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December 1997
LE8003A-R2

23 JAN 2001

4-Port BNC Repeater

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Customer Support Information

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

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

12. Precaución debe ser tomada de mal 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 recommendaciones 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.

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1.0 SPECIFICATIONS

1.1 Technical Specifications

Performance

Data Rate: 10 Mbits / sec

Partitioning: Enforced after 32 consecutive collisions.

Reconnect: Occurs after 512 bits of error-free transmission.

Network Standards

Ethernet V 1.0/V2.0 IEEE 802.3: 10BASE2, 10BASE5
(The 4-Port BNC Repeater is a physical layer standard Ethernet product, and operates independently of all software)

Maximum Ethernet Segment Lengths

10BASE2 ThinNet (BNC) - 185 m (607 ft), less if heavily tapped

10BASE5 ThickNet drop-cable - 50 m (164 ft)

Connectors (or ports) for 10Mb Ethernet media

4-Port BNC Repeater : For Ethernet media attachment, there are 4 BNC connectors (no BNC terminators or taps are included) and one AUI (DB15 female with slide lock) connector.

Operating Environment :

Ambient Temperature: 32° to 120° F (0° to 50°C)

Storage Temperature: -5° to 140°F (-20°to 60°C)

Ambient Relative Humidity: 10% to 95% (non-condensing)

Packaging Specifications of the 4-Port BNC Repeater :

Enclosure: High strength steel.

Suitable for wiring closet shelf or desktop mounting.

Dimensions: 9.0 in D x 11.0 in. W x 2.0 in. H

(23 cm x 28 cm x 5 cm)

Weight: 6 lb. shipping weight (2.7 Kg)

Cooling method: Convection

4-Port BNC Repeater Power Supply (Internal) :

AC Power Connector: IEC-type, male recessed, rear of chassis

Input Voltage: 90 to 260 vac (auto-ranging)

Input Frequency: 47 to 63 Hz (auto-ranging)

Power Consumption: 30 watts max. for the 4-Port BNC Repeater unit

LED Indicators on Chassis

PWR - Power, Green LED, steady ON indicates there is AC power applied to the unit.

JAM - Jam, Amber LED, illuminates when jam or jabber condition (illegal packet size) is detected on any port; affected port is partitioned temporarily until jabber stops.

ACT - Activity LED, flashes to indicate there is packet traffic in the unit.

LED Indicators per port

REC- Receive, Green LED, blinks to indicate network activity, data being received from the port.

COL - Collision, Yellow LED, flashes when a collision is detected on the port.

PAR - Partition, steady on indicates the port has been partitioned in order to isolate it (and a fault connected to it) from the rest of the repeater ports. The other ports should continue to function normally.

MAN PAR - Manual Partition, steady on indicates the port has been manually partitioned using the adjacent pushbutton switch. This is typically done as an aid to troubleshooting the BNC cable and connections attached to the port.

Agency Approvals

UL Listed (UL 1950), cUL, CE, emissions meets FCC Part 15 Class A

115v 60 Hz Power Supply: UL Listed, CSA certified

230v 50 Hz Power Supply: UL Listed, CSA certified, GS approved

1.2 Ordering Information

4-Port BNC Repeater	
LE8003A-R2	4-Port BNC Repeater, plus an AUI connector for backbone connections, compliant to Ethernet IEEE 802.3, 10BASE2, and 10BASE5 standards. Auto-ranging internal power supply.

(Note: A "tee" connector is normally required for each BNC port)

2.0 INTRODUCTION

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 4-Port BNC Repeater

1 AC Power Cord (use with U.S. and other 115 VAC only)

1 Installation and User Guide (this manual)

Remove the items 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 the party from whom you purchased the product. If the unit needs to be returned, please use the original shipping container if possible. Refer to Section 5, Troubleshooting, for specific return procedures.

2.2 Product Description

The 4-Port BNC Repeater can expand a 10Mb Ethernet network by interconnecting up to four individual Ethernet BNC segments, i.e., it operates as a BNC "hub". In addition, an AUI port provides a connection for other media types, such as an AUI drop-cable or another media (such as RJ-45 twisted pair of Fiber) via an appropriate mini-transceiver attached to the AUI port.

Each 4-Port BNC Repeater unit is a complete operational unit with internal auto-ranging (for world-wide use) power supply. It is enclosed in a compact, rugged metal enclosure. The media connectors and the status LEDs are all conveniently accessed from the front. It is easily installed and is suitable for wiring closet shelf or desktop mounting.

The 4-Port BNC Repeater provides full repeater functionality per IEEE 802.3 specifications and is compliant with Ethernet V1.0/2.0 standards.

