Sun Ultra 1 Creator Series Reference Manual

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Preface

The *Sun Ultra 1 Creator Series Reference Manual* contains useful information about the use and maintenance of a Sun Ultra 1 Creator Series system.

This book is for use with Ultra 1 Creator and Ultra 1 Creator 3D systems only. The nameplate on your system front panel must be like the nameplates shown in FIGURE P-1.
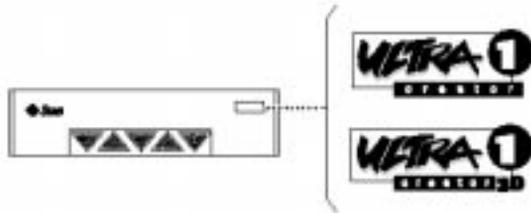
FIGURE P-1   Ultra 1 Creator Series Nameplates

How This Book Is Organized

Chapter 1, "Back Panel Connectors," shows the location of each back panel connector and gives the pinouts for each connector.

Chapter 2, "Twisted-Pair Ethernet Link Test," presents a full tutorial about connecting the system to a 10BASE-T twisted-pair Ethernet local area network.

Chapter 3, "Modem Setup Specifications," gives modem settings for Sun Ultra 1 Creator Series systems used in specific network telecommunication applications.

Chapter 4, "Main-Logic Board Jumpers," gives the locations and pin definitions of user-configurable main-logic board jumpers.

Chapter 5, "Physical Specifications," gives system requirements about power and environment, and also gives system dimension, weight, and memory mapping specifications.

Related Books

The following documents contain topics that relate to the information in the Sun Ultra 1 Creator Series Reference Manual.

TABLE P-1   Related Books

Application	Title	Part Number
Installation	*Sun Ultra 1 Creator Series Hardware Setup Instructions*	802-4143-10
Installation	*Sun Ultra 1 Creator Series Installation Guide*	802-4145-10
Service	*Sun Ultra 1 Creator Series Service Manual*	802-4148-10

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Back Panel Connectors

1.1 Connector Layout

Power
On/Standby
switch

UPA slot

Serial connectors
RS-423/RS-232

SBus slot 1

SBus slot 0

Audio
connectors

Power outlet
(Female socket)

Power inlet
(Male plug)

Parallel
connector

Keyboard/
mouse
connector

MII
connector

TPE
connector

SCSI
connector
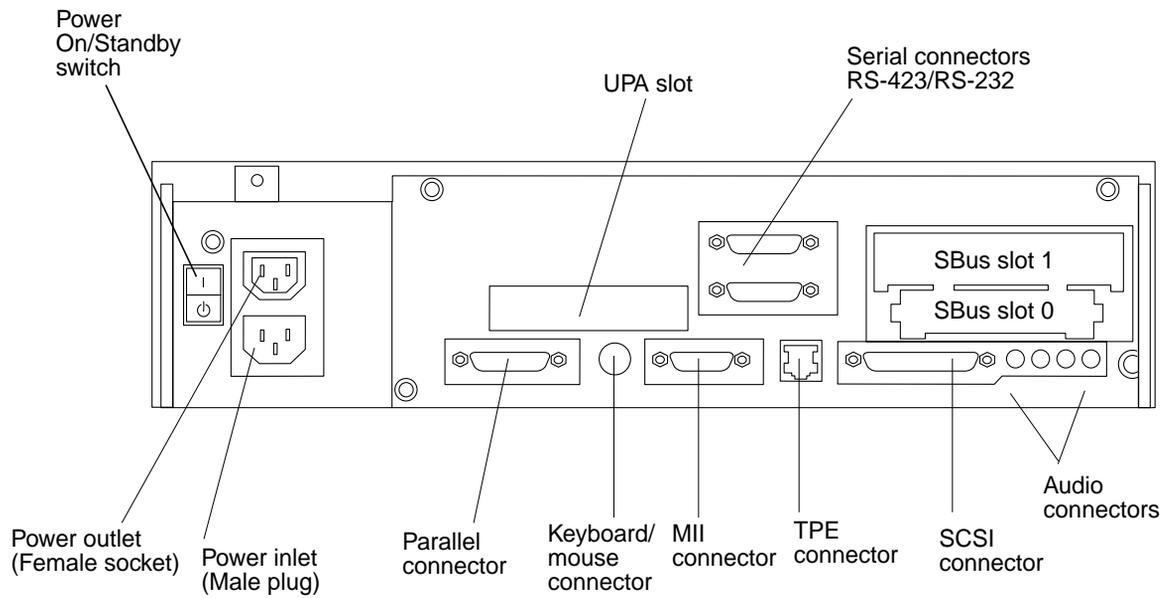
FIGURE 1-1   Back Panel Switches and Connectors

