

***Sabre Disc Drive***

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***ST8368J***

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***ST8500J***

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***Hardware Maintenance***

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***Manual, Volume 1***

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***(SMD Interface)***

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### WARNING

Do not attempt to install, operate, or repair the unit before you read the important safety information located directly after the revision record in this manual. Failure to follow that and other safety precautions in this manual could cause injury to yourself and others.

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

If the operator or status/control panel (component assembly) is not installed in the inner drawer, it is your responsibility to provide any additional RFI shielding or grounding needed to ensure FCC Class A compliance.

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

### VORSICHT

Versuchen Sie nicht, das Gerät zu installieren, zu betreiben oder zu reparieren bevor Sie die in der Anlage B aufgeführten Installations- und Betriebserfordernisse sorgfältig gelesen haben. Die Nichtbeachtung dieser und weiterer in diesem Manual gegebenen Informationen kann Verletzungen Ihrer selbst und Anderer zur Folge haben.

### AVERTISSEMENT

Ne tentez pas d'installer, de mettre en marche, ou de dépanner cet appareil avant d'avoir lû les instructions d'installation et de fonctionnement données dans l'appendice C. A défaut d'observer ceci ainsi que les autres informations de ce manuel vous pourriez mettre votre propre santé en danger, ou celle d'autrui.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

### PRECAUCION

No intente instala, operar ó reparar está unidad antes de leer los requerimientos de instalación y operación dados en el Apéndice D. Cualquier negligencia en seguir esta u otra información dada en esta manual puede causarle daños a uno mismo u otros.

## **Sabre Disc Drive**

**ST8368J (97200-368)**

**ST8500J (97200-500)**

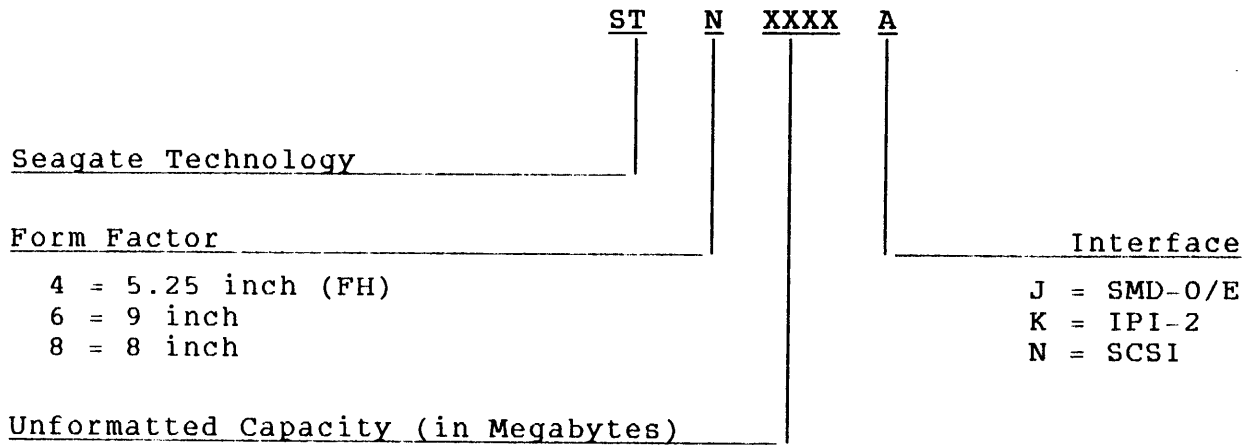
### **Hardware Maintenance Manual, Volume 1 (SMD Interface)**

**General Description  
Operation  
Installation and Checkout  
Parts Data**

**Publication Number: 83325410-H**



## Seagate Disc Drive Product Numbers



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## PREFACE

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This manual contains maintenance information for the Seagate ST8368J and ST8500J Sabre disc drives. It provides instructions to persons who operate, install and check out the drive. Persons involved in training, troubleshooting, and repair activities should obtain copies of the Hardware Maintenance Manual, Volumes 2 and 3 (listed below) that pertain to the drives they are maintaining.

As you use these manuals, you will find information specific either to the PA8A1/A2 (ST8368J) drives or to the PA8D1/D2 (ST8500J) drives. Specific references to one type of drive or the other are keyed to the nominal drive capacity as follows:

- PA8A1/A2 (ST8368J) drives are referred to as 368 MB drives.
- PA8D1/D2 (ST8500J) drives are referred to as 500 MB drives.

The Configuration Chart following the Preface lists the drives (in equipment number order) that this manual applies to.

The information in this manual is presented as follows:

- Section 1 - General Description. Describes equipment functions and specifications.
- Section 2 - Operation. Describes and illustrates the location and use of all controls and indicators, and provides operating procedures.
- Section 3 - Installation and Checkout. Describes site requirements, unpackaging and inspection, installation and checkout.
- Section 4 - Parts Data. Contains illustrated parts breakdown and spare parts list.
- Appendix A - Diagnostic Testing and Status Code Summary. Provides simplified troubleshooting information.

Continued on next page

Appendix B - Reference Material for Sector Selection. Provides additional information on setting sector switches.

Appendix C - Installation and Operating Requirements (German). Contains basic installation and operation information in the German language.

Appendix D - Installation and Operating Requirements (French). Contains basic installation and operation information in the French language.

Appendix E - Installation and Operating Requirements (Spanish). Contains basic installation and operation information in the Spanish language.

The following manuals apply to these Sabre drives and are available for purchase from:

Seagate Technology, Inc.  
Customer Services  
12701 Whitewater Drive  
Minnetonka, MN 55343

Phone: (612) 931-8612  
Fax: (612) 931-8817

<u>Publication No.</u>	<u>Title</u>
83325410	Hardware Maintenance Manual, Volume 1
83325420	Hardware Maintenance Manual, Volume 2 (contains theory of operation and maintenance)
83325430	Hardware Maintenance Manual, Volume 3 (contains diagrams)
83325660	Pocket Reference (summarizes status codes and diagnostic operation)

## CONFIGURATION CHART

The following is a list of drives that this manual applies to:

Equipment Number	Model Number	Interface	Data Capacity (MB)	Sector Length
PA8A1A	ST8368J	Single Channel	368	Unspecified
PA8A1B	ST8368J	Single Channel	368	Unspecified
PA8A2A	ST8368J	Dual Channel	368	Unspecified
PA8A2B	ST8368J	Dual Channel	368	Unspecified
PA8A2C	ST8368J	Dual Channel	368	Unspecified
PA8A2D	ST8368J	Dual Channel	368	Unspecified
PA8A2E	ST8368J	Dual Channel	368	Unspecified
PA8A2F	ST8368J	Dual Channel	368	Unspecified
PA8A2G	ST8368J	Dual Channel	368	Unspecified
PA8A2H	ST8368J	Dual Channel	368	Unspecified
PA8D1A	ST8500J	Single Channel	500	Unspecified
PA8D1B	ST8500J	Single Channel	500	Unspecified
PA8D2A	ST8500J	Dual Channel	500	Unspecified
PA8D2B	ST8500J	Dual Channel	500	Unspecified
PA8D2C	ST8500J	Dual Channel	500	Unspecified
PA8D2D	ST8500J	Dual Channel	500	Unspecified

This manual reflects the following series codes (with FCOs listed) of the above equipments:

SERIES CODE	WITH FCOs	COMMENTS
01-06	None	PA8D1/PA8D2 only
01-02	29068, 29098, 29890	PA8A1/PA8A2 only
03-06	29068, 29890	PA8A1/PA8A2 only
07-12	29890	PA8A1/PA8A2 only
13-14	None	PA8A1/PA8A2 only

## IMPORTANT SAFETY INFORMATION AND PRECAUTIONS

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Use of proper safety and repair techniques is important for safe, reliable operation of this unit. Service should be done only by qualified persons. We recommend the procedures in this manual as effective ways of servicing the unit. Some procedures require the use of special tools. For proper maintenance and safety, you must use these tools as recommended.

The procedures in this manual and labels on the unit contain warnings and cautions that must be carefully read and followed to minimize or eliminate the risk of personal injury. The warnings point out conditions or practices that may endanger you or others. The cautions point out conditions or practices that may damage the unit, possibly making it unsafe for use.

You must also understand that these warnings and cautions are not exhaustive. We cannot possibly know, evaluate, and advise you of all the ways in which maintenance might be performed or the possible risk of each technique. Consequently, we have not completed any such broad evaluation. If you use a non-approved procedure or tool, first ensure that the method you choose will not risk either your safety or unit performance.

For the safety of yourself and others, observe the following warnings and precautions.

- Perform all maintenance by following the procedures in this manual.
- Follow all cautions and warnings in the procedures and on unit labels.
- Use the special tools called out in the procedures.
- Use sound safety practices when operating or repairing the unit.
- Use caution when troubleshooting a unit that has voltages present. Remove power from unit before servicing or replacing parts.
- Wear safety glasses when servicing units.
- Wear safety shoes when removing or replacing heavy parts.
- Use only designated Seagate replacement parts. Non-Seagate replacement parts can adversely affect safety in addition to degrading reliability, increasing maintenance downtime, and voiding warranty coverage.

- Use care while working with the power supply because line voltages are always present when the ac power cord is connected to a power source. Setting the power supply switch to position "⏏" disables dc power to the drive but has no effect on ac power within the supply. For complete safety, remove the ac power plug from the site power outlet.
- The site power outlet shall be installed near the equipment and shall be easily accessible.
- In case of fire or other emergency, isolate the drive from main power by removing the drive power plug from the ac outlet. In situations where pulling the plug is not possible or practical, use the system main power disconnect to isolate the drives from main power.
- In an IT power system, a disconnect device shall be provided which simultaneously interrupts all phase and neutral conductors.
- **WARNING:** In IT power systems, the unearthed neutral is considered as a phase conductor. For such IT power systems, double pole/neutral fusing is required.
- When the drive is mounted in an equipment rack or cabinet, ensure that the internal temperature of the rack or cabinet will not exceed the limits defined for the drive. Where units are stacked vertically, pay special attention to the top where temperatures are usually highest.
- This drive is designed to be installed and operated in accordance with UL1950, IEC380, IEC950, EN 60950, CSA C22.2 154, CSA C22.2 220, and VDE0806.
- Follow the precautions listed under Protecting the Drive From Electrostatic Discharge.
- If the power supply is placed on a bench for testing, position the supply so all ventilation holes are open, to allow proper air flow to internal components.
- Do not attempt to disassemble the module. It is not field repairable. Replace the entire module assembly if it is defective.
- Always deenergize drive before removing or installing circuit boards, cables, or any other electrical components.

- Do not operate the drive over an extended period of time without the top cover installed.
- The power supply is designed to be connected to an IT network.
- Do not attempt to disassemble the power supply. It is not field repairable. Replace the entire supply if it is defective.
- If you do not use a recommended Seagate power supply, ensure the supply meets the specifications in this manual and is designed to be used in accordance with UL1950, IEC380, IEC950, EN 60950, CSA C22.2 154, CSA C22.2 220, and VDE0806.



## ABBREVIATIONS

---

A	Ampere	CLR	Clear
ABV	Above	cm	Centimetre
ac	Alternating Current	CNTR	Counter
ADD	Address	COMP	Comparator
ADDR	Address	CONT	Control
ADJ	Adjust	CONTD	Continued
ADRS	Address	CT	Center Tap
AGC	Automatic Gain Control	CYL	Cylinder
ALT	Alternate	D/A	Digital to Analog
AM	Address Mark	dc	Direct Current
AME	Address Mark Enable	DET	Detect
AMP	Amplifier, Ampere	DIFF	Differential
ASSY	Assembly	DIV	Division
BLW	Below	DLY	Delay
C	Celsius	DRVR	Driver
CB	Circuit Breaker	ECL	Emitter Coupled Logic
CDA	Complete Drive Assembly	ECO	Engineering Change Order
CH	Channel	EMD	Eight-Inch Module Drive
CHK	Check	EN	Enable
CLK	Clock		

## ABBREVIATIONS (Contd)

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ENBL	Enable	in	Inch
EXT	External	IND	Index
F	Fahrenheit, Fuse	INTRPT	Interrupt
FCO	Field Change Order	I/O	Input/Output
FDBK	Feedback	IPB	Illustrated Parts Breakdown
FIG	Figure	kg	Kilogram
FLT	Fault	kPa	Kilopascal
FRU	Field Replaceable Unit	kW	Kilowatt
ft	Foot	lb	Pound
FTU	Field Test Unit	LCD	Liquid Crystal Display
FWD	Forward	LED	Light Emitting Diode
GND	Ground	LSI	Large Scale Integration
HD	Head	LTD	Lock to Data
HEX	Hexagon, Hexadecimal	m	Metre
Hg	Mercury	MAX	Maximum
HR	High Resolution	MB	Megabyte
HYST	Hysteresis	MEM	Memory
Hz	Hertz	MHz	Megahertz
IC	Integrated Circuit	mm	Millimetre
IDENT	Identification		

## ABBREVIATIONS (Contd)

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MPU	Microprocessor Unit	PROC	Procedure
MRK	Mark	PROG	Programmable
ms	Millisecond	PS	Power Supply
MTR	Motor	PWR	Power
mV	Millivolt	RCVR	Receiver
NC	No Connection	RD	Read
NORM	Normal	RDY	Ready
NRZ	Non Return to Zero	REF	Reference
ns	Nanosecond	REQ	Request
OC	On Cylinder	RES	Resolution
OS	One-Shot	REV	Reverse, Revision
OSC	Oscillator	RGTR	Register
P	Plug	r/min	Revolutions Per Minute
PD	Peak Detect	RTZ	Return to Zero
pF	Picofarad	R/W	Read/Write
PFTU	Programmable Field Test Unit	s	Second
PG	Page	S/C	Series Code
PHH	Phillips Head	SEC	Second
PLO	Phase Lock Oscillator	SEL	Select

## ABBREVIATIONS (Contd)

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SEQ	Sequence	VCO	Voltage Controlled Oscillator
SKT	Socket	W	Watts
SPD	Speed	W/	With
SS	Sector Switch	W/O	Without
T	Tracks to go	W PROT	Write Protect
TF	Thread Forming	W+R	Write or Read
TIM	Timer	W·R	Write and Read
TP	Test Point	WRT	Write
TSP	Troubleshooting Procedure	XFR	Transfer
TTL	Transistor-Transistor Logic	Ω	Ohms
V	Volts, Voltage	\$	Hexadecimal Address
Vbb	Bias Voltage	μF	Microfarad
VCC	Bias Voltage	μs	Microsecond

# Section 1 General Description

---

## INTRODUCTION

The Seagate ST8368J and ST8500J Sabre Disc Drives are high speed, random access digital data storage devices that connect to a central processor through a controller. The total unformatted storage capacity is 368 megabytes for Model ST8368J and is 500 megabytes for Model ST8500J. All the equipment specifications for the drives are listed in table 1-1.

The remainder of this section provides a general description of the drive and is divided into the following areas:

- Equipment Interface Description -- Describes available drive interfaces.
- Equipment Functional Description -- Explains the basic function of the drive.
- Equipment Physical Description -- Provides a basic description of the drive's physical characteristics.
- Equipment Configuration -- Describes the various drive configurations and how to identify them.

## EQUIPMENT INTERFACE DESCRIPTION

The drive can be configured to operate with either a standard (SMD-0) or an enhanced (SMD-E) interface. Refer to section 3 of this manual for definitions of signals on the interface cables (under Interface Requirements). Section 3 also contains instructions on selecting the various interface options available (under Setting Circuit Board Switches). Refer to volume 2 of the hardware maintenance manual for a complete description of interface functions.

## EQUIPMENT FUNCTIONAL DESCRIPTION

The drive contains all the circuits and mechanical devices necessary to record data on and recover it from its discs. The necessary power for this is provided by the power supply, which receives its input power from the site main power source.

TABLE 1-1. DRIVE SPECIFICATIONS

Characteristics	Conditions	Specifications
Size	Dimensions	See Space Requirements in section 3
	Weight (Drive only)	13.0 kg (28.8 lb)
	Weight (Power Supply only)	3.6 kg (8.0 lb)
Interface	SMD-0/SMD-E	
Recording	Total Capacity ST8368J ST8500J	(Unformatted) 368 megabytes 500 megabytes
	Bytes per track 368 MB drives 500 MB drives	30 240 bytes 41 088 bytes
	Number of discs	7
	Movable data heads	10
	Servo Heads	1
	Tracks per inch	960
	Physical heads per surface	1
	Logical cylinders per head/disc assy	1217 (0-1216)
	Modulation	2-7 code
	Table Continued on Next Page	

TABLE 1-1. DRIVE SPECIFICATIONS (Contd)

Characteristics	Conditions	Specifications
Transfer rate	Disc speed at 3600 r/min 368 MB drives 500 MB drives	14.52 MHz (1.814 MB/s) 19.72 MHz (2.465 MB/s)
Latency	Average  Maximum	Latency is time to reach a particular track address after positioning is complete.  8.33 milliseconds (disc rotation speed at 3600 r/min)  16.83 milliseconds (disc rotation speed at 3564 r/min)
Seek Time	Full  Average  Single Track	35 milliseconds maximum  18 milliseconds  5 milliseconds maximum
Start Time		90 seconds maximum
Stop Time		60 seconds maximum



All functions performed by the drive are done under direction of the controller. The controller communicates with the drive via the interface which consists of a number of I/O lines carrying the necessary signals to and from the drive.

Some interface lines, including those that carry commands to the drive, are not enabled unless the drive is selected by the controller. Unit selection allows the controller, which can be connected to more than one drive, to initiate and direct an operation on a specific drive.

All operations performed by the drive are related to data storage and recovery (normally referred to as writing and reading). The actual reading and writing is performed by electromagnetic devices called heads that are positioned over the recording surfaces of the rotating discs. There is one head for each disc surface, and the heads are positioned in such a way that data is written in concentric tracks around the disc surfaces (see figure 1-1).

Before any read or write operation can be performed, the controller must instruct the drive to position the heads over the desired cylinder (called seeking) and also to use the head located over the surface (head selection) where the operation is to be performed.

After selecting a head and arriving at the data track, the controller must locate that portion of the track on which the data is to be written or read. This is called track orientation and is done by using the Index and Sector signals generated by the drive. The Index signal indicates the logical beginning of each track, and the Sector signals are used by the controller to determine the position of the head on the track with respect to Index.

When the desired location is reached, the controller commands the drive to actually read or write the data. During a read operation, the drive recovers data from the discs and transmits it to the controller. During a write operation, the drive receives data from the controller, processes it and writes it on the discs.

The drive is also capable of recognizing certain errors that may occur during its operation. When an error is detected, it is indicated either by a signal to the controller or by a maintenance indicator on the drive itself.

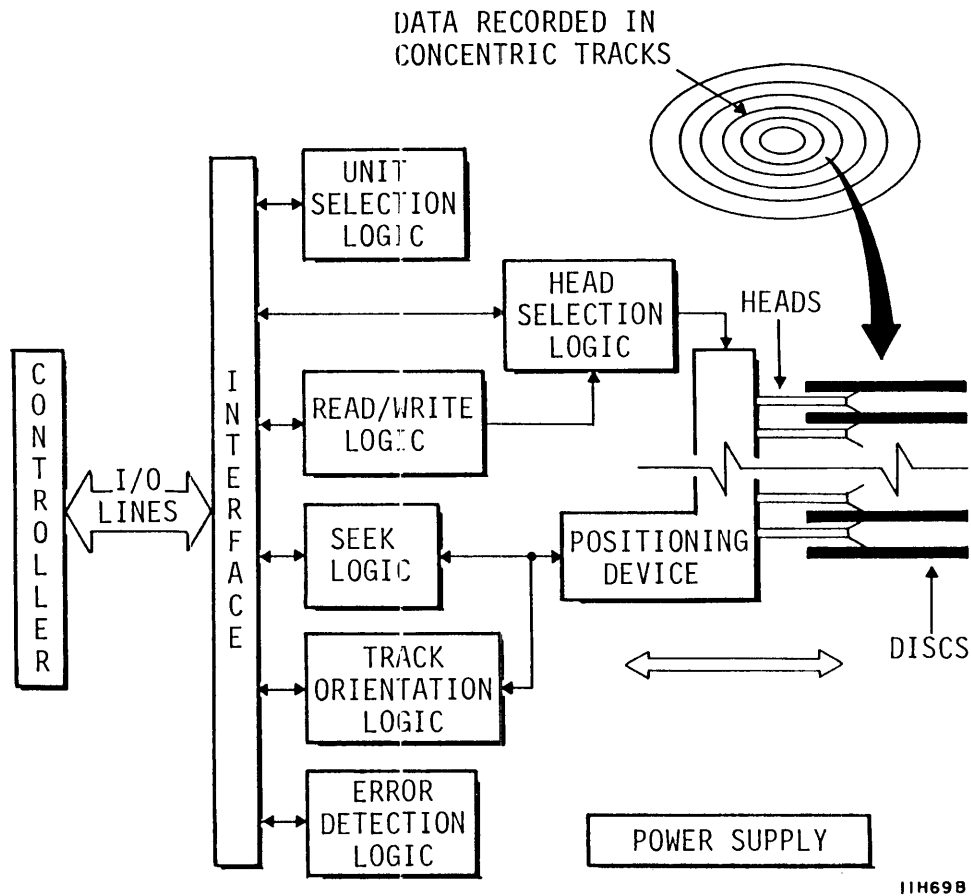
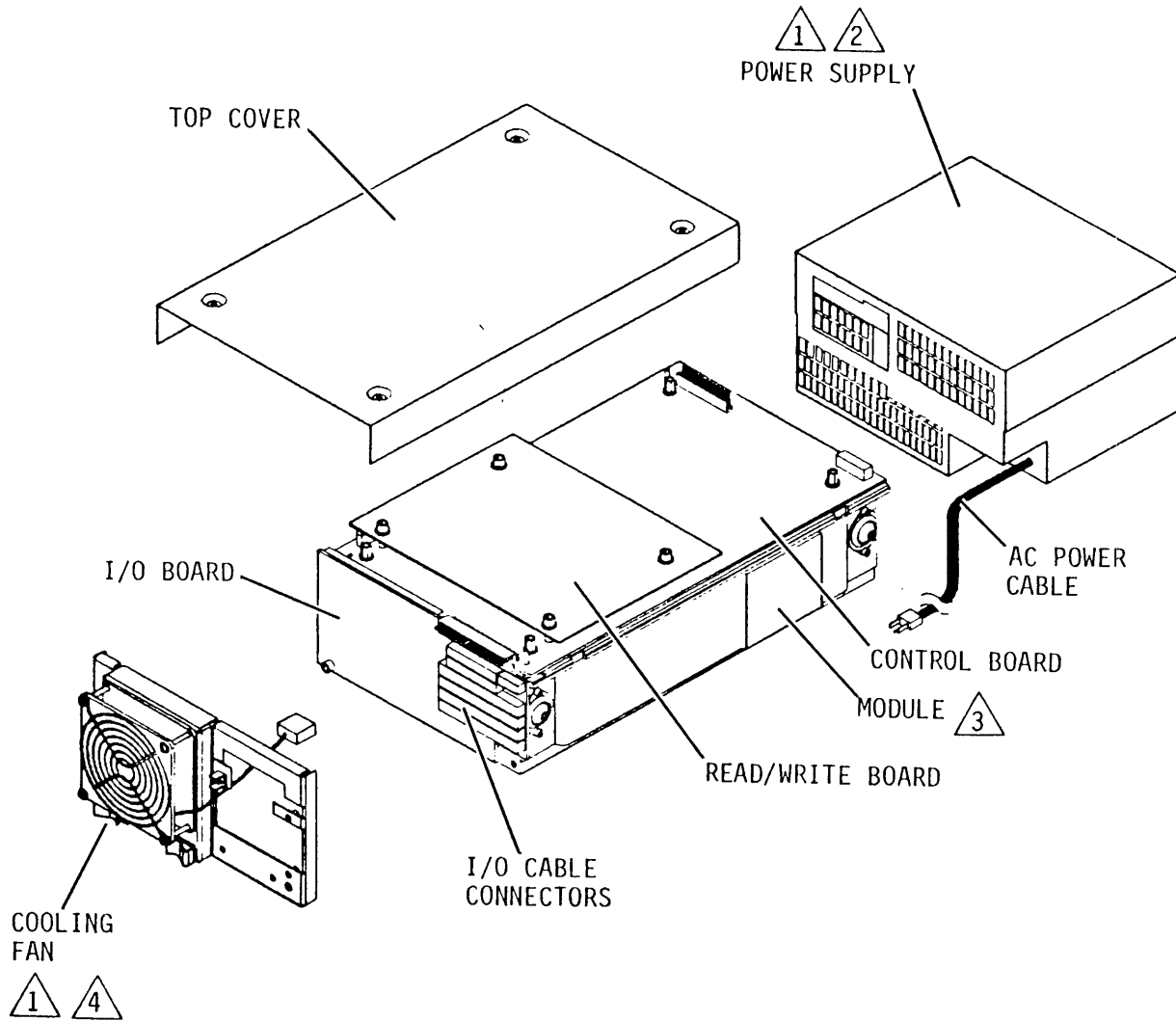


Figure 1-1. Drive Functional Block Diagram

### EQUIPMENT PHYSICAL DESCRIPTION

The following paragraphs provide a physical description of the drive. The components mentioned in this discussion are identified in figure 1-2.

A drive installation requires a drive, interconnecting cabling, and a power supply. Site power enters the power supply via the ac power cable. The power supply develops the dc voltages required by the drive. These voltages are supplied to the drive by the dc power cable.

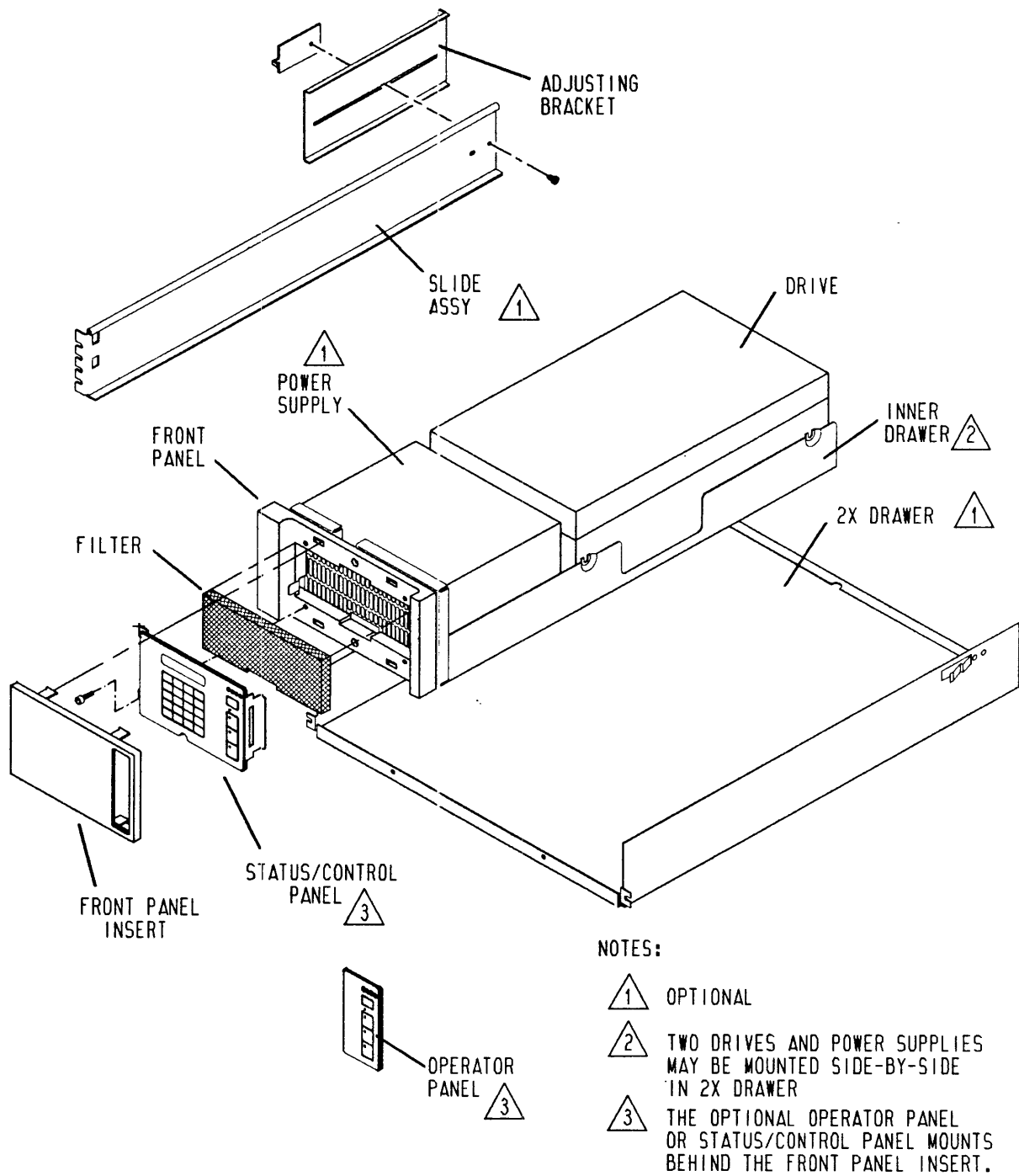


NOTES:

- ① OPTIONAL
- ② MOUNTED DIRECTLY IN FRONT OF DRIVE (IN 2X DRAWER) OR MOUNTED IN REMOTE LOCATION.
- ③ MODULE CONTAINS THE DISCS, SPINDLE, DRIVE MOTOR, ACTUATOR, AND THE HEADS.
- ④ USED WHEN POWER SUPPLY IS MOUNTED IN REMOTE LOCATION.

11F21 B

Figure 1-2. Drive Major Assemblies (Sheet 1 of 2)



11F62A

Figure 1-2. Drive Major Assemblies (Sheet 2)

The drive package includes a top cover, rear panel, module, and three circuit boards. Air flow is provided by a cooling fan. The cooling fan is an integral part of the optional power supply, and provides cooling air to the drive when the power supply is mounted directly in front of the drive. When the power supply is mounted in a remote location, drive cooling is provided by an optional fan and rear panel assembly.

Two optional panels provide external control of the drive. The operator panel contains basic switches and indicators for the operator. The status/control panel contains these same switches and indicators and, for troubleshooting, a diagnostic keyboard and display. These panels can be mounted either in-line with the drive and power supply or in a remote location.

The drive's internal components include three circuit boards and a module. The circuit boards are mounted on the module, and they contain the electronics required for drive operation. The module is a sealed unit containing the electromechanical components used for data storage and retrieval. These components include the discs, spindle, drive motor, actuator and heads.

The seven discs provide the recording medium for the drive. These discs are mounted on a spindle, and the spindle is coupled directly to the drive motor. When activated, the drive motor rotates the discs at 3600 r/min and also produces a circulation of air within the sealed module.

The actuator is the assembly that holds the heads and moves the heads over the rotating discs. There are 11 heads; a servo head to sense actuator positioning, and 10 data heads used for data transfers to and from the discs. The actuator has a voice coil which rotates in and out of a permanent magnetic field in response to signals from the servo positioning circuitry. The voice coil moves the heads in an arc across the rotating discs. When the drive is not in use, the heads rest on the disc surface in the preassigned landing zone (beyond the data zone). The actuator is automatically latched in this position at shutdown for moving or shipping protection. When the drive is activated to bring the discs up to speed, the heads fly on a cushion of air close to the disc surface.

The drive may be mounted either in a cabinet or rack. An optional 2X drawer with a front panel for each drive is available for mounting two drives and power supplies side-by-side.

A complete listing of field-replaceable parts is given in the parts data section of this manual. Refer to volume 2 of the hardware maintenance manual for theory of operation of the drive components.

## EQUIPMENT CONFIGURATION

The equipment configuration is identified by the equipment identification label and by the Equipment Configuration Log. It is necessary to identify the equipment configuration to determine if the manuals being used are applicable to the equipment.

## EQUIPMENT IDENTIFICATION

The equipment is identified by labels attached to the drive top cover and to the power supply. The label on the drive top cover identifies the basic mechanical and logical configuration of the drive at the time it leaves the factory. To maintain drive configuration whenever the top cover is removed, always identify which drive the top cover was removed from. The label on the power supply references the components making up the drive installation and lists the site power requirements for the power supply. The information contained on these labels includes the following:

- Seagate Model Number -- Identifies a basic family of drives having the same capacity, form factor, and interface. These numbers are defined in the front of the manual. (Example = ST82368K)
- Equipment Identification Number -- Indicates the basic functional capabilities of the drive and unique characteristics that are necessary to adapt a drive to specific system requirements. A group of drives with the same Seagate model number may have different equipment identification numbers. (Example = PA8C2A)
- Series Code -- Represents a time period within which a unit is built. All units are interchangeable at the system level, regardless of series code; however, parts differences may exist within units built in different series codes.
- Part Numbers -- Several part numbers are used to designate the drive with its options and the drive alone. They are defined in the parts data manual.
- Serial Number -- Serial numbers are assigned sequentially within a family of drives.

## EQUIPMENT CONFIGURATION LOG

Engineering Change Orders (ECOs) are electrical or mechanical changes that are performed at the factory. When the factory installs an ECO early (prior to a series code change), it is logged on the unit's configuration log.

Field Change Orders (FCOs) are electrical or mechanical changes that may be performed either at the factory or in the field. FCO changes do not affect the series code but are indicated by an entry on the Equipment Configuration Log that accompanies each machine. The components of a unit with an FCO installed may not be interchangeable with those of a unit without the FCO; therefore, it is important that you enter the FCO on the Equipment Configuration Log when you install the FCO.

Throughout the life cycle of a machine, changes are made, either in the factory build (a series code change) or by FCOs installed in the field. All of these changes are also reflected in changes to the manual package.

## Section 2 Operation



---

## INTRODUCTION

This section provides the information and instructions to operate the drive. It is divided into the following areas:

- Switches and Indicators - locates and describes the various controls and indicators.
- Operating Instructions - describes procedures for operating the drive.
- Filter Replacement and Cleaning - describes filter maintenance for the drive operator.

## SWITCHES AND INDICATORS

### GENERAL

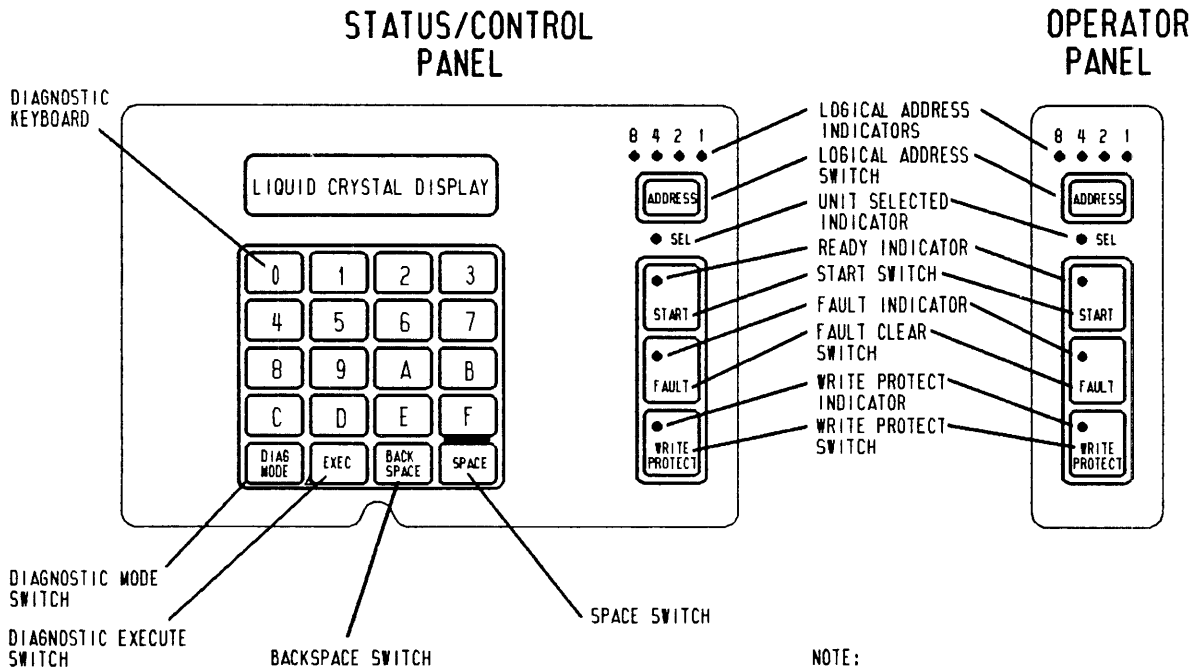
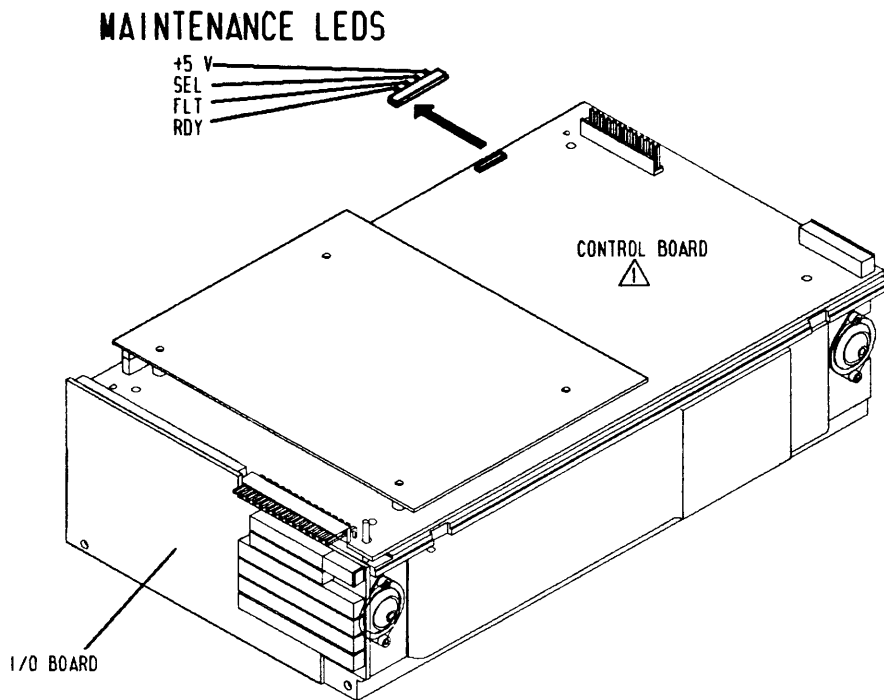
Switches and indicators are found in four locations on the drive:

- Power Supply (Optional)
- Operator Panel or Status/Control Panel (Optional)
- Control Board
- I/O Board

Figure 2-1 shows these controls and indicators, and they are explained in table 2-1 and in the following text.

### POWER SUPPLY

The ac power is applied to the power supply when the ac power cord is connected to a power source. All operating voltages for the drive and cooling fan are generated when the On/Standby switch on the power supply is placed in the On (1) position.



NOTE:

▲ SWITCHES LOCATED ON CIRCUIT BOARDS ARE ILLUSTRATED IN SECTION 3

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Figure 2-1. Switches and Indicators (Sheet 1 of 2)

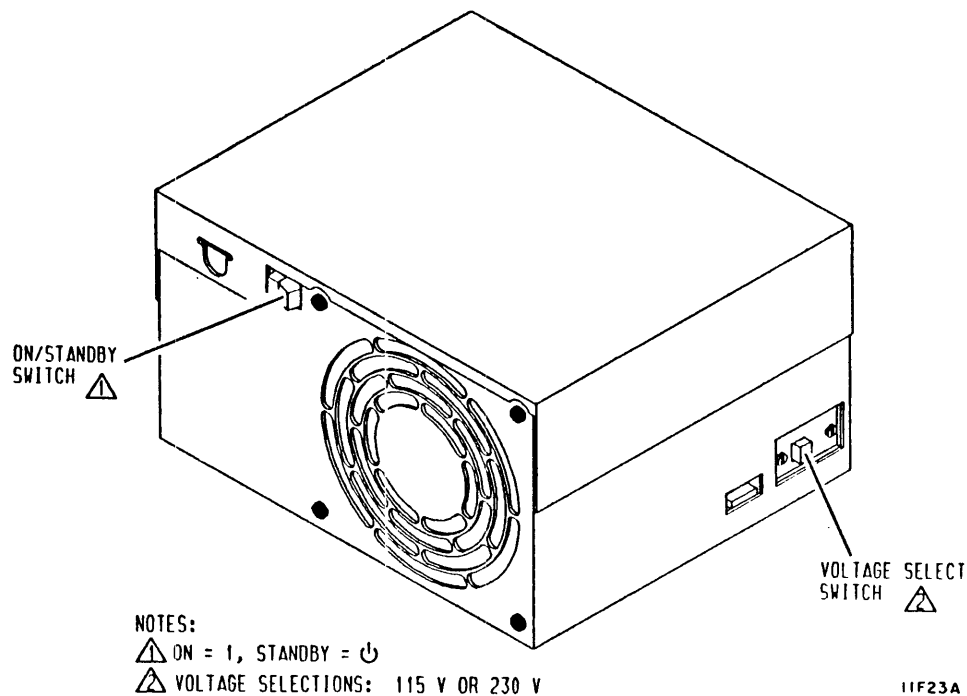


Figure 2-1. Switches and Indicators (Sheet 2)

## OPTIONAL OPERATOR AND STATUS/CONTROL PANELS

Figure 2-1 illustrates the optional operator and status/control panels. Both types of panels contain the switches and indicators needed to control and monitor operation of the drive. Operation of a drive that does not have either type of panel is controlled by setting the appropriate switches on the control and I/O boards. Refer to Setting Circuit Board Switches in section 3 of this manual for switch setting instructions.

### CONTROL BOARD

The control board contains switches that are set during drive installation. Refer to Setting Circuit Board Switches in section 3 of this manual for instructions on setting these switches.

