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Elite Disc Drive
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ST41201K
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User's Manual
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(IPI Interface)
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Preface

This manual contains information for users of the Seagate ST41201K Elite disc drives (employing the IPI interface). It provides instructions to all personnel who operate the drive and to customer engineers who install and check out the drive. Additional information is available in the reference manual (publication 83327330).

Electrostatic discharge protection

Caution. Removal of circuit boards by personnel not performing depot repair will damage components and may void the warranty.

All drive electronic assemblies are sensitive to static electricity due to the electrostatically sensitive devices used within the drive circuitry. Although some 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 the direct discharge of a charged conductor, or by exposure to the static fields surrounding charged objects. To avoid damaging drive electronic assemblies, 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 the part number). Connection may be made to any grounded metal assembly. As a general rule, remember that you and the drive electronics must all be grounded to avoid potentially damaging static discharges.
- Turn off power before removing or installing the DC power cable.
- Do not remove any circuit boards from the drive.
- Never use an ohmmeter on any circuit boards.

Important safety information and precautions

Caution. Use forced-air ventilation when bench-testing the drive to ensure proper cooling of drive components.

Use proper safety and repair techniques 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 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. 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.

Always observe the following warnings and precautions:

- Perform all maintenance by following the procedures in this manual.
- Follow all cautions and warnings 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 the unit before servicing it.
- Wear safety shoes when removing or replacing heavy parts.
- Provide a means to isolate the drive from the main power in case of fire or other emergency.
- Ensure that the internal temperature of the rack or cabinet will not exceed the limits defined for the drive, when the drive is mounted in an equipment rack or cabinet. When units are stacked vertically, pay special attention to the top where temperatures are usually highest.
- Follow the precautions listed under "Electrostatic discharge protection" above.
- Do not remove any circuit boards from the drive chassis. Return the entire drive for depot repair if any circuit board is defective. Removal of circuit boards by personnel not performing depot repair will damage components and may void the warranty.

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- Do not remove the head and disc assembly (HDA) from the drive chassis. Return the entire drive for depot repair if the HDA is defective.
 - Do not attempt to disassemble the HDA. It is not field repairable. If the sealed HDA is opened by personnel not performing depot repair, this will damage components and void the warranty.
 - As a component, this drive is designed to be installed and operated in accordance with UL1950, IEC950, EN60950, CSA C22.2 950, and VDE0806.
 - Always de-energize the drive before removing or installing cables.
 - Ensure that the power supply meets the specifications in this manual and is designed to be used in accordance with UL1950, IEC950, EN60950, CSA C22.2 950, and VDE0806.

Seagate takes all reasonable steps to ensure that its products are certifiable to currently accepted standards. Typical applications of these disc drives include customer packaging and subsystem design. Safety agencies conditionally certify component parts, such as the Elite disc drive, based on their final acceptability in the end-use product. The subsystem designers are responsible for meeting these conditions of acceptability in obtaining safety/regulatory agency compliance in their end-use products and in certifying where required by law. A necessary part of meeting safety requirements is the provision for overcurrent protection on drive SELV supply voltages.

This unit is a component assembly and as such is not meant to comply with FCC or similar national requirements as a stand-alone unit. Engineering radiated and conducted emissions test results are available through the Seagate Safety Department to assist the subsystem designer.

Technical support services

Seagate Technology provides technical support literature and diagnostic utilities to authorized distributors. Please contact your dealer for technical support and installation troubleshooting. Product technical support is available for all Seagate products by calling the SeaFAX, SeaFONE, or SeaBOARD services. These are toll calls if you dial from outside of the number's local dialing area.

SeaFAX: (408) 438-2620

You can use a Touch-Tone telephone to access Seagate's automated FAX delivery system and select technical support information by return FAX. This service is available twenty-four hours a day, seven days a week.

SeaFONE: (408) 438-8222

The enhanced phone system provides recorded technical information on selected Seagate products while you are on hold. Technical support specialists are available to answer questions from 8:00 A.M. to 5:00 P.M. PST, Monday through Friday. Recordings are accessible twenty-four hours a day, seven days a week.

SeaBOARD:

The Seagate Technical Support Bulletin Board System (BBS) is available twenty-four hours a day, seven days a week. A modem is required to access this service. The communications software must be set for eight data bits no parity and one stop bit (8N1). With this service you can access:

- Specifications and jumper configurations for all Seagate products
- Reprints of Seagate documentation
- A directory of information and helpful utilities that you can download to your own computer

Location	Telephone Number	Maximum Baud Rate
United States/Canada	(408) 438-8771	9600
England	44-62-847-8011	9600
Germany	49-89-140-9331	2400
Singapore	65-227-2217	9600
Australia	61-2-756-2359	9600

Note. This is a toll call if you dial from outside of the number's local dialing area.

Section 1. General description

The Seagate ST41201K Elite disc drive is a high speed, random access digital data storage device that connects to a central processor through a controller. The ST41201K disc drive is shown in Figure 1, and its specifications are listed in Table 1.

The drive is a component for installation in an enclosure designed for the drive. The enclosure design must ensure adequate cooling for the drive, and it must address the requirements for grounding and for shielding of emissions. The reference manual (publication 83327330) presents design guidelines for designing the enclosure, but the design is your responsibility.

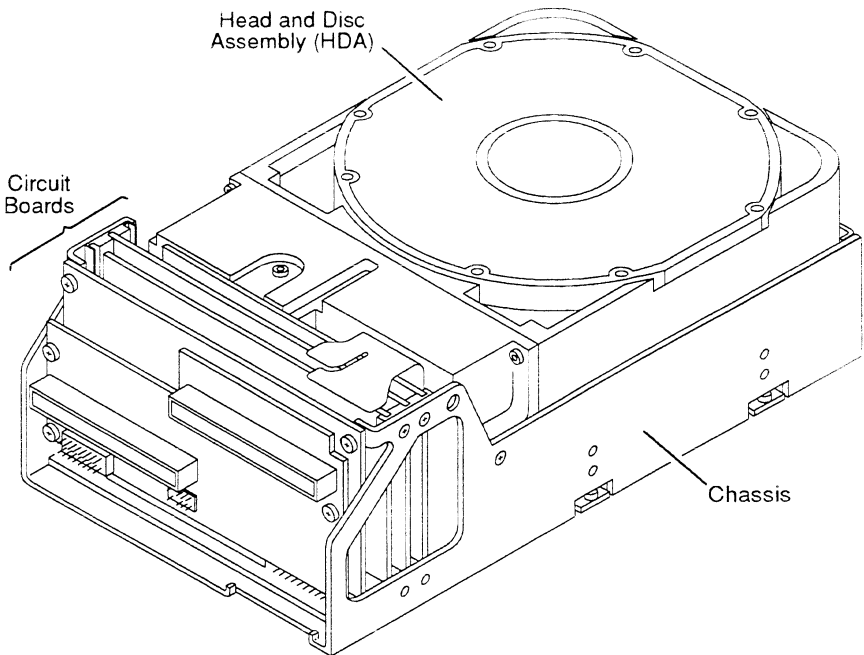


Figure 1. The ST41201K disc drive

Table 1. Drive specifications

Characteristics	Conditions	Specifications
Size	Dimensions (see "Space requirements" in section 2)	
	Weight (drive only)	4.1 kg (9.0 lb)
	Weight (power supply only)	2.3 kg (5.0 lb)
Interface	IPI-2	
Recording	Total capacity (unformatted)	1,200,055,000 bytes
	Bytes per track (unformatted)	33,599
	Number of discs	10
	Movable data heads	17
	Servo heads	1
	Physical heads per surface	1
	Cylinders per head/disc assy	2101* (0-2100 logical)
	Modulation	2,7 code
Transfer rate	Disc speed at 5400 RPM	24.2 MHz (3.0 Mbytes/sec)

* Users normally reserve two cylinders for diagnostic use (cylinder 2100 for defect map and cylinder 2099 for diagnostics); however, both cylinders can be used for customer data if desired.

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Characteristics	Conditions	Specifications
Seek time (time required to move heads to a different track address)	Typical full	22.5 msec max
	Typical average	11.5 msec max
	Typical one-track	1.7 msec max
Latency (time required to reach a particular track address after head positioning is complete)	Average	5.55 msec (disc rotation at 5400 RPM)
	Maximum	11.17 msec (disc rotation at 5373 RPM)
Start time**		60 sec max
Stop time		60 sec max

** Following the power sequence delay, once DC power is applied and start conditions are present.

The drive contains all the circuits and mechanical devices necessary to record data on and recover it from its discs. The drive requires DC voltage inputs from an external power supply, which receives its AC input power from the site main power source. A power supply and DC power cable are available accessories.

The drive consists of a head and disc assembly (HDA) and several circuit boards mounted on a common chassis. The circuit boards contain the electronics required for drive operation. The HDA 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 ten 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. The drive motor rotates the discs at 5400 RPM and also produces a circulation of air within the sealed HDA.

All functions performed by the drive are done under direction of the controller. As shown in Figure 2, 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. Refer to the reference manual for a description of interface functions.

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.