2.2.1 4-Port BNC Repeater Chassis

The 4-Port BNC Repeater functions as a BNC "hub" repeater. Its chassis houses the main repeater circuit board, the port connectors and status LEDs, and the power supply. The BNC ports are used for attaching one Ethernet BNC (or ThinNet) segment each, and provide full IEEE 802.3 repeater functionality supporting a full length segment. The AUI port is used for attaching an AUI drop-cable to a ThickNet backbone, or for a mini-transceiver to enable connecting other media types

Figure 2.2.1: 4-Port BNC Repeater (Front and Rear Views)

All LEDs for the 4-Port BNC Repeater unit are front-mounted for easy visual monitoring. The AC power cord port is in the rear.

The internal power supply is auto-ranging to handle any AC power type worldwide. Power input may range from 90 to 260 vac, with a frequency rating of 47 to 63 Hz. The unit is equipped with a rear mounted IEC-type recessed male AC power connector. (When shipped for use in areas other than 115 vac, a power cord will not be included). The unit is convection-cooled for silent operation.

The 4-Port BNC Repeater base unit features Power (PWR), Jabber (JAM) and ACT (Activity) LED status indicators located in the front of the unit. These common LEDs provide a visual assessment of the operational condition and aggregate network activity at the unit, and are in addition to the LEDs on each individual BNC port.

Each BNC port requires a "tee" connector, and has Receive, Collision, Partition and Manual Partition LEDs. The "partition" function (see "Specifications" for details) is the standard for Ethernet repeaters, i.e. it indicates the port has been partitioned (separated and no longer connected to the rest of the ports) in order to isolate a fault. Usually, the fault is somewhere in the attached BNC cable and its tap or connections. A BNC port that is not properly terminated will also be partitioned.

The "Manual Partition" pushbutton switch on each BNC port provides a way to separate or segment a BNC port in order to run network tests or to make repairs on the attached BNC cable and connections. The manual partition over-rides the auto-partition.

2.3 Features and Benefits

- **Standards Compliant, for use in 10Mb Ethernet networks**

  The 4-Port BNC Repeater complies with IEEE802,3 10BASE2 and 10BASE5 standards. Users may expand network distances while retaining the ability to add users via BNC taps.

- **Front-mounted ports and status LEDs**

  Cable connections and status LEDs are all located on the front of the unit for easy installation and for visual monitoring of operational status over time.

- **Rugged chassis, withstands the strain of heavy cables**

  The heavy-duty unit has a metal case. The weight of the unit enables it to be stable. Even when several bulky BNC cables are attached, it will not tip over. Rubber feet on the bottom grip the mounting surface without scratching it for added stability.

- **Manual Partition switch on each BNC port**

  The 4-Port BNC Repeater features a pushbutton switch on each BNC port that enables that port to be isolated. This simplifies installation and repairs.

  When a port is manually partitioned, devices and connections attached to it may be tested or serviced without the risk of interfering with the operation of the other ports. Especially for BNC networks where any faulty connection will bring down the network, this is useful in order to be certain proper connections have been made before restoring the BNC connection to the Repeater unit. The manual partition function is similar to but additional to the auto-partition function that is built in as part of the electronics of the unit. An LED indicates when the manual partition is enabled.

  When BNC networks are expanded and segments need to be extended or changed, the 4-Port BNC Repeater product is ideal.

- **World-wide applications**

  An internal universal power supply allows the 4-Port BNC Repeater to be used throughout the world.

2.4 Applications

The 4-Port BNC Repeaters are generally used to extend or interconnect BNC Ethernet segments. In addition, an AUI port enables a ThickNet backbone or another media connection via a mini-transceiver. (The BNC taps and terminators, as well as the mini-transceivers illustrated below are not supplied with the unit, may be purchased separately). As many as four repeaters may be connected in series to connect users at the extremities of 5X the standard segment distance while still adhering to the Ethernet "four repeater" rule.

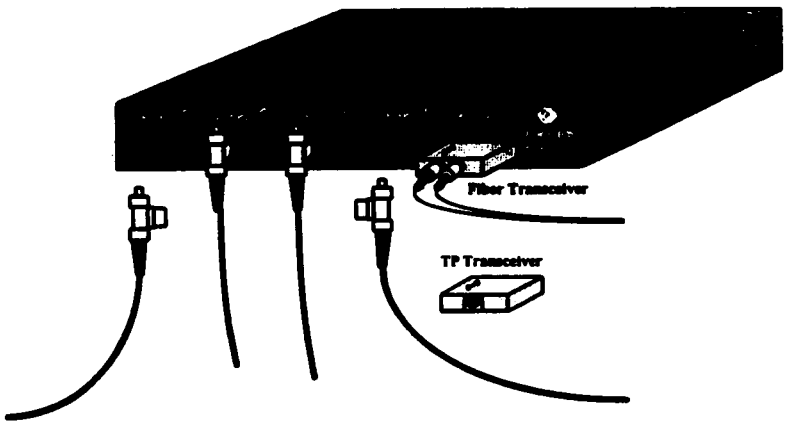

Figure 2.4.1: 4-Port BNC Repeaters combine and extend segments of 10BASE2 networks, and have an AUI port for different media and backbone connections.

