



RS-232 to RS-485 Optically Isolated Converter, DB25F to Terminal Block

Product Code IC1660A

This RS-232 to RS-422/485 converter changes unbalanced, full or half-duplex RS-232 signals to balanced, full or half-duplex RS-422 or RS-485 signals at baud rates up to 115.2 kbps. In addition the unit optically isolates and surge suppresses the RS-422/485 lines. The driver uses automatic SD (send data) or RTS (handshake) control, or can be configured as always enabled for use in RS-422 systems.

A dipswitch selects communication features. Two LEDs show data traffic in either direction. Only one power supply is necessary, located on the RS-232 side. The isolated power and ground on the RS-422/485 side are generated internally.

Connections are made through a DB25 female connector on the RS-232 side and terminal blocks on the RS-422/485 side. All terminal blocks, dipswitches, and jumpers are located inside the hood and are reachable through the access panel, which closes to protect the connections.

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. There are two LEDs: A Transmit Data LED to show when data goes from the RS-232 side to the RS-485 side, and a Receive Data LED showing data going from the RS-485 side to the RS-232 side. These are very useful for determining if data is getting through the converter.

The RS-485 terminal blocks support Transmit Data (A) and (B), Receive Data (A) and (B), and Signal Ground. A single supply voltage of 10 to 30 VDC on the RS-232 side powers the unit. An 8-position dipswitch allows the selection of baud rate, 2-wire or 4-wire mode, echo on or off, and termination in or out.

RS-422/485 Driver Control

This converter uses either RTS Control or Send Data Control to enable the RS-485 driver. This option is user selectable by setting push-on jumpers located next to the terminal blocks. RTS controls the driver using toggling Request to Send (pin 4) of the RS-232 side. Raising RTS enables the driver and lowering RTS disables it. Automatic Send Data Control recognizes the first bit of data from the RS-232 side, enables the transmitter and disables the receiver.

After the last bit of data is sent from the RS-232 side, the timeout waits one character length then disables the transmitter and enables the receiver. The timeout can be selected with dipswitches or by changing the value of R21 (see Table 1). The timeout is preset at the factory for 9600 baud. Removing both sets of jumpers completely will constantly enable the RS-485 driver. This makes the unit behave like an RS-422 converter. See Table 2 for standard communications settings.

Termination and Echo Options

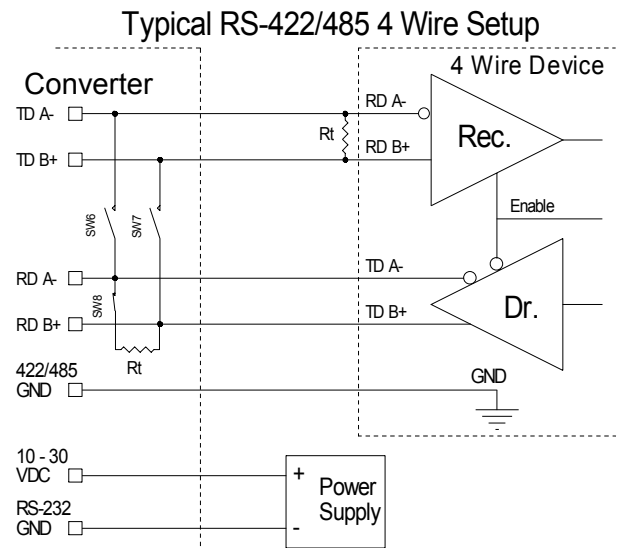
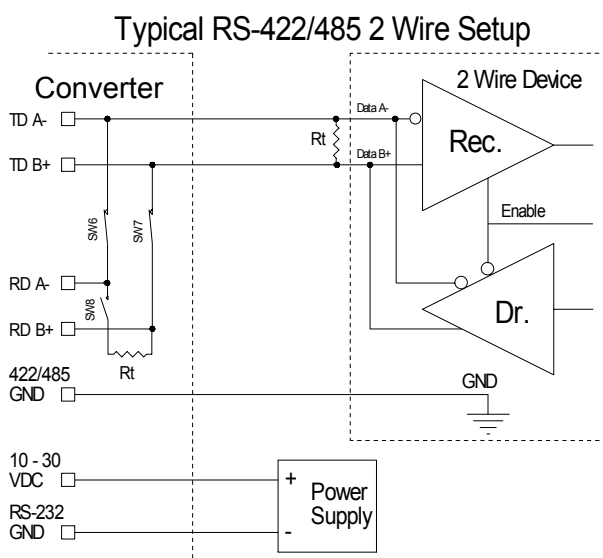
Termination resistance can be selected with Switch 8 for high baud rates and long cable distances. The 4-wire/2-wire switches (6 and 7) are turned off for 4-wire mode and on for 2-wire mode. When they are set to ON, they connect TD(A) to RD(A) and TD(B) to RD(B) internally. Switch 5 is controls Echo on and off. When switch 5 is in the off position the receiver is constantly enabled. Placing the switch in the on position allows the driver or the receiver to be enabled at any time. In 2-wire mode it is recommended that switch 5 be turned on to prevent data being sent out from being "echoed" back through the receiver. Up to 32 receivers can be driven by any one RS-485 driver, allowing you to put together large systems with many drop points. Using an RS-422/485 repeater such as Black Box product code IC1650A can increase the number of receivers.

Table 1. Baud Rate Selection

| Baud | Switch 1 | Switch 2 | Switch 3 | Switch 4 | R21 | Time out (ms) |
|--------|----------|----------|----------|----------|----------|---------------|
| 1200 | OFF | OFF | OFF | OFF | 820kΩ | 9.0 |
| 2400 | OFF | OFF | OFF | OFF | 410kΩ | 4.5 |
| 4800 | ON | OFF | OFF | OFF | Not Used | 2.2 |
| 9600 | OFF | ON | OFF | OFF | Not Used | 1.1 |
| 19200 | OFF | OFF | ON | OFF | Not Used | 0.6 |
| 38400 | OFF | OFF | OFF | ON | Not Used | 0.3 |
| 57600 | OFF | OFF | ON | ON | Not Used | 0.2 |
| 115200 | OFF | OFF | OFF | OFF | 8.2kΩ | 0.1 |

Table 2. Standard Communications Settings

| Communication Mode | JP1 | Switch 5 Echo | Switch 6 4W/2W | Switch 7 4W/2W |
|----------------------------------|-----------|---------------|----------------|----------------|
| RS-422 Mode (full duplex) | Neither | OFF | OFF | OFF |
| RS-485 4-Wire Mode (full-duplex) | RTS or SD | OFF | OFF | OFF |
| RS-485 2-Wire Mode (half-duplex) | RTS or SD | ON | ON | ON |



Specifications

Dimensions: 2.7 x 5.1 x 0.9 in. (7.0 x 13.0 x 24.0 cm)
 Temperature Range: 32 to 158°F (0 to 70°C)
 Supply Voltage: +10 to 30 VDC @ 95 mA maximum
 Data Rates: Up to 115.2 kbs
 Connectors: DB25 female for RS-232
 Terminal blocks for RS-422/485 and power
 Isolation: 2000 VAC Optical Isolation of Data Signals and Ground
 Surge Suppression: 7.5V, bi-directional avalanche breakdown device.
 500W peak power dissipation
 Clamping time <1 picosecond (theoretical)

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|---------------|--------------------------------------------------------------|
| Model Number: | IC1660A |
| Description: | RS-232/485 Optically Isolated Converter |
| Type: | Light industrial ITE equipment |
| Standards: | EN 55022 EN 50082-1: EN 61000 (-4-2, -4-3, -4-4, -4-6) |



