

## Battery Powered RS-232 to RS-422/485 Converter CE Model 485BAT2



The 485BAT2 converts unbalanced RS-232 signals to balanced, full or half duplex RS-485 signals. RS-485 is an enhanced version of the RS-422 Standard. It allows multiple drivers and receivers on a two wire system.

The RS-232 port has a female DB25 connector with pins 2 (TD), 3 (RD), and 7 (Signal Ground) supported. Pins 4 (RTS) and 5 (CTS) are tied together, and pins 6 (DSR), 8 (CD), and 20 (DTR) are also tied together. Pins 1 (Frame Ground) and 7 (Signal Ground) are connected straight through to the RS-485 connector. The RS-485 port has a DB-25 male with pins 2 (TD A), 14 (TD B), 3 & 5 (RD A), 16 & 17 (RD B), 1 (Frame Ground), and 7 (Signal Ground) supported. Table 2 and 3 show the RS-232 and RS-485 pinouts. The 485BAT2 has an On-Off switch for conserving battery life when the unit is not in use.

Figure 2 shows how to interconnect two RS-485 converters using two wires. Terminating resistors are optional, they should be used only on long length runs or at high baud rates. These resistors should match the impedance of the cable being used, which is normally about 120 ohms. The 485BAT2 allows for the addition of a terminating resistor at R5 as shown in Figure 1. This unit also allows for changing the values for R4 and R8 ( 4.7k biasing resistors). When the values are to be changed, remove the surface mount component and then install new value in the corresponding through hole.

The 485BAT2 uses two methods to control the RS-485 driver, handshake control (RTS) and send data (SD) control. These methods are jumper selectable (JP1 & 2). See Figure 1. Handshake control requires that the RS-232 device software raise RTS (pin 4 on the RS-232) to enable the RS-485 driver. After the transmission is complete, the RS-232 device must lower RTS to disable the RS-485 driver and enable the RS-485 receiver. SD control uses the leading edge of the first character transmitted from the RS-232 device to enable the RS-485 driver. After the last character is transmitted the converter waits one character time (1ms at 9600 baud) to disable the RS-485 driver.

There are two components on the printed circuit board, a resistor (R9) and a capacitor (C2) that are part of the send data control circuit. These components are factory selected for 9600 baud, which will allow the converter to run at 9600 baud or higher. With these two components the RS-485 driver will shut off approximately 1ms after the last character has been sent. If you need to change to a baud rate lower than 9600 baud, or would like to configure the 485BAT2 to match a specific baud rate, see Table 1. Note that these timing components are not used when this converter is using RTS to enable the RS-485 driver.

<b>Table 1</b>			
COMPONENT REPLACEMENTS FOR CHANGING BAUD RATE TIMEOUTS			
Baud Rate	Time (ms)	Resistor R9 (ohm)	Capacitor (C2) (mfd)
300	33.3	330K	0.1
600	16.6	160K	0.1
1200	8.33	820K	0.01
2400	4.16	430K	0.01
4800	2.08	200K	0.01
9600	1.04	100K	0.01
19200	.520	56K	0.01
38400	.260	27K	0.01
57600	.176	16K	0.01
115200	.0868	8.2K	0.01

<b>Table 2</b>	
RS-232 Pinouts	Description
1	Frame Ground
2	Transmit Data (DCE port)
3	Receive Data
4	Request to Send
7	Signal Ground

Incoming signal from RS-232 device

<b>Table 3</b>	
RS-485 Pinouts	Description
1	Frame Ground
2	Transmit Data A (-)
3 or 5	Receive Data A (-)
7	Signal Ground
14	Transmit Data B (+)
16 or 17	Receive Data B (+)

Outgoing signal to RS-485 device

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The Echo jumper (JP3) controls the RS-485 receiver, it can be removed which constantly enables the receiver (RS-422, 4-wire mode) or install the jumper which allows the receiver to be enabled only when the RS-485 driver is disabled (2-wire mode). When the jumper is installed and in 2-wire mode, the data being sent from the RS-232 port will not be echoed back to the RS-232 port. See Figure 1 for jumper locations.

