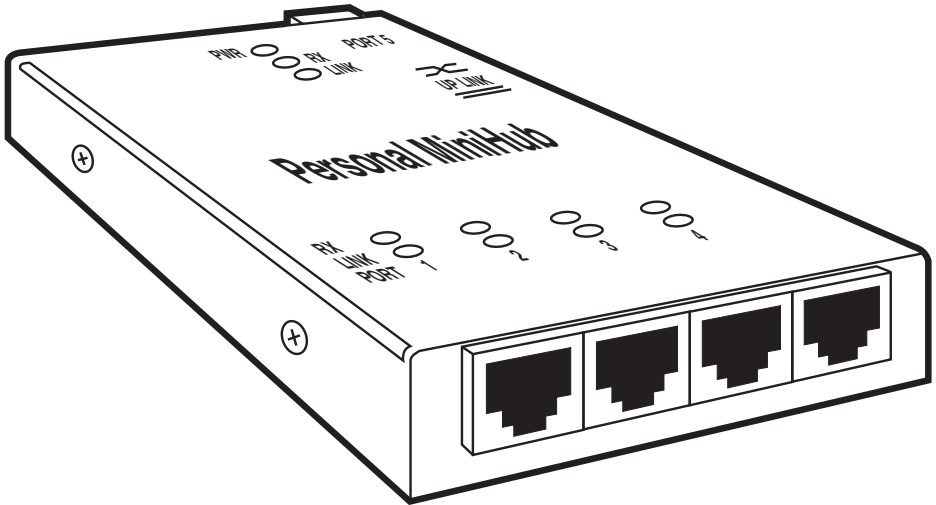




Personal MiniHub



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INFORMATION**

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FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

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 édicté par Industrie Canada.

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1. Specifications

Standards — IEEE 802.3 Ethernet

Connectors — (5) RJ-45 female:
(4) station ports, (1) switch-selectable uplink/station port

Indicators — (11) LEDs: (5) LINK,
(5) RX, (1) PWR

Switches — (1) uplink switch on side
of unit

Performance — Data Rate: 10 Mbps,
Partitioning: Enforced after 32
consecutive collisions;
Reconnect: Occurs after 512
bits error-free transmission

Maximum Ethernet Segment

Lengths — UTP (Unshielded
10BASE-T): 328 ft. (100 m);
STP (Shielded 10BASE-T):
492 ft. (150 m)

Network Standards — Ethernet
V2.0, IEEE 802.3: 10BASE-T
(the Hub is a physical-layer
standard Ethernet product and
operates independently of all
software)

Operating Environment — Ambient
Temperature: 32 to 122° F (0 to
50° C); Storage Temperature: -4
to 140° F (-20 to 60° C)

Power — LE2650A: 115 VAC,
60 Hz power supply, UL® listed,
CSA certified; LE2650AE:
230 VAC, 50 Hz power supply,
UL® listed, CSA certified, TUV
and GS approved

Size — 0.8"H x 3.3"W x 4.8"D
(2 x 8.4 x 12.2 cm)

Weight — Hub: 0.8 lb. (0.4 kg);
Power supply: 1 lb. (0.5 kg)

2. Introduction

2.1 Inspecting the Package and Product

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

- Personal MiniHub
- External power supply, either 115 VAC, 60 Hz (LE2650A) or 230 VAC, 50 Hz (LE2650AE)
- (1) Velcro® tape section, approximately 3 inches long
- (2) Rackmount brackets and screws
- This User's Guide

Remove the Personal MiniHub from the shipping container. Be sure to keep the shipping container in case you need to ship the unit at a later date.

If any items are missing or damaged, contact Black Box.

2.2 Description

The Personal MiniHub is a five-port 10BASE-T workplace hub in a very compact package. It can expand a “power user’s” existing single network port to provide up to three extra ports in the immediate office or lab area. It is simple to install and use in an office or lab environment, requiring no special rack cabinets or wiring-closet apparatus. The MiniHub is a standard physical-layer Ethernet product and operates independently of all software.

