosen attaching hardware securing upper left hand corner such that assembly can later be removed.
3. Raise deck to maintenance position.
4. Remove connector J200. It may be necessary to use a tool to pry apart two halves of connector.
5. Remove two sets of attaching hardware securing assembly to deck casting. It may be necessary to raise deck higher in order to gain adequate access to attaching hardware.
6. Carefully lift assembly from behind attaching hardware loosened in step 2.

Repair

Repair of the power amplifier assembly consists of removing and replacing broken or damaged parts in accordance with the parts data section. When replacing any of the resistors on the board, use RTV adhesive sealant, or a suitable substitute, to cement the resistor body to the board blank. When replacing transistors Q1 through Q4, apply a thin coat of dielectric grease between the base of the transistor and the heat sink. Transistor Q5 uses the insulating wafer and does not need the dielectric grease.

TRACK SERVO PREAMPLIFIER (A3A05)

The track servo preamplifier assembly is illustrated in figure 3-23, sheet 1.

Adjustment

There is no adjustment applicable to the servo preamplifier assembly.

Removal-Replacement

The following procedure covers removal of the servo preamplifier assembly from the mounting plate and leaves the mounting plate secured to the deck. Replacement is performed in the reverse order of removal.

1. Raise deck to maintenance position.
2. Reach behind servo preamplifier from under deck and disconnect connector J8. It may be necessary to cut and remove cable tie strap.
3. Loosen attaching hardware on upper left hand corner of assembly. Carefully slide servo preamplifier shield from behind attaching hardware and leave it hanging on servo head cable.
4. Remove attaching hardware securing servo preamplifier housing to mounting plate. It may be necessary to remove deck support bracket and move deck up or down in order to have clear access to attaching hardware. Especially on cabinet mounted drives, it is easier to have one person manipulate deck into position and have a second person remove attaching hardware.
5. Unplug servo head connector from servo preamplifier board. Carefully remove preamplifier housing (containing board) from between deck and power supply. It may be easier to remove preamplifier housing if deck is lowered to normal operating position.
6. Remove attaching hardware securing servo amplifier board to housing.

Repair

There is no repair of the servo preamplifier possible at the field level. If the board is malfunctioning it must be replaced.

DRIVE BELT

The drive belt and associated adjusting hardware are shown in figure 3-23, sheet 5.

Adjustment

The drive belt adjustment may be performed any time there is suspicion that the belt may be slipping or as required by other procedures in this manual. Before performing the adjustment, check the belt for any signs of damage: fraying, cracking, or checking of belt surface. If any of these signs exist, replace the belt before performing adjustment.

1. Raise deck to maintenance position.
2. Referring to figure 2-17, measure distance between spring guide and stop nut. Distance must be:

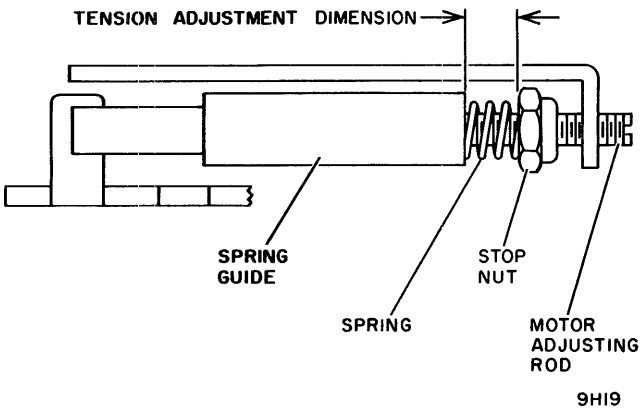

Figure 2-17. Drive Belt Adjustment

- 0.40 ±0.05 inch (10.16 ±1.27 mm) for 50 Hz drives.
- 0.25 ±0.05 inch (6.35 ±1.27 mm) for 60 Hz drives.

3. If dimension is not correct, turn motor adjusting rod until it meets specification.
4. Open pack access cover and rotate spindle while checking drive belt tracking. Belt must run true on both motor pulley and spindle pulley. Belt not tracking properly indicates pulley misalignment.
5. When belt is tracking properly, close pack access cover and return deck to normal operating position.

Apply power to drive and press START switch to start drive motor. Again watch drive belt and see that it is tracking properly.

Removal-Replacement

The following procedure covers both the removal and replacement of the drive belt and applies to all drives.

1. Raise deck to maintenance position.

CAUTION

Failure to relieve pressure on compression spring may cause the motor shaft to be bent.

2. Turn motor adjusting rod out until pressure on compression spring is fully relieved.
3. Remove drive belt from motor by rolling belt off motor pulley while rotating pulley. Disengage belt from spindle pulley and slip it out from around brake.
4. To install drive belt, slip belt up over brake and then engage other end of belt in groove on spindle pulley. Apply tension to belt and guide it on to motor pulley while manually rotating drive belt and drive motor pulley.
5. Manually rotate drive motor pulley several times to make certain that drive belt is tracking properly.
6. Perform Adjustment procedure.

Repair

There is no repair of the belt possible.

DRIVE MOTOR AND BRAKE ASSEMBLIES (A3DM1, A3HB1)

The drive motor and brake assemblies are illustrated in figure 3-28.

Adjustment

There are two adjustments pertaining to the drive motor and brake assemblies 1) drive belt adjustment 2) brake adjustment. The drive belt adjustment procedure is provided in the Drive Belt paragraph. The brake adjustment is performed during the replacement and is provided in the Removal-Replacement paragraph under brake replacement.

Removal-Replacement

The brake assembly may be removed and replaced separately, or the drive motor and brake assemblies may be removed and replaced as a unit. When removing the drive motor, the brake must also be removed. Removal and replacement of either the brake or drive motor and brake is self evident when using the illustration in the parts data section. Before beginning any work on the drive motor and brake assemblies, perform the drive belt removal procedure. The following information presents details of the reassembly procedures which are not obvious. Be thoroughly familiar with this information before attempting replacement.

Brake Replacement - The following procedure is to be used when ever a brake is installed on the drive motor shaft.

CAUTION

In order to prevent damage to drive motor shaft, brake replacement must be performed in the order specified.

1. Loosely install brake mounting bracket on motor mounting plate (see figure 3-28).
2. Install brake shaft collar (with ridge of collar facing away from drive motor) and then brake on drive motor shaft.
3. Slide brake on motor shaft so that collar slides on split shaft of brake armature and so that stud on brake strikes end of slot in brake mounting bracket. Tighten nut securing brake to brake mounting bracket.

CAUTION

In following step, be certain that brake is centered around drive motor shaft. If brake is miscentered it could cause damage to, or breaking of, drive motor shaft.

4. Support brake to maintain centering on motor shaft while tightening screw securing brake mounting bracket to motor mounting plate.
5. While holding motor pulley to prevent shaft from turning, rotate hysteresis brake armature several turns to eliminate any binding between drive motor shaft and brake armature.
6. With brake shaft collar resting on brake, tighten hex head socket screw in collar as follows:
   - On newer units (use a 9/64-inch hex wrench) tighten screw to a torque of 30 ±2 pounds-force-inch.
   - On older units (use a 7/64-inch hex wrench) tighten screw to a torque of 20 ±2 pounds-force-inch.

NOTE

Replacement brakes are supplied with extension cabling (required on older units.) If extension cable is not required, discard it.

7. Connect brake leadwires.
8. Replace cable ties, being certain that all wires are secured so they will not be rubbed by drive belt.

Drive Motor Replacement - Observe the following when reassembling the drive motor assembly:

NOTE

If it is necessary to replace drive motor assembly because of an electrical failure of the motor, also replace capacitor A3C6. It is likely that this capacitor is associated with failure.

1. With motor mounted on motor mounting plate, position pulley on drive motor shaft so that alignment dimension shown in figure 2-18 is 13/16 ±1/32 inch (20.7 ±0.8 mm).
2. Ensure that motor pulley flange protrudes slightly through shaft collar.
3. Tighten set screw in shaft collar to a torque of 65 ±5 pounds-force-inch.

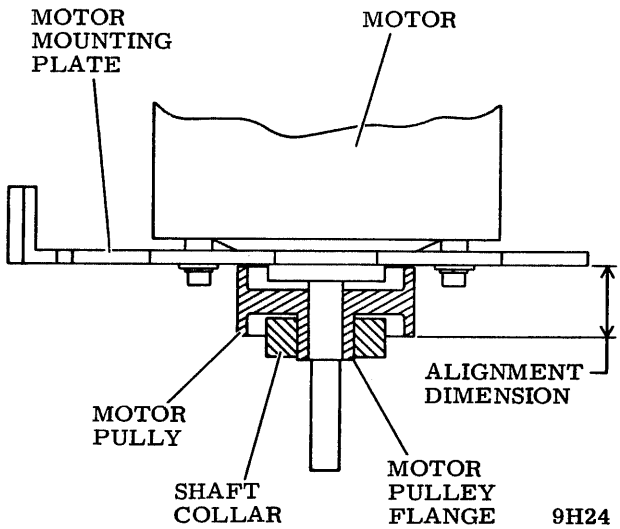

Figure 2-18. Drive Motor Pulley Adjustment

Repair

Repair of the drive motor and brake assemblies is limited to removing and replacing broken or damaged parts in accordance with information in the parts data section.

SPINDLE ASSEMBLY

The spindle assembly is illustrated in figure 3-24.

Adjustment

Spindle adjustment must be performed any time the attaching hardware securing the spindle to the deck has been loosened.

1. Remove head arm assembly number 3 (second from bottom).
2. Install carriage alignment arm in slot on carriage just vacated by head arm assembly number 3. Secure alignment arm to carriage and tighten attaching hardware until torque is 4 ±1/2 pounds-force-inch.
3. Extend carriage until alignment arm is aligned as shown in figure 2-19.
4. Using non-metalic feeler gauge, check that distance between alignment arm and spindle is as specified in figure 2-19. If adjustment is required, go to step 5. If specification is met go to step 11.
5. Retract carriage and rotate spindle until holes in top of spindle align with mounting hardware.
6. Remove screws and washers securing spindle to deck. Install screws (without washers) and just snug screws tight.
7. Extend carriage until alignment arm is positioned as shown in figure 2-19.
8. Using a plastic faced hammer, gently tap spindle until dimension between alignment arm and spindle is as specified in figure 2-19.
9. Tighten one screw at a time and check dimension after tightening each screw.
10. When last screw is tighten in step 9, remove first screw tightened and install washer on it. Then reinstall screw, tighten it, and recheck dimensional requirement. Repeat this procedure for the second and third screws.

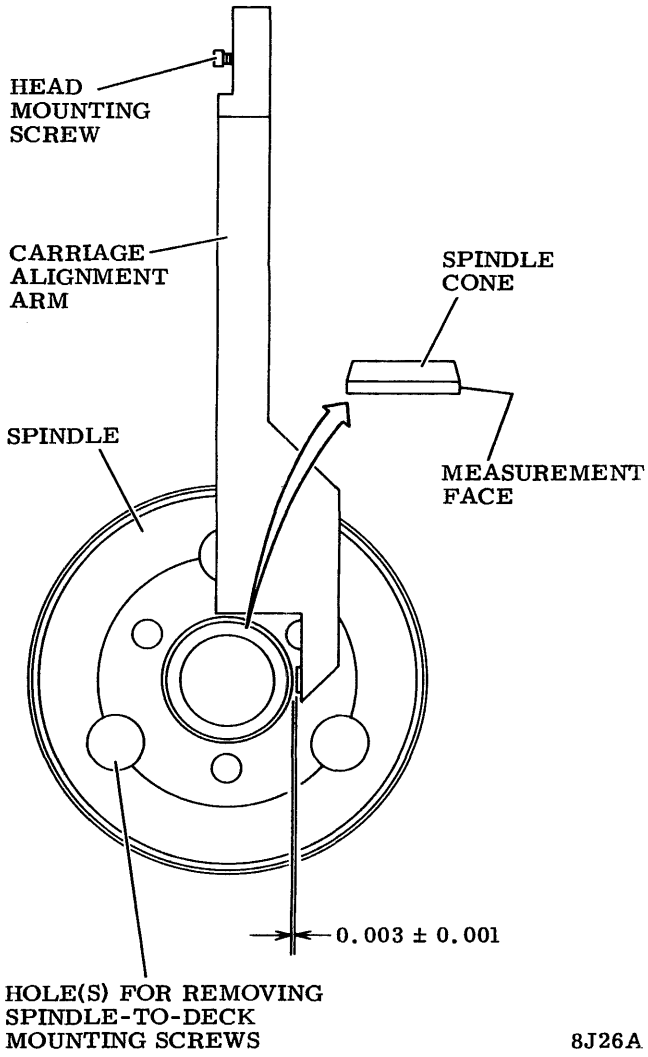

Figure 2-19. Spindle/Carriage Alignment

11. Remove alignment arm and install head arm assembly in slot number 3 in carriage.
12. Perform static ground spring adjustment and head arm alignment procedures.

Removal-Replacement

The following procedure covers removing and replacing the entire spindle assembly. It is not necessary to remove the spindle to

perform lockshaft replacement. Refer to Repair for information concerning lockshaft replacement.

1. Raise deck to maintenance position.
2. Referring to figure 3-23, sheet 5, remove attaching hardware securing ground cable to static ground spring block.
3. Remove drive belt and set it aside.
4. Lower deck to normal operating position.
5. Rotate spindle until holes in top of spindle align with mounting hardware.
6. Remove attaching hardware securing spindle assembly to deck.
7. Lift spindle assembly from deck, being careful to avoid damage to static ground spring.
8. Remove attaching hardware securing static ground spring mounting block to spindle assembly. Remove static ground spring assembly and install it on replacement spindle assembly.
9. Carefully lower replacement spindle assembly through deck opening in shroud. Orient spindle assembly so that ground spring mounting block faces drive motor.
10. Secure spindle assembly to deck using screws only. Lock washers are installed during Adjustment procedure.
11. Raise deck to maintenance position.
12. Install ground cable to static ground spring mounting block and install drive belt.
13. Perform Drive Belt Adjustment procedure and then the Spindle Assembly Adjustment procedure. Following spindle assembly adjustment, check speed sensor adjustment.

Repair

Repair of the spindle assembly is limited to removal and replacement of the lockshaft and associated hardware as indicated in the parts data section. The following procedure covers removal and replacement of the lockshaft.

1. Raise deck to maintenance position.
2. Referring to figure 3-23, sheet 5, remove attaching hardware securing ground cable to static ground spring block.
3. Remove static ground spring from mounting block.
4. Remove shaft end seal by prying down with a pair of opposing screw drivers.
5. Reaching in from bottom of spindle, remove shoulder screw and associated washers and spring. Spindle may be locked in position during shoulder screw removal, by pressing down on end of brake plate.
6. Lift lockshaft out from top of spindle.
7. Install replacement lockshaft, sliding it in from top of spindle. If smaller compression spring came out with old lockshaft, assemble it on new lockshaft before assembly.
8. Assembly two washers and compression spring on shoulder screw as shown in figure 3-24. Apply a thin coat of Loctite primer, grade T, to last four threads of shoulder screw; being careful not to get any primer on spring or washers.
9. Allow Loctite primer to air dry for approximately 5 minutes.
10. When Loctite primer is dry apply a thin coat of Loctite, grade C, to last four threads of shoulder screw. Parts must be assembled within three minutes of Loctite application.
11. Assemble shoulder screw and hardware into bottom of lockshaft. Tighten shoulder screw to a torque of 40 ±5 pounds-force-inch.
12. Press shaft end seal into position on bottom of spindle assembly. Lower deck to normal operating position and allow Loctite to air dry for approximately three hours.
13. Following Loctite cure, raise deck to maintenance position and assemble static ground spring and associated ground cable.
14. Perform Clean and Lubricate Lockshaft procedure (see preventive maintenance).
15. Perform Static Ground Spring Adjustment procedure.

STATIC GROUND SPRING

The static ground spring (located on the bottom of the spindle assembly) is illustrated in figure 3-23, sheet 5.

Adjustment

The ground spring adjustment procedure must be performed any time the screws securing the spring or mounting block have been loosened, or as required by other procedures in this manual.

1. Raise deck to maintenance position.
2. Connect push-pull gauge to outer end of ground spring.
3. Using a force in-line with lockshaft, pull down on push-pull gauge. Force required to pull ground spring free of spindle end seal must be 90 ±10 grams.
4. If force is within specification, go to step 7. If force is not within specification, loosen attaching hardware securing ground spring mounting block to side of spindle assembly.
5. Adjust spring tension by sliding mounting block toward deck (to increase tension) or away from deck (to decrease tension) and retightening attaching hardware.
6. Repeat force measurement and adjustment steps until specifications are met. If specifications cannot be met, replace ground spring.
7. Remove attaching hardware securing ground cable to ground spring mounting block and disconnect ground cable.
8. Connect multimeter (set to RX1) between ground cable and ground spring. Meter should indicate zero ohms. If specification is met go to step 10, if it is not met go to step 9.
9. Clean bottom of shaft end seal (on bottom of spindle) using a piece of gauze slightly dampened with media cleaning solution. Repeat step 8. If specification is not met, replace ground spring.
10. Disconnect multimeter and connect ground cable to ground spring mounting block.
11. Lower deck to normal operating position.

Removal-Replacement

There are no special procedures for the removal and replacement of the static ground spring. Perform the removal-replacement in accordance with the information in the parts data section.

Repair

No repair of the static ground spring is possible. If any of the parts fail, they must be replaced.

SPEED TRANSDUCER (A3L1)

The speed transducer assembly is illustrated in figure 3-23, sheet 3.

Adjustment

Speed transducer adjustment is required when ever the relative position of the spindle and the speed transducer has been changed, or as required by other procedures in this manual.

1. Inside the pack area, place a straight edge across top of spindle face plate so that it extends out over top of speed transducer.
2. Check dimension from top of speed transducer to top of spindle assembly face plate (see figure 2-20). Dimension must be as specified in figure. If dimension is correct, terminate procedure. If dimension is not correct, go to next step.
3. Raise deck to maintenance position.
4. Loosen locknut on bottom of speed transducer. Disconnect connector J202 so that leads are free to turn during adjustment.

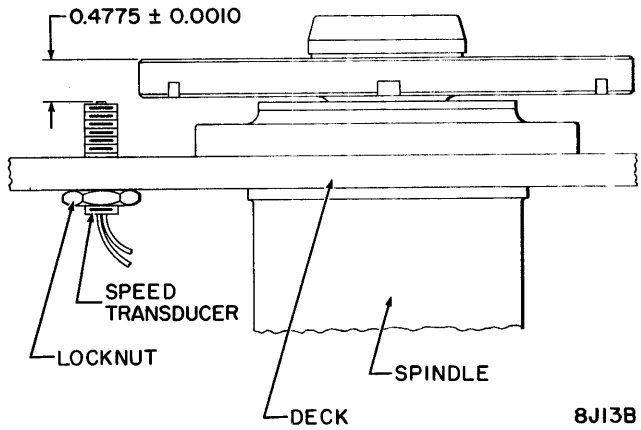

Figure 2-20. Speed Transducer Adjustment

5. Rotate speed transducer until dimension is correct. Tighten locknut until torque is 5 ±1 pounds-force-inch. Recheck dimension.

6. When dimension is correct and locknut is tightened, install connector J202.

7. Lower deck to normal operating position.

Removal-Replacement

There are no special procedures for the removal or replacement of the speed transducer. The speed transducer is removed and replaced from the bottom side of the deck assembly. When replacement is completed, perform the adjustment procedure.

Repair

Repair of the speed transducer is limited to the replacement of the connector and pins in accordance with the parts data section. Refer to Cable Assembly repair procedures for information on connector and pin replacement.

VELOCITY TRANSDUCER (A3L2)

The velocity transducer is illustrated in figure 2-21 and shown in parts data illustration 3-27.

Adjustment

Velocity transducer adjustment is covered in the removal and replacement procedure.

Removal-Replacement

The velocity transducer assembly consists of a transducer coil (complete with housing and connector), a transducer core, and an extension rod. When ever it is necessary to change any part of the transducer assembly, all parts of the assembly must be changed.

NOTE

When ordering the velocity transducer assembly be certain to also order the extension rod.

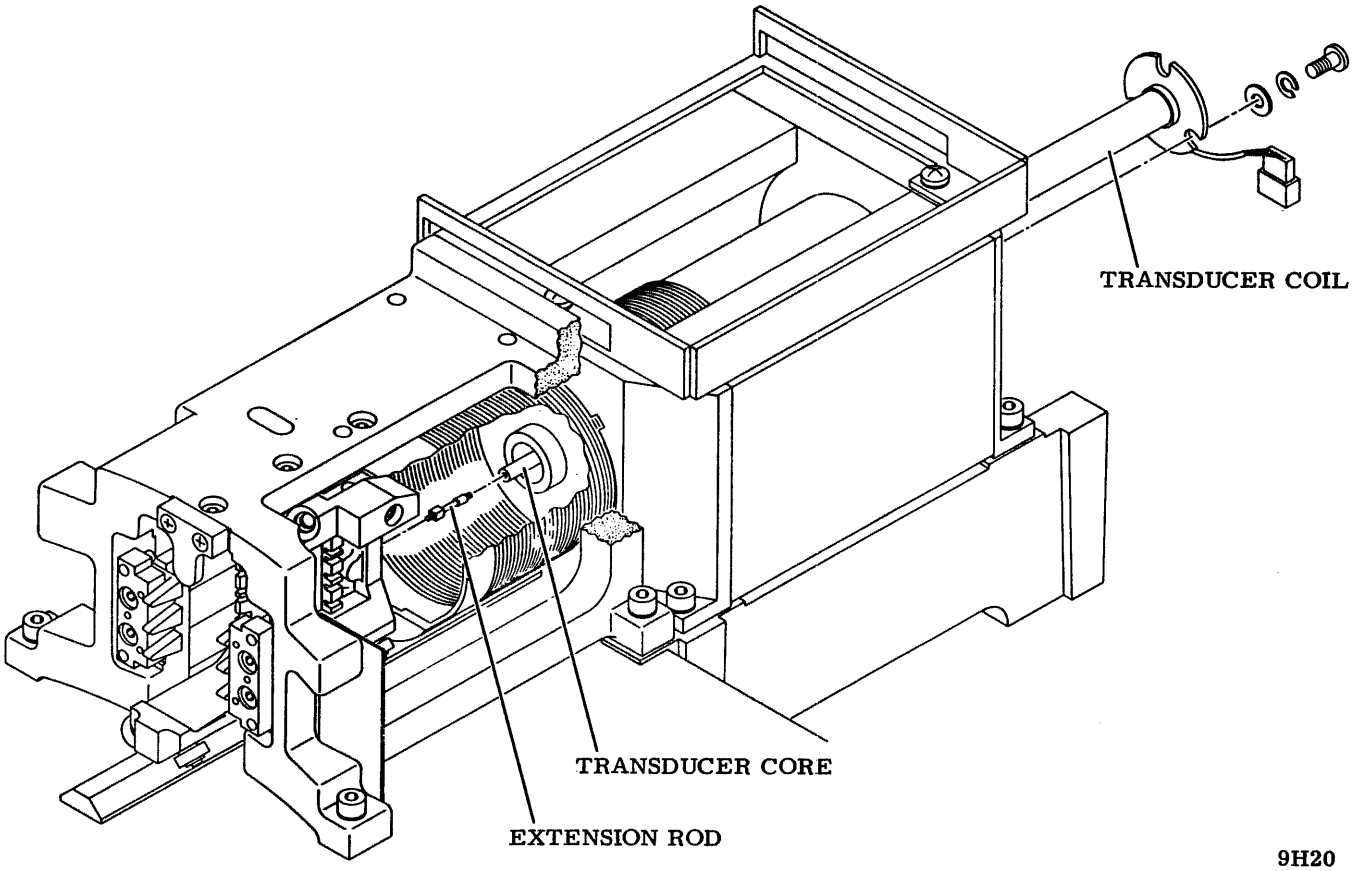

Figure 2-21. Velocity Transducer Replacement

The following procedure first covers replacement of the transducer coil, aligning it to the old transducer core. It then covers replacement of the core.

1. Remove attaching hardware securing transducer coil to rear of magnet assembly. Unplug connector P22.

2. Carefully remove transducer coil, sliding it straight out rear of magnet assembly.

3. Slowly and carefully slide replacement transducer coil into rear of magnet assembly.

4. Align one of the three slots on back of transducer coil with mounting hole in magnet. Manually extend heads and slide carriage back and forth. Be aware of any drag or of any rubbing sound. Rotate coil and move carriage again for each of remaining two slots on back of remaining two slots on back of transducer coil.

5. Select mounting slot which produced minimum drag and minimum rubbing. Orient this slot to mounting hole and install and tighten attaching hardware.

6. Connect connector P22. Extend heads and move carriage back and forth to verify alignment of transducer coil.

7. Reach in from logic chassis side of drive and disconnect extension rod from rear of carriage assembly using a 1/8-inch open end wrench.

8. Push extension rod and transducer core through coil and out rear of magnet assembly.

9. Apply light coat or Loctite grade C to threads of new extension rod and screw rod into end of replacement transducer core. Wipe off excessive Loctite.

NOTE

Do not apply Loctite to remaining end of extension rod until completing next step.

10. Slowly and carefully slide replacement transducer core and extension rod through coil from rear.

CAUTION

Use extreme care not to allow Loctite to get on carriage rails or bearings.

11. Very carefully apply a light coat of Loctite grade C to threads on end of extension rod. Thread extension rod into rear of carriage and lightly tighten. Wipe away excessive Loctite.

12. Manually extend heads and move carriage back and forth to verify that carriage moves freely and there is no excessive drag.

Repair

Repair of the velocity transducer assembly is limited to removing and replacing the connector and pins in accordance with the parts data section. Refer to Cable Assembly repair procedures for information on connector and pin replacement.

PACK COVER SOLENOID (A3L3)

The pack cover solenoid (optional) is illustrated in figure 3-23, sheet 1.

Adjustment

The pack cover solenoid adjustment is required whenever the solenoid is changed or if the pack cover does not lock when power is removed from the drive. There are two adjustments pertaining to the solenoid: 1) clearance, 2) spring tension.

The clearance adjustment is made to obtain minimum clearance between the interlock latch (see figure 2-22) and the interlock keeper on the pack access cover. When the pack access cover is latched (solenoid deenergized, and latch in up position) the keeper must strike the latch and not allow the pack cover catch to be released. Loosen the attaching hardware securing the solenoid assembly to the shroud, and slide the assembly backwards or forwards to achieve this adjustment.

The spring tension adjustment is made to fully extend the solenoid plunger when the solenoid is deengergized. The tension should not be so great as to prevent the plunger from fully retracting when the solenoid is energized. Perform the adjustment by loosening the spring mounting hardware and sliding it up or down in the mounting slot.

Removal-Replacement

There are no special procedures for removal and replacement of the pack cover solenoid. Perform the removal and replacement in accordance with the information in the parts data section.

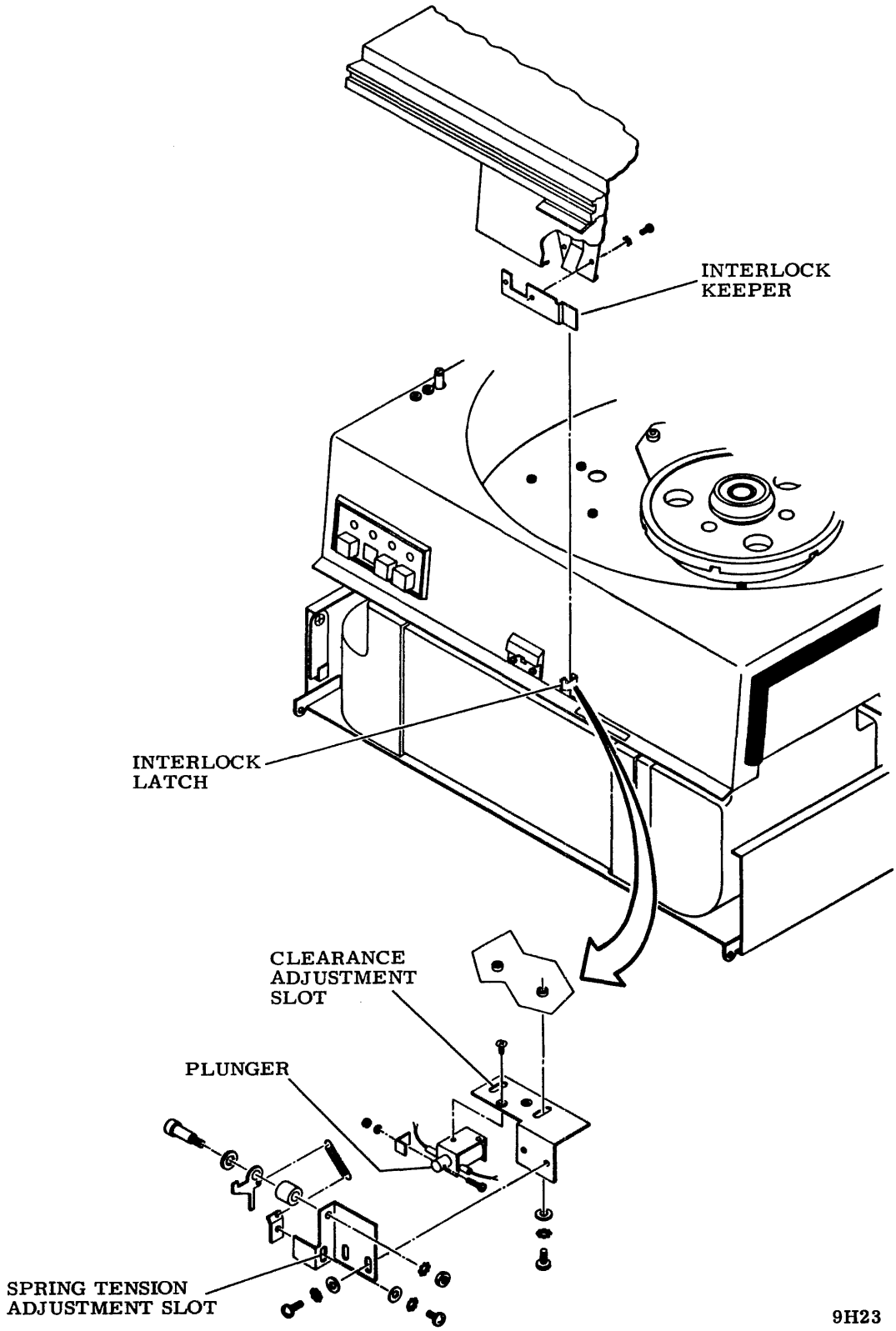

Figure 2-22. Pack Cover Solenoid Adjustment

Repair

No repair of the pack cover solenoid is possible. If any part fails, it must be replaced.

RAIL BRACKET ASSEMBLY

The rail bracket assembly is illustrated in figure 3-25.

Adjustment

The rail bracket assembly is not adjustable in the field. Refer to Removal-Replacement for additional information.

Removal-Replacement

Because of the precision alignment, and the special tools and training required to accomplish the alignment, it is not possible to perform adjustment or replacement of the rails or the rail bracket assembly in the field. Under no circumstances should the screws securing the rails or the rail bracket to the deck be loosened. If either the rails or the rail bracket assembly are damaged or misaligned, contact the factory maintenance representative for service.

Repair

Repair of the rail bracket assembly is limited to the replacement of those items mounted on the bracket, as specified in the parts data section. In addition to the following information, refer to the Heads Loaded Switch and the Flex Lead Assembly procedures.

When replacing the cam towers, tighten attaching screws to torque of 12 ±1 pound-force-inch. When replacing the upper stop block, the rubber stop bumper must also be replaced. Attach the stop bumper to the stop block using a small amount of rubber silicone sealant.

CARRIAGE AND COIL ASSEMBLY

The carriage and coil assembly is illustrated in figure 3-26. Because of the precision alignment of the carriage bearings, and the special tools and training required to accomplish the alignment, the carriage and coil assembly cannot be replaced in the field. If either the carriage or coil is damaged or misaligned, call the factory maintenance representative for service.

The flex lead assembly, also illustrated in figure 3-26, can be replaced in the field. Refer to that procedure for service information.

HEADS LOADED SWITCH (A3S2)

The heads loaded switch is illustrated in figure 3-25.

Adjustment

Perform the heads loaded switch adjustment under any of the following conditions:

- Heads do not fully retract when drive is powered down
- Unknown cause of a power amplifier or power amplifier fuse failure
- Heads loaded switch is changed or in any way moved
- Instructed to do so by another procedure

1. Disconnect leadwires from heads loaded switch, taking note of leadwire placement.
2. Connect multimeter (set to RX1 scale) between ground contact and normally open contact as shown in figure 2-23. With carriage fully retracted, multimeter should indicate zero ohms.

NOTE

Measure carriage travel between rear edge of voice coil and inside back edge of magnet assembly.

3. Note measurement from rear of voice coil to inside back edge of magnet assembly with carriage retracted. Manually extend heads very slowly, while observing multimeter. Measure carriage travel at point that multimeter switches from zero ohms to infinity. Difference between fully retracted measurement and heads extended measurement should be 0.07 ±0.04 inch.
4. If switch does not transfer within specified measurement, loosen hardware securing switch mounting bracket to rail bracket assembly and adjust switch position.
5. When adjustment is complete recheck carriage travel per step 3. Assuming adjustment is correct, reconnect leadwires to heads loaded switch.

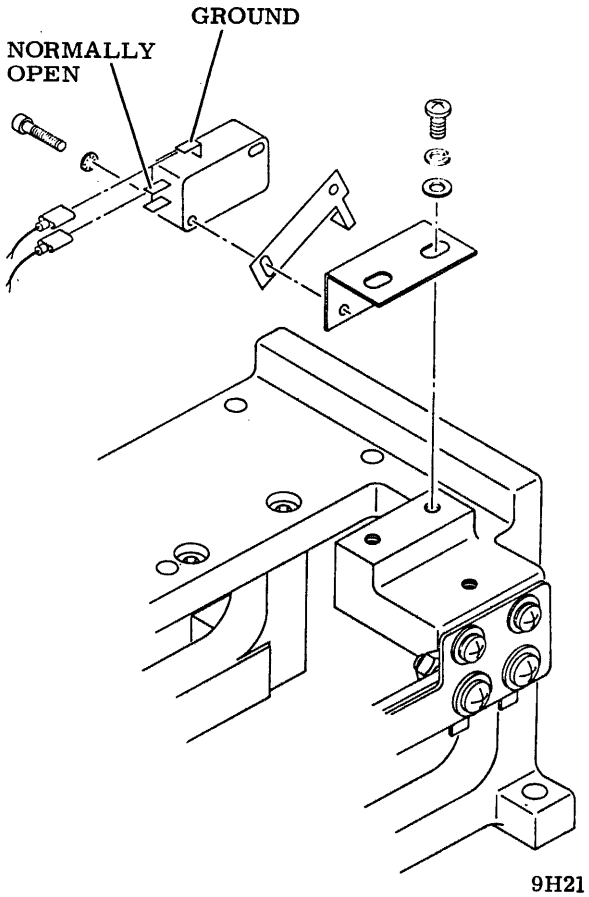

Figure 2-23. Heads Loaded Switch Replacement

Removal-Replacement

No special procedures are required for replacement of the heads loaded switch.

Repair

No repair of the heads loaded switch is possible. If the switch fails, it must be replaced.

FLEX LEAD ASSEMBLY

The flex lead assembly is shown in relation to the carriage and coil assembly in figure 3-26.

Adjustment

Adjust the flex lead assembly any time the assembly is changed, or any time work is done in the area which could cause the flex lead assembly to become misaligned.

Adjustment of the flex lead assembly is a matter of positioning the assembly so that it is parallel with the travel of the carriage and coil. When the flex lead assembly is properly aligned, there is no buckling of the leads during extension and retraction of the carriage and coil assembly. Likewise, there is a parallel motion with the carriage, without evidence of the leads either riding up or down.

Removal-Replacement

There are no special procedures for the removal and replacement of the flex lead assembly. Perform the removal and replacement in accordance with the information in the parts data section.

Repair

No repair of the flex lead assembly is possible. If any of the parts are damaged or frail, the assembly must be replaced.

MAGNET ASSEMBLY

The magnet assembly and associated hardware is shown in figure 3-27.

Adjustment

The magnet assembly must be adjusted any time the mounting hardware securing the magnet to the deck is loosened.

The magnet assembly is properly adjusted when the coil slides through its complete travel without contacting the magnet assembly. Ensure that when the magnet assembly is secured to the deck, a 0.005 inch non-metalic feeler gauge passes between the coil and the magnet. The 0.005 inch clearance must be maintained at all points around the coil in the front opening of the magnet assembly. After securing the magnet to the deck, and before installing the velocity transducer, manually extend the heads and move the carriage and coil assembly back and forth through its full travel. There should be no rubbing or scrapping sound and there should be no drag felt during this movement.

Removal-Replacement

There are no special procedures for the removal and replacement of the magnet assembly. Perform the removal and replacement in accordance with the information in the parts data section.

Repair

Repair of the magnet assembly is limited to the removal and replacement of the velocity transducer assembly. Refer to that procedure for service information.

HEAD ARM ASSEMBLIES

The head arm assemblies are shown in figure 3-23, sheet 1. In addition, the various parts involved in the removal and replacement of the head arms are identified in figures 2-24 and 2-25. Repair of the head arm assemblies is limited to inspection and cleaning, refer to the Repair paragraph for details and limits.

Adjustment

Adjustment of the head arm assemblies is covered in Section 2C, Test and Adjustment.

Removal-Replacement

The following procedure covers removal and replacement of either the servo head or the read/write heads. Remove heads from the carriage only to perform head inspection and cleaning, or as directed by other procedures in this manual. When removing the servo head also remove read/write head number two. This allows room for the head cable and connectors to pass between the adjacent head arms with a lessened chance of doing damage.

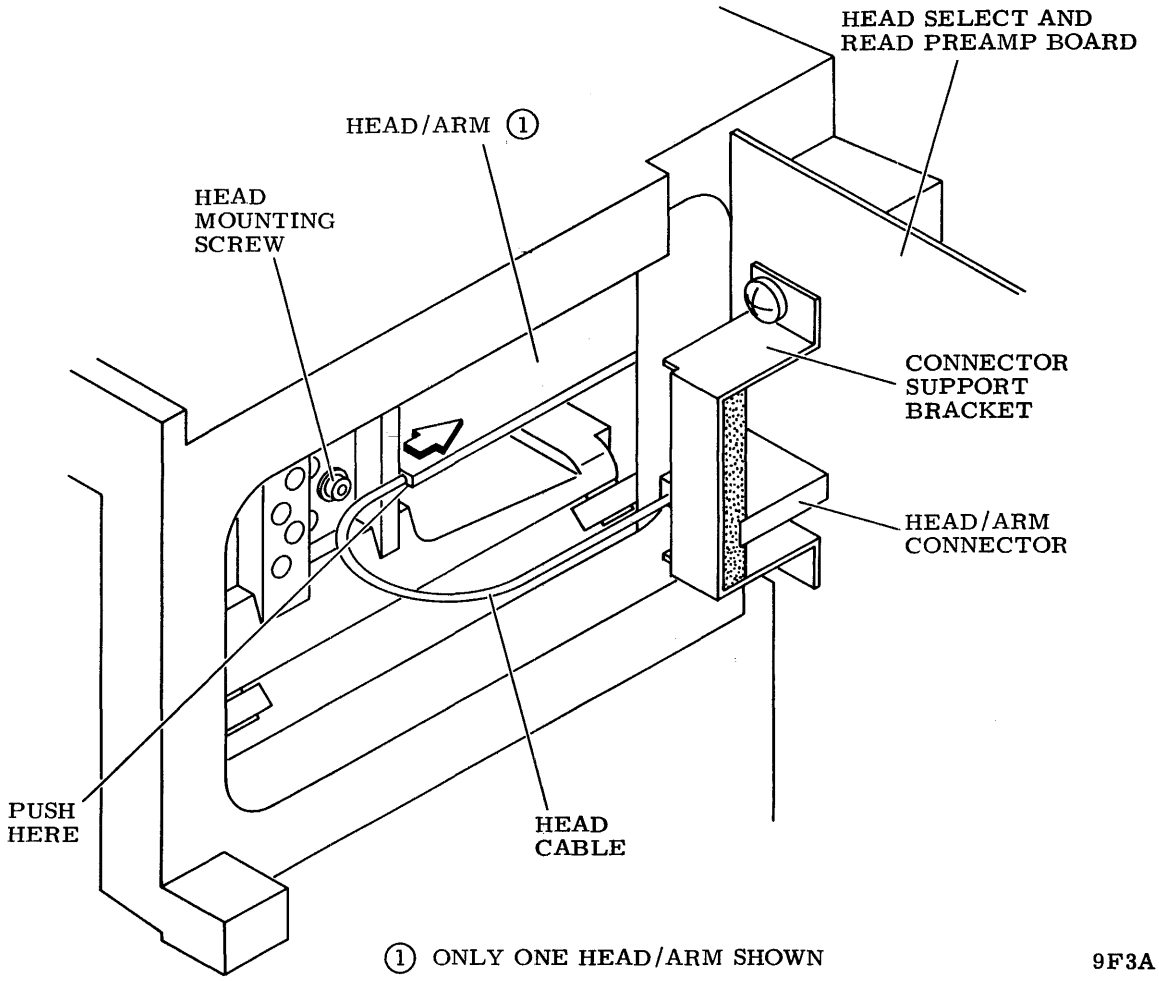

Figure 2-24. Head Replacement - Left Side View

1. Remove connector support bracket or servo pre-amplifier shield and disconnect head arm connector for subject head (for servo head, also remove head cable from cable clip and disconnect tie point connector).