1.2   Serial Connectors
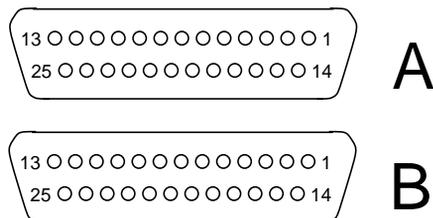
FIGURE 1-2   DB-25 Serial Connectors

TABLE 1-1   Serial Connector Pinouts, RS-423/RS-232

Pin	Function	I/O	Signal Description
1	none	none	Not connected
2	TxD	O	Transmit Data
3	RxD	I	Receive Data
4	RTS	O	Ready To Send
5	CTS	I	Clear To Send
6	DSR	I	Data Set Ready
7	Gnd		Signal Ground
8	DCD	I	Data Carrier Detect
9-14	none	none	Not connected
15	TRxC	I	Transmit Clock
16	none	none	Not connected
17	RTxC	I	Receive Clock
18-19	none	none	Not connected
20	DTR	O	Data Terminal Ready
21-23	none	none	Not connected
24	TxC	O	Transmit Clock
25	none	none	Not connected

1.3   Parallel Connector
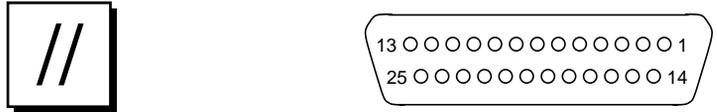
FIGURE 1-3   DB-25 Parallel Connector

TABLE 1-2   Parallel Connector Pinouts

Pin	Description	Pin	Description
1	nStrobe	14	nAutoFd
2	Data[1]	15	nFault
3	Data[2]	16	nInit
4	Data[3]	17	nSelectln
5	Data[4]	18	Signal Ground
6	Data[5]	19	Signal Ground
7	Data[6]	20	Signal Ground
8	Data[7]	21	Signal Ground
9	Data[8]	22	Signal Ground
10	nAck	23	Signal Ground
11	Busy	24	Signal Ground
12	PError	25	Signal Ground
13	Select		

1.4 Keyboard/Mouse Connector
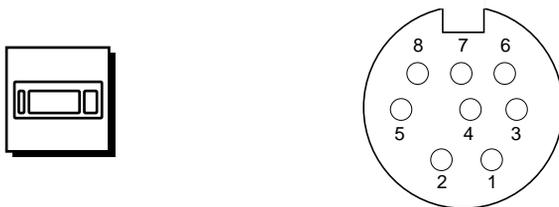
FIGURE 1-4 DIN-8 Keyboard/Mouse Connector

TABLE 1-3 Keyboard/Mouse Connector Pinouts

Pin	Description	Pin	Description
1	Ground	5	Keyboard Out
2	Ground	6	Keyboard In
3	+5 VDC	7	Power Key In
4	Mouse In	8	+5 VDC

Note – All signals are standard TTL levels. The +5V supply is fuse-protected.

1.5 Media Independent Interface (MII) Connector
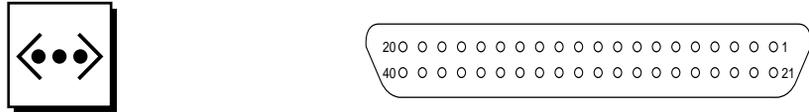
FIGURE 1-5   40-Pin Miniature-D MII Connector

TABLE 1-4   MII Connector Pinouts

Pin	Function	Pin	Function
1	+5V	18	COL
2	MDIO	19	CRS
3	MDC	20	+5V
4	RXD<3>	21	+5V
5	RXD<2>	22	Signal Ground
6	RXD<1>	23	Signal Ground
7	RXD<0>	24	Signal Ground
8	RX_DV	25	Signal Ground
9	RX_CLK	26	Signal Ground
10	RX_ER	27	Signal Ground
11	TX_ER	28	Signal Ground
12	TX_CLK	29	Signal Ground
13	TX_EN	30	Signal Ground
14	TXD<0>	31	Signal Ground
15	TXD<1>	32	Signal Ground
16	TXD<2>	33	Signal Ground
17	TXD<3>	34	Signal Ground

TABLE 1-4   MII Connector Pinouts *(Continued)*

Pin	Function	Pin	Function
35	Ground	38	Signal Ground
36	Ground	39	Signal Ground
37	Ground	40	+5V

1.6   Twisted-Pair Ethernet (TPE) Connector

FIGURE 1-6   RJ-45 TPE Connector

TABLE 1-5   TPE Connector Pinouts

Pin	Description	Pin	Description
1	Transmit Data +	5	N.C.
2	Transmit Data -	6	Receive Data -
3	Receive Data +	7	N.C.
4	N.C.	8	N.C.

