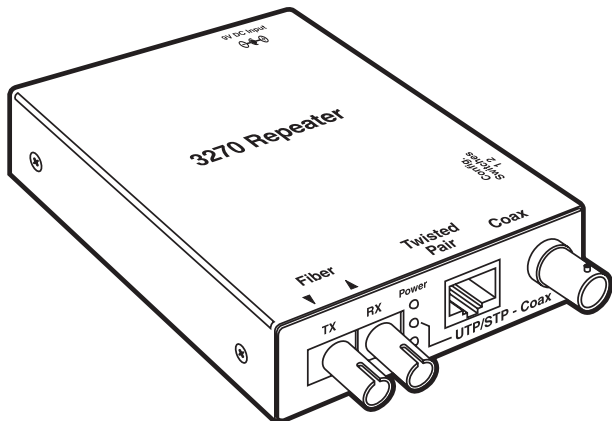


3270 Repeater—Fiber



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**

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 classe A 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 connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas 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 objetos 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: 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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Contents

Chapter	Page
1. Specifications	6
1.1 3270 Repeater—Fiber	6
1.2 Fiber Optic Cable	7
1.2.1 Multimode	7
1.2.2 Single-Mode	7
1.3 Twisted-Pair Cable and Connector	8
1.3.1 Category 3	8
1.3.2 Category 5	9
1.3.3 Category 3 and 5	9
1.4 RG-62 Cable	10
2. Introduction	11
3. Installation	12
4. Operation	18
5. Application	19
5.1 Repeaters in the Network	19
5.2 Typical Application	20
6. Troubleshooting	21
6.1 Before Calling for Technical Support	21
6.2 Calling Black Box	23
6.3 Shipping and Packaging	24

1. Specifications

1.1 3270 Repeater — Fiber

Host Connection: IBM® 317x or 327x cluster controller

Distance: Repeater to repeater over fiber optic cable: 6561 ft. (2000 m); Repeater to workstation: 900 ft. (274.3 m)

Indicators: (3) Status LEDs: Power, UTP/STP-Coax, Fiber

Connectors: (1) RJ-45 (8-wire) modular jack, (2) ST®

Switches: (1) Configuration switch: Twisted-pair or Coax

Temperature Tolerance: 32 to 122°F (0 to 50°C)

Relative Humidity: 10 to 90%, noncondensing

Altitude: Up to 10,000 ft. (3048 m)

Power: External transformer

Size: 1"H x 3"W x 3.9"D (2.5 x 7.6 x 9.9 cm)

Shipping Weight: 2 lb. (0.9 kg)

1.2 Fiber Optic Cable

The physical characteristics of the fiber cable must meet or exceed the following.

1.2.1 MULTIMODE

Fiber Optic Cable recommended: 62.5/125- μm multimode fiber

Transmitter Power: Minimum -19.0 dBm; Maximum -14.0 dBm

Receiver Sensitivity: Minimum -32.5 dBm; Maximum -14.0 dBm

Wavelength: 850 nm

Bit Error Rate: $\leq 10^{-9}$

Maximum Cable Distance: 2 km (1.2 mi.)

1.2.2 SINGLE-MODE

Fiber Optic Cable Recommended: 9- μm single-mode fiber

Transmitter Power: Minimum -27.0 dBm; Maximum -17.0 dBm

Receiver Sensitivity: Minimum -32.5 dBm; Maximum -13.0 dBm

Wavelength: 1300 nm

Bit Error Rate: $\leq 10^{-9}$

Maximum Cable Distance: 8 km (4.9 mi.)

1.3 Twisted-Pair Cable and Connector

Category 3 wire or better is required; Category 5 wire is recommended. Either shielded twisted pair (STP) or unshielded twisted pair (UTP) can be used. Do *not* use flat or silver-satin wire.

1.3.1 CATEGORY 3

Gauge: 24 to 22 AWG

Attenuation: 28 dB/1000 ft. @ 10 MHz

Differential Characteristic Impedance: $100 \Omega \pm 1\%$
@ 10 MHz

1.3.2 CATEGORY 5**Gauge:** 24 to 22 AWG**Attenuation:** 20 dB/1000 ft. @ 10 MHz**Differential Characteristic Impedance:** $100 \Omega \pm 10\%$
@ 10 MHz**1.3.3 CATEGORY 3 AND 5****Minimum UTP/STP Cable Distance:** 1.8 m (5.9 ft.)**Maximum UTP/STP Cable Distance:** 762 m (2500 ft.)**NOTE**

The active pair in a twisted-pair copper 3270-compliant network are pins 4 and 5. Use only dedicated wire pairs (such as blue/white and white/blue, orange/white and white/orange) for the active pins.

