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SPARC/CPU-5TE
Installation Guide

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Table of Contents

Getting Started

1.1 Caution 1
1.2 Location Diagram of the SPARC CPU-5TE Board 1
1.3 Before Powering Up 4
1.3.1 Default Switch Settings 4
1.3.2 Memory Module MEM-5 8
1.4 Powering Up 9
1.4.1 VME Slot-1 Device 9
1.4.2 VMEbus SYSRESET 9
1.4.2.1 SYSRESET Input 9
1.4.2.2 SYSRESET Output 9
1.4.3 Serial Ports 9
1.4.4 RESET and ABORT Key Enable 10
1.4.5 Front Panel SCSI#1 Termination 10
1.4.6 P2 SCSI Termination 10
1.4.7 Boot Flash EPROM Write Protection 11
1.4.8 User Flash EPROM Write Protection 11
1.4.9 Reserved Switches 11
1.4.10 Floppy Interface or SCSI#2 Availability on P2 12
1.4.11 Network Interface Selection (NIS) for Ethernet 13
1.4.12 Parallel Port 13
1.5 OpenBoot Firmware 14
1.5.1 Boot the System 14
1.5.2 NVRAM Boot Parameters 17
1.5.3 Diagnostics 18
1.5.4 Display System Information 21
1.5.5 Reset the System 22
1.5.6 OpenBoot Help 22
1.6 Front Panel 24
1.6.1 Features of the Front Panel 25
1.8 SPARC CPU-5TE Connectors 26
1.8.1 Twisted Pair Ethernet Connector Pinout 27
1.8.2 Serial Port A and B Connector Pinout 28
1.8.3 Keyboard/Mouse Connector Pinout 30

1.8.4 VME P2 Connector Pinout 31
1.8.5 The IOBP-10 Connectors 32
1.8.5.1 Jumper Setting for IOBP-10 32
1.9 IOBP-DS 37
1.9.1 Jumper Setting for IOBP-DS 37
1.9.2 IOBP-DS P2 Connector Pinout 38
1.10 How to Determine the Ethernet Address and Host ID 43
1.11 History of the Manual 44

List of Figures

Figure 1. Diagram of the CPU-5TE (Top View) 2
Figure 2. Diagram of the CPU-5TE (Bottom View) 3
Figure 3. SCSI Termination 10
Figure 4. Floppy or SCSI #2 Availability on P2 12
Figure 5. Diagram of the Front Panel 24
Figure 6. Twisted Pair Ethernet 27
Figure 7. Serial Ports A and B Connector Pinout 29
Figure 8. Keyboard/Mouse Connector 30
Figure 9. The IOBP-10 32
Figure 10. The IOBP-DS 37

List of Tables

Table 1.	Default Switch Settings	4
Table 2.	Device Alias Definitions	16
Table 3.	Setting Configuration Parameters	17
Table 4.	Diagnostic Routines	18
Table 5.	Commands to Display System Information	21
Table 6.	SPARC CPU-5TE Connectors	26
Table 7.	Twisted Pair Ethernet Connector Pinout	27
Table 8.	Serial Port A and B Connector Pinout	28
Table 9.	Keyboard/Mouse Connector Pinout	30
Table 10.	VME P2 Connector Pinout	31
Table 11.	IOBP-10 P1 Pinout	33
Table 12.	IOBP-10 P2 Pinout (SCSI #1)	34
Table 13.	IOBP-10 P3 Pinout (Floppy)	35
Table 14.	IOBP-10 P5 Pinout (Serial)	36
Table 15.	IOBP-10 Pinout (Ethernet)	36
Table 16.	IOBP-DS J1 Pinout (SCSI #1)	39
Table 17.	IOBP-DS J2 Pinout (SCSI #2)	40
Table 18.	IOBP-DS J3 Pinout (Ethernet #1 - AUI)	41
Table 19.	IOBP-DS J4 Pinout (Serial A and B)	42
Table 20.	IOBP-DS J5 Pinout (Keyboard/Mouse)	42
Table 21.	History of Manual	44

1. Getting Started

This *Installation Guide* provides guidelines for powering up the SPARC/CPU-5TE board. The *Installation Guide*, which you have in your hand now, appears both as Section 2 of the *SPARC CPU-5TE Technical Reference Manual* and as a stand-alone *Installation Guide*. The *SPARC CPU-5TE Technical Reference Manual* is also available from FORCE COMPUTERS. *The SPARC/CPU-5TE Technical Reference Manual* provides a comprehensive hardware and software guide to your board and is intended for those persons who require complete information.

1.1 Caution

Please read this *Installation Guide* before installing the board. Take a moment to examine the Table of Contents to see how this documentation is structured. This will be of value to you when looking for specific information in the future.

CAUTION: Do not plug or remove board under power.

1.2 Location Diagram of the SPARC CPU-5TE Board

A location diagram showing the important components on the CPU-5TE (top view) appears on the following page. On the page next to it, there is a location diagram of the CPU-5TE (bottom view) showing the position of five of the on-board switches.

FIGURE 1. Diagram of the CPU-5TE (Top View)