1.7 SCSI Connector


```
34 ○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○ 1
68 ○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○ 35
```
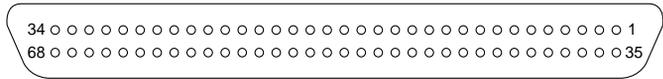
FIGURE 1-7 68-Pin SCSI Connector

TABLE 1-6 68-Pin SCSI Connector Pinout

Pin	Signal Name	Pin	Signal Name
1	Ground	27	Ground
2	Ground	28	Ground
3	Ground	29	Ground
4	Ground	30	Ground
5	Ground	31	Ground
6	Ground	32	Ground
7	Ground	33	Ground
8	Ground	34	Ground
9	Ground	35	-DB<12>
10	Ground	36	-DB<13>
11	Ground	37	-DB<14>
12	Ground	38	-DB<15>
13	Ground	39	-PAR<1>
14	Ground	40	-DB<0>
15	Ground	41	-DB<1>
16	Ground	42	-DB<2>
17	TERMPWR	43	-DB<3>
18	TERMPWR	44	-DB<4>
19	Not connected	45	-DB<5>
20	Ground	46	-DB<6>
21	Ground	47	-DB<7>

TABLE 1-6   68-Pin SCSI Connector Pinout *(Continued)*

Pin	Signal Name	Pin	Signal Name
22	Ground	48	-PAR<0>
23	Ground	49	Ground
24	Ground	50	TERM.DIS
25	Ground	51	TERMPWR
26	Ground	52	TERMPWR
53	Reserved	61	-SEL
54	Ground	62	-CD
55	-ATN	63	-REQ
56	Ground	64	-IO
57	-BSY	65	-DB<8>
58	-ACK	66	-DB<9>
59	-RST	67	-DB<10>
60	-MSG	68	-DB<11>

Note – All signals shown in Table 1-6 are active low.

1.7.1   SCSI Implementation

- Single-ended
- 16-bit (wide SCSI) with parity
- 20 MBytes/sec Fast Wide SCSI
- Supports 16 SCSI addresses:

    - Target 0–6 and 8–F for devices
    - Target 7 reserved for SCSI host adapter on main-logic board
- Supports up to 3 internal SCSI drives:

    - SCSI disk drive target 0 (lower drive slot)
    - SCSI disk drive target 1 (upper drive slot)
    - SCSI CD-ROM drive target 6 *or* SCSI tape drive target 5
- External 8-bit and 16-bit SCSI devices supported via 68-pin SCSI connector

1.7.2   SCSI Cabling and Configuration

When mixing 8-bit and 16-bit SCSI devices on the same physical SCSI bus, follow these cabling and configuration guidelines to insure proper device addressing and operation:

- If all external mass storage devices use 68-pin connectors, connect all non-Sun devices to the Ultra 1 Creator Series system first and follow them with Sun devices. Sun devices use autotermination.

- If external mass storage devices consist of 68-pin Sun devices and 50-pin devices, connect the Sun 68-pin devices to the Ultra 1 Creator Series system first and terminate the daisy chain with the 50-pin device and its terminator.

See FIGURE 1-8 for a summary of cabling and configuration guidelines.
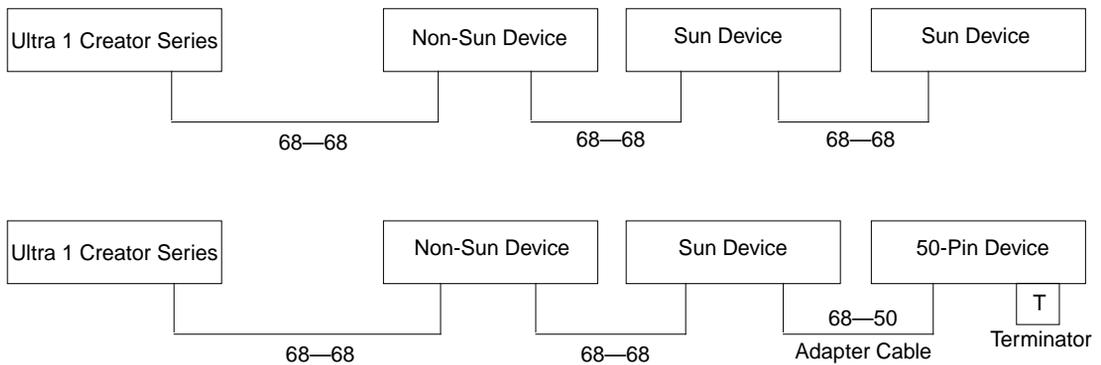
FIGURE 1-8   Connecting External Mass Storage Devices

