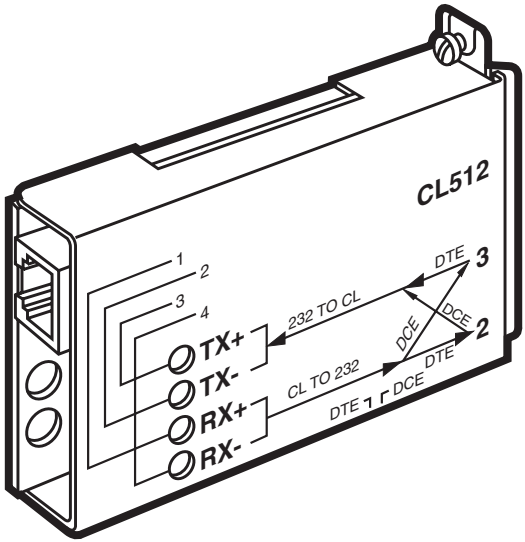
BLACK BOX®
NETWORK SERVICES

JANUARY 1998
CL512A-F
CL512A-M

Modular Current Loop Adapter



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**

TRADEMARKS USED IN THIS MANUAL

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Contents

1. Specifications

Speed —	Up to 19.2 Kbps
Maximum Distance —	1000 ft. (304.8 m)
Operation —	Passive, 20-mA current loop, unipolar, mark=current, space=no current
Interface —	RS-232/V.24, DCE or DTE (switch-selectable), 20-mA current loop
Connectors —	RS-232: (1) DB25 male for CL512A-M, (1) DB25 female for CL512A-F; Current Loop: (1) four-position screw terminal strip and (1) RJ-11 (4-wire)
Enclosure —	Metal
Power —	+12 volts must be provided by EIA Interface (Pin 6 when unit is configured as a DTE, Pin 20 when configured as a DCE); current provided by external "active" device (20 mA, 24 VDC max.), optically isolated for RS-232 signal protection
Size —	0.9" H x 2.1" W x 3" D (2.3 x 5.3 x 7.6 cm)
Weight —	2.1 oz. (59.5 g)

2. Description

The Modular Current Loop Adapter connects current-loop equipment such as industrial controllers and Data General computers to RS-232 equipment such as modems, multiplexors, computers and terminals. The unit is a “passive” device: this means it does not provide current for the current loop. The “passive” adapter must connect to an “active” current-loop device. The “active” device provides the 20-mA current for the loop. (There can be only one active device in the current loop.) The RS-232 interface of the attached equipment must provide a +12 voltage on either pin 6 or pin 20 to power the adapter.

3. Configuration and Installation

3.1 RS-232 Interface

3.1.1 DCE or DTE Configuration

The adapter connects easily to an RS-232 device such as a DTE (terminal, computer) or DCE (modem, line driver, multiplexor).

The attached RS-232 device supplies power to the adapter via a positive (+12) voltage on the adapter's pin 20 (if the unit is configured as DCE) or pin 6 (if the unit is configured as DTE). Pinnings for both configurations are shown below.

DTE	DCE
Pin 2 = TD (output)	Pin 2 = TD (input)
Pin 3 = RD (input)	Pin 3 = RD (output)
Pin 6 = DSR (input)	Pin 20 = DTR (input)
Pin 7 = Signal Ground	Pin 7 = Signal Ground

To configure the adapter, simply move the external switch to the DTE or DCE position. If you are going to plug the adapter into a DTE, move the adapter switch to the DCE position. If you are going to plug the adapter into a DCE, move the adapter switch to the DTE position.

3.1.2 Connecting the RS-232 Device

To connect the adapter to the RS-232 device, simply plug the unit's DB25 connector into your RS-232 equipment's DB25 connector. (The unit is available in both male and female versions to accommodate your equipment.)

