VX3-350-SCW-DAT

MASS STORAGE SUBSYSTEM

Technical Information

812 W. Southern Avenue, Orange, CA 92865

PREFACE

A number of conventions are used throughout this manual in order to provide clarity and descriptive accuracy. These include:

1. The use of an 'H' (character) suffix to a number indicates that the number reference is in hexadecimal notation.

2. The use of a '-' (minus) postfix to a signal name indicates that the signal is either true when the signal is at a logic 0 level or that the signal initiates actions on a high-to-low signal transition.

DISCLAIMER

TRADEMARKS

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Chapter 1
Manual Organization and Introduction

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Scope

This chapter describes the organization of this manual and gives an overview of the VX3-350-SCW-DAT.

Manual Organization

This manual is organized as follows:

Chapter 1 **MANUAL ORGANIZATION AND INTRODUCTION**
Contains an overview of the manual organization and provides a brief product description.

Chapter 2 **FEATURES AND SPECIFICATIONS**
Describes the product features, compatibility, and electrical specifications.

Chapter 3 **CONFIGURATION, INSTALLATION AND OPERATION**
Provides information on how to configure and install the VX3-350-SCW-DAT.

Chapter 4 **SCSI HARD DISK DETAILS**
Contains specific details about the hard disk drive used on the VX3-350-SCW-DAT.

Chapter 5 **DAT DRIVE DETAILS**
Provides specific details about the tape drive used on the VX3-350-SCW-DAT.

Chapter 6 **PRODUCT SUPPORT, SERVICE AND WARRANTY**
Describes what to do if you have trouble and how we will support you.

VX3-350-SCW-DAT Introduction

The VX3-350-SCW-DAT has been designed to provide a complete disk/tape drive subsystem which is mechanically compatible with the VMEbus. It has been designed specifically to interface with VMEbus processors with an embedded SCSI Host Adapter. Together with the processor, a complete system can be installed in only four standard VMEbus system slots. The VX3-350-SCW-DAT provides a DAT drive and a hard disk drive within the same module making it very convenient to have fixed and removable data storage. The drives used on board the VX3-350-SCW-DAT were chosen for their compatibility, ruggedness and reliability.