The Personal MiniHub is also well-suited for small-to-medium sized office or lab environments (two to four persons) that need an independent Ethernet network. Small independent networks built using the Hub are easily expanded by cascading hubs of equal or greater capacity. See **Section 3.4** for more about the Up-Link switched-port feature.

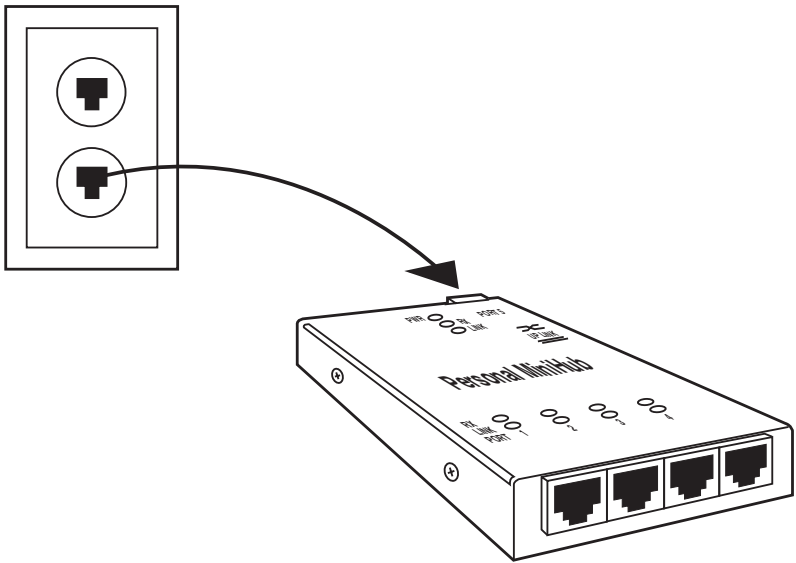


Fig. 2-1. Personal MiniHub.

The Personal MiniHub's small size makes it very useful for demonstration situations in conference rooms and in exhibitions where a temporary network or network expansion is needed. The Personal MiniHub takes up minimal space and uses minimal power, and is rugged enough to be carried in a coat pocket.

The Personal MiniHub fits easily into the workplace environment. It can be mounted on a tabletop or shelf, or, with the included Velcro® strip, on a wall surface, or on the back or side of a desk or cabinet. All of the wiring connectors are in the same place, so that wiring space is neat and minimal. The external power supply conveniently plugs into an available AC wall receptacle or power strip.

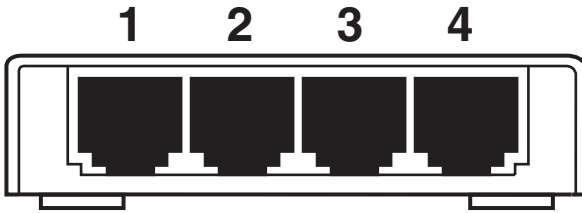


Fig. 2-2. RJ-45 10BASE-T Ports.

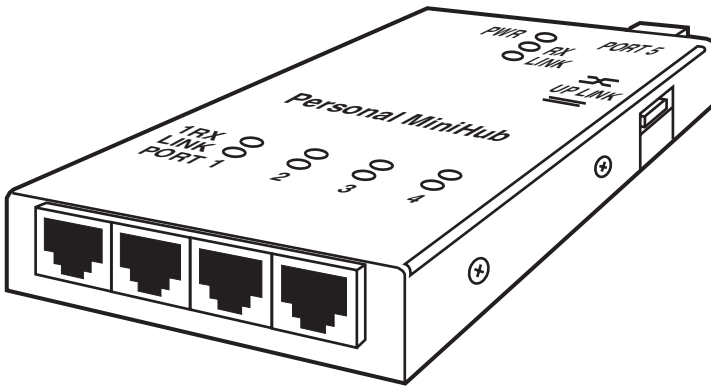


Fig. 2-3. Top View—Personal MiniHub.

