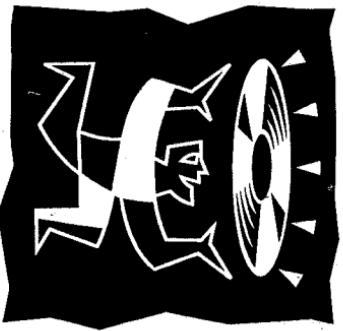


INSTALLATION AND USER'S GUIDE



# T6-5200

OPTICAL DISK DRIVE

**Maxoptix®**

DOCUMENT 2005830 REV. 1P

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Document 2005830 Rev. 1P. June 1998

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## Regulatory Approvals

C-UL

UL

TUV

CE

This Class 1 laser product conforms to the applicable requirements of 21 CFR 1040, IEC 825-1;1993, and EN 60825-1;1994. The wavelength of the laser is 680 nanometers and the maximum power output of the laser is 30 milliwatts.

MODEL NO. T6-5200  
+5V 2.0A +12V 2.0A      SERIAL NO.  
MANUFACTURED:  
MAXOPTIX CORPORATION  
3342 GATEWAY BLVD.  
FREMONT, CA 94538  
<http://www.maxoptix.com>

E9872207

Made in U.S.A.

**Maxoptix®**  
THIS PRODUCT COMPLIES WITH 21 CFR 1040  
CLASS 1 LASER PRODUCT  
LASER KLASSE 1  
APPAREIL A LASER DE CLASSE 1  
PRODUCT LASER DE CLASSE 1

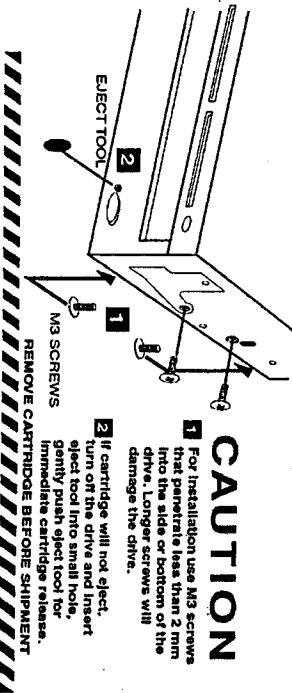
VORSICHT  
LÄSERSTRÄHL  
NICHT DEN STRAHL AUSSETZEN  
DANGER  
RAYON DU LASER EN CAS D'EXPOSITION  
EVITER TOUTE EXPOSITION AU RAYONNEMENT  
ADVARSEL  
ADVARSEL VED EKSPONASJE PÅ LASER STRÅLEN.  
SKJER IKKE PÅ LASER STRÅLEN.  
UNG LEJSE LASER STRÅLEN FOR STRÅLING.  
UNOG LEJSE LASER STRÅLEN FOR STRÅLING.



MADE IN U.S.A.

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRABLE OPERATION.

CAUTION  
For installation use M2 screws  
that penetrate less than 2 mm  
into the side or bottom of the  
drive. Longer screws will  
damage the drive.



This label is located on the top of the drive

## Compliance Information Statement

This device, trade name Maxopix, model number T6-5200, has been tested and complies with the limits for a Class A device pursuant to Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

The T6-5200 also complies with EC Directives 73/23/EEC Low Voltage and 89/336/EEC EMC.

Compliance of this drive as a system component was confirmed with a test system. We cannot guarantee that your system will comply. The drive is not meant for external use (without properly designed enclosure, shielded I/O cable, etc.)

**NOTE:** These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operations of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## 1 Product Summary

The Maxopix T6-5200 drive is a 5.25-inch, half-height optical data storage drive. It accepts removable, rewritable glass or plastic optical disk drive cartridges up to 5.2 GB. The drive interfaces with its host via a SCSI-2 interface. See Chapter 5 for detailed specifications of the T6-5200 drive and optical storage media.

### 1.1 Drive Features

Figures 1-1 and 1-2 show the features of the T6-5200 drive.

Figure 1-1. T6-5200 Drive Front View

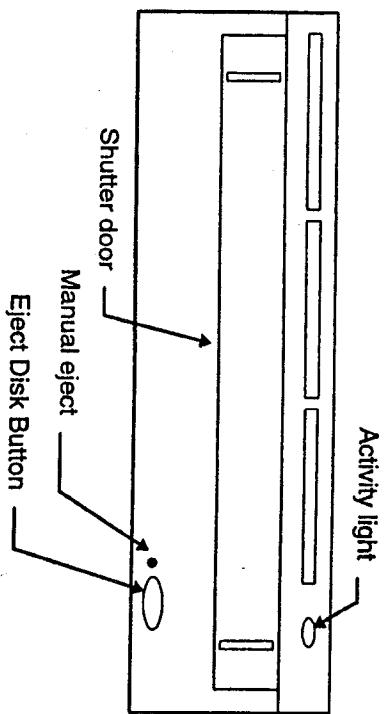
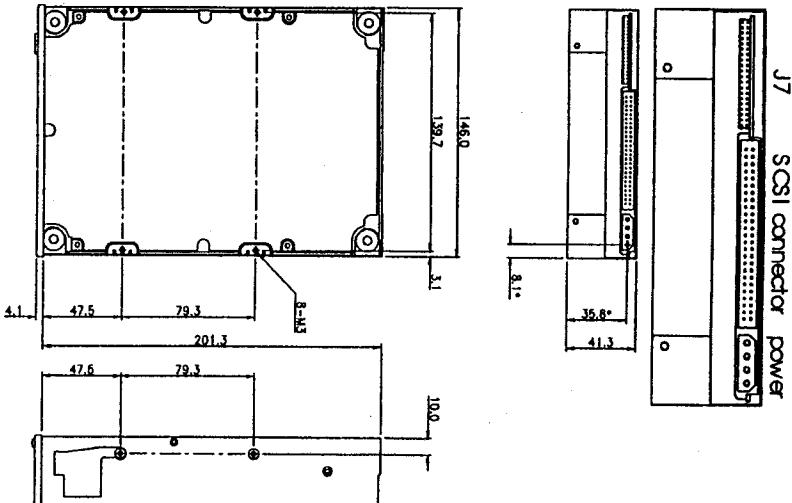


Figure 1-2. T6-5200 Drive - Rear View Details



- Because this product contains a semiconductor laser diode, observe the following precautions to avoid exposure to laser radiation. Visible laser radiation is present inside the drive assembly.
- Never remove any circuit board from the drive. The drive has NO user-serviceable parts.
- Do not use the drive without installing it in a chassis or enclosure. The drive is designed to operate only within a chassis or enclosure.
- The drive does not require user maintenance. If the drive does not operate properly, do not try to fix it yourself. Call your dealer, distributor, technical support representative, or Maxoptix Applications Engineering for service information.

## Sicherheitsvorschriften für Lasergeräte

**Warnung!** Nicht in das Laufwerk schauen oder einen Spiegel zum Hineinschauen benutzen. Der Laser kann zu Augenschäden führen.

