

SCSI

Small Computer Systems Interface

Host Adapter Card

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HARDWARE INSTALLATION MANUAL

INTRODUCTION

This manual contains procedures for installing the physical SCSI controller card into your 99/4a or Geneve computer system. It does NOT describe software functionality or usage of the disk manager software. For information on use of the accompanying software, refer to the SOFTWARE OPERATIONS MANUAL.

This product is based on the industry standard 53C80 SCSI controller chip manufactured by several companies. It provides full SCSI level 1 support and allows integration of hard disks, floppy disks and other SCSI devices into the 99/4a or Geneve system.

The SCSI interface is a standard described by ANSI. For more information about SCSI and its implementation in the 53C80 controller chip, please refer to the ANSI documentation or manufacturers specifications. This document is intended ONLY to cover installation of the peripheral card.

Western Horizon Technologies would like to thank you for purchasing this product. If you have any difficulties with installation or operations covered in our warranty (see back page for warranty information) please call:

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INSTALLATION

The SCSI interface card is a standard sized peripheral card for use with the Texas Instruments 99/4a, or Myarc Geneve computers. To utilize this card you will **need** the following system setup:

TI 99/4a Console, Monitor, 32K Memory, Peripheral Expansion Box

OR

Myarc Geneve, Monitor, Peripheral Expansion Box

Before installation begins, ensure that your computer is fully powered down and disconnected from the ac outlets.

PROGRAMS ON DISTRIBUTION DISKS

Included with the SCSI card are utilities, and necessary programs to fully utilize the peripheral. In most cases, a doc file is included on the disk, therefore no documentation is included in this manual.

The distribution disks contain the following:

MDOS 2.5s (or greater)

SCUZZY

SDM

CAT

README

etc.....

The Geneve MDOS with SCSI support

A SCSI Hard drive sector editor

A simple TI based SCSI Disk Manager (EA 3)

A BASIC program to catalog a disk (SCSI or other)

The latest information about the distribution

You should read and familiarize yourself with all the documentation that is on the diskettes. Most programs are intuitive and menu driven, those that are not have doc files on disk.

SETTING THE DIP SWITCHES

The SCSI card contains two sets of DIP switches for hardware setup, they are labeled SW1 and SW2 on the main board. SW1 Controls the CRU address of the card, and SW2 sets the SCSI ID and TI/Geneve selection. These switches are set to a factory default of >1100 for the CRU and SCSI ID 7 for TI operations.

DIP SW1 CONFIGURATION

SW1 Controls the CRU (Communications Register Unit) base address. The following table indicates the possible settings for the SCSI peripheral, also included in this table are other peripherals that may occupy the same address. It is important that the SCSI card occupy its own unique address space for operation. If you have any of the listed cards, place the SCSI card and a known un-used

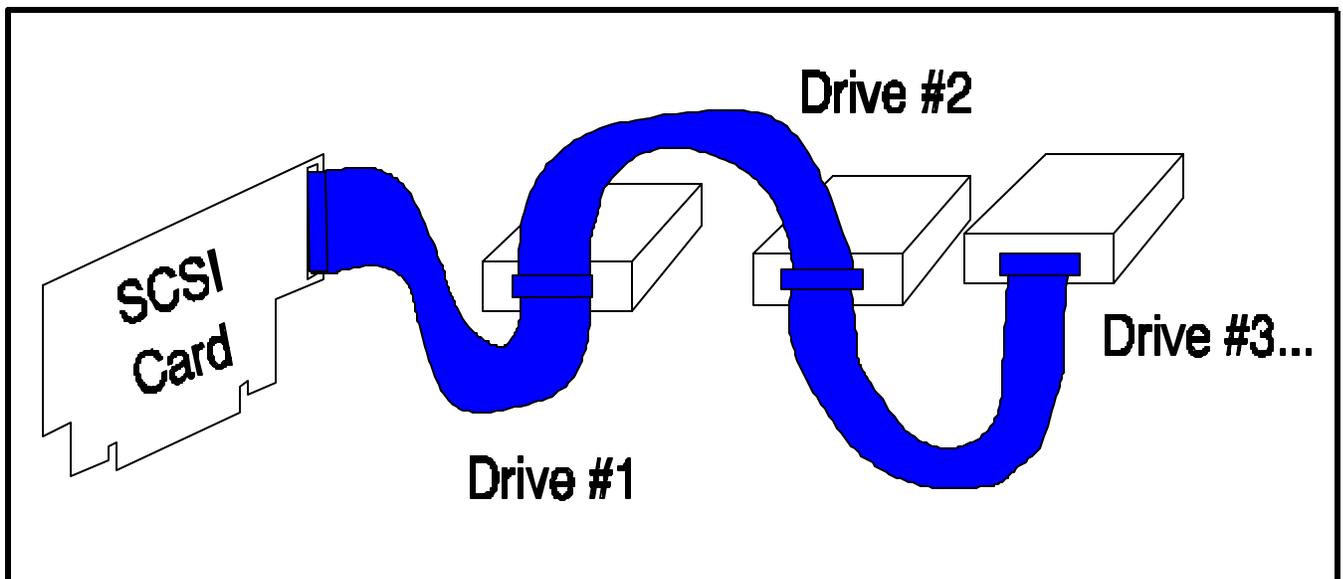
CRU BASE	1	2	3	4	5	6	7	8	Other possible hardware at this location
*>600	Off	On	On	Off	Off	On	On	On	*Addresses >600 through >F00 are only usable when
*>700									installed with an AT Keyboard and ROM upgrade
*>800									available separately. These addresses have no other
*>900									uses.
*>A00									
*>B00									
*>C00									
*>D00									
*>E00									
*>F00									
>1000									Mech. 80 Col Card, HFDC, HRD, 4a Memex
>1100									Any FDC, HFDC
>1200									Math Co-Processor
>1300									RS232 #1
>1400									AVPC 80 Column Card
>1500									RS232 #2
>1600									
>1700									PGRAM, PGRAM +
>1800									Thermal Printer
>1900									
>1A00									
>1B00									Debugger Card, WHT VGA
>1C00									
>1D00									IEE-488 Controller, MBP Real Time Clock
>1E00									
>1F00									P-Code Card