1.8   Audio Ports
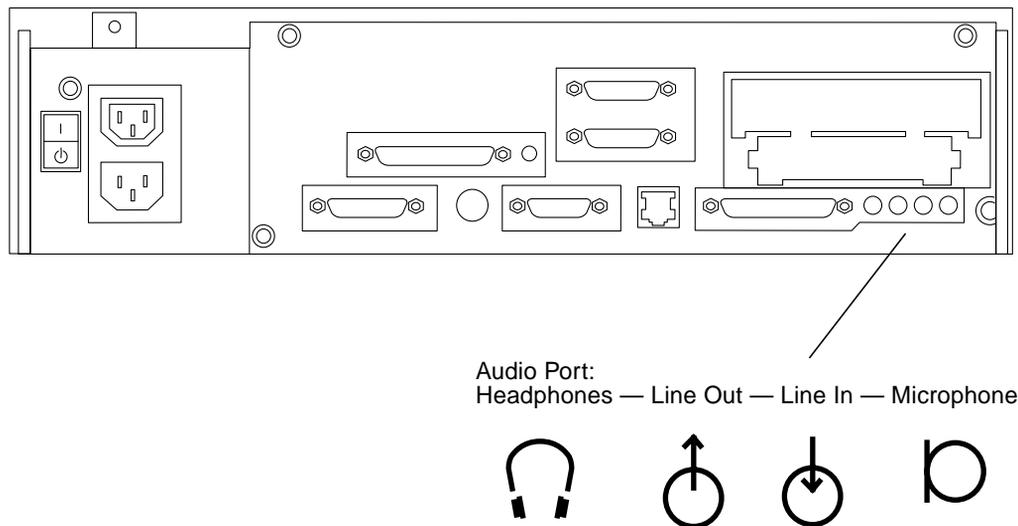
FIGURE 1-9   Audio Port Locations

All audio ports use EIA standard 3.5-mm/0.125-inch jacks.

TABLE 1-7   Audio Port Signals

	Headphones	Line Out	Line In	Microphone
Tip	Left Channel	Left Channel	Left Channel	Left Channel
Ring (Center)	Right Channel	Right Channel	Right Channel	Right Channel
Shield	Ground	Ground	Ground	Ground

TABLE 1-8   Audio Port Functions

Port	Function
Headphones	Connects stereophonic headphones for private listening of audio output

TABLE 1-8   Audio Port Functions

Port	Function
Line Out	Connects the system audio output to an external stereophonic amplifier and loudspeakers
Line In	Connects external stereophonic audio sources such as a compact disc player or cassette tape player to the sytem
Microphone	Connects the SunMicrophone‰ II (or other suitable microphone[1]) to the system

1. The Ultra 1 Creator Series system microphone port accepts stereophonic input; however, the Sun Microphone II is a monophonic device. Note also that the older SunMicrophone is not compatible with the Ultra 1 Creator Series system.

1.9   Audio Specifications

The specifications in TABLE 1-9 assume use of the Audio Tool format setting "CD-ROM or DAT" selected.

The microphone input specifications are for the SunMicrophone II.

TABLE 1-9   Audio Inputs and Output

Stereo I/Os	Specifications
Line In	2V typical, 4V max.; 5–50W impedance
Frequency Response	20 Hz-17 kHz ±0.5 dB
Internal CD Input	
Input Level	0.1 Vrms typical at 10 kW; 2Vpp max.
Distortion	0.01%, typical at 1 kHz
S/N Ratio	84 dB, typical IEC 179 A-weighted
Frequency Response	20 Hz-17 kHz +/- 0.5 dB
Microphone Input	15 mV typical, 0.6-1.0 kW impedance;
	+5 VDC input bias via a 2.2kW resistor
Headphones Output	1V typical, 2.4V max.; 16W-1kW impedance
Line Out	1V typical, 2.4V max.; 5-50 kW impedance

TABLE 1-10 Internal Monaural Speaker Specifications

Speaker	Specifications
Power Output	1.5W ave., 3W peak
Distortion	0.02%, typical at 1 kHz
Impedance	16W ± 20%
Frequency Response	150 Hz-17 kHz ± 0.5 dB

1.10 Graphics Card 13W3 Video Connector
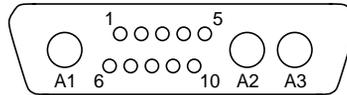
FIGURE 1-10 13W3 Video Connector

The graphics card for your system provides the 13W3 video connector for transmitting video output signals from the system unit to the monitor.

See TABLE 1-11 for 13W3 video connector pinouts.

TABLE 1-11 13W3 Video Connector Pinouts

Pin	Function	I/O	Level
A1	Red	O	Analog
A2	Green	O	Analog
A3	Blue	O	Analog
1	Serial Read		TTL
2	Vert Sync	O	TTL
3	Sense <0>	I	TTL
4	Ground		GND
5	Comp Sync	O	TTL
6	Horiz Sync	O	TTL
7	Serial Write		TTL

TABLE 1-11   13W3 Video Connector Pinouts

Pin	Function	I/O	Level
8	Sense <1>	I	TTL
9	Sense <2>	I	TTL
10	Ground		GND

10BASE-T Twisted-Pair Ethernet Link Test

Read this chapter if you are connecting your Ultra 1 Creator Series system to a 10BASE-T twisted-pair Ethernet (TPE) network. This chapter contains important information for getting your system to communicate correctly over a TPE network. If you have no experience with TPE networks, ask your system or network administrator to perform the procedures in this chapter.

Note – This chapter does not apply to 100BASE-T networks. In such networks, the link test function must be enabled at both the host and the hub. If your host is connected to a 100BASE-T network, you must not disable the host link test function.

2.1 Overview

- The twisted-pair Ethernet link integrity test is a function defined by the IEEE 802.3 10BASE-T specification.

