TABLE OF CONTENTS

DESCRIPTION -

This document contains highlights of the vendor documentation for parts of the operator workstation which includes both the table and computer cabinet.

1- HAYES MODEM

- If the Modem lights are not lit...

If the modem light are not lit, plug the modem into another outlet to check power. If this problem occurs with a previously working modem, your modem may have been damaged by a power surge over the electrical or telephone line.

- If the RD and/or SD lights come on or are flashing...

Your modem cable may be damaged. Turn the modem off, disconnect the modem cable, and turn the modem cable back on. If the RD or SD light is still on replace modem.

- If the CD or HD light remains on ...

If the CD or HD light remains on after you have disconnected, replace Modem.

- If the modem will not connect over the line to another modem...

Check the modem and the telephone connections, then try dialing the number on your phone. If you hear a high pitched whistle, then another modem is answering the call, the modems may be having trouble negotiating.

- If the modem will not answer an incoming call...

Auto answer may not be enabled, call the online center.

- If the modem disconnects unexpectedly...

Try dialing the number again. Also check for loose connections between the modem and computer or between the modem and telephone. If the connections seem secure, you may have had a bad connection. Try again.

2- BIT 3 BUS TO BUS ADAPTER

Bit 3 Fiber-Optic Interfaces are available in two- and four- cards and modules. Each card or module is one half of a two Interface high performance fiber-optic link between two Bit 3 Adapter cards. Fiber-Optic cable lengths to 2 kilometers (km) are supported.

Model 400-60 are external Fiber-Optic Interface Modules with a chassis, power supply and installed fiber-optic interface card. Bit 3 Fiber-Optic Interface Modules can be used with any Bit 3 Adapter to interconnect two computer systems via fiber-optic cable.

Bit 3's Fiber-Optic Interfaces convert the signals that are normally sent over wire cable to light signals that travels over fiber-optic cables. Because of the inherent capabilities of the fiber-optic cable, the distance between the two computer chassis that are linked by a bit 3 Adapter is greatly extended without impact on the data to be transferred. In addition to extending the distance between chassis, the Fiber-Optic Interfaces provide virtual immunity to the electromagnetic interference.

Fiber-Optic Interface work transparently with Bit 3 Adapter. With Fiber-Optic Interfaces installed, Adapter cards in the chassis at either end of the cable are able to detect if at all cables are present and if the adapter card at the opposite end of the link is powered up.

Direct Memory Access (DMA) data transfers are supported by the Fiber-Optic Interfaces.

In most cases the Fiber-Optic Interfaces require no additional software support beyond that required by the Bit 3 Adapter.

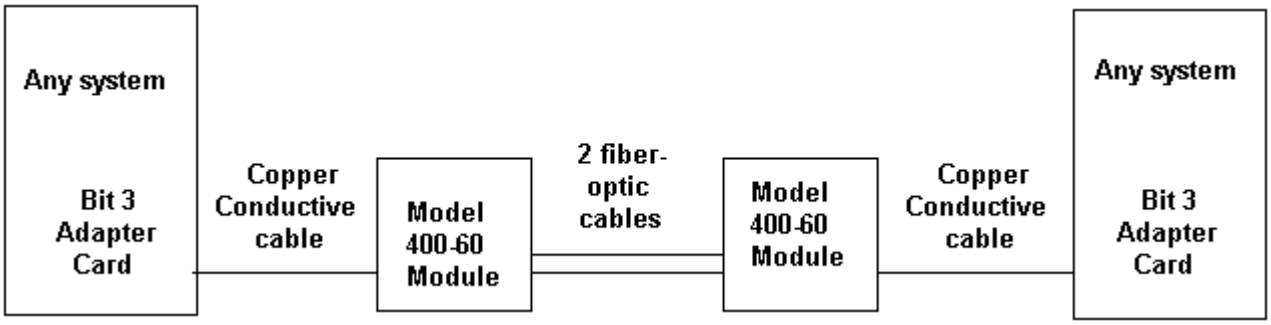
Two Fiber-Optic Interfaces and a Bit 3 Adapter (includes two Adapter cards) are required for a functional link.

Model 400-60 (four Fiber) Modules can link any two Bit 3 Adapter cards.

