

FOSTCDRI

Industrial Serial to Multimode Fiber Converter

PRODUCT INFORMATION

B&B ELECTRONICS

- ✓ **Data Rates up to 115.2 kbps**
- ✓ **10 – 48 VDC Input Power Range**
- ✓ **Wide Operating Temperature**
- ✓ **3-Way 2000V Optical Isolation**
- ✓ **MODBUS ASCII/RTU Compatible**
- ✓ **EMI / RFI Protection**
- ✓ **UL Class 1 DIV 2**

The FOSTCDRI is our premium Industrial Serial to Multimode Fiber Optic Converter. Designed for rugged industrial environments, it is UL approved and certified for use in Class 1 Division 2 environments. In addition to direct point-to-point connectivity, it is capable of operating in a multi-drop mode. This allows one serial device to communicate with up to 31 other around a fiber ring. Since it supports mixed standards, you can replace other converters and isolators and add the EMI / RFI protection inherent to fiber optic communications.

In RS-232 mode, the converter supports transmit and receive data. Handshaking signals are not passed through. An Automatic Send Data Control circuit controls the RS-422/485 driver chip, eliminating the requirement for external software.

Easy to install and configure, it has a 12 position DIP Switch on the bottom to configure RS-422/485 parameters. The serial data and power connect to removable terminal blocks. ST connectors are used for the fiber.

Remember, when it comes to reliable communications in harsh duty industrial environments, B&B Electronics ILinx™ brand is your number one choice.



Specifications

Serial Technology

RS-232	TD, RD, GND
RS-485 2-Wire	Data A(-), Data B(+), GND
RS-422/485 4-Wire	TDA(-), TDB(+), RDA(-), RDB(+), GND
Serial Connector	Removable Terminal Block (28 to 14 AWG)
Data Rate	9.6 to 115.2 kbps
Isolation	2KV RMS, 1 minute
Surge Protection	600 W Peak Power Dissipation Clamping time < 1 pico-second
Industrial Bus	MODBUS ASCII/RTU

Fiber Optic Technology

Type / Wavelength	Multimode / 820 nm
Output Power	(-) 17 to (-) 10 dBm
Receive Sensitivity	(-) 24.4 dBm
Cable	62.5/125 micro-meter
Connector	ST
Data Rate	9.6 TO 115.2 kbps
Maximum Distance	2.5 miles (4 km)
Idle State	Transmitter Light ON

Power

Source	External
Input Voltage	10 to 48 VDC
Power Consumption	1.75 Watts
Connector	Removable Terminal Block (28 to 14 AWG)

Mechanical

LED Indicators	FO Receive, FO Transmit, Power
Dimensions	4.5 x 1.3 x 4.9 in (11.4 x 3.3 x 12.4 cm)
Enclosure	35mm DIN Mount, Plastic, IP 30
Weight	0.44 lbs (199.6 g)

Environmental

Op Temperature	- 40 to 176°F (- 40 to 80°C)
Storage Temp	- 40 to 185°F (- 40 to 85°C)
Op Humidity	0 to 95% Non-condensing

Regulatory

Approvals	FCC, CE, UL Class 1 DIV 2
UL File Number	E222870 (C1 D2 E245458)
MTBF	138904 hours
MTBF Calc. Method	Parts Count Reliability Prediction

Class 1 DIV 2 Wiring

Type	Solid Copper Only
Size	28 to 14 AWG
Temperature Rating	105°C (221°F) Minimum
Terminal Torque	0.5 Nm (Newton-Meters)

Ordering Information

FOSTCDRI	Serial to Single-mode fiber optic converter
Accessories	
MDR-20-24	24VDC DIN Rail Power Supply (not included)
7145	2 Position Terminal Block (1 included)
6545	5 Position Terminal Block (1 included)

Package Contents

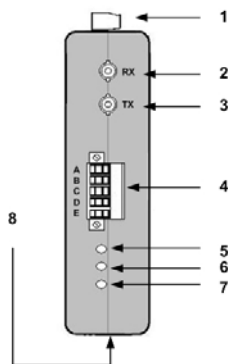
- FOSTCDRI Industrial Serial To Multimode Fiber Optic Converter
 - Datasheet
 - Power Terminal Block (installed)
 - Serial Terminal Block (installed)
 - Fiber Optic Dust Cover (installed)
- If any item is missing or damaged, contact B&B Electronics for a replacement

Special Precautions for Class 1 Div 2 Environment

Special Instructions for Installation and Operation in a Class 1 DIV 2 Environment.