3.2 Current-Loop Interface

Review the following pinning guidelines before you connect the twisted-pair cable from your current-loop device to the adapter's RJ-11 port or four-position screw terminal. Figure 3-1 shows the pin positions for both connectors.

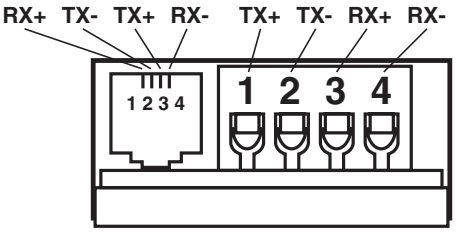

Figure 3-1. Pin Positions for RJ-11 and Terminal Screw Block.

Connections on the current-loop side of the adapter may be full- or half-duplex. In full-duplex transmission, both the adapter and the current-loop device may send and receive data simultaneously. In half-duplex transmission, only one device at a time may send or receive data. **Section 3.2.1** describes full-duplex connections and **Section 3.2.2** discusses half-duplex connections.

3.2.1 Full-Duplex Operation

Table 3-1. Pinouts for Full-Duplex Current-Loop Connections

RJ-11 Modular Pinnings:
1 = RX+, connect to the TX+ of your device.
2 = TX-, connect to the RX- of your device.
3 = TX+, connect to the RX+of your device.
4 = RX-, connect to the TX- of your device.
Terminal Block Pinnings:
1 = TX+, connect to the RX+ of your device.
2 = TX-, connect to the RX- of your device.
3 = RX+, connect to the TX+ of your device.
4 = RX-, connect to the TX- of your device.

Typical full-duplex applications for the adapter are shown in Figures 3-2 and 3-3. In Figure 3-2, the unit is connected to a DTE device. In Figure 3-3, the unit is connected to a DCE device.

NOTE

When connected to a DTE device, the adapter does not output pins 5 (CTS), 6 (DSR), or 8 (CD). If your computer (DTE) needs these pins before it can send data, you must use a short cable with the proper pin configuration between the computer and the unit. This entails looping pin 4 (RTS) or any other signal at 12 volts to pins 5, 6, and 8 on the side connected to the computer.

When connected to a DCE device, the adapter does not output pins 4 (RTS) or 20 (DTR), which your modem may need before it can send data. If your modem needs these pins, you must use a short cable with the proper pin configuration between the modem and the unit. This involves looping pin 8 (CD) or any other signal on the interface that is at +12 V to pins 4 and 20 on the side connected to the modem.

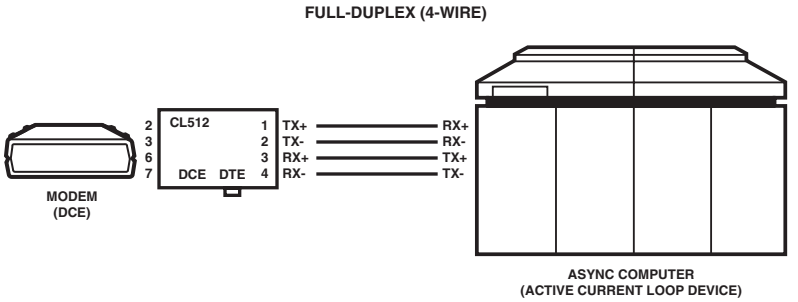

Figure 3-2. Full-Duplex DTE Operation.

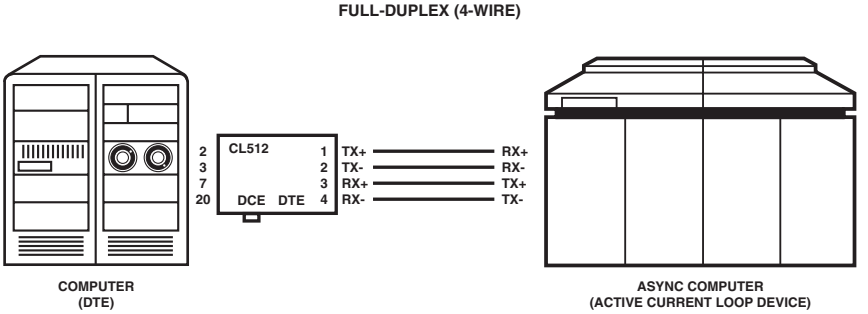

Figure 3-3. Full-Duplex DCE Operation.

