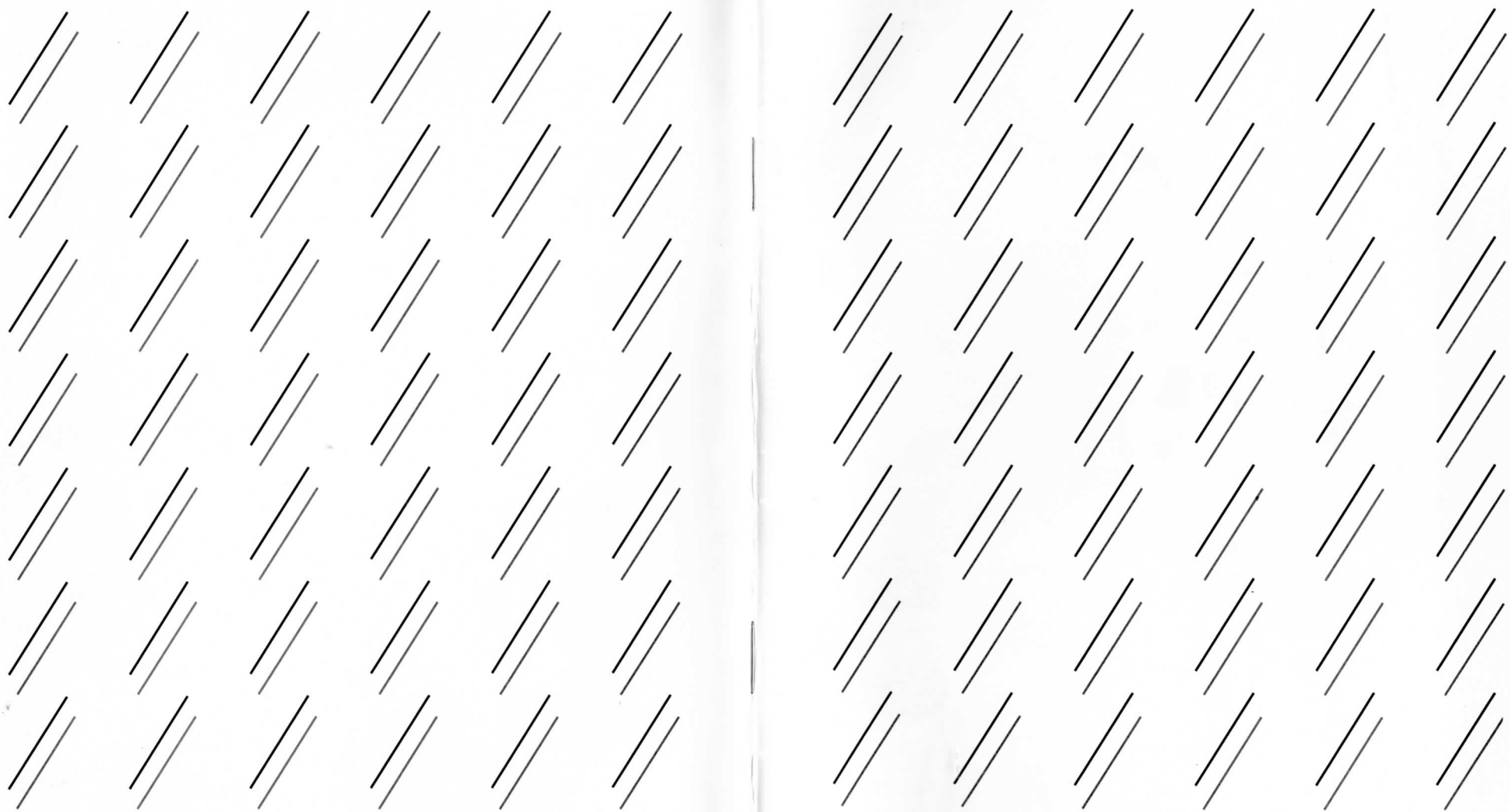


XT-4000E Family Disk Drives

QUICK REFERENCE GUIDE



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XT-4000E

Quick Reference Guide

Document 1018329
Revision A
April 1989

XT-4000E Quick Reference Guide

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REVISION RECORD

Revision	Date Published	Revised Contents
A	April 1989	First Edition

Document No. 1018329

WARRANTY

Maxtor XT-4000E Family disk drives are warranted against defects in materials and workmanship for a period that is specified by the contractual agreement with the purchaser. Any questions regarding the warranty should be directed to your Maxtor Sales Representative. Maxtor maintains a Customer Service Center for the repair/reconditioning of all Maxtor products. All requests for repair should be directed to the Maxtor Service Center in San Jose. This will assure you of the fastest possible service.

