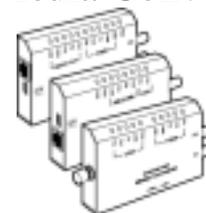




JANUARY 2002
LE1500-BNC
LE1500A-UTP
LE1501A
LE1502A

Media Converters



Installation and User Guide

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BLACK BOX® Media Converters

Installation and User Guide

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84-00051 (Rev. B 01/02)

Important: Black Box Media Converters contain no user serviceable parts. Attempted service by unauthorized personnel shall render any and all warranties null and void. If problems are experienced with a Black Box Media Converter, consult Section 5, Troubleshooting, of this User Guide.

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Contacting Black Box Corporation

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FEDERAL COMMUNICATIONS COMMISSION
AND
CANADIAN DEPARTMENT OF COMMUNICATIONS
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 B 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.

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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 the Canadian Department of Communications.

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 le ministère des Communications du Canada.

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 debe 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 conectado 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 física 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 líneas de energía.
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 objetos líquidos 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: Objetos 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.

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Certification Notice for
Equipment Used in Canada

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications-network protective, operation, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly (extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility—in this case, your supplier. Any repairs or alterations made by the user to this

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equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices, subject only to the requirement that the total of the load numbers of all the devices does not exceed 100.

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Updated Logo, FCC information, and Layout for 2002.

1.0 SPECIFICATIONS

**1.1. Technical Specifications for Models: LE1502A, LE1500A-BNC,
LE1500A-UTP, LE1501A**

Performance:

Data Rate: 10 Mbps (IEEE 802.3)

Network Standards:

Ethernet V1.0/2.0 IEEE 802.3: 10BASE2, 10BASE-T, FOIRL,
10BASE-FL

(Black Box Media Converters are physical layer standard Ethernet products,
and operate independently of all software.)

Maximum Standard Ethernet Segment Lengths:

10BASE-T (unshielded twisted pair):	100 m (328 ft)
10BASE2 ThinNet (BNC):	185 m (607 ft)
FOIRL Fiber optic:	1.0 km (3,281 ft)
10BASE-FL Fiber optic :	2.0 km (6,562 ft)
10BASE-FL Single Mode Fiber optic:	10.0 km (32,810ft)

*Note: Black Box Media Converters **DO NOT** support full length Ethernet segments. See Section 3.2 of this manual for media lengths and segment distance calculations.*

Operating Environment:

Ambient Temperature: 32°F to 122°F (0°C to 50°C)
Storage Temperature: -20°C to 60°C
Ambient Relative Humidity: 10% to 95% (non-condensing)

Power Supply (External):

Power Input: 95 - 125 vac at 60 Hz for U.S. and Canadian models,
200 - 250 vac at 50 Hz for international models which have
IEC power cable connector.

Power Consumption: 6 watts max. for the Media Converter

Connectors:

RJ-45 Port: Modular 8-Pin female, with MDI-X up-link switch

BNC Port: Standard BNC connector, RG-58 ThinNet

Fiber Port: Fiber optic (standard ST type), 10BASE-FL

Packaging:

Enclosure: High strength sheet metal.

Dimensions:

LE1502A: 2.5 in x 3.75 in x 0.75 in (6.35 cm x 9.53 cm x 1.9 cm)

LE1500A-BNC: 2.5 in x 3.75 in x 0.75 in (6.35 cm x 9.53 cm x 1.9 cm)

LE1500A-UTP: 2.5 in x 3.9 in x 0.75 in (6.35 cm x 9.90 cm x 1.9 cm)

LE1501A: 2.5 in x 3.9 in x 0.75 in (6.35 cm x 9.90 cm x 1.9 cm)

Power Supply: 2.0 in x 2.0 in x 1.5 in (5.1 cm x 5.1 cm x 3.8 cm)

Weight: **All Models:** 6.9 oz. (197g); power supply 10 oz (285g)

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LE Series LED Indicators:

<u>LED</u>	<u>1502A</u>	<u>1500A-BNC</u>	<u>1500A-UTP,1501A</u>	<u>Description</u>
PWR	unit	unit	unit	Indicates unit is receiving DC power.
Link	TP	Fiber	TP, Fiber	Steady ON when proper link is established at both ends of the segment.
RX	TP, BNC	BNC, Fiber	TP, Fiber	Indicates port is receiving packets.
TX	n.a.	BNC, Fiber	Fiber	Indicates port is transmitting packets
COL	TP, BNC	BNC, Fiber	TP, Fiber	Indicates unit is simultaneously transmitting and receiving data from the cables.
POL	TP	n.a.	TP	Indicates the unit has detected a TP receive wire-pair signal inversion (polarity).
JAB	unit	BNC	TP, Fiber	Indicates jabber (illegal packet length fault) condition. Segment is partitioned when lit.

Black Box reserves the right to change specifications, performance characteristics and/or model offerings without notice.

Agency Approvals:

115v 60 Hz Power Supply is UL Listed (UL 1310), CSA Certified

230v 50 Hz Power Supply is same, also TUV and GS approved

Emissions: Meets FCC Part 15 Class A, cUL

Made in USA

1.2 Summary of models and descriptions:

LE1500A-UTP = TP to fiber, transparent hdx/fdx, ST connector, multi-mode, ext. 12V 1A P.S

LE1500A-BNC = BNC to fiber, ST connector, multi-mode, ext. 12V 1A P.S

LE1501A = TP to fiber, transparent hdx/fdx,, ST connector, single-mode, ext. 12V 1A P.S

LE1502A = TP to BNC, half-duplex, ext. 12V 1A P.S

MC TRAY = Rack-mount tray for Media Converters, up to 12 units

2.0 INTRODUCTION

This section describes the LE1502A, LE1500A-BNC, LE1500A-UTP, LE1501A including appearance, features and possible applications.

2.1 Inspecting the Package and Product

Examine the shipping container for obvious damage prior to installing this product; notify the carrier of any damage which you believe occurred during shipment or delivery. Inspect the contents of this package for any signs of damage and ensure that the items listed below are included.

This package should contain:

- 1 Black Box Media Converter Unit
- 1 External Power Supply, either 115 vac 60 Hz or 230 vac 50 Hz
- 1 Velcro[®] Tape section, approximately 3 inches in length
- 1 User Guide

Remove the Black Box Media Converter from the shipping container. Be sure to keep the shipping container should you need to ship the unit at a later date.

In the event there are items missing or damaged contact your supplier. If you need to return the unit use the original shipping container. Refer to Section 5, Troubleshooting, for specific return procedures.

2.2 Product Description

Black Box Media Converters offer a compact, cost-effective way to adapt a pre-existing Ethernet cabling configuration as network requirements change. They offer a graceful way to convert and transmit data among twisted pair, thin coaxial and fiber network cabling environments. A variety of twisted-pair-to-fiber models provide for multi-mode or single-mode, full-or half-duplex, ST or SC connectors, and normal or Link-pass-through operation. Black Box Media Converters cost significantly less than

full repeaters and can be used whenever media distance limitations will not be exceeded in the new environment. All units are compatible with Ethernet V 1.0 / 2.0 specifications and comply with IEEE 802.3 standards.

Black Box Media Converters are designed for quick and easy installation even in very tight spaces. Media cables are easily attached to the corresponding Media Converter. Because of their compact size, Black Box Media Converters can be Velcro®-mounted on an office wall or the side of a desk or cabinet. The external power supply plugs into a nearby AC wall socket or power strip. Each converter features a full set of LEDs that convey essential diagnostic and status information. See Section 4.1, LED Indicators, for specific LED function information.

Black Box Media Converters are designed to provide low-temperature operation over an extended period to make them some of the most reliable in the

industry. Their high-strength fabricated metal packaging shields against Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI).