2. Remove head mounting screw and associated hardware.

3. Manually extend heads far enough to be able to grasp front of head arm from inside pack area.

CAUTION

Head pads and gimbal springs are extremely delicate and easily damaged. Grasp head arms carefully and only by edges of head arm. If head pad is touched, perform head cleaning procedure.

4. Grasp entire stack of heads such that they are all held in alignment to one another. Carefully extend heads all the way into pack area.

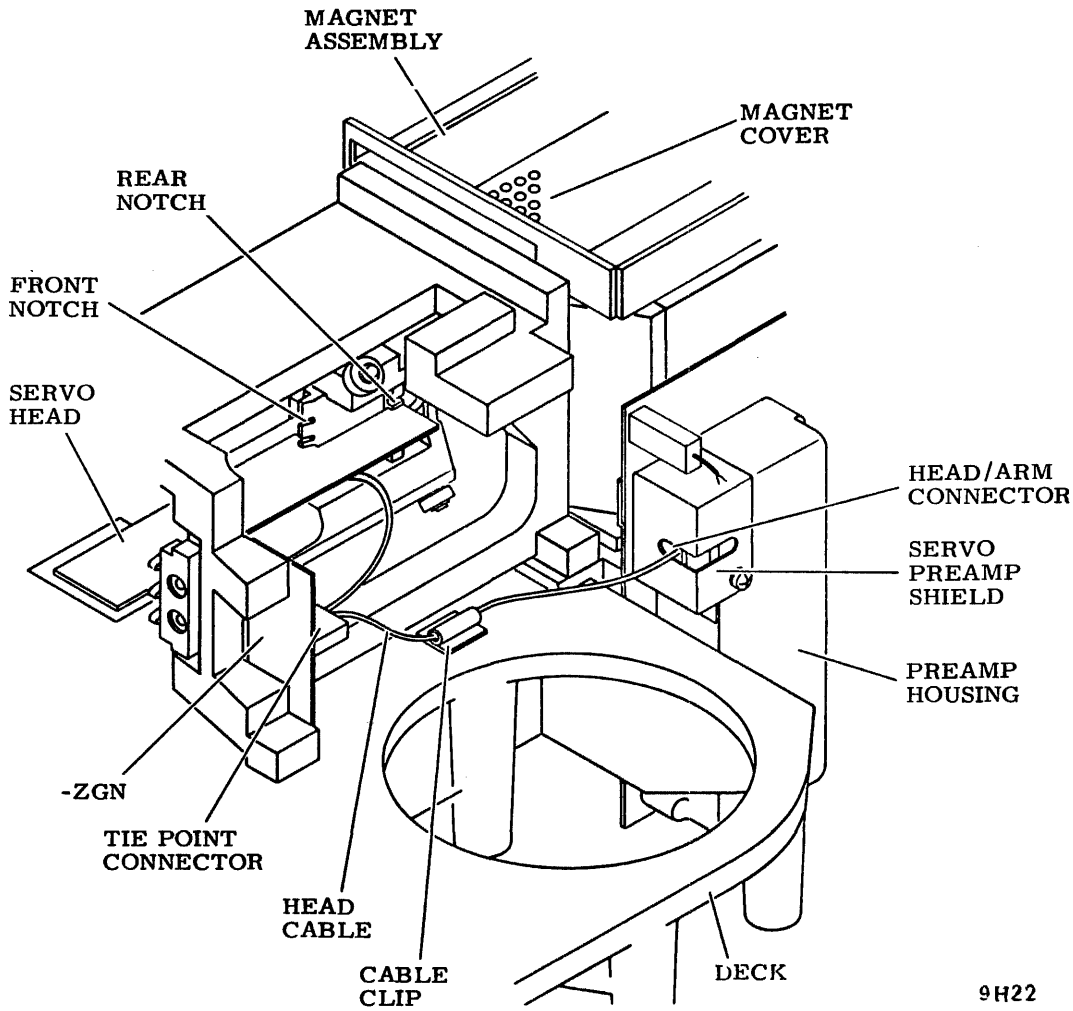

Figure 2-25. Head Replacement - Right Side View

5. Carefully grasp subject head arm at front and also push gently on rear of head arm as shown in figure 2-24. Guide head arm and connector(s) through adjacent head arms and into pack area.

6. Perform required maintenance procedure.

7. Install head arm assembly by fully extending heads into pack area, and guiding head arm connector between adjacent head arms. Use care not to damage adjacent heads.

8. Seat head arm in both front and rear notches on carriage.

9. Grasp entire stack of heads such that they are all held in alignment to one another. Carefully retract heads. Do not push on front of head arm assemblies while retracting heads.

10. Carefully position head arm as required in order to insert head mounting screw. Support head arm from opposite side when inserting head mounting screw or forward pressure of wrench may dislodge head arm.

11. Ensure that head arm assembly is aligned in relation to remainder of heads where they protrude into pack area.

12. Tighten screw, securing head arm assembly to carriage, until torque is 12 ±1/2 pounds-force-inch.

13. Carefully reconnect head arm connector and replace related hardware removed in step 1.

14. Perform Head Arm Adjustment procedure.

Repair

The drive has a positive pressure filtration system that eliminates the need for periodic inspection and cleaning of heads. The heads should be inspected for the following reasons only:

1. A problem is traced to a specific head or heads; for example, excessive data errors.
2. Head to disk contact is suspected. This may be indicated by an audible ping, scratching noise, or a burning odor when the heads are over the disk area.
3. Concentric scratches are observed on the disk surfaces.
4. Contamination of pack is suspected (possibley due to improper storage of the pack).
5. The pack has been physically damaged (possibly due to dropping or bumping).

CAUTION

Do not attempt to operate the media on another drive until full assurance is made that no damage or contamination has occurred to the media.

Do not attempt to operate the drive with another media until full assurance is made that no damage or contamination has occurred to the drive heads or to the shroud area.

Head Inspection

CAUTION

Do not smoke when inspecting or cleaning heads. Use extreme care not to damage the head.

Do not touch the head pad or gimbal spring with fingers or tools.

If head must be laid down, do not allow the head pad or gimbal spring to touch anything.

Remove suspected head as described in the Read/Write Servo Head/Arm Replacement procedure. Referring to figure 2-26, observe the head/arm, and perform the suggested remedy as follows:

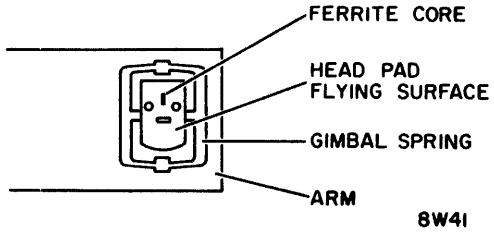

Figure 2-26. Typical Head/Arm Components

1. If reddish-brown oxide deposits exist on the head, replace or clean the head/arm assembly.
2. If head appears scratched, replace or clean the head/arm assembly.
3. If head appears damaged, replace the head/arm assembly.
4. If the gimbal spring (it holds the head pad to the arm) is bent or damaged, replace the head/arm assembly.

Head Cleaning

CAUTION

Head cleaning is a delicate procedure which is not recommended. It should not be undertaken unless it is absolutely necessary and then it should be performed by properly trained personnel only.

Refer to figure 2-27 if head cleaning is required and perform the following procedure. Use care not to damage any part of the head arm assembly.

CAUTION

In the following step, hold the can of dust remover upright (vertical). If the can is not held upright, liquid propellant will be sprayed on the head.

1. Use super dry dust remover (see list of Maintenance Tools and Materials) to blow off all loose particles from the head pad (flying surface), from the edge of the head pad, and from the holes in the head pad. Hold the nozzel one-fourth to one-half inch (6 to 12 mm) from the head pad. Spray with a back and forth motion across the head pad, making certain to hold the can only in a vertical position.

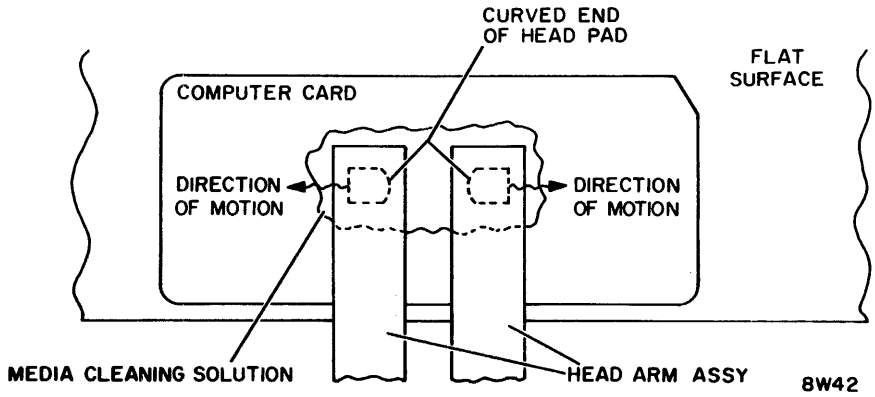

Figure 2-27. Head Cleaning Motion

2. Clean a smooth, flat working surface, for example, a glass or formica table top.

3. Place a new, unpunched, clean computer card with the back side up (printing down) on the clean flat working surface as shown in figure 2-27.

CAUTION

Care should be taken to avoid excess cleaning solution. Excess solution on the head cable may remove the plasticizer and make the cable stiff. A stiff cable reduces the flexibility of the head pad and could cause broken wires.

4. Moisten a small area in the center of the card with media cleaning solution. (Refer to the list of Maintenance Tools and Materials.)

CAUTION

Inspect the media cleaning solution for contamination, rust, dirt, etc. Do not use contaminated solution.

5. Very carefully place the head pad flying surface on moistened area and move head pad from moistened area to dry area in a zig-zag motion as shown in figure 2-27. Move head in a direction away from curved end of head pad. If it is moved in the opposite direction the sharp edge of the curved end will cut into the computer card and prevent movement and proper cleaning.

NOTE

Discoloration of media cleaning solution and computer card indicate that oxide particles are being removed from head pad flying surface.

6. Repeat steps 3, 4, and 5 using a clean computer card and clean media cleaning solution each time until no discoloration on card is present.

7. After discoloration has ceased, inspect head to determine that oxide deposits were removed. If deposits remain but show signs of being removed repeat cleaning procedure until deposits are removed.

8. If oxide deposits cannot be removed, replace head/arm assembly.

9. If oxide deposits were removed and head passes inspection according to the Head/Arm Replacement Criteria, reinstall head.

10. Follow Read/Write or Servo/Head Arm Replacement procedure to install cleaned head or a replacement head as required.

Head/Arm Replacement Criteria

A head arm assembly requires replacement if any of the following conditions exist:

1. Consistent oxide buildup on the same head, indicating repeated head to disk contact.

2. Appreciable oxide buildup which cannot be removed.

3. Scratches on the head flying surface.

4. Imbedded particles in the head pad flying surface.

5. Bent or damaged gimbal spring.

6. Any apparent physical damage to head/arm assembly.

CABLE ASSEMBLIES (W1 THROUGH W4, W11, W12)

Part numbers for all cable assemblies are listed on figure 3-20, sheet 1. Cable assemblies are not illustrated in their entirety; however, all connectors, pins, etc, are illustrated (and the part numbers given) at the point of origin or destination. This information is, therefore, spread throughout the parts data section.

Adjustment

Other than positioning the cable assemblies to provide proper strain relief, no adjustment of the cable assemblies is required.

Removal-Replacement

The cable assemblies rarely, if ever, need to be removed from the drive. However, during normal maintenance, it may be necessary to separate the cable from the item to which it is attached. The connectors on all cables in the drive may be removed directly, or simply by squeezing its locking devices. If a connector does not separate easily from its mating half, carefully insert a blunt tool between the two halves and gently pry them apart. Trying to exert excessive force, in the process of separating a connector, could cause damage to other components in the drive.

Repair

Repair of the various cable assemblies consists of replacing broken or damaged parts. All parts of the cable assemblies are called out in the parts data section. Some of the connections in the drive are crimp-type, and require the use of expensive tools. These connections can be repaired by first tinning the wires and then carefully crimping them into the pins with a pair of pliers. To ensure electrical and mechanical integrity of these connections, they should then be carefully reheated with a soldering iron to allow the solder to flow onto the pin.

SECTION 3

PARTS DATA

INTRODUCTION

The parts data section provides a systematic parts breakdown for all Storage Module Drives (SMD) listed in the preface of this manual. This section also serves as a maintenance aid, showing the interrelationship between piece parts, assemblies, and attaching hardware.

To have a complete understanding of this section, a brief explanation of abbreviation, structure, and symbology is necessary.

Some of the abbreviations used in this section are defined below. For a complete list of abbreviations, refer to the front of this manual.

Each figure number represents a major assembly. That assembly may require one or more illustrations depending upon its complexity. The parts shown on the illustrations are numbered and those numbers correspond to the index numbers on the parts list.

The parts list is divided into four columns:

Index Number Column - The numbers given in this column correspond to the numbers shown on the illustration. When more than one entry is given for a particular index number, the use of each part is defined in the Notes column. Items may be listed without index numbers, and are mentioned for reference only. These items do not appear on the illustration.

Part Number Column - This column provides the eight digit number by which a part may be ordered. There are several conditions when there will be an incomplete number or no number at all. In some cases the last two digits (referred to as tab numbers) may be shown as "XX". This situation exists when an assembly changes tab numbers rapidly in the course of normal factory build. If it is necessary to order an assembly catalogued in this manner, the actual part number can be found on the part number label attached to the assembly. If the actual part number cannot be determined, be sure to include on the order the series code of the machine and listing of all the change orders installed. If the last two digits are shown as "**", the tab number can be determined by referring to table 3-1 (Color Code Chart). NRF in the part number column indicates that an assembly is not field replaceable. If replacement or repair of the NFR items is necessary, refer to the maintenance section of this manual for further information.

Description Column - This column gives the name and a brief description of each part and assembly. The relationship of parts and assemblies is shown within the column by means of indentation. Each indented item is part of the previously listed item at a lesser indentation.

When the attaching hardware or associated parts for an item cannot be shown on the illustration, the note (ATTACHING PARTS) or (ASSOCIATED PARTS) appears in the Description column. All attaching/associated parts for the previously listed part or assembly are listed beneath this note and are separated from the rest of the parts list by the symbol ---*---.

When necessary, items are identified as being right side or left side. Right and left are determined by facing the front (pack end) of the drive.

Note Column - This column defines multiple entries for a single index number. Multiple entries may be necessary to identify differences in machine configurations (50/60 Hz) or to track history (SC 11 w/48268). Information that is unique to one particular equipment or application will also be noted in this column.

Color Code Chart - The color code chart (table 3-1), used in conjunction with the equipment configuration chart (see front of this manual) and the parts list, will provide the eight-digit number needed to order painted parts for all SMD units covered by this manual.

First, determine the correct color code by referring to the equipment configuration chart. Then, find that code in the color code column of table 3-1. Following the code are the tab numbers for each painted part. If an entire assembly is being replaced, use the two digits listed under ASSY TAB. If just the piece part is needed use the two digits listed under PC PT TAB. The parts list contains the first six digits of each part number plus the symbol "**" (for example 775601**). The complete number is obtained by substituting the tab numbers in place of the symbol "**".

TABLE 3-1. COLOR CODE CHART

COLOR CODE	CASE		PACK ACCESS COVER		FRONT DOOR		REAR DOOR		LEFT SIDE PANEL		RIGHT SIDE PANEL		TOP PANEL		CASE DOOR		FILLER PANEL-UPPER		FILLER PANEL-LOWER		COMMENTS
	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	ASSY TAB	PC PT TAB	
A	00	03	15	09	-	-	-	-	-	-	-	-	-	-	-	03	-	-	-	-	
B	01	03	15	09	-	-	-	-	-	-	-	-	-	-	-	03	-	-	-	-	
C	01	03	15	09	-	06	-	06	-	03	-	03	-	03	-	03	-	-	-	-	
D	01	03	12	09	-	-	18	09	-	-	-	-	-	-	-	03	-	03	-	09	
E	01	03	12	09	-	-	19	09	-	-	-	-	-	-	-	03	-	03	-	09	
F	04	03	12	09	01	09	22	09	02	03	03	03	-	-	-	-	-	-	-	-	
G	04	03	12	09	01	09	23	09	02	03	03	03	-	-	-	-	-	-	-	-	
H	02	36	26	36	-	36	-	37	-	37	-	37	-	37	-	36	-	-	-	-	
J	05	72	29	71	-	71	-	71	-	72	-	72	-	72	-	72	-	-	-	-	
K	03	63	27	66	-	63	-	64	-	65	-	65	-	63	-	63	-	-	-	-	
L	04	34	28	33	-	33	-	33	-	34	-	34	-	34	-	34	-	-	-	-	
M	11	34	18	33	05	33	29	33	10	34	11	34	-	-	-	-	-	-	-	-	
N	06	34	18	33	-	-	21	33	-	-	-	-	-	-	-	-	-	-	-	-	
P	-	-	25	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
R	06	34	18	33	-	-	25	33	-	-	-	-	-	-	-	-	-	-	-	-	

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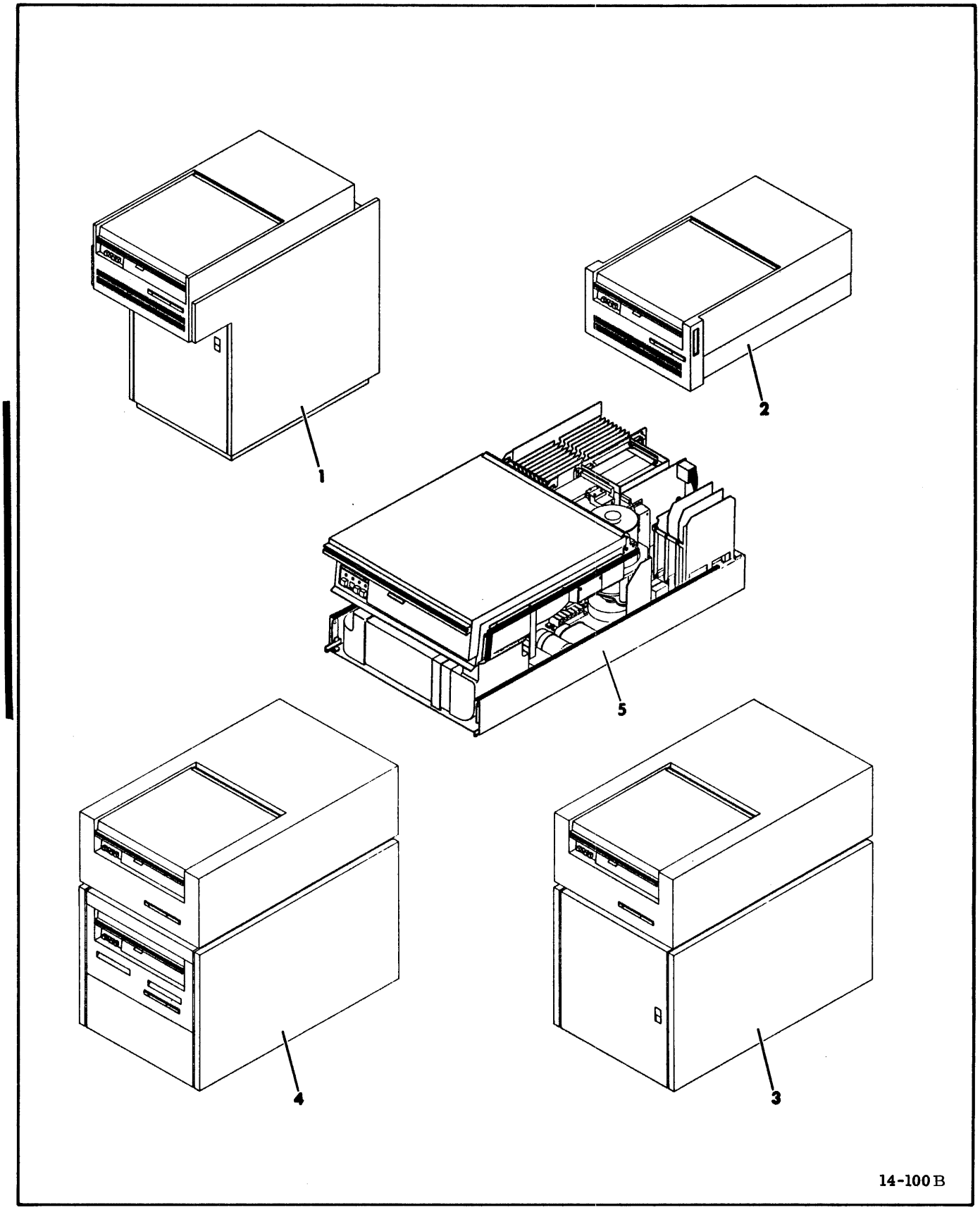

Figure 3-1. Final Assembly Locator

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-1		FINAL ASSEMBLY LOCATOR	
1		FINAL ASSEMBLY, Pedestal (See Figure 3-2)	
2		FINAL ASSEMBLY, 30 Inch Rack Mount (See Figure 3-5)	
2		FINAL ASSEMBLY, 36 Inch Rack Mount (See Figure 3-6)	
3		FINAL ASSEMBLY, Acoustic Cabinet (See Figure 3-3)	
4		FINAL ASSEMBLY, Acoustic Drawer (See Figure 3-4)	
5		FINAL ASSEMBLY, Nude (See Figure 3-4.1)	

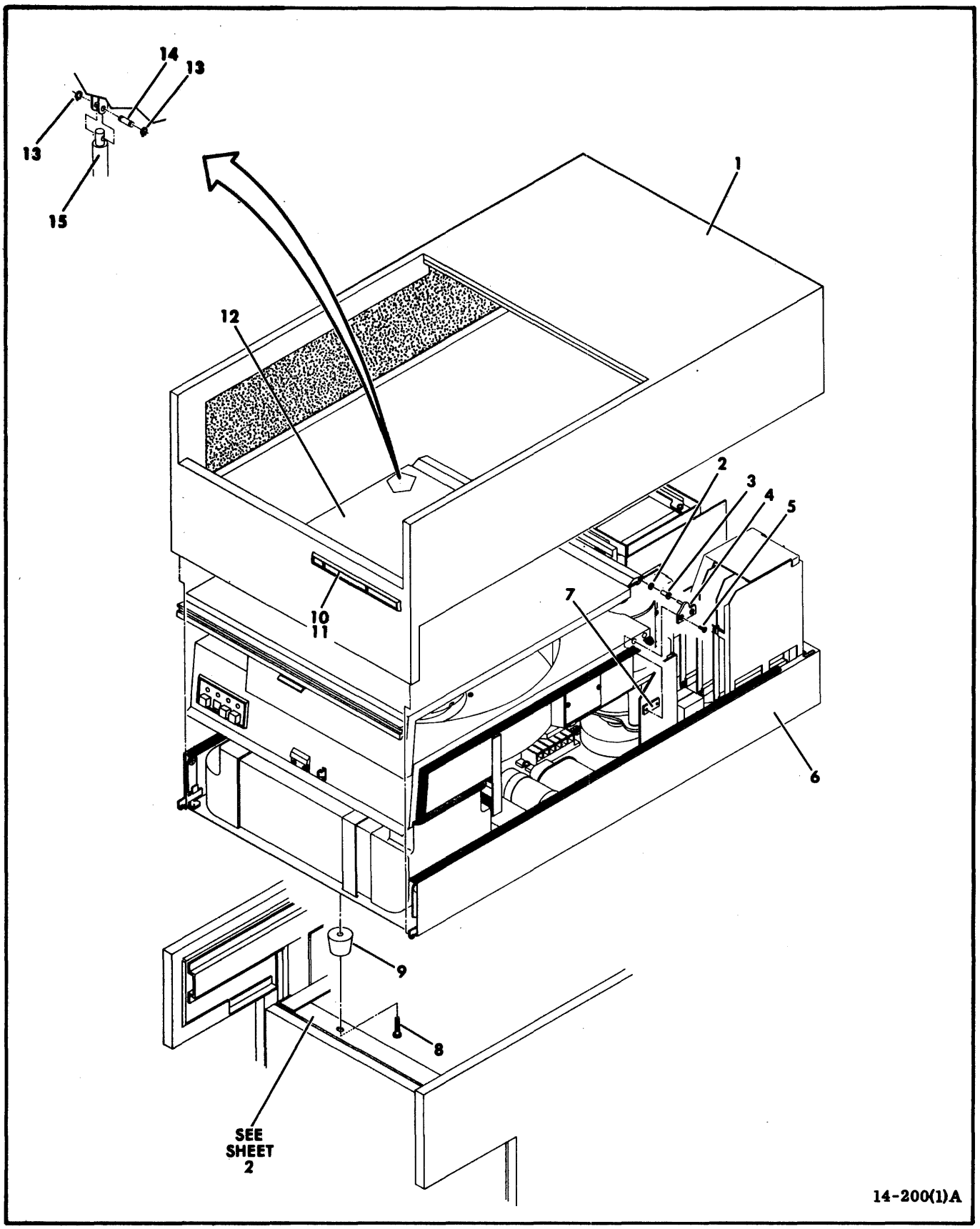

Figure 3-2. Final Assembly - Pedestal (Sheet 1 of 2)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-2		FINAL ASSEMBLY, Pedestal, (Sheet 1 of 2)	
1		CASE ASSEMBLY, Pedestal (See Figure 3-7)	
2	76419100	SPACER, Pack Cover	
3	41274008	BEARING, Flanged	
4	75070000	HINGE, Pin	Right Side
4	75070001	HINGE, Pin (Not Shown)	Left Side
5	10125714	SCREW, Flat Head, 6-32 x 3/8	
6		DRIVE ELECTRONICS (See Figure 3-20)	
7	75173306	PLATE, Nut	
8	10127147	SCREW, Machine, Pan Head, 10-32 x 1	
9		BUMPER, Molded Recess (See Base Assembly, Sheet 3, For Part Number)	
10	15000601	EMBLEM, Product Identification, 97XX SMD	See Note
11	94365001	EMBLEM, Exterior Identification, CDC	See Note
12		PACK ACCESS COVER ASSEMBLY, Nonacoustic (See Figure 3-12)	
13	92033221	RING, Retaining	
14	75071700	PIN, Pivot, Cover	
15		SPRING, Gas (See Deck Assembly, Sheet 5, For Part Number)	

NOTE:
The part numbers listed are for standard CDC emblems only. Not all units are shipped from the factory with standard CDC emblems.

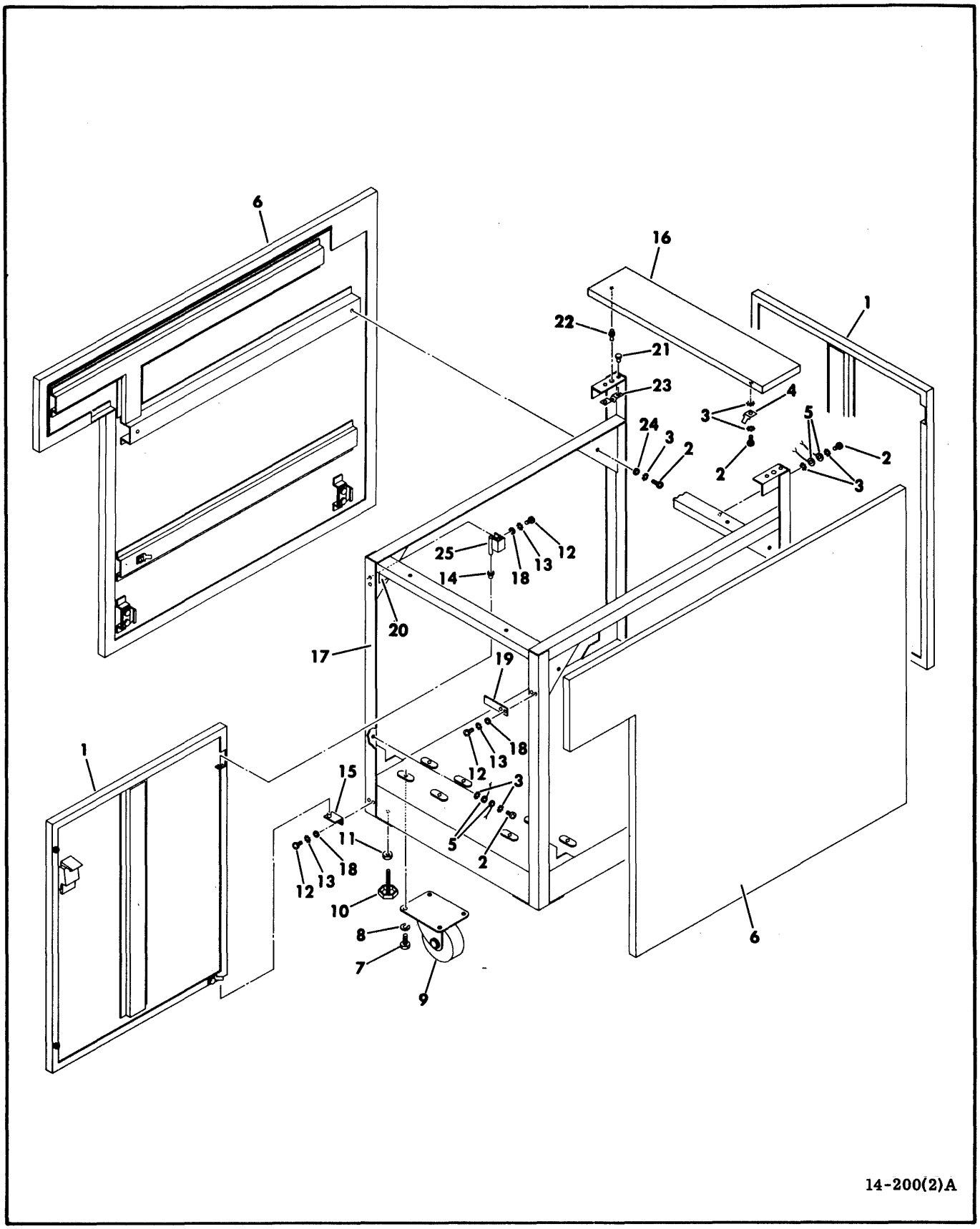

Figure 3-2. Final Assembly - Pedestal (Sheet 2 of 2)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-2		FINAL ASSEMBLY, Pedestal (Sheet 2)	
	752416XX	BASE CABINET ASSEMBLY	
1		FRONT AND REAR DOOR, Nonacoustic (See Figure 3-14)	
2	10127131	SCREW, Machine, Pan Head, 10-24 x 3/8	
3	10126403	WASHER, Lock, External Tooth, 10	
4	94274140	TERMINAL, Quick Connect	
5	94369530	CABLE, Ground	
6		SIDE PANEL ASSEMBLY, Nonacoustic, (See Figure 3-18)	
7	92151017	SCREW, Hex Head	
8	10125807	WASHER, Lock, Spring, 5/16	
9	92703015	CASTER	
10	93697013	LEVELER	
11	10125303	NUT, Hex, 3/8-16	
12	10127121	SCREW, Machine, Pan Head, 8-32 x 5/16	
13	10126402	WASHER, Lock, External Tooth, 8	
14	93847001	BEARING, Flanged	
15	76418400	HINGE, Door, Lower	
16	765160**	PANEL, Top	
17	76414900	FRAME, Base	
18	10125606	WASHER, Flat, 8	
19	75074800	KEEPER, Latch	
20	94368701	LABEL	
21	16345307	PIVOT	
22	93326004	STUD, Ball	
23	93325001	CATCH, Spring	
24	10125607	WASHER, Flat, 10	
25	75074900	HINGE, Door, Upper	

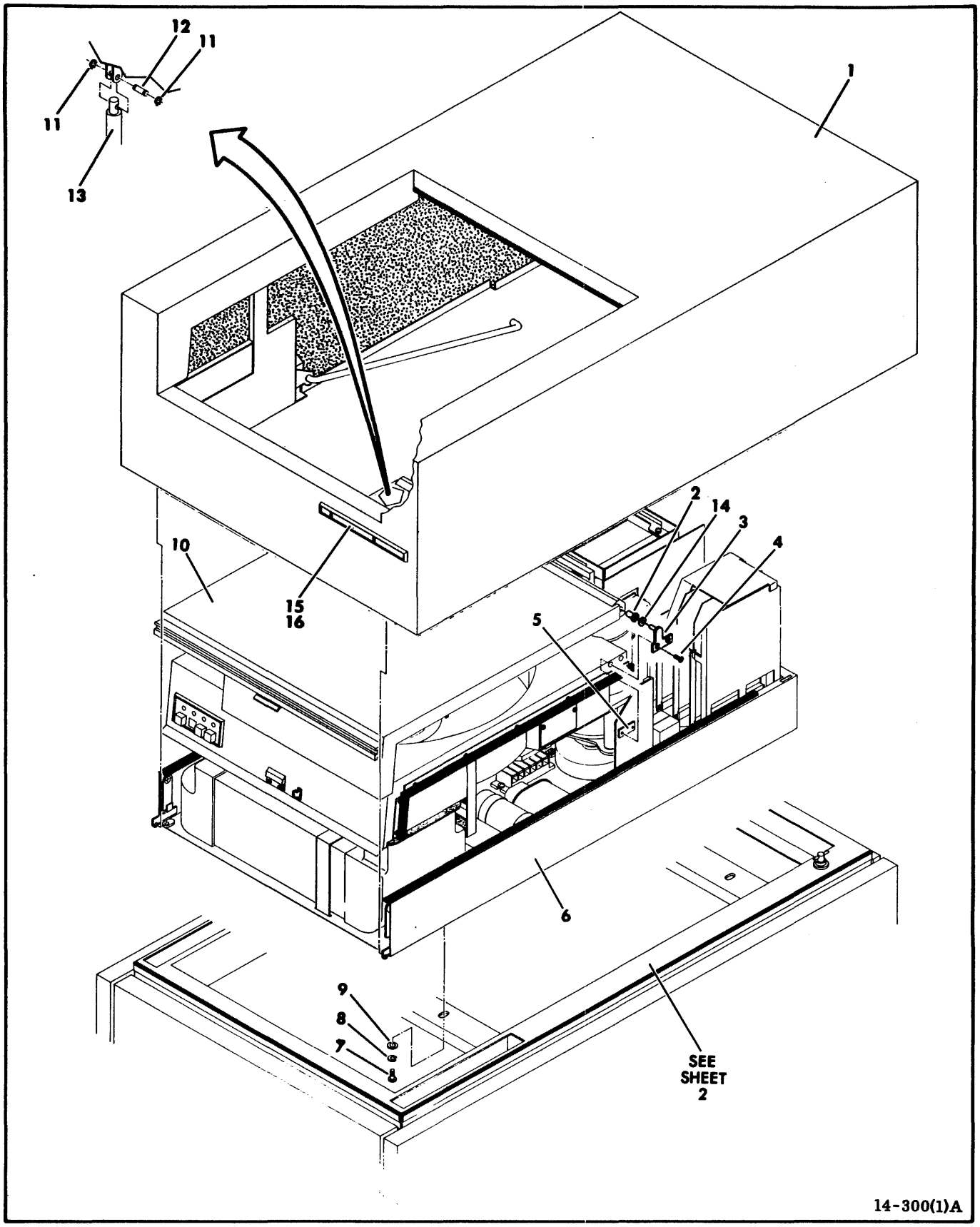

Figure 3-3. Final Assembly - Acoustic Cabinet (Sheet 1 of 2)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-3		FINAL ASSEMBLY, Acoustic Cabinet (Sheet 1 of 2)	
1		CASE ASSEMBLY, Acoustic Cabinet (See Figure 3-8)	
2	76429600	BEARING, Flanged	
3	77560300	PIVOT, Pin, Cover	Right Side
3	77560200	PIVOT, Pin, Cover (Not Shown)	Left Side
4	10125724	SCREW, Flat Head, 8-32 x 3/8	
5	75173307	PLATE, Nut	Right Side
5	77560400	PLATE, Nut (Not Shown)	Left Side
6		DRIVE ELECTRONICS (See Figure 3-20)	
7	10127143	SCREW, Machine, Pan Head, 10-32 x 1/2	
8	10125805	WASHER, Lock, Spring, 10	
9	10125607	WASHER, Flat, 10	
10		PACK ACCESS COVER, Acoustic (See Figure 3-13)	
11	92033221	RING, Retaining	
12	75071700	PIN, Pivot, Cover	
13		SPRING, Gas (See Deck Assembly Sheet 5, For Part Number)	
14	76419100	SPACER, Pack Cover	
15	15000601	EMBLEM, Product Identification, 97XX SMD	See Note
16	94365000	EMBLEM, Exterior Identification, CDC	See Note

NOTE:
The part numbers listed are for standard CDC emblems only. Not all units are shipped from the factory with standard CDC emblems,

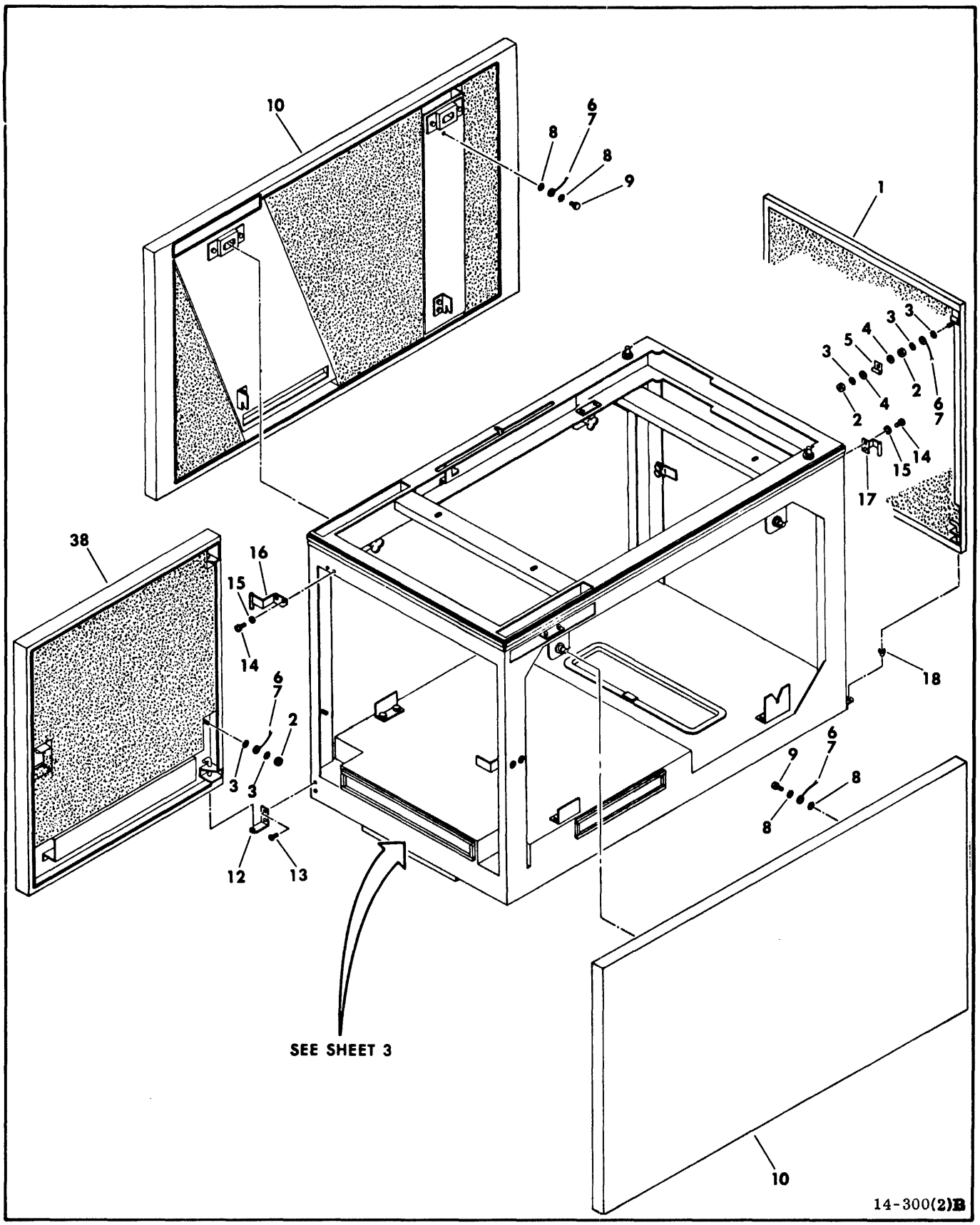

Figure 3-3. Final Assembly - Acoustic Cabinet (Sheet 2 of 2)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-3		FINAL ASSEMBLY, Acoustic Cabinet (Sheet 2)	
1		REAR DOOR ASSEMBLY, Acoustic Cabinet (See Figure 3-16)	
2	10125106	NUT, Hex, 8-32	
3	10126402	WASHER, Lock, External, 8	
4	10125606	WASHER, Flat, 8	
5	92602002	CLAMP, Cable, Nylon	
6	94281494	CABLE, Ground	
7	94274105	TERMINAL, Quick Connect	
8	10126403	WASHER, Lock, External Tooth, 10	
9	93592428	SCREW, Hex Head, 10-32 x 3/8	
10		SIDE PANEL ASSEMBLY, Acoustic (See Figure 3-19)	
11		FRONT DOOR ASSEMBLY, Acoustic (See Figure 3-15)	
	77563200	FRAME ASSEMBLY	
12	77561600	HINGE, Door, Front, Lower	
13	10125747	SCREW, Flat Head, 10-32 x 1/2	
14	10127142	SCREW, Machine, Pan Head, 10-32 x 3/8	
15	10126105	WASHER, Lock, Internal Tooth, 10	
16	77561700	HINGE, Door	
17	76428300	HINGE, Top	
18	92373003	NYLINER, Snap In	

