Dansk Data Elektronik A/S

Technical Data Sheet

Part 2

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NOTICE

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SECTION 2.0

DDE Data Sheet for Winchester Disk Drives. WD 1 REV. 0

MANUFACTURER: ATASI TYPE: 3046

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:
+5 VDC +- 5 pct., 1.0 Amp typ.
+12 VDC +- 5 pct., 2.5 Amp typ. Starting current 4.5 A typ.

Operating temperature range: 10 to 50 deg. celsius.

CAPACITY:

Unformatted capacity: 46.3 Mb

Number of cylinders: 645

Number of heads: 7

ACCESS TIMES:

Track to track:	3.0 ms
Average:	30.0 ms
Maximum:	60.0 ms

Write precompensation from cylinder: 320
Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo.

Delay between step pulses buffered mode: Min. 2.5 us. Max. 500 us.
Delay between step pulses non buffered mode: Min. 3 ms.

HEAD LOCK MECHANISM: Automatic.

LOCATION OF STRAPS AND CONNECTORS:

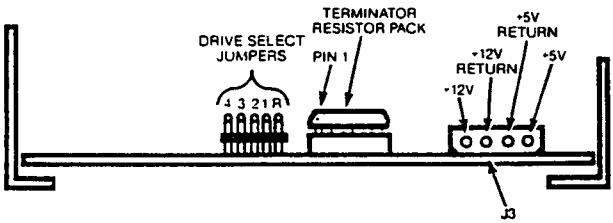


Figure 7 SELECT JUMPER, TERMINATOR AND J3 LOCATIONS

SECTION 5 — PHYSICAL INTERFACE

The interface between the disk drive and the host controller consists of four connections:

J1 — CONTROL SIGNALS

J2 — READ/WRITE SIGNALS

J3 — DC POWER

J4 — FRAME GROUND

(see Figure 14 for connector locations).

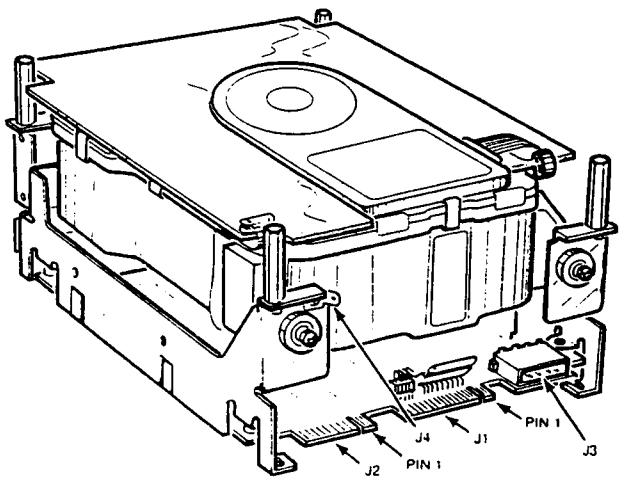


Figure 14 CONNECTOR LOCATIONS

DDE Data Sheet for Winchester Disk Drives. WD 2 REV. 0

MANUFACTURER: HITACHI TYPE: DK511-5

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:
+5 VDC +- 5 pct., 2.0 Amp typ.
+12 VDC +-10 pct., 2.5 Amp typ. Starting current 5.0 A typ.

Operating temperature range: 5 to 45 deg. celsius.

CAPACITY:

Unformatted capacity: 51.0 Mb

Number of cylinders: 699

Number of heads: 7

ACCESS TIMES:

Track to track:	8.0 ms
Average:	30.0 ms
Maximum:	55.0 ms

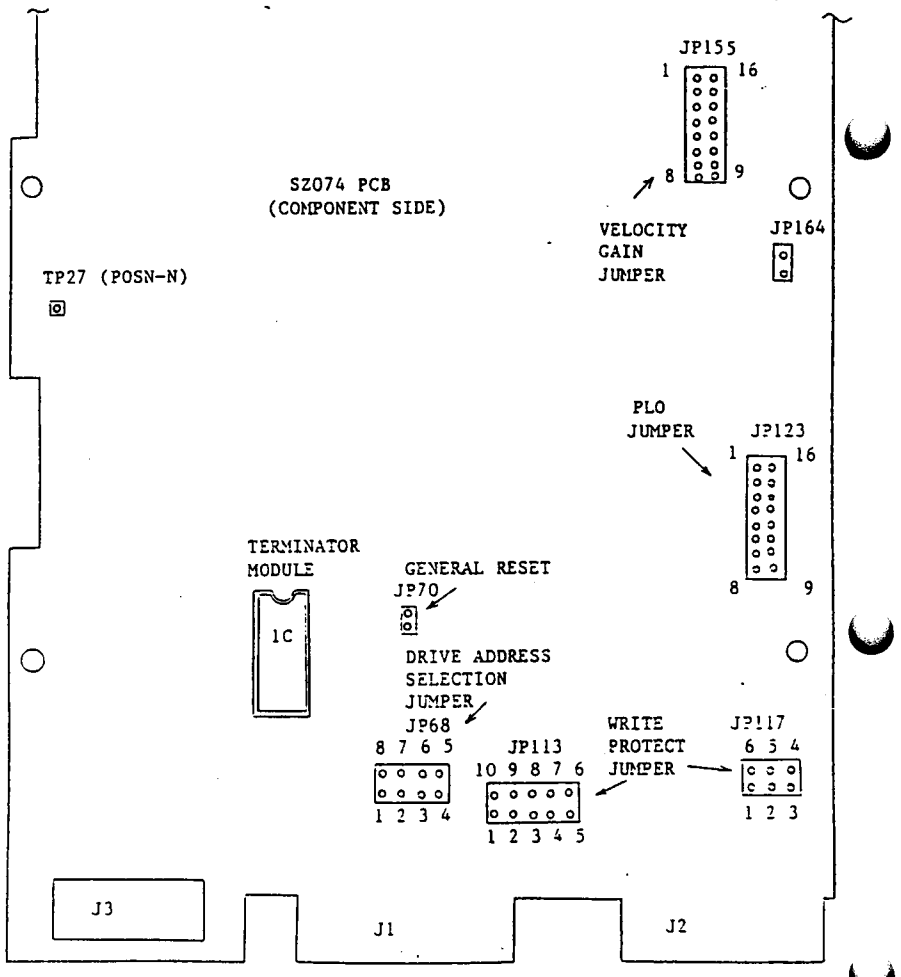
Write precompensation from cylinder: 256
Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo.

Delay between step pulses: Min. 0.3 us. Max. 100 us.

HEAD LOCK MECHANISM: None.

LOCATION OF STRAPS AND CONNECTORS:



J1: COMMAND CABLE. 34 PINS.
J2: DATA CABLE. 20 PINS.
J3: POWER CABLE.

1C: TERMINATOR MODULE.
If multiple drives are connected in daisy chain mode, only the last drive must be terminated.

JP68: Drive address selection jumper.

drive address 0:	pin 1 connected to pin 8
drive address 1:	pin 2 connected to pin 7
drive address 2:	pin 3 connected to pin 6
drive address 3:	pin 4 connected to pin 5

JP70: General RESET: Not installed.

JP113: Write protect: Jumper between pin 2 and pin 9.

JP117: Write protect: Jumper between pin 2 and pin 3.

JP164: Not installed.

JP123: Ajustment of PLO free running frequency: DO NOT CHANGE.

JP155: Ajustment of velocity gain: DO NOT CHANGE.

DDE Data Sheet for Winchester Disk Drives. WD 3 REV. 0

MANUFACTURER: HITACHI TYPE: DK511-8

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:
+5 VDC +- 5 pct., 2.0 Amp typ.
+12 VDC +- 5 pct., 2.5 Amp typ. Starting current 5.0 A typ.

Operating temperature range: 5 to 45 deg. celsius.

CAPACITY:

Unformatted capacity: 85.7 Mb

Number of cylinders: 823

Number of heads: 10

ACCESS TIMES:

Track to track:	6.0 ms
Average:	25.0 ms
Maximum:	45.0 ms

Write precompensation from cylinder: not specified.
Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo.

Delay between step pulses: Min. 0.3 us. Max. 100 us.

HEAD LOCK MECHANISM: None.

LOCATION OF STRAPS AND CONNECTORS:

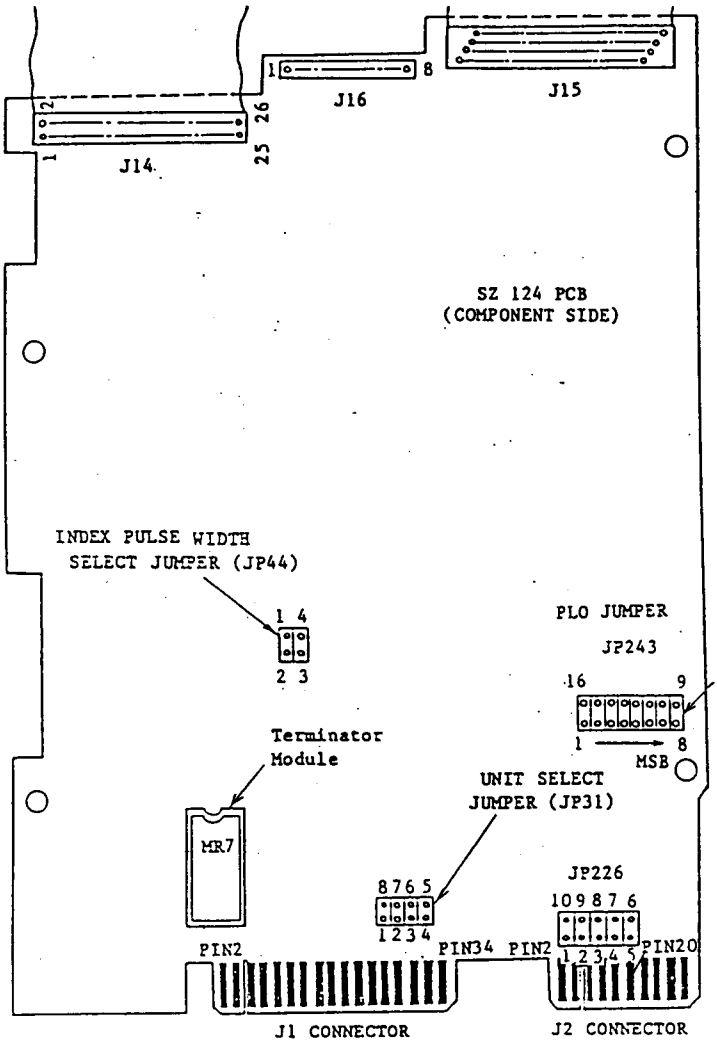


Fig. 1 DK511-8 JUMPERS ON SZ124 PCB

NOTE. The other jumpers unless stated setting-up method in this manual must not be removed.

J1: COMMAND CABLE. 34 PINS.
J2: DATA CABLE. 20 PINS.

MR7: TERMINATOR MODULE.
If multiple drives are connected in daisy chain mode, only the last drive must be terminated.

JP31: Drive address selection jumper.

drive address 0: pin 2 connected to pin 7
drive address 1: pin 3 connected to pin 6
drive address 2: pin 4 connected to pin 5
drive address 3: pin 1 connected to pin 8

JP44: Index pulse with: Jumper between pin 1 and pin 2.

JP226: Write protect: Jumper between pin 8 and pin 9.
Jumper between pin 5 and pin 6.

JP243: Ajustment of PLO free running frequency: DO NOT CHANGE.

DDE Data Sheet for Winchester Disk Drives. WD10 REV. 0

MANUFACTURER: MAXTOR TYPE: XT-3280

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: SCSI

Power requirements:
+5 VDC +- 5 pct., 1.7 Amp typ.
+12 VDC +- 5 pct., 1.8 Amp max. Starting current 4.5 A max.

Power dissipation: 30 W typ. 35 W max.

Operating temperature range: 10 to 45 deg. celsius.

Maximum temperature gradient: 10 deg. celsius/hour.

Operating humidity: 8 pct. - 95 pct. no condensation.

CAPACITY:

Unformatted capacity: 286 Mb

Number of cylinders: 1224

Number of data heads: 15

ACCESS TIMES (including settling time):

Track to track: 4.0 ms

Average: 30.0 ms

Maximum: 54.0 ms

HEAD MOVE MECHANISM:

Rotary voice coil controlled by track following servo.

HEAD LOCK MECHANISM:

Upon spin down the positioner is retracted and locked and the spindel is stopped using dynamic braking.

CONNECTORS:

J1: SCSI connector.

J2: Power connector.

Pin 1: +12 VDC.
Pin 2: +12 Return.
Pin 3: + 5 Return.
Pin 4: + 5 VDC.

+ designates factory installed position.

CONTROLLER ID:

Controller ID is set by three straps: JP 83, JP 84, JP 85.

ID	JP 85	JP 84	JP 83
0 +	out	out	out
1	out	out	in
2	out	in	out
3	out	in	in
4	in	out	out
5	in	out	in
6	in	in	out
7	in	in	in

TERMINATOR RESISTORS:

Interface terminator packs RN83, RN82, and RN81 provide proper termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

SPINDEL MOTOR JUMPER, JP 44:

+ When JP 44 is installed, the spindel motor will start as soon as power is applied.

When JP 44 is removed, the spindel motor will start after a delay time when power is applied. The delay time is 13 seconds multiplied by the the controller ID.

BUS PARITY CHECK, JP 86:

If JP 86 is not installed, the disk drive does not generate or check parity on the SCSI cable.

+ If JP 86 is installed, the disk drive generates and checks parity on the SCSI cable.

DRIVE TYPE, JP 87:

If JP 87 is installed the drive reports its type as XT-3170.

+ If JP 87 is not installed the drive reports its size as XT-3280.

BUS TERMINATOR POWER JUMPERS JP 81, JP 82:

+ If JP 81 is installed the terminator power comes from the disk drive.

If JP 82 is installed the terminator power comes from the SCSI interface.

Write Data Jumper JP 21:

Must be installed.

Write Unsafe Enable Jumper JP 43:

Must be installed.

Off-track Write Disable Jumper JP 41:

Must be installed.

Write Protect Jumper JP 42:

When JP 42 is installed, data cannot be written on the drive.

CAUTION:

Mounting screw lengths must be chosen such that no more then .125" of the screw is available to enter the frame mounting hole.

Torque applied to mounting screws must be between 9 inch*pounds and 12 inch*pounds. (1 - 1.3 Nm).

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Micropolis 1924S 2.4GB.

Manufacturer: Micropolis	**Sheet number: WD 20 revision 0**
Type: 1924 Series	**Form Factor: 5.25" Full-Height**
Date: 93-04-02	**Interface: SCSI-2, A-cable**

General Drive Description.

The Micropolis 1924S 2.4GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 2 Giga byte mass storage in a 5.25" full hight form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 2 msec.
Average: 11.5 msec.
Maximum: 25 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 30 to 40 MHz.

Transfer rate at interface: 4 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

General functional specifications.

Number of cylinders: 2467
Number of heads: 21

Unformatted capacity 2440 Mbytes
Formatted capacity 2047 Mbytes

MTBF: 250.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5% maximum	1.0A	1.25A	1.0A	1.25A	1.0A	1.25A	2%
+12 ±5% typical	4.0A	4.1A	2.1A	2.4A	2.35A	3.5A	2%
maximum	4.2A	4.35A	2.3A	2.6A	2.65A	3.7A	

Average power dissipation: 30 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 65 °C.

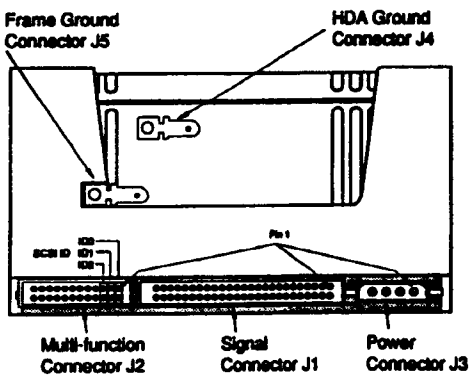
Maximum temperature gradient: 24 °C/hour.

Operating humidity : 10 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



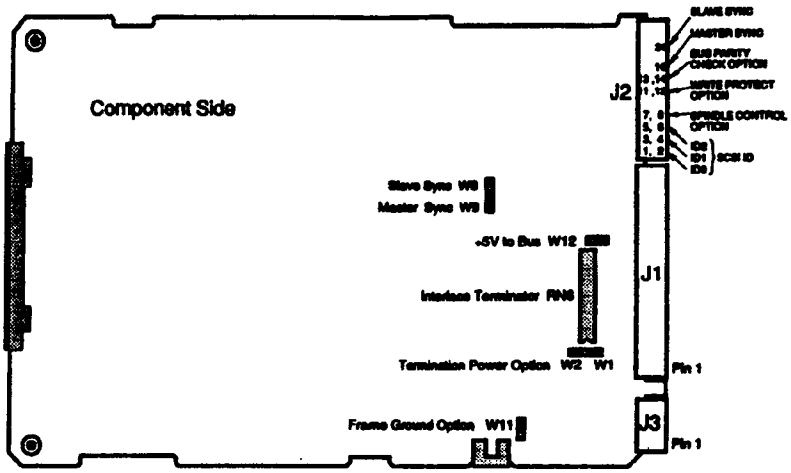
Power and interface connections.

J1: SCSI connector

J2: Multi-function Connector

J3: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

SCSI jumpers are located in J2, ID0 pin 1-2, ID1 pin 3-4, ID2 pin 5-6.

Terminator resistors.

Interface terminator pack RN6 provides termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.
• When a jumper is installed in W1, the drive provides terminator power.
When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W2 and W12, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26.
• Not installed.

• designates factory installed position.

BUS parity check.

When a jumper is installed at PARITY, the disk drive does not generate or check parity on the SCSI cable.
• When a jumper is not installed at PARITY, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at Spindle Control, the disk drive must wait for a Start motor command to start the spindle motor.
• When a jumper is not installed in Spindle Control, the drive starts the spindle motor at power up.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system. During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet. When transported to a customer site the disk must be allowed to adjust to the temperatur and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Diagnostic Program is also used to initialize the disk for disk array/dual host systems. Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Micropolis:
Product Description Micropolis 1924.
SCSI Implementation in Micropolis "MZR" Products.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Micropolis 2105S 640MB

Manufacturer: Micropolis	**Sheet number: WD 19 revision 0**
Type: 2105 Series	**Form Factor: 3.5" Full-Height**
Date: 93-04-02	**Interface: SCSI-2, A-cable**

General Drive Description.

The Micropolis 2105S 640MB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 512 Megabyte mass storage in a 3.5" full hight form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 1.5 msec.
Average: 10 msec.
Maximum: 25 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 24 to 40 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

General functional specifications.

Number of cylinders: 1728
Number of heads: 8

Unformatted capacity 640 Mbytes
Formatted capacity 512 Mbytes

MTBF: 300.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5%							2%
maximum	0.95A	1.05A	0.95A	1.05A	0.95A	1.05A	
+12 ±5%							2%
typical	1.8A	2.0A	0.6A	0.75A	0.7A	1.6A	
maximum	2.0A	2.2A	0.75A	0.9A	0.85A	2.2A	

Average power dissipation: 13 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 65 °C.

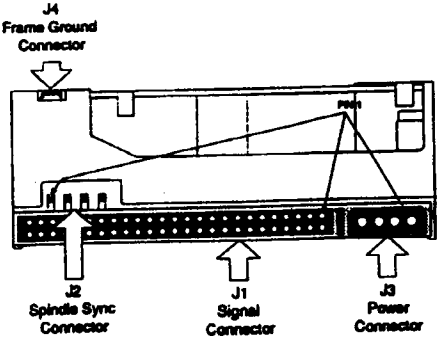
Maximum temperature gradient: 24 °C/hour.

Operating humidity : 10 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and interface connections.

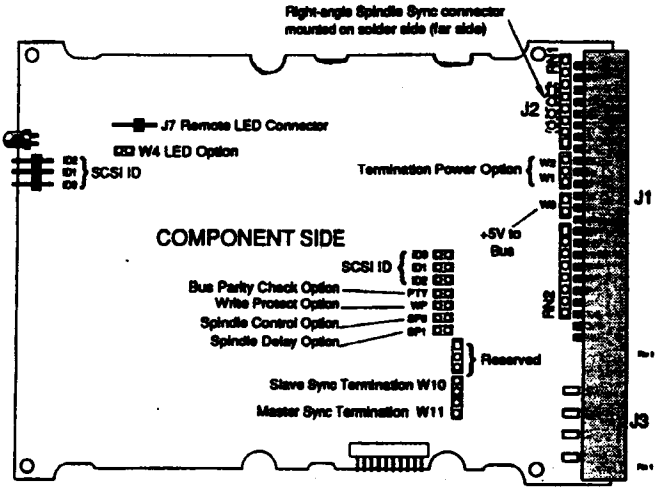
J1: SCSI connector

J2: Spindle Sync connector

J3: Power connector
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Configuration options.

Note: There are two identical groups of address jumpers on the Device Electronics board; one group is near the LED, and the other group is in line with SP0, SP1, WP, and PTY. Use either group for address selection but not both at the same time.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

The remote SCSI ID straps (located close to LED) are not used.

Terminator resistors.

Interface terminator pack RN1 and RN2 provide termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.
- When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W3 and W1, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26.
- Not installed.

- designates factory installed position.

BUS parity check.

When a jumper is installed at PTY, the disk drive does not generate or check parity on the SCSI cable.
- When a jumper is not installed at PTY, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at SP0 the disk drive must wait for a Start motor command to start the spindle motor.
- When a jumper is not installed in SP0, the drive starts the spindle motor at power up.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system. During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet. When transported to a customer site the disk must be allowed to adjust to the temperatur and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Diagnostic Program is also used to initialize the disk for disk array/dual host systems. Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 2105.
SCSI Implementation in Micropolis "MZR" Products.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Micropolis 2112S 1.2GB.

Manufacturer: Micropolis	**Sheet number: WD 18 revision 1**
Type: 2112-15 Series	**Form Factor: 3.5" Full-Height**
Date: 93-05-04	**Interface: SCSI-2, A-cable**

General Drive Description.

The Micropolis 2112S 1.2GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 1000 M byte mass storage in a 3.5" full hight form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 1.5 msec.
Average: 10 msec.
Maximum: 25 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 24 to 40 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

General functional specifications.

Number of cylinders: 1771
Number of heads: 15

Unformatted capacity 1209 Mbytes
Formatted capacity 1000 Mbytes

MTBF: 300.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5%							2%
maximum	0.95A	1.05A	0.95A	1.05A	0.95A	1.05A	
+12 ±5%							2%
typical	1.8A	2.0A	0.6A	0.75A	0.7A	1.6A	
maximum	2.0A	2.2A	0.75A	0.9A	0.85A	2.2A	

Average power dissipation: 13 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 65 °C.

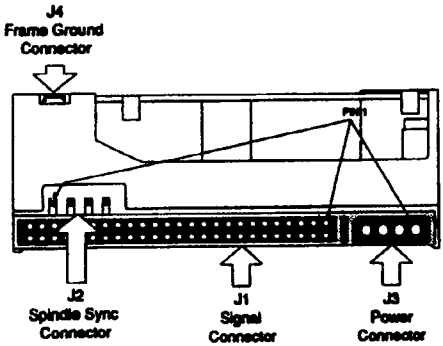
Maximum temperature gradient: 24 °C/hour.

Operating humidity : 10 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and interface connections.

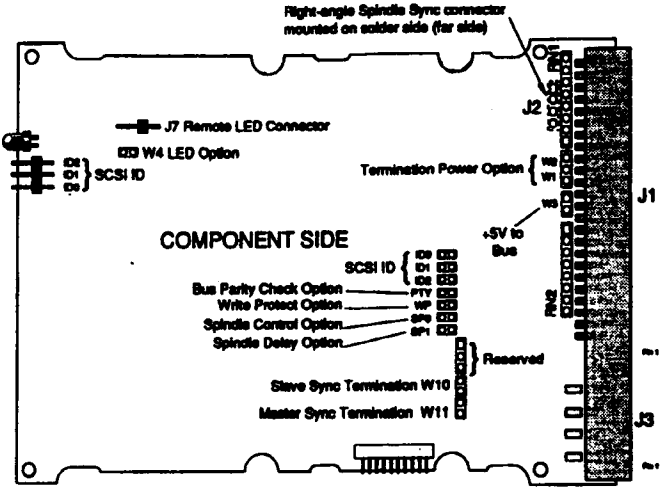
J1: SCSI connector

J2: Spindle Sync connector

J3: Power connector
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Configuration options.

Note: There are two identical groups of address jumpers on the Device Electronics board; one group is near the LED, and the other group is in line with SP0, SP1, WP, and PTY. Use either group for address selection but not both at the same time.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

The remote SCSI ID straps (located close to LED) are not used.

Terminator resistors.

Interface terminator pack RN1 and RN2 provide termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.
- When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W3 and W1, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26.
- Not installed.

- designates factory installed position.

BUS parity check.

When a jumper is installed at PTY, the disk drive does not generate or check parity on the SCSI cable.
- When a jumper is not installed at PTY, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at SP0 the disk drive must wait for a Start motor command to start the spindle motor.
- When a jumper is not installed in SP0, the drive starts the spindle motor at power up.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system. During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet. When transported to a customer site the disk must be allowed to adjust to the temperatur and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller.
The Diagnostic Program is also used to initialise the disk for disk array/dual host systems.
Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 2112.
SCSI Implementation in Micropolis "MZR" Products.

Data Sheet for Winchester Disks

Manufacturer: Micropolis	**Sheet number: WD 17 revision 0**
Type: 1528-15 Series	**Form Factor: 5¼" Full-Height**

Environment.

Electrical interface: SCSI.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Idle Avg.	Idle Peak	Seeking Avg.	Seeking Peak	Ripple (maximum)
+5V ±5% maximum	1.5A	1.5A	1.5A	1.5A	1.5A	1.5A	2%
+12 ±5% typical	4.25A	4.25A	1.80A	1.90A	2.25A	3.10A	2%
maximum	4.35A	4.35A	2.00A	2.10A	2.45A	3.30A	

Average power dissipation: 30 W.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 65 °C.

Maximum temperature gradient: 24 °C/hour.

Operating humidity : 10 to 90 %, non condensing.

General performance specifications.

Seek time (including settling time)

Track-to-track: 4 msec.
Average: 14.5 msec.
One-Third Strike (maximum): 15.5 msec.
Maximum: 32 msec.

Rotational Latency Average: 8.33 msec.

Media transfer rate: 23.33 Mhz.
Transfer rate at interface: 1.8 Mbyte/s. (asynchronous)
Transfer rate at interface: 4.8 Mbyte/s. (synchronous)

General functional specifications.

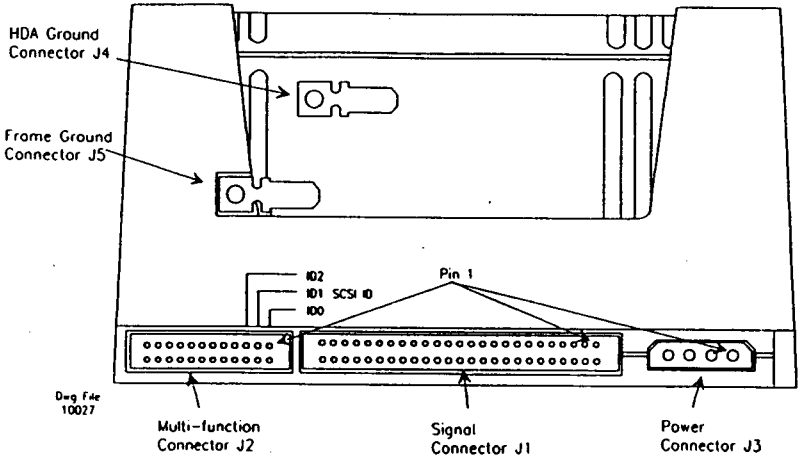
Number of cylinders: 2106
Number of heads: 15
Unformatted capacity 1535 Mbytes

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



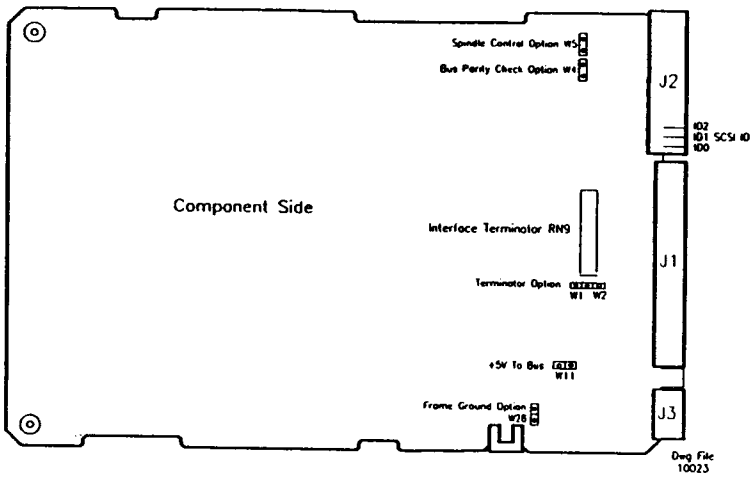
Power and interface connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* designates factory installed position.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

SCSI jumpers are located in J2, ID0 pin 1-2, ID1 pin 3-4, ID2 pin 5-6.

Terminator resistors.

Interface terminator pack RN9 provides termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminator installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

* When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W2 and W11, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26.

* Not installed.

BUS parity check.

When a jumper is installed at W4, the disk drive does not generate or check parity on the SCSI cable.

* When a jumper is not installed at W4, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W5 the disk drive must wait for a Start motor command to start the spindle motor.

* When a jumper is not installed in W5, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1528-15.
Technical Manual Micropolis 1528-15.

DDE Data Sheet for Winchester Disks

Manufacturer: Micropolis	**Sheet number: WD 16 rev. 0**
Type: 1680 Series	**Form Factor: 5¼" Half-Height**

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Idle Avg.	Idle Peak	Seeking Avg.	Seeking Peak	Ripple (maximum)
+5V ±5% maximum	1.0A	1.1A	1.0A	1.1	1.0A	1.1A	2%
+12 ±5% typical	1.40A	2.00A	0.80A	1.10	0.90A	2.10A	2%
maximum	2.00A	2.20A	1.10A	1.40	1.20A	2.50A	

Average power dissipation: 15 W.

Operating temperature range: 10 to 50 deg. celsius.

Storage temperature range: -40 to 65 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity : 10 to 90 %. no condensation.

General Performance Specifications.

Seek time (including settling time)

Track-to-track: 4 msec.
Average: 14 msec.
One-Third Strike (maximum): 15 msec.
Maximum: 30 msec.

Rotational Latency Average 8.33 msec.

Media transfer rate 15Mhz.
Transfer rate at interface 1.6 Mbyte/s. (maximum)

General Functional Specifications.

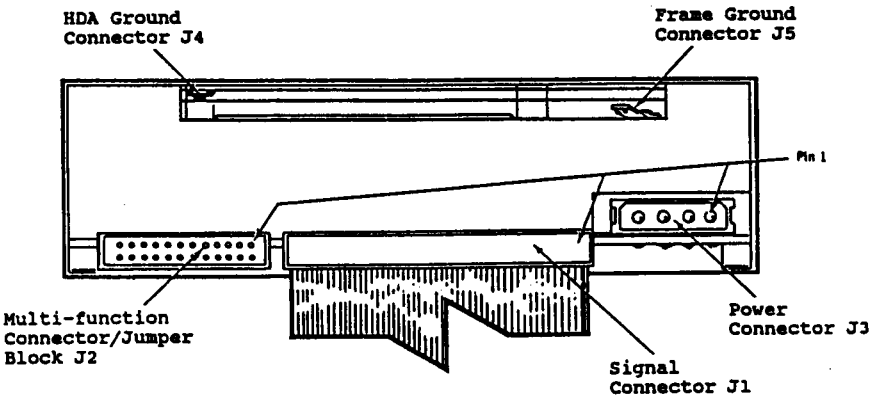
cylinders: 1780
heads: 7
Unformatted capacity 389 Mbytes

The positioner automatically retracts and losks, in a data-free landing zone, on spin-down.

Mounting.

Recommemded orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



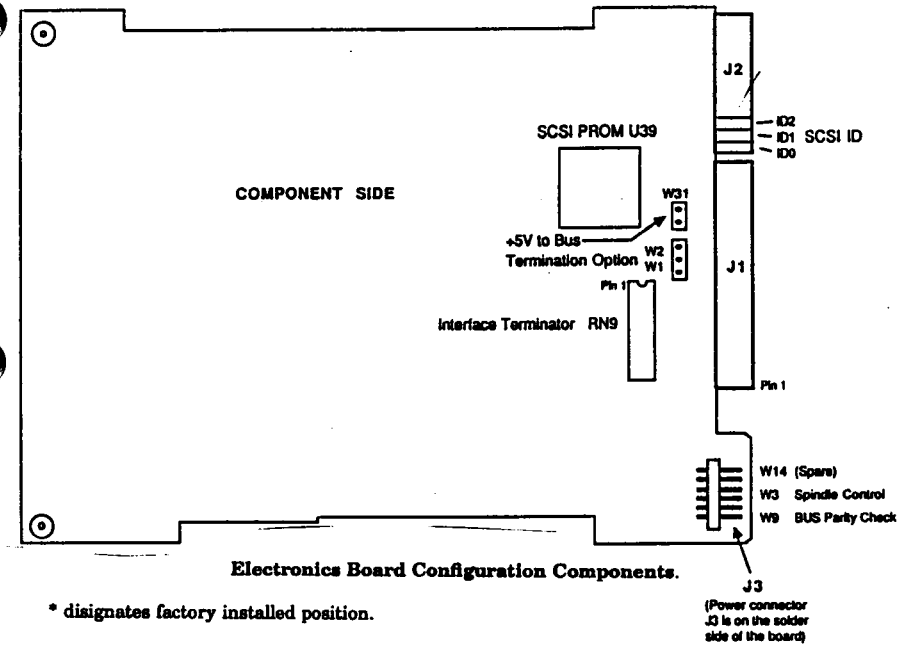
Power and Interface Connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* disignates factory installed position.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

SCSI jumpers is located in J2, ID0 pin1-2, ID1 pin 3-4, ID2 pin 5-6.

Terminator resistors.

Interface terminator pack RN9 provide termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminator installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.
* When a jumper is installed in W1, the drive provides terminator power.
When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W2 and W31, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26. * Not installed.

BUS parity check.

When a jumper is installed at W9, the disk drive does not generate or check parity on the SCSI cable.
* When a jumper is not installed at W9, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W3 the disk drive must wait for a Start motor command to start the spindle motor.
* When a jumper is not installed in W3, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1680 Series.
Tecnical Manual Micropolis 1680 Series.