- For a networked workstation (host) to communicate with a network hub, the link test state (enabled or disabled) must be the same on the host and hub.

- If either the host or hub does not share the link test enabled/disabled state of the other, then the host cannot communicate effectively with the hub, and the hub cannot communicate effectively with the host.

FIGURE 2-1 gives an example of a star configuration local area network (LAN), showing the relationship of hosts to a hub.

FIGURE 2-2 shows the importance of ensuring that the host and hub link test settings match in a 10BASE-T network.

Ultra 1 Creator Series (Host)
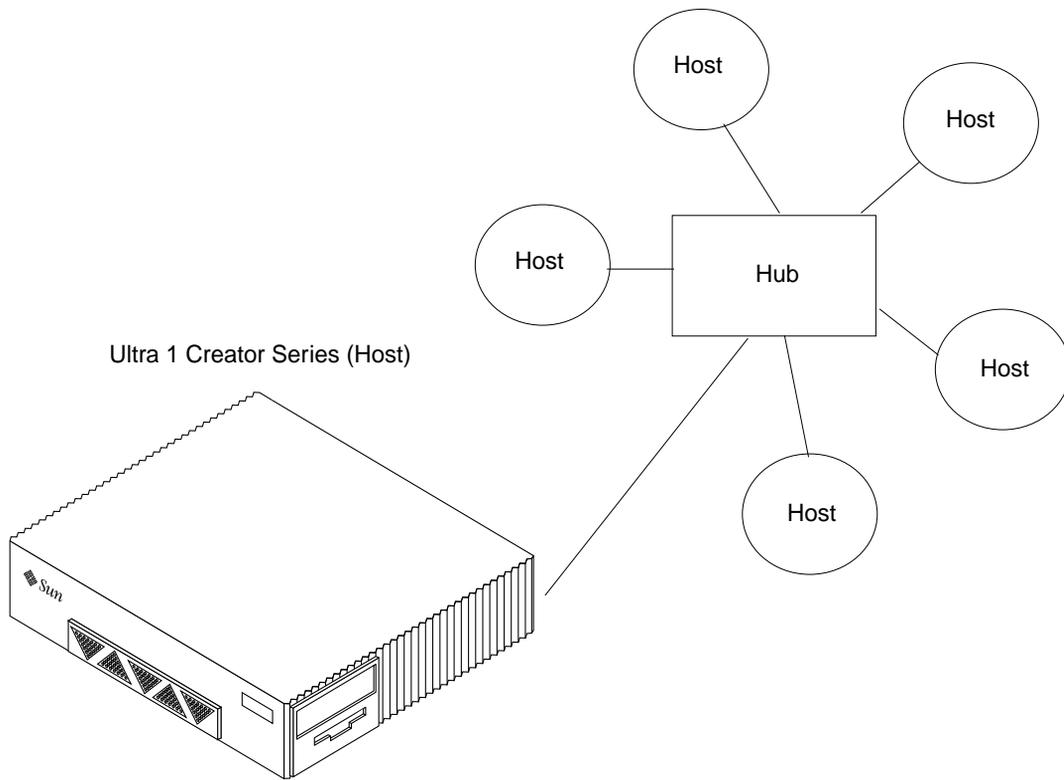
FIGURE 2-1   Hosts and Hub in a Local Area Network
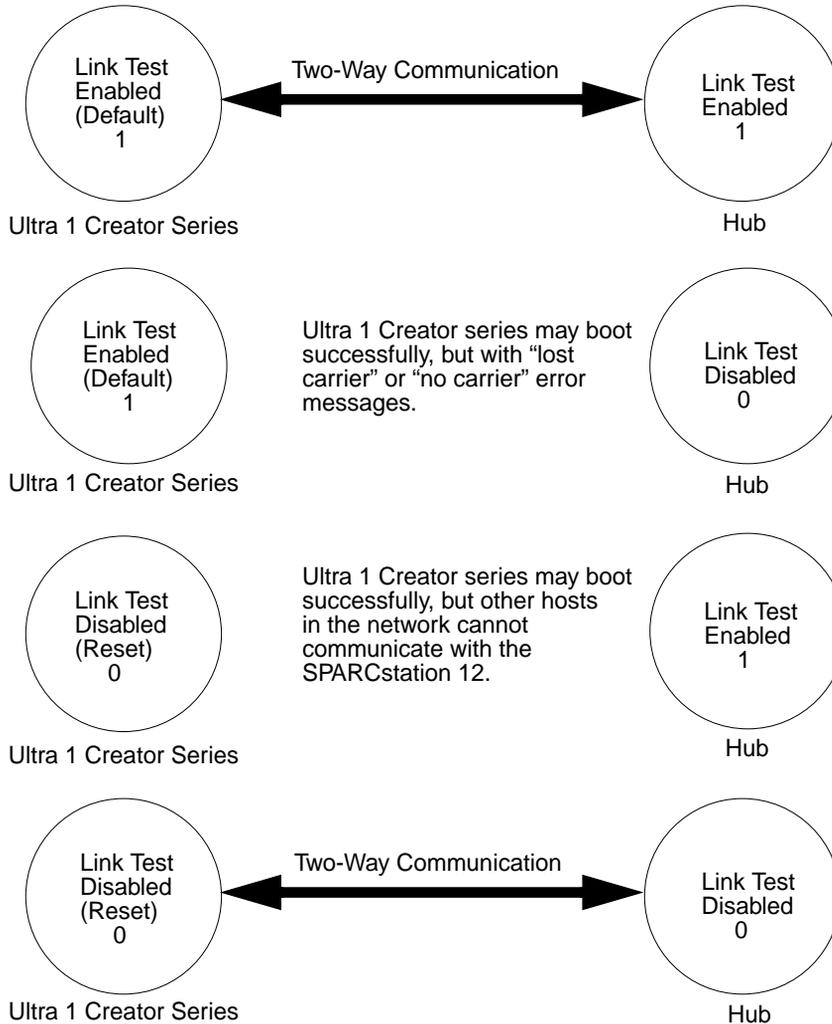
FIGURE 2-2   Ensuring Host-Hub Communication in a 10BASE-T Network