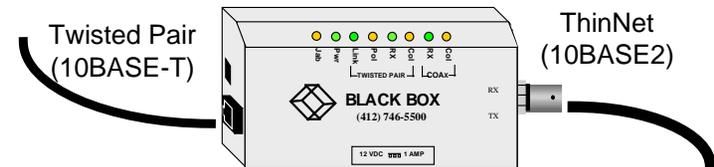
Black Box Media Converters are specifically designed to convert data signaling to allow transmission between two different Ethernet cabling types, allowing migration to a new media type while preserving segments of the pre-existing wiring structure.

All of the Black Box Media Converters comply with the IEEE 802.3 10BASE-T specification for 10 Mb/sec traffic via shielded (STP) or unshielded twisted pair (UTP) segments. The Media Converters feature an up-link to eliminate the need for a special cross-over cable when connecting to a hub or concentrator. The maximum number of 10Mb Media Converters that can be used in series is three. The cumulative noise from 4 or more units together causes packet alignment errors.

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NOTE: experience shows that the maximum number of 10Mb Media Converters that can be used in series is three. The cumulative noise from 4 or more units together causes packet alignment errors.

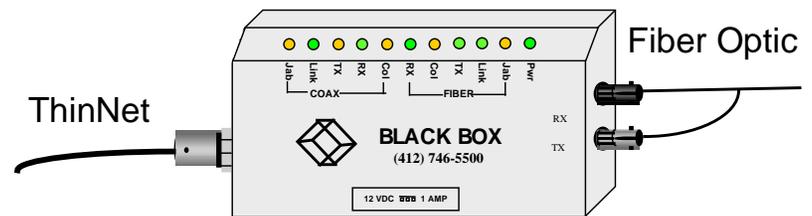
The LE1502A is equipped with one BNC and one RJ-45 port. The BNC connector complies with IEEE 802.3 10BASE2 specifications for ThinNet segments.



The LE1502A integrates 10BASE-T and 10BASE2 Ethernet networks.

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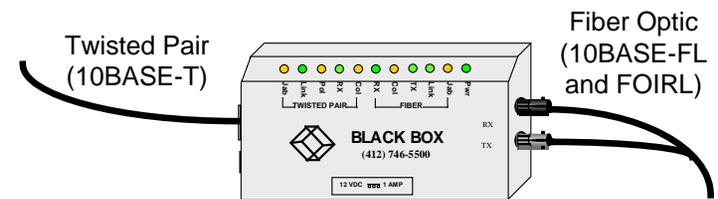
The BLACK BOX® LE1500A-BNC is equipped with one BNC and one Fiber-ST connector for connection to IEEE FOIRL or 10BASE-FL compliant networks.



The LE1500A-BNC integrates ThinNet and Fiber Ethernet networks.

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The BLACK BOX® LE1500A-UTP and LE1501A are equipped with one fiber-ST and one RJ-45 connector for connection to IEEE FOIRL or 10BASE-FL compliant networks.



The LE1500A-UTP integrates 10BASE-T and Fiber Ethernet networks.

2.3 Features and Benefits

- **Reduces Network Costs**

Black Box Media Converters offer the ideal solution to quickly and inexpensively connect Twisted Pair with Fiber or ThinNet media within an expanding Ethernet network where full repeaters are not required.

- **No added Repeater Hop Count**

Media Converters do not add signal timing delays associated with full repeaters, and can be installed without increasing the repeater hop count of an existing network.

- **Fiber / twisted-pair models for fiber and media types**

A variety of twisted-pair-to-fiber models provide single or multi-mode full or half duplex mode, ST connectors, and Link Pass-through operation.

■ **Small, Compact, Lightweight Design**

Featuring a compact and lightweight metal case with an external power supply, Black Box Media Converters can be conveniently installed in minimal space on table-tops or wall-mounted.

■ **Full Complement of LEDs.**

Each Media Converter model is equipped with a full complement of LEDs to provide network traffic status and basic diagnostic information without additional network diagnostic equipment.