DDE Data Sheet for Winchester Disks

Manufacturer: Micropolis	**Sheet number: WD 15 rev. 0**
Type: 1670 Series	**Form Factor: 5¼" Half-Height**

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5%							2%
maximum	2.3A	2.3A	2.3A	2.3	2.3A	2.3A	
+12 ±5%							2%
typical	1.75A	2.00A	0.60A	0.90	0.90A	1.80A	
maximum	2.00A	2.00A	0.88A	1.00	1.10A	2.00A	

Average power dissipation: 22 W.

Operating temperature range: 10 to 50 deg. celsius.

Storage temperature range: -40 to 65 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity : 10 to 90 %. no condensation.

General Performance Specifications.

Seek time (including settling time)

Track-to-track: 4 msec.
Average: 16 msec.
One-Third Strike (maximum): 18 msec.
Maximum: 37 msec.

Rotational Latency Average 8.33 msec.

Media transfer rate 10Mhz.
Transfer rate at interface 1.6 Mbyte/s. (maximum)

General Functional Specifications.

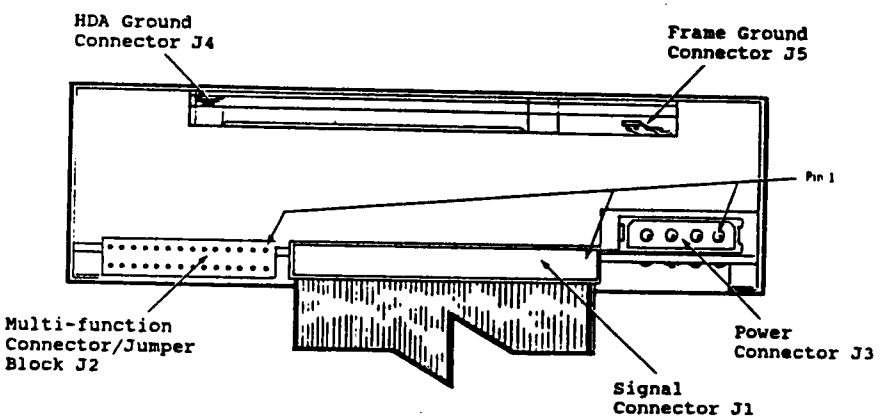
cylinders: 1245
heads: 7
Unformatted capacity 182 Mbytes

The positioner automatically retracts and losks, in a data-free landing zone, on spin-down.

Mounting.

Recommemded orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



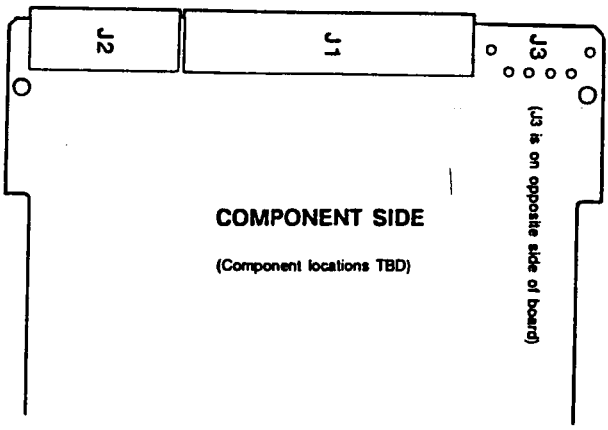
Power and Interface Connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* disignates factory installed position.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

SCSI jumpers is located in J2, ID0 pin1-2, ID1 pin 3-4, ID2 pin 5-6.

Terminator resistors.

Interface terminator pack RN9 provide termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminator installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.
* When a jumper is installed in W1, the drive provides terminator power.
When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

BUS parity check.

When a jumper is installed at W9, the disk drive does not generate or check parity on the SCSI cable.
* When a jumper is not installed at W9, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W3 the disk drive must wait for a Start motor command to start the spindle motor.
* When a jumper is not installed in W3, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1670 Series.
Tecnical Manual Micropolis 1670 Series.

DDE Data Sheet for Winchester Disks

Manufacturer: Micropolis	**Sheet number: WD 14 rev. 0**
Type: 1580 Series	**Form Factor: 5¼"**

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Idle Avg.	Idle Peak	Seeking Avg.	Seeking Peak	Ripple (maximum)
+5V ±5% maximum	2.0A	2.0A	2.0A	2.0	2.0A	2.0A	2%
+12 ±5% typical	4.25A	4.25A	1.80A	1.90	2.25A	3.10A	2%
maximum	4.35A	4.35A	2.00A	2.10	2.45A	3.30A	

Average power dissipation: 33 W.

Operating temperature range: 10 to 50 deg. celsius.

Storage temperature range: -40 to 65 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity : 10 to 90 %. no condensation.

General Performance Specifications.

Seek time (including settling time)

Track-to-track: 4 msec.
Average: 16 msec.
One-Third Strike (maximum): 17 msec.
Maximum: 35 msec.

Rotational Latency Average 8.33 msec.

Media transfer rate 15Mhz.
Transfer rate at interface 1.6 Mbyte/s. (maximum)

General Functional Specifications.

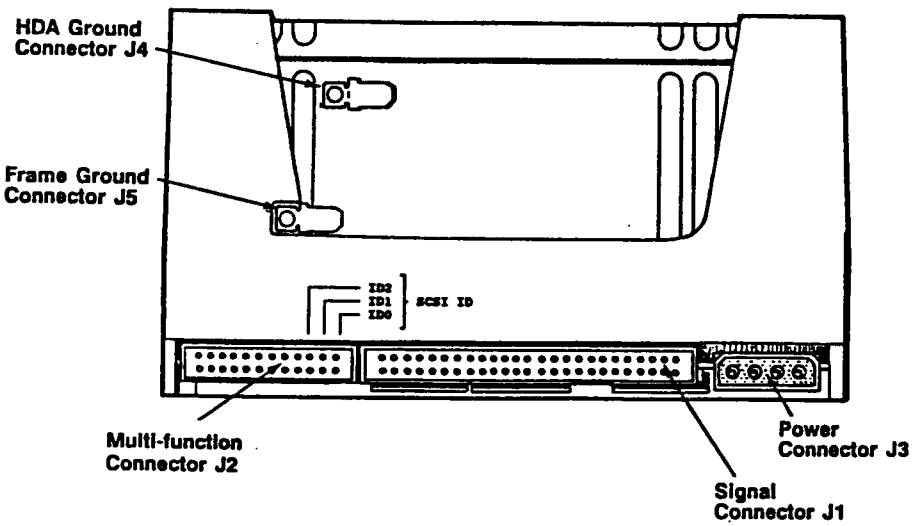
cylinders: 1632
heads: 15
Unformatted capacity 765 Mbytes

The positioner automatically retracts and losks, in a data-free landing zone, on spin-down.

Mounting.

Recommemded orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



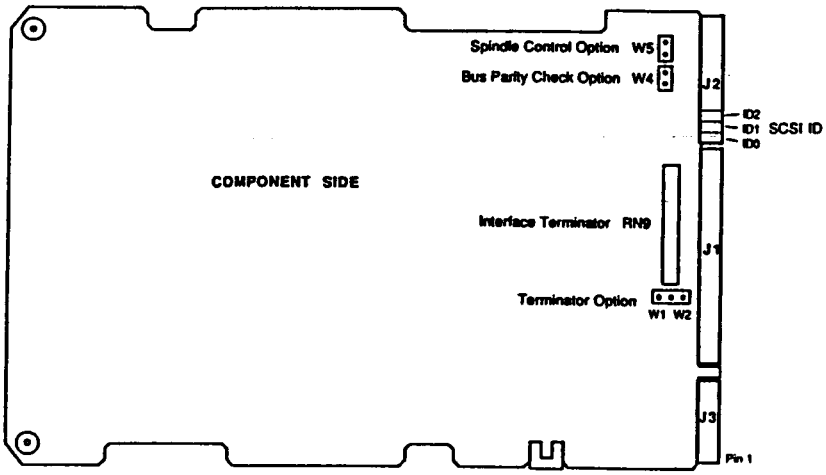
Power and Interface Connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* disignates factory installed position.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

Interface terminator pack RN9 provide termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminator installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.
* When a jumper is installed in W1, the drive provides terminator power.
When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

BUS parity check.

When a jumper is installed at W4, the disk drive does not generate or check parity on the SCSI cable.
* When a jumper is not installed at W4, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W5 the disk drive must wait for a Start motor command to start the spindle motor.
* When a jumper is not installed in W5, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1580 Series.
Tecnical Manual Micropolis 1580 Series.

DDE Data Sheet for Winchester Disk Drives. WD 13 REV. 0

MANUFACTURER: MICROPOLIS TYPE: 1373

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: SCSI

Power requirements:
+5 VDC +- 5 pct., 2.0 Amp max.
+12 VDC +- 5 pct., 3.3 Amp max. Starting current 4.35 A max.

Average power dissipation: 38 W.

Operating temperature range: 10 to 50 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity: 10 pct. - 90 pct. no condensation.

CAPACITY:

Unformatted capacity: 85 Mb

NNumber of cylinders: 1016

Number of heads: 4

ACCESS TIMES (including settling time):

Track to track:	5.0 ms
Average:	23.0 ms
One-Third stroke:	25.0 ms
Maximum:	50.0 ms

HEAD MOVE MECHANISM:

Rotary voice coil controlled by track following servo.

HEAD LOCK MECHANISM:

Upon spin down the positioner is retracted and locked and the spindel motor brake is applied.

CONNECTORS:

J1: SCSI connector.

J2: Multi function connector.

J3: Power connector.

Pin 1: +12 VDC.
Pin 2: +12 Return.
Pin 3: + 5 Return.
Pin 4: + 5 VDC.

J4: Head Disk Assembly ground connector.

J5: Outer Frame ground connector.

+ disignates factory installed position.

CONTROLLER ID:

The controller ID is set by three straps in J2.

Strap between pin 1 and pin 2 in J2: ID0
Strap between pin 3 and pin 4 in J2: ID1
Strap between pin 5 and pin 6 in J2: ID2

ID	ID2	ID1	ID0
0 +	out	out	out
1	out	out	in
2	out	in	out
3	out	in	in
4	in	out	out
5	in	out	in
6	in	in	out
7	in	in	in

TERMINATOR RESISTORS:

Interface terminator packs RN1, RN7, and RN8 provide proper termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

SPINDEL CONTROL OPTION:

If J2 pin 7 is connected to J2 pin 8, the disk drive will wait for a Start Spindle Command to start the spindle motor.

+ If J2 pin 7 and J2 pin 8 are not connected, the disk drive starts the spindle motor at power up.

BUS PARITY CHECK:

If J2 pin 9 and J2 pin 10 are connected, the disk drive does not generate or check parity on the SCSI cable.

+ If J2 pin 9 and J2 pin 10 are not connected, the disk drive generates and checks parity on the SCSI cable.

BUS TERMINATION POWER:

A jumper must be installed at W1 or W2 to select the source of power to the terminator packs RN1, RN7, and RN8.

+ When the jumper is installed at W1, the disk drive provides terminator power.

When the jumper is installed at W2, terminator power is provided by the host system via interface cable J1 pin 26.

Note: The maximum torque applied to mounting screws must not exceed 10 inch*lbs. (1.1 Nm).

DDE Data Sheet for Winchester Disks

Manufacturer: Micropolis	**Sheet number: WD 12 rev. 1**
Type: 1570 Series	**Form Factor: 5¼"**

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5%							2%
maximum	2.0A	2.0A	2.0A	2.0	2.0A	2.0A	
+12 ±5%							2%
typical	4.25A	4.25A	1.80A	1.90	2.25A	3.10A	
maximum	4.35A	4.35A	2.00A	2.10	2.45A	3.30A	

Average power dissipation: 38 W.

Operating temperature range: 10 to 50 deg. celsius.

Storage temperature range: -40 to 65 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity : 10 to 90 %. no condensation.

General Performance Specifications.

Seek time (including settling time)

Track-to-track: 4 msec.
Average: 18 msec.
One-Third Strike (maximum): 19 msec.
Maximum: 40 msec.

Rotational Latency Average 8.33 msec.

Media transfer rate 10Mhz.
Transfer rate at interface 1.6 Mbyte/s. (maximum)

General Functional Specifications.

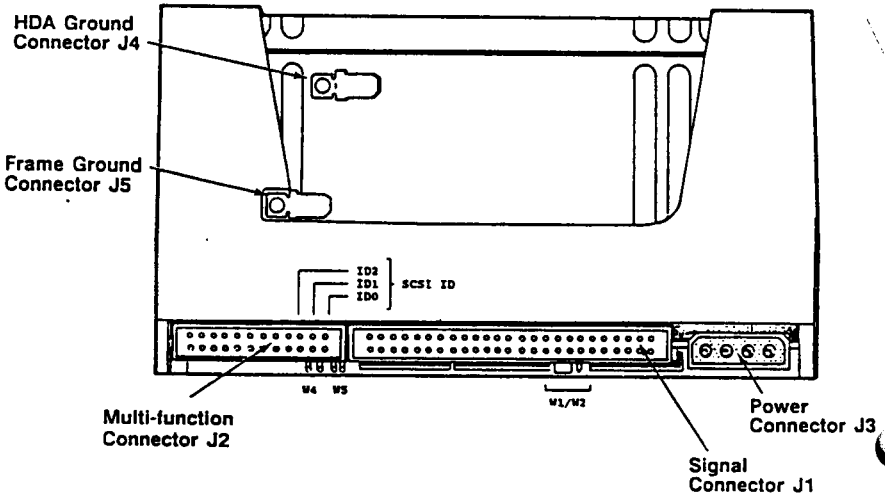
cylinders: 1224
heads: 15
Unformatted capacity 382 Mbytes

The positioner automatically retracts and losks, in a data-free landing zone, on spin-down.

Mounting.

Recommemded orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



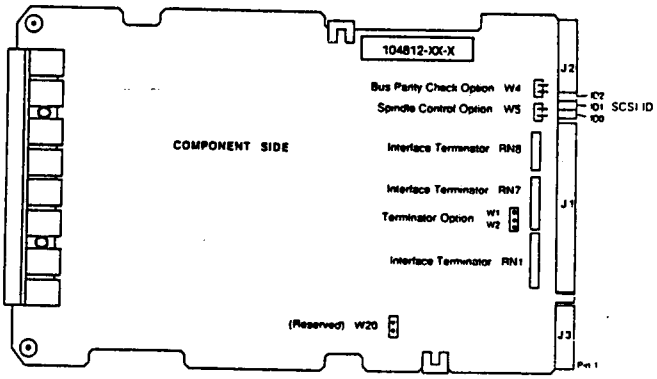
Power and Interface Connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* disignates factory installed position.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

Interface terminator packs RN1, RN7, and RN8 provide termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.
Please note that the orientation of the terminators differs on different versions of the board. Pin 1 is marked on the board.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.
* When a jumper is installed in W1, the drive provides terminator power.
When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

BUS parity check.

When a jumper is installed at W4, the disk drive does not generate or check parity on the SCSI cable.
* When a jumper is not installed at W4, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W5 the disk drive must wait for a Start motor command to start the spindle motor.
* When a jumper is not installed in W5, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1570 Series.
Tecnical Manual Micropolis 1570 Series.

DDE Data Sheet for Winchester Disk Drives. WD 9 REV. 0

MANUFACTURER: MICROPOLIS TYPE: 1375

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: SCSI

Power requirements:
+5 VDC +- 5 pct., 2.0 Amp max.
+12 VDC +- 5 pct., 3.3 Amp max. Starting current 4.35 A max.

Average power dissipation: 38 W.

Operating temperature range: 10 to 50 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity: 10 pct. - 90 pct. no condensation.

CAPACITY:

Unformatted capacity: 170 Mb

Number of cylinders: 1016

Number of heads: 8

ACCESS TIMES (including settling time):

Track to track: 5.0 ms

Average: 23.0 ms

One-Third stroke: 25.0 ms

Maximum: 50.0 ms

HEAD MOVE MECHANISM:

Rotary voice coil controlled by track following servo.

HEAD LOCK MECHANISM:

Upon spin down the positioner is retracted and locked and the spindel motor brake is applied.

CONNECTORS:

J1: SCSI connector.

J2: Multi function connector.

J3: Power connector.

Pin 1: +12 VDC.
Pin 2: +12 Return.
Pin 3: + 5 Return.
Pin 4: + 5 VDC.

J4: Head Disk Assembly ground connector.

J5: Outer Frame ground connector.

+ disignates factory installed position.

CONTROLLER ID:

The controller ID is set by three straps in J2.

Strap between pin 1 and pin 2 in J2: IDO
Strap between pin 3 and pin 4 in J2: ID1
Strap between pin 5 and pin 6 in J2: ID2

ID	ID2	ID1	IDO
0 +	out	out	out
1	out	out	in
2	out	in	out
3	out	in	in
4	in	out	out
5	in	out	in
6	in	in	out
7	in	in	in

TERMINATOR RESISTORS:

Interface terminator packs RN1, RN7, and RN8 provide proper termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

SPINDEL CONTROL OPTION:

If J2 pin 7 is connected to J2 pin 8, the disk drive will wait for a Start Spindle Command to start the spindle motor.

+ If J2 pin 7 and J2 pin 8 are not connected, the disk drive starts the spindle motor at power up.

BUS PARITY CHECK:

If J2 pin 9 and J2 pin 10 are connected, the disk drive does not generate or check parity on the SCSI cable.

+ If J2 pin 9 and J2 pin 10 are not connected, the disk drive generates and checks parity on the SCSI cable.

BUS TERMINATION POWER:

A jumper must be installed at W1 or W2 to select the source of power to the terminator packs RN1, RN7, and RN8.

+ When the jumper is installed at W1, the disk drive provides terminator power.

When the jumper is installed at W2, terminator power is provided by the host system via interface cable J1 pin 26.

Note: The maximum torque applied to mounting screws must not exceed 10 inch*lbs. (1.1 Nm).

DDE Data Sheet for Winchester Disk Drives. WD 5 REV. 0

MANUFACTURER: MICROPOLIS TYPE: 1325

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:
+5 VDC +- 5 pct., 0.9 Amp average.
+12 VDC +- 5 pct., 3.3 Amp average. Peak current 3.9 A.

Operating temperature range: 10 to 46 deg. celsius.

Thermal Shock: max. 24 deg. celcius/hour.

This gradient should not be exceeded when moving drive from storage to operation.

CAPACITY:

Unformatted capacity: 85.3 Mb

Number of cylinders: 1024

Number of heads: 8

Maximum number of defective tracks: 85

ACCESS TIMES (including settling time):

Track to track:	6.0 ms
Average:	28.0 ms
Maximum:	62.0 ms

Write precompensation must NOT be used.

Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo. Rotary voice coil.

Delay between step pulses: 2 us to 200 us or > 1ms.

Step periods exceeding 20 us will extend access times.

HEAD LOCK MECHANISM: Automatic.

LOCATION OF AND CONNECTORS: Figure 3-1.

J1: COMMAND CABLE. 34 PINS.
J2: DATA CABLE. 20 PINS.
J3: DC POWER INPUT.
J4: FRAME GROUND.

LOCATION OF STRAPS: Figure 3-2.

RN1: TERMINATOR MODULE.

If multiple drives are connected in daisy chain mode, only the last drive must be terminated.

J6: Drive address selection jumper. SHUNT BLOCK Figure 6-1.

DS4 installed: Drive address 4.
DS3 installed: Drive address 3.
DS2 installed: Drive address 2.
DS1 installed: Drive address 1.

Only one connection must be installed.

W2: installed.
W1: Not installed

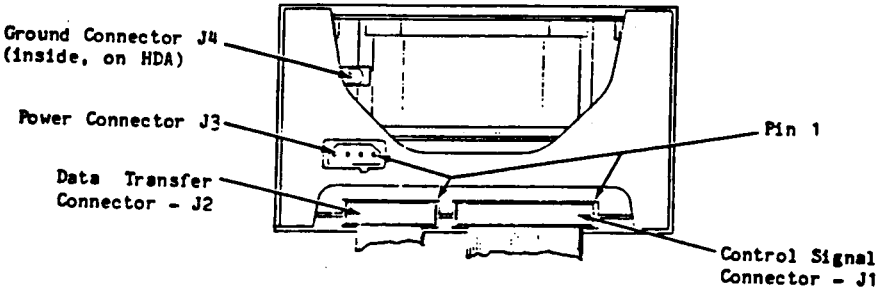
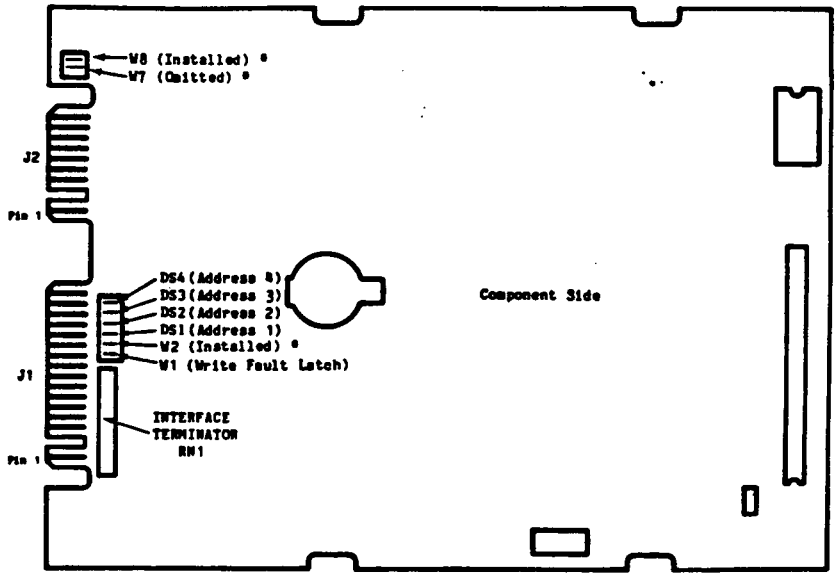


Figure 3-1. Power and Interface Connections



* Options. See Maintenance Manual Micropolis No. 101420.

Figure 3-2. Drive-Address Jumpers and Interface Terminator

DDE Data Sheet for Winchester Disk Drives. WD 7 REV. 0

MANUFACTURER: NEC TYPE: D5126

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: ST 506

Power requirements:
+5 VDC +- 5 pct., 1.0 Amp max.
+12 VDC +- 5 pct., 1.8 Amp max. Starting current 2.5 A max.

Temperature range: 5 to 50 deg. celsius.

Humidity: 8 pct. - 80 pct. no condensation.

CAPACITY:

Unformatted capacity: 25.6 Mb

Number of cylinders: 615

Number of heads: 4

ACCESS TIMES (including settling time):

Track to track: 18.0 ms

Average: 85.0 ms

Maximum: 215.0 ms

Write precompensation from cylinder: 128
Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: Stepper motor.

Delay between step pulses buffered mode: Min. 3 us. Max. 200 us.

Delay between step pulses non buffered mode: Min. 3 ms.

HEAD LOCK MECHANISM: Automatic.

Before power off, for transportation, it is recommended that the controller commands the drive to seek to cylinder 664.

SWITCHES:

Disk drive number:
DIP switch located in position 02:

SWITCH NUMBER :	1	2	3	4	5	6	7	8
drive number 1:	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SWITCH NUMBER :	1	2	3	4	5	6	7	8
drive number 2:	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
SWITCH NUMBER :	1	2	3	4	5	6	7	8
drive number 3:	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
SWITCH NUMBER :	1	2	3	4	5	6	7	8
drive number 4:	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF

TERMINATOR RESISTORS:

Terminator resistors are switched on/off by a DIP switch located in position 2D. When the switches are ON the terminator resistors are connected to the disk drive. When more than one disk drive are connected to a controller in daisy chain only the last disk drive in the chain must have the terminator resistors connected.

DDE Data Sheet for Winchester Disk Drives. WD 6 REV. 0

MANUFACTURER: NEC TYPE: D2257

FORM FACTOR: 8"

ENVIRONMENT:

Electrical Interface: SMD

Power requirements:
+5 VDC +- 5 pct., 4.0 Amp typ.
-12 VDC +- 5 pct., 1.0 Amp typ.
+24 VDC +-10 pct., 3.0 Amp typ. Starting current 5.5 Amp.

Temperature range: 5 to 40 deg. celsius.

Relative humidity: 20 pct. - 80 pct without condensation.

CAPACITY:

Unformatted capacity: 167.7 Mb

Number of cylinders: 1024

Number of heads: 8

ACCESS TIMES:

Track to track: 5.0 ms

Average: 20.0 ms

Maximum: 40.0 ms

HEAD MOVE MECHANISM: Track following servo. Rotary actuator.

HEAD LOCK MECHANISM: MANUAL.

SWITCHES:

INSTALLATION MODE DIP SWITCH. Position 14A.

BIT(1:4): Binary coded unit number. BIT(1): MSB. BIT(4): LSB.
BIT(5): Address mode switch.
BIT(6): Servo offset control
BIT(7): Motor start delay.
BIT(8): Motor start mode.

Bit no.	1	2	3	4	5	6	7	8
DDE factory setting:	0	0	0	0	0	0	0	0

If two disk drives are connected to the same controller, switch setting on the second disk drive must be changed to:

Bit no.	1	2	3	4	5	6	7	8
	0	0	0	1	0	0	1	0

Do not change bit 5, 6, and 8.

CONTROL MODE DIP SWITCH. DO NOT CHANGE. Position 13M.

BIT(1:3): Device type.
BIT(4): AM mode select.
BIT(5): RPS mode select.
BIT(6): FWRF mode select
BIT(7): TAG4 control
BIT(8): Interface control.

Bit no.	1	2	3	4	5	6	7	8
DDE factory setting:	0	0	0	1	0	0	0	1

SECTOR SELECT SWITCHES. Position 14M.

Bit no. 1 2 3 4 5 6 7 8

DDE factory setting 0 1 0 0 0 0 0 0

This switch setting must be used when ther disk drive is controlled by NEC DS800B

If the disk drive is controlled by XEBEC S1490 the switch setting must be changed to:

Bit no. 1 2 3 4 5 6 7 8

0 1 1 1 0 0 0 0

Disk drive number

TERMINATOR RESISTORS:

Terminator resistors must only be installed in the last disk drive in the daisy chain, when more than one disk drive are connected to the the same controller.

The terminator resistors are four dual-in-line packages palced in positions 17F, 17G, 17H, and 17J close to connector P1 on board G9QSV.

DDE Data Sheet for Winchester Disk Drives. WD 8 REV. 0

MANUFACTURER: PERTEC TYPE: DX332

FORM FACTOR: 8"

ENVIRONMENT:

Electrical Interface: SMD.

Power requirements:
+24 VDC +-10 pct., 4.5 Amp typ. Maximum current 12 Amp.
+24 VDC +-10 pct., 1.0 Amp typ. Maximum current 3 Amp.
+ 5 VDC +- 3 pct., 2.2 Amp typ. Maximum current 3 Amp.
- 5.2 VDC +- 3 pct., 2.9 Amp typ. Maximum current 3 Amp.

Temperature range: 10 to 40 deg. celsius operating.
Relative humidity 10 pct. - 80 pct. operating.
Maximum shipping an storage altitude: 6096 meters.

NOTE: "It is recommended that power be applied to the drive 30 minutes prior to recording of data."

CAPACITY:

Unformatted capacity: 332.4 Mb

Number of cylinders: 1649

Number of heads: 10

ACCESS TIMES:

Track to track: 5 ms

Average: 22 ms

Maximum: 45 ms

HEAD MOVE MECHANISM: track following servo.

HEAD LOCK MECHANISM: Automatic.

SWITCHES:

SW3(1): 1 = disable write
0 = enable write

SW3(2): Not used.

SW3(3:4): Drive type. 0 0 for DX332.

SW3(5:8): Sector clock switches

DDE factory switch setting:

BIT number:	1	2	3	4	5	6	7	8
SW3:	0	0	0	0	0	0	0	1

SW2(1:8): Sector clock switches

DDE factory switch setting:

BIT number:	1	2	3	4	5	6	7	8
SW2:	1	0	1	1	0	0	0	0

SW1(1:8): Not used

DDE factory switch setting:

BIT number:	1	2	3	4	5	6	7	8
SW1:	1	0	0	0	0	0	0	0

0 = switch open
1 = switch closed

DISK DRIVE NUMBER:

DIP switch position U20

BIT(4:1): binary coded unit number. BIT(4) MSB, BIT(1) LSB.

DDE factory switch setting:

BIT number:	1	2	3	4	5	6	7	8
U20:	0	0	0	0	0	0	0	1

TERMINATOR RESISTORS:

Terminator resistors are mounted on a printed circuit board J3 placed in connector J1A2. When two or more disk drives are connected in a daisy chain, only the last disk drive must contain pull up resistors.

DDE Data Sheet for Winchester Disk Drives. WD 11 REV. 1

MANUFACTURER: PRIAM TYPE: 717, 728, 738

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: SCSI

Power requirements:
+5 VDC +- 5 pct., 2.1 Amp max.
+12 VDC +- 5 pct., 4.0 Amp max. Starting current 4.5 A max.

Average power dissipation: 38 W.

Operating temperature range: 10 to 50 deg. celsius.

Maximum temperature gradient: 15 deg. celsius/hour.

Operating humidity: 8 pct. - 80 pct. no condensation.

CAPACITY:	717	728	738
Unformatted capacity:	170 Mbyte	280 Mbyte	380 Mbyte
Number of cylinders:	1225	1225	1225
Number of heads:	7	11	15

ACCESS TIMES (including settling time):

Track to track:	5.0 ms
Average (1/3 stroke):	20.0 ms
Maximum:	30.0 ms

HEAD MOVE MECHANISM:

Linear voice coil controlled by track following servo.

HEAD LOCK MECHANISM:

Upon spin down the positioner is retracted and locked and the spindel motor brake is applied.

CONNECTORS:

J1: SCSI connector.

J3: Power connector.

Pin 1: +12 VDC.
Pin 2: +12 Return.
Pin 3: + 5 Return.
Pin 4: + 5 VDC.

J11: Jumper settings.

J14: Frame ground connector.

+ disignates factory installed position.

JUMPER SETTING:

controller ID:

The controller ID is set by three straps in J11.

Strap between pin 1 and pin 2 in J11: ID1
Strap between pin 3 and pin 4 in J11: ID2
Strap between pin 5 and pin 6 in J11: ID4

ID	ID4	ID2	ID1
0 +	out	out	out
1	out	out	in
2	out	in	out
3	out	in	in
4	in	out	out
5	in	out	in
6	in	in	out
7	in	in	in

J11 pin 7-8:

in+ : auto sequence up

J11 pin 9-10

in+ : parity enable

J11 : pin 11-12, 13-14:

out+ : blocksize selected by software.

J11 : pin 15-16

out+ : unit attention enabled

J11 : pin 17-18

output: drive ready (not used)

J11 : pin 19-20

out+ : disable write protect

Jumper W3:

out+: soft scsi bus reset

Jumper W5:

out+: no delay on motor start (this jumper is not mounted on all versions of the controller board)

Jumper W6:

in+: terminator power to j1-26

TERMINATOR RESISTORS:

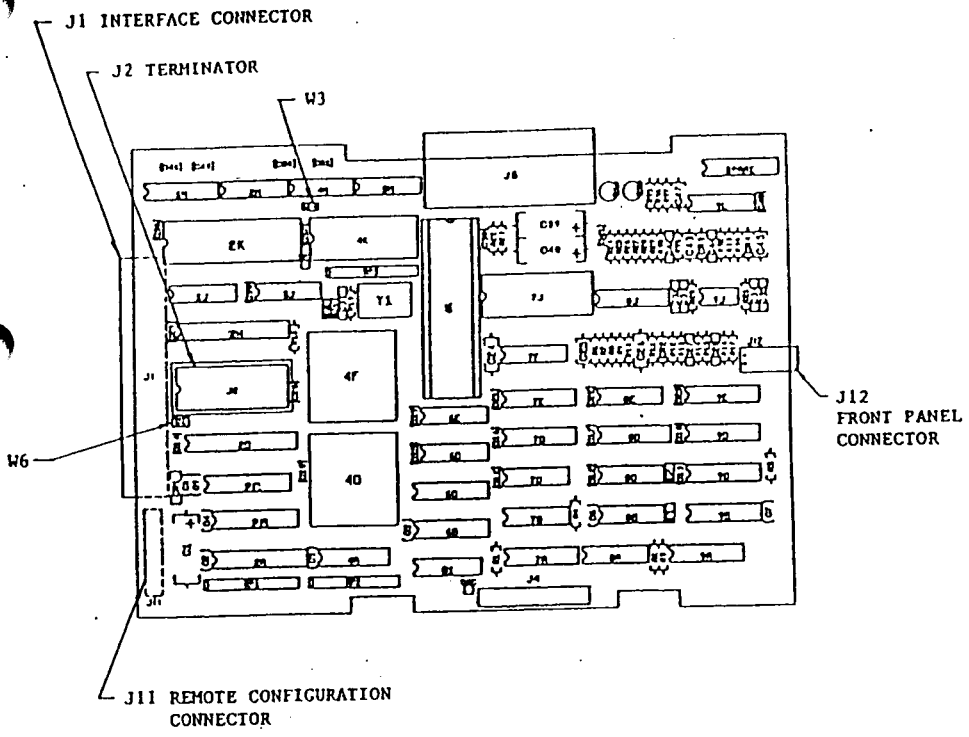
Interface terminator pack J2 provide proper termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

DOCUMENTATION:

Publications available from PRIAM:

OEM/service manual 717/728/738 winchester disk drives.
P/N 308080

Priam specification models 717, 728, and 738 SCSI interface.
P/N 300971



SCSI interface connector/switch placement

DDE Data Sheet for Winchester Disk Drives. WD 4 REV. 0

MANUFACTURER: VERTEX TYPE: V185

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:
+5 VDC +- 5 pct., 1.5 Amp typ.
+12 VDC +-10 pct., 2.8 Amp typ. Starting current 4.5 A typ.

Operating temperature range: 4 to 50 deg. celsius.

CAPACITY:

Unformatted capacity: 85.0 Mb

Number of cylinders: 1166

Number of heads: 7

Maximum number of defective tracks: 85

ACCESS TIMES:

Track to track:	5.0 ms
Average:	30.0 ms
Maximum:	65.0 ms

Write precompensation must NOT be used.

Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo. Rotary voice coil.

Delay between step pulses: Min. 5 us.

Step periods exceeding 39 us will extend access times.

HEAD LOCK MECHANISM: Automatic.

LOCATION OF STRAPS AND CONNECTORS: Figure 6-1.

J1: COMMAND CABLE. 34 PINS.
J2: DATA CABLE. 20 PINS.
J3: DC POWER INPUT.
J4: FRAME GROUND.

RP1: TERMINATOR MODULE. Figure 11-3.
If multiple drives are connected in daisy chain mode, only the last drive must be terminated.