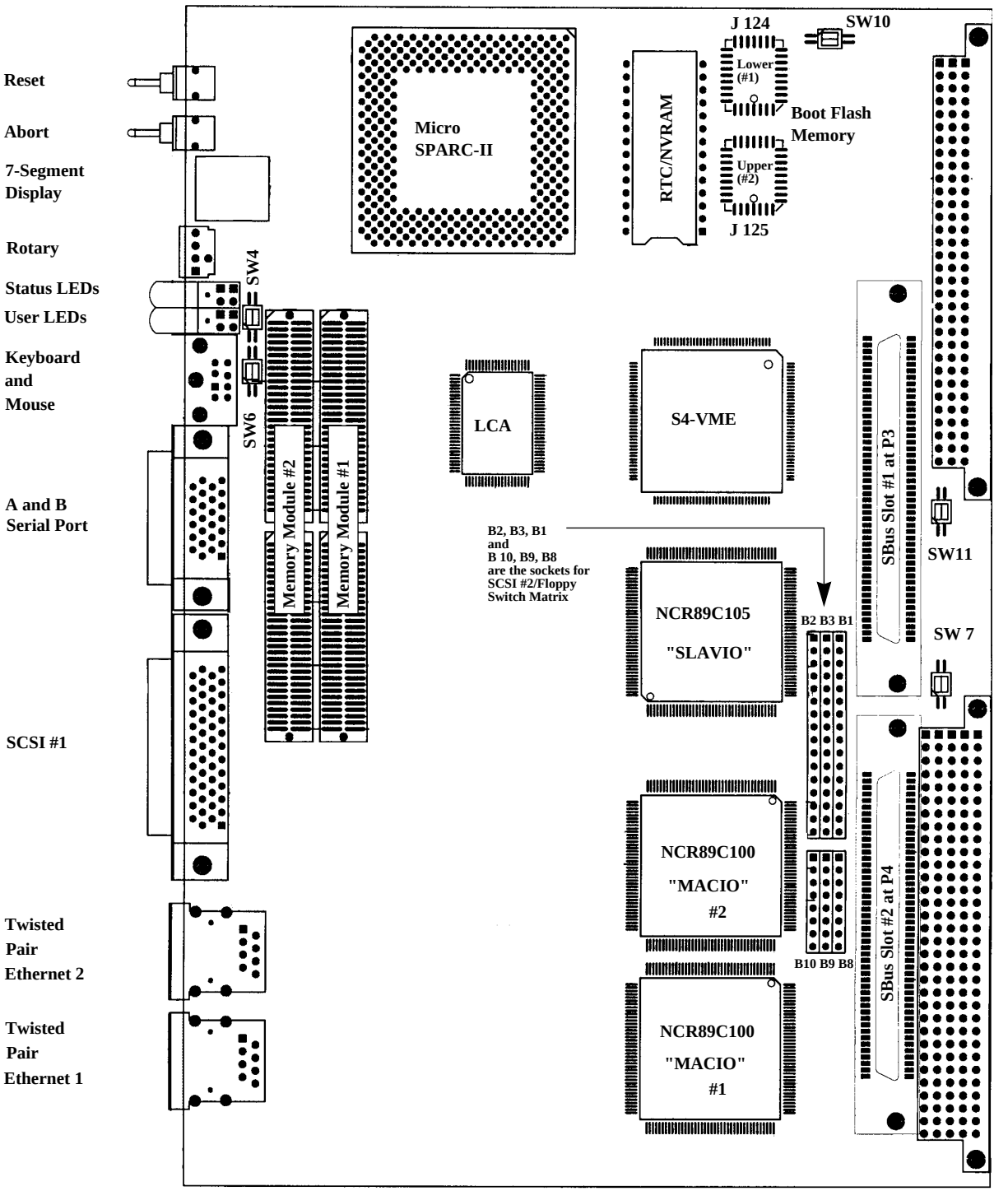
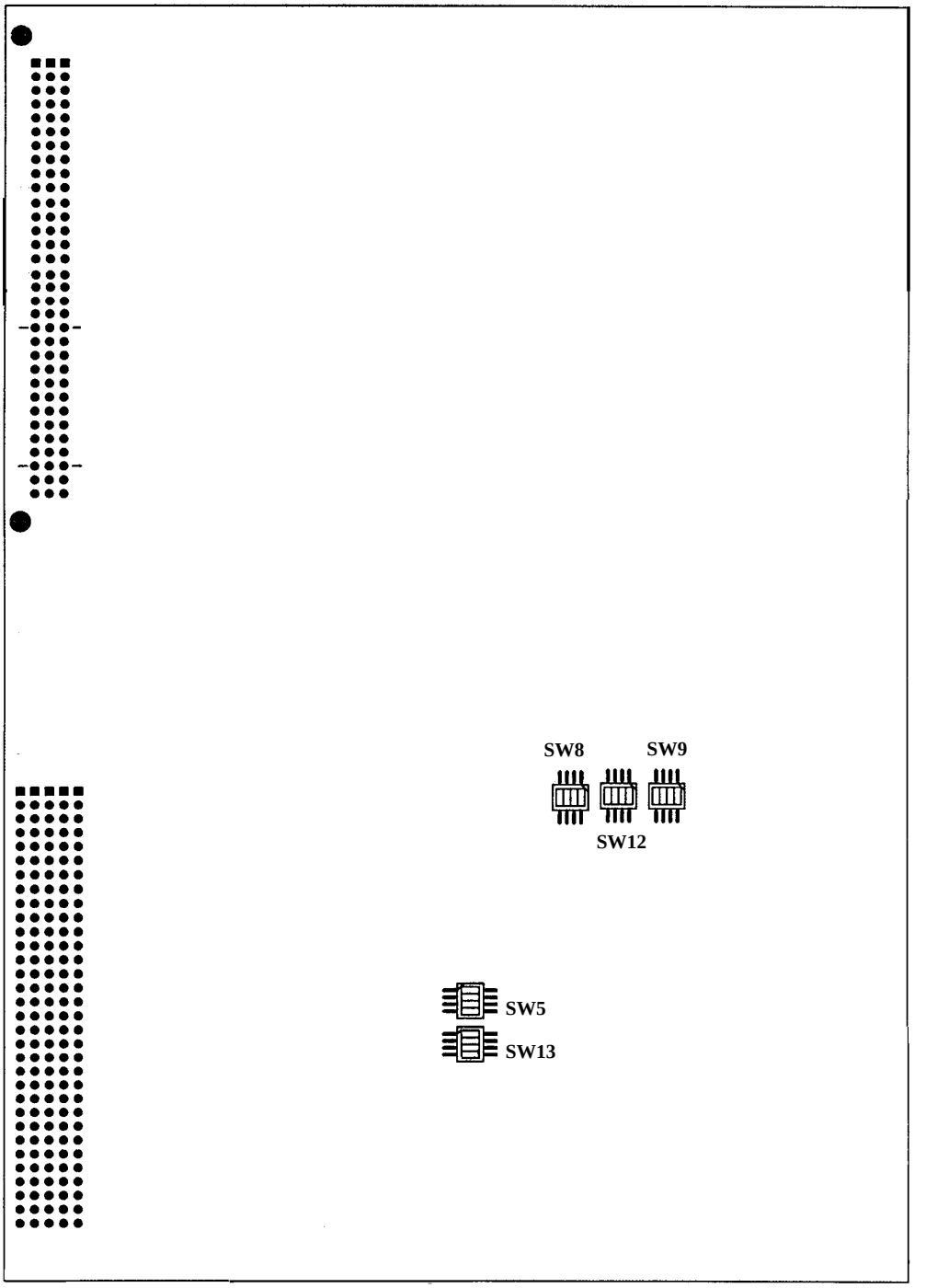


FIGURE 2. Diagram of the CPU-5TE (Bottom View)



1.3 Before Powering Up

Before powering up, please make sure that the default switch settings are all set according to the table below. Check these switch settings *before* powering up the SPARC CPU-5TE because the board is configured for power up according to these default settings. For the position of the switches on the board, please see the diagrams on the previous two pages.

1.3.1 Default Switch Settings

Table 1: Default Switch Settings

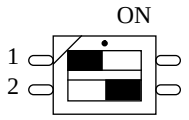
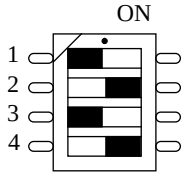
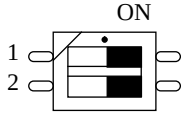
Diagram of Switch	Switches	Default Setting	Function
SWITCH 4			
	SW4-1	OFF	reserved, must be **OFF**.
	SW4-2	ON	reserved, must be **ON**.
SWITCH 5			
	SW5-1	OFF	**Test Switch**, must be **OFF**
	SW5-2	ON	**Test Switch**, must be **ON**
	SW5-3	OFF	**SCSI Termination for SCSI # 2 on P2** OFF = Enable, ON = Disable
	SW5-4	ON	**SCSI Termination for SCSI # 1 on P2** OFF = Enable, ON = Disable
SWITCH 6			
	SW6-1	ON	**Reset Key Control** ON=Reset Key enable, OFF=Reset Key disable
	SW6-2	ON	**Abort Key Control** ON=Abort Key enable, OFF=Abort Key disable

Table 1: Default Switch Settings (cont.)

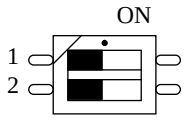
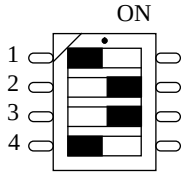
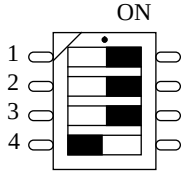
Diagram of Switch	Switches	Default Setting	Function
SWITCH 7			
	SW7-1	OFF	**SCSI#1 termination** for Front Panel OFF = Automatic (When a connector is plugged into the front panel SCSI connector, then termination is disabled. When no connector is plugged into the front panel SCSI connector, then termination is enabled.) ON = disabled
	SW7-2	OFF	**Test Switch**, must be **OFF**
SWITCH 8			
	SW8-1	OFF	**Test Switch**, must be **OFF**
	SW8-2	ON	TRXC on Front Panel Connector for RS-232 ON=Available, OFF=Not Available (Serial Port B)
	SW8-3	ON	TRXC on Front Panel Connector for RS-232 ON=Available, OFF=Not Available (Serial Port A)
	SW8-4	OFF	TRXC +/- on Front Panel Connector for RS-422 ON=Available, OFF=Not Available (Serial Port B)
SWITCH 9			
	SW9-1	ON	CTS on Front Panel Connector for RS-232 or CTS +/- on Front Panel Connector for RS-422 ON=Available, OFF=Not Available (Serial Port B)
	SW9-2	ON	RTS on Front Panel Connector for RS-232 or RTS +/- on Front Panel Connector for RS-422 ON=Available, OFF=Not Available (Serial Port B)
	SW9-3	ON	RTS on Front Panel Connector for RS-232 or RTS +/- on Front Panel Connector for RS-422 ON=Available, OFF=Not Available (Serial Port A)
	SW9-4	OFF	TRXC +/- on Front Panel Connector for RS-422 ON=Available, OFF=Not Available (Serial Port A)

Table 1: Default Switch Settings (cont.)