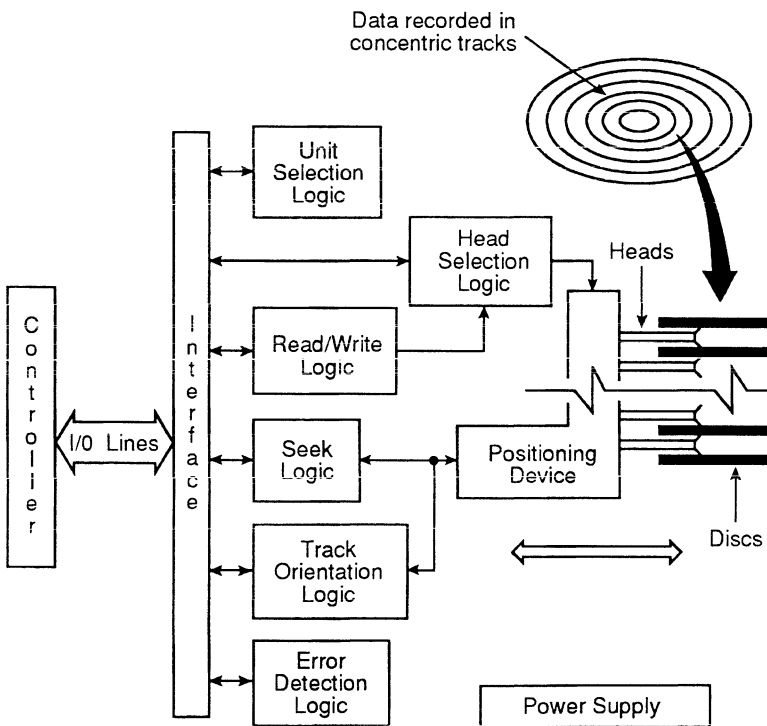


Figure 2. Drive functional block diagram

All drive operations are related to data recovery and storage (normally referred to as reading and writing). The actual reading and writing is performed by heads that are positioned over the rotating discs' recording surfaces. There is one head for each data surface. The heads are positioned in such a way that data is written in concentric tracks around the disc surfaces (see Figure 2).

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 use the head located over the surface (head selection) where the operation is to be performed.

The heads are mounted on the actuator, and the actuator moves the heads over the rotating discs. There are 18 heads—a servo head to sense actuator positioning and 17 data heads used for data transfers to and from the discs. The actuator has a voice coil that moves in 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 powered on, the heads rest on the disc surface in the preassigned landing zone (beyond the data zone). The actuator automatically latches in this position, to protect the drive in the event that it is moved or shipped. 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.

After arriving at the data track and selecting a head, the controller locates the portion of the track where the data is to be read or written. This is called track orientation. Signals from the drive indicate the beginning of each track. The controller uses these signals to determine the position of the head on the track.

When the head is above the desired track location, the controller commands the drive to actually read or write the data. During a read operation, the drive retrieves data from the discs, processes it, and transmits it to the controller. During a write operation, the drive receives data from the controller, processes it, and stores it on the discs.

The drive can also recognize certain errors that may occur during its operation. When an error is detected, status information is available through the controller.

Section 2. Installation

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

Site requirements

The site requirements considered are environment, airflow, space, power, grounding, and interface.

Environmental requirements

Table 2 lists all environmental requirements for the drive.

Table 2. Environmental requirements

Conditions	Specifications
Operating environment	
Temperature	Range of 10°C to 45°C (50°F to 113°F) with a maximum change of 15°C (27°F) per hour
Humidity	Range of 20% to 80% relative A maximum wet bulb temperature of 26°C (79°F)
Barometric pressure	-305 m to 2,000 m (-1,000 ft to 6,560 ft) 104 kPa to 79 kPa (30 in Hg to 23 in Hg)
Non-operating environment (unpacked)	
Temperature	Range of 10°C to 45°C (50°F to 113°F) with a maximum change of 15°C (27°F) per hour
Humidity	Range of 20% to 80% relative A maximum wet bulb temperature of 26°C (79°F)
Barometric pressure	-305 m to 3,000 m (-1,000 ft to 10,000 ft) 104 kPa to 69 kPa (30 in Hg to 20 in Hg)
Storage environment (packed)	
Temperature	Range of -10°C to 50°C (14°F to 122°F) with a maximum change of 15°C (27°F) per hour
Humidity	Range of 5% to 95% relative
Barometric pressure	-305 m to 3,000 m (-1,000 ft to 10,000 ft) 104 kPa to 69 kPa (30 in Hg to 20 in Hg)
Transit environment (packed)	
Temperature	Range of -40°C to 60°C (-40°F to 140°F) with a maximum change of 20°C (36°F) per hour
Humidity	Range of 5% to 95% relative
Barometric pressure	-305 m to 12,192 m (-1,000 ft to 40,000 ft) 104 kPa to 19 kPa (30 in Hg to 6 in Hg)

Airflow requirements

The enclosure design must ensure adequate cooling for the drive. Note that the fan in the power supply cools only the power supply's internal parts.

The drive's product specification (document 64403104) describes how to evaluate the airflow design. The evaluation consists of ensuring that the case temperatures of certain critical components remain within acceptable limits during drive operation.

We recommend orienting the drive or directing the airflow in a way that creates the least amount of airflow resistance while providing airflow above the circuit boards and around the head and disc assembly (HDA). Also, choose the shortest possible path between the air inlet and exit. This minimizes the distance traveled by air that is heated by the drive and by other nearby heat sources.

Figure 3 shows the design approach with one or more fans used to generate airflow. The airflow patterns can be created by the fans either pushing or drawing air. It is possible to install a pair of drives side-by-side so that the air circulation created by one or more fans ventilates both drives.

Figure 4 shows the design approach when the airflow pattern is from front to back or from back to front. Baffles can redirect a portion of the airflow through the space between the circuit boards.