2.2   Technical Discusssion

The twisted-pair Ethernet link integrity test determines the state of the twisted-pair cable link between the host and the hub in a network. Both the host and hub regularly transmit a link test pulse. When either the host or hub has not received a

link test pulse within a certain amount of time (50–150 ms), it makes the transition from the link-pass state to the link-fail state and remains in the link-fail state until it once again receives regular link test pulses.

The link integrity test is specific to twisted-pair Ethernet and is not applicable to the other physical layer implementations of IEEE 802.3 such as 10BASE5 ("thicknet") or 10BASE2 ("thinnet").

The link test function at the host or hub is either enabled (link test enabled or 1) or disabled (link test disabled or 0). The IEEE 802.3 10BASE-T specification requires that the link test be enabled at both the host and the hub.

Although link test disabled does not conform to the specification, it is often encountered in real-world 10BASE-T installations. Some hubs from various vendors can exhibit any of the following:

■ Link test is "hardwired" enabled—link test is always enabled.

■ Link test is "hardwired" disabled—link test is always disabled.

■ Link test is configurable—the network administrator may enable or disable link test.

2.3 Troubleshooting

If you have connected an Ultra 1 Creator Series host to a hub using twisted-pair Ethernet cable and observe either "no carrier" messages or fail to communicate effectively with another host in the same network, look first at the hub. If it supports configurable link test, then make sure "link test enabled" is configured. This is usually done by setting a hardware switch.

If the hub does not support configurable link test, then refer to the hub manufacturer's documentation. Check to see if your hub is hardwired for link test disabled. If it is, you must follow the "Checking or Disabling the Link Test" procedure elsewhere in this chapter to disable the link test at your Ultra 1 Creator Series host.

2.4 Moves and Changes

If the Ultra 1 Creator Series host is physically moved to another network location or if the hub is reconfigured, remember to refer back to FIGURE 2-2. Unless the new network relationship between the host and the hub is functional (that is, 1-1 link test enabled-link test enabled or 0-0 link test disabled-link test disabled), there will be no full, regular two-way communication between the host and the hub.

2.5 Checking or Disabling the Link Test

To check the link test state of a Ultra 1 Creator Series host:

1. **If you do not see the** ok **prompt, press the Stop (L1)-a keys.**

2. **At the** ok **prompt, type:**

```
ok printenv tpe-link-test?
tpe-link-test?         true                    true
ok
```

The above screen shows the current link test state (true, or enabled), followed by the default state (true, or enabled).

To disable the host's link test function:

1. **Type the following commands:**

```
ok setenv tpe-link-test? false
tpe-link-test? =    false
ok reset-all
```

2. **Boot the host and verify that the transceiver cable problem messages do not appear. Type either** boot net **or** boot disk **and press Return.**

2.6   Enabling the Link Test

1. **If you do not see the** ok **prompt, press the Stop (L1)-a keys.**

2. **At th**e ok **prompt, type:**

```
ok printenv tpe-link-test?
tpe-link-test?        false                true
ok
```

The above screen shows the current link test state (false, or disabled), followed by the default state (true, or enabled).

1. **To enable the host's link test function, type the following commands:**

```
ok setenv tpe-link-test? true
tpe-link-test? =    true
ok reset-all
```

2. **Boot the host and verify that the transceiver cable problem messages do not appear. Type either** boot net **or** boot disk **and press Return.**

CHAPTER **3**

Modem Setup Specifications

3.1   Setting Up the Modem

Any modem compatible with U.S. Robotics' or CCITT V.24 can be connected to the
Ultra 1 Creator Series serial ports. Modems can be set up to function in one of three
ways:

■ Dial out only
■ Dial in only
■ Bidirectional Calls

To set up your modem:

1. **Become superuser. Type** `admintool`.

```
% su
Password:
# admintool
```

2. **Highlight** `Browse`.