address. The default address for the SCSI card is >1200. The recommended secondary location of the SCSI card is >1000.

FUNCTION	POS	NOTES
SCSI ID SELECT BIT 0	1	Normally ON = ID 7
BIT 1	2	Normally ON
BIT 2	3	Normally ON
System Select	4	ON= Geneve, OFF = TI

The SCSI card supports co-existence with other hard and floppy disk controller cards. For example, you may already own a Myarc HFDC, it's default address is >1100, therefore you must locate the SCSI card at >1000 or some other unused address.

A second, and most likely the most common configuration, is the use of the SCSI card with a FDC, in this case, the FDC occupies >1100 and the SCSI card should occupy >1000 or any other



unused address.

Another configuration may be an HFDC and FDC (TI, CorComp, Myarc, etc..). In this case, the FDC will occupy >1100, the HFDC >1000, and the SCSI card may be set to >1200 or any other unused address.

There are too many configurations to list here, if you are unsure about how to set up the CRU address for your system, please call for help.

DIP SW2 CONFIGURATION

SW2 activates software related functions, the following table explains what these functions are:

CABLING

Included with the SCSI controller card is one internal/external drive cable. This cable has 4 50 Pin connectors on it, three at one end, and two at the other. To hook up SCSI drives, they must be connected in a single continuous chain. This cable is provided so you can attach up to 3 internal/external devices, or 2 devices and continue the chain off the third connector. If you intend to attach more than 3 devices to the SCSI card, you will require additional cabling. For information about available cabling, please call or write.

SCSI drives require termination for proper operations. Each drive may or may not contain built in termination. Please refer to the drive's documentation on how to activate/deactivate termination on the drive.

To attach a drive to the SCSI card, plug one end of the cable into the SCSI card (the end with only one connector on it) and the other end (use the furthest connector for the furthest device) into the disk drive. See the figure on the previous page.

Once the drive(s) are attached, you must activate/deactivate termination on them. Termination should ONLY occur on the furthest drive on the cable loop. Activate the terminator on this drive, and deactivate it on ALL others. Refer to your drive's documentation on how to activate termination. Without proper termination, the SCSI system may not be stable. If you encounter problems with reading or writing, check your termination. Too many terminators can inhibit data transmission, and none can introduce excessive noise into the system.

It is recommended that you use the shortest distance from device to controller card. If you have extra cable, you may wish to wrap it inside the drive enclosure for extra shielding.

RECOMMENDED DISK DRIVES

Any standard SCSI hard drive that supports 512 bytes per sector is compatible with the WHT SCSI host adapter. This includes all drives compatible with the IBM PC, Apple Macintosh and most other drives. If you have any questions about the support of a particular drive, please call or write before attempting installation. Installation of a non-supported drive may damage your card and void

your warrantee so please be careful in your drive selection. Often times users purchase surplus or refurbished drives, these can often harm or damage ANY computer system. ALWAYS get a written guarantee from the dealer that the drive has been tested and guaranteed that it will not do any damage to your computer if installed correctly.

POWER SUPPLIES

Any drive you purchase for use with the SCSI card will require a power supply for operations. You may opt to install your SCSI drive in your P-Box. HOWEVER, due to power restrictions, BE CAREFUL about installing ANY HARD DRIVE into a peripheral expansion box. Refer to the P-Box documentation about available power in the drive bays and ENSURE that ANY hard drive or floppy drive(s) you install do not exceed this power limit. IF YOU EXCEED THE SUPPLIED POWER LIMITS YOU MAY DAMAGE YOUR P-BOX AND ALL CARDS IN IT. We will not be responsible for ANY damage related to installing hard drives in the P-Box.

