

# RS-232 to RS-485 Converter

Model BB-485CON

B+B SMARTWORX

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## PRODUCT FEATURES

- Convert unbalanced, full-duplex RS-232 to balanced, full-duplex or half-duplex RS-485
- Extend RS-232 data signals up to 1.2 km (4000 ft)
- 240 kbps baud rate (typical)
- Quick, easy inline installation
- Power supply required (not included, sold separately)

Model BB-485CON, RS-232 to RS-485 converter, converts unbalanced, full-duplex RS-232 signals to balanced, full-duplex or half-duplex RS-485 signals. RS-485 is an enhanced version of the RS-422 balanced line standard. It allows multiple drivers and receivers on a two-wire system.

The RS-232 port uses a male DB-25P type of connector with pins 2 (TD input) and 3 (RD output) supported. Protective Ground (pin 1) and Signal Ground (pin 7) are also connected. The RS-485 port uses a female DB-25S type of connector with Send Data outputs on pins 2 and 14, and Receive Data inputs on pins 5 and 17. Protective Ground (pin 1) and Signal Ground (pin 7) are connected through to the RS-232 connector.

## CONNECTIONS

The polarity of the two RS-485 lines must be correct. With no data being sent, the RS-232 line should be negative and the RS-485 "A" terminal should be negative with respect to the "B" terminal. If your equipment uses a "+" and "-" naming scheme, in most cases the "A" line will be connected to the "-" and the "B" line will be connected to the "+". The RS-485 driver must be enabled when checking the polarity of the output of a RS-485 driver. On this connector, the RTS input (pin 4), on the RS-232 side must be raised to enable the RS-485 driver.

Figure 1 shows how to interconnect two RS-485 converters using two signal wires. The resistors  $R_t$  are optional, depending on the line length, baud rate, etc. The resistors should be about the impedance of the line used, which is normally about 120 Ohms each. Termination resistors are installed only at each end of the RS-485 multidrop network. RTS must be off (low or marking) to receive and on (high or spacing) to transmit. Both RTS's should not be on at the same time. Although you will not damage anything, the data sent will be garbled. If both RTS lines are off, the line may be floating and random data may appear on the outputs. Your protocol should allow for this if it can happen.

Up to 32 receivers can be driven by any one generator. This allows you to put together large systems with many drop points. The termination resistors should be located at approximately opposite ends of the system.

## ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-485 CONNECTOR	OUTPUT SIGNALS
BB-485CON	DB25 Male	DB25 Female	Full- or half-duplex RS-485

## ACCESSORIES – sold separately

BB-SMI612VP230C1 - Power Supply, 12 VDC 6 Watt, 2.5MM Plug, International AC Input, International AC Blades

Proper operation of any RS-485 system requires the presence of a signal return path. The RS-485 Standard recommends that a third wire be used for this. For safety, a 100 Ohm resistor should be connected between pin 7 and the "reference" wire at every drop point. While it may be possible to interconnect signal grounds (pin 7s) directly, this is not recommended due to the danger of circulating currents possibly being present.

No wire type or maximum run length is listed in the RS-485 Standard. However, the RS-422 Standard, which is very similar, recommends 1200 meters (4000 ft) of number 24 AWG twisted-pair telephone cable with a shunt capacitance of 16 picofarads per foot.

## FIGURE 1 - INTERCONNECTIONS

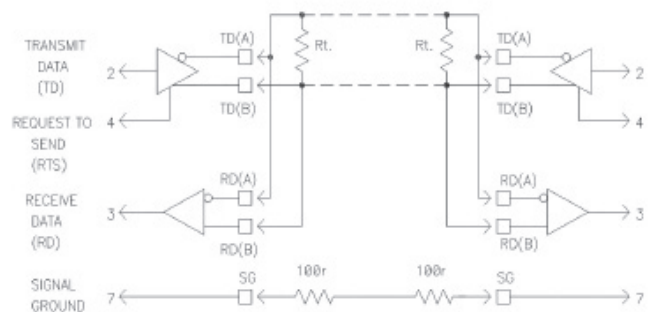


FIGURE 2. INTERCONNECTION DRAWING

All product specifications are subject to change without notice.

BB-485CON\_4818ds

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## SPECIFICATIONS

SERIAL TECHNOLOGY	
Communication	2-channel, RTS control
RS-232 Connector	DB25 male
RS-485 Connector	DB25 female
Data Rate	240 kbps (typical); 120 kbps (minimum)
POWER	
Source Requirements	12 VDC, 100 mA external power source (power supply required, not included, sold separately)
Connector	2.5mm power jack
MEANTIME BETWEEN FAILURE (MTBF)	
MTBF	8800803 hours
MTBF Calc. Method	MIL 217F using Parts Count Reliability Prediction Method

## SPECIFICATIONS - continued

APPROVALS / DIRECTIVES / STANDARDS	
FCC, CE	
Directives	2014/30/EU - Electromagnetic Compatibility Directive (ECD) 2011-65/EU - Reduction of Hazardous Substances Directive (RoHS) 2012/19/EU - Waste Electrical and Electronic Equipment (WEEE)
Standards	EN 55032 Class B - Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements EN 55024 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement EN 61000-6-3 +A1 - Generic Emission Standard for Residential, Commercial and Light-industrial Environments (Class B) EN 61000-6-2 - Generic Immunity Standard for Industrial Environments

## SCHEMATIC

