



Model: 485OPDR  
Industrial DIN Rail Mounted  
RS-422/485 Line Isolator / Repeater



### Features

- ✓ **High Speed Communications.** Supports data rates up to 460.8 kbps.
- ✓ **Extended Communications.** Supports distances up to 1,200 m (4,000 ft).
- ✓ **Wide Operating Temperature, -40° to 80° C (-40° to 176° F).**
- ✓ **Modbus ACSII or RTU Compatible.**
- ✓ **2000 V 2-way Optical Isolation.** Reliable in harsh electrical environments.

### Functional Description

The 485OPDR provides 2-way optical isolation between one piece of RS-422/485 equipment and the remainder of the network. As a repeater, it extends the distance of an existing network and expands it beyond the 32-node limitation. All inputs connect to a terminal block. Data lines, power, and ground are isolated from one side of the repeater to the other. The device supports Transmit Data (A) and (B), Receive Data (A) and (B), Signal Ground, and Protective Ground. The 485OPDR operates in two-wire half-duplex, four-wire half-duplex, or four-wire full-duplex systems. Additionally, it will convert four-wire to two-wire. An external 10 to 30 VDC power supply is required (not included).

### Ordering Information

Model Number	Description
485OPDR	RS-422/485 Isolator / Repeater
Accessories	
DR9FTB	Terminal Block to DB9 Female DIN Mountable Adapter
ERS35	Steel DIN Mounting Rail
DR-30-24	DIN Rail Mount Power Supply, 24 VDC
PS5R-A12	DIN Rail Mount Power Supply, 12 VDC
PS5R-A24	DIN Rail Mount Power Supply, 24 VDC



**International Headquarters:** 707 Dayton Road PO Box 1040 Ottawa, IL 61350 USA  
815-433-5100 Fax 433-5104 [www.bb-elec.com](http://www.bb-elec.com) [orders@bb-elec.com](mailto:orders@bb-elec.com) [support@bb-elec.com](mailto:support@bb-elec.com)

**European Headquarters:** Westlink Commercial Park Oranmore Co. Galway Ireland  
+353 91 792444 Fax +353 91 792445 [www.bb-europe.com](http://www.bb-europe.com) [orders@bb-europe.com](mailto:orders@bb-europe.com) [support@bb-europe.com](mailto:support@bb-europe.com)

## Operation

- The 485OPDR enables both receivers when it is not transmitting. When one side receives data, the opposite side enables its driver. The device waits one character time after receiving the falling edge of the last data bit before disabling the driver. This time-out is factory preset to about one millisecond, which accommodates a baud rate of 9,600 pits per second. Change the time-out by positioning the DIP Switches in accordance with Table 1. The switch selectable baud rates should accommodate most systems. Configure alternative time-outs by turning the baud rate switches OFF and placing a specific value through-hole resistor and/or through-hole capacitor on the circuit board near the switches.
- 4.7 K $\Omega$  pull-up/down resistors provide bias on the Data In lines. This value is adequate for most applications without termination. If necessary, add specific value through-hole resistors (R12, R21, R14, and R23).
- Refer to B&B's RS-422/485 Application Note and the Schematic Diagram before configuring non-standard baud rates and biasing. They are free and available for download. See the web links below table one. B&B's Technical Support staff will also assist with these configurations.
- Set the communications mode by positioning DIP Switches in accordance with Table 2.
- The DIP Switch settings for both sides of the converter are identical.
- The 485OPDR is factory pre-set to RS-485 2-wire, 9600 baud.
- Figures 1 through 3 illustrate various configurations. Figure 4 is a mechanical drawing, which shows the DIP Switch orientation.
- Refer to Table 3 to determine signals associated with each terminal on the terminal block.
- Two LED's indicate data flow.