The Personal MiniHub includes Link and RX LEDs for each RJ-45 port, and one LED for power, located near the external power supply. Since each LED is near the port it monitors, it is easy to associate the status LED for each of the ports with the appropriate port.

The external power supply that comes with the Personal MiniHub is one of two types: one version for AC input power of 115 VAC, 60 Hz, and one version for 230 VAC, 50 Hz. The 115-VAC version has a small transformer integral with a convenience power outlet plug, and a lightweight DC power cord to the applicable power jack on the hub. 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. It also includes a lightweight DC power cord to connect to the power jack on the Personal MiniHub unit.

2.3 Features and Benefits

- **Interconnect to an existing Ethernet network**—The Personal MiniHub provides an Up-Link switch for port #5 to be used to connect it into an existing Ethernet environment (such as the central hub for the building or area) via 10BASE-T wiring.
- **Interoperable with other Ethernet devices**—The Personal MiniHub is completely 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 within any standard Ethernet network and to operate with all standard software.
- **Installation versatility**—The Personal MiniHub is simple and easy to install in almost any office or lab location. The tiny package is very unobtrusive.
- **Robust Network Operations**—The Personal MiniHub 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.

- LEDs simplify network installation and maintenance—The Personal MiniHub is equipped with a full complement of LEDs to provide status about basic network activity. Five Link LEDs offer a very simple way for operational connections to be verified at the end of each 10BASE-T segment.
- Low-cost, standalone 10BASE-T connectivity—Operating in a standalone environment as a self-sufficient device, the Personal MiniHub offers a very low cost method of providing small workgroups access to a variety of Ethernet networking services such as file sharing, email, printer sharing, and other computer information.

2.4 Applications

Expanding from one to four ports at an existing site is easy, and requires no modification to typical building wiring. The installer simply plugs the existing networked device's network cable segment into one of the MiniHub's front RJ-45 ports. The Up-Link port #5 (with switch set to X) connects via 10BASE-T cabling to the existing network outlet. Then, power is connected to the Hub by plugging in its external power supply unit to an AC power receptacle, and plugging the DC power plug into the jack on the back/rear of the unit. In minutes, three new ports are available for other networked devices.

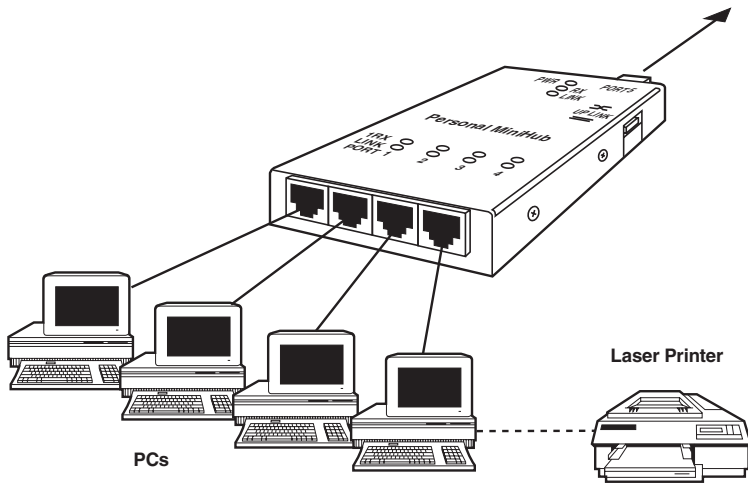


Fig. 2-4. Attaching to a Backbone.

The Personal MiniHub may also be used as a standalone to network a local personal multi-user system such as shown in **Fig. 2-5**.