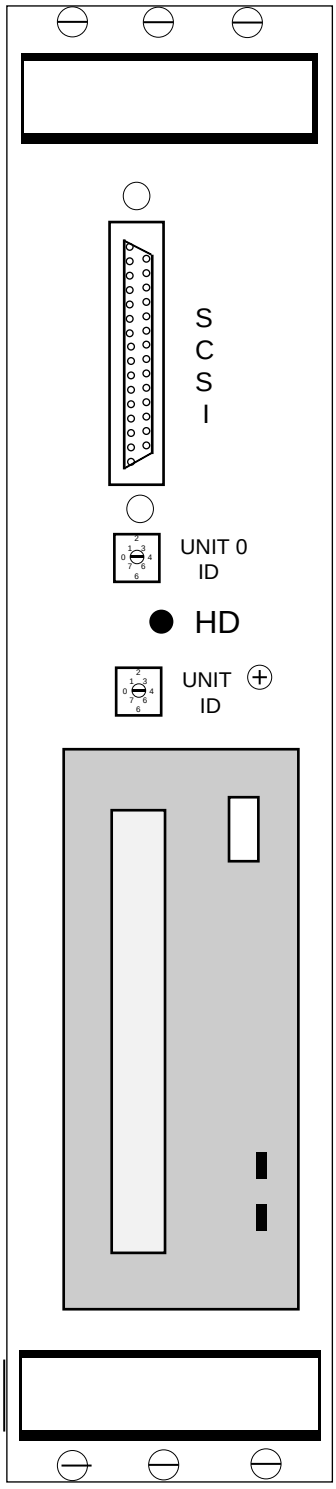

Figure 1-1: VX3-350-SCW-DAT Front Panel

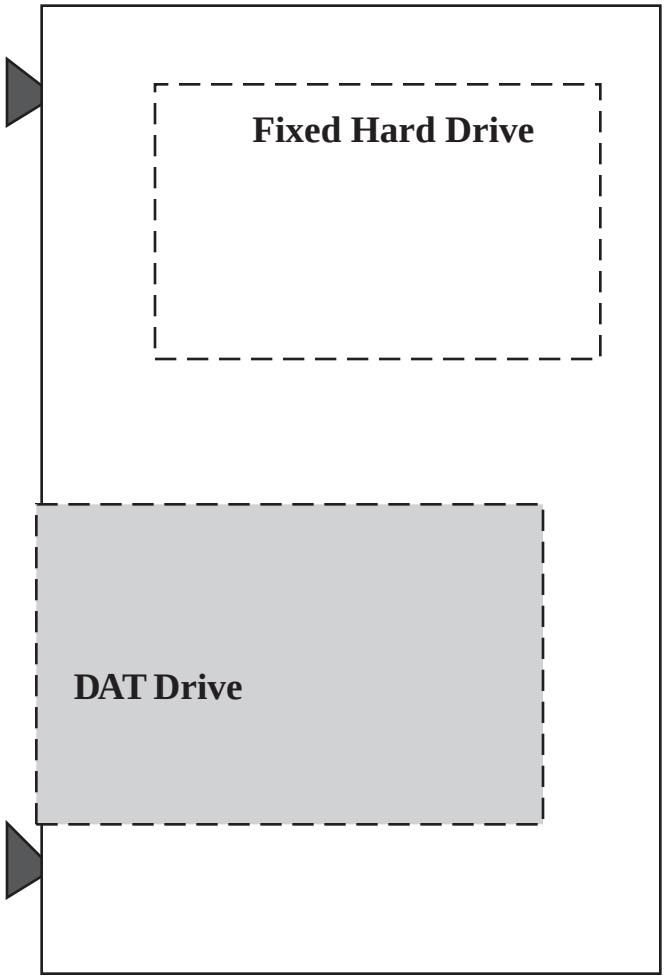

Figure 1-2: VX3-350-SCW-DAT Jumper Configuration

Chapter 2
Features and Specifications

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Scope

This chapter describes the overall features and specifications of the VX3-350-SCW-DAT.

Features

The VX3-350-SCW-DAT incorporates a very compact winchester disk drive and a DDS-4 DAT drive within a single module. The tape drive is physically compact, occupying only 3 1/2" of panel in the half-height form factor. The hard disk drive is a high-performance winchester type with embedded disk drive control electronics. This embedded controller is on the hard disk and the tape drive are microprocessor controlled and compatible with ANSI X3.131-1986 SCSI commands. The hard drive is a very high performer, with an average track-to-track access times of less than 6 milliseconds. It incorporates at least an embedded 2 Mbyte buffer which is operated in "look ahead" mode, providing buffering for sequential sector operations. The tape drive is DDS-4 compatible. Both the hard drive and the tape drive have been carefully packaged with suitable control cables and power distribution connectors for direct attachment to single board computers in the VME chassis or to external devices.

SCSI Interface Description

In order to provide a method of embedding the disk drive control electronics within the hard disk drive, several disk drive manufacturers jointly defined an interface specification. This specification for the *Small Computer System Interface* has become known throughout the industry as "SCSI". Basically, the SCSI interface consists of the required address, data and control signals from an SCSI Host Adapter. Since a goal of the specification is to allow the disk drive to be connected via standard cable, the specification required buffering of all signals so that the drive could be mounted a suitable distance from the board interface. This distance, however, is limited to 12 meters. The specification provides all signals via a 68 pin header connector for use with standard 68 conductor cable and connectors. Table 2-2 is a description of the Ultra-160 SCSI pin definition. The direction indicated is relative to the host(IN=From Host/Out=To Host).

