Digital Storage Products

Model DSP5200
Model DSP5350
Installation Guide

Order Number: EK-DS002-IG. C01

Contents

1 Introduction

This manual presents the information needed to configure and install your Digital Storage Products SCSI disk drive. Before unpacking or handling the drive or attempting any installation, please read through this manual, including all warnings and cautions.

The Model DSP5200 is a full-height 5.25 inch disk drive with a formatted capacity of 2000 megabytes and a single-ended (S) or differential (D) SCSI-2 interface.

The Model DSP5350 is a full-height 5.25 inch disk drive with a formatted capacity of 3570 megabytes and a single-ended (S) SCSI-2 interface.

CAUTION

Handle the disk drive with care. Observe antistatic precautions. Static electricity can damage integrated circuits. Always use a properly grounded wrist strap and antistatic pad when removing the disk drive from its antistatic bag and handling it outside the bag.

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2 SCSI Address and Options Selections

An option connector on the printed circuit module is used to set the SCSI address and select the various operating options that are described in the following paragraphs. Jumpers are placed across specific pins in the connector to select the desired SCSI address and operating options. The connector and various jumper placements are shown in the figures that follow.

SCSI Bus Address Selection

Three pairs of pins on the option connector are used to set the disk drive's address on the SCSI bus. The drive will accept addresses 0 through 7. Each device on a SCSI bus must be assigned a unique address. Typically the first drive on the bus is assigned address 0, the second drive address 1, and so on. SCSI address 7 is typically reserved for the host adapter.

REAR VIEW

Power Connector Option Connector 21 1

Note: Pins 21 and 22 on DSP5350 only

22
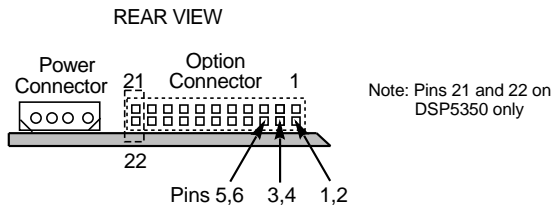
Pins 5,6   3,4   1,2

ID JUMPER SETTINGS			
SCSI ID	Pins 5,6	3,4	1,2
0	open	open	open
1	open	open	closed
2	open	closed	open
3	open	closed	closed
4	closed	open	open
5	closed	open	closed
6	closed	closed	open
7	closed	closed	closed

Spin Up Option Selection

When a jumper is installed across pins 13 and 14 of the option connector the disk drive will spin up when power is applied. Without the jumper the drive waits for a START UNIT command before spinning up.

The disk drive spins down when power is removed or when a fault condition is detected.

REAR VIEW

Power Connector   21   Option Connector   1   Note: Pins 21 and 22 on DSP5350 only

22   2

Pins 13,14 SPINUP Jumper
■ Spin up when power is applied.
▯ Wait for START UNIT command.

Pins 19,20 FIRMWARE LOAD Jumper
■ Firmware load option enabled.
▯ Firmware load option disabled.
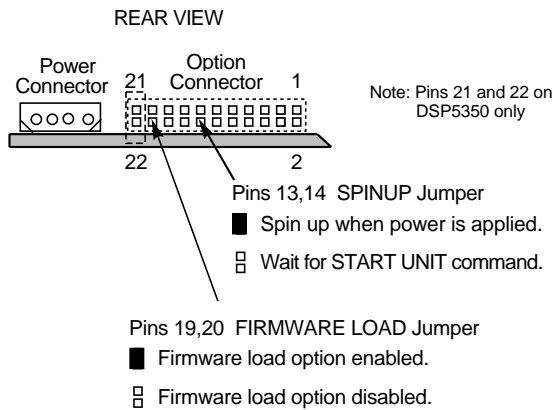
Firmware Load Option Selection

The capability to update the drive's internal flash ROM has been provided to allow firmware updates to be made in the field. In order to update the flash ROM the following steps should be taken:

1. Apply power to the drive.

2. Install the jumper across pins 19 and 20 of the option connector.

3. Load the firmware update.

4. Remove jumper when the update is complete.

Power should NOT be applied to the drive with the jumper installed.

LED Indicator Options Selections

The bottom rear of the disk drive has two surface mounted LED indicators, busy (BSY, green) and fault (FLT, amber). These indicators are operational only when jumpers are installed as described below.