Up to 32 receivers can be driven by any one RS-485 driver, allowing you to put together large systems with many drop points. If you are using termination resistors, they should be located at opposite ends of the system.

Proper operation of any RS-485 system requires the presence of a return path. The RS-485 standard recommends that a third wire be used for the return path. For safety, a 100 ohm resistor should be connected between Signal Ground and the "reference wire" at every drop point. While it may be possible to interconnect Signal Grounds directly, this is not recommended due to the danger of circulating currents possibly being present. See interconnection drawing Figure 2.

The 485BAT2 is powered by a 9 volt alkaline battery. To conserve battery life, a slide switch on the side of the unit lets the user disconnect power when not in use. Optional power supply, Model 485PS, is available for externally powering the 485BAT2.

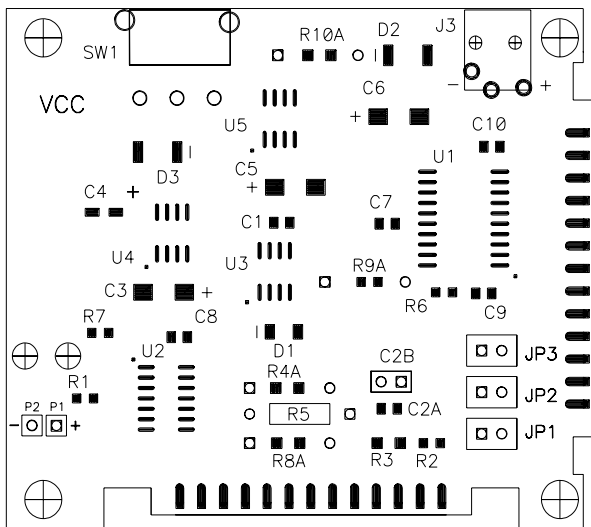


Figure 1

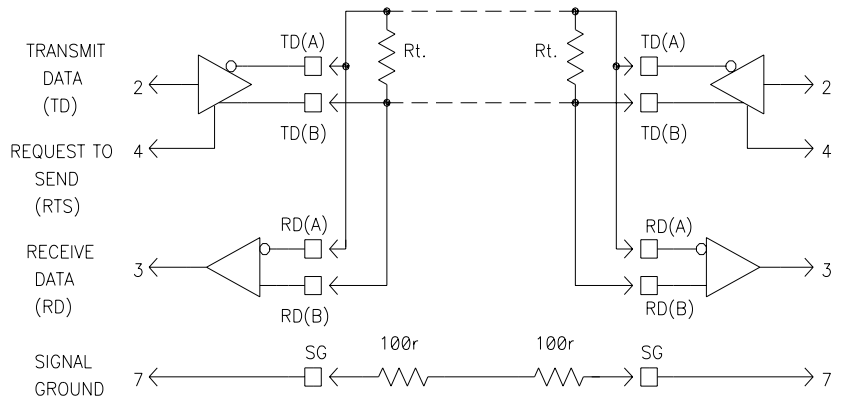


FIGURE 2. INTERCONNECTION DRAWING

Figure 2

**Specifications:**

Dimensions: 2.75" w x 4.85" l x 1.05" h

Data Rate: Up to 115.2K baud

Connectors: RS-232: DB-25 female (DCE)  
RS-485: DB-25 male (RS-530 pinouts)

Power Supply: 12VDC @ 100mA--or--9VDC (battery) current draw approx. 18mA @ 9VDC (no load)

Two channel device (transmit and receive only)

**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: 485BAT2  
 Description: RS-422/485 Battery Powered Converter  
 Type: Light industrial ITE equipment  
 Application of Council Directive: 89/336/EEC  
 Standards: EN 50082-1 (IEC 801-2, IEC 801-3, IEC 801-4)  
 EN 50081-1 (EN 55022)

