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ST11200 Family:
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ST11200N/ND/NC
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ST1980N
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ST1950N
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ST1830N
.....
Installation Guide
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Publication Number: 77738480, Rev. D.

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Introduction

Before attempting any installation, please read through all applicable sections of this document, including all warnings and cautions.

Warning. This equipment generates, uses, and can radiate radio frequency energy and if not installed in accordance with these instructions, may cause interference to radio communications.

Electromagnetic interference (EMI) considerations

The drive(s) described herein, as delivered, are designed for system integration and installation into a suitable enclosure prior to use. As such, the drive(s) described herein are supplied as a sub-assembly and are not subject to Subpart J of Part 15 of the FCC Rules and Regulations nor the Radio Interference Regulations of the Canadian Department of Communications. However, the unit has been tested using proper shielding and grounding and found to be compliant with the Class A limits of the FCC Rules and the Regulations of the Canadian Department of Communications.

The physical design characteristics of the drive(s) described herein, serve to minimize EMI radiation when installed in an enclosure that provides reasonable shielding. As such, the drive(s) are capable of meeting the Class B limits of the FCC Rules and the Regulations of the Canadian Department of Communications.

Note. It is the end users' responsibility to assure that the drive(s) described herein meet the appropriate EMI requirements of their system. Shielded I/O cables may be required if the enclosure does not provide adequate shielding. If I/O cables are external to the enclosure, shielded cables should be used, with the shields grounded to the enclosure and to the host controller.

Before you begin

Verify that the system is switched off and disconnected from main power before any installation is attempted.

Protect yourself, the drive, and your valuable programs and data by reading the following cautions and warnings.

- Do not unpack drive from its static shielded bag until you are ready to install it in the system.
- Always handle the drive by the frame or casting.
- Do not touch printed circuit board (PCB) or the I/O connector pins.
- Never apply pressure to the PCB or to the drive top cover.
- Do not tamper with sealed top cover. Doing so voids your warranty. The drive contains no user servicable components. See Product Repair section for more information.
- Visually inspect the shipping container for any obvious damage.

- Inspect drive for possible shipping damage. All claims of this type should be filed promptly with the transporter involved. Save original packing materials to be used when reshipping.
- Verify all parts listed on shipping bill are received with the equipment. Discrepancies or damage should be reported to the shipping company.
- When transporting or shipping a drive or system, please ensure that they are correctly packed in original Seagate approved (or equivalent) container and shipped via an air-ride carrier experienced in handling computer equipment.

Caution. The circuit assemblies and components contained in this equipment can be degraded or destroyed by Electrostatic Overstress (EOS) or by Electrostatic Discharge (ESD).

Static electrical charges can accumulate quickly on personnel, clothing and synthetic materials. The electrostatic fields due to these charges when brought in close proximity to susceptible circuit assemblies and components, can result in degraded reliability or immediate failure of the affected component or assembly.

To insure optimum reliable equipment operation, it is required that technical support personnel discharge themselves by wearing a grounding strap around the wrist and be connected to a grounding terminal while working in the vicinity of, and while handling EOS/ESD susceptible assemblies/parts. If unavailable, ground yourself frequently by touching the metal chassis of the system before handling any components (this helps only if the system is connected to a ground). *Avoid static-inducing carpeted areas.*

Safety instructions

1. The disc drive(s) are to be installed in a customer supplied enclosure where the surrounding air does not exceed 50°C.
2. Four (4) 6-32 UNC-2A screws are required for installation. Maximum screw length into side of drive is 0.15 inches (3.81 mm). Maximum screw length into bottom is 0.20 in. (5.08 mm).
3. The power requirements are shown in Section 1.0 Product Information.
4. The power supply must satisfy the safety requirements for SELV (Safety Extra Low Voltage) circuits.
5. Service is to be provided by trained Seagate service personnel.
6. The incorporation of the disc drives listed in this guide into a customer enclosure must meet the appropriate safety requirements of the country in which it is used (e.g. UL 1950, CAN/CSA-C22.2 No. 950-M89, DIN VDE 0805/05.90 and EN60950:1988 (IEC 950)).