REGULATORY APPROVALS

UL Recognition obtained: File Number E87276
 CSA Certification obtained: File Number LR54048VDE
 VDE Recognition obtained: Registration Number 37230G

PREFACE

The purpose of this reference guide is to provide information which ensures easy use and installation of Maxtor's XT-4000E Family disk drives.

Maxtor reserves the right to make changes and/or improvements to its products without incurring any obligation to incorporate such changes or improvements in units previously sold or shipped.

Maxtor publishes descriptive brochures and data sheets, an OEM manual, and a quick reference guide for each product line.

REFERENCE NUMBERS

For information concerning drive set-up and operation, contact Maxtor Technical Support at (408)432-4698 or (408)432-4710.

For information regarding PC AT/XT applications, contact Storage Dimensions Inc. (SDI) Technical Support at (408)395-2688, extensions 278-281.

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1.0 UNPACKING AND DRIVE HANDLING

The disk drive packaging has been carefully designed to protect the drive from shock and vibration, moisture, and Electrostatic Discharge (ESD). The drive should remain in the package until it is ready to be tested or installed.

The protective cover on the printed circuit board (PCB) is designed to stay with the drive until it is installed in the system.

NOTE: *The cover must be removed before installation.*

Precautions should be taken to protect the drive from ESD. Grounded work stations and operators should be used.

CAUTION: *The XT-4000E disk drive should be handled with extreme care. Do not bang or drop the drive.*

2.0 PRODUCT SPECIFICATIONS

All specifications for the XT-4000E Family disk drives are listed as follows.

2.1 PERFORMANCE SPECIFICATIONS

	XT-4170E	XT-4380E
Capacity, Unformatted		
Per Drive (Mbytes)	179.45	384.53
Per Surface (Mbytes)	25.64	25.64
Per Track (bytes) (minimum)	20,940	20,940
Capacity, Formatted (512 bytes/sector)		
Per Drive (Mbytes)	157.93	338.4
Per Surface (Mbytes)	22.56	22.56
Per Track (bytes)	18,432	18,432
Sector/Track	36	36
Transfer Rate, Mbits/Sec	10.0	10.0
Typical Seek Time, msec*		
Average	14	16
Track-to-Track	2.5	2.5
Full Stroke	27	29
Max Seek Time, msec*		
Average	16	18
Track-to-Track	3	3
Full Stroke	34	34

* Includes Settling

Table 1
Performance Specifications

2.2 FUNCTIONAL SPECIFICATIONS

	XT-4170E	XT-4380E
ROTATIONAL SPEED (rpm) *	3,600	3,600
AVERAGE LATENCY (msec)	8.33	8.33
RECORDING DENSITY (bpi)	21,064	21,064
FLUX DENSITY (fci)	14,043	14,043
TRACK DENSITY (tpi)	1,070	1,070
CYLINDERS	1,224	1,224
TRACKS	8568	18,360
SECTORS (36 sectors/track)	308,448	660,960
DATA HEADS	7	15
SERVO HEADS	1	1
DISKS	5	8

*Accurate to +0%, -0.2%

Table 2
Functional Specifications

2.3 ENVIRONMENTAL SPECIFICATIONS

	OPERATING	NONOPERATING
AMBIENT TEMPERATURE	50° F to 122° F (10° C to 50° C)	-40° F to 149° F (-40° C to 65° C)
MAXIMUM TEMPERATURE GRADIENT	18° F/hr (10° C/hr), Below Condensation	18° F/hr (10° C/hr), Below Condensation
RELATIVE HUMIDITY	8 to 80% Noncondensing with Max Gradient of 10% /hr	8 to 80% Noncondensing with Max Gradient of 10% /hr
MAXIMUM ELEVATION	10,000 ft	-1,000 ft to 40,000 ft
VIBRATION (INPUTS TO FRAME OF DRIVE)	All axes, 5-40 Hz, 0.006 in. P-P 40-500 Hz, 0.5 G Peak Acceleration	All axes, 5-31 Hz, 0.02 inches P-P 31-500 Hz, 1.0 G Peak Acceleration
SHOCK (INPUTS TO FRAME OF DRIVE)	5 G with 11 msec Pulse Width, Half Sine Wave, (all axes) (no retry)	25 G With 11 msec Pulse Width, Half Sine Wave, (all axes)