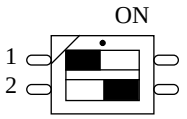
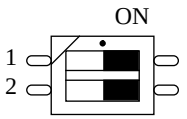
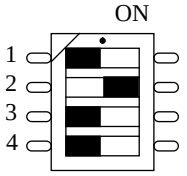
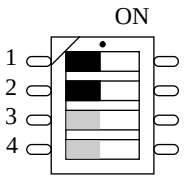
Diagram of Switch	Switches	Default Setting	Function
SWITCH 10			
	SW10-1	OFF	**Test Switch**, must be **OFF**
	SW10-2	ON	**VMEbus Slot-1 Device** ON = Automatic Slot-1 Device Recognition OFF = Not Slot-1 Device
SWITCH 11			
	SW11-1	ON	**SYSRESET** received from VMEbus ON = VMEbus SYSRESET generates on-board RESET OFF = VMEbus SYSRESET does not generate on-board RESET
	SW11-2	ON	**VMEbus SYSRESET Generation** ON = SYSRESET is driven to VMEbus if board is Slot-1 Device or during power-up reset OFF = SYSRESET is not driven to VMEbus
SWITCH 12			
	SW12-1	OFF	RTXC +/- on Front Panel Connector for RS-422 ON=Available, OFF=Not Available (Serial Port B)
	SW12-2	ON	CTS on Front Panel Connector for RS-232 or CTS +/- on Front Panel Connector for RS-422 ON=Available, OFF=Not Available (Serial Port A)
	SW12-3	OFF	RTXC +/- on Front Panel Connector for RS-422 ON=Available, OFF=Not Available (Serial Port A)
	SW12-4	OFF	**Test Switch**, must be **OFF**

Table 1: Default Switch Settings (cont.)

Diagram of Switch	Switches	Default Setting	Function
SWITCH 13			
	SW13-1	OFF	**User Flash EPROM write protection** ON = disable, OFF = enable
	SW13-2	OFF	**Boot Flash EPROM write protection** ON = disable, OFF = enable
	SW13-3	OFF/ON	No function
	SW13-4	OFF/ON	No function

CAUTION: To avoid damaging the serial ports, please consider the following regarding Switch 8, Switch 9 and Switch 12. Do not set the switches (SW8-3 and SW12-4), or (SW9-4 and SW9-3), or (SW12-2 and SW12-3) to ON at the same time and do not set the switches (SW8-2 and SW8-1), or (SW8-4 and SW9-2), or (SW9-1 and SW12-1) to ON at the same time!

1.3.2 Memory Module MEM-5

It is necessary to install the memory module on the board before powering up. For instructions on installing the MEM-5, please see the document *How to Install MEM-5*.

Memory Module # 1 must be installed for power up because it holds configuration information for booting the board. Memory module # 2 is optional for increasing memory capacity. For the location of the memory module connectors on the board, please see “Diagram of the CPU-5TE (Top View)” on page 2.

1.4 Powering Up

The initial power up can easily be done by connecting a terminal to ttya (serial port A). The advantage of using a terminal is that no frame buffer, monitor, or keyboard is used for initial power up, which facilitates a simple startup.

Please see the chapter “Boot the System” on page 14 for more detailed information on booting the system.

1.4.1 VME Slot-1 Device

The SPARC CPU-5TE can be plugged into any VMEbus slot; however, the default configuration automatically detects that the board is a VME slot-1 device, which functions as VME system controller. To configure your CPU-5TE so it is not a VME slot-1 device, the default configuration must be changed so that SW10-2 is OFF.

CAUTION: Before installing the SPARC CPU-5TE in a miniforce chassis, please first disable the VMEbus System Controller function by setting switch SW10-2 to OFF.

1.4.2 VMEbus SYSRESET

1.4.2.1 SYSRESET Input

A SYSRESET received from VMEbus generates an on-board RESET if switch SW11-1 is ON (default setting). When SW11-1 is OFF, the SYSRESET received from the VMEbus does not generate an on-board RESET.

1.4.2.2 SYSRESET Output

There are several possible ways for the CPU-5TE to generate a SYSRESET signal to the VMEbus. One way is when the CPU-5TE is a VMEbus slot-1 device and an on-board local SBus reset occurs, then the CPU-5TE generates the SYSRESET signal to the VMEbus. A second way for the SYSRESET signal to be generated is by power-up reset. Power-up reset occurs by switching on the power. Power-up Reset also occurs when the power monitor detects power fail or the front panel reset key is toggled.
This SYSRESET signal can be disabled by setting the switch SW11-2 to OFF.

1.4.3 Serial Ports

By default, both serial ports are configured as RS-232 interfaces. The chapter “Default Switch Settings” on page 4 shows the necessary switch settings for RS-232 operation.

1.4.4 RESET and ABORT Key Enable

To enable the RESET and the ABORT functions on the front panel, set switches SW6-1 (RESET) and SW6-2 (ABORT) to ON. This is the default setting.

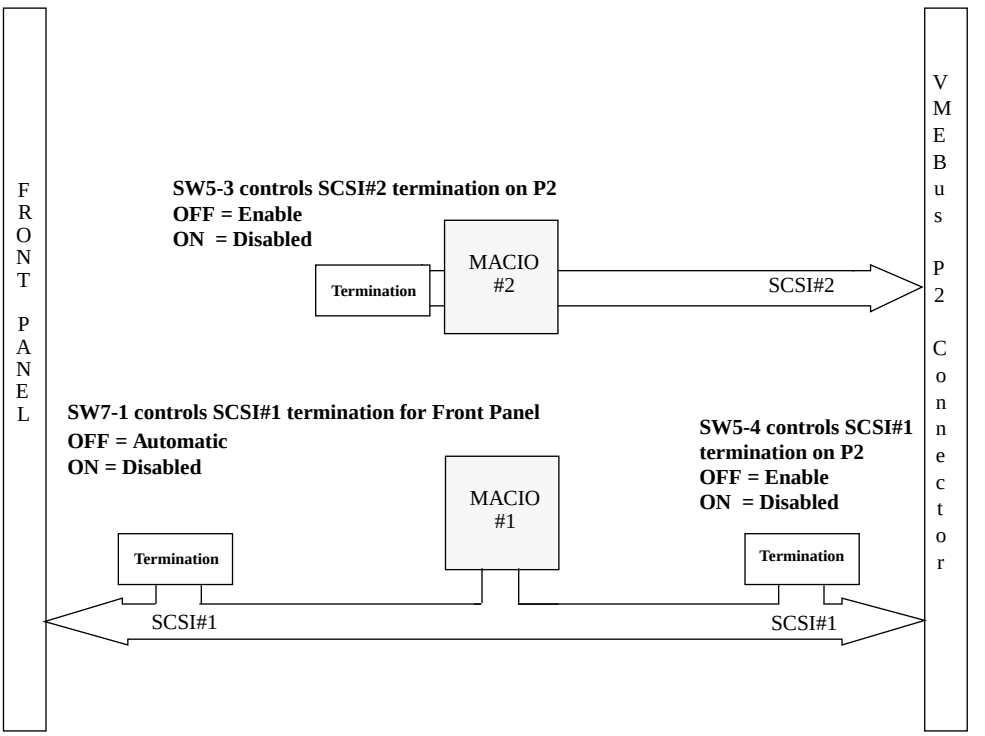
1.4.5 Front Panel SCSI#1 Termination

Please note how the SCSI#1 termination works on the front panel. Termination for the SCSI#1 interface is disabled when SW7-1 is ON. When switch SW7-1 is OFF, the termination is set to automatic termination mode. Automatic termination mode means the respective termination is disabled when you connect a standard SCSI cable to the connector.

1.4.6 P2 SCSI Termination

Termination for the P2 SCSI#1 is disabled when SW5-4 is ON, and this is the default setting. Termination for the P2 SCSI#2 is enabled when SW5-3 is OFF, and this is the default setting.

FIGURE 3. SCSI Termination



1.4.7 Boot Flash EPROM Write Protection

Both Boot Flash EPROMs are write protected via the switch SW13-2. When SW13-2 is OFF, the devices are write protected, and this is the default setting.

1.4.8 User Flash EPROM Write Protection

The optional User Flash EPROMs are write protected via SW13-1. When SW13-1 is OFF, the User Flash EPROMs are write protected, and this is the default setting.

1.4.9 Reserved Switches

SW5-1, SW5-2, SW7-2, SW8-1, SW10-1 and SW12-4 are reserved for test purposes. SW5-1, SW7-2, SW8-1, SW10-1 and SW12-4 should always be OFF. SW5-2 should always be ON.

