# BB-4WSD9R
# BB-4WSD9TB

## Port-powered RS-232 to RS-485 Converters

### Features

- Change RS-232 TD and RD to RS-485 signals
- Extend RS-232 data signals up to 1.2 km (4,000 ft.)
- Data rate: 115.2 kbps
- Quick, inline installation
- DIP switch selectable RS-422 or RS-485
- RS-232 port-power or external 12 Vdx source (power supply not included, sold separately)

## Introduction

Models BB-4WSD9TB and BB-4WSD9R, universal serial converters, provide RS-232 to RS-422/RS-485 conversion using either port-power or an external power supply. Model BB-4WSD9TB has a terminal block RS-485 connector; Model BB-4WSD9R has a DB9 female RS-485 connector.

Data is converted in both directions, RS-232 Transmit Data is converted to balanced RS-422 or RS-485 Transmit Data. Received RS-422/485 signals are converted to RS-232. Unlike converters that require programming hardware handshaking signals to control RS-422 or RS-485 operation, Models BB-4WSD9TB and BB-4WSD9R provide automatic Send Data Control. In RS-485 mode, the RS-485 driver is enabled by circuitry which senses the RS-232 TD input. In half-duplex RS-485 mode, the receiver is enabled when not transmitting. For full-duplex operation, the receiver is set always enabled.

In RS-422 mode, the transmitter and receiver are always enabled. The operating mode is set with 4 switches see Table 1. The converters are powered by the RS-232 signal lines whether they are set high or low. If not enough power is available from the port, or no handshaking lines are available, a DC jack is provided to connect an optional external 12 Vdc supply. The DB9 female connector for RS-232 is wired as DCE (like a modem).

**Table 1. RS-422/485 Pinout**

| Pin | Signal |
|---|---|
| 2 | RDA(-) |
| 3 | TDB(+) |
| 4 | Ground |
| 6 | Ground |
| 7 | RDB(+) |
| 8 | TDA(-) |

No external power is required if two RS-232 output handshake lines are available and the cable run is short. If the handshake lines are raised and no termination is used, the power efficiency is greatly increased. Less than 3 mA is required to operate the converter - plus the load current. For applications that do not have handshake lines or require a large load current, power may be externally supplied with a +12 Vdc power supply with a 2.5mm plug (tip positive). (Power supply not included, sold separately.)

## Ordering Information

| Model No. | RS-232 Connector (DCE) | RS-485 Connector | Output | Optional Power Supply |
|---|---|---|---|---|
| **BB-4WSD9R** | DB9 Female | DB9 Female | RS-485 2 or 4 wire, or RS-422 | Yes |
| **BB-4WSD9TB** | DB9 Female | Terminal Block | RS-485 2 or 4 wire, or RS-422 | Yes |

### Accessories – Sold Separately

BB-SMI6B-12V-P230C1 – Power supply, 12 Vdc, 6 W, 2.5 mm plug(+), International AC input, International AC blades

BB-9PAMF6 – Serial adapter cable, DB9 male to DB9 female, 1.8 m (6 ft)

The RS-232 port has a female DB9 connector with pins 2 (RD), 3 (TD), and 5 (Signal Ground) supported. Pins 7 (RTS) and 8 (CTS) are tied together, and pins 6 (DSR), 1 (DCD), and 4 (DTR) are also tied together. Any incoming data lines in either the high or low state are used to port power the converter. The more handshake lines available, the more likely the unit can be port powered. Table 2. shows the RS-232 pinout.

**Table 2. RS-232 Pinout**

| Pin | Signal |
|---|---|
| 1 | DCD |
| 2 | RD |
| 3 | TD |
| 4 | DTR |
| 5 | Ground |
| 6 | DSR |
| 7 | RTS |
| 8 | CTS |

Although handshake lines can be used to power the converter, no handshaking is required to control the RS-422/RS-485 driver. With Switch 1 set to RS-422, the driver is always enabled. When Switch 1 is in the RS-485 position, the RS-485 driver is automatically enabled during each spacing state on the RS-232 side. During the marking or idle state, the RS-485 driver is disabled and the data lines are held in the marking state by the 4.7K Ohm pull-up and pull-down resistors. The value of these resistors may need to be changed to a different value when termination is used in order to maintain the proper DC bias during the idle state.


All product specifications are subject to change without notice.

## Specifications

| | |
|---|---|
| **Serial Technology** | |
| Data Rate | Up to 115.2 kbps, maximum |
| **RS-232** | |
| RS-232 Connector | BB-4WSD9R: DB9 female<br>BB-4WSD9TB: DB9 female |
| RS-232 Signals / Port-Power * | RD, TD, GND supported.<br>Pins 7 (RTS) and 8 (CTS) are tied together.<br>Pins 6 (DSR), 1 (DCD), and 4 (DTR) are tied together. |
| **RS-422/RS-485** | |
| RS-422/485 Connector | BB-4WSD9R: DB9 female<br>BB-4WSD9TB: Terminal block |
| RS-422/485 Signals | TDA (-), TDB (+), RDA (-), RDB (+), GND |
| Operation | DIP switch selectable RS-422 or RS-485<br>BB-4WSD9R: RS-485 2 or 4-wire or RS-422<br>BB-4WSD9TB: RS-485 2 or 4-wire or RS-422 |
| Biasing Resistors | 4.7k Ohms |
| Termination | None |
| **Power** | |
| Source | Port-powered: from RS-232 handshake lines.<br>External 12 Vdc power supply optional,<br>(not included, sold separately) |
| * Port-Power | Port-powering requires 7 to 12 Vdc supplied on at least one handshake line. |
| Connector | 2.5 mm plug (tip positive) |
| Input Voltage | 12 Vdc |
| **Mechanical** | |
| Dimensions | BB-4WSD9R: 7.8 x 4.3 x 2.0 cm (3.0 x 1.6 x 0.8 in)<br>BB-4WSD9TB: 9.0 x 4.3 x 2.3 cm (3.6 x 1.7 x 0.9 in) |
| Enclosure | Plastic |
| Mounting | In-line installation |
| Weight | BB-4WSD9R: 49 gm (0.10 lb)<br>BB-4WSD9TB: 50 gm (0.11 lb) |

| | |
|---|---|
| **Environmental** | |
| Operating Temperature | 0 to +70 °C (+32 to +158 °F) |
| Storage Temperature | -40 to +85 °C (-40 to +185 °F) |
| Operating Humidity | 0 to 95%, non-condensing |
| **Meantime Between Failures (MTBF)** | |
| MTBF | BB-4WSD9R: 880179<br>BB-4WSD9TB: 345242 |
| Calculation Method | MIL217F Parts Count Reliability Prediction |
| **Regulatory – Approvals / Standards / Directives** | |
| Approvals | FCC Part 15, CISPR, CE |
| CE - Directives | 2014/30/EU – Electromagnetic Compatibility Directive (ECD)<br>2011-65/EU – amended by (EU) 2015/863 Reduction of Hazardous Substances Directive (RoHS)<br>2012/19/EU – Waste Electrical and Electronic Equipment (WEEE) |
| CE - Standards | EN 55032 Class B - Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements<br>EN 55024 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement |
| Other Standards | EN 61000-6-3 + A1 - Generic Emission Standard for Residential, Commercial and Light-industrial Environments (Class B)<br>EN 61000-6-1 - Generic Immunity Standard for Residential, Commercial and Light-industrial Environments |

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