Steuerungen, Einstellungen oder Verfahren, die nicht hier spezifiziert sind, können zu harmvoller Strahlenaussetzung führen.

Da dieses Gerät eine Klasse IIIB Halbleiter-Laserdiode enthält, müssen die folgenden Vorsichtsmaßnahmen befolgt werden, um eine Laserstrahlgefähr zu vermeiden. Innerhalb des Laufwerkes befinden sich unsichtbare Laserstrahlen.

- Nie die Schaltkarten vom Laufwerk entfernen. Das Laufwerk hat keine vom Anwender zu reparierbaren Teile.

- Das Laufwerk nicht verwenden, es sei denn es ist im Gehäuse oder in einer Abdeckung installiert.
- Das Laufwerk benötigt keine Wartung. Sollte das Laufwerk nicht sachgemäß funktionieren, so versuchen Sie nicht es zu reparieren. Bitte den Hersteller oder Maxoptix Kundendienst anrufen, um Informationen zu erhalten.

## Sicherheitshinweise

Bevor Sie mit der Konfigurierung und der Installation Ihres Laser-Plattenlaufwerkes beginnen, bitte die Verfahren und Sicherheitshinweise in diesem Handbuch beachten.

### 1.2 Safety Notices

Before you attempt to configure and install the drive, review the procedures and safety notes in this manual.

#### 1.2.1 Safety Precautions for Laser Equipment

**WARNING!** *Do not look inside the drive or use a mirror to look inside the drive. The laser can cause eye damage.*

*Controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.*

## 1.2.2 General Safety Guidelines

Pay special attention to and follow all the hazard warnings on the drive and in the manual. Failure to do so can cause injury to yourself or damage to the drive.

Do not perform any operation or action in any way other than as directed in this manual. When in doubt, contact Maxoptix for advice about the safety of a procedure.

Remember that the hazard warnings in this manual or on the drive cannot cover every possible case, as it is impossible to predict and evaluate all circumstances beforehand. **Be alert and use your common sense!**

## Allgemeine Sicherheitsvorschriften

Befolgen Sie besonders die Warnungshinweise auf dem Laufwerk und in dieser Gebrauchsanweisung. Ein Nichtbeachten kann zu Verletzungen oder Geräteschäden führen.

Bitte keine Arbeiten durchführen, die nicht in diesem Handbuch beschrieben sind. Falls im Zweifel, wenden Sie sich bitte an den Maxoptix Kundendienst, um Sicherheitstipps bezüglich des Verfahrens zu erhalten.

Bitte beachten Sie, daß die Warnungen in dieser Gebrauchsanweisung oder auf dem Laufwerk nicht unbedingt sämtliche möglichen Risiken erwähnen, da diese oft nicht voraussehbar sind. Seien Sie vorsichtig und gehen Sie mit Vernunft vor!

## Produktunterstützung

### Garantie

Maxoptix garantiert das T6-5200 optische Plattenlaufwerk gegen Materialschäden und Konstruktionschäden für einen Zeitraum von 24 Monaten für den Originalerwerber.

Maxoptix bietet Kundendienst-Zentren an, die sämtliche Maxoptix-Geräte reparieren oder erweitern. Fragen bitte an den Vertreiber oder Händler richten.

### 1.3.2 Product Support Information

For all product service and support information, customers in the United States may call the Maxoptix Product Information and Customer Service Line at 800 848-3092. From outside the United States, call +510 353-9700. European customers may call Maxoptix Europe Ltd in the United Kingdom at +44 1483 776 799.

The Maxoptix fax number for product support is +510 353-1845.

## Kundendienst-Informationen

Für Kundendienst oder Informationen sollten Kunden in den USA die Maxoptix Produktinformation unter der folgenden Nummer anrufen: 800 848-3092. Auserhalb der USA bitte die Nummer 510 353 9700 verwenden. Europäische Kunden können Maxoptix Europa in England unter 44 1483 776 799 erreichen. Die Maxoptix Faxnummer für Kundendienst ist 510 353 1845.

## 1.3 Product Support

### 1.3.1 Warranty

Maxoptix warrants the T6-5200 optical drive against defects in materials and workmanship for a period of 24 months for the original purchaser.

Maxoptix maintains Customer Service Centers for the repair or reconditioning of all Maxoptix products. Direct any questions about the warranty to your distributor or dealer.

## 2 Drive Configuration

Before installing the T6-5200 optical drive, set its jumpers to configure it for your system. Figure 1-2 shows the location of the address and options jumper block, J7, at the rear of the drive; and Figure 2-1, below, shows the section numbers of J7:

*Figure 2-1. J7 Section Numbers*

2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

1    3    5    7    9    11    13    15    17    19    21    23    25    27    29    31    33    35    37    39

### 2.1 Pin assignments J7

PIN NUMBER	DESCRIPTION	DEFAULT
1	GND	
2	SCSI ID Bit Zero	OFF
3	GND	
4	SCSI ID Bit One	ON
5	GND	
6	SCSI ID Bit Two	ON
7	GND	
8	Dec VAX Mode	OFF
9	GND	
10	Auto Spin Up *	OFF
11	GND	
12	SCSI Bus Parity *	OFF
13	GND	
14	Apple® Macintosh™ Mode **	OFF
15	GND	
16	Removable Media Report *	OFF
17	GND	
18	Peripheral Device Type	OFF

PIN NUMBER	DESCRIPTION	DEFAULT	SCSI ID	JUMPER BIT 0	JUMPER BIT 1	JUMPER BIT 2
19	GND		0	OUT	OUT	OUT
20	Force Write With Verify **	OFF	1	IN	OUT	OUT
21	GND		2	OUT	IN	OUT
22	Write Cache *	OFF	3	IN	IN	OUT
23	GND		4	OUT	OUT	IN
24	Read Cache *	OFF	5	IN	OUT	IN
25	GND		6	OUT	IN	IN
26	Active Termination **	ON	7	IN	IN	IN
27	GND					
28	Drive Supplied Term Power	ON				
29	GND					
30	SCSI Bus Supplied Term Power	ON				
31	AC Eject	—				
32	LED Pipe	—				
33	PwrDnReq	—				
34	PwrDnAck	—				
35	AC Error	—				
36	Cart_In_Drive	—				
37	AC Reset	—				
38	Cart_Loaded	—				
39	GND	—				
40	Stand Alone/AC	OFF				

\* Install jumper to disable, \*\* Install jumper to enable

Table 2-1. Pin Assignments J7

The SCSI device ID is set with jumper bits zero through two (J7 Pin 1 - J7 Pin 6).

See Table 2-2, SCSI Device ID Jumper Settings.

Jumper Bit 0 means J7 Pin 1 and 2 - JUMPER is IN.

Jumper Bit 1 means J7 Pin 3 and 4 - JUMPER is IN.

Jumper Bit 2 means J7 Pin 5 and 6 - JUMPER is IN.