Pin	Signal	Direction	Description	Pin	Signal
1	+DB (12)	In/Out	Bidirectional data line 12	35	-DB(12)
2	+DB (13)	In/Out	Bidirectional data line 13	36	-DB(13)
3	+DB (14)	In/Out	Bidirectional data line 14	37	-DB(14)
4	+DB (15)	In/Out	Bidirectional data line 15	38	-DB(15)
5	+DB (P1)	In/Out	Bidirectional data line P1	39	-DB(P1)
6	+DB (0)	In/Out	Bidirectional data line 0	40	-DB(0)
7	+DB (1)	In/Out	Bidirectional data line 1	41	-DB(1)
8	+DB (2)	In/Out	Bidirectional data line 2	42	-DB(2)
9	+DB (3)	In/Out	Bidirectional data line 3	43	-DB(3)
10	+DB (4)	In/Out	Bidirectional data line 4	44	-DB(4)
11	+DB (5)	In/Out	Bidirectional data line 5	45	-DB(5)
12	+DB (6)	In/Out	Bidirectional data line 6	46	-DB(6)
13	+DB (7)	In/Out	Bidirectional data line 7	47	-DB(7)
14	+DB (P)	In/Out	Bidirectional data line P	48	-DB(P)
15	GND	-	Ground reference	49	GND
16	DIFFSNS (1)	-		50	GND
17	TERMPWR	-	Terminator Power	51	TERMPWR
18	TERMPWR	-	Terminator Power	52	TERMPWR
19	RESERVED	-	Reserved for future use	53	RESERVED
20	GND	-	Ground reference	54	GND
21	+ATN	In/Out	Attention	55	-ATN
22	GND	-	Ground reference	56	GND
23	+BSY	In/Out	Busy	57	-BSY
24	+ACK -	In	Acknowledge	58	-ACK
25	+RST	In	Reset	59	-RST
26	+MSG	Out	Message	60	-MSG
27	+SEL	In/Out	Select	61	-SEL
28	+C/D	Out	Control/Data	62	-C/D
29	+REQ	Out	Request	63	-REQ
30	+I/O	Out	Input/Output	64	-I/O
31	+DB (8)	In/Out	Bidirectional data line 8	65	-DB(8)
32	+DB (9)	In/Out	Bidirectional data line 9	66	-DB(9)
33	+DB (10)	In/Out	Bidirectional data line 10	67	-DB(10)
34	+DB (11)	In/Out	Bidirectional data line 11	38	-DB(11)

Table 2-2: SCSI Pin Definition

NOTES:

(1) The DIFFSNS voltage level determines single-ended or LVD operation.

(2) The minus sign next to the signals indicates active low, plus indicates active high.

VX3-350-SCW-DAT Specifications

The following table provides the specifications of the complete VX3-350-SCW-DAT. Individual disk/DAT drive specifications are given in their respective chapters.

General

Model:	VX3-350-SCW-DAT
Description:	Hard disk/DAT drive module compatible with LVD/SE SCSI commands.
Interface:	DAT drive: LVD/SE Ultra-160 SCSI Hard Drive: LVD/SE Ultra-160 SCSI
Drive Type:	Tape drive:..Digital Audio Tape drive Hard Drive: (depends on capacity ordered)
Hardware Compatibility:	VMEbus Double Eurocard (6Ux12HP)

Electrical

Power:	+5VDC .200A(max) +12VDC (applicable to mounted device only) Power figures are with both drives R/W

Physical

Size:	160mm x 234mm (Double Eurocard) 12HP (3 Standard Slots)
Construction:	Steel/Double-sided Printed Circuit

Environmental

Temperature:	0-55^{o} C Inlet Air (Operating) -20^{o} to 60^{o} C (Non-operating)
Humidity:	8-80% RH, Non-condensing
Shock:	Unit will withstand shock exceeding the specifications of devices mounted.