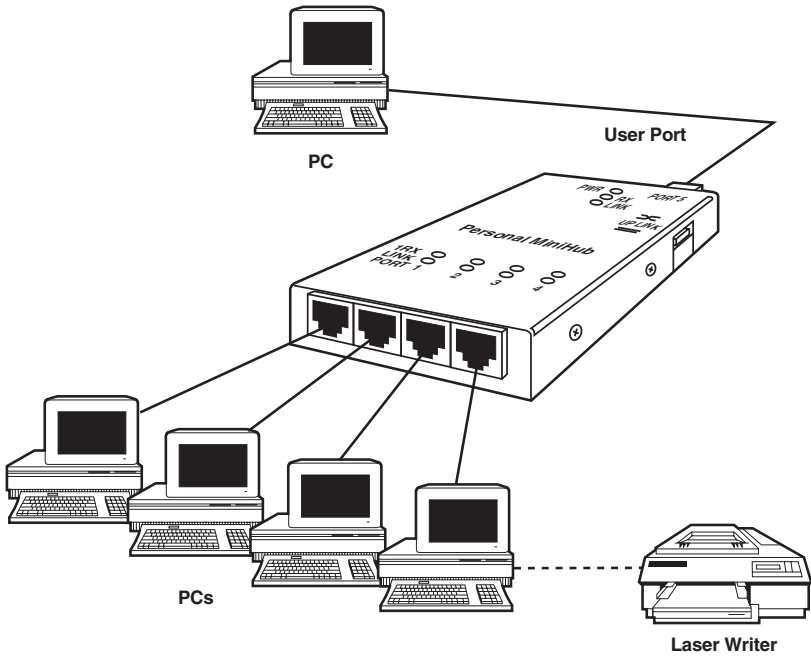


Fig. 2-5. Hub Used in a Standalone Network.

Up to five RJ-45 user ports are available where only 10BASE-T wiring is used, and full-length Ethernet segments are supported on all five segments. In this application, the "Up-Link" switch is in the straight-through or = position, so that port #5 on the back of the unit is a user port (not an up-link to another hub).

3. Installation

Installation of a Personal MiniHub is a very simple procedure. First, locate an AC receptacle that is within six feet (1.8 m) of the intended hub location and plug in the external power supply (provided with the Personal MiniHub). The small DC power cord from the power supply plugs into the matching right-rear power jack of the Hub, and when power is applied the green “PWR” LED will light.

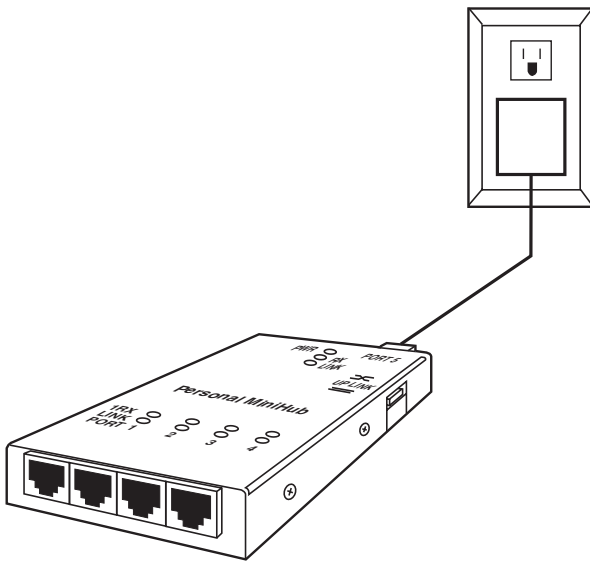


Fig. 3-1. Connecting the Personal MiniHub to the External Power Supply.

The external power supply is one of two types: one version for AC input power of 115 VAC, 60 Hz, and one version for 230 VAC, 50 Hz. Examine the power supply to make sure the version you have is the right type for your AC power system. The 115 VAC version has a small transformer integral with a convenience power outlet plug, and a lightweight DC power cord to the applicable power jack on the hub. 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. It also includes a lightweight DC power cord to connect to the power jack on the Personal MiniHub.