3. **Select** `Serial Port`.

4. **Select Port A or Port B for your modem connection.**

5. **Select** `Edit`.

6. **Select** `Expert`.

7. **Open the** `Use Template` **menu, and select one of the following:**

     `Modem- Dial-Out Only`

     `Modem- Dial-In Only`

   `Modem - Bidirectional`

8. **Select** `Apply`.

9. **Set your modem auto-answer switch to one of the following:**

    For Dial-Out Only, set the switch to Off.

    For Dial-In Only, set the switch to On.

    For Bidirectional, set the switch to On.

3.2   Serial Port Speed Change

You must edit the `/etc/remote` file to change the speed of a serial port.

1. **Become rootsuperuser, and type** `cd /etc`.

```
% su
Password:
# cd /etc
```

2. **Type** `vi remote`.

3. **Type** `tip` *speed*   *device-name* .

    Typical speeds are 9600, 19200 to 38400 bps. The device name is the serial port name
    — for example, `/dev/tty[a,b]` or `/dev/term/[a,b]`.

4. **Press Esc and type** `:wq` **to save your file change(s) and to exit from the** `vi` **text
    editor.**

3.3   Recommendations

3.3.1   Cable

For a modem-to-host (system) connection, use an RS-423/RS-232 straight-through
cable with DB-25 male connectors at both ends.

3.3.2   Modem Switch Settings (AT Commands)

- Enable transmit flow control (AT&H1) [suggested setting] (Required for sending binary/8-bit data)
- Set link rate to fixed (Will not track modem data rate, AT&Bn; n = menu choice in modem manual.)
- Set display result codes (ATQ0)
- Set verbal result codes (ATV1)
- Set result code subset (ATXn; n = option choice)
- Save settings in NVRAM (AT&W)

Note – The above settings are guidelines to help you get started quickly. Changes to these guidelines should be expected depending on your site requirements and the modem you are using.

For additional information about modem switch settings, see the manual that came with your modem.

Main Logic Board Jumpers

Jumper settings given in this chapter refer to etchings on the main logic board. Jumpers are labeled with the letter "J" followed by a four-digit number. See FIGURE 4-1.
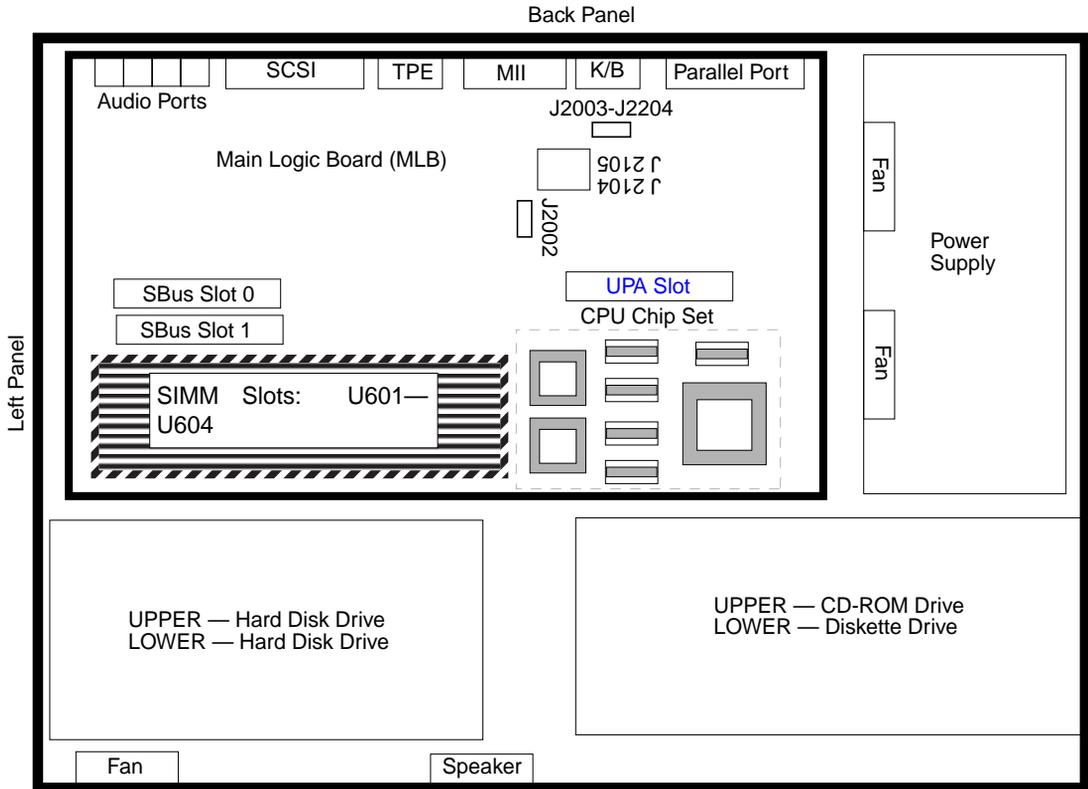
FIGURE 4-1   Jumper Locations on the Main Logic Board

4.1 Identifying Jumpers

Jumpers are marked on the main logic board with part numbers. For example, the serial port jumpers are marked J2104 and J2105. Jumper pins are located immediately adjacent to the part number. Pin 1 is marked with an asterisk in any of the positions shown. See FIGURE 4-2.