Sicherheitsanleitung

1. Das Gerät ist ein Einbaugerät, vorgesehen für eine maximale Umgebungstemperatur von 50°C.
2. Zur Befestigung der Drive werden 4 Schrauben benötigt (6-32 UNC-2A). Die maximale Länge der Schrauben in der unteren Seite des Chassis darf nicht mehr als 0.20 in (5.08 mm) betragen, die in der oberen 0.15 in (3.81 mm).
3. Die Versorgungsspannungen werden im Kapitel 1.0 (Produkt Information) gezeigt.
4. Die Versorgungsspannung muss SELV entsprechen.
5. Alle Arbeiten dürfen nur von ausgebildetem Seagate Service-Personal durchgeführt werden.
6. Der Einbau des Drives muss den Anforderungen gemäss DIN VDE 0805/05.90 oder EN60950: 1988 (IEC 950).

Installation Overview

Installation of the drive can be divided into distinct phases as outlined below. Some of these may not be applicable to your particular installation requirements. Refer to the individual drive installation sections for specific information on your drive model.

- **Drive configuration:** The user must select which of the drive features are appropriate to enable for installation in their system. This is done by installing or removing of the user configuration jumpers found on the drive PCB. "NC" models are probably configured by the host over the 80 pin interface.
- **Mechanical installation:** After setting up the drive configuration the drive must be mechanically installed into the host system and the power and I/O cables attached. Previously mentioned precautions should be observed
- **SCSI drives should not be defined in the CMOS:** The SCSI Host adapter has its own BIOS to handle the Input/output procedures. The CMOS setting for SCSI drive is either drive type zero, or the "no drive installed" option.

- **Low-level formatting:** After the drive has been properly configured for the system, it does not need to be low-level formatted, as this has been done by the factory and does not require this step during installation. (The low-level format writes the sector boundaries and track information to the drive). Defect management information is read from the drive by the host system when required in the installation procedure. If an installed drive is low-level formatted, all user data stored on the drive will be lost.

Note. Seagate Technology assumes no liability for lost user data.

- **Partitioning and high level formatting:** A drive can be sub-divided into "partitions" which behave as individual drives within the system. See your system documentation. Present day drive installation programs have menus that lead you through these installation procedures.

Product repair information

Service requirements

The special facilities required for the manufacture of these drives generally prohibit repair in the field. If problems occur during installation, please contact your supplier for assistance. Do not attempt to disassemble or repair. Drives should be sent to the repair depot through the purchase source, if possible. Please observe the following cautions.

Caution.

- Handle drive with care. Do not drop or bump hard.
- **Never** remove the cover of these disc drives. Servicing items in the sealed HDA (heads, media, actuator, etc.) require special facilities. The drive contains no user purchasable parts or PCBs.
- Opening the sealed HDA voids the drive warranty.
- Applying a soldering device to the components on the PCB voids the drive warranty.

- Place drive on a flat, static dissipative surface and handle with extreme care. Always follow all EOS/ESD precautions to avoid damage to the electrical assemblies.

Shipping: When transporting or shipping a drive, a Seagate approved container must be used. Keep your original box. They are easily identified by the Seagate Approved Package label. Shipping a drive in a non-approved container voids the drive warranty.

Seagate repair centers may refuse receipt of components improperly packaged or obviously damaged in transit. Contact your Authorized Seagate Distributor to purchase additional boxes. Seagate recommends shipping by an air-ride carrier experienced in handling computer equipment.

Product repair and return information

Seagate customer service centers are the only facilities authorized to service Seagate drives. Seagate does not sanction any third-party repair facilities. Any unauthorized repair or tampering with the factory-seal voids the warranty.

Warranty: Contact your Seagate Authorized Distributor, Dealer or other purchase source for warranty information.

If the drive is no longer under warranty contact purchase source for repair information or refer to numbers listed in the following paragraph .

Technical support services

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.

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 24 hours a day, 7 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 AM to 5:00PM PST, Monday through Friday. Recordings are accessible 24 hours a day, 7 days a week.

SeaBOARD:

The Seagate Technical Support Bulletin Board System (BBS) is available 24 hours a day, 7 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.