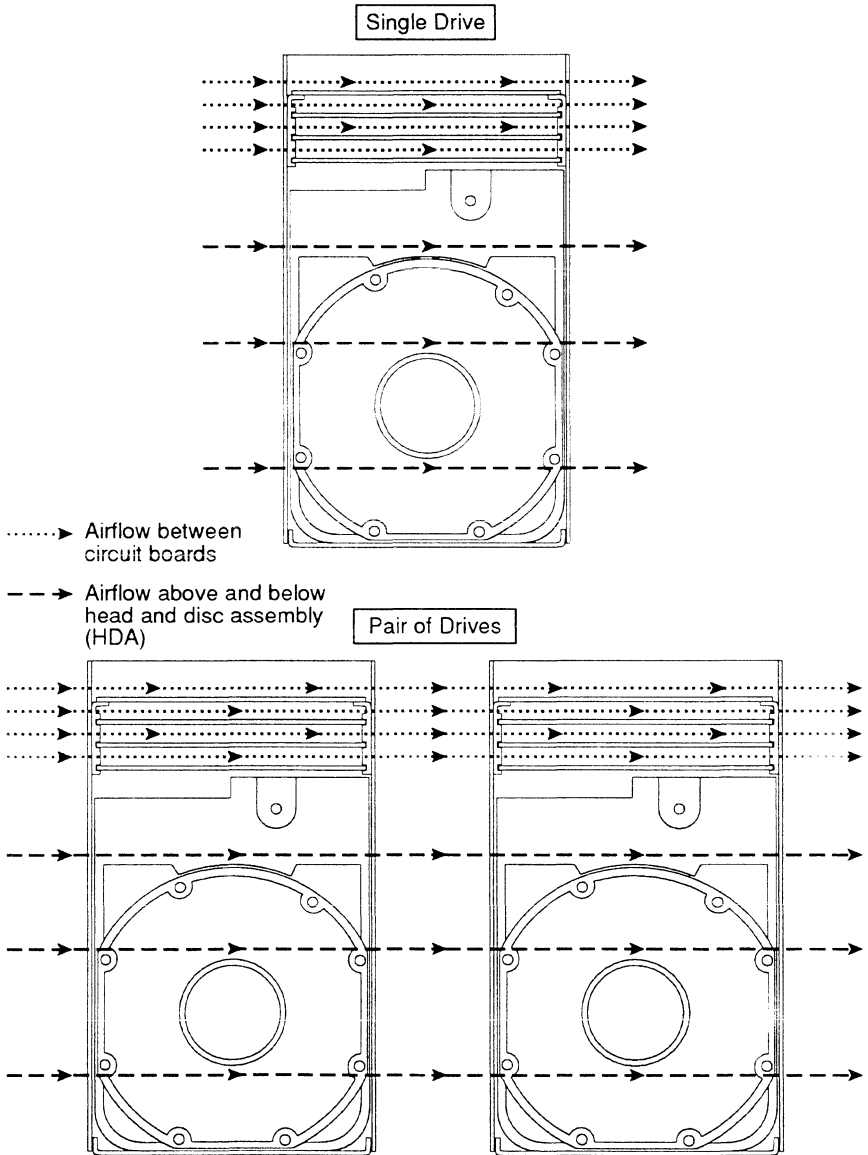


Figure 3. Perpendicular airflow

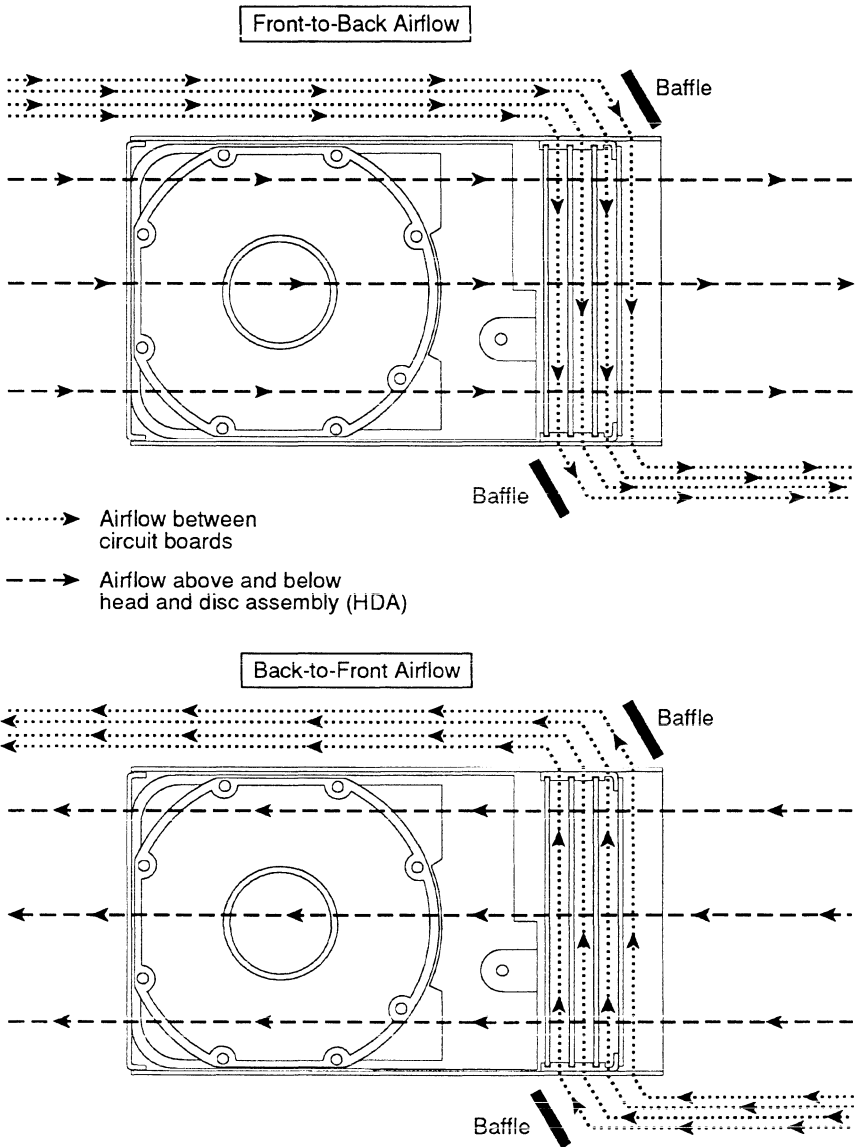


Figure 4. Lengthwise airflow

Space requirements

The drive is designed to be mounted in one of the three orientations shown in Figure 5. The drive may be mounted on its base or on either side. The physical dimensions of the drive and optional power supply are shown in Figure 6. The drive itself weighs 4.1 kg (9.0 lb).

For details about designing an enclosure to match the drive mounting dimensions, refer to the drive's product specification.

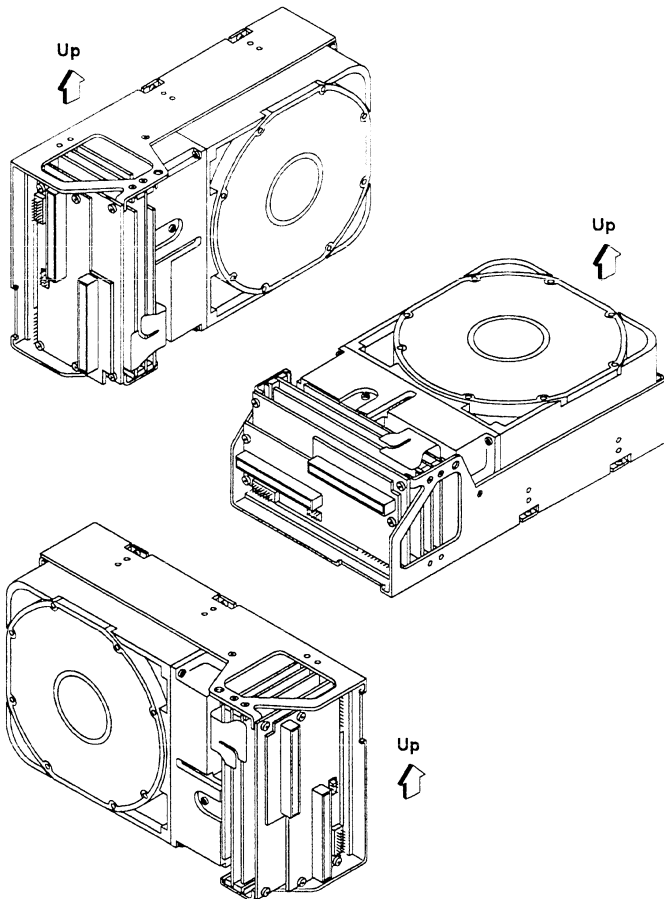


Figure 5. Mounting orientations

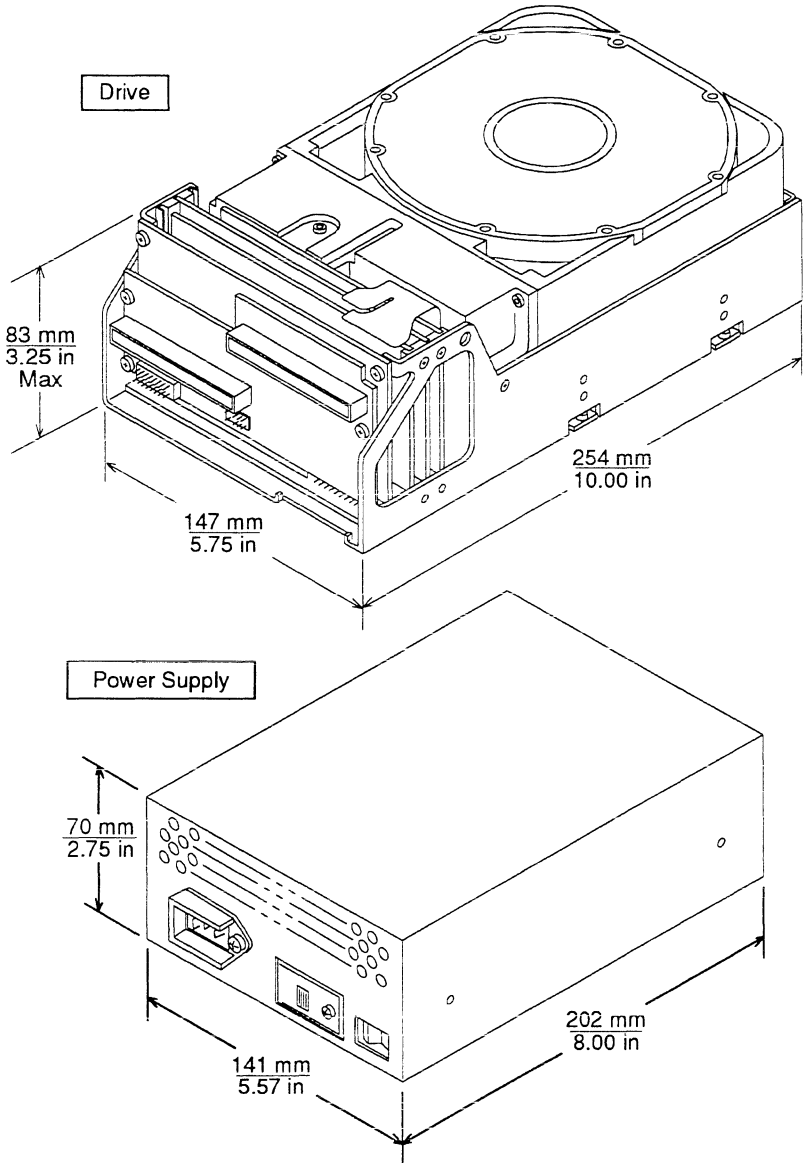


Figure 6. Dimensions of the drive

Power requirements

The voltage and current requirements for a single drive are shown in Table 3 below. Consult the product specification before selecting or designing a power supply for the drive. The product specification presents more detailed requirements including the types of overvoltage and overcurrent protection needed.

AC power requirements for the optional Seagate power supply are listed in Table 4. Conversion to the different line voltages is explained in the installation procedures.

Table 3. DC power requirements for the drive

Voltage	Idle	Current		
		Seeking and Reading	Maximum Power Seeking	Continuous Reading
+5 V	2.7 A	3.1 A	2.7 A	3.7 A
+12 V	2.0 A	2.3 A	2.6 A	2.0 A
Watts	38 W	43 W	45 W	43 W
Maximum Current Limits			+5 V	+12V
Maximum operating current*			3.7 A	2.9 A
Average idle current			2.7 A	2.0 A
Maximum starting current*			2.7 A	5.4 A
Maximum seek current			2.7 A	3.7 A

*Instantaneous +12 V current peaks will exceed these values by up to 0.8 A.

