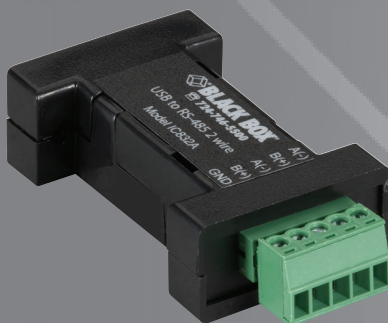# BLACK BOX®
NETWORK SERVICES

USB to RS-485 Mini Converter

Connect RS-485 devices to your USB port.

Just plug the converter into an available USB port on your computer or USB hub and install the drivers (supplied on CD-ROM).

1. Specifications

Data Rate — USB: 12 Mbps;
   Serial: Up to 921.6 kbps

MTBF — 1,869,313 hours

MTBF Method — Parts count reliability prediction

Software — Drivers included for Windows 98, Me, 2000, and XP; and Windows Vista

Terminal Block Signals — RS-485 2-Wire: Data A(-), Data B(+), Ground;
   RS-485 4-Wire: TDA (-), TDB(+), RDA(-), RDB(+), Ground

Connector — USB: Type B female (high-retention);
   Serial: Removable terminal block (28 to 16 AWG)

Standard — USB 2.0, backward compatible

Temperature Tolerance — Operating: 32 to 158° F
   (0 to 70° C);
   Storage: -40 to +185° F (-40 to +85° C)

Operating Humidity — 0 to 95%, noncondensing

Power — Source: USB port; Input Voltage: 5 VDC;
   Consumption: Approximately 0.5 W (low-power device draws less than 100 mA)

Size — 2.6"H x 1.3"W x 0.6"D (6.5 x 3.2 x 1.6 cm)

Weight — 0.23 lb. (104.3 g) with USB cable

2. Overview
2.1 Description
Universal Serial Bus (USB) has become the connectivity work-horse of today's PCs, replacing the familiar serial ports. However, many commercial and industrial devices still use the RS-485 interface. To connect these devices to modern PCs, you need a simple and reliable conversion solution. The IC832A and IC833A offer this solution in a space-saving, USB-port-powered package. Simply plug the converter into an available USB port on your computer or USB hub and install the drivers supplied on CD-ROM. The device will show up as an additional COM port in the Windows Device Manager, which is fully compatible with your Windows applications. A 3.2-ft. (1-m) USB cable is included.

2.2 Features
• Connect RS-485 devices to your USB port.

• Perfect for field service applications.

• Small—fits easily into any laptop bag.

• USB port powered.

8024-0512

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

• USB 2.0 (12 Mbps) compatible.

• Supports RS-485 data rates up to 921.6 kbps.

• Has a removable terminal block for easy wiring.

• High-retention USB connector.

• Supports Windows® 98, Me, 2000, XP; and Windows Vista®.

2.3 What's Included

• IC832A or IC833A USB to RS-485 Mini Converter.

• 3.2-ft. (1-m) USB Cable.

• This user manual and CD with drivers for Windows 98, Me, 2000, and XP; and Windows Vista.

3. Installation
3.1 Terminal Block

Table 1. Terminal block pinning.

IC832A		IC833A	
Position	Signal	Position	Signal
A(-)	Data A(-)	TDA(-)	Transmit Data A(-)
B(+)	Data B(+)	TDB(+)	Transmit Data (B+)
A(-)	Data A(-)	RDA(-)	Receive Data (A-)
B(+)	Data B(+)	RDB(+)	Receive Data (B+)
GND	Ground	GNC	Ground

3.2 Driver Installation

NOTE: Screen shots are from Windows XP.

THE FOUND NEW HARDWARE WIZARD WILL RUN TWICE: ONCE TO INSTALL THE USB DEVICE AND ONCE TO INSTALL THE SERIAL COM PORT.

1. Connect the converter to your PCs USB port with the supplied cable.

2. The "Found New Hardware" wizard will start.

3. When prompted to connect to Windows Update to search for the driver, select "No, not at this time" and click on "Next >."

Figure 1. Found New Hardware Wizard welcome screen.