BBS Location	Modem Number	Maxmum Baud Rate
United States	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: These are toll calls

Drive specifications

Product

Information	ST11200N/NC	ST11200ND
Interface [7]	SCSI-2 Fast	SCSI-2 Fast
Cache Type	Multi-segmented, 256 Kb	
Capacity MB		
Unformatted	1248	1248
Formatted [1]	1054	1054
Cylinders	1872	1872
Heads	15	15
Sectors/track	74 (avg.)	74 (avg.)
Recording method	RLL (1,7)	RLL (1,7)
Rev/min	411	5411

Seek time (ms typ.)[2]

Average	Read	12.0	12.0
	Write	12.7	12.7

Operating environment

Ambient temp. [4] ----- 5°C to 50°C-----

HDA max temp. [3] -----60°C-----

Power requirements (Versorgungsspannungen)

+12 V +/-5% (Max [6]	1.0 A	1.0 A
(Max Start) [5]	2.0 A	2.0 A
+5 V +/-5% (Max) [6]	0.8 A	1.0 A
(Max Start)	0.8 A	0.9 A
Power Idle (Typ)	9.0 W	10 W
Oper. (Typ)	11.0 W	12 W

Product Information		ST1980N
Interface [7]		SCSI-2 Fast
Cache Type		Multi-segmented, 256 Kb
Capacity MB		
Unformatted		1021
Formatted [8]		860
Cylinders		1730
Heads		13
Sectors/track		74 (avg.)
Recording method		RLL (1,7)
Rev/min		5411
Seek time (ms typ.)[2]		
Average	Read	11.7
	Write	12.5
Operating environment		
Ambient temp. [4]		-----5°C to 50°C-----
HDA max temp. [3]		-----60°C-----
Power requirements (Versorgungsspannungen)		
+12 V +/-5% (Max [6]		1.0 A
(Max Start) [5]		2.0 A
+5 V +/-5% (Max) [6]		0.8 A
(Max Start)		0.8 A
Power Idle (Typ)		9.0 W
Oper. (Typ)		11.0 W

Product Information	ST1830N	ST1950N
Interface [7]	SCSI-2 Fast	SCSI-2 Fast
Cache Type	Multi-segmented, 256 Kb	
Capacity MB		
Unformatted	834	953
Formatted [8]	702	803
Cylinders	1325	1575
Heads	13	13
Sectors/track	74 (avg.)	74 (avg.)
Recording method	RLL (1,7)	RLL (1,7)
Rev/min	5411	5411
Seek time (ms typ.)[2]		
Average		
Read	TBD	TBD
Write	TBD	TBD
Operating environment		
Ambient temp. [4]	-----5°C to 50°C-----	
HDA max temp. [3]	-----60°C-----	
Power requirements (Versorgungsspannungen)		
+12 V +/-5% (Max [6])	1.0 A	1.0 A
(Max Start) [5]	2.0 A	2.0 A
+5 V +/-5% (Max) [6]	0.8 A	0.8 A
(Max Start)	0.8 A	0.8 A
Power Idle (Typ)	9.0 W	9.0 W
Oper. (Typ)	11.0 W	11.0 W

Notes.

- [1] Standard units are factory formatted with 512 data bytes per sector with twelve spare sectors per cylinder and 2 cylinders at inner tracks reserved for spares in addition to capacity listed.
- [2] Includes on-board controller overhead.
- [3] Maximum measured at any location on top cover.
- [4] For best reliability keep below 35°C (95°F).
- [5] -10% regulation for a maximum of 10 seconds at power up. (-10% Regelung für 10 Sekunden max).
- [6] Measured with an average reading DC ammeter. Instantaneous +12 V current peaks will exceed these values.
- [7] Can be commanded to operate according to SCSI-1 protocol.
- [8] 512 data bytes per sector with one spare sector per track, two spare cylinders at inner tracks.

Initial setup information

For the initial setup connect the cables, set the SCSI bus address and remove, install, or leave as is the SCSI I/O line terminator resistor packs. These procedures are described in paragraphs following.