BOTTOM VIEW

Busy (BSY, green) LED

Fault (FLT, amber) LED

(Connector Side)

REAR VIEW

Power Connector

Option Connector 21   1

Note: Pins 21 and 22 on DSP5350 only

22   2

Pins 7,8 FAULT LED Jumper

■ Onboard Fault LED enabled.

▯ Onboard Fault LED disabled.

Pins 9,10 BUSY LED Jumper

■ Onboard Busy LED enabled.

▯ Onboard Busy LED disabled.
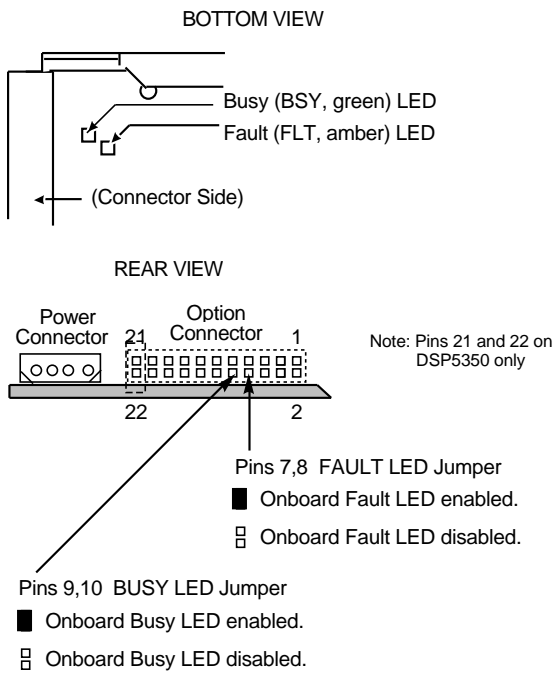
The busy LED indicates that the drive is working on a SCSI command. It is not equivalent to the SCSI BSY signal. The fault LED indicates a drive fault condition. It is normal for both indicators, if enabled by their jumpers, to light briefly upon application of power as a lamp test.

Remote Options

The option connector can be used to remotely control or monitor certain drive functions. When the remote control panel is to be used, jumpers are removed from the option connector and are replaced by a cable(s) to the remote panel. The supported remote options include:

* Selection of SCSI address from external switches, such as on an operator control panel.

* Monitoring busy and fault conditions with external LED indicators instead of those on the drive. (The user must provide external current-limiting resistors to limit the current to 6mA or less. No current limiting resistors are necessary if the LED is rated to handle up to 7 mA maximum.)

  A front bezel with a BUSY LED mounted may have been installed at the factory. The associated cable has to be connected to the option connector in the following manner: black lead to pin 9 and red lead to pin 11.

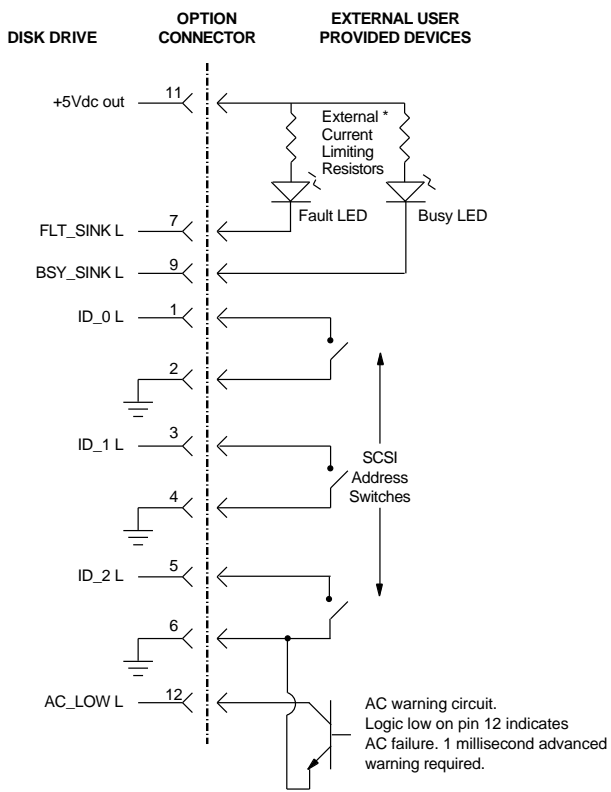 ———————— **Note** ————————

  In this case no current-limiting resistors are needed.