SCSI ID	JUMPER BIT 0	JUMPER BIT 1	JUMPER BIT 2
0	OUT	OUT	OUT
1	IN	OUT	OUT
2	OUT	IN	OUT
3	IN	IN	OUT
4	OUT	OUT	IN
5	IN	OUT	IN
6	OUT	IN	IN
7	IN	IN	IN

Table 2-2. SCSI Device ID Jumper Settings

To connect the T6-5200 to a DEC MicroVAX computer, jumper J7 Pin 7-8 must be installed. This jumper allows the initiator to change the EEC bit in MODE SELECT Page Code 01h and changes the default values in MODE SENSE Page Code 01h. Refer to MODE SELECT/SENSE Page Code 01h.

When the jumper is installed, J7 Pin 9-10 disables the automatic media spin-up feature. In this case, a START command must be received to spin up the media. When installed, J7 Pin 11-12 disables SCSI bus parity checking, although parity is always generated. The factory default is J7 Pin 7-8 removed.

To connect the T6-5200 to an older Apple Macintosh computer (SE models), jumper J7 Pin 13-14 must be shorted. This jumper will disable the reporting of UNIT ATTENTION for Power On or Reset (Sense Key 06 and Sense Code 29). It will also disable the reporting of BUSY STATUS during internal testing such as power-up diagnostics.

J7 Pin 15-16 selects the Removable Media Bit (RMB) with the INQUIRY data. When this jumper is removed, the removable media bit is set to one in the INQUIRY data and media removal is allowed. When the jumper is installed, the removable media bit is zero in the INQUIRY data.

J7 Pin 17-18 selects the "Peripheral Device Type" that the drive reports with the INQUIRY data. When this jumper is left open, byte zero of the INQUIRY data block is set to 07h (optical storage device). When this jumper is installed, byte zero of the INQUIRY data block is set to 00h (direct-access device).

When J7 Pin 19-20 is installed, the drive will verify the write data in response to a WRITE command (0Ah, 2Ah, and AAh).

To disable the Write Cache option, install J7 Pin 21-22. Refer to Table 2-3, Read/Write Cache Option Jumpers. Also refer to Page Code 08h of the MODE SELECT/SENSE.

To disable the Read Cache option, install J7 Pin 23-24. See Table 2-3, Read/Write Cache Option Jumpers. Refer to MODE SELECT/SENSE Page Code 08h.

J7 Pin 21-22	J7 Pin 23-24	Write cache	Read cache
IN	IN	OFF	OFF
OUT	OUT	OFF	ON
OUT	IN	*	*
	OUT	ON	ON

\* Enable secondary APC Mode.

Table 2-3. Read/Write Cache Option Jumpers

### 2.2.1 APC Summary

APC Stands for *Automatic Power Control*. It is the way the drive keeps itself calibrated and quite literally, on track. Our drive will periodically perform an alignment intended to compensate for the slight shift in the position of the tracks due to heat expansion and also to adjust the intensity and focus of the laser. This process is analogous to the *Thermal Recalibration* cycle.

The T6-5200 drive has two modes of APC operation. The default or Primary method is to perform an APC 30 seconds after power has been applied to the unit or immediately before the first write (0Ah, 2Ah) command - whichever occurs first. After the first set of APC cycles, it is performed regularly at 30 minutes intervals. Primary APC is non-interruptible, and is also the default factory setting for the drive.

Secondary APC mode works like Primary mode except that if a SCSI command is issued during an APC cycle the drive will interrupt APC and postpone it until the unit has finished processing all other commands. Secondary APC is particularly well-suited for AV applications which require uninterrupted streams of data for long periods of time.

For day to day applications, Primary APC mode is preferred, since the veracity of alignment is checked on a regular basis. Only customers using the drive for demanding AV applications should make use of Secondary APC mode.

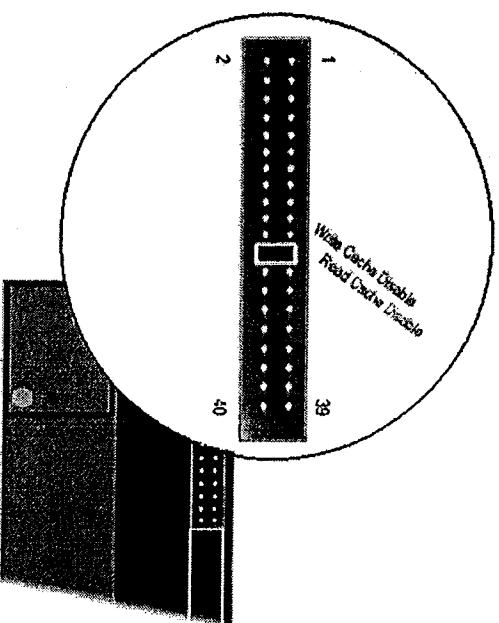
**Note:** In order to use Secondary APC mode, you must have a firmware version of A6.3 or above.

### 2.2.2 Secondary APC Jumper Settings

To enable Secondary APC mode, set Write Cache on and Read Cache off. Since this configurations is normally invalid, it has the effect of setting the drive to secondary APC mode. Accomplish this by installing a jumper at J7 Pin 23 - 24 (Read-Cache) while leaving the J7 Pin 21-22 (Write-Cache) open - as show in Figure 2-2.

**Note:** This configuration does not disable read-caching. Write Caching cannot be used if Read Cache is not enabled as well. Write Caching on / Read Caching off sets APC to the Secondary mode.

Figure 2-2. Jumper Settings for Secondary APC Mode



## 2.3 Power for SCSI Bus Terminator

Jumper J7 Pin 27-28 selects the power source for the SCSI bus active terminator.

When J7 Pin 27-28 is installed, termination power is provided by the T6-5200.

When J7 Pin 27-28 is removed, the drive does not supply any termination power.

When J7 Pin 29-30 is installed, termination power is provided by the SCSI bus. With J7 Pin 29-30 is removed, the termination is not supplied by the SCSI bus.

The factory default is J7 Pin 27-28 and J7 Pin 29-30 installed.

In multiple SCSI device applications, only the device at the end of the daisy chain cable should be terminated. The termination power is typically supplied by the initiator via TERMPWR (Pin 26 of the SCSI cable). This ensures that the SCSI bus is properly terminated, even when the power source for the drive is switched off.

When only one SCSI device is attached to the initiator system, it is acceptable to derive terminator power from the SCSI device's (T6-5200) power source. This power source may be used to:

- Supply power to the internal terminators only (J7 Pin 27-30 installed, J7 Pin 29-30 removed)

Supply power to TERMPWR to provide power to the terminators at the opposite end of the cable as well as to the internal terminators (J7 Pin 27-28 installed, J7 Pin 29-30 installed) (factory default setting)

Power to the internal terminators may also be supplied by another source on the SCSI bus (J7 Pin 27-28 removed and J7 Pin 29-30 installed).

To disable the active termination, remove a jumper to J7 Pin 25-26. To enable the active termination, install J7 Pin 25-26.