4. Select "Install the software automatically" and click "Next >."
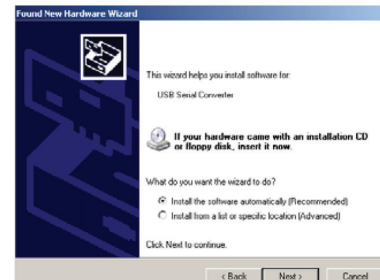

Figure 2. Insert software disk.

5. A warning concerning Windows logo testing will be displayed. Click on "Continue Anyway >. "

Figure 3. Hardware Installation screen.

6. The Completing the Found New Hardware Wizard will be displayed. Click on "Finish >."

THE FOUND NEW HARDWARE WIZARD WILL RUN TWICE: ONCE TO INSTALL THE USB DEVICE AND ONCE TO INSTALL THE SERIAL COM PORT.

Figure 4. Completing the Found New Hardware Wizard screen.

3.3 Check Drivers

NOTE: Screen shots are from Windows XP.

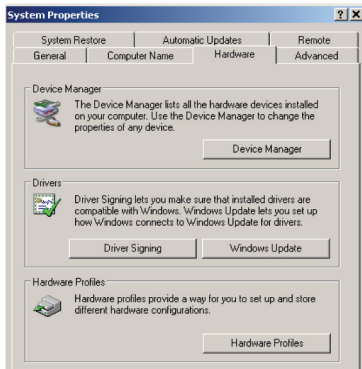1. Right click on "My Computer." Select the "Hardware" tab.

8024-0512

Figure 5. Hardware tab.

2. Expand the Ports (COM & LPT) tree. The USB Serial Port will be listed as the next available COM Port.
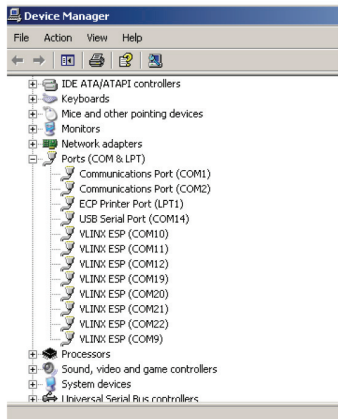

FIgure 6. Expand the COM and LPT ports.

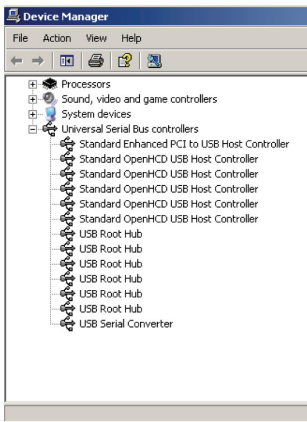3. Expand the USB Controllers tree. The USB Serial Converter will be listed.

Figure 7. USB Controllers Tree screen.

3.4 Installation Notes

• When the driver is installed, the converter is associated to that PC. If you plug in a different converter, the driver must be installed again. Another COM port will also be created with the driver installation.

• Instructions for uninstalling the driver are located on the CD-ROM.
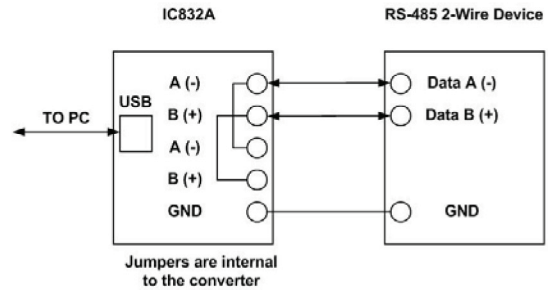
3.5 IC832A Wiring
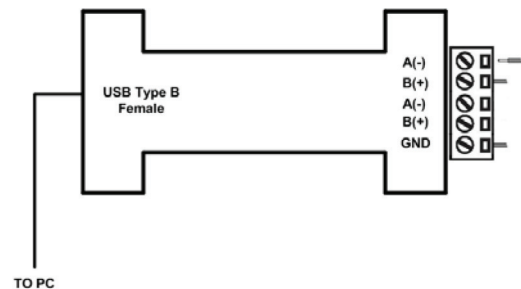

Figure 8. IC832A wiring diagram #1.