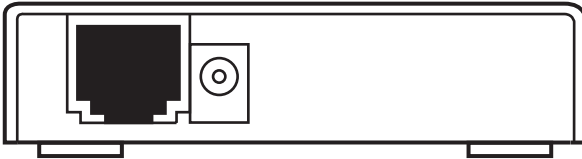


Fig. 3-2. Rear View of the Personal MiniHub.

3.1 Table-Top or Shelf Mounting

The Personal MiniHub is easily mounted on a table-top or shelf, and has four rubber feet to provide stability and keep it from scratching finished surfaces. A piece of Velcro may be used to add additional stability if desired. When properly installed, the LED status indicators will be in plain view and easy to read. Plug in two or more Ethernet cable segments, and your network is in operation.

The rugged steel case of the Personal MiniHub will protect it from accidental damage in an office or lab setting. Keep an open area around the unit so that convection cooling can occur while the unit is in operation.

3.2 Wall (or Vertical Surface) Mounting

A piece of Velcro mounting tape is supplied with the unit, and may be used to mount a MiniHub in a vertical position. Stick one side of the Velcro on the bottom of the MiniHub between the rubber feet. Stick the other side of the Velcro to the desired vertical mounting location. This permits the compact hub to be mounted on a wall surface, on the side of a server unit cabinet, on the back of a desk, or in other similar convenient locations in the workplace where the associated cables are out of the way.

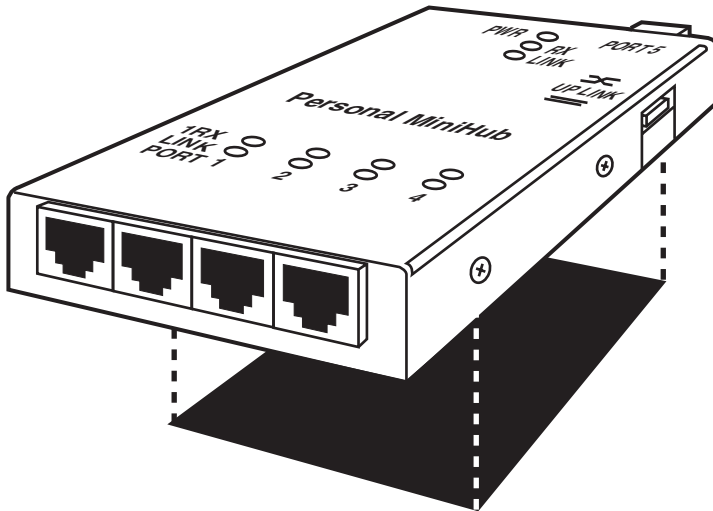


Fig. 3-3. Personal MiniHub, Velcro Mounting.

As an alternative to Velcro mounting, small brackets for mounting with screws may be used. The metal screws in each side of the case may be used to attach the brackets. Use of the optional brackets permits the Hub to be mounted in almost any desired position.