SCSI interface cable connection

Model ST11200 family are SCSI interface drives. On "N/ND" models, system connection is via a 50 pin, SCSI connector. On "NC" models system connection and DC power is via a single 80 pin SCSI connector. Because of its shape, there is only one way the drive can mate with the input connector. Pin 1 is noted in Figure 2. Some cables have a contrasting color stripe on one edge to indicate pin 1. Strain relief is recommended at the cable. *Do not block system cooling air flow by the routing of cables.*

SCSI address selection

On "ND" model drives, make sure that the SCSI bus address jumper(s) are properly set for the bus address assigned to the drive. See figures at beginning of Section 3 showing the bus address select header and the jumper configurations that select addresses 0 through 7. Typically the primary boot device is set to ID 0, and the subsequent SCSI drives are jumpered in ascending order. Bus addresses 0 through 6 should be used (the host adapter usually uses address 7). On "NC" model drives the SCSI ID can be, and presumably will be set over the 80 pin interface by the host computer. Unless directed to by the host system documentation, no jumpers should be installed for address selection on "NC" models. The host also has complete control over motor starting, so no motor start jumper is required. If the drive LED shows no on/off activity when the host is trying to communicate with it, an incorrect bus address selection at the drive should be suspected.

Resistor terminator packs

If you are installing a single drive, the resistor terminator packs must remain installed. See Figure 2 where they are noted as I/O Terminators. If you are installing multiple hard disc drives, remove the resistor termination packs from all the drives but the one connected to the end of the SCSI I/O cable.

When reinstalling a resistor pack, note that pin 1 end on the pack is denoted by a dot, a number one or a notch.

Model numbers that end in ND and NC have no provisions for terminators that plug into the drive PCB. The system manufacturer must provide some external means of I/O line termination.

Read/write head auto-park

Seagate disc drives described herein park the heads automatically at power off. This feature requires no operator intervention.

Optional parity bit enable

Some systems require parity bit checking. Consult the system documentation for the specific requirements. See figures in Section 3 for location of Parity Bit Enable jumper. Jumper-on enables parity reporting by the SCSI bus.

DC power connection

Drive model numbers ending in "N" or "ND" receive DC power through a 4 pin connector mounted on the PCB next to the 50 pin SCSI I/O connector. See Figures 1 and 2.

Drive model numbers ending in "NC" get DC power from the host computer through the 80 pin I/O connector. No separate DC power connector is provided.

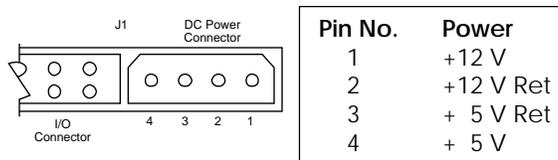
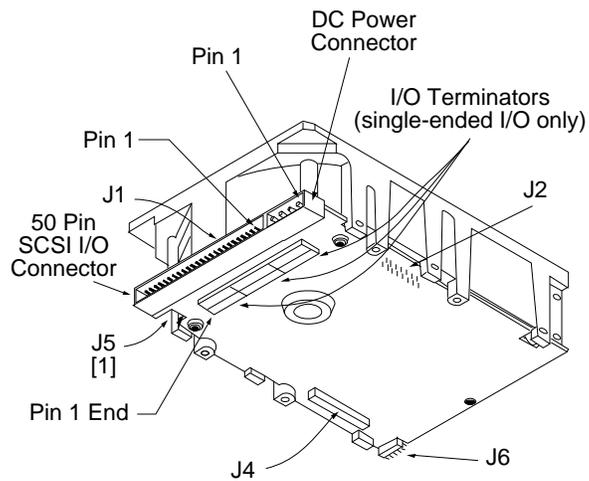


Figure 1. DC power connection



[1] Drives with model numbers ending in "NC" do not

Figure 2. ST11200 Family 50 pin I/O and 4 pin DC power

Drive configuration

Each disc drive has option select header connectors on the sides and front where jumper plugs are installed to select the way that the drive is to be configured or to select its ID on the I/O bus.

SCSI I/O drives

On SCSI I/O drives with model numbers ending in "N" or "ND", either J6 (on the front of the drive) or J5 (on the side behind the SCSI I/O connector) may be used to set the drive ID. To avoid possible incorrect ID setting, do not use both J5 and J6 for ID selection. The following figures show where these headers are located on the different drives covered by this manual. There are notes following where explanations are given about the purpose of each jumper and specify the standard factory (called "default") settings of these jumpers (i.e., settings used for most common single drive application). Changes to these settings should be made only if it is known that the system requires a different configuration.

SCSI model "NC" drives do not have J5 for ID selection. See [2] following Figures 3a and 3b.