  ——————————————————————

* Remote power supply notification to the drive of AC power failure.

  If the power supply warns the drive at least 1.0 milliseconds before the voltages become unsafe, the drive will prevent write splices (write interruptions within a data sector). Unsafe voltages levels (measured at the drive connector) are voltages outside the following;

  4.690 to 5.557 for the +5Vdc supply
  10.994 to 13.399 for the +12Vdc supply

The following diagram shows proper connection of remote options.

DISK DRIVE	OPTION CONNECTOR	EXTERNAL USER PROVIDED DEVICES

+5Vdc out — 11

External * Current Limiting Resistors

Fault LED   Busy LED

FLT_SINK L — 7

BSY_SINK L — 9

ID_0 L — 1

2

ID_1 L — 3

SCSI Address Switches

4

ID_2 L — 5

6

AC_LOW L — 12

AC warning circuit.
Logic low on pin 12 indicates
AC failure. 1 millisecond advanced
warning required.

* The 470 ohm current limiting resistors on the
module are not shown in this drawing.

Spindle Synchronization Option (DSP5350 only)

Spindle synchronization for the DSP5350 is enabled by the installation of a daisy-chain cable from drive to drive. This cable should connect pin 21 to the daisy-chained SPINDLE_SYNC_REF SIGNAL, using pin 22 as its ground reference.
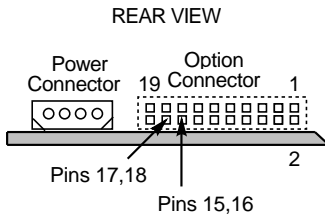
REAR VIEW

Power Connector

Option Connector

21   1

22   2

Pins 21,22 SPINDLE SYNC Cable

■ Spindle Sync Reference is enabled

No connection to Spindle Sync Reference
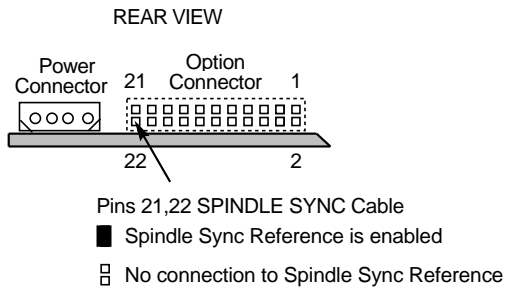
3 SCSI Bus Termination

DSP5200 Termination

The DSP5200 disk drive can provide terminator power to its own termination resistor packs (if installed) and/or to the SCSI bus. Alternatively, the drive's termination resistor packs can be powered from the SCSI bus. The figure below shows the proper jumper arrangements for each terminator power configuration.

In all cases, the drive's termination resistor packs are to be installed ONLY if the drive is at the end of the SCSI bus.
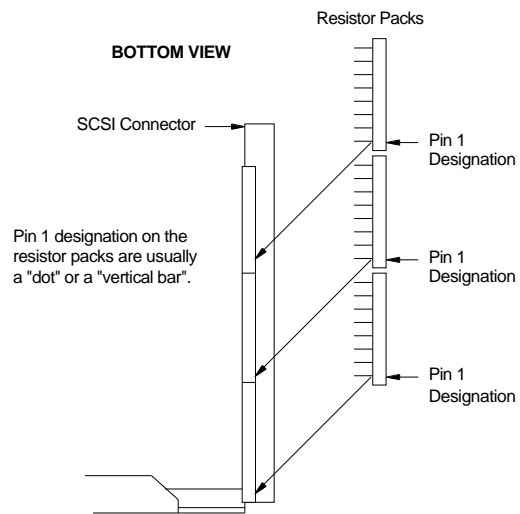
REAR VIEW

Power
Connector   19 Option
Connector   1

Pins 17,18

Pins 15,16

Pin
17   15
  No drive power provided to SCSI TERMPWR.

  No power to drive terminator resistor packs..
  Resistor packs must be removed.

  Drive provides termination power to the drive's
  terminator resistor packs (if installed).

  SCSI bus provides termination power to the drive's
  terminator resistor packs (if installed).

  Drive provides termination power to the drive's
  terminator resistor packs (if installed) and to SCSI bus.

The following figure shows the proper placement of
the termination resistor packs on the drive module.

