

# USER MANUAL

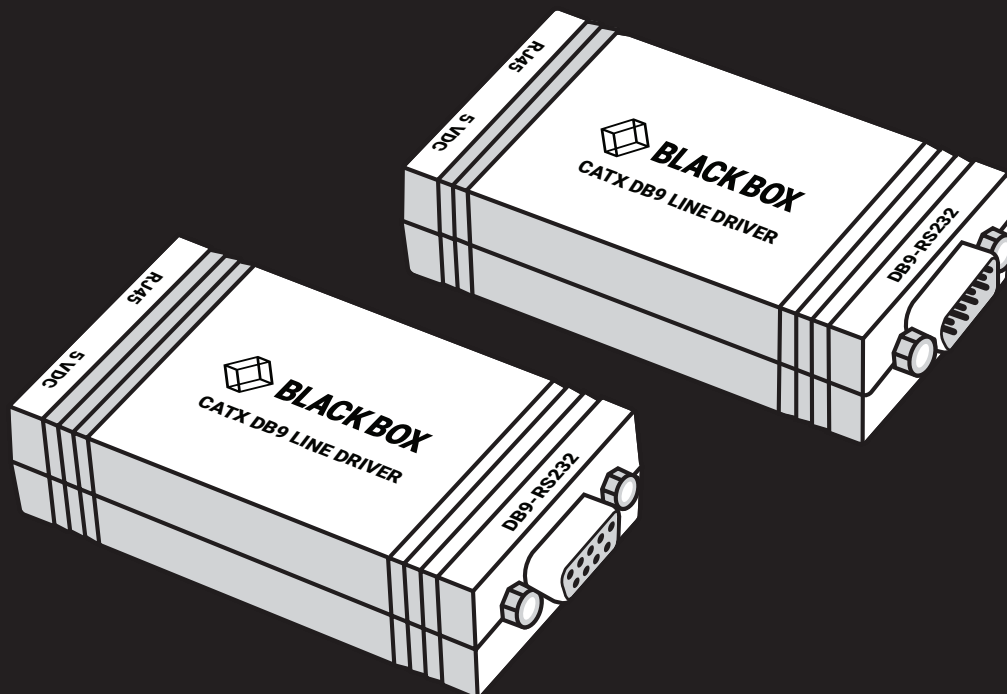
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ME890A-R2

# CATX DB9 LINE DRIVER

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24/7 TECHNICAL SUPPORT AT 1.877.877.2269 OR VISIT [BLACKBOX.COM](http://BLACKBOX.COM)



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# CHAPTER 1: SPECIFICATIONS

**TABLE 1-1. SPECIFICATIONS**

SPECIFICATION	DESCRIPTION
<b>Power</b>	
Power Supply	Input: 100–240 VAC, 47–63 Hz; Output: 5 VDC
<b>Interface</b>	
Interface	DB9: EIA RS-232-F, ITU v.28; RJ-45: RS-485
Flow Control	RTS/CTS
<b>Mechanical</b>	
Dimensions	0.8"H x 1.7"W x 3.2"D (2.1 x 4.3 x 8.1 cm)
Weight	2.0 lb. (0.9 kg), including local unit, remote unit, and (2) power supplies
<b>Data Transmission</b>	
Data Format	Asynchronous, Full-Duplex
Maximum Distances/Data Rates	4000 ft. (1250 m) for data rates < or = 100 kbps;
	2000 ft. (625 m) for data rates < or = 200 kbps;
	1500 ft. (468 m) for data rates < or = 250 kbps
	NOTE: The combined RS-232 cable and device load should be < or = 1000 pf and > or = 3 kohm in order to operate at 250 kbps
Isolation	1000 VDC isolation between RS-232 interface and RS-485 interface
<b>Cables and Connectors</b>	
Interconnect Cable	Four-pair twisted-pair cable, low-capacitance CAT5 or CAT6 recommended for best performance
Connectors	(1) DB9 female (local),
	(1) DB9 male (remote),
	(1) RJ-45,
	(1) DC power jack
<b>Environmental</b>	
Temperature	Operating: 32 to 140° F (0 to 60° C);
	Storage: -14 to +158° F (-10 to +70° C)
Humidity (non-condensing)	Operating: 20 to 80%;
	Storage: 10 to 90%