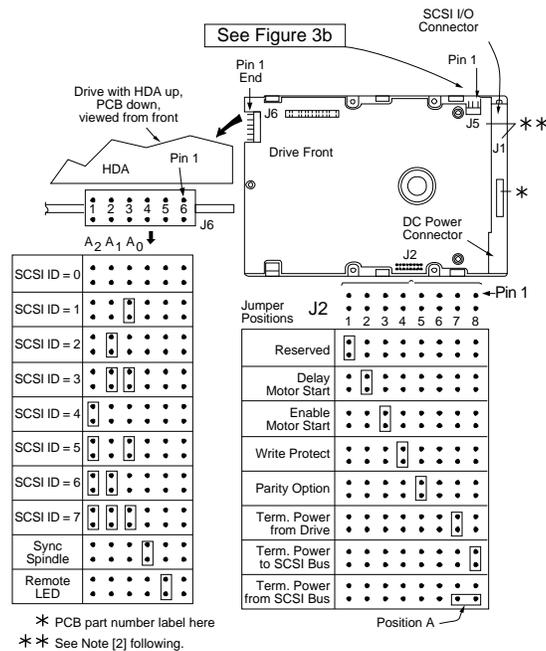


Figure 3a. Drive configuration for ST11200 family

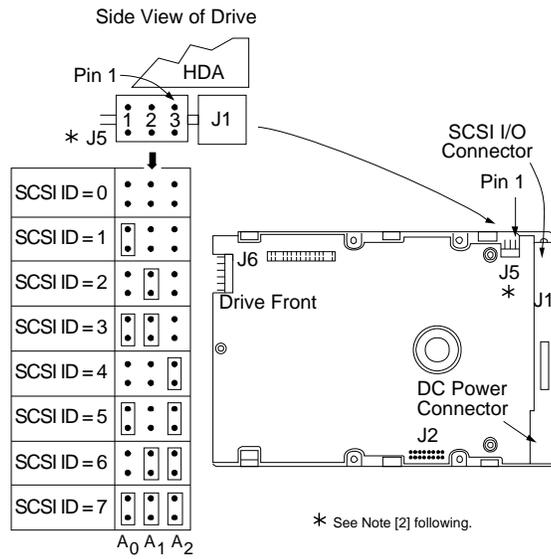


Figure 3b. Drive configuration for ST11200 family

Notes for Figure 3a and 3b:

- [1] Notes explaining the functions of the various jumpers on jumper header connectors J2, J5 and J6 are given below in order of jumper position (not connector pin number). The term "default" means as standard OEM units are configured when shipped from factory.

- [2] The PCB on "NC" models does not have connector J5, and has a single 80 pin combined SCSI I/O and DC power connector instead of the normal 50 pin SCSI I/O and 4 pin DC power connectors. Included among the 80 pins are the SCSI ID, Motor Start and Delayed Motor Start select functions, and the synchronous spindle master sync signal and the remote LED signals. Do not use J2 and J6 for these five functions if the host uses the ones included in the 80 pin connector.

Jumper**Position Jumper Function Description**

J2	1	Reserved for later use. Default is jumper off.
J2	2	Jumper installed in position 2 enables the Delayed Motor Start option (if jumper in position 3 is off). Motor start delay is 16 times the drive ID number in seconds; i.e., drive ID 0 starts immediately, drive one starts 16 seconds later, drive ID 2 starts 32 seconds later and etc. Default is no jumper on.
J2	3	Jumper installed enables Motor Start option. The drive waits for the Start unit command from the host before starting the spindle motor. If no jumper is installed, drive operation depends on whether or not there is a jumper in position 2. Default is no jumper on.
J2	4	Jumper installed means entire drive is write protected. Default is no jumper on.
J2	5	Jumper installed means parity checking and error reporting by the drive is enabled. Default is no jumper on.