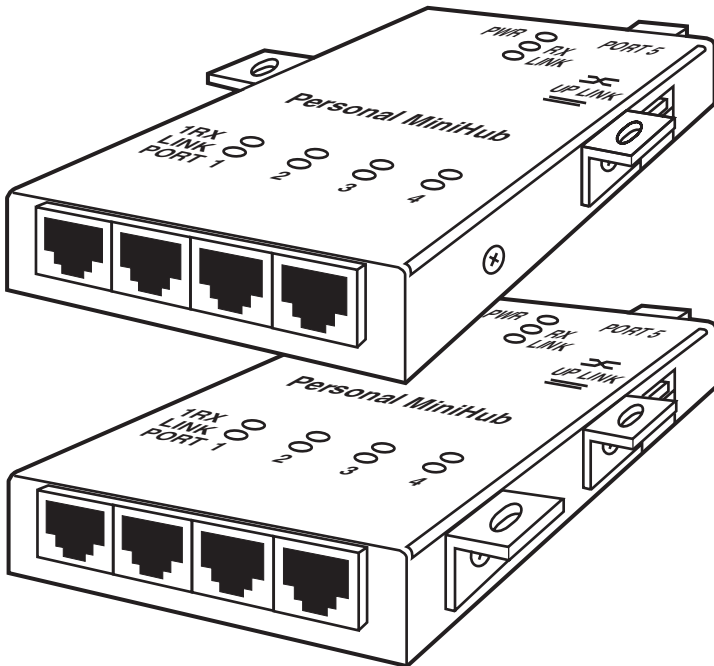


Fig. 3-4. Personal MiniHub, Optional Bracket Mounting.

3.3 Twisted Pair Segment Connections

Follow these steps:

1. Using standard 10BASE-T media, insert the plug on one end of the network cable into one of the RJ-45 female ports on the Personal MiniHub. Even though the Hub's ports are of the shielded type, they will accept and operate properly with either unshielded or shielded RJ-45 twisted-pair wiring plugs.
2. Connect the other end of each network segment to the applicable workstation or user device. The "Link" LED will be lit for each port where the connection is made on both ends of the segment, and where the AC power is on at each end as well, in other words, when the segment circuit is established and is ready to use.
3. For the port #5 up-link options, see **Section 3.4**.

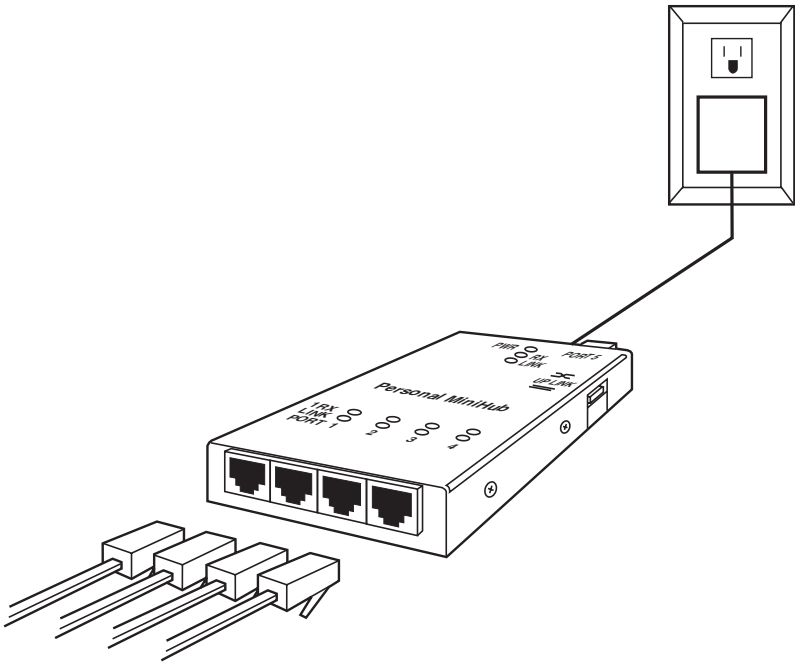


Fig. 3-5. Twisted-Pair Segment Connections.

3.4 Up-Link Option on Port #5, Up-Link Switch

For RJ-45 port #5 only, the Up-Link crossover switch on the right side of the MiniHub is used to select either a normal 10BASE-T wiring segment connection to a user device (switch in the “=” position) or a special network up-link 10BASE-T wiring segment connection to another hub or concentrator (switch in the “X” position). A special crossover cable for up-links is not needed with the MiniHub because of the built-in up-link switch feature.