Table 3
Environmental Limits

2.4 PHYSICAL SPECIFICATIONS

HEIGHT	= 3.25 in. (82.55 mm)
WIDTH	= 5.75 in. (146.05 mm)
DEPTH	= 8.20 in. (208.28 mm)
WEIGHT	= 7.1 lb (3.2 kg)
SHIPPING WEIGHT	= 9.3 lb (4.2 kg)

Table 4
Physical Specifications

2.5 RELIABILITY SPECIFICATIONS

MTBF	- 40,000 POH, Typical Usage
PM	Not Required
MTTR	15 Minutes
COMPONENT DESIGN LIFE	5 Years

Table 5
Reliability Specifications

2.6 ERROR RATE SPECIFICATIONS

SOFT READ ERRORS	10 per 10 ¹¹ Bits Read
HARD READ ERRORS*	10 per 10 ¹³ Bits Read
SEEK ERRORS	10 per 10 ⁷ SEEKs

*Not Recoverable Within 16 Retries

Table 6
Error Rate Specifications

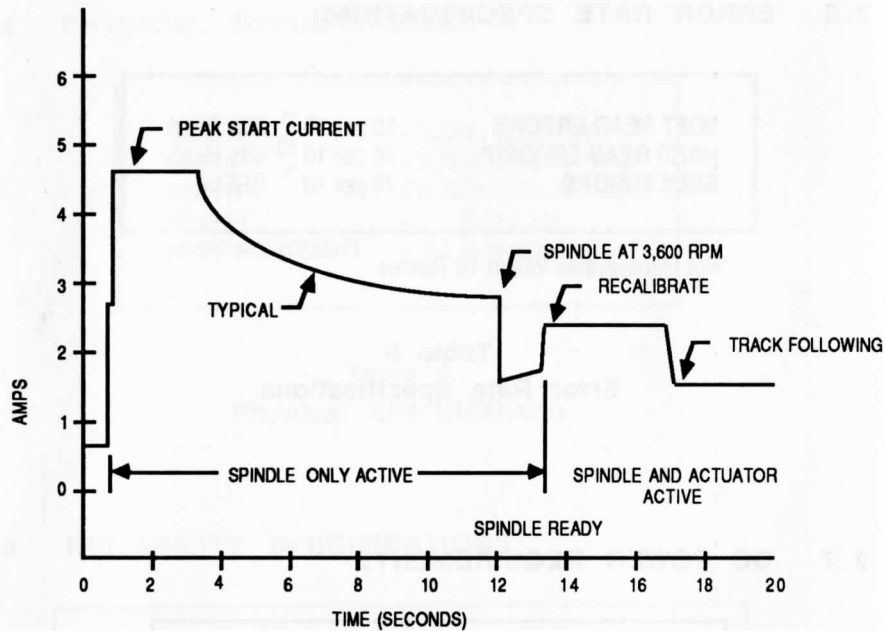
2.7 DC POWER REQUIREMENTS

VOLTAGE (NOMINAL)	+12 V DC	+5 V DC
Regulation	±5%	±5%
Current (Typical)	1.5 A	1.7 A
Current (Maximum)*	4.5 A **	1.9 A
Ripple (Maximum, P-P)	120 mV	50 mV