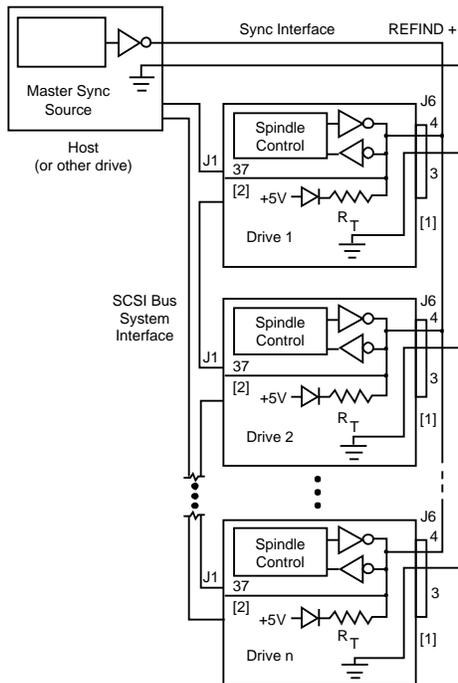
Jumper**Position Jumper Function Description**

J2	6	Reserved for factory use. No jumper installed.
J2	7,8	Select terminator power source. In position 8 the drive supplies power to the SCSI bus, pin 26. In position 7 the drive supplies power only to its own terminators. Jumper in position A (between pins 2 and 4), between positions 7 and 8 (nearest PCB edge) means the drive takes power from the SCSI bus, pin 26. Jumpers on both 7 and 8 at the same time is allowed. Default is jumper on position 7.
J5	1,2,3 (A ₀ ,A ₁ , A ₂)	Drive ID on SCSI Bus (J6 may be used instead). The drive ID is binary coded position-wise i.e., jumper in position A ₂ is drive ID 4, in position A ₁ is ID 2, position A ₀ is ID 1 and no jumpers is ID 0. Default is ID = 0. Note that relative positions of A ₂ and A ₀ are opposite to what they are on J6.

"NC" model drives do not have J5.

Jumper**Position Jumper Function Description**

J6 1,2,3 (A ₂ ,A ₁ , A ₀)	Either J5 or J6 (optional) may be used to select drive ID. Both should not be used at the same time, because at some future time when the ID is changed the user could fail to configure both J5 and J6 the same. The drive ID is binary coded positionwise (A ₀ is least significant position and A ₂ is most significant position), i.e., jumper in position A ₂ is drive ID 4, in position A ₁ is ID 2, position A ₀ is ID 1 and no jumpers is ID 0. Default is ID = 0.
J6 4	Used as a cable connection for the reference index signal (REFSIG+) (J6 pin 6, bottom) for sync spindle feature. J6 pin 5 is GND.
J6 5	No jumper. These pins used to connect a remote LED indicator. Pin 3 (top, nearest HDA), the anode connection, connects in the drive to the +5V supply through a pull-up resistor. Pin 4 (bottom), the cathode connection connects in the drive to signal command through the emitter-collector junction of a transistor switch that controls the LED on/off condition.
J6 6	Reserved position.



[1] Configuration Select Connector

[2] Connection available only on ST11200NC

Figure 4. Synchronized spindle interconnection diagram for ST11200 family

Drive installation

This section describes the physical mounting of the drive in the host cabinet and the logical installation as a system member, which is called drive setup.

Disc drive mounting

Do not touch the connector pins or any PCB components without observing static-discharge precautions. Always handle the drive by the frame only.

The drive may be mounted in any orientation.

- Mount to host system chassis using four 6-32 UNC screws. Three mounting holes are in each side and four in the bottom of the drive. See Figure 5 or 6. The maximum length that the screws should extend into the side chassis mounting holes is 0.150 inch (3.81 mm), and 0.20 inch (5.08 mm) into bottom holes, measured from the outer surface of the chassis. The minimum thread engagement for all mounting screws is .12 inch (3.0 mm). Tighten the screws evenly to a maximum torque of 8 in-lb. Do not over tighten or force when screw does not seem to screw in easily (threads not correctly engaged).