TABLE 2-1. DRIVE SWITCHES AND INDICATORS

Switch or Indicator	Function
POWER SUPPLY	
On/Standby Switch (1/ ⏻)	Applies dc operating voltages to the drive electronics and fan when placed in the On (1) position.
Voltage Select Switch	Selects either of two operating voltages (115v or 230v).
OPERATOR PANEL OR STATUS/CONTROL PANEL	
Logical Address Switch (ADDRESS)/ Indicators (8/4/2/1)	The Logical Address switch establishes the logical address of the drive. The switch must be pressed for 2 to 3 seconds to advance the logical address. Pressing it longer causes the address to increment continuously. The Logical Address Indicators display the logical address in binary. The logical address is stored in memory when dc power is removed.
Unit Selected Indicator	Indicates that the drive is selected by a controller.
START Switch/ Ready Indicator	The START switch has momentary action for Start and Stop, and it contains the Ready indicator. Pressing the START switch activates the power up sequence, and Ready indicator flashes (rapidly) until the discs are up to speed, the heads are loaded, and there are no fault conditions. The Ready indicator is on steady with power up complete. Pressing the START switch to release it from the Start position causes the Ready indicator to flash (slowly) until disc rotation has stopped. The current condition of the START switch (Start/Stop) is stored in memory when dc power is removed.
Table Continued on Next Page	

TABLE 2-1. DRIVE SWITCHES AND INDICATORS (Contd)

Switch or Indicator	Function
<p>FAULT Indicator/ Fault Clear Switch</p> <p>WRITE PROTECT Switch/Indicator</p>	<p>The FAULT indicator is inside the Fault Clear switch, and it lights if a fault exists within the drive. It is turned off by any of the following (provided that the error condition or conditions no longer exist):</p> <ul style="list-style-type: none"> <li>• Pressing the Fault Clear switch</li> <li>• Fault Clear command from the controller</li> <li>• A drive power up operation</li> </ul> <p>The operation of the WRITE PROTECT switch or the WRITE PROTECT maintenance switch on the control board places the drive in the write protected mode (preventing write operations) and lights the WRITE PROTECT indicator. The current position of the WRITE PROTECT switch is stored in memory when dc power is removed.</p>
<p>STATUS/CONTROL PANEL ONLY</p>	
<p>Diagnostic Keyboard</p> <p>Liquid Crystal Display</p> <p>DIAG MODE (Diagnostic Mode) Switch</p> <p>SPACE and BACK SPACE Switches</p> <p>EXEC (Execute) Switch</p>	<p>Used to enter diagnostic tests and parameters.</p> <p>Displays drive status, faults, and current cylinder address.</p> <p>Places drive in diagnostic mode and disables the I/O.</p> <p>Used to enter the desired diagnostic tests.</p> <p>Starts and stops diagnostic tests.</p>
<p>Table Continued on Next Page</p>	

TABLE 2-1. DRIVE SWITCHES AND INDICATORS (Contd)

Switch or Indicator	Function
CONTROL BOARD	
WP/N (Write Protect/ Normal) Switch	Placing the switch in the WP (write protect) position prevents the drive from performing write operations. The switch must be returned to the N (normal) position to enable write operations.
Sector Select Switches	Allow the dividing of the disc into specific segments or sectors. The switch settings determine the number of sectors per track (see Setting Sector Select Switches in section 3).
.8/1.6 (Sector Clock) Switch	Selects a sector clock frequency of 0.8 MHz or 1.6 MHz (nominal). See Setting Circuit Board Switches in section 3.
Logical Address Switches 2 <sup>0</sup> -2 <sup>3</sup>	Switches 2 <sup>0</sup> through 2 <sup>3</sup> are used to set the logical address for drives without the operator panel or status/control panel.
Maintenance LEDs	Provide indications of drive status when no operator panel or status/control panel is available.
+5 V	Indicates presence of +5 V.
SEL	Indicates that drive is selected by a controller.
RDY	Indicates that the drive is ready (spindle power up is complete, heads are loaded, and no fault exists).
FLT	Indicates that a fault exists within the drive.
Table Continued on Next Page	

TABLE 2-1. DRIVE SWITCHES AND INDICATORS (Contd)

Switch or Indicator	Function
I/O BOARD	
R/L (Remote/Local) Switch	Controls whether the drive can be powered up from the controller (Remote) or the drive (Local). In both switch positions, power up requires turning On the power supply On/Standby switch; however, in the Remote position, a power sequence signal must come from the controller. For drives with an operator or status/control panel, the START switch must be activated whether the drive is in local or remote operation.

### I/O BOARD

The R/L (Remote/Local) switch on the I/O board is set during drive installation according to instructions in section 3 of this manual (under Setting Circuit Board Switches).

## OPERATING INSTRUCTIONS

### GENERAL

For drives that have an operator or status/control panel, operating instructions are presented in the following sequence:

- Power On Procedure
- Power Off Procedure

For drives with no operator or status/control panel, there are no operating procedures. On these drives, when the R/L (Remote/Local) switch is placed in the Remote position, spindle power on/power off is handled by the controller. In Remote operation, the power up sequence is delayed. The length of delay is determined by the logical address number used, in increments of 5 seconds.

## POWER ON PROCEDURE (DRIVES WITH OPERATOR PANEL OR STATUS/CONTROL PANEL)

The following procedure describes how to power up the drive. It is assumed that dc power is available to the drive because the power supply On/Standby switch is normally left in the On (1) position. The R/L (Remote/Local) switch is located on the I/O board (\_VRX).

### NOTE

Drive power up is indicated by rapid flashing of the Ready indicator. This occurs, provided either of the following conditions exist:

- R/L (Remote/Local) switch is in Local
  - R/L (Remote/Local) switch is in Remote and either sequence Pick or Hold (ground) is available from the controller
1. Press START switch. If the R/L (Remote/Local) switch was set in the Remote position, the power up sequence continues when the power sequence Pick or Hold (ground) signal is available from the controller. With the R/L (Remote/Local) switch in Remote position, power up sequence to each drive is delayed. The length of delay is determined by the logical address number used, in increments of 5 seconds.

For example:

Logical Address 0 = 0 second delay  
Logical Address 7 = 35 second delay

2. After the delay is completed, observe that the Ready indicator (located in START switch) flashes rapidly, indicating that power up is in progress.
3. Observe that the Ready indicator lights steadily within 90 seconds, indicating that discs are up to speed and heads are loaded.
4. Ensure that the FAULT indicator is off.

The power up sequence is now complete, and the drive is ready to read or write data.



## POWER OFF PROCEDURE (DRIVES WITH OPERATOR PANEL OR STATUS/CONTROL PANEL)

The following procedure describes how to power down the drive.

1. Press START switch.
2. Observe that the Ready indicator (located in START switch) flashes slowly, indicating that power down is in progress.
3. Observe that the Ready indicator goes off within 60 seconds, indicating that power down is complete.

With power down complete, the heads are positioned in the landing zone and the discs are not rotating. Normally, the power supply On/Standby switch is left On (1 position) to continue supplying dc power to the drive.

## FILTER REPLACEMENT AND CLEANING

The air filter must be clean to ensure proper air circulation through the drive. The filter is located behind the operator panel or status/control panel, as shown in figure 2-2. The procedure for replacing or cleaning the filter is simple enough that this task requires no technical expertise.

Inspect the filter periodically and either replace or clean it when it is dirty. Clean the filter only if replacement filters are not available.

## CAUTION

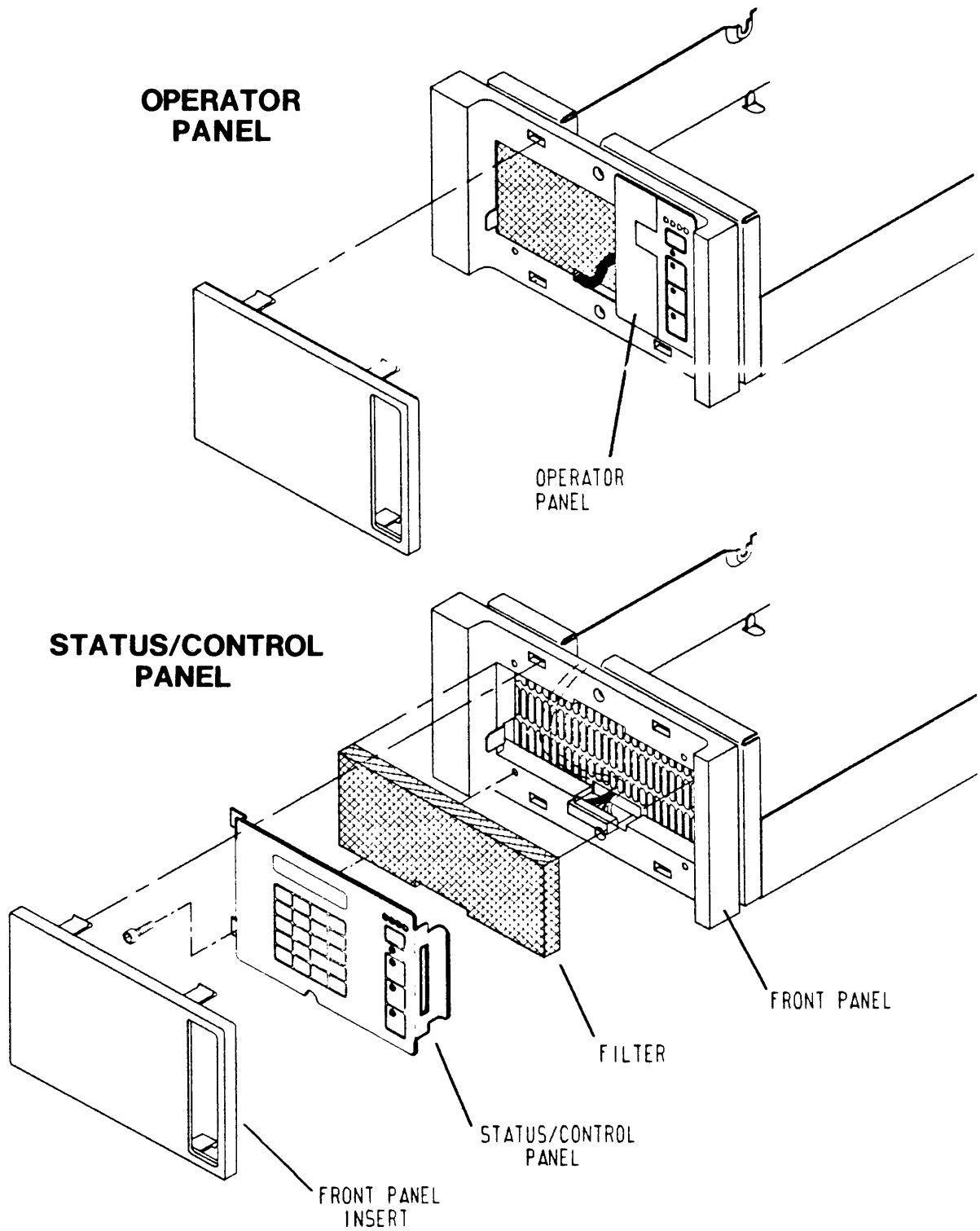
Be careful not to damage the system cabling when sliding the drive in the drawer and the drawer in and out of the rack.

1. Remove front panel insert from each drive (see figure 2-2).

## NOTE

The release latch on the left-hand drive locks the 2X drawer in the rack. The release latch on the right-hand drive has no function.

2. Push 2X drawer release latch to the right and extend 2X drawer to gain access to power supply.



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Figure 2-2. Air Filter Replacement

3. Remove power from drive as follows:

For drives with operator panel or status/control panel:

- a. Press START switch to stop the drive.
- b. Wait for Ready indicator (in START switch) to stop flashing; then, set On/Standby switch on power supply to Standby (0) position.

For drives without either panel, set On/Standby switch on power supply to Standby (0) position.

NOTE

If an operator panel is used, ignore steps 4 and 7. Filter may be replaced with operator panel in place.

4. Remove screws securing status/control panel to front panel and move status/control panel away from front panel to gain access to filter.
5. Remove dirty filter. If replacement filter is unavailable, clean dirty filter in solution of water and mild detergent. Rinse filter and allow it to dry.
6. Install clean filter.
7. Align status/control panel to front panel and secure with screws.
8. Set On/Standby switch on power supply to On (1) position.
9. Push 2X drawer back to closed position in rack.
10. Replace front panel insert.

# **Section 3 Installation and Checkout**

---

## INTRODUCTION

The information contained in this section describes installation and initial checkout of the drive.

## SITE REQUIREMENTS

### GENERAL

The site requirements considered are electrostatic discharge protection, environment, space, power, grounding, and interface.

### ELECTROSTATIC DISCHARGE PROTECTION

All drive electronic assemblies are sensitive to static electricity, due to the electrostatically sensitive devices used within the drive circuitry. Although some of these devices such as metal-oxide semiconductors are extremely sensitive, all semiconductors as well as some resistors and capacitors may be damaged or degraded by exposure to static electricity.

Electrostatic damage to electronic devices may be caused by a direct discharge of a charged conductor, or by exposure to the static fields which surround charged objects. To avoid damage to drive electronic assemblies, service personnel must observe the following precautions when servicing the drive:

- Ground yourself to the drive whenever the drive electronics are or will be exposed. Connect yourself to ground with a wrist strap (refer to Accessories in section 4 for part numbers). Connection may be made to any metal assembly. As a general rule, remember that you, the drive, and the circuit boards must all be at ground potential to avoid potentially damaging static discharges.
- Keep boards in conductive bags - when circuit boards are not installed in the drive, keep them in conductive static shielding bags (refer to Accessories in section 4 for part numbers). These bags provide absolute protection from direct static discharge and from static fields surrounding charged objects. Remember that these bags are conductive and should not be placed where they might cause an electrical short circuit.

- Remove boards from bags only when you are grounded - all boards received from the factory are in static shielding bags, and should not be removed unless you are grounded.
- Turn off power to drive before removing or installing any circuit boards.
- Do not touch pins on power supply connector J15. Power supply circuitry is sensitive to electrostatic discharge.
- Never use an ohmmeter on any circuit boards.

### ENVIRONMENTAL REQUIREMENTS

All environmental requirements for the drive are listed in table 3-1.

TABLE 3-1. ENVIRONMENTAL REQUIREMENTS

Conditions	Characteristics	Specifications
TEMPERATURE		
Storage (Packaged)	Range	-10 to 50°C (14 to 122°F)
	Maximum change per hour	15°C (27°F)
Transit (Packaged)	Range	-40 to 60°C (-40 to 140°F)
	Maximum change per hour	20°C (36°F)
Table Continued on Next Page		

TABLE 3-1. ENVIRONMENTAL REQUIREMENTS (Contd)

Conditions	Characteristics	Specifications
RELATIVE HUMIDITY		
Storage (Packaged)	Range	5% to 95%
Transit (Packaged)	Range	5% to 95%
Operating	Range	20% to 80% (no condensation allowed).
BAROMETRIC PRESSURE (STANDARD DAY)		
Storage (Packaged)	Range	-305 m to 3000 m (-1000 ft to 10 000 ft) 104 kPa to 69 kPa (30 in to 20 in Hg)
Transit (Packaged)	Range	-305 m to 12 192 m (-1000 ft to 40 000 ft) 104 kPa to 19 kPa (30 in Hg to 6 in Hg)
Operating	Range	-305 m to 3000 m (-1000 ft to 10 000 ft) 104 kPa to 69 kPa (30 in Hg to 20 in Hg)

## SPACE REQUIREMENTS

The drive and power supply mount side-by-side with another drive and power supply into a 2X drawer, and the 2X drawer slide mounts into a 483 mm (19 in) standard rack. The slide action allows outward extension of the drawer for ease of maintenance. The space requirements are shown in figure 3-1.

The combined mass of the drive and power supply is 16.6 kg (36.8 lbs). With both units mounted in the drawer and the drawer extended on the slides, the center of gravity is approximately 32 cm (12.5 in) from the rack front.

## POWER REQUIREMENTS



### WARNING

This unit has a single phase power supply with a capacitor input filter (sometimes called a switching type supply). If power comes from a 3-phase, 4-wire, wye branch or feeder circuit, ensure the circuit meets the latest requirements of the United States National Electrical Code. Failure to meet these requirements may cause hazardous conditions due to high currents and heating in the neutral conductors and transformers supplying the unit.

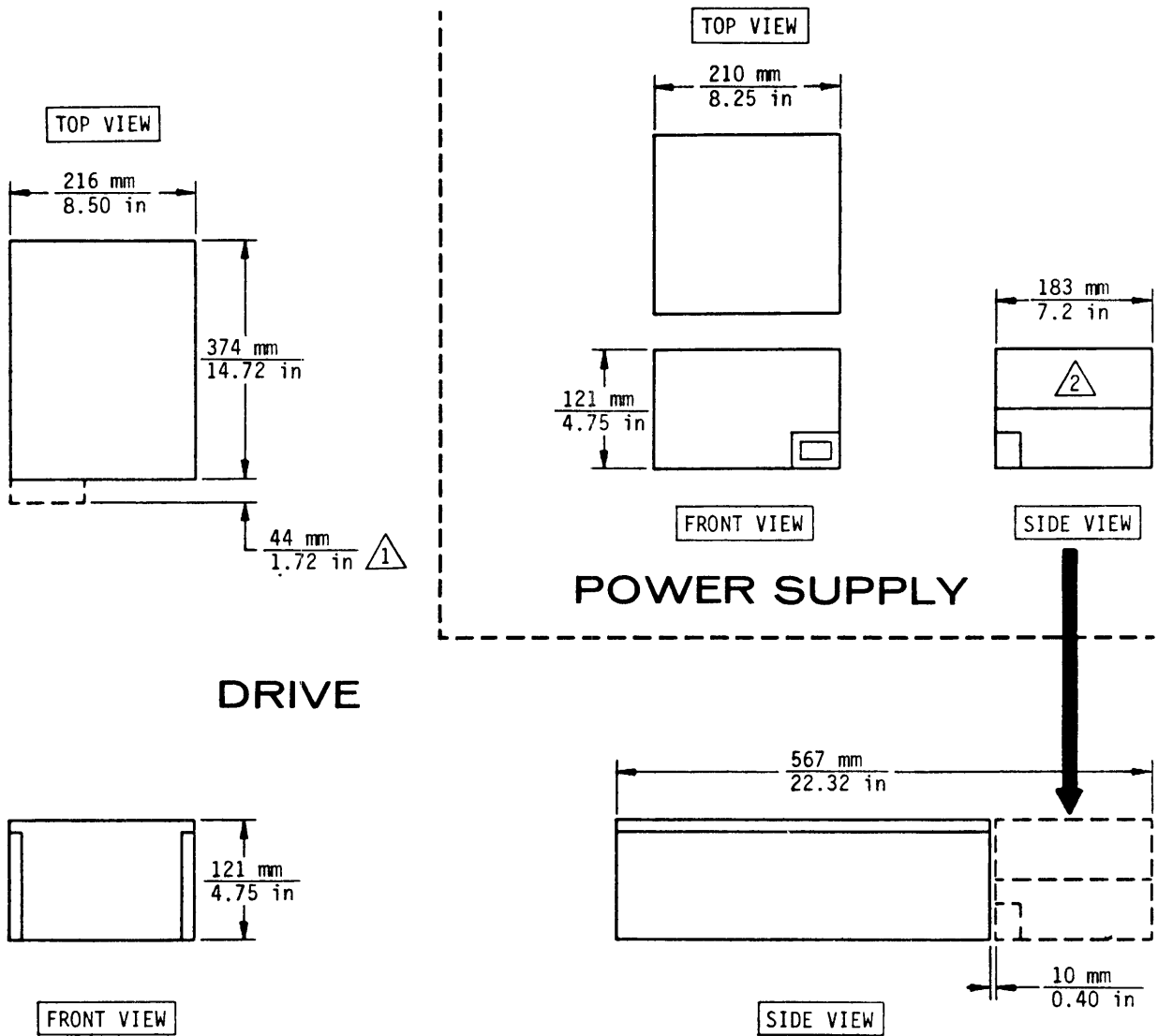
Drive ac power requirements are listed in table 3-2. Conversion to the different line voltages is explained in the installation procedures. Typical drive current versus start-up time is shown in figure 3-2 for 100-120 and 208-240 volt connections.

An ac power cord used in the United States should be UL-listed. It should use Basic Cord Type SV (or UL-accepted equivalent). This cord must have copper conductors with a minimum gauge of 18 AWG. The following NEMA connector plugs are required:

- Type 5-15P for 120 volts
- Type 6-15P for 208 through 240 volts.

If you are installing the drive in a nation outside the United States, you should use a power cord that is acceptable in that nation and that is certified by authorities accepted in that nation.





NOTES:

- 1 COOLING FAN MOUNTS ON REAR PANEL WHEN POWER SUPPLY IS NOT MOUNTED IN LINE WITH DRIVE.
- 2 COOLING FAN IS INSIDE POWER SUPPLY.
- 3. DIMENSIONS ARE NOMINAL.

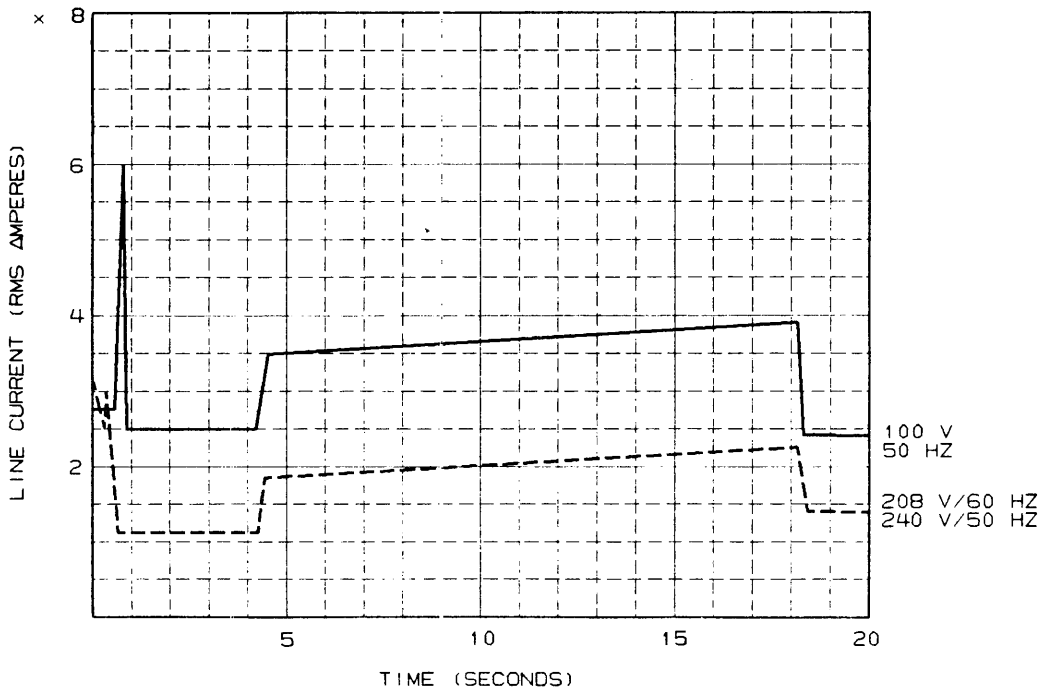
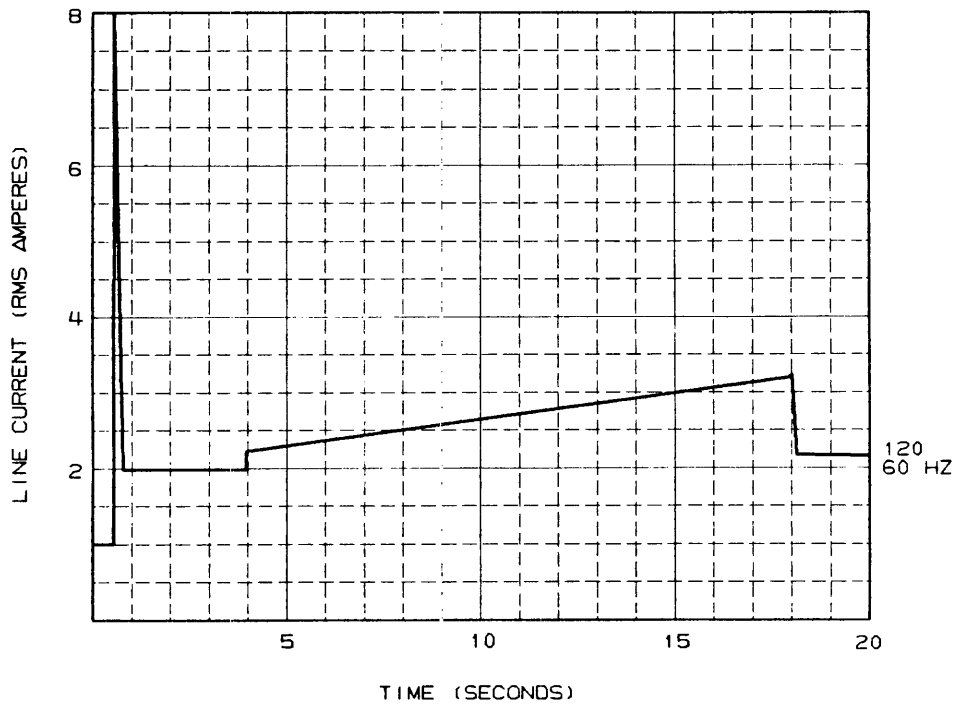
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Figure 3-1. Drive Space Requirements

TABLE 3-2. POWER REQUIREMENTS

Specifications	Nominal Values	
	100 - 120 V ac	208 - 240 V ac
Voltage Range	85 to 132 V	177 to 264 V
Nominal Line Frequency	50/60 Hz	50/60 Hz
Frequency Range	48.0 to 62.0 Hz	48.0 to 62.0 Hz
Phase Requirements	Single Phase	Single Phase
Power Consumed*	0.135 - 0.140 kW	0.136 - 0.136 kW
Line Current*	2.3 - 2.1 A	1.3 - 1.2 A
Power Factor*	0.57 - 0.57	0.48 - 0.45
Start Up Current	See figure 3-2.	See figure 3-2.

\*Measured at nominal values when discs are rotating and carriage is moving.



11F214

Figure 3-2. Typical Line Current Versus Start-up Time

## **GROUNDING REQUIREMENTS**

### **General**

Safety grounding (connecting the drive power cord to a grounded outlet) and system grounding (establishing a common ground between the drives, the power supplies, and the controller) are discussed in the following paragraphs.

### **Safety Grounding**

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

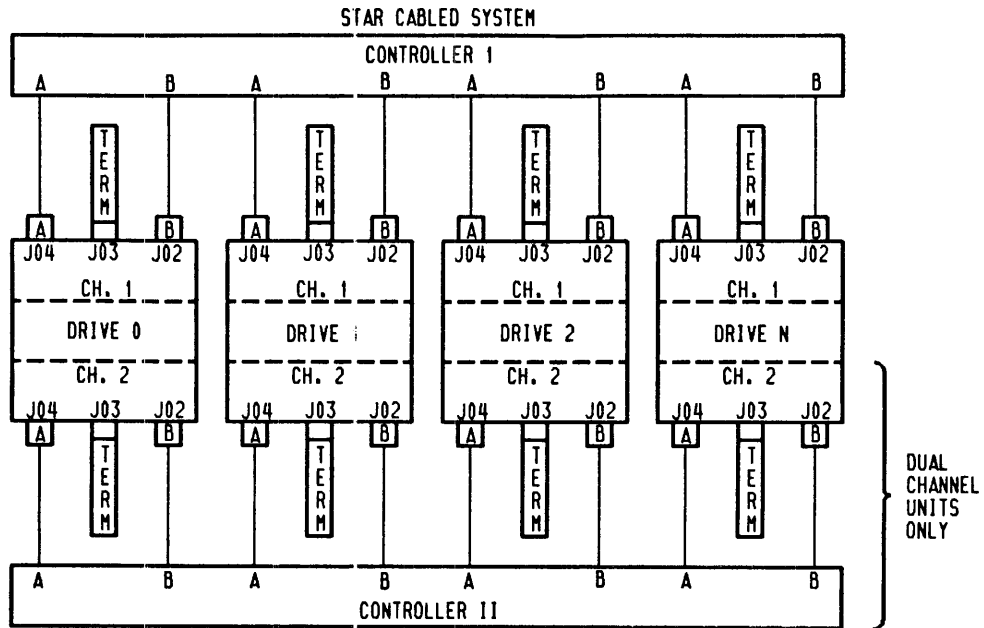
### **System Grounding**

In addition to safety grounding, system ground connections are also required. System ground is established by a set of ground straps connected in a star or daisy chain configuration. The ground straps connect ground on the controller to earth ground and to each drive in the system. The installation procedures in this section provide detailed grounding instructions and a schematic diagram of the star and daisy chain configurations.

## **INTERFACE REQUIREMENTS**

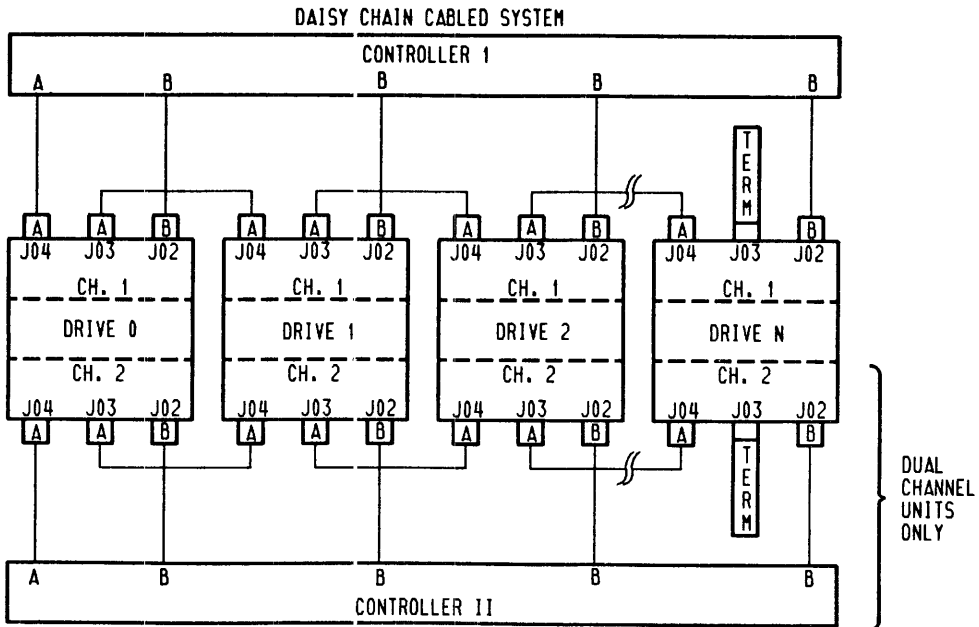
An important part of site preparation is planning the layout and routing of I/O cables. The I/O cables are designated as A and B cables. The I/O A cables may be connected in either a star or daisy chain configuration as shown in figure 3-3. Each configuration calls for the use of terminators; these too are shown in figure 3-3.

The following discussion of the I/O configurations applies to single channel installations where a set of drives are interfaced to one controller. Extending the discussion to dual channel installations (involving two controllers) requires doubling the quantities of cables and terminators because the two channels have independent cabling.



**NOTES:**

1. MAXIMUM INDIVIDUAL A CABLE LENGTHS = 100 FEET (STAR)
2. MAXIMUM CUMULATIVE A CABLE LENGTHS = 100 FEET (DAISY CHAIN)
3. MAXIMUM INDIVIDUAL B CABLE LENGTHS = 50 FEET
4. A SYSTEM MAY INCLUDE UP TO 16 DRIVES



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Figure 3-3. System Cabling

The star configuration has individual A and B cables going from the controller to each drive, and each drive has a terminator installed on it. The daisy chain configuration has individual B cables going from the controller to each drive. However, a single A cable connects the controller to the first drive. Other A cables go from drive to drive, and the last drive in the string has a terminator installed on it.

In estimating the I/O cables needed for an installation, decide which configuration will be used and allow sufficient length to permit extension of rack-mounted drives. Limitations on I/O cable lengths may influence system layout. The maximum length for each B cable is 15.3 m (50 ft). Each star system A cable or the cumulative A cabling in a daisy chain system cannot exceed 30.6 m (100 ft) in length. Refer to Accessories in section 4 for terminator and I/O cable part numbers.

Figure 3-4 shows the pin assignments and signal names for the A cable. Figure 3-5 shows the pin assignments and signal names for the B cable. Detailed information about interface lines is given in section 1 of hardware maintenance manual, volume 2.

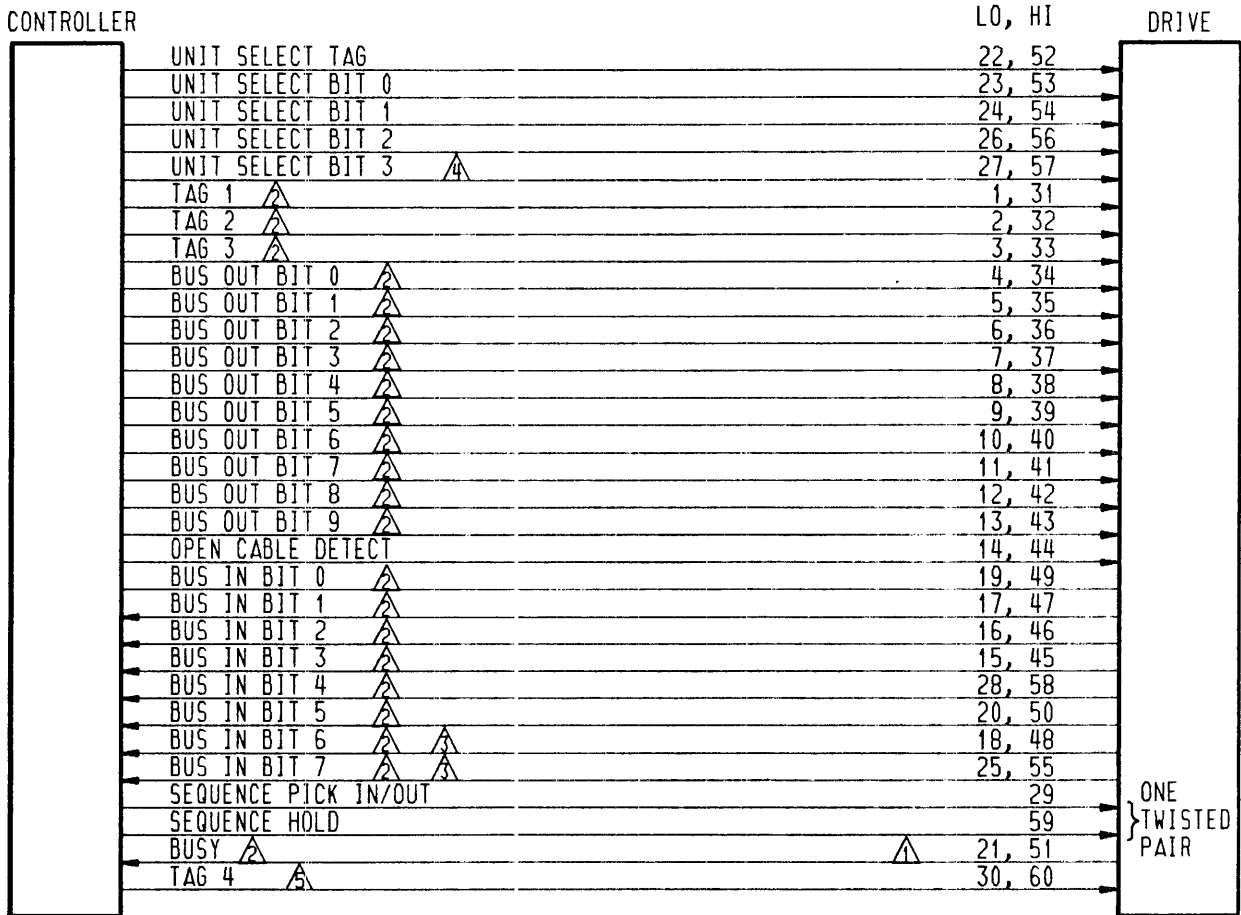
## **UNPACKAGING, INSPECTION AND REPACKAGING**

### **GENERAL**

After removing packaging material according to the unpackaging instructions provided with the drive, inspection for shipping damage should be carried out and several final unpackaging procedures performed. Save all packaging materials for future use.

### **UNPACKAGING**

1. Open package (save all packaging materials).
2. If drive has a 2X drawer with slide mount option, remove packages containing drawer, two slide mounts and slide mount hardware kit.
3. Remove package containing ac power cable and dc power cable.
4. Remove plastic dust cover from around drive and power supply.
5. Check all items against shipping bill for required equipment and hardware to complete installation. Discrepancies, missing items, damaged equipment, etc., should be reported to the sales representative from whom the drive was purchased.



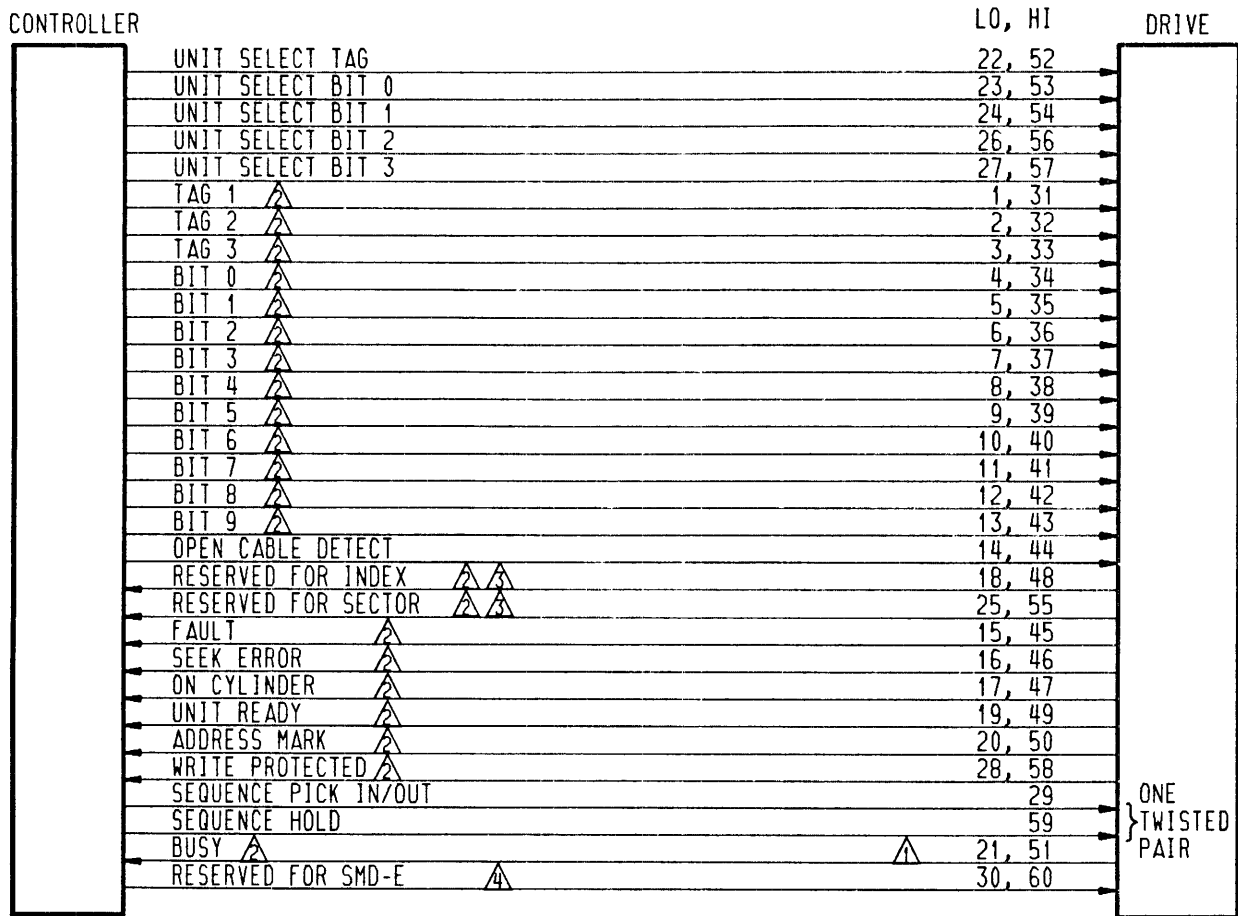
NOTES:

- <sup>1</sup> DUAL CHANNEL UNITS ONLY
- <sup>2</sup> GATED BY UNIT SELECT
- <sup>3</sup> INDEX AND SECTOR MAY BE IN "A" CABLE, "B" CABLE, OR BOTH.
- <sup>4</sup> FUNCTIONS AS TAG 5 LINE FOLLOWING UNIT SELECTION.
- <sup>5</sup> FUNCTIONS AS CYLINDER ADDRESS BIT 2<sup>10</sup> LINE, WHEN OPERATING WITH TAG 1 EXTENDED ADDRESSING FEATURE.

SMD-E SIGNAL DEFINITIONS

11F43

Figure 3-4. A Cable (Sheet 1 of 2)



NOTES:

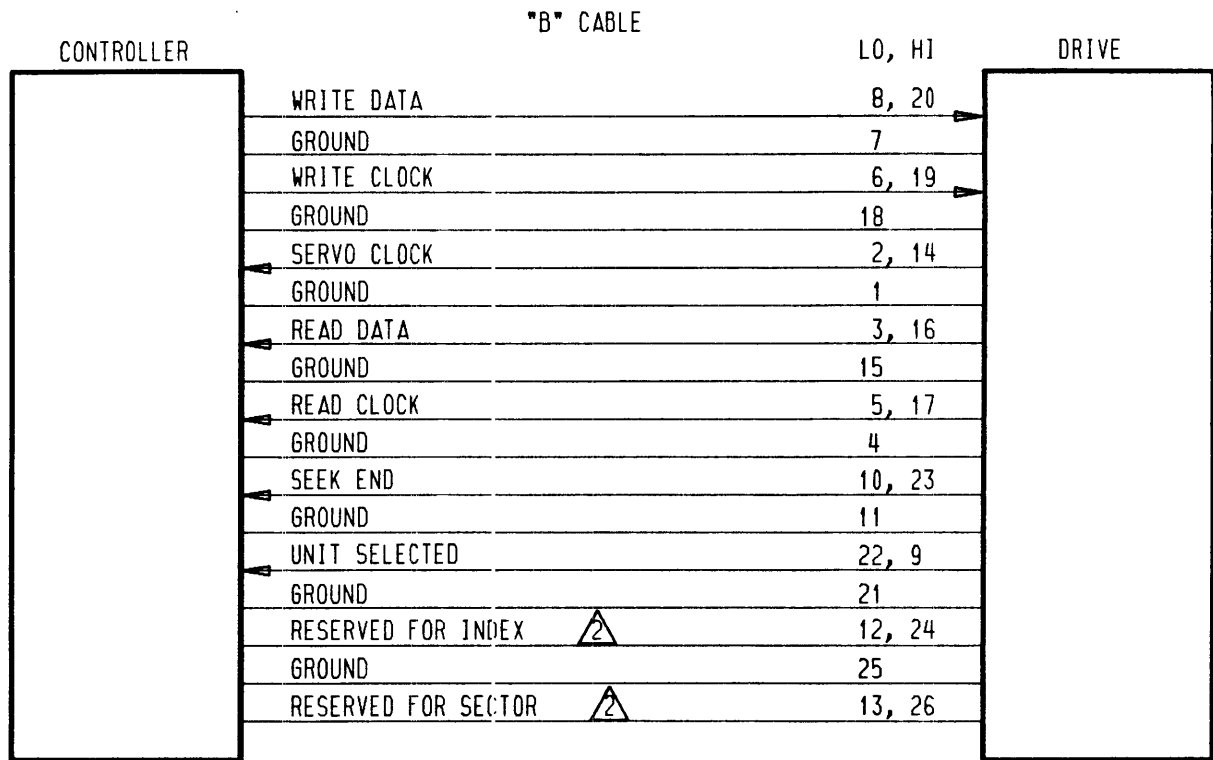
- <sup>1</sup> DUAL CHANNEL UNITS ONLY
- <sup>2</sup> GATED BY UNIT SELECT
- <sup>3</sup> INDEX AND SECTOR MAY BE IN "A" CABLE, "B" CABLE, OR BOTH.
- <sup>4</sup> FUNCTIONS AS CYLINDER ADDRESS BIT 2<sup>10</sup> LINE WHEN OPERATING WITH TAG 1 EXTENDED ADDRESSING FEATURE.

SMD-0 SIGNAL DEFINITIONS

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Figure 3-4. A Cable (Sheet 2)





NOTES:

1 NO SIGNALS GATED BY UNIT SELECTED

△ INDEX AND SECTOR MAY BE IN "A" CABLE, "B" CABLE, OR BOTH

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Figure 3-5. B Cable

**INSPECTION**

Inspect the drive, power supply, and accessory items for possible shipping damage. All claims for shipping damage should be filed with the carrier involved.