## CHAPTER 2: OVERVIEW

### 2.1 INTRODUCTION

The CATx DB9 Line Drivers enable you to position your receiving device up to 4000 feet (1250 m) from the sending device. The local unit has a DB9 female connector and is configured as a DCE device. The remote unit has a DB9 male connector and is configured as a DTE device. This allows the local/remote pair to function as a long extension cable between two RS-232 devices. There are no user-configurable settings.

The local and remote units are connected with a CAT5 or CAT6 twisted-pair cable. The local and remote units swap the RJ-45 pins so a straight-pinned cable is required. The units are isolated to provide protection from differences in ground potential between the units. The units pass TXD, RXD, RTS, and CTS signals to allow the application to use hardware handshake signals if required. The local unit provides an active high output on DSR and DCD, while the remote unit provides an active high output on DTR.

### 2.2 FEATURES

- ♦ Signals include RD, TD, RTS, CTS, GND, plus DTR (or DSR) asserted
- ♦ Local and remote units can be up to 4000 feet (1250 m) apart
- ♦ No configuration needed
- ♦ Fixed DCE local and DTE remote
- ♦ Operates point-to-point in full-duplex mode
- ♦ Provides 1000-VDC isolation between RS-232 interface and RS-485 interface
- ♦ Requires one external power supply (included) at each end
- ♦ Operates at 32 to 140° F (0 to 60° C)
- ♦ Supports data pair plus one control pair, and asserts one additional control line
- ♦ Can provide jumpers to select different control leads

### 2.3 WHAT'S INCLUDED

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or [info@blackbox.com](mailto:info@blackbox.com)

- ♦ (1) Local Unit
- ♦ (1) Remote Unit
- ♦ (2) 5-VDC external power supplies

To download this user manual from the Black Box web site:

1. Go to [www.blackbox.com](http://www.blackbox.com)
2. Enter the part number ME890A-R2 in the search box.
3. Click on the product in the "Product Results" page.
4. Click on the "Support" tab on the product page, and select the document you wish to download.



## 2.4 HARDWARE DESCRIPTION

### 2.4.1 LOCAL UNIT

Figure 2-1 shows the local unit's left-side panel. Figure 2-2 shows its right-side panel. Table 2-1 describes the local unit's components pictured in Figures 2-1 and 2-2.

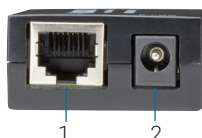


FIGURE 2-1. LOCAL UNIT'S LEFT-SIDE PANEL



FIGURE 2-2. LOCAL UNIT'S RIGHT-SIDE PANEL

TABLE 2-1. LOCAL UNIT'S LEFT- AND RIGHT-SIDE COMPONENTS

NUMBER IN FIGURES 2-1 AND 2-2	CONNECTION	DESCRIPTION
1	RJ-45 connector	Connects to remote unit via CATx cable
2	Barrel connector	Connects to power supply
3	DB9 female connector	Connects to DCE device

## 2.4.2 REMOTE UNIT

Figure 2-3 shows the remote unit's left-side panel. Figure 2-4 shows its right-side panel. Table 2-2 describes the remote unit's components pictured in Figures 2-3 and 2-4.