J6: Drive address selection jumper. SHUNT BLOCK Figure 6-1.

pin 1 - pin 16 open
pin 2 - pin 15 open
pin 3 - pin 14 open
pin 4 - pin 13 open
pin 5 - pin 12 drive address 3 if shorted
pin 6 - pin 11 drive address 2 if shorted
pin 7 - pin 10 drive address 1 if shorted
pin 8 - pin 9 drive address 0 if shorted

Only one connection must be installed.

J12: PCB Option Pads. Figure 6-1.

No connections installed.

6.1 Physical Interface Overview

The electrical interface between the V100 and the host controller is via four connectors:

1. J1—Control signals (multiplexed)
2. J2—Read/write signals (radial)
3. J3—DC power input
4. J4—Frame ground

Refer to Figure 6-1 for connector locations.

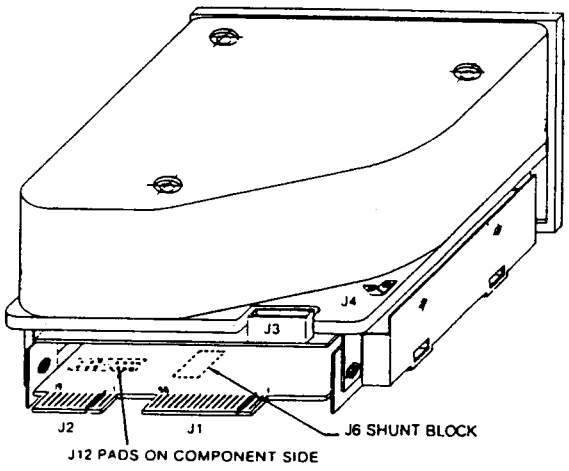


Figure 6-1
Interface Connector Physical Locations

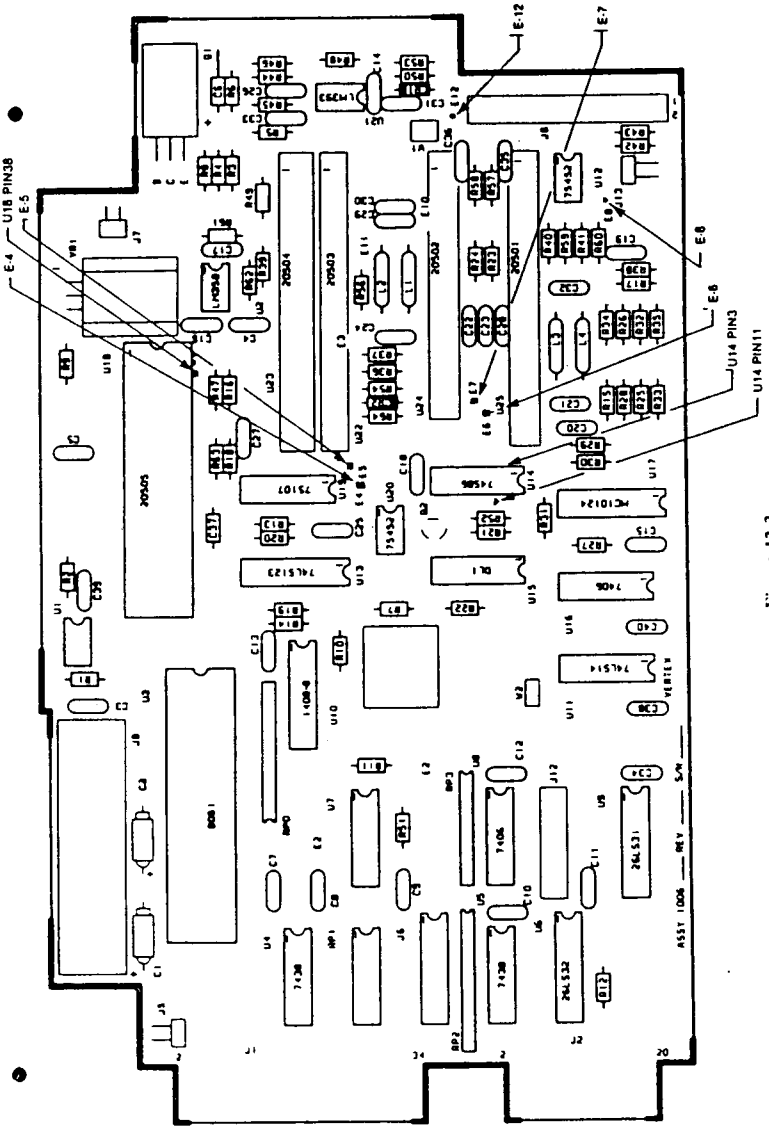


Figure 12-3
MI.C 2.X Test Point Locations
Data PCB

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Hewlett Packard C3724S 1.2GB.

Manufacturer: Hewlett Packard	**Sheet number: WD 28 revision 0**
Type: C3724S	**Form Factor: 3.5" LP (Height 25.4 mm).**
Date: 95-06-16	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The Hewlett Packard C3724S 1.2GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 1000 M byte mass storage in a 3.5" low profile form factor.

General performance specifications.

Electrical interface: SCSI-2 (8 bit, single ended).

Seek time (including settling time)

Track-to-track (read): 2.5 msec.
Average: 10 msec.
Maximum: 22 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 45 to 64 MHz.

Transfer rate at interface: 2.5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x1024x60)x(5400/60) = 44,236,800

General functional specifications.

Number of cylinders: 3495
Number of heads: 5

Formatted capacity 1000 Mbytes

MTBF: 800.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up Avg.	Start-up Peak	Idle Avg.	Idle Peak	Seeking Avg.	Seeking Peak	Ripple (maximum)
+5V ±5% maximum	0.68A		0.68A		0.76A		2%
+12 ±5% typical maximum		1.96A	0.34A		0.45A	1.96A	2%

Average power dissipation: 7.5 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 65 °C.

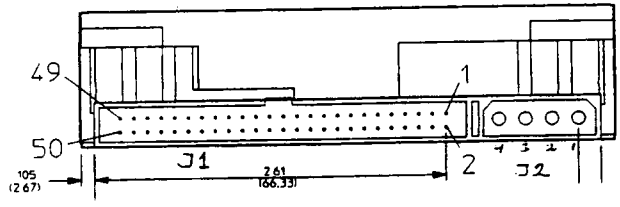
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 8 to 80 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.

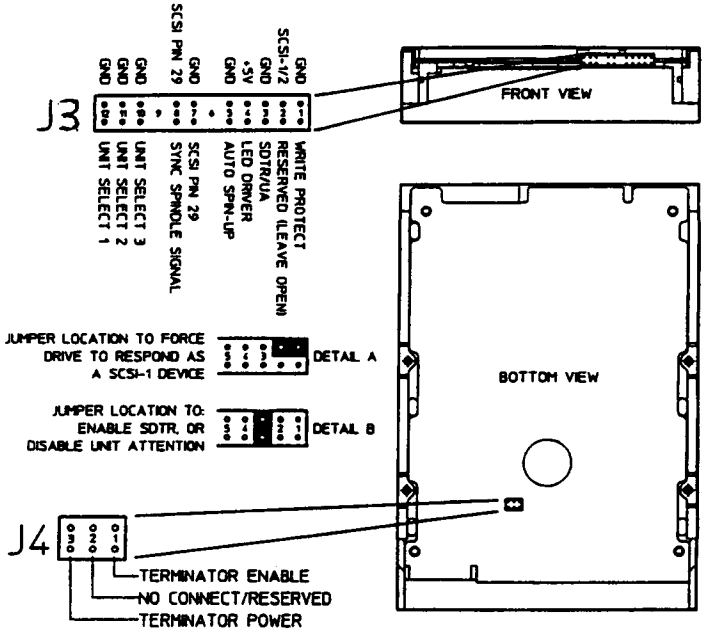


Power and interface connections.

J1: SCSI connector

J2: Power connector
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	US3(10)	US2(11)	US1(12)
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the TERMINATOR ENABLE jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

When used in hot-plug modules, the termination must NOT be enabled.

BUS termination power.

A jumper may be installed at TERMINATOR POWER to select the source of power to the termination.
* When a jumper is NOT installed in TERMINATOR POWER, only the drive provides terminator power. This setting should always be used.
When a jumper is installed in TERMINATOR POWER, terminator power is provided by the host system via interface cable J1 pin 26 OR by the drive.

* designates factory installed position.

BUS parity check.

The drive always generates and checks parity. There is no strap option for parity.

Spindle control.

* When a jumper is installed in AUTO SPIN UP, the drive starts the spindle motor at power up.
When a jumper is not installed in AUTO SPIN UP, the disk drive must wait for a Start Motor command to start the spindle motor.

When used in the SPC/3, the jumper must NOT be installed.

SDTR/UA.

This pin may select Synchronous Data Transfer Request or Unit Attention. The pin has a dual function according to the Mode Select page 23H bit setting.

When the disk is used in a Supermax or SPC/3, the strap should be removed. Default is then UA enabled.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperature and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
On installation, set the ID straps (or in case it's mounted in a hot plug module, connect the ID cable and LED cable, see below), mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller.
The Supermax Diagnostic Program is also used to initialize the disk for disk array/dual host systems.
Finally the disk configuration is carried out.

Strap overview:

When mounted in a Supermax:

> Strap mounted in position AUTO SPIN-UP and
> if required, also in TERMINATOR ENABLE.

When mounted in an SPC/3:

> Only the ID cable and the LED cable are connected to the strap pins.

ID cable and LED cable.

Two cables are connected to the strap pins of the disk drive:

1. The ID cable (with block of 6 wires), where the red wire corresponds to the ID2 position.
2. The LED cable (with block of 2 wires), where the red wire must connect to the +5V side of strap 4 and the black wire then connects to the lower pin of strap 4 (LED driver).

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Hewlett Packard:

HP C3324/C3724, C3325/C3725 3.5-inch SCSI-2 Disk Drives,
Technical Reference Manual, HP part number 5963-0277.

HP C3324/C3724, C3325/C3725 3.5-inch SCSI-2 Disk Drives,
Technical Installation Guide, HP part number 5963-0276.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Hewlett Packard C3323A 1.2GB.

Manufacturer: Hewlett Packard	**Sheet number: WD 24 revision 0**
Type: C3323A	**Form Factor: 3.5" LP (Height 25.4 mm).**
Date: 94-11-22	**Interface: SCSI-2, A-cable**

General Drive Description.

The Hewlett Packard C3323A 1.2GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 1000 M byte mass storage in a 3.5" low profile form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 2.5 msec.
Average: 10 msec.
Maximum: 22 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 32 to 53.3 MHz.

Transfer rate at interface: 2.5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x1024x50)x(5400/60) = 36,864,000

General functional specifications.

Number of cylinders: 2933
Number of heads: 7

Unformatted capacity 1209 Mbytes
Formatted capacity 1000 Mbytes

MTBF: 500.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5% maximum	0.59A		0.84A		0.92A		2%
+12 ±5% typical maximum	1.04A	1.39A	0.34A		0.45A	1.04A	2%

Average power dissipation: 8.3 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 65 °C.

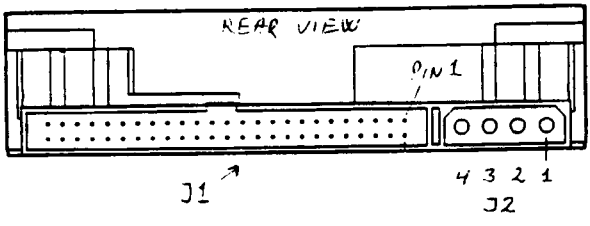
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 8 to 80 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.

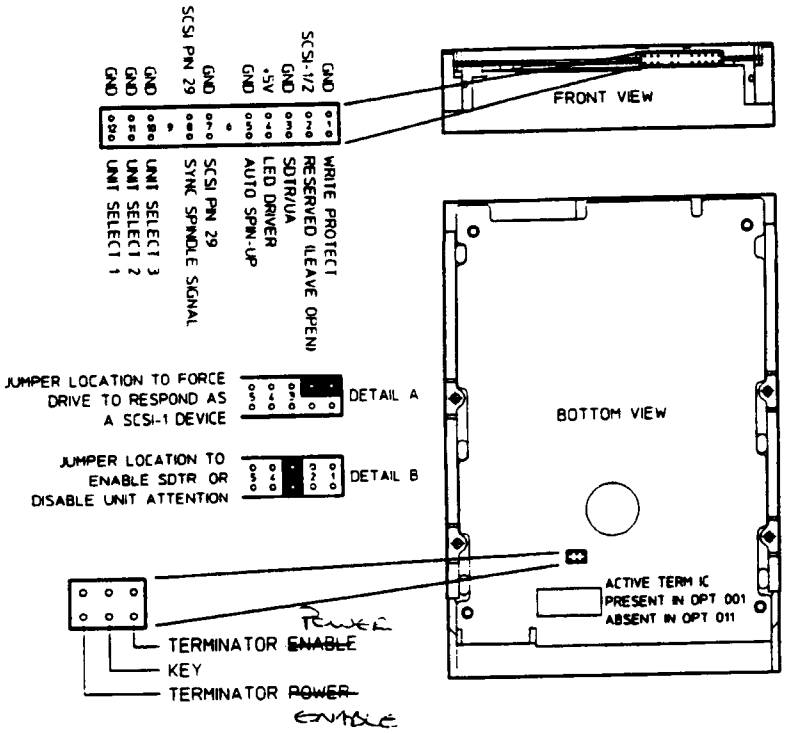


Power and interface connections.

J1: SCSI connector

J2: Power connector
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	US3 (10)	US2 (11)	US1 (12)
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the TERMINATOR ENABLE jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

BUS termination power.

A jumper may be installed at TERMINATOR POWER to select the source of power to the termination.

* When a jumper is NOT installed in TERMINATOR POWER, only the drive provides terminator power.

When a jumper is installed in TERMINATOR POWER, terminator power is provided by the host system via interface cable J1 pin 26 OR by the drive.

* designates factory installed position.

BUS parity check.

The drive always generates and checks parity. There is no strap option for parity.

Spindle control.

* When a jumper is installed in AUTO SPIN UP, the drive starts the spindle motor at power up.

When a jumper is not installed in AUTO SPIN UP, the disk drive must wait for a Start Motor command to start the spindle motor.

SDTR/UA.

This pin may select Synchronous Data Transfer Request or Unit Attention. The pin has a dual function according to the Mode Select page 23H bit setting.

When the disk is used in a Supermax, the strap should be removed. Default is then UA enabled.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperatur and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When installed in a new SM kabinet, a special mounting bracket is needed. This bracket will be supplied with the disk.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller.
The Diagnostic Program is also used to initialize the disk for disk array/dual host systems.
Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Hewlett Packard:

HP C3323A 3.5-inch SCSI-2 Disk Drives Technical Reference Manual.
HP C3323A 3.5-inch SCSI-2 Disk Drives Installation Guidelines.

SECTION 2.1

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SECTION 2.2 10

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, IBM DFHS S1F, 1.2GB.

Manufacturer: IBM	**Sheet number: WD 25 revision 0**
Type: DFHS S1F	**Form Factor: 3.5" LP (Height 25.4 mm).**
Date: 95-02-06	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The IBM DFHS S1F 1.2GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 1000 M byte mass storage in a 3.5" low profile form factor.

General performance specifications.

Electrical interface: SCSI-2 (8 bit, single ended).

Seek time (including settling time)

Track-to-track (read): 0.5 msec.
Average: 7.8 msec.
Maximum: 14 msec.

Rotational Latency Average: 4.17 msec.

Media transfer rate: 76 to 100 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x1024x64)x(7200/60) = 62,914,560

General functional specifications.

Number of cylinders: 4385
Number of heads: 4

Formatted capacity 1000 Mbytes

MTBF: 1.000.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up Avg.	Peak	Idle Avg.	Peak	Seeking Avg.	Peak	Ripple (maximum)
+5V ±5% maximum	0.96A		0.73A		0.96A		2%
+12 ±5% typical maximum	1.17A	1.50A	0.28A		0.36A	1.56A	2%

Average power dissipation: 7.0 W.

Environment.

Operating temperature range: 5 to 55 °C.

Storage temperature range: −40 to 65 °C.

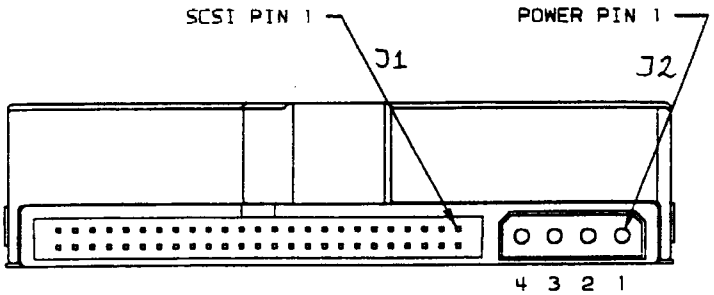
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 5 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.

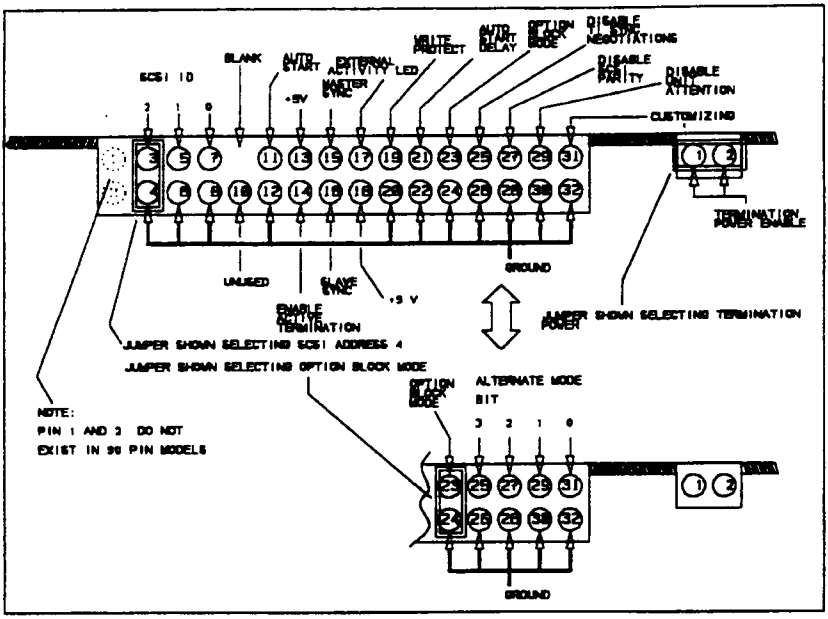


Power and interface connections.

J1: SCSI connector

J2: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



50 pin Single Ended Front Option Jumper Block (& TermPower Block)

Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2 (3)	ID1 (5)	ID0 (7)
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the ENABLE ACTIVE TERMINATION jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

When used in hot-plug modules, the termination must NOT be enabled.

BUS termination power.

This disk has an option of providing termination power to the SCSI bus.
* When a jumper is NOT installed in TERMINATION POWER ENABLE, the disk does not supply power to the SCSI TERMPWR line.
When a jumper is installed in TERMINATION POWER ENABLE, the disk will provide power to the SCSI bus via interface cable J1 pin 26.

This option is not used in DDE products.

* designates factory installed position.

BUS parity check.

When a jumper is installed in DISABLE SCSI PARITY, the drive does not check or generate parity.
* When a jumper is not installed in DISABLE SCSI PARITY, the disk checks and generates parity.

Spindle control.

* When a jumper is installed in AUTO START, the drive starts the spindle motor at power up.
When a jumper is not installed in AUTO START, the disk drive will wait for a Start Motor command to start the spindle motor.

When used in the SPC/3, the jumper must not be installed.

UNIT ATTENTION.

When a jumper is installed in DISABLE UNIT ATTENTION, the UA function is disabled.
* When a jumper is not installed in DISABLE UNIT ATTENTION, the UA function is enabled.

SYNC NEGOTIATE.

* When a jumper is installed in DISABLE TI SYNC NEGOTIATE, the disk does not initiate a Sync. Negotiate sequence after power on.
When a jumper is not installed in DISABLE TI SYNC NEGOTIATE, the disk will initiate a Sync. Negotiate sequence after power on.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperature and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
When mounted on one side, the mounting screws should be no longer than 3/16 inch (4.76 mm), as the maximum allowed penetration of the mounting screws is 3.8 mm. When mounted using the four bottom holes, the standard mounting screws (6 mm long) can be used.
On installation, set the ID straps (or in case it's mounted in a hot plug module, connect the ID cable and LED cable, see below), mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Diagnostic Program is also used to initialize the disk for disk array/dual host systems. Finally the disk configuration is carried out.

Strap overview:

When mounted in a Supermax:

> Straps mounted in positions AUTO START, DISABLE SYNC NEGOTIATE and if required, also in ENABLE ACTIVE TERMINATION.

When mounted in an SPC/3:

> Strap mounted in position DISABLE SYNC NEGOTIATE and the ID cable and the LED cable are connected to the strap pins.

ID cable and LED cable.

Two cables are connected to the strap pins of the disk drive:

1. The ID cable (with block of 6 wires), where the red wire corresponds to the ID2 position.
2. The LED cable (with block of 2 wires), where the red wire must connect to the strap pin marked +5V (p18) and the black wire then connects to EXTERNAL ACTIVITY LED (p17).

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from IBM:

IBM DFHS SCSI Models 3.5 Inch Disk Drives Functional Spec. Version 4.0
IBM DFHS SCSI Models 3.5 Inch Drives Interface Spec. Release 1.03

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, IBM DFHS S4F, 4.8GB.

Manufacturer: IBM	**Sheet number: WD 29 revision 0**
Type: DFHS S4F	**Form Factor: 3.5" LP (Height 42 mm).**
Date: 95-09-15	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The IBM DFHS S4F 4.8GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 4095 M byte mass storage in a 3.5" form factor.
This disk drive is only to be used in the Supermax Enterprise Server.

General performance specifications.

Electrical interface: SCSI-2 (8 bit, single ended).

Seek time (including settling time)

Track-to-track (read): 0.6 msec.
Average: 8.0 msec.
Maximum: 16.5 msec.

Rotational Latency Average: 4.17 msec.

Media transfer rate: 76 to 100 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x512x135)x(7200/60) = 66,355,200

General functional specifications.

Number of cylinders: 4171
Number of heads: 16

Formatted capacity 4095 Mbytes

MTBF: 1.000.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5% maximum	0.98A		0.76A		0.98A		2%
+12 ±5% typical maximum	1.98A	2.20A	0.77A		0.88A	2.07A	2%

Average power dissipation: 13 W.

Environment.

Operating temperature range: 5 to 55 °C.

Storage temperature range: −40 to 65 °C.

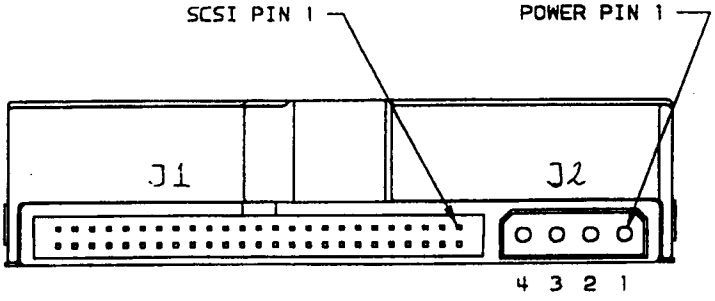
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 5 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.

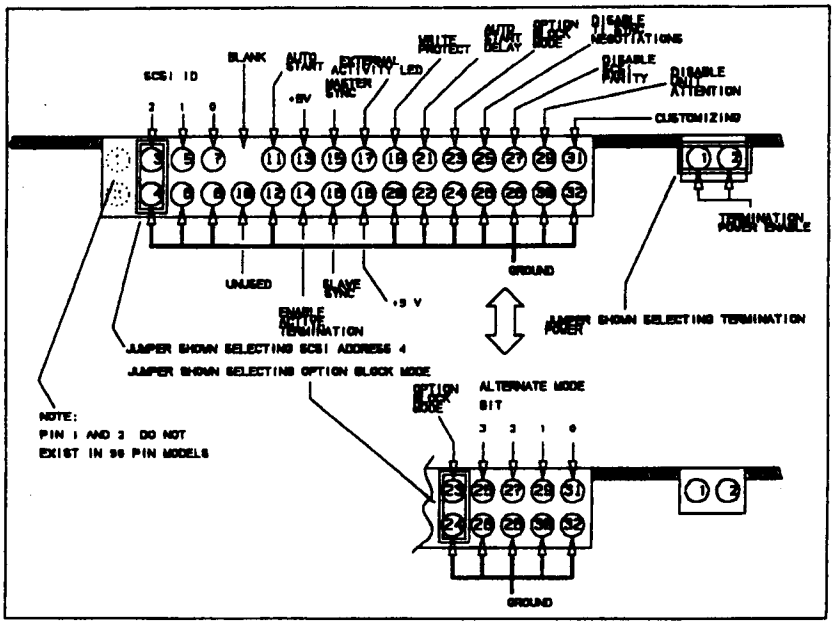


Power and interface connections.

J1: SCSI connector

J2: Power connector
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Configuration options.



50 pin Single Ended Front Option Jumper Block (& TermPower Block)

Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2 (3)	ID1 (5)	ID0 (7)
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the ENABLE ACTIVE TERMINATION jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

When used in hot-plug modules, the termination must NOT be enabled.

BUS termination power.

This disk has an option of providing termination power to the SCSI bus.
* When a jumper is NOT installed in TERMINATION POWER ENABLE, the disk does not supply power to the SCSI TERMPWR line.
When a jumper is installed in TERMINATION POWER ENABLE, the disk will provide power to the SCSI bus via interface cable J1 pin 26.

This option is not used in DDE products.

* designates factory installed position.

BUS parity check.

When a jumper is installed in DISABLE SCSI PARITY, the drive does not check or generate parity.
* When a jumper is not installed in DISABLE SCSI PARITY, the disk checks and generates parity.

Spindle control.

* When a jumper is not installed in AUTO START, the disk drive will wait for a Start Motor command to start the spindle motor.
When a jumper is installed in AUTO START, the drive starts the spindle motor at power up.

UNIT ATTENTION.

When a jumper is installed in DISABLE UNIT ATTENTION, the UA function is disabled.
* When a jumper is not installed in DISABLE UNIT ATTENTION, the UA function is enabled.

SYNC NEGOTIATE.

* When a jumper is installed in DISABLE TI SYNC NEGOTIATE, the disk does not initiate a Sync. Negotiate sequence after power on.
When a jumper is not installed in DISABLE TI SYNC NEGOTIATE, the disk will initiate a Sync. Negotiate sequence after power on.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperature and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When mounted on one side, the mounting screws should be no longer than 3/16 inch (4.76 mm), as the maximum allowed penetration of the mounting screws is 3.8 mm. When mounted using the four bottom holes, the standard mounting screws (6 mm long) can be used.
On installation, set the ID straps (or in case it's mounted in a hot plug module, connect the ID cable and LED cable, see below), mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller.

Strap overview:

When mounted in an Enterprise Server:

> Strap mounted in position DISABLE SYNC NEGOTIATE and the ID cable and the LED cable are connected to the strap pins.

ID cable and LED cable.

Two cables are connected to the strap pins of the disk drive:

1. The ID cable (with block of 6 wires), where the red wire corresponds to the ID2 position.
2. The LED cable (with block of 2 wires), where the red wire must connect to the strap pin marked +5V (p18) and the black wire then connects to EXTERNAL ACTIVITY LED (p17).

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from IBM:

IBM DFHS SCSI Models 3.5 Inch Disk Drives Functional Spec. Version 4.0
IBM DFHS SCSI Models 3.5 Inch Drives Interface Spec. Release 1.03

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, IBM DFHS S2F, 2.4GB.

Manufacturer: IBM	**Sheet number: WD 26 revision 0**
Type: DFHS S2F	**Form Factor: 3.5" LP (Height 25.4 mm).**
Date: 95-02-06	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The IBM DFHS S2F 2.4GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 2047 M byte mass storage in a 3.5" low profile form factor.

General performance specifications.

Electrical interface: SCSI-2 (8 bit, single ended).

Seek time (including settling time)

Track-to-track (read): 0.5 msec.
Average: 8.2 msec.
Maximum: 15 msec.

Rotational Latency Average: 4.17 msec.

Media transfer rate: 76 to 100 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x1024x64)x(7200/60) = 62,914,560

General functional specifications.

Number of cylinders: 4253
Number of heads: 8

Formatted capacity 2047 Mbytes

MTBF: 1.000.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up Avg.	Peak	Idle Avg.	Peak	Seeking Avg.	Peak	Ripple (maximum)
+5V ±5% maximum	0.96A		0.73A		0.96A		2%
+12 ±5% typical maximum	1.17A	1.50A	0.41A		0.50A	1.61A	2%

Average power dissipation: 8.6 W.

Environment.

Operating temperature range: 5 to 55 °C.

Storage temperature range: −40 to 65 °C.

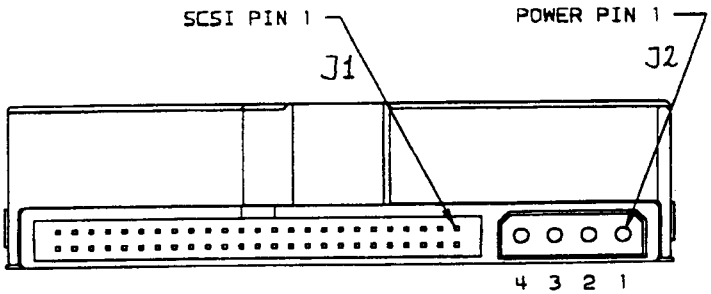
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 5 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.

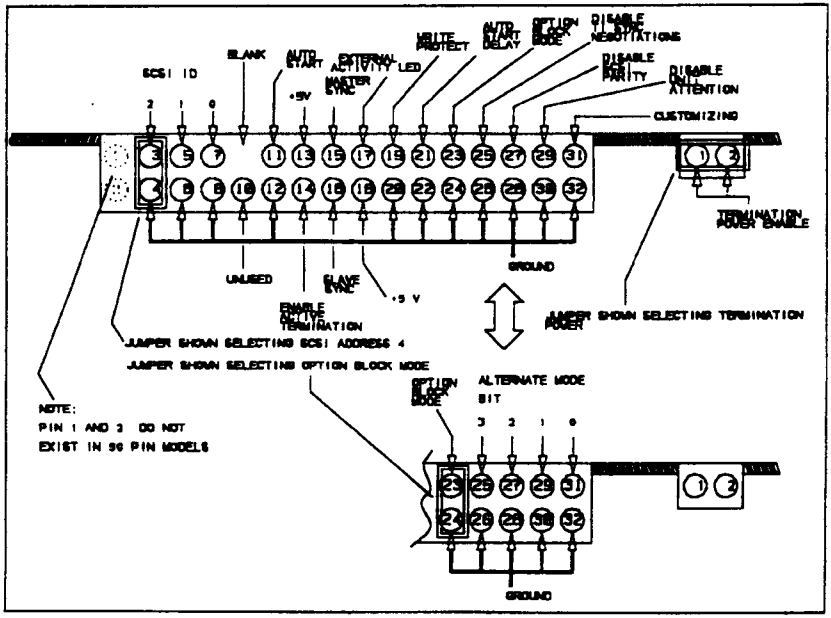


Power and interface connections.

J1: SCSI connector

J2: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



50 pin Single Ended Front Option Jumper Block (& TermPower Block)

Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2 (3)	ID1 (5)	ID0 (7)
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the ENABLE ACTIVE TERMINATION jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

When used in hot-plug modules, the termination must NOT be enabled.

BUS termination power.

This disk has an option of providing termination power to the SCSI bus.
* When a jumper is NOT installed in TERMINATION POWER ENABLE, the disk does not supply power to the SCSI TERMPWR line.
When a jumper is installed in TERMINATION POWER ENABLE, the disk will provide power to the SCSI bus via interface cable J1 pin 26.

This option is not used in DDE products.

* designates factory installed position.

BUS parity check.

When a jumper is installed in DISABLE SCSI PARITY, the drive does not check or generate parity.
* When a jumper is not installed in DISABLE SCSI PARITY, the disk checks and generates parity.

Spindle control.

* When a jumper is installed in AUTO START, the drive starts the spindle motor at power up.
When a jumper is not installed in AUTO START, the disk drive will wait for a Start Motor command to start the spindle motor.

When used in the SPC/3, the jumper must not be installed.

UNIT ATTENTION.

When a jumper is installed in DISABLE UNIT ATTENTION, the UA function is disabled.
* When a jumper is not installed in DISABLE UNIT ATTENTION, the UA function is enabled.

SYNC NEGOTIATE.

* When a jumper is installed in DISABLE TI SYNC NEGOTIATE, the disk does not initiate a Sync. Negotiate sequence after power on.
When a jumper is not installed in DISABLE TI SYNC NEGOTIATE, the disk will initiate a Sync. Negotiate sequence after power on.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperature and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
When mounted on one side, the mounting screws should be no longer than 3/16 inch (4.76 mm), as the maximum allowed penetration of the mounting screws is 3.8 mm. When mounted using the four bottom holes, the standard mounting screws (6 mm long) can be used.
On installation, set the ID straps (or in case it's mounted in a hot plug module, connect the ID cable and LED cable, see below), mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Diagnostic Program is also used to initialize the disk for disk array/dual host systems. Finally the disk configuration is carried out.

Strap overview:

When mounted in a Supermax:

> Straps mounted in positions AUTO START, DISABLE SYNC NEGOTIATE and if required, also in ENABLE ACTIVE TERMINATION.

When mounted in an SPC/3:

> Strap mounted in position DISABLE SYNC NEGOTIATE and the ID cable and the LED cable are connected to the strap pins.

ID cable and LED cable.

Two cables are connected to the strap pins of the disk drive:

1. The ID cable (with block of 6 wires), where the red wire corresponds to the ID2 position.
2. The LED cable (with block of 2 wires), where the red wire must connect to the strap pin marked +5V (p18) and the black wire then connects to EXTERNAL ACTIVITY LED (p17).

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from IBM:

IBM DFHS SCSI Models 3.5 Inch Disk Drives Functional Spec. Version 4.0
IBM DFHS SCSI Models 3.5 Inch Drives Interface Spec. Release 1.03

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Seagate ST12550N 2.4 GB.

Manufacturer: Seagate	**Sheet number: WD 23 revision 0**
Type: ST12550N	**Form Factor: 3.5" (height 42 mm).**
Date: 94-01-18	**Interface: SCSI-2, A-cable**

General Drive Description.

The Seagate ST12550N 2.4 GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 2047 M byte mass storage in a 3.5" form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 0.6 msec.
Average: 8.0 msec.
Maximum: 19 msec.

Rotational Latency Average: 4.17 msec.

Media transfer rate: 36 to 56 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x1024x42)x(7200/60) = 41,287,680

General functional specifications.