NOTE THAT:
S (single-ended) units use 8-pin packs
D (differential) units use 14-pin packs

Resistor Packs

BOTTOM VIEW

SCSI Connector ⟶

Pin 1
Designation

Pin 1 designation on the
resistor packs are usually
a "dot" or a "vertical bar".

Pin 1
Designation

Pin 1
Designation

DSP5350 Termination

The DSP5350 disk drive is capable of supplying termination power to the SCSI bus, as well as providing active termination to the bus. The DSP5350 drive does not use removable resistor packs for termination. The figure shows the proper jumper arrangements for each terminator power configuration.

Active termination should be enabled ONLY if the drive is at the end of the SCSI bus.

REAR VIEW

Power Connector   Option Connector

Pins 17,18

Pins 15,16
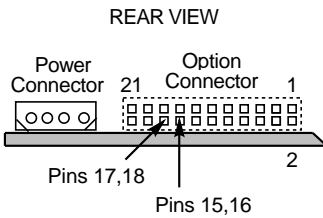
Pin
17   15

SCSI TERMPWR is NOT provided by the drive.

Active termination is DISABLED.

SCSI TERMPWR is NOT provided by the drive.

Active termination is ENABLED. (drive at end of SCSI cable)

TERMPWR is provided to SCSI bus by the drive.

Active termination is DISABLED.

TERMPWR is provided to SCSI bus by the drive.
Active termination is ENABLED. (drive at end of SCSI cable)

4 Power Connections and Requirements

Each disk drive requires +5 and +12 volt DC which is supplied from an external source by means of the 4-pin power connector of the drive.

REAR VIEW

Power Connector 21   Option Connector   1

Note: Pins 21 and 22 on DSP5350 only

Pin 1   4

22   2

Power Connector

Pin 1 +12VDC
Pin 2 Gnd (+12V Return)
Pin 3 Gnd (+5V Return)
Pin 4   +5VDC
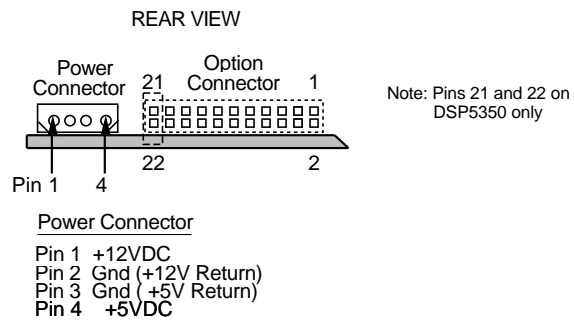
**Voltage &
Regulation:**

	+5VDC	+12VDC
DSP5200S	±5%	±5% (±6% during spin-up)
DSP5200D	±5%	±5% (±6% during spin-up)
DSP5350	±5%	±5% (±5% during spin-up)

**Ripple &
Noise:**

	+5VDC	+12VDC
DSP5200S	<100mv p-p	<200mv p-p
DSP5200D	<100mv p-p	<200mv p-p
DSP5350	<75mv p-p	<150mv p-p

Current:

+5VDC Current	Typical	Maximum
DSP5200S	1.0A	1.2A
DSP5200D	1.4A	1.6A
DSP5350	1.0A	1.2A

+12VDC Current	Typical	Maximum
Spin-up	4.3A	5.0A
Spinning—no seeks	1.0A	1.2A
Continuous random seeks	1.5A	1.8A

Power:

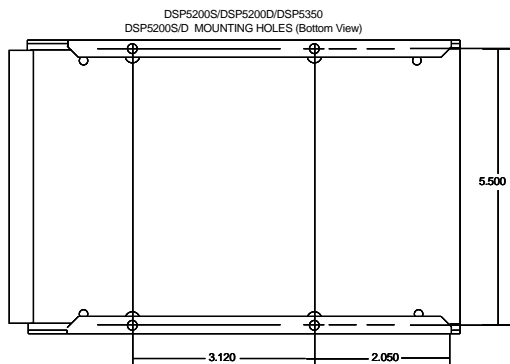| Total power with continuous random seeks	Typical	Maximum
DSP5200S	22.9W	28.4W
DSP5200D	25.0W	30.5W
DSP5350	35.0W	40.8W

5 Mounting

The disk drive may be mounted in any orientation. Allow 0.10 inches clearance between the HDA and all adjacent surfaces, and sufficent slack in all cables, to provide for motion of the drive on its shock mounts relative to the drive frame.