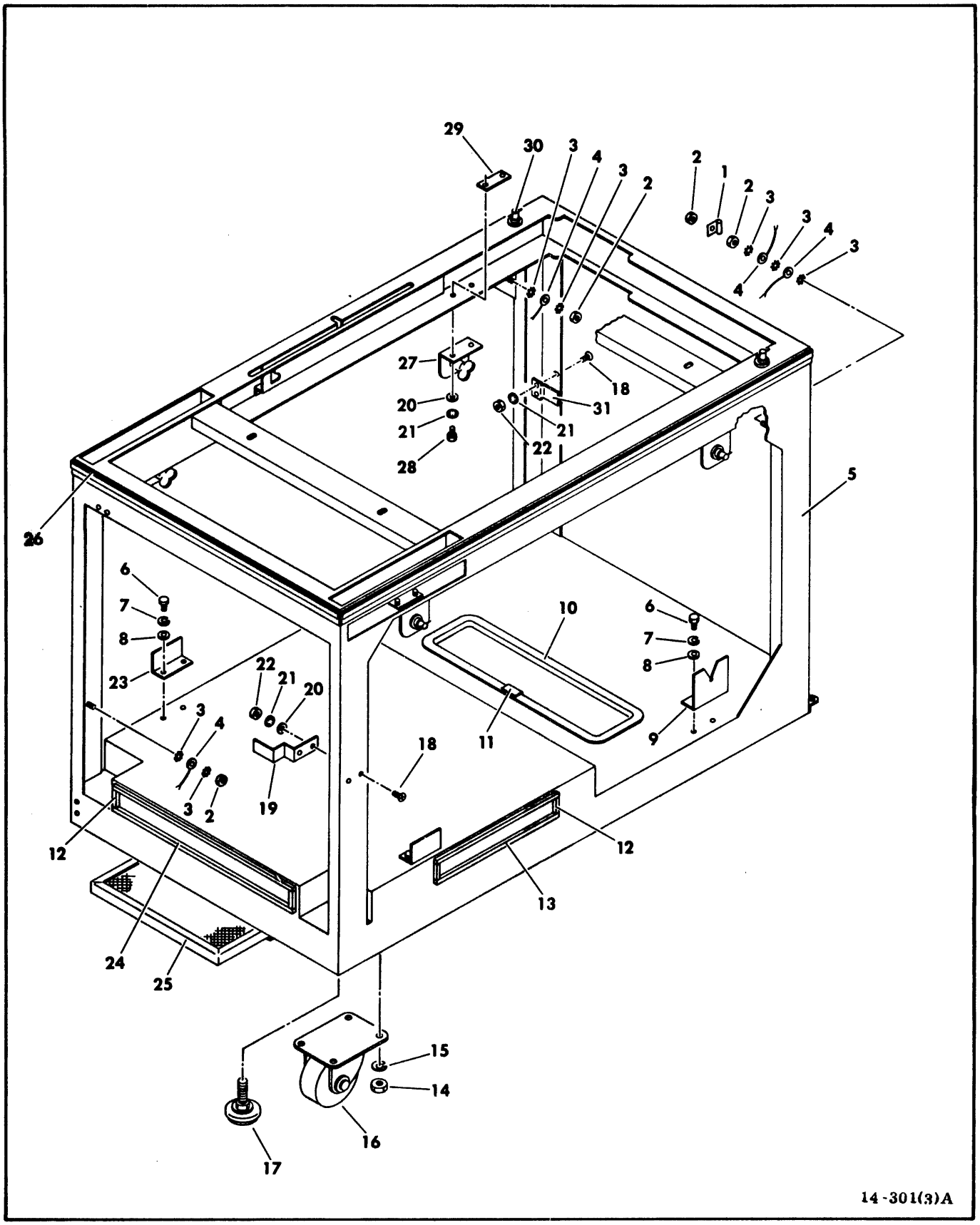

Figure 3-3. Final Assembly - Acoustic Cabinet (Sheet 3 of 3)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-2		FINAL ASSEMBLY, Acoustic Cabinet (Sheet 3)	Unless Otherwise Noted All Parts And Assemblies Listed Here Are Common To Both The Acoustic Cabinet And The Acoustic Drawer.
		FRAME ASSEMBLY (See Sheet 2 for Additional Frame Information)	
1	92602002	CLAMP, Cable, Nylon	
2	10125106	NUT, Hex, 8-32	
3	10126402	WASHER, Lock, External Tooth, 8	
4	94281494	CABLE, Ground	
5	76428900	FRAME, Main	
6	10126501	SCREW, Hex Head, 1/4-20 x 5/8	
7	10125806	WASHER, Lock, Spring, 1/4	
8	10125608	WASHER, Flat, 1/4	
9	75007400	BRACKET, Panel, Side	
10	94237703	TRIM, Safety, Black	
11	41282100	CLIP, Safety Trim	
12	76429302	SEAL, Acoustical	
13	76429300	SEAL, Acoustical	
14	10125302	NUT, Hex, 5/16-18	
15	10125807	WASHER, Lock, Spring, 5/16	
16	92703005	CASTER	
17	93697021	LEVELER	
18	10125747	SCREW, Flat Head, 10-32 x 1/2	
19	77561800	KEEPER, Latch	
20	10125607	WASHER, Flat, 10	
21	10126105	WASHER, Lock, Internal Tooth, 10	
22	10125108	NUT, Hex, 10-32	
23	75007300	BRACKET, Panel	
24	76429301	SEAL, Acoustical	
25	00815481	FILTER, Aluminum	
26	93993001	EXTRUSION, Rubber	
27	40029500	BRACKET, Stud	
28	10125062	SCREW, Hex Head, 10-32 x 1/2	
29	75031800	PLATE, Nut	
30	93573004	STUD ASSEMBLY	
		(ATTACHING PARTS)	
	93571002	GROMMET	
	93572001	RING, Snap	
		- - - * - - -	
31	76428400	LATCH, Door	

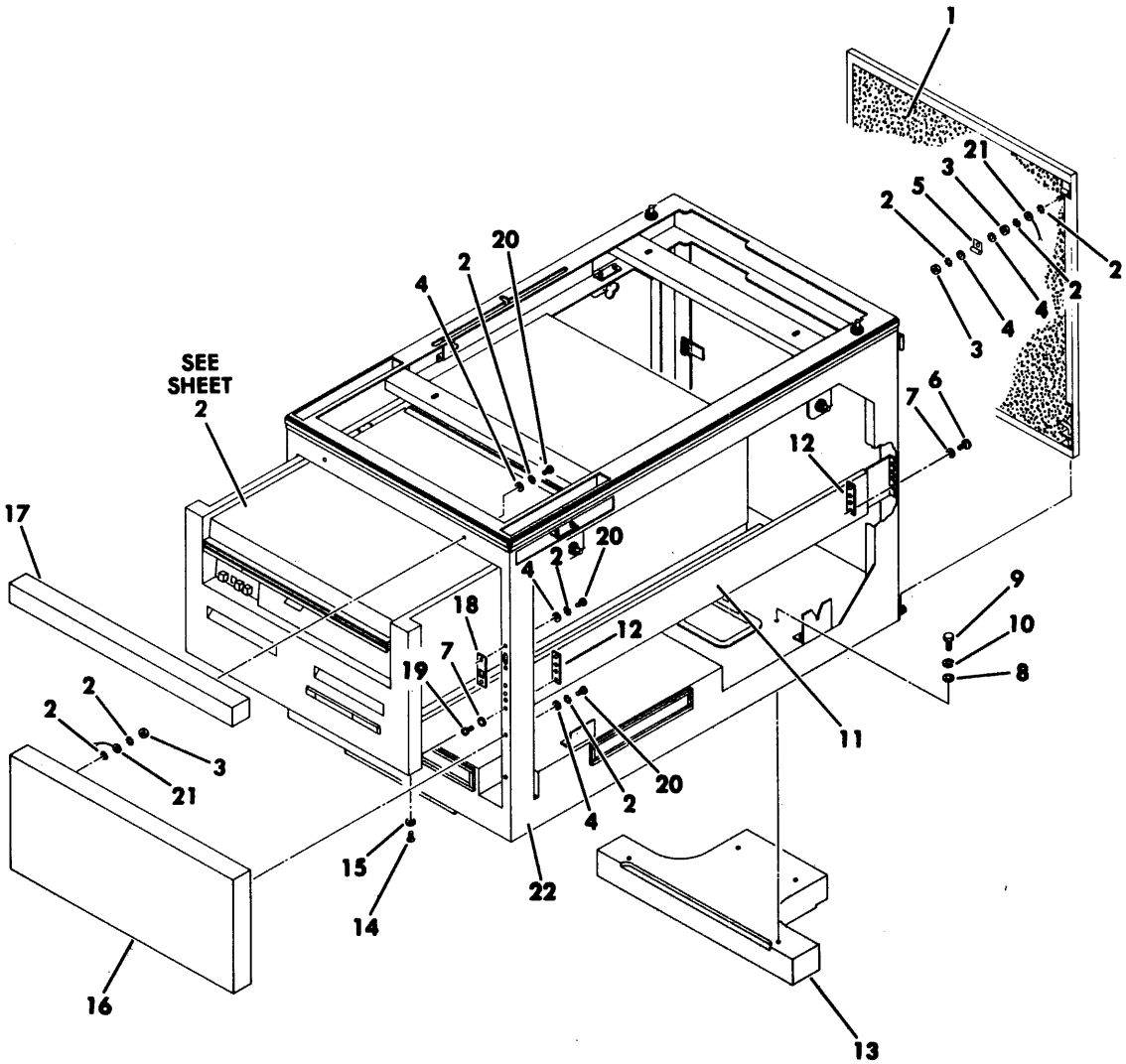

Figure 3-4. Final Assembly - Acoustic Drawer (Sheet 1 of 2)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-4		FINAL ASSEMBLY, Acoustic Drawer, (Sheet 1 of 2)	
1		REAR DOOR ASSEMBLY, Acoustic Drawer, (See Figure 3-17)	
2	10126402	WASHER, Lock, External Tooth, 8	
3	10125106	NUT, Hex, 8-32	
4	10125606	WASHER, Flat, 8	
5	92602002	CLAMP, Cable, Nylon	
6	10126244	SCREW, Socket, Hex Head, 10-32 x 3/8	
7	10126105	WASHER, Lock, Internal Tooth, 10	
8	10125608	WASHER, Flat, 1/4	
9	10126502	SCREW, Hex Head, 1/4-20 x 3/4	
10	10125806	WASHER, Lock, Spring, 1/4	
11	94393001	SLIDE	Right Side
11	94393000	SLIDE (Not Shown)	Left Side
12		PLATE, Nut	Supplied As Part Of Slide
13	77563300	BALLAST	
14	10125746	SCREW, Flat Head, 10-32 x 3/8	
15	76422600	WASHER, Special	
16	775627**	PANEL, Front, Lower	
17	764286**	PANEL, Front, Upper	
18	76428100	KEEPER, Latch	
19	10127143	SCREW, Machine, Pan Head, 10-32 x 1/2	
20	10127122	SCREW, Machine, Pan Head, 8-32 x 3/8	
21		CABLE, Ground (See Final Assembly, Acoustic Cabinet For Part Number)	
22		FRAME (See Final Assembly, Acoustic Cabinet For Part Numbers)	

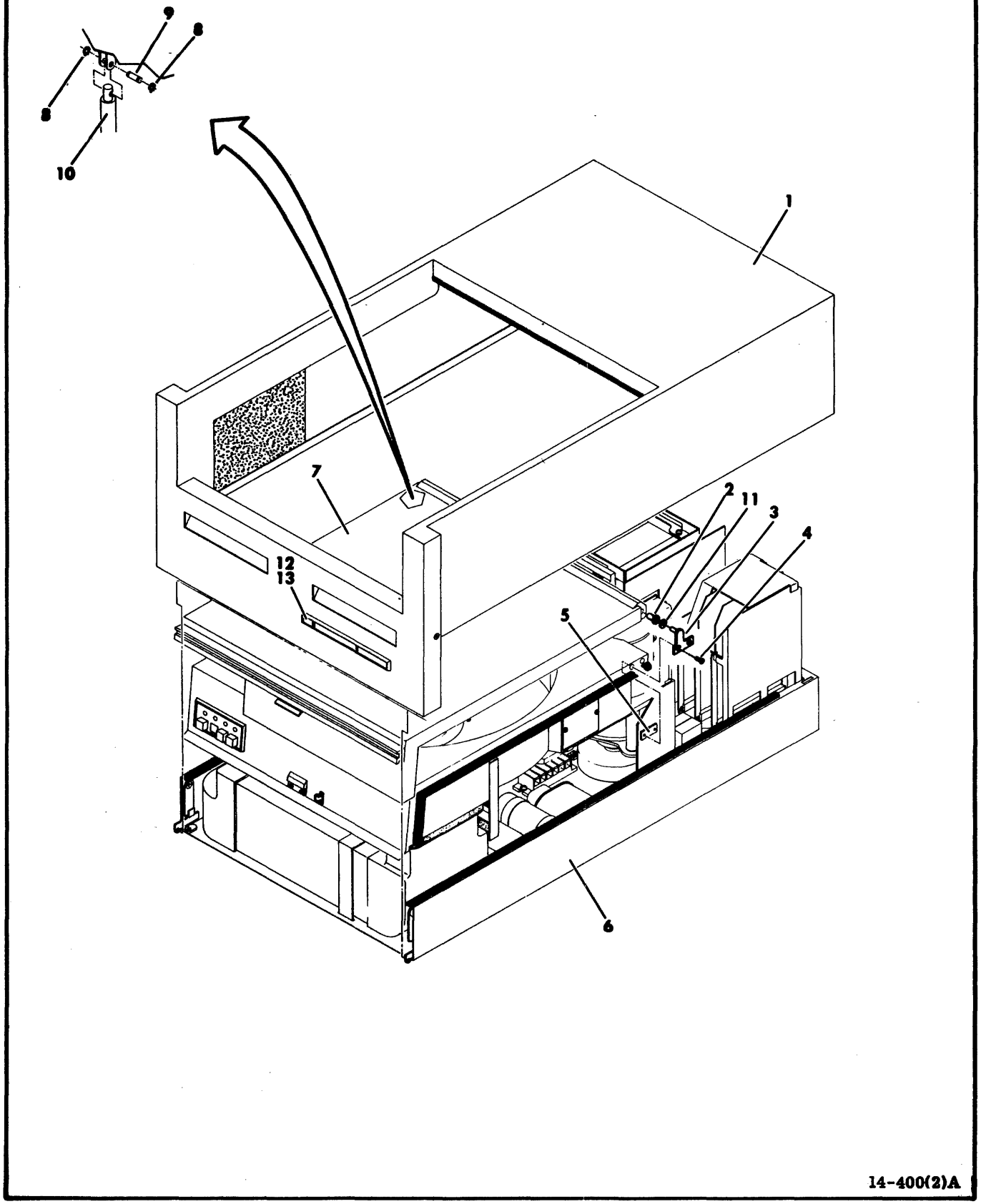

Figure 3-4. Final Assembly - Acoustic Drawer (Sheet 2 of 2)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-4		FINAL ASSEMBLY, Acoustic Drawer, (Sheet 2)	
1		CASE ASSEMBLY, Acoustic Drawer	
2	76429600	BEARING, Flanged	
3	77560300	PIVOT, Pin, Cover	Right Side
3	77560200	PIVOT, Pin, Cover (Not Shown)	Left Side
4	10125724	SCREW, Flat Head, 8-32 x 3/8	
5	77560400	PLATE, Nut	Right Side
5	75173307	PLATE, Nut (Not Shown)	Left Side
6		DRIVE ELECTRONICS (See Figure 3-20)	
7		PACK ACCESS COVER ASSEMBLY, Acoustic (See Figure 3-13)	
8	92033221	RING, Retaining	
9	75071700	PIN, Pivot, Cover	
10		SPRING, Gas (See Deck Assembly, Sheet 5, For Part Number)	
11	76419100	SPACER, Pack Cover	
12	15000601	EMBLEM, Product Identification, 97XX SMD	See Note
13	94365001	EMBLEM, Exterior Identification, CDC	See Note

NOTE:
The part numbers listed are for standard CDC emblems only. Not all units are shipped from the factory with standard CDC emblems.

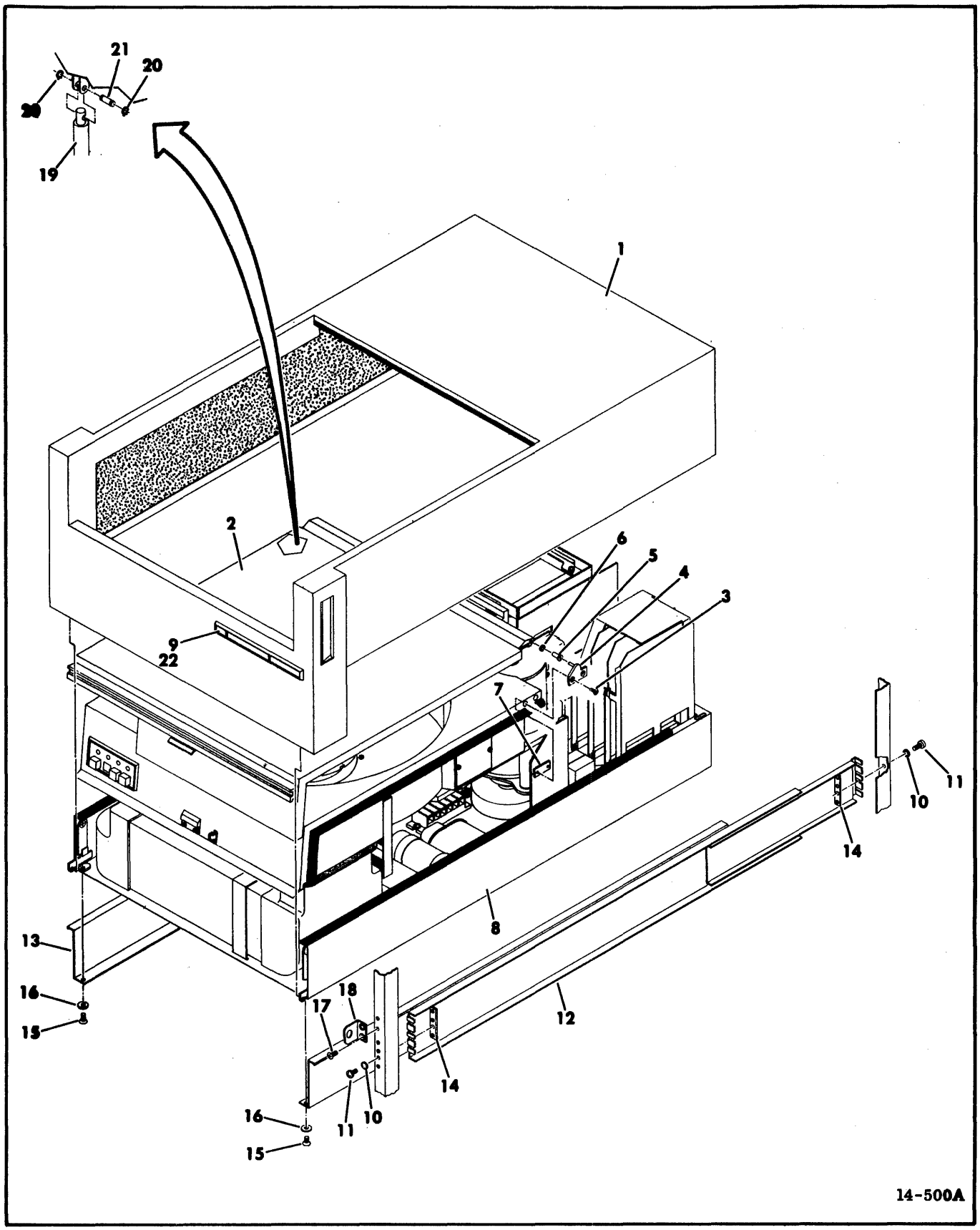

Figure 3-5. Final Assembly - 30 Inch Rack Mount

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-5		FINAL ASSEMBLY, 30 Inch Rack Mount	
1		CASE ASSEMBLY, 30 Inch Rack Mount (See Figure 3-10)	
2		PACK ACCESS COVER ASSEMBLY, Nonacoustic (See Figure 3-12)	
3	10125714	SCREW, Flat Head, 6-32 x 3/8	
4	75070000	HINGE, Pin	Right Side
4	75070001	HINGE, Pin (Not Shown)	Left Side
5	41274008	BEARING, Flanged	
6	76419100	SPACER, Pack Cover	
7	75173306	PLATE, Nut	
8		DRIVE ELECTRONICS (See Figure 3-20)	
9	94365001	EMBLEM, Exterior Identification, CDC	See Note
	77569501	SLIDE ASSEMBLY	
10	10126105	WASHER, Lock, Internal Tooth, 10	
11	10127142	SCREW, Machine, Pan Head, 10-32 x 3/8	
12	94383601	SLIDE	Right Side
13	94383600	SLIDE	Left Side
14		PLATE, Nut	Supplied As Part Of Slide
15	10125746	SCREW, Flat Head, 10-32 x 3/8	
16	76422600	WASHER, Special	
17	10125931	SCREW, Flat Head, 10-32 x 7/16	
18	77564700	KEEPER, Latch	
19		SPRING, Gas (See Deck Assembly, Sheet 5, For Part Number)	
20	92033221	RING, Retaining	
21	75071700	PIN, Pivot, Cover	
22	15000601	EMBLEM Product Identification, 97XX SMD	See Note

NOTE:
The part numbers listed are for standard CDC emblems only. Not all units are shipped from the factory with standard CDC emblems.

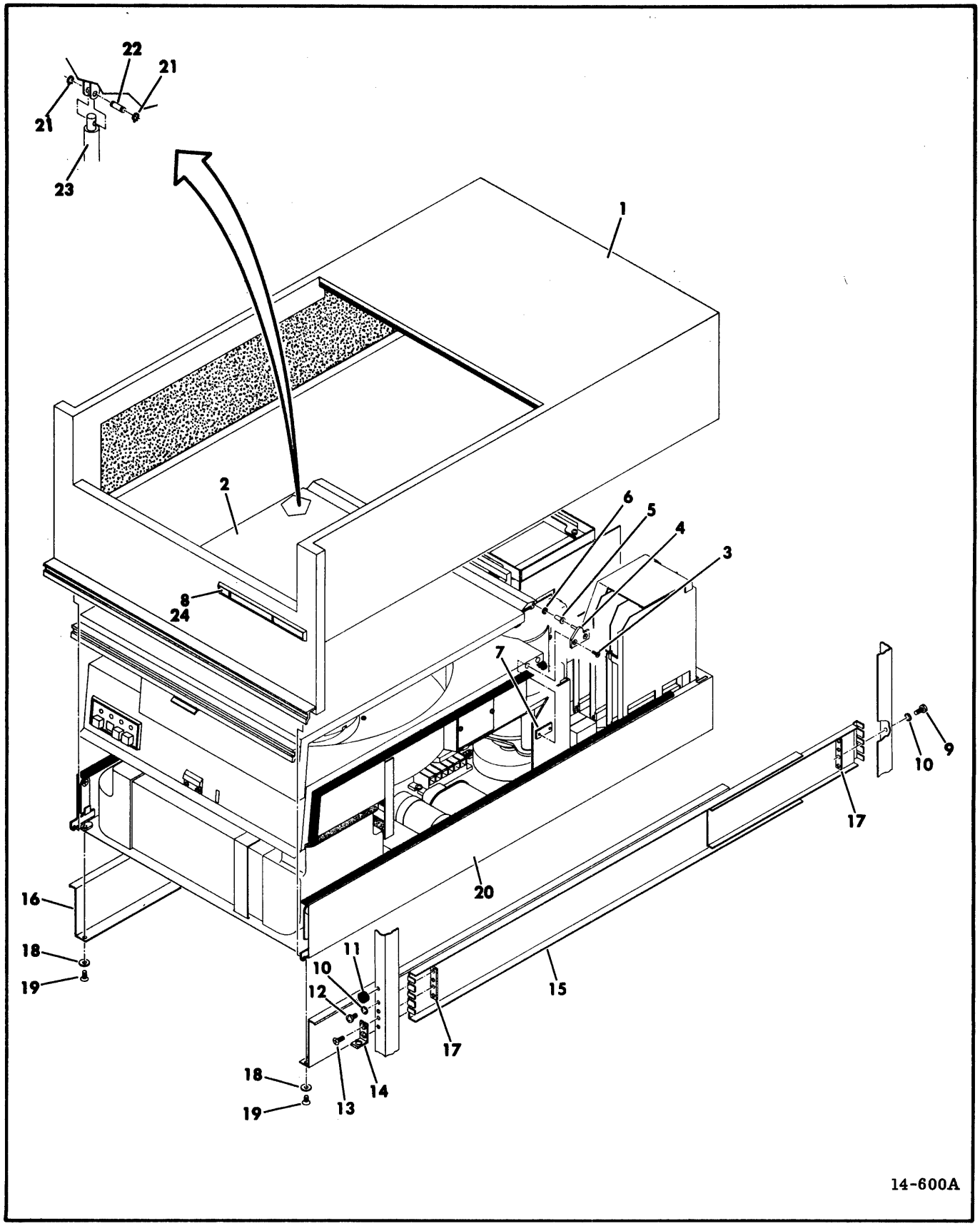

Figure 3-6. Final Assembly - 36 Inch Rack Mount

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-6		FINAL ASSEMBLY, 36 Inch Rack Mount	
1		CASE ASSEMBLY, 36 Inch Rack Mount (See Figure 3-11)	
2		RACK ACCESS COVER ASSEMBLY, Nonacoustic (See Figure 3-12)	
3	10125714	SCREW, Flat Head, 6-32 x 3/8	
4	75070000	HINGE, Pin	Right Side
4	75070001	HINGE, Pin (Not Shown)	Left Side
5	41274008	BEARING, Flanged	
6	76419100	SPACER, Pack Access Cover	
7	75173306	PLATE, Nut	
8	94365001	EMBLEM, Exterior Identification, CDC	See Note
	77569500	SLIDE ASSEMBLY	
9	10125062	SCREW, Machine, Hex Head, 10-32 x 1/2	
10	10126105	WASHER, Lock, Internal Tooth, 10	
11	92633003	BUMPER, Grommet	
12	10127142	SCREW, Machine, Pan Head, 10-32 x 3/8	
13	10125747	SCREW, Flat Head, 10-32 x 1/2	
14	76030900	KEEPER, Latch	
15	94393001	SLIDE	Right Side
16	94393000	SLIDE	Left Side
17		PLATE, Nut	Supplied As Part of Slide
18	76422600	WASHER, Special	
19	10125746	SCREW, Flat Head, 10-32 x 3/8	
20		DRIVE ELECTRONICS (See Figure 3-20)	
21	92033221	RING, Retaining	
22	75071700	PIN, Pivot, Cover	
23		SPRING, Gas (See Deck Assembly, Sheet 5 For Part Number)	
24	15000601	EMBLEM, Product Identification, 97XX SMD	See Note

NOTE:
The part numbers listed are for standard CDC emblems only. Not all units are shipped from the factory with standard CDC emblems.

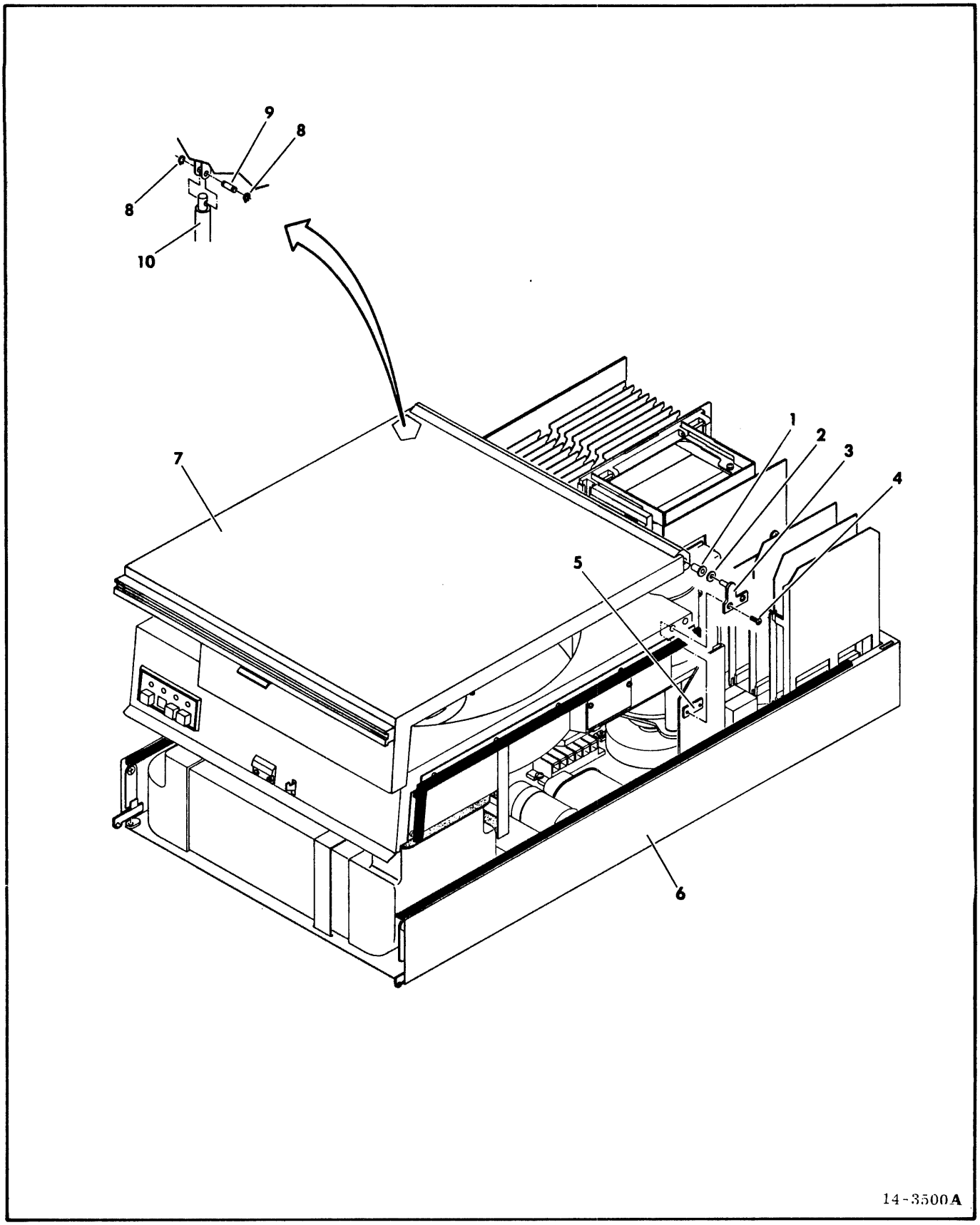

Figure 3-6.1. Final Assembly - Nude

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-6.1		FINAL ASSEMBLY, Nude	
1	76429600	BEARING, Flanged	
2	76419100	SPACER, Pack Cover	
3	77560300	PIVOT, Pin, Cover	
4	77560200	PIVOT, Pin, Cover (Not Shown)	
5	75173307	PLATE, Nut	
5	77560400	PLATE, Nut (Not Shown)	
6		DRIVE ELECTRONICS (See Figure 3-20)	
7		PACK ACCESS COVER, Acoustic (See Figure 3-13)	
8	92033221	RING, Retaining	
9	75071700	PIN, Pivot, Cover	
10		SPRING, Gas (See Deck Assembly Sheet 5, For Part Number)	

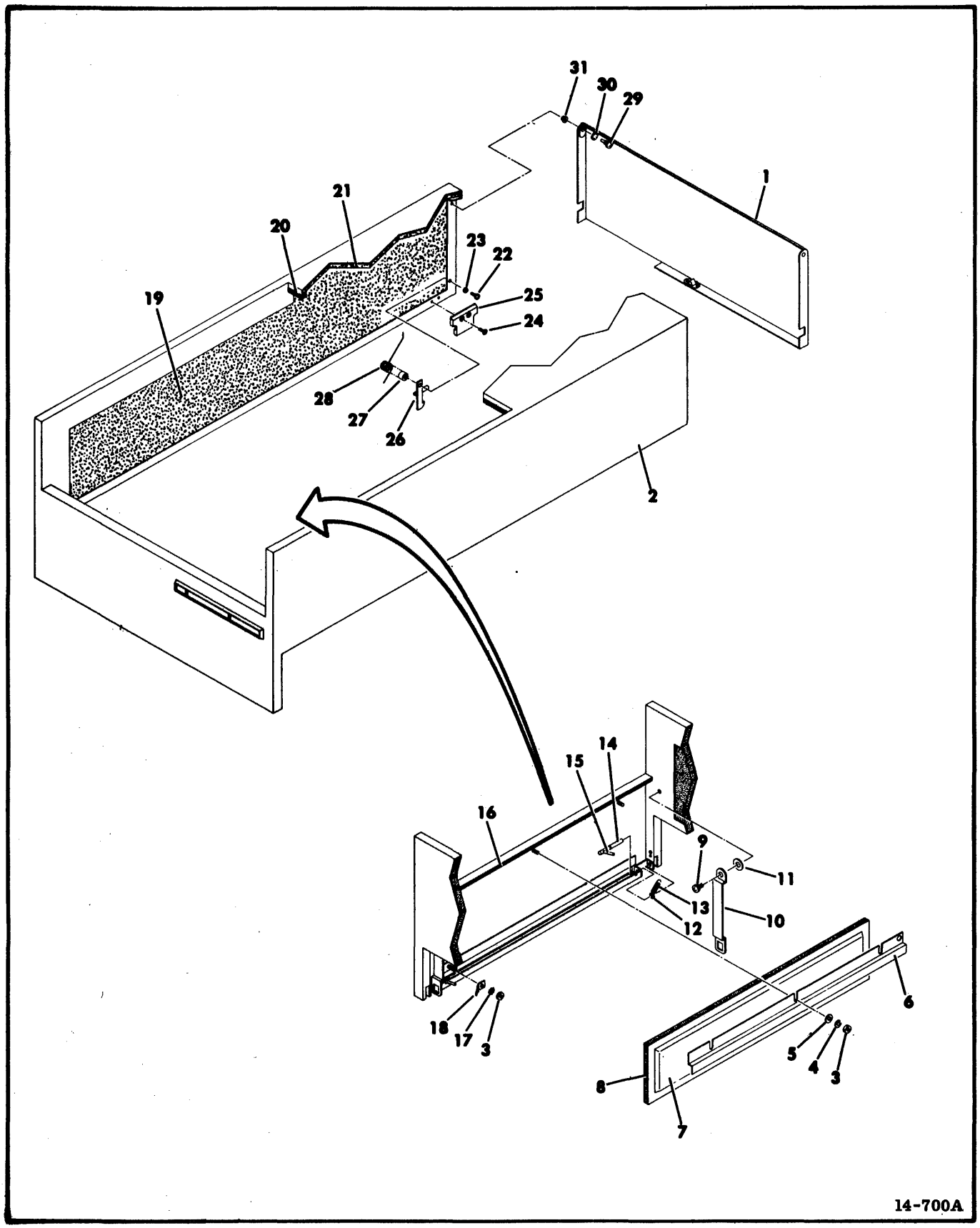

Figure 3-7. Case Assembly - Pedestal

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-7	472021**	CASE ASSEMBLY, Pedestal	
1	471954**	DOOR, Case	
2	774566**	CASE, Top	
3	10125106	NUT, Hex, 8-32	
4	10125804	WASHER, Lock, Spring, 8	
5	10125606	WASHER, Flat, 8	
6	75257700	RETAINER, Filter	
7	94364902	FILTER, Air	
8	92628413	TAPE, Foam	
9	10127142	SCREW, Machine, Pan Head, 10-32 x 3/8	
10	76427601	ARM, Support, Case	
11	75062400	WASHER, Insulator	
12	92033037	RING, Retaining	
13	46819300	SPRING, Extension	
14	75065200	PIN, Pivot, Case	
15	93530021	PIN, Roll	
16	92628302	TAPE, Adhesive Back, Black	
17	10126402	WASHER, Lock, External Tooth, 8	
18	94274105	TERMINAL, Quick Connect	
19	75040479	PANEL, Foam, Acoustical	Left Side
19	75040480	PANEL, Foam, Acoustical (Not Shown)	Right Side
20	76429332	SEAL, Acoustical	
21	75040426	PANEL, Foam, Acoustical	
22	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
23	10126103	WASHER, Lock, External Tooth, 6	
24	10125714	SCREW, Flat Head, 6-32 x 3/8	
25	47198100	CLIP, Case	
26	47175200	LATCH, Case	Left Side
26	47175201	LATCH, Case (Not Shown)	Right Side
27	47195300	SPACER, Latch	
28	47195500	SPRING, Torsion	
29	75257301	SCREW, Modified	
30	10126105	WASHER, Lock, Internal Tooth, 10	
31	92373001	NYLINER, Snap In	