* At Spinup Heat Dissipation = 30 W typical
35 W maximum

** Potential Current Surge for 1st 100 to 200 μsec to Charge Capacitors Dependent on Power Supply at Power On

Table 7
DC Power Requirements



NOTE: WHEN A FULL-LENGTH SEEK IS DONE, ONE ADDITIONAL AMP IS REQUIRED FOR A DURATION OF 15 MILLISECONDS

Figure 1
Typical 12 Volt Current Power Up Cycle

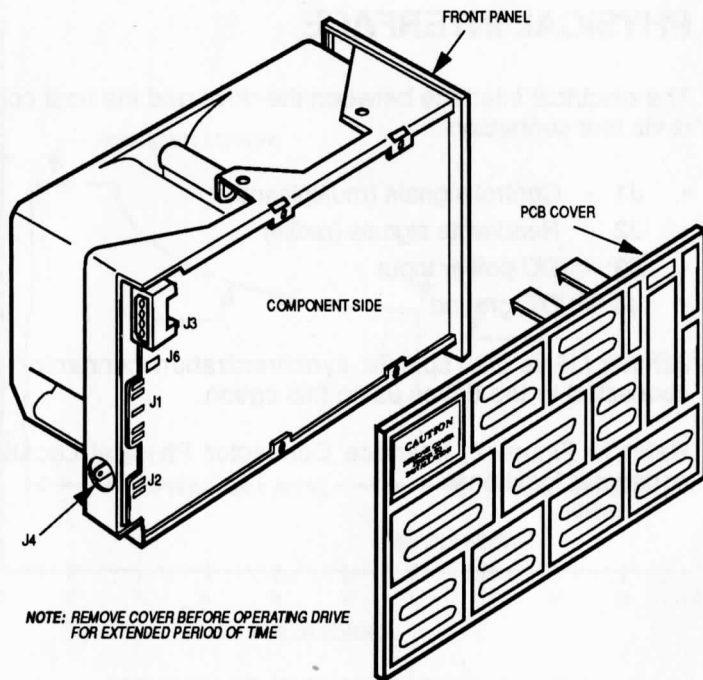
3.0 PHYSICAL INTERFACE

The electrical interface between the drive and the host controller is via four connectors:

- J1 - Control signals (multiplexed)
- J2 - Read/write signals (radial)
- J3 - DC power input
- J4 - DC ground

Jumper J6 is the spindle synchronization connector and is connected to the drives using this option.

Refer to Figure 2, Interface Connector Physical Location, for connector locations.



NOTE: REMOVE COVER BEFORE OPERATING DRIVE FOR EXTENDED PERIOD OF TIME

Figure 2
Interface Connector Physical Location

3.1 J1/P1 CONNECTOR

Connection to J1 is via a 34 pin PCB edge connector. The dimensions for this connector are shown in Figure 3, J1 Connector Dimensions. The pins are numbered 1 through 34 with the even pins located on the component side of the PCB. Pin 2 is located on the end of the PCB connector closest to the DC power connector J3/P3. A key slot is provided between pins 4 and 6. The recommended mating connector for P1 is AMP ribbon connector P/N 88373-3 or equivalent.

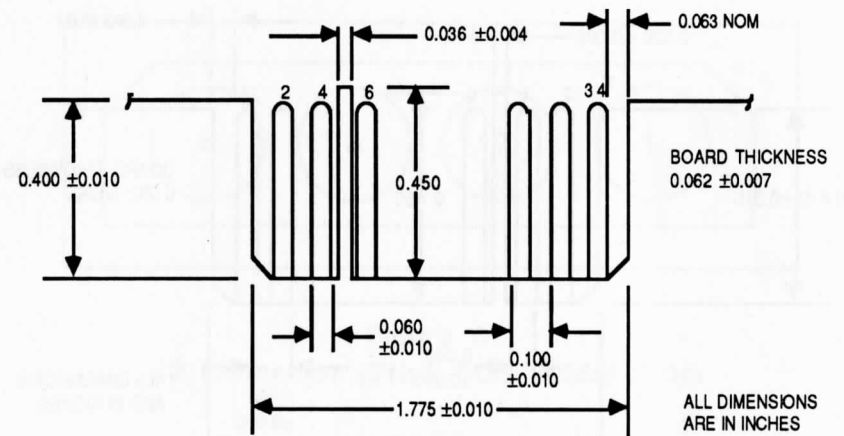


Figure 3
J1 Connector Dimensions

3.2 J2/P2 CONNECTOR

Connection of J2 is via a 20 pin PCB edge connector. The dimensions for the connector are shown in Figure 4, J2 Connector Dimensions. The pins are numbered 1 through 20 with the even pins located on the component side of the PCB. The recommended mating connector for P2 is AMP ribbon connector P/N 88373-6. A key slot is provided between pins 4 and 6.