## 2.4 Autochanger Connector

(Jumper block J7 Pin 31-40)

PIN. NO.	SIGNAL	DESCRIPTION
31	AC Eject	Instructs the drive to eject the media. Asserted active low by the autochanger and pulled up to 5 volts by the drive.
32	LED Pipe	Drives the drive's front panel LED. Regular TTL active high signal.
33	PwrDnReq	Indicates that data in the write buffer will be transferred to the disk immediately. Active low TTL signal.
34	PwrDnAck	Response to a PwrDnReq after the data in the write buffer has been written to the disk. Active low TTL signal.
35	AC Error	Indicates a mechanical error was detected within the drive. Drive is not able to load or eject medium due to a hardware error. Drive active low by the drive and should be pulled up to 5 volts by the autochanger.
36	Cart_In_Drive	Indicates whether a cartridge exists in the drive loader mechanism. Cartridge may or may not be loaded onto the spindle. Driven active low by the drive and pulled up to 5 volts by the autochanger.
37	AC Reset	Instructs the drive to perform a hard reset and update the SCSI jumper status. Has the same meaning as the SCSI bus hard reset defined by the SCSI bus specification and has the same timing constraint as in the SCSI specification. Driven low by the autochanger and is pulled up to 5 volts by the drive.
38	Cart_Loaded	Indicates a cartridge is loaded onto the drive spindle and spinning. Driven active low by the drive and pulled up to 5 volts by the autochanger.
39	GND	Ground.
40	Stand Alone/AC	Indicates to the drive whether it is operating inside an autochanger environment. High = stand alone. Low = autochanger. Connected to ground within the autochanger and pulled up to 5 volts by the drive.

Table 2-4. Autochanger Connector Pin Assignments

## 3 Drive Installation

The following procedures are for trained system integrators and service personnel. Details of system access are omitted, due to the wide range of possible installations available for the T6-5200 drive.

### Installation des Laufwerkes

Die folgenden Verfahren sind für ausgebildetes Personal oder Kundendienst gedacht. Einzelheiten werden nicht geliefert, da es zu viele verschiedene Installationsmöglichkeiten für den T6-5200 gibt.

### 3.1 Installation Precautions

Observe these precautions during installation of the T6-5200 drive:

1. Do not allow static discharge to the drive.
2. Install the drive at room temperature.
3. Do not drop or shock the drive.
4. Avoid exposure of the drive and the media to magnetic fields.
5. Avoid dusty or dirty environments.
6. The T6-5200 requires proper software drivers for installation into systems. Use of software or hardware not designed for the drive could damage the drive, system, or destroy the data.

### Vorsichtsmaßnahmen bei der Installation

Diese Vorsichtsmaßnahmen während der Installation des T6-5200 Laufwerkes beachten:

1. Keine statische Entladung am Laufwerk zulassen.
2. Das Laufwerk bei Zimmertemperatur installieren.
3. Das Laufwerk nicht fallenlassen oder anschlagen.
4. Das Laufwerk und die Media keinen magnetischen Feldern aussetzen.
5. Eine schmutzige oder staubige Umgebung vermeiden.
6. Das T6-5200 muss zur Installation mit den sachgemäßen Softwaretreibern ausgestattet werden. Ein Gebrauch von Hardware oder Software, die nicht für dieses Plattenlaufwerk bestimmt ist, kann zu Schäden am Laufwerk, System, oder zu Datenverlust führen.

## 3.2 Unpacking

Rapid temperature changes may cause condensation in the drive. Before unpacking, permit the packed T6-5200 drive to gradually come to room temperature for approximately one full day. Avoid a temperature gradient greater than 5 degrees Centigrade per hour.

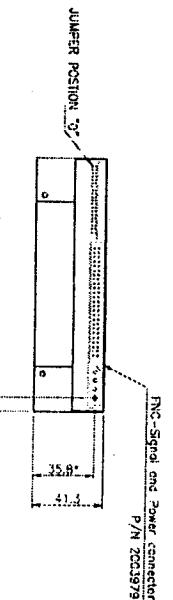
Unpack the T6-5200 drive carefully, observing standard anti-shock and anti-static precautions. Hold the drive by its frame when you remove it from its packing. Place it on a cushioned, anti-static surface.

- Inspect the drive for damage due to shipment.
- Save the packing materials in case you ever need to ship the drive.

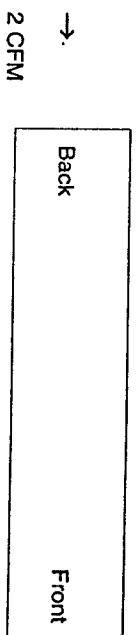
## 3.3 Planning a Drive Enclosure

Check your intended drive host to ensure that its dimensions are appropriate for the T6-5200 drive. Figure 3-1 shows the dimensions required by the T6-5200 drive for installation.

*Figure 3-1. Installation Dimensions (Dimensions are in millimeters  $\pm 0.5\text{mm}$ )*



### Side view of T6-5200

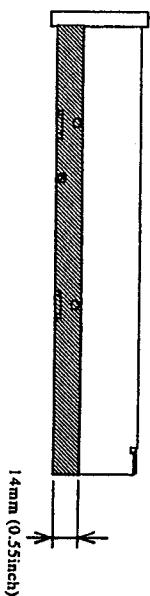


Install the drive only in a horizontal or a vertical position.

## 3.4 Mounting the Drive

1. After you unpack and inspect the drive, set its jumpers to configure it for your system requirements. See Chapter 2 for information about jumper settings.
2. Secure the drive in a mounting bay or bracket using screws through the mounting holes in the drive. Four threaded holes are available at the bottom of the drive, and the two on each side of the drive.

*Figure 3-5. Drive Mounting Region*



Keep more than 5 mm (0.2 inches) of space around all sides of the drive to avoid heat build up. Also design the structure so that air will flow freely around the drive and the drive will not be affected by other heat generating components.

Select a cooling fan that is ample to cool the drive, power supply, and any other devices in the system. The required airflow volume is dependent on the air flow direction and the heat generated by other devices. However, airflow volume should be more than  $0.06 \text{ m}^3/\text{min}$  (2.1 CFM). The air flow around the drive must be sufficient to cool the IC chips on the PCB. Figure 3-2 shows an example system design.

*Figure 3-2. Suggested Cooling System*

Avoid mounting the drive in a bracket or a housing that applies pressure outside the shaded area. Pressure can cause damage to the cover and internal parts of the drive.

## **IMPORTANT! The maximum penetration length of the screw must be 2 mm (.08 inches) or less from the surface of the chassis. Damage will occur to the drive if the penetration length is more than 2 mm.**

### **Use only M3 size screws.**

- When the drive is securely mounted, plug a cable from the SCSI host into SCSI bus connector J1. Plug a cable from a power supply into the power connector.

## **3.5 Jumper Extension Cables**

The following table shows the recommended connector and cable to extend the SCSI address and options pins of jumper connector J7. If you are mounting the drive in a cabinet. See sections 2.1 and 2.2 for details about jumper J7.