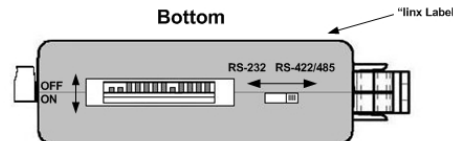
1. Power, input / output (I/O) wiring must be in accordance with Class 1 Division 2 wiring methods [Article 501.10(B) of the National Electrical Code, NFPA70] and in accordance with the local authority having jurisdiction.
2. **WARNING – EXPLOSION HAZARD:** SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2.
3. **WARNING – EXPLOSION HAZARD:** WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES
4. **WARNING – EXPLOSION HAZARD:** DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
5. **WARNING – THIS APPARATUS IS SUITABLE FOR USE IN CLASS 1, DIVISION 2, GROUPS A, B, C, AND D, OR UNCLASSIFIED LOCATIONS.**

Front Panel



1	Power TB	2 Position, Removable
2	Fiber RX Port	ST Connector
3	Fiber TX Port	ST Connector
4	Serial TB	5 Position, removable
5	Receive LED	Red, ON when serial data received
6	Transmit LED	Red, ON when serial data sent
7	Power LED	Red, ON when power applied
8	Switches	SW1, 12 Position DIP Switch
8		SW2, 2 Position mode selection

DIP Switch (SW1)



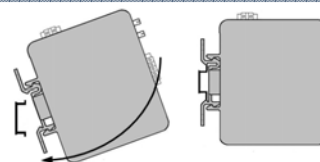
Pos	ON	OFF
1	RS-485	RS-422
2	HALF-DUPLEX	FULL-DUPLEX
3	2-WIRE	4-WIRE
4	2-WIRE	4-WIRE
5	TERMINATION IN	TERMINATION OUT
6	TX BIAS OUT	TX BIAS IN
7	RX BIAS OUT	RX BIAS IN
8	57.6 KBPS	
9	38.4 KBPS	
10	19.2 KBPS	
11	9.6 KBPS	
12	MULTI-DROP	POINT-TO-POINT

Terminal Block

Terminal	RS-232
A	GND
B	Not Used
C	RS-232 IN
D	Not Used
E	RS-232 OUT

Terminal	RS 4852-Wire	RS-422/4854-Wire
A	GND	GND
B	Data B(+)	RDB(+)
C	Data A(-)	RDA(-)
D	Not Used	TDB(+)
E	Not Used	TDA(-)

DIN Rail Mounting

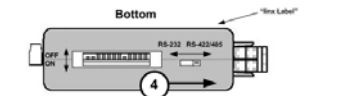
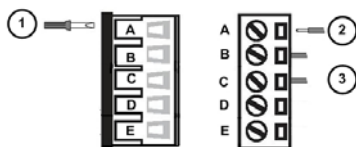
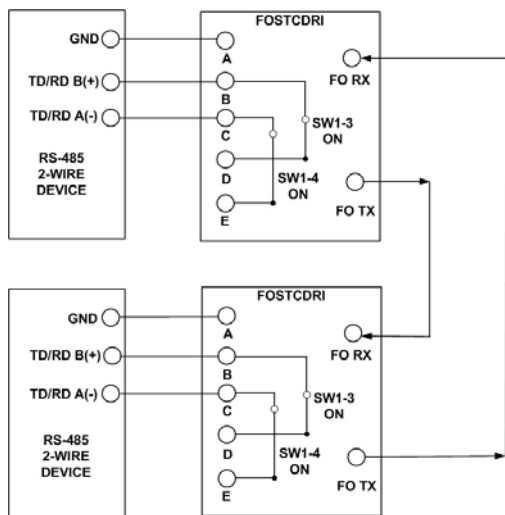


1. Angle the top portion of the DIN mount over the top of DIN Rail.
2. Move the converter so that it is parallel with the DIN Rail and snap into place.