Number of cylinders: 2657
Number of heads: 19

Unformatted capacity 2566 Mbytes
Formatted capacity 2047 Mbytes

MTBF: 500.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5% maximum	0.7A	-	0.7A	-	0.7	-	2%
+12 ±5% typical			0.7A	-			2%
maximum	2.5A	2.5A			-	-	

Average power dissipation: 12 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 70 °C.

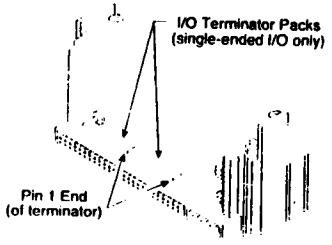
Maximum temperature gradient: 25 °C/hour.

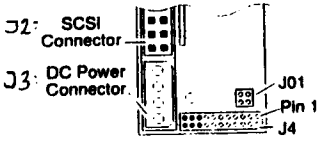
Operating humidity : 8 to 80 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.





Power and interface connections.

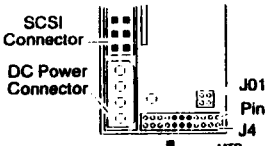
J1: Terminator power options.

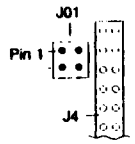
J2: SCSI connector

J3: Power connector
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

J4: Option settings

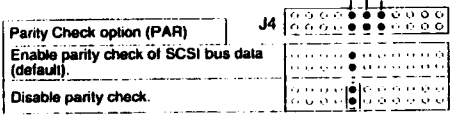
Configuration options.





Terminator power options. These jumpers determine how termination is supplied.	
Terminator power from the drive (default). The drive provides its own terminator power.	
Terminator power from pin 26 on the SCSI bus.	
Terminator power to the SCSI bus. The drive supplies power to pin 26 on the SCSI bus.	
Terminator power to the SCSI bus and drive.	

Setting terminator power jumpers



Parity Check option (PAR)	
Enable parity check of SCSI bus data (default).	
Disable parity check.	

Motor Start option (MTR)	
Enable motor start (default). This makes the drive wait for the Start unit command from the host before starting the spindle motor.	
Disable motor start. This causes the drive to start according to the Delay Motor Start option setting as described below.	

Delay Motor Start option (DMS) (valid only if the Motor Start jumper is not connected)	
Motor start delay equal to the SCSI ID multiplied by 16 seconds. For example, if the SCSI ID = 2, the drive will delay for 32 seconds before starting.	
Disable the delay motor start option (default).	

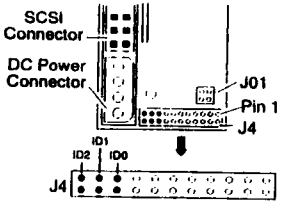
Write Protect option (WP)	
Write Protect = On (disables writing).	
Write Protect = Off (enables writing – default).	

Remote LED Connector*	
Pin 5 (top pin in this illustrason) is negative, Pin 6 (bottom pin) is positive.*	

Reserved (RES)	
Reserved for future use.	

Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x



Terminator resistors.

Interface terminator pack right next to the SCSI connector provides termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

BUS termination power.

A jumper may be installed at J01 to select the source of power to the termination, see drawing.

* When a jumper is installed in pin 1 and pin 2 of J01, only the drive provides terminator power.

* designates factory installed position.

BUS parity check.

* When a jumper is not installed at PAR, the disk drive generates and checks parity on the SCSI cable.

When a jumper is installed at PAR, the disk drive does not generate or check parity on the SCSI cable.

Spindle control.

* When a jumper is not installed in MTR, the drive starts the spindle motor at power up (DMS not conn.)

When a jumper is installed in MTR, the disk drive must wait for a Start Motor command to start the spindle motor.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.

During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.

When transported to a customer site the disk must be allowed to adjust to the temperatur and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.

When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.

On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.

It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Diagnostic Program is also used to initialize the disk for disk array/dual host systems. Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Seagate:

Seagate Barracuda Disc Drive ST12550N/ND Installation Guide.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Seagate ST15150N, 4.8GB.

Manufacturer: Seagate	**Sheet number: WD 30 revision 1**
Type: ST15150N	**Form Factor: 3.5" LP (Height 43 mm).**
Date: 95-10-09	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The Seagate ST15150N 4.8GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 4095 M byte mass storage in a 3.5" form factor.
This disk drive is only to be used in the Supermax Enterprise Server.

General performance specifications.

Electrical interface: SCSI-2 (8 bit, single ended).

Seek time (including settling time)

Track-to-track (read): 0.6 msec.
Average: 8.0 msec.
Maximum: 17 msec.

Rotational Latency Average: 4.17 msec.

Media transfer rate: 42.4 to 72 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x512x108)x(7200/60) = 53,084,160

General functional specifications.

Number of cylinders: 3713
Number of heads: 21

Formatted capacity 4095 Mbytes

MTBF: 800.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5% maximum	0.96A		0.92A		1.30A		2%
+12 ±5% typical maximum	1.20A	2.18A	0.80A		1.20A	1.87A	2%

Average power dissipation: 12 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 70 °C.

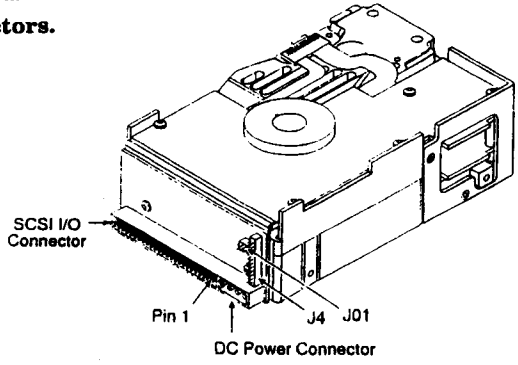
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 5 to 95 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.

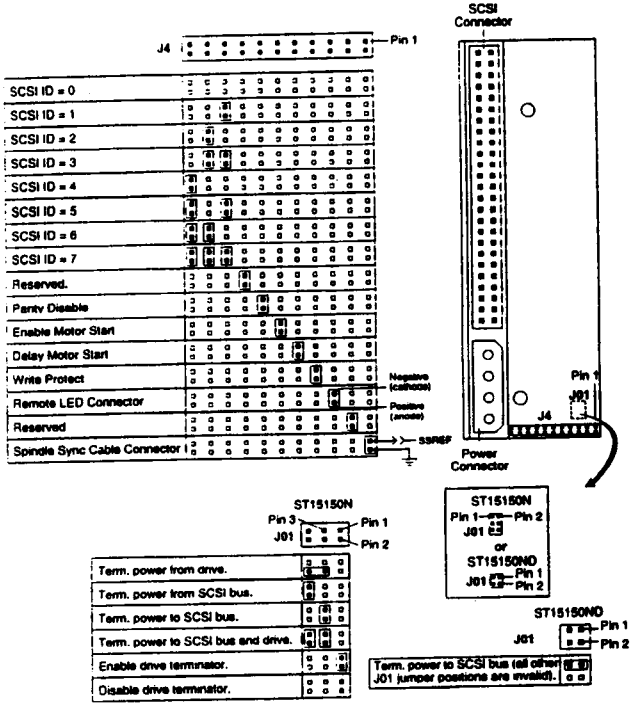


Power and interface connections.

X1: SCSI connector

X2: Power connector
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	J4 21-22	J4 19-20	J4 17-18
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the ENABLE DRIVE TERMINATOR (J01) jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

When used in hot-plug modules, the termination must NOT be enabled.
When used in hot-plug modules, also the Term. Power From Drive jumper should be removed.

BUS termination power.

This disk has several options of termination power connections, see Configuration options.
* When a jumper is installed on pin 4 and pin 6 of J1, the disk will provide power to the active termination resistors.
When a jumper is NOT installed on pin 4 and 6 of J1, the disk will not provide power to the internal terminations. This setting should be used in hot-plug modules.

* designates factory installed position.

BUS parity check.

When a jumper is installed in PARITY DISABLE (J4), the drive does not check or generate parity.
* When a jumper is not installed in PARITY DISABLE, the disk checks and generates parity.

Spindle control.

* When a jumper is installed in ENABLE MOTOR START, the disk drive will wait for a Start Motor command to start the spindle motor.
When a jumper is NOT installed in ENABLE MOTOR START (J4), the drive starts the spindle motor at power up.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperature and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When mounted on one side, the mounting screws should be no longer than 3/16 inch (4.76 mm), as the maximum allowed penetration of the mounting screws is 3.8 mm. When mounted using the four bottom holes, the standard mounting screws (6 mm long) can be used.
On installation, set the ID straps (or in case it's mounted in a hot plug module, connect the ID cable and LED cable, see below), mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller.

Strap overview:

When mounted in an Enterprise Server:

Strap mounted in position MOTOR START ENABLE and the ID cable and the LED cable are connected to the strap pins.

ID cable and LED cable.

Two cables are connected to the strap pins of the disk drive:

1. The ID cable (with block of 6 wires), where the red wire corresponds to the ID2 position.
2. The LED cable (with block of 2 wires), where the red wire must connect to the strap pin marked Positive and the black wire then connects to the Negative pin (Remote LED connector on J4).

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Seagate:
Barracuda 4 Disc Drive ST15150N/ND Product Manual, Volume 1
Disc Drive SCSI-2/SCSI-3 Interface ST15150 Family Product Manual, Volume 2, Vers. 2
Barracuda 4 Family ST15150N/ND Installation Guide.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Seagate ST32550N, 2.4GB.

Manufacturer: Seagate	**Sheet number: WD 27 revision 0**
Type: ST32550N	**Form Factor: 3.5" LP (Height 25.4 mm).**
Date: 95-06-15	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The Seagate ST32550N 2.4GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 2047 M byte mass storage in a 3.5" low profile form factor.

General performance specifications.

Electrical interface: SCSI-2 (8 bit, single ended).

Seek time (including settling time)

Track-to-track (read): 0.8 msec.
Average: 8.5 msec.
Maximum: 19 msec.

Rotational Latency Average: 4.17 msec.

Media transfer rate: 47.5 to 72 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x1024x56)x(7200/60) = 55,050,240

General functional specifications.

Number of cylinders: 3454
Number of heads: 11

Formatted capacity 2047 Mbytes

MTBF: 800.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5% maximum	0.94A		0.88A		0.94A		2%
+12 ±5% typical maximum	1.33A	1.93A	0.50A		0.78A	1.60A	2%

Average power dissipation: 8.9 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 70 °C.

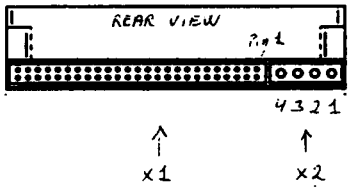
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 5 to 95 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Notes:

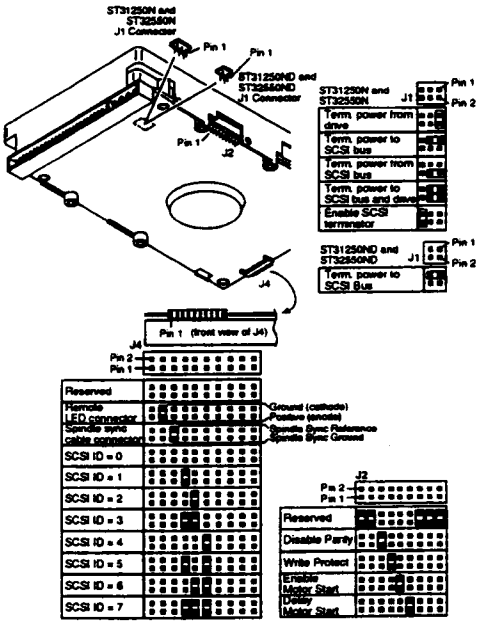
[1] Mounting holes three on each side, 6-32 UNC. Max screw length into side of drive 0.15 in. (3.81 mm). Screw tightening torque 6.0 in-lb (.675 NM) max with minimum thread engagement of 0.12 in. (3.05 mm).

Power and interface connections.

X1: SCSI connector

X2: Power connector
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	J4 11-12	J4 9-10	J4 7-8
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the ENABLE SCSI TERMINATOR jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

When used in hot-plug modules, the termination must NOT be enabled.
When used in hot-plug modules, also the Term. Power From Drive jumper should be removed.

BUS termination power.

This disk has several options of termination power connections, see Configuration options.
* When a jumper is installed on pin 1 and pin 2 of J1, the disk will provide power to the active termination resistors.
When a jumper is NOT installed on pin 1 and 2 of J1, the disk will not provide power to the internal terminations. This setting should be used in hot-plug modules.

* designates factory installed position.

BUS parity check.

When a jumper is installed in DISABLE PARITY (J2), the drive does not check or generate parity.
* When a jumper is not installed in DISABLE PARITY, the disk checks and generates parity.

Spindle control.

* When a jumper is NOT installed in ENABLE MOTOR START, the drive starts the spindle motor at power up.
When a jumper is installed in ENABLE MOTOR START, the disk drive will wait for a Start Motor command to start the spindle motor.

When used in the SPC/3, the jumper must be installed.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperature and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
When mounted on one side, the mounting screws should be no longer than 3/16 inch (4.76 mm), as the maximum allowed penetration of the mounting screws is 3.8 mm. When mounted using the four bottom holes, the standard mounting screws (6 mm long) can be used.
On installation, set the ID straps (or in case it's mounted in a hot plug module, connect the ID cable and LED cable, see below), mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Supermax Diagnostic Program is also used to initialize the disk for disk array/dual host systems.
Finally the disk configuration is carried out.

Strap overview:

When mounted in a Supermax:

> Straps mounted in positions Term. Power From Drive (J1) and
> if required, also in ENABLE SCSI TERMINATOR.
> DIOC III disk controller chips (S9 and S59) must not be marked PROTO.
> When mounted using the four bottom screws ensure that the straps (J2) do not touch the mounting bracket.

When mounted in an SPC/3:

> Strap mounted in position MOTOR START ENABLE and the
> ID cable and the LED cable are connected to the strap pins.

ID cable and LED cable.

Two cables are connected to the strap pins of the disk drive:

1. The ID cable (with block of 6 wires), where the yellow wire corresponds to the ID2 position.
2. The LED cable (with block of 2 wires), where the yellow wire must connect to the strap pin marked Positive and the black wire then connects to the Ground pin (Remote LED connector on J4).

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Seagate:

Barracuda 2LP Disc Drive ST32550N/ND Product Manual, Volume 1
Disc Drive SCSI-2/SCSI-3 Interface ST32550 Family Product Manual, Volume 2, Vers. 2
Barracuda 2LP Disc Drive ST32550N/ND Installation Guide.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Hewlett Packard C2244 600MB.

Manufacturer: Hewlett Packard	**Sheet number: WD 22 revision 0**
Type: C2244	**Form Factor: 3.5" (height 42 mm).**
Date: 93-10-26	**Interface: SCSI-2, A-cable**

General Drive Description.

The Hewlett Packard C2244 600MB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 512 M byte mass storage in a 3.5" form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 2.5 msec.
Average: 10.5 msec.
Maximum: 22 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 24.8 to 42.6 MHz.

Transfer rate at interface: 2.5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x1024x40)x(5400/60) = 29,491,200

General functional specifications.

Number of cylinders: 1975
Number of heads: 7

Unformatted capacity 647 Mbytes
Formatted capacity 512 Mbytes

MTBF: 300.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5%							2%
maximum	0.93A	1.03A	0.93A	1.03A	0.93A	1.03A	
+12 ±5%							2%
typical	2.45A	2.45A	0.54A	0.54A	0.82A	1.2A	
maximum	2.5A	2.5A	0.57A	0.57A	0.85A	1.5A	

Average power dissipation: 12.6 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 65 °C.

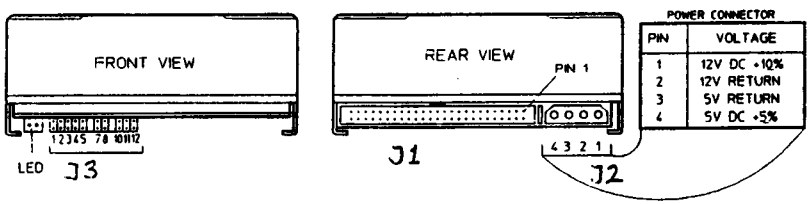
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 8 to 80 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



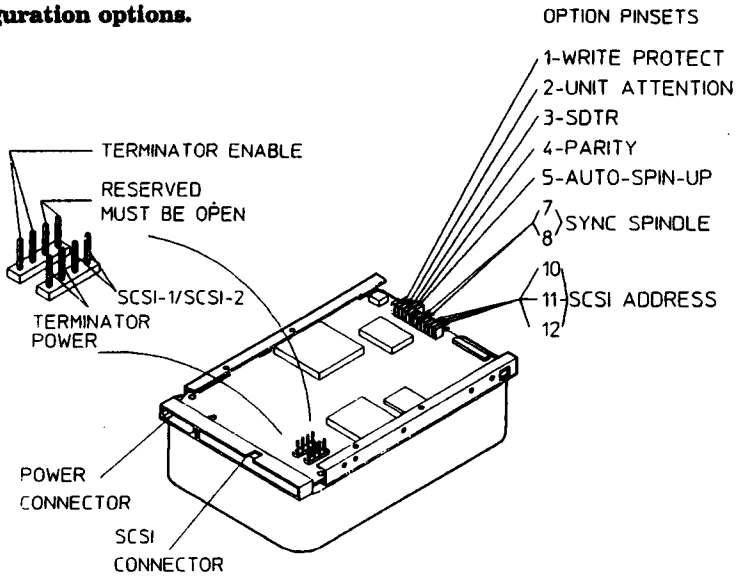
Power and interface connections.

J1: SCSI connector

J2: Power connector

J3: Option settings
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2 (10)	ID1 (11)	ID0 (12)
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the TERMINATOR ENABLE jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

BUS termination power.

A jumper may be installed at TERMINATOR POWER to select the source of power to the termination.
* When a jumper is NOT installed in TERMINATOR POWER, only the drive provides terminator power.
When a jumper is installed in TERMINATOR POWER, terminator power is provided by the host system via interface cable J1 pin 26 OR by the drive.

* designates factory installed position.

BUS parity check.

* When a jumper is installed at PARITY, the disk drive generates and checks parity on the SCSI cable.
When a jumper is not installed at PARITY, the disk drive does not generate or check parity on the SCSI cable.

Spindle control.

* When a jumper is installed in AUTO SPIN UP, the drive starts the spindle motor at power up.
When a jumper is not installed in AUTO SPIN UP, the disk drive must wait for a Start Motor command to start the spindle motor.

Unit Attention.

* When a jumper is installed at Unit Attention, the Unit Attention function is enabled.
When a jumper is not installed at Unit Attention, the Unit Attention function is disabled.

When the disk is used in a Supermax, the Unit Attention strap should be changed from the factory default to Unit Attention disabled, i.e. the strap should be removed.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperatur and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When installed in a new SM kabinet, a special mounting bracket is needed. This bracket will be supplied with the disk.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller.
The Diagnostic Program is also used to initialize the disk for disk array/dual host systems.
Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Hewlett Packard:

HP C2240 Series 3.5-inch SCSI-2 Disk Drive Technical Reference Manual.
HP C2244/45/46/47 3.5-inch SCSI-2 Disk Drives Installation Guidelines.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Hewlett Packard C2247 1.2GB.

Manufacturer: Hewlett Packard	**Sheet number: WD 21 revision 0**
Type: C2247	**Form Factor: 3.5" (Height 42 mm).**
Date: 93-10-26	**Interface: SCSI-2, A-cable**

General Drive Description.

The Hewlett Packard C2247 1.2GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 1000 M byte mass storage in a 3.5" full hight form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 2.5 msec.
Average: 10.5 msec.
Maximum: 22 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 24.8 to 42.6 MHz.

Transfer rate at interface: 2.5 Mbyte/s. (asynchronous)
Transfer rate at interface: 10 Mbyte/s. (synchronous)

Data Bit Transfer Rate: DTBR = (8x1024x40)x(5400/60) = 29,491,200

General functional specifications.

Number of cylinders: 1975
Number of heads: 13

Unformatted capacity 1201 Mbytes
Formatted capacity 1000 Mbytes

MTBF: 300.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5% maximum	0.93A	1.03A	0.93A	1.03A	0.93A	1.03A	2%
+12 ±5% typical	2.45A	2.45A	0.54A	0.54A	0.82A	1.2A	2%
maximum	2.5A	2.5A	0.57A	0.57A	0.85A	1.5A	

Average power dissipation: 12.6 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: −40 to 65 °C.

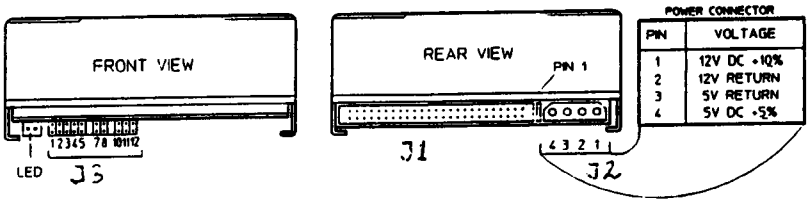
Maximum temperature gradient: 20 °C/hour.

Operating humidity : 8 to 80 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



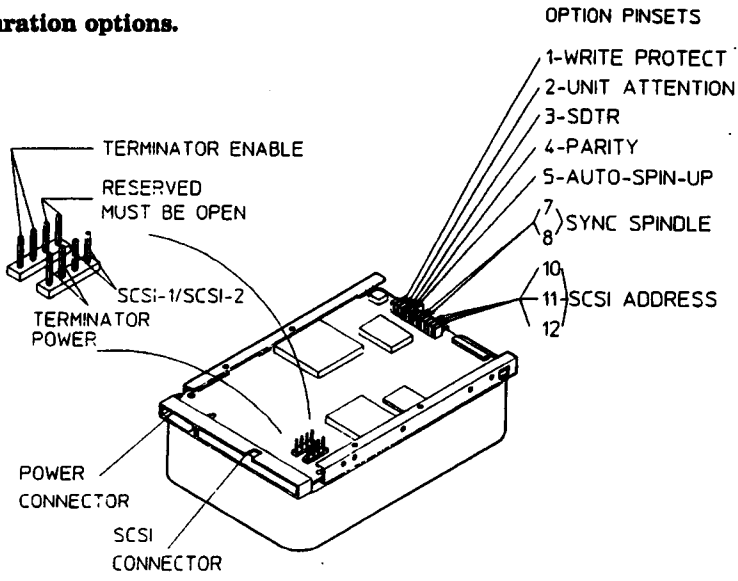
Power and interface connections.

J1: SCSI connector

J2: Power connector

J3: Option settings
- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2 (10)	ID1 (11)	ID0 (12)
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

This disk drive is using active termination of the interface lines.
The interface terminators are connected to the interface lines when the TERMINATOR ENABLE jumper is installed. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators enabled.

BUS termination power.

A jumper may be installed at TERMINATOR POWER to select the source of power to the termination.
* When a jumper is NOT installed in TERMINATOR POWER, only the drive provides terminator power.
When a jumper is installed in TERMINATOR POWER, terminator power is provided by the host system via interface cable J1 pin 26 OR by the drive.

* designates factory installed position.

BUS parity check.

* When a jumper is installed at PARITY, the disk drive generates and checks parity on the SCSI cable.
When a jumper is not installed at PARITY, the disk drive does not generate or check parity on the SCSI cable.

Spindle control.

* When a jumper is installed in AUTO SPIN UP, the drive starts the spindle motor at power up.
When a jumper is not installed in AUTO SPIN UP, the disk drive must wait for a Start Motor command to start the spindle motor.

Unit Attention.

* When a jumper is installed at Unit Attention, the Unit Attention function is enabled.
When a jumper is not installed at Unit Attention, the Unit Attention function is disabled.

When the disk is used in a Supermax, the Unit Attention strap should be changed from the factory default to Unit Attention disabled, i.e. the strap should be removed.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system.
During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet.
When transported to a customer site the disk must be allowed to adjust to the temperatur and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.
When installed in a new SM kabinet, a special mounting bracket is needed. This bracket will be supplied with the disk.
When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.
On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.
It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller.
The Diagnostic Program is also used to initialize the disk for disk array/dual host systems.
Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Hewlett Packard:

HP C2240 Series 3.5-inch SCSI-2 Disk Drive Technical Reference Manual.
HP C2244/45/46/47 3.5-inch SCSI-2 Disk Drives Installation Guidelines.

Adaptec ACB 4000

The Adaptec ACB 4000 controller can control up to two 5.25 inch winchester disk drives with ST-506 interface.
The controller is not initialized by the program. At reset time the controller reads the disk parameters from the disk. Therefore, the program is able to read the disk parameters from the controller. If the controller is unable to read the parameters, the program will report an error. The following disk parameters are read by the program from the controller or typed in by the user:

Number of cylinders
Number of heads
Starting reduced write current
Starting write precompensation
Step period

If the user wants to modify these parameters, it will only affect the controller if the drive is formatted.

The control byte must always be set to 00 Hex. Error correction and retries cannot be disabled.

Adaptec controller has 33 sectors/track when using interleave factor 2 or more, but only 32 sectors/track using interleave factor 1.

3.0 HARDWARE INSTALLATION

3.1 INTRODUCTION

This section describes the steps necessary to install the ACB-4000A and 4070 hardware. First the operating enviroment, unpacking procedure, and board layout are described. This section also describes the integration of the drive, controller, and host adapter.

3.2 ENVIRONMENTAL REQUIREMENTS

The ACB-4000 Series Controllers will perform properly over the following range of conditions:

	Operating	Storage
Temperature (F/C)	32/0 to 131/55	-40/-40 to 167/75
Humidity	10% to 95%	10% to 95%
Altitude, feet	Sea level to 10,000	Sea level to 20,000
MTBF, Hours	20,000 POH @ 55 C	

3.3 UNPACKING

The carrier is responsible for damage incurred during shipment. In case of damage, have the carrier note the damage on both the delivery receipt and the freight bill, then notify your freight company representative so that the necessary insurance claims can be initiated.

After opening the shipping container, use the packing slip to verify receipt of the individual items listed on the slip. Retain the shipping container and packing material for possible later reuse should return of the equipment to the factory be necessary.

NOTE:
THEACB-4000A AND 4070, LIKE ALL ELECTRONIC EQUIPMENT, ARE STATIC SENSITIVE. PLEASE TAKE THE PROPER PRECAUTIONS WHEN HANDLING THE BOARD. KEEP THE BOARD IN ITS CONDUCTIVE WRAPPING UNTIL IT IS CONFIGURED AND READY TO BE INSTALLED IN YOUR SYSTEM.

3.4 BOARD LAYOUT

The ACB-4000A is shown in Figure 3-1. The ACB-4070 is shown in Figure 3-2. These figures show the location of the firmware, key components, terminators, jumpers and connectors.

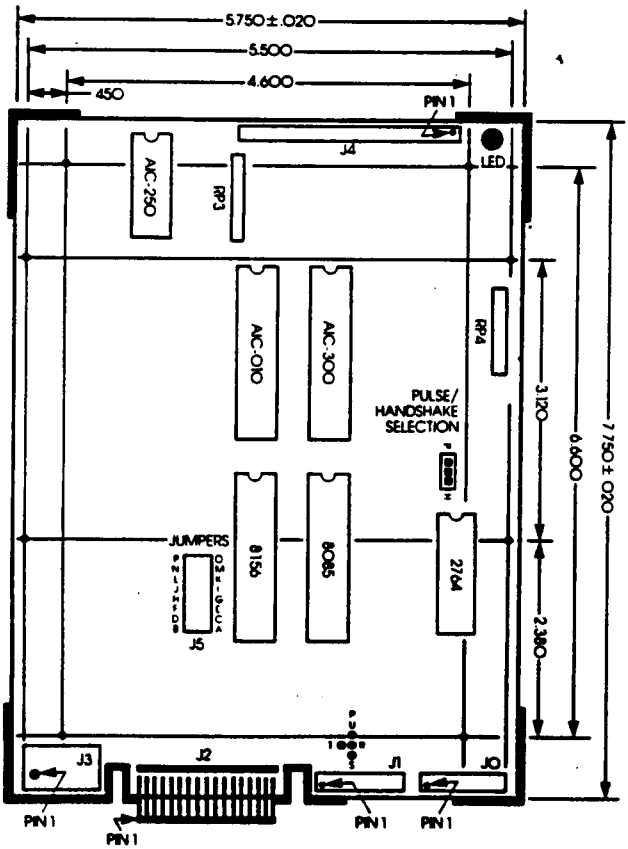


FIGURE 3-1. ACB-4000A BOARD LAYOUT

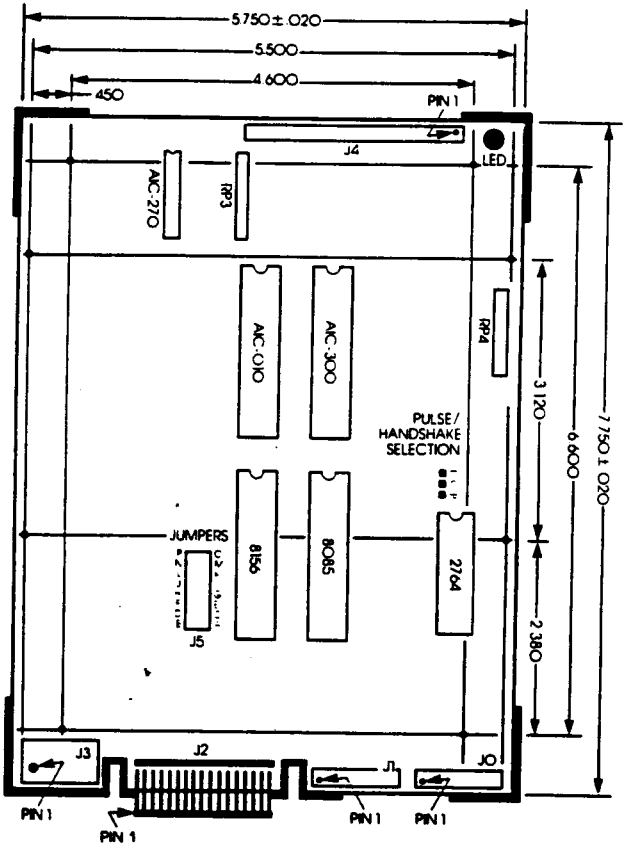


FIGURE 3-2. ACB-4070 BOARD LAYOUT

3.5 INTEGRATION OF CONTROLLER AND DRIVE

To install the Adaptec ACB-4000A or 4070 board into your system you must first configure the drive(s), set the controller jumpers and connect the drive cables properly. This section describes all the necessary steps needed to successfully install this hardware.

In order to configure the drives, you need the Disk Drive OEM Manual that was supplied with your drive. (If you do not have this manual call your Drive vendor for assistance.) This manual is required to obtain the drive characteristics for your particular drive.

3.5.1 DRIVE SELECTION AND TERMINATION

The drive changeable parameters are the drive selection switches (or jumpers) and the drive termination. These parameters allow a drive to be selected as drive 0, 1, 2 or 3. This is accomplished by changing the drive address selection switches or jumpers.

NOTE:
SOME DRIVE MANUFACTURERS HAVE DESIGNATED THE DRIVE ADDRESSES TO BE 1,2,3,4 INSTEAD OF 0,1,2,3. DO NOT SET THE DRIVE AS A RADIAL SELECTED DRIVE. RADIAL SELECTION WILL SET ALL DRIVE OUTPUT SIGNALS TO BE ACTIVE, EVEN IF THE DRIVE IS NOT SELECTED. IN THIS CASE, THE DRIVE LED WILL BE ON AT ALL TIMES.

Use the two lowest drive addresses available as drive "0" and drive "1" to be seen by the controller.

Before the drives can be cabled to the controller the drive cable terminator must be properly set. The terminator is used to reduce signal "ringing" in the cables. The terminator, as its name implies, must be at the end of each cable in order to have the controller and drive communicate properly. The controller has a permanent terminator built-in. The disk drives, since they can be connected in a daisy chain configuration have a removable terminator. This is usually a 16-pin DIP resistor package. The last physical drive in the chain must have its terminator installed (see Figures 3-3 and 3-4).

Example 1: When one drive and one controller are used, both must be terminated.

FIGURE 3-3. ONE DRIVE, ONE CONTROLLER TERMINATION EXAMPLE

Example 2: When two drives and one controller are used, only the last one in the chain is terminated.

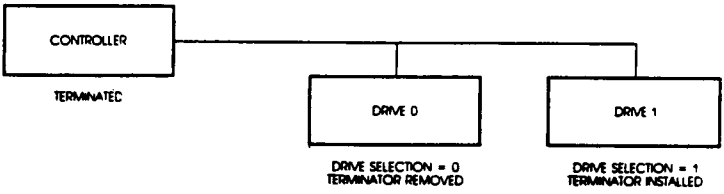


FIGURE 3-4. TWO DRIVES, ONE CONTROLLER TERMINATION EXAMPLE

Now select the proper drive addresses and remove or install the required terminators for your configuration.

3.5.2 CONTROLLER JUMPER SELECTION

The controller changeable parameters are defined as the variables that can be changed on the controller to accommodate the different drive characteristics. These parameters can easily be changed by use of the MODE SELECT command and by the use of the jumpers defined in Table 3-1.

TABLE 3-1. DEFINITION OF JUMPERS

Jumper	Definition	Installed	Removed
A-B	LSB of Controller's SCSI Address	bit = 1	bit = 0
C-D	Controller's SCSI Address	bit = 1	bit = 0
E-F	MSB of Controller's SCSI Address	bit = 1	bit = 0
G-H	DMA Transfer Rate	SYSCLOCK/4	DATACLOCK/2
I-J	Extended Command Set (See Appendix D)	Enabled	Disabled
K-L	Not Used		
M-N	Support of Syquest 312, DMA 360 and drives that drop SEEK COMPLETE signal during head switching	Enabled	Disabled
O-P	Self Diagnostics	Enabled	Disabled
R-PU *	Write Precompensation turned off for both drives	Enabled	Disabled
R-S *	Write Precomp starts at same cylinder as reduced write current for both drives	Enabled	Disabled
R-T *	Write Precomp is applied to all tracks for both drives	Enabled	Disabled

NOTE: * denotes that these jumpers are for the ACB-4000A only, they are not present on the ACB-4070.

The jumpers are divided into five categories: SCSI address, host adapter options, drive options, write precompensation options and self diagnostics.

Jumpers A-B, C-D and E-F are used to select the controller's SCSI device ID or address. They determine how the controller will be identified when installed in the SCSI bus.

Jumper G-H is used to select two DMA transfer rates on the SCSI bus. When removed, the controller will transfer data at the maximum rate allowed by the controller, equal to DATACLOCK/2. Some host adapters cannot support this data rate. When this jumper is installed, the data transfer rate is reduced to run at a rate of SYSCLOCK/4 on single sector transfers. This is one-half of the controller's maximum DMA speed. Multisector transfers are always made at the maximum rate of DATACLOCK/2, with or without this jumper.

Jumper I-J is used to enable the extended command set. This is used only when replacing SASI-type controllers. See Appendix D for details.