**REPACKAGING**

If it is necessary to ship the drive, repackage the drive with the original packaging materials (saved during installation). Comply with the manufacturer's packaging instructions to ensure that the drive will be undamaged in shipment. To obtain packaging instructions, contact:

Seagate Technology, Inc.  
 Customer Services  
 12701 Whitewater Drive  
 Minnetonka, MN 55343

Phone: 1-800-382-6060  
 Fax: (612) 931-8817

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

## INSTALLATION PROCEDURES

### GENERAL

With the site requirements completed and the drive unpackaged, you are ready to begin the installation. Certain parts of the installation may vary -- how the drive and power supply are mounted, how dc power is supplied to the drive, and whether an operator panel or status/control panel is used. For those installations where the drive and power supply are mounted in a 2X drawer, the following procedures apply:

- Mounting 2X Drawer in Rack
- Mounting Front Panel
- Mounting Operator Panel or Status/Control Panel
- Mounting Drive and Power Supply in 2X Drawer

For some customers, the drive, power supply, and operator panel (if used) are mounted in an inner drawer prior to shipment. In this case, the following procedures apply:

- Mounting 2X Drawer in Rack
- Mounting Drive and Power Supply in 2X Drawer

For those installations where a 2X drawer is not used, the topic Alternate Methods for Installing the Drive provides some basic information. However, specific details of alternate mounting are beyond the scope of this manual.

There is another group of procedures that apply to all installations. They are:

- Power Supply Voltage Conversion
- System I/O Cabling
- System Grounding
- Setting Circuit Board Switches

In most cases, you will find it convenient to perform the procedures in the order they are presented in the manual. However, you might find it convenient to make switch settings on both the drive and the power supply before mounting them.

## POWER SUPPLY VOLTAGE CONVERSION

The power supply is configured before shipment to operate in one of two ranges of ac input voltages. The voltage select plate on the power supply (see figure 3-6) indicates the voltage range selected prior to shipment. The voltage range is determined by setting the voltage select switch to the desired range. The voltage select plate locks the switch in the desired range. The ac power cord must be replaced if the voltage range is changed. Refer to figure 3-7 and to the parts data section for information about ordering the replacement ac power cable.

### CAUTION

Power supply could fail if voltage select switch is not matched with input voltage.

1. Ensure that ac power cable is disconnected from power supply.

#### NOTES:

- 1 LOCKS VOLTAGE SWITCH IN EITHER 115V POSITION OR 230V POSITION (OTHER SIDE)

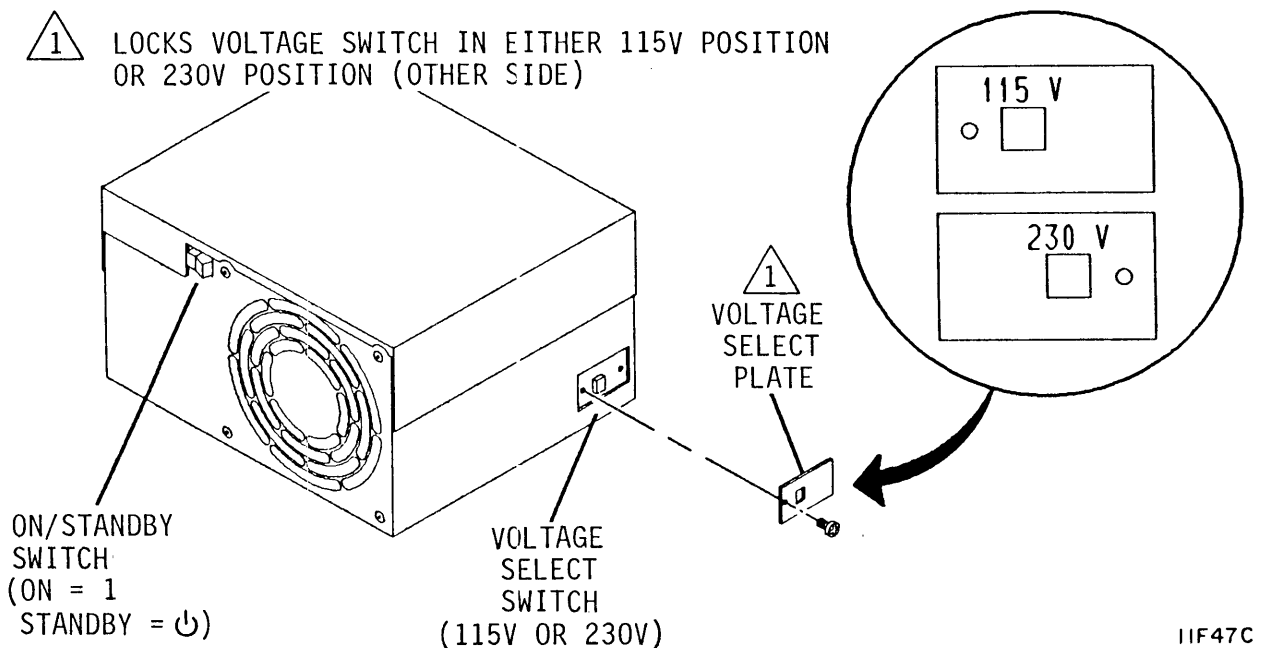
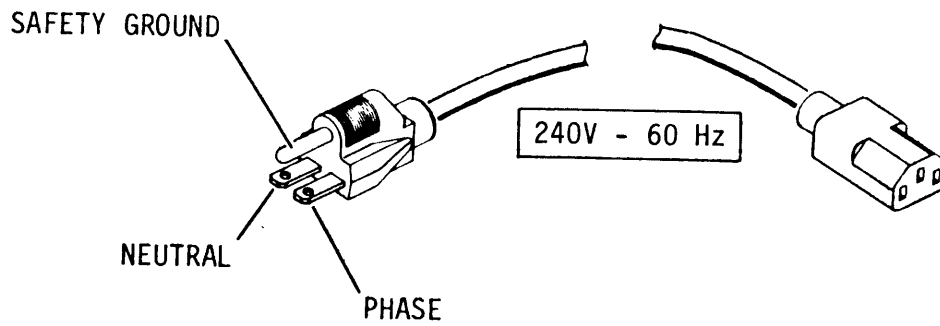
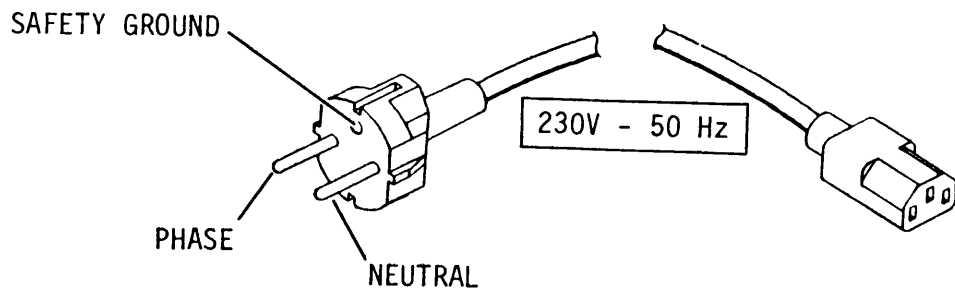
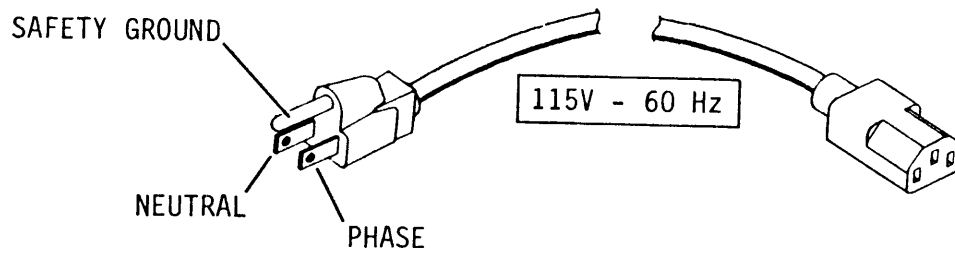


Figure 3-6. Power Supply Voltage Conversion



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Figure 3-7. AC Power Cables

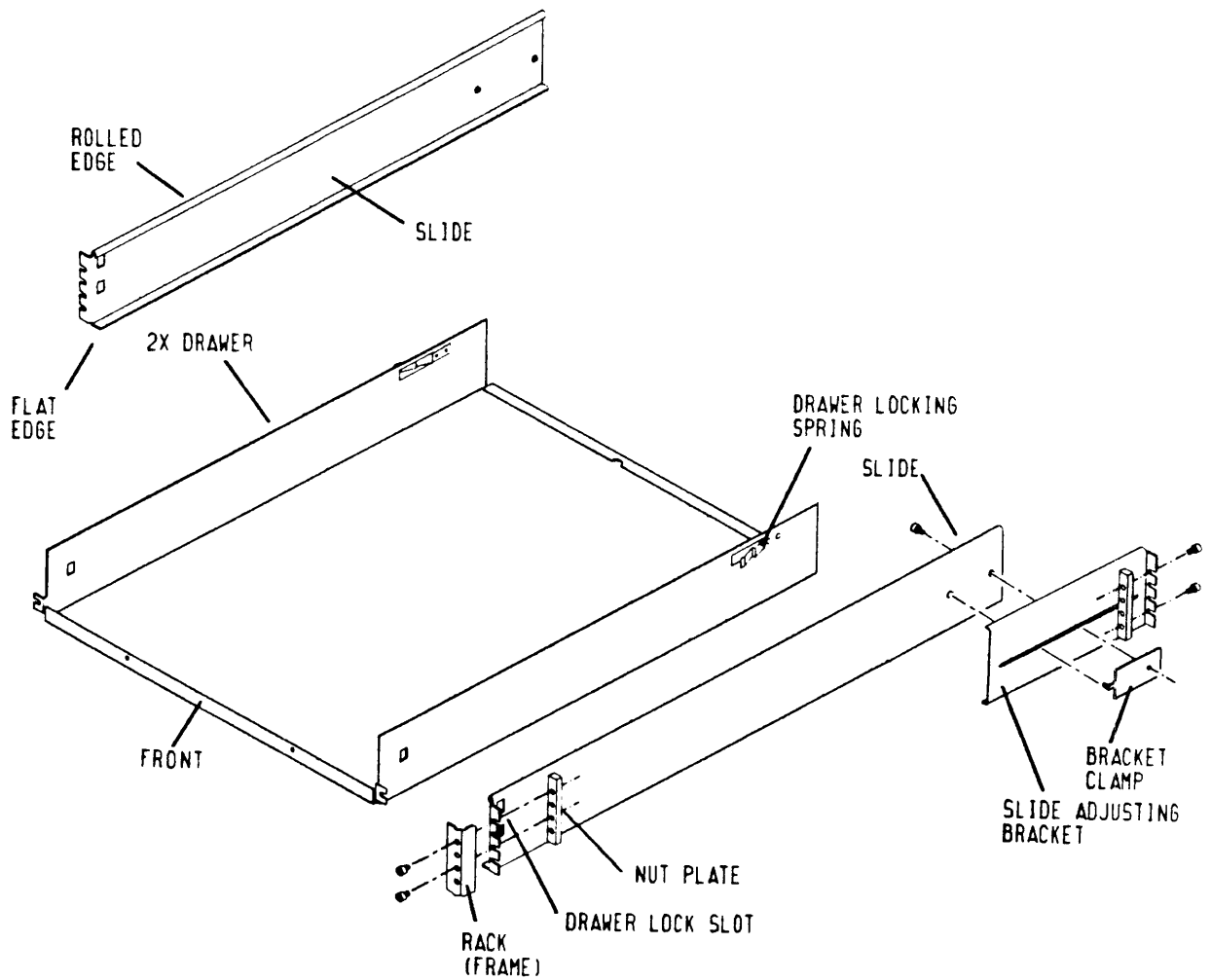
2. Remove screw securing voltage select plate to power supply and remove plate from power supply. Retain plate and hardware.
3. Set the voltage select switch to the desired range.
4. Reverse the voltage select plate and install plate on power supply to lock the switch in the desired range. Plate should indicate new voltage setting.
5. Replace existing ac power cable with the ac power cable specified for new operating voltage.

## MOUNTING 2X DRAWER IN RACK

The slide assemblies permit inline mounting of the 2X drawer in a rack. The drawer may be extended out the front surface of the rack for maintenance. The following procedure provides instructions for attaching the 2X drawer to the rack.

1. Remove screws from rack mounting kit. There are four smaller screws in kit. Two screws attach slide adjusting brackets to slides (step 2). Two others attach inner drawers to 2X drawer (see Mounting Drive and Power Supply in 2X Drawer).
2. Loosely attach a slide adjusting bracket to each slide with a bracket clamp and screw (see figure 3-8).
3. Loosely attach screws and nut plates (for each slide) to rack as follows (see figure 3-8):
  - For rack front, screws go in top and third holes.
  - For rack rear, screws go in top and bottom holes.
4. Set slide adjusting brackets as required for proper rack depth and mount right-hand and left-hand slides in rack in accordance with user requirements. Orient slides so that the 2X drawer rests on the flat edge of the slides as shown in figure 3-8.
5. Secure adjusting brackets to slides and slides to rack.
6. Lift drawer and guide it into slide assemblies. Continue pushing until drawer is in rack. Ensure that there is no binding when sliding 2X drawer in and out of rack.

If it is necessary to remove drawer from rack, slide drawer out to full extension. Press drawer locking springs and remove drawer from rack.



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Figure 3-8. 2X Drawer Installation

### MOUNTING FRONT PANEL

The following procedure describes how to install the air filter and how to attach the front panel to the inner drawer. If the operator panel or status/control panel will be installed, go to the next procedure, which includes front panel mounting instructions.

NOTE

When installing the front panel, ensure that the overhang covers the rack frame (vertical support). If left and right hand inner drawers are interchanged in the 2X drawer, rotate the front panels 180 degrees.

1. Align top edge of front panel to top edge of inner drawer (see figure 3-9).
2. Secure front panel into place with four screws.
3. Install filter.

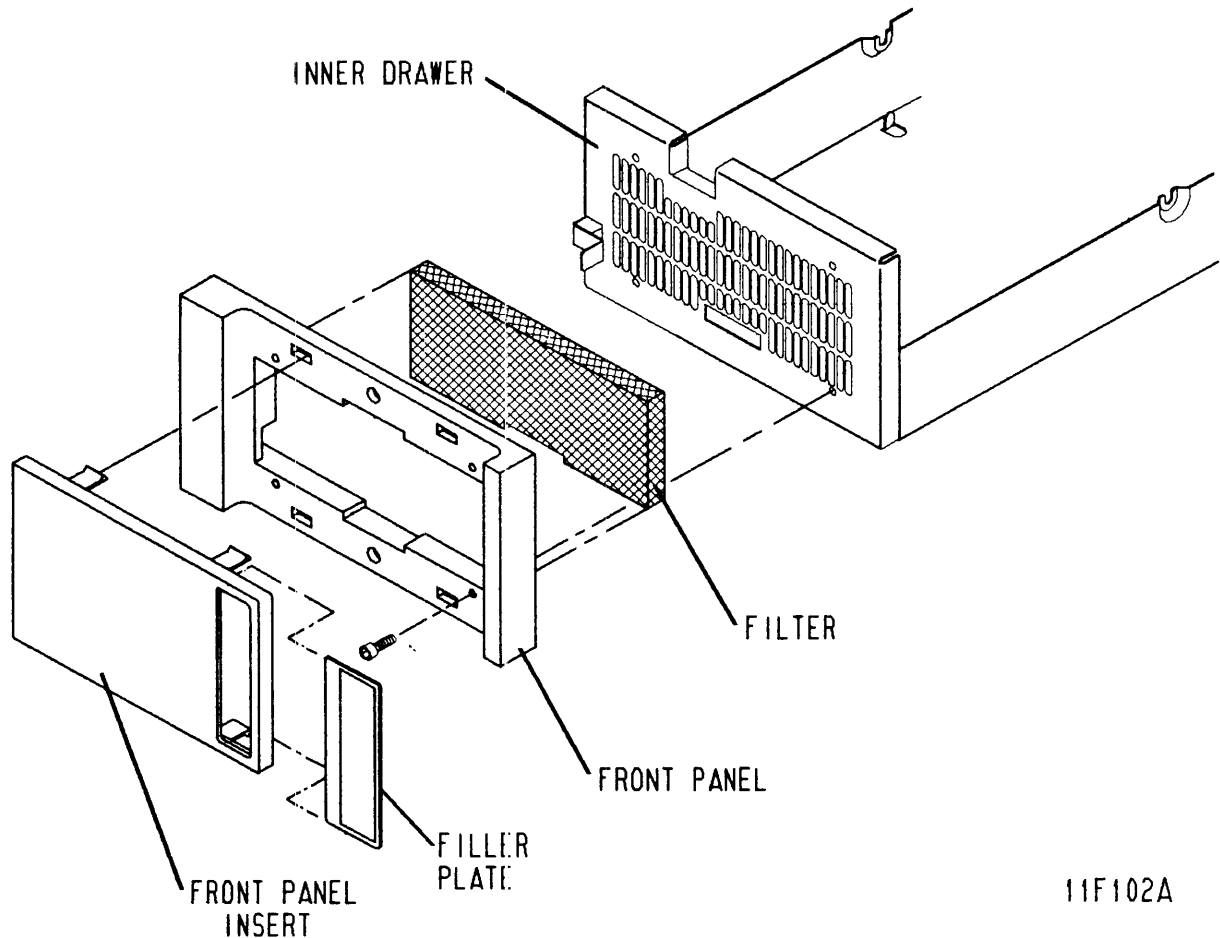


Figure 3-9. Mounting Front Panel

4. Remove adhesive backing and attach filler plate to front panel insert.
5. Install front panel insert.

## **MOUNTING THE OPERATOR PANEL OR STATUS/CONTROL PANEL**

The following procedure provides complete instructions for mounting either an operator panel or a status/control panel to an existing 2X drawer configuration. Figure 3-10 shows this mounting for the status/control panel, and figure 3-11 shows it for the operator panel.

If you are mounting the panel as part of a new site 2X drawer installation, then perform steps 21, 22, 23, 24, and either 25 or 26. If you are mounting the panel in an existing installation, you will need to reinstall the drive and power supply as described in this section.

1. Remove front panel insert from each drive.

### **NOTE**

The release latch on the left-hand drive locks the 2X drawer in the rack. The release latch on the right-hand drive has no function.

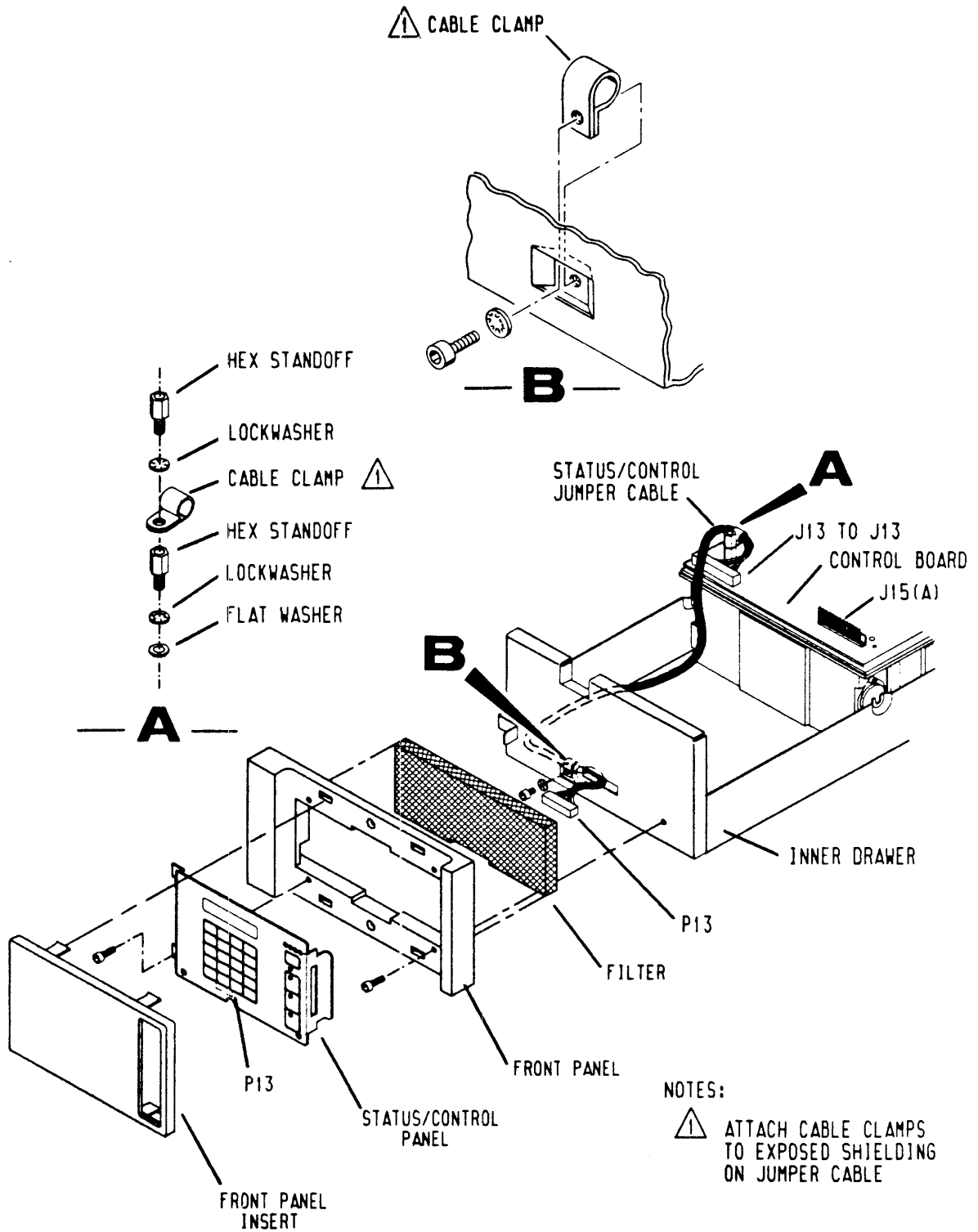
2. Push 2X drawer release latch to the right and extend 2X drawer to gain access to On/Standby switch on power supply.
3. Remove power from drive by setting On/Standby switch on power supply to Standby (0) position.
4. Push 2X drawer back to closed position in rack.
5. Remove I/O cover and cable clamps from I/O cable bracket.

### **CAUTION**

Remove terminators by hand. They could be damaged if a pliers or other tool is used.

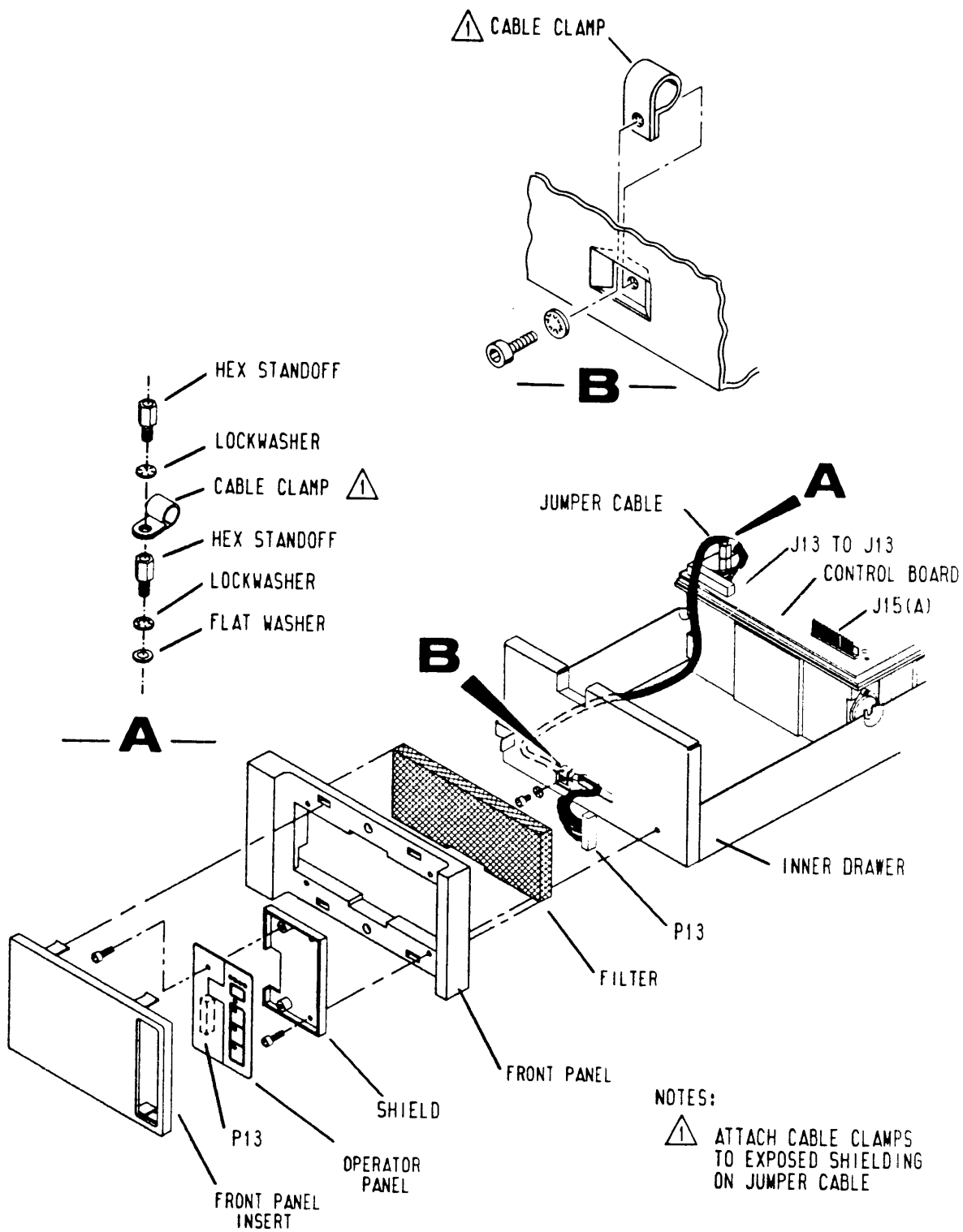
6. Disconnect I/O cables, terminators, and system ground strap from drive.
7. Remove I/O cable bracket from drive rear panel.
8. Disconnect ac power cable from site power.
9. Push 2X drawer release latch to the right and extend 2X drawer to fully extended position.





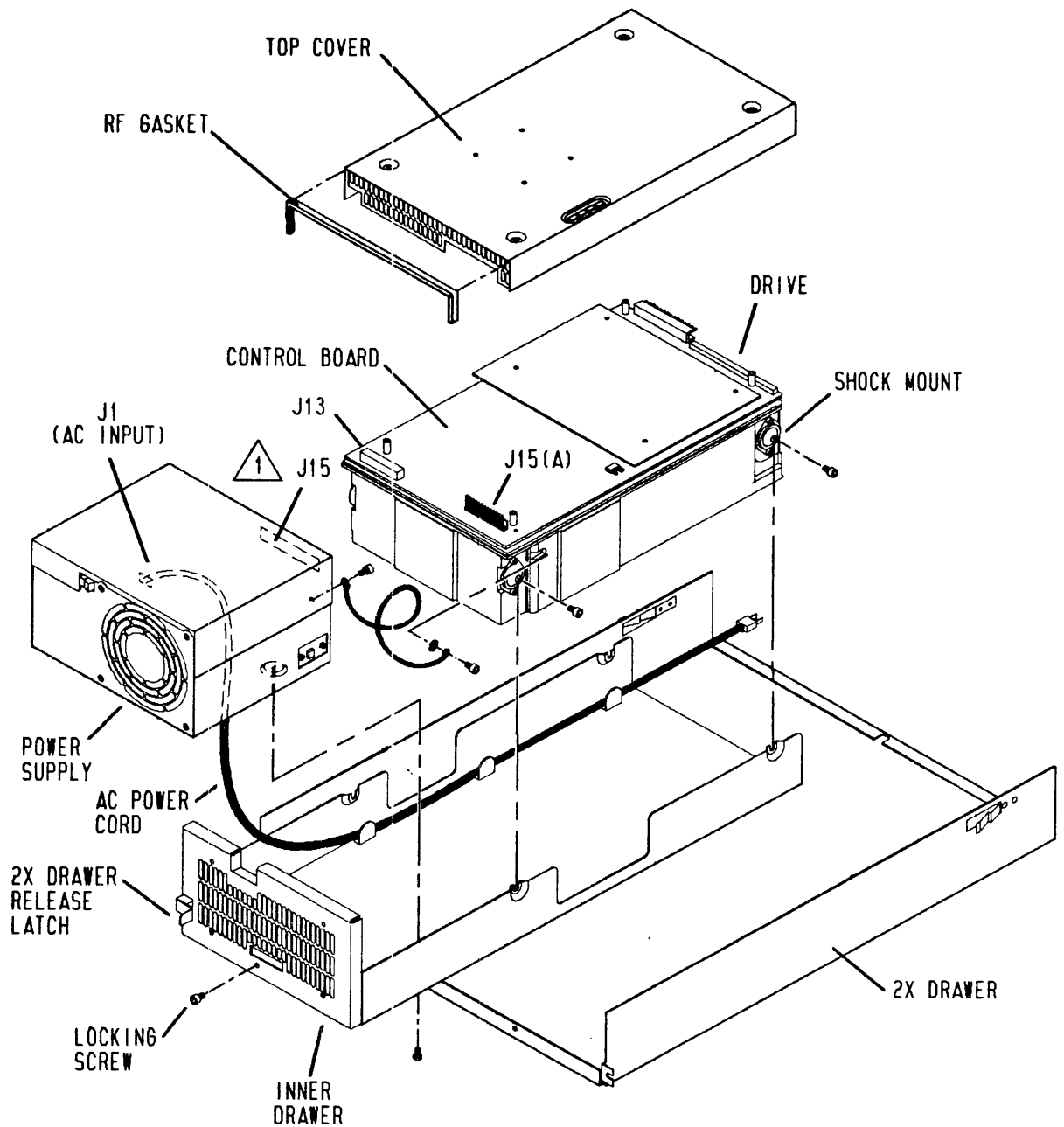
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Figure 3-10. Mounting the Status/Control Panel



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Figure 3-11. Mounting the Operator Panel



 DO NOT TOUCH PINS ON CONNECTOR J15. POWER SUPPLY CIRCUITRY IS SENSITIVE TO ELECTROSTATIC DISCHARGE.

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Figure 3-12. Mounting Drive and Power Supply in 2X Drawer

10. Remove inner drawer locking screw.
11. Push 2X drawer release latch to the right, lift inner drawer up and remove it from 2X drawer. Place inner drawer on work table.
12. Remove screws securing top cover to drive.

NOTE

To maintain drive configuration whenever the top cover is removed, always identify which drive that the top cover was removed from.

13. Carefully lift off cover.
14. Disconnect dc power cable from J15 (A) on control board.
15. Disconnect dc ground strap from module.
16. Loosen shock mount screws securing module to inner drawer.
17. Carefully lift drive out of drawer and move to desired location.
18. Disconnect ac power cable from ac input connector J1.
19. Remove screws securing power supply to inner drawer.
20. Lift power supply out of drawer and move to desired location.
21. Attach the two metal cable clamps (found in operator panel kit or status/control panel kit) to the exposed shielding on the jumper cable.
22. Attach cable clamp at the P13 end of jumper cable to the inner drawer using a screw and lockwasher.
23. Route jumper cable around left side of where power supply will be.

#### NOTE

When installing the front panel, ensure that the overhang covers the rack frame (vertical support). If left and right hand inner drawers are interchanged in the 2X drawer, rotate the front panels 180 degrees.

24. Align front panel to inner drawer so that holes in front panel are centered on holes in inner drawer.
25. For a status/control panel installation, perform the following steps:
  - a. Secure front panel into place with two screws on right side of front panel.
  - b. Install filter.
  - c. Connect jumper cable to P13 on status/control panel.
  - d. Align status/control panel to front panel and secure with screws.
  - e. Remove protective film from front surface of status/control panel.
26. For an operator panel installation, perform the following steps:
  - a. Secure front panel into place with two screws on left side of front panel.
  - b. Install filter.
  - c. Remove screws attaching operator panel to shield.
  - d. Align shield to front panel and secure with screws.
  - e. Connect jumper cable to P13 on operator panel.
  - f. Align operator panel to shield and secure with screws.

If you are adding the panel to an existing installation, continue with the remaining procedures in this section to reinstall the drive and power supply.

## MOUNTING DRIVE AND POWER SUPPLY IN 2X DRAWER

The following procedure provides instructions for mounting the drive and power supply into the 2X drawer. You may find it convenient to make switch settings on the drive and power supply (described in this section) prior to mounting them in the 2X drawer. See figure 3-12.

If your drive and power supply were mounted in the inner drawer prior to shipment, skip to step 11 of this procedure.

### NOTE

For drives with an operator panel or status/control panel, ensure that the P13 jumper cable does not interfere with power supply mounting. Cable is routed around left side of power supply (see figure 3-10).

1. Place power supply into position in inner drawer and secure with screws, supplied with power supply kit.
2. Connect dc power cable to J15 on power supply.
3. Connect ground cable to ac ground terminal on power supply.
4. Connect ac power cable to ac input connector J1 on power supply. Route cable inside inner drawer as shown in figure 3-12.
5. Remove drive top cover.
6. Loosely attach shock mount screws to drive.
7. Mount drive to inner drawer and secure into place.
8. Connect dc power cable to J15 (A) on the control board.
9. Attach ground cable to drive module as shown in figure 3-12.
10. For drives with status/control panel (figure 3-10) or operator panel (figure 3-11), perform the following steps:
  - a. Remove and discard standoff (located next to P13) from control board.
  - b. Attach cable clamp to the control board with the washers and two short standoffs, at location where old standoff was removed in previous step.

- c. Connect jumper cable end marked J13 to J13 on control board.

### CAUTION

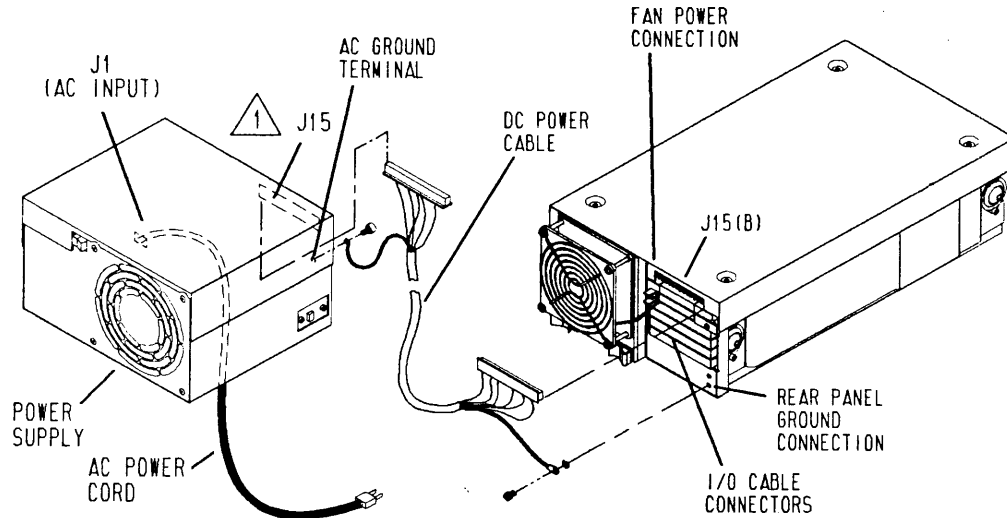
When replacing cover, use care to avoid damaging logic boards and cable P25 connected to the carriage latch electromagnet.

11. Insert RF gasket in channel of drive top cover as shown in figure 3-12.
12. Replace drive top cover.
13. Slide inner drawer into position in 2X drawer and secure with locking screw.
14. Push 2X drawer back to closed position in rack.
15. Replace front panel insert.
16. Connect ac power cable to site power.

### ALTERNATE METHODS FOR INSTALLING THE DRIVE

Any alternate method of mounting the drive in an enclosure must satisfy certain requirements regarding mechanical isolation and air flow. The mounting design must support the drive by its shock mounts, either horizontally or vertically. It must allow adequate clearance between the drive and any surfaces near the drive. The mounting design must also ensure adequate ventilation of the drive and power supply. Detailed mounting requirements are given in the drive's product specification. Prior to actually mounting the drive and power supply in the enclosure, you may find it convenient to set their switches for normal operation.

When the power supply mounting is remote from the drive, a shielded dc power cable is recommended. Figure 3-13 shows how the cable connects to the power supply and the drive. One end of the cable connects to J15 on the power supply, and the trailing ground lead on that end connects to the ac ground terminal on the power supply. The other end of the cable goes to J15(B) on the drive. The trailing ground lead on that end connects to the ground screw below the I/O connectors.



⚠ DO NOT TOUCH PINS ON CONNECTOR J15. POWER SUPPLY CIRCUITRY IS SENSITIVE TO ELECTROSTATIC DISCHARGE.

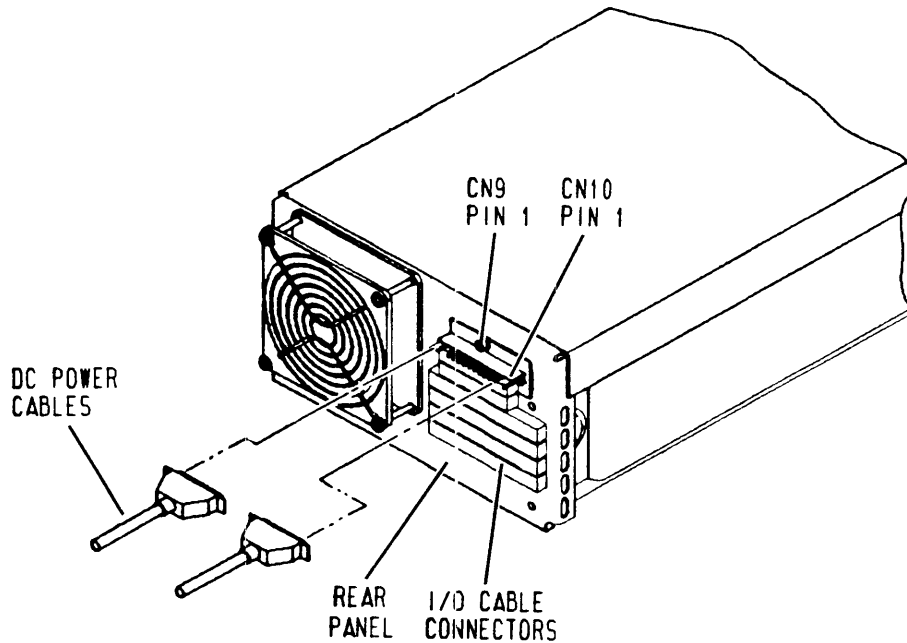
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Figure 3-13. Cabling for a Remote Power Supply

Some drives operate from a power source supplying -12 V, +5 V, and +24 V. They contain a voltage converter that develops an additional supply voltage of -5 V from the -12 V input. As shown in figure 3-14, these drives have two dc power connectors, CN9 and CN10, located side-by-side above the I/O connectors. Following the directions provided with the power supply, connect the two dc power cables from the supply to CN9 and CN10. The following list provides pin assignments for these connectors:

<u>Connector</u>	<u>Pin Number</u>	<u>Signal</u>
CN9	1	+5 V
	2	+5 V
	3	+24 V return
	4	+24 V return
	5	+24 V
	6	Key
	7	+24 V
CN10	1	-12 V return
	2	Key
	3	-12 V return
	4	-12 V
	5	-12 V
	6	+5 V return
	7	+5 V return





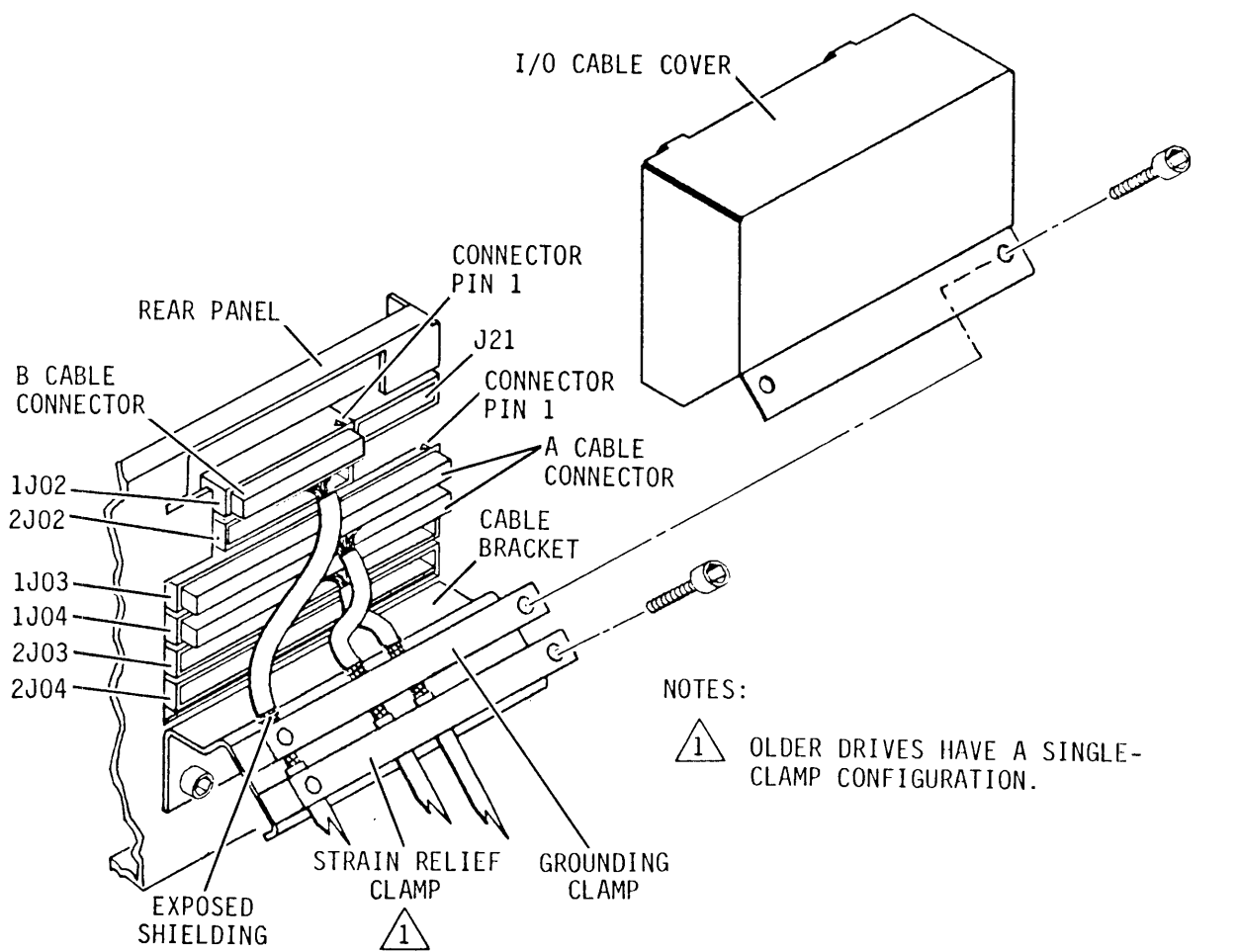
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Figure 3-14. Cabling for a Drive with a Voltage Converter

### SYSTEM I/O CABLING

It is assumed that the site has been prepared in accordance with the site requirements information provided earlier in this section. The following procedures describe how to cable the system in either a daisy chain or star configuration. These configurations were discussed earlier in this section under Interface Requirements.