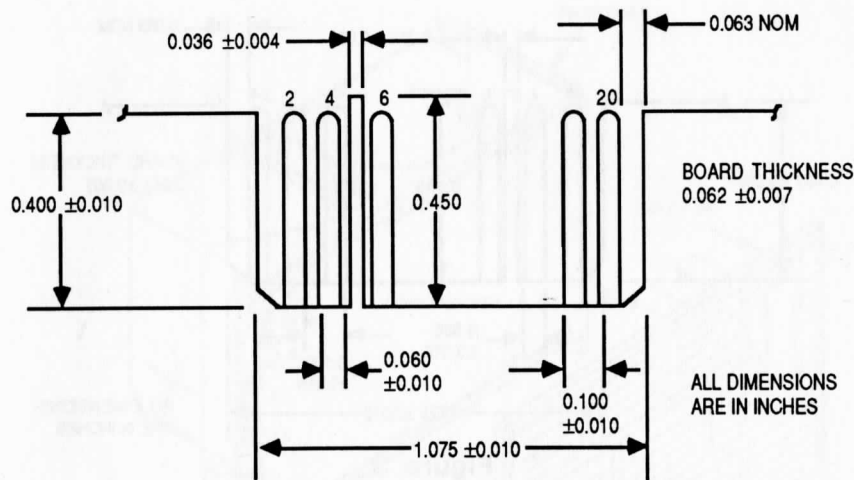


Figure 4
J2 Connector Dimensions

3.3 J3/P3 CONNECTOR

The DC power connector, J3, is a 4 pin AMP MATE-N-LOCK connector justify margin P/N 350543-1 mounted on the solder side of the PCB. The recommended mating connector (P3) is AMP P/N 1-480424-0 using AMP pins P/N 350078-4 (strip) or P/N 61173-4 (loose piece). J3 pins are numbered as shown in Figure 5.

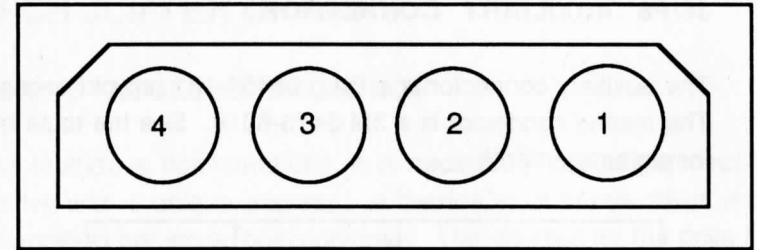


Figure 5
J3 Connector (Drive PCB Solder Side)

VOLTAGE (NOMINAL)	+12 V DC	+5 V DC
Regulation	±5%	±5%
Current (Typical)	1.5 A	1.7 A
Current (Maximum)	4.5 A *	1.9 A
Ripple (Maximum, P-P)	120 mV	50 mV

* Potential Current Surge for 1st 100 to 200 μsec to Charge Capacitors Dependent on Power Supply at Power On

Table 8
DC Power Requirements

3.4 J4/P4 FRAME GROUND CONNECTOR

The frame ground connector is a Faston-type connector, AMP part number 61761-2. The recommended mating connector is AMP 62187-1. If wire is used, the hole in J4 accomodates a maximum wire size of 18 AWG.

3.5 J6/P6 AUXILIARY CONNECTOR

The auxiliary connector is a Berg 68451-121 ten-pin connector. The mating connector is a 3M 3473-6010. See the table below for pin assignments.

SIGNAL NAME	PIN
MAPOUT	1
MAPIN	2
GND	3
MAPIN	4
GND	5
KEY (N.C.)	6
- REMOTE WRITE PROTECT	7
	8
- LED	9
+ LED	10

Table 9
J6 Auxilliary Signal Cable Pin Assignments

4.0 PCB JUMPER OPTIONS

4.1 DRIVE ADDRESS SELECTION

In multidrive configurations, it is necessary to configure each drive with a unique address. A maximum of seven drives are permitted per single host controller. The address for the drive is determined by installing the jumper plug in the appropriate jumper location (Figure 6, Drive Jumper Options). Table 10, Drive Select Jumpers, shows the drive selection jumpers. As shipped from the factory, the drive is configured as logical unit number one. Removing the jumper entirely is equivalent to a "no select."

