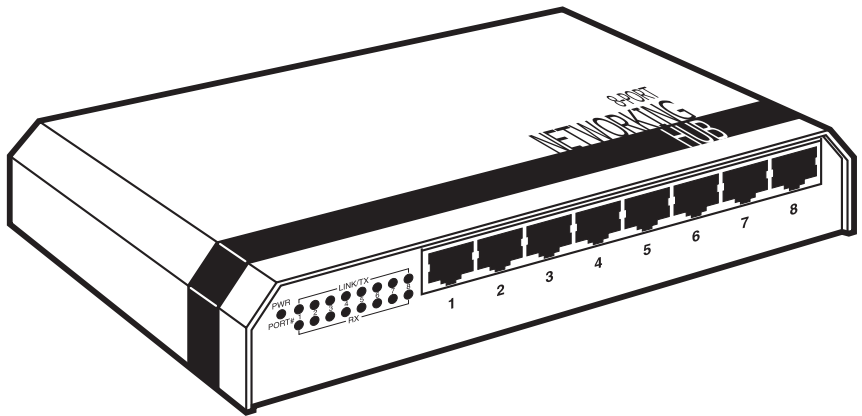




Networking Hub 8-Port, 10BASE-T



**CUSTOMER
SUPPORT
INFORMATION**

Order toll-free in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: www.blackbox.com • E-mail: info@blackbox.com

**FEDERAL COMMUNICATIONS COMMISSION
and INDUSTRY CANADA
RADIO FREQUENCY INTERFERENCE STATEMENTS**

Class B Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an experienced radio/TV technician for help.

Caution

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

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

This digital apparatus does not exceed the Class B 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 classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie 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 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 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.

TRADEMARKS

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1. Specifications

Compliance: FCC Class B, IC Class, VDE Class B, UL® listed

Standard: IEEE 802.3 Ethernet v. 1.0/2.0

LAN Interface: RJ-45 ports for Category 3 or better twisted-pair cable

Data Rate: 10 Mbps

Partitioning: Automatic after 32 consecutive collisions

Reconnection: Occurs after 512 bits of error-free transmission

Maximum Segment Length: UTP (unshielded 10BASE-T): 100 m (328 ft.)

Indicators: (17) Front-mounted recessed LEDs: (1) Power, (8) Link/TX, and (8) RX

Connectors: (8) Front-mounted shielded-type RJ-45 female

Leads/Signals Supported: RJ-45 Pins 1, 2, 3, and 6

Enclosure: High-strength sheet metal

Cooling Method: Convection

Temperature Tolerance: *Operating:* 32 to 122°F (0 to 50°C); *Storage:* -4 to +140°F (-20 to +60°C)

Humidity: 10 to 95% noncondensing

Power: From wallmount power supply: *Input:* 120 VAC, 60 Hz; *Output:* 12 VDC, 1 amp; *Power consumption:* 6 watts typical, 10 watts maximum

Size: 0.8"H x 5"W x 4.4"D (2 x 12.7 x 11.2 cm)

Weight: Unit plus power supply: 1.3 lb. (0.6 kg)

2. Introduction

2.1 Overview

The Networking Hub installs easily for use in a home, office, or lab environment, requiring no special rack cabinets or wiring-closet apparatus. This compact, standard physical-layer Ethernet hub operates independently of all software.

Simple and inexpensive to use, the Hub is ideal for networking a multi-system home or office using 10BASE-T twisted-pair cabling. The front panel has eight shielded twisted-pair ports, and the back panel has a 120-VAC power supply outlet.

Perfect for small-to-medium-size home, office, or lab environments (two to eight users), the Hub helps you build an independent Ethernet network. It operates as a self-sufficient unit to provide 10BASE-T Ethernet connectivity for local users and devices. You can easily expand small, independent networks by cascading hubs.

Expand your network for demonstrations or presentations over the network. Or insert this handy piece of 10-Mbps Ethernet test equipment into the network to provide a test port, and then remove it after you're finished testing. It takes up minimal space and uses minimal power, plus it's rugged enough to be carried in a coat pocket for emergencies.

Whether you place it on a table or mount it on a shelf, the hub fits easily into the home environment. All of the wiring connectors are in the same plane so that wiring space is neat and minimal. The external power supply conveniently plugs into any available AC wall receptacle or power strip.

Eight RJ-45 ports support connection of up to eight workstations or other network devices over full-length 10BASE-T cable segments. The hub fully complies with the IEEE 802.3 specification for repeater functionality by performing signal amplification, re-timing data packets, and re-generating preamble bits for each packet received. Detecting collisions, extending collision fragments, and automatically partitioning and reconnecting individual ports keep problems on one LAN segment from causing downtime elsewhere on the network.

The front panel has Link/TX and RX LEDs for each RJ-45 port, numbered for the corresponding ports (see Figure 2-1), and one LED for AC power. Observing the operation and status of the ports is easy.