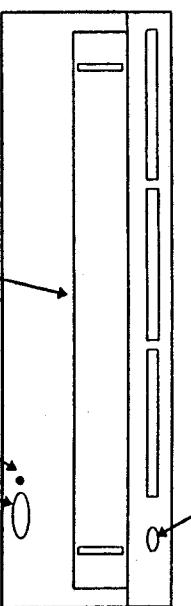
<b>Recommended Cable</b>	<b>Recommended Connector</b>
AWG# 2630 Outside diameter of coating: 0.65 to 1.0mm	Dual row 2.0 mm pitch - Molex 51110-3050 30 pin or equivalent

*Table 3-1. Jumper extension cable / connector*

# **4 Use and Maintenance**

## **4.1 Drive Controls**

*Figure 4-1. Drive Switch and LED*



### **Eject button:**

Pressing this button causes the disk to stop spinning and then eject the cartridge. This button has no function while the Prevent Media Removal command from the host is in effect, or if a command from the host is being executed.

### **Activity light:** Shown below are the operating states indicated by the LED:

<b>Red flickering</b>	The drive detected a Self Diagnostic (CUDG) error. A detailed list of error codes is provided in Chapter 5.
<b>Green on</b>	The drive is being powered up, the drive is reading data.
<b>Green flickering</b>	The drive is executing a command.
<b>Orange on</b>	The drive holds write data in the buffer memory.
<b>Orange flickering</b>	The drive is executing a command and holds write data in the buffer memory or performing an internal calibration.
<b>Off</b>	The drive is not ready.

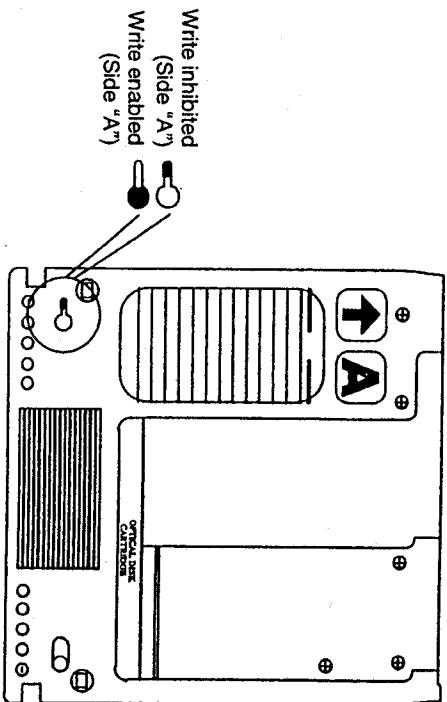
## 4.2 Operating the Drive

1. The drive has no integrated power switch. It turns on when it receives power from its power source.
2. The drive executes a power-on self diagnostic test for about 6 seconds before it accepts an inserted media cartridge.
3. Media is automatically mounted upon insertion.
4. Pull an ejected media cartridge out of the drive before reinserting it.
5. Before switching off the drive power source, eject the media cartridge.

## 4.3 Using Optical Media

Figure 4-2 shows the locations of the write-protection switch on the optical media cartridge.

*Figure 4-2. Drive Write-Protection Switch*



Observe these precautions when handling and storing optical media cartridges:

1. Keep cartridges free from dust or dirt. Check the media periodically and clean it when necessary. Cartridge cleaning kits are available from Maxoppix.
2. Keep cartridges free from moisture. Do not allow condensation on or in the optical disk cartridge. Do not put cartridges in a damp place or by an air conditioner.
3. Do not expose cartridges to direct sunlight or place them near a heat source.

## 4.4 Caring for the Drive

To maintain drive performance, observe these precautions:

1. Remove all media before moving the drive.
  2. Avoid a dirty or dusty environment. Maintain the environmental specifications (temperature, humidity, etc.) shown in section 5.9.
  3. Do not use non-standard, non-specified, or non-approved media in the drive. Do not use damaged cartridges.
  4. Do not stick objects into the drive (screwdrivers, etc.). Objects can damage internal mechanisms mechanically or through static discharge.
  5. Do not turn the drive on or off during cartridge loading or ejection.
  6. Do not move, bump, or shock the drive during operation.
- If the drive emits noises or vibrations, immediately eject the media and turn off the power to the drive.

# 5 Technical Specifications

## 5.1 Performance Specifications

	5.2 GB (8X) FORMAT
CAPACITY, ON LINE*	512 BPS 4.1 GB 1,024 BPS 4.8 GB 2,048 BPS 5.2 GB
ROTATIONAL SPEED *	2942 rpm
SPINDLE SEQUENCE UP/DOWN TIME (typical) **	3.5 / 1.9 sec
PLASTIC DISK	
SEEK TIME (Average) **	20 msec
LATENCY (Average)	10.2 msec
TRANSFER RATE FROM/TO DISK	22.8 - 47.28 Mbytes/sec
AT SCSI (Async), Maximum	10 Mbytes/sec
AT SCSI (Fast Sync), Maximum	20 Mbytes/sec

\* Time includes carriage motion and settling

\*\* Plastic disk. Time includes cartridge load/eject cycle

### Note:

Loading time includes spin-up time. Loading time is defined as the time in which the START/STOP UNIT command, using polycarbonate medium, takes to execute. But, in the case of immediate loading after power on, the drive must perform a self diagnosis of about 6 seconds. If the optical disk cartridge is inserted during self diagnosis, the loading time will be delayed until the self diagnosis is complete.

# Technische Spezifikationen

## Leistungsdaten

	<b>5.2 GB (8X) FORMAT</b>
<b>Kapazität, ON LINE*</b>	512 BPS      4.1 GB
	1.024 BPS      4.8 GB
	2.048 BPS      5.2 GB
<b>Rotationsgeschwindigkeit *</b>	2942 rpm
<b>Spindelsequenz</b>	3.5 / 1.9 sec
<b>Nutzzeit/Ausfallzeit (typisch) **</b>	
<b>Plastikdiskette</b>	
<b>Positionierzeit (Durchschnitt) **</b>	20 msec
<b>Wartezeit</b>	10.2 msec
<b>Übertragungszeit</b>	22.8 - 47.28 Mbits/sec
<b>Von/zur Disk</b>	
<b>AT SCSI (Async), Maximum</b>	10 Mbytes/sec
<b>AT SCSI (Fast Sync), Maximum</b>	20 Mbytes/sec

\* Zeit einschliesslich Rücklauf und Einstellzeit

\*\* Plastikdiskette: Zeit einschliesslich Kassetteneingabe/ Ausgabe.

### Hinweis:

Die Laudezeit ist einschliesslich der Spinnzeit: Laudezeit ist die Zeit, die die Start/Stop Einheit im Gebrauch des Polykarbonats benötigt. Im Falle eines sofortigen Ladens nach dem Einschalten, führt das Laufwerk für 6 Sekunden einen Selbsttest durch. Wird die optische Kassette während des Selbsttests eingeschoben, so wird sich die Laudezeit etwas verzögern, bis der Test beendet ist.