■ **Highly Reliable and Dependable**

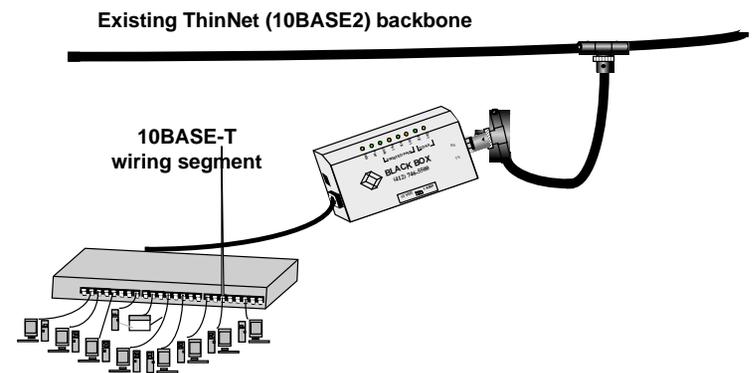
Black Box Media Converters are based on a robust design and are packaged in a metal enclosure to ensure high reliability and durability.

2.4 Applications

The primary function of a Black Box Media Converter is to permit two different media types to coexist inexpensively within the same network by allowing data to be transmitted and received between different media types.

Black Box Media Converters are typically used where new 10BASE-T networking equipment is being installed and connection to existing BNC or fiber Ethernet cabling is required. Alternatively, two twisted-pair-to-fiber models (LE1500A-UTP and LE1501A) are convenient for inserting a fiber segment into a twisted pair environment in order to connect to a remote workstation or workgroup via fiber cabling, without increasing the repeater hop count.

The xxxxxxLP, with Link Pass-through feature, is often desired for managed networks, where the LINK indication passes-through from the fiber side to the TP side.



Black Box LE1502A provides connectivity for 10BASE-T devices through an existing BNC network tap.

Black Box Media Converters have an external power supply, enabling them to be used to convert signals among media that does not have a power source as part of the cabling system, such as twisted pair, BNC and Fiber. (AUI port can supply power).

2.5 Full / half-duplex applications.

Of the various 10Mb media types, only the twisted-pair to fiber combination is capable of full-duplex (i.e., simultaneously transmitting and receiving on the same cable segment) operation. Full-duplex is rarely required at 10Mb, but might occasionally be desired to connect a 10Mb RJ-45 switch port over a fiber link to a full-duplex RJ-45 NIC in a remote server, or to connect to another full-duplex 10Mb RJ-45 switch port.

The various LB1502A units tagged FULL/HALF DUPLEX operate transparently to the simultaneous TX / RX condition, and do not indicate Collisions or Jabber even if they are present. They are suitable for all normal half- and full-duplex applications

3.0 INSTALLATION

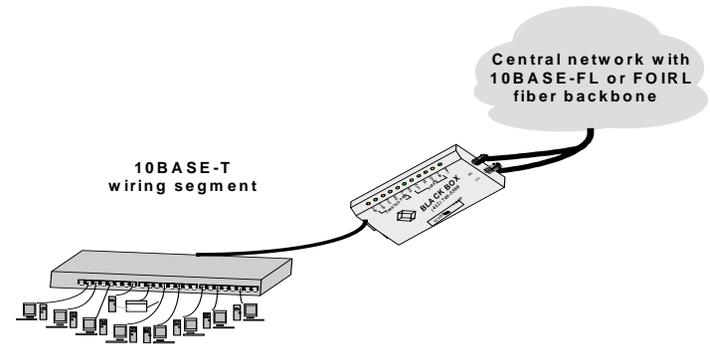
This section describes the installation of the Black Box Media Converters, including location, segment distance calculation and media connection.

3.1 Locating the Media Converter Unit

The compact and lightweight design of the Black Box Media Converter allows it to be easily installed in most any location. A Velcro strip is included for mounting the unit on a vertical surface such as a wall or cabinet, or for securing the unit on a table-top or shelf. Installation location is dependent upon the physical layout of the Ethernet network. Make sure the unit is installed in a location that will be easily accessible to an AC power outlet or power strip, and where convection cooling is not inhibited.