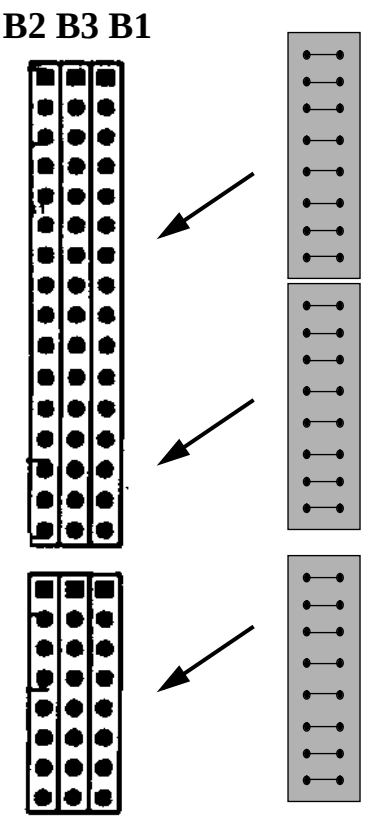
1.4.10 Floppy Interface or SCSI#2 Availability on P2

It is important to understand that the availability of both the floppy and SCSI#2 devices at the same time is dependent upon the availability of a 5-row P2 connector. When using a 3-row P2 connector, you have the choice of either the floppy or the SCSI#2 on P2. The following describes how to configure the board for floppy or SCSI#2.

Via a 24-pin configuration switch matrix, it is possible for either the floppy interface or the SCSI#2 to be available on the VME P2 connector on row C. The default setting enables the floppy interface via the VME P2 connector, with the configuration switch matrix plugged into B2/B3 and B10/B9. This means, of course, that by default the SCSI#2 is not available via the VMEbus P2 connector on row C.

To enable the SCSC#2 via the VME P2 connector, plug the configuration switch matrix in sockets B3/B1 and B9/B8.

FIGURE 4. Floppy or SCSI #2 Availability on P2



This 3-piece configuration switch matrix is used for choosing either the floppy interface or SCSI#2.

Plug the interface into sockets B2/B3 and B10/B9 for the floppy interface.

Or

Plug the interface into sockets B3/B1 and B9/B8 for the SCSI#2 interface.

CAUTION: If you use an IOBP-DS, the switch matrix must be located on B3/B1 and B9/B8 in order to route SCSI #2 to P2 row C. If you use an IOBP-10, the switch matrix must be located on B2/B3 and B10/B9 in order to route the floppy interface to P2 row C.

1.4.11 Network Interface Selection (NIS) for Ethernet

It is important to understand that the Ethernet is selected either via the twisted pair connector or the AUI (Attachment Unit Interface). When you boot your system and a connection exists with an AUI network, then the AUI is automatically selected. In other words, when you have a successful connection with a network, the AUI is used. When you have no connection with the network, then the twisted pair is selected. This is valid for both Ethernet #1 and Ethernet #2. The Ethernet#1 channel and the Ethernet#2 channel function independently of each other. For both Ethernet interfaces there is one Ethernet address. This means that you don’t have to connect both interfaces to one physical cable.

1.4.12 Parallel Port

The availability of the parallel port is dependent upon the availability of a 5-row P2 connector. When using a 3-row P2 connector, parallel port is not available.

1.5 OpenBoot Firmware

This chapter describes the use of OpenBoot firmware. Specifically, you will read how to perform the following tasks.

- Boot the System
- Run Diagnostics
- Display System Information
- Reset the System
- OpenBoot Help

For detailed information concerning OpenBoot, please see the *OPEN BOOT PROM 2.0 MANUAL SET*. This manual is included in the *SPARC CPU-5TE Technical Reference Manual* Set.

1.5.1 Boot the System

The most important function of OpenBoot firmware is booting the system. Booting is the process of loading and executing a stand-alone program such as the operating system. After it is powered on, the system usually boots automatically after it has passed the Power On SelfTest (POST). This occurs without user intervention.

If necessary, you can explicitly initiate the boot process from the OpenBoot command interpreter. Automatic booting uses the default boot device specified in nonvolatile RAM (NVRAM); user initiated booting uses either the default boot device or one specified by the user.

To boot the system from the default boot device, type the following command at the Forth Monitor prompt.

```
ok boot
```

or, if you are at the Restricted Monitor Prompt, you have to type the following:

```
> b
```

The boot command has the following format:

boot [device-specifier] [filename] [-ah]

The optional parameters are described as follows.

[device-specifier]	The name (full path or alias) of the boot device. Typical values are cdrom, disk, floppy, net or tape.
[filename]	The name of the program to be booted. *filename* is relative to the root of the selected device. If no filename is specified, the boot command uses the value of *boot-file* NVRAM parameter. The NVRAM parameters used for booting are described in the following chapter.
[-a]	-a prompt interactively for the device and name of the boot file.
[-h]	-h halt after loading the program.

NOTE: These options are specific to the operating system and may differ from system to system.

To explicitly boot from the internal disk, type:

```
ok boot disk
```

or at the Restricted Monitor prompt:

```
> b disk
```

To retrieve a list of all device alias definitions, type *devalias* at the Forth Monitor command prompt. The following table lists some typical device aliases:

Table 2: Device Alias Definitions

Alias	Boot Path	Description
disk	/iommu/sbus/espdma/esp/sd@3,0	Default disk (1st internal) SCSI-ID 3
disk3	/iommu/sbus/espdma/esp/sd@3,0	First internal disk SCSI-ID 3
disk2	/iommu/sbus/espdma/esp/sd@2,0	Additional internal disk SCSI-ID 2
disk1	/iommu/sbus/espdma/esp/sd@1,0	External disk SCSI-ID 1
disk0	/iommu/sbus/espdma/esp/sd@0,0	External disk SCSI-ID 0
tape	/iommu/sbus/espdma/esp/st@4,0	First tape drive SCSI-ID 4
tape0	/iommu/sbus/espdma/esp/st@4,0	First tape drive SCSI-ID 4
tape1	/iommu/sbus/espdma/esp/st@5,0	Second tape drive SCSI-ID 5
cdrom	/iommu/sbus/espdma/esp/sd@6,0:d	CD-ROM partition d, SCSI-ID 6
net	/iommu/sbus/ledma/le	Ethernet
floppy	/obio/SUNW,fdtwo	Floppy drive

1.5.2 NVRAM Boot Parameters

The OpenBoot firmware holds configuration parameters in NVRAM. At the Forth Monitor prompt, type *printenv* to see a list of all available configuration parameters. The OpenBoot command *setenv* may be used to set these parameters.

setenv [configuration parameter] [value]

This information refers only to those configuration parameters which are involved in the boot process. The following table lists these parameters.

Table 3: Setting Configuration Parameters

Parameter	Default Value	Description
auto-boot?	true	If true, boot automatically after power on or reset
boot-device	disk	Device from which to boot
boot-file	empty string	File to boot
diag-switch?	false	If true, run in diagnostic mode
diag-device	net	Device from which to boot in diagnostic mode
diag-file	empty string	File to boot in diagnostic mode

When booting an operating system or another stand-alone program, and neither a boot device nor a filename is supplied, the boot command of the Forth Monitor takes the omitted values from the NVRAM configuration parameters. If the parameter diag-switch? is false, boot-device and boot-file are used. Otherwise, the OpenBoot firmware uses diag-device and diag-file for booting.

For a detailed description of all NVRAM configuration parameters, please refer to the *OPEN BOOT PROM 2.0 MANUAL SET.*

1.5.3 Diagnostics

At power on or after reset, the OpenBoot firmware executes POST. If the NVRAM configuration parameter diag-switch? is true for each test, a message is displayed on a terminal connected to the first serial port. In case the system is not working correctly, error messages indicating the problem are displayed. After POST, the OpenBoot firmware boots an operating system or enters the Forth Monitor if the NVRAM configuration parameter auto-boot? is false.

The Forth Monitor includes several diagnostic routines. These on-board tests let you check devices such as network controller, SCSI devices, floppy disk system, memory, clock and installed SBus cards. User installed devices can be tested if their firmware includes a selftest routine.

The table below lists several diagnostic routines.

Table 4: Diagnostic Routines

Command	Description
probe-scsi	Identify devices connected to the on-board SCSI bus
probe-scsi-all [*device-path*]	Perform probe-scsi on all SCSI buses installed in the system below the specified device tree node. (If *device-path* is omitted, the root node is used.)
test *device-specifier*	Execute the specified device's selftest method. *device-specifier* may be a device path name or a device alias. For example: test net - test network connection test /memory - test number of megabytes specified in the selftest-#megs NVRAM parameter or test all of memory if diag-switch? is true
test-all [*device-specifier*]	Test all devices (that have a built-in selftest method) below the specified device tree node. (If *device-path* is omitted, the root node is used.)
watch-clock	Monitor the clock function
watch-net	Monitor network connection

To check the on-board SCSI bus for connected devices, type:

```
ok probe-scsi
Target 3
        Unit 0 Disk MICROP 1684-07MB1036511AS0C1684
ok
```

To test all the SCSI buses installed in the system, type:

```
ok probe-scsi-all
/iommu@0,10000000/sbus@0,10001000/esp@2,100000
Target 6
        Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012 3.1a

/iommu@0,10000000/sbus@0,10001000/espdma@4,8400000/esp@4,8800000
Target 3
        Unit 0 Disk MICROP 1684-07MB1036511AS0C1684

ok
```

The actual response depends on the devices on the SCSI buses.