Model 400-60 Fiber-Optic Interfaces support two duplex fiber-Optic cables for higher data transfer speed and optimal performance. Two duplex fiber-optic cables provide two paths for transmitted data and two for receive data.

The four-fiber models, effectively support Adapters, such as Models 467-1, 477-1, 487-1, 497 and 413-1, that allow high-speed DMA Burst Mode data transfers for applications requiring above 15M Bytes/sec.

2-1 Configuration



BIT 3 ADAPTER WITH FIBER-OPTIC INTERFACE MODULES

ILLUSTRATION 2-1

2-2 Card Specifications

- Transfer Rate: Model 400-60 30M Bytes/sec.
- LED's

Each Fiber Optic Interface Card and Module has two LED status indicators: READY and ACTIVE, READY is lit after the power-up sequence has completed successfully and the Interface is ready to transmit or receive data. ACTIVE is lit when a fiber-optic data transfer is in progress.

Chassis Dimensions:

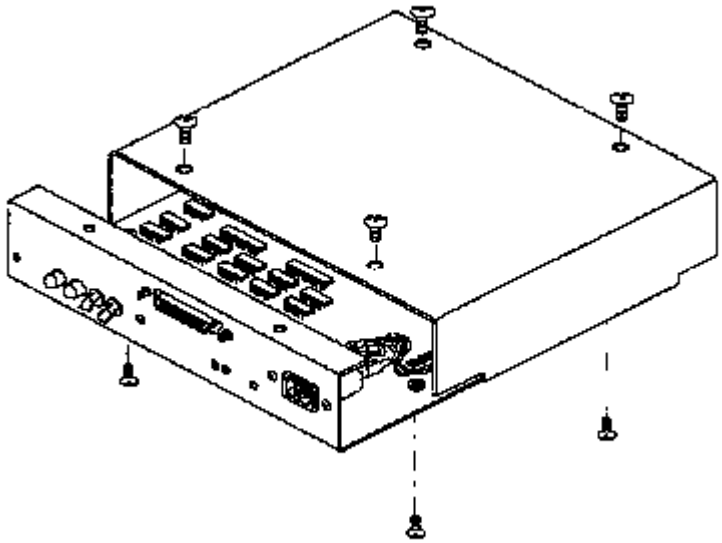
Height 2.5 inches
width 12.0 inches
Depth 10.0 inches

2-3 Hardware Configuration:

To configure Fiber-Optic Interface Modules

1. Turn power switch to off and detach power cord from Fiber-Optic Interface Module chassis.

2. Remove the screw that secure the chassis cover to the base (four on chassis top and four on the bottom). Refer to illustration 2-2

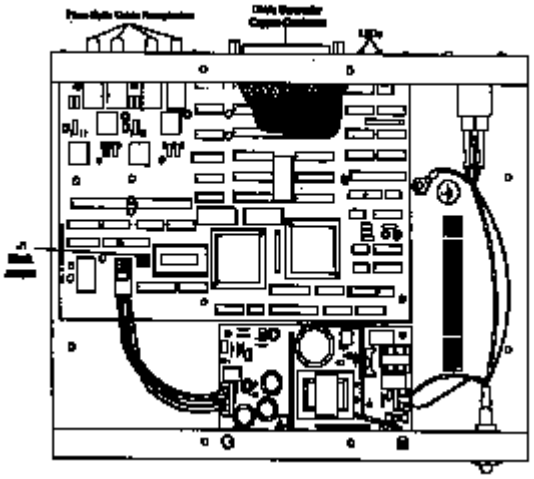


FIBER-OPTIC INTERFACE MODULE
ILLUSTRATION 2-2

3. Remove cover and set aside.

2-3 Hardware Configuration: (continued)

4. Locate jumper block J1 on the Interface card (see Illustration 2-3).



FIBER-OPTIC INTERFACE MODULE LOCATION OF JUMPER BLOCK J1,CABLE CONNECTORS & LEDS
ILLUSTRATION 2-3

5. Jumper block configuration:

   - Jumper 1: must always be in the on position. This jumper is reserved for future use.

   - Jumper 2 : (the Adapter Select Jumper): The position of this jumper is determined by the Bit 3 Adapter with which the Fiber-Optic Interface is used.