Table 4. AC power requirements for the power supply

Specifications	Nominal Values	
	100–120 VAC	208–240 VAC
Voltage range	85 to 132 V	175 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*	65 W	63 W
Line current*	0.90 A	0.56 A
Power factor*	0.61	0.54

*Measured at nominal values when discs are rotating and carriage is track-following.

Grounding requirements

A safety ground must be provided by the site AC power system. The green wire (or green wire with yellow stripe) in the AC power cord provides the safety ground connection between the power supply and the site AC power system. The site AC power system must provide the safety ground to earth ground connection.

All site AC power connection points, including convenience outlets for test equipment, must be maintained at the same safety ground potential.

Interface requirements

This drive is a two-port device, so it can be shared by two controllers if necessary. It is designed to be connected in a daisychain I/O configuration as shown in Figure 7. Table 5 shows the pin assignments and signal names for the I/O cables. Detailed information about interface lines is given in the reference manual (publication 83327330).

The two I/O connectors at the back of the drive accept the I/O cables that connect it to the system. J31 (port A) and J32 (port B) are the connectors to which daisychain I/O cables are attached. Each daisychain cable is a continuous cable having one connector for each drive it connects to.

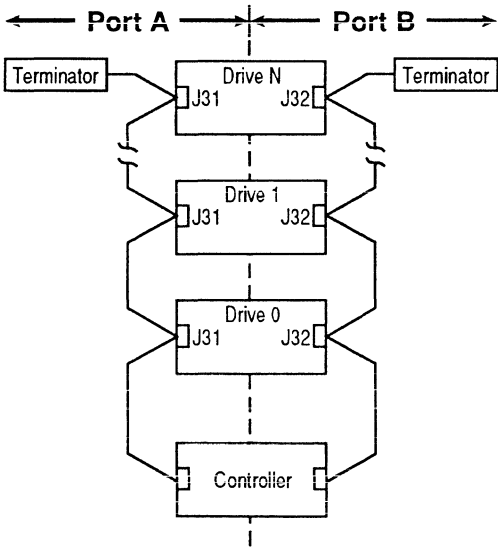


Figure 7. Daisychain configuration

A terminator must be installed at the end of each daisychain cable. An unused port (having no I/O cables) must be disabled as described in "Setting the circuit board switches."

Refer to the reference manual for guidelines on I/O cabling. These guidelines discuss the use of unshielded cabling inside cabinets and shielded cabling running between cabinets. They also contain information about constructing continuous daisychain cabling (including part numbers for the required cabling components).

Table 5. I/O cable pin assignments

Signal Name	(+) Pin Number	(-) Pin Number
DC Ground	1	2
Select Out	29	30
Master Out	35	36
Sync Out	23	24
Sync In	43	44
Slave In	17	18
Attention In	9	10
Bus A - Bit 0	37	38
Bus A - Bit 1	39	40
Bus A - Bit 2	15	16
Bus A - Bit 3	27	28
Bus A - Bit 4	31	32
Bus A - Bit 5	33	34
Bus A - Bit 6	11	12
Bus A - Bit 7	13	14
Bus A - Parity	41	42
Bus B - Bit 0	45	46
Bus B - Bit 1	47	48
Bus B - Bit 2	7	8
Bus B - Bit 3	19	20
Bus B - Bit 4	21	22
Bus B - Bit 5	25	26
Bus B - Bit 6	3	4
Bus B - Bit 7	5	6
Bus B - Parity	49	50

Unpacking, inspection, and repacking

After removing the packing material, inspect the drive for shipping damage. Save all packing materials for future use.

The drive is shipped separately from any other items ordered for the installation.

Unpacking

1. Allow the drive temperature to approach the ambient temperature of the unpacking area. Ensure that the temperature stabilization period meets the requirements printed on the drive container.
2. Open the package and remove the drive from its conductive static shielding bag, using precautions described in the preface.
3. Check all items against the 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.

Inspection

Inspect the drive for possible shipping damage. All claims for shipping damage should be filed with the carrier involved.

Repacking

If it is necessary to ship the drive, repack the drive with the original packing materials (saved during unpacking). Refer to section 5 for instructions.

Installation procedures

With the site requirements completed, the enclosure designed, and the drive unpacked, you are ready to begin the installation. The following procedures are included in drive installation:

- Setting the circuit board jumpers
- Installing the power supply (if used)
- Mounting the drive
- Connecting the system I/O cabling
- Grounding the system
- Synchronizing the spindle
- Connecting an OEM maintenance panel

Setting the circuit board jumpers and switches

Caution. Do not remove circuit boards to set jumpers or switches.

The circuit boards inside the drive contain a number of jumpers and switches that must be set correctly for normal operation of the drive.

You may encounter two types of switches (see Figure 8). 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. Do not set switches when power is applied to the unit.

The following figures contain information about their settings:

- Figure 8—shows DIP switches, with instructions on setting them to either the open (off) or the closed (on) position.
- Figure 9—identifies and locates jumpers and switches on the I/O transceiver board, and lists the possible settings for normal drive operation. It also identifies and locates the master/slave jumper on the I/O board.
- Figure 10—identifies and locates jumpers and switches on the servo board, and lists the possible settings for normal drive operation. Switches are present on early drives; jumpers are present on current drives.

If you are going to connect an OEM maintenance panel at J10 on the I/O board, set the unit select switches on the servo board for 0 (all switches off [open]). Inputs from the maintenance panel can then determine the logical address (in the range 0 through 7). For more information about using an OEM maintenance panel to select the logical address, refer to the “Connecting an OEM maintenance panel” topic later in this section.