Figure 1-1. Straight-through cable pinning.

RJ-45 Connector	RJ-45 Connector
3	3
4 -----	4
5 -----	5
6	6

1.4 RG-62 Cable

Cable Type: Coaxial RG-62

Impedance: 93Ω @ 10 MHz

Mutual Capacitance: 13 pF/ft. $\pm 20\%$ @ 10 MHz

Maximum Cable Distance: 307 m (1007 ft.)

Minimum Distance/Connection: 1.8 m (5.9 ft.)

2. Introduction

The 3270 Repeater—Fiber supports all IBM 3270-compliant devices and extends the signal distance of a 317x or 327x cluster controller to terminal links.

The Repeater provides an RJ-45 twisted-pair connector to copper cable, a BNC connector to coaxial cable, and a set of RX (receive) and TX (transmit) ST connectors to multimode fiber optic cable.

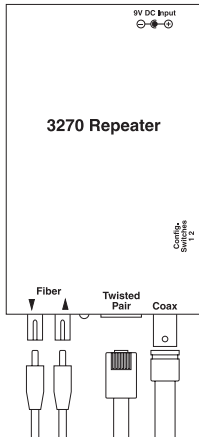


Figure 2-1. Connections to the Repeater.

3. Installation

NOTE

All cable connections to the Repeater must be at least 1.8-m (6-ft.) long.

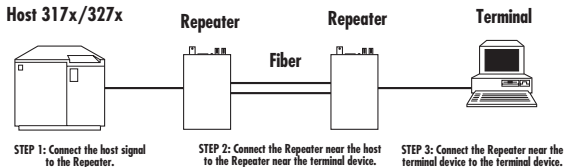


Figure 3-1. Installation.

1. Connect the host signal to the Repeater.

NOTE

Set the configuration switch (located on the side of the Repeater) according to site requirements, using the following switches.

Switch 1	NOT USED
Switch 2	UP = Twisted Pair DOWN = Coax

For twisted pair:

- Locate or build twisted-pair cables (see **Chapter 1**) with male RJ-45 plug connectors at both cable ends.

NOTE

Install a balun (Black Box part number 50370) between the RJ-45 cable and the coax connector.

- Install the balun at the host coax connector.
- Connect the male RJ-45 plug connector at one end of the twisted-pair cable to the balun on the host coax connector.
- Connect the male RJ-45 plug connector at the other end of the cable to the female RJ-45 connector on the Repeater.

Coax:

- Locate or build coaxial RG-62 cables (see **Chapter 1**) with male connectors at both ends.
- Install one end of the cable to the female BNC connector on the host.

- Install the other end of the cable to the female BNC connector on the Repeater.

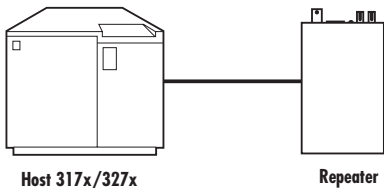


Figure 3-2. Step 1. Connect the host signal to the Repeater.

2. Connect the Repeater *near the host* to the Repeater *near the terminal device*.
 - Locate or build fiber cable that conforms to the cable specifications (see **Chapter 1**) with male fiber connectors at both ends.
 - Connect one end of the first fiber cable to the Repeater's TX connector.
 - Connect the other end of *that* fiber cable to the second Repeater's RX connector.
 - Connect one end of the *second* fiber cable to the Repeater's RX connector.

- Connect the other end of *that* fiber cable to the second Repeater's TX connector.

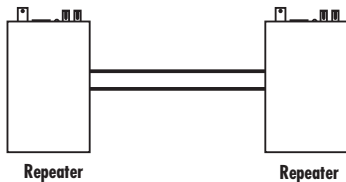


Figure 3-3. Step 2. Connect the host signal to the Repeater near the host to the Repeater near the terminal device.

3. Connect the Repeater *near the terminal device* to the terminal device.

Twisted-pair:

NOTE

Install a balun (part number 50370) between the RJ-45 cable and the terminal device coax connector.

- Install the balun at the terminal device's coax connector.
- Connect the male RJ-45 plug connector on one end of the cable to the female RJ-45 connector marked "UTP/STP" on the Repeater.

- Connect the male RJ-45 plug connector at the other end of the cable to the balun on the terminal device.

Coaxial:

- Connect the male coax connector on one end of the cable to the female connector marked “Coax” on the Repeater.
- Connect the male coax connector at the other end of the cable to the female coax connector on the terminal device.