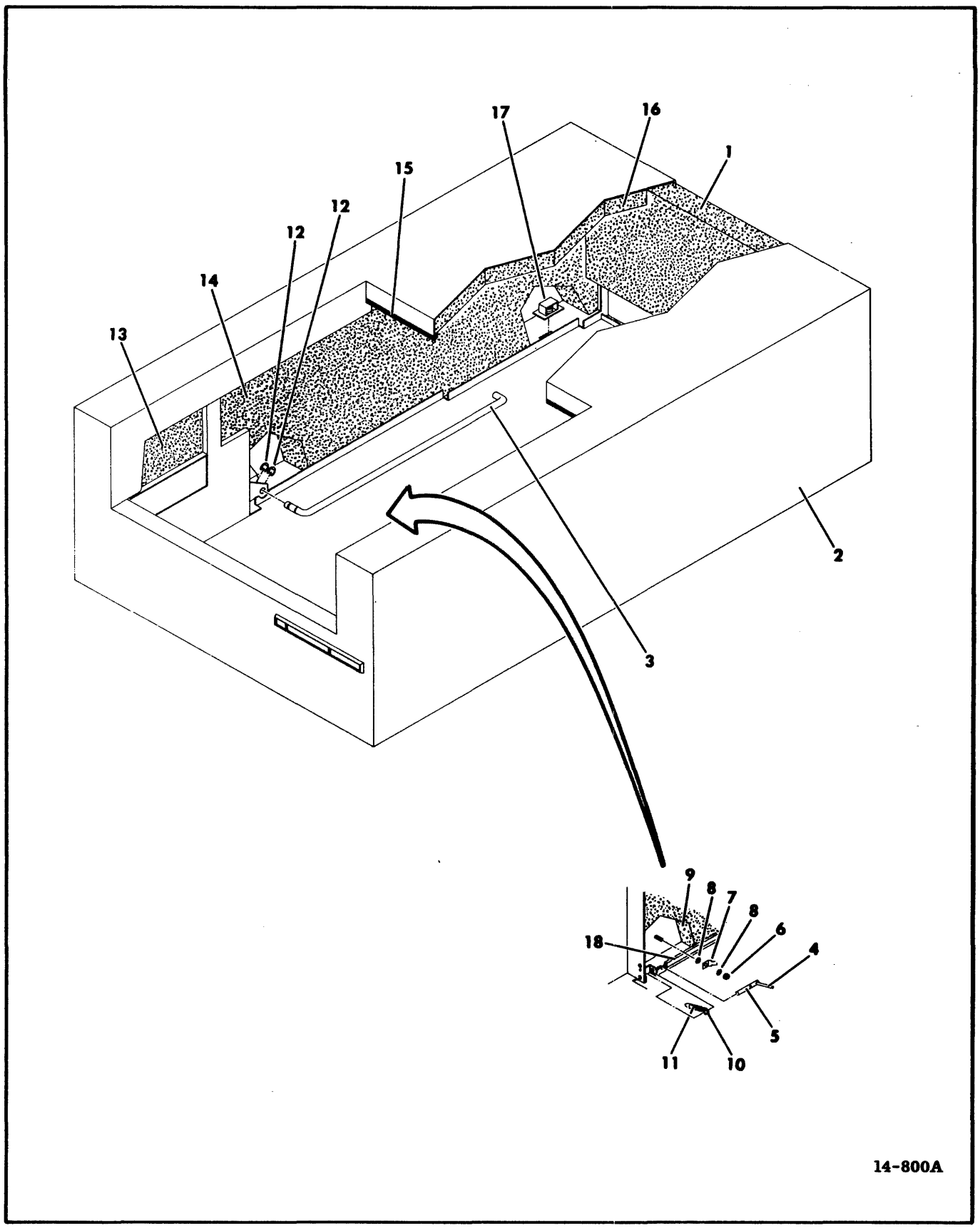

Figure 3-8. Case Assembly - Acoustic Cabinet

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-8	775628**	CASE ASSEMBLY, Acoustic Cabinet	
1	75040478	PANEL, Foam, Acoustical	
2	778173**	CASE, Acoustical, Top	
3	77561000	SUPPORT, Rod	
4	93530021	PIN, Roll	
5	75065200	PIN, Pivot, Case	
6	10125106	NUT, Hex, 8-32	
7	94274105	TERMINAL, Quick Connect	
8	10126402	WASHER, Lock, External Tooth, 8	
9	75040450	PANEL, Foam, Acoustical	
10	92033037	RING, Retaining	
11	46819300	SPRING, Extension	
12	92033087	RING, Retaining	
13	75040451	PANEL, Foam, Acoustical	
14	75040448	PANEL, Foam, Acoustical	Left Side
14	75040449	PANEL, Foam, Acoustical (Not Shown)	Right Side
15	76429320	SEAL, Acoustical	
16	75040474	PANEL, Foam, Acoustical	
17	94303500	RECEPTACLE, Clip In	
18	76429322	SEAL, Acoustical	

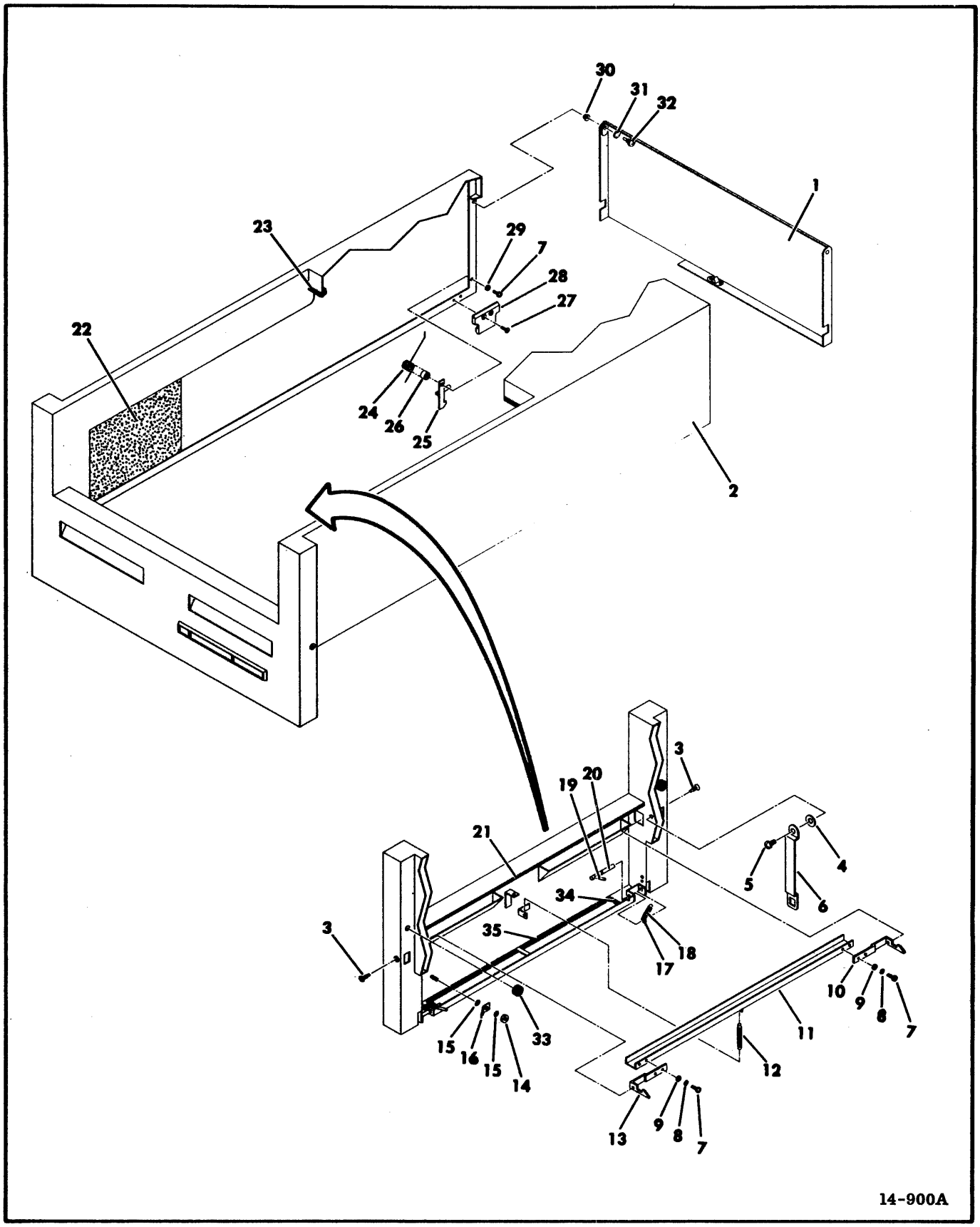

Figure 3-9. Case Assembly - Acoustic Drawer

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-9	472022**	CASE ASSEMBLY, Acoustic Drawer	
1	471954**	DOOR, Case	
2	774565**	CASE, Acoustical	
3	76427900	SCREW, Modified	
4	75062400	WASHER, Insulator	
5	10127142	SCREW, Machine, Pan Head, 10-32 x 3/8	
6	76427601	ARM, Support, Case	
7	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
8	10126401	WASHER, Lock, External Tooth, 6	
9	10125605	WASHER, Flat, 6	
10	76428000	LATCH, Rack Mount	
11	76428200	ACTUATOR, Latch	
12	40063200	SPRING, Extension	
13	76428001	LATCH, Rack Mount	
14	10125106	NUT, Hex, 8-32	
15	10126402	WASHER, Lock, External Tooth, 8	
16	94274105	TERMINAL, Quick Connect	
17	92033037	RING, Retaining	
18	46819300	SPRING, Extension	
19	93530021	PIN, Roll	
20	75065200	PIN, Pivot, Case	
21	92628302	TAPE, Adhesive Back, Black	
22	75040477	PANEL, Foam, Acoustical	
23	76429332	SEAL, Acoustical	
24	47195500	SPRING, Torsion	
25	47175200	LATCH, Case	Left Side
25	47175201	LATCH, Case (Not Shown)	Right Side
26	47195300	SPACER, Latch	
27	10125714	SCREW, Flat Head, 6-32 x 3/8	
28	47198100	CLIP, Case	
29	10126103	WASHER, Lock, Internal Tooth, 6	
30	92373001	NYLINER, Snap In	
31	10126105	WASHER, Lock, Internal Tooth, 10	
32	75257301	SCREW, Modified	
33	92633021	BUMPER, Grommet	
34	76429310	SEAL, Acoustical	
35	76429309	SEAL, Acoustical	

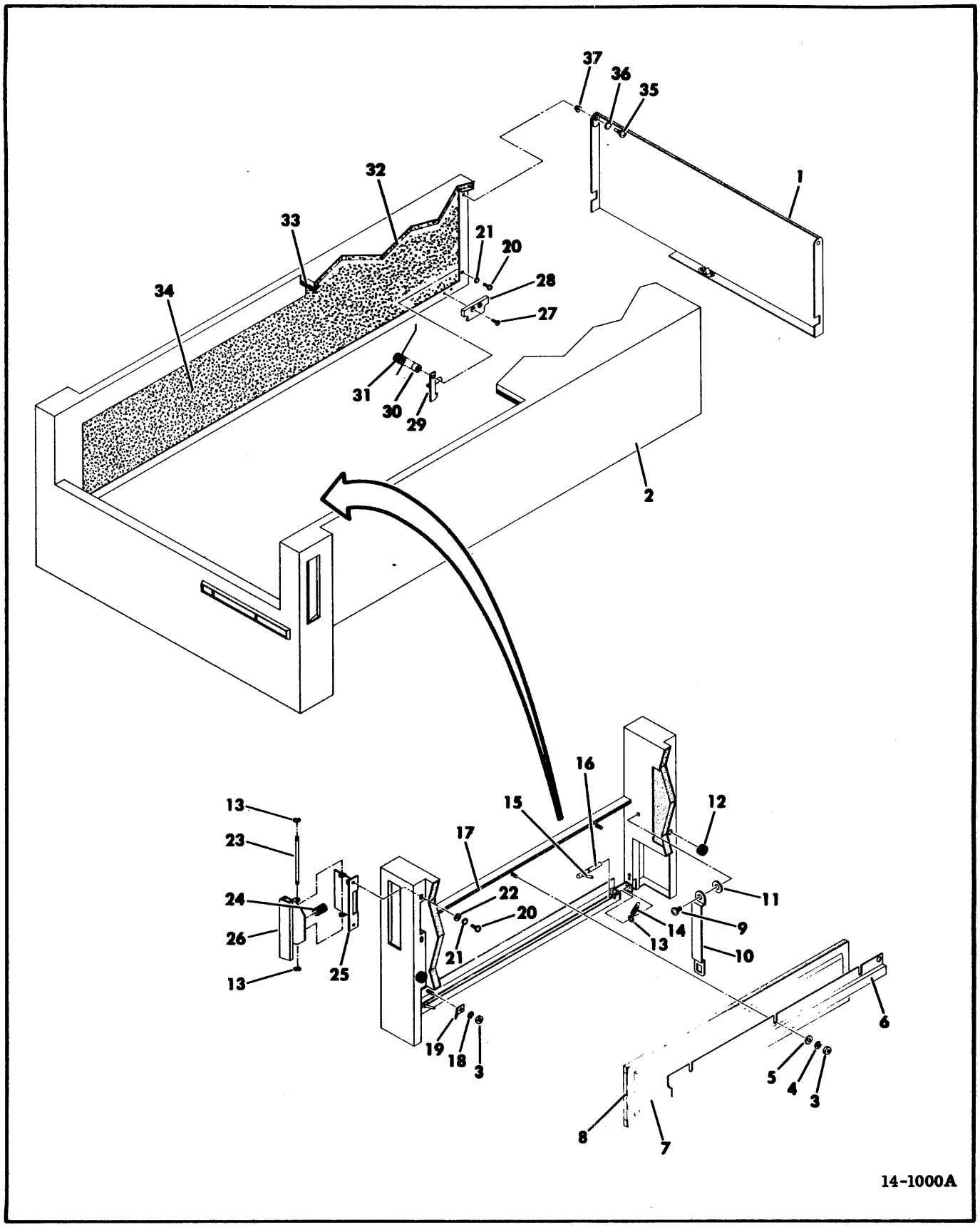

Figure 3-10. Case Assembly - 30 Inch Rack Mount

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-10	775663**	CASE ASSEMBLY, 30 Inch Rack Mount	
1	471954**	DOOR, Case	
2	775646**	CASE, Rack Mount	
3	10125106	NUT, Hex, 8-32	
4	10125804	WASHER, Lock, Spring, 8	
5	10125606	WASHER, Flat, 8	
6	75257700	RETAINER, Filter	
7	94364902	FILTER, Air	
8	92628413	TAPE, Foam	
9	10127142	SCREW, Machine, Pan Head, 10-32 x 3/8	
10	76427601	ARM, Support, Case	
11	75062400	WASHER, Insulator	
12	92633021	BUMPER, Grommet	
13	92033237	RING, Retaining	
14	46819300	SPRING, Extension	
15	93530021	PIN, Roll	
16	75065200	PIN, Pivot, Case	
17	92628302	TAPE, Adhesive Backed, Black	
18	10126402	WASHER, Lock, External Tooth, 8	
19	94274105	TERMINAL, Quick Connect	
20	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
21	10126103	WASHER, Lock, Internal Tooth, 6	
22	10125605	WASHER, Flat, 6	
23	77564800	PIN, Latch	
24	94205791	SPRING, Compression	
25	77564900	BASE, Latch	
26	77565003	ARM, Latch	
27	10125714	SCREW, Flat Head, 6-32 x 3/8	
28	47198100	CLIP, Case	
29	47175200	LATCH, Case	Left Side
29	47175201	LATCH, Case (Not Shown)	Right Side
30	47195300	SPACER, Latch	
31	47195500	SPRING, Torsion	
32	75040426	PANEL, Foam, Acoustical	
33	76429332	SEAL, Acoustical	
34	75040480	PANEL, Foam, Acoustical	Left Side
34	75040479	PANEL, Foam, Acoustical (Not Shown)	Right Side
35	75257301	SCREW, Modified	
36	10126105	WASHER, Lock, Internal Tooth, 10	
37	92373001	NYLINER, Snap In	

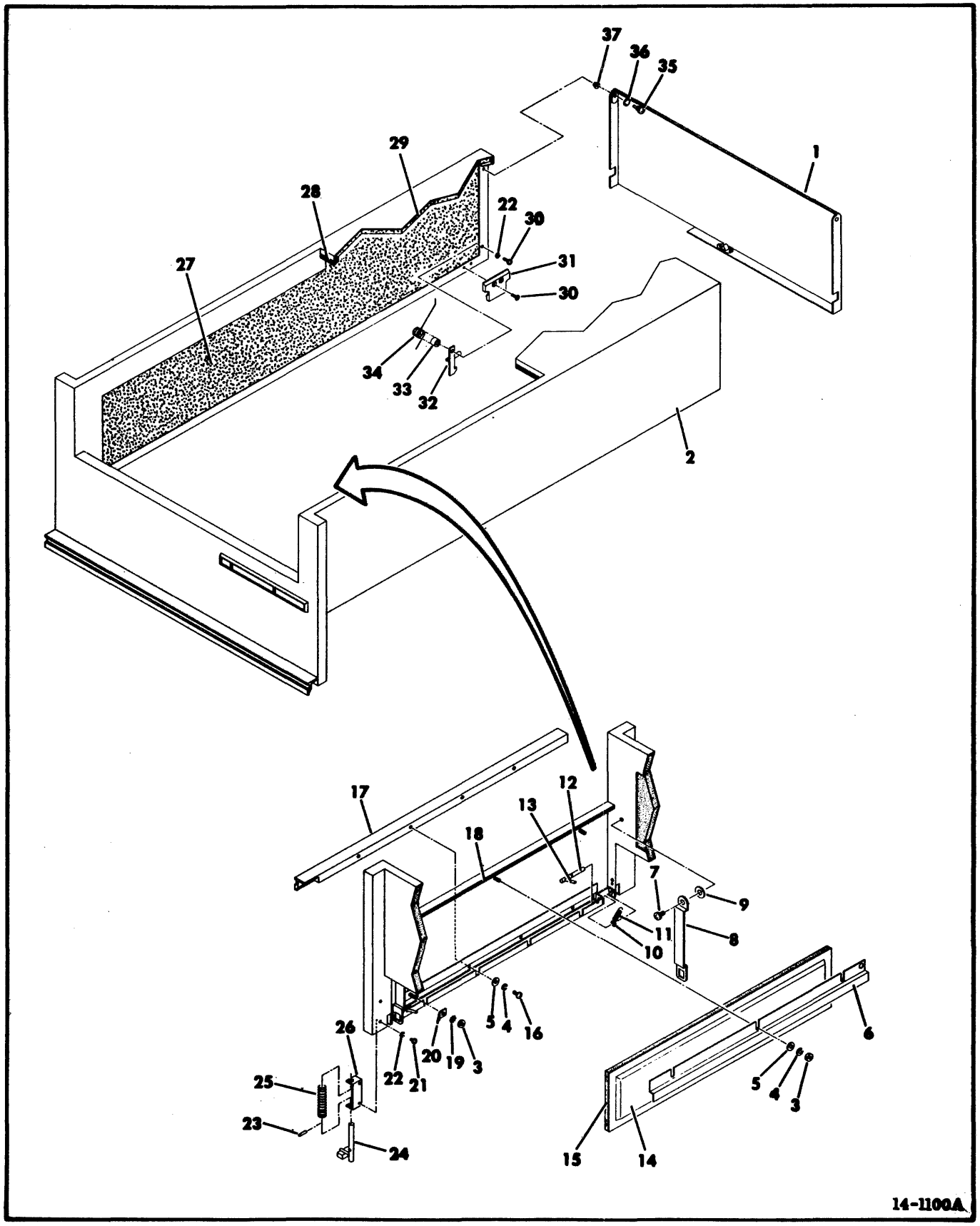

Figure 3-11. Case Assembly - 36 Inch Rack Mount

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-11	472020**	CASE ASSEMBLY, 36 Inch Rack Mount	
1	471954**	DOOR, Case	
2	774564**	CASE, Rack Mount	
3	10125106	NUT, Hex, 8-32	
4	10125804	WASHER, Lock, Spring, 8	
5	10125606	WASHER, Flat, 8	
6	75257700	RETAINER, Filter	
7	10127142	SCREW, Machine, Pan Head, 10-32 x 3/8	
8	76427601	ARM, Support, Case	
9	75062400	WASHER, Insulator	
10	92033037	RING, Retaining	
11	46819300	SPRING, Extension	
12	75065200	PIN, Pivot, Case	
13	93530021	PIN, Roll	
14	94364902	FILTER, Air	
15	92628413	TAPE, Foam	
16	10127122	SCREW, Machine, Pan Head, 8-32 x 3/8	
17	76030400	HANDLE, Rack Mount	
18	92628302	TAPE, Adhesive Backed, Black	
19	10126402	WASHER, Lock, External Tooth, 8	
20	94274105	TERMINAL, Quick Connect	
21	10127331	SCREW, Machine, Pan Head, 6-32 x 3/16	
22	10125803	WASHER, Lock, Spring, 6	
23	93530083	PIN, Roll	
24	76417500	PIN, Latch	
25	76417600	SPRING, Compression	
26	76030600	GUIDE, Pin	
27	75040480	PANEL, Foam, Acoustical	Left Side
27	75040479	PANEL, Foam, Acoustical (Not Shown)	Right Side
28	76429332	SEAL, Acoustical	
29	75040426	PANEL, Foam, Acoustical	
30	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
31	47198100	CLIP, Case	
32	47175200	LATCH, Case	Left Side
32	47175201	LATCH, Case (Not Shown)	Right Side
33	47195300	SPACER, Latch	
34	47195500	SPRING, Torsion	
35	75257301	SCREW, Modified	
36	10126105	WASHER, Lock, Internal Tooth, 10	
37	92373001	NYLINER, Snap In	

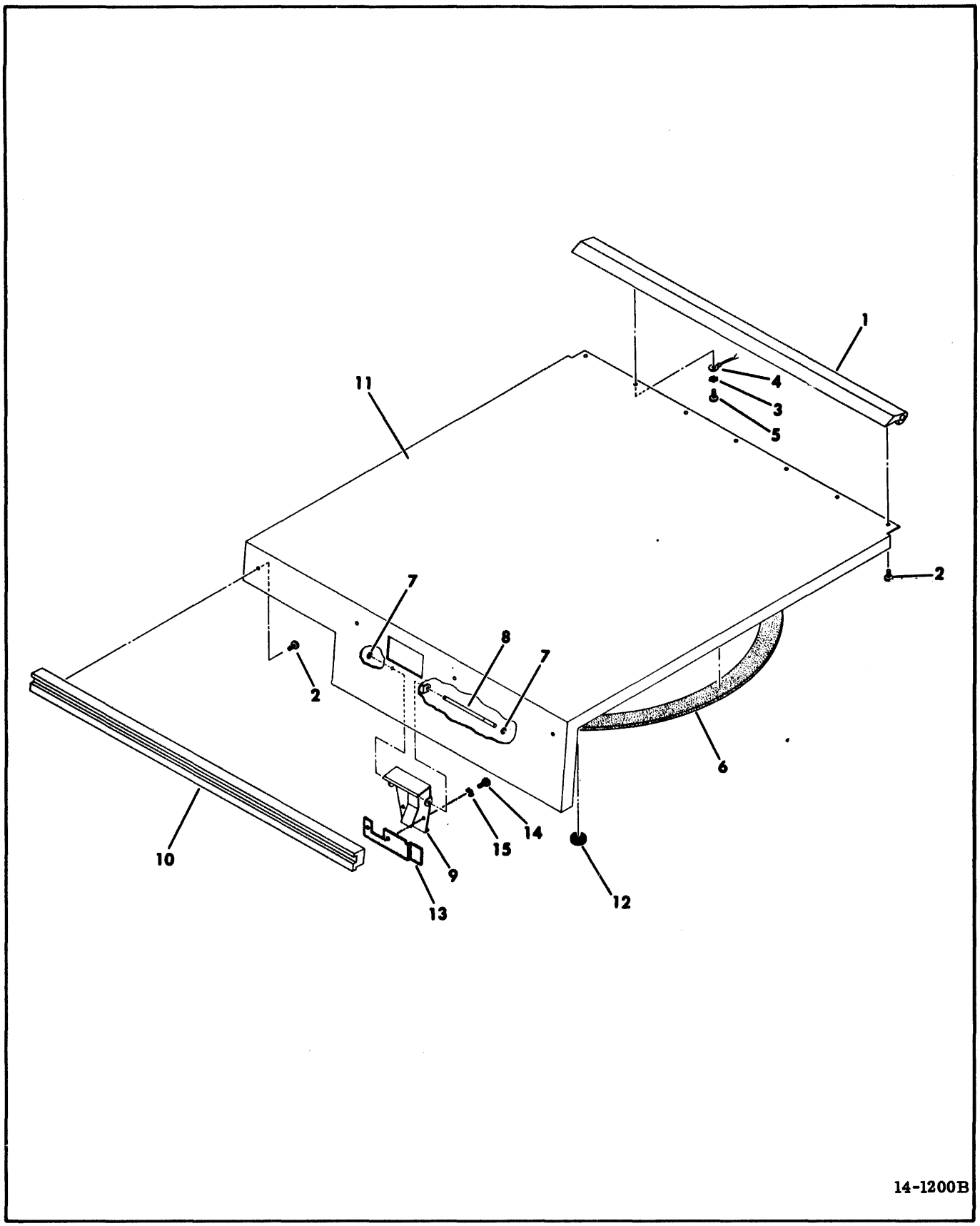

Figure 3-12. Pack Access Cover Assembly - Nonacoustic

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-12	750602**	PACK ACCESS COVER ASSEMBLY, Nonacoustic	
1	75070200	RETAINER, Cover, Pack	
2	93749158	SOREW, Machine, Pan Head, 6-32 x 1/4	
3	10126401	WASHER, Lock, External Tooth, 6	
4	94369529	CABLE, Ground	
5	10127111	SCREW, Machine, Pan Head, 6-32 x 1/4	
6	94276611	TAPE, Foam	
7	92033107	RING, Retaining	
8	75070900	ROD, Pivot, Latch	
9	75071401	LATCH AND SPRING ASSEMBLY	
10	77462900	HANDLE, Pack Access Cover	
11	778189**	COVER, Pack Access	
		(ITEMS LISTED BELOW ARE NOT PART OF THE PACK ACCESS COVER ASSEMBLY)	
12	75070701	BUMPER, Self Sticking	
13	76421800	KEEPER, Interlock	
14	10127102	SCREW, Machine, Pan Head, 4-40 x 1/4	
15	10126400	WASHER, Lock, External Tooth, 4	

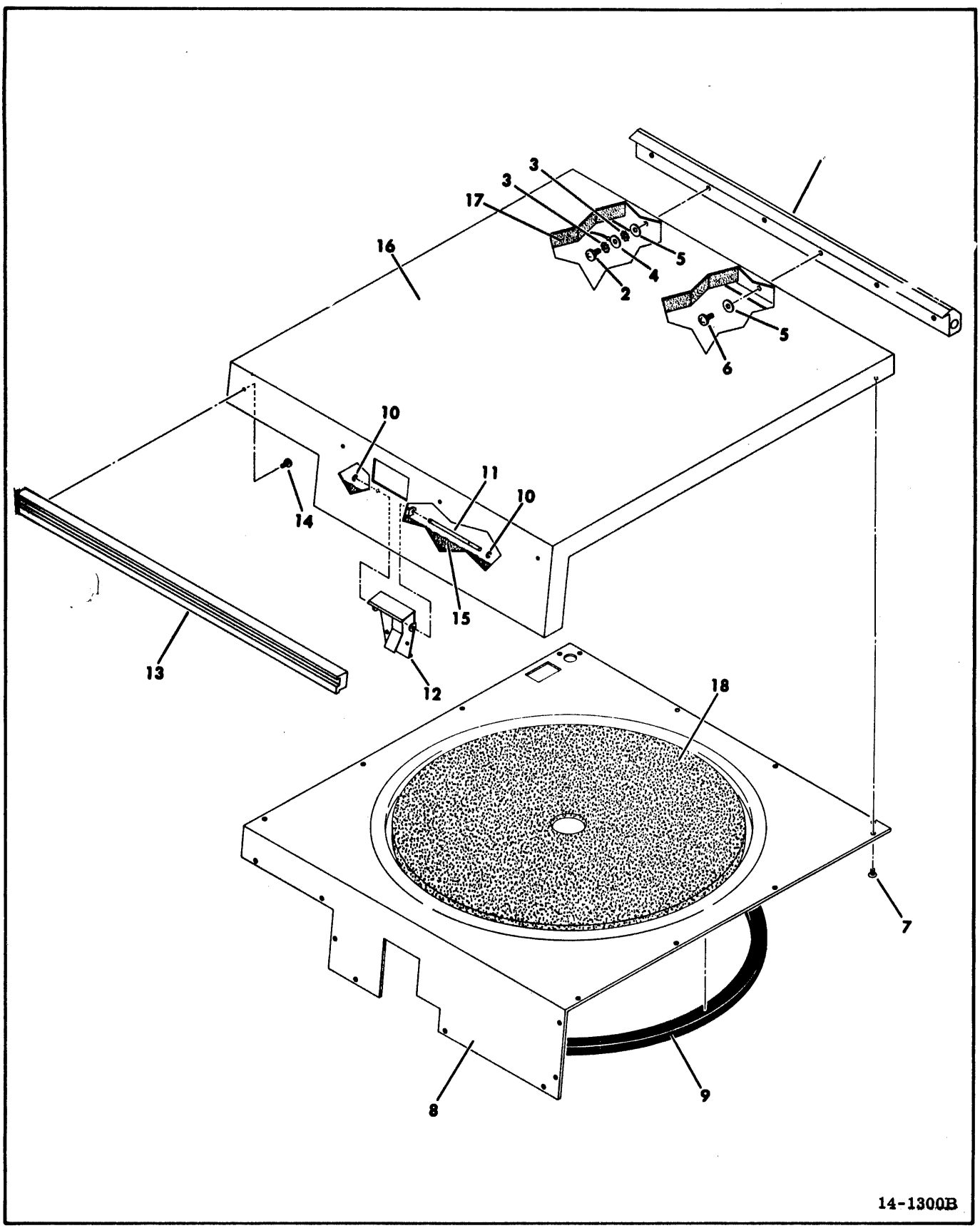

Figure 3-13. Pack Access Cover Assembly - Acoustic

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-13	775630**	PACK ACCESS COVER ASSEMBLY, Acoustic	
1	77560600	RETAINER, Cover, Pack	
2	10127131	SCREW, Machine, Pan Head, 10-24 x 3/8	
3	10126403	WASHER, Lock, External Tooth, 10	
4	94369526	CABLE, Ground	
5	10125607	WASHER, Flat, 10	
6	93749238	SCREW, Pan Head, Washer, 10-24 x 3/8	
7	93725141	SCREW, Machine, Truss Head	
8	83227400	COVER, Inner	
9	77561401	GASKET, Extended Sponge	
10	92033107	RING, Retaining	
11	75070900	ROD, Pivot, Latch	
12	77563100	LATCH AND SPRING ASSEMBLY	
13	77462900	HANDLE, Pack Access Cover	
14	93749158	SCREW, Pan Head, Washer, 6-32 x 1/4	
15	75040455	PANEL, Foam, Acoustical	
16	764299**	COVER, Pack Access	
17	75040456	PANEL, Foam, Acoustical	
18	75040454	PANEL, Foam, Acoustical	

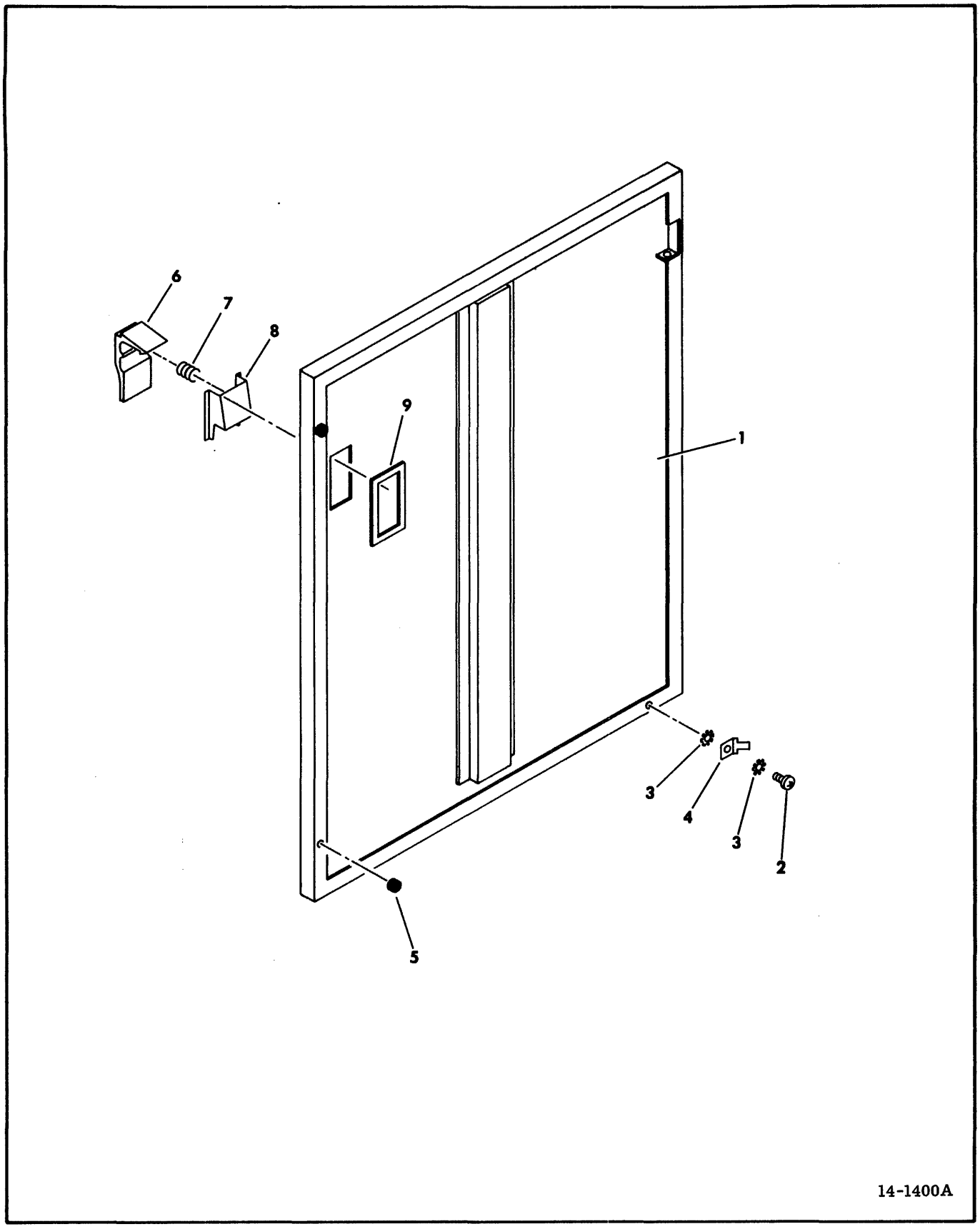

Figure 3-14. Front and Rear Door - Nonacoustic

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-14		FRONT AND REAR DOOR, Nonacoustic	
1	765158**	DOOR, Front	
1	765159**	DOOR, Rear	
2	10127131	SCREW, Machine, Pan Head, 10-24 x 3/8	
3	10126403	WASHER, Lock, External Tooth, 10	
4	94274140	TERMINAL, Quick Connect	
5	92633201	BUMPER, Grommet	
6	94221400	LATCH, Flush	
7		SPRING, Latch	Supplied With Flush Latch
8		BRACKET, Latch	Supplied With Flush Latch
9	94224907	SPACER, Latch	

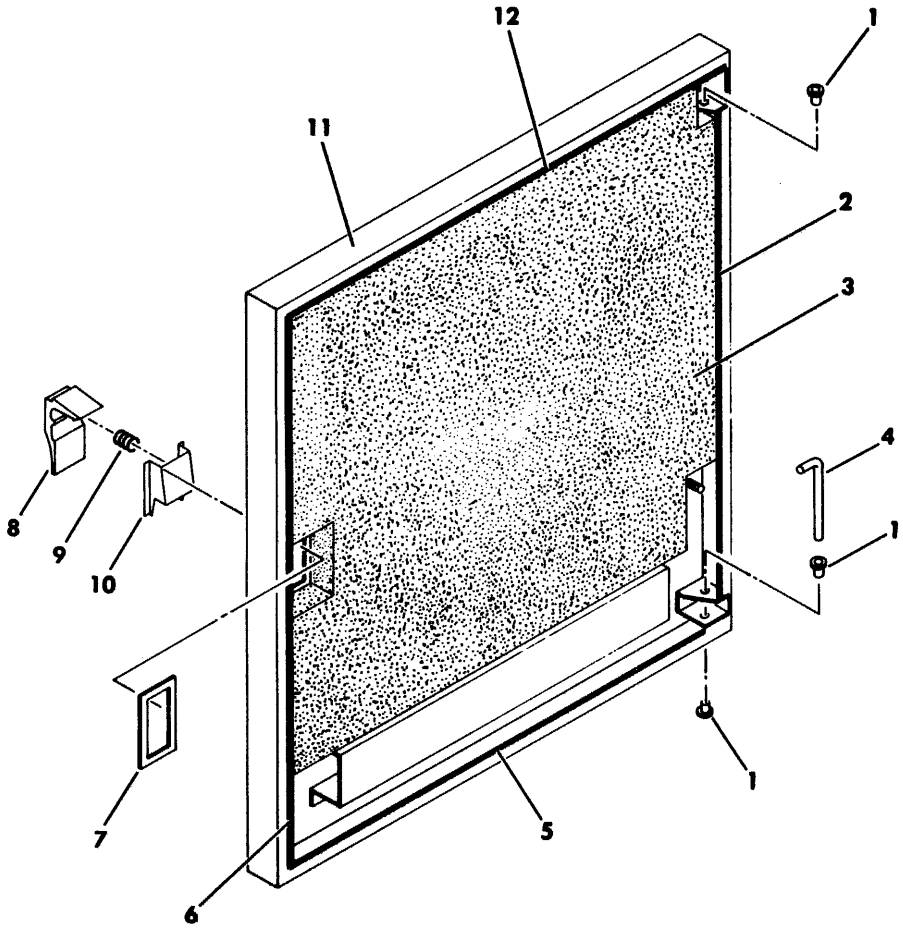

Figure 3-15. Front Door Assembly - Acoustic

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-15	775624**	FRONT DOOR ASSEMBLY, Acoustic Cabinet	
1	92373003	NYLINER, Snap In	
2	76429317	SEAL, Acoustical	
3	75040460	PANEL, Foam, Acoustical	
4	70948500	PIN, Hinge	
5	76429315	SEAL, Acoustical	
6	76429313	SEAL, Acoustical	
7	94224906	SPACER, Latch	
8	94221400	LATCH, Flush	
9		SPRING, Latch	Supplied With Flush Latch
10		BRACKET, Latch	Supplied With Flush Latch
11	775615**	DOOR, Front	
12	76429314	SEAL, Acoustical	