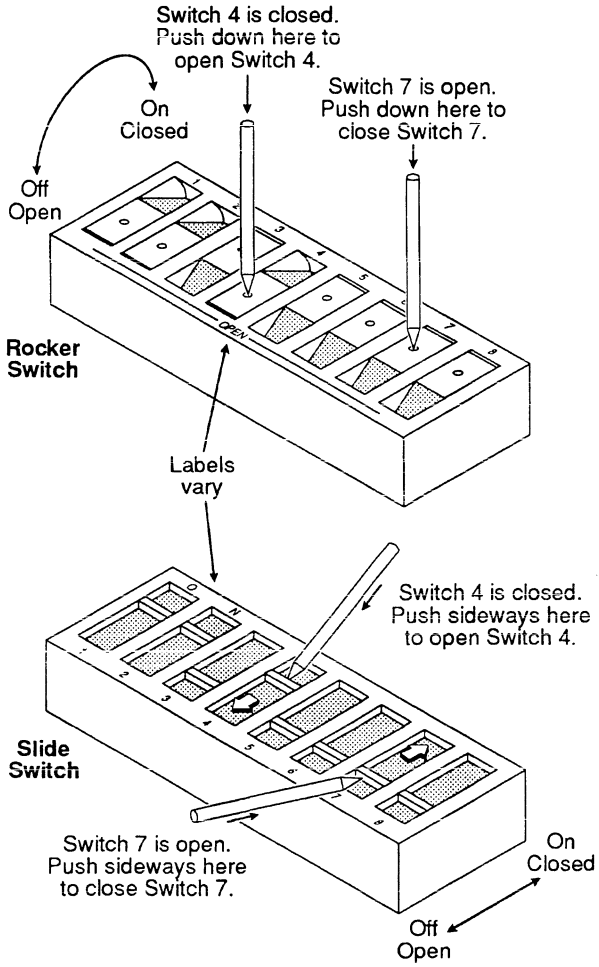


Figure 8. How to set DIP switches

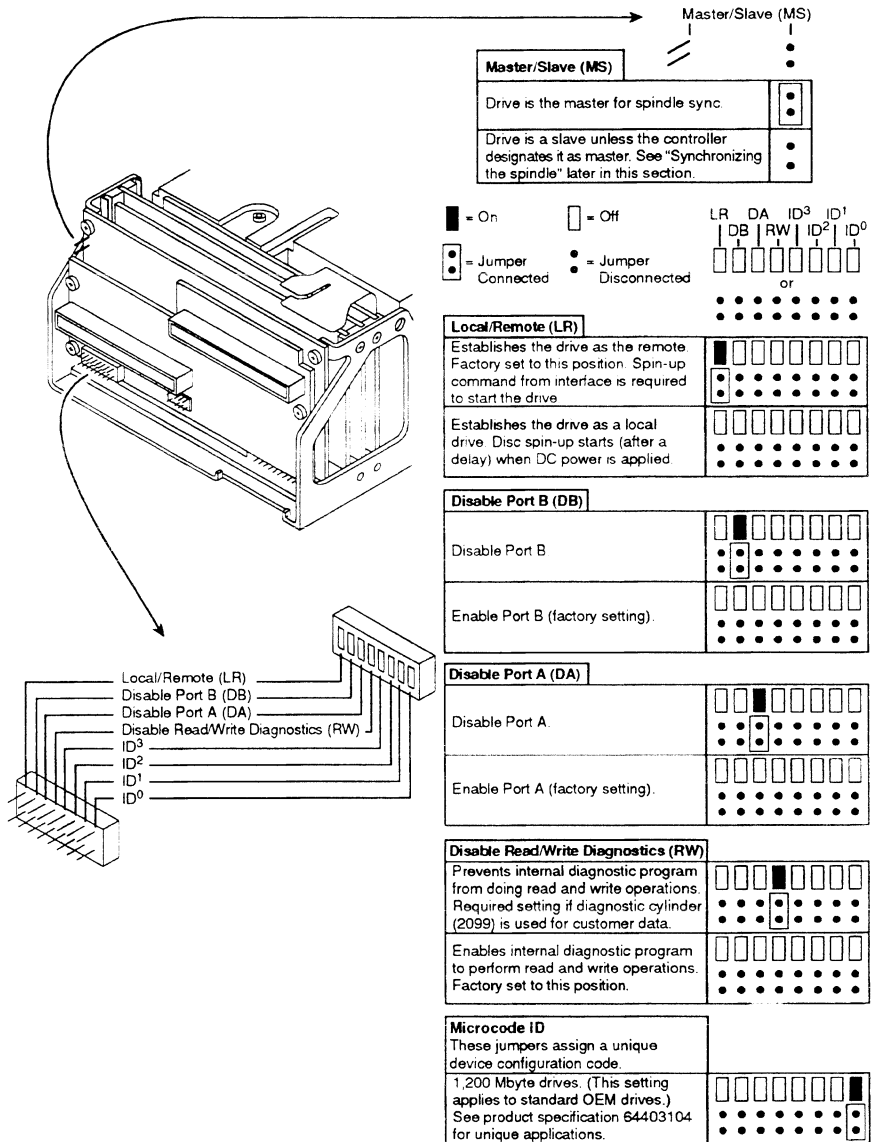
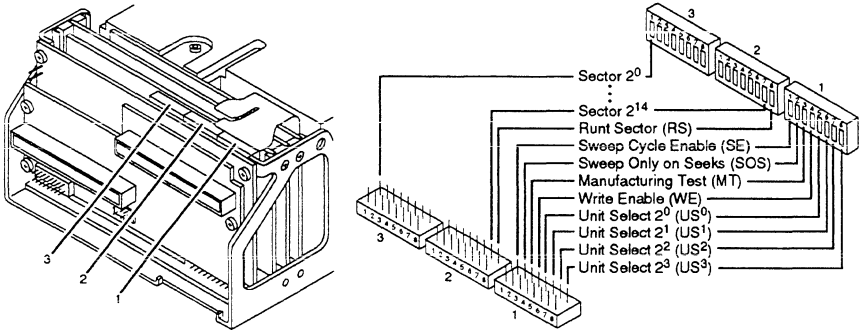


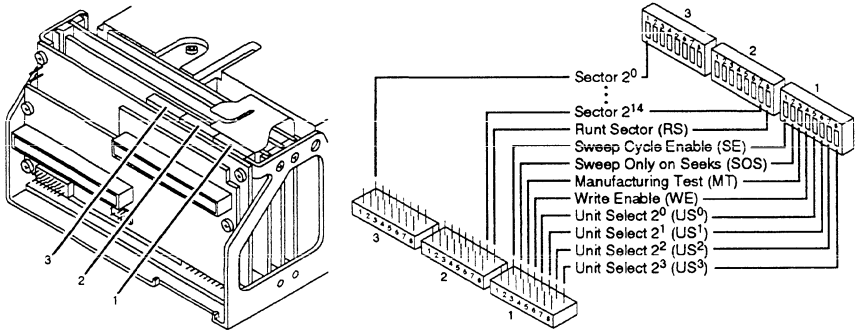
Figure 9. I/O transceiver board and master/slave jumpers and switches



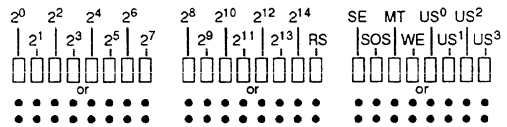
- = On
- = Off
- = Jumper Connected
- = Jumper Disconnected

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Runt Sector (RS)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Factory set as illustrated. Do not change this setting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweep Cycle Enable (SE)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enable sweep cycles at the drive level with the sweep option selected below. Some controllers will not function with sweep cycles enabled.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disable sweep cycles. If you use this setting, sweep cycles should be enabled at the system or subsystem level.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweep Only on Seeks (SOS) For additional information, see reference manual (publication 83327330)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enable sweep only on seeks. Each sweep cycle is part of a controller-driven direct seek. Factory set as illustrated. Do not change this setting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disable sweep only on seeks. Each sweep segment is either self-initiated or part of a controller-driven seek. Do not change this setting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manufacturing Test (MT)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Factory set as illustrated (off/disconnected). Do not change this setting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 10. Servo board switches (sheet 1 of 2)



= On = Off
 = Jumper Connected = Jumper Disconnected



Write Enable (WE)	2 ⁰	2 ¹	2 ²	2 ³	2 ⁴	2 ⁵	2 ⁶	2 ⁷	2 ⁸	2 ⁹	2 ¹⁰	2 ¹¹	2 ¹²	2 ¹³	RS	SE	SOS	MT	WE	US ⁰	US ¹	US ²	US ³	
Enable writing (normal setting).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disable writing (write protect).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Unit Select 2 ⁰ - 2 ³ (US ⁰ - US ³) Used to set the appropriate logical address if a maintenance panel is not connected	2 ⁰	2 ¹	2 ²	2 ³	2 ⁴	2 ⁵	2 ⁶	2 ⁷	2 ⁸	2 ⁹	2 ¹⁰	2 ¹¹	2 ¹²	2 ¹³	RS	SE	SOS	MT	WE	US ⁰	US ¹	US ²	US ³	
Logical Address 0.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logical Address 1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logical Address 2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Logical Address 3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Logical Address 4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Logical Address 5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Logical Address 6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Logical Address 7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Figure 10. Servo board switches (sheet 2)

Installing the power supply

A power supply and AC power cord are available if desired. The power supply is configured before shipment to operate in one of two AC input voltage ranges. The voltage select plate on the power supply (see Figure 11) indicates the factory-preset voltage. You may change the voltage range by setting the voltage select switch to the desired range.

Caution. The power supply will be damaged if the voltage select is set for the low range (100–120 VAC), and a voltage in the high range (208–240 VAC) is applied.

1. Ensure that the AC power cable is disconnected from the power supply.
2. If the correct voltage range is not selected, perform the following steps:
 - a. Remove the screw securing the voltage select plate to the power supply and remove the plate from the power supply. Retain the plate and all hardware.
 - b. Set the voltage select switch to the desired range.

Caution. The AC power cord must be replaced if the voltage range is changed. Refer to section 4 for information about ordering the replacement AC power cord.

- c. Reverse the voltage select plate and install the plate on the power supply to lock the switch in the desired range.
 - d. Replace the existing AC power cable with the AC power cable specified for the new operating voltage.

Note. Mounting screws must have complete thread engagement in the power supply chassis but must not exceed the limits given in the next step.

3. Select mounting screws that meet the following criteria for insertion depth:
 - For bottom mounting—2.8 to 6.4 mm (0.110 to 0.250 in)
 - For side mounting—5.0 mm (0.2 in) maximum
4. Mount the power supply in the desired location with four 6-32 screws. Use tapped mounting holes in the bottom of the power supply or in the sides of the power supply.
5. Connect a ground strap between the chassis safety ground screw on the power supply and cabinet ground.
6. Attach the AC power cord to the power supply connector J1. Do not connect the power cord to site power until directed.