Figure 9. IC832A Wiring diagram #2.

NOTE: This converter is used for RS-485 2-wire systems.

1. Loosen the screws to open the terminal block lead clamps for the A(-), B(+), and GND terminals.

2. Insert the RS-485 2-wire signal leads in accordance with the diagram above. The terminal block will accept 28 to 16 AWG wire.

3. Tighten the screws to close the terminal block lead clamps. Make sure the clamps hold the leads securely, but do not overtighten.

NOTE: Bias is provided by 4.7 K-Ohm pull-up and pull-down resistors.

4. If termination is required, it must be installed externally. In most cases, termination is not required.

5. During operation, the receiver toggles with the transmit data.
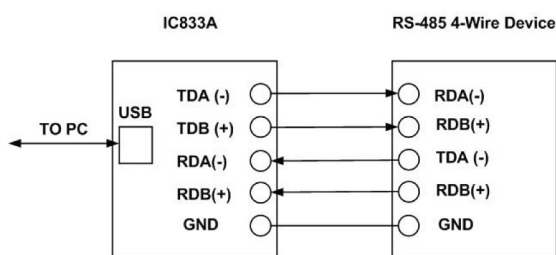
3.6 IC833A Wiring

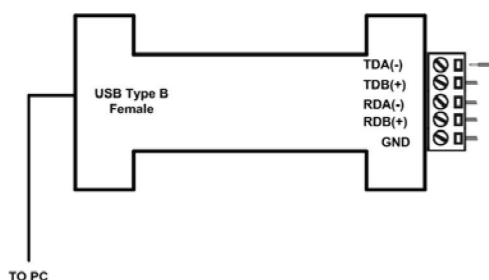
Figure 10. IC833A wiring diagram #1.

Figure 11. IC833A wiring diagram #2.

This converter is used for RS-485 4-wire systems.

1. Loosen the screws to open the terminal block lead clamps for the TDA(-), TDB(+), RDA(-), RDB(+), and GND terminals.

2. Insert the RS-485 4-wire signal leads in accordance with the diagram above. The terminal block will accept 28 to 16 AWG wire.

3. Tighten the screws to close the terminal block lead clamps. Make sure the clamps hold the leads securely, but do not overtighten.

NOTE: Bias is provided by 4.7 K-Ohm pull-up and pull-down resistors.

4. If termination is required, it must be installed externally. In most cases, termination is not required.

5. During operation, the receiver is always active.

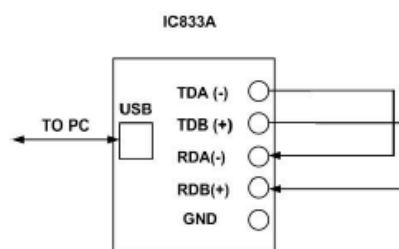## 3.7 IC832A Loopback Test

Figure 12. Loopback test for IC832A.

1. Loop back TDA(-) to RDA(-) and TDB(+) to RDB(+) as shown in the diagram above.

2. Using Hyperterminal® or a similar program, connect to the appropriate COM port. Set the desired baud rate. Ensure Hyperterminal local echo is OFF.

3. Transmit data. If the same character string is returned, the test is good.
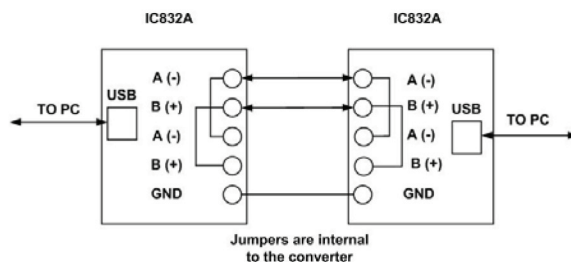
3.8 IC832A Back-to-Back Test

Figure 13. Back-to-back test for IC832A.

1. Wire the converters as shown above.

2. Using Hyperterminal or a similar program, connect to the appropriate COM ports. Set the desired baud rate.

3. Transmit data. If the same string is received on the distant end, the test is good.