Figure 1 – 2-Wire Repeater

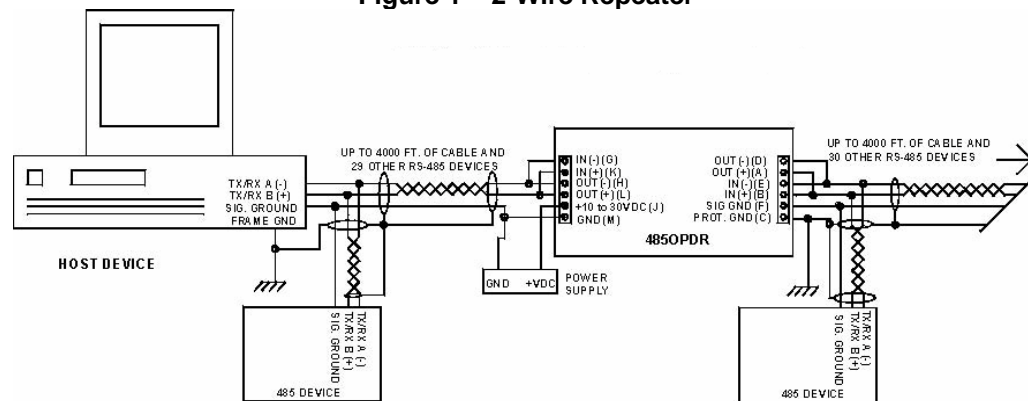


Figure 2 – 4-Wire Repeater

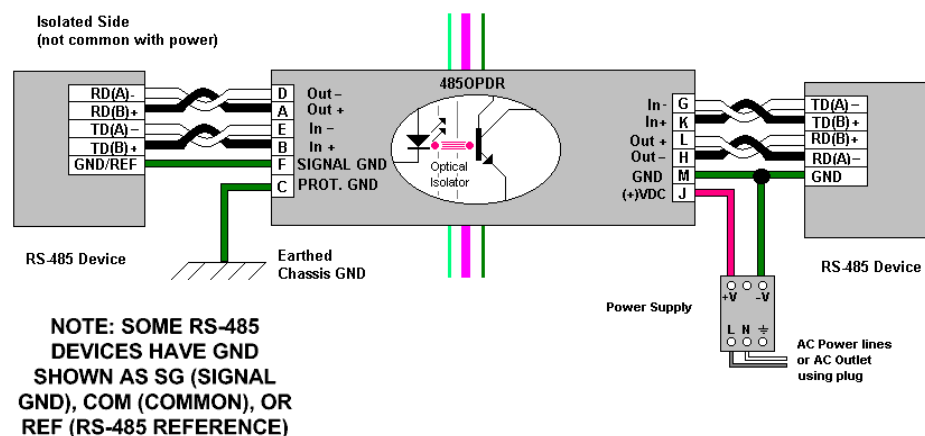


Figure 3 – 4-Wire to 2-Wire Converter

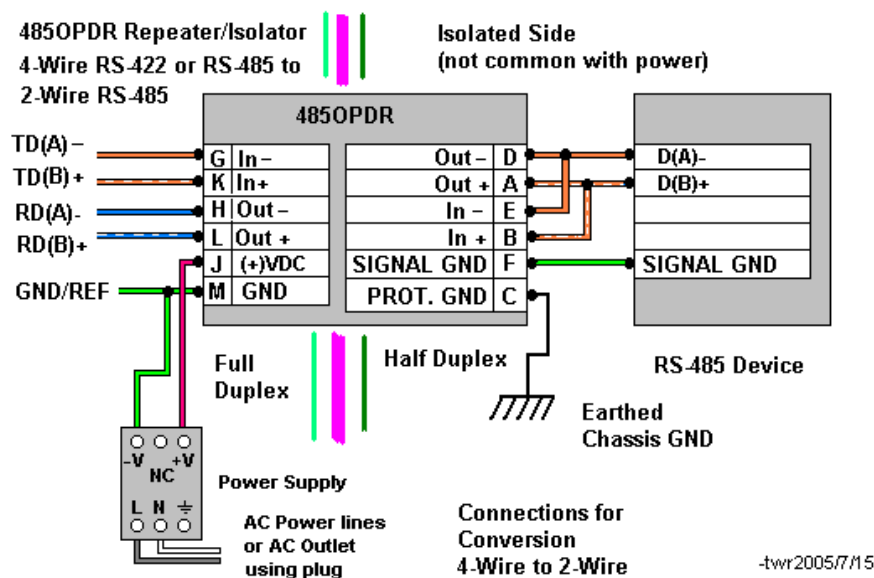


Figure 4 – Mechanical Drawing

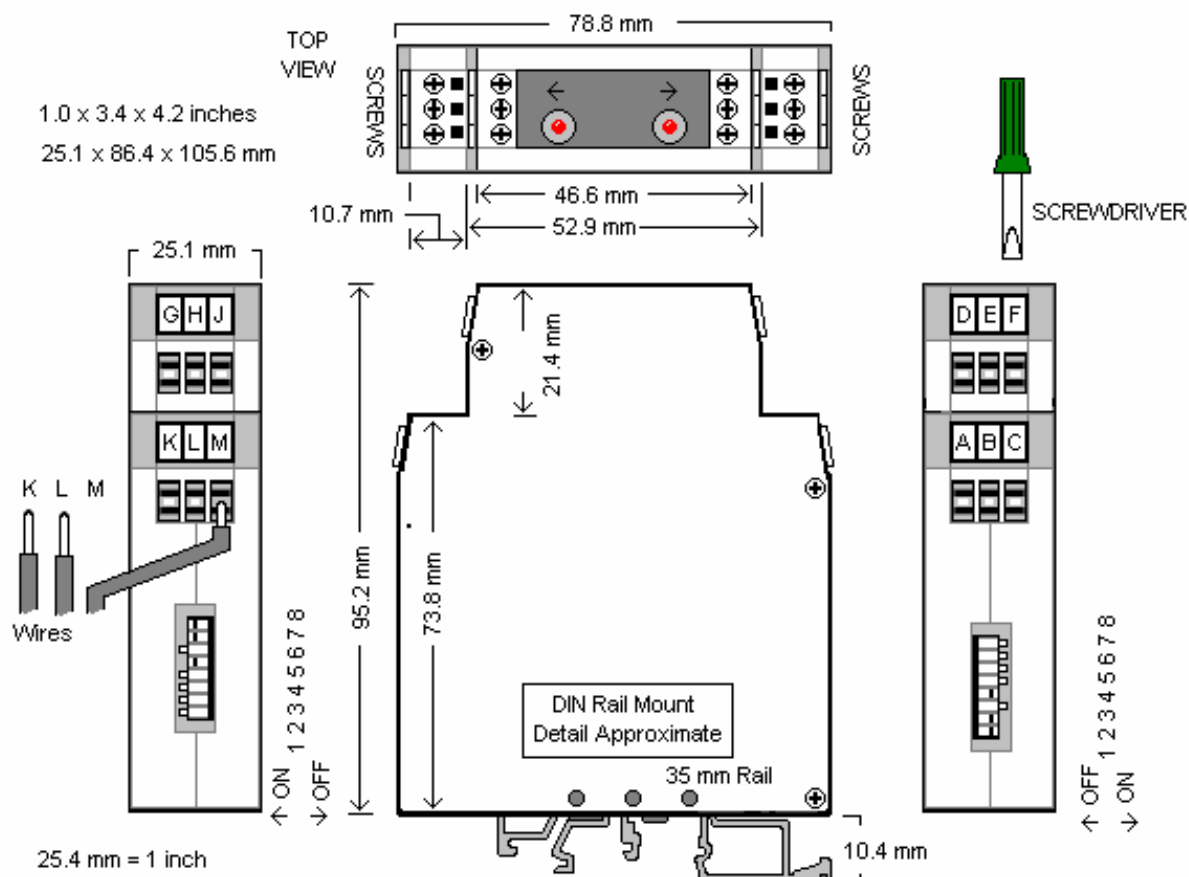


Table 1 – Baud Rate Selection

DIP Switch Position								
Baud	1	2	3	4	5	6	R7 & R28	Time (ms)
1200	OFF	OFF	OFF	OFF	OFF	OFF	820 kΩ	9.02
2400	ON	OFF	OFF	OFF	OFF	OFF	Not Used	4.73
4800	OFF	ON	OFF	OFF	OFF	OFF	Not Used	2.20
9600	OFF	OFF	ON	OFF	OFF	OFF	Not Used	1.10
19.2 k	OFF	OFF	OFF	ON	OFF	OFF	Not Used	.62
38.4 k	OFF	OFF	OFF	OFF	ON	OFF	Not Used	.29
57.6 k	OFF	OFF	OFF	OFF	OFF	ON	Not Used	.17
76.8 k	OFF	OFF	OFF	ON	OFF	ON	Not Used	.15
115.2 k	OFF	OFF	OFF	ON	ON	ON	Not Used	.11
153.6 k	OFF	OFF	OFF	OFF	OFF	OFF	6.2 kΩ	.07
230.4 k	OFF	OFF	OFF	OFF	OFF	OFF	4.3 kΩ	.05
460.8 k	OFF	OFF	OFF	OFF	OFF	OFF	2 kΩ	.02

Note: Baud rate switches are ignored in RS-422 mode.