## 5.2 Optical Disk Media

Disk size 5.25-inches (130 mm)

Sensitive layer Rare earth transition metal alloy

Disk structure Bonded sandwich glass or plastic

Archival life Lifetime warranty for glass or plastic

Write method Magneto-optical

Media types RW: Rewritable

WO: Write Once

WO: Direct Over Write (LIMDOW)

## 5.3 Error Conditions

ERROR	COLOR 1	COLOR 2	COLOR 3	COLOR 4
RAM TEST FAILURE	ORANGE	ORANGE	ORANGE	ORANGE
SCSI RESET ALWAYS ASSERTED (SEE TERMINATION PROBE)	ORANGE	ORANGE	ORANGE	GREEN
DSP WATCHDOG TIMER FAILURE	ORANGE	ORANGE	GREEN	ORANGE
MICROCODE CHECKSUM FAILURE	ORANGE	ORANGE	GREEN	GREEN
SCSI CHIP TEST FAILURE	ORANGE	GREEN	ORANGE	ORANGE
ENDEC CHIP TEST FAILURE	ORANGE	GREEN	ORANGE	GREEN
POWER SUPPLY FAULT	ORANGE	GREEN	GREEN	ORANGE
OVER TEMPERATURE FAULT	ORANGE	GREEN	GREEN	GREEN
DISK BUFFER TEST FAILURE	GREEN	ORANGE	ORANGE	ORANGE
DSP ROM CHECKSUM FAILURE	GREEN	ORANGE	ORANGE	GREEN
DSP RAM R/W TEST FAILURE	GREEN	ORANGE	GREEN	ORANGE
INVALID VALUES FOUND IN NON-VOLATILE MEMORY	GREEN	ORANGE	GREEN	GREEN
LOADER FAILURE OR EJECT FAULT	GREEN	GREEN	ORANGE	ORANGE
SPIN-UP OR SPIN-DOWN FAULT	GREEN	GREEN	ORANGE	GREEN

### LED Flashing Sequence

RED	off	COLOR 1	off	COLOR 2	off	COLOR 3	off	COLOR 4	off

## 5.4 Physical Specifications

HEIGHT	4.13 cm
WIDTH	14.61 cm
DEPTH	20.32 cm
DISK DIAMETER	130 mm
WEIGHT	1.5 kg
SHIPPING WEIGHT	2.0 kg

## Physikalische Dimensionen

Höhe	4.13 cm
Breite	14.61 cm
Tiefe	20.32 cm
Disketten-Umfang	130 mm
Gewicht	1.5 kg
Versandgewicht	2.0 kg

## 5.5 Reliability Specifications

MTBF	More than 200,000 hours
MTTR	15 min
PM	Not Required
DRIVE DESIGN LIFE	5 Years
ARCHIVAL LIFE	5 Years (unrecorded)
TO SPECIFIED ERROR RATES	10 Years (recorded)

## DC Leistungsbedarf

Nennspannung	+12 V DC	+5 V DC
Regulierung	±5%	±5%
Strom (typisch)	1.0 A	1.75 A
Strom (maximal)	2.0 A	2.0 A
Ripple (Maximal, P-P)	120 mV	50 mV

**Vorsicht:** Gleichstrom zum PCB sollte extern von zu starken Strom geschützt werden; ein interner Schutz ist nicht vorhanden

## 5.7 Error Rates

RECOVERABLE ERRORS	Less than 10 per 10 <sup>5</sup> Bits Read
UNRECOVERABLE ERRORS	Less than 10 per 10 <sup>13</sup> Bits Read
SEEK ERRORS	Less than 10 per 10 <sup>7</sup> SEEKS
ERROR CORRECTION CAPABILITY (at 1,024/512 bytes/sector)	Up to 80/40 Bytes
ERROR DETECTION CAPABILITY (at 1,024/512 bytes/sector)	160/80 Bytes
PROBABILITY OF MISCORRECTED DATA	8.0 x 10 <sup>-23</sup>

## 5.6 DC Power Requirements

VOLTAGE (nominal)	+12 V DC	+5 V DC
REGULATION	±5%	±5%
CURRENT (Typical)	1.0 A	1.75 A
CURRENT (Maximum)*	2.0 A	2.0 A
RIPPLE (Maximum, P-P)	120 mV	50 mV

\*At Sequence Up

**CAUTION:** DC power into the PCB should be externally protected from excessive current; no internal protection is provided.

## 5.8 Disk Drive Environmental Specifications

EQUIPMENT OPERATING	EQUIPMENT NONOPERATING	EQUIPMENT OPERATING	EQUIPMENT NONOPERATING
AMBIENT TEMPERATURE	+5°C to +50°C	-40°C to 70°C	-20°C to 55°C (Short Term) -20°C to 40°C (For Archival Storage)
MAXIMUM TEMPERATURE	10°C/hr 18°F/hr	10°C/hr 18°F/hr	
RELATIVE HUMIDITY	8% to 80% Noncondensing	5% to 90% Noncondensing	5% to 90% Noncondensing
MAXIMUM WET BULB			
ELEVATION	30°C -300 m to 3000 m (-1,000 ft to 10,000 ft)	30°C -300 m to 12,000 m (-1,000 ft to 40,000 ft)	-300 m to 12,000 m (-1,000 ft to 40,000 ft)
VIBRATION (inputs to frame of drive, all axes)	5-25 Hz, 0.016 in P-P 5-25 Hz, 0.5 G Peak	5-31 Hz, 0.021 in P-P 31-500 Hz, 1G Peak Acceleration	4,000 A/M (50 Oe) or less
SHOCK (inputs to frame of drive)	3 msec Pulse Width (1/2 sine) 35 G	11 msec Pulse Width (1/2 sine) 50 G	4,000 A/M (50 Oe) or less

## Umweltbedingungen für das Plattenlaufwerk

GERÄT IN BETRIEB	AUSSER BETRIEB	GERÄT IN BETRIEB	AUSSER BETRIEB
UMGEBUNGSTEMPERATUR	+5 bis +50 °C	-40°C bis 70°C	-20°C bis 55°C (kunstzügig)
MAXIMALER TEMPERATURGRADIENT	10°C/hr 18°F/hr	10°C/hr 18°F/hr	-20°C bis 40°C (Lagerung in Archiv)
RELATIVE LUFTFEUCHTIGKEIT	8% bis 80% nicht-kondensierend	5% bis 90% nicht-kondensierend	5% bis 90% nicht-kondensierend
MAX. AM FEUCHTHERMOMETER	30°C	30°C	29°C (leucht)
HÖHE	-300 m bis 3000 m	-300 m bis 3000 m	-300 m bis 12,000 m
VIBRATION (IN DEN LAUFWERKKRÄHMEN, ALLE AXEN)	5-25 Hz, 0.016 in P-P 25-500 Hz, 0.5 G Höchstbeschleunigung	5-31Hz, 0.021 in P-P 31-500 Hz, 1 G Höchstbeschleunigung	4,000 A/M (50 Oe) oder weniger
SCHOCK (AM LAUFWERK)	3 msec Impulsbreite (1/2 sinus) 35 G	11 msec Impulsbreite (1/2 sinus) 50 G	Klasse 3M Klasse 3M

## 5.10 SCSI Interface

### 5.10.1 Cable Connections

Recommended SCSI interface cable (controller to drive):

Flat ribbon or twisted pair (1.27mm pitch, AWG# 28, 50-core) maximum length 6 meters.

