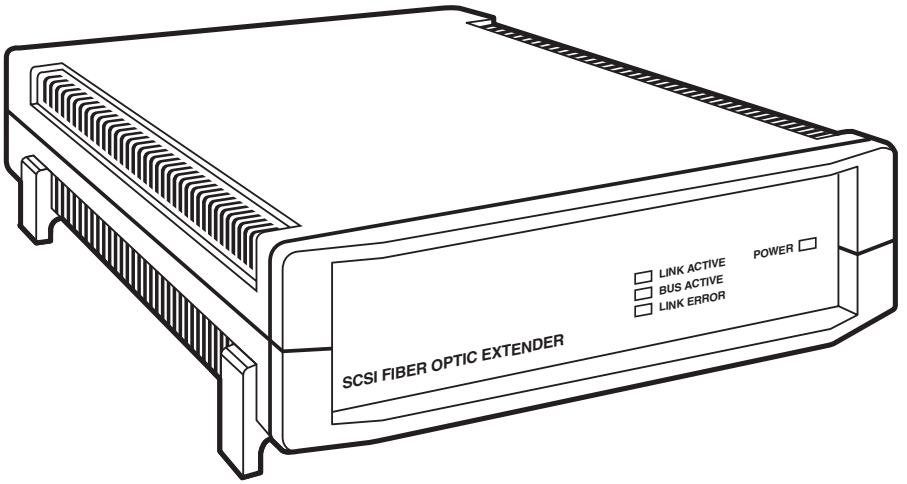
BLACK BOX®
NETWORK SERVICES

MAY 1999
IC507A
IC508A

SCSI Fiber Optic Extenders



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RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

CE

This unit is CE approved.

UL and CUL compliance: This unit complies with UL and CUL standards.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS USED IN THIS MANUAL

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CONTENTS

CONTENTS (Continued)

1. Specifications

1.1 SCSI Interface

1.1.1 Both Units

Speed—Up to 40 MB per second

Protocol—Asynchronous and synchronous compatible

Standards—ANSI X3.131, ANSI X3T9.2, SCSI I, SCSI II, SCSI III

Conversion Delay—SCSI to fiber: 125 ns

Fuse—Resettable internal TERMPWR

Internal Terminator Power—1 amp

1.1.2 SCSI Fiber Optic Extender Single-Ended (IC507A)

Maximum Cable Length—19.7 ft. (6 m)

Internal Bus Termination—Active

Skew Rate—3 ns (max.)

SCSI Connector—68-pin

1.1.3 SCSI Fiber Optic Extender Differential (IC508A)

Maximum Cable Length—82 ft. (25 m)

Internal Termination—Passive

Skew Rate—5 ns (max.)

SCSI Connector—68-pin

1.2 Fiberoptic Interface

Maximum Fiber Cable Length—62.5/125-µm MMF: 700 ft. (220 m); 50/125-µm MMF: 1600 ft. (500 m)

Fiberoptic Serial Data Rate—1.06 GHz

Fiberoptic Connector Type—SC

Optical Wavelength—850 nm

Typical BER (Bit Error Rate)—10^{-14}

Recommended Duplex Cable—62.5/125-µm MMF, 50/125-µm MMF

1.3 Physical

Temperature—32 to 131°F (0 to 55°C)

Relative Humidity—0 to 90%

Power—100 to 240 VAC ±10%, 48 to 65 Hz, 15 W

Size—2.1"H x 6"W x 9.6"D (5.3 x 15.2 x 24.4 cm)

Weight—3 lb. (1.4 kg)

1.4 Approvals

UL, CUL, CE, FCC Class A

2. Introduction

2.1 Description

The SCSI Fiber Optic Extenders let you surpass the distance limitation of a Single-ended or Differential SCSI (Small Computer System Interface) bus. The SCSI bus is one of the most popular interfaces used to connect additional devices to a computer system. With the Extenders, SCSI components such as disk drives, CD-ROM memory systems, RAID arrays, tape backup peripherals, and SCSI laser printers can be located up to 1600 feet (500 m) from the host computer.