The following procedures make the connections for one I/O channel. For dual channel installations, part of the procedure must be repeated. On dual channel drives there are two sets of I/O connectors: 1J02, 1J03, and 1J04 for channel 1, and 2J02, 2J03, and 2J04 for channel 2. The recommended connections are A cable to J04 and terminator to J03. These connections may be reversed without affecting drive operation. Figure 3-15 shows typical I/O cable connections.



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Figure 3-15. I/O Cable Attachment

## Daisy Chain I/O Cabling Procedure

1. Attach cable bracket to rear panel, using two shorter screws found in hardware kit.

### NOTE

Steps 2 through 5 apply to single channel drives and must be repeated for dual channel drives.

2. Connect B cables from controller to connector J02 on each drive.
3. Connect A cable from controller to connector J04 on first drive in daisy chain.

### NOTE

If drive is not last drive in daisy chain, repeat step 4 until last drive is connected. When last drive is connected in daisy chain, perform step 5.

4. Connect another A cable from connector J03 to connector J04 on next drive in daisy chain.
5. Install terminator on drive connector J03 and make terminator ground connection (see figure 3-16). A terminator is required on last drive in a daisy chain system.
6. Perform Cable Clamping Procedure (which appears several pages later in this topic) to ensure proper shielding of I/O cables.

## Star I/O Cabling Procedure

1. Attach cable bracket to rear panel, using two shorter screws found in hardware kit.

### NOTE

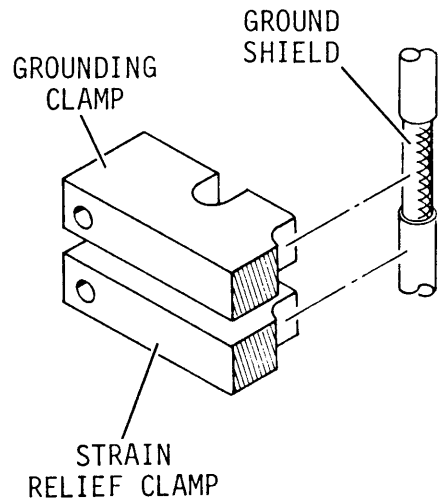
Steps 2 through 4 apply to single channel drives and must be repeated for dual channel drives.

2. Connect B cables from controller to connector J02 on each drive.

2. On drives with dual-clamp (newer) configuration, install I/O cable clamps as follows:

a. Strip heat shrink tubing from all cables so that bare shielding will be in contact with grounding clamp and not in contact with strain relief clamp.

b. Loosely install strain relief clamp (strain relief clamp has larger diameter openings than grounding clamp) onto cable bracket with cables positioned as shown.



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c. Position cabling so that bare shielding begins just above strain relief clamp; then secure strain relief clamp into place with screws. This will ensure that grounding clamp (installed in following step) is in contact with bare shielding of cabling.

d. Install grounding clamp and I/O cable cover onto cable bracket with cables positioned as shown in figure 3-15 and secure with screws. Ensure that bare shielding on each cable is in contact with grounding clamp.

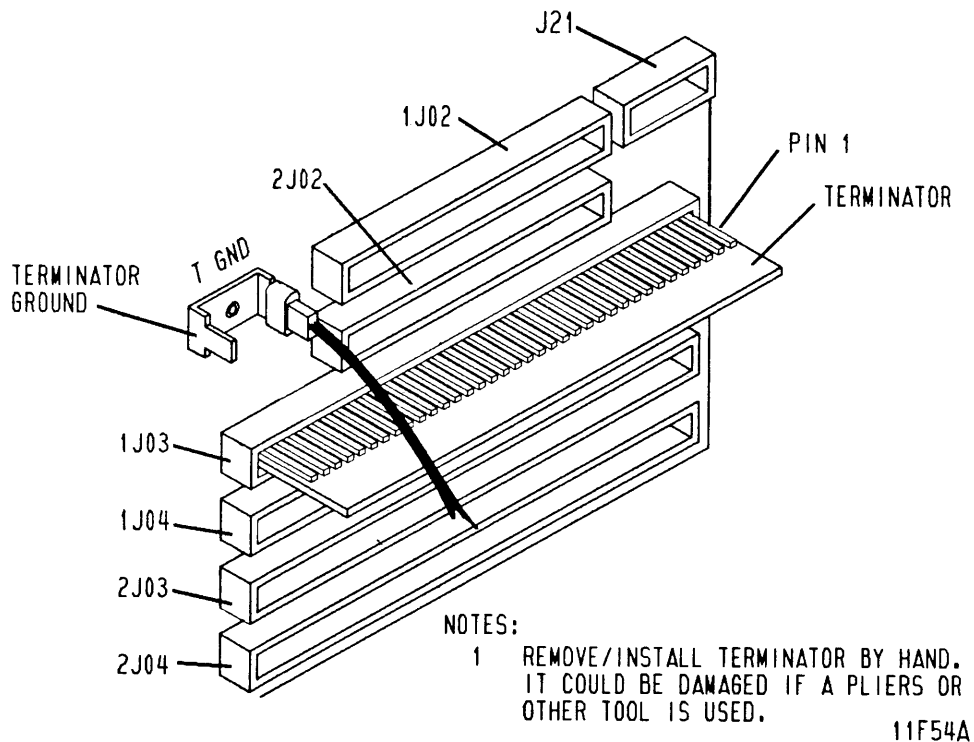


Figure 3-16. Terminator Installation (Typical)

## SYSTEM GROUNDING

This section contains instructions on grounding the system to the drive. It is assumed that the site has been prepared in accordance with the site requirements information provided earlier in this section. The following procedures describe how to ground the system in a star or daisy chain configuration as shown in figure 3-17. Refer to Accessories in section 4 for part numbers of grounding accessories.

Interconnect cabling is supplied with each drive and installed on site, between case ground on each drive and case ground on its power supply. Refer to mounting drive and power supply procedure in this section, for instructions on attaching ground cable between drive and power supply.

### Star Grounding Procedure

This procedure describes how to ground the system in a star configuration. In this configuration, ground straps connect the controller ground to each drive in the system as shown in figure 3-17.

NOTE

Repeat steps 3 and 4 for each drive in star system.

3. Connect an A cable from controller to drive connector J04.
4. Install terminator on drive connector J03 and make terminator ground connection (see figure 3-16). Terminators are required on all drives in a star system.
5. Perform Cable Clamping Procedure (which follows) to ensure proper shielding of I/O cables.

### Cable Clamping Procedure

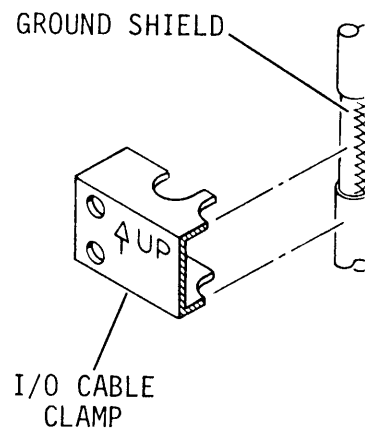
NOTE

There are several locations on each I/O cable where heat shrink tubing can be removed to expose the ground shield. The ground shield should be exposed only where necessary to establish a proper ground.

1. On drives with single-clamp (older) configuration, install I/O cable clamp as follows:

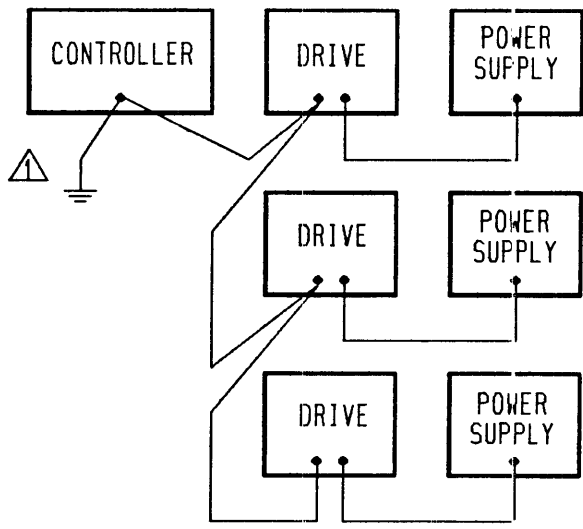
- a. Strip heat shrink tubing from all cables so that bare shielding will be in contact with the top of the I/O cable clamp and will not be in contact with the bottom of the clamp.

- b. Place I/O cable clamp onto cable bracket with cables and clamp positioned as shown. Loosely install two lower screws. Clamp must be installed with arrow pointing up.

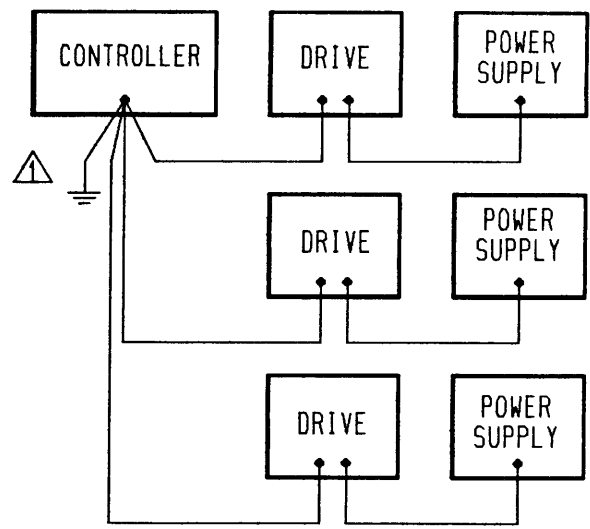


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- c. Install I/O cable cover onto cable bracket with remaining two screws. Tighten two lower screws.



DAISY CHAIN CONFIGURATION



STAR CONFIGURATION

NOTES:

△ EARTH GROUND CONNECTION

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Figure 3-17. System Grounding Diagram

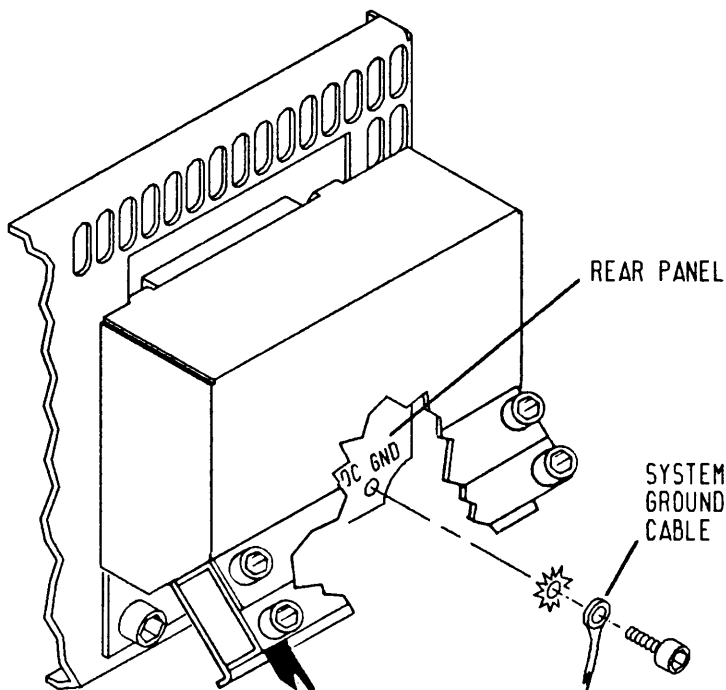
1. Prepare ground straps as follows:
  - a. Allowing sufficient length for drive extension, cut ground straps to length needed for the following connections:
    - Controller to earth ground
    - Controller to each drive
  - b. Crimp and solder terminal lugs to both ends of each ground strap.
2. Referring to figure 3-17, connect ground straps to controller as follows:
  - a. Connect one end of each of the ground straps to controller ground terminal.

- b. Connect one of the ground straps to earth ground.
  - c. Route the remaining ground straps to the drives.
3. Connect a ground strap from controller to each drive as follows:
    - a. Remove screw and lockwasher from the system ground terminal (DC GND) on each drive. See figure 3-18.
    - b. Referring to figure 3-18, attach system ground strap to drive ground terminal. Ensure that lockwasher is between ground strap and ground terminal.

### Daisy Chain Grounding Procedure

This procedure describes how to ground the system in a daisy chain configuration. In this configuration, a ground strap connects the controller ground to the first drive in the system. The remainder of the drives are connected by grounding straps going from the first drive to the second, the second to the third, and so on. See figure 3-17.

1. Prepare ground straps as follows:



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Figure 3-18. System Grounding



- a. Allowing sufficient length for drive extension, cut ground straps to length needed for the following connections:
    - Controller to earth ground
    - Controller to nearest drive
    - Each drive to next drive in daisy chain
  - b. Crimp and solder terminal lugs to both ends of each ground strap.
2. Referring to figure 3-17, connect ground straps to controller as follows:
    - a. Connect two ground straps to controller ground terminal.
    - b. Connect one of the ground straps to earth ground.
    - c. Route the other ground strap to the first drive in the daisy chain. Route the remaining ground straps (prepared in step 1) from drive to drive.
  3. Make the daisy chain ground connections at each drive as follows:
    - a. Remove screw and lockwasher from the system ground terminal (DC GND) on each drive. See figure 3-18.
    - b. Referring to figure 3-18, attach system ground strap to drive ground terminal. Ensure that lockwasher is between ground strap and ground terminal.

## SETTING CIRCUIT BOARD SWITCHES

The circuit boards inside the drive contain a number of switches that must be set correctly for normal operation of the drive. The following pictures and tables contain information about switch settings:

- Figure 3-19 -- identifies switches and gives their locations on the I/O board.
- Table 3-3 -- lists the possible settings for normal drive operation for all switches on the I/O board.
- Figure 3-20 -- identifies switches and jumpers and gives their locations on the control board.

- Table 3-4 -- lists the possible settings for normal drive operation for switches on the control board. However, setting the sector switches and logical address is covered later in this section.
- Table 3-5 -- lists the possible settings for normal drive operation for jumpers on the control board.
- Figure 3-21 -- shows pictures of actual DIP switches with instructions on setting them to either the open (off) or the closed (on) position.

Setting the circuit board switches does not require removing the top cover. Both the top cover and the rear panel have openings to allow access to the DIP switches. To examine or change the setting of the control board jumpers, you will need to remove the top cover.

You may encounter two types of switches. Rocker switches are actuated by pressing one end of the actuator or the other (rocking it) to turn the switch on (closed) or off (open). Slide switches are actuated by sliding the actuator one way or the other to turn the switch on or off. Use a slender ball point pen, a straightened paper clip, or any similar object to change switch settings. Do not use a lead pencil point as it may break off and lodge in the switch, or cause the switch to malfunction.

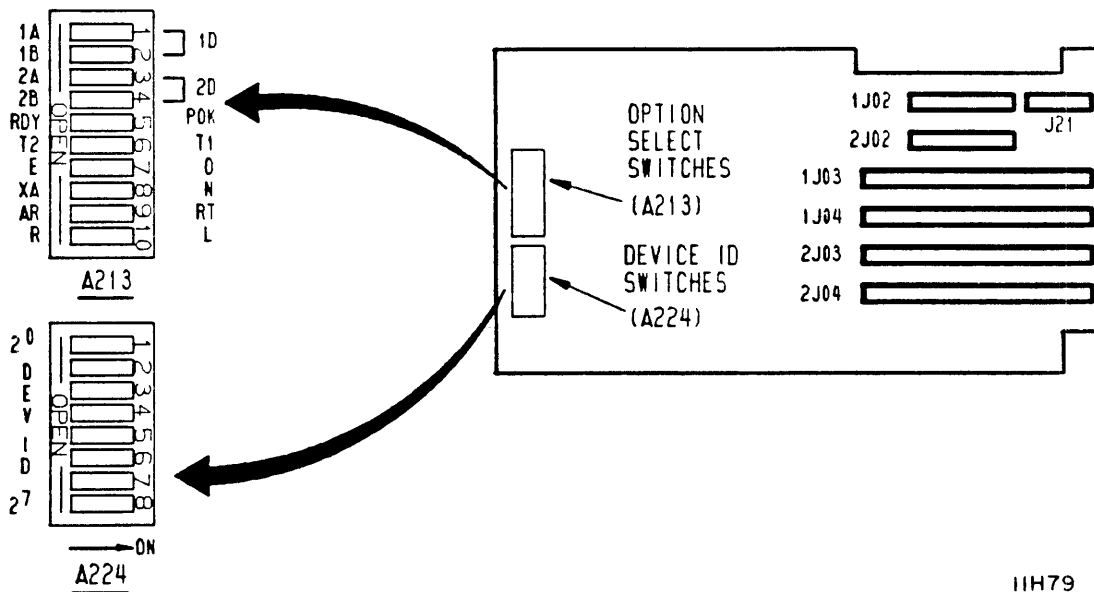


Figure 3-19. I/O Board Switches

TABLE 3-3. I/O BOARD SWITCHES

Switch	Setting	Description
1A/1D, 1B/1D		Enable/Disable CH 1 and select an option for sending Index & Sector (I & S) to CH 1 controller. The four combinations of switch settings are as follows:
1A/1D 1B/1D	1A 1D	This pair of switch settings enables CH 1 & sends I & S on A cable only
1A/1D 1B/1D	1D 1B	This pair of switch settings enables CH 1 & sends I & S on B cable only
1A/1D 1B/1D	1A 1B	This pair of switch settings enables CH 1 & sends I & S on A and B cables
1A/1D 1B/1D	1D 1D	This pair of switch settings disables CH 1
2A/2D, 2B/2D		Enable/Disable CH 2 and select an option for sending Index & Sector to CH 2 controller (see description of CH 1 switches)
RDY/POK	RDY	Normal I/O Ready status (Up to speed, heads loaded and no fault exists)
	POK	Ready status with Power OK. In addition to above conditions (when switch is in RDY), Ready status also indicates that the optional power supply we provide has an acceptable ac input voltage. If the ac input voltage drops, Ready status goes inactive at least 5 milliseconds before a voltage fault is registered.
Table Continued on Next Page		

TABLE 3-3. I/O BOARD SWITCHES (Contd)

Switch	Setting	Description
T2/T1		Selects type of extended cylinder addressing, provided that XA/N switch is set in XA position.
	T2	Enables Extended Cylinder Address bits $2^{10}$ and $2^{11}$ , via Tag 2 (Head Select). Can be selected in either SMD-0 or SMD-E mode.
	T1	Enables Extended Cylinder Address bit $2^{10}$ , via Tag 1 (Cylinder Select). Can be selected in either SMD-0 or SMD-E mode, but Tags 4 and 6 are unusable with this selection.
E/O	E	SMD-E mode (Tags 1-6)
	O	SMD-O mode (Tags 1-3)
XA/N	XA	Extended Cylinder Address (cylinders 0-1217); method set by T2/T1 switch
	N	Normal Cylinder Address (cylinders 0-1023): T2/T1 switch has no effect
AR/RT	AR	Absolute Reserve (Dual Channel)
	RT	Reserve Timer (Dual Channel)
R/L	R	Remote power on
	L	Local power on
DEV ID $2^0-2^7$	(Closed)	Set according to customer requirements.

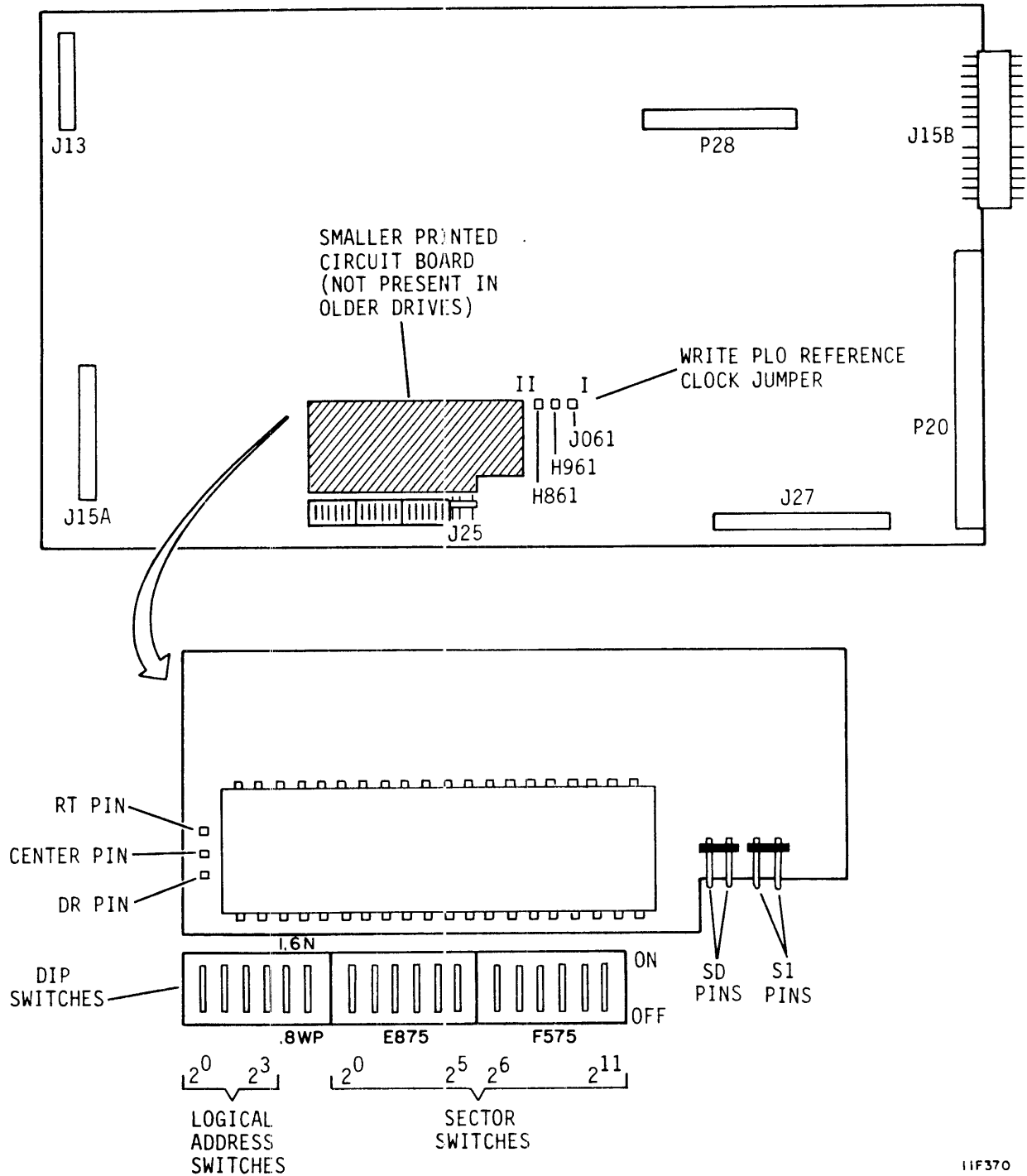


Figure 3-20. Control Board Switches and Jumpers

TABLE 3-4. CONTROL BOARD SWITCHES

Switch	Setting	Description
Sector Switches		See discussion on Setting Sector Switches.
Logical Address Switches		Used on drives without operator panel or status/control panel. See discussion on Setting Logical Address Switches.
.8/1.6	.8	0.8 MHz Sector Clock
	1.6	1.6 MHz Sector Clock
WP/N	WP	Write Protect: prevents write operations
	N	Normal: allows write operations

TABLE 3-5. CONTROL BOARD JUMPERS

Jumper	Setting	Description
SD Jumper*	Connected	Disables sweep cycles.
	Discon- nected	Enables sweep cycles.
S1 Jumper*	Connected	Disables the option for sweep only on seeks.
	Discon- nected	Enables the option for sweep only on seeks
DR/RT Jumper*	RT	Enables the option to return the heads to their original position following a sweep segment.
	DR	Disables that option.
Write PLO Reference Clock Jumper	I	Jumper is properly set at factory and must not be changed.  For 368 MB drives, jumper is preset during manufacturing between H961 and J061.
	II	For 500 MB drives, jumper is preset during manufacturing between H861 and H961.
<p>* Read Programming the Sweep Cycle Function before selecting sweep cycle options. Some controllers will not function with sweep cycle enabled.</p>		

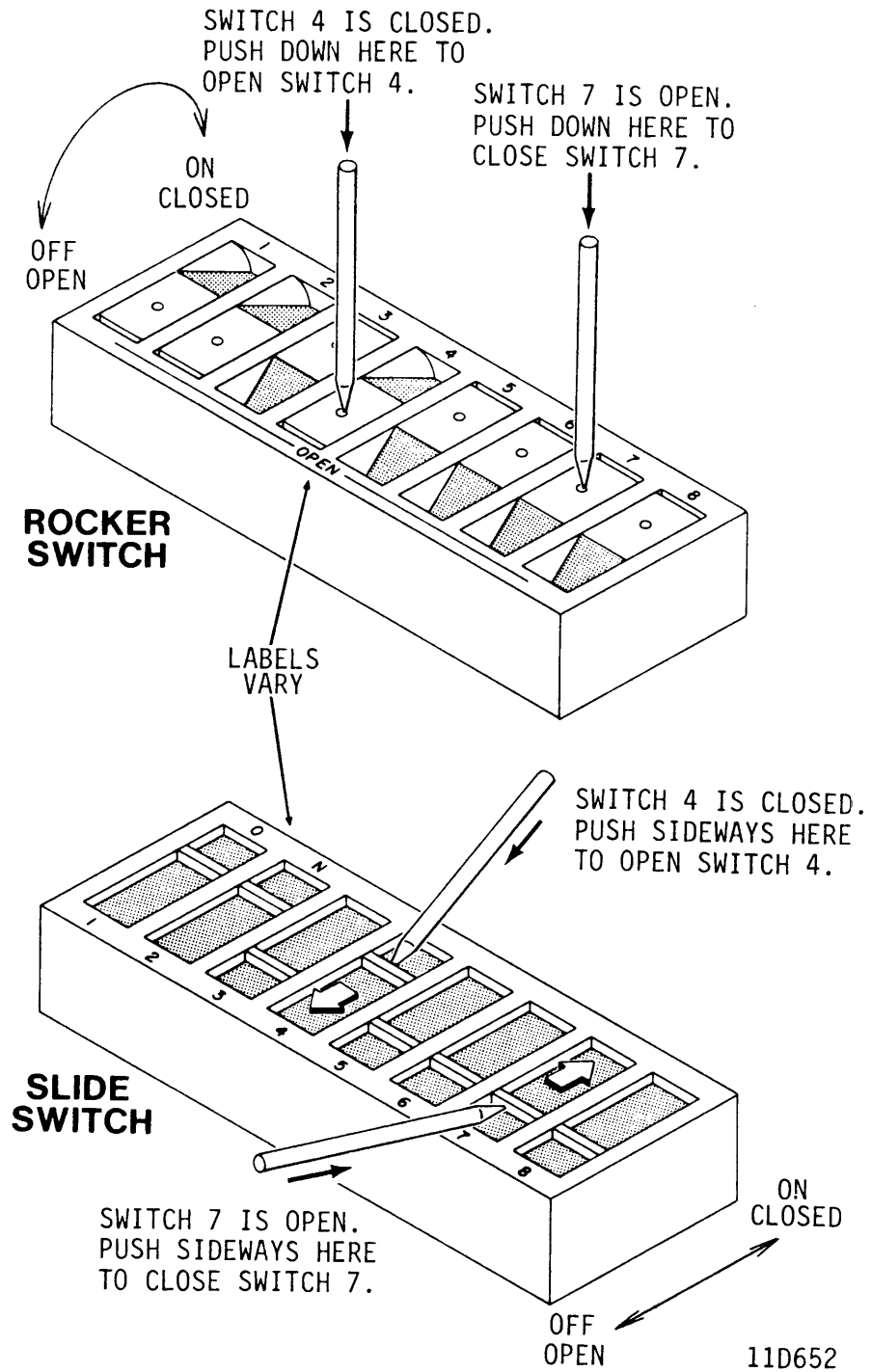


Figure 3-21. How to Set DIP Switches



## Setting Logical Address Switches

The control board logical address switch settings are shown in table 3-6. For drives with an operator panel or status/control panel, the Logical Address switch settings on the control board are ignored. Set the logical address on either panel by pressing the Logical Address switch and observing the indicators, displayed in binary (see figure 2-1).

TABLE 3-6. LOGICAL ADDRESS SWITCHES ON CONTROL BOARD

Logical Address	Switch (Binary)*				Logical Address	Switch (Binary)*			
	2 <sup>0</sup>	2 <sup>1</sup>	2 <sup>2</sup>	2 <sup>3</sup>		2 <sup>0</sup>	2 <sup>1</sup>	2 <sup>2</sup>	2 <sup>3</sup>
0	C	C	C	C	8	C	C	C	O
1	O	C	C	C	9	O	C	C	O
2	C	O	C	C	10	C	O	C	O
3	O	O	C	C	11	O	O	C	O
4	C	C	O	C	12	C	C	O	O
5	O	C	O	C	13	O	C	O	O
6	C	O	O	C	14	C	O	O	O
7	O	O	O	C	15	O	O	O	O

\* O = Open (Off), C = Closed (On)

## Programming the Sweep Cycle Function

The sweep cycle is a feature that periodically moves the heads to different locations on the discs during intervals when the drive is idle. The following are highlights of the sweep cycle function:

- Using the sweep cycle enhances drive reliability. We encourage you either to enable the drive sweep cycle or to use a sweep cycle driven at the system or subsystem level. Consult with an analyst in making this choice.
- There are several sweep cycle options available at the drive level. Make sure that the selected option is compatible with system operation.
- Our testing has verified that sweep activity results in lower particle count in the module.
- The sweep routine consumes 11 seconds of a 13-hour period. Thus, the drive is available to the system more than 99% of the time.
- You can disable the sweep cycle (described below) without affecting the specified Mean Time Between Failures (MTBF) or warranty agreements.

The drive is preset during manufacturing with a set of sweep cycle options selected. Three jumpers on a smaller printed circuit board control the selection, as shown in figure 3-20.

The three sweep cycle jumpers are labeled SD, S1, and DR/RT. The following paragraphs discuss the functions controlled by each jumper and tell different ways to position the jumpers:

SD -- enables or disables the sweep cycle function. The jumper can be positioned as follows:

- Connecting the two pins --- disables the sweep cycle function. The other jumpers then have no effect.
- Mounted on one pin (two pins not connected) -- enables the sweep cycle function.

S1 -- enables or disables the option to sweep only on seeks. When enabled, sweep movements can occur only in conjunction with seeks required by the controller. Each time the drive performs a sweep cycle, it starts a 12-minute timeout. When the timeout has elapsed, the drive performs another sweep cycle only when it receives a Seek command (Tag 1). When combining a sweep cycle with a seek, the drive performs the sweep cycle first and then executes the Seek command. The jumper can be positioned as follows:

- Connecting the two pins -- disables the option to sweep only on seeks (sweep cycles can be initiated within the drive).
- Mounted on one pin (two pins not connected) -- enables the option to sweep only on seeks.

DR/RT -- enables or disables the option to return the heads to their original cylinder following a sweep segment. The jumper can be positioned as follows:

- Connecting the center pin and the RT pin -- enables the option. The drive performs the sweep and, when selected, returns to the original cylinder (where it was before the sweep occurred) with the following exceptions:
  - If the sweep was initiated by a Seek command, the drive performs the sweep function and then moves the heads to the cylinder requested by the controller.
  - If the drive had not been selected during the 12 minutes prior to a sweep, the heads stay on a cylinder accessed during the sweep segment.
- Connecting the center pin and the DR pin -- disables the option. The heads always stay on a cylinder accessed during the sweep segment with the following exception: If the sweep was initiated by a Seek command, the drive performs the sweep function and then moves the heads to the cylinder requested by the controller.

## Setting Sector Switches

Setting the sector select switches is discussed in the following paragraphs. Refer to the subsystem or controller reference manual to determine the number of sectors (or the bytes/sector) required by the controller. To achieve that requirement, the following settings are required:

- Sector switches -- See figure 3-20.
- Sector Clock switch (.8/1.6) -- See figure 3-20.

Your task of setting the sector switches on the drive is relatively easy if you already understand the various choices available. There are a number of selection methods, each described by a separate table of selections. If you know how many sectors are needed or the number of bytes in each sector, refer to the switch selection tables, make the suggested settings, and proceed with the drive installation. However, if you need more information about the different methods before you choose one of them, read on. The following material will step you through the selection process.

Additional background information about sector selection appears in appendix B. For most installations it will not be necessary to refer to appendix B. However, some systems designers, when matching a disc drive to a specific controller, choose a sector length different from any given here in the tables. In cases like this, the material in the appendix relates arbitrary sector lengths to switch settings.

Eight tables are needed to cover all the possibilities for sector selection on the drives described in this manual. The following variables make it necessary to use multiple tables:

- Drive Capacity -- the 368 MB drive and the 500 MB drive have different numbers of bytes per track.
- Sector Clock Frequency -- selecting either 0.8 MHz or 1.6 MHz affects the switch settings and in some cases the number of bytes per sector.
- Round-up and Round-down Methods -- produce differing results when the number of sector clock pulses per revolution is not evenly divisible by the number of sectors. The problem of an uneven division can be solved by methods of either rounding up or rounding down the result.

## Round-down and Round-up Methods

Figure 3-22 uses an example of 63 sectors to show how the two methods differ both in terms of sector lengths and in the presence or absence of an extra sector pulse. This illustration also lists and describes the various tables.

For the round-down method, the sector tables list the bytes in usable sectors and the bytes in the runt sector. A runt sector is a short interval following the last usable sector. When a runt sector occurs, it is preceded by an extra sector pulse.

For the round-up method, the sector tables list the bytes in early sectors and the bytes in the last sector. The last sector can be somewhat shorter than the other sectors. There is no runt sector (or extra sector pulse), however.

The round-up and round-down methods yield the same results for many sector counts. In these cases, the two methods call for identical switch settings.

The choice of sector clock frequencies (via the .8/1.6 switch) can affect the lengths of the usable sectors (round-down and round-up methods), the runt sector (round-down method), or the last sector (round-up method).

## Exact Sector Lengths

The sector selection tables provide idealized values for sector lengths. Deriving exact values from these idealized values requires an adjustment. This adjustment must be considered if the chosen sector length allows minimal overhead.

The adjustment must be made to calculate the actual lengths of the first sector (logical sector 0) and the last sector. For each drive type and sector clock combination, table 3-6.1 lists the number of bytes of adjustment that must be added to the first sector and subtracted from the last sector.

TABLE 3-6.1. SECTOR LENGTH ADJUSTMENT

Drive Type	Sector Clock	Adjustment (Bytes)
368 MB	0.8 MHz	2.25
368 MB	1.6 MHz	4.00
500 MB	0.8 MHz	3.00
500 MB	1.6 MHz	5.25

The following examples show how to calculate exact sector lengths for the round-down method and then the round-up method. These examples are based on selecting 63 sectors on a 368 MB drive with the 0.8 MHz sector clock. Table 3-6.1 indicates for this case that the adjustment is 2.25 bytes.

Example 1: Round-down method (see table 3-7)

Values from table

Sectors 0 thru 62 = 479.25 bytes

Runt Sector = 47.25 bytes

Adjusted values

Sector 0 =  $479.25 + 2.25 = 481.50$  bytes

Sectors 1 thru 62 = 479.25 bytes

Runt Sector =  $47.25 - 2.25 = 45.00$  bytes

Example 2: Round-up method (see table 3-9)

Values from table

Sectors 1 thru 61 = 481.50 bytes

Sector 62 = 387.00 bytes

Adjusted values

Sector 0 =  $481.50 + 2.25 = 483.75$  bytes

Sectors 1 thru 61 = 481.50 bytes

Sector 62 =  $387.00 - 2.25 = 384.75$  bytes

If a round-down sector table indicates either no runt or a very short runt, in actuality the last usable sector is shortened. Example 3 is based on selecting 89 sectors on a 368 MB drive with the 1.6 MHz sector clock:

Example 3: Round-down method (see table 3-8)

<u>Values from table</u>	<u>Adjusted values</u>
Sectors 0 thru 88 = 339.75 bytes	Sector 0 = $339.75 + 4.00 = 343.75$ bytes
	Sectors 1 thru 88 = 339.75 bytes
Runt Sector = 2.25 bytes	Runt Sector = $2.25 - 4.00 = -1.75$ bytes

A negative runt sector length doesn't make sense, however. The numbers indicate that there really is no runt and that sector 88 is shortened by 1.75 bytes. Expressing these results more sensibly:

Sector 0 =  $339.75 + 4.00 = 343.75$  bytes  
Sectors 1 thru 87 = 339.75 bytes  
Sector 88 =  $339.75 - 1.75 = 338.00$  bytes

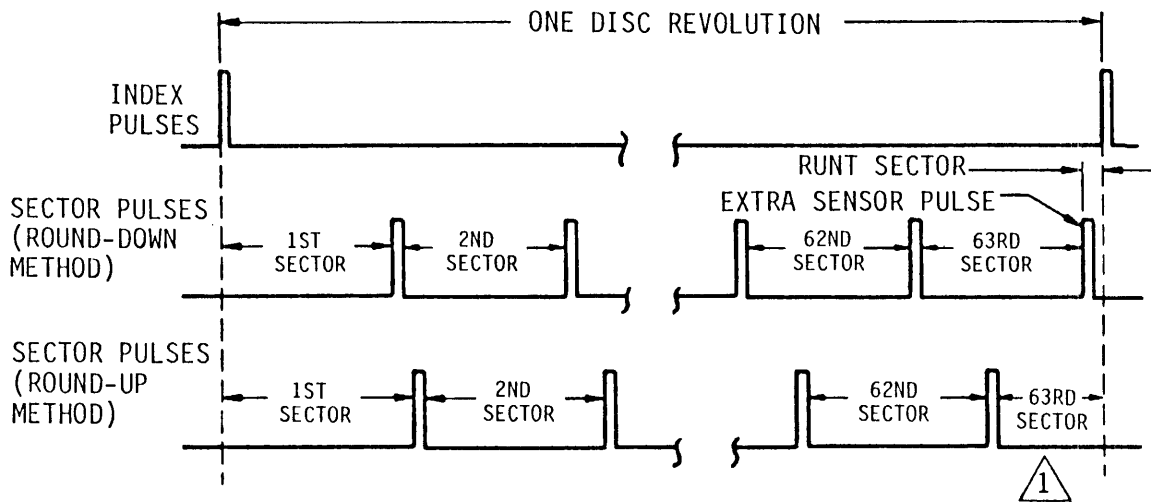
Making the Selection

You must decide now which sector selection table you will use for switch setting information. If you don't know which table is best, compare the sector lengths listed in each of the tables to the requirements of the controller. The choice of tables may be arbitrary, or one of the tables may offer a real advantage over the others.

The Sector Select switch assembly has twelve independent switches used for selecting sectors. These switches and the .8/1.6 switch are located on the control board as shown in figure 3-20. Across from the number of sectors listed in each table is a row of Cs and Os. C represents the Closed (On) position of the sector switch. O represents the Open (Off) position of the sector switch. Set the switches to the positions designated in the table while referring to figure 3-21 for an illustration of the switch positions. Verify also that the .8/1.6 switch is set correctly.

For future reference, you may want to record the switch settings you made. Use the following worksheet:

Table Used: _____
Number of Sectors: _____
Switch Settings:
Switch E875: 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___
Switch F575: 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___
.8/1.6 Switch: _____



NOTES:

- ① WITH ROUND-UP METHOD, LAST SECTOR MAY BE SHORTER THAN EARLY SECTORS.