DRIVE SELECT NUMBER	JUMPER INSTALLED
1	DS1
2	DS2
3	DS3
4	DS4
5	DS5
6	DS6
7	DS7

Table 10
Drive Select Jumpers

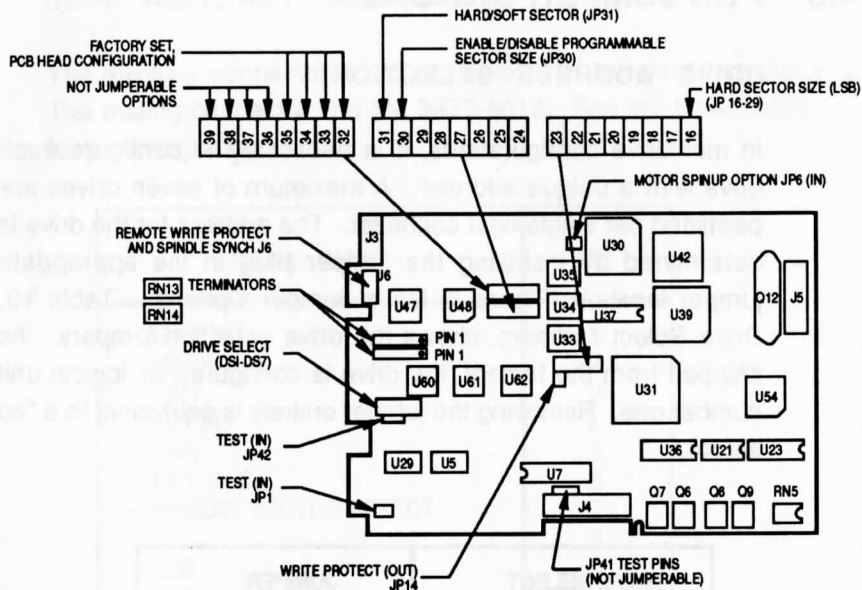


Figure 6
Drive Jumper Options

JUMPER	DESCRIPTION
JP1 (in) JP6 (in)	Used for Manufacturing Testing In = Motor Spinup Option Disabled Out = Remote Motor Spinup Option Enabled
DS1-DS7 (DS1 in) JP14 (out)	Drive Select In = Write Protected Out = No Write Protection
JP16-JP29	Unformatted Hard Sector Size in Bytes Jumpers, LSB = JP16, MSB = JP29
JP30	In = Enables Programming of the Hard Sector Size Through the Interface Out = Disable this Function
JP31	In = Soft Sector Mode Out = Hard Sector Mode
JP32-JP35 JP41	PCB Head Configuration Test Connection, Not a Jumperable Option
JP42 (in)	Used for Manufacturing Testing
<p>NOTE: JP4, JP5, JP15, JP36, JP37, JP38, JP39, JP40, JP41 ARE NOT JUMPERABLE OPTIONS. THE ONLY CUSTOMER CONFIGURABLE OPTIONS ARE JP6, P14, JP16-JP29, JP30, JP31, and DS1-DS7.</p>	

Table 11
Jumper Selections

4.2 DATA HEAD SELECTION JUMPERS (JP32-JP36)

Jumpers have been provided to allow the number of usable data heads to be selected. In order for the drive to respond correctly to the request configuration command - number of heads, these jumpers are set at the factory to correspond with the model of the drive. Table 12, Data Head Number Selection Jumpers, shows the various configuration options.

DRIVE MODEL	NUMBER OF DATA HEADS	JUMPER CONFIGURATION			
		JP 32	JP 33	JP 34	JP 35
XT-4170E	7	In	In	In	Out
XT-4380E	15	In	In	In	In

Table 12
Data Head Number Selection Jumpers

4.3 WRITE PROTECT SELECTION JUMPER (JP14)

Jumper JP14 is the write protect jumper. When the jumper is present (installed), the drive is write-protected and can only be read; no writing may take place. The drive does not have this jumper installed when it is shipped from the factory.