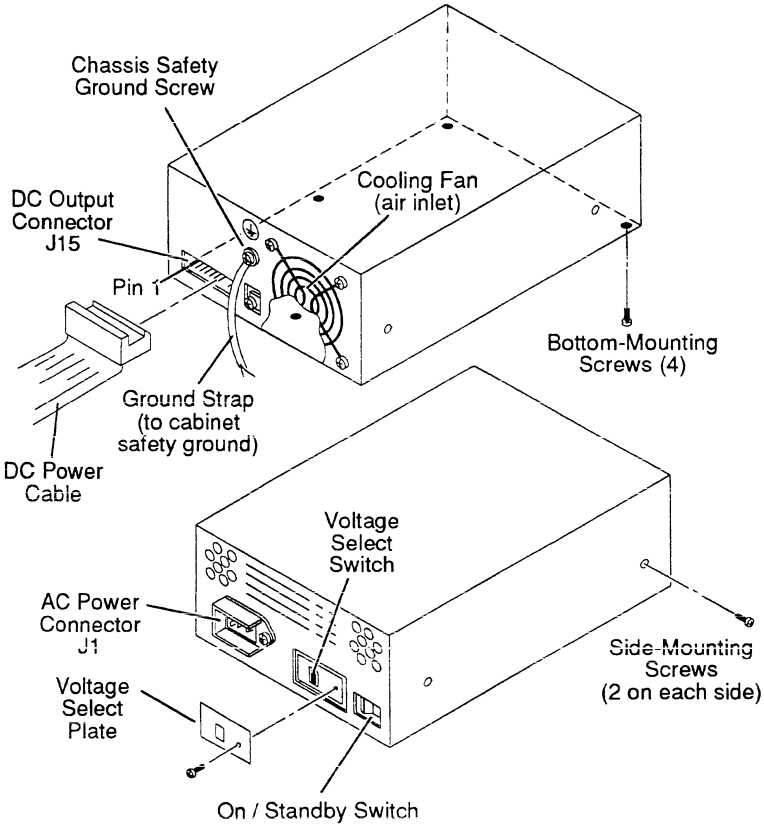


Figure 11. Power supply installation

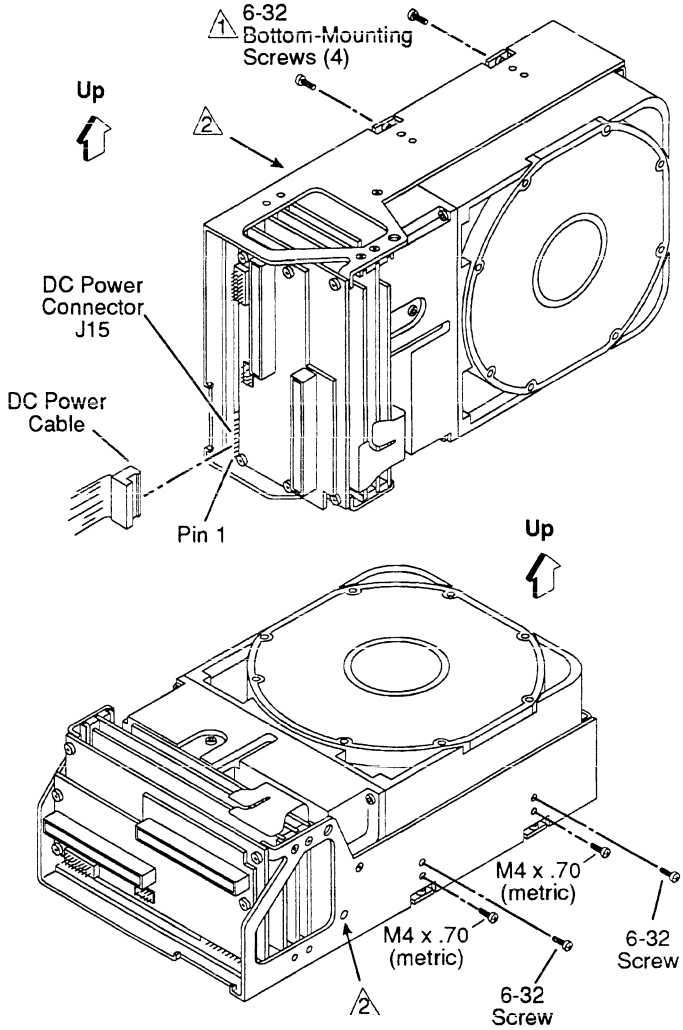
Mounting the drive

Caution. When installing the drive, observe all precautions listed under “Electrostatic discharge protection” in the preface. Failure to observe these precautions can result in serious damage to electronic assemblies.

The drive may be secured to the enclosure by tapped holes in either the sides or the bottom of the drive chassis. Figure 12 shows two of the three allowable mounting orientations.

Note. Mounting screws must have complete thread engagement in the drive chassis, but the portion that extends into the chassis must not exceed 3.2 mm (0.125 in) in length.

1. Place the drive into position in the enclosure and secure with four screws as shown in Figure 12.
 - For bottom mounting, use 6-32 screws.
 - For side mounting, use either 6-32 screws or M4 X .70 (metric) screws. There are tapped holes for each type.
2. Connect the DC power cable between the output connector on the power supply and the DC power connector J15 on the drive.
3. Connect the AC power cord to site power.



Notes:

- 1 Either side- or bottom-mounting screws can be used with each drive orientation
- 2 Auxiliary mounting holes for 6-32 screws (1 on each side and 2 on bottom).

1 Side-Mounting Screws (2 on each side)

Figure 12. Mounting the drive

Connecting the system I/O cabling

Make sure the site has been prepared in accordance with the site requirements information provided earlier in this section. This procedure describes how to cable the system in a daisychain configuration.

The drives have two I/O connectors as shown in Figure 13. Both J31 (for Port A) and J32 (for Port B) are located on the I/O transceiver board. Figure 13 shows how typical I/O cables connect to the board. Each I/O cable must be terminated following the last drive in the daisychain.

To secure the I/O cables, rotate the ejectors on connectors J31 and J32 to the latched position. If it is necessary to disconnect the I/O cables, rotate the ejectors to the unlatched position to loosen the connection.

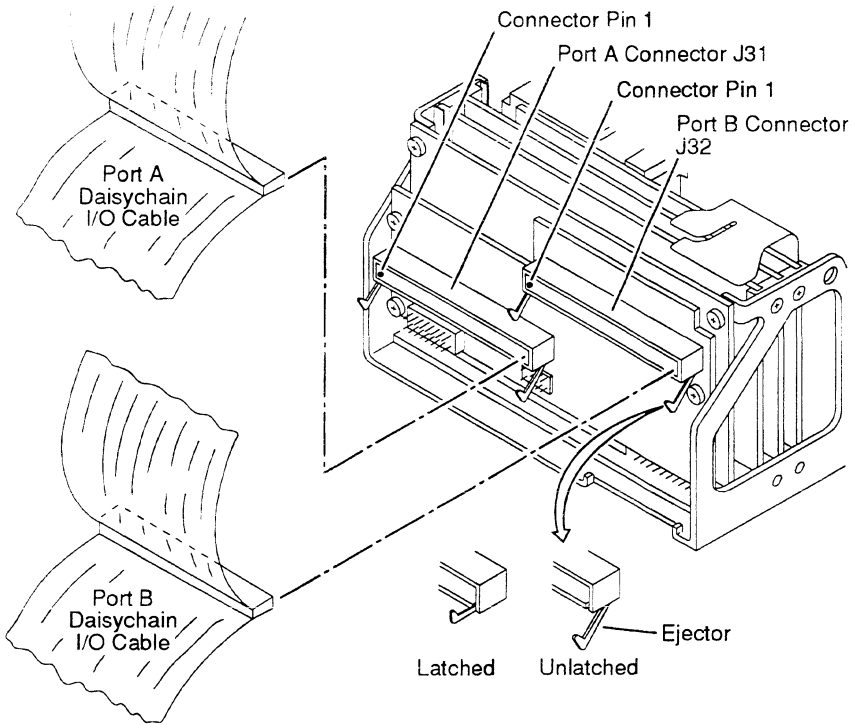


Figure 13. I/O cable attachment

Grounding the system

Grounding the system through the power cables and I/O cables is usually sufficient to protect against noise and emissions.

Synchronizing the spindle

The spindle sync feature makes it possible to synchronize the spindle rotation of a group of disc drives. This reduces the latency normally encountered when the controller switches between multiple disc drives.

Figure 14 shows two system configurations. In one type of system, one of the disc drives in the system provides the reference clock. In the other type, an external signal source provides the reference clock.

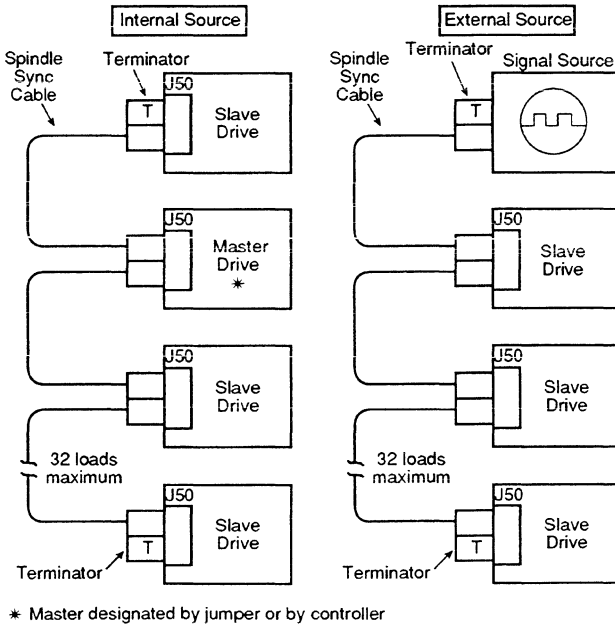


Figure 14. System diagram for spindle sync

To enable the feature, it is necessary to run an additional daisychain cable from drive to drive and to make a master/slave selection for each drive. Connector J50 on the I/O transceiver board handles both the cable connections. A jumper for master/slave selection is provided on the I/O board. Figure 15 shows the J50 connections and jumper location.