Jumper M-N is installed to support drives that drop the SEEK COMPLETE line on the ST506/412 interface during head switches. Soft-sectored removable media drives that have wedge servo information of all surfaces require this jumper to be installed. Syquest 312 10 MB and DMA 360 10 MB drives require this jumper to be installed. The installation of this jumper does not affect operation of drives that do not drop SEEK COMPLETE between head switches.

Jumpers R-PU, R-S and R-T are used to select write precompensation for both drives. Only one of these options can be used at a time. This hardware jumper overrides any software selection made in the MODE SELECT command (see Section 5). The write precompensation used is 12ns. The ACB-4070 controller does not have these jumpers since 2,7 RLL encoding does not use write precompensation. Please see Figure 3-1 for location of these jumpers.

NOTE:
ON THE ACB-4000A, THESE JUMPERS ARE ORIENTED DIFFERENTLY THAN ON THE ACB-4000.

Jumper O-P is used to enable the ACB-4000 Series Controllers' Self Diagnostics. These diagnostics test the internal circuitry of the controller and can be used for incoming inspection of boards and test the internal circuitry of the controller. See Section 6 for operation and associated error codes.

Configure the jumpers at this time to meet your drive and system requirements.

3.5.3 CONTROLLER AND DRIVE CABLING

Now that the drive and controller are configured, they can be connected together. The controller has three drive cable connectors J0, J1 ,and J2. These are described in Table 3-2.

TABLE 3-2. CONTROLLER TO ST506/412 CONNECTOR DEFINITIONS

Connector	Signals	Cable
J0	Data	20-pin flat ribbon cable Connected to drive 0
J1	Data	20-pin flat ribbon cable Connected to drive 1
J2	Control	34-pin flat ribbon cable Connected to both drives 0 and 1

Connector	Recommended Plug	Maximum Length
J0	3M Part # 3421	20 feet (6 meters)
J1	3M Part # 3421	20 feet (6 meters)
J2	3M Part # 3414	20 feet (6 meters)

The connector locations and pin orientation for the ACB-4000A connectors are shown in Figure 3-1, and for the ACB-4070 in Figure 3-2.

NOTE:
PIN 1 OF J0, J1 AND J2 IS LOCATED ON THE SIDE CLOSEST TO THE POWER CONNECTOR.

Connect the cables as shown in Figure 3-5.

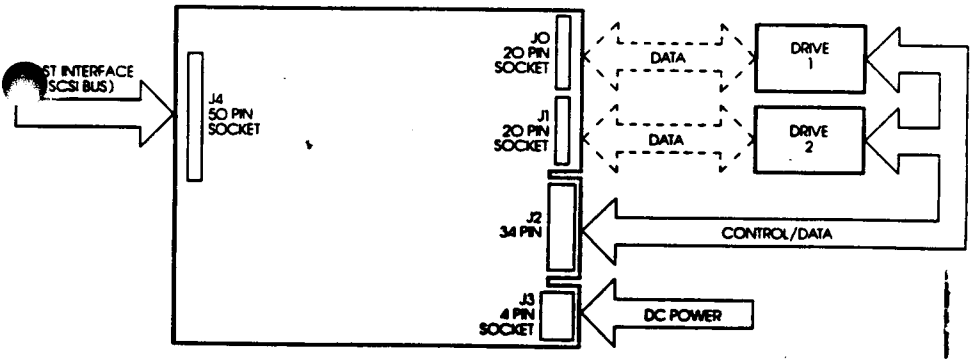


FIGURE 3-5. CONTROLLER CABLING

3.5.4 CONTROLLER POWER REQUIREMENTS AND GROUNDING

The power requirements for the ACB-4000 Series Controllers are shown in Table 3-3.

TABLE 3-3. POWER REQUIREMENTS

Voltage (Volts)	Tolerance	Current (Max. Amps)	Ripple (Volts, RMS)
+5 VDC	+/- 5%	1.5 A	150 mV
+12 VDC	+/- 10%	300 mA	150 mV

The power is applied through the 4-pin connector J3. The recommended mating connector is AMP Part # 1-480424-0. Connector J3 pin assignments are shown in Figure 3-6.

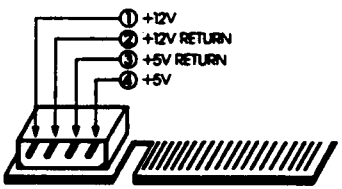


FIGURE 3-6. POWER CONNECTOR J3

The ACB-4000 Series Controller and attached Disk Drives should be grounded using a Single Point Grounding Scheme. This scheme connects all grounds from controller, drives, plus all other major components within the cabinet to one point that is then connected to the chassis ground. See Figure 3-7.

NOTE:
IF PROPER GROUNDING IS NOT FOLLOWED, RANDOM FORMAT, WRITE AND READ ERRORS MAY OCCUR.

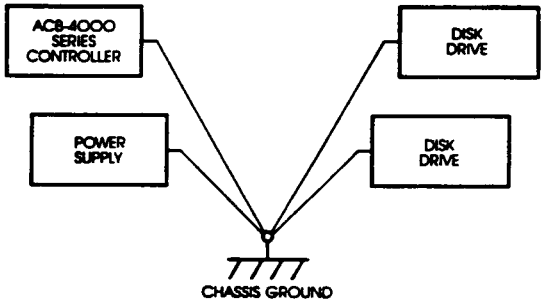


FIGURE 3-7. SINGLE POINT GROUNDING SCHEME

3.6 INTEGRATION OF CONTROLLER AND HOST ADAPTER

Now that the controller and drive have been configured, the controller must now be attached to the SCSI host adapter. The successful integration of controller and host adapter must take into account controller addressing, termination, cabling and the exact implementation of SCSI used by the host adapter and controller. This section addresses these topics.

NOTE:
IF A SASI-TYPE HOST ADAPTER IS USED, OR IF YOU ARE REPLACING A SASI-TYPE CONTROLLER WITH THE ACB-4000 SERIES CONTROLLERS, PLEASE SEE APPENDIX D FOR TIMING AND SOFTWARE CONSIDERATIONS.

3.6.1 ACB-4000 SERIES SCSI HARDWARE IMPLEMENTATION

The ACB-4000 Series Controllers support the proposed ANSI Standard X3T9.2/82-2 Revision 14, Small Computer System Interface (SCSI).

The ACB-4000 Series supports 17 active lines and 25 ground lines in a 50-pin flat cable. All odd number pins are ground. This is known as an unbalanced SCSI bus. The bus has open-collector drivers and is terminated at both ends by a 220 ohm pull-up resistor to +5V and a 330 ohm pull-down resistor to ground. The bus is low-active, thus a grounded line is considered active or asserted.

Eight of the lines are the byte-wide bi-directional data bus. The ACB-4000 Series supports DB7-0 data lines and does not support the data parity line. The data parity line is not terminated at the controller.

Nine of the lines are the control and status lines. The ACB-4000 Series supports all nine lines including BSY, SEL, C/D, I/O, MSG, REQ, ACK, ATN AND RST.

The RST, reset line, is a "hard" reset and causes the controller to abort its current operation and to get off of the bus. Any outstanding operation is aborted. The SCSI specification has a minimum RST pulse width of 25 microseconds. The ACB-4000 Series allows a minimum RST pulse width of 50 nanoseconds to accommodate older SASI-type host adapters.

3.6.2 SASI AND SCSI HOST ADAPTER CONSIDERATIONS

When using a SASI or SCSI host adapter the following areas must be considered: SCSI handshake timing, transfer rate of controller, use of ATN line, and I/O driver design termination. Appendices A, B, C, and D address these topics.

3.6.3 CONTROLLER ADDRESSING AND TERMINATION

In order for the ACB-4000 Series Controllers to operate properly in a system environment, the controller must be properly selected and terminated. The controller can be jumpered to be selected as SCSI device ID or address 0 through 7. See Table 3-1 for the definition of these jumpers and install any that are needed.

In a single controller system use the controller SCSI ID = 0 which requires no jumpers for locations A-B, C-D and E-F on the controller.

The SCSI bus is a daisy chained bus between host adapter and I/O controllers. In order to reduce signal ringing, the two ends of thebus must be terminated. This termination consists of a 220-ohm resistor to +5 Volts and a 330-ohm resistor to ground for each signal line. Check your host adapter to see if it is terminated. The ACB-4000 Series Controllers have socketed terminator packs located at RP3 and RP4 for this termination as noted in Figures 3-1 and 3-2.

In a single controller system both must be terminated, i.e. RP3 and RP4 must be installed. In a multiple I/O controller system only the last controller must be terminated, i.e. RP3 and RP4 must be installed only if the ACB-4000 Series Controller is the last one in the chain.

3.6.4 CONTROLLER AND HOST ADAPTER CABLING

Now that the controller and host adapter are addressed and terminated properly, they can be cabled together.

The controller 50-pin connector J4 is the SCSI bus connector. A 50-pin flat ribbon cable with a maximum length of 20 feet (6 meters) is required. A 3M Part # 3425-3000 cable connector is recommended.

POWER UP OPERATION

If the drive is correctly formatted, the controller will seek the drive to the last cylinder and read the largest block address present. The parameter information and largest block address are saved on the ACB-4000 Series Controller.

Once the last block address has been read, the controller will seek the drive back to Track 0, stopping several times in 'zones' on the way back to read the defect count at that point. This defect count is also saved in the controller to allow the controller to better predict the location of the block on the disk.

In addition to the drive seeks and reads, the Adaptec ACB-4000 Series Controllers do a series of self-diagnostics after power-up. Immediate selection of the disk and movement of the heads during this period is a sign of properly functioning Adaptec ACB-4000 Series Controllers.

When power is supplied to the system, the controller will enter power-up mode and wait for a minimum of 18 seconds for the drive to become ready. During the 18 second power-on sequence, the controller is checking for drive 0 and drive 1 to become ready (nine sec/drive). If the host senses a command requiring access to a drive before it has become ready (and before 18 seconds have elapsed) the controller will accept the command and continue to check for a ready status. Once the drive comes ready, the controller will then execute the command; if 18 seconds elapse and the drive does not come ready, a DRIVE NOT READY (04 hex) error will result. The controller will then check for a ready status on the next command requiring access to that drive.

Once a drive comes ready, the controller will recalibrate the head to track 0 if needed. If the drive started at track 0, the controller will step the head off of track 0 to confirm that the drive can seek and that the track 0 signal was valid. With the drive's ability to seek confirmed, the controller then seeks back to track 0. The drive actuator (if it can be seen) appears to make a short 'blip.'

The controller then attempts to read from track 0 parameter information which is written during formatting. If the drive is unformattedor had been formatted by another vendors controller, the parameter information is not present so the controller then sets a bit in its memory called 'blown format' to warn the user that the drive is unuseable. If the drive format is blown, the reset sequence is stopped and the controller is ready for a command. The drive must be formatted to allow a READ or WRITE access to disk data.

NOTE:
IF THE CONTROLLER DOES NOT OPERATE AS DESCRIBED, PLEASE SEE SECTION 6 FOR TROUBLESHOOTING PROCEDURES.

6.0 TROUBLESHOOTING

6.1 INTRODUCTION

This section describes the procedures needed to troubleshoot problems that may arise when installing the Adaptec ACB-4000 Series Controller boards. These are the most commonly found problems and are not inclusive of every application.

NOTE:
WHEN TROUBLESHOOTING PROBLEMS, USE THE MOST BASIC SYSTEM CONFIGURATION. THAT IS, ONE HARD DISK DRIVE ON THE ACB-4000A AND NO OTHER CONTROLLERS SUCH AS TAPE, ETC., REMOVED. ONCE THE SYSTEM WORKS FOR THE BASIC CONFIGURATION, ADD DRIVES AND CONTROLLERS TO THE SYSTEM ONE AT A TIME AND RETEST AFTER EACH ADDITION.

If these procedures fail to give a solution to your problem, recheck your steps, read the entire manual, document the problem, and check with the technical support department where you bought the controller.

ADAPTEC ACB-4000A/4070 TROUBLESHOOTING CHECKLIST

--- CHECK JUMPERS ON THE DISK DRIVE, BE SURE THAT IT IS NOT SET FOR A RADIAL SELECTED DRIVE.

--- CHECK JUMPERS ON CONTROLLER, BE SURE THAT JUMPERS AND PULSE OR HANDSHAKING SELECTION (SEE APPENDIX D) HAVE BEEN DONE PROPERLY.

--- CHECK CABLES, BE SURE THAT J0 GOES TO DRIVE 0, J1 GOES TO DRIVE 1 AND J2 GOES TO BOTH DRIVES. BE SURE THAT PIN 1 ON THE CONTROLLER IS CONNECTED TO PIN 1 OF THE DRIVE. BE SURE THAT THE SCSI CABLE IS CONNECTED PROPERLY, NOTING THE LOCATION OF PIN 1.

--- CHECK THAT THE DRIVE PARAMETERS AND STEP PULSE RATE ARE IN AGREEMENT WITH THE DRIVE VENDOR.

--- CHECK THAT THE TERMINATORS ON THE DRIVE AND SCSI BUS ARE SET PROPERLY.

--- CHECK THAT THE POWER SUPPLY CAN SUPPORT THE ADDED CURRENT REQUIRED BY THE DRIVE. BE SURE THAT THE +5V AND +12V VOLTAGES ARE CORRECT. VERIFY WITH THE DRIVE VENDOR HIS REQUIREMENTS.

--- CHECK THE DRIVE'S WRITE PRE-COMPENSATION AND REDUCED WRITE CURRENT VALUES IF SOFT READ ERRORS OCCUR. ALSO IF THESE ARE NOT BEING USED BE SURE THAT THE CORRECT JUMPER IS INSTALLED. THERE MUST BE A JUMPER FROM "R" TO ANOTHER PIN.

--- CHECK TO SEE THAT YOU ARE MEETING THE SCSI BUS SIGNAL PARAMETERS SUCH AS SETUP, HOLD , MINIMUM AND MAXIMUM TIMES.

SECTION 2.2

DDE Data Sheet for Streaming Tape Cartridge Drive SD3 REV. 0

MANUFACTURER: ARCHIVE TYPE: 2060L and 2150L

GENERAL DRIVE DESCRIPTION:

The VIPER is a streaming 1/4" tape cartridge drive.The VIPER contains a embedded controller in a half-high package.
The VIPER 2060 stores 45 megabytes on 9 tracks, using a DC300 cartridge.
The VIPER 2150 stores 125 Mbyte on 15 tracks, or 150 Mbyte on 18 tracks, using a DC600 cartridge.

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: QIC-02

Power requirements:
+5 VDC +- 5 pct., 0.7 Amp
+12 VDC +-10 pct., 0.2 Amp motor not running.
0.8 Amp typ motor running max. 1.5 amp
2.5 Amp tape start surge(up to 300ms)

Power dissipation: 20.0 W typical
35.0 W max.

Operating temperature range: 5 to 45 deg. celsius.

Maximum temperature gradient: ----------

Operating humidity: 20 pct. - 80 pct. non-condensing.

DATA FORMAT AND MEDIA:

2060L:	QUALIFIED TAPE	FUNCTION
	3M DC600A	read/write QIC-24
	3M DC300XLP	read/write QIC-24

2150L:	QUALIFIED TAPE	FUNCTION
	3M DC600XTD	read/write QIC-150
		read/write QIC-120
		read QIC-24
	3M DC600A	read/write QIC-120
		read QIC-24
	3M DC300XLP	read QIC-24

PREVENTIVE MAINTENANCE:

The only preventive maintenance required for the VIPER is that the head and sensor holes must be kept clean.

The recording head should be cleaned after each initial pass with a new tape.
The recording head should be cleaned after every 8 hours of read/write activity.
The sensor openings and cartridge cavity should be cleaned whenever dirt or dust becom visible.

Information about cleaning procedure is available in the product manual.

CONNECTORS AND STRAPS:

1: QIC-02 connector.

2: Power connector.

Pin 1: +12 VDC.
Pin 2: +12 Return.
Pin 3: + 5 Return.
Pin 4: + 5 VDC.

Factory strapping: no straps installed

DOCUMENTATION:

Publications available from ARCHIVE:

Product manual QIC02 models 2060L and 2150L
Manual part number 21494-001.

Data Sheet for Streaming Tape Drives

Manufacturer: Tandberg Data	**Sheet number: SD 7 revision 0**
Type: TDC 4220	**Form Factor: 5¼" Half-Height**
Date: 95-02-06	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The Tandberg Data TDC 4220 is a streaming ¼" tape cartridge drive.
The TDC 4220 records and reads on 42 tracks and can store 2300 Mbytes on a 1200 foot cartridge. Using a 950 foot cartridge the capacity is decreased to 1900 Mbyte.

Environment.

Electrical Interface: SCSI-2.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical	0.50A		0.50A		0.50A		200mV
+12 ±10% typical	3.3A		1.45A		0.10A		200mV

Average power dissipation: 3.5 W. (motor not running)
Average power dissipation: 15.00 W. (motor running)

Operating temperature range: 5 to 45 °C.

Storage temperature range: -30 to 60 °C.

Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Tape Formats.

Tape Formats								
Drive	QIC-24		QIC-120/150		QIC-525		QIC-2GB	
	Read	Write	Read	Write	Read	Write	Read	Write
TDC 4220	+	-	+	+	+	+	+	+

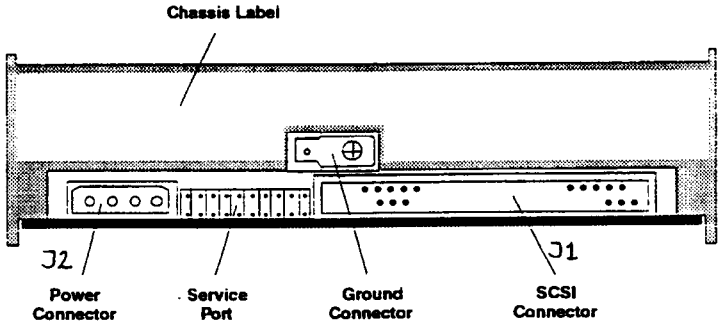
Type of Media.

For the 4220 use DC 6150 (3M), DC 6525 (3M), Magnus 2.0 (3M, 950 ft.) or QD 9250N (Sony, 1200 ft.).
The drive will automatically select a suitable density code for the inserted medium. If DC 600A is inserted the drive writes in QIC-120 format. If DC 6150 is inserted the drive writes in QIC-150 format. If DC 6320 or DC 6525 is inserted the drive writes in QIC-525 format, and if Magnus 2.0 or QD 9250 is used the drive writes in QIC-2GB format.

Mounting.

Recommended mounting position is either horizontal with the indicator to the left, or vertical with the indicator down.

Connectors.



Rear View of the TDC 4000 Series Drive

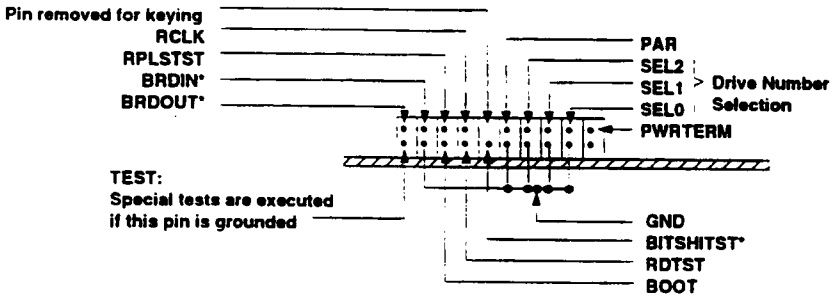
Power and Interface Connections.

J1: SCSI connector

J2: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.

The layout of the jumper/strap connector is shown below:



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	SEL2	SEL1	SEL0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

* designates factory installed position.

BUS parity check.

* When a jumper is installed in PAR, the tape drive generates and checks parity on the SCSI cable.
When a jumper is not installed in PAR, the tape drive does not generate or check parity on the SCSI cable.

Preventive Maintenance.

The only maintenance normally required is to clean the read/write head. Recommended equipment for head cleaning is *TDC Cleaning Cartridge Kit.* Always clean the head immediately after using a new cartridge. If the streamer is used daily, the head must be cleaned once a week.

Documentation.

Publications available from Tandberg:

TDC 4000 Series Reference Manual.
TDC 4000 Series SCSI-2 Functional Specifications, Revision 2.

Data Sheet for Streaming Tape Drives

Manufacturer: Tandberg	**Sheet number: SD 6 revision 0**
Type: 3800	**Form Factor: 5¼" Half-Height**

General Drive Description.

The Tandberg Data TDC 3800 is a streaming ¼" tape cartridge drive.
The TDC 3800 records and reads on 26 tracks and can store 525 Mbytes on a 1020 foot cartridge. Using a 600 foot cartridge the capacity is decreased to 320 Mbyte.

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical	0.50A		0.50A		0.50A		200mV
+12 ±10% typical	3.3A		1.45A		0.70A		200mV

Average power dissipation: 3.1 W. (motor not running)
Average power dissipation: 15.00 W. (motor running)

Operating temperature range: 5 to 40 °C.

Storage temperature range: -30 to 60 °C.

Maximum temperature gradient: 6 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Tape Formats.

Tape Formats								
Drive	QIC-24		QIC-120		QIC-150		QIC-525	
	Read	Write	Read	Write	Read	Write	Read	Write
TDC 3800	+	-	+	+	+	+	+	+

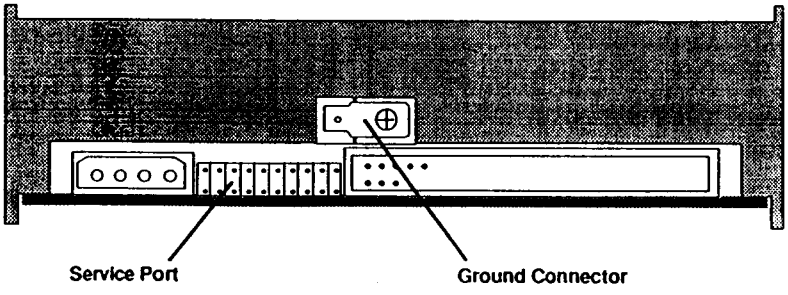
Type of Media.

For the 3800 use DC 600A, DC 6150, DC 6320 or DC 6525.
The drive will automatically select a suitable density code for the inserted medium. If DC 600A is inserted the drive writes in QIC-120 format. If DC 6150 is inserted the drive writes in QIC-150 format. If DC 6320 or DC 6525 is inserted the drive writes in QIC-525 format.

Mounting.

Recommended mounting position is either horizontal with the indicator to the left, or vertical with the indicator down.

Connectors.

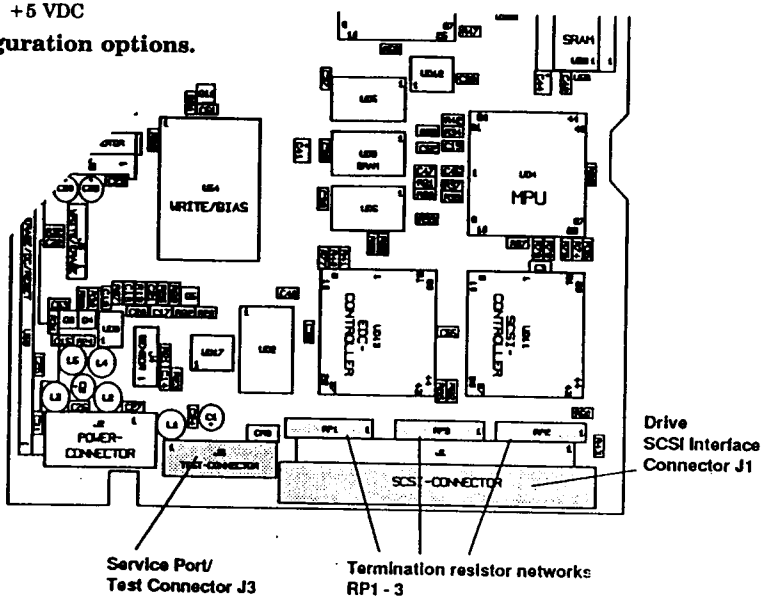


Power and Interface Connections.

J1: SCSI connector

J2: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	SEL2	SEL1	SEL0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

* designates factory installed position.

BUS parity check.

* When a jumper is installed in PARI, the tape drive generates and checks parity on the SCSI cable.
When a jumper is not installed in PARI, the tape drive does not generate or check parity on the SCSI cable.

Preventive Maintenance.

The only maintenance normally required is to clean the read/write head. Recommended equipment for head cleaning is *TDC Cleaning Cartridge Kit*. Always clean the head immediately after using a new cartridge. If the streamer is used daily, the head must be cleaned once a week.

Documentation.

Publications available from Tandberg:
TDC 3800 Reference Manual.
TDC 3800 Series Maintenance Manual.

Data Sheet for Streaming Tape Drives

Manufacturer: Tandberg	**Sheet number: SD 5 revision 0**
Type: 3620/3640/3660	**Form Factor: 5¼" Half-Height**

General Drive Description.

The Tandberg Data TDC 3620/40/60 is a streaming ¼" tape cartridge drive.
The TDC 3620 records and reads on 9 tracks and can store 45 Mbytes on a 450 foot cartridge. With a 600 foot cartridge the capacity is increased to 60 Mbyte.
The TDC 3640 records and reads on 15 tracks and can store 120 Mbytes on a 600 foot cartridge.
The TDC 3660 records and reads on 18 tracks and can store 150 Mbytes on a 600 foot cartridge.

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical	0.25A		0.25A		0.25A		200mV
+12 ±10% typical	3.9A		1.20A		0.25A		200mV

Average power dissipation: 2.25 W. (motor not running)
Average power dissipation: 15.00 W. (motor running)

Operating temperature range: 5 to 40 °C.

Storage temperature range: -30 to 60 °C.

Maximum temperature gradient: 6 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Tape Formats.

Tape Formats								
Drive	QIC-11		QIC-24		QIC-120		QIC-150	
	Read	Write	Read	Write	Read	Write	Read	Write
TDC 3620	+	+	+	+	-	-	-	-
TDC 3640	+	-	+	-	+	+	-	-
TDC 3660	+	-	+	-	+	+	+	+

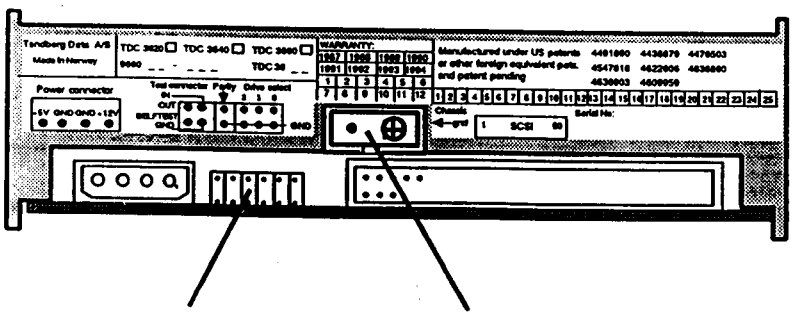
Type of Media.

For the 3620 use DC 300XLP, DC 600A or DC 6150 cartridge.
For the 3640 use DC 600A or DC 6150 cartridge.
For the 3660 use DC 6150 cartridge.

Mounting.

Recommended mounting position is either horizontal with the indicator to the left, or vertical with the indicator down.

Connectors.

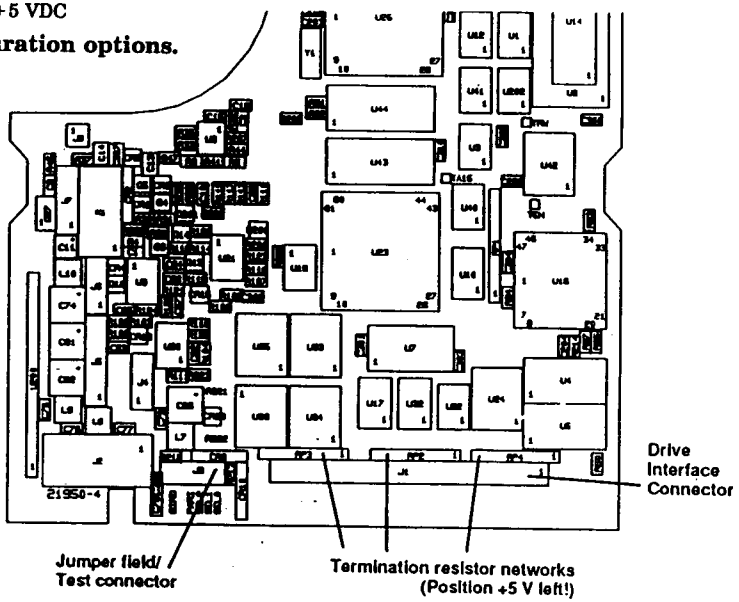


Power and Interface Connections.

J1: SCSI connector

J2: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	SEL2	SEL1	SEL0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

* designates factory installed position.

BUS parity check.

* When a jumper is installed in PARI, the tape drive generates and checks parity on the SCSI cable.
When a jumper is not installed in PARI, the tape drive does not generate or check parity on the SCSI cable.

Preventive Maintenance.

The only maintenance normally required is to clean the read/write head. Recommended equipment for head cleaning is *TDC Cleaning Cartridge Kit*. Always clean the head immediately after using a new cartridge. If the streamer is used daily, the head must be cleaned once a week.

Documentation.

Publications available from Tandberg:
TDC 3620/40/60 Reference Manual.
TDC 3600 Series SCSI Maintenance Manual.

Data Sheet for Streaming Tape Drives

Manufacturer: Tandberg	**Sheet number: SD 4 revision 0**
Type: 3610/3630/3650	**Form Factor: 5¼" Half-Height**

General Drive Description.

The Tandberg Data TDC 3610/30/50 is a streaming ¼" tape cartridge drive.
The TDC 3610 records and reads on 9 tracks and can store 45 Mbytes on a 450 foot cartridge. With a 600 foot cartridge the capacity is increased to 60 Mbyte.
The TDC 3630 records and reads on 15 tracks and can store 120 Mbytes on a 600 foot cartridge.
The TDC 3650 records and reads on 18 tracks and can store 150 Mbytes on a 600 foot cartridge.

Environment.

Electrical Interface: QIC-02.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical	0.25A		0.25A		0.25A		200mV
+12 ±10% typical	3.9A		1.20A		0.25A		200mV

Average power dissipation: 2.25 W. (motor not running)
Average power dissipation: 15.00 W. (motor running)

Operating temperature range: 5 to 40 °C.

Storage temperature range: -30 to 60 °C.

Maximum temperature gradient: 6 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Tape Formats.

Tape Formats								
Drive	QIC-11		QIC-24		QIC-120		QIC-150	
	Read	Write	Read	Write	Read	Write	Read	Write
TDC 3610	+	+	+	+	-	-	-	-
TDC 3630	+	-	+	-	+	+	-	-
TDC 3650	+	-	+	-	+	+	+	+

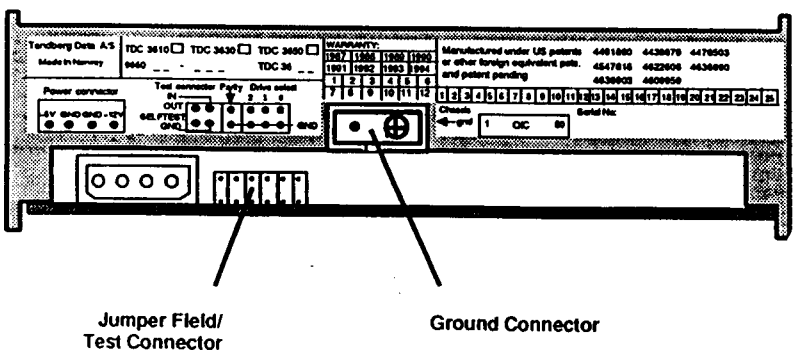
Type of Media.

For the 3610 use DC 300XLP, DC 600A or DC 6150 cartridge.
For the 3630 use DC 600A or DC 6150 cartridge.
For the 3650 use DC 6150 cartridge.

Mounting.

Recommended mounting position is either horizontal with the indicator to the left, or vertical with the indicator down.

Connectors.

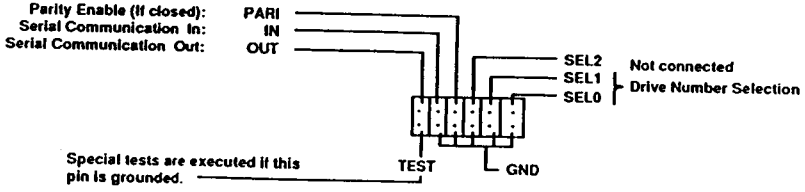


Power and Interface Connections.

J1: QIC connector

J2: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.



Factory strapping: no straps installed.

Preventive Maintenance.

The only maintenance normally required is to clean the read/write head. Recommended equipment for head cleaning is *TDC Cleaning Cartridge Kit*. Always clean the head immediately after using a new cartridge. If the streamer is used daily, the head must be cleaned once a week.

Documentation.

Publications available from Tandberg:
TDC 3610/30/50 Reference Manual.
TDC 3600 Series QIC-02 Maintenance Manual.

DDE Data Sheet for Streaming Tape Cartridge Drive SD1 REV. 0

MANUFACTURER: TANDBERG TYPE: TDC 3320

GENERAL DRIVE DESCRIPTION:

The TDC 3320 is a streaming 1/4" tape cartridge drive comprising the TDC 3315 (basic drive) and the TDC 3350 MK-II (intelligent formatter). It records and reads serially on 15 tracks, and can store 125 Mbytes on a 600-foot cartridge.

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface:

formatter to DIOC: QIC-02

drive to formatter: QIC-36

Power requirements:
+5 VDC +- 5 pct., 1.8 Amp
+12 VDC +-10 pct., 0.3 Amp motor not running.
1.0 Amp typ motor running max. 1.4 amp

Power dissipation: 12.6 W motor not running
21.0 W typical, motor running

Operating temperature range: 5 to 40 deg. celsius.

Maximum temperature gradient: 6 deg. celsius/hour

Operating humidity: 20 pct. - 80 pct. non-condensing.

DATA FORMAT:

The tape format conforms with the QIC-120 standard for data interchange.

The drive is able to read QIC-11 and QIC-24 tape formats, but it is unable to write other formats than the QIC-120.

MEDIA:

Type of media:

DC600A (600-foot), certified for 10.000 frpi.
DC600XTD (600-foot), certified for 10.000 frpi.

From other manufacturers than 3M, it is recommended to use only DC600XTD.

PREVENTIVE MAINTENANCE:

It is required to clean the read/write head.

Recommemded equipment for head cleaning are:

a) The Tandberg Data 'TDC cleaning cartridge kit'.
b) Isopropyl-alcohol and cotton-tipped swabs, i.e. the 'CK-90' kit from 3M.