4.4 OPTION FOR SEQUENTIAL SPINDLE MOTOR SPINUP JUMPER (JP6)

The spindle motor spinup jumper (JP6) allows a string of drives to be started sequentially by the controller. When the jumper is present (installed), the drive automatically spins up as soon as power is applied. If JP6 is removed, the drive is started by issuing the appropriate command from the controller. As shipped from the factory, jumper JP6 is installed.

4.5 TEST JUMPERS (JP1, JP41, JP42)

These jumpers provide access to certain test signals. The specific signals and the normal factory settings are shown in the table below.

JUMPER	FACTORY SETTING	NOTES ON FUNCTION
JP1	In	Write Data
JP41	N/A	Test Pins, Not Jumperable
JP42	In	Write Gate

Table 13
Test Pin Jumpers

4.6 HARD SECTOR CONFIGURATION JUMPERS (JP16-JP31)

Jumper JP31 selects the mode of operation. Jumper JP31 installed configures the drive as a soft sector drive; removed, it configures the drive as a hard sector drive.

Jumpers JP16 through JP29 allow the user to configure the drive's hard sector size. The sector size can range from a minimum of 123 to a maximum of 10,470 bytes per sector, with 1 byte granularity.

The hard sector configuration jumpers are encoded in a binary fashion, with JP16 being the least significant byte, and JP29 being the most significant byte (see Table 14). An installed jumper equates to a one.

Jumper JP30, if installed, enables setting the hard sector size over the ESDI interface. The drive must be in hard sector mode (i.e. JP31 removed).

JUMPER	# BYTES/SECTOR
J16	1
J17	2
J18	4
J19	8
J20	16
J21	32
J22	64
J23	128
J24	256
J25	512
J26	1,024
J27	2,048
J28	4,096
J29	8,192

Example: 36 Sectors Desired

1. $\frac{20,940 \text{ Bytes/Track}}{36 \text{ Sectors}} = 581 \text{ Bytes/Sector}$
2. Install Jumpers J25, J22, J18, +J16
Number Bytes/Sector = $512 + 64 + 4 + 1 = 581$

Table 14
Customer Selectable Jumpers

5.0 REMOVABLE FACEPLATE

The faceplate may be removed in installations that do not require it. Remove the two C-clips and unplug the LED cable from the PCB. Refer to the figure below.

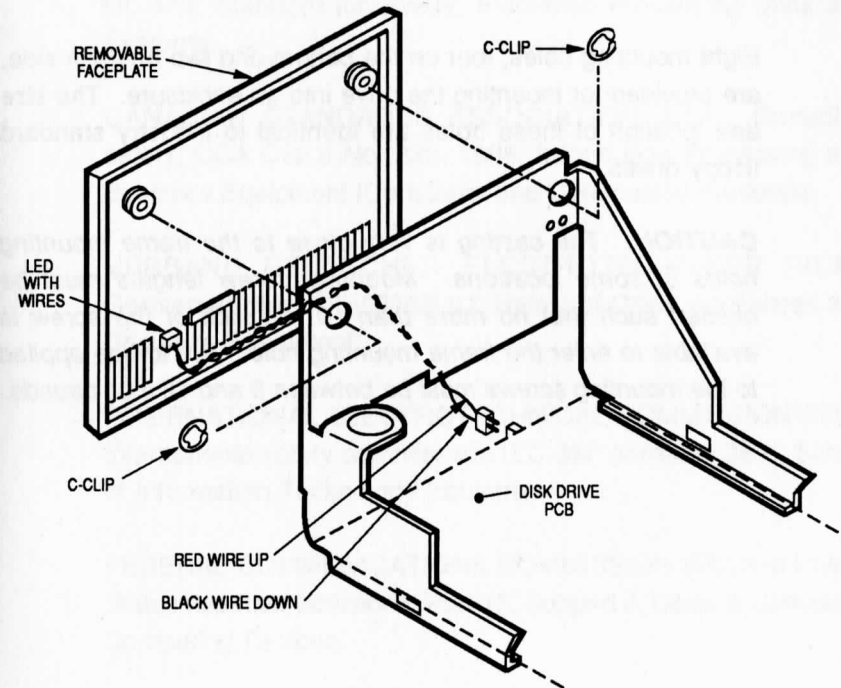


Figure 7
Removable Faceplate

6.0 MOUNTING

The drive may be mounted in any orientation. In any final mounting configuration, insure that the operation of the three shock mounts which isolate the base casting from the frame is not restricted.