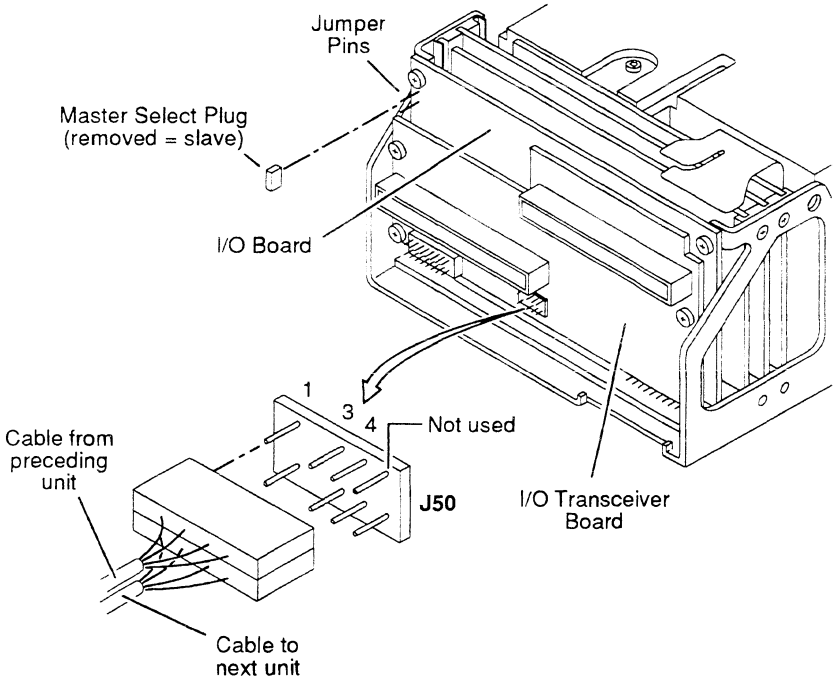


Figure 15. Making spindle sync connections

For a drive at the end of the daisychain, the cable connects to one row of pins in J50, and a terminator connects to the other row of pins in J50. Both ends of the cable must be terminated.

For each drive in the middle of the daisychain, the cable from the preceding unit connects to one row of pins in J50, and the cable to the next unit connects to the other row of pins in J50.

There are two ways to establish a drive as a master (supply the sync reference signal to all drives connected for spindle sync).

- Connect the master select plug. The drives are shipped with the plug connected.
- Issue the drive an Enable Master Sync command on the IPI interface. (The master select plug must be disconnected.) The IPI commands for spindle sync are discussed in the reference manual.

Only one drive in the daisychain can be established as the master. The master drive can be located anywhere along the daisychain cable as long as both ends of the cable are terminated.

Connecting an OEM maintenance panel

Connector J10 on the I/O board makes it possible to connect an optional OEM maintenance panel. Panel design is your responsibility; a panel is not offered as an accessory. Figure 16 shows where the I/O board connector is located and identifies the signal lines on the connector. Table 6 lists the switch settings for setting the logical address. If you do not connect a panel, the four Unit Select switches on the servo board set the logical address of the drive.

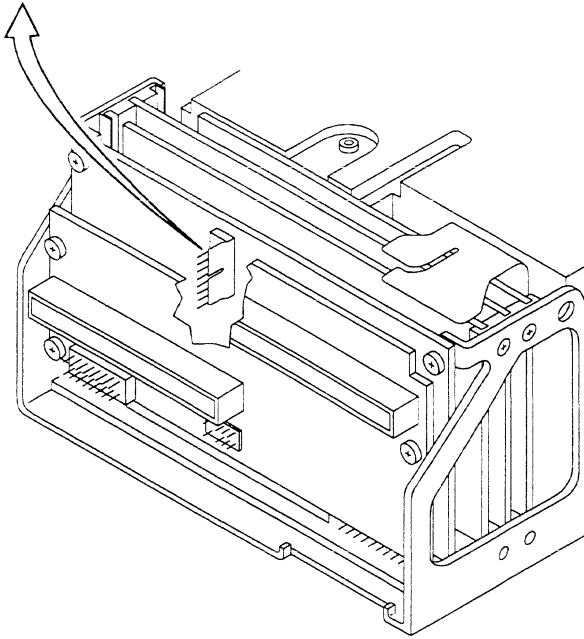
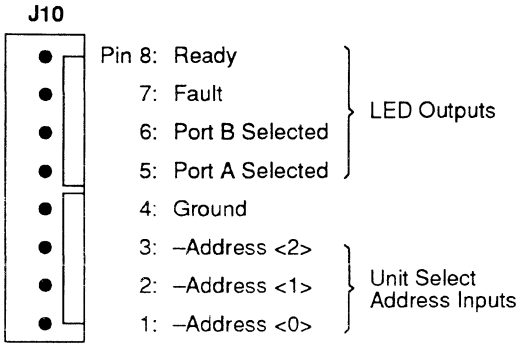


Figure 16. OEM maintenance panel connector

Table 6. Remote address selection for an OEM maintenance panel

Logical Address	Switch Settings*		
	< 2 >	< 1 >	< 0 >
0	off	off	off
1	off	off	on
2	off	on	off
3	off	on	on
4	on	off	off
5	on	off	on
6	on	on	off
7	on	on	on

*On = closed; off = open.

The panel can be designed to include the following LEDs:

- Ready—on steady when the discs are up to speed and the heads are loaded
- Fault—lights if a fault exists in the drive. The fault indicator can be turned off by the following (provided that the error condition or conditions no longer exist):
 - A Slave or Logical Selective Reset command from the controller
 - Removing and reapplying DC power to the drive
- Port B selected—lights if the drive is selected by a controller on Port B
- Port A selected—lights if the drive is selected by a controller on Port A

The panel can also be used to set the logical address of the drive (used in unit selection). Address lines < 2 >, < 1 >, and < 0 > are available for that purpose. To use this feature, ensure that the four Unit Select switches on the servo board are set in the off (open) position (logical address 0), as described earlier.

Verification

After completing installation of the drive, follow the sequence outlined below for initial startup in either remote or local mode.

1. Apply DC power to the drive.
 - If the Local/Remote jumper (or switch) on the I/O transceiver board was set in the Local position, the power on sequence delay begins immediately.
 - If the Local/Remote jumper (or switch) on the I/O transceiver board was set in the Remote position, the power on sequence delay begins when the controller issues a spin-up function code.

The power on sequence delay is 10 seconds multiplied by the logical address number of the unit (0 through 7).

2. Observe that the Ready LED (the green LED on the servo board) flashes from the time DC power is applied until the drive is ready.
3. When the power sequence delay is complete, observe that the Ready LED lights steadily within 60 seconds. This indicates that the drive motor is up to speed and that the heads are positioned at track 0.

If all of these events occurred, the drive is now ready for online operation. If any event did not occur, a problem exists in the drive—refer to section 5.

Section 3. Operation

This section provides the information and instructions to operate the drive. It is arranged as follows:

- **Switches and indicators**—locates and describes the switches and indicators used for normal drive operation.
- **Operating instructions**—describes procedures for operating the drive.

Switches and indicators

Following initial checkout, the drive normally requires no attention from the operator. Although power is usually left on, as the operator you should know where the On/Standby switch is located on the power supply. Also, you may be asked to examine maintenance LEDs located on the edge of the drive's servo board. Figure 17 shows the switches and indicators. They are explained in Table 7.

