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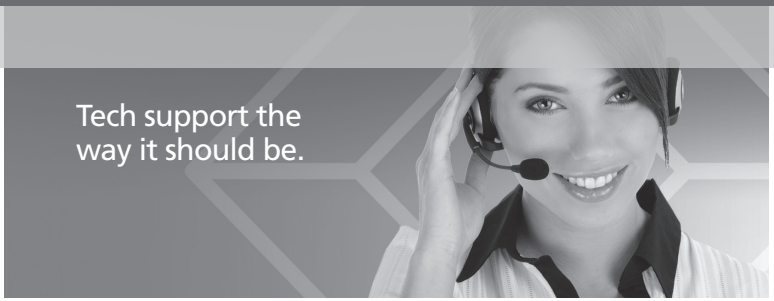

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BLACK BOX®
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About Black Box

Black Box Network Services is your source for an extensive range of networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 30 seconds or less.

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ICD114A_QSG, rev. 1

ICD114A
ICD115A
ICD116A

Industrial Opto-Isolated Serial to Fiber Converters

Convert RS-232/422/485 data for extension over fiber in heavy industrial areas.

Rugged IP30-rated metal case
for panel mounting.

ICD114A, ICD115A, and ICD116A, Quick Start Guide

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

1. What's Included:

- ICD114A, ICD115A, or ICD116A Industrial Opto-Isolated Serial to Fiber Converter
- Specifications Manual
- This Quick Start Guide

User-Supplied Components

- 10- to 48-VDC power supply; this converter draws a maximum of 2.6 watts; Black Box recommends a 120-VAC/12-VDC Wallmount Power Supply with Bare Leads (PS1003).

2. UL® Class 1 Division 2 Information

1. Refer to the Nonincendive Field Wiring Apparatus Control Drawing for important information.
2. Power, input/output (I/O) wiring for the end-use enclosure must be in accordance with Class 1 Division 2 wiring methods (Article 501.10(B) of the National Electric Code, NFPA 70) and in accordance with local authorities.
3. The maximum ambient air temperature is 185° F (85° C).
4. The temperature rating of field-installed conductors is 221° F (105°C). Use copper wire only.
5. These devices must be installed in an end-use enclosure suitable for the location.

WARNING: Explosion hazard: Substitution of components may impair the suitability of these products for Class 1 Division 2 wiring methods.

WARNING: Explosion hazard: Do not disconnect equipment unless the power has been turned off or the area is known to be non-hazardous.

WARNING: This Apparatus is suitable for use in Class 1 Division 2 Groups A, B, C, and D, or nonhazardous locations only.

3. Front and Back Panels, DB9 Pin-out

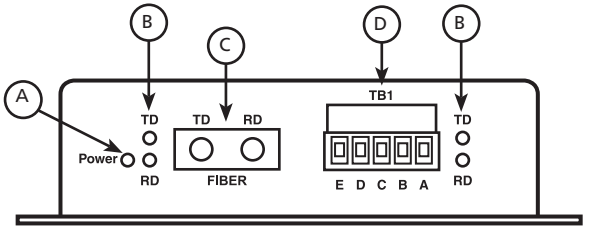

Figure 1. Front panel

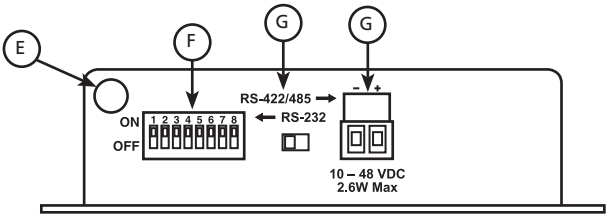

Figure 2. Back panel

Table 1: Front and Back Panels

A	Power LED	Red, "on" when power applied.
B	Data LEDs	Green. LEDs flash when data is on port. Left LEDs indicate fiber activity, right LEDs show copper activity.
C	Fiber Optic Connectors	ST, SC, or MM; see **Section 7.**
D	Serial Terminal Block	Five-position, removable.
E	Grounding Lug	Chassis ground to ground; see **Section 5.**
F	DIP Switch	Used to configure the converter; see **Section 4.**
G	Serial Mode Switch	Used to configure serial mode, RS-232 or RS-422/485.
H	Power Terminal block	Two-position, removable; see **Section 5.**

Table 2: Terminal Block 1: RS-422/485 Settings

A	–	TDA (-)
B	–	TDB (+)
C	Data A (-)	RDA (-)
D	Data B (+)	RDB (+)
E	Ground	Ground

Table 3: Terminal Block 1: RS-422/485 Settings

A	RD	Output
B	–	–
C	TD	Input
D	–	–
E	Ground	–

4. Configuration of the DIP Switch

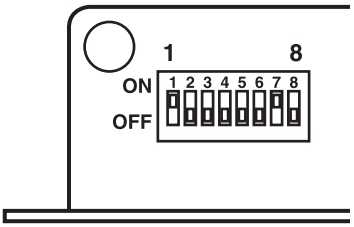

Figure 3. Settings shown here represent the factory default.