To test a single installed device, type:

```
ok test device-specifier
```

This executes the device method name selftest of the specified device node.
device-specifier may be a device path name or a device alias as described in Table 2, “Device Alias Definitions,” on page 16. The response depends on the selftest of the device node.

To test a group of installed devices, type:

```
ok test-all
```

All devices below the root node of the device tree are tested. The response depends on the devices that have a selftest routine. If a device specifier option is supplied at the command line, all devices below the specified device tree node are tested.

When you use the memory testing routine, the system tests the number of megabytes of memory specified in the NVRAM configuration parameter selftest-#megs. If the NVRAM configuration parameter diag-switch? is true, all memory is tested.

```
ok test /memory
testing 32 megs of memory at addr 0 27
ok
```

The command **test-memory** is equivalent to **test /memory**. In the example above, the first number (0) is the base address of the memory bank to be tested, the second number (27) is the number of megabytes remaining. If the CPU board is working correctly, the memory is erased

and tested and you will receive the **ok** prompt. If the PROM or the on-board memory is not working, you receive one of a number of possible error messages indicating the problem.

To test the clock function, type:

```
ok watch-clock
Watching the 'seconds' register of the real time clock chip.
It should be 'ticking' once a second.
Type any key to stop.
22
ok
```

The system responds by incrementing a number once a second. Press any key to stop the test.

To monitor the network connection, type:

```
ok watch-net
Using AUI Ethernet Interface
Lance register test -- succeeded.
Internal loopback test -- succeeded.
External loopback test -- succeeded.
Looking for Ethernet packets.
'.' is a good packet. 'X' is a bad packet.
Type any key to stop.
.....X.....X.....
ok
```

The system monitors the network traffic, displaying "." each time it receives a valid packet and displaying "X" each time it receives a packet with an error that can be detected by the network hardware interface.

1.5.4 Display System Information

The Forth Monitor provides several commands to display system information. These commands let you display the system banner, the Ethernet address for the Ethernet controller, the contents of the ID PROM, and the version number of the OpenBoot firmware.

The ID PROM contains information specific to each individual machine, including the serial number, date of manufacture, and assigned Ethernet address.

The following table lists these commands.

Table 5: Commands to Display System Information

Command	Description
banner	Display system banner.
show-sbus	Display list of installed and probed SBus devices.
.enet-addr	Display current Ethernet address.
.idprom	Display ID PROM contents, formatted.
.traps	Display a list of SPARC trap types.
.version	Display version and date of the Boot PROM.
show-devs	Display a list of all device tree nodes.
devalias	Display a list of all device aliases.

1.5.5 Reset the System

If your system needs to be reset, you either press the reset button on the front panel or, if you are in the Forth Monitor, type **reset** on the command line.

```
ok reset
```

The system immediately begins executing the Power On SelfTest (POST) and initialization procedures. Once the POST finishes, the system either boots automatically or enters the Forth Monitor, just as it would have done after a power on cycle.

1.5.6 OpenBoot Help

The Forth Monitor contains an on-line help. To get this, type:

```
ok help
Enter ‘help command-name’ or ‘help category-name’ for more help
(Use ONLY the first word of a category description)
Examples: help select -or- help line
Main categories are:
File download and boot
Resume execution
Diag (diagnostic routines)
Power on reset
>-prompt
Floppy eject
Select I/O devices
Ethernet
System and boot configuration parameters
Line editor
Tools (memory, numbers, new commands, loops)
Assembly debugging (breakpoints, registers, disassembly, symbolic)
Sync (synchronize disk data)
Nvramrc (making new commands permanent)
ok
```

A list of all available help categories is displayed. These categories may also contain subcategories. To get help for special forth words or subcategories just type help [name]. An example is shown on the next page.

An example of how to get help for special forth words or subcategories.

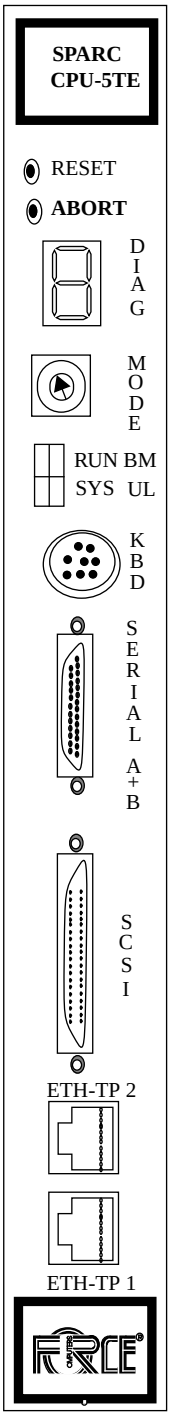
```
ok help tools
Category: Tools (memory, numbers, new commands, loops)
Sub-categories are:
Memory access
Arithmetic
Radix (number base conversions)
Numeric output
Defining new commands
Repeated loops
ok
ok help memory
Category: Memory access
dump ( addr length -- ) display memory at addr for length bytes
fill ( addr length byte -- ) fill memory starting at addr with byte
move ( src dest length -- ) copy length bytes from src to dest address
map? ( vaddr -- ) show memory map information for the virtual address
l? ( addr -- ) display the 32-bit number from location addr
w? ( addr -- ) display the 16-bit number from location addr
c? ( addr -- ) display the 8-bit number from location addr
l@ ( addr -- n ) place on the stack the 32-bit data at location addr
w@ ( addr -- n ) place on the stack the 16-bit data at location addr
c@ ( addr -- n ) place on the stack the 8-bit data at location addr
l! ( n addr -- ) store the 32-bit value n at location addr
w! ( n addr -- ) store the 16-bit value n at location addr
c! ( n addr -- ) store the 8-bit value n at location addr
ok
```

The on-line help shows you the forth word, the parameter stack before and after execution of the forth word (before -- after), and a short description.

The on-line help of the Forth Monitor is located in the boot PROM, so there is not an on-line help for all forth words.

1.6 Front Panel

FIGURE 5. Diagram of the Front Panel



1.6.1 Features of the Front Panel

- Reset and Abort key
- Status LEDs on the front panel
- Hex display on the front panel

These features are described in detail in Section 3 of the *SPARC CPU-5TE Technical Reference Manual*.

1.7. Front Panel Layout

Device	Function	Name
Switch	Reset	RESET
Switch	Abort	ABORT
HEX. Display	Diagnostic	DIAG
Rotary Switch	Diagnostic	MODE
LED/LED	Run-Halt VME BM-SYSFAIL	RUN BM
LED/LED	Slavio SYS LED User LED	SYS UL
Mini DIN Connector	Keyboard/Mouse	KBD
Serial Connector	Serial Interface A and B	SERIAL A+B
SCSI Connector	SCSI Interface	SCSI
RJ45 Connector	Ethernet Interface	ETH 2
RJ45 Connector	Ethernet Interface	ETH 1

1.8 SPARC CPU-5TE Connectors

The connectors on the SPARC CPU-5TE are listed in the following table.

Table 6: SPARC CPU-5TE Connectors

Function	Location	Type	Manufacturer Part Number
Ethernet # 1 (Twisted Pair)	Front Panel	RJ-45	AMP 555131-1
Ethernet # 2 (Twisted Pair)	Front Panel	RJ-45	AMP 555131-1
Serial Port A + B	Front Panel	26-pin Fine Pitch	AMP 749831-2
SCSI	Front Panel	50-pin Fine Pitch	AMP 749831-5
Keyboard/Mouse	Front Panel	8-pin Mini DIN	AMP 749232-1
SBus Slot2 (SBus Slave Select 1)	P3	96-pin SMD	FUJITSU FCN-234J096-G/V
SBus Slot3 (SBus Slave Select 2)	P4	96-pin SMD	FUJITSU FCN-234J096-G/V
VMEbus P1	P1	96-pin VGA	Various
VMEbus P2	P2	96-pin VGA	Various

The following pages show the pinouts of the connectors.