Because the Extenders are completely transparent to your SCSI system, additional computer software is not needed for installation or operation.

2.2 What the Package Includes

Your package should include the following items.

- (1) SCSI Fiber Optic Extender, Single-Ended (IC507A) or Differential (IC508A)
- (1) AC power cord
- This user's manual

Check each item carefully for shipping damage. If anything is missing or damaged, please call Black Box immediately at 724-746-5500. Keep the original packaging in case you need to ship or store the unit.

2.3 Features

- Extends SCSI bus to 1600 feet (500 m)
- 40.0 MB per second maximum data rate
- Ultra/Wide SCSI compatible
- Transparent to SCSI System
- Asynchronous and synchronous compatible
- Supports SCSI 1, 2, 3 specifications
- Single-ended/differential SCSI interface

- Does not require SCSI bus ID
- 1.06-GHz fiberoptic serial link
- Standard “SC” fiberoptic connectors
- Compatible with standard fiberoptic cables
- Fiberoptic data security
- Internal active bus termination
- No additional software required
- Easy to install

2.4 Typical Application

Figure 2-1 shows a typical application of the SCSI Fiber Optic Extender.

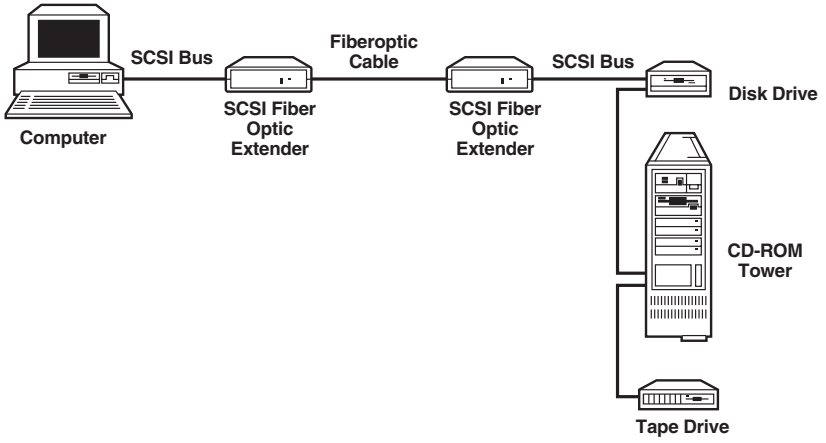

Figure 2-1. SCSI Fiber Optic Extender Application.

The SCSI Fiber Optic Extender supports a maximum SCSI data rate of 40.0 MB per second in asynchronous or synchronous mode. You can make full use of the "Ultra SCSI" performance available in top-of-the-line computers and peripheral devices. Proprietary switching logic enables the Extender to maintain complete SCSI command functionality and remain transparent to the user.

The SCSI Fiber Optic Extender conforms to ANSI X3.131 and X3T9.2 specifications with single-ended device termination. Disconnect and Reselect are fully supported to ensure complete SCSI compatibility. The Extender does not require a SCSI device address.

A 68-pin SCSI connector is provided on the rear panel for easy installation to the host or peripheral. Internal bus terminators are internally installed. These terminators can be removed for systems that require external termination.

A standard duplex fiber optic cable with "SC" connectors provides the interface between local and remote units. Fiber optic cable is lighter and thinner than standard wire cable, allowing easier installation.

The SCSI Fiber Optic Extender contains a universal power-cord receptacle and rear-panel AC switch to switch between 100 VAC and 240 VAC.

3. Installation

3.1 AC Line Voltage

You can externally connect the desktop SCSI Fiber Optic Extender to any AC input voltage between 100 and 240 volts. North American units are shipped with a 110-volt power cord.