Table 4: Communications Mode

	Switch			
	1	2	3	4
RS-485 2-Wire Half-Duplex	On	On	On	On
RS-485 4-Wire Full-Duplex	On	Off	Off	Off
RS-422 Full-Duplex	Off	Off	Off	Off

Table 5: Built-in Termination Resistor

	Switch
	5
Use the 120-ohm built-in termination	On
Use external or no termination	Off

Table 6: Built-in Transmit Bias Resistor

	Switch
	6
Use the external or no bias resistor	On
Use the 1.2K-ohm transmit bias resistor	Off

Table 7: Built-in Receive Bias Resistor

	Switch
	7
Use the external or no bias resistor	On
Use the 1.2K-ohm transmit bias resistor	Off

Table 8: Fiber Optic Mode

	Switch
	8
Multidrop ring	On
Point-to-point	Off

For an explanation of RS-485 termination and biasing requirements, refer to Black Box's white paper, "The Elements of an RS-422 and RS-485 System." This publication can be downloaded at www.blackbox.com/go/WP.

5. Power and Ground Connection

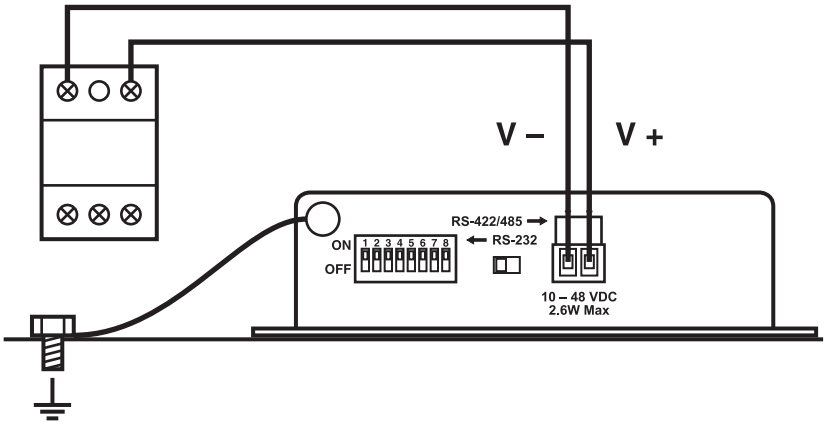

Figure 4. Black Box recommends that you ground the chassis as shown here.

Make sure that the chassis is grounded. Connect a grounding wire from the ground lug to a good grounding source.

Then connect the power. The terminal block will accept 28 to 12 AWG wire. Power requirements: 10- to 48-VDC, 2.6 watts maximum.

6. Wiring Examples

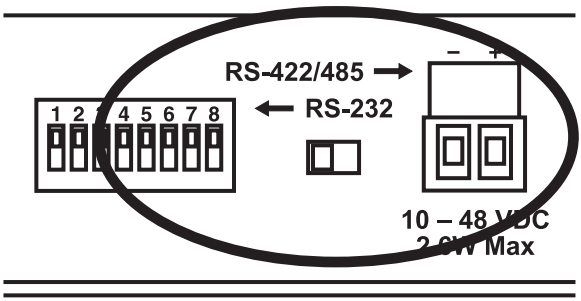

Figure 5. Set the unit for RS-422/485 or RS-232 connection.

6.1 RS-485 2-Wire Connections

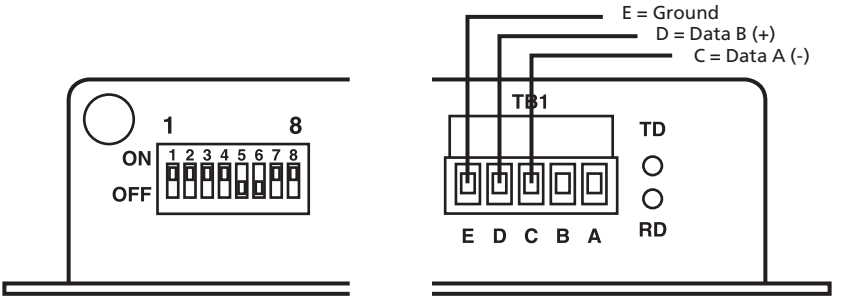

Figure 6. A 2-wire RS-485 connection.

Table 9: RS-485 2-Wire DIP Switch Settings

1	2	3	4	5	6	7
On	On	On	On	X	X	X

Positions 5, 6, and 7 are used for termination and biasing. See **Section 4**. Position 8 is used for fiber optic point-to-point or multidrop ring.