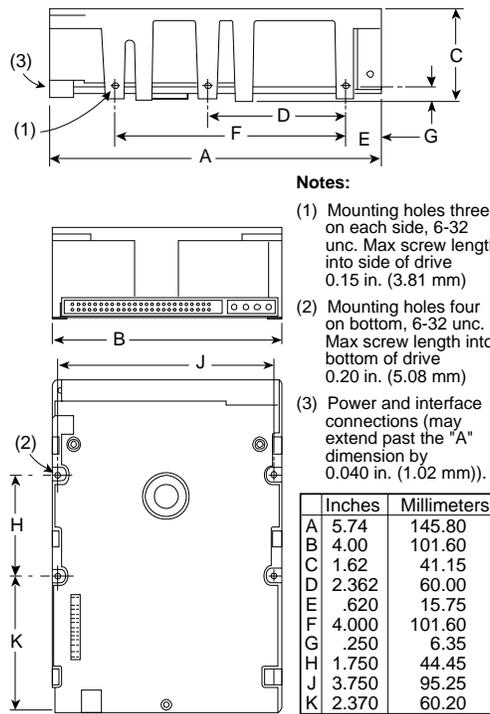
- Verify that all connections between the drive and the host system are correctly installed. Most cables have a contrasting color stripe indicating pin 1. Pin 1 on the drive I/O connector and the DC power connector are indicated in Figures 1 and 2.
- Verify option select and drive ID select jumpers and installation of terminator resistor packs where applicable. See Sections 2 and 3.

Do not power up the host system until the drive is mounted and the system cover is replaced.

- Connect DC power connector to the drive (not required on "NC" model drives).
- Replace the Host System cover.
- Turn on DC power.
- Boot the system from the floppy drive or from a previously installed hard-drive if there is one.
- Proceed with drive setup of the new hard drive.

Grounding

Signal ground (PCB) and HDA ground are connected together in the ST11200 drives family and cannot be separated by the user. The equipment in which the drive is mounted is connected directly to the HDA and PCB with no electrically isolating shock mounts. If it is desired for the system chassis to not be connected to the HDA/PCB ground, the systems integrator or user must provide a nonconductive (electrically isolating) method of mounting the drive in the host equipment.



- Notes:**
- (1) Mounting holes three on each side, 6-32 unc. Max screw length into side of drive 0.15 in. (3.81 mm)
 - (2) Mounting holes four on bottom, 6-32 unc. Max screw length into bottom of drive 0.20 in. (5.08 mm)
 - (3) Power and interface connections (may extend past the "A" dimension by 0.040 in. (1.02 mm)).

Figure 5. ST11200N/ND family drive mounting

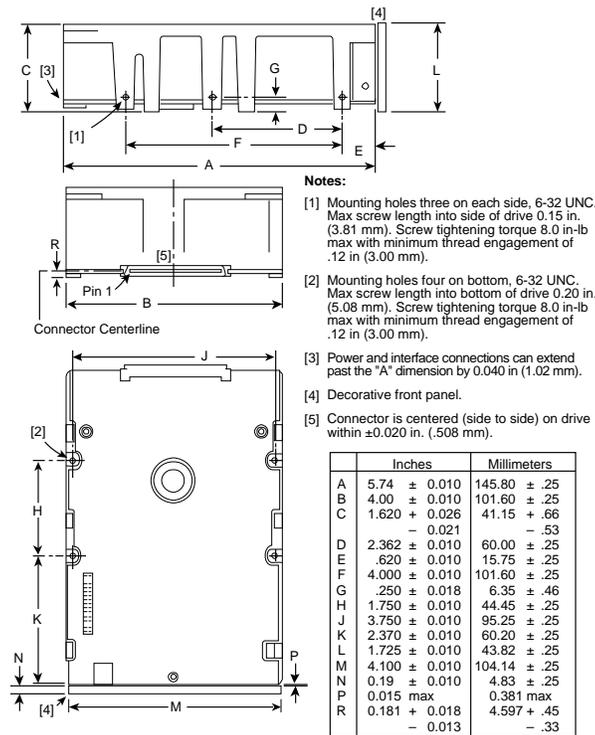


Figure 6. Mounting configuration details for ST11200NC model drives

Drive setup

SCSI interface drives

The SCSI interface handles both drive geometry and defect management internally or the "no drive installed" option can be selected for systems with SCSI drives.

All SCSI interface drives are low-level formatted at the factory. If you wish to low-level format the drive to optimize its performance for your system, consult the controller documentation for information on low-level formatting. Partitioning and high-level formatting can be done through DOS by way of the FDISK utility for partitioning, and FORMAT for high-level formatting. Consult your DOS manual for FORMAT and FDISK command options.

Warning. If an installed drive is low-level formatted, all user data stored on the drive is lost.

Seagate Technology assumes no liability for lost user data.



Seagate Technology, Inc.

920 Disc Drive, Scotts Valley, CA. 95066-4544, USA

Publication Number: 77738480, Rev. D

Printed in USA