

Models: 4WSD9OTB/4WSD25OTB

**Isolated Universal Converters****RS-232, 4-wire RS-422, 2-wire or 4-wire RS-485****Features**

- ✓ High Speed Communications. Supports data rates up to 115.2 kbps.
- ✓ Extended communications. Supports distances up to 4000 ft (1200 m).
- ✓ Removable terminal blocks for easy RS-422/RS-485 connections.
- ✓ Switchable modes. Supports 2-wire RS-485, 4-wire RS-485, and full duplex RS-422.
- ✓ Automatic RS-485 driver control. External software modifications are not required.
- ✓ 2000 VAC isolation. Reliable in harsh electrical conditions.

**Functional Description**

Isolates and converts RS-232 signals into RS-422 / RS-485 signals and vice versa. Unlike other converters, external software is not required to control data flow. The RS-232 input is wired for DCE and interfaced through a female DB25 or DB9 connector. RS-422 or RS-485 signals are connected to a removable terminal block. External power is applied to separate removable terminal block. A 10 – 48 VDC power supply (not included) is required.

**Ordering Information**

| Model Number | Description   |
|--------------|---|
| 4WSD9OTB     | Converter with female DB9 RS-232 Connector            |
| 4WSD25OTB    | Converter with female DB25 RS-232 Connector           |
| 7175         | Power 2-position Terminal Block – one included        |
| 7372         | Data 5-position Terminal Block – one included         |
| 9PAMF6       | 6ft. Serial Cable DB9M to DB9F                        |
| 485PS2       | 120 VAC to 12 VDC Power Supply                        |
| PS2EU-1000   | 220/240 VAC to 12 VDC Power Supply; 2-Prong Euro Plug |
| PS2UK-1000   | 220/240 VAC to 12 VDC Power Supply; 3-Prong UK Plug   |

Operation

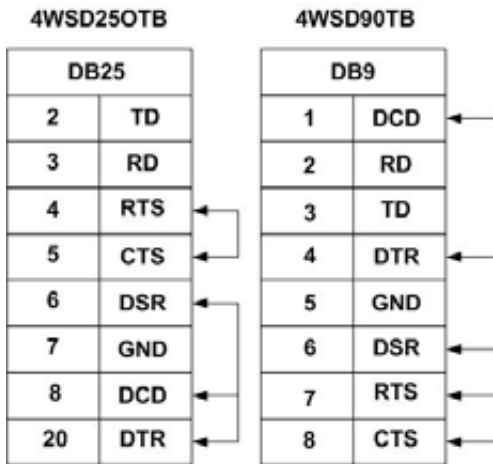
- Configure operating mode using guidance in Table 1.
- Common Applications are discussed in Figures 1 through 3.
- RS-232 connection requires RD, TD, and Signal Ground. The remaining signals are looped back within the converter as shown in Table 2.
- In half duplex operation, the receiver is enabled when not transmitting (Echo Off).
- In RS-422 mode, the driver is always enabled.
- In RS-485 mode, the RS-485 driver is automatically enabled during each space state by the presence of an RS-232 signal. When the RS-232 data is in a mark or idle state, the RS-485 driver is disabled and the RS-485 data lines are held in a mark state by the bias provided by a 4.7K Ω resistor. The value of this resistor may need to be changed depending on the termination used.
- Refer to B&B Electronics' RS-422/RS-485 Application Note for detailed information concerning RS-422 and RS-485 networks. This document is available for download at [http://www.bb-elec.com/tech\\_articles](http://www.bb-elec.com/tech_articles).
- The loopback test mode switch is used with hyper terminal to verify the operation of the converter. Additional troubleshooting guidance is available at [http://www.bb-elec.com/technical\\_library.asp](http://www.bb-elec.com/technical_library.asp).

Table 1 – Operating Mode Switch Settings

| Switches                         | Switch 1 (Tx) | Switch 2 (Rx) | Switch 3 (bridge) | Switch 4 (bridge) |
|----------------------------------|---------------|---------------|-------------------|-------------------|
| <b>Operating Mode</b>            |               |               |                   |                   |
| RS-485 2-Wire Mode (half duplex) | RS-485        | Echo Off      | 2-Wire            | 2-Wire            |
| RS-485 4-Wire Mode (full duplex) | RS-485        | Echo On       | 4-Wire            | 4-Wire            |
| RS-422 4-Wire Mode (full duplex) | RS-422        | Echo On       | 4-Wire            | 4-Wire            |
| Loopback Test Mode*              | As Desired    | Echo On       | 2-Wire            | 2-Wire            |

- Used with HyperTerminal or another terminal program to confirm operation of data through converter.

Table 2 – RS-232 Pin-out



Loop back jumpers are pre-wired within the converter



Figure 1: 2-Wire RS-485

- Used to connect several RS-485 devices with minimal wire.
- Devices communicate one at a time.
- Units are normally in receive mode.
- When data is requested, the addressed device waits one delay time before responding.
- After transmitting, the device reverts to receive.
- Switch settings are: Switch 1: RS-485, Switch 2: Echo Off, Switches 3 and 4 to 2-Wire.