RS-422/485 Baud / Timeout

Baud	SW1 8	SW1 9	SW1 10	SW1 11	Timeout (ms)
9600	OFF	OFF	OFF	ON	1.30
19.2K	OFF	OFF	ON	OFF	0.56
38.4K	OFF	ON	OFF	OFF	0.27
57.6K	ON	OFF	OFF	OFF	0.22
76.8K	ON	OFF	ON	ON	0.14
115.2K	ON	OFF	ON	OFF	0.10

RS-485 2-Wire

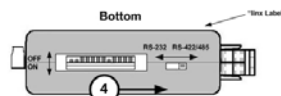
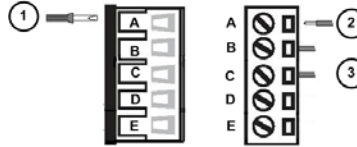
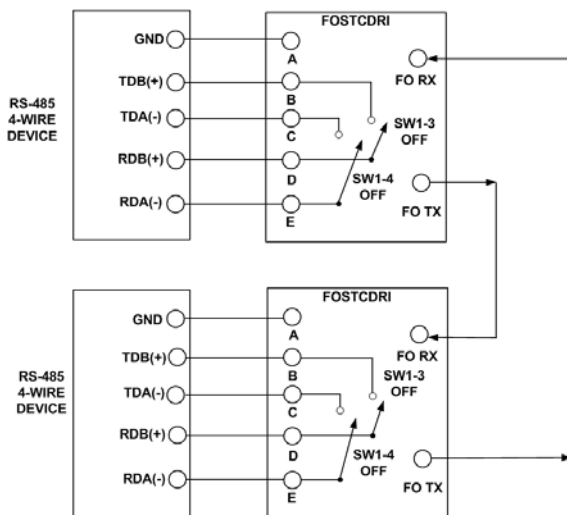


A – ON = TERMINATION IN, OFF = TERMINATION OUT
 B – ON = TX BIAS OUT, OFF = TX BIAS IN
 C – ON = RX BIAS OUT, OFF = RX BIAS IN

DIP Switch SW1						
1	2	3	4	5	6	7
ON	ON	ON	ON	A	B	C

POSITIONS 8 THROUGH 11 ARE USED TO SET BAUD RATE. REFER TO SW1 CHART
 REFER TO FIBER OPTIC INFORMATION FOR POSITION 12 SETTING

RS-422 / RS-485 4-Wire



A – ON = TERMINATION IN, OFF = TERMINATION OUT
 B – ON = TX BIAS OUT, OFF = TX BIAS IN
 C – ON = RX BIAS OUT, OFF = RX BIAS IN

DIP Switch SW1						
1	2	3	4	5	6	7
ON	OFF	OFF	OFF	A	B	C

POSITIONS 8 THROUGH 11 ARE USED TO SET BAUD RATE. REFER TO SW1 CHART
 REFER TO FIBER OPTIC INFORMATION FOR POSITION 12 SETTING

- Loosen the screws to open the Serial TB Lead Clamps for the A, B, and C terminals.
- Insert the RS-485 2-Wire Signals Leads. The TB will accept 28 to 14 AWG wire.
- Tighten the screws to close the Serial TB Lead Clamps. Ensure the clamps hold the leads securely. However, do not over tighten. For Class 1 DIV 2 installations, ensure wiring is in accordance with the special precautions and specification table.
- Position the 422/485/232 Switch to the 422/485 position.
- Configure the DIP Switch on the bottom of the converter for RS-485 2-Wire operation.