   - Jumper 3: Selects the error checking mode.

   - Setting jumper 3 to the on position enables, Enhanced Error Checking.

   When configured for the enhanced Error Checking, two error checking circuits are operational. One circuit relies on 4B/5B and 5B/6B data encoding to detect errors. Each data word is encoded before transmission. Upon reception, the code is checked against a list of valid codes. All invalid codes are flagged as errors. Although use of this error checking circuit is fast and provides invalid code detection, it cannot detect errors that cause a valid code to transform into other valid codes.

   Additional enhanced error checking, is provided by a second error checking circuit. This second circuit uses a cyclical redundancy check (CRC) algorithm that can detect errors that corrupt a valid code into other codes. The CRC checker provides enhanced error detection: however the additional overhead required reduces performance.

   Setting jumper 3 to the OFF position enables BASIC ERROR CHECKING.

   Basic error checking bypasses the CRC checker and uses the code checker (the first error checking circuit); consequently, higher performance is achieved.

6. Replace the chassis cover and screws.

2-4 Performance Notes

2-4-1 Introduction

This chapter describes the effects of the Fiber-Optic Interface on the Bit 3 Adapter cards to which they are connected. In all cases, the performance figures below apply only to the Fiber-Optic Interfaces.

2-4-2 Fiber-Optic Interface Performance

Fiber-Optic Interfaces are functionally transparent to the operation of the Bit 3 Adapter. The Interface, however affects Adapter throughput. Both transfer rate and latency are affected.

Transfer rate refers to the sustained DMA throughput the Fiber-Optic Interface is capable of supporting. The larger the block of data transmitted, the closer throughput will be to the transfer rate. However, since the DMA data received by the Fiber-Optic Interface are always accompanied by the header information, actual data throughput in an application is always slightly less than the maximum hardware transfer capability.

Latency refers to the additional time required to complete any transfer, either random access or DMA, over and above the time required by the adapter with no Fiber-Optic Interface. For example, a random access read take an average of 1.6 microseconds longer (Basic Error Checking) with the Fiber-Optic Interface Installed.

The performance statistics below include two sets of figures for each Fiber-Optic Interface Module: Basic Error Checking and Enhanced Error Checking.

2-4-3 Four Fiber Performance

- Basic Error Checking
  - Transfer rate up to 30M Byte/sec.
  - Latency: (minimum) 1.5 microseconds
    (Average) 1.6 microseconds
    (maximum) 1.7 microseconds
- Enhanced Error Checking
  - Transfer rate up to 30M Byte/sec.
  - Latency: (minimum)1.8 microseconds
    (Average)1.9 microseconds
    (maximum)2.0 microseconds

2-4-4 Cable Length Effects

It takes approximately 5 nanoseconds for a signal to travel down one meter of Bit 3 Fiber-optic cable. As a result, approximately 10 nanoseconds of round trip latency is added for each meter of fiber-optic cable used. For example it takes approximately 1 microsecond longer to complete a random access read using a 105 meter cable than it would using a five meter cable.

2-5 Glossary

Bit: a single digit in a binary number (0 or 1).

Byte: 8 bits

CRC: Cyclical Redundancy Check. An error checking technique used to ensure the accuracy of transmitting digital code over a communications channel. Transmitted messages are divided into predetermined lengths that are divided by a fixed divisor. The remainder of the calculation is appended onto and sent with the message. At the receiving end the computer recalculates the remainder. It doesn't match the transmitted remainder, an error is detected.

DMA: Direct Memory Access Transfers. The adapter may be programmed to transfer large blocks of data across the cable to or from the remote chassis, rather than the requiring a processor or move data.

km: Kilometer ; 1000 meters; 3,280.8 feet.