6.2 RS-422 / 485 4-Wire Connections

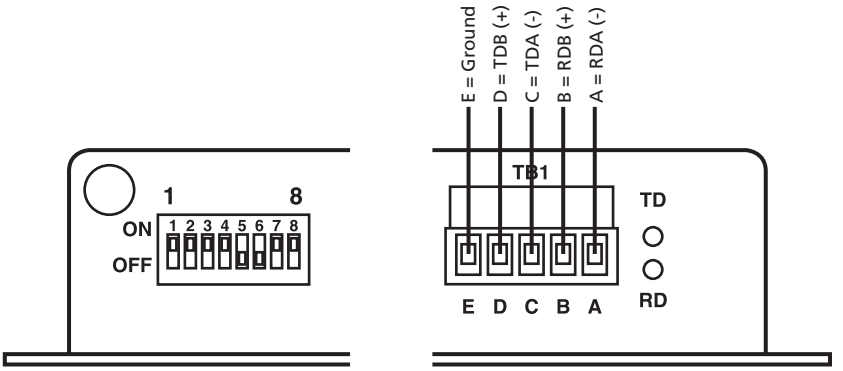

Figure 7. A 4-wire RS-485 connection.

Table 10: RS-485 4-Wire DIP Switch Settings

1	2	3	4	5	6	7
On	Off	Off	Off	X	X	X

Position 1 = "On" for RS-485, "Off" for RS-422. Positions 5, 6, and 7 are used for termination and biasing. See **Section 4**. Position 8 is used for fiber optic point-to-point or multidrop ring.

6.3. RS-232 Connections

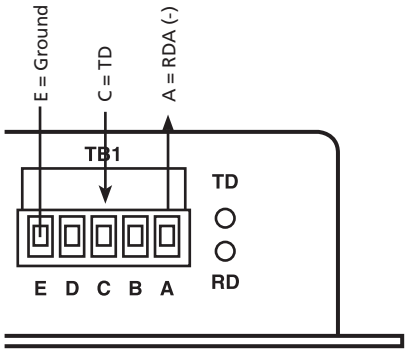

Figure 8. DIP Switch positions 1 through 7 have no effect in RS-232 mode. Set position 8 to "Off" for fiber optic point-to-point or to "On" for multidrop.

7. Fiber Optic Side

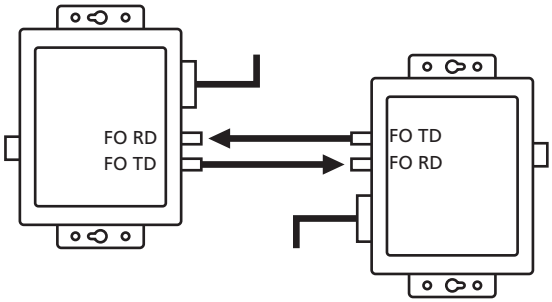

Figure 9. A point-to-point connection. Set DIP Switch position 8 to "Off" on both converters. Connect Fiber Optic TD to Fiber Optic RD and vice versa.

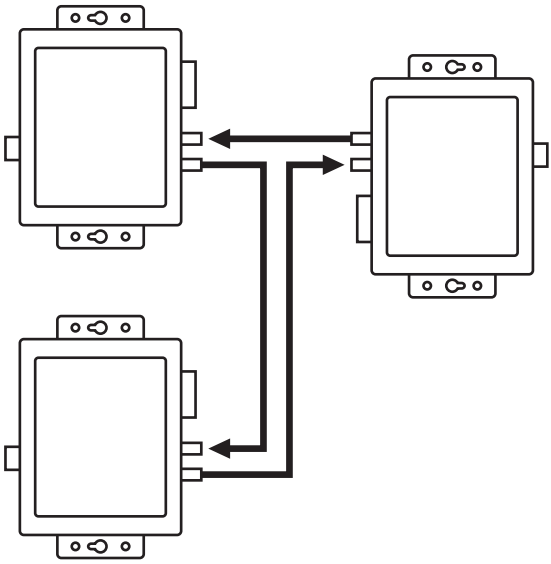

Figure 10. A multi drop ring connection. Set DIP Switch position 8 to "On" on all converters. Connect Fiber Optic TD to Fiber Optic RD and vice versa.

Table 11: Maximum number of converters in a Multi-drop Ring

Baud Rate	RS-422/485	RS-232
≤ 19.2 kbps	32	32
37.4 kbps	24	16
115.2 kbps	8	2

Table 12: Distance

SKU	Connector	Fiber Type	Size of Fiber	Range
ICD114A	SC	Multimode	62.5/125 µm	2 km
ICD115A	ST	Multimode	62.5/125 µm	2 km
ICD116A	SC	Single-mode	9/125 µm	15 km
Wavelength: 1310 nm				

8. Loopback test / troubleshooting

Black Box recommends:

- Configure the converter for RS-485 4-wire.
- Set DIP Switch position 8 to "Off".
- Cross-connect the fiber optic TD and RD.
- Connect a PC to the serial port.
- Use HyperTerminal® or a similar program to connect to the appropriate COM port. Turn off hyperterminal local echo.
- Transmit the data. If the same characters are returned, the test is good.