In Figure 6-2, the converter is set up to use internal bias and no termination with four wires.

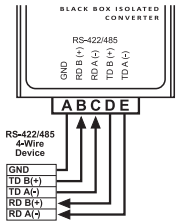
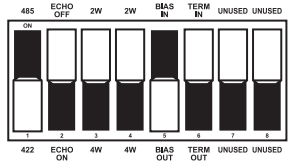
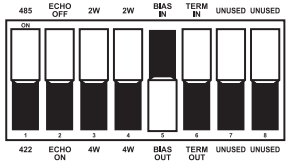


Figure 6-2. RS-485 4-wire example.

NOTE: Shaded black means the DIP switch is ON.



RS-485 4-wire DIP switch.



RS-422 4-wire DIP switch.

7. Bias and Termination

The circuit can be biased using the built-in 2 k-ohm pull-up and pull-down resistors. This is controlled with DIP switch position 5. The default setting is ON (bias resistors in).

When an RS-485 network is in an idle state, all nodes are in listen (receive) mode. Under this condition, there are no active drivers on the network. All drivers are tri-stated. Without anything driving the network, the state of the line is unknown. IF the voltage level at the receiver's A and B inputs is less than ±200 mV, the logic level at the output of the receivers will be the value of the last bit received. To maintain the proper idle voltage state, bias resistors must be applied to force the data lines to the idle condition.

If termination is necessary on the receive lines, a built-in 120-ohm resistor can be switched in using DIP switch position 6. In most cases, termination is not required. The default setting is OFF (termination out).

Termination is used to match impedance of a node to

the impedance of the transmission line being used. Termination increases load on the drivers, requires installation complexity, changes biasing requirements, and makes system modification more difficult. Generally, termination should only be used for long distances. "If in doubt, leave it out."

8. Loopback Test/Troubleshooting

- Configure for RS-485 4-wire.
- Jumper terminals B to D and C to E.
- Connect a PC to the RS-232 port.
- TD and RD LEDs are ON when power is applied.
- Using hyperterminal or a similar program, connect to the appropriate COM port. Turn off hyperterminal local echo.
- Transmit data. The same data should be returned. When data is sent and looped back, the TD and RD LEDs blink on and off indicating data flow.

Customer Support Information

Order toll-free in the U.S.:
Call 877-877-BBOX
(outside U.S. call 1-724-746-5500)

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

Isolated RS-232 to RS-422/485 Converter

This rugged panel-mount converter offers 2 kV isolation.

Withstands temperature variations from -40 to +176° F (-40 to +80° C).

1. Specifications

- Complies with FCC Class B and CE requirements.

2. What's Included

Your package should include the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

- RS-232 to RS-422/485 Converter
- This Quick Start Guide
- 10-to 30-VDC power connector

You might also need:

- DIN rail clip (DRCLIP)

3. Controls and Indicators

Figure 3-1 shows the Isolated RS-232 to RS-422/485 Converter. Table 3-1 describes its components.

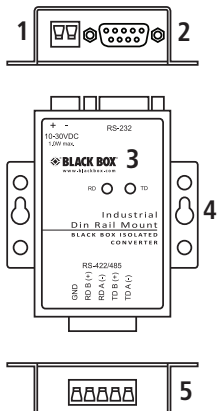


Figure 3-1. ICD400A.

Table 3-1. Converter's components.

ID in Fig. 3-1	Component	Description
1	Power connector	2-position, removable
2	DB9 female connector	RS-232 (wired as DCE)
3	Data LEDs	Green: ON when power is applied. Blinking: Data is flowing.
4	Mounting ears	Used for panel mounting
5	R2-422/485 connector	5-position, removable
*6	8-position DIP switch	Located on back of unit

*See Figure 3-2. *NOTE: Shaded black means the DIP switch is ON.*

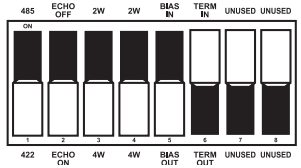


Figure 3-2. DIP switch (located on back of unit).

4. Pinouts and Terminal Identification

Figure 4-1 and Table 4-1 describe the RS-232 connector pinout.

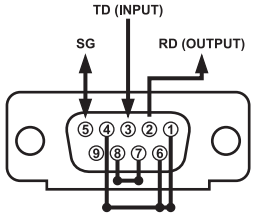


Figure 4-1. DB9 connector pinout.

Table 4-1. DB9 DCE female connector pinout.

Pin	Signal	Direction	Pin	Signal	DIrection
1	DCD	—	6	DSR	—
2	RD	Output	7	RTS	—
3	TD	Input	8	CTS	—
4	DTR	—	9	RI	—
5	GND	—	—	—	—

NOTE: PIns 1, 6, and 4 are tied together internally. Pins 7 and 8 are tied together internally.

Figure 4-2 and Table 4-2 show the terminal identification.

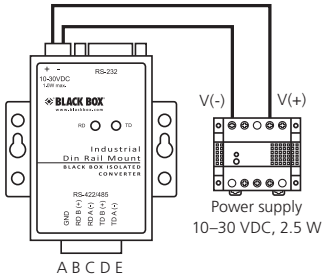


Figure 4-2. Terminal identification.

Table 4-2. Terminal identification.

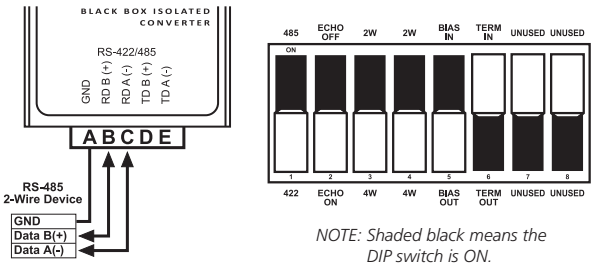
RS-422/485 4-Wire		RS-485 2-Wire	
A	Ground	A	Ground
B	RDB(+)	B	Data B(+)
C	RDA(-)	C	Data A(-)
D	TDB(+)	D	—
E	TDB(-)	E	—

5. Power Connection

Connect your external power supply to the 2-position power terminal block A. The polarity is indicated on the front label. The converter will accept 10- to 30-VDC, 1.0 W maximum. The terminal block will accept 28 to 12 AWG wire.

6. Wiring Examples

In Figure 6-1, the converter is set up to use the internal bias and no termination.



NOTE: Shaded black means the DIP switch is ON.

Figure 6-1. RS-485 2-wire example.