The cleaning interval depends on three main factors:

a) How much the drive is used.
b) The quality of the tape.
c) The quality of the enviroment

However, the following can be used as a recommended guideline:

Usage	Clean
8 hours a day	Daily
Daily	Weekly
Weekly	Monthly

Always clean the head immediately after using a new cartridge, and if a large number of rewrite- or reread operations are performed.

CONNECTORS AND STRAPS:

J1: Signal connector formatter board/basic drive.

J2: Power connector.

Pin 1: +12 VDC.
Pin 2: +12 Return.
Pin 3: + 5 Return.
Pin 4: + 5 VDC.

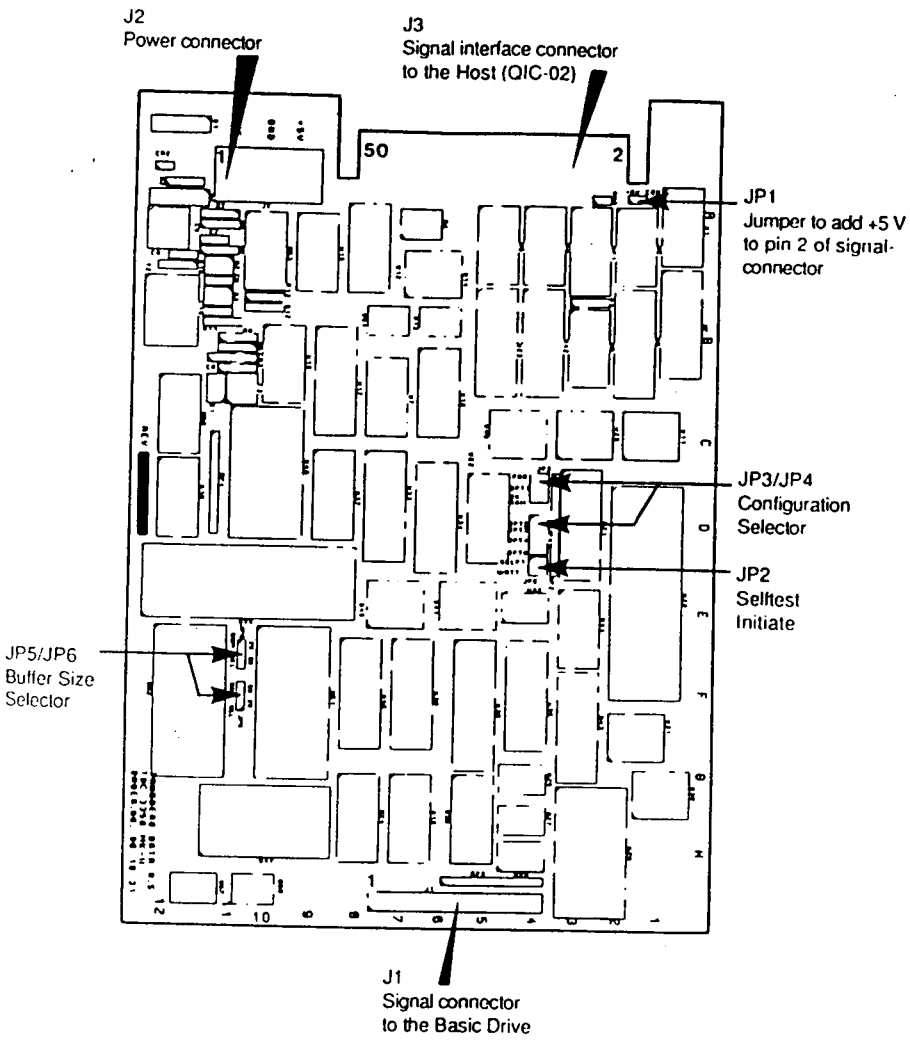
J3: QIC-02 connector to the host.

Factory strapping: no straps installed

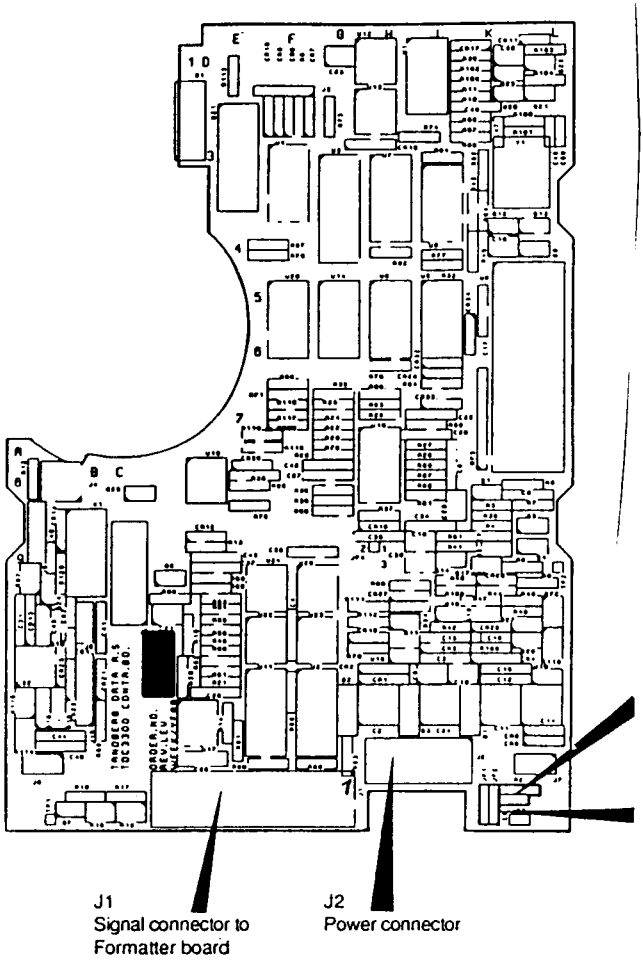
DOCUMENTATION:

Publications available from Tandberg Data:

TDC 3320 Reference Manual
TDC 3320 Maintenance Manual



Location of jumper positions and connectors
on the TDC 3315 controller board.



Location of jumper positions and connectors on the TDC 3350 formatter board.

DDE Data Sheet for Streaming Tape Cartridge Drive SD2 REV. 0

MANUFACTURER: TANDBERG TYPE: TDC 3319

GENERAL DRIVE DESCRIPTION:

The TDC 3319 is a streaming 1/4" tape cartridge drive comprising the TDC 3309 (basic drive) and the TDC 3350 MK-II (intelligent formatter). It records and reads serially on 9 tracks, and can store 45 Mbytes on a 450-foot cartridge.

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface:

formatter to DIOC: QIC-02

drive to formatter: QIC-36

Power requirements:
+5 VDC +- 5 pct., 1.9 Amp
+12 VDC +-10 pct., 0.3 Amp motor not running.
1.0 Amp typ motor running max. 1.4 amp

Power dissipation: 12.5 W motor not running
21.5 W typical, motor running

Operating temperature range: 5 to 40 deg. celsius.

Maximum temperature gradient: 6 deg. celsius/hour

Operating humidity: 20 pct. - 80 pct. non-condensing.

DATA FORMAT:

The tape format conforms with the QIC-24 standard for data interchange.

The drive is able to read QIC-11 and QIC-24 tape formats, but it is unable to write other formats than the QIC-24.

MEDIA:

Type of media:

DC300XLP	(450-foot), certified for 10.000 frpi.
DC600A	(600-foot), certified for 10.000 frpi.
DC600XTD	(600-foot), certified for 10.000 frpi.

It is recommmended to use tapes certified for 10.000 frpi.

PREVENTIVE MAINTENANCE:

It is required to clean the read/write head.

Recommemded equipment for head cleaning are:

a) The Tandberg Data 'TDC cleaning cartridge kit'.
b) Isopropyl-alcohol and cotton-tipped swabs, i.e. the 'CK-90' kit from 3M.

The cleaning interval depends on three main factors:

a) How much the drive is used.
b) The quality of the tape.
c) The quality of the enviroment

However, the following can be used as a recommended guideline:

Usage	Clean
8 hours a day	Daily
Daily	Weekly
Weekly	Monthly

Always clean the head immediately after using a new cartridge, and if a large number of rewrite- or reread operations are performed.

CONNECTORS AND STRAPS:

J1: Signal connector formatter board/basic drive.

J2: Power connector.

Pin 1: +12 VDC.
Pin 2: +12 Return.
Pin 3: + 5 Return.
Pin 4: + 5 VDC.

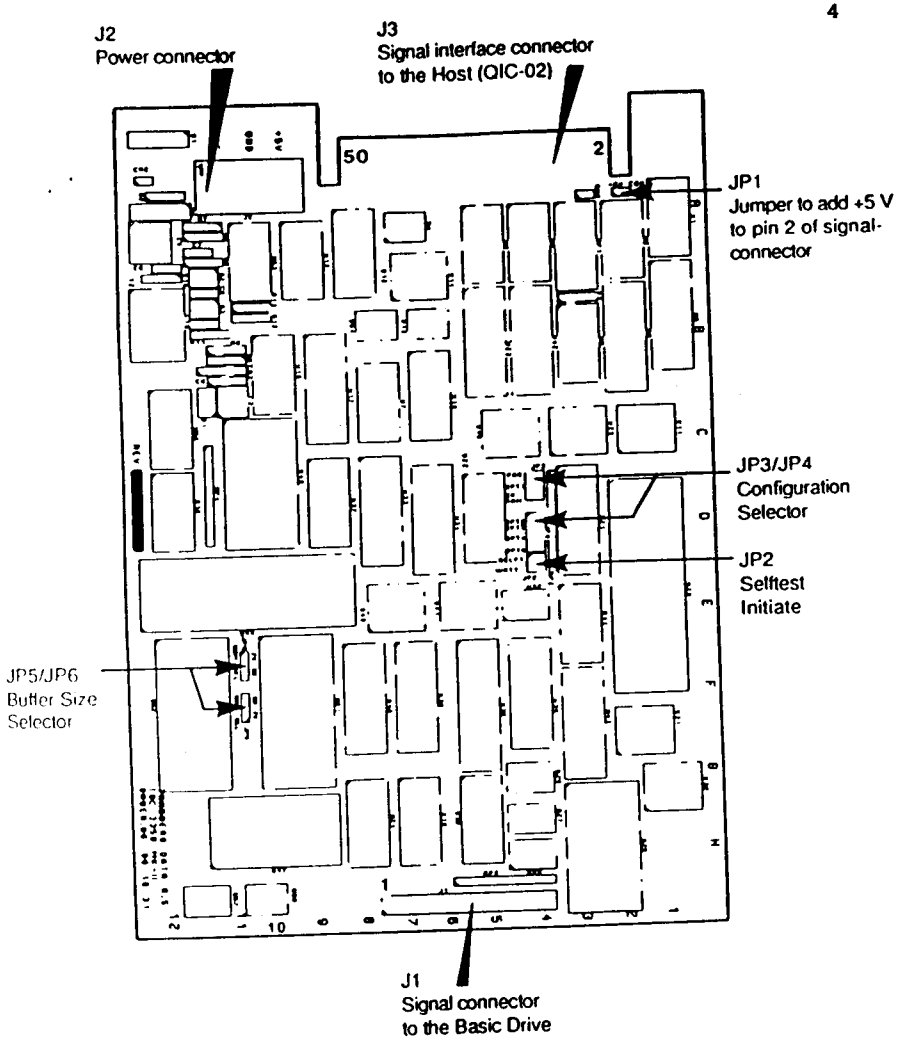
J3: QIC-02 connector to the host.

Factory strapping: no straps installed

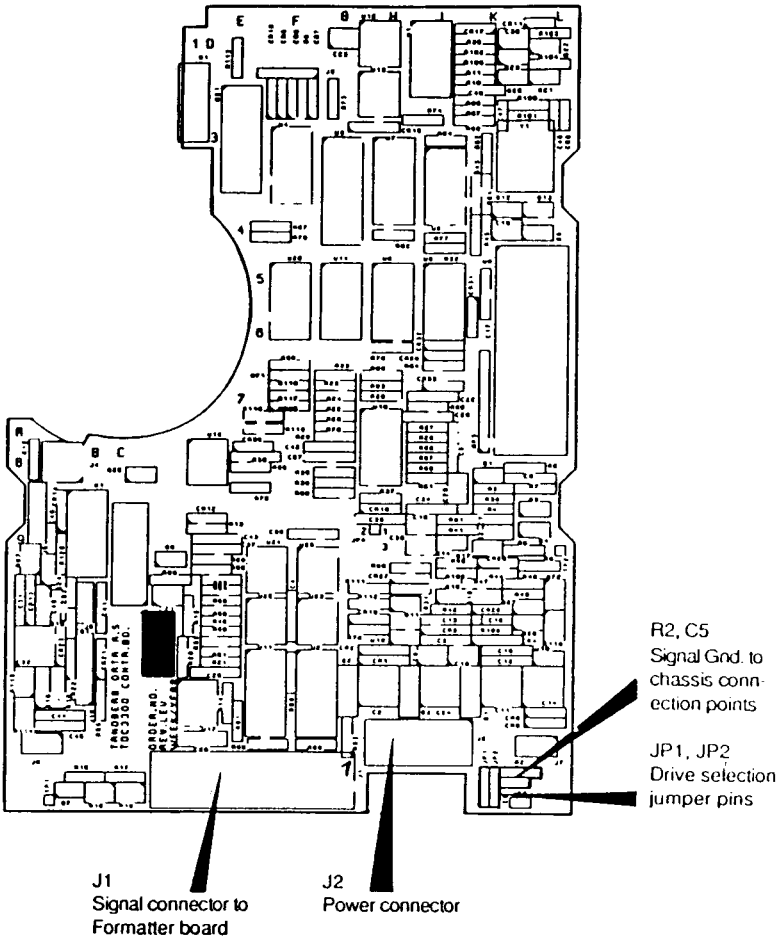
DOCUMENTATION:

Publications available from Tandberg Data:

TDC 3319 Reference Manual
TDC 3319 Maintenance Manual



Location of jumper positions and connectors
on the TDC 3309 controller board.



Location of jumper positions and connectors on the TDC 3350 formatter board.

Data Sheet for Video Tape Drives

Manufacturer: Exabyte	**Sheet number: VD 3 revision 0**
Type: EXB-8205	**Form Factor: 5¼" Half-Height**

General Drive Description.

The EXABYTE EXB-8205 CTS is a high capacity 8 mm cartridge drive.The drive contains an embedded controller with SCSI interface. It uses helical scan technology, to record on an industry standard 8 mm cartridge. The cartridge stores more than 2000 Mbytes of formatted user data.

Environment.

Electrical Interface: SCSI-II.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical			1.4A	2.3A			125mV
+12 ±5% typical			0.5A	1.1A			125mV

Minimum power dissipation: 9.1 W.

Maximum power dissipation: 23.7 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -40 to 60 °C.

Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Mounting.

The EXB-8205 may be mounted either horizontally or vertically, as follows:
In the horizontal configuration, the data cartridge door should be facing upwards. In the vertical configuration, the drive may be mounted so that the cartridge door faces either right or left.

Connectors.

Power and Interface Connections.

P4: SCSI connector

P1: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.

SCSI controller ID			
SCSI ID	SEL3	SEL2	SEL1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

Preventive Maintenance.

The EXB-8205 tape head/path requires cleaning once a month or after 30 Gigabytes of data transfer (the two outer LED's will start flashing when the unit needs cleaning).
To clean the tape head/path, the *EXABYTE 8mm Cartridge Tape Subsystem Cleaning Kit* should be used. Also refer to DDE Product Note for advice on installation and maintenance.

Documentation.

DDE Produkt Information: "Drift og Installation af Exabyte streameren"
Publications available from Exabyte:
EXB-8205 Product Specification.
EXB-8205 User's Manual.

Data Sheet for Video Tape Drives

Manufacturer: Exabyte	**Sheet number: VD 4 revision 0**
Type: EXB-8505	**Form Factor: 5¼" Half-Height**

General Drive Description.

The EXABYTE EXB-8505 CTS is a high capacity 8 mm cartridge drive.The drive contains an embedded controller with SCSI interface. It uses helical scan technology, to record on an industry standard 8 mm cartridge. The cartridge stores approximately 4700 Mbytes of formatted user data.

Environment.

Electrical Interface: SCSI-II.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical			1.7A	2.8A			125mV
+12 ±5% typical			0.5A	1.6A			125mV

Minimum power dissipation: 13.0 W.

Maximum power dissipation: 33.2 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -40 to 60 °C.

Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Mounting.

The EXB-8205 may be mounted either horizontally or vertically, as follows:
In the horizontal configuration, the data cartridge door should be facing upwards. In the vertical configuration, the drive may be mounted so that the cartridge door faces either right or left.

Connectors.

Power and Interface Connections.

P4: SCSI connector

P1: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.

SCSI controller ID			
SCSI ID	SEL3	SEL2	SEL1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

Preventive Maintenance.

The EXB-8505 tape head/path requires cleaning once a month or after 30 Gigabytes of data transfer (the two outer LED's will start flashing when the unit needs cleaning).
To clean the tape head/path, the *EXABYTE 8mm Cartridge Tape Subsystem Cleaning Kit* should be used. Also refer to DDE Product Note for advice on installation and maintenance.

Documentation.

DDE Produkt Information: "Drift og Installation af Exabyte streameren"
Publications available from Exabyte:
EXB-8505 Product Specification.
EXB-8505 User's Manual.

Data Sheet for Video Tape Drives

Manufacturer: Exabyte	**Sheet number: VD 2 revision 0**
Type: EXB-8500	**Form Factor: 5¼" Full-Height**

General Drive Description.

The EXABYTE EXB-8500 CTS is a high capacity 8 mm cartridge drive.The drive contains an embedded controller with SCSI interface. It uses helical scan technology, to record on an industry standard 8 mm cartridge. The cartridge stores more than 5000 Mbytes of formatted user data.

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical			0.7A	1.8A			125mV
+12 ±5% typical			0.40A	0.75A			125mV

Minimum power dissipation: 8.30 W.

Maximum power dissipation: 17.00 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -40 to 60 °C.

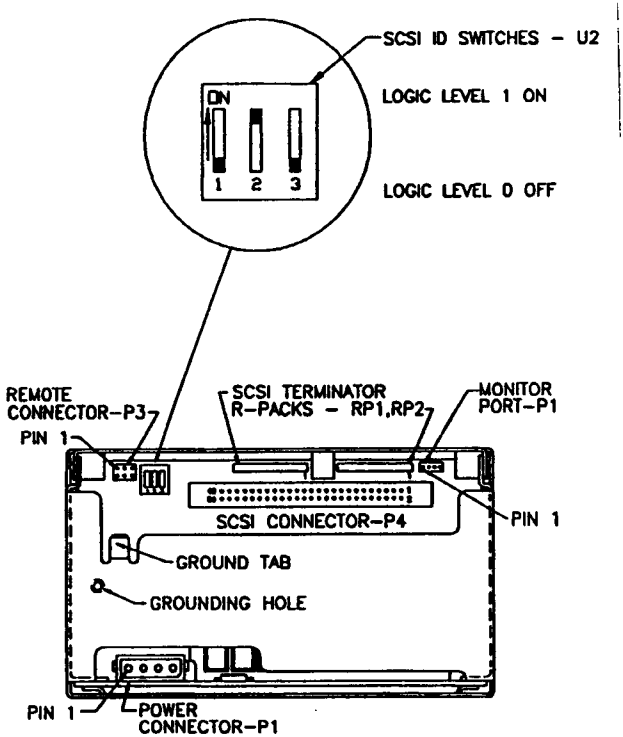
Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Mounting.

The EXB-8200 may be mounted either horizontally or vertically, as follows:
In the horizontal configuration, the drive door opens down from the top of the unit. In the vertical configuration, the drive may be mounted so that the door opens to either the right or left.

Connectors.



Power and Interface Connections.

P4: SCSI connector

P1: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.

SCSI controller ID			
SCSI ID	SEL3	SEL2	SEL1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

Preventive Maintenance.

The EXB-8500 tape head/path requires cleaning once a month or after 60 Gigabytes of data transfer.
To clean the tape head/path, the *EXABYTE 8mm Cartridge Tape Subsystem Cleaning Kit* should be used.

Documentation.

Publications available from Exabyte:
EXB-8500 Product Specification.
EXB-8500 User's Manual.

Data Sheet for Video Tape Drives

Manufacturer: Exabyte	**Sheet number: VD 1 revision 1**
Type: EXB-8200	**Form Factor: 5¼" Full-Height**

General Drive Description.

The EXABYTE EXB-8200 CTS is a high capacity 8 mm cartridge drive.The drive contains an embedded controller with SCSI interface. It uses helical scan technology, to record on an industry standard 8 mm cartridge. The cartridge stores more than 2000 Mbytes of formatted user data.

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical			1.2A	2.8A			125mV
+12 ±5% typical			0.17A	0.4A			125mV

Average power dissipation: 15.00 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -40 to 60 °C.

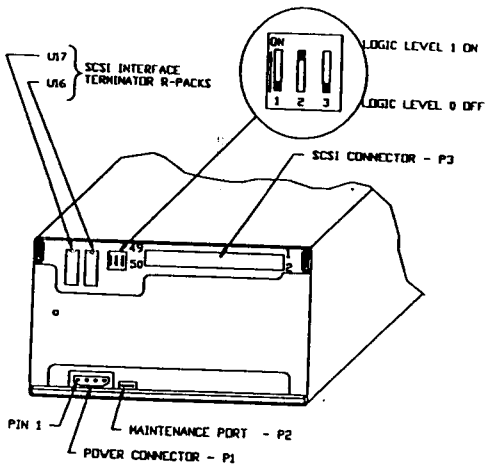
Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

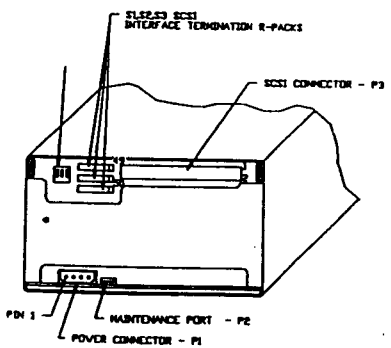
Mounting.

The EXB-8200 may be mounted either horizontally or vertically, as follows:
In the horizontal configuration, the drive door opens down from the top of the unit. In the vertical configuration, the drive may be mounted so that the door opens to either the right or left.

Connectors.



Power and Interface Connections(Level 1 DB Card).



Power and Interface Connections(Level 2 DB Card).

P3: SCSI connector

P1: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.

SCSI controller ID			
SCSI ID	SEL3	SEL2	SEL1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

Preventive Maintenance.

The EXB-8200 tape head/path requires cleaning once a month or after 30 Gigabytes of data transfer.
To clean the tape head/path, the *EXABYTE 8mm Cartridge Tape Subsystem Cleaning Kit* should be used.

Documentation.

Publications available from Exabyte:
EXB-8200 Product Specification.
EXB-8200 User's Manual.

Section I

DESCRIPTION

GENERAL DESCRIPTION

This manual describes the Small Computer System Interface (SCSI) installed on the Microstreamer®, CacheTape®, and the GCR CacheTape®. The Cipher SCSI-to-Tape Drive Controller (CSC) incorporates all the components and circuitry on a multi-layered printed wiring board. The two CSC models which are usable on the tape drives specified are:

- o CSC 100 -- Single-Ended Drivers and Receivers
- o CSC 200 -- Differential Drivers and Receivers

The CSC dimensions are:

- o Height - 6.80 inches
- o Width - 16.50 inches
- o Depth - 2.67 inches with non-shielded connector;
  3.0 inches with shielded connector
- o Weight - 7.5 lbs.

The major modules of the CSC are:

- o SCSI Protocol Controller Chip
- o Memory Array Controller
- o 64K Byte Buffer Memory
- o 8085 Microprocessor
- o 2K X 8-Bit Scratch Pad RAM
- o 24K X 8-Bit EPROM
- o 5V Power Supply

The SCSI bus capabilities are:

- o Transfer Rate: 1.5 Mbytes/sec. maximum - asynchronous
- o Organization: 8-Bit Parallel with Parity

Power for the controller is supplied from the tape drive to a switching voltage regulator on the SCSI PWB. The CSC requires no preventive maintenance.

PHYSICAL DESCRIPTION

The CSC assembly (Figure 1-1) is designed to be field-installable (by a technician) onto the rear of the tape drive housing. The SCSI controller is integrated onto a 6.3" X 16" multi-layered printed wiring board. When the CSC enclosure is securely anchored, it hinges open to allow access to the controller PWB and to facilitate interconnecting the CSC to the tape drive interface connectors and the input power connector. There is no operator access to the CSC assembly once installed on the tape drive. Access is restricted to trained maintenance personnel for repair and replacement purposes only.

FUNCTIONAL DESCRIPTION

The CSC provides the required control functions and interface signals to accommodate the operation of Microstreamer, CacheTape and GCR CacheTape on ANSI standard SCSI bus. The two interfaces which the controller provides are the standard Cipher interface and SCSI. The controller will perform standard SCSI tape functions including the COPY command. Its circuitry includes all logic required to operate as a target device when executing the standard tape functions, and as an initiator device when executing the COPY command to another device on the SCSI bus. The microprocessor and associated memory are used to control communication over the SCSI bus, manage the controller buffer memory, queue tape functions, and control the tape interface protocol.

Figure 1-2 is a system block diagram. Data transfer to tape is accomplished by data coming in from the SCSI interface and being temporarily stored in the buffer memory. From the buffer memory data is sent to the tape interface. Reading from the tape occurs by data coming in from the tape interface and being held in the buffer memory. From there, bytes are transferred out to the SCSI interface.

REFERENCE MANUALS

This addendum is designed to be used in conjunction with the technical manuals for Cipher's 1/2" reel-to-reel tape drives:

TAPE DRIVE	MANUAL P/N
F880 Microstreamer	799816-003
M890/M891 CacheTape	799816-006
M990 GCR CacheTape	799891-001

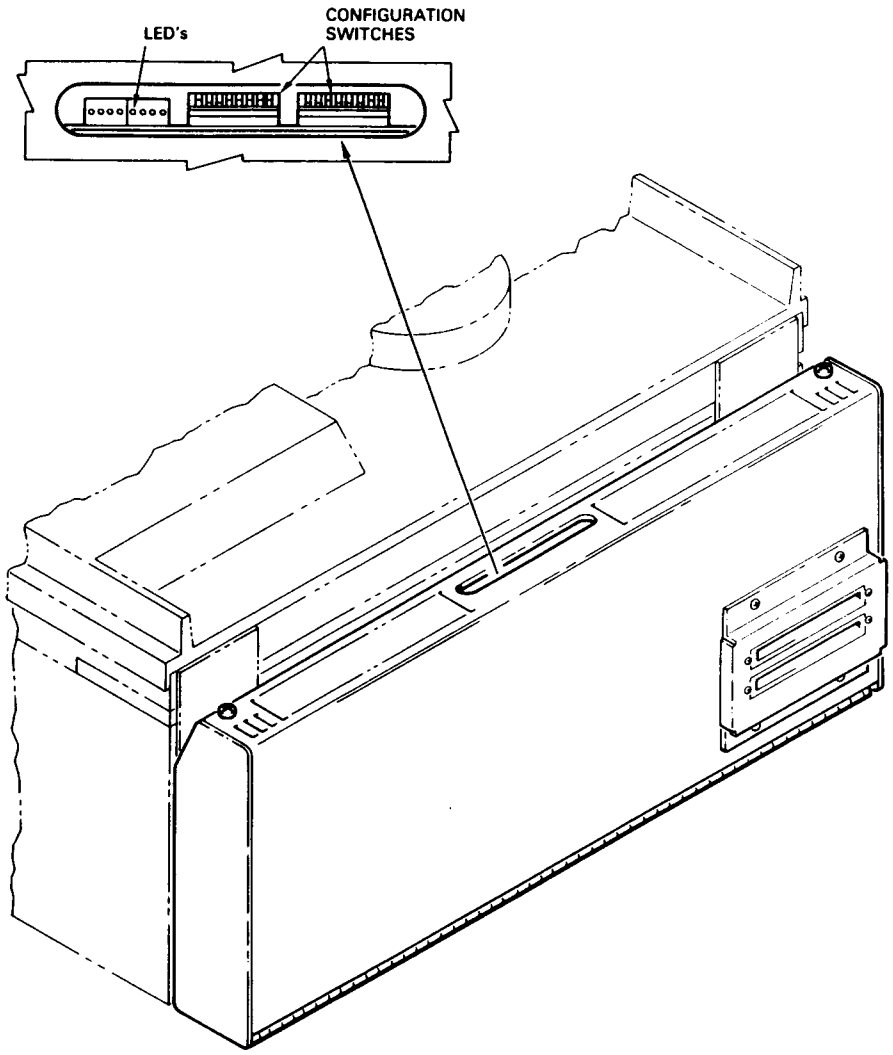


Figure 1-1. SCSI Controller Assembly

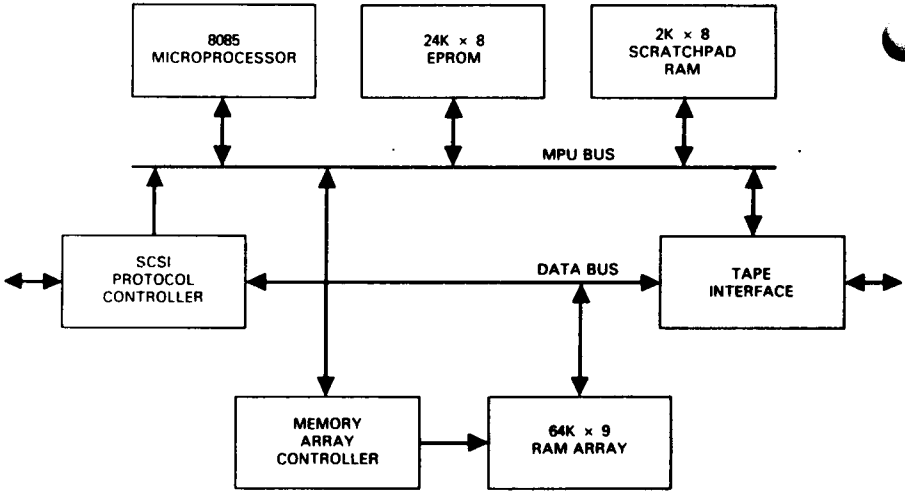


Figure 1-2. System Block Diagram

SECTION II

INSTALLATION, RETROFIT INSTALLATION, SWITCH SETTINGS, AND INTERFACE CONNECTIONS

Notice: If installation is for a retrofit kit, disregard this procedure and refer to retrofit installation instructions, page 2-6.

INSTALLATION

The CSC assembly should be installed by a qualified technician. It is designed to attach on tape drives that are rack-mounted or mounted inside a Cipher enclosure. The CSC enclosure opens to allow access to the controller PWB and to facilitate connecting the CSC to the tape drive interface and the input power. If it is to be installed on a rack-mounted tape drive, the CSC assembly must be attached to the tape drive before installation in the equipment rack. On an enclosed tape drive, the tape drive must be removed from the enclosure before installation can be attempted. The installation of the CSC assembly requires a pair of diagonal pliers, cutters and a phillips screw driver. Refer to Figure 2-1.

To install, proceed as follows:

1. Open the top cover of the tape drive and loosen the two screws on either side of the top plate behind the front panel.

2. Open the top plate by lifting the sides directly behind the front panel. Place the safety pin in the hole provided in the top plate support arm. See Figure 2-1, sheet 1.

3. Disconnect the main harness from the PWB.

4. Locate the small male connector tie-wrapped to the main harness; this is the SCSI power and ground harness. Cut and remove the three tie wraps that secure it to the main harness. See Figure 2-1, sheet 1.

5. Route the SCSI harness to the back of the tape drive. Loosely attach an adhesive backed tie wrap anchor to the SCSI harness. Attach the anchor to the back wall of the chassis as shown in Figure 2-1, sheet 1.

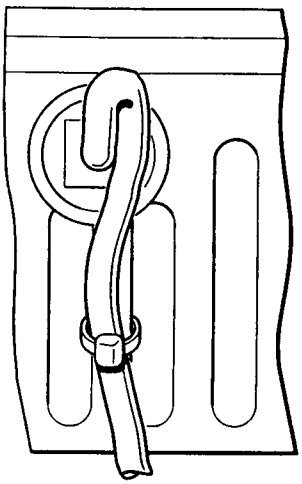
6. Route the male end of the SCSI harness through the large opening in the back of the chassis. Connect the male connector to the female connector of the SCSI power cable. See Figure 2-1, sheet 2.

7. Reconnect the main harness assembly to the PWB.

8. Assemble the mounting screw, bracket, and well nut to the CSC chassis. Install the well nut through the bracket hole on the front side of th CSC from the inside out. Slide the bracket into the front slot, lip down, facing away from the CSC chassis for Microstreamer and CacheTape drives (facing toward the CSC chassis for GCR's), between the well nut and inner hole. Insert the screw through the bracket and into the well nut.

9. Route the power cable through the chassis slot (bottom) of the CSC housing.

10. Hook the CSC assembly onto the back of the tape drive. Route the power cord down the back of the drive. Provide a service loop in the cord and secure the cord with a tie-wrap as shown below.



11. Tighten the well nut, while applying pressure on the bracket, until the CSC assembly is securely fastened to the tape driave chassis.

12. Plug the power cable into J4 on the CSC board. Secure it to the CSC housing with the provided tie wrap anchor.

13. Plug the interface cables to the PWB assembly and to the CSC assembly board. J1 and J2 plug into P1 and P2, respectively. Loop the cable.

14. Close the CSC enclosure and refer to Figure 2-1, sheet 3. Fasten one end of each ground strap to each screw on top of the CSC housing. Tighten the screws.

15. Fasten the other end of each ground strap onto the back of the top plate using one hinge screw on each end of the top plate.

16. Check that the drive passes the power-up tests.

17. Install the drive in rack or enclosure. Remove the window on an enclosure - for I/O cable access - before reinstalling the tape drive unit.

SERVICE ACCESS

Service access to the CSC PWB on a rack-mounted tape drive can be done without removing the drive from the slides. The tape drive must be removed from an enclosure for service.