## Web Links

## RS-422/485 Application Note

[http://www.bb-elec.com/tech\\_articles/rs422\\_485\\_app\\_note/table\\_of\\_contents.asp](http://www.bb-elec.com/tech_articles/rs422_485_app_note/table_of_contents.asp)

## Schematic Diagram

[http://www.bb-elec.com/product\\_family.asp?FamilyId=12&TrailType=Sub&Trail=19](http://www.bb-elec.com/product_family.asp?FamilyId=12&TrailType=Sub&Trail=19)

Table 2 – Mode

DIP Switch Position		
Mode	7 TX Enable	8 RX Enable
RS-485 2-Wire	ON	ON
RS-485 4-Wire	ON	OFF
RS-422	OFF	OFF



Table 3 – Terminal Block

Terminal	Signal
Isolated Side	A OUT (+)
	B IN (+)
	C PROTECTED GROUND
	D OUT (-)
	E IN (-)
	F SIGNAL GROUND
Non-Isolated Side	G IN (-)
	H OUT (-)
	J + 10 TO 30 VDC
	K IN (+)
	L OUT (+)
	M GROUND

## Specifications

Input Power	+10 to 30 VDC
Isolation	2,000 VRMS for 1 Minute, Optical Isolation of data lines.
Surge Suppression	6.5 V working peak voltage, bi-directional, 600 W peak power dissipation.
Current Draw	67mA @ 12 VDC
Signal and Power Connection	Terminal Block
Data Rate	Switch Selectable 2400 to 115.2 kbps, See Table 1 for other data rates.
Operating Temperature	-40 to +80 °C (-40 to +176 °F)
Operating Humidity	0 to 95% Non-condensing
LED Indicators	2 data flow
Dimensions	3.9 x 2.9 x 0.9 in (10.0 x 7.4 x 2.3 cm)
DIN Mount	35 mm
MTBF	225,299 hours, based on MIL217F using Parts Count Reliability Prediction Method.
Approvals	CE, RoHS

## CE Declaration of Conformity

Manufacturer's Name:	B&B Electronics
Manufacturer's Address:	PO Box 1040 707 Dayton Road Ottawa, IL 61350 USA 485OPDR
Model Number:	Light Industrial ITE Equipment
Description:	89/336/EEC
Application of Council Directive	EN 55022
Standards:	EN 61000-6-1 EN 61000 (-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11)
 Michael J. Fahrion, director of Engineering	
	



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**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331