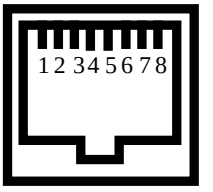
1.8.1 Twisted Pair Ethernet Connector Pinout

The following table shows the pinout of the twisted pair Ethernet connector. The pinout for both of the connectors is identical.

Table 7: Twisted Pair Ethernet Connector Pinout

Pin Number	Signal Name
1	TPE0
2	TPE1
3	TPE2
4	N.C.
5	N.C.
6	TPE3
7	N.C.
8	N.C.

FIGURE 6. Twisted Pair Ethernet



RJ45

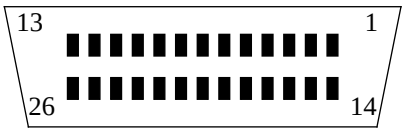
1.8.2 Serial Port A and B Connector Pinout

The following table is a pinout of the serial port connector. The figure on the next page shows the serial port connector and location of the pin numbers.

Table 8: Serial Port A and B Connector Pinout

Pin	Signal	Direction	Port	Description
1	none	none	A	Not connected
2	TD	output	A	Transmit Data
3	RD	input	A	Receive Data
4	RTS	output	A	Request To Send
5	CTS	input	A	Clear To Send
6	DSR	input	A	Data Set Ready
7	SG	none	A	Signal Ground
8	DCD	input	A	Data Carrier Detect
9	none	none	Not connected	
10	none	none	Not connected	
11	SDTR	output	B	Secondary Data Terminal Ready
12	SDCD	input	B	Secondary Data Carrier Detect
13	SCTS	input	B	Secondary Clear To Send
14	STD	output	B	Secondary Transmit Data
15	TC	input	A	Transmit Clock: DCE Source
16	SRD	input	B	Secondary Receive Data
17	RC	input	A	Receive Clock
18	STC	input	B	Secondary Transmit Clock
19	SRTS	output	B	Secondary Request To Send
20	DTR	output	A	Data Terminal Ready
21	SDSR	input	B	Secondary Data Terminal Ready
22	SRC	input	B	Secondary Receive Clock
23	SSG	none	B	Secondary Signal Ground
24	TC	output	A	Transmit Clock: DTE Source
25	STC	output	B	Transmit Clock: DTE Source
26	none	none	Not connected	

FIGURE 7. Serial Ports A and B Connector Pinout



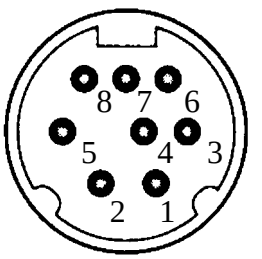
1.8.3 Keyboard/Mouse Connector Pinout

The keyboard and mouse port is available on the front panel via a Mini DIN connector.

Table 9: Keyboard/Mouse Connector Pinout

Pin	Function
1	GND
2	GND
3	+5VDC
4	Mouse In
5	Keyboard Out
6	Keyboard In
7	Mouse Out
8	+5VDC

FIGURE 8. Keyboard/Mouse Connector



1.8.4 VME P2 Connector Pinout

The SCSI#2 interface is an alternative to the FDC interface. The signals for rows Z and D are only available on the 5-row P2 Connector.

Table 10: VME P2 Connector Pinout

Pin #	Signal Row Z	Signal Row A	Signal Row C (FDC signals)	Signal Row C (SCSI#2 signals)	Signal Row D
1	CENTR DS	SCSI#1-D0	FPY DENSEL	SCSI#2-D0	NC
2	GND	SCSI#1-D1	FPY DENSENS	SCSI#2-D1	NC
3	CENTR D0	SCSI#1-D2	N.C.	SCSI#2-D2	SCSI#2-D0
4	GND	SCSI#1-D3	FPY INDEX	SCSI#2-D3	SCSI#2-D1
5	CENTR D1	SCSI#1-D4	FPY DRVSEL	SCSI#2-D4	SCSI#2-D2
6	GND	SCSI#1-D5	N.C.	SCSI#2-D5	SCSI#2-D3
7	CENTR D2	SCSI#1-D6	N.C.	SCSI#2-D6	SCSI#2-D4
8	GND	SCSI#1-D7	FPY MOTEN	SCSI#2-D7	SCSI#2-D5
9	CENTR D3	SCSI#1-DP	FPY DIR	SCSI#2-DP	SCSI#2-D6
10	GND	GND	FPY STEP	SCSI#2-ATTN	SCSI#2-D7
11	CENTR D4	GND	FPY WRDATA	SCSI#2-BSY	SCSI#2-DP
12	GND	GND	FPY WRGATE	SCSI#2-ACK	TERMPWR#2
13	CENTR D5	TERMPWR#1	FPY TRACK0	SCSI#2-RST	SCSI#2-ATTN
14	GND	GND	FPY WRPROT	SCSI#2-MSG	SCSI#2-BSY
15	CENTR D6	GND	FPY RDDATA	SCSI#2-SEL	SCSI#2-ACK
16	GND	SCSI#1-ATTN	FPY HEADSEL	SCSI#2-CD	SCSI#2-RST
17	CENTR D7	GND	FPY DISKCHG	SCSI#2-REQ	SCSI#2-MSG
18	GND	SCSI#1-BSY	FPY EJECT	SCSI#2-IO	SCSI#2-SEL
19	CENTR ACK	SCSI#1-ACK	+12VDC	ETH#1_POW	SCSI#2-CD
20	GND	SCSI#1-RST	GND	TERMPWR#2	SCSI#2-REQ
21	CENTR BSY	SCSI#1-MSG	GND	GND	SCSI#2-IO
22	GND	SCSI#1-SEL	ETH#1_REC+	ETH#1_REC+	CENTR SLCTIN
23	CENTR PE	SCSI#1-CD	ETH#1_REC-	ETH#1_REC-	MOUSEOUT
24	GND	SCSI#1-REQ	ETH#1_TRA+	ETH#1_TRA+	ETH#2_POW
25	CENTR AF	SCSI#1-IO	ETH#1_TRA-	ETH#1_TRA-	ETH#2_REC+
26	GND	MOUSEIN	ETH#1_COL+	ETH#1_COL+	ETH#2_REC-
27	CENTR INIT	TXD_KBD	ETH#1_COL-	ETH#1_COL-	ETH#2_TRA+
28	GND	RXD_KBD	GND	GND	ETH#2_TRA-
29	CENTR ERR	TXD_A	TXD_B	TXD_B	ETH#2_COL+
30	GND	RXD_A	RXD_B	RXD_B	ETH#2_COL-
31	CENTR SLCT	DTR_A	DTR_B	DTR_B	NC
32	GND	DCD_A	DCD_B	DCD_B	NC

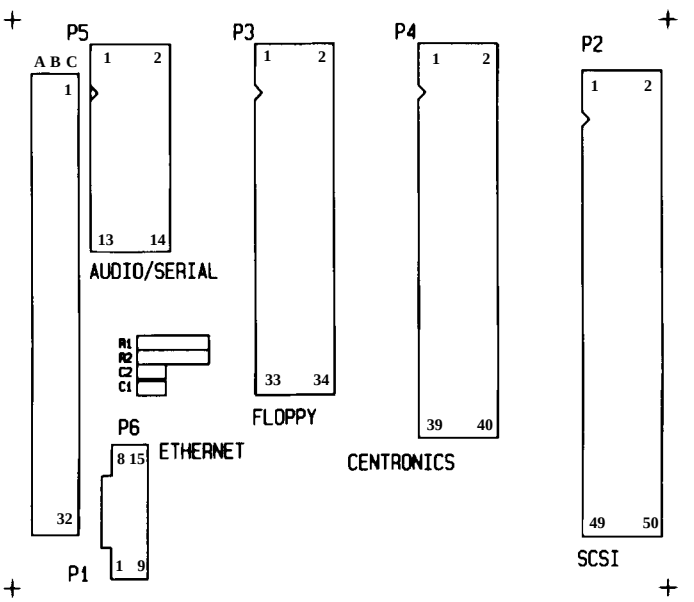
1.8.5 The IOBP-10 Connectors

The IOBP-10 is an I/O back panel on VMEbus P2 with flat cable connectors for SCSI, serial I/O, Centronics/floppy interface, and a micro D-Sub connector for the Ethernet#1 interface. The Centronics interface on the IOBP-10 is not supported by the CPU-5TE. This back panel can be plugged into the VMEbus P2 connector. The diagram below shows all the connectors. The IOBP-10 back panel and the IOBP-DS are especially designed for the SPARC CPU-5TE. Do not use any other I/O back panels on the SPARC CPU-5TE, for example, the IOBP-1.