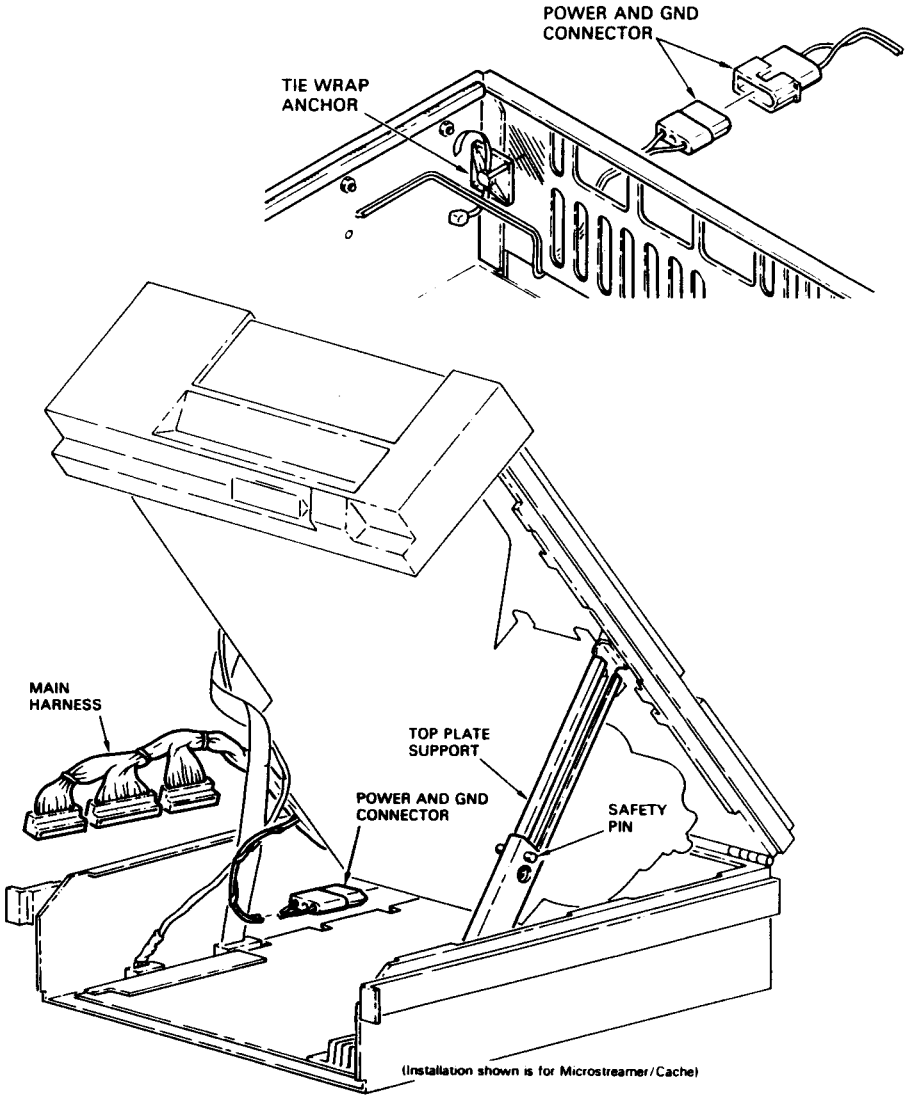


Figure 2-1. CSC Assembly Installation

Sheet 1 of 3

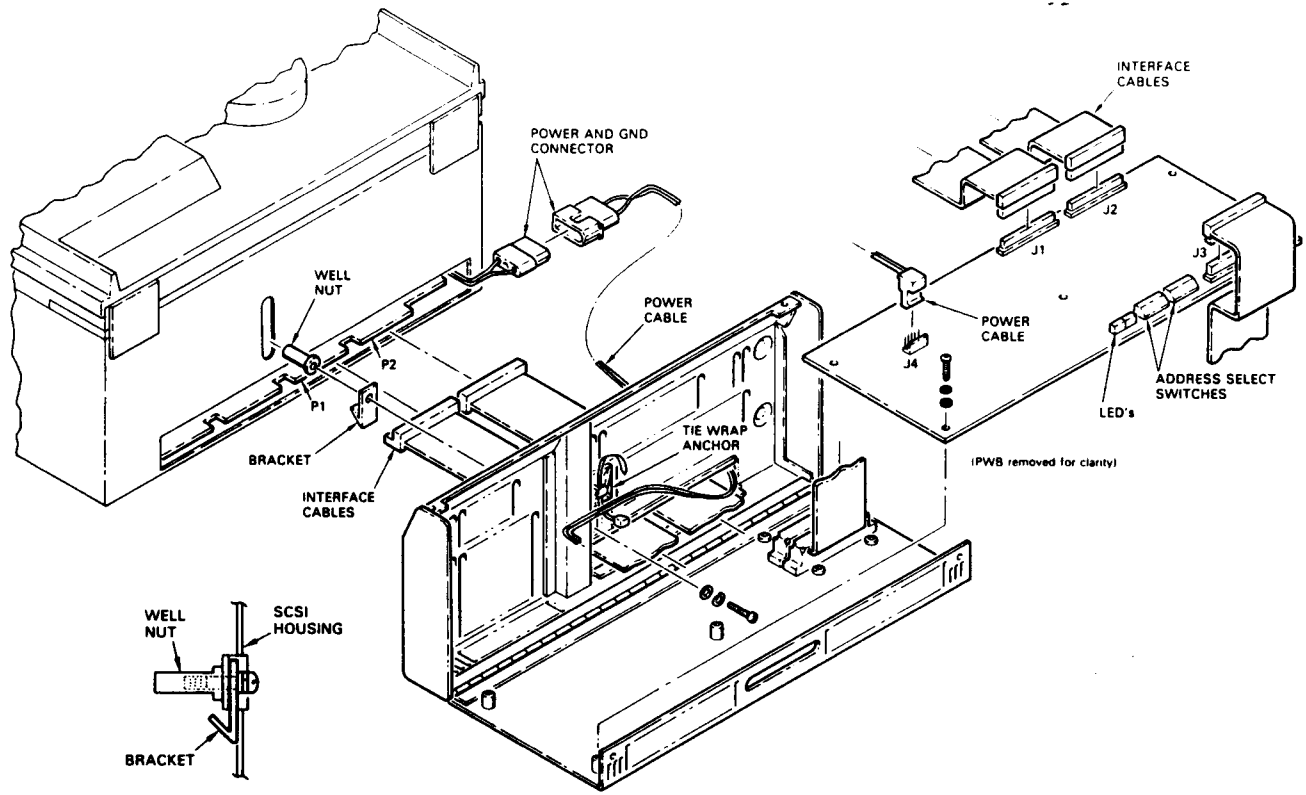


Figure 2-1. CSC Assembly Installation

Sheet 2 of 3

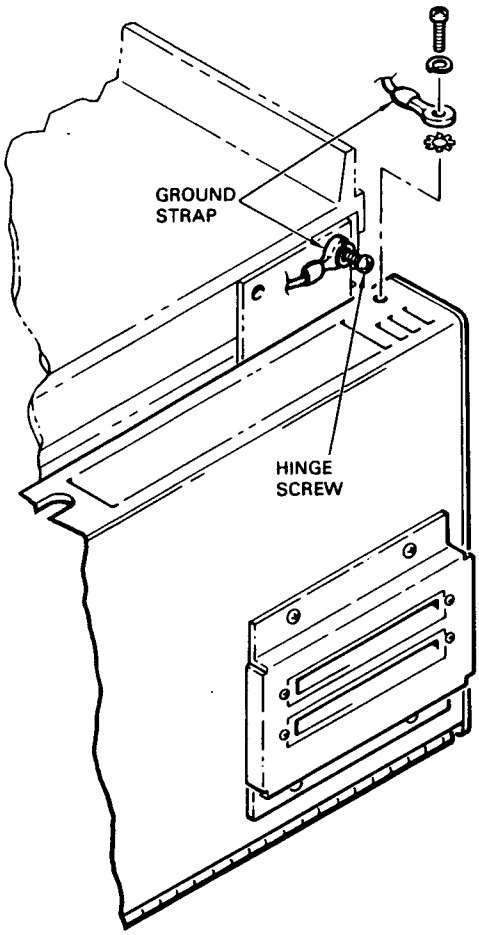


Figure 2-1. CSC Assembly Insatllation

Sheet 3 of 3

INSTALLATION

The CSC assembly should be installed by a qualified technician. It is designed to attach on tape drives that are rack-mounted or mounted inside a Cipher enclosure. The CSC enclosure opens to allow access to the controller PWB and to facilitate connecting the CSC to the tape drive interface and the input power. If it is to be installed on a rack-mounted tape drive, the drive must be fully extended and removed from the rack slides prior to installation. On an enclosed tape drive, the tape drive must be removed from the enclosure before installation can be attempted. The installation of the CSC assembly requires a pair of diagonal pliers, pliers, and a phillips screw driver. Refer to Figure 2-1A.

To install, proceed as follows:

1. Turn power off and remove tape drive power cord from outlet.
2. Place the top cover in the Maintenance Access position. Open top plate by lifting sides directly behind front panel. Place safety pin in hole provided in top plate support arm. See Figure 2-1A, sheet 1.
3. Disconnect cable harness from the PWB.
4. Install line tap connectors to main harness assembly by crimping onto wire as follows (connect to the top board, Sense/Servo board, on the GCR):

MAIN HARNESS	POWER CONNECTIONS
(GCR)	
P1-3	White wire--P2
P1-1	Black wire--P3
Microstreamer/Cache)	
P3-10	White wire--P2
P3-9	Black wire--P3

5. Plug the black and white wires of the SCSI Harness adapter cable into the taps according to step 4.
6. Route the male end of the SCSI Harness through the back of the chassis.
7. Connect the female plug of the SCSI Harness to the male plug.
8. Reconnect main harness assembly to PWB.
9. Power up the tape drive

CAUTION -

CSC 100 only: Connect a voltmeter between pins 1 (gnd) and 5 (voltage) of J4. The value of the input should be +35±6 Vdc for Microstreamer and CacheTape, and +57±6 or +37±5 Vdc for GCR. Turn drive power off before continuing and remove power cord. **Warning** - If voltages don't check correctly, do not reconnect harness. Go back to step 4 and repeat steps 4-9 after turning power off.

10. Close top plate and place power cord on top.

11. Route the power cable through the CSC housing bottom slot and anchor with tie wrap as shown in Figure 2-1A.

12. Hook CSC assembly onto the back of the tape drive housing and tighten the well nut.

13. Plug power cable to J4 on the CSC board.

14. Plug interface cables to PWB assembly and to CSC assembly board. J1 and J2 plug into P1 and P2, respectively. Loop the cable.

15. Close CSC enclosure and refer to Figure 2-1A, sheet 3. Fasten one end of each ground strap to both screws located on top of enclosure and tighten the screws.

16. Fasten the other end of each ground strap onto the back of the top plate by loosening one hinge screw located on each end of the top plate. Retighten the screws

17. Turn drive on and check that drive powers up correctly.

18. Power drive off and reinstall in rack or enclosure. Remove the window on an enclosed Microstreamer for I/O cable access, before reinstalling the tape drive unit.

SERVICE ACCESS

Service access to the CSC PWB on a rack-mounted tape drive can be done without removing the drive from the slides. The tape drive must be removed from an enclosure for service.

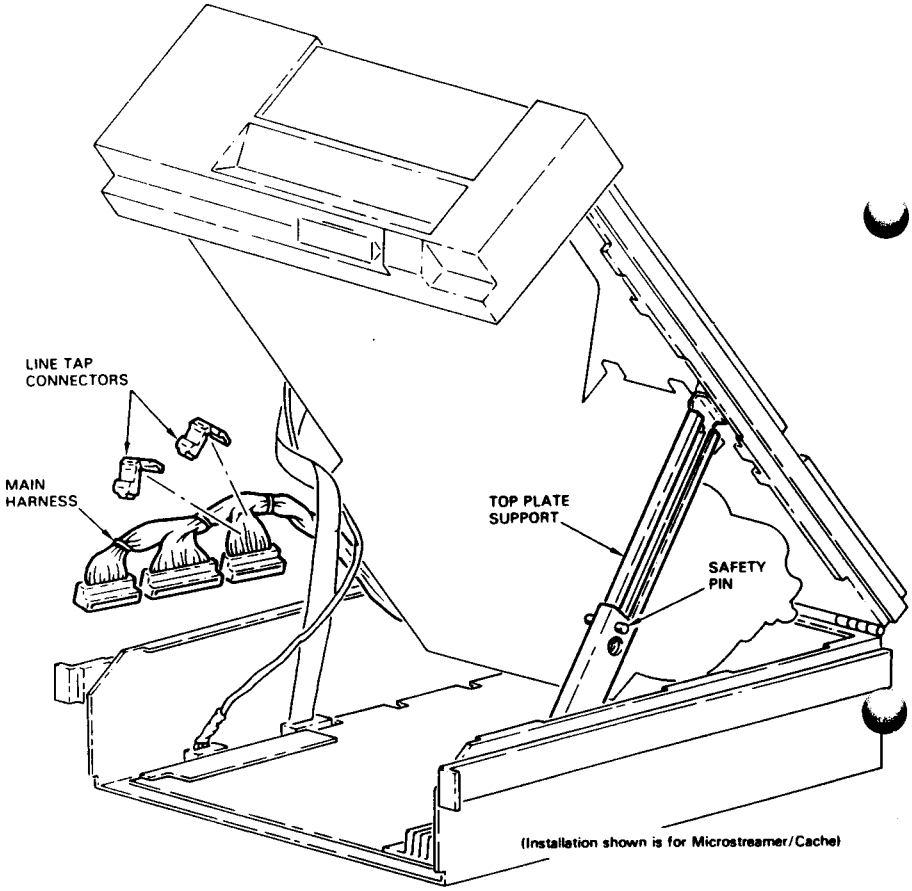


Figure 2-1a. CSC Retrofit Assembly Installation
Sheet 1 of 4

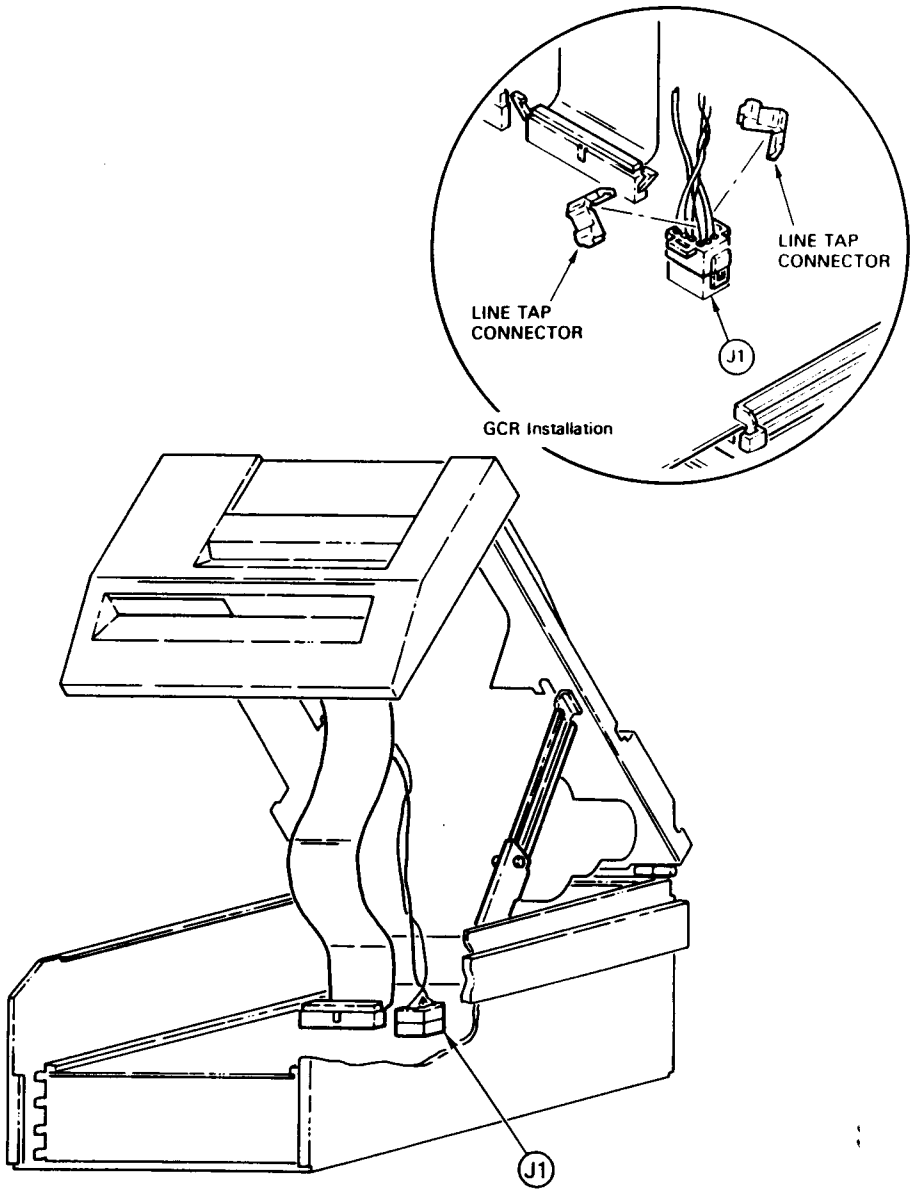


Figure 2-1a. CSC Retrofit Assembly Installation,
Sheet 2 of 4

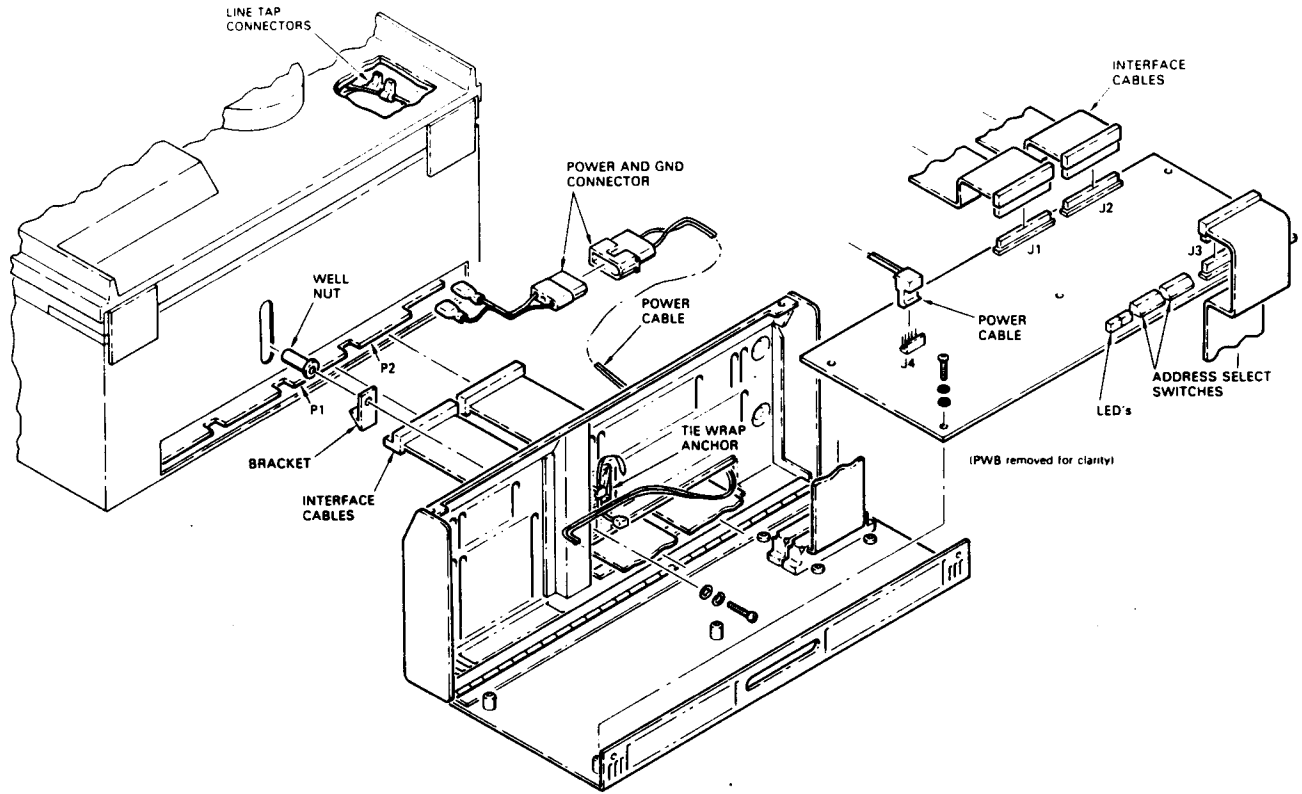


Figure 2-1a. CSC Retrofit Assembly Installation

Sheet 3 of 4

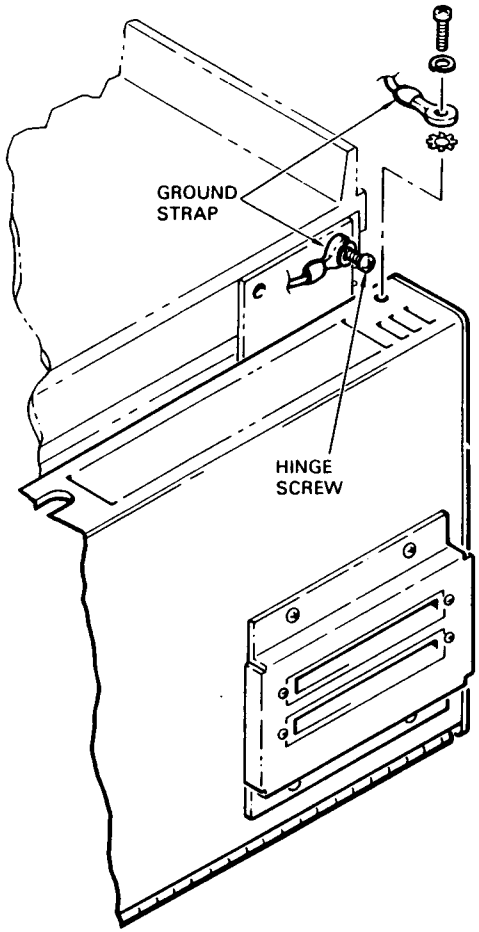


Figure 2-1a. CSC Retrofit Assembly Installation
Sheet 4 of 4

SCSI ID SWITCHES

A DIP switch is used to select the SCSI ID as shown on Table 2-1. Note: Refer to the silkscreen on the board for these switches.

	2	1	0	SCSI ID
	Open	Open	Open	0
	Open	Open	Closed	1
	Open	Closed	Open	2
*	Open	Closed	Closed	3
	Closed	Open	Open	4
	Closed	Open	Closed	5
	Closed	Closed	Open	6
	Closed	Closed	Closed	7

Table 2-1. SCSI ID

Silkscreen position S, between 0 and C of switch position 4 is the hardware reset switch; its normal operating position is open. Toggle this to reset the board. Switches 5 through 7 are not used and should be closed.

CONFIGURATION SWITCHES

The switches, labeled 0 through 7, and their functions are listed in Table 2-2.

SWITCH	POSITION		FUNCTION
SW1	0	1	
*	Closed	Closed	1 Unit available on controller
	Open	Closed	2 Units available on controller
	Closed	Open	3 Units available on controller
	Open	Open	4 Units available on controller
	2	3	
*	Closed	Closed	Normal
	Open	Closed	Loop on power-up routines
	Closed	Open	Loop on RAM data dump
	Open	Open	Allow execution after power-up failure
	4	5	
	Closed	Closed	880
	Open	Closed	890/891
	Closed	Open	990 (up to 32K data blocks; data recoverable after fatal drive error)
	Open	Open	990 (up to 64K data blocks; data not recoverable after fatal drive error)
6			
*	Closed		Parity checked
	Open		Non-parity checked
7			
*	Closed		Arbitrating Model
	Open		Non-arbitrating Model

Table 2-2. Configuration Switches

* Factory settings

CSC 100 ONLY

There are a number of jumpers on the CSC 100 PWB. Only jumper W7 can be altered. An installed jumper causes the controller to issue a hard reset of the SCSI bus at power-up. A hard reset is not issued if the jumber is removed.

CSC 200 ONLY

The CSC 200 has two DIP switches not found on the CSC 100, at locations 5A and 6T. All switches at 5A should be closed. They are for test purposes only. All switches at 6T except 4 and 5 should be closed. The following table provides the function of switches 4 and 5.

POSITION		FUNCTION
4	5	
Closed	Open	*Hard reset of SCSI bus issued at power-up.
Open	Closed	No hard reset of SCSI bus issued at power-up.

* Factory Setting

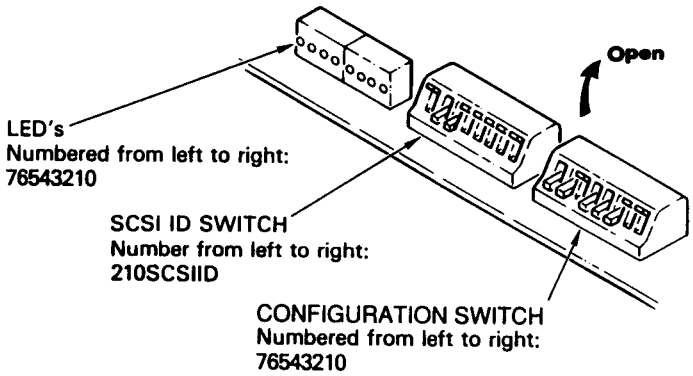


Figure 2-2. Controller Board Switches

INTERFACE CONNECTIONS

SCSI controllers are daisy-chained together using a common cable. A minimum conductor size of 28 AWG is used to minimize noise effects and ensure proper distribution of terminator power. For both models, a 50-conductor flat cable or 25 twisted-pair cable is used. Shielded or non-shielded cable connectors are available.

The CSC 100 can use terminator power supplied by the SCSI bus in the event the drive and interface are at the end of the bus and not turned on.

Figure 2-3 shows the termination scheme for CSC 100 and CSC 200. For CSC 100, the ribbon cable connecting the peripherals in a daisy-chained manner is limited to 6.0 meters. All SCSI signals in the cable are terminated at each end by 220/330 Ohm termination resistors. The CSC 200 is recommended for SCSI connections exceeding 6.0 meters and ranging up to 15.0 meters, primarily for interconnection outside of a cabinet. All SCSI bus signals consist of two lines denoted (+)signal and (-)signal. Each differential pair must be terminated at each end of the SCSI bus with 330 Ohms to +5V. 330 Ohms to ground, and 150 Ohms between the signal pairs. Terminations are made by inserting terminators into the sockets: on the CSC 100 PWB at locations 2A and 2B and on the CSC 200 at locations 2A, 2H, and 3G. Only two devices at each physical end of the bus require terminators; if the controller is not at either physical end of the bus, remove the terminators.

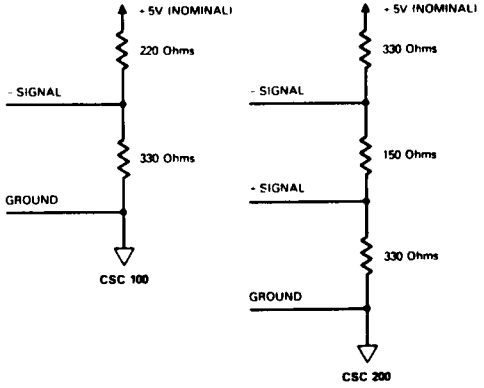


Figure 2-3. SCSI Bus Signal Termination

SCSI Bus Terminator Power. The controller supplies terminator power through a diode to its socketed SCSI bus terminators. This power is also supplied to SCSI bus connection J3 pin 26 for powering a terminator on the opposite end of the bus. This provides for signal integrity if that device loses internal power. Additionally, external terminator power into the controller can be provided through a diode in SCSI bus connector J3 pin 26.

Connectors. Two 50-pin connectors, J1 and J2, are provided to connect the controller to the tape drive. Also mounted on this board is a 50-pin connector, J3, which is provided to connect the CSC 100 to the SCSI bus in a daisy-chain configuration. For the model CSC 200, two 50-pin connectors, J3 and J4, are provided for daisy-chaining.

Pin Assignments. The signals, mnemonics and pin assignments for connectors J1 and J2 are presented in Table 2-3. See Section III for command definitions. Table 2-4 shows the single-ended pin assignments for ANSI unshielded and Alternative 1 shielded connectors. Table 2-5 shows the single-ended pin assignments for ANSI Alternative 2 shielded connectors. Table 2-6 shows the differential pin assignments for ANSI unshielded and Alternative 1 shielded connectors, Table 2-7 for Alternative 2 shielded connectors.

Connector	Signal Pin	Signal
J1 Controller to Tape Drive	2	Formatter Busy (IFBY)
	4	Last Word (ILWD)
	6	Write Data 4 (IW4)
	8	Initiate Command (IGO)
	10	Write Data 0 (IW0)
	12	Write Data 1 (IW1)
	14	---
	16	---
	18	Reverse (IREV)
	20	Rewind (IREW)
	22	Write Data Parity (IWP)
	24	Write Data 7 (IW7)
	26	Write Data 3 (IW3)
	28	Write Data 6 (IW6)
	30	Write Data 2 (IW2)
	32	Write Data 5 (IW5)
	34	Write (IWRT)
	36	---
	38	Edit (IEDIT)
	40	Erase (IERASE)
	42	Write File Mark (IWFM)
	44	---
	46	Transport Address 0 (ITAD0)
	48	Read Data 2 (IRD2)
	50	Read Data 3 (IRD3)
J2 Controller to Tape Drive	1	Read Data Parity (IRDP)
	2	Read Data 0 (IRD0)
	3	Read Data 1 (IRD1)
	4	Load Point (ILDP)
	6	Read Data 4 (IRD4)
	8	Read Data 7 (IRD7)
	10	Read Data 6 (IRD6)
	12	Hard Error (IHER)
	14	File Mark (IFMK)
	16	Identification (IIDENT)
	18	Formatter Enable (IFEN)
	20	Read Data 5 (IRD5)
	22	End of Tape (IEOT)
	24	Rewind/Unload (IRWU)
	26	---
	28	Ready (IRDY)

Table 2-3. Interface Connections, Controller to Tape Drive

Connector	Signal Pin	Signal
J2 Controller to Tape Drive	30	Rewinding (IRWD)
	32	File Protected (IFPT)
	34	Read Strobe (IRSTR)
	36	Write Strobe (IWSTR)
	38	Data Busy (IDBY)
	40	High Speed Status (ISPEED)
	42	Corrected Error (ICER)
	44	On Line (IONL)
	46	Transport Address (ITAD1)
	48	Formatter Address (IFAD)
	50	Select Speed (IHISP)

NOTE: All other pins on J1 and J2 are grounded.

Table 2-3. Interface Connections, Controller to Tape Drive (Cont'd.)

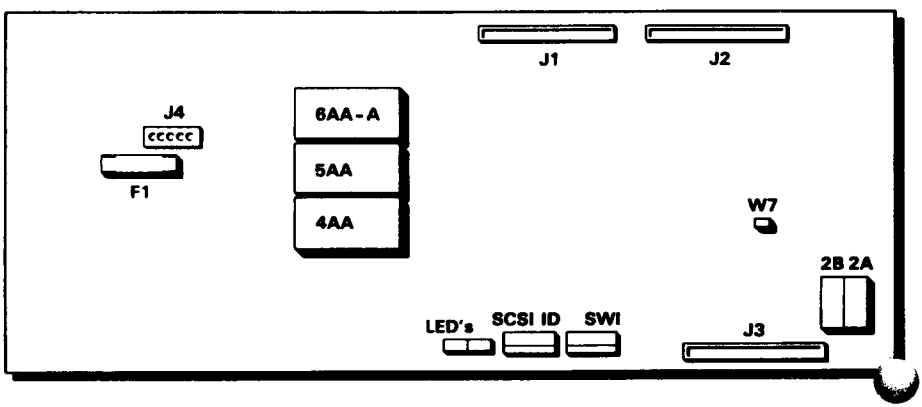


Figure 2-4. CSC PWB Component Locations

Signal Pin	Signal
2	-DB0
4	-DB1
6	-DB2
8	-DB3
10	-DB4
12	-DB5
14	-DB6
16	-DB7
18	-DBP
20	Ground
22	Ground
24	Ground
26	Terminator Power
28	Ground
30	Ground
32	-ATN
34	Ground
36	-BSY
38	-ACK
40	-RST
42	-MSG
44	-SEL
46	-C/D
48	-REQ
50	-I/O

All odd-numbered pins except 25 are connected to ground. Pin 25 left open.

Table 2-4. Model CSC 100 Connector J3 Pin Assignments.

Signal	Pin Number
-DB (0)	26
-DB (1)	27
-DB (2)	28
-DB (3)	29
-DB (4)	30
-DB (5)	31
-DB (6)	32
-DB (7)	33
-DB (P)	34
GROUND	35
GROUND	36
GROUND	37
TERMPWR	38
GROUND	39
GROUND	40
-ATN	41
GROUND	42
-BSY	43
-ACK	44
-RST	45
-MSG	46
-SEL	47
-C/D	48
-REQ	49
-I/O	50

Pins 1-12 and 14-25 are connected to ground. Pin 13 left open.

Table 2-5. Model CSC 100 Connector J3 Pin Assignments (Alternative 2).

Signal Name	Pin Number		Signal Name
SHIELD GROUND	1	2	GROUND
+DB (0)	3	4	-DB (0)
+DB (1)	5	6	-DB (1)
+DB (2)	7	8	-DB (2)
+DB (3)	9	10	-DB (3)
+DB (4)	11	12	-DB (4)
+DB (5)	13	14	-DB (5)
+DB (6)	15	16	-DB (6)
+DB (7)	17	18	-DB (7)
+DB (P)	19	20	-DB (P)
DIFFSENS	21	22	GROUND
GROUND	23	24	GROUND
TERMPWR	25	26	TERMPWR
GROUND	27	28	GROUND
+ATN	29	30	-ATN
GROUND	31	32	GROUND
+BSY	33	34	-BSY
+ACK	35	36	-ACK
+RST	37	38	-RST
+MSG	39	40	-MSG
+SEL	41	42	-SEL
+C/D	43	44	-C/D
+REQ	45	46	-REQ
+I/O	47	48	-I/O
GROUND	49	50	GROUND

Table 2-6. Model CSC 200 Connector J3 Pin Assignments.

Signal Name	Pin Number		Signal Name
SHIELD GROUND	1	26	GROUND
+DB (0)	2	27	-DB (0)
+DB (1)	3	28	-DB (1)
+DB (2)	4	29	-DB (2)
+DB (3)	5	30	-DB (3)
+DB (4)	6	31	-DB (4)
+DB (5)	7	32	-DB (5)
+DB (6)	8	33	-DB (6)
+DB (7)	9	34	-DB (7)
+DB (P)	10	35	-DB (P)
DIFFSENS	11	36	GROUND
GROUND	12	37	GROUND
TERMPWR	13	38	TERMPWR
GROUND	14	39	GROUND
+ATN	15	40	-ATN
GROUND	16	41	GROUND
+BSY	17	42	-BSY
+ACK	18	43	-ACK
+RST	19	44	-RST
+MSG	20	45	-MSG
+SEL	21	46	-SEL
+C/D	22	47	-C/D
+REQ	23	48	-REQ
+I/O	24	49	-I/O
GROUND	25	50	GROUND

Table 2-7. Model CSC 200 Connector J3 Pin Assignments (Alternative 2).

Data Sheet for Floppy Disk Drives

Manufacturer: Teac	**Sheet number: FD 2 revision 0**
Type: 235HF	**Form Factor: 3½"**

General Drive Description.