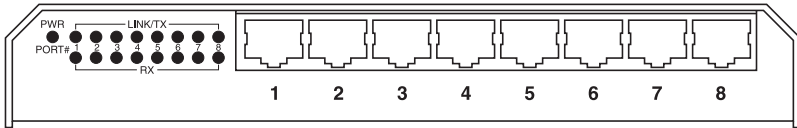


Figure 2-1. Front panel.

The included external wallmount power supply uses AC input power of 120 VAC/60 Hz. Its lightweight cord carries DC power to the barrel-type power jack on the rear panel (shown in Figure 2-2).

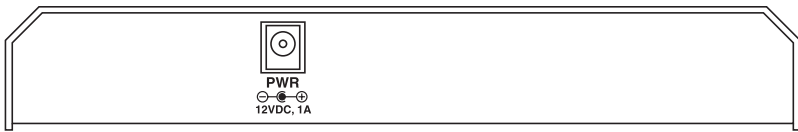


Figure 2-2. Rear panel.

2.2 Features and Benefits

- **Interoperability with other Ethernet devices:** The Networking Hub is interoperable with other Ethernet-compliant network devices. Each is fully compliant with IEEE 802.3 specifications for 10-Mbps CSMA/CD operation. This allows the hub to be integrated into any standard 10-Mbps Ethernet network.
- **Installation versatility:** The hub's small size makes it very unobtrusive, so it fits easily into almost any home, office, or lab location.
- **Robust network operation:** The hub uses the "star" network topology and has automatic per-port partitioning and reconnection. A fault on one segment is isolated from the rest of the network, avoiding most network downtime.

- Simple network diagnosis and maintenance with LEDs: A full complement of LEDs show the status of basic network activity. Link/TX LEDs for each port offer a simple way to verify operational connections for each 10BASE-T segment.
- Low-cost standalone 10BASE-T connectivity: This low-cost, standalone, self-sufficient device gives small workgroups access to a variety of Ethernet networking services such as file sharing, email, printer sharing, and other computer information.
- High-quality construction: A rugged metal enclosure and compliance with rigid Class B emission standards make the hub suitable for commercial and home offices.

2.3 Applications

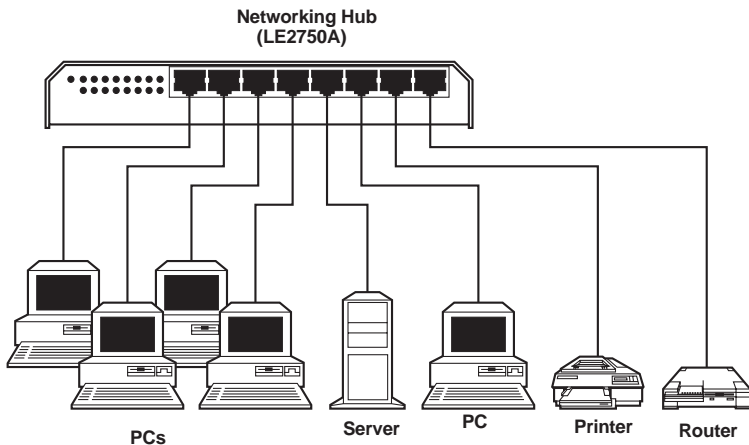


Figure 2-3. Using the Networking Hub as a standalone Ethernet local area network.

The Networking Hub may be used to network a local multi-user system, as shown in Figure 2-3. Up to eight 10BASE-T RJ-45 user ports are available, and 10BASE-T Ethernet segments are supported on all segments.

3. Installation

3.1 Before You Install: Inspect the Complete Package

Inspect the contents of the package for any signs of damage, and make sure that you received these items. If anything is missing or damaged, please return the package to its place of purchase.

- (1) Networking Hub (8-Port, 10BASE-T).
- (1) External 120-VAC, 60-Hz power supply.
- This users' manual.

Remove the hub from the shipping container. Keep the container in case you need to re-package the unit later.

3.2 The Installation Procedure

Installing a Networking Hub is very simple. First, keeping in mind that it must be within 6 feet (1.8 m) of an AC outlet, decide how and where you're going to mount the Networking Hub.

3.2.1 POSITIONING THE NETWORKING HUB ON A TABLE OR SHELF

The Networking Hub can be placed on a table or shelf, and has four rubber feet to provide stability without scratching finished surfaces. When properly positioned, the LED status indicators will be in plain view and easy to read.

The hub's rugged, metal case will protect it from accidental damage in your home, office, or lab. Keep an open area around the unit so that convection cooling can occur while the unit is operating.

3.2.2 POWERING UP THE HUB

Once you've positioned the Networking Hub, plug the included external power supply's DC power cord into the matching power jack on the hub's rear panel. Plug the power supply's transformer into an AC receptacle that is 6 feet (1.8 m) or less away. The green PWR LED should light. Now you are ready to begin attaching Ethernet cables, as described in **Section 3.2.3**.