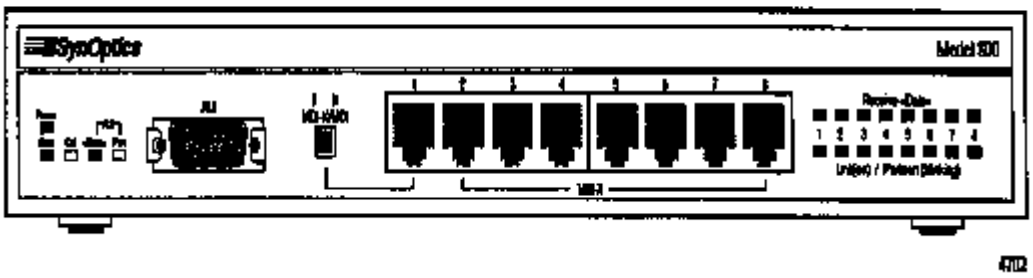
M Byte: Megabyte. Two to the twentieth power (exactly 1048,576) bytes.

3- ETHERNET HUB MODEL 800

This section describes the Model 800 hub LED indicators and functions, and provides you with information about the hub ports, their connectors, and pin assignments.

3-1 LED Indicators

The Model 800 hub has two sets of LED indicators on the front panel. The LED's on the left side of the hub indicate the overall status of the hub (such as whether or not it is receiving power) and the status of the AUI port. The LED's on the right side of the hub provide status information about the 10BASE-T ports. During the power-up sequence, all LEDs flash for approximately two seconds while the hub performs a lamp test. See Illustration 3-1.



HUB FRONT PANEL
ILLUSTRATION 3-1

3-2 AUI Port

The following are the AUI connector, and pin assignments. See Table 3-1.

TABLE 3-1
AUI PORT PIN OUT

Pin	Signal Name
1	Ground
2	CI-A
3	DO-A
4	Ground
5	DI-A
6	+ 12-VDC Return
7	(Not connected)
8	(Not connected)
9	CI-B
10	DO-B
11	Ground
12	DI-B
13	+12 VDC
14	Ground
15	Ground

3-3 10BASE-T Ports

The following table shows the Model 800 RJ-45 port, its connector, and pin assignments. Each of these eight shielded RJ-45 jacks is 10BASE-T port using the standard media-dependent interface with internal crossover (MDI-X) pin assignment shown in the following table. Each port detects the polarity of the circuit connected to RD pins and adjust polarity as necessary to correctly complete this circuit. See Table 3-2.

TABLE 3-2
10 BASE-T PORTS

Pin no.	MDI-X Signal (function)	MDI Signal (function)
1	RD + (Receive from UTP wire)	TD + (Transmit to UTP wire)
2	RD - (Receive from UTP wire)	TD - (Transmit to UTP wire)
3	TD + (Transmit to UTP wire)	RD + (Receive from UTP wire)
4	Not used by 10BASE-T	Not used by 10BASE-T
5	Not used by 10BASE-T	Not used by 10BASE-T
6	TD - (Transmit to UTP wire)	RD + (Receive from UTP wire)
7	Not used by 10BASE-T	Not used by 10BASE-T
8	Not used by 10BASE-T	Not used by 10BASE-T