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SELECTING A TABLE FOR 368 MB DRIVES:

	Round-down Method	Round-up Method
0.8 MHz Clock	Table 3-7	Table 3-9
1.6 MHz Clock	Table 3-8	Table 3-10

SELECTING A TABLE FOR 500 MB DRIVES:

	Round-down Method	Round-up Method
0.8 MHz Clock	Table 3-11	Table 3-13
1.6 MHz Clock	Table 3-12	Table 3-14

Figure 3-22. Choosing a Sector Selection Method



TABLE 3-7. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 0.8 MHZ CLOCK AND ROUND-DOWN METHOD

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
4	C	C	C	C	C	O	O	O	C	O	C	C	7560	0
5	C	C	C	C	C	C	C	O	O	C	O	C	6048	0
6	C	C	C	C	C	C	O	C	O	O	O	C	5040	0
7	C	C	C	C	C	C	C	O	C	C	C	O	4320	0
8	C	C	C	C	O	O	O	C	O	C	C	O	3780	0
9	O	O	C	O	C	O	C	C	C	O	C	O	3359.25	6.75
10	C	C	C	C	C	C	O	O	C	O	C	O	3024	0
11	O	O	C	O	O	O	C	C	O	O	C	O	2747.25	20.25
12	C	C	C	C	C	O	C	O	O	O	C	O	2520	0
13	O	O	O	C	O	O	O	O	O	O	C	O	2324.25	24.75
14	C	C	C	C	C	C	O	C	C	C	O	O	2160	0
15	C	C	C	C	C	C	C	O	C	C	O	O	2016	0
16	C	C	C	O	O	O	C	O	C	C	O	O	1890	0
17	C	O	C	O	C	O	O	O	C	C	O	O	1777.50	22.50
18	C	O	O	C	O	C	C	C	O	C	O	O	1678.50	27
19	O	C	O	O	O	O	C	C	O	C	O	O	1590.75	15.75
20	C	C	C	C	C	O	O	C	O	C	O	O	1512	0
21	C	C	C	C	C	C	C	O	O	C	O	O	1440	0
22	C	O	O	O	O	C	C	O	O	C	O	O	1372.50	45
23	C	C	C	O	O	O	C	O	O	C	O	O	1314	18
24	C	C	C	C	O	C	O	O	O	C	O	O	1260	0
25	O	O	O	C	C	O	O	O	O	C	O	O	1208.25	33.75
26	C	C	O	O	O	O	O	O	O	C	O	O	1161	54
27	O	O	O	O	C	C	C	C	C	O	O	O	1118.25	47.25
28	C	C	C	C	C	O	C	C	C	O	O	O	1080	0
29	O	C	C	C	O	O	C	C	C	O	O	O	1041.75	29.25
30	C	C	C	C	C	C	O	C	C	O	O	O	1008	0
31	O	O	O	O	C	C	O	C	C	O	O	O	974.25	38.25
32	C	C	O	O	O	C	O	C	C	O	O	O	945	0
33	O	C	C	O	C	O	O	C	C	O	O	O	915.75	20.25
34	O	C	O	C	O	O	O	C	C	O	O	O	888.75	22.50
35	C	C	C	C	C	C	C	O	C	O	O	O	864	0
36	O	O	C	O	C	C	C	O	C	O	O	O	839.25	27
37	O	C	O	C	O	C	C	O	C	O	O	O	816.75	20.25
38	O	O	O	O	O	C	C	O	C	O	O	O	794.25	58.50
39	C	C	C	O	C	O	C	O	C	O	O	O	774	54
40	C	C	C	C	O	O	C	O	C	O	O	O	756	0
41	O	C	C	O	O	O	C	O	C	O	O	O	735.75	74.25
42	C	C	C	C	C	C	O	O	C	O	O	O	720	0
43	C	C	C	O	C	C	O	O	C	O	O	O	702	54
44	O	O	O	O	C	C	O	O	C	O	O	O	686.25	45
45	C	O	O	C	O	C	O	O	C	O	O	O	670.50	67.50

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-7. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
 USING 0.8 MHZ CLOCK AND ROUND-DOWN METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
46	C	C	O	O	O	C	O	O	C	O	O	O	657	18
47	O	O	C	C	C	O	O	O	C	O	O	O	641.25	101.25
48	C	C	C	O	C	O	O	O	C	O	O	O	630	0
49	C	O	O	O	C	O	O	O	C	O	O	O	616.50	31.50
50	C	C	O	C	O	O	O	O	C	O	O	O	603	90
51	O	C	C	O	O	O	O	O	C	O	O	O	591.75	60.75
52	C	O	O	O	O	O	O	O	C	O	O	O	580.50	54
53	O	O	C	C	C	C	C	C	O	O	O	O	569.25	69.75
54	C	C	C	O	C	C	C	C	O	O	O	O	558	108
55	C	C	O	O	C	C	C	C	O	O	O	O	549	45
56	C	C	C	C	O	C	C	C	O	O	O	O	540	0
57	O	C	O	C	O	C	C	C	O	O	O	O	528.75	101.25
58	O	C	C	O	O	C	C	C	O	O	O	O	519.75	94.50
59	O	C	O	O	O	C	C	C	O	O	O	O	510.75	105.75
60	C	C	C	C	C	O	C	C	O	O	O	O	504	0
61	C	C	O	C	C	O	C	C	O	O	O	O	495	45
62	C	C	C	O	C	O	C	C	O	O	O	O	486	108
63	O	O	C	O	C	O	C	C	O	O	O	O	479.25	47.25
64	C	O	O	O	C	O	C	C	O	O	O	O	472.50	0
65	C	O	C	C	O	O	C	C	O	O	O	O	463.50	112.50
66	O	C	O	C	O	O	C	C	O	O	O	O	456.75	94.50
67	C	C	C	O	O	O	C	C	O	O	O	O	450	90
68	O	O	C	O	O	O	C	C	O	O	O	O	443.25	99
69	C	O	O	O	O	O	C	C	O	O	O	O	436.50	121.50
70	C	C	C	C	C	C	O	C	O	O	O	O	432	0
71	O	O	C	C	C	C	O	C	O	O	O	O	425.25	47.25
72	C	O	O	C	C	C	O	C	O	O	O	O	418.50	108
73	C	C	C	O	C	C	O	C	O	O	O	O	414	18
74	O	O	C	O	C	C	O	C	O	O	O	O	407.25	103.50
75	O	C	O	O	C	C	O	C	O	O	O	O	402.75	33.75
76	C	C	C	C	O	C	O	C	O	O	O	O	396	144
77	C	O	C	C	O	C	O	C	O	O	O	O	391.50	94.50
78	C	C	O	C	O	C	O	C	O	O	O	O	387	54
79	C	O	O	C	O	C	O	C	O	O	O	O	382.50	22.50
80	C	C	C	O	O	C	O	C	O	O	O	O	378	0
81	O	O	C	O	O	C	O	C	O	O	O	O	371.25	168.75
82	O	C	O	O	O	C	O	C	O	O	O	O	366.75	166.50
83	O	O	O	O	O	C	O	C	O	O	O	O	362.25	173.25
84	C	C	C	C	C	O	O	C	O	O	O	O	360	0
85	C	O	C	C	C	O	O	C	O	O	O	O	355.50	22.50
86	C	C	O	C	C	O	O	C	O	O	O	O	351	54
87	C	O	O	C	C	O	O	C	O	O	O	O	346.50	94.50

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-7. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 0.8 MHz CLOCK AND ROUND-DOWN METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
88	C	C	C	O	C	O	O	C	O	O	O	O	342	144
89	O	C	C	O	C	O	O	C	O	O	O	O	339.75	2.25
90	O	O	C	O	C	O	O	C	O	O	O	O	335.25	67.50
91	O	C	O	O	C	O	O	C	O	O	O	O	330.75	141.75
92	C	O	O	O	C	O	O	C	O	O	O	O	328.50	18
93	C	C	C	C	O	O	O	C	O	O	O	O	324	108
94	C	O	C	C	O	O	O	C	O	O	O	O	319.50	207
95	O	O	C	C	O	O	O	C	O	O	O	O	317.25	101.25
96	C	C	O	C	O	O	O	C	O	O	O	O	315	0
97	C	O	O	C	O	O	O	C	O	O	O	O	310.50	121.50
98	O	O	O	C	O	O	O	C	O	O	O	O	308.25	31.50
99	O	C	C	O	O	O	O	C	O	O	O	O	303.75	168.75
100	C	O	C	O	O	O	O	C	O	O	O	O	301.50	90
101	O	O	C	O	O	O	O	C	O	O	O	O	299.25	15.75
102	O	C	O	O	O	O	O	C	O	O	O	O	294.75	175.50
103	C	O	O	O	O	O	O	C	O	O	O	O	292.50	112.50
104	O	O	O	O	O	O	O	C	O	O	O	O	290.25	54
105	C	C	C	C	C	C	C	O	O	O	O	O	288	0
106	C	O	C	C	C	C	C	O	O	O	O	O	283.50	189
107	O	O	C	C	C	C	C	O	O	O	O	O	281.25	146.25
108	C	C	O	C	C	C	C	O	O	O	O	O	279	108
109	O	C	O	C	C	C	C	O	O	O	O	O	276.75	74.25
110	C	O	O	C	C	C	C	O	O	O	O	O	274.50	45
111	O	O	O	C	C	C	C	O	O	O	O	O	272.25	20.25
112	C	C	C	O	C	C	C	O	O	O	O	O	270	0
113	C	O	C	O	C	C	C	O	O	O	O	O	265.50	238.50
114	O	O	C	O	C	C	C	O	O	O	O	O	263.25	229.50
115	C	C	O	O	C	C	C	O	O	O	O	O	261	225
116	O	C	O	O	C	C	C	O	O	O	O	O	258.75	225
117	C	O	O	O	C	C	C	O	O	O	O	O	256.50	229.50
118	O	O	O	O	C	C	C	O	O	O	O	O	254.25	238.50
119	C	C	C	C	O	C	C	O	O	O	O	O	252	252
120	C	C	C	C	O	C	C	O	O	O	O	O	252	0
121	O	C	C	C	O	C	C	O	O	O	O	O	249.75	20.25
122	C	O	C	C	O	C	C	O	O	O	O	O	247.50	45
123	O	O	C	C	O	C	C	O	O	O	O	O	245.25	74.25
124	C	C	O	C	O	C	C	O	O	O	O	O	243	108
125	O	C	O	C	O	C	C	O	O	O	O	O	240.75	146.25
126	C	O	O	C	O	C	C	O	O	O	O	O	238.50	189
127	O	O	O	C	O	C	C	O	O	O	O	O	236.25	236.25
128	O	O	O	C	O	C	C	O	O	O	O	O	236.25	0

\* C = Closed or On; O = Open or Off

TABLE 3-8. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-DOWN METHOD

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
7	C	C	C	C	C	C	C	C	O	C	C	C	4320	0
8	C	C	C	C	C	O	O	O	C	O	C	C	3780	0
9	C	O	O	C	O	C	O	C	C	C	O	C	3359.25	6.75
10	C	C	C	C	C	C	C	O	O	C	O	C	3024	0
11	O	C	O	C	O	O	O	C	C	O	O	C	2748.37	7.87
12	C	C	C	C	C	C	O	C	O	O	O	C	2520	0
13	O	C	O	O	C	O	O	O	O	O	O	C	2325.37	10.12
14	C	C	C	C	C	C	C	O	C	C	C	O	2160	0
15	C	C	C	C	C	C	C	C	O	C	C	O	2016	0
16	C	C	C	C	O	O	O	C	O	C	C	O	1890	0
17	O	O	C	C	O	C	O	O	O	C	C	O	1778.62	3.37
18	O	O	C	O	C	O	C	C	C	O	C	O	1679.62	6.75
19	C	O	C	O	O	O	O	C	C	O	C	O	1590.75	15.75
20	C	C	C	C	C	C	O	O	C	O	C	O	1512	0
21	C	C	C	C	C	C	C	C	O	O	C	O	1440	0
22	O	O	C	O	O	O	C	C	O	O	C	O	1373.62	20.25
23	C	C	C	C	O	O	O	C	O	O	C	O	1314	18
24	C	C	C	C	C	O	C	O	O	O	C	O	1260	0
25	O	C	O	O	C	C	O	O	O	O	C	O	1209.37	5.62
26	O	O	O	C	O	O	O	O	O	O	C	O	1162.12	24.75
27	O	C	O	O	O	C	C	C	C	C	O	O	1119.37	16.87
28	C	C	C	C	C	C	O	C	C	C	O	O	1080	0
29	C	O	C	C	C	O	O	C	C	C	O	O	1041.75	29.25
30	C	C	C	C	C	C	C	O	C	C	O	O	1008	0
31	O	C	O	O	O	C	C	O	C	C	O	O	975.37	3.37
32	C	C	C	O	O	O	C	O	C	C	O	O	945	0
33	C	O	C	C	O	C	O	O	C	C	O	O	915.75	20.25
34	C	O	C	O	C	O	O	O	C	C	O	O	888.75	22.50
35	C	C	C	C	C	C	C	C	O	C	O	O	864	0
36	C	O	O	C	O	C	C	C	O	C	O	O	839.25	27
37	C	O	C	O	C	O	C	C	O	C	O	O	816.75	20.25
38	O	C	O	O	O	O	C	C	O	C	O	O	795.37	15.75
39	O	O	O	O	C	C	O	C	O	C	O	O	775.12	10.12
40	C	C	C	C	C	O	O	C	O	C	O	O	756	0
41	O	C	C	C	O	O	O	C	O	C	O	O	736.87	28.12
42	C	C	C	C	C	C	C	O	O	C	O	O	720	0
43	O	O	O	O	C	C	C	O	O	C	O	O	703.12	5.62
44	C	O	O	O	O	C	C	O	O	C	O	O	686.25	45
45	O	O	C	O	C	O	C	O	O	C	O	O	671.62	16.87

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-8. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-DOWN METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
46	C	C	C	O	O	O	C	O	O	C	O	O	657	18
47	O	C	O	C	C	C	O	O	O	C	O	O	642.37	48.37
48	C	C	C	C	O	C	O	O	O	C	O	O	630	0
49	C	C	O	O	O	C	O	O	O	C	O	O	616.50	31.50
50	O	O	O	C	C	O	O	O	O	C	O	O	604.12	33.75
51	O	C	C	C	O	O	O	O	O	C	O	O	592.87	3.37
52	C	C	O	O	O	O	O	O	O	C	O	O	580.50	54
53	O	C	O	C	C	C	C	C	C	O	O	O	570.37	10.12
54	O	O	O	O	C	C	C	C	C	O	O	O	559.12	47.25
55	C	C	C	O	O	C	C	C	C	O	O	O	549	45
56	C	C	C	C	C	O	C	C	C	O	O	O	540	0
57	O	C	C	O	C	O	C	C	C	O	O	O	529.87	37.12
58	O	C	C	C	O	O	C	C	C	O	O	O	520.87	29.25
59	O	C	C	O	O	O	C	C	C	O	O	O	511.87	39.37
60	C	C	C	C	C	C	O	C	C	O	O	O	504	0
61	C	C	C	O	C	C	O	C	C	O	O	O	495	45
62	O	O	O	O	C	C	O	C	C	O	O	O	487.12	38.25
63	C	O	O	C	O	C	O	C	C	O	O	O	479.25	47.25
64	C	C	O	O	O	C	O	C	C	O	O	O	472.50	0
65	O	O	C	C	C	O	O	C	C	O	O	O	464.62	39.37
66	O	C	C	O	C	O	O	C	C	O	O	O	457.87	20.25
67	O	O	O	O	C	O	O	C	C	O	O	O	451.12	14.62
68	O	C	O	C	O	O	O	C	C	O	O	O	444.37	22.50
69	O	O	C	O	O	O	O	C	C	O	O	O	437.62	43.87
70	C	C	C	C	C	C	C	O	C	O	O	O	432	0
71	C	O	O	C	C	C	C	O	C	O	O	O	425.25	47.25
72	O	O	C	O	C	C	C	O	C	O	O	O	419.62	27
73	C	C	C	C	O	C	C	O	C	O	O	O	414	18
74	O	C	O	C	O	C	C	O	C	O	O	O	408.37	20.25
75	C	O	C	O	O	C	C	O	C	O	O	O	402.75	33.75
76	O	O	O	O	O	C	C	O	C	O	O	O	397.12	58.50
77	O	O	C	C	C	O	C	O	C	O	O	O	392.62	7.87
78	C	C	C	O	C	O	C	O	C	O	O	O	387	54
79	C	C	O	O	C	O	C	O	C	O	O	O	382.50	22.50
80	C	C	C	C	O	O	C	O	C	O	O	O	378	0
81	O	C	O	C	O	O	C	O	C	O	O	O	372.37	77.62
82	O	C	C	O	O	O	C	O	C	O	O	O	367.87	74.25
83	O	C	O	O	O	O	C	O	C	O	O	O	363.37	79.87
84	C	C	C	C	C	C	O	O	C	O	O	O	360	0
85	C	C	O	C	C	C	O	O	C	O	O	O	355.50	22.50
86	C	C	C	O	C	C	O	O	C	O	O	O	351	54
87	C	C	O	O	C	C	O	O	C	O	O	O	346.50	94.50

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-8. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 1.6 MHz CLOCK AND ROUND-DOWN METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
88	O	O	O	O	C	C	O	O	C	O	O	O	343.12	45
89	C	O	C	C	O	C	O	O	C	O	O	O	339.75	2.25
90	C	O	O	C	O	C	O	O	C	O	O	O	335.25	67.50
91	O	C	C	O	O	C	O	O	C	O	O	O	331.87	39.37
92	C	C	O	O	O	C	O	O	C	O	O	O	328.50	18
93	O	O	O	O	O	C	O	O	C	O	O	O	325.12	3.37
94	O	O	C	C	C	O	O	O	C	O	O	O	320.62	101.25
95	C	O	O	C	C	O	O	O	C	O	O	O	317.25	101.25
96	C	C	C	O	C	O	O	O	C	O	O	O	315	0
97	O	O	C	O	C	O	O	O	C	O	O	O	311.62	12.37
98	C	O	O	O	C	O	O	O	C	O	O	O	308.25	31.50
99	O	C	C	C	O	O	O	O	C	O	O	O	304.87	57.37
100	C	C	O	C	O	O	O	O	C	O	O	O	301.50	90
101	C	O	O	C	O	O	O	O	C	O	O	O	299.25	15.75
102	O	C	C	O	O	O	O	O	C	O	O	O	295.87	60.75
103	C	C	O	O	O	O	O	O	C	O	O	O	292.50	112.50
104	C	O	O	O	O	O	O	O	C	O	O	O	290.25	54
105	C	C	C	C	C	C	C	C	C	O	O	O	288	0
106	O	O	C	C	C	C	C	C	C	O	O	O	284.62	69.75
107	O	C	O	C	C	C	C	C	C	O	O	O	282.37	25.87
108	C	C	C	O	C	C	C	C	C	O	O	O	279	108
109	C	O	C	O	C	C	C	C	C	O	O	O	276.75	74.25
110	C	C	O	O	C	C	C	C	C	O	O	O	274.50	45
111	C	O	O	O	C	C	C	C	C	O	O	O	272.25	20.25
112	C	C	C	C	O	C	C	C	C	O	O	O	270	0
113	O	O	C	C	O	C	C	C	C	O	O	O	266.62	111.37
114	O	C	O	C	O	C	C	C	C	O	O	O	264.37	101.25
115	O	O	O	C	O	C	C	C	C	O	O	O	262.12	95.62
116	O	C	C	O	O	C	C	C	C	O	O	O	259.87	94.50
117	O	O	C	O	O	C	C	C	C	O	O	O	257.62	97.87
118	O	C	O	O	O	C	C	C	C	O	O	O	255.37	105.75
119	O	O	O	O	O	C	C	C	C	O	O	O	253.12	118.12
120	C	C	C	C	C	O	C	C	O	O	O	O	252	0
121	C	O	C	C	C	O	C	C	O	O	O	O	249.75	20.25
122	C	C	O	C	C	O	C	C	O	O	O	O	247.50	45
123	C	O	O	C	C	O	C	C	O	O	O	O	245.25	74.25
124	C	C	C	O	C	O	C	C	O	O	O	O	243	108
125	O	C	C	O	C	O	C	C	O	O	O	O	241.87	5.62
126	O	O	C	O	C	O	C	C	O	O	O	O	239.62	47.25
127	O	C	O	O	C	O	C	C	O	O	O	O	237.37	93.37
128	C	O	O	O	C	O	C	C	O	O	O	O	236.25	0

\* C = Closed or On; O = Open or Off

TABLE 3-9. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 0.8 MHz CLOCK AND ROUND-UP METHOD

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
4	C	C	C	C	C	O	O	O	C	O	C	C	7560	7560
5	C	C	C	C	C	C	C	O	O	C	O	C	6048	6048
6	C	C	C	C	C	C	C	O	C	O	O	O	5040	5040
7	C	C	C	C	C	C	C	C	O	C	C	C	4320	4320
8	C	C	C	C	O	O	O	O	C	O	C	C	3780	3780
9	C	O	C	O	C	O	O	C	C	C	O	C	3361.50	3348
10	C	C	C	C	C	C	C	O	O	C	O	C	3024	3024
11	C	O	C	O	O	O	O	C	C	O	O	C	2749.50	2745
12	C	C	C	C	C	O	O	C	O	O	O	C	2520	2520
13	C	O	O	C	O	O	O	O	O	O	O	C	2326.50	2322
14	C	C	C	C	C	C	C	O	C	C	C	O	2160	2160
15	C	C	C	C	C	C	C	C	O	C	C	O	2016	2016
16	C	C	C	O	O	O	O	C	O	C	C	O	1890	1890
17	O	C	C	O	C	O	O	O	O	C	C	O	1779.75	1764
18	O	C	O	C	O	C	O	C	C	O	C	O	1680.75	1667.25
19	C	C	O	O	O	O	O	C	C	O	C	O	1593	1566
20	C	C	C	C	C	O	O	O	C	O	C	O	1512	1512
21	C	C	C	C	C	C	C	C	O	O	C	O	1440	1440
22	O	C	O	O	O	C	O	C	O	O	C	O	1374.75	1370.25
23	O	O	O	C	O	O	O	C	O	O	C	O	1316.25	1282.50
24	C	C	C	C	O	C	O	O	O	O	C	O	1260	1260
25	C	O	O	C	C	O	O	O	O	O	C	O	1210.50	1188
26	O	O	C	O	O	O	O	O	O	O	C	O	1163.25	1158.75
27	C	O	O	O	C	C	C	C	C	C	O	O	1120.50	1107
28	C	C	C	C	C	O	O	C	C	C	O	O	1080	1080
29	C	C	C	C	O	O	O	C	C	C	O	O	1044	1008
30	C	C	C	C	C	C	C	O	C	C	O	O	1008	1008
31	C	O	O	O	C	C	O	O	C	C	O	O	976.50	945
32	C	C	O	O	O	C	O	O	C	C	O	O	945	945
33	C	C	C	O	C	O	O	O	C	C	O	O	918	864
34	C	C	O	C	O	O	O	O	C	C	O	O	891	837
35	C	C	C	C	C	C	C	C	O	C	O	O	864	864
36	C	O	C	O	C	C	C	C	O	C	O	O	841.50	787.50
37	C	C	O	C	O	C	O	C	O	C	O	O	819	756
38	C	O	O	O	O	C	O	C	O	C	O	O	796.50	769.50
39	O	O	O	C	C	O	O	C	O	C	O	O	776.25	742.50
40	C	C	C	C	O	O	O	C	O	C	O	O	756	756
41	C	C	C	O	O	O	O	C	O	C	O	O	738	720
42	C	C	C	C	C	C	C	O	O	C	O	O	720	720
43	O	O	O	C	C	C	O	O	O	C	O	O	704.25	661.50
44	C	O	O	O	C	C	O	O	O	C	O	O	688.50	634.50
45	O	C	O	C	O	C	O	O	O	C	O	O	672.75	639

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-9. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 0.8 MHZ CLOCK AND ROUND-UP METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
46	O	O	C	O	O	C	O	O	C	O	O	O	659.25	573.75
47	C	O	C	C	C	O	O	O	C	O	O	O	643.50	639
48	C	C	C	O	C	O	O	O	C	O	O	O	630	630
49	O	C	O	O	C	O	O	O	C	O	O	O	618.75	540
50	O	O	C	C	O	O	O	O	C	O	O	O	605.25	582.75
51	C	C	C	O	O	O	O	O	C	O	O	O	594	540
52	O	C	O	O	O	O	O	O	C	O	O	O	582.75	519.75
53	C	O	C	C	C	C	C	C	C	O	O	O	571.50	522
54	O	O	O	C	C	C	C	C	C	O	O	O	560.25	546.75
55	O	O	C	O	C	C	C	C	C	O	O	O	551.25	472.50
56	C	C	C	C	O	C	C	C	C	O	O	O	540	540
57	C	C	O	C	O	C	C	C	C	O	O	O	531	504
58	C	C	C	O	O	C	C	C	C	O	O	O	522	486
59	C	C	O	O	O	C	C	C	C	O	O	O	513	486
60	C	C	C	C	C	O	C	C	C	O	O	O	504	504
61	O	O	C	C	C	O	C	C	O	O	O	O	497.25	405
62	O	O	O	C	C	O	C	C	O	O	O	O	488.25	456.75
63	C	O	C	O	C	O	C	C	O	O	O	O	481.50	387
64	C	O	O	O	C	O	C	C	O	O	O	O	472.50	472.50
65	O	C	C	C	O	O	C	C	O	O	O	O	465.75	432
66	C	C	O	C	O	O	C	C	O	O	O	O	459	405
67	O	O	O	C	O	O	C	C	O	O	O	O	452.25	391.50
68	C	O	C	O	O	O	C	C	O	O	O	O	445.50	391.50
69	O	C	O	O	O	O	C	C	O	O	O	O	438.75	405
70	C	C	C	C	C	C	O	C	O	O	O	O	432	432
71	C	O	C	C	C	C	O	C	O	O	O	O	427.50	315
72	O	C	O	C	C	C	O	C	O	O	O	O	420.75	366.75
73	O	O	O	C	C	C	O	C	O	O	O	O	416.25	270
74	C	O	C	O	C	C	O	C	O	O	O	O	409.50	346.50
75	C	C	O	O	C	C	O	C	O	O	O	O	405	270
76	O	O	O	O	C	C	O	C	O	O	O	O	398.25	371.25
77	O	C	C	C	O	C	O	C	O	O	O	O	393.75	315
78	O	O	C	C	O	C	O	C	O	O	O	O	389.25	267.75
79	O	C	O	C	O	C	O	C	O	O	O	O	384.75	229.50
80	C	C	C	O	O	C	O	C	O	O	O	O	378	378
81	C	O	C	O	O	C	O	C	O	O	O	O	373.50	360
82	C	C	O	O	O	C	O	C	O	O	O	O	369	351
83	C	O	O	O	O	C	O	C	O	O	O	O	364.50	351
84	C	C	C	C	C	O	O	C	O	O	O	O	360	360
85	O	C	C	C	C	O	O	C	O	O	O	O	357.75	189
86	O	O	C	C	C	O	O	C	O	O	O	O	353.25	213.75
87	O	C	O	C	C	O	O	C	O	O	O	O	348.75	247.50

\* C = Closed or On; O = Open or Off

Continued



TABLE 3-9. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 0.8 MHZ CLOCK AND ROUND-UP METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
88	O	O	O	C	C	O	O	C	O	O	O	O	344.25	290.25
89	C	C	C	O	C	O	O	C	O	O	O	O	342	144
90	C	O	C	O	C	O	O	C	O	O	O	O	337.50	202.50
91	C	C	O	O	C	O	O	C	O	O	O	O	333	270
92	O	C	O	O	C	O	O	C	O	O	O	O	330.75	141.75
93	O	O	O	O	C	O	O	C	O	O	O	O	326.25	225
94	O	C	C	C	O	O	O	C	O	O	O	O	321.75	317.25
95	C	O	C	C	O	O	O	C	O	O	O	O	319.50	207
96	C	C	O	C	O	O	O	C	O	O	O	O	315	315
97	O	C	O	C	O	O	O	C	O	O	O	O	312.75	216
98	C	O	O	C	O	O	O	C	O	O	O	O	310.50	121.50
99	C	C	C	O	O	O	O	C	O	O	O	O	306	252
100	O	C	C	O	O	O	O	C	O	O	O	O	303.75	168.75
101	C	O	C	O	O	O	O	C	O	O	O	O	301.50	90
102	C	C	O	O	O	O	O	C	O	O	O	O	297	243
103	O	C	O	O	O	O	O	C	O	O	O	O	294.75	175.50
104	C	O	O	O	O	O	O	C	O	O	O	O	292.50	112.50
105	C	C	C	C	C	C	C	O	O	O	O	O	288	288
106	O	C	C	C	C	C	C	O	O	O	O	O	285.75	236.25
107	C	O	C	C	C	C	C	O	O	O	O	O	283.50	189
108	O	O	C	C	C	C	C	O	O	O	O	O	281.25	146.25
109	C	C	O	C	C	C	C	O	O	O	O	O	279	108
110	O	C	O	C	C	C	C	O	O	O	O	O	276.75	74.25
111	C	O	O	C	C	C	C	O	O	O	O	O	274.50	45
112	C	C	C	O	C	C	C	O	O	O	O	O	270	270
113	O	C	C	O	C	C	C	O	O	O	O	O	267.75	252
114	C	O	C	O	C	C	C	O	O	O	O	O	265.50	238.50
115	O	O	C	O	C	C	C	O	O	O	O	O	263.25	229.50
116	C	C	O	O	C	C	C	O	O	O	O	O	261	225
117	O	C	O	O	C	C	C	O	O	O	O	O	258.75	225
118	C	O	O	O	C	C	C	O	O	O	O	O	256.50	229.50
119	O	O	O	O	C	C	C	O	O	O	O	O	254.25	238.50
120	C	C	C	C	O	C	C	O	O	O	O	O	252	252
121	C	C	C	C	O	C	C	O	O	O	O	O	252	0
122	O	C	C	C	O	C	C	O	O	O	O	O	249.75	20.25
123	C	O	C	C	O	C	C	O	O	O	O	O	247.50	45
124	O	O	C	C	O	C	C	O	O	O	O	O	245.25	74.25
125	C	C	O	C	O	C	C	O	O	O	O	O	243	108
126	O	C	O	C	O	C	C	O	O	O	O	O	240.75	146.25
127	C	O	O	C	O	C	C	O	O	O	O	O	238.50	189
128	O	O	O	C	O	C	C	O	O	O	O	O	236.25	236.25

\* C = Closed or On; O = Open or Off

TABLE 3-10. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-UP METHOD

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
7	C	C	C	C	C	C	C	C	O	C	C	C	4320	4320
8	C	C	C	C	C	O	O	O	C	O	C	C	3780	3780
9	O	C	O	C	O	C	O	C	C	C	O	C	3360.37	3357
10	C	C	C	C	C	C	C	O	O	C	O	C	3024	3024
11	C	C	O	C	O	O	O	C	C	O	O	C	2749.50	2745
12	C	C	C	C	C	C	O	C	O	O	O	C	2520	2520
13	C	C	O	O	C	O	O	O	O	O	O	C	2326.50	2322
14	C	C	C	C	C	C	C	O	C	C	C	O	2160	2160
15	C	C	C	C	C	C	C	C	O	C	C	O	2016	2016
16	C	C	C	C	O	O	O	C	O	C	C	O	1890	1890
17	C	O	C	C	O	C	O	O	O	C	C	O	1779.75	1764
18	C	O	C	O	C	O	C	C	C	O	C	O	1680.75	1667.25
19	O	C	C	O	O	O	O	C	C	O	C	O	1591.87	1586.25
20	C	C	C	C	C	C	O	O	C	O	C	O	1512	1512
21	C	C	C	C	C	C	C	C	O	O	C	O	1440	1440
22	C	O	C	O	O	O	C	C	O	O	C	O	1374.75	1370.25
23	O	O	O	O	C	O	O	C	O	O	C	O	1315.12	1307.25
24	C	C	C	C	C	O	C	O	O	O	C	O	1260	1260
25	C	C	O	O	C	C	O	O	O	O	C	O	1210.50	1188
26	C	O	O	C	O	O	O	O	O	O	C	O	1163.25	1158.75
27	C	C	O	O	O	C	C	C	C	C	O	O	1120.50	1107
28	C	C	C	C	C	C	O	C	C	C	O	O	1080	1080
29	O	C	C	C	C	O	O	C	C	C	O	O	1042.87	1039.50
30	C	C	C	C	C	C	C	O	C	C	O	O	1008	1008
31	C	C	O	O	O	C	C	O	C	C	O	O	976.50	945
32	C	C	C	O	O	O	C	O	C	C	O	O	945	945
33	O	C	C	C	O	C	O	O	C	C	O	O	916.87	900
34	O	C	C	O	C	O	O	O	C	C	O	O	889.87	874.12
35	C	C	C	C	C	C	C	C	O	C	O	O	864	864
36	O	C	O	C	O	C	C	C	O	C	O	O	840.37	826.87
37	O	C	C	O	C	O	C	C	O	C	O	O	817.87	796.50
38	C	C	O	O	O	O	C	C	O	C	O	O	796.50	769.50
39	C	O	O	O	C	C	O	C	O	C	O	O	776.25	742.50
40	C	C	C	C	C	O	O	C	O	C	O	O	756	756
41	C	C	C	C	O	O	O	C	O	C	O	O	738	720
42	C	C	C	C	C	C	C	O	O	C	O	O	720	720
43	C	O	O	O	C	C	C	O	O	C	O	O	704.25	661.50
44	O	C	O	O	O	C	C	O	O	C	O	O	687.37	682.87
45	C	O	C	O	C	O	C	O	O	C	O	O	672.75	639

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-10. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-UP METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
46	O	O	O	C	O	O	C	O	O	C	O	O	658.12	624.37
47	C	C	O	C	C	C	O	O	O	C	O	O	643.50	639
48	C	C	C	C	O	C	O	O	O	C	O	O	630	630
49	O	O	C	O	O	C	O	O	O	C	O	O	617.62	594
50	C	O	O	C	C	O	O	O	O	C	O	O	605.25	582.75
51	C	C	C	C	O	O	O	O	O	C	O	O	594	540
52	O	O	C	O	O	O	O	O	O	C	O	O	581.62	577.12
53	C	C	O	C	C	C	C	C	C	O	O	O	571.50	522
54	C	O	O	O	C	C	C	C	C	O	O	O	560.25	546.75
55	O	O	O	C	O	C	C	C	C	O	O	O	550.12	533.25
56	C	C	C	C	C	O	C	C	C	O	O	O	540	540
57	C	C	C	O	C	O	C	C	C	O	O	O	531	504
58	C	C	C	C	O	O	C	C	C	O	O	O	522	486
59	C	C	C	O	O	O	C	C	C	O	O	O	513	486
60	C	C	C	C	C	C	O	C	C	O	O	O	504	504
61	O	O	O	C	C	C	O	C	C	O	O	O	496.12	472.50
62	C	O	O	O	C	C	O	C	C	O	O	O	488.25	456.75
63	O	C	O	C	O	C	O	C	C	O	O	O	480.37	456.75
64	C	C	O	O	O	C	O	C	C	O	O	O	472.50	472.50
65	C	O	C	C	C	O	O	C	C	O	O	O	465.75	432
66	C	C	C	O	C	O	O	C	C	O	O	O	459	405
67	C	O	O	O	C	O	O	C	C	O	O	O	452.25	391.50
68	C	C	O	C	O	O	O	C	C	O	O	O	445.50	391.50
69	C	O	C	O	O	O	O	C	C	O	O	O	438.75	405
70	C	C	C	C	C	C	C	O	C	O	O	O	432	432
71	O	C	O	C	C	C	C	O	C	O	O	O	426.37	393.75
72	C	O	C	O	C	C	C	O	C	O	O	O	420.75	366.75
73	O	O	O	O	C	C	C	O	C	O	O	O	415.12	351
74	C	C	O	C	O	C	C	O	C	O	O	O	409.50	346.50
75	O	C	C	O	O	C	C	O	C	O	O	O	403.87	353.25
76	C	O	O	O	O	C	C	O	C	O	O	O	398.25	371.25
77	C	O	C	C	C	O	C	O	C	O	O	O	393.75	315
78	O	O	O	C	C	O	C	O	C	O	O	O	388.12	354.37
79	O	O	C	O	C	O	C	O	C	O	O	O	383.62	317.25
80	C	C	C	C	O	O	C	O	C	O	O	O	378	378
81	C	C	O	C	O	O	C	O	C	O	O	O	373.50	360
82	C	C	C	O	O	O	C	O	C	O	O	O	369	351
83	C	C	O	O	O	O	C	O	C	O	O	O	364.50	351
84	C	C	C	C	C	C	O	O	C	O	O	O	360	360
85	O	O	C	C	C	C	O	O	C	O	O	O	356.62	283.50
86	O	O	O	C	C	C	O	O	C	O	O	O	352.12	309.37
87	O	O	C	O	C	C	O	O	C	O	O	O	347.62	344.25

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-10. SECTOR SELECT SWITCH SETTINGS -- 368 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-UP METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
88	C	O	O	O	C	C	O	O	C	O	O	O	344.25	290.25
89	O	C	C	C	O	C	O	O	C	O	O	O	340.87	243
90	O	C	O	C	O	C	O	O	C	O	O	O	336.37	302.62
91	C	C	C	O	O	C	O	O	C	O	O	O	333	270
92	O	O	C	O	O	C	O	O	C	O	O	O	329.62	244.12
93	C	O	O	O	O	C	O	O	C	O	O	O	326.25	225
94	C	O	C	C	C	O	O	O	C	O	O	O	321.75	317.25
95	O	C	O	C	C	O	O	O	C	O	O	O	318.37	312.75
96	C	C	C	O	C	O	O	O	C	O	O	O	315	315
97	C	O	C	O	C	O	O	O	C	O	O	O	312.75	216
98	O	C	O	O	C	O	O	O	C	O	O	O	309.37	230.62
99	C	C	C	C	O	O	O	O	C	O	O	O	306	252
100	O	O	C	C	O	O	O	O	C	O	O	O	302.62	280.12
101	O	C	O	C	O	O	O	O	C	O	O	O	300.37	202.50
102	C	C	C	O	O	O	O	O	C	O	O	O	297	243
103	O	O	C	O	O	O	O	O	C	O	O	O	293.62	290.25
104	O	C	O	O	O	O	O	O	C	O	O	O	291.37	228.37
105	C	C	C	C	C	C	C	C	O	O	O	O	288	288
106	C	O	C	C	C	C	C	C	O	O	O	O	285.75	236.25
107	C	C	O	C	C	C	C	C	O	O	O	O	283.50	189
108	O	O	O	C	C	C	C	C	O	O	O	O	280.12	266.62
109	O	C	C	O	C	C	C	C	O	O	O	O	277.87	229.50
110	O	O	C	O	C	C	C	C	O	O	O	O	275.62	196.87
111	O	C	O	O	C	C	C	C	O	O	O	O	273.37	168.75
112	C	C	C	C	O	C	C	C	O	O	O	O	270	270
113	C	O	C	C	O	C	C	C	O	O	O	O	267.75	252
114	C	C	O	C	O	C	C	C	O	O	O	O	265.50	238.50
115	C	O	O	C	O	C	C	C	O	O	O	O	263.25	229.50
116	C	C	C	O	O	C	C	C	O	O	O	O	261	225
117	C	O	C	O	O	C	C	C	O	O	O	O	258.75	225
118	C	C	O	O	O	C	C	C	O	O	O	O	256.50	229.50
119	C	O	O	O	O	C	C	C	O	O	O	O	254.25	238.50
120	C	C	C	C	C	O	C	C	O	O	O	O	252	252
121	O	C	C	C	C	O	C	C	O	O	O	O	250.87	135
122	O	O	C	C	C	O	C	C	O	O	O	O	248.62	156.37
123	O	C	O	C	C	O	C	C	O	O	O	O	246.37	182.25
124	O	O	O	C	C	O	C	C	O	O	O	O	244.12	212.62
125	C	C	C	O	C	O	C	C	O	O	O	O	243	108
126	C	O	C	O	C	O	C	C	O	O	O	O	240.75	146.25
127	C	C	O	O	C	O	C	C	O	O	O	O	238.50	189
128	C	O	O	O	C	O	C	C	O	O	O	O	236.25	236.25

\* C = Closed or On; O = Open or Off

TABLE 3-11. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 0.8 MHz CLOCK AND ROUND-DOWN METHOD

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
4	C	C	C	C	C	O	C	O	C	O	C	C	10272	0
5	O	C	O	O	C	C	O	C	O	C	O	C	8217	3
6	C	O	O	C	O	C	C	C	O	O	O	C	6846	12
7	C	C	O	O	O	C	O	C	C	C	C	O	5868	12
8	C	C	C	C	O	C	O	C	O	C	C	O	5136	0
9	O	O	O	O	C	C	C	C	C	O	C	O	4563	21
10	O	O	O	C	C	O	C	O	C	O	C	O	4107	18
11	O	O	C	C	C	O	C	C	O	O	C	O	3735	3
12	O	O	C	O	C	C	C	O	O	O	C	O	3423	12
13	O	O	C	C	C	O	O	O	O	O	C	O	3159	21
14	C	O	O	O	C	O	C	C	C	C	O	O	2934	12
15	O	O	O	O	C	O	O	C	C	C	O	O	2739	3
16	C	C	C	O	C	O	C	O	C	C	O	O	2568	0
17	O	O	C	O	O	C	O	O	C	C	O	O	2415	33
18	C	C	C	O	C	C	C	C	O	C	O	O	2280	48
19	C	C	C	C	O	O	C	C	O	C	O	O	2160	48
20	C	C	O	C	O	C	O	C	O	C	O	O	2052	48
21	C	C	O	C	O	O	O	C	O	C	O	O	1956	12
22	C	O	C	C	O	C	C	O	O	C	O	O	1866	36
23	O	C	O	O	C	O	C	O	O	C	O	O	1785	33
24	C	O	O	C	C	C	O	O	O	C	O	O	1710	48
25	O	C	O	O	O	C	O	O	O	C	O	O	1641	63
26	C	O	C	C	O	O	O	O	O	C	O	O	1578	60
27	O	C	O	C	C	C	C	C	C	O	O	O	1521	21
28	O	O	O	C	O	C	C	C	C	O	O	O	1467	12
29	C	C	C	O	C	O	C	C	C	O	O	O	1416	24
30	C	C	C	O	O	O	C	C	C	O	O	O	1368	48
31	O	O	O	C	C	C	O	C	C	O	O	O	1323	75
32	C	C	O	C	O	C	O	C	C	O	O	O	1284	0
33	O	C	C	C	C	O	O	C	C	O	O	O	1245	3
34	C	O	O	O	C	O	O	C	C	O	O	O	1206	84
35	O	C	C	O	O	O	O	C	C	O	O	O	1173	33
36	C	C	O	C	C	C	C	O	C	O	O	O	1140	48
37	C	O	O	O	C	C	C	O	C	O	O	O	1110	18
38	C	C	C	O	O	C	C	O	C	O	O	O	1080	48
39	O	C	C	C	C	O	C	O	C	O	O	O	1053	21
40	C	O	C	O	C	O	C	O	C	O	O	O	1026	48
41	C	O	C	C	O	O	C	O	C	O	O	O	1002	6
42	C	O	C	O	O	O	C	O	C	O	O	O	978	12
43	C	O	C	C	C	C	O	O	C	O	O	O	954	66
44	O	C	C	O	C	C	O	O	C	O	O	O	933	36
45	C	C	C	C	O	C	O	O	C	O	O	O	912	48

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-11. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 0.8 MHZ CLOCK AND ROUND-DOWN METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
46	O	O	O	C	O	C	O	O	C	O	O	O	891	102
47	O	C	O	O	O	C	O	O	C	O	O	O	873	57
48	O	O	C	C	C	O	O	O	C	O	O	O	855	48
49	O	C	C	O	C	O	O	O	C	O	O	O	837	75
50	O	O	O	O	C	O	O	O	C	O	O	O	819	138
51	C	C	O	C	O	O	O	O	C	O	O	O	804	84
52	O	C	C	O	O	O	O	O	C	O	O	O	789	60
53	C	O	O	O	O	O	O	O	C	O	O	O	774	66
54	O	O	C	C	C	C	C	C	O	O	O	O	759	102
55	O	O	O	C	C	C	C	C	O	O	O	O	747	3
56	C	C	O	O	C	C	C	C	O	O	O	O	732	96
57	C	C	C	C	O	C	C	C	O	O	O	O	720	48
58	C	C	O	C	O	C	C	C	O	O	O	O	708	24
59	C	C	C	O	O	C	C	C	O	O	O	O	696	24
60	C	C	O	O	O	C	C	C	O	O	O	O	684	48
61	C	C	C	C	C	O	C	C	O	O	O	O	672	96
62	C	C	O	C	C	O	C	C	O	O	O	O	660	168
63	O	O	O	C	C	O	C	C	O	O	O	O	651	75
64	C	O	C	O	C	O	C	C	O	O	O	O	642	0
65	C	O	O	O	C	O	C	C	O	O	O	O	630	138
66	O	C	C	C	O	O	C	C	O	O	O	O	621	102
67	C	C	O	C	O	O	C	C	O	O	O	O	612	84
68	O	O	O	C	O	O	C	C	O	O	O	O	603	84
69	C	O	C	O	O	O	C	C	O	O	O	O	594	102
70	O	C	O	O	O	O	C	C	O	O	O	O	585	138
71	C	C	C	C	C	C	O	C	O	O	O	O	576	192
72	C	O	C	C	C	C	O	C	O	O	O	O	570	48
73	O	C	O	C	C	C	O	C	O	O	O	O	561	135
74	O	O	O	C	C	C	O	C	O	O	O	O	555	18
75	C	O	C	O	C	C	O	C	O	O	O	O	546	138
76	C	C	O	O	C	C	O	C	O	O	O	O	540	48
77	O	O	O	O	C	C	O	C	O	O	O	O	531	201
78	O	C	C	C	O	C	O	C	O	O	O	O	525	138
79	O	O	C	C	O	C	O	C	O	O	O	O	519	87
80	O	C	O	C	O	C	O	C	O	O	O	O	513	48
81	O	O	O	C	O	C	O	C	O	O	O	O	507	21
82	O	C	C	O	O	C	O	C	O	O	O	O	501	6
83	O	O	C	O	O	C	O	C	O	O	O	O	495	3
84	O	C	O	O	O	C	O	C	O	O	O	O	489	12
85	O	O	O	O	O	C	O	C	O	O	O	O	483	33
86	O	C	C	C	C	O	O	C	O	O	O	O	477	66
87	O	O	C	C	C	O	O	C	O	O	O	O	471	111