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For rack-mounting of media converters, the BLACK BOX® RM1500 rack-mount tray is available.



Black Box LE1500A-UTP provides connectivity between a fiber network and 10BASE-T network devices.

Important Note: Special consideration must be given to maximum segment lengths on each side of the Black Box Media Converter. It is recommended that IEEE 802.3 specifications for overall maximum segment distances be adhered to in order to maintain optimum network performance. (See Technical Specs, Maximum Standard Ethernet Segment Distances, Section 1.1 of this manual.)

3.2 Calculating Overall Segment Distance

When installing the Black Box Media Converter, it is important to consider the combined overall segment length of both of the attached media types. The overall segment length is calculated by adding together the segment lengths on both sides of the Black Box Media Converters.

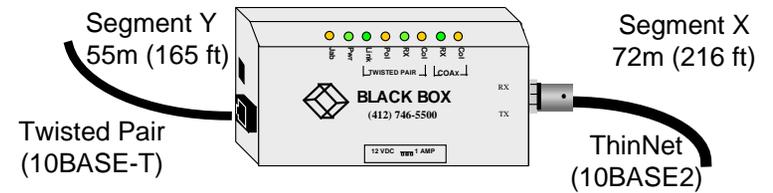
Segment length on each side of the Media Converter is measured as a percentage of the maximum allowable standard media distance for the given media type. The percentages, when added together, must not exceed 100%.

Media Distance Formula for Black Box Media Converters:

$$X\% + Y\% \leq 100\%$$

Where **X** = The segment distance on one side of the Black Box Media Converter divided by the Standard Maximum Media Distance for that media type, x 100%

Where **Y** = The segment length on the other side of the Black Box Media Converter divided by the Standard Maximum Media Distance for that media cabling type, x 100%



Connectivity between ThinNet and TP Ethernet Media.

In the figure shown above, the length of Segment X is 72m (216 ft). This is 39% of the maximum allowable distance for 10BASE2 media (185 m) [$72/185 \times 100\% = 39\%$]. The length of Segment Y is 55m (165 ft). This is 55% of the maximum allowable

distance for UTP 10BASE-T media (100 m) [$55/100 \times 100\% = 55\%$]. The total of the two percentages (39% + 55%) is 94%, which is allowable.

Note 1: Where more than one media converter is used in one segment run, the percentages for all of the cabling lengths in the run must be added together and must not exceed 100%.

Note 2: If the total segment distance calculation result is greater than 100%, consider using a Black Box Repeater so that each cable type can be 100% of its maximum allowed length.

Note 3: The maximum number of 10Mb Media Converters that can be used in series is three. The cumulative noise from 4 or more units together causes packet alignment errors.

3.3 Connecting Ethernet Media

Connecting Ethernet media to the Black Box Media Converter is very simple and straightforward. Using a properly terminated media segment, simply attach the cable end to the appropriate connector.

See Sections 4.2 and 4.3 for a description of the LEDs of the media converter models.

3.3.1 Connecting Twisted Pair (RJ-45, Unshielded or Shielded)

The following procedure describes how to connect a 10BASE-T twisted pair segment to the RJ-45 port on the Black Box Media Converters. The procedure is the same for both unshielded and shielded twisted pair segments.

1. Using standard 10BASE-T media, insert either end of the cable with an RJ-45 plug into the RJ-45 connector of the Black Box Media Converter.
2. Connect the other end of the cable to the corresponding device.
3. Use the LINK LED to ensure proper connectivity by noting that the LED will be illuminated when the unit is powered and proper connection is established. If the LINK LED is not illuminated, change the setting of the up-link switch (See Section 4.4 for up-link switch information.) If this does not help, ensure that the cable is connected properly and is not defective.
4. For the xxxxxLP model with the Link-Pass-through feature. The two LINK LEDs operate together, and either both LEDs are lit or neither is lit. Both of the attached cables must be operate for LINK to be indicated. Absence of LINK does not point to the problem cable segment, and the fault may be in either.