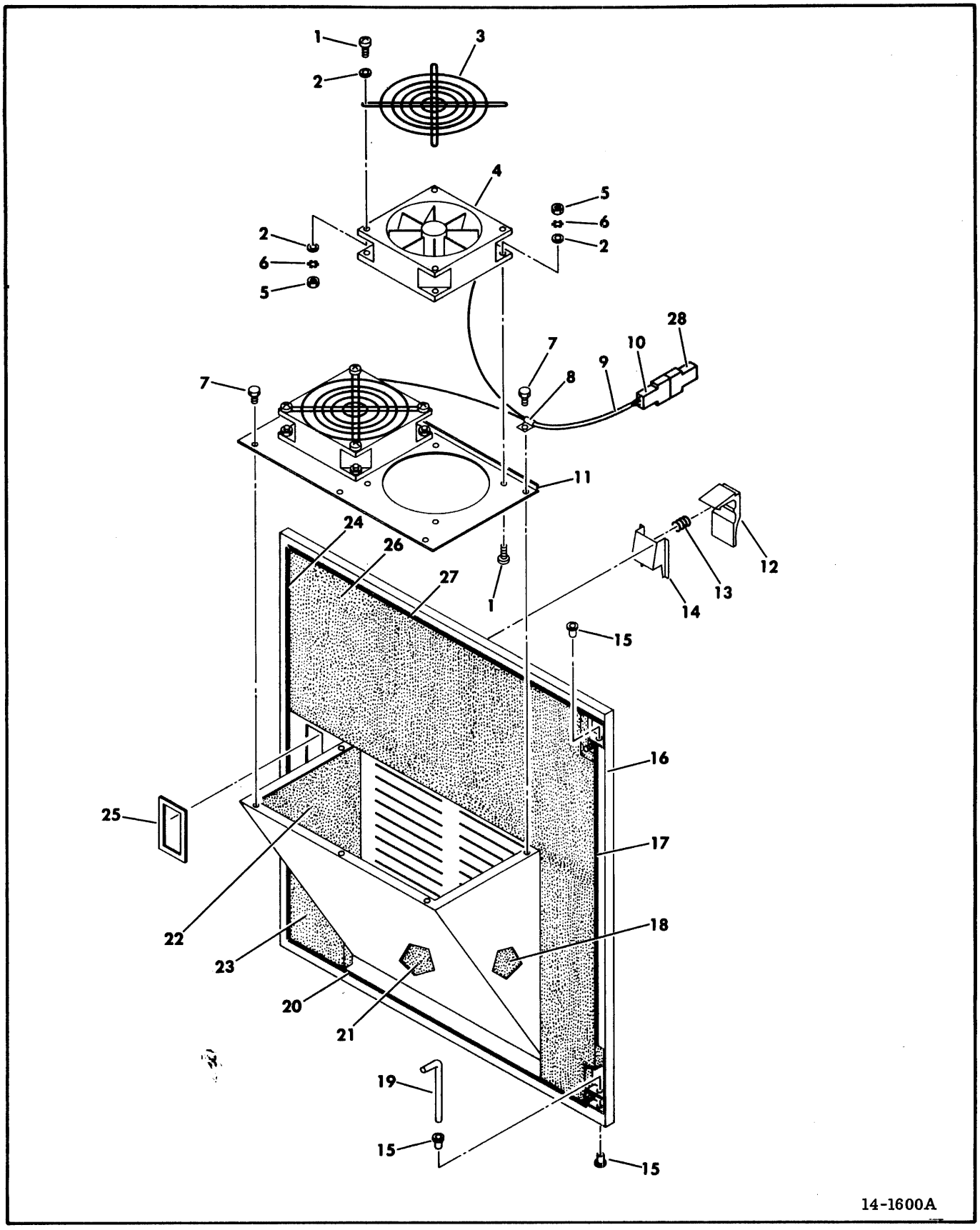

Figure 3-16. Rear Door Assembly - Acoustic Cabinet

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-16	775625**	REAR DOOR ASSEMBLY, Acoustic Cabinet	
1	10127115	SCREW, Machine, Pan Head, 6-32 x 5/8	
2	10125605	WASHER, Flat, 6	
3	40034600	GUARD, Finger	
4	94253100	FAN, Venturi	60 Hz
4	94247101	FAN, Venturi	50 Hz
5	10125105	NUT, Hex, 6-32	
6	10126401	WASHER, Lock, External Tooth, 6	
7	93592158	SCREW, Self Tapping, Hex Head, 6-32 x 1/4	
8	92602002	CLAMP, Cable, Nylon	
9		W11 CABLE ASSEMBLY (See Drive Electronics Locator For Part Number)	
10	93948003	CONNECTOR, Pin Housing (P400) (ASSOCIATED PARTS)	
	93942009	CONTACT, Pin	
		- - - * - - -	
11	77561900	PANEL, Mounting, Fan	
12	94221400	LATCH, Flush	
13		SPRING, Latch	Supplied With Flush Latch
14		BRACKET, Latch	Supplied With Flush Latch
15	92373003	NYLINER, Snap In	
16	778180**	DOOR, Rear	
17	76429316	SEAL, Acoustical	
18	75040467	PANEL, Foam, Acoustical	
19	70948500	PIN, Hinge	
20	76429315	SEAL, Acoustical	
21	75040466	PANEL, Foam, Acoustical	
22	75040468	PANEL, Foam, Acoustical	
23	75040458	PANEL, Foam, Acoustical	
24	76429313	SEAL, Acoustical	
25	94224906	SPACER, Latch	
26	75040461	PANEL, Foam, Acoustical	
27	76429314	SEAL, Acoustical	
		ITEMS LISTED BELOW ARE NOT PART OF THE REAR DOOR ASSEMBLY	
28	93947004	CONNECTOR, Pin Housing (J400) (Part of W12) (ASSOCIATED PARTS)	
	93943009	CONTACT, Pin	
		- - - * - - -	

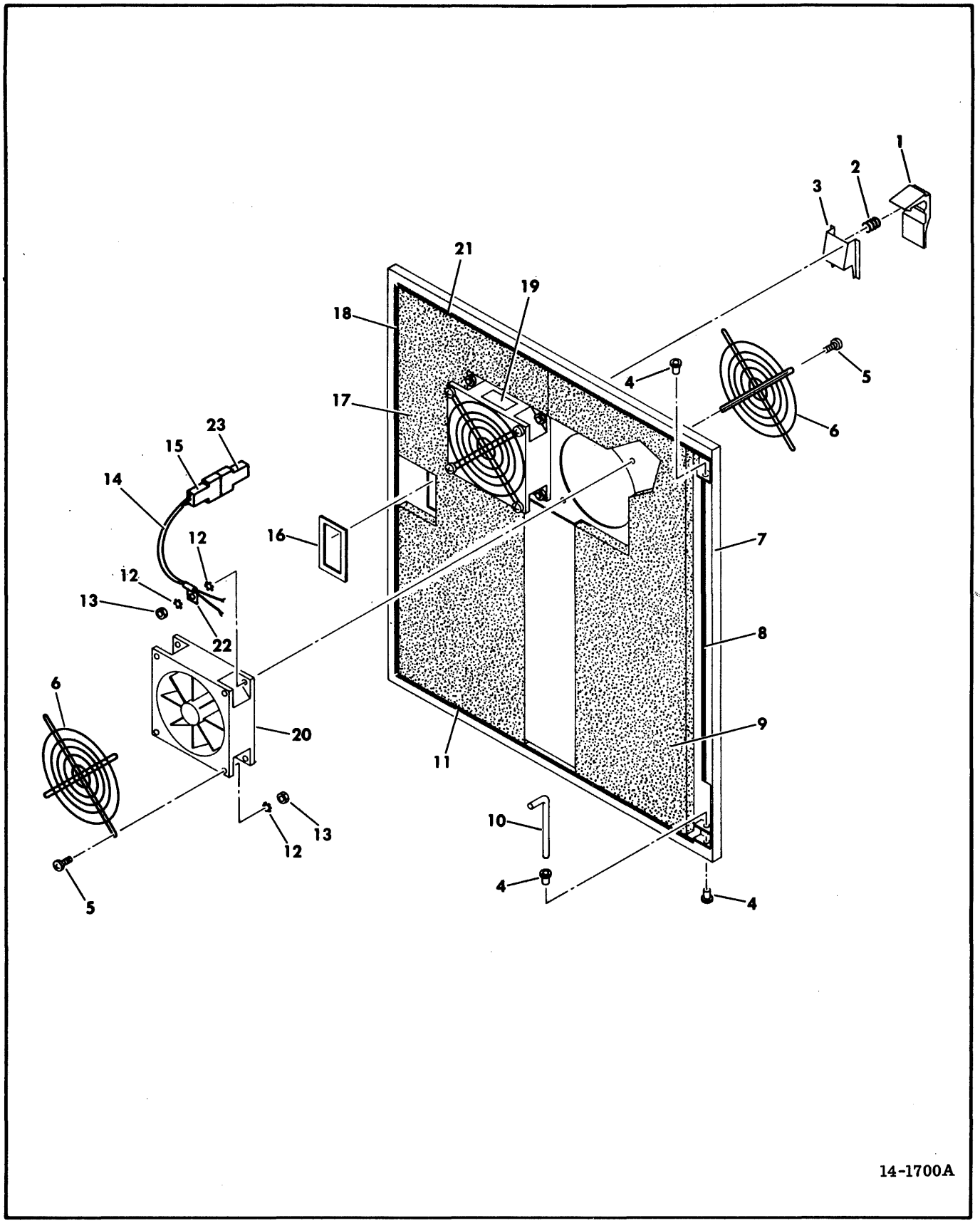

Figure 3-17. Rear Door Assembly - Acoustic Drawer

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-17	775601**	REAR DOOR ASSEMBLY, Acoustic Drawer	
1	94221400	LATCH, Flush	
2		SPRING, Latch	} Supplied With Flush Latch
3		BRACKET, Latch	
4	92373003	NYLINDER, Snap In	
5	10127116	SCREW, Machine, Pan Head, 6-32 x 3/4	
6	94375401	FINGER GUARD, Fan Axial	
7	778181**	DOOR, Rear	
8	76429316	SEAL, Acoustical	
9	75040470	PANEL, Foam, Acoustical	
10	70948500	PIN, Hinge	
11	76429315	SEAL, Acoustical	
12	10126401	WASHER, Lock, External Tooth, 6	
13	10125105	NUT, Hex, 6-32	
14		W11 CABLE ASSEMBLY (See Drive Electronics Locator For Part Number)	
15	93948003	CONNECTOR, Pin Housing (P400) (ASSOCIATED PARTS)	
	93942009	CONTACT, Pin	
		- - - * - - -	
16	94224906	SPACER, Latch	
17	75040469	PANEL, Foam, Acoustical	
18	76429313	SEAL, Acoustical	
19	94368701	LABEL	
20	94253100	FAN, Venturi	60 Hz, 120 V AC,
20	94253102	FAN, Venturi	60 Hz 220/240 V AC
20	94247101	FAN, Venturi	50 Hz
21	76429314	SEAL, Acoustical	
22	92602002	CLAMP, Cable, Nylon	
		(ITEMS LISTED BELOW ARE NOT PART OF REAR DOOR ASSEMBLY)	
23	93947004	CONNECTOR, Pin Housing (J400) (Part of W12) (ASSOCIATED PARTS)	
	93943009	CONTACT, Pin	
		- - - * - - -	

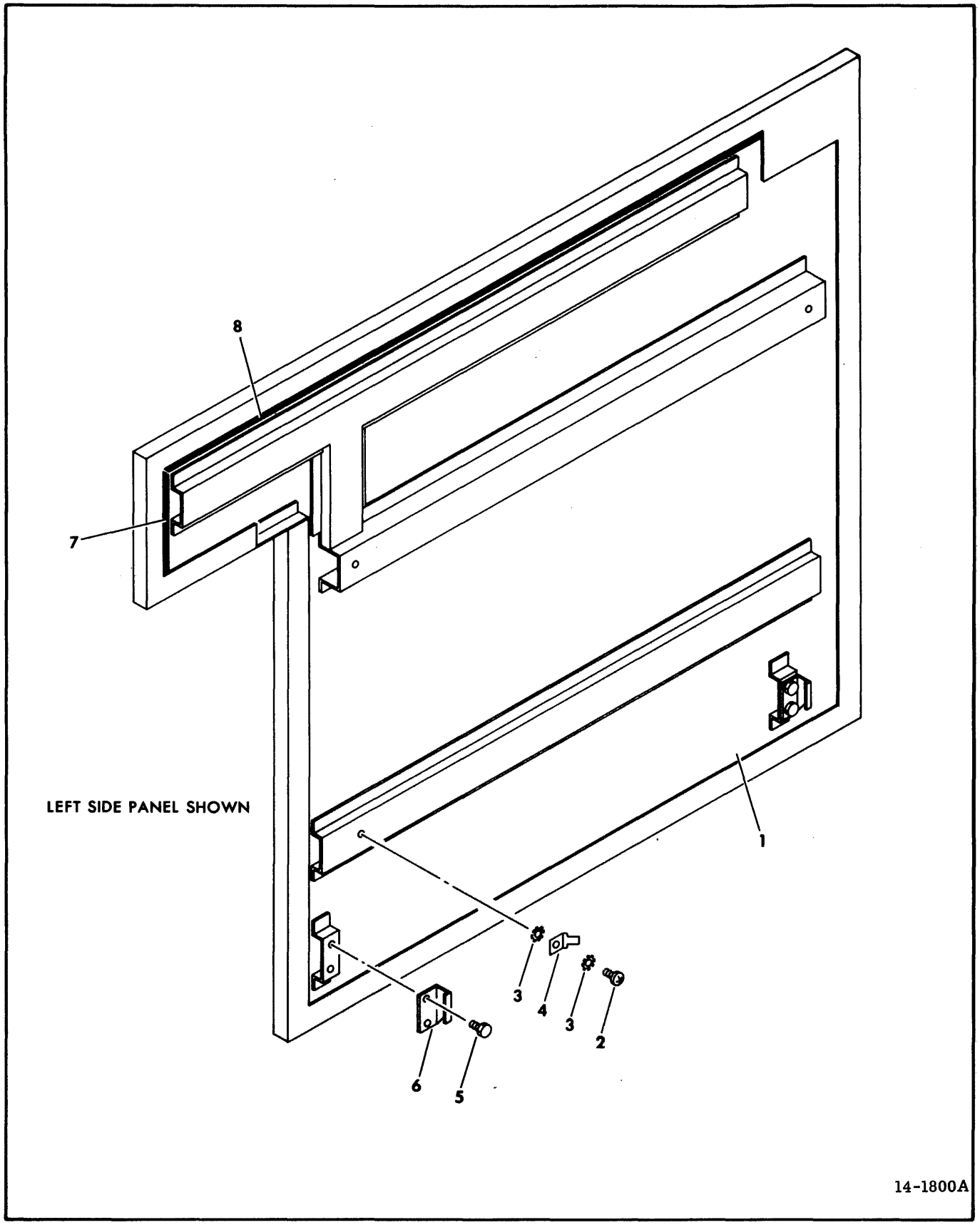

Figure 3-18. Side Panel - Nonacoustic

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-18		SIDE PANEL, Nonacoustic	
1	760299**	PANEL, Side	Left Side Panel
1	760298**	PANEL, Side	Right Side Panel
2	10127131	SCREW, Machine, Pan Head, 10-24 x 3/8	
3	10126403	WASHER, Lock, External Tooth, 10	
4	94274140	TERMINAL, Quick Connect	
5	93592428	SCREW, Self Tapping, Hex Head, 10-32 x 3/8	
6	77568600	BRACKET, Mounting, Panel	
7	76429342	SEAL, Acoustical	Left Side Panel
7	76429345	SEAL, Acoustical	Right Side Panel
8	76429343	SEAL, Acoustical	Left Side Panel
8	76429344	SEAL, Acoustical	Right Side Panel

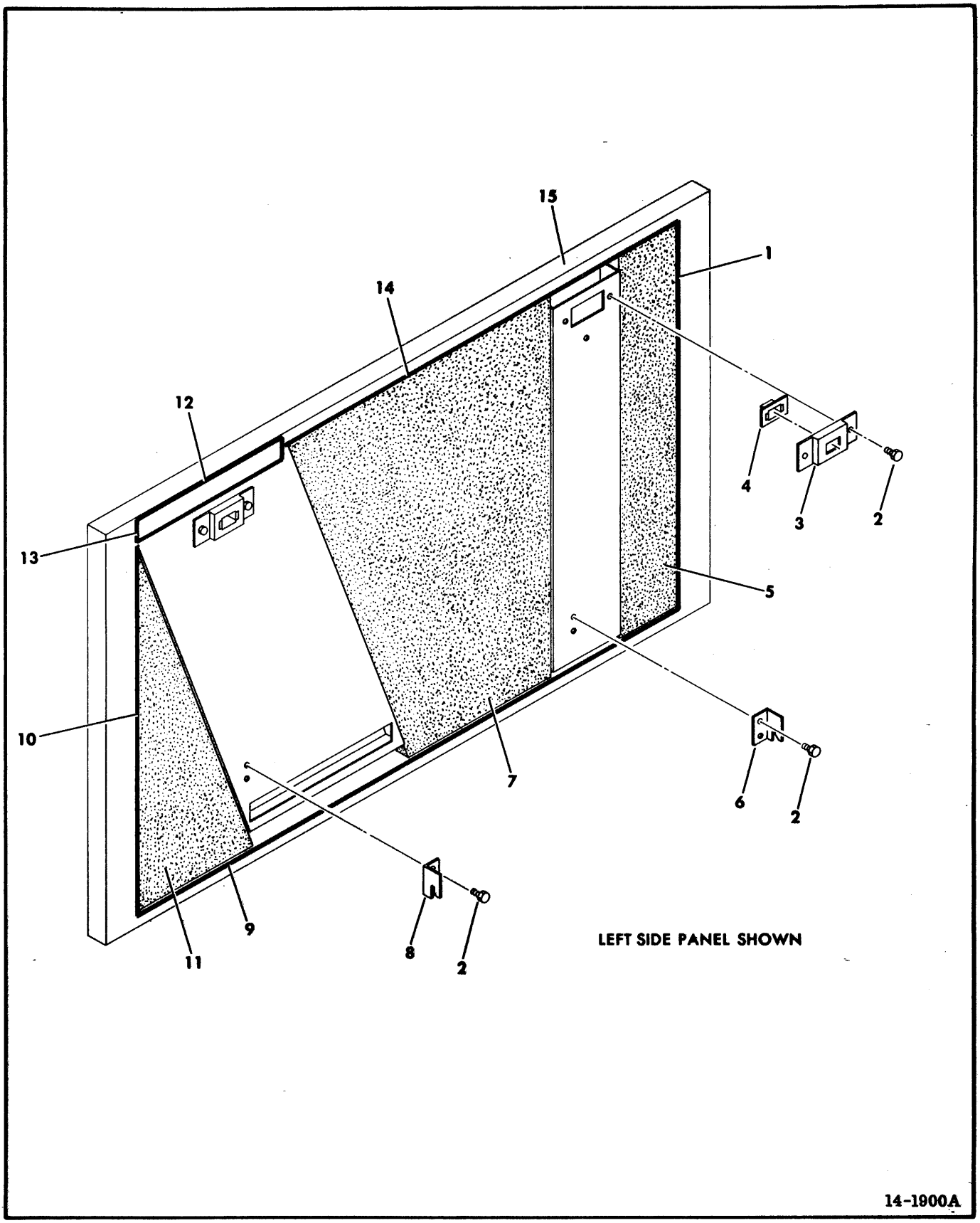

Figure 3-19. Side Panel Assembly - Acoustic

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-19	775622**	SIDE PANEL ASSEMBLY, Acoustic	
1	76429303	SEAL, Acoustical	
2	93592428	SCREW, Self Tapping, Hex Head, 10-32 x 3/8	
3	77561300	BRACKET, Receptacle	
4	94303500	RECEPTACLE, Clip In	
5	75040459	PANEL, Foam Acoustical	
6	75194501	BRACKET, Support	
7	75040464	PANEL, Foam, Acoustical	Left Side Panel
7	75040465	PANEL, Foam, Acoustical	Right Side Panel
8	75194500	BRACKET, Support	
9	76429304	SEAL, Acoustical	
10	76429308	SEAL, Acoustical	Left Side Panel
10	76429307	SEAL, Acoustical	Right Side Panel
11	75040462	PANEL, Foam, Acoustical	Left Side Panel
11	75040463	PANEL, Foam, Acoustical	Right Side Panel
12	76429312	SEAL, Acoustical	
13	76429311	SEAL, Acoustical	
14	76429305	SEAL, Acoustical	Left Side Panel
14	76429306	SEAL, Acoustical	Right Side Panel
15	764290**	PANEL, Side, Left	
15	764292**	PANEL, Side, Right	

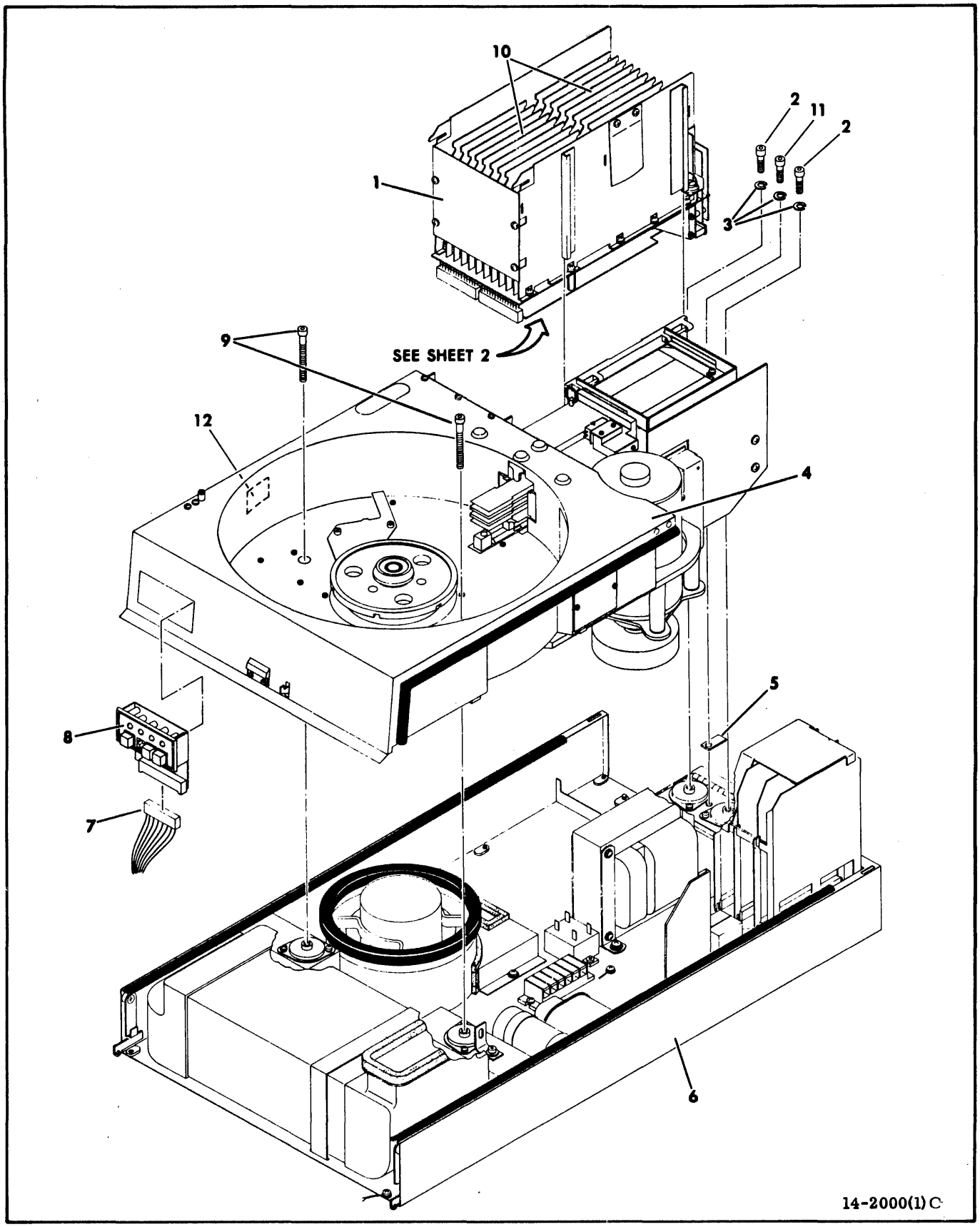

Figure 3-20. Drive Electronics Locator (Sheet 1 of 2)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-20		DRIVE ELECTRONICS LOCATOR (Sheet 1 of 2)	
1		LOGIC CHASSIS ASSEMBLY (A2) (See Figure 3-22)	
2	10126257	SCREW, Socket Head, 1/4 x 20 x 7/8	
3	10125806	WASHER, Lock, Spring, 1/4	
4		DECK ASSEMBLY (A3) (See Figure 3-23)	
5	76420600	SPACER, Shock	
6		BASE ASSEMBLY (A1) (See Figure 3-30)	
7	94261810	BODY, Connector (P201) (Part of W3) (ASSOCIATED PARTS)	
	94245601	CONTACT, Crimp	
		- - - * - - -	
8		CONTROL PANEL ASSEMBLY (A3A01) (See Figure 3-21)	
9	10126264	SCREW, Socket Head, 1/4 x 20 x 2-1/2	
		(THE PART NUMBERS FOR ALL CABLES AND HARNESSES APPEAR BELOW)	
	47172700	W1 HARNESS ASSEMBLY	
	47171900	W2 CABLE ASSEMBLY	
	47174600	W3 HARNESS ASSEMBLY	
	47172100	W4 CABLE ASSEMBLY	
	77562001	W11 CABLE ASSEMBLY	
	77562901	W12 CABLE ASSEMBLY	
		(TERMINALS AND CONNECTORS FOR ALL HARNESSING ARE SHOWN AT THEIR ORIGINS AND DESTINATIONS)	
10		LOGIC CARDS (See Card Interchangeability Diagrams For Part Numbers)	
11	10126258	SCREW, Socket Head, 1/4-20x1	
12	10127600	LABEL, U/L Marker	60 Hz Units Only

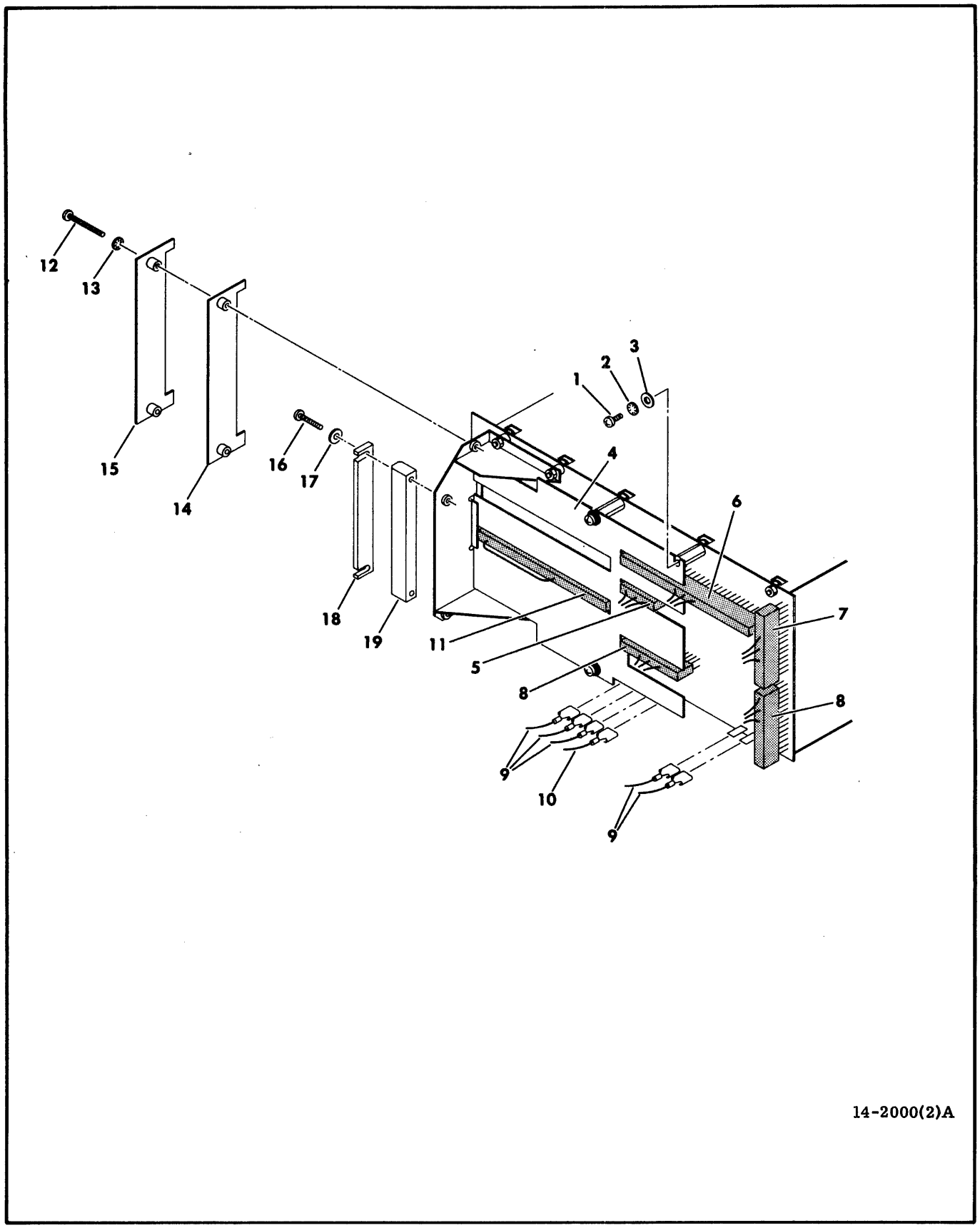

Figure 3-20. Drive Electronics Locator (Sheet 2 of 2)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-20		DRIVE ELECTRONICS LOCATOR (Sheet 2)	
1	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
2	10126103	WASHER, Lock, Internal Tooth, 6	
3	10125605	WASHER, Flat, 6	
4	47173200	PANEL, Protective, Logic Chassis	
5	94261807	BODY, Connector (PA07) (Part of W2) (ASSOCIATED PARTS)	
	94245606	CONTACT, Socket	
	94245601	CONTACT, Socket	
		- - - * - - -	
6	94261811	BODY, Connector (PA09) (Part of W3) (ASSOCIATED PARTS)	
	94245606	CONTACT, Socket	
		- - - * - - -	
7	94261810	BODY, Connector (JA81) (Part of W4) (ASSOCIATED PARTS)	
	94245602	CONTACT, Socket	
	94245607	CONTACT, Socket	
	94245604	CONTACT, Socket	
		- - - * - - -	
8	94261810	BODY, Connector (PA03)(PA81) (Part of W3) (ASSOCIATED PARTS)	
	94245601	CONTACT, Socket	
	94245606	CONTACT, Socket	
		- - - * - - -	
9	95643216	CONNECTOR, Quick Connect (Part of W3)	
10		CABLE, Ground (See Base Assembly For Part Number)	
11	47203100	JUMPER PLUG ASSEMBLY	Single Channel Units Only
12	10127119	SCREW, Machine, Pan Head, 6-32 x 1 1/4	
13	10126103	WASHER, Lock Internal Tooth, 6	
14		I/O CARD, Channel I, (A2D1) (See Card Interchangeability Diagram)	
15		I/O CARD, Channel II, (A2D2) (See Card Interchangeability Diagram)	Dual Channel Units Only
16	10127116	SCREW, Machine, Pan Head, 6-32 x 3/4	
17	10125605	WASHER, Flat, 6	
18	93255300	CLAMP, I/O	
19	47205900	SPACER, Clamp, I/O	

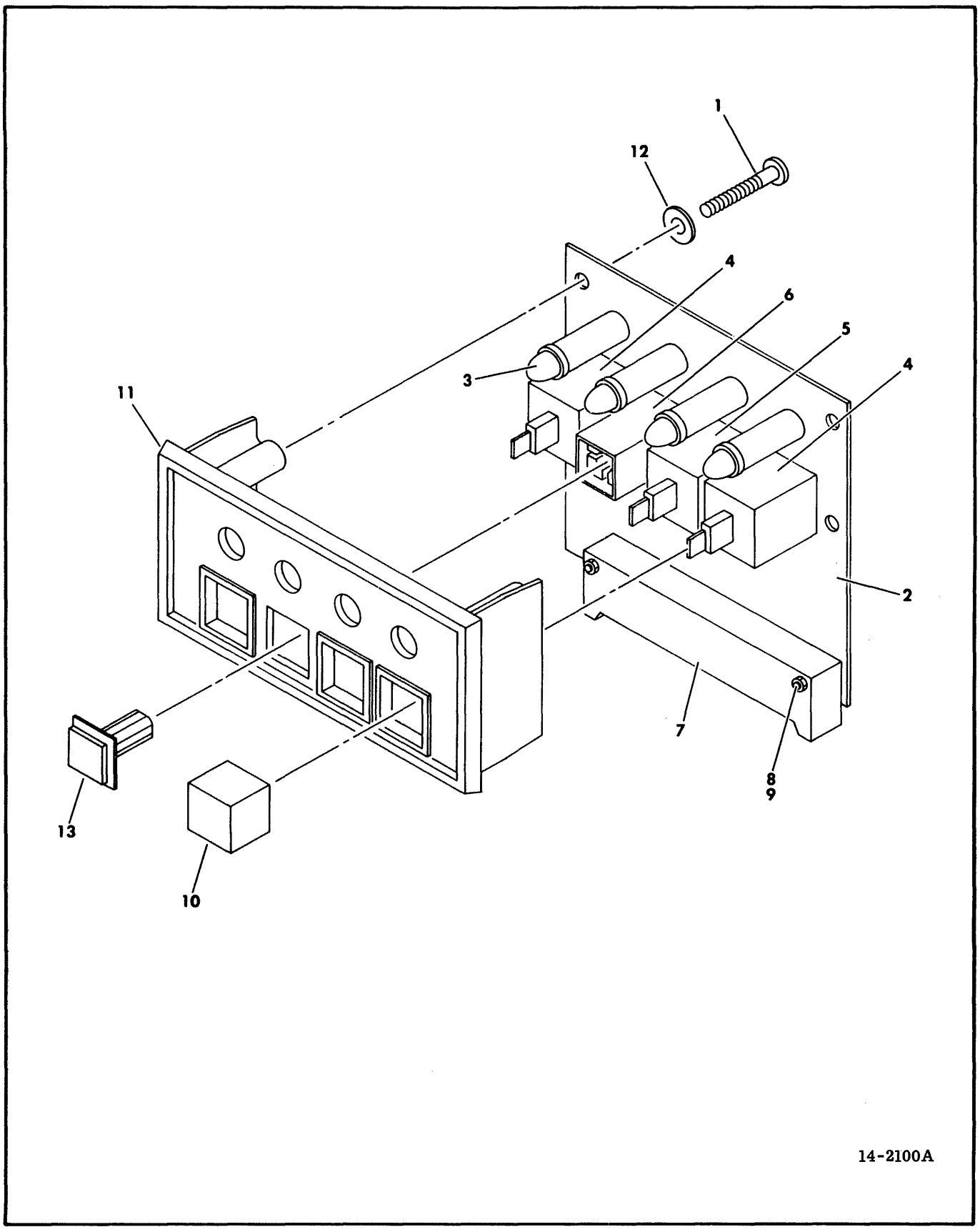

Figure 3-21. Control Panel Assembly

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-21	76422501	CONTROL PANEL ASSEMBLY (A3A01)	
1	17901505	SCREW, Thread Roll, Phillips, 4-40 x 3/4	
2		COMPONENT ASSEMBLY, Type _ZYN (See Card Interchangeability Diagram)	
3	94367112	LED, Lens, Diffused (1CR2, 1CR3, 1CR4, 1CR6)	
4	94363701	SWITCH, Keyboard (S1, S4)	
5	94363700	SWITCH, Keyboard (S3)	
6	94364816	SWITCH, Programmable (S2)	
7	94365600	HEADER, Pin	
8	92742011	SCREW, Machine, Pan Head, 2-56 x 7/16	
9	10125102	NUT, Hex, 2-56	
10	75068300	BUTTON, Front Panel	
11	76422400	BEZEL, Panel, Front	
12	10125603	WASHER, Flat, 4	
		(ITEMS LISTED BELOW ARE NOT PART OF THE CONTROL PANEL ASSEMBLY)	
13	943724XX	KEY, Insert, Programmable (Logical Address Plug) (Tab 00-15)	Packed Separately And Shipped With Unit. Part Number Tab Corresponds To Key Number.

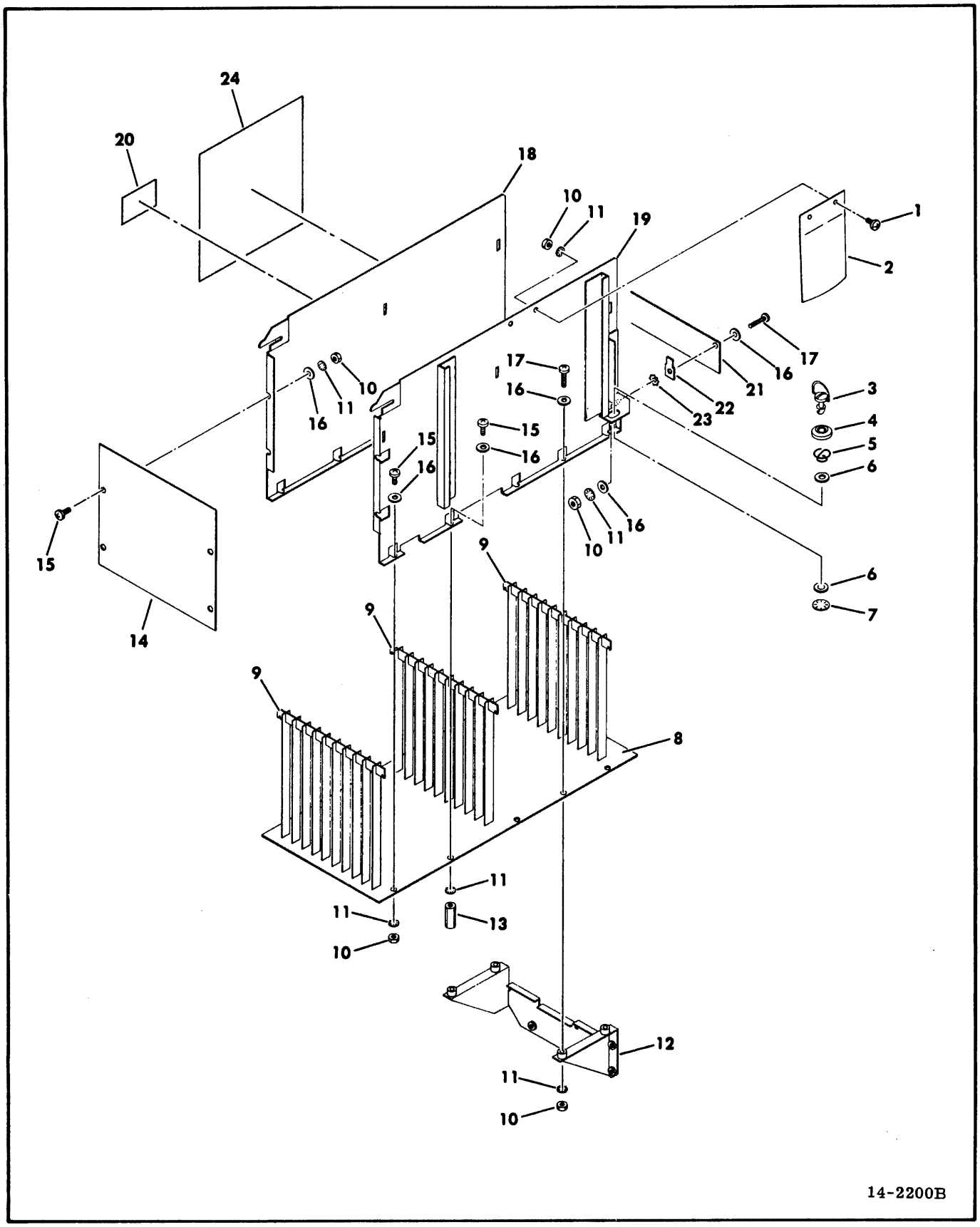

Figure 3-22. Logic Chassis Assembly

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-22	471742XX	LOGIC CHASSIS ASSEMBLY	
1	10127111	SCREW, Machine, Pan Head, 6-32 x 1/4	
2	47198400	SPRING, Flat, Logic Chassis	
3	51911752	FASTENER, 1/4 Turn	
4	94379800	ACCESSORIES, 1/4 Turn Fastener	
5	94379801	ACCESSORIES, 1/4 Turn Fastener	
6	94379802	ACCESSORIES, 1/4 Turn Fastener	
7	93988002	RETAINER, Split Ring	
8	471741XX	WIRE WRAP ASSEMBLY	
	94245409	POST, Wire Wrap (.732)	
	94245410	POST, Wire Wrap (1.122)	
	94245411	POST, Wire Wrap (1.122 Soldered To Ground)	
	94245415	POST, Wire Wrap (.695)	
9	46490200	RAIL, Guide	
10	10125105	NUT, Hex, 6-32	
11	10126103	WASHER, Lock Internal Tooth, 6	
12	83255200	SUPPORT, I/O Card	
13	93114216	STANDOFF, Tapped Post, Hex	
14	47171300	PANEL, End, Logic Chassis	
15	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
16	10125605	WASHER, Flat	
17	10127115	SCREW, Machine, Pan Head, 6-32 x 5/8	
18	47170900	PANEL, Right Side, Logic Chassis	
19	47171000	PANEL, Left Side, Logic Chassis	
20	94208501	LABEL	
21	47205800	INSULATOR, I/O	
22	94274101	TERMINAL, Quick Connect	
23	10126401	WASHER, Lock, External Tooth, 6	
24	83274200	LABEL, Chassis Map	