3.2 Placing the Extender

Place the Extender in a convenient location near the host computer and/or peripherals. Ensure that the ventilation slots on the sides of the unit obtain adequate airflow. Do not place the unit on any devices that generate excessive heat.

3.3 Cabling

High-quality shielded SCSI cables will provide a connection with the greatest noise immunity and distance from the Extender to your peripherals. But in any case, no cables connected to the Extender may exceed 19.7 ft. (6 m) for single-ended units and 82 ft. (25 m) for differential units.

NOTE

Peripherals operating at Ultra SCSI data rates require shorter cable lengths for proper operation. The total cable length for a single-ended Ultra SCSI bus should be no longer than 1 meter and differential cables 12 meters.

3.4 Connecting the Extender to the SCSI Bus

NOTE

The IC508A Extender supports a differential SCSI interface only. Do not attach this unit to a single-ended SCSI system or damage to your system may result. The Extender itself contains protection circuitry and will not be damaged if inadvertent connection is made to a single-ended interface.

NOTE

Switch off power to all computers and peripherals attached to the SCSI bus, before connecting the Extender.

You may install the Extender at any point on the SCSI bus. The Extender has a SCSI connector with screw lock for secure connections.

NOTE

You can operate the IC507A single-ended Extender with another IC508A differential Extender to convert from one bus type to the other.

3.5 Ensuring Proper Termination

All SCSI buses require proper termination at each end of a SCSI link. Since the Extender creates two optically isolated SCSI buses, termination is required on each side of the Extender, in addition to the standard terminators at each end of the SCSI chain.

That's a total of four terminators—two on each side of the Extender. If external device termination is required, ensure that the internal termination networks have been removed. See **Figures 5-1, 5-2,** and **5-3** to disable or enable terminators.

NOTE

The Extenders are shipped with termination enabled.

3.6 Connecting a Fiberoptic Cable

A duplex fiberoptic cable with standard "SC" plugs interconnects two Extenders.

3.6.1 Local Extender

Insert one plug into each fiber optic socket on the rear of the local unit. Make sure that the "key" on each plug is facing the top of the Extender before insertion.

NOTE

Make sure that the plug is properly aligned with the connector before inserting. Do not force the plug into the connector, or damage will result.

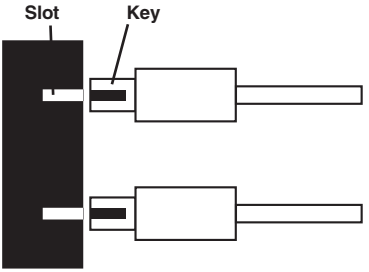

Figure 3-1. Installing SC Fiberoptic Plugs.

3.6.2 Remote Extender

For proper operation, the fiber optic transmitter (XMT) on the local unit must be connected to the remote fiber optic receiver (RCV), and the local receiver (RCV) must be connected to the remote transmitter (XMT).

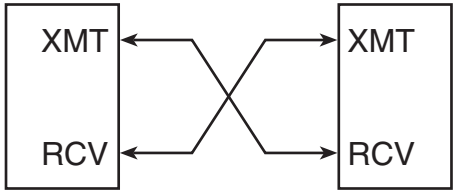

Figure 3-2. Connecting Two Powerlink Units.

3.7 Verify Communications

Power on both Extenders and verify that the LINK ACTIVE indicators are lit. This will verify that the local and remote Extenders are communicating. Power up other computer equipment.

NOTE

If the LINK ACTIVE indicators are not lit, reverse the fiberoptic cables to one unit and verify the indicators.

4. Operator Controls and Indicators

4.1 Power Switch

The Extender's power switch is located on the rear panel of the unit. When the switch is in the "1" position, the power is on.

4.2 Indicators

Four indicators on the front panel provide status information for the Extender.