1.8.5.1 Jumper Setting for IOBP-10

Please make sure that the configuration switch matrix is plugged into sockets B2 / B3 and B10 / B9, that is, the configuration for floppy interface on P2. This is described in chapter “Floppy Interface or SCSI#2 Availability on P2” on page 12.

FIGURE 9. The IOBP-10



The pinouts of the connectors (P1) ... (P6) are shown in the following tables.

CAUTION

This IOBP-10 back panel and the IOBP-DS are especially designed for the SPARC CPU-5TE. Do not use any other I/O back panels on the SPARC CPU-5TE, for example, the IOBP-1.

Table 11: IOBP-10 P1 Pinout

ROW A	Signal	ROW B	Signal	ROW C	Signal
1	SCSI Data 0	1	N.C.	1	FPY DENSEL
2	SCSI Data 1	2	GND	2	FPY DENSENS
3	SCSI Data 2	3	N.C.	3	N.C.
4	SCSI Data 3	4	N.C.	4	FPY INDEX
5	SCSI Data 4	5	N.C.	5	FPY DRVSEL
6	SCSI Data 5	6	N.C.	6	N.C.
7	SCSI Data 6	7	N.C.	7	N.C.
8	SCSI Data 7	8	N.C.	8	FPY MOTEN
9	SCSI DP	9	N.C.	9	FPY DIR
10	GND	10	N.C.	10	FPY STEP
11	GND	11	N.C.	11	FPY WRDATA
12	GND	12	GND	12	FPY WRGATE
13	TERMPWR	13	N.C.	13	FPY TRACK0
14	GND	14	N.C.	14	FPY WRPROT
15	GND	15	N.C.	15	FPY RDDATA
16	SCSI ATN	16	N.C.	16	FPY HEADSEL
17	GND	17	N.C.	17	FPY DISKCHG
18	SCSI BSY	18	N.C.	18	FPY EJECT
19	SCSI ACK	19	N.C.	19	+12VDC [2]
20	SCSI RST	20	N.C.	20	GND
21	SCSI MSG	21	N.C.	21	GND
22	SCSI SEL	22	GND	22	ETH REC+ [2]
23	SCSI CD	23	N.C.	23	ETH REC- [2]
24	SCSI REQ	24	N.C.	24	ETH TRA+ [2]
25	SCSI IO	25	N.C.	25	ETH TRA- [2]
26	RESERVED	26	N.C.	26	ETH COL+ [2]
27	RESERVED	27	N.C.	27	ETH COL- [2]
28	RESERVED	28	N.C.	28	GND
29	TxD Port A	29	N.C.	29	TxD Port B
30	RxD Port A	30	N.C.	30	RxD Port B
31	RTS Port A	31	GND	31	RTS Port B
32	CTS Port A	32	N.C.	32	CTS Port B

Table 12: IOBP-10 P2 Pinout (SCSI #1)

Pin No.	Signal	Pin No.	Signal
1	GND	2	SCSI #1 Data 0
3	GND	4	SCSI #1 Data 1
5	GND	6	SCSI #1 Data 2
7	GND	8	SCSI #1 Data 3
9	GND	10	SCSI #1 Data 4
11	GND	12	SCSI #1 Data 5
13	GND	14	SCSI #1 Data 6
15	GND	16	SCSI #1 Data 7
17	GND	18	SCSI #1 DP
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	N.C.	26	TERMPWR #1
27	GND	28	GND
29	GND	30	GND
31	GND	32	SCSI #1 ATN
33	GND	34	GND
35	GND	36	SCSI #1 BSY
37	GND	38	SCSI #1 ACK
39	GND	40	SCSI #1 RST
41	GND	42	SCSI #1 MSG
43	GND	44	SCSI #1 SEL
45	GND	46	SCSI #1 CD
47	GND	48	SCSI #1 REQ
49	GND	50	SCSI #1 IO

Table 13: IOBP-10 P3 Pinout (Floppy)

Pin No.	Signal	Pin No.	Signal
1	FPY EJECT	2	FPY DENSEL
3	GND	4	FPY DENSENS
5	GND	6	N.C.
7	GND	8	FPY INDEX
9	GND	10	FPY DRVSEL
11	GND	12	N.C.
13	GND	14	N.C.
15	GND	16	FPY MOTEN
17	GND	18	FPY DIR
19	GND	20	FPY STEP
21	GND	22	FPY WRDATA
23	GND	24	FPY WRGATE
25	GND	26	FPY TRACK0
27	N.C.	28	FPY WRPROT
29	GND	30	FPY RDDATA
31	GND	32	FPY HEADSEL
33	GND	34	FPY DISKCHG

Table 14: IOBP-10 P5 Pinout (Serial)

Pin No.	Signal	Pin No.	Signal
1	GND	2	RESERVED
3	RESERVED	4	RESERVED
5	TxD Port B	6	TxD Port A
7	RxD Port B	8	RxD Port A
9	RTS Port B	10	RTS Port A
11	CTS Port B	12	CTS Port A
13	GND	14	GND

Table 15: IOBP-10 Pinout (Ethernet)

Pin	Function
1	GND
2	Collision+
3	Transmit Data+
4	GND
5	Receive Data+
6	GND
7	N.C.
8	N.C.
9	Collision-
10	Transmit Data-
11	GND
12	Receive Data-
13	+12VDC
14	GND
15	N.C.

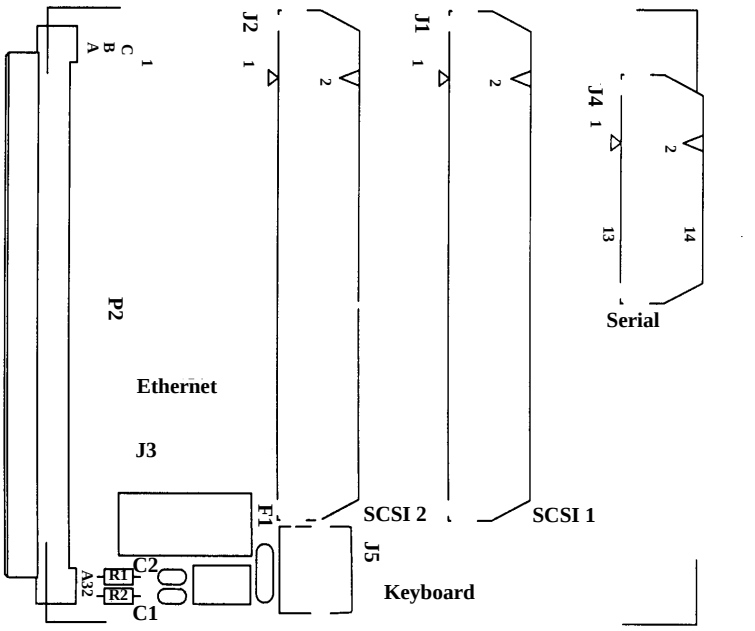
1.9 IOBP-DS

The IOBP-DS is an I/O back panel on VMEbus P2 with flat cable connectors for SCSI #1, SCSI #2, serial I/O, keyboard/mouse and a micro D-Sub connector for the Ethernet #1 interface (AUI). This back panel can be plugged into the VMEbus P2 connector. The diagram below shows all the connectors. The IOBP-I/O back panel and the IOBP-DS are especially designed for the SPARC CPU-5TE. Do not use any other I/O back panels on the SPARC CPU-5TE, for example, the IOBP-1.

1.9.1 Jumper Setting for IOBP-DS

Please make sure that the configuration switch matrix is plugged into sockets B3/B1 and B9/B8, that is, the configuration for dual SCSI interface on P2 (3-row connector). This is described in chapter “Floppy Interface or SCSI#2 Availability on P2” on page 12.

FIGURE 10. The IOBP-DS



The pinouts of the connectors are shown in the following tables.

CAUTION

This IOBP-10 back panel and the IOBP-DS are especially designed for the SPARC CPU-5TE. Do not use any other I/O back panels on the SPARC CPU-5TE, for example, the IOBP-1.