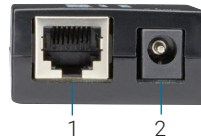


FIGURE 2-3. REMOTE UNIT'S LEFT-SIDE PANEL

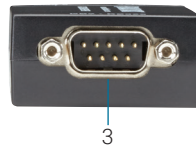


FIGURE 2-4. REMOTE UNIT'S RIGHT-SIDE PANEL

TABLE 2-2. REMOTE UNIT'S LEFT- AND RIGHT-SIDE COMPONENTS

NUMBER IN FIGURES 2-3 AND 2-4	CONNECTION	DESCRIPTION
1	RJ-45 connector	Connects to local unit via CATx cable
2	Barrel connector	Connects to power supply
3	DB9 male connector	Connects to DTE device

## 2.5 APPLICATION DIAGRAM

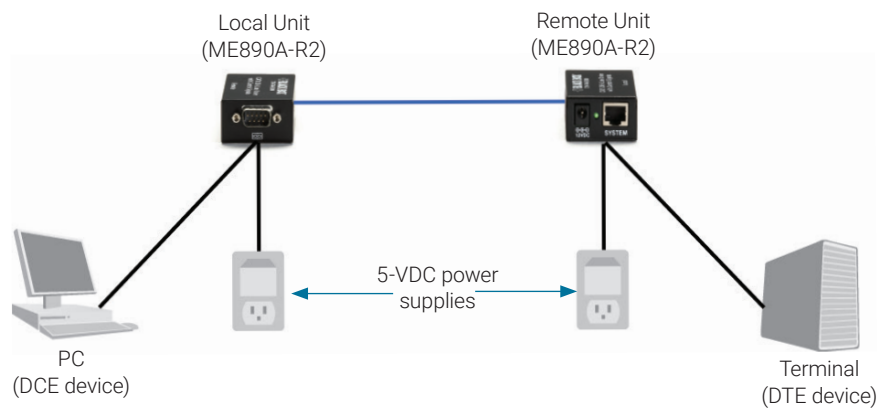


FIGURE 2-5. TYPICAL APPLICATION

## CHAPTER 3: INSTALLATION

Before you begin, make sure all equipment is powered off and the CATx DB9 Line Drivers are not powered on.

### 3.1 INSTALLATION STEPS

**Step 1:** Connect the local (DB9 female) device to a PC or Data Terminal Equipment (DTE) device.

**Step 2:** Connect the remote (DB9 male) device to a Data Communication Equipment (DCE) device.

**Step 3:** Connect the local and remote units with a straight-through CAT5 or CAT6 twisted-pair cable.

**Step 4:** Once all connections are made, use the supplied 5-VDC power supplies to power up the Line Drivers. Then apply power to your equipment.

### 3.2 DB9 PINOUT

TABLE 3-1. DB9 PINOUT

DB9 SIGNAL NUMBER	DB9 SIGNAL NAME	LOCAL DCE	REMOTE DTE
1	Carrier Detect	Asserted high	No connection
2	Received Data	Output	Input
3	Transmitted Data	Input	Output
4	Data Terminal Ready	No connection	Asserted high
5	Signal Ground	RS-232 Ground	RS-232 Ground
6	Data Set Ready	Asserted high	No connection
7	Request To Send	Input	Output
8	Clear To Send	Output	Input
9	Ring Indication	No connection	No connection

#### NOTES:

DCE = Data Carrier Equipment (can connect to a PC)

DTE = Data Terminal Equipment (configured the same as a PC)

## CHAPTER 3: INSTALLATION

### 3.3 RJ-45 PINOUT

TABLE 3-2. RJ-45 PINOUT

RJ-45 PIN NUMBER	RJ-45 SIGNAL NAME	LOCAL	REMOTE
1	Pair 3+	TXD+ (output)	TXD+ (input)
2	Pair 3-	TXD- (output)	TXD- (input)
3	Pair 2+	RXD+ (input)	RXD+ (output)
4	Pair 1+	RTS+ (output)	RTS+ (input)
5	Pair 1-	RTS- (output)	RTS- (input)
6	Pair 2-	RXD- (input)	RXD- (output)
7	Pair 4+	CTS+ (input)	CTS+ (output)
8	Pair 4-	CTS- (input)	CTS- (output)
9	Shield	RS-485 Ground	RS-485 Ground

You can use a shielded RJ-45 cable to connect the RS-485 ground between the local and remote units. A shielded cable can reduce noise, which can improve the RS-485 signals, but can also add capacitance, which can reduce the RS-485 data rate.