- Power—The Power lamp indicates that power is applied to the unit.
- Link Active—The Link Active lamp provides visual indication that Extenders are communicating and sending sync data over the fiber optic link. The Extender will disconnect from the SCSI bus when the link is not active.
- Bus Active—The Bus Active indicator provides visual indication of the BUSY signal on the SCSI bus interface. This indicator provides a general indication of devices communicating on the SCSI bus.
- Link Error—The Link Error indicator notifies the user that the integrity of the fiber optic link is below specification and data-transfer errors will occur if not corrected. The Extender will disconnect from the SCSI bus when a Link Error is detected.

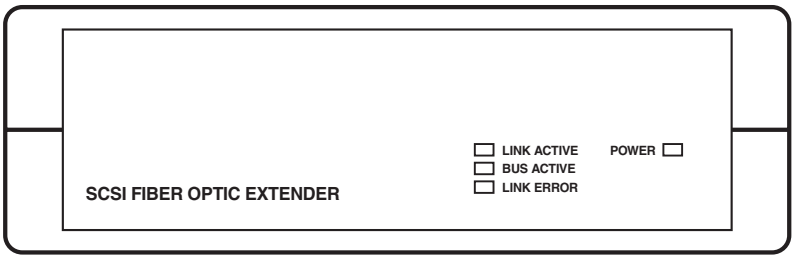

Figure 4-1. Front Panel Indicators.

5. Interfacing Requirements

5.1 SCSI Cable Interface Requirements

The SCSI Fiber Optic Extender can be installed at any point on the SCSI bus. The Extender provides an optically isolated SCSI bus over extended distances. Terminators must be installed on both the local and extended bus. Ensure that a maximum of two terminators are installed on each bus. The Extender contains a 68-pin SCSI connector.

5.1.1 Single-ended Extender

The IC507A supports a maximum cable length of 19.7 ft. (6 m) at standard SCSI data rates (5 MB per second, narrow), 9 ft. (3 m) at Fast SCSI data rates (10 MB per second) and 6 ft. (1.5 m) at Ultra SCSI data rates (40 MB per second).

5.1.2 Differential SCSI Extender

The IC508A supports a maximum cable length of 82 ft. (25 m) at standard or Fast SCSI data rates.

NOTE

Peripherals operating at Ultra SCSI data rates require shorter cable lengths for proper operation. The total cable length should be no longer than 1 meter for a single-ended Ultra SCSI bus, or 12 meters for a differential bus.

NOTE

Do not intermix single-ended and differential devices on any one side of the SCSI chain unless you use an IC508A to convert from one bus type to the other.

5.2 Internal/External Terminator Options

The Extender contains an internal SCSI bus termination. You can disable the internal terminator for added flexibility. Data errors may result if more than two sets of terminators are installed on any SCSI bus. Terminators should normally be installed on opposite ends of the SCSI bus. To disable or enable the internal terminators, remove the four screws on the bottom of the unit and configure as shown in **Figure 5-1**.

Figure 5-1. Enable External Terminator Power.

NOTE

Default is "INSTALLED."

5.3 Internal Terminator Power and Fuse

The Extender can supply external terminator power via an internal resettable fuse. This fuse supplies 1 amp at 5 volts to the TERMPWR signal. The Extender contains internal protection and will not be affected if other SCSI devices provide terminator power.

To enable External Terminator Power, install a jumper as shown in **Figure 5-2**.

Figure 5-2. Enable External Terminator Power.

NOTE

Default is "INSTALLED."

5.4 Selecting Internal Terminator Power

Internal Extender termination can be powered by internal 5-volt power or externally from the SCSI-bus "TERMPWR" line. Depending on system applications, it may be advantageous to power the internal terminators by the SCSI peripheral or computer.

Figure 5-3. Terminator Power Jumpers.

NOTE

Default is "INTERNAL 5V."

5.5 Fiberoptic Cable Requirements

The Extender's fiber optic interface incorporates industry-standard "SC" optical connectors. Standard full-duplex mutimode fiber optic cables can be used with this system. Typical cable types include 62.5/125-µm and 50/125-µm fiber optic cable. Pre-wired multimode fiber optic cables conforming to these cable parameters are compatible with this system if terminated with "SC" connectors.