Installation Notes:

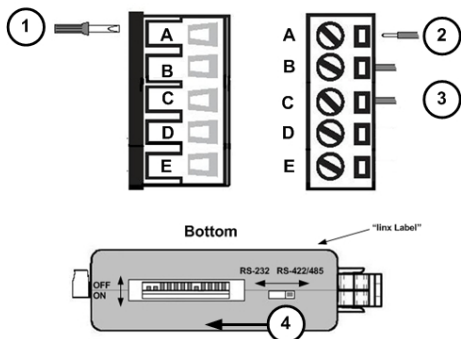
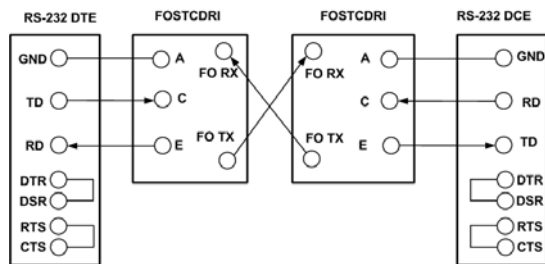
- In 2-Wire mode, the B and C terminals are tied to the D and E terminals with DIP Switch SW1-3 and SW1-4.
- If Termination is required, a 120Ω resistor can be placed across the D and E terminals by setting SW1-5 to ON.
- This converter has 1.2 KΩ pull-up/down bias resistors built in. To use this bias, set SW1-6 and SW1-7 to ON.
- B&B Electronics' RS-485 Application Note contains more information about termination and biasing. This reference is available on our web site.

- Loosen the screws to open the Serial TB Lead Clamps for the A, B, C, D, and E terminals.
- Insert the RS-422/485 4-Wire Signal Leads. The TB will accept 28 to 14 AWG wire.
- Tighten the screws to close the Serial TB Lead Clamps. Ensure the clamps hold the leads securely. However, do not over tighten. For Class 1 DIV 2 installations, ensure wiring is in accordance with the special precautions and specification table.
- Position the 422/485/232 Switch to the 422/485 position.
- Configure the DIP Switch on the bottom of the converter for RS-422/485 4-Wire operation.

Installation Notes:

- If Termination is required, a 120Ω resistor can be placed across the D and E terminals by setting SW1-5 to ON.
- This converter has 1.2 KΩ pull-up/down bias resistors built in. To use this bias, set SW1-6 and SW1-7 to ON.
- B&B Electronics' RS-485 Application Note contains more information about termination and biasing. This reference is available on our web site.

RS-232 Configuration



1. Loosen the screws to open the Serial TB Lead Clamps for the A, C, and E terminals.
2. Insert the RS-232 Signal Leads into the TB. The TB will accept 28 to 14 AWG wire.
3. Tighten the screws to close the Serial TB Lead Clamps. Ensure the clamps hold the leads securely. However, do not over tighten. For Class 1 DIV 2 installations, ensure wiring is in accordance with the special precautions and specification table.
4. Position the 422/485/232 Switch to the 232 position.

Installation Notes:

- DIP Switch SW1-12 Positions 1 through 11 (on the bottom of the converter) are not used in RS-232 Mode. Refer to the fiber optic section for Position 12 setting.
- The wiring example shows a DTE device on one end and a DCE device on the other.
- Handshaking signals are not passed through.
- The loopback jumpers shown in the wiring diagram may or may not be required. Refer to the operating manual for your RS-232 device for more information.

Need More Information?

For more information about serial communications, visit B&B Electronics' web site:

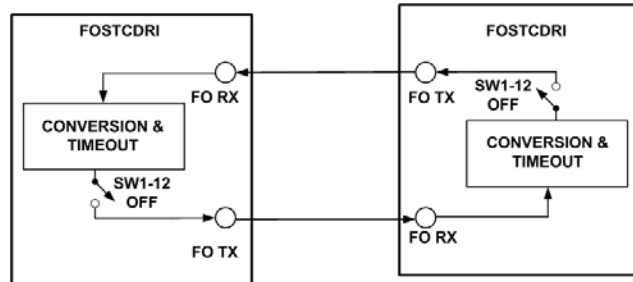
www.bb-elec.com

B&B Electronics maintains an extensive technical library available for download free of charge.