3.3.2 Connecting ThinNet 10BASE2

Connect the ThinNet coax cable to the BNC connector on the Black Box Media Converter in the same manner as is done for any standard BNC connection. Be sure that the BNC segment is properly terminated using a standard “T” connector and terminator.

3.3.3 Connecting Fiber Optic multi-mode, single mode

The following procedure applies to 10BASE-FL multi-mode and single mode applications using the LE1500A-BNC, LE1500A-UTP, and LE1501A Media Converter with ST-type fiber connectors. The primary difference between the LE1500A-UTP and LE1501A for users is the maximum distance allowed. The LE1500A-UTP is used for a multi-mode fiber segment length of up to 2000m, while the LE1501A is used for single mode fiber segments of up to 10km in length. The following table is provided for general information:

<u>Fiber Cable Type</u>	<u>cable diameter</u> *	<u>Max. length</u>	<u>Wavelength</u>
Multi-mode fiber	50/125, 62.5/125, 80/125, 100/140 **	2 Km (see next page)	820 nm

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Single-mode fiber 2/15 - 8/60 10 Km 1300 nm

* xx/yy are the diameters of the core and the core plus cladding respectively

** The values shown are typical values

Procedure for connecting multi-mode and single-mode fiber cables:

1. Before connecting the fiber optic cable, remove the protective dust caps from the tips of the connectors on the media converter. Save these dust caps for future use.
2. Wipe clean the ends of the dual connectors with a soft cloth or lint-free lens tissue dampened in alcohol. Make certain the connectors are clean before connecting.

Note: One strand of the duplex fiber optic cable is coded using color bands at regular intervals; you must use the color-coded strand on the associated ports at each end of the fiber optic segment.

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3. Connect the Transmit (TX) port (light colored post) on the Black Box Media Converter to the Receive (RX) port of the remote device. Begin with the color-coded strand of the cable for this first TX-to-RX connection.
4. Connect the Receive (RX) port (dark colored post) on the product to the Transmit (TX) port of the remote device. Use the non-color coded fiber strand for this.
5. The LINK LED corresponding to the fiber port on the front of the product will illuminate when a proper connection has been established at both ends (and when power is ON in the unit). If LINK is not lit after cable connection, the normal cause is improper cable polarity. Swap the fiber cables on the product connector to remedy this situation.
6. For the Link-Pass-through model, connection is the same except that the LINK indication will not be present unless LINK is made for the cables on both sides.

4.0 OPERATION

This section describes the operation of the Black Box Media Converters including power supply requirements, up-link switch functionality, and a description of all LEDs.

4.1 Power Requirements, Power Supply Types

Black Box Media Converters require 6 watts of power and are designed to be used with an external power supply. The external power supply unit supplied is one of two types; one version (U.S. and Canadian models) for AC input power of 115 vac 60 Hz, and one international version for 230 vac 50 Hz. The 115 vac version has a small transformer integral with a convenience power outlet plug. The 230 vac version has a small transformer integral with an IEC-type power plug for a user-supplied AC power cord with a convenience power outlet plug. Both types include a lightweight DC power cord to the applicable power jack on the Media Converter unit.

4.2 Front Panel LEDs - - BLACK BOX® LE1502A

<u>LED</u>	<u>Description</u>
PWR	Illuminates GREEN to indicate the unit is receiving DC power.
LINK	(TP) Illuminates GREEN, to indicate proper connectivity on the 10BASE-T network segment. LINK will turn off in the event connectivity is lost between the ends of the twisted pair segment or a loss of power occurs in the unit or remote device.
RX	(per port) Illuminates GREEN to indicate data is being received.
POL	(TP) Illuminates AMBER to indicate inverse polarity detected.
JAB	Illuminates AMBER to indicate jabber (illegal packet length).
COL	(per port) Illuminates AMBER to indicate a collision on the segment.