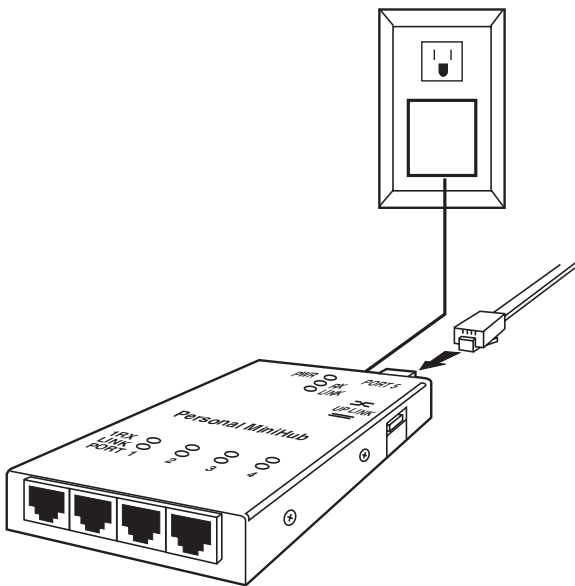


Fig. 3-6. Up-Link Option on Port #5.

PERSONAL MINIHUB

UP-LINK OPTION USED FOR CASCADING

Hubs may be cascaded in order to expand networks. For example, a MiniHub may be cascaded via its port #5 up-link into any port of another MiniHub. Since each MiniHub provides full repeater functionality,

cascaded units can operate together even though there may be a full segment of distance between them. Based on the “four-repeater rule” defined by Ethernet standards, there may be a maximum of four units in any one chain between any two users.

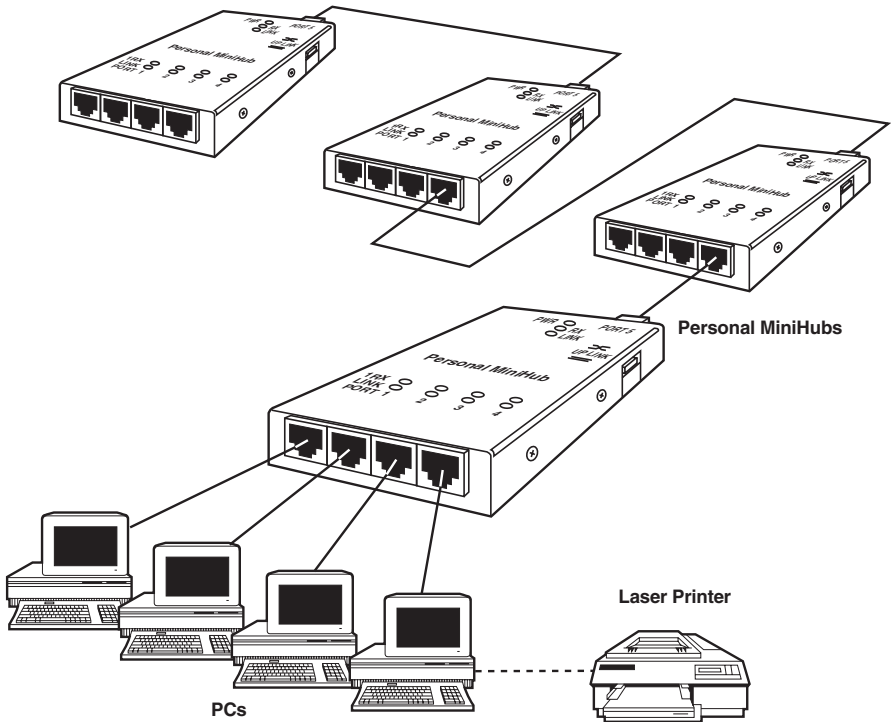


Fig. 3-7. Personal MiniHubs Cascaded to Show Full Repeater Functionality.

4. Operation

This section details the various operational features of the Personal MiniHub, including a description of the LED indicators. The Personal MiniHub is fully compliant with the Ethernet Version 2/IEEE 802.3 repeater specification for CSMA/CD 10 Mbps operation and will function accordingly.