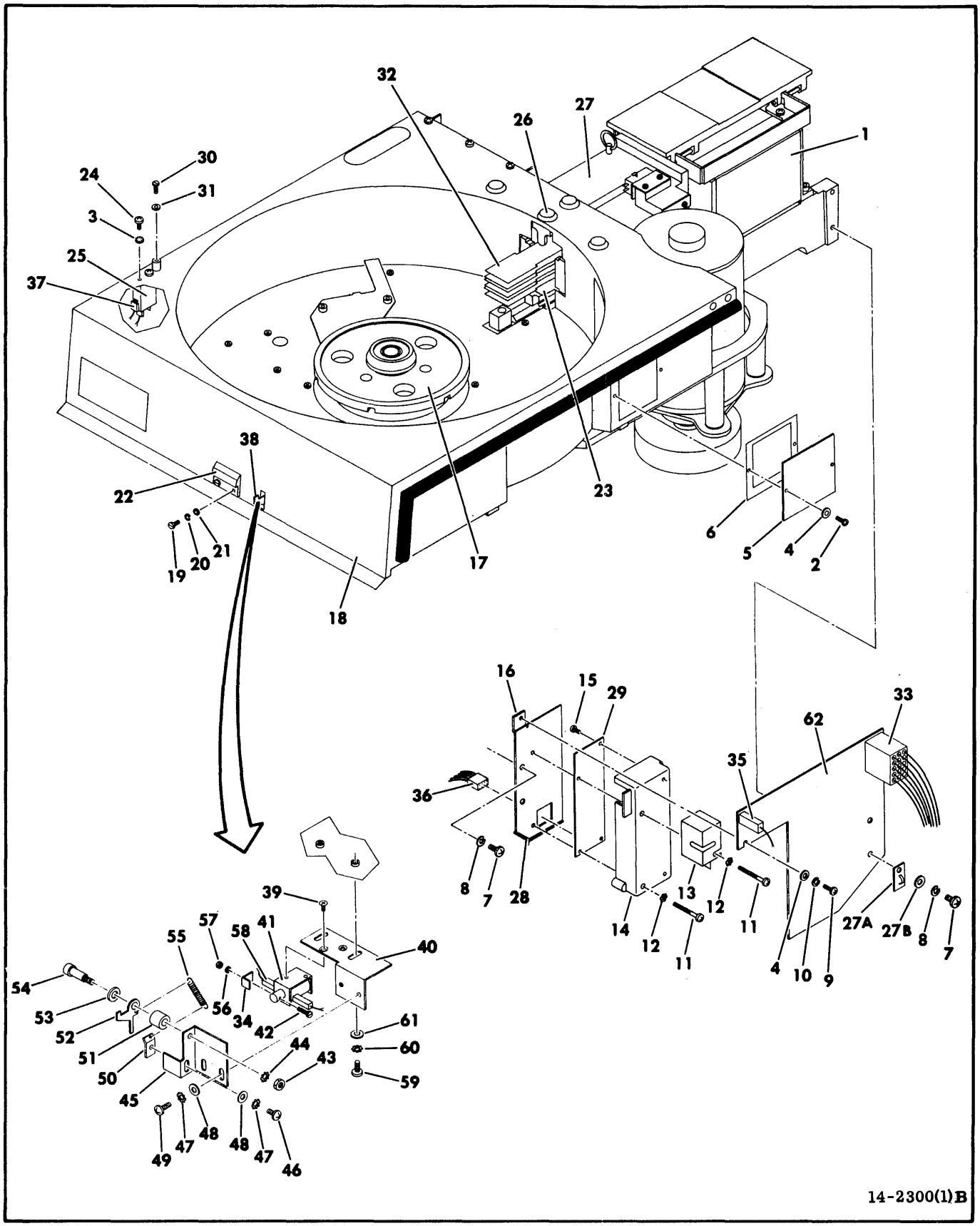

Figure 3-23. Deck Assembly (Sheet 1 of 5)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-23		DECK ASSEMBLY (A3) (Sheet 1 of 5)	
1		MAGNET ASSEMBLY (See Figure 3-27)	
2	93749162	SCREW, Pan Head, Washer, 6-32 x 3/8	
3	10126103	WASHER, Lock, Internal Tooth, 6	
4	10126505	WASHER, Flat, 6	
5	77563700	WINDOW, Shroud	
6	77563800	GASKET, Window, Shroud	
7	10127131	SCREW, Machine, Pan Head, 10-24 x 3/8	
8	10125805	WASHER, Lock, Spring, 10	
9	10127114	SCREW, Machine, Pan Head, 6-32 x 1/2	
10	10125803	WASHER, Lock, Spring, 6	
11	10127119	SCREW, Machine, Pan Head, 6-32 x 1/4	
12	10126401	WASHER, Lock, External Tooth, 6	
13	76425300	SHIELD, Pre-amp, Servo	
14	73479800	HOUSING, Pre-amp	
15	93592082	SCREW, Washer, Hex Head, 4-40 x 1/4	
16	47194100	PLATE, Mounting, Pre-amp	
17		SPINDLE ASSEMBLY (See Figure 3-24)	
18	77824400	SHROUD, Pack	
19	92004120	SCREW, Machine, Pan Head, 4-40 x 5/16	
20	10125801	WASHER, Lock, Spring, 4	
21	93211105	WASHER, Flat, 4	
22	76427700	CATCH, Cover, Pack Access	
23		CARRIAGE AND COIL ASSEMBLY (See Figure 3-26)	
24	92004121	SCREW, Machine, Pan Head, 6-32 x 1/4	
25	93560002	SWITCH, Pack Cover (A3S3)	
26	94279415	BUTTON, Plug, Recessed Head	
27		RAIL BRACKET ASSEMBLY (See Figure 3-25)	
27A	94277503	BASE, Mounting	
27B	10125607	WASHER, Flat, 10	
		(ITEMS LISTED BELOW ARE NOT PART OF THE DECK ASSEMBLY)	
28	94060003	CHANNEL, Rubber	
29		SERVO PREAMPLIFIER (A3A05) (_ZQN Card) (See Card Interchangeability Diagram)	
30	93342098	SCREW, Nylon	
31	93564042	WASHER, Nylon	
32		HEAD ASSEMBLIES	
	75010002	HEAD ARM ASSEMBLY, Data Head 1,2,4	BK4XX
	75010003	HEAD ARM ASSEMBLY, Data Head 0,3	BK4XX
	75010005	HEAD ARM ASSEMBLY, Servo Head	BK4XX
	75010102	HEAD ARM ASSEMBLY, Data Head, 1,2,4	BK5XX
	75010103	HEAD ARM ASSEMBLY, Data Head, 0,3	BK5XX
	75010105	HEAD ARM ASSEMBLY, Servo Head	BK5XX
	75017500	SCREW, Head Arm (Part of Head Arm Assembly)	
33	51906006	CONNECTOR, Plug (P200) (Part of W3)	
		(ASSOCIATED PARTS)	
	51906200	CONTACT, Socket	
		- - - * - - -	
34	76420500	STOP, Interlock	
35	94309802	POD, Terminal (PA) (Part of W3)	
		(ASSOCIATED PARTS)	
	93747025	RECEPTACLE, Slide On	
		- - - * - - -	
36	94261803	BODY, Connector (P8) (Part of W3)	
		(ASSOCIATED PARTS)	
	94245601	CONTACT, Socket (24-26 Gauge)	
	94245606	CONTACT, Socket (20-22 Gauge)	
		- - - * - - -	
37	93747060	RECEPTACLE, Slide On (S3) (Part of W3)	
		- - - * - - -	

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-23		DECK ASSEMBLY (A3) (Sheet 1 of 5) (Cont)	
38	83243401	INTERLOCK ASSEMBLY (A3L3)	Optional
39	10125711	SCREW, Flat Head, 6-32 x 3/16	
40	76422000	BRACKET, Mounting, Interlock	
41	94237900	SOLENOID, dc	
42	10127314	SCREW, Machine, Pan Head, 2-56 x 1/2	
43	10125107	NUT, Hex, 10-24	
44	10126403	WASHER, Lock, External Tooth, 10	
45	76422100	BRACKET, Pivot, Interlock	
46	10127122	SCREW, Machine, Pan Head, 8-32 x 3/8	
47	10126402	WASHER, Lock, External Tooth, 8	
48	10125606	WASHER, Flat, 8	
49	10127123	SCREW, Machine, Pan Head, 8-32 x 1/2	
50	76422200	BRACKET, Spring, Interlock	
51	76421901	SPACER, Interlock	
52	76421700	LATCH, Interlock	
53	76421900	SPACER, Interlock	
54	92541005	SCREW, Shoulder, 10-24 x 3/8 x 5/8	
55	46819300	SPRING, Extension	
56	10125800	WASHER, Lock, Spring	
57	10125102	NUT, Hex, 2-56	
58	94309801	POD, Terminal (A3L1) (Part of W3) (ASSOCIATED PARTS)	
	93747025	RECEPTACLE, Slide On	
		- - - * - - -	
59	10127122	SCREW, Machine, Pan Head, 8-32 x 3/8	
60	10126402	WASHER, Lock, External Tooth, 8	
61	10125606	WASHER, Flat, 8	
62		POWER AMPLIFIER (A3A04) (_VTN Card) (See Figure 3-29)	

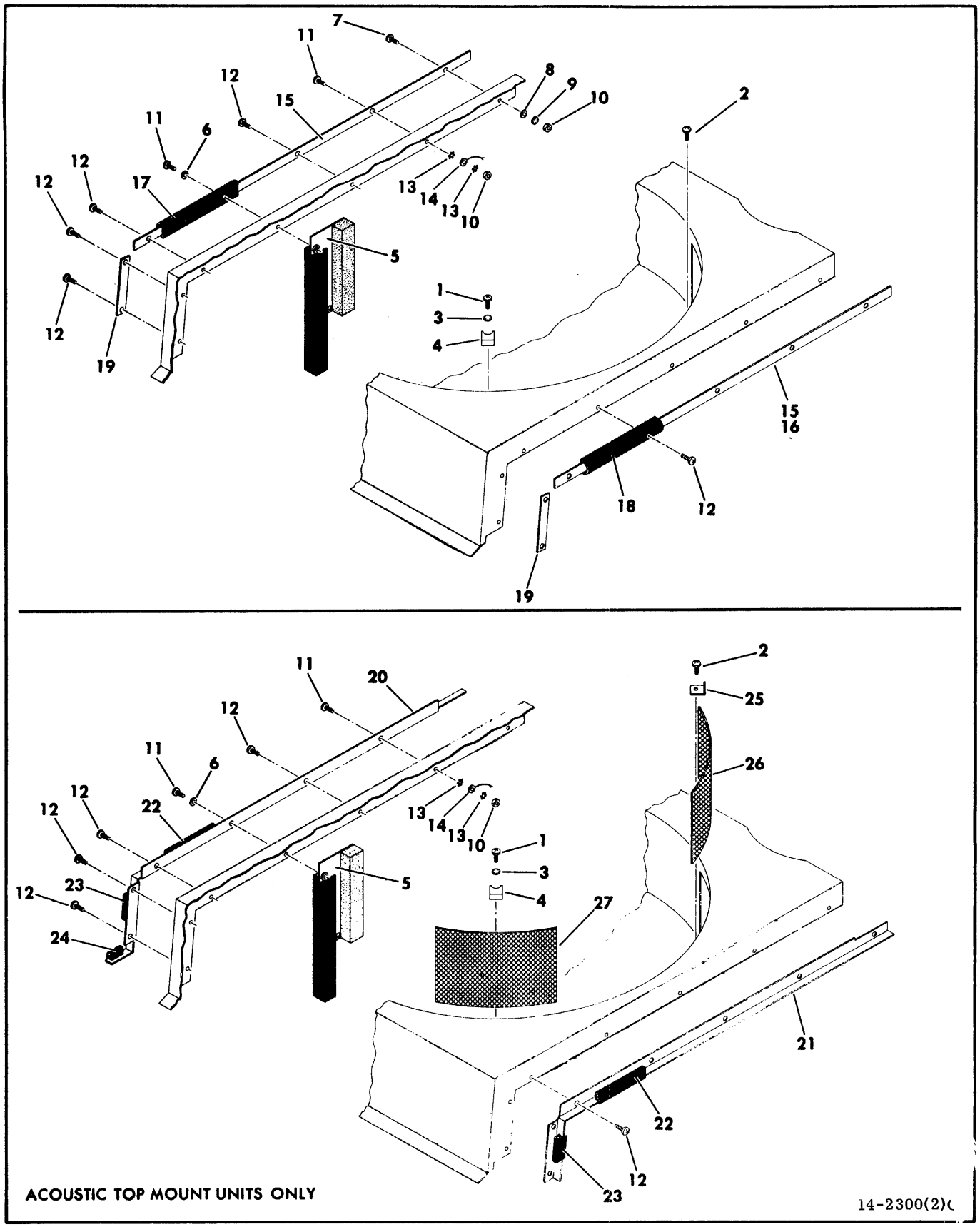

Figure 3-23. Deck Assembly (Sheet 2 of 5)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-23		DECK ASSEMBLY (Sheet 2)	
1	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
2	92001702	SCREW, Pan Head, Washer, 6-32 x 5/16	
3	10126103	WASHER, Lock, Internal Tooth, 6	
4	76031600	BLOCK, Stop	
5		PLATE, Shroud, Seal (See Sheet 5 For Part Number)	
		(ITEMS LISTED BELOW ARE NOT PART OF DECK ASSEMBLY)	
6	10125803	WASHER, Lock, Spring, 6	
7	10127114	SCREW, Machine, Pan Head, 6-32 x 1/2	Nonacoustic Units Only
8	10125605	WASHER, Flat, 6	Nonacoustic Units Only
9	10126103	WASHER, Lock, Internal Tooth, 6	Nonacoustic Units Only
10	10125105	NUT, Hex, 6-32	
11	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
12	95655516	SCREW, Sheet Metal, 6-20 x 3/8	
13	10126401	WASHER, Lock, External Tooth, 6	
14		CABLE, Ground (See Sheet 4 For Part Number)	
15	76423401	STIFFENER, Gasket (Left and Right)	Nonacoustic Units
15	76423402	STIFFENER, Gasket (Left)	Acoustic Drawer Units
16	76423401	STIFFENER, Gasket (Right)	Acoustic Drawer Units
17	76423500	GASKET, Side, Shroud (Left)	
18	76423501	GASKET, Side, Shroud (Right)	
19	76423400	STIFFENER, Gasket	
20	77561200	FLANGE, Shroud, Left	
21	77561100	FLANGE, Shroud, Right	
22	76429327	SEAL, Acoustic	
23	76429328	SEAL, Acoustic	
24	76429329	SEAL, Acoustic	
25	77562300	CLIP, Screen, Shroud	
26	77562101	SCREEN, Shroud	
27	77562100	SCREEN, Shroud	

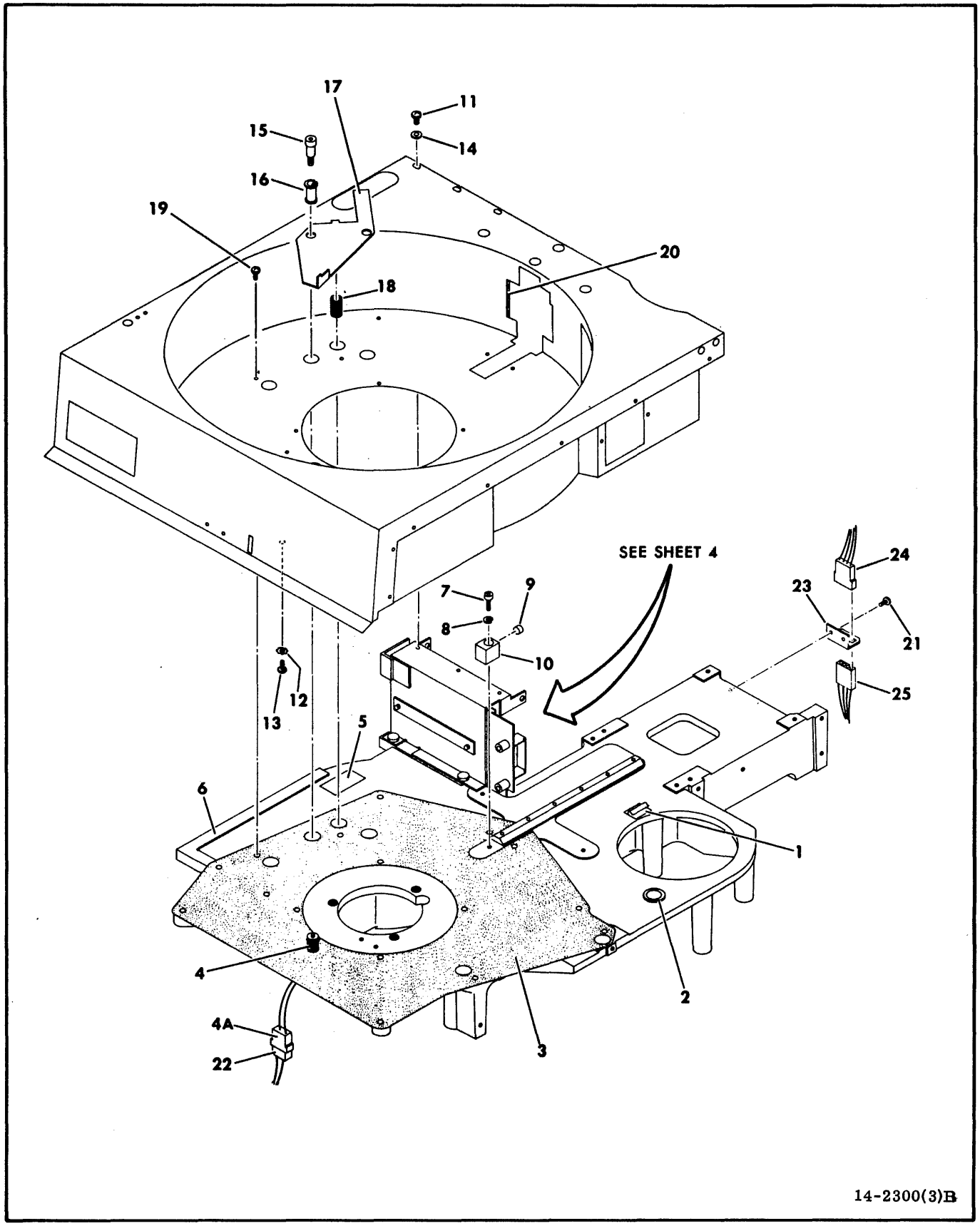

Figure 3-23. Deck Assembly (Sheet 3 of 5)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-23		DECK ASSEMBLY (Sheet 3)	
1	94241008	CLIP, Cable, Adhesive Back	
2	15012412	BUSHING, Snap-In	
3	77824500	GASKET, Shroud	
4	77387101	SPEED SENSOR ASSEMBLY (A3L1) (Speed Transducer)	
4A	93948004	CONNECTOR, Housing (J202) (ASSOCIATED PARTS)	
	93942008	CONTACT, Pin	
		- - - * - - -	
5	94368700	LABEL	
6	77825600	DECK	
7	10126226	SCREW, Socket, Hex Head, 8-32 x 1/2	
8	10125804	WASHER, Lock, Spring, 8	
9	75070700	STOP, Bumper	
10	75070800	BLOCK, Stop	
11	93749158	SCREW, Pan Head, Washer, 6-32 x 1/4	
12	10126104	WASHER, LOCK, Internal Tooth, 8	Units W/O Interlock Assy Only
13	10127120	SCREW, Machine, Pan Head, 8-32 x 1/4	Units W/O Interlock Assy Only
14	10125605	WASHER, Flat, 6	
15	92541001	SCREW, Shoulder, 10-24 x 3/8 x 1/2	
16	92373005	NYLINER, Snap-In	
17	75073700	LOCK, Brake, Spindle	
18	94205789	SPRING, Compression	
19	92001702	SCREW, Pan Head, Washer, 6-32 x 5/16	
20	94276602	TAPE, Foam	
		(ITEMS LISTED BELOW ARE NOT PART OF THE DECK ASSEMBLY)	
21	93749160	SCREW, Pan Head, Washer, 6-32 x 5/16	
22	93947005	CONNECTOR, Socket Housing (P202) (Part of W3) (ASSOCIATED PARTS)	
	93943008	CONTACT, Socket	
		- - - * - - -	
23	76426700	BRACKET, Connector	
24		CONNECTOR (See Magnet Assembly For Part Number)	
25	93947009	CONNECTOR, Socket Housing (J22) (Part of W2) (ASSOCIATED PARTS	
	93943009	CONTACT, SOCKET	
		- - - * - - -	

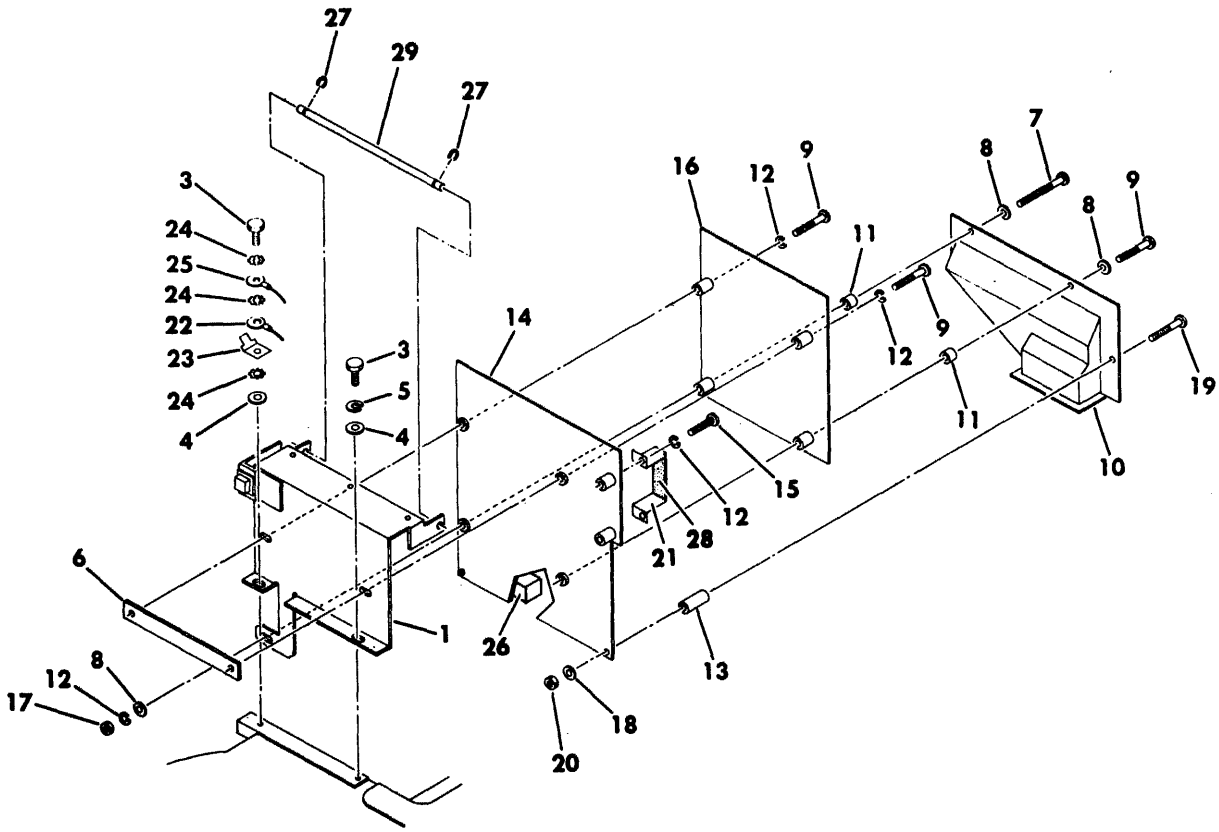

Figure 3-23. Deck Assembly (Sheet 4 of 5)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-23		DECK ASSEMBLY (Sheet 4)	
1	77560801	BRACKET, Pivot	
2	51805800	BUMPER, Self-Sticking	
3	10125030	SCREW, Machine, Hex Head, 8-32 x 1/2	
4	10125606	WASHER, Flat, 8	
5	10125804	WASHER, Lock, Spring, 8	
6	75173310	PLATE, Nut	
7	92742176	SCREW, Machine, Pan Head, 6-32 x 1-1/2	
8	10125605	WASHER, Flat, 6	
9	10127118	SCREW, Machine, Pan Head, 6-32 x 1	
10	47171600	AIR DUCT, Locig Chassis	
11	93109210	STANDOFF, Spacer Round	
12	10125803	WASHER, Lock, Spring, 6	
13	93109271	STANDOFF, Spacer	
14		COMPONENT ASSEMBLY (A3A02), Type _ZJN, (See Card Interchangeability Diagram)	
15	10127116	SCREW; Machine, Pan Head, 6-32 x 3/4	
16		COMPONENT ASSEMBLY (A3A03), Type _ZKN, (See Card Interchangeability Diagram)	
17	10125105	NUT, Hex, 6-32	
18	93564004	WASHER, Nylon	
19	10127110	SCREW, Machine, Pan Head, 4-40 x 1-1/4	
20	10125103	NUT, Hex, 4-40	
		(ITEMS LISTED BELOW ARE NOT PART OF THE DECK ASSEMBLY)	
21	75244500	BRACKET, Support, Connector	
22	95604057	TERMINAL, Ring Tongue (Part of W3)	
23	94274105	TERMINAL, Quick Connect	
24	10126402	WASHER, Lock, External Tooth, 8	
25	94281467	CABLE, Ground (Deck to Shroud)	
26	94261810	BODY, Connector (P101) (Part of W4)	
		(ASSOCIATED PARTS)	
	94245602	CONTACT, Socket	
	94245607	CONTACT, Socket	
	94245604	CONTACT, Socket	
		- - - * - - -	
27	92033237	RING, Retaining	
28	94276607	TAPE, Foam	
29	75065300	ROD, Support, Logic Chassis	

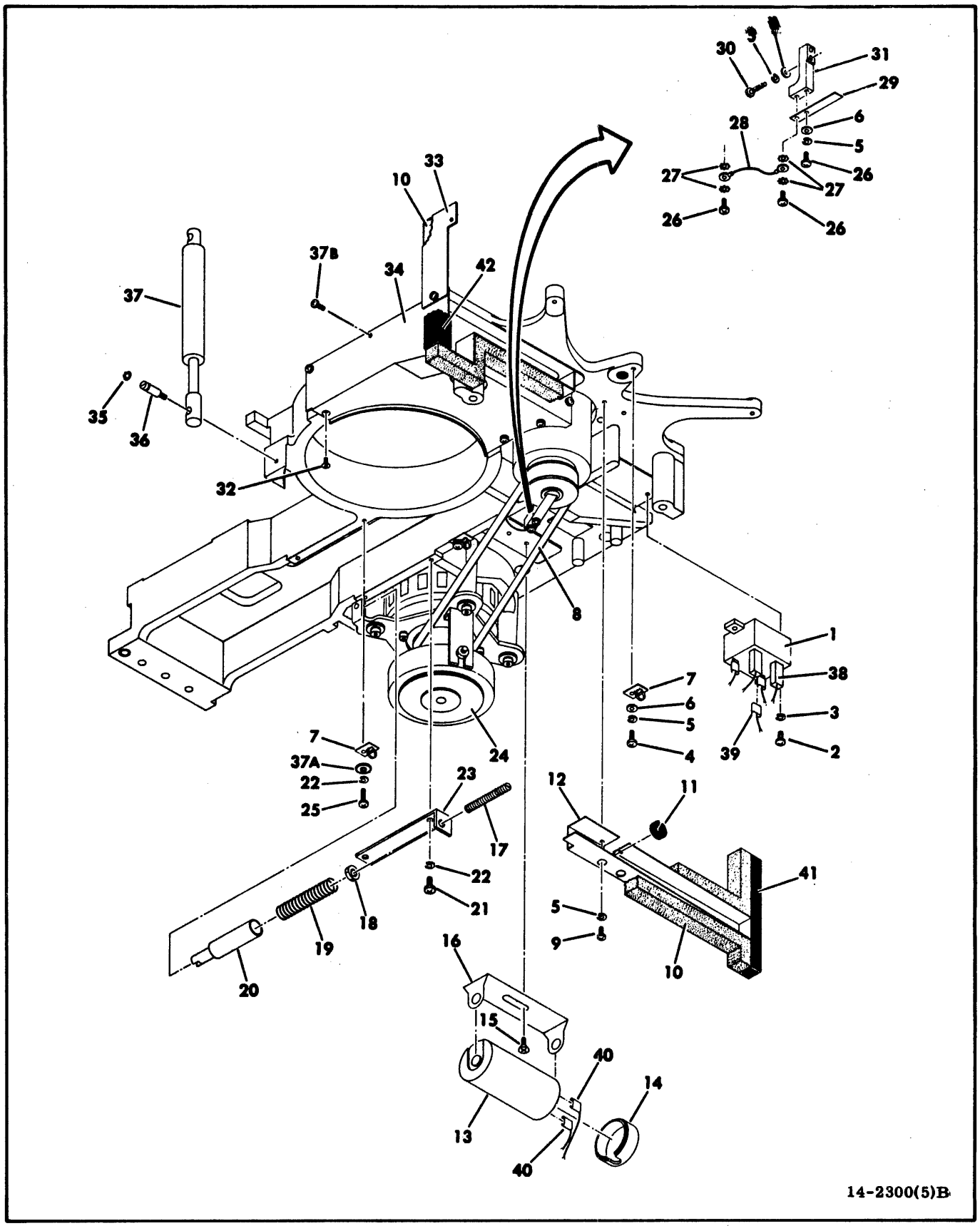

Figure 3-23. Deck Assembly (Sheet 5 of 5)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-23	94376501	DECK ASSEMBLY (Sheet 5)	
1	94371303	SWITCH, Solid State, AC (A3K5) (Start Triac)	60 Hz
1	~~94371304~~	SWITCH, Solid State, AC (A3K5) (Start Triac)	50 Hz
2	10127122	SCREW, Machine, Pan Head, 8-32 x 3/8	
3	10125804	WASHER, Lock, Spring, 8	
4	10127114	SCREW, Machine, Pan Head, 6-32 x 1/2	
5	10125803	WASHER, Lock, Spring, 6	
6	10125605	WASHER, Flat, 6	
7	94277503	BASE, Mounting	
8	92314113	BELT, Drive, Flat	60 Hz
8	92314119	BELT, Drive, Flat	50 Hz
9	10127112	SCREW, Machine, Pan Head, 6-32 x 5/16	
10	94001133	TAPE, Foam	
11	95649704	GROMMET	
12	76429800	BAFFLE, Air	
13	94255116	CAPACITOR, Drive Motor, AC (A3C6)	60 Hz
13	94255109	CAPACITOR, Drive Motor, AC (A3C6)	50 Hz
14	94260504	ACCESSORIES, Capacitor, Plastic	
15	10125735	SCREW, Flat Head, 10-24 x 3/8	
16	94260501	ACCESSORIES, Capacitor, Steel	60 Hz
16	94260502	ACCESSORIES, Capacitor, Steel	50 Hz
17	47172300	ROD, Adjusting, Motor	
18	92071004	NUT, Self Tapping, Hex, 1/4-20	
19	47201300	SPRING, Compression	
20	47172400	GUIDE, Spring	
21	10127131	SCREW, Machine, Pan Head, 10-24 x 3/8	
22	10125805	WASHER, Lock, Spring, 10	
23	47172500	BRACKET, Adjusting, Rod	
24		DRIVE MOTOR (A3DM1) AND BRAKE (A3HB1) ASSEMBLIES (See Figure 3-28)	
25	10127134	SCREW, Machine, Pan Head, 10-24 x 3/4	
26	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
27	10126401	WASHER, Lock, External Tooth, 6	
28	94369522	CABLE, Ground	
29	76408000	GROUND, Spring	
30	10127115	SCREW, Machine, Pan Head, 6-32 x 5/8	
31	75069800	HOLDER, Spring, Ground	
32	10125712	SCREW, Flat Head, 6-32 x 1/4	
33	76424600	PLATE, Shroud, Seal	
34	76021200	INLET, Blower	
35	92033221	RING, Retaining	
36	73229002	STUD	
37	94354903	SPRING, Gas	
37A	10125607	WASHER, Flat, 10	
37B	92001702	SCREW, Pan Head, Washer, 6-32 x 5/16	
		(ITEMS LISTED BELOW ARE NOT PART OF THE DECK ASSEMBLY)	
38	94309802	POD (Part of W3)	
39	93747022	RECEPTACLE, Slide On	
40		TERMINAL, Flag, Quick Connect (See Drive Motor and Brake Assemblies for Part Number)	
41	76429330	SEAL, Acoustical	
41	76429318	SEAL, Acoustical	Acoustic Top Mount Only
42	76429331	SEAL, Acoustical	
42	76429319	SEAL, Acoustical	Acoustic Top Mount Only

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-23		DECK ASSEMBLY (Sheet 5)	
1	94371303	SWITCH, Solid State, AC (A3K5) (Start Triac)	60 Hz
1	94371304	SWITCH, Solid State, AC (A3K5) (Start Triac)	50 Hz
2	10127122	SCREW, Machine, Pan Head, 8-32 x 3/8	
3	10125804	WASHER, Lock, Spring, 8	
4	10127114	SCREW, Machine, Pan Head, 6-32 x 1/2	
5	10125803	WASHER, Lock, Spring, 6	
6	10125605	WASHER, Flat, 6	
7	94277503	BASE, Mounting	
8	92314113	BELT, Drive, Flat	60 Hz
8	92314119	BELT, Drive, Flat	50 Hz
9	10127112	SCREW, Machine, Pan Head, 6-32 x 5/16	
10	94001133	TAPE, Foam	
11	95649704	GROMMET	
12	76429800	BAFFLE, Air	
13	94255116	CAPACITOR, Drive Motor, AC (A3C6)	60 Hz
13	94255109	CAPACITOR, Drive Motor, AC (A3C6)	50 Hz
14	94260504	ACCESSORIES, Capacitor, Plastic	
15	10125735	SCREW, Flat Head, 10-24 x 3/8	
16	94260501	ACCESSORIES, Capacitor, Steel	60 Hz
16	94260502	ACCESSORIES, Capacitor, Steel	50 Hz
17	47172300	ROD, Adjusting, Motor	
18	92071004	NUT, Self Tapping, Hex, 1/4-20	
19	47201300	SPRING, Compression	
20	47172400	GUIDE, Spring	
21	10127131	SCREW, Machine, Pan Head, 10-24 x 3/8	
22	10125805	WASHER, Lock, Spring, 10	
23	47172500	BRACKET, Adjusting, Rod	
24		DRIVE MOTOR (A3DM1) AND BRAKE (A3HB1) ASSEMBLIES (See Figure 3-28)	
25	10127134	SCREW, Machine, Pan Head, 10-24 x 3/4	
26	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
27	10126401	WASHER, Lock, External Tooth, 6	
28	94369522	CABLE, Ground	
29	76408000	GROUND, Spring	
30	10127115	SCREW, Machine, Pan Head, 6-32 x 5/8	
31	75069800	HOLDER, Spring, Ground	
32	10125712	SCREW, Flat Head, 6-32 x 1/4	
33	76424600	PLATE, Shroud, Seal	
34	76021200	INLET, Blower	
35	92033221	RING, Retaining	
36	73229002	STUD	
37	94354903	SPRING, Gas	
37A	10125607	WASHER, Flat, 10	
37B	92001702	SCREW, Pan Head, Washer, 6-32 x 5/16	
		(ITEMS LISTED BELOW ARE NOT PART OF THE DECK ASSEMBLY)	
38	94309802	POD (Part of W3)	
39	93747022	RECEPTACLE, Slide On	
40		TERMINAL, Flag, Quick Connect (See Drive Motor and Brake Assemblies for Part Number)	
41	76429330	SEAL, Acoustical	
41	76429318	SEAL, Acoustical	Acoustic Top Mount Only
42	76429331	SEAL, Acoustical	
42	76429319	SEAL, Acoustical	Acoustic Top Mount Only

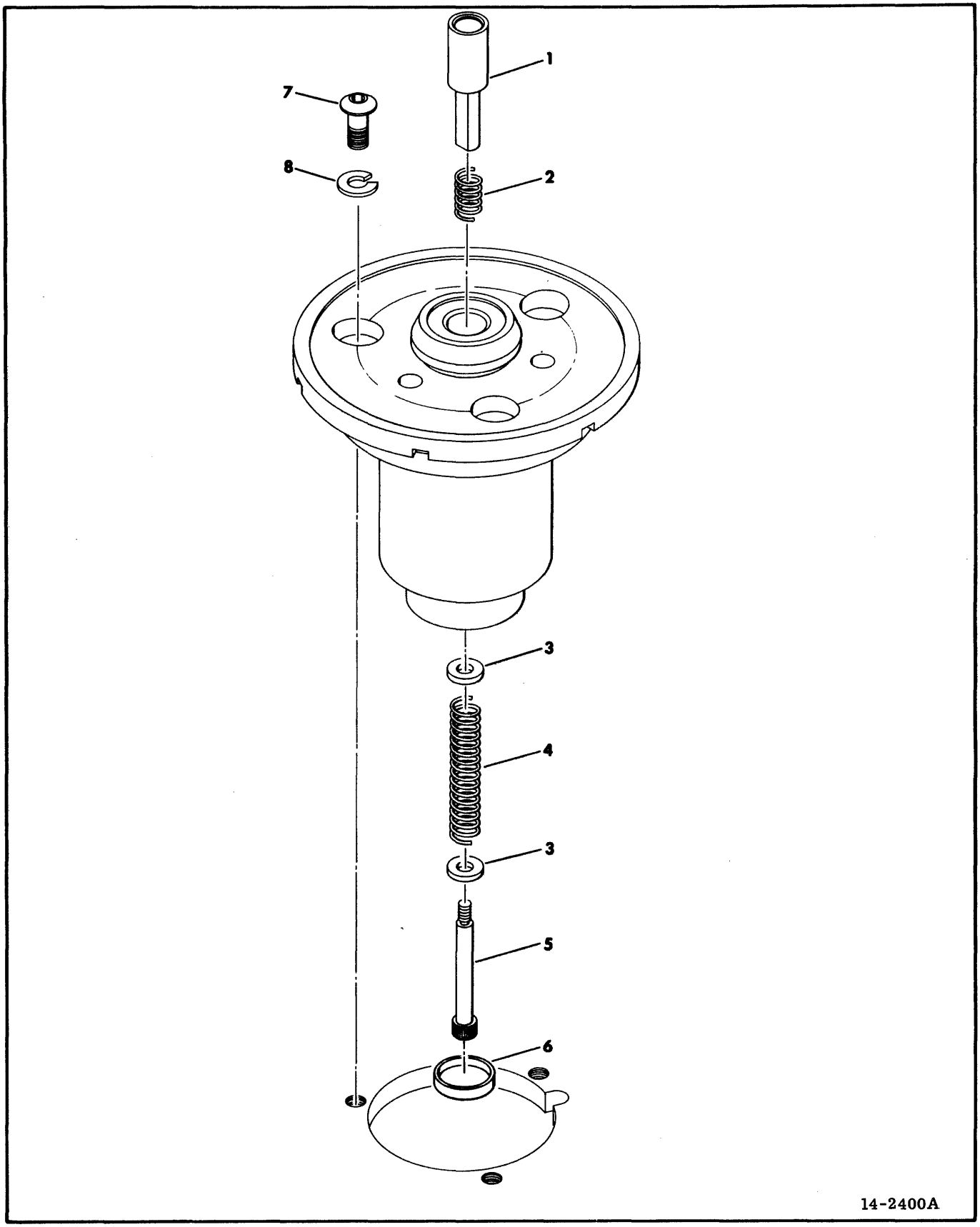

Figure 3-24. Spindle Assembly

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-24	75074713	SPINDLE ASSEMBLY	BK4XX
3-24	75074714	SPINDLE ASSEMBLY	BK5XX
1	75074200	LOCKSHAFT, Spindle	BK4XX
1	76425600	LOCKSHAFT, Spindle	BK5XX
2	75074600	SPRING, Compression, Lockshaft	
3	75074000	WASHER, Lockshaft	
4	75072700	SPRING, Compression	
5	92541059	SCREW, Shoulder, 10-24 x .38 x 2.50	
6	73587600	SHAFT, End Seal	
		(ITEMS LISTED BELOW ARE NOT PART OF THE SPINDLE ASSEMBLY)	
7	92723396	SCREW, Button, Socket Head	
8	10125807	WASHER, Lock, Spring, 5/16	