FIGURE 4-2   Identifying Jumper Pins

4.2 Flash PROM Jumpers

The Ultra 1 Creator Series system uses flash PROMs. Flash PROMs permit the following:

- Reprogramming of specific code blocks
- Remote reprogramming of the PROM chip by a system administrator over a local area network

The default shunt setting of J2002 is on pins 1 and 2. This selects the flash PROM chip as the controlling firmware device. See TABLE 4-1.

The default shunt setting of J2003 is on pins 1 and 2. This disables the flash PROM chip from being reprogrammed. Placing the shunt on pins 2 and 3 enables reprogramming of the flash PROM chip.

Note – If you are reprogramming your system flash PROM, after successful reprogramming be sure to return the flash PROM Write Protect/Enable jumper (J2003) to the Write Protect position to increase system security.

TABLE 4-1   Flash PROM Jumper Settings

Jumper	Pins 1 + 2 Select	Pins 2 + 3 Select	Default Jumper on Pins	Signal Controlled
J2002	Flash PROM	Not To Be Used	1 + 2	FLASH PROM SEL
J2003	Write Protect	Write Enable	1 + 2	FLASH PROM PROG ENABLE
J2204	High Half Booting	Normal Booting	2 + 3	XOR LOGIC SET

For flash PROM reprogramming information and the function of J2204, see the *SMCC System Flash PROM Programming Guide*.

4.3   Serial Port Jumpers

The serial port jumpers on the main logic board permit configuring the two DB-25 serial ports on the system unit back panel for either RS-423 or RS-232 signal levels. RS-423 levels are the default standard for North American users. RS-232 levels are required for digital telecommunication in nations of the European Community.

TABLE 4-2   Serial Port Jumper Settings

Jumper	Pins 1 + 2 Select	Pins 2 + 3 Select	Default Jumper on Pins	Signal Controlled
J2104	RS-232	RS-423	2 + 3	RS232/RS423 SEL
J2105	RS-232	RS-423	2 + 3	RS232/RS423 SEL

System Specifications

5.1 Power

TABLE 5-1 Power Specifications

Input/Output	Specifications
AC Power Input	100-240 VAC nominal, 47–63 Hz.
DC Power Output	180 W maximum

5.2 Environment

The following specifications comply with the *International Electrotechnical Commission (IEC) Standards*, 5th ed., 1990-1994.

See TABLE 5-2.

TABLE 5-2 Environmental Specifications

Operating	
Altitude	0 to 3000 meters (0 to 9840 feet), 5C to 35C (41F to 95F)—IEC 68-2-40, 68-2-41
Humidity	20% to 80% Relative Humidity (RH), noncondensing—IEC 68-2-2, 68-2-3
Shock	5 gravity (g) peak, 11 milliseconds half-sine pulse—IEC 68-2-27
Vibration	0.1 g peak, 5 to 500 Hz, 3 perpendicular axes—IEC 68-2-26

TABLE 5-2   Environmental Specifications *(Continued)*

Operating	
Temperature	5C to 40C (41F to 104F) at 20%–70% RH noncondensing—IEC 68-2-1, 68-2-2
Nonoperating	
Altitude	0 to 12,000 meters (0 to 39,360 feet), 0C to 10C (32F to 50F)—IEC 68-2-40, 68-2-41
Humidity	0%-95% RH, noncondensing—IEC 68-2-2, 68-2-3
Shock	30 g peak, 11 milliseconds half-sine pulse
Vibration	1 g peak, 5 to 500 Hz, 3 perpendicular axes—IEC 68-2-6
Temperature	–40C to 65C (-40F to 149F) at 0%-95% RH, noncondensing—IEC 68-2-1, 68-2-2

5.3   Physical Specifications

TABLE 5-3   Dimensions and Weight

Height	Width	Depth	Weight*
10.15 cm (4.00 in.)	41.7 cm (16.44 in.)	44.3 cm (17.44 in.)	12.25 kg (27.0 lb)

Note – *These weight figures are approximations for a system equipped with two hard disk drives, one CD-ROM drive, and three SBus cards.

TABLE 5-4   Physical Clearances

Clearance	Specification
Compact Disc∕ Diskette	16.51 cm (6.5 in.)
System Unit Parallel Placement	17.6 cm (3.0 in.)[1]

1. Physical space between two system units side by side

5.4   Memory Mapping

Single Inline Memory Modules (SIMMs) are grouped on the main logic board in banks of two slots each. SIMMs are installed in identical pairs per bank.

TABLE 5-5   Main Logic Board Memory Mapping

Bank	Slots
0	U0701 + U0601
1	U0702 + U0602
2	U0703 + U060
3	U0704 + U0604