- **Power On (PWR) LED**—lights green to show functional DC power.
- **Link Status (Link) LED**—The Personal MiniHub includes a Link LED for each port. It indicates by illuminating in green that there is proper connectivity on its 10BASE-T network segment. The Link LED will turn off if connectivity is lost between the ends of the segment or a loss of power occurs in the unit at either end.
- **Receive Packets (RX) LED**—The RX LEDs, one for each RJ-45 port, illuminate intermittently in green to indicate that data packets are being received from the segment. This provides a visual indication of network activity, and is also helpful in troubleshooting.
- **Partitioning and re-connection**—The Personal MiniHub will automatically partition any port where 32 consecutive collisions occur or after 6.5 milliseconds of continuous transmissions. Network integrity is checked every 800 milliseconds and segment re-connection occurs after one 512-bit packet is transmitted without an error.
- **Preamble regeneration**—The Personal MiniHub will add bits to the preamble so that the output packet contains at a minimum a 64-bit preamble per the Ethernet standard.
- **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 the other ports.
- **Fragment extension**—The Personal MiniHub will automatically add bits to a received data packet of less than 96 bits (a “fragment”) so that the minimum output packet to the other port is 96 bits long.

5. Troubleshooting

The Personal MiniHub is designed to provide reliability and consistently high performance in all network environments. The installation of the Personal MiniHub is a simple procedure (see **Chapter 3, Installation**). Operation is very simple and is described in **Chapter 4, Operation**.

If problems develop during installation or operation, this section should help to locate, identify, and correct such problems. Follow the suggestions listed here before you contact Technical Support. However, if you are unsure of any procedure described in this section, or if the Personal MiniHub is not operating as expected, do not attempt to repair or alter the unit. Contact Technical Support for assistance.

5.1 Before Calling for Assistance

1. If you encounter difficulty when installing or operating the Personal MiniHub, refer back to **Chapter 3, Installation** and **Chapter 4, Operation**. Check to make sure that the various other components of the network are operable.
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. Make sure that the DC power cord is properly attached to the unit, and that the external power supply unit is plugged into a functioning electrical outlet. Use the PWR LEDs to verify that the unit is receiving proper power.
4. If the problem is isolated to a network device other than the Personal MiniHub, replace the problem device with a known good device. Verify whether or not the problem is corrected. If not, go to **Step 5** below. If the problem is corrected, the Personal MiniHub and its associated cables are functioning properly.
5. If the problem continues after completing **Step 4** above, contact Technical Support by fax or by phone for assistance.

5.2 When Calling for Assistance

Please be prepared to provide the following information:

1. A complete description of the problem, including the following points:
 - a. The nature and duration of the problem;
 - b. Situations in which the problem occurs;
 - c. The components involved in the problem;
 - d. Any particular application that, when used, appears to create the problem;
2. An accurate list of products involved, with part numbers and serial numbers. Include the date that you purchased each product from Black Box.
4. A record of changes that have been made to your network configuration before the occurrence of the problem. Any changes to system administration procedures should all be noted in this record.

5.3 Return Material Authorization (RMA) Procedure

All returns for repair must be accompanied by a return material authorization (RMA) number. To obtain an RMA number, call Black Box. When calling, please have the following information available:

- Name and phone number of your contact person
- Name of your company/institution
- Your shipping address
- Product name
- Serial number
- Sales order number
- Date of installation
- Failure symptoms, including a full description of the problem.

We will carefully test and evaluate all returned products and will repair products if possible. However, if the problem cannot be duplicated by Black Box, the unit will be returned as “No problem found.”

5.4 Shipping and Packaging Information

If you need to ship the unit back to Black Box, please follow these instructions:

1. Package the unit carefully. We recommend that you use the original container if available. Units should be wrapped in a bubble-wrap plastic sheet or bag for shipping protection. (You may keep all connectors and this User's Guide.)

CAUTION

Do not pack the unit in styrofoam "popcorn" type packing material. This material may cause electrostatic shock damage to the unit.

2. Clearly mark the Return Material Authorization (RMA) number on the outside of the shipping container.
3. Ship the package prepaid back to Black Box.



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