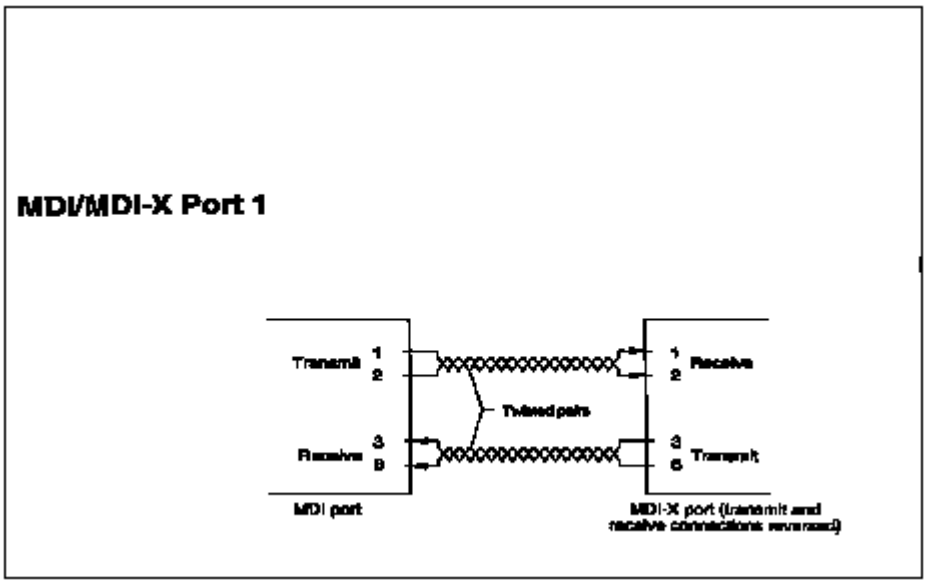
3-4 MDI/MDI-X Port 1

Model 800 hubs can switch 10BASE-T port 1 transmit and receive pins between MDI and MDI-x configurations. An MDI port transmits on RJ -45 pins 1 and 2 and receives on RJ-45 pins 3 and 6.

Ports 2 through 8 are fixed as MDI-X ports, but port 1 can be set as MDI or MDI-X using the MDI-x/MDI switch on the front panel:

- Press in the MDI-X/MDI switch to set port 1 to MDI-X configuration.
- Pop out the MDI-X/MDI switch to set port 1 to MDI configuration.

Illustration 3-2 shows MDI /MDI-X switch in both positions.



MDI AND MDI-X TRANSMIT AND RECEIVE PIN INTERNAL CROSSOVER
ILLUSTRATION 3-2

This feature allows you to conveniently connect the hub to another hub directly through their RJ-45 connectors. You can use a standard straight through UTP cable between port 1 (set to MDI) and an MDI-X 10BASE-T port on another hub. A crossover cable (nonstandard) is required to connect the hubs directly (MDI-X port to MDI-X port) through UTP cable.

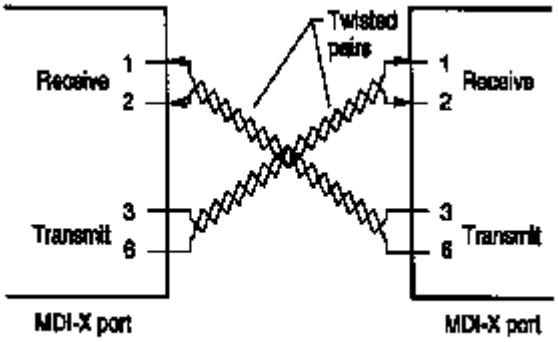
3-4 MDI/MDI-X Port 1 (continued)

Two rules govern all usual RJ-45 connections from port to port on another devise.

- A straight through cable (MDI to MDI-X as shown in Illustration 3-3 is customarily used for connection to a workstation adapter card or transceiver.

MDI/MDI-X SWITCH POSITIONS
ILLUSTRATION 3-3

- A crossover cable or adapter can be used for directly cabling an MDI-X port on a hub to an MDI-X port on another device See Illustration 3-4.



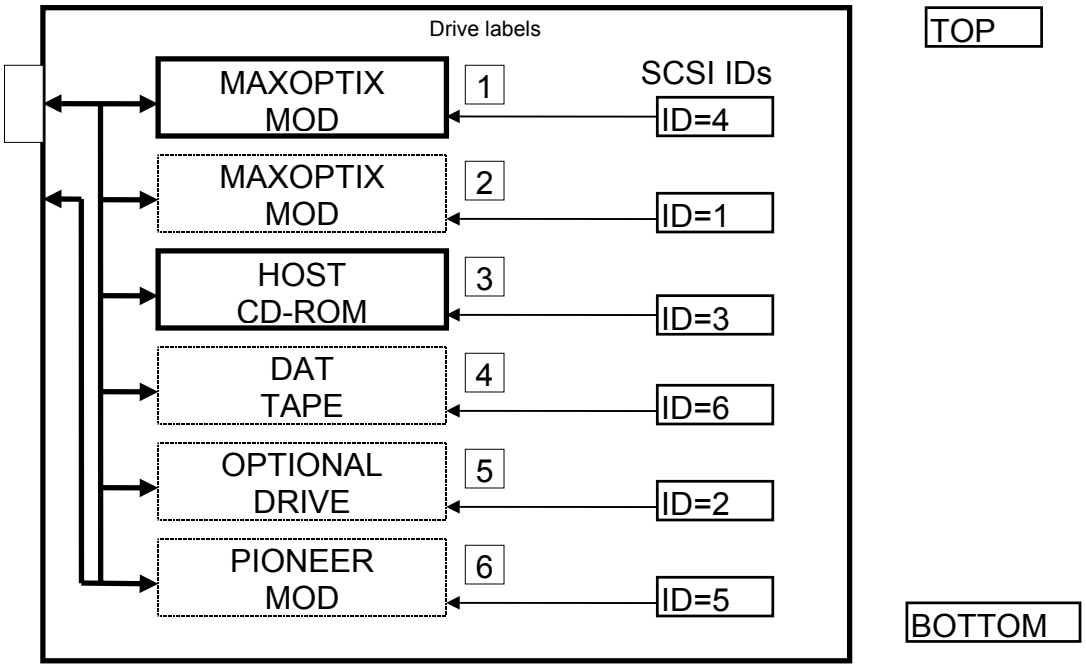
MDI-X TO MDI-X EXTERNAL
ILLUSTRATION 3-4