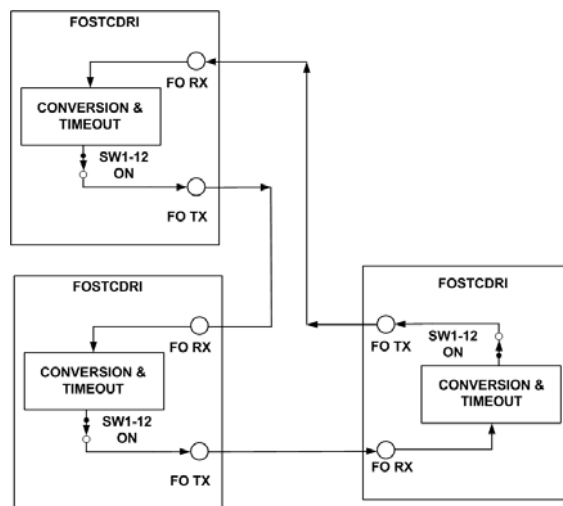
The following titles are of particular interest to users of this product.

RS-422/485 Application Note
 RS-232 Connections That Work - DTE/DCE
 An Overview of Fiber Optic Technology

Fiber Optic



Fiber Optic Point-to-Point



Fiber Optic Multi-drop Ring

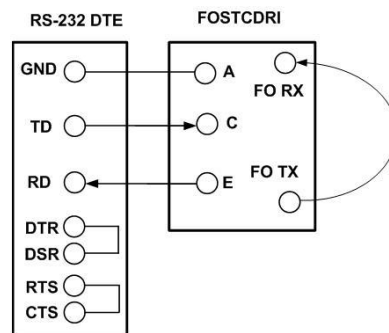
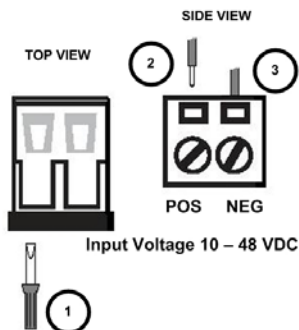
1. Ensure your fiber optic cable is terminated with an ST type connector. 62.5/125 micro-meter multimode cable is recommended.
2. Connect the converter's transmitter to the distant end receiver and vice-versa.
3. The fiber optic transmitter light is ON in the idle state. Therefore, the RX indicator will be lighted when data is not being transferred.
4. DIP Switch SW1-12 is used to select point-to-point or multi-drop mode. For point-to-point, set the switch to OFF for both converters. For multi-drop, set the switch to ON for each converter in the ring. With SW1-12 in the ON position, receive data will be looped back to the fiber optic transmitter. Data will repeat around the ring until it finally reaches its source. When the data is received by the originator, timeout circuitry will prevent it from being re-transmitted.

Maximum Converters in a Fiber Ring

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

Attach Power Leads External Supply Required

RS-232 Loopback Test



1. Loosen the screw to open the terminal block lead clamp.
2. Insert the power lead. TB will accept 28 to 14AWG wire.
3. Tighten the screw to close the terminal block lead clamp. Ensure the clamp holds the lead securely. However, do not over tighten. For Class 1 DIV 2 installations, ensure wiring is in accordance with the special precautions and specification table.

1. Configure the converter for RS-232.
2. Set DIP Switch SW1 Position 12 to OFF.
3. Cross-connect the fiber optic transmitter to the fiber optic receiver using a single-mode patch cord.
4. Connect a PC to the serial port.
5. Using Hyper Terminal or similar program, connect to the appropriate COM port. Set the baud rate to match the converter. Ensure Hyper Terminal local echo is OFF.
6. Transmit data. If the same character string is returned, the test is good.

Mechanical Diagram