P2 Connector Pin Definitions

P2 Pin Row A	Signal	P2 Pin Row C	Signal
1	-DB0	1	+DB0
2	-DB1	2	+DB1
3	-DB2	3	+DB2
4	-DB3	4	+DB3
5	-DB4	5	+DB4
6	-DB5	6	+DB5
7	-DB6	- 7	+DB6
8	-DB7	8	+DB7
9	-DBP	9	-DB8
10	+DBP	10	-DB9
11	+ATN	11	-DB10
12	+SBSY	12	-DB11
13	+SACK	13	-DB12
14	+SRST	14	-DB13
15	+SMSG	15	-DB14
16	-ATN	16	-DB15
17	GROUND	17	-DBP1
18	-BSY	18	TERMPWR
19	-ACK	19	+DB8
20	-RST	20	+DB9
21	-MSG	21	+DB10
22	-SEL	22	+DB11
23	-C/D	23	+DB12
24	-REQ	24	+DB13
25	-IO	25	+DB14
26		26	+DB15
27		27	+DBP1
28		28	+SEL
29	DIFFSNS	29	+C/D
30		30	+REQ
31		31	+I/O
32		32	P2ONL

Table 2-3 P2 Pin Definitions

Chapter 3
Configuration, Installation, and Operation

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Scope

This chapter describes how to configure, install and operate the VX3-350-SCW-DAT mass storage subsystem module.

DAT Drive Hardware Configuration

The DAT drive can be set so that it is activated by the SCSI unit 0-F, as is required to maintain compatibility with the SCSI software. The drive installed on the VX3-350-SCW-DAT utilizes the Ultra-160 SCSI interface. It is possible to connect another type of SCSI device via the interface cable and to connect 14 other units to the SCSI interface if needed. Please call Phoenix International Customer Support if you need assistance.

Hard Disk Drive Hardware Configuration

The hard drive can be set so that it is activated by the SCSI unit 0-F, as is required to maintain compatibility with the SCSI software. The hard drive installed on the VX3-350-SCW-DAT utilizes the Ultra-160 SCSI interface. It is possible to connect another type of SCSI device via the interface cable and to connect 14 other units to the SCSI interface if needed. Please call Phoenix International Customer Support if you need assistance.

Considerations For Installation

There are several considerations before installing the VX3-350-SCW-DAT into your system.

VMEbus Slot Requirements

The VX3-350-SCW-DAT requires three adjacent slots in a standard VMEbus 6U card cage. Since the drives are mounted on an steel panel, this could potentially cause a shorting problem. If you are going to have a VMEbus card located in the next adjacent slot, you should carefully check it to make sure that no leads are likely to touch the VX3-350-SCW-DAT.

VMEbus Backplane Configuration

The VMEbus P1 connectors supply all operating power to the VX3-350-SCW-DAT and shunts the daisy-chain signals on the P1 connectors. However, no other VME signals are connected on board. Therefore, you must check your VMEbus backplane for all daisy-chain signals continuity at the two slot positions occupied by the VX3-350-SCW-DAT.

Power Supply Requirements

Make sure that your VMEbus power supply has adequate capabilities to support the operation of the VX3-350-SCW-DAT when it is installed with all other cards in your VMEbus system. Pay particular attention to the +12 volt power requirement. The specifications listed in Chapter 2 should be consulted for the maximum current requirements. Your power supply must be capable of providing sufficient current for the hard disk drive motor to spin up during initial operation (approximately 5 seconds).

Installing the VX3-350-SCW-DAT

Make sure that all power is removed from the backplane before inserting the boards. Prior to inserting the VX3-350-SCW-DAT into the card cage, it is necessary to verify the cable connections to the SCSI host/processor. Once you have connected and properly seated the associated cable assemblies, you should insert the host/processor into the VMEbus card cage. Now install the VX3-350-SCW-DAT into the VME chassis and mate the P1 connector properly. The P2 connector should also be aligned. Then connect the VX3-350-SCW-DAT to the SCSI host/processor with a 68 pin Micro-D cable or via the P2 connector on the backplane with the proper Phoenix International adapter module.