High-quality connectors and low-loss fiber cable will provide the greatest operating distance between units. The maximum achievable distance between units is 500 meters, or approximately 1600 feet. Improper connector termination, splicing of the fiberoptic cable, and use of other cable diameters may result in reduced link distances and increased data-error rates.

Keep fiber optic connectors and Extender optical components free of dust and dirt. Whenever cables are not connected to the Extender, it is good practice to cover them with the protective plastic caps included with the system.

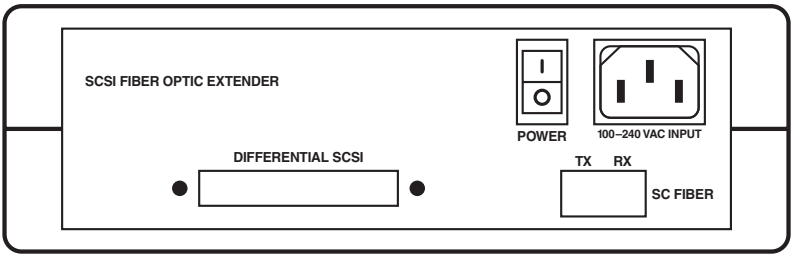

Figure 5-4. Extender Rear-Panel Connectors.

6. Operation

6.1 Description

The Extender converts SCSI data and command information into a high-speed (1.06-GHz) serial data stream which is transmitted over a fiber optic interface to another remote Extender. The remote extender decodes the data stream and re-converts it to the proper SCSI signals.

The fiberoptic serial link conforms to the ANSI X3T9.5 encoding scheme specified in SCSI 3 and is virtually immune to all forms of radio-frequency and electromagnetic interferences (RFI/EMI). An unauthorized tap of the link is nearly impossible without detection. Fiberoptic cable is also lighter and smaller than standard wire cable, allowing easier installation.

SCSI bus signals are routed through proprietary switching logic which enable the Extender to appear "transparent" to devices on the SCSI bus. The Extender will disconnect from the SCSI bus interface if the fiberoptic link fails or disconnects from the power source.

6.2 System Performance

The Extender will support any combination of asynchronous and synchronous SCSI devices on the bus. Overall system performance will depend on the individual data rate and protocol of each SCSI device plus the overhead of the host computer.

In general, devices connected to an Extender system with a 300-ft. (100-m) fiber optic link, can expect to achieve aggregate data rates of 300 KB per second in asynchronous mode. In synchronous mode, with a byte offset of 8, you can expect sustainable data rates of 12 MB per second. A synchronous offset of 16 will provide 14 MB per second.

6.3 System Configuration Options

The Extender supports a maximum data rate of 40 MB per second using wide SCSI devices. This data rate is often referred to as "Ultra/Wide SCSI."

For optimum system performance, some system configurations may require a secondary SCSI channel to interface with the Extender.

In this configuration, the primary SCSI bus would be connected to the local high-speed peripherals.

The secondary SCSI bus would be used exclusively as the extended SCSI bus.

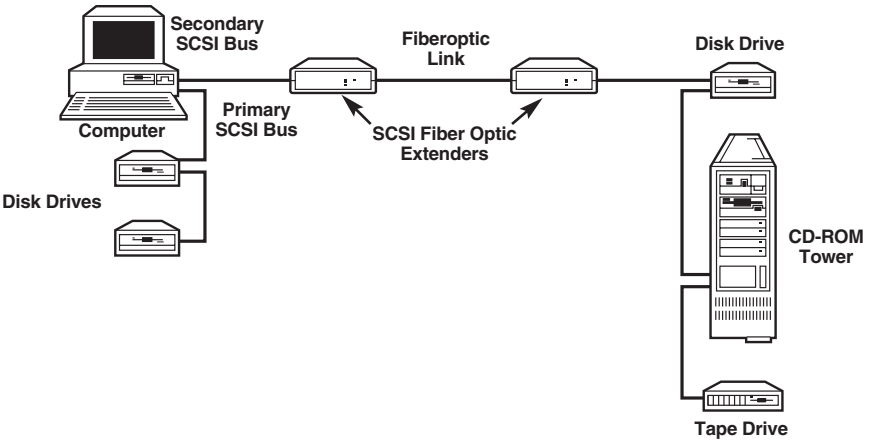

Figure 6-1. System Configuration with Secondary SCSI Bus.