Some guidelines for installing drives in the p-box are:

- * **NEVER install a full height hard drive in the P-Box**
- * **3.5 inch hard drives are USUALLY low enough power to operate in the P-Box**
- * **ALWAYS add up the power consumption of the drives you intend to install in the P-Box and MAKE SURE it is less than the supplied power in the P-Box**
- * **It is SAFEST to just NOT install drives in the P-Box.**
- * **The drive supply lines in the Texas Instruments Peripheral Expansion Box are rated at approximately 25 watts each.**

You may choose to install your hard drive/floppy drives in an external case. Be sure that this case is recommended for hard drive operations before installing the drives. Follow the above instructions for cabling for any enclosure option.

ACCESSING SCSI DEVICES THROUGH ASSEMBLY

DSR link sub programs

The following is an abbreviated syntax of low level DSR link subprograms for access to SCSI devices through GPL and assembly. Information on how to utilize these subprograms is provided in the TI Editor/Assemble manual.

In general the >1X routines are for floppy access, >2X routines are for hard drive access. Error codes are generally returned in CPU address >8350.

Sector READ/WRITE - Subprograms >10 and >20

>834A Returned sector number

>834C Unit #

Where bit 0-3 is the drive number

bit 4 and 5 is the absolute sector size

0,0 = 256 bytes per sector

0,1 = 512 bytes per sector

1,0 = 1024 bytes per sector

1,1 = 2048 bytes per sector

bit 6 activates absolute sector size access

0 = use logical sector size of 256 bytes

	file. Starting sector number in additional info.
>834E Pointer to file name	16 bit pointer to 10 character buffer in CPU or VDP RAM
>8350 Additional info	Offset to information at >83XX
>83XX	Buffer start address
>83XX+2	Number of first sector
>83XX+4	Status flags
>83XX+5	Number of records per sector
>83XX+6	EOF Offset
>83XX+7	Logical record size
>83XX+8	Number of level 3 records allocated
>83XX+10	MSB of first sector
>83XX+11	MSB of level 3 record
>83XX+12	Extended record length

Buffer allocation - Subprogram >16

>834C Number of file buffers allocated

Set current pathname - Subprogram >27

>834C Unit #	Where bit 0-3 is the drive number bit 7 buffer location 0 = VDP RAM 1 = CPU RAM
>834E Pointer to path name	16 bit pointer to 39 character buffer in CPU or VDP RAM

Create subdirectory - Subprogram >18 and >28

>834C Unit #	Where bit 0-3 is the drive number bit 7 buffer location 0 = VDP RAM 1 = CPU RAM
>834E Pointer to directory name	16 bit pointer to 10 character buffer in CPU or VDP RAM

Delete subdirectory - Subprogram >19 and >29

>834C Unit #	Where bit 0-3 is the drive number bit 7 buffer location 0 = VDP RAM 1 = CPU RAM
>834E Pointer to directory name	16 bit pointer to 10 character buffer in CPU or VDP RAM

Will not remove a subdirectory that is not empty

SCSI Direct - Subprogram >1B

>834A Returned SCSI status byte	
>834B Returned SCSI message byte	
>834C Unit #	Where bit 0-2 is the SCSI ID

U10-U11	74LS259
U12	20V8 GAL, WHT Part #: ADDRESS v2.0
U13	16V8 GAL, WHT Part #: DMA v4.0
U14	62256 SRAM (or equivalent 32K by 8 SRAM) 250ns or Better
U15	27C512 EPROM, WHT Part#: SCSI DSR v1.0
U16	53C80 SCSI Controller chip
C1	10 uF, 16V
C2	1uF, 16V
C3	10 uF, 16V
C4	Rev E: .1 uF, Rev F: 10 uF, 16V
C5	Rev E: .1 uF, Rev F: 1 uF, 16V
C6-C22	.1 uF, Titalium
R1	47 ohm, 1/4 Watt
R6	Rev E: 1K ohm, 1/4 Watt, Rev F: 2K ohm, 1/4 Watt
R7	Rev E: not present, Rev F: 1K ohm, 1/4 Watt
R2-R5	2K ohm, 1/4 Watt
N1	2N3904 Transistor
D1	1N914 Diode (installed on reverse side on Rev E)
L1	RED LED
TERM 1-3	220/330 ohm terminators (on Rev F only)
SW1	8 Position DIP switch
SW2	4 Position DIP switch
M1,M2	MC7085, 1 Amp, +5V regulator (M2 present only on revision F)
C1,C2	50 Pin dual row header, keyed (C2 present only on revision F)

This product was brought to you through the combined efforts of many individuals:

Don O'Neil	Hardware Design, Board Layout, Documentation
David Nieters	Software development team member, TI DSR, Disk Manager
Brad Snyder	Software development team member, sector editor design
Mike Maksimik	Software development team member, MDOS
Tim Tesch	Software development team member, MDOS
Dave Connery	Special Consideration
Bud Mills	Assembly, Sales, Funding

THREE-MONTH LIMITED WARRANTY

Western Horizon Technologies Inc. extends this consumer warranty only to the original consumer purchaser.

WARRANTY COVERAGE

This warranty covers the electronic and case components of the diskettes and board. These components include all semiconductor chips and devices, diskettes, plastics, boards, wiring, and all other hardware contained in the board("the Hardware"). This limited warranty does not extend to the programs contained on the diskette or cartridge or the accompanying book materials ("the Programs").