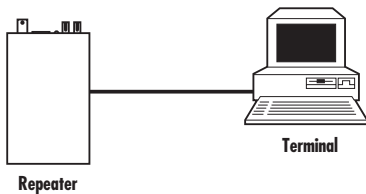


Figure 3-4. Step 3: Connect the Repeater near the terminal device to the terminal device.

4. Connect the Repeater to power.
 - Locate the correct power supply adapter for site installation.
 - Connect the Repeater's power connector at the end of the power supply adapter cord to the Repeater's power receptacle.
 - Connect the 2-prong or 3-prong external power connector on the other end of the power supply adapter cord to external AC power.

4. Operation

Table 4-1. Status LEDs.

LED	Description
Power	Steady green LED indicates connection to external AC power.
UTP/STP—Coax	Blinking green LED indicates network traffic on the unshielded or shielded twisted-pair link or on the coaxial cable.
Fiber	Blinking green LED indicates network traffic on the fiber link.

NOTE

Devices installed at maximum distances may not function reliably because of limitations imposed by host timeouts and/or by terminal equipment timeouts.

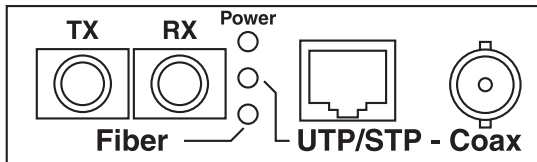


Figure 4-1. Front panel showing LEDs and connectors.

5. Application

5.1 Repeaters in the Network

3270 Repeaters can be installed:

1. In pairs that connect, through copper cable, RJ-45 connectors, baluns, **and** through fiber, an IBM 317x or 327x cluster controller and a 3270-compliant terminal device.
2. In pairs that extend network distance, through twisted-pair copper cable, an RJ-45 connector, and balun, **and** through fiber **and** coax cable to a 3270 compliant terminal device.
3. In pairs that connect, through coax cable and through fiber, an IBM 317x or 327x cluster controller and a 3270-compliant terminal device.

NOTE

See Figure 3-1 on the following page for an illustration of #1, #2, and #3 described above.

5.2 Typical Application

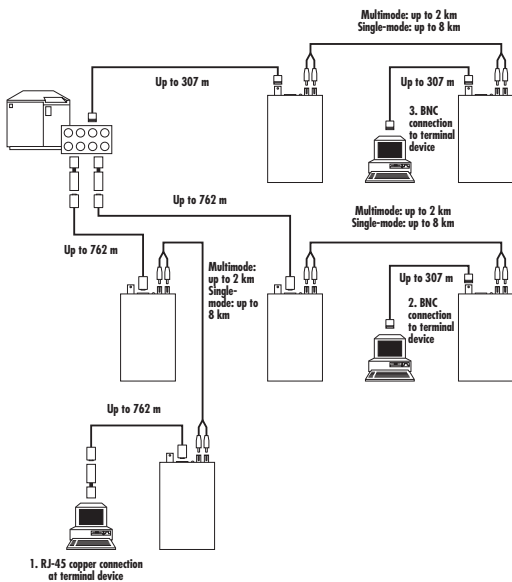


Figure 5-1. Typical application.

6. Troubleshooting

6.1 Before Calling for Technical Support

If the Repeater fails, ask the following questions.

1. Is the Power LED on the Repeater lit?

NO

- Is the power adapter the proper voltage and cycle frequency for the AC outlet?

Requirement	Location
240 volts, 50 Hz	United Kingdom
230 volts, 50 Hz	Europe
120 volts, 60 Hz	USA/Canada/Mexico
100 volts, 50-60 Hz	Japan
240 volts, 50 Hz	Australia

- Is the power adapter properly installed in the Repeater and in the outlet?
- Call Black Box Technical Support at 724-746-5500.

YES

- Proceed to step 2.

2. Is the UTP/STP-Coax LED lit?

NO

Twisted pair:

- Check twisted-pair cables for proper connection.
- Check the RJ-45 connector for correct twisted-pair cable configuration.
- Check the configuration switch for correct (twisted-pair) setting.
- Call Black Box Technical Support at 724-746-5500.

Coax:

- Check the coax cables for proper connection.
- Check the configuration switch for correct (coax) setting.
- Call Black Box Technical Support at 724-746-5500.

YES

- Proceed to step 3.

3. Is the Fiber LED lit?

NO

- Check fiber cables for proper connection.
- Verify that the TX and RX cables on the Repeater are connected to TX and RX ports, respectively, on the other device.
- Call Black Box Technical Support at 724-746-5500.

YES

- Call Black Box Technical Support at 724-746-5500.

6.2 Calling Black Box

If you determine that your 3270 Repeater—Fiber 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. 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.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

6.3 Shipping and Packaging

If you need to transport or ship your Repeater:

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



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