1.9.2 IOBP-DS P2 Connector Pinout

Pin #	Signal Row A	Signal Row B	Signal Row C (SCSI#2 signals)
1	SCSI#1-D0	5V	SCSI#2-D0
2	SCSI#1-D1	GND	SCSI#2-D1
3	SCSI#1-D2	N.C.	SCSI#2-D2
4	SCSI#1-D3	N.C.	SCSI#2-D3
5	SCSI#1-D4	N.C.	SCSI#2-D4
6	SCSI#1-D5	N.C.	SCSI#2-D5
7	SCSI#1-D6	N.C.	SCSI#2-D6
8	SCSI#1-D7	N.C.	SCSI#2-D7
9	SCSI#1-DP	N.C.	SCSI#2-DP
10	GND	N.C.	SCSI#2-ATTN
11	GND	N.C.	SCSI#2-BSY
12	GND	GND	SCSI#2-ACK
13	TERMPWR#1	5V	SCSI#2-RST
14	GND	N.C.	SCSI#2-MSG
15	GND	N.C.	SCSI#2-SEL
16	SCSI#1-ATTN	N.C.	SCSI#2-CD
17	GND	N.C.	SCSI#2-REQ
18	SCSI#1-BSY	N.C.	SCSI#2-IO
19	SCSI#1-ACK	N.C.	ETH#1_POW
20	SCSI#1-RST	N.C.	TERMPWR#2
21	SCSI#1-MSG	N.C.	GND
22	SCSI#1-SEL	GND	ETH#1_REC+
23	SCSI#1-CD	N.C.	ETH#1_REC-
24	SCSI#1-REQ	N.C.	ETH#1_TRA+
25	SCSI#1-IO	N.C.	ETH#1_TRA-
26	MOUSEIN	N.C.	ETH#1_COL+
27	TXD_KBD	N.C.	ETH#1_COL-
28	RXD_KBD	N.C.	GND
29	TXD_A	N.C.	TXD_B
30	RXD_A	N.C.	RXD_B
31	DTR_A	GND	DTR_B
32	DCD_A	5V	DCD_B

Table 16: IOBP-DS J1 Pinout (SCSI #1)

Pin No.	Signal	Pin No.	Signal
1	GND	2	SCSI #1 Data 0
3	GND	4	SCSI #1 Data 1
5	GND	6	SCSI #1 Data 2
7	GND	8	SCSI #1 Data 3
9	GND	10	SCSI #1 Data 4
11	GND	12	SCSI #1 Data 5
13	GND	14	SCSI #1 Data 6
15	GND	16	SCSI #1 Data 7
17	GND	18	SCSI #1 DP
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	N.C.	26	TERMPWR #1
27	GND	28	GND
29	GND	30	GND
31	GND	32	SCSI #1 ATN
33	GND	34	GND
35	GND	36	SCSI #1 BSY
37	GND	38	SCSI #1 ACK
39	GND	40	SCSI #1 RST
41	GND	42	SCSI #1 MSG
43	GND	44	SCSI #1 SEL
45	GND	46	SCSI #1 CD
47	GND	48	SCSI #1 REQ
49	GND	50	SCSI #1 IO

Table 17: IOBP-DS J2 Pinout (SCSI #2)

Pin No.	Signal	Pin No.	Signal
1	GND	2	SCSI #2 Data 0
3	GND	4	SCSI #2 Data 1
5	GND	6	SCSI #2 Data 2
7	GND	8	SCSI #2 Data 3
9	GND	10	SCSI #2 Data 4
11	GND	12	SCSI #2 Data 5
13	GND	14	SCSI #2 Data 6
15	GND	16	SCSI #2 Data 7
17	GND	18	SCSI #2 DP
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	N.C.	26	TERMPWR #2
27	GND	28	GND
29	GND	30	GND
31	GND	32	SCSI #2 ATN
33	GND	34	GND
35	GND	36	SCSI #2 BSY
37	GND	38	SCSI #2 ACK
39	GND	40	SCSI #2 RST
41	GND	42	SCSI #2 MSG
43	GND	44	SCSI #2 SEL
45	GND	46	SCSI #2 CD
47	GND	48	SCSI #2 REQ
49	GND	50	SCSI #2 IO

Table 18: IOBP-DS J3 Pinout (Ethernet #1 - AUI)

Pin	Function
1	GND
2	Collision+
3	Transmit Data+
4	GND
5	Receive Data+
6	GND
7	N.C.
8	GND
9	Collision-
10	Transmit Data-
11	GND
12	Receive Data-
13	+12VDC
14	GND
15	N.C.

Table 19: IOBP-DS J4 Pinout (Serial A and B)

Pin No.	Signal	Pin No.	Signal
1	RESERVED	2	RESERVED
3	RESERVED	4	RESERVED
5	TxD Port B	6	TxD Port A
7	RxD Port B	8	RxD Port A
9	RTS Port B	10	RTS Port A
11	CTS Port B	12	CTS Port A
13	GND	14	GND

Table 20: IOBP-DS J5 Pinout (Keyboard/Mouse)

Pin	Function
1	GND
2	GND
3	+5VDC
4	Mouse In
5	Keyboard Out
6	Keyboard In
7	N.C.
8	+5VDC

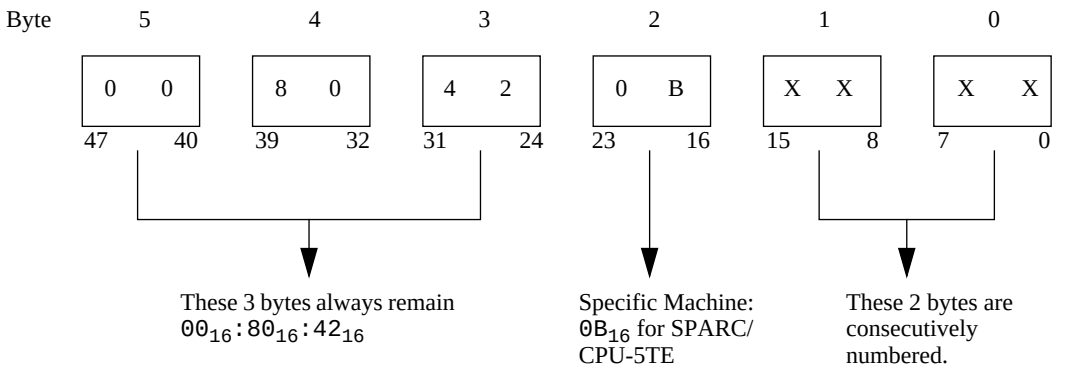
1.10 How to Determine the Ethernet Address and Host ID

In order to see the Ethernet address and host ID, type the following command at the prompt:

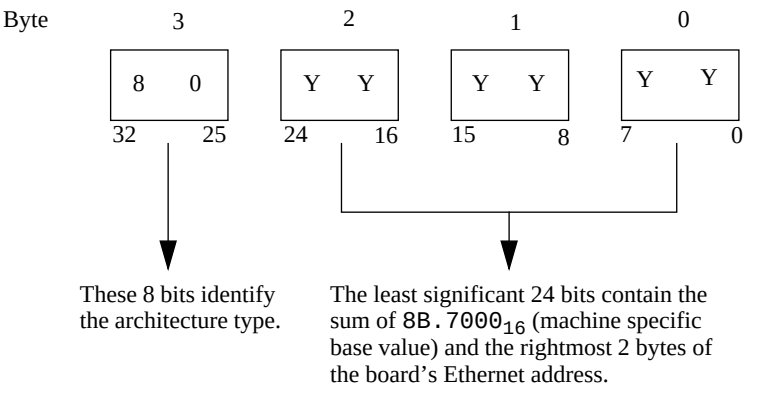
```
ok banner
```

The information below explains how the SPARC/CPU-5TE Ethernet address and the host ID are determined.

The 48-bit (6-byte) Ethernet address



The 32-bit (4-byte) host ID



1.11 History of the Manual

Below is a description of the publication history of this *SPARC/CPU-5TE Installation Guide.*

Table 21: History of Manual

Edition No.	Description	Date of Last Change
1	First Print	June 1995
2	Row C of VME P2 Connector Pinout has been corrected.	September 1995
3	Corrected IOBP-DS pinout description The section “How to Determine the Ethernet Address and Host ID” on page 43 has been updated.	October 1996
4	Diagrams of switch in Table 1, “Default Switch Settings,” on page 4 have been corrected.	December 1997
5	Table 10, “VME P2 Connector Pinout,” on page 31 has been corrected.	February 1999

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