Eight mounting holes, four on the bottom and two on each side, are provided for mounting the drive into an enclosure. The size and location of these holes are identical to industry standard floppy drives.

CAUTION: *The casting is very close to the frame mounting holes in some locations. Mounting screw lengths must be chosen such that no more than 0.125 inch of the screw is available to enter the frame mounting hole. The torque applied to the mounting screws must be between 9 and 12 inch pounds.*

7.0 STANDARDS AND REGULATIONS

The Maxtor XT-4000E Family disk drives satisfy the following standards and regulations:

UNDERWRITERS LABORATORIES (UL), United States safety; UL 478, Standard for Safety, Electronic Processing Units and Systems.

CANADIAN STANDARDS ASSOCIATION (CSA), Canadian safety; CSA C22.2 No. 220, 1986, Information Processing and Business Equipment (Consumer and Commercial Products).

VERBAND DEUTSCHER ELECTROTECHNIKER (VDE), German safety; VDE 0806/8.81, Safety of Office Appliances and Business Equipment.

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC), International safety commission; IEC 950 (formerly 380), Safety of Information Technology Equipment.

FEDERAL COMMUNICATIONS COMMISSION (FCC) is United States radiation emissions; Part 15, Subpart J, Class B Consumer Computing Devices.

CAUTION: *Connections between equipment must be made with shielded cables, and a shielded power cord must be used to connect AC power to the unit.*

8.0 OTHER MAXTOR PRODUCTS

- XT-1000/2000 Family, 85, 140, and 190 Megabyte, ST506.
- XT-4000S Family, 170 and 380 Megabyte, SCSI.
- XT-8000E Family, 380 and 760 Megabyte, ESDI.
- XT-8000S Family, 380 and 760 Megabyte, SCSI.
- RXT-800S Family, 800 Megabyte, WORM (with removable media), SCSI.
- LXT-100S Family, 50 and 100 Megabyte, (3.5") SCSI.
- LXT-200S Family, 200 Megabyte, (3.5") SCSI.
- Tahiti 1 Family, 650 Megabyte/1 Gigabyte (5.25", removable erasable optical), SCSI.

ESDI = Enhanced Small Device Interface
 SCSI = Small Computer System Interface
 WORM = Write Once, Read Multiple

9.0 FREQUENTLY ASKED QUESTIONS

Q. Do the jumper settings require modification from the ship configuration?

A. This depends upon your controller and/or requirements. The drive is currently being shipped in hard sector mode, at 580 bytes per sector, programmable through the interface.

In hard sector mode, the bytes per sector may be set via the interface (JP30 closed/jumpered), or via jumpers JP16 through JP29 (JP30 open/not jumpered).

Note: This jumper configuration is *vise versa* for drives with A.15 servo firmware.

The optimum bytes per sector will vary with different controllers and applications. Some experimentation may be required.

Other jumper configurations regarding number of heads and spinup control can be found within the OEM manual.

Q. Is the manufacturer's defect list (MDL) written on the drive, and if so, where?

A. Yes, it is written at maximum cylinder 1224 (1223 with 0 as a reference), maximum cylinder - 8 or 1216 (1215 with 0 as a reference), and the first sector of each surface/head, per ESDI specification.

XT-4000E Quick Reference Guide

Most AT bus ESDI controllers are not able to read the MDL. However, most minicomputer and mainframe ESDI controllers should have no problem reading the MDL.

- Q .** What controllers are compatible with the XT-4000E?
- A.** Any ESDI controller that is within ESDI specifications. The only incompatibility would be drive parameters supported. Technical phone support, at (408) 432-4710, can usually recommend a number of controllers for various applications.
- Q .** Within a PC AT environment, can the full capacity of the drive be utilized, and if so, how?
- A.** In most cases no, unless the AT's drive type table supports the full parameters of the drive. A utility to format and partition along with a device driver, such as SpeedStor, will be required otherwise.