7. SCSI Technical Information

7.1 SCSI Basics

7.1.1 SCSI-1

The original specification supports data transfers up to 5 MB per second on an 8-bit wide parallel data bus. SCSI-1 standards had some incompatibility problems between host adapters and peripheral devices. The need to improve compatibility, increase transfer rates, and add other features for better performance required a review of the specification.

7.1.2 SCSI-2

Improved compatibility and higher transfer rates were provided in this enhancement. The addition of Wide SCSI permits 16 or 32 bits to be transferred in parallel, the latter requiring two cables. In combination with the "Fast SCSI" option, synchronous data transfers up to 10 MB per second for 8-bit, 20 MB per second for 16-bit, and 40 MB per second for 32-bit were achieved.

7.1.3 SCSI-3

The most significant additions include the ability to address up to 32 devices, a 16-bit single cable data bus, and serial SCSI protocol. The SCSI-3 standard has been split into several subdocuments, including the SCSI Parallel Interface (SPI), which is based on a layered protocol and SCSI Interlocked Protocol (SIP), a software link protocol.

7.1.4 Signal Wiring

The signal wire used in a SCSI bus has an impact on bus performance. The two wiring techniques generally used for SCSI are single-ended and differential.

With single-ended wiring, all the signal lines share a common ground. Single-ended circuitry is not noise-resistant and is generally limited to about 6 meters at data-transfer speeds of 10 MB.

Differential wiring has a separate ground wire for each signal. It offers exceptional noise resistance because it does not rely on a common ground. This allows cables up to 25 meters and reliable operation at 10 MB or greater. Differential wiring and circuitry is more complex than single-ended and generally tends to be more expensive to implement.

7.1.5 Common Problems

The majority of problems encountered with SCSI bus installations are due to unbalanced or improper impedance on the SCSI bus transmission cables caused by varying manufacturers' peripheral devices. SCSI terminators compensate for these inherent impedance mismatches on a SCSI bus where peripheral devices such as hard drives, CD-ROM drives, scanners, and printers are used.

7.1.6 Passive Terminators

The most basic is a passive-resistance terminator. This is usually supplied with peripherals and frequently does a poor job of balancing the impedance of the SCSI bus. Passive terminators are resistor networks that allow signal voltages to vary with the load and terminator power supplied, resulting in unstable signals from end to end on the bus and causing data errors. Passive terminators are no longer recommended by ANSI for designs.

7.2 SCSI Installation Tips

1. Keep your SCSI chain short. Official SCSI specifications limit a SCSI chain to no more than 19.7 ft. (6 m) long. Practical experience says the shorter, the better. The maximum length you should allow between devices is 3 ft (about a meter).

2. Never assign the same SCSI ID number to two devices on the same bus. SCSI uses these numbers as addresses to ensure that information goes to the correct location. Giving two devices the same address can result in lost information.

3. Know that some SCSI-ID numbers may be re-assigned. Internal-boot hard drives are usually set to ID "0" while secondary hard drives are set to "1." Motherboards or host adapters are generally set to ID "7."

4. Always terminate the first and last devices on the chain. Drives purchased specifically for internal use nearly always arrive with terminators installed. If in doubt, call the vendor you purchased the device from.

5. If the last device on the chain has two SCSI connectors, attach the cable to one and a terminator to the other. Otherwise, you'll have an open connector that may cause noise on the SCSI chain.