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-11. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
 USING 0.8 MHZ CLOCK AND ROUND-DOWN METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
88	O	C	O	C	C	O	O	C	O	O	O	O	465	168
89	O	O	O	C	C	O	O	C	O	O	O	O	459	237
90	C	C	C	O	C	O	O	C	O	O	O	O	456	48
91	C	O	C	O	C	O	O	C	O	O	O	O	450	138
92	C	C	O	O	C	O	O	C	O	O	O	O	444	240
93	O	C	O	O	C	O	O	C	O	O	O	O	441	75
94	O	O	O	O	C	O	O	C	O	O	O	O	435	198
95	C	C	C	C	O	O	O	C	O	O	O	O	432	48
96	C	O	C	C	O	O	O	C	O	O	O	O	426	192
97	O	O	C	C	O	O	O	C	O	O	O	O	423	57
98	O	C	O	C	O	O	O	C	O	O	O	O	417	222
99	C	O	O	C	O	O	O	C	O	O	O	O	414	102
100	C	C	C	O	O	O	O	C	O	O	O	O	408	288
101	O	C	C	O	O	O	O	C	O	O	O	O	405	183
102	C	O	C	O	O	O	O	C	O	O	O	O	402	84
103	C	C	O	O	O	O	O	C	O	O	O	O	396	300
104	O	C	O	O	O	O	O	C	O	O	O	O	393	216
105	C	O	O	O	O	O	O	C	O	O	O	O	390	138
106	O	O	O	O	O	O	O	C	O	O	O	O	387	66
107	C	C	C	C	C	C	C	C	O	O	O	O	384	0
108	C	O	C	C	C	C	C	C	O	O	O	O	378	264
109	O	O	C	C	C	C	C	C	O	O	O	O	375	213
110	C	C	O	C	C	C	C	C	O	O	O	O	372	168
111	O	C	O	C	C	C	C	C	O	O	O	O	369	129
112	C	O	O	C	C	C	C	C	O	O	O	O	366	96
113	O	O	O	C	C	C	C	C	O	O	O	O	363	69
114	C	C	C	O	C	C	C	C	O	O	O	O	360	48
115	O	C	C	O	C	C	C	C	O	O	O	O	357	33
116	C	O	C	O	C	C	C	C	O	O	O	O	354	24
117	O	O	C	O	C	C	C	C	O	O	O	O	351	21
118	C	C	O	O	C	C	C	C	O	O	O	O	348	24
119	O	C	O	O	C	C	C	C	O	O	O	O	345	33
120	C	O	O	O	C	C	C	C	O	O	O	O	342	48
121	O	O	O	O	C	C	C	C	O	O	O	O	339	69
122	C	C	C	C	O	C	C	C	O	O	O	O	336	96
123	O	C	C	C	O	C	C	C	O	O	O	O	333	129
124	C	O	C	C	O	C	C	C	O	O	O	O	330	168
125	O	O	C	C	O	C	C	C	O	O	O	O	327	213
126	C	C	O	C	O	C	C	C	O	O	O	O	324	264
127	O	C	O	C	O	C	C	C	O	O	O	O	321	321
128	O	C	O	C	O	C	C	C	O	O	O	O	321	0

\* C = Closed or On; O = Open or Off

TABLE 3-12. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-DOWN METHOD

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
7	O	O	O	C	O	O	C	O	C	C	C	C	5869.50	1.50
8	C	C	C	C	C	O	C	O	C	O	C	C	5136	0
9	O	C	O	O	O	C	C	C	C	O	C	C	4564.50	7.50
10	O	C	O	O	C	C	O	C	O	C	O	C	4108.50	3
11	C	O	O	C	C	C	O	C	C	O	O	C	3735	3
12	C	O	O	C	O	C	C	C	O	O	O	C	3423	12
13	O	C	O	C	C	C	O	O	O	O	O	C	3160.50	1.50
14	C	C	O	O	O	C	O	C	C	C	C	O	2934	12
15	C	O	O	O	O	C	O	O	C	C	C	O	2739	3
16	C	C	C	C	O	C	O	C	O	C	C	O	2568	0
17	O	C	O	C	O	O	C	O	O	C	C	O	2416.50	7.50
18	O	O	O	O	C	C	C	C	C	O	C	O	2281.50	21
19	O	O	O	O	O	C	O	C	C	O	C	O	2161.50	19.50
20	O	O	O	C	C	O	C	O	C	O	C	O	2053.50	18
21	C	C	C	O	C	O	O	O	C	O	C	O	1956	12
22	O	O	C	C	C	O	C	C	O	O	C	O	1867.50	3
23	C	O	C	O	O	C	O	C	O	O	C	O	1785	33
24	O	O	C	O	C	C	C	O	O	O	C	O	1711.50	12
25	O	C	C	O	O	O	C	O	O	O	C	O	1642.50	25.50
26	O	O	C	C	C	O	O	O	O	O	C	O	1579.50	21
27	C	O	C	O	C	C	C	C	C	C	O	O	1521	21
28	C	O	O	O	C	O	C	C	C	C	O	O	1467	12
29	C	C	C	C	O	C	O	C	C	C	O	O	1416	24
30	O	O	O	O	C	O	O	C	C	C	O	O	1369.50	3
31	O	C	O	O	C	C	C	O	C	C	O	O	1324.50	28.50
32	C	C	C	O	C	O	C	O	C	C	O	O	1284	0
33	C	O	C	C	C	C	O	O	C	C	O	O	1245	3
34	O	O	C	O	O	C	O	O	C	C	O	O	1207.50	33
35	C	O	C	C	O	O	O	O	C	C	O	O	1173	33
36	C	C	C	O	C	C	C	C	O	C	O	O	1140	48
37	C	C	O	O	O	C	C	C	O	C	O	O	1110	18
38	C	C	C	C	O	O	C	C	O	C	O	O	1080	48
39	C	O	C	C	C	C	O	C	O	C	O	O	1053	21
40	C	C	O	C	O	C	O	C	O	C	O	O	1026	48
41	C	C	O	C	C	O	O	C	O	C	O	O	1002	6
42	C	C	O	C	O	O	O	C	O	C	O	O	978	12
43	O	O	C	C	C	C	C	O	O	C	O	O	955.50	1.50
44	C	O	C	C	O	C	C	O	O	C	O	O	933	36
45	C	C	C	C	C	O	C	O	O	C	O	O	912	48

\* C = Closed or On; O = Open or Off

Continued



TABLE 3-12. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-DOWN METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
46	O	C	O	O	C	O	C	O	O	C	O	O	892.50	33
47	C	O	C	O	O	O	C	O	O	C	O	O	873	57
48	C	O	O	C	C	C	O	O	O	C	O	O	855	48
49	O	C	C	C	O	C	O	O	O	C	O	O	838.50	1.50
50	O	C	O	O	O	C	O	O	O	C	O	O	820.50	63
51	O	O	O	C	C	O	O	O	O	C	O	O	805.50	7.50
52	C	O	C	C	O	O	O	O	O	C	O	O	789	60
53	C	C	O	O	O	O	O	O	O	C	O	O	774	66
54	O	C	O	C	C	C	C	C	C	O	O	O	760.50	21
55	C	O	O	O	C	C	C	C	C	O	O	O	747	3
56	O	O	O	C	O	C	C	C	C	O	O	O	733.50	12
57	C	C	C	C	C	O	C	C	C	O	O	O	720	48
58	C	C	C	O	C	O	C	C	C	O	O	O	708	24
59	C	C	C	C	O	O	C	C	C	O	O	O	696	24
60	C	C	C	O	O	O	C	C	C	O	O	O	684	48
61	O	O	O	O	O	O	C	C	C	O	O	O	673.50	4.50
62	O	O	O	C	C	C	O	C	C	O	O	O	661.50	75
63	C	O	O	O	C	C	O	C	C	O	O	O	651	75
64	C	C	O	C	O	C	O	C	C	O	O	O	642	0
65	O	O	C	O	O	C	O	C	C	O	O	O	631.50	40.50
66	O	C	C	C	C	O	O	C	C	O	O	O	622.50	3
67	C	C	C	O	C	O	O	C	C	O	O	O	612	84
68	C	O	O	O	C	O	O	C	C	O	O	O	603	84
69	C	C	O	C	O	O	O	C	C	O	O	O	594	102
70	O	C	C	O	O	O	O	C	C	O	O	O	586.50	33
71	O	O	O	O	O	O	O	C	C	O	O	O	577.50	85.50
72	C	C	O	C	C	C	C	O	C	O	O	O	570	48
73	O	C	C	O	C	C	C	O	C	O	O	O	562.50	25.50
74	C	O	O	O	C	C	C	O	C	O	O	O	555	18
75	O	O	C	C	O	C	C	O	C	O	O	O	547.50	25.50
76	C	C	C	O	O	C	C	O	C	O	O	O	540	48
77	O	C	O	O	O	C	C	O	C	O	O	O	532.50	85.50
78	O	C	C	C	C	O	C	O	C	O	O	O	526.50	21
79	C	O	O	C	C	O	C	O	C	O	O	O	519	87
80	C	O	C	O	C	O	C	O	C	O	O	O	513	48
81	C	O	O	O	C	O	C	O	C	O	O	O	507	21
82	C	O	C	C	O	O	C	O	C	O	O	O	501	6
83	C	O	O	C	O	O	C	O	C	O	O	O	495	3
84	C	O	C	O	O	O	C	O	C	O	O	O	489	12
85	C	O	O	O	O	O	C	O	C	O	O	O	483	33
86	C	O	C	C	C	C	O	O	C	O	O	O	477	66
87	C	O	O	C	C	C	O	O	C	O	O	O	471	111

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-12. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-DOWN METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Usable Sectors	Bytes in Runt Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
88	O	C	C	O	C	C	O	O	C	O	O	O	466.50	36
89	O	C	O	O	C	C	O	O	C	O	O	O	460.50	103.50
90	C	C	C	C	O	C	O	O	C	O	O	O	456	48
91	O	O	C	C	O	C	O	O	C	O	O	O	451.50	1.50
92	O	O	O	C	O	C	O	O	C	O	O	O	445.50	102
93	C	O	C	O	O	C	O	O	C	O	O	O	441	75
94	O	C	O	O	O	C	O	O	C	O	O	O	436.50	57
95	C	C	C	C	C	O	O	O	C	O	O	O	432	48
96	O	O	C	C	C	O	O	O	C	O	O	O	427.50	48
97	C	O	O	C	C	O	O	O	C	O	O	O	423	57
98	O	C	C	O	C	O	O	O	C	O	O	O	418.50	75
99	C	C	O	O	C	O	O	O	C	O	O	O	414	102
100	O	O	O	O	C	O	O	O	C	O	O	O	409.50	138
101	O	C	C	C	O	O	O	O	C	O	O	O	406.50	31.50
102	C	C	O	C	O	O	O	O	C	O	O	O	402	84
103	O	O	O	C	O	O	O	O	C	O	O	O	397.50	145.50
104	O	C	C	O	O	O	O	O	C	O	O	O	394.50	60
105	C	C	O	O	O	O	O	O	C	O	O	O	390	138
106	C	O	O	O	O	O	O	O	C	O	O	O	387	66
107	C	C	C	C	C	C	C	C	O	O	O	O	384	0
108	O	O	C	C	C	C	C	C	O	O	O	O	379.50	102
109	O	C	O	C	C	C	C	C	O	O	O	O	376.50	49.50
110	O	O	O	C	C	C	C	C	O	O	O	O	373.50	3
111	C	O	C	O	C	C	C	C	O	O	O	O	369	129
112	C	C	O	O	C	C	C	C	O	O	O	O	366	96
113	C	O	O	O	C	C	C	C	O	O	O	O	363	69
114	C	C	C	C	O	C	C	C	O	O	O	O	360	48
115	C	O	C	C	O	C	C	C	O	O	O	O	357	33
116	C	C	O	C	O	C	C	C	O	O	O	O	354	24
117	C	O	O	C	O	C	C	C	O	O	O	O	351	21
118	C	C	C	O	O	C	C	C	O	O	O	O	348	24
119	C	O	C	O	O	C	C	C	O	O	O	O	345	33
120	C	C	O	O	O	C	C	C	O	O	O	O	342	48
121	C	O	O	O	O	C	C	C	O	O	O	O	339	69
122	C	C	C	C	C	O	C	C	O	O	O	O	336	96
123	C	O	C	C	C	O	C	C	O	O	O	O	333	129
124	C	C	O	C	C	O	C	C	O	O	O	O	330	168
125	O	C	O	C	C	O	C	C	O	O	O	O	328.50	25.50
126	O	O	O	C	C	O	C	C	O	O	O	O	325.50	75
127	O	C	C	O	C	O	C	C	O	O	O	O	322.50	130.50
128	C	O	C	O	C	O	C	C	O	O	O	O	321	0

\* C = Closed or On; O = Open or Off

TABLE 3-13. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 0.8 MHZ CLOCK AND ROUND-UP METHOD

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
4	C	C	C	C	C	O	C	O	C	O	C	C	10272	10272
5	C	C	O	O	C	C	O	C	O	C	O	C	8220	8208
6	O	C	O	C	O	C	C	O	O	O	O	C	6849	6843
7	O	O	C	O	O	C	O	C	C	C	C	O	5871	5862
8	C	C	C	C	O	C	O	C	O	C	C	O	5136	5136
9	C	O	O	O	C	C	C	C	C	O	C	O	4566	4560
10	C	O	O	C	C	O	C	O	C	O	C	O	4110	4098
11	C	O	C	C	C	O	C	C	O	O	C	O	3738	3708
12	C	O	C	O	C	C	C	O	O	O	C	O	3426	3402
13	C	O	C	C	C	O	O	O	O	O	C	O	3162	3144
14	O	C	O	O	C	O	C	C	C	C	O	O	2937	2907
15	C	O	O	O	C	O	O	C	C	C	O	O	2742	2700
16	C	C	C	O	C	O	C	O	C	C	O	O	2568	2568
17	C	O	C	O	O	C	O	O	C	C	O	O	2418	2400
18	O	O	O	C	C	C	C	C	O	C	O	O	2283	2277
19	O	O	O	O	C	O	C	C	O	C	O	O	2163	2154
20	O	O	C	C	O	C	O	C	O	C	O	O	2055	2043
21	O	O	C	C	O	O	O	C	O	C	O	O	1959	1908
22	O	C	C	C	O	C	C	O	O	C	O	O	1869	1839
23	C	C	O	O	C	O	C	O	O	C	O	O	1788	1752
24	O	C	O	C	C	C	O	O	O	C	O	O	1713	1689
25	C	C	O	O	O	C	O	O	O	C	O	O	1644	1632
26	O	C	C	C	O	O	O	O	O	C	O	O	1581	1563
27	C	C	O	C	C	C	C	C	C	O	O	O	1524	1464
28	C	O	O	C	O	C	C	C	C	O	O	O	1470	1398
29	O	O	O	C	C	O	C	C	C	O	O	O	1419	1356
30	O	O	O	C	O	O	C	C	C	O	O	O	1371	1329
31	C	O	O	C	C	C	O	C	C	O	O	O	1326	1308
32	C	C	O	C	O	C	O	C	C	O	O	O	1284	1284
33	C	C	C	C	C	O	O	C	C	O	O	O	1248	1152
34	O	C	O	O	C	O	O	C	C	O	O	O	1209	1191
35	C	C	C	O	O	O	O	C	C	O	O	O	1176	1104
36	O	O	C	C	C	C	C	O	O	C	O	O	1143	1083
37	O	C	O	O	C	C	C	O	C	O	O	O	1113	1020
38	O	O	O	C	O	C	C	O	C	O	O	O	1083	1017
39	C	C	C	C	C	O	C	O	C	O	O	O	1056	960
40	O	C	C	O	C	O	C	O	C	O	O	O	1029	957
41	O	C	C	C	O	O	C	O	C	O	O	O	1005	888
42	O	C	C	O	O	O	C	O	C	O	O	O	981	867
43	O	C	C	C	C	C	O	O	C	O	O	O	957	894
44	C	C	C	O	C	C	O	O	C	O	O	O	936	840
45	O	O	O	O	C	C	O	O	C	O	O	O	915	828

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-13. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 0.8 MHZ CLOCK AND ROUND-UP METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
46	C	O	O	C	O	C	O	O	C	O	O	O	894	858
47	C	C	O	O	O	C	O	O	C	O	O	O	876	792
48	C	O	C	C	C	O	O	O	C	O	O	O	858	762
49	C	C	C	O	C	O	O	O	C	O	O	O	840	768
50	C	O	O	O	C	O	O	O	C	O	O	O	822	810
51	O	O	C	C	O	O	O	O	C	O	O	O	807	738
52	C	C	C	O	O	O	O	O	C	O	O	O	792	696
53	O	C	O	O	O	O	O	O	C	O	O	O	777	684
54	C	O	C	C	C	C	C	C	O	O	O	O	762	702
55	C	O	O	C	C	C	C	C	O	O	O	O	750	588
56	O	O	C	O	C	C	C	C	O	O	O	O	735	663
57	O	O	O	O	C	C	C	C	O	O	O	O	723	600
58	O	O	C	C	O	C	C	C	O	O	O	O	711	561
59	O	O	O	C	O	C	C	C	O	O	O	O	699	546
60	O	O	C	O	O	C	C	C	O	O	O	O	687	555
61	O	O	O	O	O	C	C	C	O	O	O	O	675	588
62	O	O	C	C	C	O	C	C	O	O	O	O	663	645
63	C	O	O	C	C	O	C	C	O	O	O	O	654	540
64	C	O	C	O	C	O	C	C	O	O	O	O	642	642
65	O	C	O	O	C	O	C	C	O	O	O	O	633	576
66	C	C	C	C	O	O	C	C	O	O	O	O	624	528
67	O	O	C	C	O	O	C	C	O	O	O	O	615	498
68	C	O	O	C	O	O	C	C	O	O	O	O	606	486
69	O	C	C	O	O	O	C	C	O	O	O	O	597	492
70	C	C	O	O	O	O	C	C	O	O	O	O	588	516
71	O	O	O	O	O	O	C	C	O	O	O	O	579	558
72	O	C	C	C	C	C	O	C	O	O	O	O	573	405
73	C	C	O	C	C	C	O	C	O	O	O	O	564	480
74	C	O	O	C	C	C	O	C	O	O	O	O	558	354
75	O	C	C	O	C	C	O	C	O	O	O	O	549	462
76	O	O	C	O	C	C	O	C	O	O	O	O	543	363
77	C	O	O	O	C	C	O	C	O	O	O	O	534	504
78	C	C	C	C	O	C	O	C	O	O	O	O	528	432
79	C	O	C	C	O	C	O	C	O	O	O	O	522	372
80	C	C	O	C	O	C	O	C	O	O	O	O	516	324
81	C	O	O	C	O	C	O	C	O	O	O	O	510	288
82	C	C	C	O	O	C	O	C	O	O	O	O	504	264
83	C	O	C	O	O	C	O	C	O	O	O	O	498	252
84	C	C	O	O	O	C	O	C	O	O	O	O	492	252
85	C	O	O	O	O	C	O	C	O	O	O	O	486	264
86	C	C	C	C	C	O	O	C	O	O	O	O	480	288
87	C	O	C	C	C	O	O	C	O	O	O	O	474	324

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-13. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 0.8 MHZ CLOCK AND ROUND-UP METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
88	C	C	O	C	C	O	O	C	O	O	O	O	468	372
89	C	O	O	C	C	O	O	C	O	O	O	O	462	432
90	O	O	O	C	C	O	O	C	O	O	O	O	459	237
91	O	C	C	O	C	O	O	C	O	O	O	O	453	318
92	O	O	C	O	C	O	O	C	O	O	O	O	447	411
93	C	C	O	O	C	O	O	C	O	O	O	O	444	240
94	C	O	O	O	C	O	O	C	O	O	O	O	438	354
95	O	O	O	O	C	O	O	C	O	O	O	O	435	198
96	O	C	C	C	O	O	O	C	O	O	O	O	429	333
97	C	O	C	C	O	O	O	C	O	O	O	O	426	192
98	C	C	O	C	O	O	O	C	O	O	O	O	420	348
99	O	C	O	C	O	O	O	C	O	O	O	O	417	222
100	O	O	O	C	O	O	O	C	O	O	O	O	411	399
101	C	C	C	O	O	O	O	C	O	O	O	O	408	288
102	O	C	C	O	O	O	O	C	O	O	O	O	405	183
103	O	O	C	O	O	O	O	C	O	O	O	O	399	390
104	C	C	O	O	O	O	O	C	O	O	O	O	396	300
105	O	C	O	O	O	O	O	C	O	O	O	O	393	216
106	C	O	O	O	O	O	O	C	O	O	O	O	390	138
107	C	C	C	C	C	C	C	C	O	O	O	O	384	384
108	O	C	C	C	C	C	C	C	O	O	O	O	381	321
109	C	O	C	C	C	C	C	C	O	O	O	O	378	264
110	O	O	C	C	C	C	C	C	O	O	O	O	375	213
111	C	C	O	C	C	C	C	C	O	O	O	O	372	168
112	O	C	O	C	C	C	C	C	O	O	O	O	369	129
113	C	O	O	C	C	C	C	C	O	O	O	O	366	96
114	O	O	O	C	C	C	C	C	O	O	O	O	363	69
115	C	C	C	O	C	C	C	C	O	O	O	O	360	48
116	O	C	C	O	C	C	C	C	O	O	O	O	357	33
117	C	O	C	O	C	C	C	C	O	O	O	O	354	24
118	O	O	C	O	C	C	C	C	O	O	O	O	351	21
119	C	C	O	O	C	C	C	C	O	O	O	O	348	24
120	O	C	O	O	C	C	C	C	O	O	O	O	345	33
121	C	O	O	O	C	C	C	C	O	O	O	O	342	48
122	O	O	O	O	C	C	C	C	O	O	O	O	339	69
123	C	C	C	C	O	C	C	C	O	O	O	O	336	96
124	O	C	C	C	O	C	C	C	O	O	O	O	333	129
125	C	O	C	C	O	C	C	C	O	O	O	O	330	168
126	O	O	C	C	O	C	C	C	O	O	O	O	327	213
127	C	C	O	C	O	C	C	C	O	O	O	O	324	264
128	O	C	O	C	O	C	C	C	O	O	O	O	321	321

\* C = Closed or On; O = Open or Off

TABLE 3-14. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-UP METHOD

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
7	C	O	O	C	O	O	C	O	C	C	C	C	5871	5862
8	C	C	C	C	C	O	C	O	C	O	C	C	5136	5136
9	C	C	O	O	O	C	C	C	C	O	C	C	4566	4560
10	C	C	O	O	C	C	O	C	O	C	O	C	4110	4098
11	O	C	O	C	C	C	O	C	C	O	O	C	3736.50	3723
12	O	C	O	C	O	C	C	C	O	O	O	C	3424.50	3418.50
13	C	C	O	C	C	C	O	O	O	O	O	C	3162	3144
14	O	O	C	O	O	C	O	C	C	C	C	O	2935.50	2926.50
15	O	C	O	O	O	C	O	O	C	C	C	O	2740.50	2721
16	C	C	C	C	O	C	O	C	O	C	C	O	2568	2568
17	C	C	O	C	O	O	C	O	O	C	C	O	2418	2400
18	C	O	O	O	C	C	C	C	C	O	C	O	2283	2277
19	C	O	O	O	O	C	O	C	C	O	C	O	2163	2154
20	C	O	O	C	C	O	C	O	C	O	C	O	2055	2043
21	O	O	O	C	C	O	O	O	C	O	C	O	1957.50	1938
22	C	O	C	C	C	O	C	C	O	O	C	O	1869	1839
23	O	C	C	O	O	C	O	C	O	O	C	O	1786.50	1785
24	C	O	C	O	C	C	C	O	O	O	C	O	1713	1689
25	C	C	C	O	O	O	C	O	O	O	C	O	1644	1632
26	C	O	C	C	C	O	O	O	O	O	C	O	1581	1563
27	O	C	C	O	C	C	C	C	C	C	O	O	1522.50	1503
28	O	C	O	O	C	O	C	C	C	C	O	O	1468.50	1438.50
29	O	O	O	O	C	C	O	C	C	C	O	O	1417.50	1398
30	C	O	O	O	C	O	O	C	C	C	O	O	1371	1329
31	C	C	O	O	C	C	C	O	C	C	O	O	1326	1308
32	C	C	C	O	C	O	C	O	C	C	O	O	1284	1284
33	O	C	C	C	C	C	O	O	C	C	O	O	1246.50	1200
34	C	O	C	O	O	C	O	O	C	C	O	O	1209	1191
35	O	C	C	C	O	O	O	O	C	C	O	O	1174.50	1155
36	O	O	O	C	C	C	C	C	O	C	O	O	1141.50	1135.50
37	O	O	C	O	O	C	C	C	O	C	O	O	1111.50	1074
38	O	O	O	O	C	O	C	C	O	C	O	O	1081.50	1072.50
39	O	C	C	C	C	C	O	C	O	C	O	O	1054.50	1017
40	O	O	C	C	O	C	O	C	O	C	O	O	1027.50	1015.50
41	O	O	C	C	C	O	O	C	O	C	O	O	1003.50	948
42	O	O	C	C	O	O	O	C	O	C	O	O	979.50	928.50
43	C	O	C	C	C	C	C	O	O	C	O	O	957	894
44	O	C	C	C	O	C	C	O	O	C	O	O	934.50	904.50
45	O	O	O	O	O	C	C	O	O	C	O	O	913.50	894

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-14. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-UP METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
46	C	C	O	O	C	O	C	O	O	C	O	O	894	858
47	O	C	C	O	O	O	C	O	O	C	O	O	874.50	861
48	O	C	O	C	C	C	O	O	O	C	O	O	856.50	832.50
49	C	C	C	C	O	C	O	O	O	C	O	O	840	768
50	C	C	O	O	O	C	O	O	O	C	O	O	822	810
51	C	O	O	C	C	O	O	O	O	C	O	O	807	738
52	O	C	C	C	O	O	O	O	O	C	O	O	790.50	772.50
53	O	O	C	O	O	O	O	O	O	C	O	O	775.50	762
54	C	C	O	C	C	C	C	C	C	O	O	O	762	702
55	O	C	O	O	C	C	C	C	C	O	O	O	748.50	669
56	C	O	O	C	O	C	C	C	C	O	O	O	735	663
57	O	O	O	O	O	C	C	C	C	O	O	O	721.50	684
58	O	O	O	C	C	O	C	C	C	O	O	O	709.50	646.50
59	O	O	O	O	C	O	C	C	C	O	O	O	697.50	633
60	O	O	O	C	O	O	C	C	C	O	O	O	685.50	643.50
61	C	O	O	O	O	O	C	C	C	O	O	O	675	588
62	C	O	O	C	C	C	O	C	C	O	O	O	663	645
63	O	C	O	O	C	C	O	C	C	O	O	O	652.50	633
64	C	C	O	C	O	C	O	C	C	O	O	O	642	642
65	C	O	C	O	O	C	O	C	C	O	O	O	633	576
66	C	C	C	C	C	O	O	C	C	O	O	O	624	528
67	O	O	O	C	C	O	O	C	C	O	O	O	613.50	597
68	O	C	O	O	C	O	O	C	C	O	O	O	604.50	586.50
69	O	O	C	C	O	O	O	C	C	O	O	O	595.50	594
70	C	C	C	O	O	O	O	C	C	O	O	O	588	516
71	C	O	O	O	O	O	O	C	C	O	O	O	579	558
72	O	O	C	C	C	C	C	O	C	O	O	O	571.50	511.50
73	C	C	C	O	C	C	C	O	C	O	O	O	564	480
74	O	C	O	O	C	C	C	O	C	O	O	O	556.50	463.50
75	C	O	C	C	O	C	C	O	C	O	O	O	549	462
76	O	O	O	C	O	C	C	O	C	O	O	O	541.50	475.50
77	C	C	O	O	O	C	C	O	C	O	O	O	534	504
78	C	C	C	C	C	O	C	O	C	O	O	O	528	432
79	O	C	O	C	C	O	C	O	C	O	O	O	520.50	489
80	O	C	C	O	C	O	C	O	C	O	O	O	514.50	442.50
81	O	C	O	O	C	O	C	O	C	O	O	O	508.50	408
82	O	C	C	C	O	O	C	O	C	O	O	O	502.50	385.50
83	O	C	O	C	O	O	C	O	C	O	O	O	496.50	375
84	O	C	C	O	O	O	C	O	C	O	O	O	490.50	376.50
85	O	C	O	O	O	O	C	O	C	O	O	O	484.50	390
86	O	C	C	C	C	C	O	O	C	O	O	O	478.50	415.50
87	O	C	O	C	C	C	O	O	C	O	O	O	472.50	453

\* C = Closed or On; O = Open or Off

Continued

TABLE 3-14. SECTOR SELECT SWITCH SETTINGS -- 500 MB DRIVES  
USING 1.6 MHZ CLOCK AND ROUND-UP METHOD (Contd)

Number of Sectors	Location E875 Switch Number						Location F575 Switch Number						Bytes in Early Sectors	Bytes in Last Sector
	1	2	3	4	5	6	1	2	3	4	5	6		
88	C	C	C	O	C	C	O	O	C	O	O	O	468	372
89	C	C	O	O	C	C	O	O	C	O	O	O	462	432
90	O	O	O	O	C	C	O	O	C	O	O	O	457.50	370.50
91	C	O	C	C	O	C	O	O	C	O	O	O	453	318
92	C	O	O	C	O	C	O	O	C	O	O	O	447	411
93	O	C	C	O	O	C	O	O	C	O	O	O	442.50	378
94	C	C	O	O	O	C	O	O	C	O	O	O	438	354
95	O	O	O	O	O	C	O	O	C	O	O	O	433.50	339
96	C	O	C	C	C	O	O	O	C	O	O	O	429	333
97	O	C	O	C	C	O	O	O	C	O	O	O	424.50	336
98	C	C	C	O	C	O	O	O	C	O	O	O	420	348
99	O	O	C	O	C	O	O	O	C	O	O	O	415.50	369
100	C	O	O	O	C	O	O	O	C	O	O	O	411	399
101	C	C	C	C	O	O	O	O	C	O	O	O	408	288
102	O	O	C	C	O	O	O	O	C	O	O	O	403.50	334.50
103	C	O	O	C	O	O	O	O	C	O	O	O	399	390
104	C	C	C	O	O	O	O	O	C	O	O	O	396	300
105	O	O	C	O	O	O	O	O	C	O	O	O	391.50	372
106	O	C	O	O	O	O	O	O	C	O	O	O	388.50	295.50
107	C	C	C	C	C	C	C	C	O	O	O	O	384	384
108	C	O	C	C	C	C	C	C	O	O	O	O	381	321
109	C	C	O	C	C	C	C	C	O	O	O	O	378	264
110	C	O	O	C	C	C	C	C	O	O	O	O	375	213
111	O	C	C	O	C	C	C	C	O	O	O	O	370.50	333
112	O	O	C	O	C	C	C	C	O	O	O	O	367.50	295.50
113	O	C	O	O	C	C	C	C	O	O	O	O	364.50	264
114	O	O	O	O	C	C	C	C	O	O	O	O	361.50	238.50
115	O	C	C	C	O	C	C	C	O	O	O	O	358.50	219
116	O	O	C	C	O	C	C	C	O	O	O	O	355.50	205.50
117	O	C	O	C	O	C	C	C	O	O	O	O	352.50	198
118	O	O	O	C	O	C	C	C	O	O	O	O	349.50	196.50
119	O	C	C	O	O	C	C	C	O	O	O	O	346.50	201
120	O	O	C	O	O	C	C	C	O	O	O	O	343.50	211.50
121	O	C	O	O	O	C	C	C	O	O	O	O	340.50	228
122	O	O	O	O	O	C	C	C	O	O	O	O	337.50	250.50
123	O	C	C	C	C	O	C	C	O	O	O	O	334.50	279
124	O	O	C	C	C	O	C	C	O	O	O	O	331.50	313.50
125	C	C	O	C	C	O	C	C	O	O	O	O	330	168
126	C	O	O	C	C	O	C	C	O	O	O	O	327	213
127	C	C	C	O	C	O	C	C	O	O	O	O	324	264
128	C	O	C	O	C	O	C	C	O	O	O	O	321	321

\* C = Closed or On; O = Open or Off



## CHECKOUT

After completing installation of the drive, follow the sequence outlined below for initial startup in either remote or local. Refer to section 2 of this manual for information about operation of the drive.

### CHECKOUT IN REMOTE MODE

1. Set On/Standby switch at rear of power supply in On (1) position, and observe that the power supply cooling fan operates.
2. Set drive logical address. Logical address for each drive in a system must have a unique number.
3. Press START switch on drives with operator panel or status/control panel.

The power up sequence continues when the power sequence Pick or Hold (ground) signal is available from the controller. With the R/L (Remote/Local) switch in Remote position, power up sequence to each drive is delayed. The length of delay is determined by the logical address number used, in increments of 5 seconds.

For example:

Logical Address 0 = 0 second delay  
Logical Address 7 = 35 second delay

4. If the drive has an operator panel or a status/control panel, observe (with the delay complete) that the Ready indicator (located in START switch) flashes rapidly, indicating that power up is in progress.
5. Observe that the Ready indicator on the operator panel or status/control panel lights steadily within 90 seconds. This indicates that the drive motor is up to speed and that the heads are at track 0. If the drive has no operator panel or status/control panel, observe that the RDY Maintenance LED (on the control board) lights to indicate that the drive is ready.

If all of these events occurred, the drive is now ready for online operation. If any did not occur, a problem exists in the drive. Then refer to troubleshooting information either in appendix A of this manual or in volume 2 of the hardware maintenance manual.

## CHECKOUT IN LOCAL MODE

### NOTE

For drives without the operator panel or status/control panel, power on sequence begins when the power supply On/Standby switch is placed in On (1) position.

1. Set On/Standby switch at rear of power supply in On (1) position, and observe that the power supply cooling fan operates.
2. Set drive logical address. Logical address for each drive in a system must have a unique number.
3. Press START switch on drives with operator panel or status/control panel.
4. If the drive has an operator panel or a status/control panel, observe that the Ready indicator (located in START switch) flashes rapidly, indicating that power up is in progress.
5. Observe that the Ready indicator on the operator panel or status/control panel lights steadily within 90 seconds. This indicates that the drive motor is up to speed and that the heads are at track 0. If the drive has no operator panel or status/control panel, observe that the RDY Maintenance LED (on the control board) lights to indicate that the drive is ready.

If all of these events occurred, the drive is now ready for online operation. If any did not occur, a problem exists in the drive. Then refer to troubleshooting information either in appendix A of this manual or in volume 2 of the hardware maintenance manual.

# Section 4 Parts Data

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## INTRODUCTION

This section contains listings of field replaceable parts (including FRUs), manufacturer's recommended spare parts, and accessories. Use only Seagate replacement parts. Using non-Seagate replacement parts can adversely affect safety. Using other manufacturers' parts could also degrade reliability, increase maintenance downtime, and void warranty coverage.

### NOTE

ORDER AND REPLACE LOGIC BOARDS BY PART NUMBER ONLY.

Logic boards have an alpha card type designator stamped on them. In the past, ECOs that changed a board part number also changed the first letter of the designator (AWXY to BWXY). Effective 1 August 1987, only the part number changes. The card type does not change.

## FIELD REPLACEABLE PARTS LIST

This listing is divided into four columns:

- INDEX NO - The numbers in this column correspond to the numbers shown within the facing page illustration.
- PART NUMBER - Contains one of the following:
  1. Eight digit part number - use this number to order a replacement part. Within the continental U.S., parts may be ordered from:

Seagate Technology, Inc.  
Customer Services  
12701 Whitewater Drive  
Minnetonka, MN 55343

Phone: 1-800-382-6060  
Fax: (612) 931-8817

2. Optional - parts which are not used in all applications. To determine usage in a particular equipment, you must first know the Equipment Package part number (refer to Equipment Configuration in section 1 of this manual for definition and location of this number) and then refer to table 4-1. Table 4-1 contains the Equipment Package part number (the first 6 digits are on line 1, and the last 2 digits are on line 2) and a list of optional parts. If an optional part is used in a particular Equipment Package, "XX" will appear in that column.
  3. Spare - indicates that the item is a manufacturer's recommended spare part. Refer to table 4-2 for replacement part number information.
  4. CIC - the abbreviation refers to Card Interchangeability Chart at the end of this section. Items listed in the CIC are also manufacturer's recommended spare parts.
- PART DESCRIPTION - Contains part nomenclature/description. If an item is indented more than the previous item, it indicates it is part of the previous item (assembly).
  - NOTE - Usually contains entries to define differences between machine configurations (i.e., model differences, older units vs newer units, etc.).

## **MANUFACTURER'S RECOMMENDED SPARE PARTS**

This listing (table 4-2) is divided into three columns:

- DESCRIPTION/NOTES - Contains the part nomenclature/description and other pertinent information.
- PART NUMBER - Contains the part number of the part when the unit was manufactured or as a result of the latest FCO. This part can be used as a replacement on the series code and types of units indicated in the Description/Notes column. However, always use Replacement Part Number when ordering new parts or spares.

- REPLACEMENT PART NUMBER - Contains the interchangeable replacement part number. Use this number for ordering replacement or spare parts.

## **ACCESSORIES**

This listing (table 4-3) contains the following:

- PART NUMBER - Use this number to order this part. See Field Replaceable Parts List for ordering information.
- DESCRIPTION - Contains the part nomenclature/description.

## **CARD INTERCHANGEABILITY CHART**

The card interchangeability chart (CIC) provides the latest revision level of a card, its title, and its part number for ordering purposes.

Prior to attempting to use the chart, be sure to read and understand the rules for interpreting the CIC as given on sheet 1.

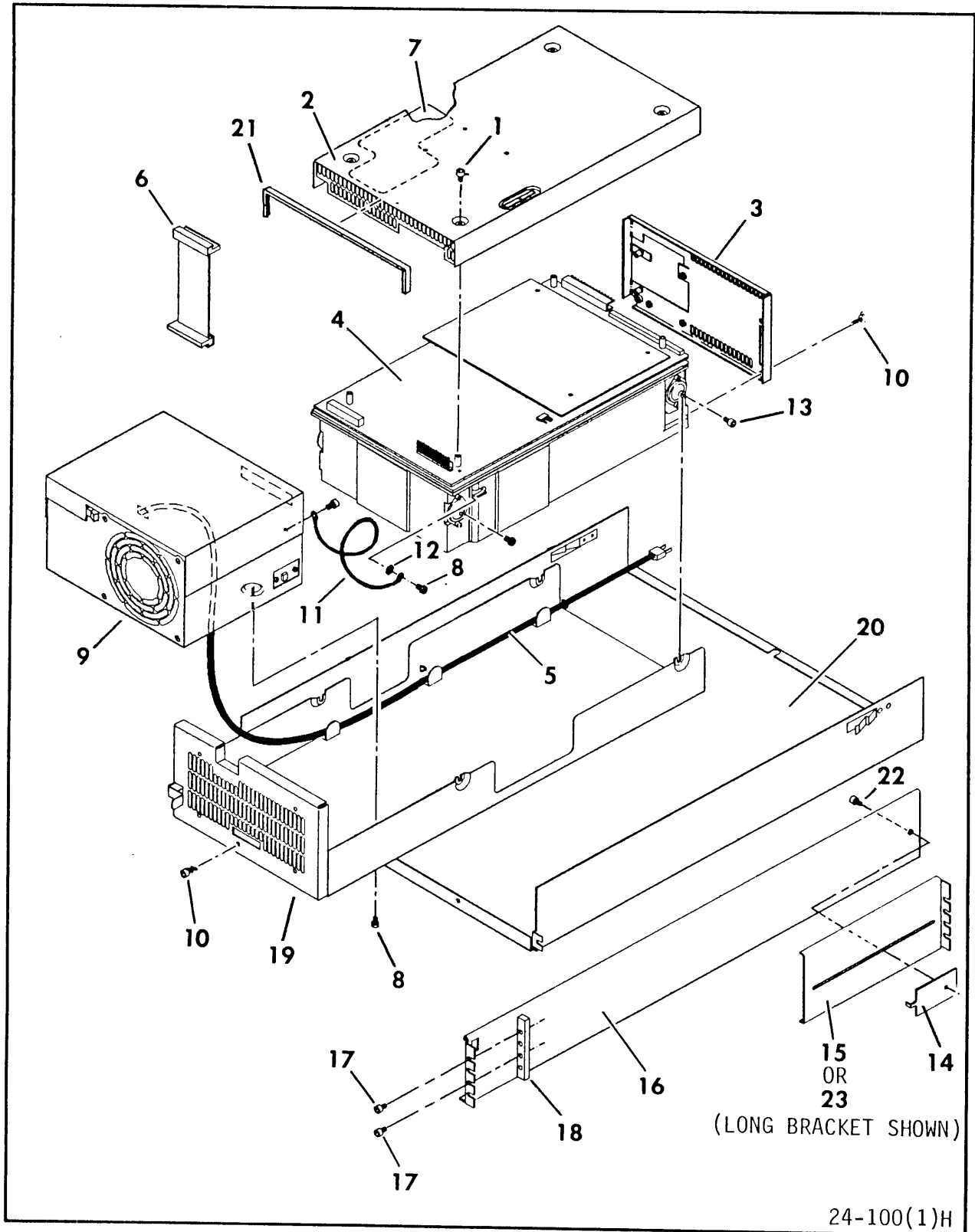
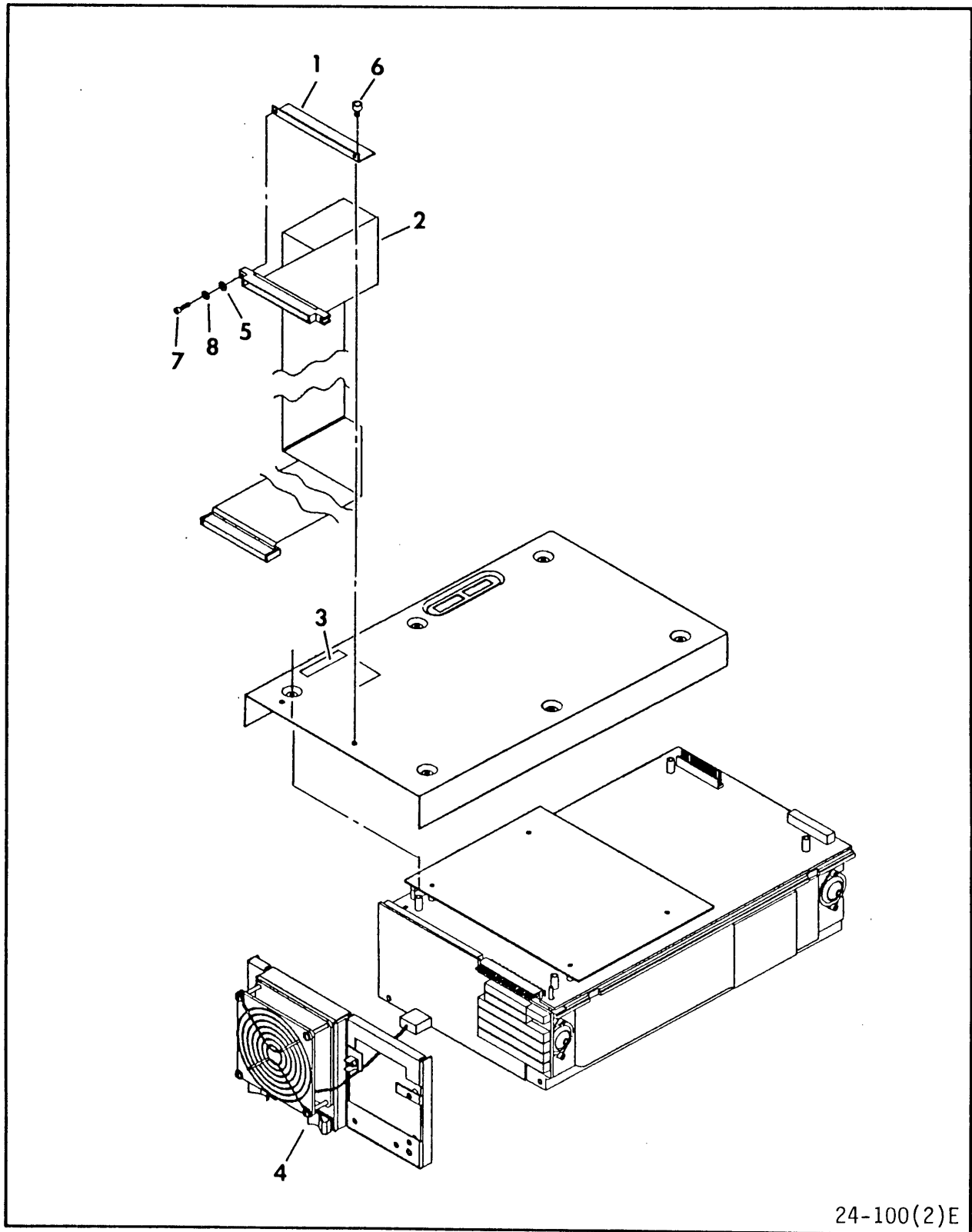


Figure 4-1. Eight-Inch Module Drive (Sheet 1 of 5)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
4-1	Optional	EIGHT-INCH MODULE DRIVE (Sheet 1 of 5)	
1	10127111	SCREW, PHH, 6-32 x 1/4	
2	47010556	COVER, Top	See Note 1
2	47010552	COVER, Top	See Note 2
3	46455321	PANEL, Rear	See Note 3
4		DRIVE ELECTRONICS ASSEMBLY (See Figure 4-2)	
5	Optional/ Spare	AC POWER CORD	
6	Optional/ Spare	DC POWER CABLE	
7	47056720	INSULATOR, Top Cover	
8	10126217	SCREW, Socket Hd, 6-32 x 1/4	
9	Optional/ Spare	POWER SUPPLY	
10	10126220	SCREW, Socket Hd, 6-32 x 5/8	
11	Optional	GROUND CABLE, Power Supply	
12	10126401	LOCKWASHER, #6	
13	10127142	SCREW, PHH, 10-32 x 3/8	Except PA8A2F
13	93660113	SCREW, PHH, 10-32 x 1/2	PA8A2F only
	Optional	RACK MOUNTING KIT	
14	75038304	BRACKET CLAMP	
15	45419002	BRACKET, Slide Adjusting, RH	22 cm (8.25 in)
15	45419003	BRACKET, Slide Adjusting, LH	22 cm (8.25 in)
16	47048260	SLIDE, RH	
16	47048261	SLIDE, LH	
17	10126244	SCREW, Socket Hd, 10-32 x 1/2	
18	94376727	NUT PLATE	
19	47007910	DRAWER, Inner	
20	47048250	DRAWER, 2X	
21	Optional	GASKET, RF	
22	10126225	SCREW, Socket Hd, 8-32 x 3/8	
23	45419004	BRACKET, Slide Adjusting, RH	6.8 cm (2.7 in)
23	45419005	BRACKET, Slide Adjusting, LH	6.8 cm (2.7 in)

Note 1: Used on all drives except PA8A2F/PA8D2C.  
Note 2: Used on PA8A2F/PA8D2C drives only.  
Note 3: See Sheet 2 for drives with fan.  
See Sheet 5 for drives with DC Voltage  
Conversion Kit.