The Teac FD-235 is a 3½" floppy disk drive.
The FD-235 is a dual mode drive, that is able to run in normal density mode, or in high density mode. In high density mode the storage capacity is 1.44 Mbytes. The drive can read and write standard 135 tpi 3½" floppy disks.

Environment.

Electrical Interface: Floppy.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical	0.66A	0.80A	0.30A	0.40A	0.07A		100mV

Average power dissipation: 50mW (motor not running)
Average power dissipation: 4.4 W. (motor running)

Operating temperature range: 4 to 50 °C.

Storage temperature range: -22 to 60 °C.

Maximum temperature gradient: 15 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

General Performance Specifications.

Settling time: 15 msec.
Track-to-track: 3 msec (excluding settling time).
Average: 94 msec (including settling time).
Rotational latency average: 100 msec.

Media transfer rate 250 Kbit(low density), 500 Kbit(high density).

Type of Media.

High density and normal density 3½" micro floppy disks.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the spindle motor down.

Connectors.

Power connector.
Pin 1: +5 VDC
Pin 2: 0 VDC
Pin 3: 0 VDC
Pin 4: N.C.

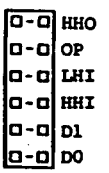
Signal connector.
34 pin connector. 17 pins on both sides, even number pins are upper side of the floppy disk drive.

Configuration options.

Terminator resistors.

Interface terminator pack provide termination for the interface lines. The terminator resistors are mounted on the PCB with soldering joint (unremovable). For the multiplex connection of floppy disk drives by daisy chaining, multiple terminator resistors are connected to the input signals.
The total cable length should be less than 3 meters.

* designates factory installed position.



Assignment of straps.

All straps are mounted on the main PCBA of the floppy disk drive. Insertion of a short bar onto the post pin is defined as the on-state of the strap.

D0 and D1 straps.
* D0 installed.

HHI, LHI, OP and HHO straps.
Straps to select the designating method of the density mode.
* HHI installed. The floppy disk drive switches the density mode according to the HD IN

input signal. HIGH level corresponds to high density mode.

Frame grounding.
Strap to connect the floppy disk drive frame electrically to DC 0 V.
* FG jumper wire installed.

5¼adaptor

The TEAC FD-235 can be integrated with a TEAC CS-235 adaptor kit.
The ST strap on the PCBA of the 5¼" adapter must set in position ST.

Documentation.

Publications available from Teac.
TEAC FD-235HF micro floppy disk drive specification.

Data Sheet for Floppy Disk Drives

Manufacturer: Teac	**Sheet number: FD 1 revision 0**
Type: 55GFR-141	**Form Factor: 5¼" Half-Height**

General Drive Description.

The Teac FD-55 is a 5¼" floppy disk drive.
The FD-55 is a dual mode drive, that is able to run in normal density mode, or in high density mode. In high density mode the storage capacity is 1200 Kbytes. The drive handles both 48 tpi and 96 tpi floppy disks.

Environment.

Electrical Interface: Floppy.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical	0.53A		0.47A		0.23A		100mV
+12 ±5% typical	1.0A		0.24A	0.58A	0.01A	0.02A	200mV

Average power dissipation: 1.0 W. (motor not running)
Average power dissipation: 4.8 W. (motor running)

Operating temperature range: 4 to 46 °C.

Storage temperature range: -22 to 60 °C.

Maximum temperature gradient: 15 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

General Performance Specifications.

Settling time 15 msec.
Track-to-track: 3 msec (excludes settling time).
Average: 94 msec (includes settling time).
Rotational Latency Average 100 msec(low density), 83 msec(high density).

Media transfer rate 250 Kbit(low density), 500 Kbit(high density).

Type of Media.

5¼" soft sectored high density flexible disks for high density mode, or 5¼" soft sectored normal density flexible disks for normal density mode.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the indicator(LED) up.

Connectors.

Power connector.
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

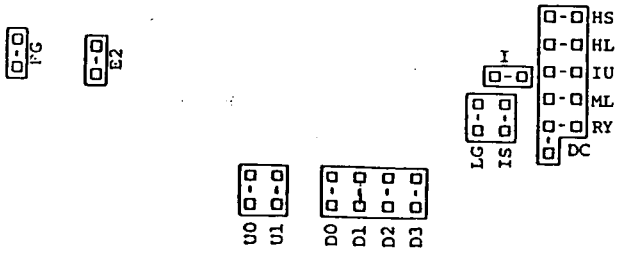
Signal connector.
34 pin connector. 17 pins on both sides, even number pins are bottom side of the floppy disk drive.

Configuration options.

Terminator resistors.

Interface terminator pack provide termination for the interface lines. The terminator resistors are mounted on the PCB with soldering joint (unremovable). For the multiplex connection of floppy disk drives by daisy chaining, multiple terminator resistors are connected to the input signals.
The total cable length should be less than 3 meters.

* designates factory installed position.



Assignment of straps.

All straps are mounted on the main PCBA of the floppy disk drive. Insertion of a short bar onto the post pin is defined as the on-state of the strap.

D0 – D3 straps.
* D1 installed.

U0, U1 and IU straps.
Straps to select the turn-on condition of the front bezel indicator.
* No straps installed, turn on condition is drive select.

HS and HL straps.
Straps to select head load condition.
* No straps installed, head load on ready state.

ML strap.
Strap to select the rotational condition of the spindle motor.
* No strap installed, the motor rotates only by the **MOTOR ON** signal.

RY/DC straps.
Straps to select the function of the **READY/DISK CHANGE** signal.
* DC strap installed, the function of the signal is **DISK CHANGE**.

LG strap.
Straps to select the function of the **HIGH/NORMAL DENSITY** signal.
* No strap installed, the low level of the signal designates the normal density mode.

I and IS straps.
Straps to select the speed mode of the floppy disk drive.
* I and IS straps installed, dual speed mode is designated. The floppy disk drive maintains the ready state with no relation to a level change of the **HIGH/NORMAL DENSITY** signal.

E2 strap.
Strap to select the output condition of the index and read data pulses.
* E2 strap not installed.

FG strap.
Strap to connect the floppy disk drive frame electrically to DC 0 V.
* FG strap installed.

Documentation.

Publications available from Teac.
TEAC FD-55GFR-141/041 mini flexible disk drive specification.

Data Sheet for Floptical Drive

Manufacturer: Insite Peripherals	**Sheet number: FD 3 revision 0**
Type: I325VM	**Form Factor: 3.5"**
Date: 95-02-06	**Interface: SCSI-2 (SPC/3 ONLY)**

General Drive Description.

The Insite I325VM is a 3.5" floptical disk drive (for use in the SPC/3 only).
The I325VM is a dual mode drive that is able to run in very high density mode, or in high density mode. In very high density mode the storage capacity is 19.8 MB, and in high density mode 1.44 MB. In very high density mode the drive uses a special magnetic/optical 3.5" media. In high density mode the drive can read and write standard 1.44 MB 3.5" floppy disks.

Environment.

Electrical Interface: SCSI-2.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical	-	1.30A	-	1.20A	0.24A		100mV

Average power dissipation: 1.2 W (motor not running)
Average power dissipation: 1.7 W. (motor running)

Operating temperature range: 5 to 45 °C.

Storage temperature range: -20 to 60 °C.

Maximum temperature gradient: 20 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

General Performance Specifications.

Track-to-track seek: 20 msec (including settling time).
Average seek: 80 msec (including settling time).
Rotational latency average: 41.67 msec.

Media transfer rate: 1.6 Mbit.
Max. sustained Transfer Rate across SCSI interface: 110 kbytes/s.

Type of Media.

Very high density Floptical diskette or high density 3.5" micro floppy disks.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the spindle motor down.

Connectors.

Power connector:
Pin 1: +5 VDC
Pin 2: 0 VDC
Pin 3: 0 VDC
Pin 4: N.C.

Signal connector:
50 pin connector SCSI-2 connector.

Configuration options:

Terminator resistors.

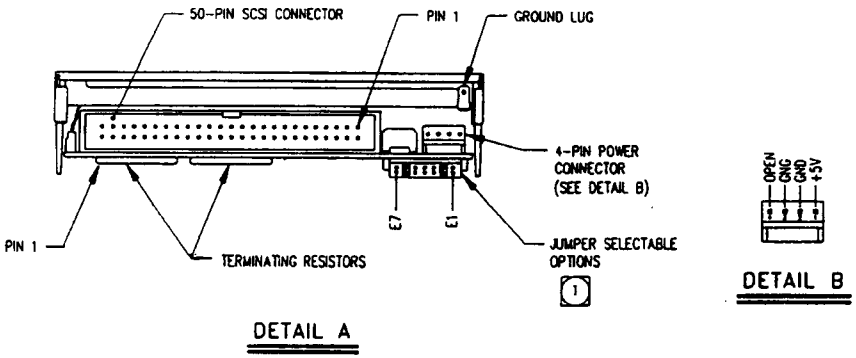
Three resistor packs (SIL) provide termination for the interface lines. When more than one unit is connected to the SCSI cable, the last unit and only the last unit on the cable must have terminators installed.

BUS termination power.

A jumper must be installed at E6 or E7 to select the source of power to the termination.

* When a jumper is installed in E6, the drive provides terminator power.

* designates factory installed position.



Assignment of straps.

All straps are mounted on the jumper options connector shown on the drawing above. Insertion of a short bar onto the connector pins is defined as the on-state of the strap.

E3, E2 and E1 straps:
These are the device ID straps, with E3 as the most significant bit.

E4 option strap:
Strap E4 enables SCSI Parity checking.
* E4 installed. The Floptical drive checks the parity by default.

E5 option strap:
Strap E5 enables Unit Attention after SCSI Reset.
Default: E5 not installed.

E6 and E7 option straps:
Straps E6 and E7 select the power source to the terminator resistors. E6 connects power from the drive to the terminators. E7 connects power from the SCSI cable to the terminators.
* E6 installed. The terminators are powered by the drive.

Shipping.

IMPORTANT: When shipping the drive, the protective cardboard disk supplied with the drive must be installed in the drive. Otherwise the movable parts of the optical system may easily be damaged.

5.25 inch adaptor kit.

The I325VM Floptical can be integrated with a TEAC CS-235 adaptor kit. This will enable the Floptical drive to be mounted in a position designed for 5.25" half height peripherals.

Preventive Maintenance.

Given that approved media and proper operating environments are observed (see Environment) preventive maintenance is not required for the I325VM.
Do NOT use cleaning disks for ordinary floppy drives in the Floptical.

Documentation.

Publications available from Insite Peripherals:
I325VM 21MB Floptical Disk Drive Specifications 03-01210-001.
I325VM Programmer's Manual 02-02094-001.

Data Sheet for Video Tape Drives

Manufacturer: Exabyte	**Sheet number: VD 5 revision 0**
Type: EXB-8900	**Form Factor: 5¼" Half-Height**
Date: 96-11-14	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The EXABYTE EXB-8900 CTS (Mammoth) is a high capacity 8 mm cartridge drive.The drive contains an embedded controller with SCSI interface. It uses helical scan technology to record on an industry standard size 8 mm cartridge. The AME tape is Exabyte proprietary.
The cartridge stores approximately 18800 Mbytes of uncompressed, formatted user data. A compression ratio of typically 1:2 yields up to 37600 MB user data on one tape. The EXB-8900 reads/writes in Mammoth format. However, it also reads the previous Exabyte 8200, 8500, and 8500c formats. Data transfer speed is 3 MB/s native, up to 6 MB/s with data compression enabled. Electrical Interface: SCSI-II. The drive does NOT have built in termination of the SCSI bus.

Environment.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical			1.4A	1.6A			125mV
+12 ±5% typical			0.4A	1.0A			125mV

Minimum power dissipation: 5.5 W (idle).

Maximum power dissipation: 19.0 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -40 to 60 °C.

Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

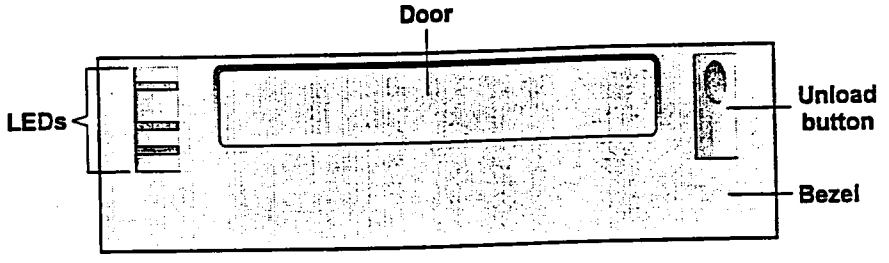
MTBF: 200.000 POH.

MEDIA: Exatape 170 meter Advanced Metal Evaporated (AME).

Mounting.

The EXB-8900 may be mounted either horizontally or vertically, as follows:
In the horizontal configuration, the data cartridge door should be facing upwards. In the vertical configuration, the drive may be mounted so that the cartridge door faces either right or left.

Connectors.



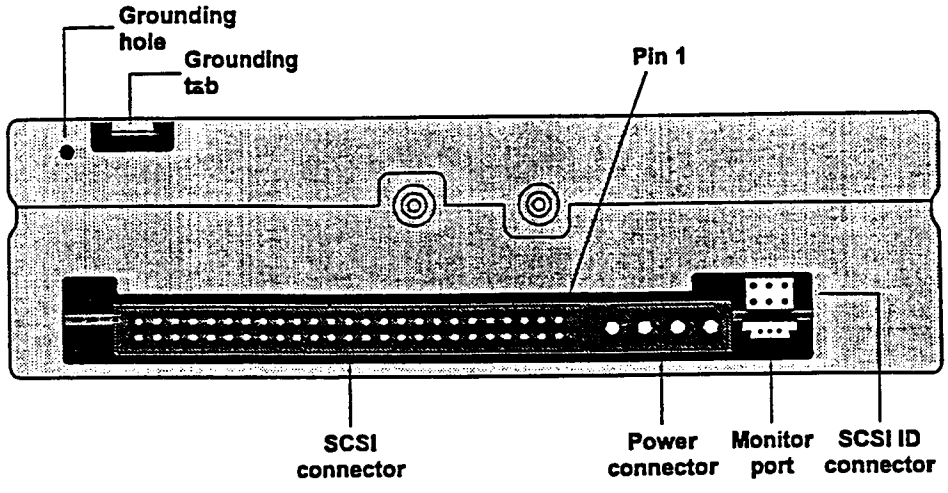
Front panel

LEDs Three light emitting diodes (LEDs) on the front panel give status information by turning on, off, or flashing.

Table 1-1 LED indicators

	Tape Drive State						
	POST or reset	Failed POST or error	Ready (no tape)	Ready (tape)	Normal motion	High speed motion	Time to clean
Top LED Amber	●	✱	○	○	○	○	○
Middle LED Amber	●	○	○	○	○	○	●
Bottom LED Green	●	○	○	●	✱	✱ fast	○

LEGEND:
○ = off
● = on
✱ = flash



Back panel with narrow SCSI

Power and Interface Connections.

P4: SCSI connector

P1: Power connector
Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

Configuration options.

SCSI controller ID			
SCSI ID	SEL3	SEL2	SEL1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Data Compression.

The data compression option factory default is data compression enabled.

Terminator resistors.

The drive does NOT have built in termination of the SCSI bus. The bus must be externally terminated when using the EXB-8900.

Preventive Maintenance.

The EXB-8900 tape head/path requires cleaning once a month or when the middle (Amber) LED on the front is constantly on.
To clean the tape head/path, the *EXABYTE Certified 8mm Mammoth Cleaning Cartridge* should be used. Also refer to DDE Product Note for advice on installation, maintenance, and operating environment.

Documentation.

DDE Produkt Information: "Drift og Installation af Exabyte streameren"
Publications available from Exabyte:
Exabyte Mammoth 8mm Tape Drive Technical Specifications 306482-002
Exabyte Mammoth 8mm Tape Drive SCSI Reference 306483-002

Data Sheet for DAT Drives

Manufacturer: Hewlett Packard	**Sheet number: DAT1 revision 0**
Type: C1533A	**Form Factor: 3.5" (Height 43 mm).**
Date: 95-03-01	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The Hewlett Packard C1533A DAT drive is a high capacity 4 mm cartridge drive. The drive contains an embedded controller with SCSI interface. It uses helical scan technology, to record on an industry standard DDS-2 4 mm cartridge. The cartridge stores approximately 3800 Mbytes of formatted user data.
The drive does not have built in termination of the SCSI bus.

Environment.

Electrical Interface: SCSI-II Fast.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical			1.2A				125mV
+12 ±5% typical			0.2A	0.6A			125mV

Typical power dissipation: 8.5 W.

Maximum power dissipation: 13.5 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -40 to 70 °C.

Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Suspended dust particles: Less than 200 microgram per cubic meter.

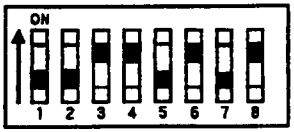
MTBF: 200.000 POH.

Mounting.

The C1533A may be mounted either horizontally or vertically, as follows:
In the horizontal configuration, the data cartridge door should be facing upwards. In the vertical configuration, the drive may be mounted so that the cartridge door faces either right or left.

Connectors and Straps.

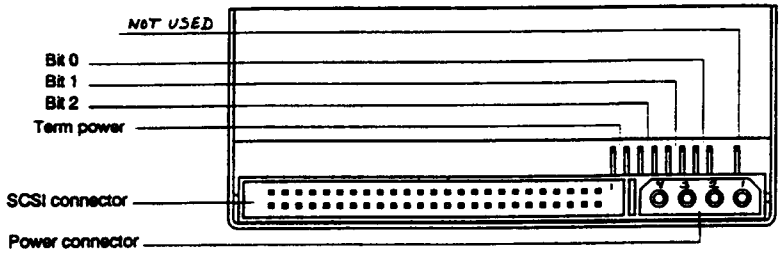
The HP C1533A has a set of configuration option switches on the bottom of the unit, as shown below.
When used in either a Supermax or an SPC/3, the default block size should be 1024 bytes, and data compression should be off, so the DIP switch setting should be as follows:



Off - Off - On - On - Off - On - Off - On
1 2 3 4 5 6 7 8

The SCSI ID is set using jumpers on the set of pins beside the SCSI connector at the rear of the drive, as shown in figure 1

Figure 1



Power and Interface Connections.

Power connector:

Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

SCSI ID strapping:

SCSI controller ID			
SCSI ID	Bit 2	Bit 1	Bit 0
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

The drive does NOT have built in termination of the SCSI bus. The bus must be externally terminated when using the HP C1533A.
The drive can provide power for an external terminator via the SCSI pin 26 line by strapping the TERM PWR pins. This option is not to be used in Supermax or SPC/3 computers.

Preventive Maintenance.

The C1533A tape head/path requires cleaning once a month or after about 30 Gigabytes of data transfer (the right LED will start flashing amber when the unit needs cleaning).
To clean the tape head/path, the *HP 92283K Cleaning Cartridge* should be used. Also refer to the Users' Manual for advice on installation and maintenance.

Documentation.

Publications available from Hewlett Packard:

The HP C1533A OEM Product Manual, Edition 3, January 1994.
The HP C1533A DDS-2 Tape Drive User's Manual, Edition 2, February 1994.

Data Sheet for CD ROM Drives

Manufacturer: Toshiba	**Sheet number: CDR2 revision 0**
Type: XM-5301B	**Form Factor: 5.25" (Height 43 mm).**
Date: 95-10-18	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The Toshiba XM-5301B CD ROM drive is a high speed (4x) CD ROM drive.The drive contains an embedded controller with SCSI interface, and supports the CD-DA, CD-XA, CD-ROM Mode 1, and CD-ROM Mode 2 (form 1 and form 2) formats. The sustained data rate is 600 kbytes/s and average access is 190 mS. The capacity of the data buffer is 256 kbytes. Also Photo CD multi-session, CD-G, CD-Bridge, CD-I, CD-I Ready, and Video CD is supported.
This CD ROM drive has a tray-type load/eject, not the earlier caddy based implementation.

Environment.

Electrical Interface: SCSI-II.

DC Power Requirements

Voltage	Start-up Avg.	Start-up Peak	Running Avg.	Running Peak	Not running Avg.	Not running Peak	Ripple (maximum)
+5V ±5% typical		1.3A	0.5A	0.64A			100mV

Typical power dissipation: 2.5 W.

Maximum power dissipation: 3.2 W.

Operating temperature range: 5 to 50 °C.

Storage temperature range: -10 to 65 °C.

Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 8 to 80 %, non condensing.

MTBF: 80.000 POH.

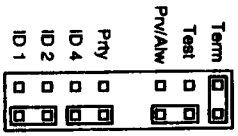
Mounting.

The XM-5301B may be mounted either horizontally or vertically, as follows:
In the horizontal configuration, the CD tray should be facing upwards. In the vertical configuration, the eject button must be upward.

Connectors and Straps.

The XM-5301B has a set of 7 configuration option straps on the rear side of the unit, as shown below.
Parity check should be enabled, and the use of the eject button should be enabled.

The switches are towards the left as you look at the back of the drive. The settings of these switches may need to be changed, depending on your needs. The two settings for each switch are ON and OFF, sometimes referred to as 1 and 0. If the connector plug **connects** the two pins, the switch is **ON**, if the connector plug touches **only one pin**, it is **OFF**.
The block of jumper switches looks like this:



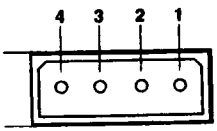
The Parity Switch

When this switch is set to OFF the parity of output data is not checked. When this switch is set to ON the output data is checked for parity and the parity bit is issued.

Eject Suppression Switch

Switch 6 is used to inhibit the operation of the drive's EJECT button. When this switch is set to ON, the EJECT button will not operate. Set the switch to OFF to allow the EJECT button to operate.

Power Connector



Power and Interface Connections.

Power connector:

Pin 1: +12 VDC (not used)
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

SCSI ID strapping:

SCSI controller ID			
SCSI ID	ID 4	ID 2	ID 1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

The drive has two SIL resistor packs for termination of the SCSI bus. The resistors are located next to the SCSI connector. These resistors can be removed in case termination is not needed.
When more than one device is connected to the SCSI cable, the last device and only the last device on the cable must have terminators installed.
The TERM jumper does not control the terminator resistors. It enables the drive to supply termination power to the SCSI bus.

Preventive Maintenance.

There is no preventive maintenance required for this drive.

Documentation.

Publications available from Toshiba:
XM-5301B CD-ROM drive Instruction Manual, Version 1.0

Data Sheet for CD ROM Drives

Manufacturer: Pioneer	**Sheet number: CDR1 revision 0**
Type: DR-U104X	**Form Factor: 5.25" (Height 43 mm).**
Date: 95-07-17	**Interface: SCSI-2, A-cable, Single Ended**

General Drive Description.

The Pioneer DR-U104X CD ROM drive is a high speed (4x) CD ROM drive.The drive contains an embedded controller with SCSI interface, and supports the CD-DA, CD-ROM Mode 1, and CD-ROM Mode 2 (form 1 and form 2) formats. The sustained data rate is 614 kbytes/s and average access is 190 mS. The capacity of the data buffer is 256 kbytes. Also Photo CD multi-session is supported.

Environment.

Electrical Interface: SCSI-II.

DC Power Requirements

Voltage	Start-up		Running		Not running		Ripple
	Avg.	Peak	Avg.	Peak	Avg.	Peak	(maximum)
+5V ±5% typical		0.53A	0.44A	0.67A			100mV
+12 ±5% typical		2.2A	0.76A	1.28A			150mV

Typical power dissipation: 11.3 W.

Maximum power dissipation: 18.7 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -20 to 50 °C.

Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 10 to 80 %, non condensing.

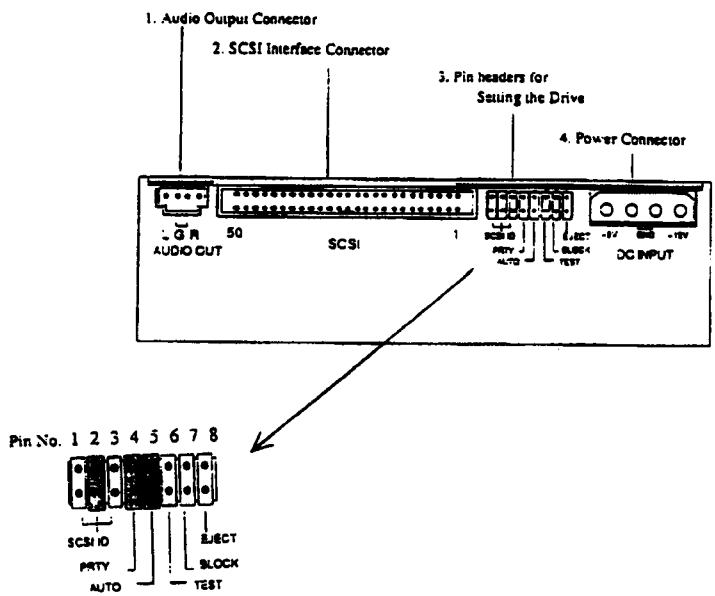
MTBF: 50.000 POH.

Mounting.

The C1533A may be mounted either horizontally or vertically, as follows:
In the horizontal configuration, the CD-caddy door should be facing upwards. In the vertical configuration, the eject button must be upward.

Connectors and Straps.

The DR-U104X has a set of 8 configuration option straps on the rear side of the unit, as shown below.
When used in either a Supermax or an SPC/3, the default block size should be 2048 bytes, parity check should be enabled, the use of quad speed should be enabled, and the use of the eject button should be enabled.
This corresponds to the factory default setting, as shown on the figure below:



Power and Interface Connections.

Power connector:

Pin 1: +12 VDC
Pin 2: +12 Return
Pin 3: +5 Return
Pin 4: +5 VDC

SCSI ID strapping:

SCSI controller ID			
SCSI ID	Pin #3	Pin #2	Pin #1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

The drive has two SIL resistor packs for termination of the SCSI bus. The resistors are located next to the SCSI connector. These resistors can be removed in case termination is not needed.
When more than one device is connected to the SCSI cable, the last device and only the last device on the cable must have terminators installed.

Preventive Maintenance.

There is no preventive maintenance required for this drive.

Documentation.

Publications available from Pioneer:

Technical Specifications for the DR-U104X CD-ROM drive, Pioneer OBU0096.
DR-U104X CD-ROM drive Operating Instructions, Pioneer DRC1013.

SECTION 3.0

DDE Data Sheet for Power Supplies. PS 12 REV. 0 DATE 880222

MANUFACTURER: Coutant NAME: dde020

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt	Tolerance	Adjustment	Max. current	Peak. current
	V	+/- %		A	A in 10 sec.
M	5	5	y	20.0	20.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 300 W.

DDE Data Sheet for Power Supplies. PS 9 REV. 0 DATE 860609

MANUFACTURER: Coutant NAME: dde019

TYPE: Switching modular ML 150

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt	Tolerance	Adjustment	Max. current	Peak. current
	V	+/- %		A	A in 10 sec.
M	5	5	y	20.0	
L	-5.2	5	y	10.0	
C	12	5	n	3.0	
C	-12	5	n	3.0	

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 150 W.

DDE Data Sheet for Power Supplies. PS 8 REV. 0 DATE 860117

MANUFACTURER: Coutant NAME: dde018

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt V	Tolerance +/- %	Adjustment	Max. current A	Peak. current A in 10 sec.
L	5	5	y	10.0	
L	-5.2	5	y	10.0	
S	24	5	n	5.0	16.0
S	24	5	n	5.0	16.0
G	-24	5	n	3.0	8.0
G	12	5	n	4.0	8.0
G	-12	5	n	3.0	8.0

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 400 W.

DDE Data Sheet for Power Supplies. PS 7 REV. 0 DATE 851218

MANUFACTURER: Coutant NAME: dde017

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt	Tolerance	Adjustment	Max. current	Peak. current
	V	+/- %		A	A in 10 sec.
M	5	5	y	20.0	20.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	24	5	n	4.0	8.0

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 300 W.

DDE Data Sheet for Power Supplies. PS 6 REV. 0 DATE 851218

MANUFACTURER: Coutant NAME: dde016

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt V	Tolerance +/- %	Adjustment	Max. current A	Peak. current A in 10 sec.
X	+ 5	5	y	40.0	-
M	+ 5	5	y	20.0	-
S	+12	5	n	8.0	16.0
BT	+24	2	n	1.0	-
BT	-12	2	n	0.5	-

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module.
X and M modules connected in parallel in order to get 60 A on +5V.
This connection must NOT be removed.
Maximum power is 400 W when fan is mounted.

DDE Data Sheet for Power Supplies. PS 5 REV. 0 DATE 851218

MANUFACTURER: Coutant NAME: dde014

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt V	Tolerance +/- %	Adjustment	Max. current A	Peak. current A in 10 sec.
X	+ 5	5	y	40.0	-
S	+12	5	n	8.0	16.0
BT	+24	2	n	1.0	-
BT	-12	2	n	0.5	-

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum power is 330 W when fan is mounted.

DDE Data Sheet for Power Supplies. PS 4 REV. 0 DATE 851218

MANUFACTURER: Coutant NAME: dde013

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt	Tolerance	Adjustment	Max. current	Peak. current
	V	+/- %		A	A in 10 sec.
X	+ 5	5	y	40.0	-
G	+12	5	n	4.0	8.0
G	+12	5	n	4.0	8.0
BT	+24	2	n	1.0	-
BT	-12	2	n	0.5	-

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum power is 330 W when fan is mounted.

DDE Data Sheet for Power Supplies. PS 3 REV. 0 DATE 851218

MANUFACTURER: Coutant NAME: dde009

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt V	Tolerance +/- %	Adjustment	Max. current A	Peak. current A in 10 sec.
M	5	5	y	20.0	-
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
S	24	5	n	8.0	16.0
C	5	5	n	3.0	-

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 400 W when fan is mounted.

DDE Data Sheet for Power Supplies. PS 2 REV. 0 DATE 851218

MANUFACTURER: Coutant NAME: dde006

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt	Tolerance	Adjustment	Max. current	Peak. current
	V	+/- %		A	A in 10 sec.
M	5	5	y	20.0	20.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	24	5	n	4.0	8.0

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 300 W.

DDE Data Sheet for Power Supplies. PS 1 REV. 0 DATE 851218

MANUFACTURER: Coutant NAME: dde001

TYPE: Switching

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 1.0% / deg. C

AC SPECIFICATIONS:

166-264 V or 85-132 V (strapable)

47-63 Hz

Inrush current: < 30 A peak

DC SPECIFICATIONS:

Modul	Volt	Tolerance	Adjustment	Min. current	Max. current
	V	+/- %		A	A
-	5	0.5	y	10.0	100.0
-	12	0.5	y	0.0	13.0
-	12	0.5	y	0.0	5.0
-	24	0.5	y	0.0	7.0
-	5	0.5	y	0.0	2.5

EFFICIENCY:

> 65 %

NOTES:

All outputs protected

Max. output power 850W.

DDE Data Sheet for Power Supplies. PS 11.

Revision 0 **Date 870601**

Name: No-Break System 2000VA

Manufacturer: SILCON A/S, Denmark.

Type: Uninterruptable Power Supply (UPS)

Mains input

Voltage	220 VAC ± 10%
Frequency	50 Hz ± 5%
Efficiency at rated load	typ. 83%
Power factor at nominal conditions	0.93
Input current	sinusoidal
Max. current with discharged battery	18.5 ARMS
External fuse	20 A

Output

Voltage, static	220 VAC ± 2%
Distortion, at linear load	< 5%
Voltage, dynamic for 100% load change	± 5%
Recovery time	< 20ms
Frequency locked to mains	
Output power at load P.F. 0.7 lag to 0.9 lead	2 kVA
Output current limited to	9.1 ARMS
Over current 50% for 30 sec. on mains operation	
Short circuit proof	
System shut down for:	
I_{peak} > 3 x max. IRMS for > 30 sec. I peak 27 A	
V_{batt} < 39 VDC	
V_{out} > 245 VAC	
High temperature	

Charger

Current limit	12 ADC
Charge voltage, adjustable	54-57 VDC

Battery operation

Battery voltage for rated output	40.8-57.6 VDC
Battery current at 48 VDC, full load	56 ADC
Battery current at 40.8 VDC, full load	66 ADC
Output frequency	50 Hz ± 0.5%
Efficiency at rated load	typ. 76%
Battery MCB (magnetic circuit breaker)	75 A
Inv. shut down for V_{batt} outside	39-60 VDC
Change to battery operation for:	
V_{mains} outside specification	
f_{mains} outside specification	
Overload	

General data

Ambient temperature	-10/+40 °C
RFI according to	VDE0875-N
Acoustic noise	appr. 50 dB(A)
Dimensions H x W x D	695x200x795 mm
Weight	appr. 105 kg

LED indicators

Mains operation	green
Battery operation	yellow
Overload	red
Output voltage	green

Alarm for battery operation and overload:
Acoustic alarm
Potential free contact

DDE Data Sheet for Power Supplies. PS10.

Revision 0 **Date 870601**

Name: No-Break System 1000VA

Manufacturer: SILCON A/S, Denmark.

Type: Uninterruptable Power Supply (UPS)

Mains input

Voltage	220 VAC ± 10%
Frequency	50 Hz ± 5%
Efficiency at rated load	typ. 82%
Power factor at nominal conditions	0.93
Input current	sinusoidal
Max. current with discharged battery	9 ARMS
External fuse	16 A

Output

Voltage, static	220 VAC ± 2%
Distortion, at linear load	< 5%
Voltage, dynamic for 100% load change	± 5%
Recovery time	< 20ms
Frequency locked to mains	
Output power at load P.F. 0.7 lag to 0.9 lead	1000 VA
Output current limited to	4.5 ARMS
Over current 50% for 30 sec. on mains operation	
Short circuit proof	
System shut down for:	
I_{peak} > 3 x max. IRMS for > 30 sec. I peak 13.5 A	
V_{batt} < 39 VDC	
V_{out} > 245 VAC	
High temperature	

Charger

Current limit	6 ADC
Charge voltage, adjustable	54-57 VDC

Battery operation

Battery voltage for rated output	40.8-57.6 VDC
Battery current at 48 VDC, full load	28 ADC
Battery current at 40.8 VDC, full load	33 ADC
Output frequency	50 Hz ± 0.5%
Efficiency at rated load	typ. 75%
Battery MCB (magnetic circuit breaker)	35 A
Inv. shut down for V_{batt} outside	39-60 VDC
Change to battery operation for:	
V_{mains} outside specification	
f_{mains} outside specification	
Overload	

General data

Ambient temperature	-10/+40 °C
RFI according to	VDE0875-N
Acoustic noise	appr. 50 dB(A)
Dimensions H x W x D	695x200x795 mm
Weight	appr. 75 kg

LED indicators

Mains operation	green
Battery operation	yellow
Overload	red
Output voltage	green

Alarm for battery operation and overload:
Acoustic alarm
Potential free contact