6. Always turn off the power to your computer and SCSI devices before swapping cables or moving devices around. SCSI cables contain sensitive data-transmission lines and one or more live power wires.

7. Turn on your SCSI devices before you turn on the computer. Some SCSI devices will not mount if they are not running when you power up your computer. Shutting down your computer first and then the attached SCSI devices allows your system to completely "flush" itself.

7.3 SCSI Interface Signals

A total of 18 signals are required for the SCSI interface.

- BSY (BUSY). An "OR-tied" signal indicating that the bus is being used.
- SEL (SELECT). An "OR-tied" signal used by an initiator to select a target or by a target to reselect and initiator.
- C/D (CONTROL/DATA). A signal driven by a target that indicates whether CONTROL or DATA information is on the data bus. True indicates CONTROL.
- I/O (INPUT/OUTPUT). A signal driven by a target that controls the direction of data movement on the data bus with respect to an initiator. True indicates input to the initiator. This signal is also used to distinguish between selection and re-selection phases.
- MSG (MESSAGE). A signal driven by a target during the message phase.
- REQ (REQUEST). A signal driven by a target to indicate a request for a REQ/ACK data transfer handshake.
- ACK (ACKNOWLEDGE). A signal driven by an initiator to indicate and acknowledgement for a REQ/ACK data transfer handshake.
- ATN (ATTENTION). A signal driven by an initiator to indicates the attention condition.
- RST (REST). An "OR-tied" signal that indicates the reset condition.
- DB(7–0,P) (DATA BUS). Eight data-bit signals, plus a parity-bit signal, that form a data bus. DB(7) is the most significant bit and has the highest priority during the arbitration phase. Bit number, significance, and priority decrease downward to DB(0). A data bit is defined as one when the signal value is true and is defined as zero when the signal value is false. Parity bit DB(P) shall be odd.

Table 7-1. IC507A Single-Ended SCSI Connector Pin Assignments.

Signal Name	Pin Number	Signal Name	Pin Number
Ground	1	-DB12	35
Ground	2	-DB13	36
Ground	3	-DB14	37
Ground	4	-DB15	38
Ground	5	-DBP1	39
Ground	6	-DB0	40
Ground	7	-DB1	41
Ground	8	-DB2	42
Ground	9	-DB3	43
Ground	10	-DB4	44
Ground	11	-DB5	45
Ground	12	-DB6	46
Ground	13	-DB7	47
Ground	14	-DBP	48
Ground	15	Ground	49
Ground	16	Ground	50
TermPwr	17	TermPwr	51
TermPwr	18	TermPwr	52
Reserved	19	Reserved	53
Ground	20	Ground	54
Ground	21	-ATN	55
Ground	22	Ground	56
Ground	23	-BSY	57
Ground	24	-ACK	58
Ground	25	-RST	59
Ground	26	-MSG	60
Ground	27	-SEL	61
Ground	28	-C/D	62
Ground	29	-REQ	63
Ground	30	-I/O	64
Ground	31	-DB8	65
Ground	32	-DB9	66
Ground	33	-DB10	67
Ground	34	-DB11	68

Table 7-2. IC508A Differential SCSI Connector Pin Assignments.