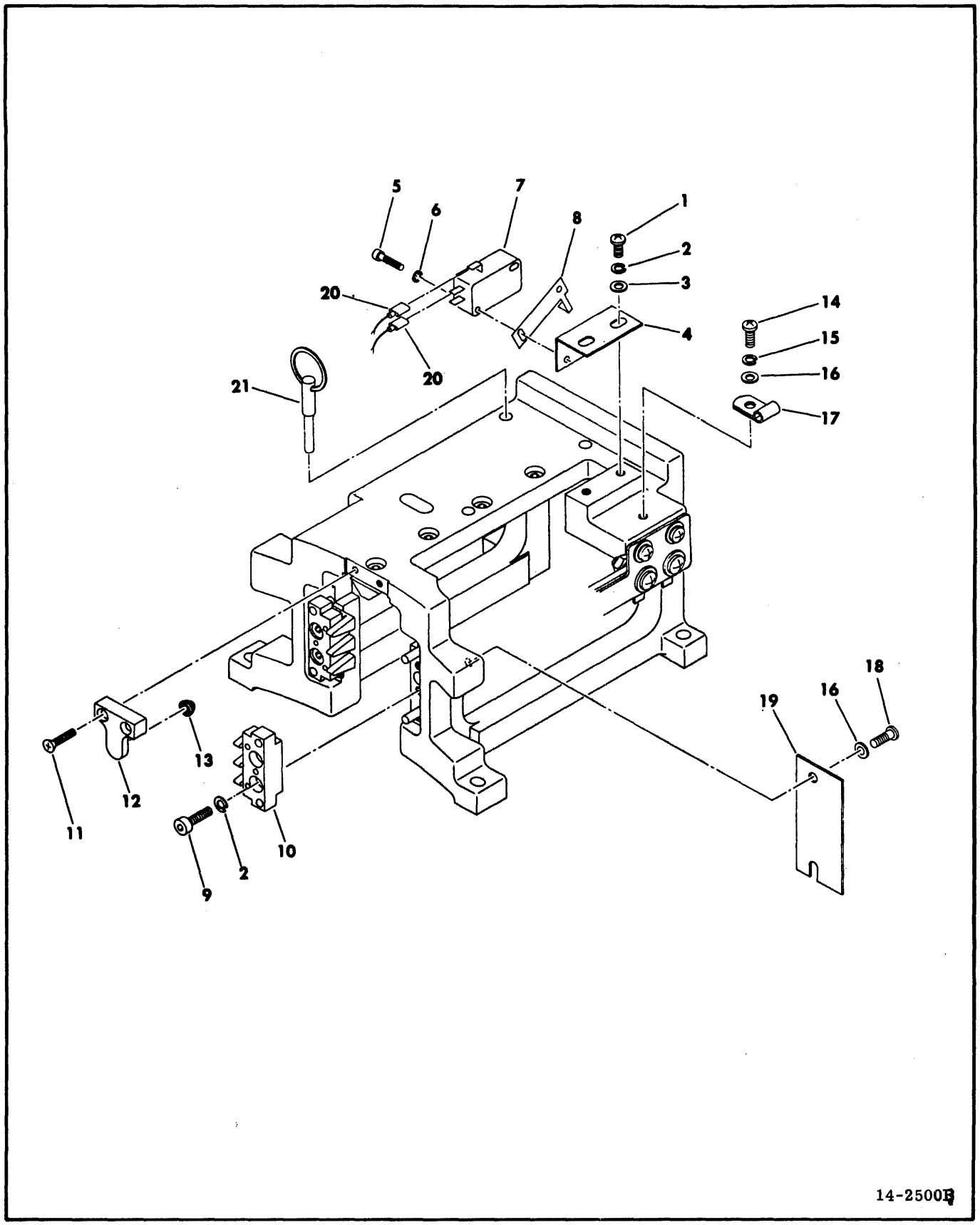

Figure 3-25. Rail Bracket Assembly

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-25	NFR	RAIL BRACKET ASSEMBLY	
1	10127111	SCREW, Machine, Pan Head, 6-32 x 1/4	
2	10125803	WASHER, Lock, Spring, 6	
3	10125605	WASHER, Flat, 6	
4	76420400	BRACKET, Mounting, Switch	
5	10127105	SCREW, Machine, Pan Head, 4-40 x 1/2	
6	10126101	WASHER, Lock, Internal Tooth, 4	
7	93786005	SWITCH, Mini, Integral, Actuator (A3S2)	
8	46807000	BRACKET, Adjustment, Pretravel	
9	10126219	SCREW, Socket, Hex Head, 6-32 x 1/2	
10	75015600	CAM, Tower	
11	10125705	SCREW, Flat Head	
12	75071100	BLOCK, Stop, Upper	
13	75070700	STOP, Bumper	
		(ITEMS LISTED BELOW ARE NOT PART OF RAIL BRACKET ASSEMBLY)	
14	10127112	SCREW, Machine, Pan Head, 6-32 x 5/16	
15	10125803	WASHER, Lock, Spring, 6	
16	10125605	WASHER, Flat, 6	
17	92602001	CLAMP, Cable, Nylon	
18	93749162	SCREW, Pan Head, Washer, 6-32 x 3/8	
19		COMPONENT ASSEMBLY, Type _ZGN (See Card Interchangeability Diagram)	
20	95643227	TERMINAL, Quick Connect (S2) (Part of W3)	
21	76425202	CARRIAGE LOCKING PIN AND RING ASSEMBLY	

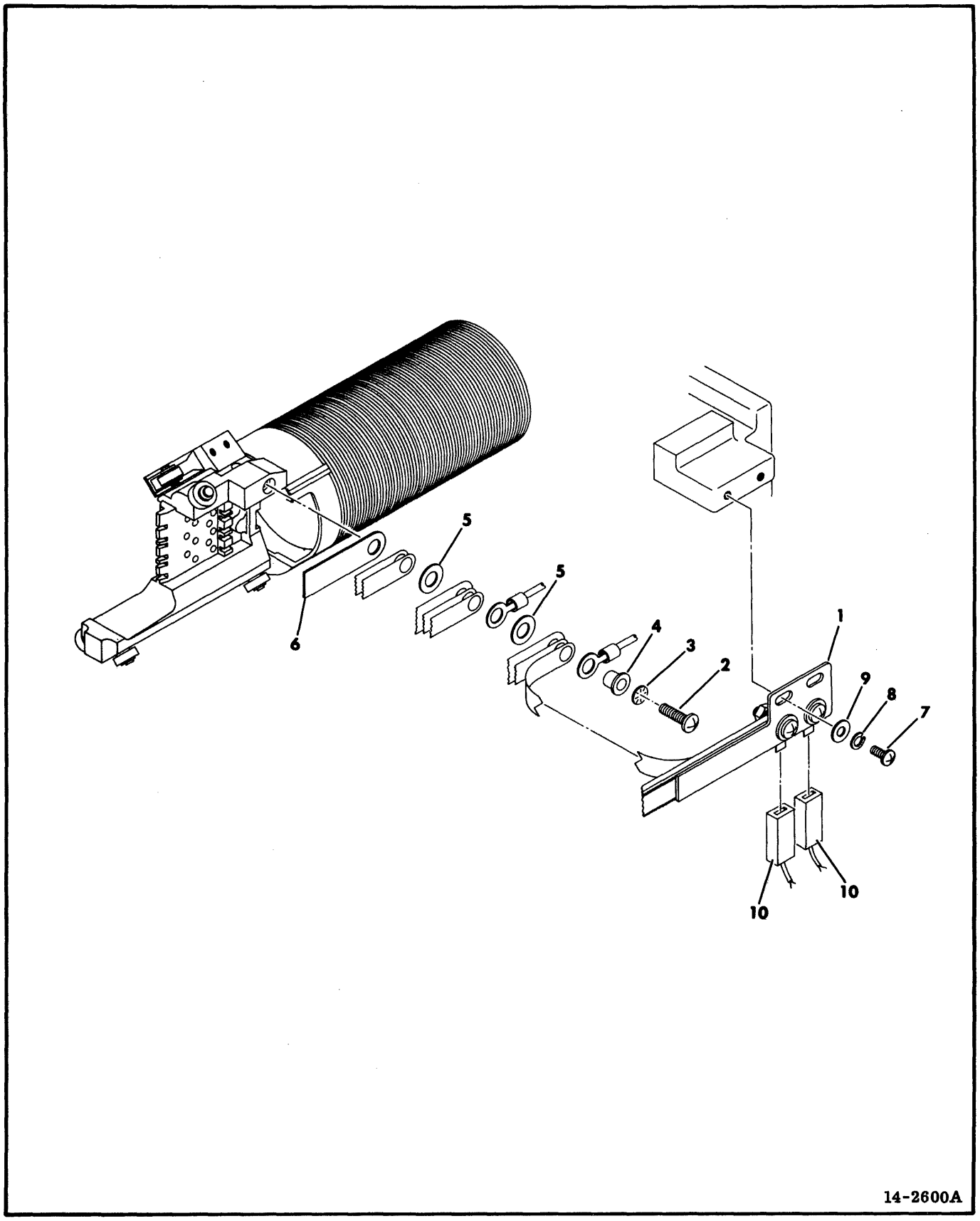

Figure 3-26. Carriage And Coil Assembly

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-26	NFR	CARRIAGE AND COIL ASSEMBLY (A3VC1)	
1	76426800	FLEX LEAD ASSEMBLY	
2	10127124	SCREW, Machine, Pan Head, 8-32 x 5/8	
3	10126104	WASHER, Lock, Internal Tooth, 8	
4	70738902	SPACER	
5	93564002	WASHER, Nylon	
6	76420200	RETAINER, Flex Lead	
		(ITEMS LISTED BELOW ARE NOT PART OF CARRIAGE AND COIL)	
7	10127112	SCREW, Machine, Pan Head, 6-32 x 5/16	
8	10125803	WASHER, Lock, Spring, 6	
9	10125605	WASHER, Flat, 6	
10	94309802	POD, Terminal (VC1 & VC2) (Part of W3)	
		(ASSOCIATED PARTS)	
	93747025	RECEPTACLE, Slide On	
		- - - * - - -	

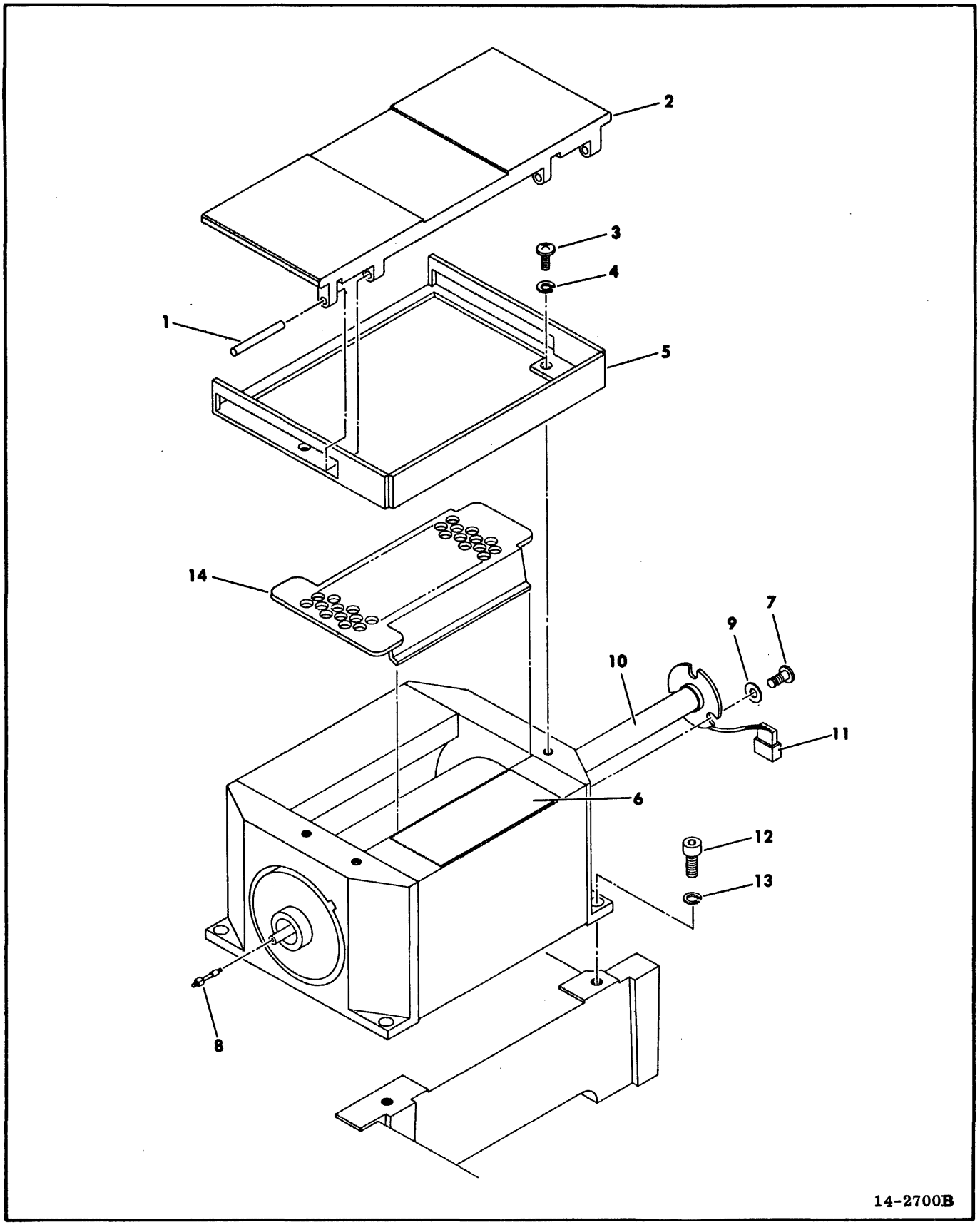

Figure 3-27. Magnet Assembly

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-27	47200700	MAGNET ASSEMBLY	
1	93530148	PIN, Roll, 1.38 x .125	
2	47171100	BRACKET, Mounting, Logic Chassis	
3	10127122	SCREW, Machine, Pan Head, 8-32 x 3/8	
4	10125804	WASHER, Lock, Spring, 8	
5	83254800	BRACKET, Slide, Logic Chassis	
6	24547538	PLATE, Warning, Magnetic Field	
		(ITEMS LISTED BELOW ARE NOT PART OF THE MAGNET ASSEMBLY)	
7	93749162	SCREW, Pan Head, Washer, 6-32 x 3/8	
8	76425801	ROD, Extension	
9	10125605	WASHER, Flat, 6	
10	76427300	TRANSDUCER ASSEMBLY (A3L2)	
11	93948008	CONNECTOR, Pin Housing (4 Pin)	
		(ASSOCIATED PARTS)	
	93942009	CONTACT, Pin	
		- - - * - - -	
12	10126234	SCREW, Socket, Hex Head, 10-24 x 1/2	
13	10125805	WASHER, Lock, Spring, 10	
14	75257100	COVER, Magnet	

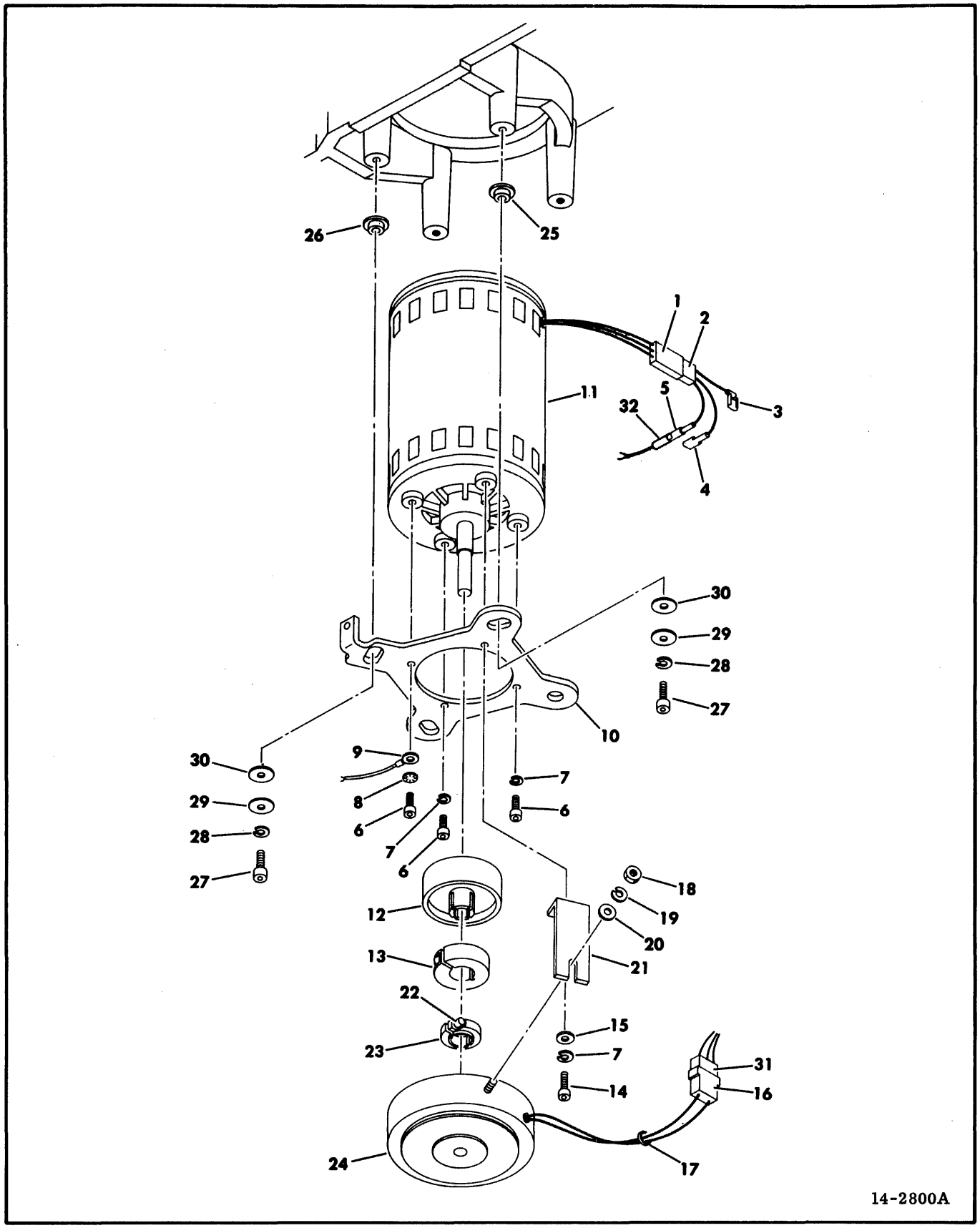

Figure 3-28. Drive Motor And Brake Assemblies

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-28		DRIVE MOTOR AND BRAKE ASSEMBLIES	
	77398410	DRIVE MOTOR ASSEMBLY (A3DM1)	60 Hz
	77398413	DRIVE MOTOR ASSEMBLY (A3DM1)	50 Hz
1	93948003	CONNECTOR, Pin Housings (3 Pin) (J304) (ASSOCIATED PARTS)	
	93942002	CONTACT, Pin	
		- - - * - - -	
2	93947004	CONNECTOR, Socket Housing (P304) (ASSOCIATED PARTS)	
	93943002	CONTACT, Socket	
		- - - * - - -	
3	94374101	TERMINAL, Flag, Quick Connect	
4	95643232	CONNECTOR, Quick Connect	
5	93948009	CONNECTOR, Pin Housing (J302) (ASSOCIATED PARTS)	
	93942002	CONTACT, Pin	
		- - - * - - -	
6	10126226	SCREW, Socket, Hex Head, 8-32 x 1/2	
7	10125804	WASHER, Lock, Spring, 8	
8	10126104	WASHER, Lock, Internal Tooth, 8	
9	94281404	CABLE, Ground	
10	76409200	PLATE, Motor, Mounting	
11	77398000	MOTOR, End Mounting	60 Hz
11	77398200	MOTOR, End Mounting	50 Hz
12	76051302	PULLEY, Motor	60 Hz
12	76051303	PULLEY, Motor	50 Hz
13	93287009	COLLAR, Shaft	
14	10126227	SCREW, Socket, Hex Head, 8-32 x	
15	93210008	WASHER, Flat, 8	
	75241501	HYSTERESIS BRAKE ASSEMBLY (A3HB1)	
16	93948004	CONNECTOR, Pin Housing (2 Pin) (J303) (ASSOCIATED PARTS)	
	93942008	CONTACT, Pin	
		- - - * - - -	
17	94277400	CABLE, Tie Strap	
18	10125107	NUT, Hex, 10-24	
19	10125805	WASHER, Lock, Spring, 10	
20	10125607	WASHER, Flat, 10	
21	75241200	BRACKET, Mounting, Brake	
22	10126228	SCREW, Socket, Hex Head, 6-32 x 3/4	
23	83259200	COLLAR, Shaft, Brake	
24	94382300	BRAKE, Hysteresis	
		(ITEMS LISTED BELOW ARE NOT PART OF THE DRIVE MOTOR AND BRAKE ASSEMBLIES)	
25	75062805	WASHER, Shoulder	
26	75062800	WASHER, Shoulder	
27	10126235	SCREW, Socket, Hex Head, 10-24 x 5/8	
28	10125805	WASHER, Lock, Spring, 10	
29	94047052	WASHER, Special	
30	75062400	WASHER, Insulator	
31	93947005	CONNECTOR, Socket Housing (Brake) (Part of W3) (ASSOCIATED PARTS)	
	93943017	CONTACT, Socket	
32	93947010	CONNECTOR, Socket (P302) (Part of W1) (ASSOCIATED PARTS)	
	93943002	CONTACT, Socket	

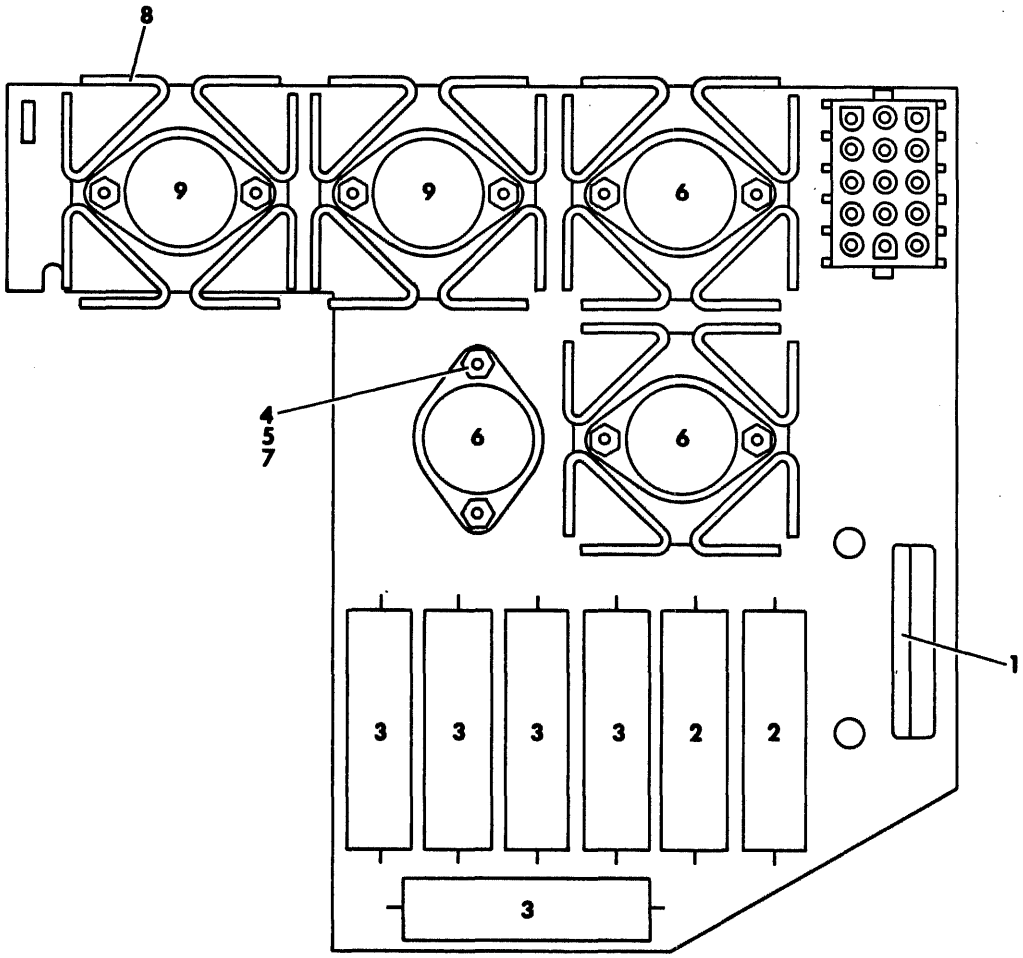

Figure 3-29. Power Amplifier

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-29	77569100	POWER AMPLIFIER, Component Assembly (Type 5VTN) (A3A04)	
1	73490300	LABEL, Assembly Number	
2	95597957	RESISTOR, Fixed, Wire Wound, 15 W, 1 Ohm, ±10%	
3	95597900	RESISTOR, Fixed, Wire Wound, 15 W, 0.5 Ohm, ±1%	
4	95510026	NUT, Hex	
5	10126103	WASHER, Lock, Internal Tooth, 6	
6	50222102	TRANSISTOR, Darlington Power, SNPN-T03, (Q3, Q4, Q5)	
7	94388100	INSULATOR, Transistor Wafer	
8	94261001	HEAT SINK, Transistor	
9	50222002	TRANSISTOR, Darlington Power, SPNP-T03, (Q1, Q2)	

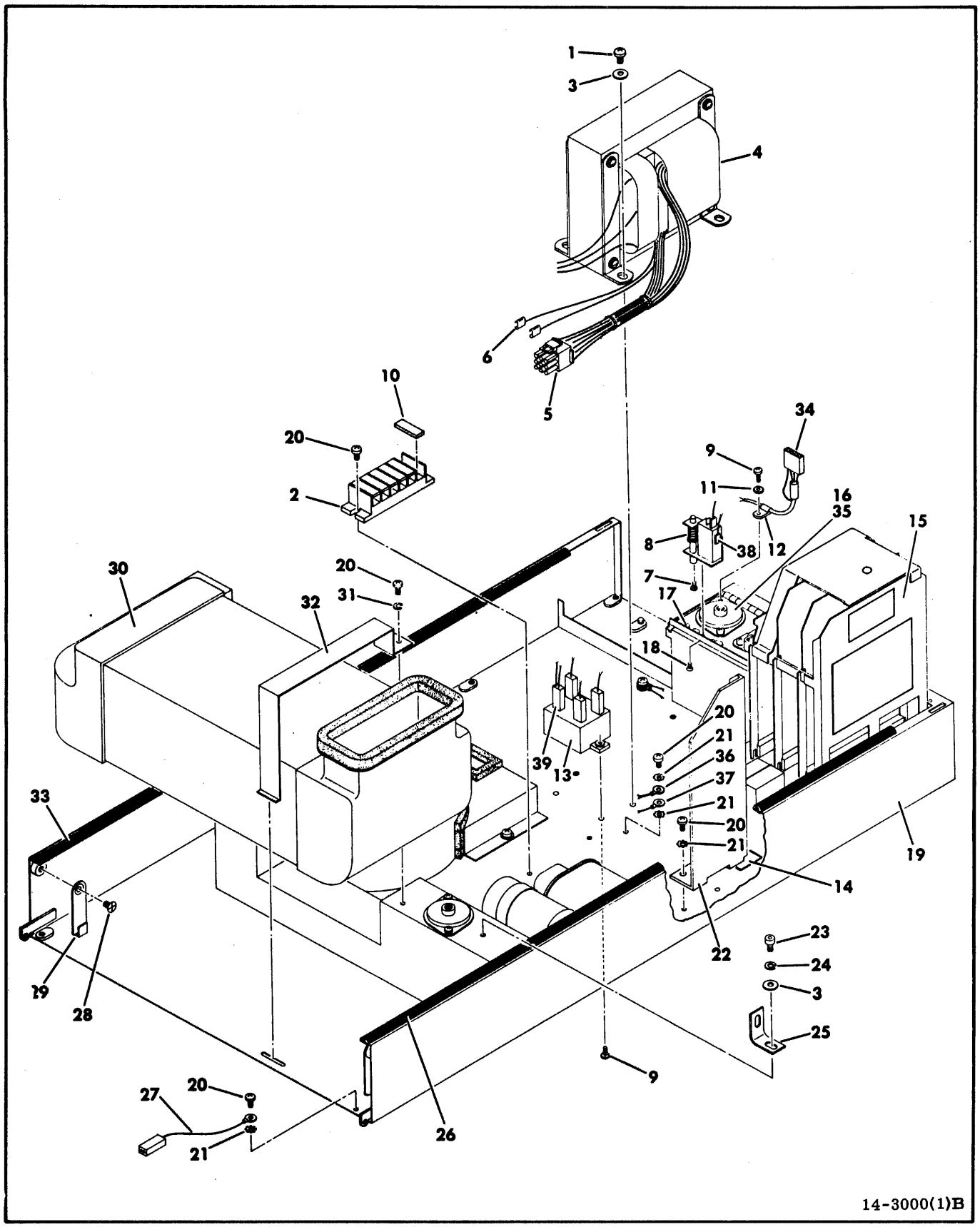

Figure 3-30. Base Assembly (Sheet 1 of 3)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-20		BASE ASSEMBLY (A1) (Sheet 1 of 3)	
1	93755236	SCREW, Pan Head, Washer, 10-32 x 5/16	
2	24501605	BLOCK, Terminal (A1TB1)	
3	10125607	WASHER, Flat, 10	
4	76840400	TRANSFORMER, Ferro (AC Power) (A1T1)	60 Hz
4	76846800	TRANSFORMER, Ferro (AC Power) (A1T1)	50 Hz
5	51906004	CONNECTOR, (P100)	
		(ASSOCIATED PARTS)	
	51906200	CONTACT, Socket	
		- - - * - - -	
6	95643212	TERMINAL, Quick Connect	
7	10127320	SCREW, Machine, Pan Head, 4-40 x 1/4	
8	93560002	SWITCH, Interlock, Deck (A1S4)	
9	93749162	SCREW, Pan Head, Washer, 6-32 x 3/8	
10	24501658	COVER, Terminal Block	
11	10125605	WASHER, Flat, 6	
12	92602002	CLAMP, Cable, Nylon	
13	76427400	SWITCH, Modified (Run Triac) (A1K1)	60 Hz
13	76427401	SWITCH, Modified (Run Triac) (A1K1)	50 Hz
14	24547502	PLATE, Warning	
15		POWER SUPPLY ASSEMBLY (See Figure 3-21)	
16	94362600	MOUNT, Shock	
17	92633023	BUMPER, Grommet Type	
18	10125907	SCREW, Machine, Flat Head, 6-32 x 3/16	
19	47172600	BASE	
20	10127121	SCREW, Machine, Pan Head, 8-32 x 5/16	
21	10126402	WASHER, Lock, External Tooth, 8	
22	47171700	GUIDE, Deck	
23	10126233	SCREW, Socket, Hex Head, 10-24 x 3/8	
24	10125805	WASHER, Lock, Spring, 10	
25	76244900	BRACKET, Shock Lock	
26	76423801	GASKET, Side, Base	
27	94281495	CABLE, Ground	
28	9291806	SCREW, Machine, Flat Head, 10-32 x 5/16	
29	76427600	ARM, Support, Case	
30	94364700	FILTER, Air	
31	10125804	WASHER, Lock, Spring, 8	
32	77475800	CLAMP, Filter, Air	
33	76423800	GASKET, Side, Base	
		(ITEMS LISTED BELOW ARE NOT PART OF THE BASE ASSEMBLY)	
34		CONNECTOR, Socket Housing (See Deck Assembly Sheet 3, For Part Number)	
35	76419000	GASKET, Shock Mount	Used As Spacer Under Shock Mounts
36		CABLE, Ground (Drive Motor Ground Cable, See Drive Motor and Brake Assembly For Part Number)	
37	93541028	TERMINAL, Ring Tongue (Part of W3)	
38	94281327	RECEPTACLE, Slide On (A1S4) (Part of W3)	
39	94309802	POD, Terminal (A1K1) (Part of W1) (Part of W3)	
		(ASSOCIATED PARTS)	
		RECEPTACLE, Slide On	
		- - - * - - -	

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-20		BASE ASSEMBLY (A1) (Sheet 1 of 3)	
1	93755236	SCREW, Pan Head, Washer, 10-32 x 5/16	
2	24501605	BLOCK, Terminal (A1TB1)	
3	10125607	WASHER, Flat, 10	
4	76840400	TRANSFORMER, Ferro (AC Power) (A1T1)	60 Hz
4	76846800	TRANSFORMER, Ferro (AC Power) (A1T1)	50 Hz
5	51906004	CONNECTOR, (P100)	
		(ASSOCIATED PARTS)	
	51906200	CONTACT, Socket	
		- - - * - - -	
6	95643212	TERMINAL, Quick Connect	
7	10127320	SCREW, Machine, Pan Head, 4-40 x 1/4	
8	93560002	SWITCH, Interlock, Deck (A1S4)	
9	93749162	SCREW, Pan Head, Washer, 6-32 x 3/8	
10	24501658	COVER, Terminal Block	
11	10125605	WASHER, Flat, 6	
12	92602002	CLAMP, Cable, Nylon	
13	76427400	SWITCH, Modified (Run Triac) (A1K1)	60 Hz
13	76427401	SWITCH, Modified (Run Triac) (A1K1)	50 Hz
14	24547502	PLATE, Warning	
15		POWER SUPPLY ASSEMBLY (See Figure 3-21)	
16	94362600	MOUNT, Shock	
17	92633023	BUMPER, Grommet Type	
18	10125907	SCREW, Machine, Flat Head, 6-32 x 3/16	
19	47172600	BASE	
20	10127121	SCREW, Machine, Pan Head, 8-32 x 5/16	
21	10126402	WASHER, Lock, External Tooth, 8	
22	47171700	GUIDE, Deck	
23	10126233	SCREW, Socket, Hex Head, 10-24 x 3/8	
24	10125805	WASHER, Lock, Spring, 10	
25	76244900	BRACKET, Shock Lock	
26	76423801	GASKET, Side, Base	
27	94281495	CABLE, Ground	
28	9291806	SCREW, Machine, Flat Head, 10-32 x 5/16	
29	76427600	ARM, Support, Case	
30	94364700	FILTER, Air	
31	10125804	WASHER, Lock, Spring, 8	
32	77475800	CLAMP, Filter, Air	
33	76423800	GASKET, Side, Base	
		(ITEMS LISTED BELOW ARE NOT PART OF THE BASE ASSEMBLY)	
34		CONNECTOR, Socket Housing (See Deck Assembly Sheet 3, For Part Number)	
35	76419000	GASKET, Shock Mount	Used As Spacer Under Shock Mounts
36		CABLE, Ground (Drive Motor Ground Cable, See Drive Motor and Brake Assembly For Part Number)	
37	93541028	TERMINAL, Ring Tongue (Part of W3)	
38	94281327	RECEPTACLE, Slide On (A1S4) (Part of W3)	
39	94309802	POD, Terminal (A1K1) (Part of W1) (Part of W3)	
		(ASSOCIATED PARTS)	
		RECEPTACLE, Slide On	
		- - - * - - -	

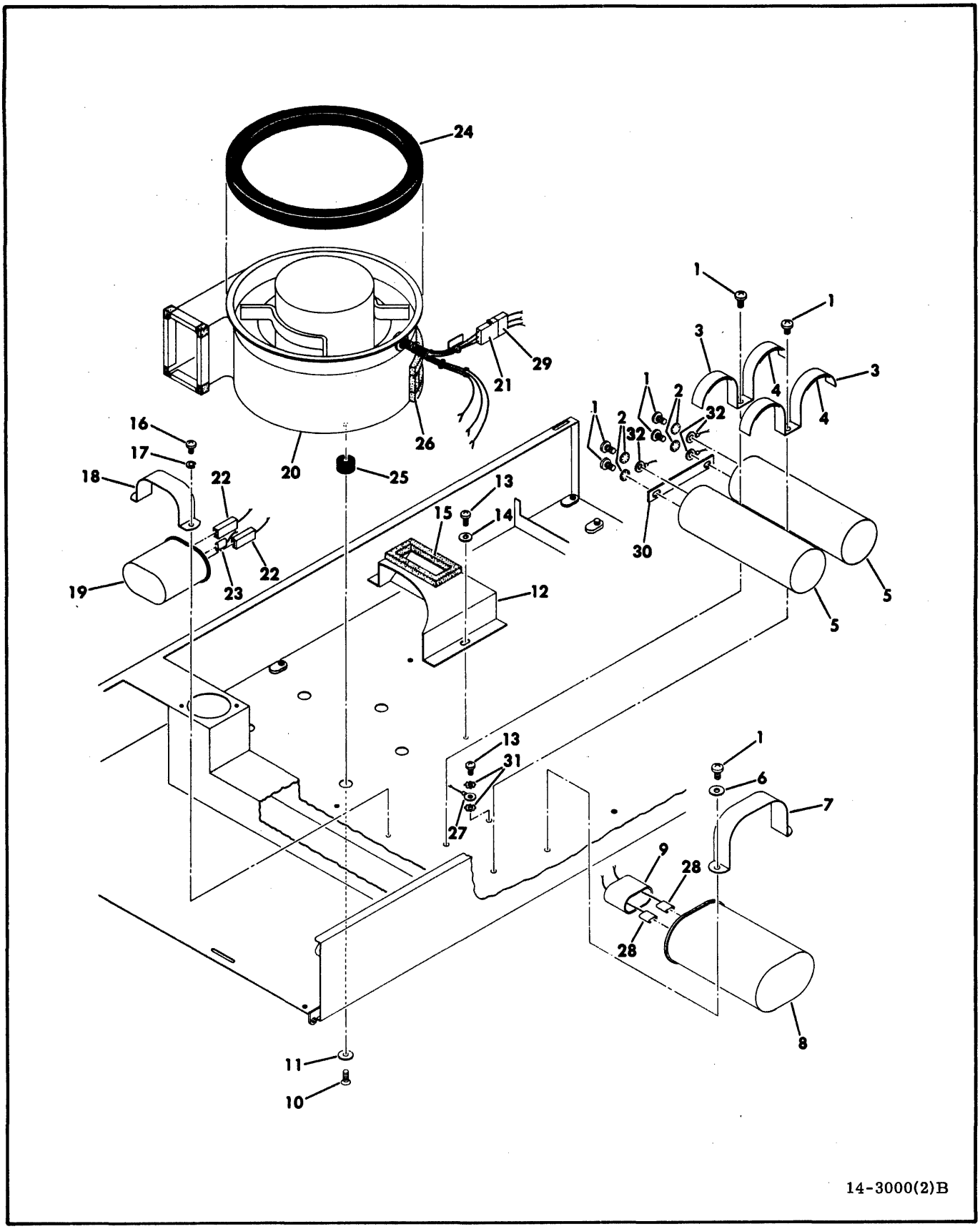

Figure 3-30. Base Assembly (Sheet 2 of 3)

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-30		BASE ASSEMBLY (Sheet 2)	
1	93755236	SCREW, Pan Head, Washer, 10-32 x 5/16	
2	10126105	WASHER, Lock, Internal Tooth, 10	
3	76417700	BRACKET, Capacitor	
4	95027403	TAPE, Foam, Double Adhesive	
5	95578111	CAPACITOR, Electrolytic, 50V, 21000µf (Servo Capacitor) (A1C1, A1C2)	
6	10125607	WASHER, Flat, 10	
7	95643601	CLAMP, Capacitor	
8	95686701	CAPACITOR, 660 VAC, 6µf (Transformer Tuning Capacitor) (A1C8)	
9	95582501	BOOT, Double Entrance	
10	10125725	SCREW, Flat Head, 8-32 x 1/2	
11	76422601	WASHER, Special	
12	47173700	PLENUM, Air, Logic Chassis	
13	10127121	SCREW, Machine, Pan Head, 8-32 x 5/16	
14	10125606	WASHER, Flat, 8	
15	47201500	GASKET, Air Plenum	
16	10127120	SCREW, Machine, Pan Head, 8-32 x 1/4	
17	10125804	WASHER, Lock, Spring, 8	
18	92826001	BRACKET, Capacitor, Wraparound	
19	94365800	CAPACITOR, 370 VAC, 4µf (Blower Motor Start Capacitor) (A1C5)	
20	75240304	BLOWER ASSEMBLY (A1BM1)	60 Hz
20	75240305	BLOWER ASSEMBLY (A1BM1)	50 Hz
21	93948003	CONNECTOR, Pin Housing (J301) (ASSOCIATED PARTS)	
	93942005	CONTACT, Pin (.080-.100 D1A)	
	93942006	CONTACT, Pin (.100-.130 D1A)	
		- - - * - - -	
22	94309802	POD, Terminal (ASSOCIATED PARTS)	
	93747022	TERMINAL, Quick Connect (.080-.100 D1A)	
	93747025	TERMINAL, Quick Connect (.100-.130 D1A)	
		- - - * - - -	
23	93747022	TERMINAL, Quick Connect	
24	76424400	GASKET, Blower	
25	94364000	GROMMET, Square Shoulder	
26	94001125	TAPE, Foam, 3/8 x 3/8	
27	93541018	TERMINAL, Ring Tongue (Chassis Ground) (Part of W1)	
28		TERMINAL, Quick Connect (See Base Assembly, Sheet 1, For Part Number)	
29	93947004	CONNECTOR (P301) (Part of W1) (ASSOCIATED PARTS)	
	93943002	CONTACT, Socket	
		- - - * - - -	
30	75244802	BAR, Buss	
31	10126402	WASHER, Lock, Externla Tooth, 8	
32	95604039	CONNECTOR, Ring Tongue (C1 & C2) (Part of W3)	