Drive Software Configuration

Initially you will need to run a device setup program in order to configure the software and hardware to properly recognize the drives on the VX3-350-SCW-DAT. You should consult the host/processor manual and/or operating system manuals for a description of the utility required to properly format and use your mass storage subsystem.

DAT Drive Software Configuration

The DAT drive can be installed as SCSI unit 0-15 (F). It has a formatted compressed storage capacity of up to 40 Gigabytes. You can assign the logical unit designation from the SCSI setup utility.

Hard Drive Software Configuration

The hard disk drive can be installed as SCSI unit 0-15(F). The disk drive characteristics are described in detail in Chapter 4. It operates using the Ultra-160 SCSI interface and has to be configured by the host operating system software for proper operation.

Termination

The Multimode termination required for the LVD/SE SCSI-3 bus is on the VX3 module. The SensiTerm™ circuitry will automatically configure the termination for the SCSI bus. It determines if the SCSI bus signals are received from the P2 connector or from the Micro-D connector on the front panel and sets the termination at the correct end of the SCSI bus. If the module is in the middle of a SCSI bus route, the SensiTerm™ circuitry automatically disables all on board termination.

DIFFSNS Signal

The voltage level of the DIFSNS signal determines if the drives will run in a Single Ended SCSI configuration or a Low Voltage Differential configuration. With a DIFFSNS voltage level of 0 Volts (Ground), the unit will terminate the bus in the Single Ended SCSI mode. If the DIFFSNS line can be driven to 1.3 volts, indicating that the Host adapter is LVD capable, the bus will be terminated in the Low Voltage Differential mode. If any SCSI unit attached to the bus is only Single Ended SCSI capable, the bus will terminate in the Single Ended mode.

Terminator Power

Terminator power for the drives is routed from the front panel uD68 pin connector to the termination circuitry and to the P2 connector, Pin C18. The Terminator power has to be generated at the SCSI Host adapter.

Operation

Once the VX3-350-SCW-DAT has been configured properly and the software has been set up, operation is identical to that of a standard SCSI storage subsystem. No specialized software is required.

Chapter 5

SDT 11000 DAT Drive Details

Scope

This chapter describes the SONY SDT 11000 DAT drive in detail.

Introduction

The SDT 11000 is a high performance 3.5" low profile 40 Gigabyte (compressed) DAT drive that is designed to operate with a SCSI host adapter or equivalent. The drive features low power requirements enabling operation in portable environments. The drive uses the industry standard *Small Computer System Interface* (SCSI-2).

Key Features

- Low power requirements enabling operation in portable applications
- Typical streaming transfer rate of 4.7 Mbytes/second.
- 10 Mbyte data buffer
- Automatic error detection and correction
- Read-after-write error detection and correction
- Synchronous and asynchronous communication modes
- Embedded Wide Ultra LVD/SE SCSI connection
- No operator maintenance: incorporates Sony's patented Super Head Cleaner™ technology
- Supportted formats: DDS-4, DDS-3, DDS-2, DDS, DDS-DC and DCLZ

Physical Configuration

Bytes per Block:	Variable or fixed
Formatted Capacity:	Up to 40 gigabytes(compressed mode)
Drive Interface:	Wide Ultra LVD/SE SCSI
Cache Buffer Size:	10 Mbyte

Drive Performance

Move to Start:	3.5 seconds
Change direction:	2.1 seconds
Write (full reposition)	4.2 seconds
Max rewind to BOP:	Less than 55 seconds
External Transfer Rate:	10 Mbyte/sec (synchronous)

Power Requirements

+ 12 Volt Start-up:	0.75 Amps
+ 12 Volt Typical:	0.25 Amps
+ 5 Volt Typical:	1.00 Amps
Typical Usage:	8.0 Watts