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

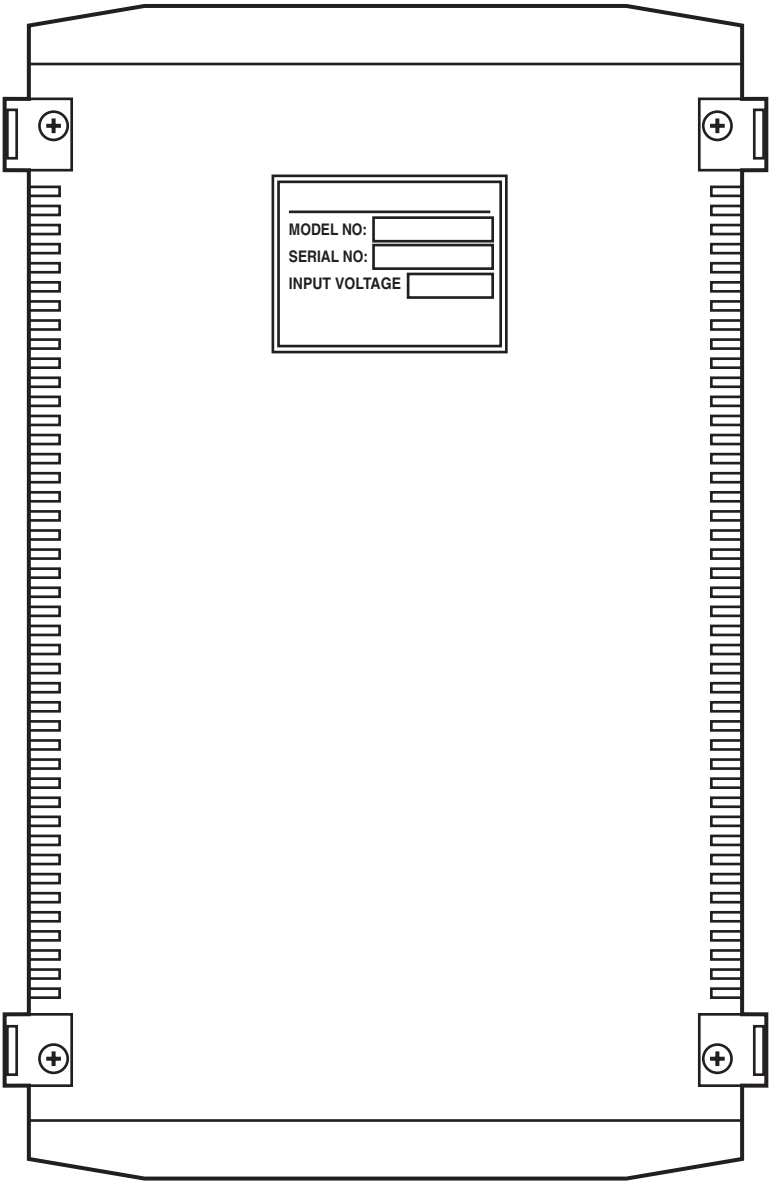

Figure 7-1. Bottom Panel of the Extender.

NOTE

To access terminators and fuses, remove the four screws as indicated above.

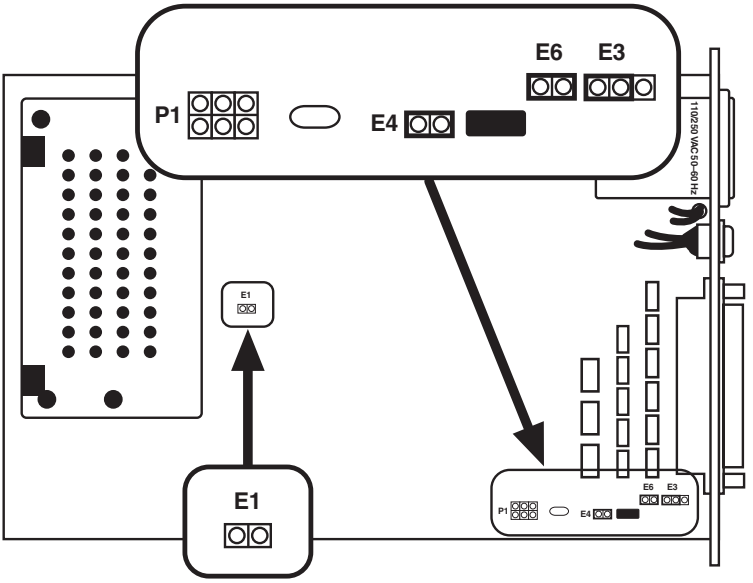

Figure 7-2. IC507A Board Layout.

NOTE

Fuses are not user-replaceable.

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