The drive is mounted with four 6-32 screws. The mounting screws should not exceed more than 0.02 inches beyond the inside surface on the drive frame.

─────────────── **CAUTION** ───────────────

Screws longer than necessary will defeat the shock mounting and could damage the drive.

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DSP5200S/DSP5200D/DSP5350
MOUNTING HOLES (Side View)

warranty

1.460

.860

.970   3.120

4.740

DSP5200S/DSP5200D/DSP5350
DSP5200S/D MOUNTING HOLES (Bottom View)

5.500

3.120   2.050
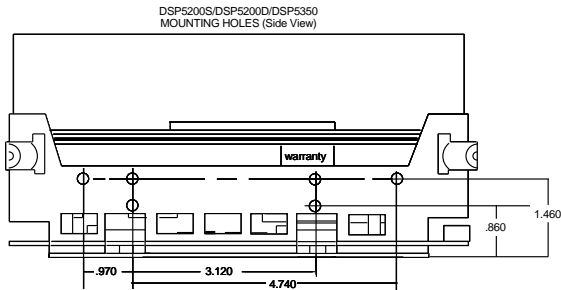
6 Summary of Specifications

DSP5200/DSP5350

Single–Ended SCSI 50–Pin Connector Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
2	–DB (0)	16	–DB (7)	30	GROUND	42	–MSG
4	–DB (1)	18	–DB (P)	32	–ATN	44	–SEL
6	–DB (2)	20	GROUND	34	GROUND	46	–C/D
8	–DB (3)	22	GROUND	36	–BSY	48	–REQ
10	–DB (4)	24	RESERVED	38	–ACK	50	–I/O
12	–DB (5)	26	TERMPWR	40	–RST		
14	–DB (6)	28	RESERVED				

Notes:
1. All odd numbered pins (except pins 23,25,27) must be connected to ground.
2. Pin 25 should be left open.
3. Pin 26 (SCSI_TERMPWR) is reserved for terminator resistor power source.
4. The minus sign indicates an active low signal..

DSP5200

Differential SCSI 50–Pin Connector Pin Assignments

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GROUND	14	–DB (5)	27	RESERVED	39	+MSG
2	GROUND	15	+DB (6)	28	RESERVED	40	–MSG
3	+DB (0)	16	–DB (6)	29	+ATN	41	+SEL
4	–DB (0)	17	+DB (7)	30	–ATN	42	–SEL
5	+DB (1)	18	–DB (7)	31	GROUND	43	+C/D
6	–DB (1)	19	+DB (P)	32	GROUND	44	–C/D
7	+DB (2)	20	–DB (P)	33	+BSY	45	+REQ
8	–DB (2)	21	DIFFSENS	34	–BSY	46	–REQ
9	+DB (3)	22	GROUND	35	+ACK	47	+I/O
10	–DB (3)	23	RESERVED	36	–ACK	48	–I/O
11	+DB (4)	24	RESERVED	37	+RST	49	GROUND
12	–DB (4)	25	TERMPWR	38	–RST	50	GROUND
13	+DB (5)	26	TERMPWR				

Notes:
1. The minus sign indicates an active low signal..
2. Some shielded flat ribbon cables use pin 1 as a connections to shield..

Disk Drive Functional Specifications		
	DSP5200	**DSP5350**
Interface	SCSI–2	SCSI–2
Formatted storage (Mbytes)	2,000	3,570
Average seek time (ms)	12.9	12.0
Bits per inch (max.)	43,880	50,500
Tracks per inch	2,432	2,756
Tracks per surface	2,620	2,570
Surfaces per drive	21	25
Sectors per track	71	119
Sector capacity (bytes)	520	512–520
Transfer rate (to/from media – Mbytes/s)	2.2	6.9
Transfer rate to bus (synchronous – Mbytes/s)		
Normal mode	5.0	5.0
Fast mode	10.0	10.0
Rotational speed (RPM)	3,600	5,400

Environmental Specifications	
Ambient temperature	
Operating	10C to 50C(50F to 122F)
Nonoperating	–40C to 66C(–40F to 151F)
Maximum wet bulb (noncondensing)	
Operating	28.0C(78F)
Nonoperating	46C(115F)
Relative humidity	
Operating	10% to 90%
Nonoperating	8% to 95%
Altitude	
Operating	2,500m (8,000 ft)
Nonoperating	4,878m (16,000 ft)