24-100(2)E

Figure 4-1. Eight-Inch Module Drive (Sheet 2)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
4-1		EIGHT-INCH MODULE DRIVE (Sheet 2)	
1	47060600	CLAMP, I/O Cable	PA8A2F only
2	92439617	CABLE ASSEMBLY	PA8A2F only
3	95001403	TAPE	PA8A2F only
4	Optional	FAN MOUNTING KIT	
	Spare	FAN, 24 V dc	
	70558651	GUARD, Finger	
	81773302	BRACKET, Fan	See Note 1
	81773306	BRACKET, Fan	See Note 2
	10127119	SCREW, PHH, 6-32 x 1-1/4	
	94047001	WASHER, Special	
	94241019	CLIP, Cable	
	94274116	TERMINAL, Quick Connect	
	92817157	SCREW, Socket Hd, 6-32 x 3/16	
	10126401	LOCKWASHER, #6	
5	10125603	WASHER, #4	PA8A2F only
6	10126217	SCREW, Socket Hd, 6-32 x 1/4	PA8A2F only
7	10126213	SCREW, Socket Hd, 4-40 x 3/8	PA8A2F only
8	10126101	LOCKWASHER, #4	PA8A2F only

Note 1: Used in Fan Mounting Kits #45419402 and  
45419420 only.

Note 2: Used in Fan Mounting Kit #45419403 only.

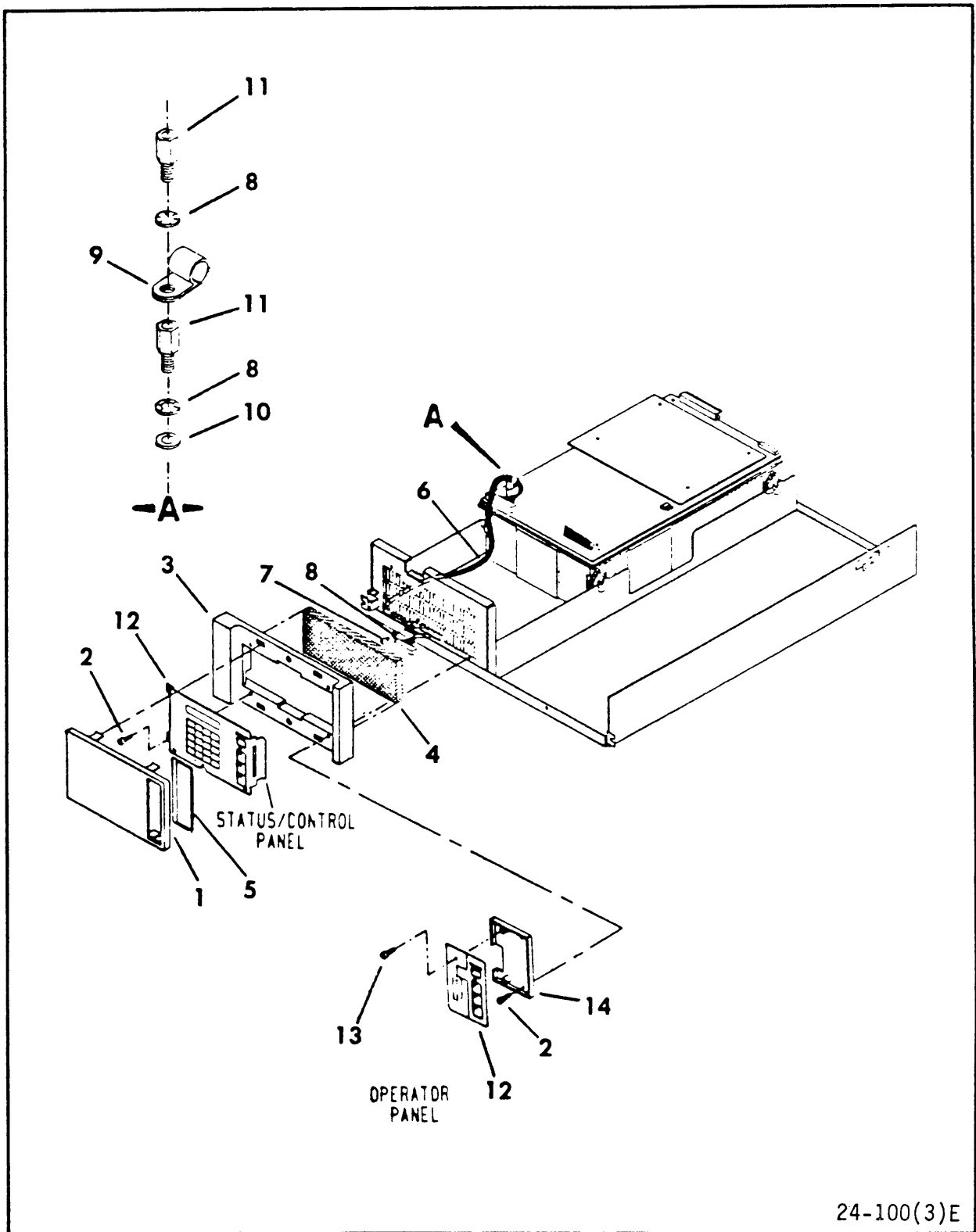


Figure 4-1. Eight-Inch Module Drive (Sheet 3)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
4-1		EIGHT-INCH MODULE DRIVE (Sheet 3)	
1	Optional	INSERT, Front Panel	
2	10126222	SCREW, Socket Hd, 6-32 x 7/8	
3	Optional	PANEL, Front	
4	Optional/ Spare	FILTER, Primary	
5	46641780	PLATE, Filler	
	Optional	STATUS/CONTROL PANEL AND OPERATOR PANEL KITS	
6	Optional/ Spare	JUMPER CABLE	
7	10126217	SCREW, Socket Hd, 6-32 x 1/4	
8	10126103	LOCKWASHER, #6	
9	92777196	CLAMP, Cable	
10	10125605	WASHER, #6	
11	77613122	STANDOFF	
12	CIC	STATUS/CONTROL BOARD (CVZX)	
12	CIC	OPERATOR PANEL BOARD (AWRX)	
13	92721196	SCREW, Socket Hd, 6-32 x 1/4	
14	47060750	SHIELD, Operator Panel	
	92777199	CLAMP, Cable	

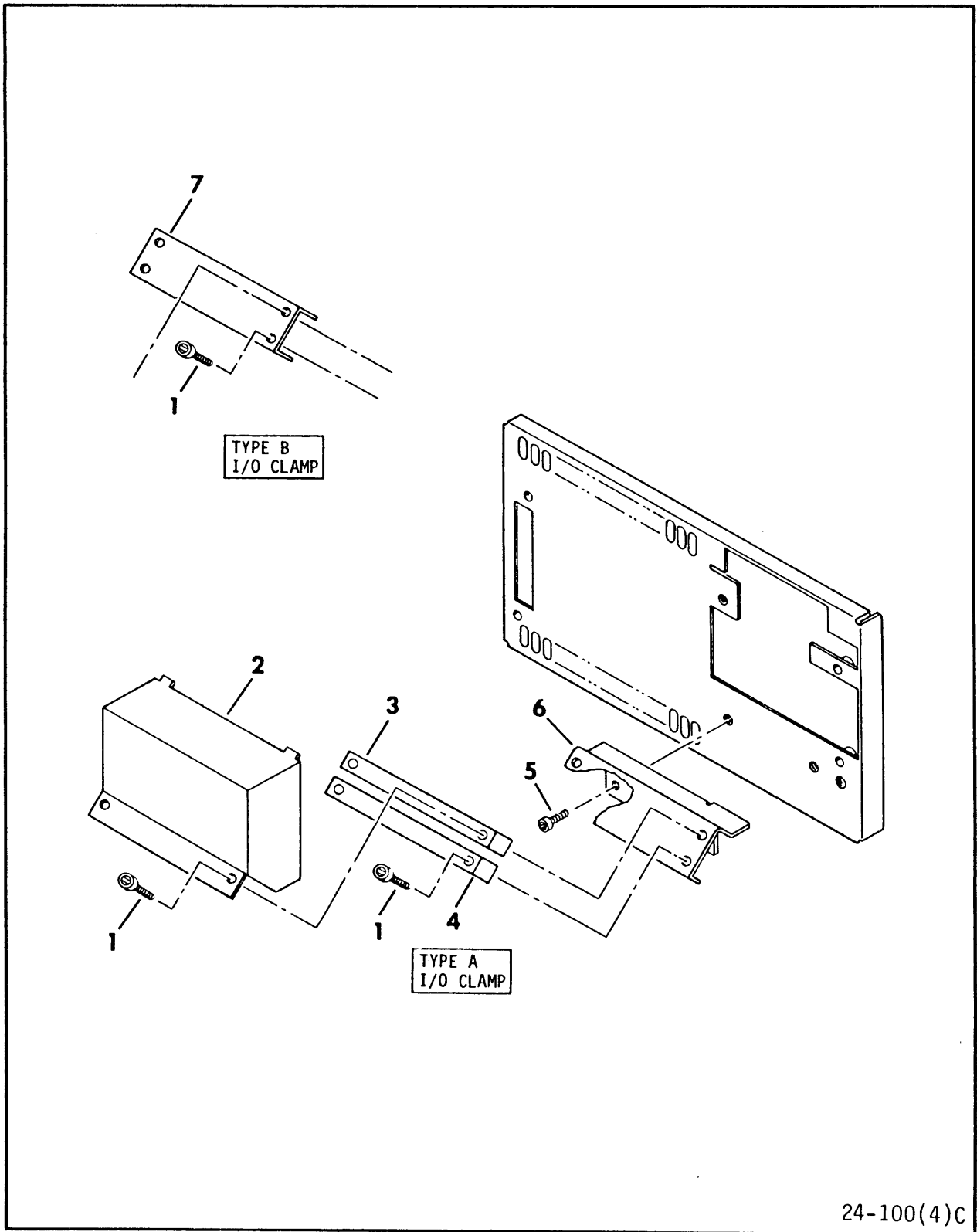


Figure 4-1. Eight-Inch Module Drive (Sheet 4)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
4-1		EIGHT-INCH MODULE DRIVE (Sheet 4)	
1	10126222	SCREW, Socket Hd, 6-32 x 7/8	
2	Optional	COVER, I/O Cable	
3	Optional	CLAMP, Grounding	Type A
4	Optional	CLAMP, Strain Relief	Type A
5	10126217	SCREW, Socket Hd, 6-32 x 1/4	
6	Optional	BRACKET, Cable	
7	Optional	CLAMP, I/O	Type B
	Optional	A CABLE	
	Optional	B CABLE	
	Optional	TERMINATOR	

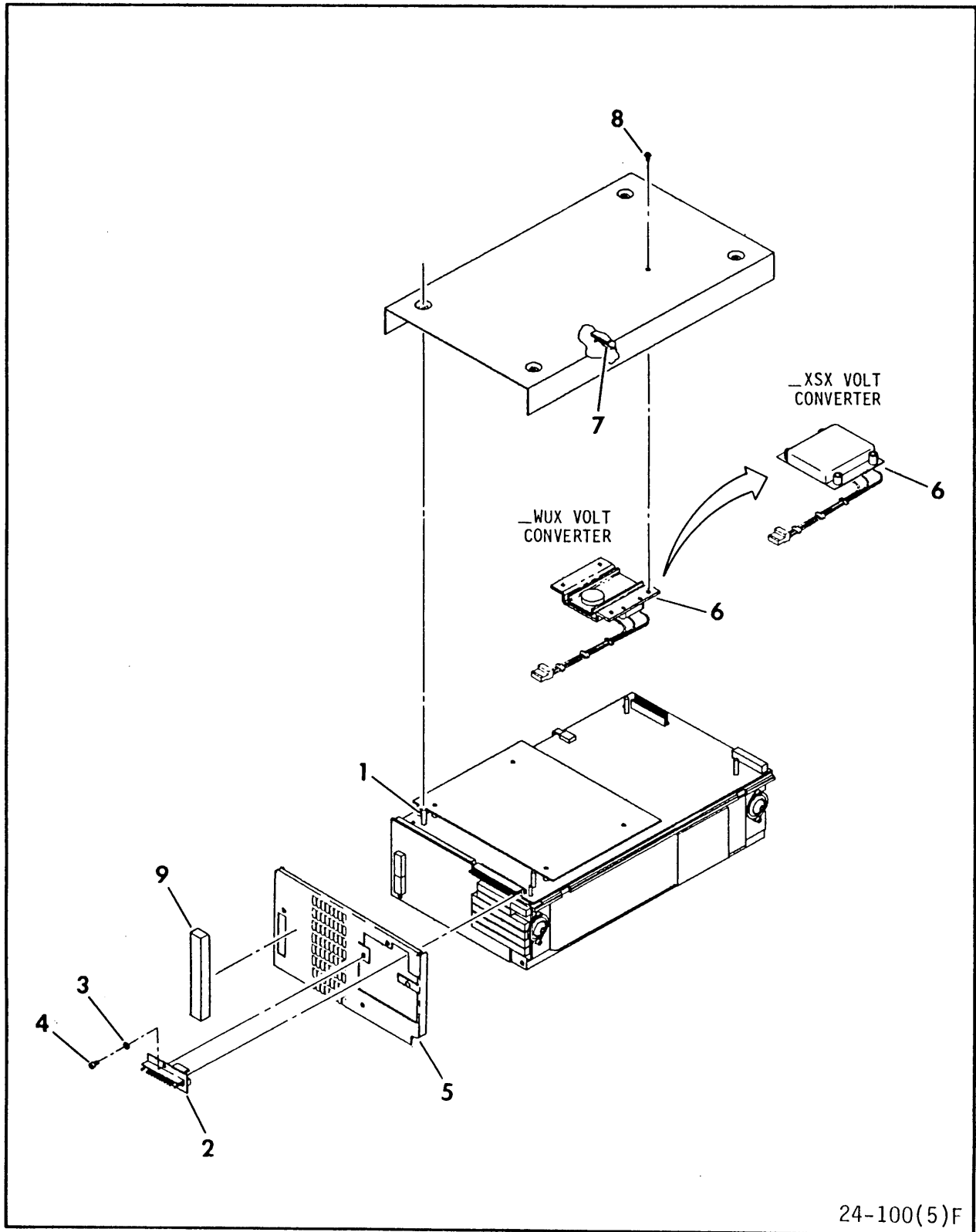


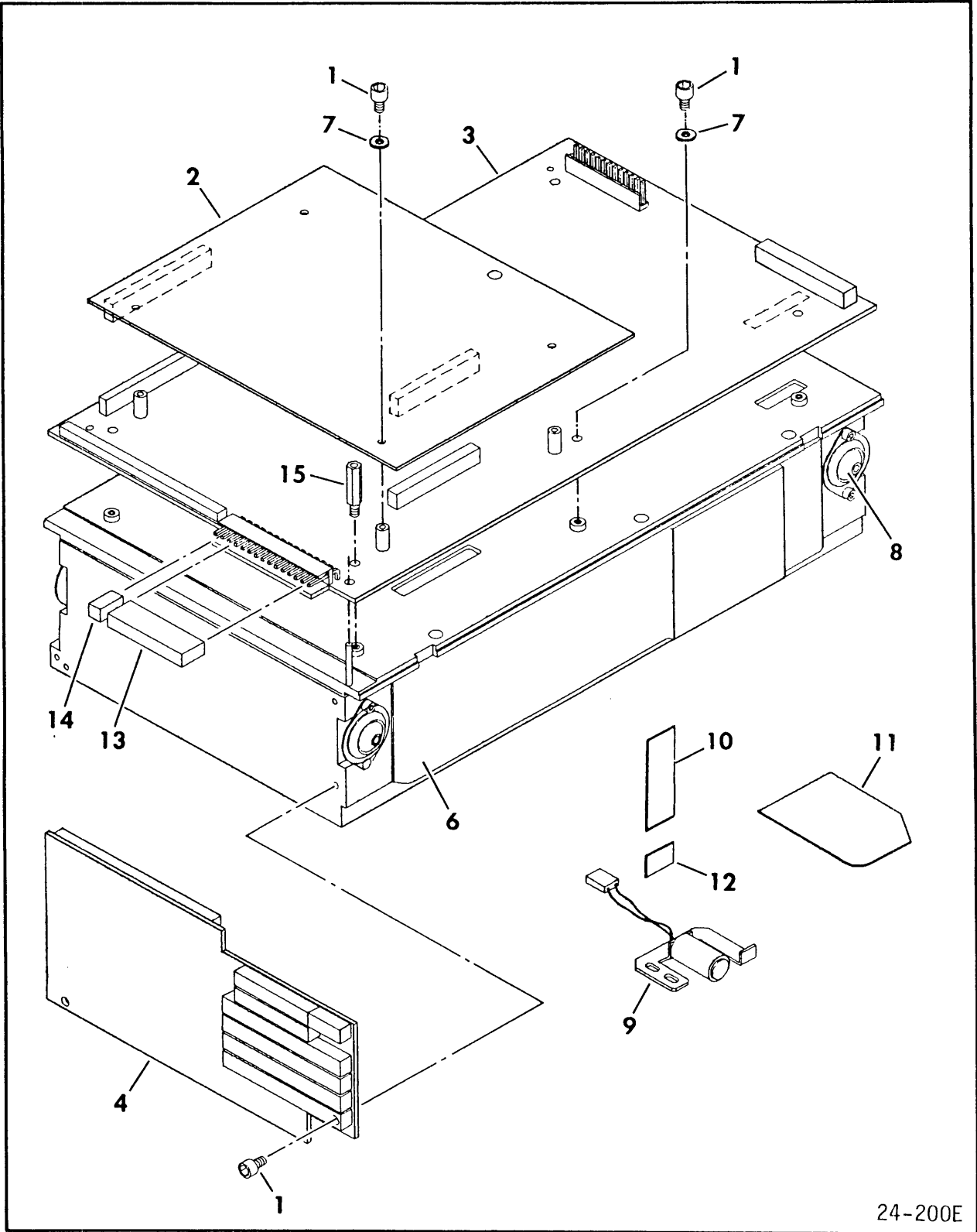
Figure 4-1. Eight-Inch Module Drive (Sheet 5)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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4-1		EIGHT-INCH MODULE DRIVE (Sheet 5)	
1	77613126	STANDOFF	
	47039121	DC VOLTAGE CONVERSION KIT	See Note 1
	47039122	DC VOLTAGE CONVERSION KIT	See Note 2
	47039124	DC VOLTAGE CONVERSION KIT	See Note 3
2	CIC	CONNECTOR ADAPTER BOARD (_WTX)	
3	10126103	LOCKWASHER, #6	
4	92721196	SCREW, Socket Hd, 6-32 x 1/4	
5	46455325	PANEL, Rear	See Note 4
5	46455326	PANEL, Rear	See Note 5
6	CIC	VOLTAGE CONVERTER BOARD	See Note 6
7	94241019	CLIP, Cable	
8	92721196	SCREW, Socket Hd, 6-32 x 1/4	
9	94289301	TAPE, Foam	See Note 5

- Note 1: Used on FA8A2D and PA8D2B drives only.
- Note 2: Used on FA8A2F S/C 10 & below without ECO 29706 installed.  
Used on FA8D2C S/C 02 & below without ECO 29706 installed.
- Note 3: Used on FA8A2F S/C 10 (with ECO 29706 installed) & above.  
Used on FA8D2C S/C 02 (with ECO 29706 installed) & above.
- Note 4: Used in kit 47039121 only.
- Note 5: Used in kits 47039122 and 47039124 only.
- Note 6: \_WUX board in older drives.  
\_X SX board in newer drive.





24-200E

Figure 4-2. Drive Electronics Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
4-2		DRIVE ELECTRONICS ASSEMBLY	
1	10126217	SCREW, Socket Hd, 6-32 x 1/4	
2	CIC	READ/WRITE BOARD	
3	CIC	CONTROL BOARD	
4	CIC	I/O BOARD	
5	10126243	SCREW, Socket Hd, 10-32 x 3/8	
6	Spare	FORMATTED MODULE ASSEMBLY	
7	10126103	LOCKWASHER, #6	
8	47038411	SHOCK MOUNT	
	Spare	CARRIAGE LATCH ELECTROMAGNET KIT	
9	47029920	ELECTROMAGNET	
10	46618921	COVER, Cable, Upper	
11	46618911	COVER, Electromagnet	
12	46618922	COVER, Cable, Lower	
13	94388624	CONNECTOR, Housing, 13 Position	
14	94388600	CONNECTOR, Housing, 2 Position	
15	95590407	STANDOFF	

TABLE 4-1. OPTIONAL PARTS

PART NO.	PART DESCRIPTION	368 MB* EQUIPMENT PACKAGE 804168xx												
		01	02	03	04	05	06	07	08	09	10	11	12	13
93895301	PA8A2A DRIVE	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
70504403	A CABLE	XX	XX											
15165427	AC CORD, 8'	XX	XX	XX	XX			XX						
75168331	AC CORD, 8'	XX	XX			XX	XX		XX		XX			
70505003	B CABLE	XX	XX											
46625990	BRACKET, CABLE	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
46641700	CLAMP, GNDING	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX		
46641705	CLAMP, GNDING												XX	XX
93920484	CLAMP, I/O													XX
46641701	CLAMP, STRN RLF	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	
46641706	CLAMP, STRN RLF													XX
46625982	COVER, I/O CBL	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
92588100	DC CABLE, 2.5"	XX	XX		XX		XX	XX	XX		XX			
92588106	DC CABLE, 5'	XX		XX		XX								
45419402	FAN MTG KIT	XX		XX		XX							XX	
72852573	FILTER, PRIMARY		XX											
94369536	GND CABLE, PS	XX	XX		XX		XX	XX	XX		XX			
70515601	INSERT, FR PNL		XX											
94377005	GASKET, RF		XX											
47001007	JUMPER CABLE	XX	XX					XX	XX		XX			
70515701	PANEL, FRONT		XX											
45070622	POWER SUPPLY	XX	XX	XX	XX	XX	XX	XX	XX		XX			XX
45140304	RACK MTG KIT		XX											
93238906	STATUS PNL KIT	XX	XX					XX	XX					
93270700	TERMINATOR	XX	XX								XX	XX		XX

\*SMD Interface Drives

Table Continued on Next Page

TABLE 4-1. OPTIONAL PARTS (Contd)

PART NO.	PART DESCRIPTION	368 MB* EQUIPMENT PACKAGE 804168xx												
		14	16	17	18	19	20	21	22	23	24	25	26	27
93895301	PA8A2A DRIVE	XX							XX				XX	XX
93895303	PA8A1A DRIVE		XX	XX	XX	XX	XX	XX						
93895304	PA8A2C DRIVE									XX				
93895305	PA8A1B DRIVE										XX			
93895306	PA8A2E DRIVE											XX		
15165427	AC CORD, 8'	XX	XX	XX			XX							
75168331	AC CORD, 8'				XX	XX		XX						
75168345	AC CORD, 3'									XX				
46625990	BRACKET, CABLE	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
46641700	CLAMP, GNDING	XX	XX	XX	XX	XX	XX	XX		XX	XX	XX		
46641705	CLAMP, GNDING									XX			XX	XX
93920484	CLAMP, I/O									XX			XX	XX
46641701	CLAMP, STRN RLF	XX	XX	XX	XX	XX	XX	XX		XX	XX	XX		
46641706	CLAMP, STRN RLF									XX			XX	XX
46625982	COVER, I/O CBL	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
92588100	DC CABLE, 2.5"			XX		XX	XX	XX		XX				
92588106	DC CABLE, 5'		XX		XX									
92588108	DC CABLE, 17"	XX												
45419402	FAN MTG KIT	XX	XX		XX									
72852573	FILTER, PRIMARY									XX				
94377005	GASKET, RF									XX				
94369536	GND CABLE, PS			XX		XX	XX	XX		XX				XX
47001007	JUMPER CABLE	XX					XX	XX	XX	XX				
47031804	OPER PANEL KIT	XX												
70515701	PANEL, FRONT									XX				
46455321	PANEL, REAR									XX				
45070622	POWER SUPPLY	XX	XX	XX	XX	XX	XX	XX	XX	XX				XX
93238906	STATUS PNL KIT						XX	XX	XX	XX				
93270700	TERMINATOR	XX								XX			XX	XX

\*SMD Interface Drives

Table Continued on Next Page

TABLE 4-1. OPTIONAL PARTS (Contd)

PART NO.	PART DESCRIPTION	368 MB* EQUIPMENT PACKAGE 804168xx												
		28	29	30	31	35	36	37	38	39	40	41	42	43
93895301	PA8A2A DRIVE	XX		XX	XX			XX			XX	XX	XX	XX
93895304	PA8A2C DRIVE					XX	XX							
93895307	PA8A2G DRIVE		XX											
93895308	PA8A2H DRIVE								XX	XX				
15165427	AC CORD, 8'									XX				
47188871	AC CORD, 2'								XX	XX				
75168331	AC CORD, 8'							XX	XX					
46625990	BRACKET, CABLE	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
46641700	CLAMP, GNDING		XX	XX	XX	XX	XX	XX	XX	XX				
46641705	CLAMP, GNDING	XX									XX	XX	XX	XX
93920484	CLAMP, I/O											XX	XX	XX
92777196	CLAMP, PWR CORD								XX	XX				
46641701	CLAMP, STRN RLF		XX	XX	XX	XX	XX	XX	XX	XX				
46641706	CLAMP, STRN RLF	XX									XX	XX	XX	XX
46625982	COVER, I/O CBL	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
92588100	DC CABLE, 2.5"							XX	XX	XX				
45419402	FAN MTG KIT		XX	XX			XX							
45419420	FAN MTG KIT											XX	XX	XX
72852573	FILTER, PRIMARY								XX	XX				
94369536	GND CABLE, PS	XX						XX	XX	XX				
47001007	JUMPER CABLE	XX							XX	XX				XX
46455321	PANEL, REAR					XX								
45070622	POWER SUPPLY	XX						XX	XX	XX	XX		XX	XX
47097410	STATUS PNL KIT	XX												
93238906	STATUS PNL KIT	XX							XX	XX				XX
93270700	TERMINATOR	XX						XX	XX	XX	XX	XX	XX	XX

\*SMD Interface Drives

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TABLE 4-1. OPTIONAL PARTS (Contd)

PART NO.	PART DESCRIPTION	500 MB* EQUIPMENT PACKAGE 470327xx												
		01	02	03	04	05	06	07	08	09	10	11	12	13
47032901	PA8D2A DRIVE	XX	XX	XX	XX	XX	XX	XX	XX					
47032902	PA8D1A DRIVE									XX	XX	XX	XX	XX
70504403	A CABLE	XX	XX											
15165427	AC CORD, 8'	XX	XX	XX	XX			XX		XX	XX			XX
75168331	AC CORD, 8'	XX	XX			XX	XX		XX			XX	XX	
70505003	B CABLE	XX	XX											
46625990	BRACKET, CABLE	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
46641700	CLAMP, GNDING	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
46641701	CLAMP, STRN RLF	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
46625982	COVER, I/O CBL	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
92588100	DC CABLE, 2.5"	XX	XX		XX		XX	XX	XX		XX		XX	XX
92588106	DC CABLE, 5'	XX		XX		XX				XX		XX		
45419402	FAN MTG KIT	XX		XX		XX				XX		XX		
72852573	FILTER, PRIMARY		XX											
94377005	GASKET, RF		XX											
94369536	GND CABLE, PS	XX	XX		XX		XX	XX	XX		XX		XX	XX
70515601	INSERT, FR PNL		XX											
47001007	JUMPER CABLE	XX	XX					XX	XX					XX
70515701	PANEL, FRONT		XX											
45070622	POWER SUPPLY	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
45140304	RACK MTG KIT		XX											
93238906	STATUS PNL KIT	XX	XX					XX	XX					XX
93270700	TERMINATOR	XX	XX											

\*SMD Interface Drives

Table Continued on Next Page



TABLE 4-1. OPTIONAL PARTS (Contd)

PART NO.	PART DESCRIPTION	500 MB* EQUIPMENT PACKAGE 470327xx									
		14	15	16	17	18	19	20	21	22	
47032901	PA8D2A DRIVE		XX	XX					XX	XX	
47032902	PA8D1A DRIVE	XX			XX	XX					
47032903	PA8D1B DRIVE						XX				
47032904	PA8D2D DRIVE							XX			
75168331	AC CORD, 8'	XX								XX	
46625990	BRACKET, CABLE	XX	XX	XX	XX	XX	XX	XX	XX	XX	
46641700	CLAMP, GNDING	XX	XX	XX	XX	XX	XX	XX	XX	XX	
46641701	CLAMP, STRN RLF	XX	XX	XX	XX	XX	XX	XX	XX	XX	
46625982	COVER, I/O CBL	XX	XX	XX	XX	XX	XX	XX	XX	XX	
92588100	DC CABLE, 2.5"	XX								XX	
45419402	FAN MTG KIT		XX		XX					XX	
72852573	FILTER, PRIMARY									XX	
94377005	GASKET, RF									XX	
94369536	GND CABLE, PS	XX								XX	
92536403	INSERT, FR PNL									XX	
47001007	JUMPER CABLE	XX	XX		XX					XX	
47031804	OPER PANEL KIT									XX	
92517403	PANEL, FRONT									XX	
45070622	POWER SUPPLY	XX								XX	
45140306	RACK MTG KIT									XX	
93238906	STATUS PNL KIT	XX	XX		XX						
93270700	TERMINATOR									XX	

\*SMD Interface Drives

Table Continued on Next Page



TABLE 4-2. MANUFACTURER'S RECOMMENDED SPARE PARTS

DESCRIPTION/NOTES	PART NUMBER	REPLACE- MENT PART NUMBER
AC POWER CORD, 8'	15165427	15165427
AC POWER CORD, 2'	47188871	47188871
AC POWER CORD, 8'	75168331	75168331
AC POWER CORD, 3'	75168345	75168345
CARRIAGE LATCH ELECTROMAGNET KIT	47009780	47009781
DC POWER CABLE ASSEMBLY (1.5 m/5 ft)	92588101	92588106
DC POWER CABLE ASSEMBLY (1.5 m/5 ft)	92588106	92588106
DC POWER CABLE ASSEMBLY (43.5 cm/17 in)	92588108	92588108
FAN, 24 V dc		
Larger Fan	46455310	45419402*
Smaller Fan	46455311	46455311
FILTER, Primary	72852573	72852573
FORMATTED MODULE ASSEMBLY, PA8A1A, PA8A2A/D	92651500	92651500
FORMATTED MODULE ASSEMBLY, PA8A1B, PA8A2E	92651504	92651504
FORMATTED MODULE ASSEMBLY, PA8A2C	92651508	92651508
FORMATTED MODULE ASSEMBLY, PA8A2F	92651510	92651510
FORMATTED MODULE ASSEMBLY, PA8A2G	92651505	92651505
FORMATTED MODULE ASSEMBLY, PA8A2H	92651509	92651509
FORMATTED MODULE ASSEMBLY, PA8D1A, PA8D2A/B/C		
With oxide media (on older drives)	47032951	70751076+
With thin film media (on newer drives)	47032956	47032956
FORMATTED MODULE ASSEMBLY, PA8D1B, PA8D2D		
With oxide media (on older drives)	47032955	70751079+
With thin film media (on newer drives)	47032959	47032959
JUMPER CABLE	47001007	47001007
POWER SUPPLY	45070622	45070622

\*Large fan is replaced by fan mounting kit, which includes small fan and matching fan bracket.

+Contains new thin film media module with new read/write board and instructions.

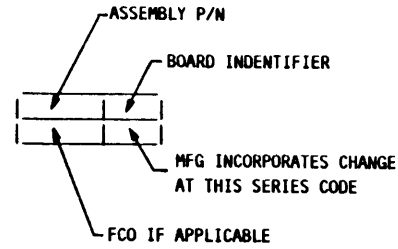
NOTE: Refer to Card Interchangeability Chart (following Table 4-3) for part numbers of component assemblies.

TABLE 4-3. ACCESSORIES

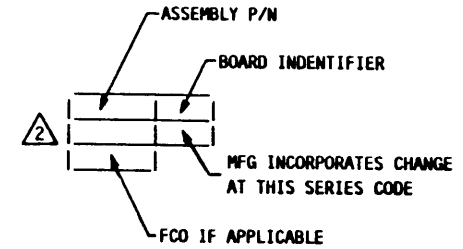
PART NUMBER	DESCRIPTION
12263496	STATIC GROUND WRIST STRAP, 6 1/2 to 8 inch wrist
12263623	STATIC GROUND WRIST STRAP, up to 6 1/2 inch wrist
12263624	STATIC SHIELDING BAG, 5 x 8 inch
12263625	STATIC SHIELDING BAG, 8 x 12 inch
12263626	STATIC SHIELDING BAG, 10 x 12 inch
12263499	STATIC SHIELDING BAG, 14 x 18 inch
12263627	STATIC SHIELDING BAG, 16 x 24 inch
70504401	I/O A CABLE, 5 foot (1.5 metre) long
70504402	I/O A CABLE, 10 foot (3.0 metre) long
70504403	I/O A CABLE, 15 foot (4.5 metre) long
70504404	I/O A CABLE, 20 foot (6.1 metre) long
70504405	I/O A CABLE, 25 foot (7.6 metre) long
70504406	I/O A CABLE, 30 foot (9.1 metre) long
70504407	I/O A CABLE, 40 foot (12.2 metre) long
70504408	I/O A CABLE, 50 foot (15.3 metre) long
70504409	I/O A CABLE, 100 foot (30.6 metre) long
70505001	I/O B CABLE, 5 foot (1.5 metre) long
70505002	I/O B CABLE, 10 foot (3.0 metre) long
70505003	I/O B CABLE, 15 foot (4.5 metre) long
70505004	I/O B CABLE, 20 foot (6.1 metre) long
70505005	I/O B CABLE, 25 foot (7.6 metre) long
70505006	I/O B CABLE, 30 foot (9.1 metre) long
70505007	I/O B CABLE, 40 foot (12.2 metre) long
70505008	I/O B CABLE, 50 foot (15.3 metre) long
93270700	I/O TERMINATOR
24534808	GROUND STRAP (specify length desired)
40125601	GROUND LUG
10126403	LOCKWASHER, #10 (for grounding)

REVISION RECORD			
REV	ECO	DESCRIPTION	DATE
A	DJ23000	RELEASED	11-28-85
B	DJ29070	INCORPORATE CWAX and DWAX	4-29-86
C	DJ29159	INCORPORATE DVRX	2-14-87
D	DJ29230	HMAX TO KWAX	2-15-87
E	DJ29234	AMUX TO BWUX	2-18-87
F	DJ29244	INCORPORATE BWTX	2-23-87
G	DJ29263	EYX TO FVYX	3-11-87
H	DJ29264	AXEX TO BXEX	3-14-87
J	DJ29275	NMAX TO LWAX	3-17-87
K	DJ29294	BWUX TO CWUX	7-4-87
L	DJ29311	KWAX TO NMAX	7-17-87
M	DJ29314	BXEX TO CXEX	8-2-87
N	DJ29322	AWYX TO BWYX	9-8-87
P	DJ29363	LWAX TO PWAX	9-12-87
R	DJ29364	CXEX TO DXEX	9-20-87
S	DJ29365	PWAX TO QWAX	10-8-87
T	DJ29396	DVRX TO FVRX	10-12-87
U	DJ29425	CVZX TO TAB 03 (368 MB)	10-26-87
V	DJ29431	CVZX TO TAB 03 (500 MB)	10-31-87
W	DJ29453	QWAX TO TAB 16	11-1-87
Y	DJ29454	CWBX TO DWBX	11-10-87
Z	DJ29455	AMZX TO BWZX	11-11-87
AA	DJ29465	QWAX TO TAB 17	11-28-87
AB	DJ29561	DXEX TO TAB 05	12-7-87
AC	DJ29590	EVRX TO GVRX (500 MB)	3-11-88
AD	DJ29594	EVRX TO GVRX (368 MB)	3-14-88
AE	DJ29598	DVRX TO FVRX (500 MB)	4-15-88
AF	DJ29602	DVRX TO FVRX (368 MB)	4-29-88
AG	DJ29668	QWAX TO TAB 18	5-21-88
		DXEX TO TAB 06	5-21-88
AH	DJ29706	INCORPORATE BXSX	6-3-88
AJ	DJ29788	QWAX TO TAB 19	6-6-88
		DXEX TO TAB 07	6-6-88
AK	DJ29890	QWAX TO TAB 20	8-8-88
AL	DJ40114	QWAX TO TAB 21	11-28-88
		DXEX TO TAB 08	11-28-88
AM	DJ40228	QWAX TO TAB 23	2-15-89
AN	DJ40229	DXEX TO TAB 10	2-18-89
AP	DJ40266	FVRX TO TAB 10	3-11-89
AR	DJ40306	FVRX TO TAB 14	4-29-89

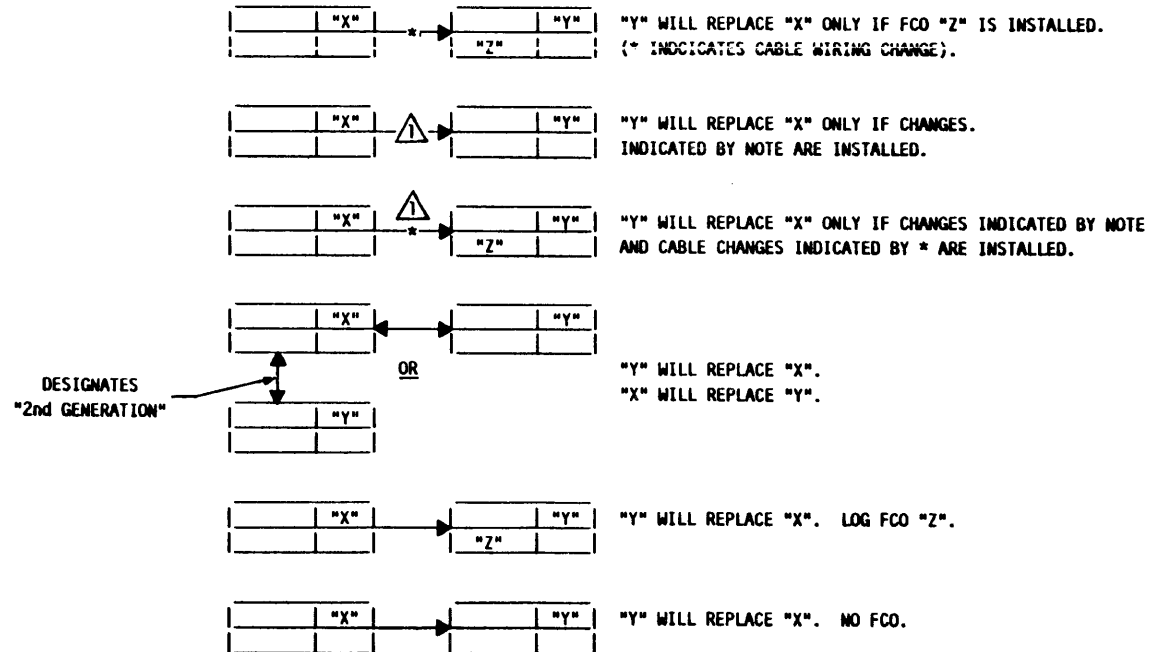
ALL BOARDS EXCEPT CONTROL BOARD



CONTROL BOARD ONLY



△ LOWER P/N IS FOR THE SWEEP CYCLE KIT. THE KIT CONTAINS THE BOARD (UPPER P/N) AND A BOOKLET TO SET-UP THE SPARE BOARD.