Recommended connectors:

3M No.3425-6500S No.3448-3050J (strain relief)

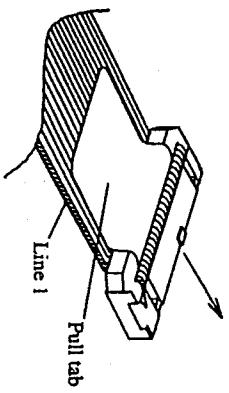
3M No.3425-6550EC (including strain relief)

Fujitsu FCN-607B050-G/O or equivalent

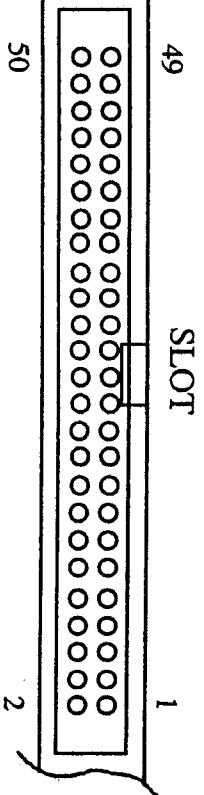
3M No.J3490-5 (pull tab) or equivalent

**Notes:**

1. In case of multiple connections of SCSI devices, maintain total length of SCSI cable within maximum cable length range.
2. Pin-outs and signal specifications conform to ANSI SCSI-2 Specification X3T9.2/86-109 REV10H.

*Figure 5-2 SCSI Cable & Connector***Notes:**

1. Both ends of the SCSI bus require terminators.
2. Do not mix single-ended and differential devices on the same SCSI bus.

**5.10.2 Connector Pin-Outs***Figure 5-3 T6-5200 SCSI Connector*

**Note:** The slot at the center of the odd-number pin side of the connector protects against inserting the connector wrong. Maxoptix recommends a mating cable connector with a tab at this position to protect against wrong insertion.

*Single-Ended SCSI Signal Names*

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	2	DB 0-N
3	GND	4	DB 1-N
5	GND	6	DB 2-N
7	GND	8	DB 3-N
9	GND	10	DB 4-N
11	GND	12	DB S-N
13	GND	14	DB 6-N
15	GND	16	DB 7-N
17	GND	18	DB P-N
19	GND	20	GND
21	GND	22	GND
23	OPEN	24	OPEN
25	OPEN	26	TERM PWR
27	OPEN	28	OPEN
29	GND	30	GND
31	GND	32	ATN-N
33	GND	34	GND
35	GND	36	BSY-N
37	GND	38	ACK-N
39	GND	40	RST-N
41	GND	42	MSG-N

*Single-Ended SCSI Signal Names (continued)*

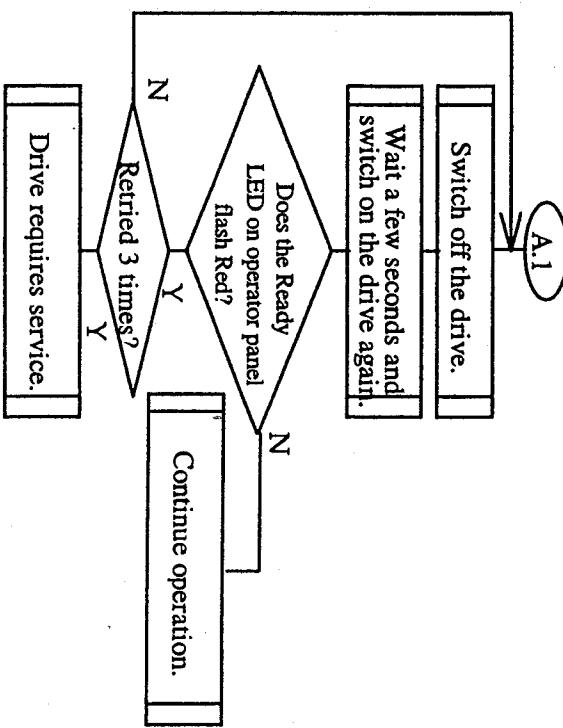
Pin No.	Signal Name	Pin No.	Signal Name
43	GND	44	SEL-N
45	GND	46	C/D-N
47	GND	48	REQ-N
49	GND	50	I/O-N

## Appendix A Troubleshooting

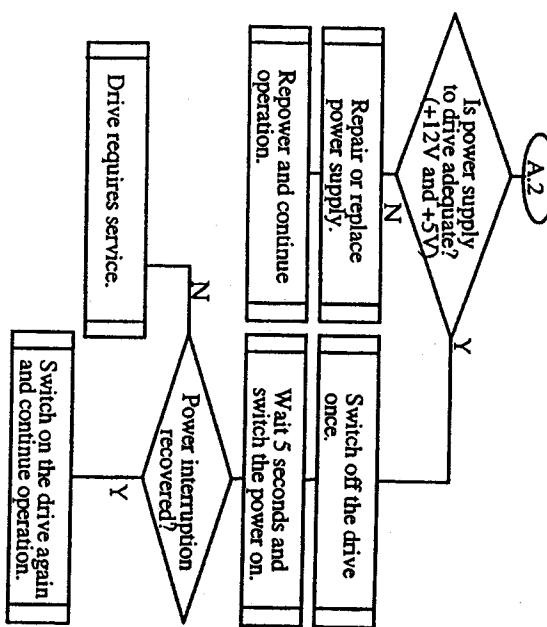
Before you begin troubleshooting, check the following items:

1. Move the drive to a different system to identify whether the trouble is caused by the drive or the system.
  2. Check the SCSI connector, SCSI cable length, terminator resistance, and terminator power.
  3. Check the SCSI address for conflict with other SCSI devices.
  4. Change the cartridge and try the same operation.
- If the troubleshooting techniques in the following sections cannot recover the drive, return it for repair with a failure description and error code(s).