4.3 Front Panel LEDs - - Black Box LE1500A-BNC

<u>LED</u>	<u>Description</u>
PWR	Illuminates GREEN to indicate the unit is receiving DC power.
LINK	(TP) Illuminates GREEN, to indicate proper connectivity on the 10BASE-T network segment. LINK will turn off in the event connectivity is lost between the ends of the twisted pair segment or a loss of power occurs in the unit or remote device.
RX	(per port) Illuminates GREEN to indicate data is being received.
TX	Illuminates GREEN to indicate attached host is transmitting data over the cable.
JAB	Illuminates AMBER to indicate jabber (illegal packet length).
COL	(per port) Illuminates AMBER to indicate a collision on the segment.

4.4 Front Panel LEDs - - BLACK BOX® LE1500A-UTP and LE1501A

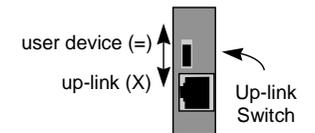
<u>LED</u>	<u>Description</u>
PWR	Illuminates GREEN to indicate the unit is receiving DC power.
LINK	(per port) Illuminates GREEN, to indicate proper connectivity on each cable segment(non-Link Pass-through models). LINK will turn off in the event connectivity is lost between the ends of the twisted pair segment or a loss of power occurs in the unit or in the attached device. For Link Pass-through models, see Section 3.3.3#6
RX	(per port) Illuminates GREEN to indicate data is being received.
TX	(Fiber) Illuminates GREEN to indicate data is being transmitted
POL	(TP) Illuminates AMBER to indicate inverse polarity detected.
JAB	(per port) When present, illuminates to indicate half-duplex jabber (illegal packet length) condition. (Inoperable or not present on models with the FULL/HALF DUPLEX tag on the unit's bottom).
COL	(per port) When present, illuminates to indicate a half-duplex collision on the segment. (Inoperable or not present on models with the FULL/HALF DUPLEX tag on the bottom of the unit

4.5 Up-Link Switch

Black Box Media Converters are equipped with an up-link slide switch to accommodate repeater-to-converter connections without a special cross-over cable.

4.5.1 Up-Link Switch

When set to the UP position (=), the Black Box Media Converter is wired for normal twisted pair connection to a user device. When set to the DOWN position (X), the Media Converter is wired with cross-over functionality for direct up-link to a network hub or concentrator.



End view - LE1500

5.0 TROUBLESHOOTING

If problems should develop during installation or operation, follow the suggestions below prior to calling Technical Support for help. If you are unsure of any procedure described in this chapter, or if the LE1500 Media Converter is not operating as expected, do not attempt to repair or alter the unit. Contact Black Box for assistance.

5.1 Before Calling for Assistance

1. If you have difficulty installing or operating the LE1500 Media Converter, refer to **Chapters 3 and 4**. Make sure that the various other components of the network are working.

2. Check the cables and connectors to make sure that they have been properly connected and the cables/wires have not been crimped or in some way impaired during installation.
3. Check that the AC power cord is plugged into a functioning electrical outlet. Make sure that the AC power cord is properly plugged into the LE1500. Use the PWR LED to verify that the unit is receiving proper power.
4. If the problem is isolated to a network device other than the LE1500 Media Converter, replace the problem device with a known good device. Verify whether or not the problem is corrected. If it is not, go to step 5. If the problem is corrected, the Ethernet Media Converter and its associated cables will function properly.
5. If the problem still exists, contact Black Box.

5.2 When Calling for Assistance

If you determine that your LE1500 Media Converter is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box at (724) 746-5500.

Before you do, make a record of the history of the problem. Your supplier will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

5.3 Shipping and Packaging Information

If you need to transport or ship your Ethernet Media Converter:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the Ethernet Hub for repair, make sure you include everything that was included in the original package. Before you ship, contact your supplier to get a Return Materials Authorization (RMA) number. Ship the package to:

Black Box Corporation
1000 Park Drive
Lawrence, PA 15055
Phone: (724) 746-5500
Fax: (724) 746-0746