Physical Characteristics

Height:	1.625 inches
Length:	5.75 inches
Width:	4.00 inches
Weight:	1.41 pounds, without cartridge

Environmental Characteristics

Temperature:	5° C to 40° C (operating)
	-40° C to +70° C (non operating)
Thermal Gradient:	10° C per hour maximum
Humidity:	20% to 80% RH, non-condensing
Altitude:	0 to 15,000 feet (operating)
	0 to 50,000 feet (non-operating)

Reliability

MTBF:	250,000 hours (POH)
MTTR:	10 minutes (typical)

Shock and Vibration

Shock:	5 G's (operating)
	maximum duration of 3 msec (half sinewave)
	90 G's (non-operating)
	maximum duration of 11 msec (half sinewave)
Vibration:	5-500 Hz @ 0.25 G (operating)
	5-22 Hz @ 0.040 inches
	22-400 Hz @ 2.00 G's

Functional Description

The SDT 11000 contains all necessary mechanical and electronic parts to interpret control signals, position the recording heads over the desired track, read and write data, and provide a contaminant free environment for the heads and disks.

Power Connector

The SDT 11000 has a 4 pin DC power connector equivalent to that of a standard disk drive. It uses a mating connector, AMP 1-480424-0 with AMP 350078-4 pins.

Functional Description

The SDT 11000 has a 68 pin SCSI connector. Two drives or other SCSI devices may be daisy chained together with a maximum cable length of 18 feet, by using the SCSI connector on the front panel of the VX3-350-SCW-DAT Mass Storage Subsystem.

Chapter 6
Product Support, Service and Warranty

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Scope

This chapter describes Phoenix International's product support program. It states our product warranty and provides details about what to do if you have a problem with the product.

Warranty Statement

Phoenix International VMEbus products come with a "return-to-factory" warranty which covers defects in materials and workmanship for a period of seven years from the date of product shipment to the customer, provided the product is unmodified and has been subject to normal and proper use. Warranty on non-Phoenix International manufactured devices incorporated into Phoenix VMEbus products is restricted to that provided by their manufacturer only.

If You Have a Problem

If you are having a problem with a Phoenix International product, you should call our main number, (714) 283-4800, and ask for Customer Service. Please be prepared to supply as much detail as you can concerning the nature of the problem and the conditions in which the problem appeared.

Obtaining an RMA

In order to return the product for repair, the following steps are necessary:

1. Obtain a return materials authorization number (RMA#) from Phoenix International Customer Service.
2. Ship the product prepaid to the designated repair point.
3. Provide with the product a written description of the claimed defect.

Shipping the Product

Any product returned to Phoenix International should be in its original shipping carton if possible. Otherwise the product should be carefully packaged in a conductive packing material and placed in a cushioned corrugated carton suitable for shipping. Please mark the shipping label with the RMA number and return it to:

Phoenix International

812 W. Southern Avenue

Orange, CA., 92865

Attn: Customer Service Department

RMA #: _____

Providing a Product Defect Report

When you are returning a product for repair, it is very important to include a written report which details the nature of the problem in order to expedite the repair. Please make sure that the following information is included:

RMA # _____
Product: _____
Serial Number: _____
Contact: _____
Phone: _____

Description of the problem/defect:

Warranty Repairs

Any product returned and found to be under warranty will be repaired or replaced at the discretion of Phoenix International within five working days of receipt and shipped freight prepaid to the Customer.

Non-warranty Repairs

If a product is found not to be under warranty, we will notify you of the non-warranty situation and provide you with a fixed cost and a schedule for the repair. Non-warranty repairs require that a purchase order be issued to Phoenix International for the amount of the repair before repairs are undertaken.

Product Updates

In an effort to improve product performance and reliability, Phoenix International reserves the right to make product modifications provided they do not negatively impact either the performance or operation of previous versions. If a product update is for the purpose of correcting a design flaw, all customers shall be notified in writing as to the nature of the flaw and the requirements for the update.