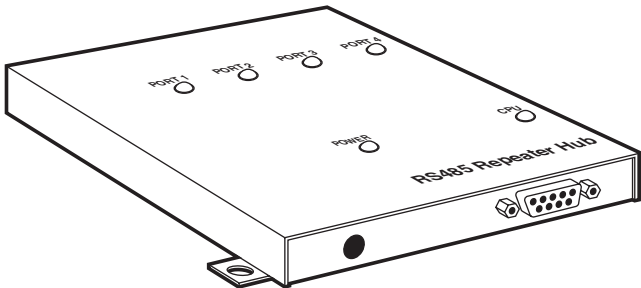




## RS-485 Repeater Hub



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### 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](http://www.blackbox.com) • E-mail: [info@blackbox.com](mailto: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 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.

*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.

## **TRADEMARKS USED IN THIS MANUAL**

UL is a registered trademark of Underwriters Laboratories Incorporated.

*Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.*

# 1. Specifications

<b>Interface</b> —	RS-485 2-wire
<b>Protocol</b> —	Asynchronous
<b>Data Rates</b> —	Up to 115,200 bps
<b>Indicators</b> —	(6) LEDs: Ports 1 through 4, Power, and CPU
<b>Connectors</b> —	(5) DB9 female, (1) 5-pin DIN power input
<b>Enclosure</b> —	Metal
<b>Approvals</b> —	Power supply: UL <sup>®</sup> , CSA
<b>MTBF</b> —	100,000 hours
<b>Maximum Altitude</b> —	15,000 feet (4570 m)
<b>Operating Temperature</b> —	32 to 158°F (0 to 70°C)
<b>Relative Humidity Tolerance</b> —	10 to 95%, noncondensing

## RS-485 REPEATER HUB

<b>Power</b> —	TL170A: 115 VAC, 60 Hz, 17 VAC (center-tapped), 20 watts; TL170AE: 230 VAC, 50 Hz, 17 VAC (center- tapped), 20 watts
<b>Size</b> —	1.5"H x 6.75"W x 7"D (3.8 x 17.2 x 17.8 cm)
<b>Weight</b> —	3 lb. (1.4 kg)

## 2. Introduction

The RS-485 Repeater Hub expands one RS-485 2-wire port to four RS-485 2-wire ports. The CPU port connects to your existing 2-wire multidrop line as usual, and up to four RS-485 2-wire lines may be connected to the remaining ports.

A typical application uses a polled environment where a master device polls the connected equipment, and each unit has a unique identity. All connected devices receive the poll from the master, but only the device whose identity matches the poll request will respond.

The RS-485 Repeater Hub delivers the poll request to all four ports and delivers the response to the CPU port. The Hub contains terminations that can be applied by installing the appropriate internal shunt. You can select termination individually for each port, including the CPU port.

All ports have LED indicators, which flash when the Hub receives data. A Power LED glows steadily when proper power is supplied.

All data connections are made via female DB9 connectors. The metal case is internally grounded



## RS-485 REPEATER HUB

to the earth ground carried to the AC wall receptacle via the wallmount transformer. Using the two tabs in the enclosure, the Hub can be mounted on a flat surface.

You can also install a surge-suppressed power strip between to AC transformer and the AC line to provide additional protection to the Hub. When using a power strip, make sure the earth-ground connection is secure from the AC outlet through the strip to the Hub.

You can special-order an RS-485 Repeater Hub with an optional surge protector built into the unit. Call Technical Support for more information.

### 3. Installation

#### WARNING!

Ground-potential differences are a hazard not only to your equipment, but to you as well. During installation, never work with any device connected to the AC power line. Make all connections to all devices *before* connecting any of them to sources of AC power.

1. Keeping in mind the warning above, position the RS-485 Repeater Hub in a clean, stable environment near a 115-volt AC power source. Fasten the Hub to a flat surface using two #10 screws.

#### NOTE

The Hub's metal enclosure is connected to earth ground via the AC transformer. The surface to which the Hub is mounted should also be at local earth-ground potential if the surface is metal. Fastening the Hub with screws which scuff the paint on the Hub's mounting tabs will establish an earth-ground connection to a metal mounting surface.

2. Route your main data cable from the main data line to the Hub's CPU port. Secure the connections by tightening the data connector's screwlocks.
3. Route up to four more data cables from your devices to the remaining port(s) on the Hub. Secure the connectors.

4. Connect the output (DIN5) plug from the AC transformer to the Hub's power connector.
5. Apply power to the Hub by plugging the AC transformer into a properly grounded AC outlet.
6. Apply power to the connected devices. If you experience problems with accurate data transmission, you may need to install one or more of the termination shunts inside the Hub.

*Before* removing the cover of the Hub, remove power from all connected devices and disconnect the AC transformer from AC power. Remove the four #4 screws which fasten the Hub's cover to its base, and lift off the cover. Push-on shunts are located on the Hub's circuit board and function according to Table 3-1. The terminations are installed by pushing the appropriate shunt onto both pins of the header marked for a selected port. Attach the Hub's cover before re-applying power.

**Table 3-1. Termination Shunts**

W1	CPU Port
W2	Port 1
W3	Port 2
W4	Port 3
W5	Port 4

**Table 3-2. DB9 Pinout**

Pin 2	Receive/Transmit+
Pin 3	Receive/Transmit-

**Table 3-3. Power Connector 5-pin DIN Pinout**

Pin 1	AC
Pin 2	Not used
Pin 3	Not used
Pin 4	Not used
Pin 5	Ground



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