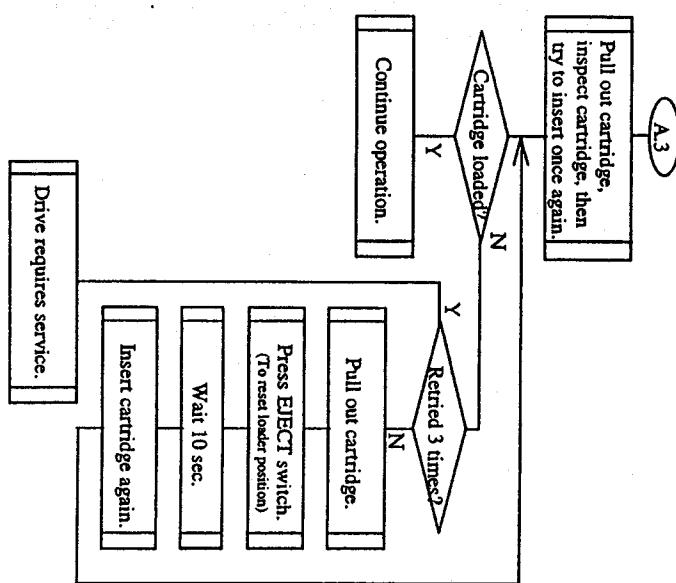
### A.1 Ready LED Error Flashing



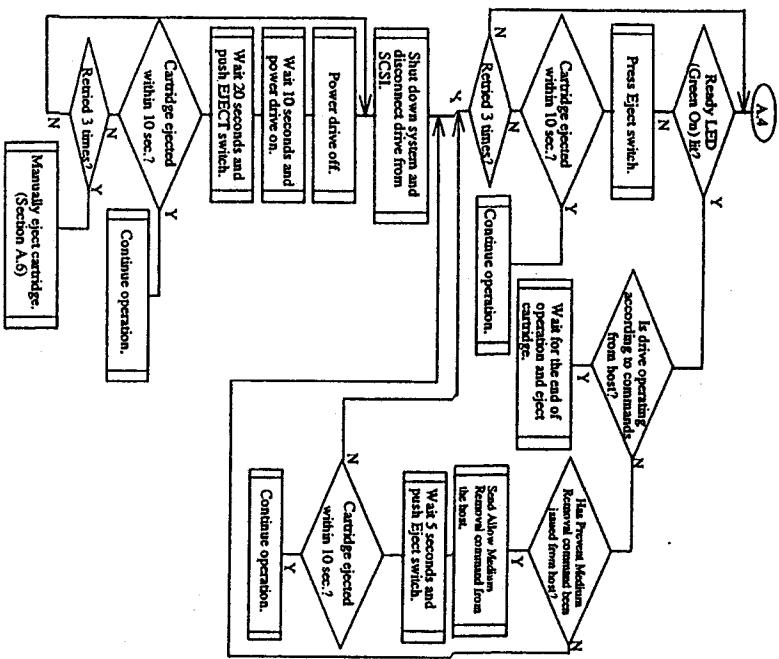
## A.2 Power Failure



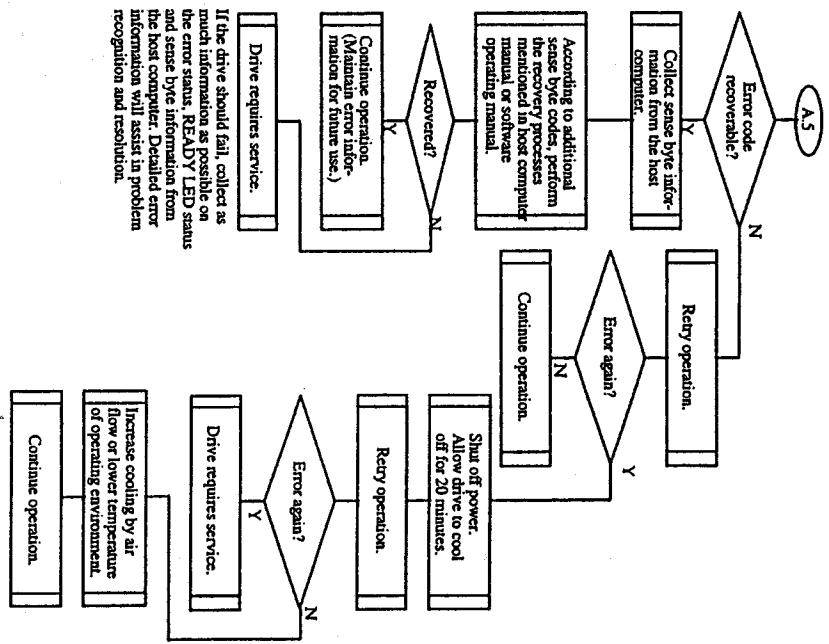
## A.3 Cartridge Load Failure



## A.4 Cartridge Eject Failure



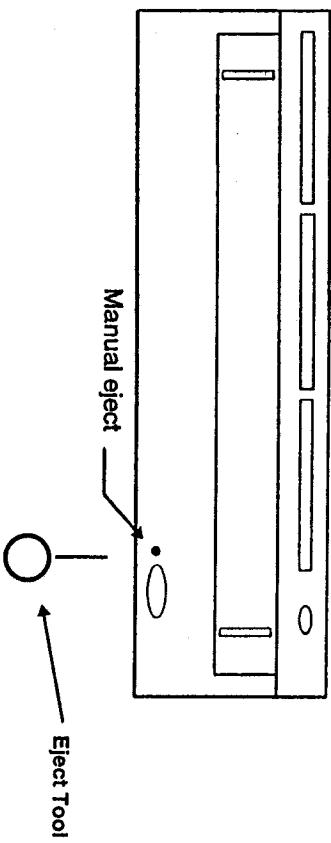
## A.5 SCSI Errors



## A.6 Manual Cartridge Removal

If you cannot remove a media cartridge from the drive, this manual method may help.

1. Turn off power to the drive.
2. Using the eject tool supplied with the drive, push the straight end of the tool into the cartridge eject hole.
3. You will feel resistance when the tool is inserted about 3/8-inch.
4. Continue pushing the tool into the hole until the disk ejects; the tool will be approximately one inch into the drive at this point. Remove the eject tool.
5. Inspect the disk cartridge for damage and replace it if needed.



## A.7 Media Compatibility

Your T6-5200 is compatible with the following major MO media formats. The following table lists these media with the drive's capability for each specific format.

Media Type	Maxoptix Part #	Media Size	Sector size	Capabilities
MO	2005760RW	5.2 GB	2048 B/S	Read & Write
	2005761RW	4.8 GB	1024 B/S	Read & Write
	2005762RW	4.1 GB	512 B/S	Read & Write
	3015385RW	2.6 GB	1024 B/S	Read & Write
	3015383RW	2.3 GB	512 B/S	Read & Write
	2015385RW	1.3 GB	1024 B/S	Read & Write
	2015383RW	1.2 GB	512 B/S	Read & Write
	1015389RW	1.0 GB	1024 B/S	Read & Write
	1015387RW	900 MB	512 B/S	Read & Write
	1015385RW	650 MB	1024 B/S	Read & Write
	1015383RW	600 MB	512 B/S	Read & Write
	3015385CW	2.6 GB	1024 B/S	Write Once
	3015383CW	2.3 GB	512 B/S	Write Once
	2015385CW	1.3 GB	1024 B/S	Write Once
LIMDOW	2015383CW	1.2 GB	512 B/S	Write Once
	3015385OW	2.6 MB	1024 B/S	Direct Over Write
	3015383OW	2.3 GB	512 B/S	Direct Over Write