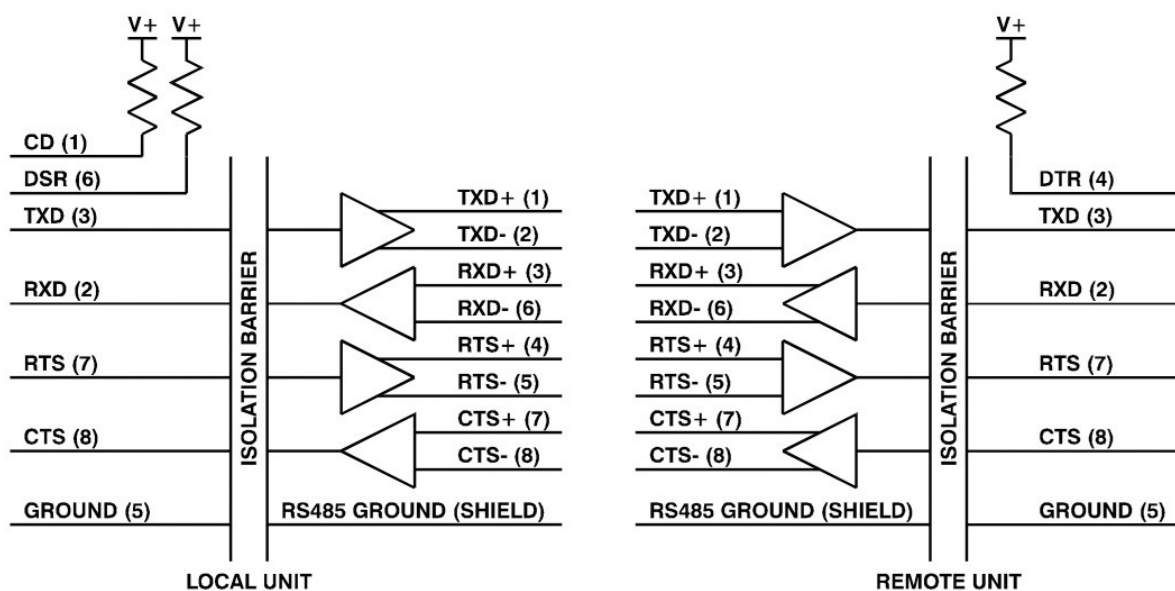


FIGURE 3-1. BLOCK DIAGRAM



## CHAPTER 4: TROUBLESHOOTING

### 4.1 PROBLEMS/SOLUTIONS

If the units fail to operate, check the following before calling for technical support.

1. Are units powered on? Check to see if the power supplies are plugged into a working AC outlet.
2. Check to see if the interconnect wire is connected properly. Use a straight-through CAT5 or CAT6 twisted-pair cable, because the local and remote units swap transmit and receive pins.
3. Try a lower baud rate if possible to make sure the baud rate is not too fast for the length of cable.
4. Check the DB9 cable connections. The local unit has a DB9 female connector, and is intended for connection to a PC or data terminal equipment. The remote unit has a DB9 male connector, and is intended for connection to a modem or data communication equipment.

### 4.2 CONTACTING BLACK BOX

If you determine that your CATx DB9 Line Driver is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box Technical Support at 724-746-5500 or [info@blackbox.com](mailto:info@blackbox.com).

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

### 4.3 SHIPPING AND PACKAGING

If you need to transport or ship your CATx DB9 Line Driver:

- ♦ Package it carefully. We recommend that you use the original container.
- ♦ If you are returning the unit, make sure you include everything you received with it. Before you ship for return or repair, contact Black Box to get a Return Authorization (RA) number.

## APPENDIX: REGULATORY INFORMATION

### A.1 FCC 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 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.



## APPENDIX: REGULATORY INFORMATION

### A.2 NOM STATEMENT

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 de 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 bloquear 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 debe 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 equipo 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 USED IN THIS MANUAL

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NOTES

NEED HELP?  
LEAVE THE TECH TO US

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Horizontal lines for notes.

NOTES

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Lined area for notes.



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