3.2.2 Half-Duplex Operation

Table 3-2. Pinouts for Half-Duplex Current-Loop Connections

RJ-11 Modular Pinnings*
3 = + Loop
Jumper 1 to 2
4 = - Loop
Terminal Block Pinnings
1 = + Loop
Jumper 2 to 3
4 = - Loop

*Half-duplex operation is not recommended for RJ-11 connections due to the difficulty involved in crossing Jumpers 2 and 3.

Typical half-duplex applications for the adapter are shown in Figures 3-4 and 3-5. In Figure 3-4, the unit is connected to a DTE device. In Figure 3-5, the unit is connected to a DCE device.

NOTE

When connected to a DTE device, the adapter does not output pins 5 (CTS), 6 (DSR), or 8 (CD). If your computer needs these pins before it can send data, you must use a short cable with the proper pin configuration between the computer and the unit. This entails looping pin 4 (RTS) or any other signal at +12 volts to pins 5, 6, and 8 on the side connected to the computer.

When connected to a DCE device, the adapter does not output pins 4 (RTS) or 20 (DTR). If your modem needs these pins before it can send data, you must use a short cable with the proper pin configuration between the modem and the unit. This involves looping pin 8 (CD) or any other signal on the interface that is at +12V to pins 4 and 20 on the side connected to the modem.

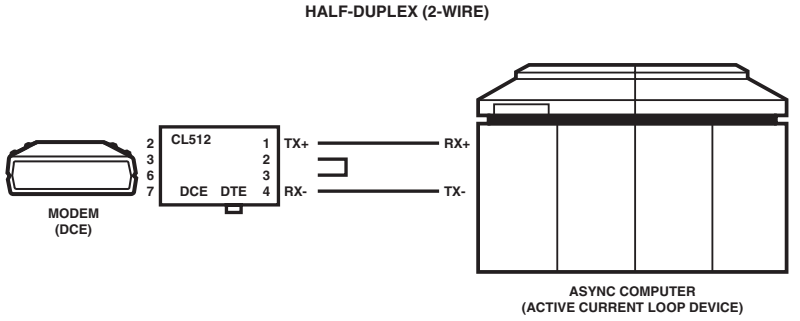

Figure 3-4. Half-Duplex DTE Operation.

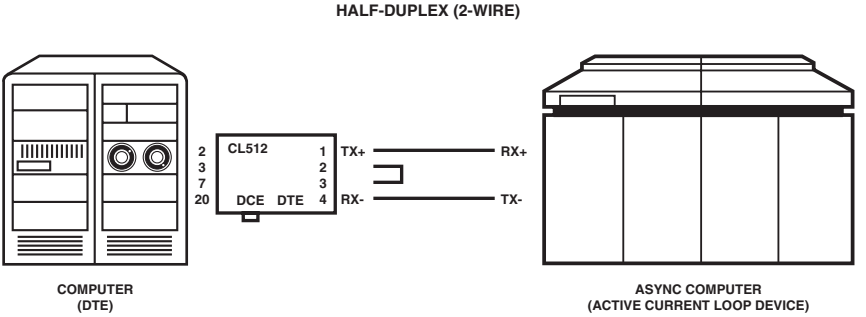

Figure 3-5. Half-Duplex DCE Operation.

3.2.3 Connecting the Current-Loop Device

If you're using the RJ-11 port on the adapter, simply plug the cable from the current-loop device into the RJ-11 port.

If you're using the screw terminal, wrap one of the 2- or 4-wire twisted pairs from the current-loop device around each of the screw terminals.

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