The internal auto-ranging power supply of the 4-Port BNC Repeater permits it to be installed anywhere in the world. In the workplace or in a wiring closet, the 4-Port BNC Repeater unit may be conveniently shelf or table-top mounted and plugged into a standard AC power convenience outlet for a simple installation. For rack-mounting, the 4-Port BNC Repeater can easily sit on a rack-shelf in a 2U vertical space.

3.0 INSTALLATION

This Section discusses location and installation of the 4-Port BNC Repeater.

3.1 Locating the 4-Port BNC Repeater

The location of the 4-Port BNC Repeater is dependent on the physical layout of the network and the area to be served. The unit should be set-up in a location that will accommodate easy and equal access to planned network devices and/or segment connections.

Locate an AC receptacle that is within six feet (2 meters) of the intended 4-Port BNC Repeater site. The rugged steel case of the 4-Port BNC Repeater will protect it from accidental damage in a wiring closet or in a workplace setting. Keep an open area around the unit so that convection cooling can occur while the unit is in operation.

3.1.1 4-Port BNC Repeater Table-Top / Shelf Mounting

The 4-Port BNC Repeater unit has four rubber feet to provide stability while not scratching finished surfaces. It is typically shelf-mounted, either in a wiring closet or in an open area. To conserve shelf space, it may be desirable to mount several units on top of each other. If so, this may be readily done as the 4-Port BNC Repeater steel case is strong.

3.2 Connecting Ethernet Media

The 4-Port BNC Repeater is specifically designed to support connections for up to four BNC segments. (Note that a fifth BNC segment may optionally be attached using the AUI port and a BNC mini-transceiver). The AUI port normally provides for attachment of an AUI drop-cable.

The media types supported along with the corresponding IEEE 802.3 standards and connector types are as follows:

Media	IEEE Standard	Connector
ThinNet	10BASE2	BNC
ThickNet	10BASE5	AUI (female)

3.2.1 Connecting ThinNet 10BASE2 (BNC)

Connect a ThinNet coax cable to a BNC connector on the front of the unit in the same manner as is done for any standard BNC connection. Use a "tee" connector on each active port, and also use a "terminator" if the connection is at the end of the BNC cable. The 4-port BNC Repeater does not have internal termination.

3.2.2 Connecting ThickNet 10BASE5 (AUI)

Using the steps below as a guide, attach a new or existing 10BASE5 ThickNet drop-cable directly to the AUI connector on the AUI port.

1. Plug the male end of the cable into the female AUI connector on the unit.
2. Engage the AUI connector slide lock to insure maximum connectivity.
3. Connect the opposite end of the cable into a network AUI port. (This could be a network backbone transceiver, a hub or fan-out with an AUI backbone port, or an AUI module in a concentrator.)

The AUI port may also used for connecting to other Ethernet devices using standard AUI cabling. In this type of situation, it is important to consider the AUI segment length to the attached device, including any cascading.

3.2.3 Connecting Mini-transceivers to the AUI port

Using the illustration below as a guide, attach a mini-transceiver to the AUI port. This will enable the AUI port to be converted to another media (such as twisted pair RJ-45, or fiber, or a fifth BNC port). The 4-port BNC Repeater will supply power to the mini-transceiver per Ethernet specifications.

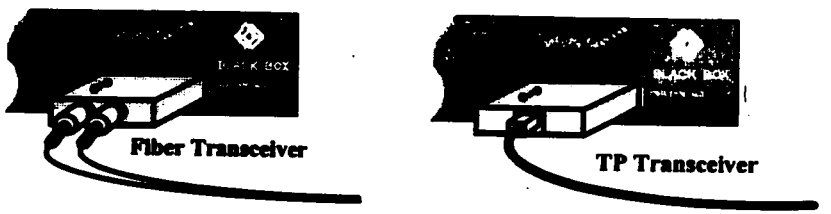

Figure3.2.3 : Installing a Fiber or a TP Mini-transceiver on the AUI port

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 4-port BNC Repeater 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 4-port BNC Repeater, refer to Chapters 3 and 4. Make sure the other components of the network are working.

2. Check the cables and connectors to make sure that they have been properly connected and 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 4-port BNC Repeater. 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 4-port BNC Repeater, 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 4-port BNC Repeater and its associated cables are OK.

5. If the problem still exists, contact Black Box.

5.2 When Calling for Assistance

If you determine that your 4-port BNC Repeater is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box.

Before you do, make a record of the history of the problem. Black Box will be able to provide more efficient and accurate assistance with 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 4-port BNC Repeater:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the 4-port BNC Repeater for repair, make sure you include everything that was in the original package. Before you ship it, contact Black Box to get a Return Materials Authorization (RMA) number.

Mark the RMA number on the package and ship it to:

Black Box Corporation
1000 Park Drive
Lawrence, PA 15055
Phone: (412) 746-5500, Fax (412) 746-0746