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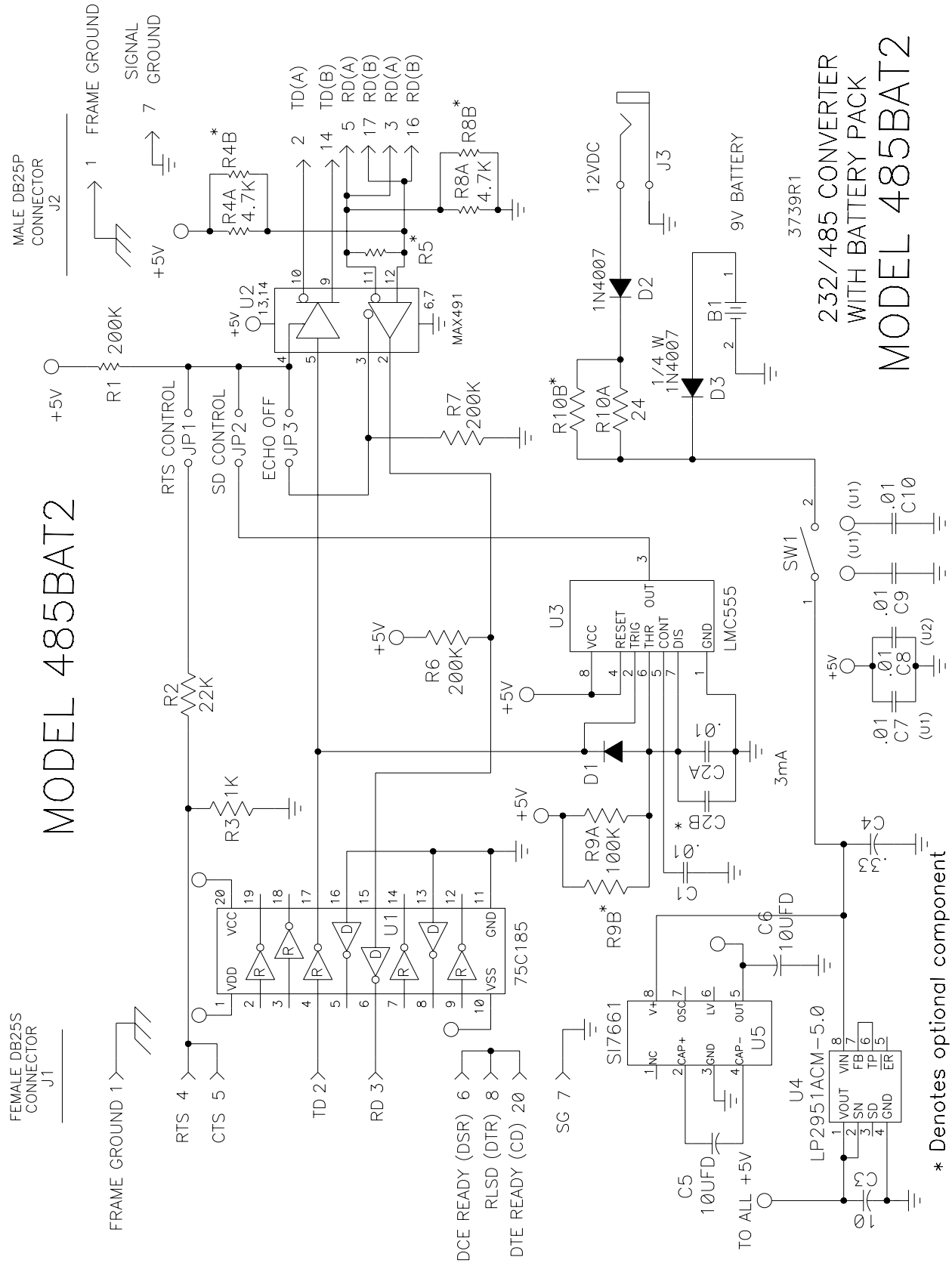
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