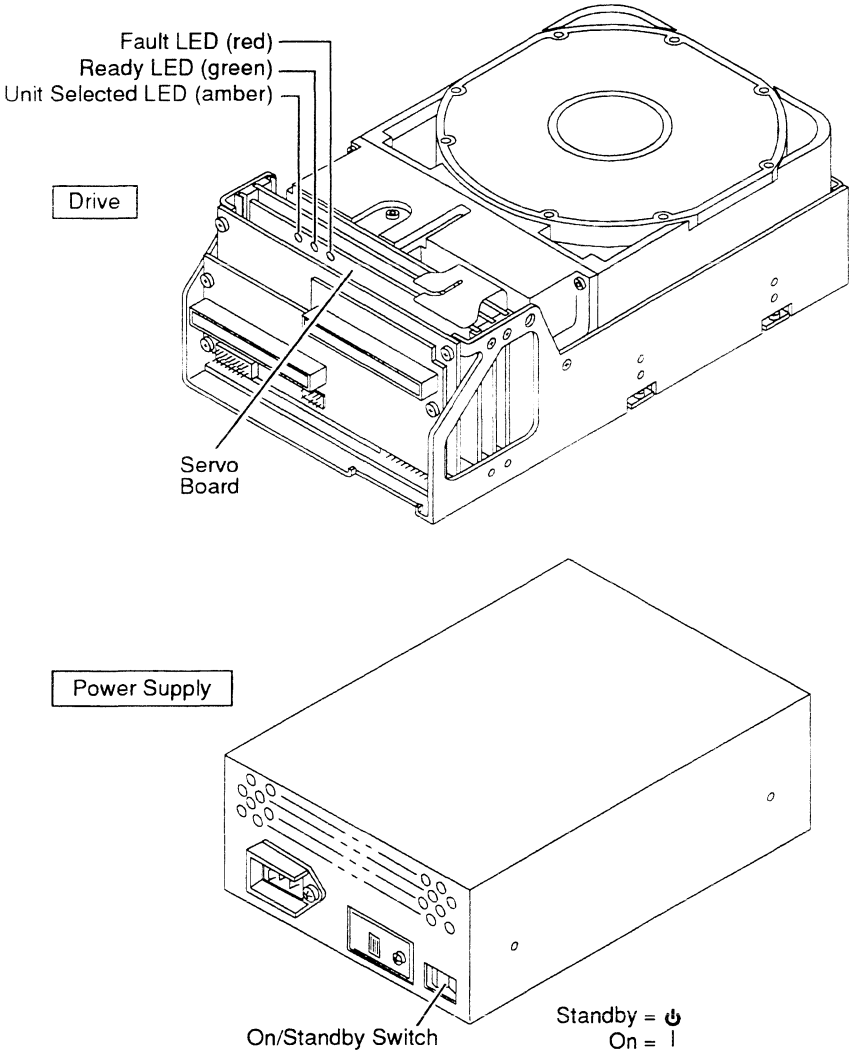



Figure 17. Switches and indicators

Table 7. Switches and indicators

Switch or Indicator	Function
Power supply On/Standby switch (I/ )	Applies DC operating voltages to the drive electronics and power supply fan when placed in the On (I) position.
Drive Selected (amber) LED	This LED indicates that the drive is selected by a controller.
Ready (green) LED	<p>During the power on sequence, this LED flashes until the discs are up to speed and the heads are loaded. The power on sequence begins when DC power is applied to the drive (local operation) or when a spin-up function code is received (remote operation).</p> <p>It is on steady with power on complete, assuming that there are no fault conditions.</p> <p>It flashes during a power off sequence. This occurs after a spin-down function code is received (remote operation). The LED stays off when remote power off is complete.</p>
Fault (red) LED	<p>This LED lights if a fault exists within the drive.</p> <p>If the LED indicates a fault, 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"> • A Slave or Logical Selective Reset command from the controller • Removing and reapplying DC power to the drive

Operating instructions

Following initial checkout, the drive normally requires no attention from the operator. DC power is available to the drive, as the On/Standby switch on the power supply is normally left in the On (I) position.

If you wish to verify that the drive has completed its power on sequence, access the drive and check that its Ready LED is on steady (see Figure 17). Another way to verify that the drive is ready is to use the interface. After selecting the drive, check the status bit for Unit Ready.

If the Local/Remote switch is set for Remote operation, the controller can control the power on sequence with the spin-up function code. It can control the power off sequence with the spin-down function code.

Section 4. Parts data

This section lists part numbers of options and accessories that can be used in a drive installation. Because the drive is depot repairable, there are no field-replaceable parts. If the drive requires maintenance, refer to the instructions in section 5.

Within the continental U.S., the accessories can be ordered from:

Seagate Technology, Inc.
Customer Services
7801 Computer Avenue South
Minneapolis, MN 55435

Phone: 1-800-382-6060 (outside Minnesota)

Phone: (612) 844-8080 (inside Minnesota)

Fax: (612) 844-7017

Table 8 lists the part numbers for options and accessories that may be required for system installation. Table 9 lists the Seagate part number of components that can be used to make custom I/O cables and terminators.

Table 8. Options and accessories

Part Number	Description
12263496	Static ground wrist strap, 6 1/2 to 8 inch wrist
47188890	Power supply (with internal cooling fan)
75168323	AC power cord set, 100–120 V, 60 Hz, 5-15P
75168334	AC power cord set, 208–240 V, 60 Hz, 6-15P
75168324	AC power cord set, 208–240 V, 50 Hz
92588111	DC power cable, 3.25 inches (8.1 cm) long—power supply to drive
92588110	DC power cable, 5-foot length (1.52 meters)—power supply to drive
89500423	DC power cable adapter (4-pin power supply connector to 9-pin drive connector)
70703929	Spindle sync cable*, 1.5-foot length (0.46 meter)
70703921	Spindle sync cable*, 3-foot length (0.92 meter)
70703922	Spindle sync cable*, 5-foot length (1.52 meters)
70703923	Spindle sync cable*, 7-foot length (2.13 meters)
70703924	Spindle sync cable*, 10-foot length (3.05 meters)
70703925	Spindle sync cable*, 20-foot length (6.10 meters)
70703926	Spindle sync cable*, 30-foot length (9.14 meters)

continued

continued from previous page

Part Number	Description
70703927	Spindle sync cable*, 40-foot length (12.20 meters)
70703928	Spindle sync cable*, 50-foot length (15.24 meters)
70574221	Spindle sync terminator
83433013	Shunt (jumper connector), two-pin

* A custom cable may be needed for spindle sync connection between a drive and an external source.

Table 9. IPI-2 I/O cable components

Part Number	Description
77611616*	50-conductor twisted-pair flat cable
92010911*	50-pin mass terminate plug connector
10130447*	50-pin mass terminate receptacle connector
92004804*	Pull tab
89500014*	IPI-2 unshielded 50-pin (2 X 25) terminator (use when drives are daisy-chained with flat cable)
15458851*	Standard IPI-2 shielded terminator (use when drives are daisy-chained using standard IPI-2 shielded cable)
15386933*	50-pin D subminiature mass terminate plug connector
15386932*	50-pin D subminiature mass terminate receptacle connector
70527050	Adapter assembly D subminiature to micro-D connector
70883011	1.5-foot (0.46 meter) standard IPI-2 shielded cable assembly with D subminiature connectors
70883013	80-foot cable length (24.40 meters)
70883014	3-foot cable length (0.92 meter)
70883015	6-foot cable length (1.83 meters)
70883016	25-foot cable length (7.63 meters)
70883017	50-foot cable length (15.24 meters)
70883018	10-foot cable length (3.05 meters)
70883019	120-foot cable length (36.60 meters)

* Refer to product specification 64403104 for a list of acceptable third-party part numbers, which may be used in place of this Seagate part.

Section 5. Maintenance

This section contains the following maintenance information:

- Observing maintenance precautions
- Arranging for depot repair
- Removing and replacing a drive
- Removing and replacing a power supply
- Packing a drive for shipment

Observing maintenance precautions

Because the drive is depot repairable, there are no field-replaceable parts. Before beginning any maintenance activities, observe the following precautions:

- Follow the precautions listed under “Electrostatic discharge protection” in the preface.
- Do not remove any circuit boards from the drive chassis. Return the entire drive for depot repair if any circuit board is defective. Removal of circuit boards by personnel not performing depot repair will damage components and may void the warranty.
- Do not remove the head and disc assembly (HDA) from the drive chassis. Return the entire drive for depot repair if the HDA is defective.
- Do not attempt to disassemble the HDA. It is not field repairable. If the sealed HDA is opened by personnel not performing depot repair, this will damage components and void the warranty.
- Use forced-air ventilation when bench-testing the drive to ensure proper cooling of drive components.
- Do not connect or disconnect I/O cables while power is applied to the drive or controller.
- Do not connect or disconnect the DC power cable while the power supply is energized.

Arranging for depot repair

Before returning any units to Seagate, it is necessary to obtain a returned material authorization (RMA) number. To get the number, you will need to know the part number and serial number of the unit. These numbers appear on a label located on the side of the HDA. Then contact:

Seagate Technology, Inc.
Customer Services
7801 Computer Avenue South
Minneapolis, MN 55435

Phone: 1-800-382-6060 (outside Minnesota)
Phone: (612) 844-8080 (inside Minnesota)
Fax: (612) 844-7017

Removing and replacing a drive

Caution. When servicing the drive, observe all precautions listed under “Electrostatic discharge protection” in the preface. Failure to observe these precautions can result in serious damage to electronic assemblies.

Warning. Be sure that the drive has completed spinning down before removing it from its mounting. You may be physically harmed by the gyroscopic motion produced by discs which have not completed spinning down.

To remove a drive for maintenance, perform the following steps:

1. Remove power from the drive by setting the On/Standby switch on the power supply to the Standby position.
2. Disconnect the AC power cable from site power.
3. Rotate ejectors on the I/O cable connectors to the unlatched position to loosen cable connections. Disconnect I/O cables from the drive.
4. Disconnect the spindle sync cables (if used) from the drive.
5. Disconnect the DC power cable from the DC power connector on the drive.
6. Remove the mounting screws that secure the drive chassis to the cabinet.
7. Carefully lift the drive from its mounting and move it to the desired location.

To install a replacement drive, follow the procedures in section 2.

Removing and replacing a power supply

To remove a power supply for maintenance, perform the following steps:

1. Remove power from the drive by setting the On/Standby switch on the power supply to the Standby position.
2. Disconnect the AC power cable from site power.
3. Disconnect the DC power cable from the DC power connector on the power supply.
4. Remove the chassis safety ground screw from the power supply to disconnect the ground strap.
5. Remove the mounting screws that secure the power supply to the cabinet.
6. Carefully lift the power supply from its mounting and move it to the desired location.

To install a replacement power supply, follow the procedures in section 2.

Packing a drive for shipment

If it is necessary to ship the drive, repack the drive with the original packing materials (saved during installation). Comply with the packing instructions to ensure that the drive will be undamaged in shipment. To obtain packing instructions or a new shipping container, contact:

Seagate Technology, Inc.
Customer Services
7801 Computer Avenue South
Minneapolis, MN 55435

Phone: 1-800-382-6060 (outside Minnesota)

Phone: (612) 844-8080 (inside Minnesota)

Fax: (612) 844-7017

When ordering packing instructions or a new shipping container, specify the exact equipment number and series code of the drive as shown on the equipment identification label.



Seagate Technology, Inc.
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