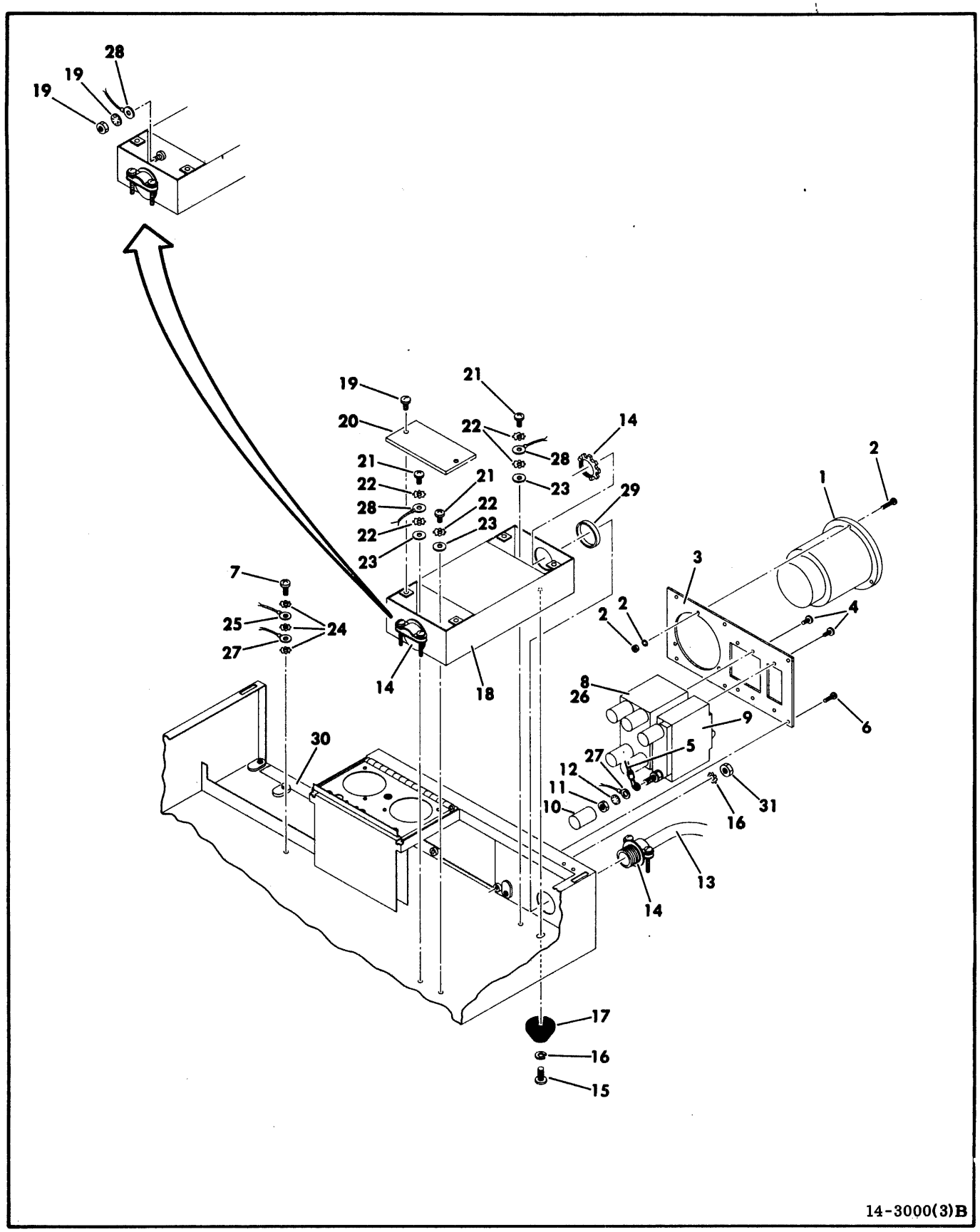

Figure 3-30. Base Assembly (Sheet 3 of 3)

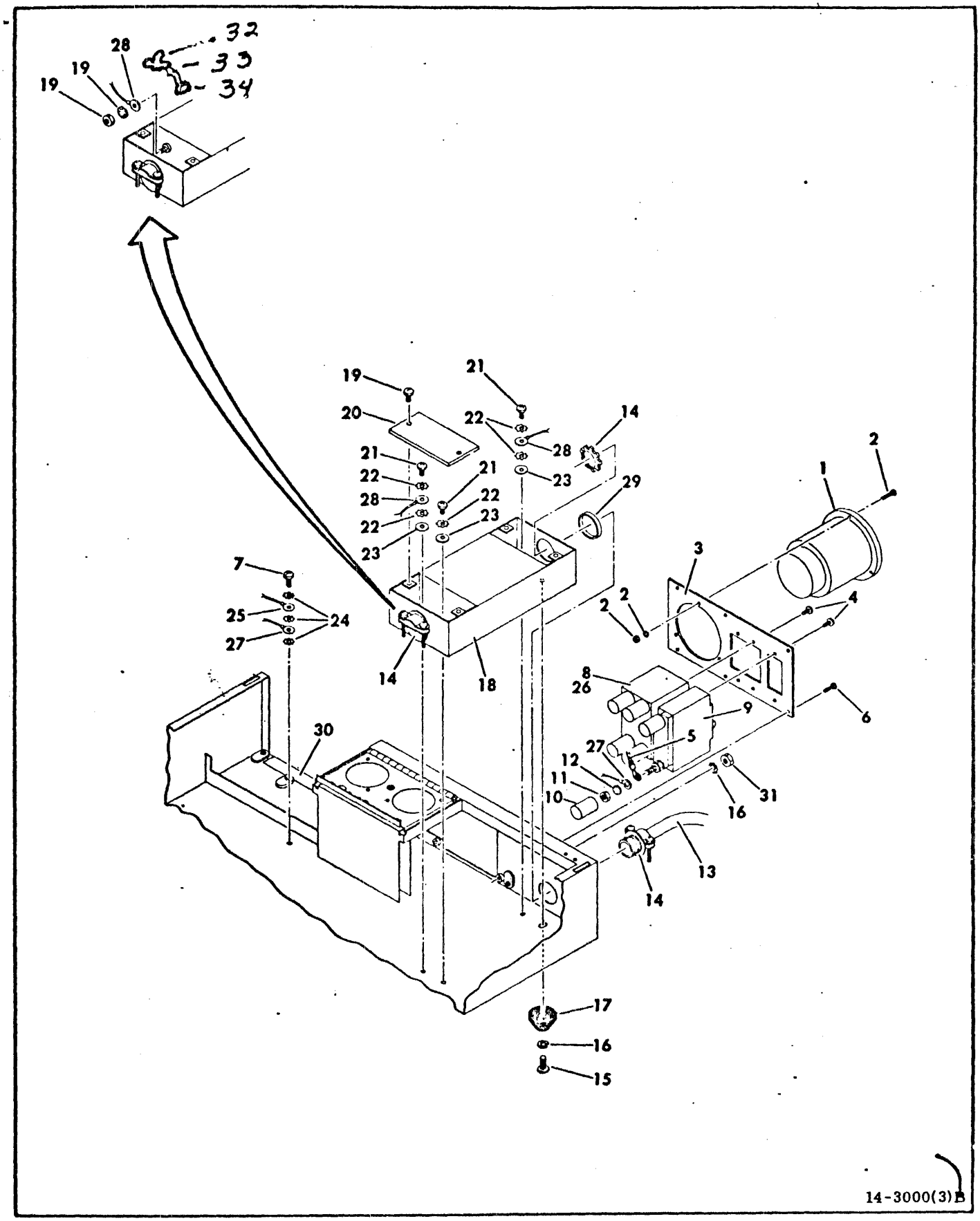

Figure 3-30. Base Assembly (Sheet 3 of 3)

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INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-30		BASE ASSEMBLY (Sheet 3)	
1	94313800	ELAPSED TIME METER (A1M1)	60 Hz
1	94313807	ELAPSED TIME METER (A1M1)	50 Hz
2		HARDWARE, Attaching	Supplied With Elapsed Time Meter
3	75256100	PLATE, Component Mounting	
4	93749158	SCREW, Pan Head, Washer, 6-32 x 1/4	
5	93541012	TERMINAL, Ring Tongue (Part of W12)	
6	93749086	SCREW, Pan Head, Washer, 4-40 x 3/8	
7	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
8	94245217	CIRCUIT BREAKER (AC Power Circuit Breaker) (A1CB1)	60 Hz
8	94245205	CIRCUIT BREAKER (AC Power Circuit Breaker) (A1CB1)	50 Hz
9	92696065	CIRCUIT BREAKER (Power Supply Circuit Breaker) (A1CB2)	60 Hz
9	92696079	CIRCUIT BREAKER (Power Supply Circuit Breaker) (A1CB2)	50 Hz
10	76416500	INSULATOR, Terminal	
11		NUT, Hex	Supplied With Circuit Breakers
12	10126105	WASHER, Lock, Internal Tooth, 10	
13	75259400	POWER CABLE ASSEMBLY	60 Hz
13	75259401	POWER CABLE ASSEMBLY	50 Hz
14	92801001	CLAMP, Cable	
15	10127141	SCREW, Machine, Pan Head, 10-32 x 5/16	
16	10126403	WASHER, Lock, External Tooth, 10	
17	95672701	BUMPER, Molded Recess	
18	94371200	FILTER, Line (A1FL1)	
19		HARDWARE, Attaching	Supplied with Line Filter
20		COVER, Line Filter	
21	10127121	SCREW, Machine, Pan Head, 8-32 x 5/16	
22	10126402	WASHER, Lock, External Tooth, 8	
23	10125606	WASHER, Flat, 8	
24	10126401	WASHER, Lock, External Tooth, 6	
25	94369515	CABLE, Ground	
26	93541028	TERMINAL, Ring Tongue (Part of W1)	
27	93541018	TERMINAL, Ring Tongue (Part of W1)	
28	93541021	TERMINAL, Ring Tongue (Part of W1)	
29	75073100	SPACER, Flat	
30	95660411	TAPE, Nylon	
31	10125108	NUT, Hex, 10-32	
32	94395600	VARISTOR	50 Hz, 220/240
33	92261118	SLEEVING	50 Hz, 220/240
34	93541046	TERMINAL, Ring Tongue	50 Hz, 220/240

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-30		BASE ASSEMBLY (Sheet 3)	
1	94313800	ELAPSED TIME METER (A1M1)	60 Hz
1	94313807	ELAPSED TIME METER (A1M1)	50 Hz
2		HARDWARE, Attaching	Supplied With Elapsed Time Meter
3	75256100	PLATE, Component Mounting	
4	93749158	SCREW, Pan Head, Washer, 6-32 x 1/4	
5	93541012	TERMINAL, Ring Tongue (Part of W12)	
6	93749086	SCREW, Pan Head, Washer, 4-40 x 3/8	
7	10127113	SCREW, Machine, Pan Head, 6-32 x 3/8	
8	94245217	CIRCUIT BREAKER (AC Power Circuit Breaker) (A1CB1)	60 Hz
8	94245205	CIRCUIT BREAKER (AC Power Circuit Breaker) (A1CB1)	50 Hz
9	92696065	CIRCUIT BREAKER (Power Supply Circuit Breaker) (A1CB2)	60 Hz
9	92696079	CIRCUIT BREAKER (Power Supply Circuit Breaker) (A1CB2)	50 Hz
10	76416500	INSULATOR, Terminal	
11		NUT, Hex	Supplied With Circuit Breakers
12	10126105	WASHER, Lock, Internal Tooth, 10	
13	75259400	POWER CABLE ASSEMBLY	60 Hz
13	75259401	POWER CABLE ASSEMBLY	50 Hz
14	92801001	CLAMP, Cable	
15	10127141	SCREW, Machine, Pan Head, 10-32 x 5/16	
16	10126403	WASHER, Lock, External Tooth, 10	
17	95672701	BUMPER, Molded Recess	
18	94371200	FILTER, Line (A1FL1)	
19		HARDWARE, Attaching	Supplied with Line Filter
20		COVER, Line Filter	
21	10127121	SCREW, Machine, Pan Head, 8-32 x 5/16	
22	10126402	WASHER, Lock, External Tooth, 8	
23	10125606	WASHER, Flat, 8	
24	10126401	WASHER, Lock, External Tooth, 6	
25	94369515	CABLE, Ground	
26	93541028	TERMINAL, Ring Tongue (Part of W1)	
27	93541018	TERMINAL, Ring Tongue (Part of W1)	
28	93541021	TERMINAL, Ring Tongue (Part of W1)	
29	75073100	SPACER, Flat	
30	95660411	TAPE, Nylon	
31	10125108	NUT, Hex, 10-32	

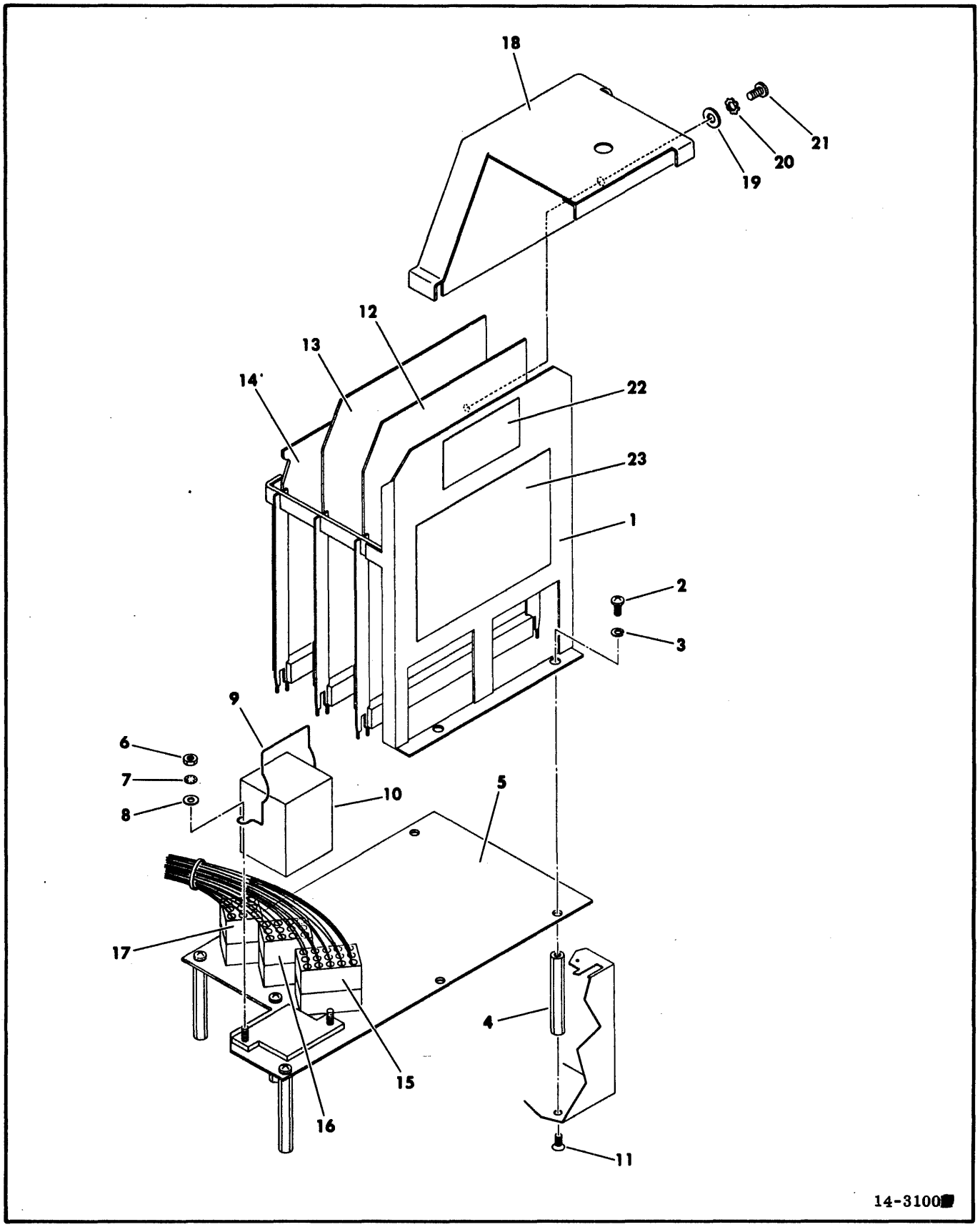

Figure 3-31. Power Supply Assembly

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-31	47174000	POWER SUPPLY ASSEMBLY	
1	47170800	CHASSIS, Power Supply	
2	10127112	SCREW, Pan Head, Phillips	
3	10125803	WASHER, Lock, Spring, 6	
4	93114322	STANDOFF, Hex	
5	77568300	MOTHERBOARD (Component Assembly, Type _VQN)	
6	95510024	NUT, Hex	
7	10126101	WASHER, Lock, Internal Tooth, 4	
8	10125603	WASHER, Flat, 4	
9	94378503	RELAY, Plug, Clip	
10	94378509	RELAY, Plug, 11 Pin, 3 Pole (Emergency Retract) (A1K2)	
		(ITEMS LISTED BELOW ARE NOT PART OF THE POWER SUPPLY ASSEMBLY)	
11	10125713	SCREW, Flat Head, 6-32 x 5/16	
12		COMPONENT ASSEMBLY, Type ASHV (±5V Power Supply) (A1A03) (See Figure 3-34)	
13		COMPONENT ASSEMBLY, Type SSKV, (±20V, ±12V Power Supply) (A1A02) (See Figure 3-33)	
14		COMPONENT ASSEMBLY, Type SSJV, (±42V Power Supply and Emergency Retract) (A1A01) (See Figure 3-32)	
15		CONNECTOR (P100) (See Base Assembly, Sheet 1, For Part Number)	
16	51906005	CONNECTOR (P1A) (Part of W3)	
		(ASSOCIATED PARTS)	
	51906200	CONTACT, Socket	
		- - - * - - -	
17	51906006	CONNECTOR (P1B) (Part of W3)	
		(ASSOCIATED PARTS)	
	51906200	CONTACT, Socket	
		- - - * - - -	
18	47174800	COVER, Power Supply	
19	10125606	WASHER, Flat, 8	
20	10126402	WASHER, Lock, External Tooth, 8	
21	10127121	SCREW, Machine, Pan Head, 8-32 x 1/32	
22	24547501	PLATE, Warning	
23	83274400	LABEL, Chassis Map	

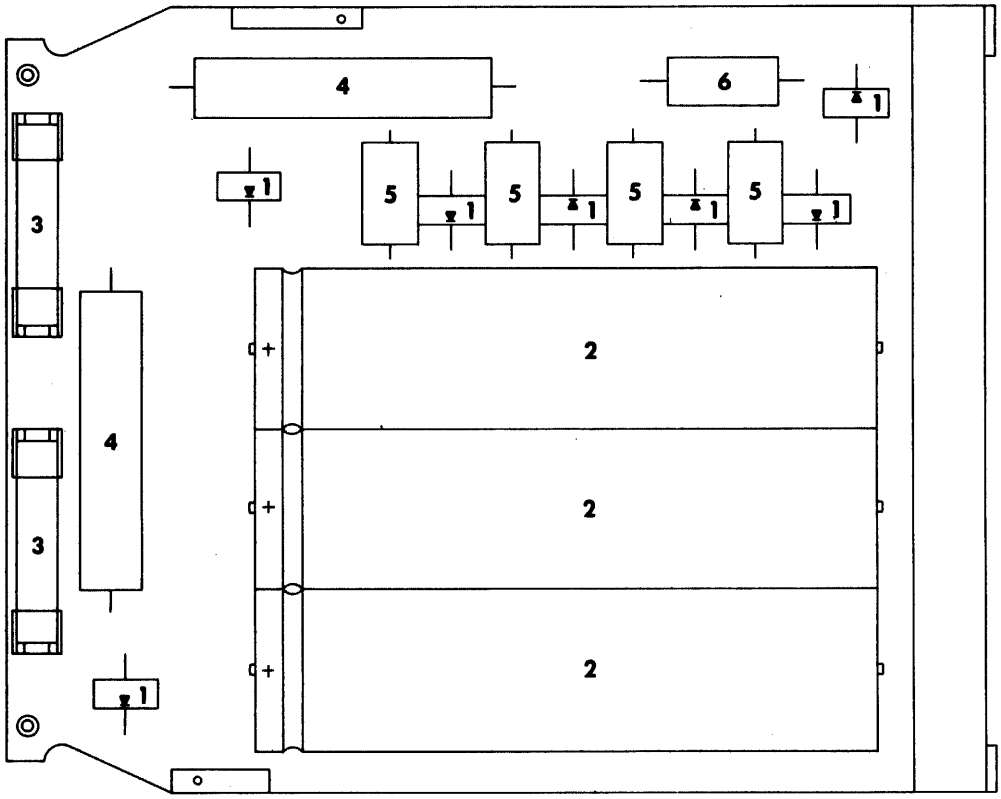

Figure 3-32. Component Assembly, Type _SJV

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-32		COMPONENT ASSEMBLY, Type _SJV (±42V Power Supply and Emergency Retract) (A1A01)	See Card Interchangeability Diagram for Part Number
1	95575000	RECTIFIER, Silicon, Hi-Current	
2	94383701	CAPACITOR, Electrolytic, 5,500 UF, 50 V, +100% -10%	
3	95647605	FUSE, Quick-Acting, 5 Amp	
4	95597919	RESISTOR, Fixed, 15W, 510 Ohm, ±10%	
5	92496185	CAPACITOR, Nonelectrolytic, 82,000 PF, 200 V, ±10%	
6	95212446	RESISTOR, 2 W, 1,000 Ohm, ±10%	

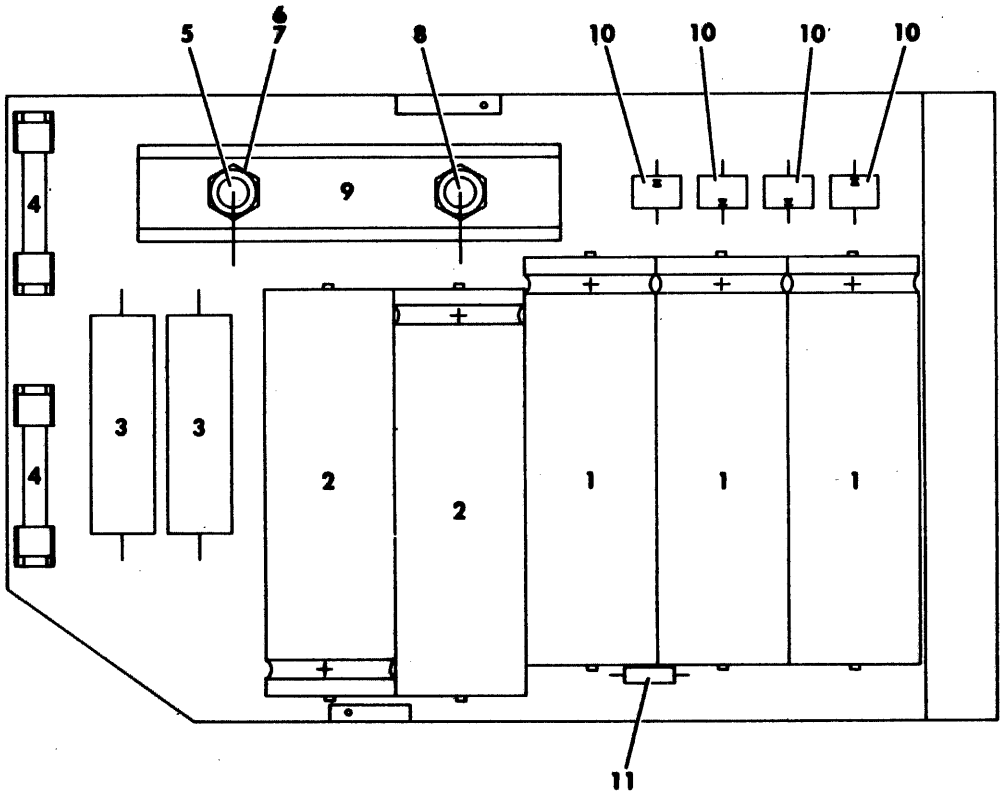

Figure 3-33. Component Assembly, Type _SKV

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-33		COMPONENT ASSEMBLY, Type SKV (±20 V, ±12 V Power Supplies) (A1A02)	See Card Interchangeability Diagram For Part Number
1	94383702	CAPACITOR, Electrolytic, 14,000 UF, 15 V, ±100% -10%	
2	94383700	CAPACITOR, Electrolytic, 7,500 UF, 35 V, ±100% -10%	
3	95594112	RESISTOR, Fixed, 10 W, 51 Ohm, ±10%	
4	95647602	FUSE, Quick-Acting, 2 Amp	
5	50240415	DIODE, Silicon, 12 V, ±5%	
6	10125108	NUT, Hex, 10-32	
7	10125805	WASHER, Lock, Spring, 10	
8	50240515	DIODE, Silicon, Zener, 10 W, 12 V, ±5%	
9	47478600	HEAT SINK	
10	95575000	RECTIFIER, Silicon, Hi Current	
11	92512825	RESISTOR, 1/2 W, 1,000 Ohm, ±5%	

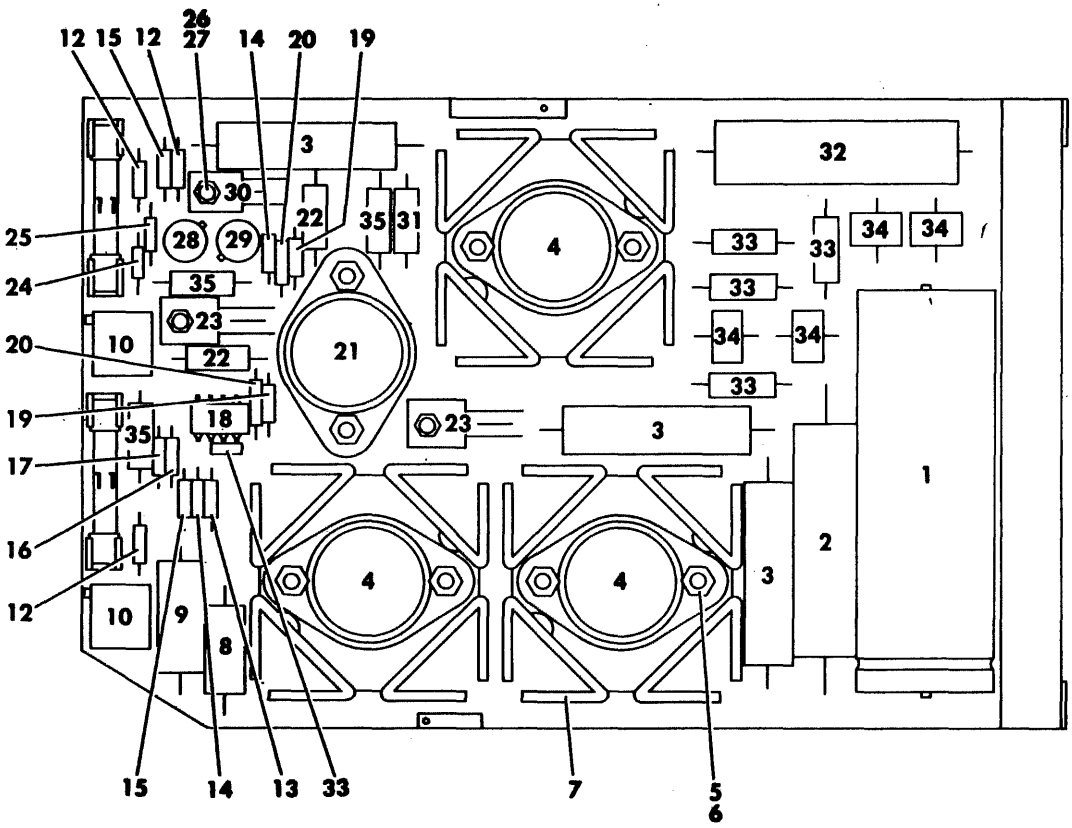

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Figure 3-34. Component Assembly, Type _SHV

INDEX NO.	PART NUMBER	PART DESCRIPTION	NOTES
3-34		COMPONENT ASSEMBLY, Type _SHV (±5 V Power Supply) (A1A03)	See Card Interchangeability Diagram For Part Number
1	94383702	CAPACITOR, Electrolytic, 14,000 UF, 15 V, +100% -10%	
2	92427152	CAPACITOR, Electrolytic, 1,500 UF, 16 V, +100% -10%	
3	92825001	RESISTOR, Fixed Power, Wire Wound, 7 W, 0.1 Ohm, ±1%	
4	50221301	TRANSISTOR, Power, Silicon (Q4, Q9, Q10)	
5	95510026	NUT, Hex	
6	10126103	WASHER, Lock, Internal Tooth, 6	
7	94261001	HEAT SINK, Transistor	
8	92512913	RESISTOR, 2 W, 33 Ohm, ±10%	
9	92427133	CAPACITOR, Electrolytic, 100 UF, 15 V, +75% -10%	
10	92617031	POTENTIOMETER, Wire Wound, 2.00 Ohm	
11	95647605	FUSE, Quick-Acting	
12	92512256	RESISTOR, 1/4 W, 1,800 Ohm, ±5%	
13	92512151	RESISTOR, 1/4 W, 56 Ohm, ±5%	
14	92512248	RESISTOR, 1/4 W, 68 Ohm, ±5%	
15	92512259	RESISTOR, 1/4 W, 5,600 Ohm, ±5%	
16	92512157	RESISTOR, 1/4 W, 470 Ohm, ±5%	
17	94356143	CAPACITOR, Nonelectrolytic, 560 PF, 200 V	
18	95596100	VOLTAGE REGULATOR, I-C	
19	92512160	RESISTOR, 1/4 W, 2,200 Ohm, ±5%	
20	50240108	DIODE, Silicon, 6.2 V, 7 Ohm, ±5%	
21	50221401	TRANSISTOR, Silicon Power, PNP (Q6)	
22	92427139	CAPACITOR, Electrolytic, 45 UF, 30 V, ±20%	
23	94262016	TRIAC, Bi-Directional	
24	94360322	RESISTOR, 1,690 Ohm, ±1%	
25	92512245	RESISTOR, 1/4 W, 27 Ohm, ±5%	
26	92583002	NUT, Lock	
27	10126101	WASHER, Lock, Internal Tooth, 4	
28	95592500	VOLTAGE REGULATOR, Negative, I-C	
29	50210610	TRANSISTOR, SPNP, 25 V	
30	50221001	TRANSISTOR, SPNP, 60 V	
31	92427089	CAPACITOR, Electrolytic, 22 UF, 15 V, ±10%	
32	95597946	RESISTOR, Fixed, Wire Wound, 15 W, 0.62 Ohm, ±10%	
33	94354826	CAPACITOR, High K, Ceramic, 0.1 UF, ±20%	
34	95575000	RECTIFIER, Silicon, Hi Current	
35	92427087	CAPACITOR, Electrolytic, 4.7 UF, 50 V, ±20%	

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Publication Number: 83322150 Manual Preliminary Revision: E

Instructions: The attached pages contain replacement information. **Insert** the attached pages into the appropriate place. **Do not** discard current manual sheet (back-up page **information** is not supplied with this packet). All **changes** contained in this preliminary packet will be **in the** released revision.

REV	REWORK NUMBER	ECO/FCO NUMBER	DESCRIPTION	PAGES AFFECTED
01	2452 S/C 16	EC048477	Increase the voltage rating of motor control triacs, add metal oxide varistor to line filter to reduce voltage spikes, and add bleeder resistor to the motor start capacitor to prevent possible high reverse voltage at start time.	3-67, 3-81, 3-8 3-85

PRELIMINARY REVISION PACKET. SUBJECT TO CHANGE WITHOUT NOTICE.

Publication Title: BK4xx/BK5xx HARDWARE MAINTENANCE VOLUME 1

Publication Number: 83322150 Manual Preliminary Revision: D

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REV	REWORK NUMBER	ECO/FCO NUMBER	DESCRIPTION	PAGES AFFECTED
01	S/C 15 Change	48519	Change card extender since interface between card extender and logic chassis prevented full engagement of card extender.	2-6
	S/C 15 and Above	EC048437 FC048518 Technical Changes.	Change AKHV to BKHV card to prevent both channels from being selected at the same time.	2-15 2-6, 2-13, 2-51

TABLE 1-7. SECTOR SELECT SWITCH SETTINGS

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
4	C	C	C	C	C	O	O	O	C	O	C	C
5	C	C	C	C	C	C	C	O	O	C	O	C
6	C	C	C	C	C	C	O	C	O	O	O	C
7	C	C	C	C	C	C	C	O	C	C	C	O
8	C	C	C	C	O	O	O	C	O	C	C	O
9	O	O	C	O	C	O	C	C	C	O	C	O
10	C	C	C	C	C	C	O	O	C	O	C	O
11	O	O	C	O	O	O	C	C	O	O	C	O
12	C	C	C	C	C	O	C	O	O	O	C	O
13	O	O	O	C	O	O	O	O	O	O	C	O
14	C	C	C	C	C	C	O	C	C	C	O	O
15	C	C	C	C	C	C	C	O	C	C	O	O
16	C	C	C	O	O	O	C	O	C	C	O	O
17	C	O	C	O	C	O	O	O	C	C	O	O
18	C	O	O	C	O	C	C	C	O	C	O	O
19	O	C	O	O	O	O	C	C	O	C	O	O
20	C	C	C	C	C	O	O	C	O	C	O	O
21	C	C	C	C	C	C	C	O	O	C	O	O
22	C	O	O	O	O	C	C	O	O	C	O	O
23	C	C	C	O	O	O	C	O	O	C	O	O
24	C	C	C	C	O	C	O	O	O	C	O	O
25	O	O	O	C	C	O	O	O	O	C	O	O
26	C	C	O	O	O	O	O	O	O	C	O	O
27	O	O	O	O	C	C	C	C	C	O	O	O

Table Continued on Next Page

TABLE 1-7. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
28	C	C	C	C	C	O	C	C	C	O	O	O
29	O	C	C	C	O	O	C	C	C	O	O	O
30	C	C	C	C	C	C	O	C	C	O	O	O
31	O	O	O	O	C	C	O	C	C	O	O	O
32	C	C	O	O	O	C	O	C	C	O	O	O
33	O	C	C	O	C	O	O	C	C	O	O	O
34	O	C	O	C	O	O	O	C	C	O	O	O
35	C	C	C	C	C	C	C	O	C	O	O	O
36	O	O	C	O	C	C	C	O	C	O	O	O
37	O	C	O	C	O	C	C	O	C	O	O	O
38	O	O	O	O	O	C	C	O	C	O	O	O
39	C	C	C	O	C	O	C	O	C	O	O	O
40	C	C	C	C	O	O	C	O	C	O	O	O
41	O	C	C	O	O	O	C	O	C	O	O	O
42	C	C	C	C	C	C	O	O	C	O	O	O
43	C	C	C	O	C	C	O	O	C	O	O	O
44	O	O	O	O	C	C	O	O	C	O	O	O
45	C	O	O	C	O	C	O	O	C	O	O	O
46	C	C	O	O	O	C	O	O	C	O	O	O
47	O	O	C	C	C	O	O	O	C	O	O	O
48	C	C	C	O	C	O	O	O	C	O	O	O
49	C	O	O	O	C	O	O	O	C	O	O	O
50	C	C	O	C	O	O	O	O	C	O	O	O
51	O	C	C	O	O	O	O	O	C	O	O	O

Table Continued on Next Page

TABLE 1-7. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
52	C	O	O	O	O	O	O	O	C	O	O	O
53	O	O	C	C	C	C	C	C	O	O	O	O
54	C	C	C	O	C	C	C	C	O	O	O	O
55	C	C	O	O	C	C	C	C	O	O	O	O
56	C	C	C	C	O	C	C	C	O	O	O	O
57	O	C	O	C	O	C	C	C	O	O	O	O
58	O	C	C	O	O	C	C	C	O	O	O	O
59	O	C	O	O	O	C	C	C	O	O	O	O
60	C	C	C	C	C	O	C	C	O	O	O	O
61	C	C	O	C	C	O	C	C	O	O	O	O
62	C	C	C	O	C	O	C	C	O	O	O	O
63	O	O	C	O	C	O	C	C	O	O	O	O
64	C	O	O	O	C	O	C	C	O	O	O	O
65	C	O	C	C	O	O	C	C	O	O	O	O
66	O	C	O	C	O	O	C	C	O	O	O	O
67	C	C	C	O	O	O	C	C	O	O	O	O
68	O	O	C	O	O	O	C	C	O	O	O	O
69	C	O	O	O	O	O	C	C	O	O	O	O
70	C	C	C	C	C	C	O	C	O	O	O	O
71	O	O	C	C	C	C	O	C	O	O	O	O
72	C	O	O	C	C	C	O	C	O	O	O	O
73	C	C	C	O	C	C	O	C	O	O	O	O
74	O	O	C	O	C	C	O	C	O	O	O	O
75	O	C	O	O	C	C	O	C	O	O	O	O

Table Continued on Next Page

TABLE 1-7. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
76	C	C	C	C	O	C	O	C	O	O	O	O
77	C	O	C	C	O	C	O	C	O	O	O	O
78	C	C	O	C	O	C	O	C	O	O	O	O
79	C	O	O	C	O	C	O	C	O	O	O	O
80	C	C	C	O	O	C	O	C	O	O	O	O
81	O	O	C	O	O	C	O	C	O	O	O	O
82	O	C	O	O	O	C	O	C	O	O	O	O
83	O	O	O	O	O	C	O	C	O	O	O	O
84	C	C	C	C	C	O	O	C	O	O	O	O
85	C	O	C	C	C	O	O	C	O	O	O	O
86	C	C	O	C	C	O	O	C	O	O	O	O
87	C	O	O	C	C	O	O	C	O	O	O	O
88	C	C	C	O	C	O	O	C	O	O	O	O
89	O	C	C	O	C	O	O	C	O	O	O	O
90	O	O	C	O	C	O	O	C	O	O	O	O
91	O	C	O	O	C	O	O	C	O	O	O	O
92	C	O	O	O	C	O	O	C	O	O	O	O
93	C	C	C	C	O	O	O	C	O	O	O	O
94	C	O	C	C	O	O	O	C	O	O	O	O
95	O	O	C	C	O	O	O	C	O	O	O	O
96	C	C	O	C	O	O	O	C	O	O	O	O
97	C	O	O	C	O	O	O	C	O	O	O	O
98	O	O	O	C	O	O	O	C	O	O	O	O
99	O	C	C	O	O	O	O	C	O	O	O	O

Table Continued on Next Page

TABLE 1-7. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
100	C	O	C	O	O	O	O	C	O	O	O	O
101	O	O	C	O	O	O	O	C	O	O	O	O
102	O	C	O	O	O	O	O	C	O	O	O	O
103	C	O	O	O	O	O	O	C	O	O	O	O
104	O	O	O	O	O	O	O	C	O	O	O	O
105	C	C	C	C	C	C	C	O	O	O	O	O
106	C	O	C	C	C	C	C	O	O	O	O	O
107	O	O	C	C	C	C	C	O	O	O	O	O
108	C	C	O	C	C	C	C	O	O	O	O	O
109	O	C	O	C	C	C	C	O	O	O	O	O
110	C	O	O	C	C	C	C	O	O	O	O	O
111	O	O	O	C	C	C	C	O	O	O	O	O
112	C	C	C	O	C	C	C	O	O	O	O	O
113	C	O	C	O	C	C	C	O	O	O	O	O
114	O	O	C	O	C	C	C	O	O	O	O	O
115	C	C	O	O	C	C	C	O	O	O	O	O
116	O	C	O	O	C	C	C	O	O	O	O	O
117	C	O	O	O	C	C	C	O	O	O	O	O
118	O	O	O	O	C	C	C	O	O	O	O	O
119	C	C	C	C	O	C	C	O	O	O	O	O
120	C	C	C	C	O	C	C	O	O	O	O	O
121	O	C	C	C	O	C	C	O	O	O	O	O
122	C	O	C	C	O	C	C	O	O	O	O	O
123	O	O	C	C	O	C	C	O	O	O	O	O

Table Continued on Next Page

TABLE 1-7. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
124	C	C	O	C	O	C	C	O	O	O	O	O
125	O	C	O	C	O	C	C	O	O	O	O	O
126	C	O	O	C	O	C	C	O	O	O	O	O
127	O	O	O	C	O	C	C	O	O	O	O	O
128	O	O	O	C	O	C	C	O	O	O	O	O

Note: C = Closed or On position; O = Open or Off position.

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