4- SCSI EXPANSION

The SCSI Expansion box interconnects all the SCSI peripherals used in the system. The box is defined to accommodate up to six peripheral devices. Currently the system will ship with two. Refer to Illustration 4-1.

Note

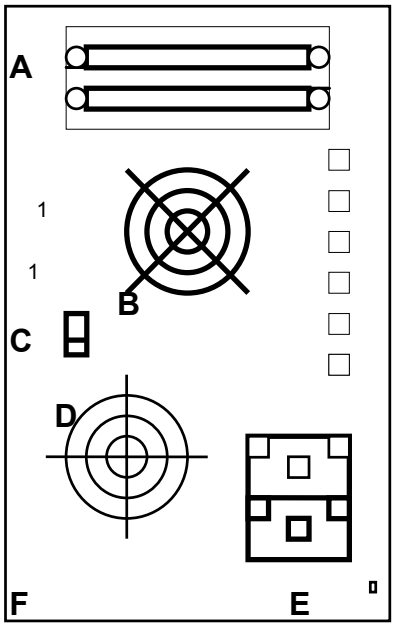
The dashed boxes are optional drives that can be installed in the field.



SCSI EXPANSION BOX LAYOUT
ILLUSTRATION 4-1

4- SCSI EXPANSION (continued)

Illustration 4-2 shows the rear view of the SCSI Expansion enclosure.



A - Rear I/O Connector Plate with 2 SCSI II female I/O connectors.

B - Fan

C - Filler Plugs

D - On/Off AC Select Switch

E - AC Socket - IEC Type

F - Power Supply Fan

ENCLOSURE REAR VIEW AND DEFINITION
ILLUSTRATION 4-2

4-1 MaxOptic Optical Drive

The Maxoptic Magneto Optical Drive is in slot 4 with a SCSI ID set to 4. The MOD has a capacity of 2.6 GB and a feature half height form factor, random access, and multifunction capabilities.

4-2 Host CD-ROM

The CDROM is at minimum a 12-speed drive and uses a SCSI II interface. The SCSI ID is set to 3. It has a fast 115ms average random seed and a 1,800 KB/sec transfer rate.

5- OCTANE WORKSTATION

The following sections show the pin out assignments for the various connectors on the back of the Octane computer workstation. Also, section 5-3 shows the connectors for the graphics modules located in the XIO modules.

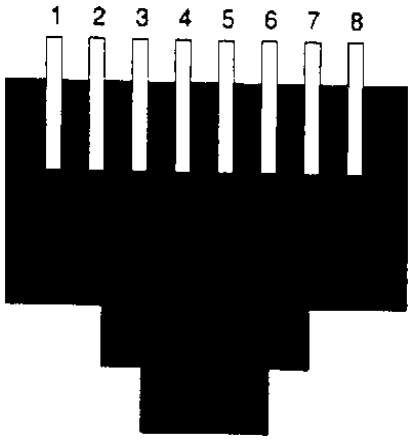
5-1 Serial port

The OCTANE serial ports operate with RS-232 electrical levels with a standard PC pinout. Refer to Table 5-1 for the pin assignments.