3.2.3 CONNECTING TWISTED-PAIR SEGMENTS TO THE FRONT-PANEL PORTS

1. Insert the male plug on one end of a standard 10BASE-T cable into one of the RJ-45 female ports on the Hub's front panel.

NOTE

Even though the Networking Hub's connectors are shielded, they will accept—and operate properly with—either unshielded or shielded RJ-45 twisted-pair cables. Use Category 3 cable or better.

2. Connect the other end of each network segment to a workstation or user device. If the Networking Hub is getting AC power, it will light the Link/TX LED corresponding to each Networking Hub port that has a powered-up and functional device attached to it on the other end of the cable.

3.3 Cascading

You can cascade Networking Hubs in order to expand networks. For example, use a 10BASE-T crossover cable to connect a Networking Hub's RJ-45 port to any port of another 10BASE-T hub, as shown in Figure 3-1. Since each Networking Hub provides full repeater functionality, cascaded units can operate together even though there may be a full segment of distance between them. To satisfy the “four-repeater rule” defined by 10-Mbps Ethernet standards, you shouldn't place more than four 10BASE-T Ethernet hubs or repeaters in any path between two users on the same Local Area Network (LAN).

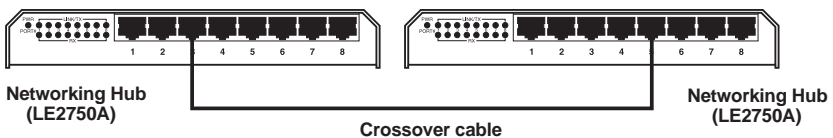


Figure 3-1. Cascading Networking Hubs.

4. Operation

This chapter describes the Network Hub's LEDs and operating features. The Hub is fully compliant with the Ethernet Version 2/IEEE 802.3 Repeater Specification for CSMA/CD 10-Mbps operation and will function accordingly.

4.1 LEDs

- **Power On (PWR) LED:** Lights green to show functional DC power.
- **Link Status (Link/TX) LEDs:** The Networking Hub has a Link/TX LED for each port, which lights green when the the hub detects that a 10BASE-T segment is properly connected to that port. Each Link/TX LED will turn OFF independently if either end of the segment's cable comes loose, or if the hub or the device at the other end loses power.
- **Receive Packets (RX) LEDs:** The RX LEDs, one for each RJ-45 port, flicker green to show that data packets are being received from the segment connected to that port. These LEDs provide reassurance of normal network activity and help you spot abnormal activity.

4.2 Operating Features

- **Partitioning and Reconnection:** The Networking Hub will automatically partition any port where 32 consecutive collisions occur or after 6.5 ms of continuous transmissions. Network integrity is checked every 800 ms, and the segment is reconnected after one 512-bit packet is transmitted without an error.
- **Preamble Regeneration:** As per Ethernet standards, the hub adds bits to the preambles of output packets so that each output packet contains a minimum 64-bit preamble.
- **Collisions:** When carrier is detected simultaneously on multiple ports, a jam pattern is generated on each port to create a collision condition. When a collision signal from one port is detected, it generates a jam pattern to other ports.
- **Fragment Extension:** The hub will automatically add bits to a received data packet of less than 96 bits (a "fragment") so that the size of the packet sent on toward its destination is at least 96 bits, per Ethernet standards.

5. Troubleshooting

If problems develop during the installation or operation of your Networking Hub, this chapter should help to locate, identify, and correct such problems. Please follow the suggestions listed in **Section 5.1**. If nothing helps, contact Black Box (see **Section 5.2**).

5.1 Things to Check

1. If you have a problem installing or operating the Networking Hub, refer to **Chapters 3 and 4**. Make sure that the various other components of the network are operable.
2. Check the attached cables. Do they have RJ-45-type (*not* RJ-11 “telephone” type) connectors? Are the cables properly connected? Have the cables or wires been crimped or damaged during installation?
3. Make sure the DC power cord is properly attached to the Networking Hub. Verify that the external power supply is plugged into a functioning electrical outlet. Is the Pwr LED on, signalling that the unit is receiving proper power?
4. If the problem is isolated to a network device other than the Networking Hub, replace the problem device with a device that you know is in proper working order. Verify whether or not the problem goes away. If not, go to Step 5. If the problem goes away, the Networking Hub and its associated cables are functioning properly.
5. If the problem persists, contact Black Box for technical support. (See **Section 5.2**.)

5.2 Calling Black Box

If you determine that your Networking Hub is malfunctioning, do not attempt to alter or repair it. Contact Black Box at 724-746-5500. The problem might be solvable over the phone.

Before you do, make a record of the history of the problem. We 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.

NETWORKING HUB

- The components involved in the problem.
- Any particular application that, when used, appears to create the problem or make it worse.

If you cannot solve the problem over the phone, return the Networking Hub to the place of purchase.



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