CARD INTERCHANGEABILITY CHART

83325410

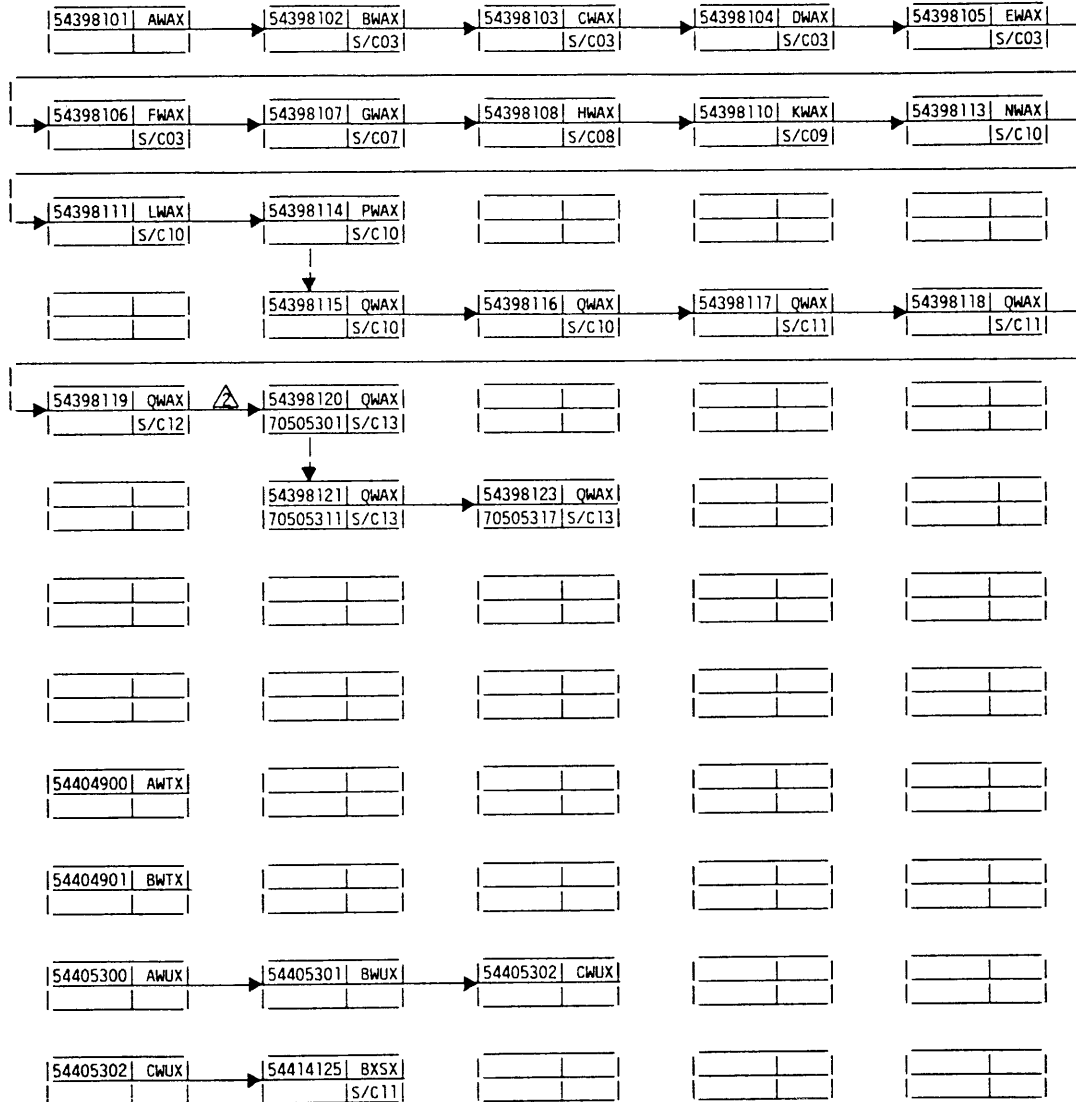
G

PA8A1/PA8A2/PA8D1/PA8D2

SHEET: 1

PAGE: 4-29

TITLE      USAGE  
CONTROL BOARD      COMMON



CONNECTOR ADAPTER BOARD      PABA2D

CONNECTOR ADAPTER BOARD      PABA2F

VOLTAGE CONVERTER ASSEMBLY      PABA2D

VOLTAGE CONVERTER ASSEMBLY      PABA2F

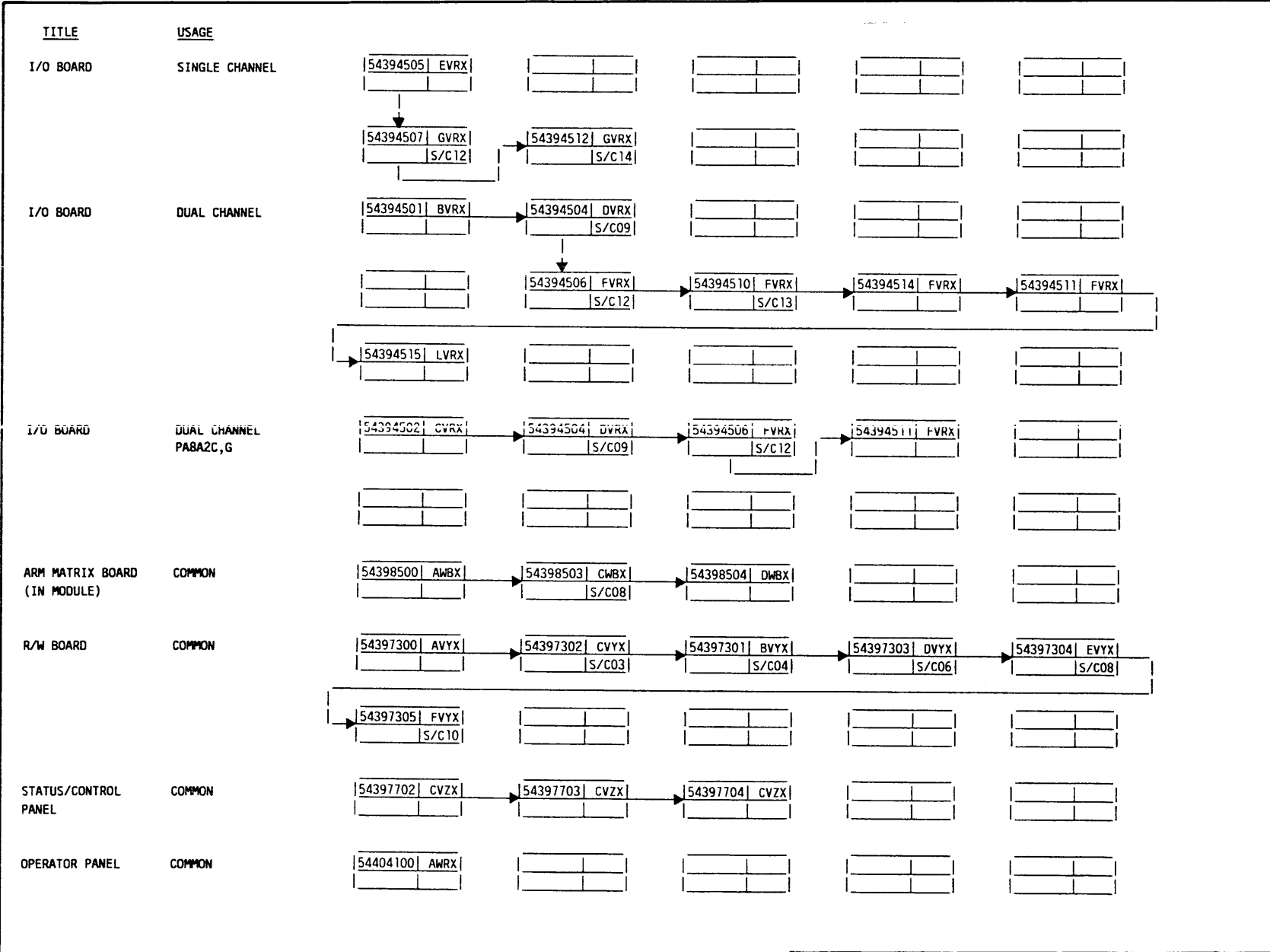
CARD INTERCHANGEABILITY CHART  
PABA1/PABA2

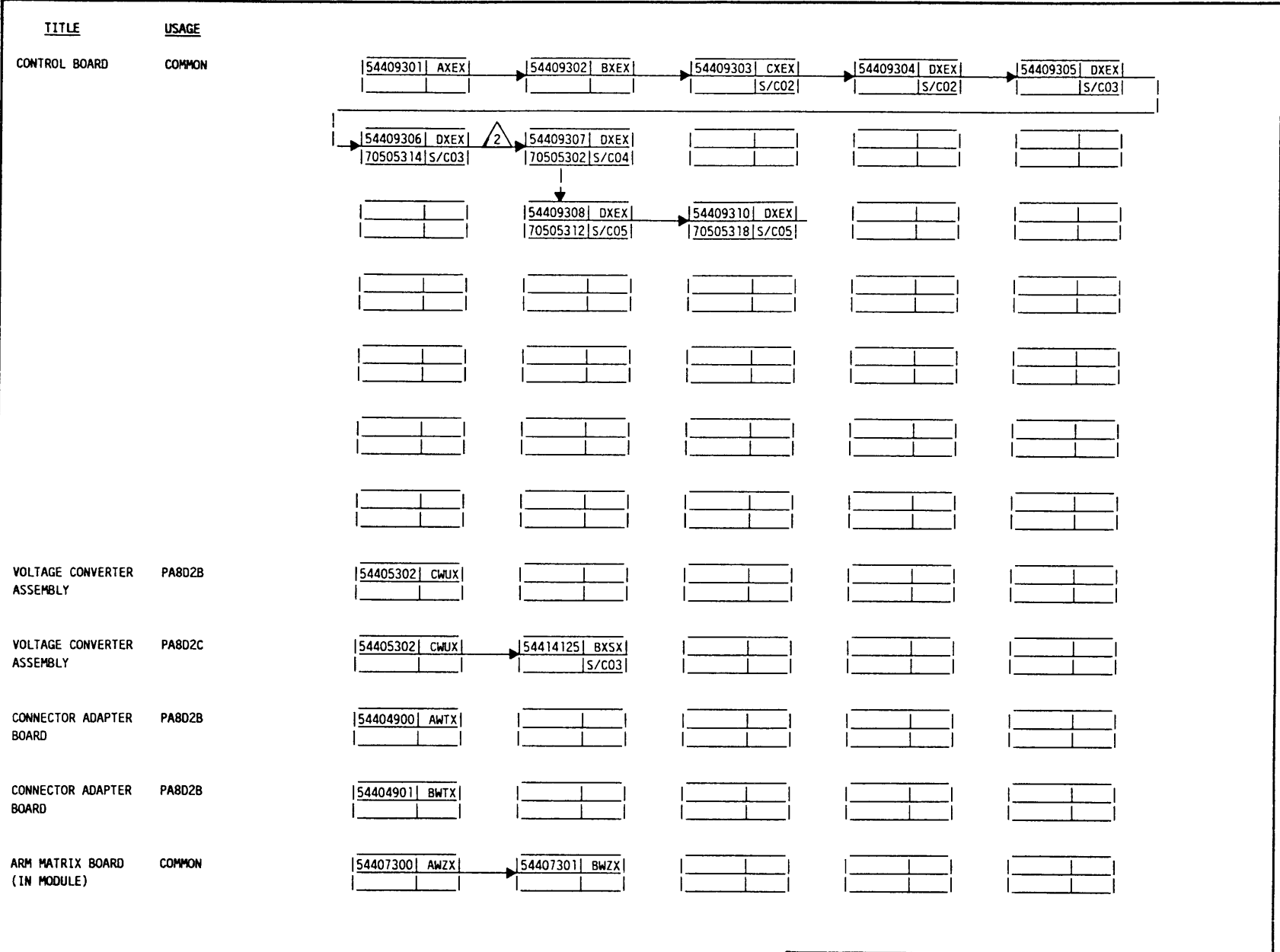
83325410

H

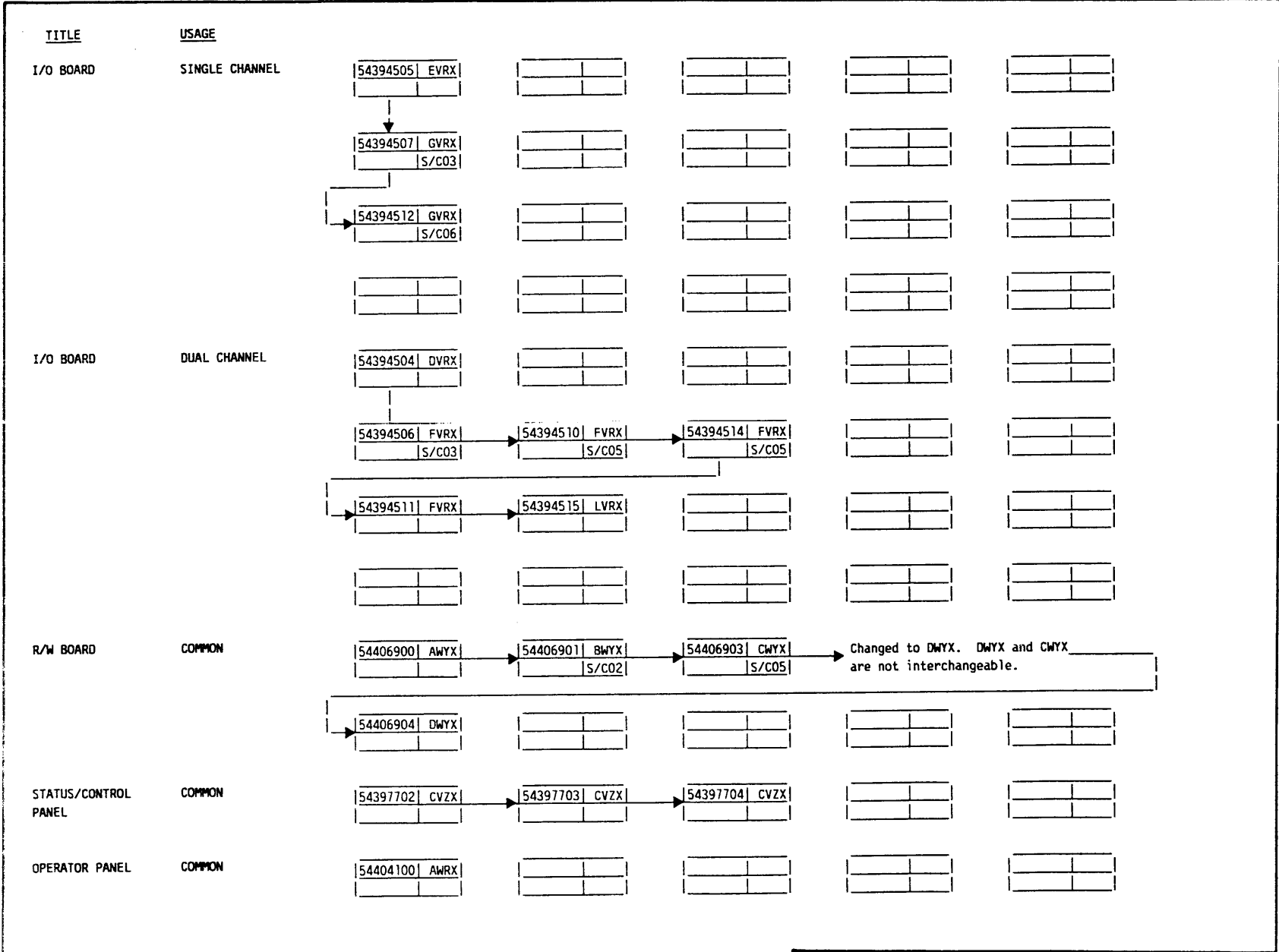
368 MB SHEET: 2

PAGE: 4-30









# **Appendix A Diagnostic Testing and Status Code Summary**

# DIAGNOSTIC TESTING AND STATUS CODE SUMMARY A

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## CAUTION

When servicing the drive, observe all precautions listed under Electrostatic Discharge Protection in section 3 of this manual. Failure to observe these precautions can result in serious damage to electronic assemblies.

## INTRODUCTION

This appendix presents information on interpreting the information displayed on the status/control panel and running offline diagnostic tests. More complete troubleshooting information can be found in volume 2 of the hardware maintenance manual. You should be familiar with the contents of that manual before doing any troubleshooting.

For trouble analysis, a status/control panel is needed. If the drive installation does not include a status/control panel, we advise that you connect one to the drive during troubleshooting. Refer in this manual to section 4 for part numbers for the status/control panel and its interconnect cable and to section 3 for instructions on connecting the panel to the drive.

The following types of troubleshooting information are presented in this appendix:

- Power On Test -- describes drive self-tests that occur when dc power is applied to the drive
- Diagnostic Testing -- describes how to use diagnostic testing to isolate drive malfunctions
- Drive Status Codes -- provides information on correcting problems associated with drive power-on/power-off and with servo operation

## POWER ON TEST

When dc power is applied to the drive, the Control MPU performs a series of self-tests. During these tests the Address, Ready, FAULT, and WRITE PROTECT lights on the operator panel or status/control panel will be lit. After approximately four seconds, the FAULT light will go off, indicating successful completion of the self-tests. If the Ready and FAULT lights remain on constantly, it indicates the drive failed the power on self-test. The Address lights will then indicate which self test routine the drive failed to complete. Refer to table A-1 to determine which test failed and what action to take.

In addition to the individual tests listed in table A-1, the Control MPU attempts to communicate with the status/control panel. If this communication is unsuccessful, the Control MPU displays the message PANEL FAILURE on the LCD of the panel.

## DIAGNOSTIC TESTING

The drive's offline diagnostics are initiated and monitored via the keyboard and LCD of the status/control panel. Refer to section 2 of this manual for information on the switches and indicators on the panel.

### TEST SELECTION PROCEDURE

To run offline diagnostic tests on the drive, place the drive in diagnostic mode and select the tests desired. To do this:

- Press the DIAG MODE switch to enter diagnostic mode and observe that the LCD reads DIAG TEST XX.
- Enter two hexadecimal characters on the keyboard and press EXEC switch to select the first test.

Directions for running the individual diagnostic tests appear later in this section. When the Execute switch is pressed one more time, the test ends and the LCD again reads DIAG TEST XX. At this point you have two choices:

- Enter two hexadecimal characters on the keyboard and press EXEC switch to select another test, or
- Press the DIAG MODE switch to leave diagnostic mode and observe that the LCD displays drive operating status.

TABLE A-1. POWER ON TEST FAILURE

Address Lights*	Hex Code	Test Failed** & Actions
<p>8    4    2    1</p> <p>•    •    •    •</p> <p>•    •    •    o</p> <p>•    •    o    •</p> <p>•    •    o    o</p> <p>•    o    •    •</p> <p>•    o    •    o</p>	<p>F</p> <p>E</p> <p>D</p> <p>C</p> <p>B</p> <p>A</p>	<p><u>RAM Test</u></p> <p>Action: 1. Replace control board.</p> <p><u>ROM Test</u></p> <p>Action: 1. Replace control board.</p> <p><u>I/O Chip Test</u></p> <p>Actions: 1. Replace I/O board. 2. Replace control board.</p> <p><u>Peripheral Chip (Test 1)</u></p> <p>Action: 1. Replace control board.</p> <p><u>Peripheral Chip (Test 2)</u></p> <p>Action: 1. Replace control board.</p> <p><u>Motor MPU Test</u></p> <p>Action: 1. Replace control board.</p>
<p>* Darkened circles indicate light is On.</p> <p>**Ready and FAULT lights remain on constantly, indicating drive failed four second power on self-test.</p>		

## TEST DESCRIPTIONS

### Test 00 -- Display Drive Operating Status Log

This test displays the 8 most recently generated drive status codes. After test selection, the display provides a hexadecimal status code from the internal log. This code is preceded by a character (0-7) and a colon, indicating the position of the status code in the status log. To execute test 00, perform the following steps:

1. Enter Test 00, then press EXEC switch. The LCD will display DRIVE LOG: 0:XX where the number 0 indicates the position in the log and XX represents the status code entered in that position.
2. Press SPACE switch repeatedly until you see a code preceded by an asterisk (for example, DRIVE LOG: \*5:XX). The asterisk identifies that code as the most recent code stored in the status log.
3. Use the SPACE switch to step through from the 8th most recent to the most recent status.
4. Press EXEC switch to end the test and return to test selection.

### Test 01 -- Display Fault Log

This test displays the 8 most recently stored fault codes. After test selection, a hexadecimal fault code will be displayed. This code is preceded by a character (0-7) and a colon, indicating the position of the fault code in the fault log. To execute test 01, perform the following steps:

1. Enter Test 01, then press EXEC switch. The LCD will display FAULT LOG: 0:XX where the number 0 indicates the position in the log and XX represents the fault code entered in that position.
2. Press SPACE switch repeatedly until you see a code preceded by an asterisk (for example, FAULT LOG: \*5:XX). The asterisk identifies that code as the most recent code stored in the fault log.
3. Use the SPACE switch to step through from the 8th most recent to the most recent fault.
4. If more than one fault occurs simultaneously (multiple faults), more than one bit in the fault code will be set. Check the bit-mapped locations of each fault by referring to the following list:

<u>Bit</u>		<u>Definition</u>
0	(LSB)	Read•Write Fault (01)
1		(Read+Write)•Off Cylinder Fault (02)
2		First Seek Fault (04)
3		Write Fault (08)
4		Write•Write Protected Fault (10)
5		Head Select Fault (20)
6		Voltage Fault (40)
7	(MSB)	Not Used (80)

5. Press EXEC switch to end the test and return to test selection.

#### Test 04 -- Calculate Three Most Likely Field Replaceable Units

##### NOTE

Do not execute Tests 05, 06, or 07 prior to running Test 04.

This test uses the fault status and the drive operating status history (Tests 00 and 01) to predict the most likely cause of drive failure. Table A-2 lists the individual codes and their corresponding replacement part. To execute Test 04, perform the following steps:

1. Enter Test 04, then press EXEC switch. The LCD will display FRUS: XX XX XX. Upon test completion, the three field replaceable units will be displayed, with the first hexadecimal code being the most likely cause of the failure.
2. Press EXEC switch to end the test and return to test selection.

TABLE A-2. CODING OF FIELD REPLACEABLE UNITS

Hex Display	Field Replaceable Unit
00	No FRU Information
01	Control Board
02	Module
03	Power Supply
04	I/O Board
05	Read/Write Board
06	Carriage Latch Electromagnet

**Test 05 -- Servo Test**

This test clears both the drive status log and fault log. Because Test 04 relies on status history that would be cleared by Test 05, you might want to run Test 04 before running Test 05. Test 05 automatically performs several types of seek operations. They are as follows:

<u>Operation</u>	<u>Number Of Times Executed</u>
RTZ	1
1 Track Seek	16
RTZ	1
Partial Servo Recalibrate	1
RTZ	1
Maximum Length Seek	16
RTZ	1

Execution stops when an error is detected or the test completes. To execute Test 05, perform the following steps:



1. Enter Test 05, then press EXEC switch. Upon successful completion of the test, the LCD will display OK, CYL: 000. If an error occurs, the LCD will display SERVO ERROR: XX. Drive status codes (servo errors) are defined in table A-3 at the end of this section.
2. Press EXEC switch to end the test and return to test selection.

#### Test 06 -- Clear Drive Operating Status Log

This test clears the drive status log resident in program RAM. Because Test 04 relies on status history that would be cleared by Test 06, you might want to run Test 04 before running Test 06. To execute Test 06, perform the following steps:

1. Enter Test 06 and press EXEC switch. The LCD will display DRIVE LOG CLEAR.
2. Press EXEC switch to end the test and return to test selection.

#### Test 07 -- Clear Fault Log

This test clears the fault log. Because Test 04 relies on status history that would be cleared by Test 07, you might want to run Test 04 before running Test 07. To execute Test 07, perform the following steps:

1. Enter Test 07 and press EXEC switch. The LCD will display FAULT LOG CLEAR.
2. Press EXEC switch to end the test and return to test selection.

#### Test 08 -- Direct Or Continuous Seeks

This test performs direct or continuous seeks between cylinder 0 and the desired cylinder address. The operation stops if an error occurs or if the EXEC switch is pressed. To execute Test 08, perform the following steps:

1. Enter Test 08 and press EXEC switch.
2. The display HEX CYL XXX asks you to supply a valid destination address (between 0 and 4C0 inclusive). Enter three characters and press SPACE switch.

3. The display DIR OR CONT? D/C asks you to select either DIRect (D) or CONTinuous (C) seeks. Enter either C or D to start test.
4. If D was entered and the direct seek was successful, the LCD will display OK, CYL: XXX, where XXX is the destination address previously entered. Press EXEC switch to end the test and return to test selection.
5. If either D or C was entered and an error occurs, the LCD will display SERVO ERROR: XX. Drive status codes (servo errors) are defined in table A-3 at the end of this section. By running Test 05 or Test 0E, you can clear the seek error.
6. If C was entered, press EXEC switch to end the test and return to test selection.

#### Test 09 -- Random Seek

This test performs random seeks between cylinders 0 and 1216 (maximum cylinder address). Operation stops if an error occurs or if the EXEC switch is pressed. To execute Test 09, perform the following steps:

1. Enter Test 09 and press EXEC switch.
2. The LCD will display OK, CYL: XXX if execution was successful.
3. If an error occurs during the test, the LCD will display SERVO ERROR: XX. Drive status codes (servo errors) are defined in table A-3 at the end of this section.
4. Press EXEC switch to end the test and return to test selection.

#### Test 0C -- Display EPROM Part Number

This test displays the 8-digit part number of the control microprocessor EPROM. To execute Test 0C, perform the following steps:

1. Enter Test 0C and press EXEC switch. The LCD will display the 8-digit part number of the EPROM (for example, EPROM# = 12345678).
2. Press EXEC switch to end the test and return to test selection.

## Test OE -- Return To Zero

This test initiates a return to zero command. To execute Test OE, perform the following steps:

1. Enter Test OE and press EXEC switch. The LCD will display OK, CYL: 000.
2. If an error occurs during the test, the LCD will display SERVO ERROR: XX. Drive status codes (servo errors) are defined in table A-3 at the end of this section.
3. Press EXEC switch to end the test and return to test selection.

## DRIVE STATUS CODES

Whenever the drive is in a power on condition (dc power active), the Control MPU is periodically checking the operation of the drive and generating appropriate operating status codes.

Table A-3 lists the status codes and a definition of each code. If a drive malfunction occurs, observe the error code and perform Diagnostic Test 04 to calculate the action to be taken.

Figure A-1 shows an example of the LCD during normal operation and when a fault occurs. During normal operation, the LCD displays current drive status, current cylinder address, and which drive channel is selected and/or reserved.

If a fault occurs, the LCD displays the type of fault(s) that occurred along with the current drive status. If more than one fault occurred, use the SPACE switch to step through the fault log to determine what faults are present.

Pressing the Fault Clear switch on the status/control panel clears the LCD fault display and the FAULT indicator, provided that the fault condition is no longer present. However, a Fault Clear signal from the initiator clears only the FAULT indicator.

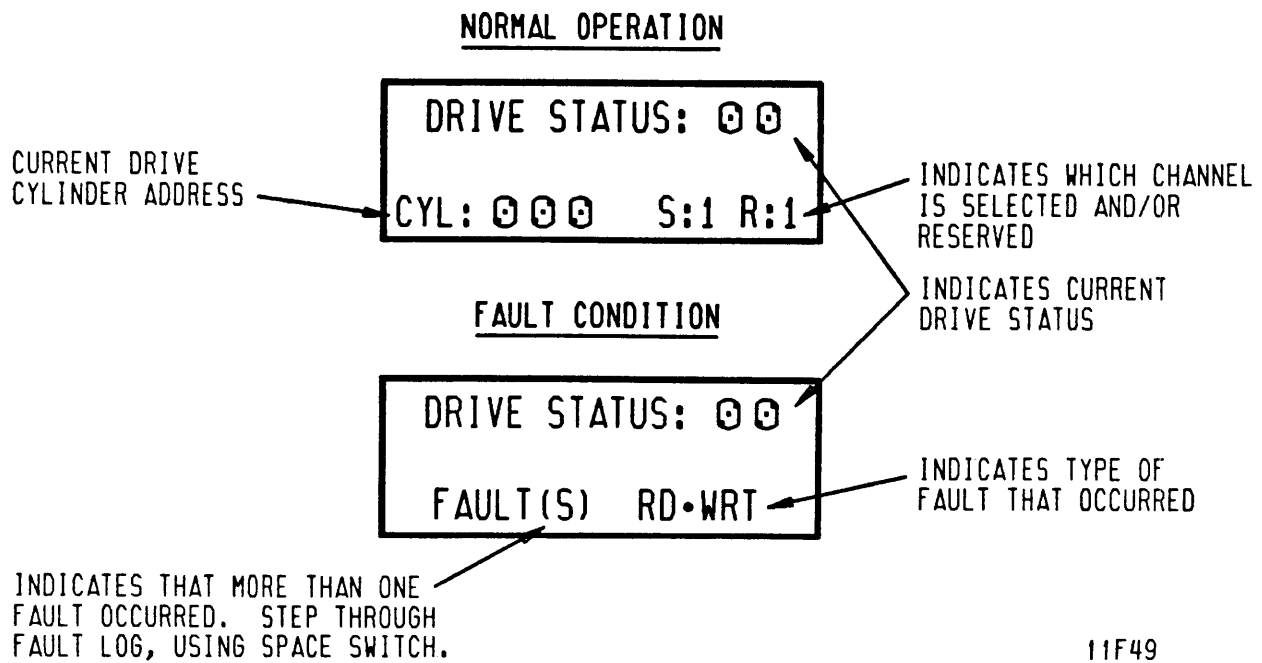


Figure A-1. Example of LCD (Liquid Crystal Display)

TABLE A-3. DRIVE STATUS CODES

Code	Title	Description
<b>NORMAL START/STOP STATUS</b>		
00	Ready & On Cylinder	Indicates that the drive is on cylinder and ready to perform normal operations.
02	Motor Stopping	Indicates that the motor is coasting down or that motor braking is in progress.
03	Motor Stopped	Indicates that the motor is stopped.
Table Continued on Next Page		

TABLE A-3. DRIVE STATUS CODES (Contd)

Code	Title	Description
NORMAL START/STOP STATUS (Contd)		
04	First Load/Calibrate	Indicates that the heads are moving from the landing zone to track 0 and servo calibration is being performed.
05	Sequence Delay	Indicates, in Remote mode, that a power sequence delay is occurring. The delay depends on the drive's unit address.
06	START Switch Pressed and Waiting for Power Sequence Signals	Indicates, in Remote mode, that the START switch was pressed and that the drive is waiting for power sequence signals from the controller before starting the sequence delay.
07	Starting Motor	Indicates that start conditions are present and that the spindle motor is starting.
08	Motor Up To Speed	Indicates that the spindle motor has reached full speed.
SWEEP CYCLE STATUS		
0A	Drive in Sweep Segment	The drive is executing a series of seeks for a sweep cycle. On Cylinder and Seek End inactive at this time.
0B	Heads Left on Last Cylinder of Sweep	Current head position determined by last sweep cycle -- not by a controller-requested seek. On Cylinder and Seek End inactive at this time.
Table Continued on Next Page		

TABLE A-3. DRIVE STATUS CODES (Contd)

Code	Title	Description
SEEK ERROR STATUS		
46	Seek Timeout	Indicates that during a normal seek the drive took longer than 100 milliseconds to reach on cylinder.
4B	Off Track Seek Error	Indicates that either the drive failed to stay on cylinder or cylinder pulses were detected during track-following.
4D	Illegal Cylinder Address	Indicates that during a normal seek, the controller issued too high a cylinder address (greater than 1216).
4F	Seek Error On Settle In	Indicates that the drive could not settle in on the destination cylinder.
CONTROL MPU ERRORS (Reported on older drives)		
50	Low Vcc Glitch	Indicates that the Control MPU was reset and that DC Master Clear is active due to Low Vcc (power loss).
51	Control MPU Reset	Indicates that the Control MPU was reset due to a hang condition.
FIRST SEEK FAULT STATUS		
54	First Seek Fault On Retract	Indicates that the drive failed to complete the retract portion of the first seek.
Table Continued on Next Page		

TABLE A-3. DRIVE STATUS CODES (Contd)

Code	Title	Description
FIRST SEEK FAULT STATUS (Contd)		
55	First Seek Fault On Load	Indicates that the drive failed to load the heads.
56	First Seek Fault On RTZ	Indicates that the drive failed to complete the return to zero (RTZ) portion of the first seek.
57	First Seek Fault On Calibrate	Indicates that the drive did not complete the velocity calibration operation.
ERROR CONDITION STATUS		
58	Speed Loss	Indicates that the spindle speed fell below 3564 r/min. When this happens, the drive activates the Write Protect line, drops the Ready signal, and performs a retract operation.
59	Motor Can't Start Due to Error	Indicates a problem in the motor control circuitry.
5A	Emergency Retract	Indicates that the heads retracted to the landing zone due to a power loss (-Low Vcc active), or that a servo-controlled retract failed.
MOTOR AND SERVO MPU ERRORS		
60	Motor MPU Failure	Indicates that the Control MPU was unable to communicate with the Motor MPU.
61	Servo MPU Failure	Indicates that the Control MPU was unable to communicate with the Servo MPU.

# **Appendix B Reference Material For Sector Selection**



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## INTRODUCTION

The information in this appendix supplements the instructions for sector selection given in section 3. Section 3 provides a number of options for sector selection and uses tables to indicate switch settings and sector lengths. For most installations section 3 provides all the information required.

The information in this appendix is intended more for systems designers who are matching the drive's sector length to the nonstandard requirements of certain controllers. This information is organized as follows:

- What the Sector Switches Do
- How to Set Desired Numbers of Sectors
- How to Set Desired Sector Lengths
- How to Calculate Sector Lengths

## WHAT THE SECTOR SWITCHES DO

The sector switches supply a preset count to the sector counter circuit. This circuit counts sector clock pulses, starting at the preset value when index appears and after each new sector pulse is issued. When the sector counter has received a specific number of clock pulses, it issues another sector pulse and begins at the preset value to count again. A switch selection determines whether the sector clock frequency is 0.8 MHz or 1.6 MHz.

Two numbers enter into all of the calculations presented here. They are the number of sector clock pulses per disc rotation and the number of bytes per track. Table B-1 summarizes these numbers.

TABLE B-1. SECTOR CALCULATION DATA

Characteristics	368 MB Drives	500 MB Drives
Bytes per track	30 240	41 088
Sector clock pulses per disc rotation		
.8/1.6 switch set at .8	13 440	13 696
.8/1.6 switch set at 1.6	26 880	27 392
Bytes per sector clock pulse		
.8/1.6 switch set at .8	2.25	3
.8/1.6 switch set at 1.6	1.125	1.5
Sector length adjustment (bytes)		
.8/1.6 switch set at .8	2.25	3.00
.8/1.6 switch set at 1.6	4.00	5.25

The groups of sector switches are identified by their component locations on the control board (see section 3). Each sector switch represents a binary and decimal value of clock pulses (as counted in the logic). The values related to each switch are as follows:

<u>Switch No.</u>	<u>Binary Value</u>	<u>Decimal Value</u>
Loc. E875		
1	$2^0$	1
2	$2^1$	2
3	$2^2$	4
4	$2^3$	8
5	$2^4$	16
6	$2^5$	32

<u>Switch No.</u>	<u>Binary Value</u>	<u>Decimal Value</u>
Loc. F575		
1	$2^6$	64
2	$2^7$	128
3	$2^8$	256
4	$2^9$	512
5	$2^{10}$	1024
6	$2^{11}$	2048

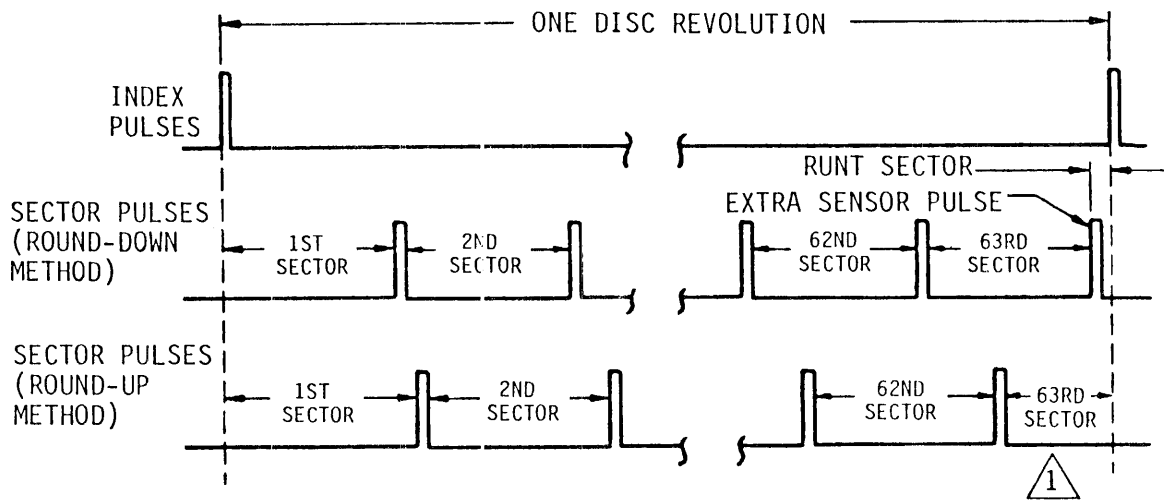
## HOW TO SET DESIRED NUMBERS OF SECTORS

This topic describes the process used for calculating sector switch settings for a desired number of sectors per disc rotation. This process is the basis for all the sector selection tables found in section 3. After a description of the process, there is an example of the calculation. The process makes use of numbers given in table B-1. Here are the steps required:

1. Calculate the number of selected clock pulses per sector. Use the following formula:

$$\text{Selected Clock Pulses} = \frac{\text{Sector Clock Pulses/Rotation} - 1}{\text{Number of Sectors Desired}}$$

2. If the result in step 1 is not an integer, either round it up or round it down. (The number 313.6, for example, can be rounded up to 314 or can be rounded down to 313.) Figure B-1 shows the effects of using the round-up and round-down methods, and section 3 contains some discussion of the two methods.
3. Express the result of step 2 as a sum of individual sector switch values (see previous page). When a switch value appears in the sum, that switch must be placed in the Closed (On) position.



NOTES:

△ 1 WITH ROUND-UP METHOD, LAST SECTOR MAY BE SHORTER THAN EARLY SECTORS.

11F213A

Figure B-1. Round-up and Round-down Methods

Here is an example of determining the switch settings for selecting 63 sectors on a 368 MB drive, using the 0.8 MHz Sector Clock and the round-down method:

1. Selected Clock Pulses =  $\frac{13\ 440}{63} - 1 = (213.33 - 1)$   
= 212.33
2. For the round-down method, this result becomes 212. (For the round-up method, it would be 213.)
3. Determine which switches to place in the Closed (On) position as follows:

Selected clock pulses	212
Clock pulses selected by switch F575-2 (Difference)	-128 84
Clock pulses selected by switch F575-1 (Difference)	-64 20
Clock pulses selected by switch E875-5 (Difference)	-16 4
Clock pulses selected by switch E875-3 (Difference)	-4 0

Thus, placing switches E875-3, E875-5, F575-1 and F575-2 in the Closed (On) position selects 63 sectors. Since a remainder existed in the formula and was rounded down, an additional sector pulse will appear just before index.

Refer to How to Calculate Sector Lengths (at the end of this section) for information on finding the number of bytes in the usable sectors and in the last sector.

For future reference, you may want to record the switch settings you made. Use the following worksheet:

Number of Sectors: \_\_\_\_\_

Switch Settings:

Switch E875: 1 \_\_\_ 2 \_\_\_ 3 \_\_\_ 4 \_\_\_ 5 \_\_\_ 6 \_\_\_

Switch F575: 1 \_\_\_ 2 \_\_\_ 3 \_\_\_ 4 \_\_\_ 5 \_\_\_ 6 \_\_\_

.8/1.6 Switch: \_\_\_\_\_

Sector Length: \_\_\_\_\_ bytes

## HOW TO SET DESIRED SECTOR LENGTHS

This topic describes the process used for calculating sector switch settings for a desired sector length. It also provides an example of the calculation.

With this method, there is no attempt to divide the disc rotation into nearly equal segments. Instead, the method starts with a known sector length (data field plus overhead, expressed in bytes). The process makes use of numbers given in table B-1. Here are the steps required:

1. Calculate the number of selected clock pulses per sector. Use the following formula:

$$\text{Selected Clock Pulses} = \frac{\text{Sector Length in Bytes}}{\text{Bytes per Sector Clock Pulse}} - 1$$

2. If the result in step 1 is not an integer, round it up. (The number 313.6, for example, would be rounded up to 314.)
3. Express the result of step 2 as a sum of individual sector switch values (see page B-2). When a switch value appears in the sum, that switch must be placed in the Closed (On) position.

Here is an example of determining the switch settings for selecting 572-byte sectors (512-byte data field plus 60 bytes of overhead) on a 500 MB drive, using the 1.6 MHz Sector Clock:

1. Selected Clock Pulses =  $\left(\frac{572}{1.5} - 1\right) = (381.3 - 1) = 380.3$
2. Because this is not an integer, round it up to 381.
3. Determine which switches to place in the Closed (On) position as follows:

Selected clock pulses	381
Clock pulses selected by switch F575-3 (Difference)	<u>-256</u> 125
Clock pulses selected by switch F575-1 (Difference)	<u>-64</u> 61
Clock pulses selected by switch E875-6 (Difference)	<u>-32</u> 29
Clock pulses selected by switch E875-5 (Difference)	<u>-16</u> 13
Clock pulses selected by switch E875-4 (Difference)	<u>-8</u> 5
Clock pulses selected by switch E875-3 (Difference)	<u>-4</u> 1
Clock pulses selected by switch E875-1 (Difference)	<u>-1</u> 0

Thus, placing switches E875-1, E875-3, E875-4, E875-5, E875-6, F575-1, and F575-3 in the Closed (On) position selects the sectors with the required length.

Refer to How to Calculate Sector Lengths (at the end of this section) for information on finding the number of bytes in the usable sectors and in the last sector.

For future reference, you may want to record the switch settings you made. Use the following worksheet:

Sector Length: _____ bytes
Switch Settings:
Switch E875: 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___
Switch F575: 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___
.8/1.6 Switch: _____
Sector Length: _____ bytes

## HOW TO CALCULATE SECTOR LENGTHS

This method for calculating sector lengths uses the actual sector switch settings as a starting point. It works for any combination of switch settings regardless of how they were derived. This topic describes the process involved and provides an example of how to do the calculation.

1. Examine the sector switches and note which ones are in the Closed (On) position. Also note the position of the .8/1.6 switch.
2. For each sector switch noted in step 1, write down its decimal value given on page B-2.
3. Add the numbers accumulated in step 2. If you used the calculation formulas in either of the preceding topics to obtain the sector switch settings, take note. The sum in this step is the same number derived in step 2 of those topics.
4. Add 1 to the result in step 3 to obtain the length of a sector expressed in sector clock pulses.
5. Multiply the result in step 4 by the number of bytes per sector clock pulse (given in table B-1) to obtain the number of bytes per sector.

Here is an example of determining the sector length for a 500 MB drive:

1. You observe that the following switches are in the Closed (On) position: E875-3, E875-4, E875-5, and F575-2. The .8/1.6 switch is set at .8 (0.8 MHz sector clock).
2. The Closed sector switches have the following values:

E875-3	4
E875-4	8
E875-5	16
F575-2	128
3. These numbers total  $4 + 8 + 16 + 128 = 156$ .
4. By adding 1, you get  $156 + 1 = 157$ .
5. A 500 MB drive with a 0.8 MHz sector clock has 3 bytes per sector clock pulse (from table B-1). You get the sector length by multiplying 157 by 3; it is 471 bytes.

You may be wondering at this point how long the last sector is. You have found that each of the early sectors is 471 bytes long. Refer to table B-1 to find the number of bytes per track (41 088 for this drive).

To find the number of full-length sectors, divide 41 088 by 471. It is 87 with a remainder of 111. This calculation implies that there are 87 sectors, each 471 bytes long, followed by a runt sector of 111 bytes.

These sector lengths are idealized in that the numbers do not reflect an adjustment that must be made to calculate the actual lengths of the first sector (logical sector 0) and the last sector. Table B-1 indicates the sector length adjustment (3 bytes for this example).

Including this adjustment, the sector lengths are as follows:

Sector 0 =  $471 + 3 = 474$  bytes  
Sectors 1 thru 72 = 471 bytes  
Runt Sector =  $111 - 3 = 108$  bytes

# COMMENT SHEET

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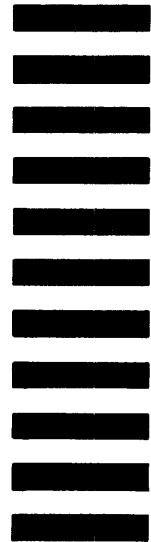
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