TABLE 5-1
SERIAL PORT PINOUT - PC COMPATIBLE

Pin	Assignment	Description
1	DCD	Data Carrier Detect
2	RD	Receive Data
3	TD	Transmit Data
4	DTR	Data Terminal Ready
5	SG	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request to Send

5-2 Ethernet 10-BASE-T



Pin	Assignment
1	Transmit +
2	Transmit -
3	Receive +
4	(Reserve)
5	(Reserve)
6	Receive -
7	(Reserved)

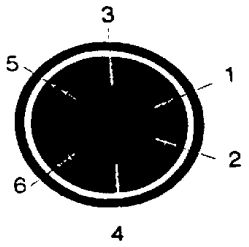
5-3 Ports on XIO Graphics Boards

Table 5-2 shows the pinout assignments for the OCTANE monitor port.

TABLE 5-2
MONITOR PINOUT

Pin	Assignment
A1	Red Signal, Analog
A2	Green Signal, Analog
A3	Blue Signal, analog
1	Monitor ID Bit 3, TTL
2	Monitor ID Bit 0, TTL
3	Composite Sync (Active Low), TTL
4	Horizontal Drive (Active High), TTL
5	Vertical Drive (Active High), TTL
6	Monitor ID Bit 1, TTL
7	Monitor ID Bit 2, TTL
8	Ground
9	Ground
10	Ground

5-4 Keyboard and Mouse



Pin Assignment
Keyboard

1	Keyboard Data
2	(Reserved)
3	Ground
4	Keyboard Power (+5V)
5	Keyboard Clock
6	(Reserved)

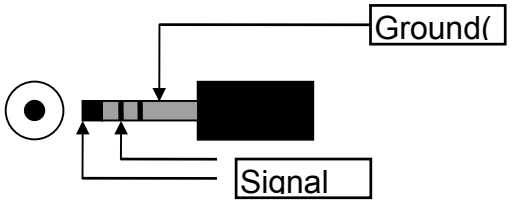
Mouse

1	Mouse Data
2	(reserved)
3	Ground
4	Mouse Power
5	Mouse Clock
6	(Reserved)

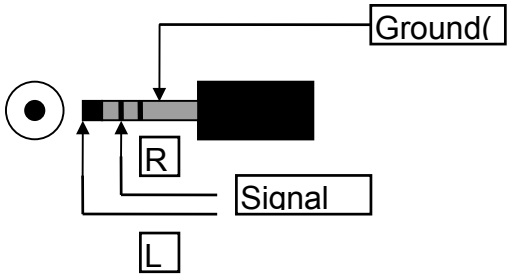
5-5 Audio Ports

The audio ports include: microphone, speaker, analog line level audio, coaxial digital audio, and optical digital audio. Currently the microphone and speaker ports are used.

- Microphone Port



- Speaker Port



5-6 SCSI Port

TABLE 5-3
SCSI PORT PIN ASSIGNMENT

Pin	Assignment	Pin	Assignment	Pin	Assignment	Pin	Assignment
1	Ground	21	Ground	41	DB(1)	61	SEL
2	Ground	22	Ground	42	DB(2)	62	C/D
3	Ground	23	Ground	43	DB(3)	63	REQ
4	Ground	24	Ground	44	DB(4)	64	I/O
5	Ground	25	Ground	45	DB(5)	65	DB(8)
6	Ground	26	Ground	46	DB(6)	66	DB(9)
7	Ground	27	Ground	47	DB(7)	67	DB(10)
8	Ground	28	Ground	48	DB(P)	68	DB(11)
9	Ground	29	Ground	49	Ground		
10	Ground	30	Ground	50	Ground		
11	Ground	31	Ground	51	Termpwr		
12	Ground	32	Ground	52	Termpwr		
13	Ground	33	Ground	53	Open		
14	Ground	34	Ground	54	Ground		
15	Ground	35	DB(12)	55	ATN		
16	Ground	36	DB(13)	56	Ground		
17	Termpwr	37	DB(14)	57	BSY		
18	Termpwr	38	DB(15)	58	ACK		
19	Open	39	DB(P1)	59	RST		
20	Ground	40	DB(0)	60	MSG		

REVISION HISTORY

REV	DATE	AUTHOR	PRIMARY REASONS FOR CHANGE
A	Apr 30, 1998	K. L-P	Initial version