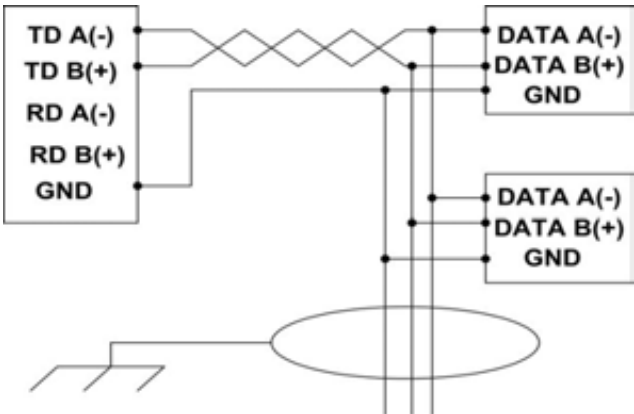
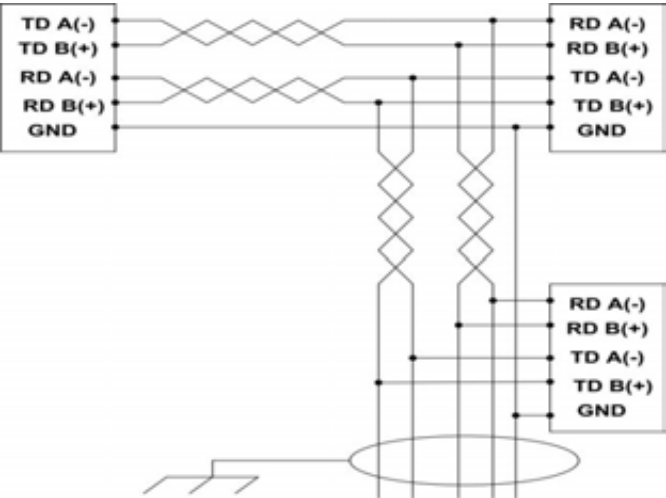


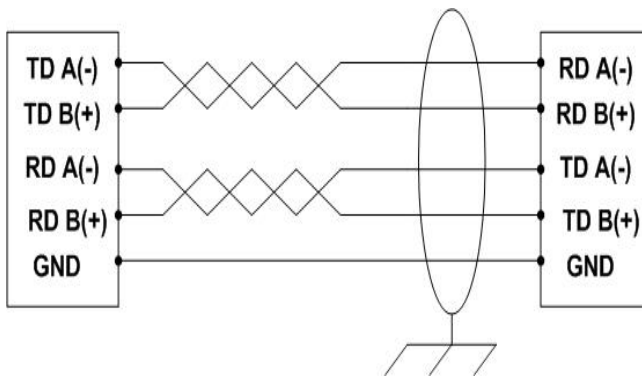
Figure 2: 4-Wire RS-485

- Used for 4-Wire Master/Slave circuits.
- Each device is polled, allowing faster response time.
- Addressed devices can receive while responding to a request.
- When used as a Master in a single master system, Switch 1 may be set RS-422 since it is the only transmitter.
- When used as a slave, the RS-232 device must provide addressability. Select RS-485 mode in this situation.
- Biasing is provided by the end-of-line slave.
- Switch settings for this mode are : Switch 1: RS-485, Switch 2: Echo On, Switches 3 and 4: 4-wire.



**Figure 3: 4-wire RS-422**

- Used as the master in a master/slave circuit with receive only slaves.
- Full-duplex communications.
- Requires a twisted pair for transmit, a twisted pair for receive, and a ground reference wire.
- Switch settings are: Switch 1: RS-422, Switch 2: Echo On, Switches 3 and 4: 4-wire.



**Specifications**

|                          |  |
|--------------------------|--|
| Input Power Requirement  | 10 – 48 VDC                              |
| Isolation                | 2000 VAC                                 |
| Current Draw             | 28 mA at 12 VDC (typical)                |
| RS-232 Connection        | DB9/DB25                                 |
| RS-422/RS-485 Connection | Removable Terminal Block                 |
| Data Rate                | Up to 115.2 kbps                         |
| Operating Temperature    | 32 – 158°F (0 - 70°C)                    |
| LED Indicators           | TD and RD                                |
| Dimensions (4WSD9OTB)    | 3.9 x 1.7 x 0.9 in<br>9.8 x 4.3 x 2.3 cm |
| Dimensions (4WSD25OTB)   | 3.9 x 2.2 x 0.9 in<br>9.8 x 5.5 x 2.3 cm |
| Approvals                | CE                                       |

**DECLARATION OF CONFORMITY**

Manufacturer's Name: B&B Electronics Manufacturing Company  
 Manufacturer's Address: P.O. Box 1040  
 707 Dayton Road  
 Ottawa, IL 61350 USA  
 Model Number: 4WSDxxOTB  
 Description: RS-422/485 Converter  
 Type: Light industrial ITE equipment  
 Application of Council Directive: 89/336/EEC  
 Standards: EN 55022  
 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

