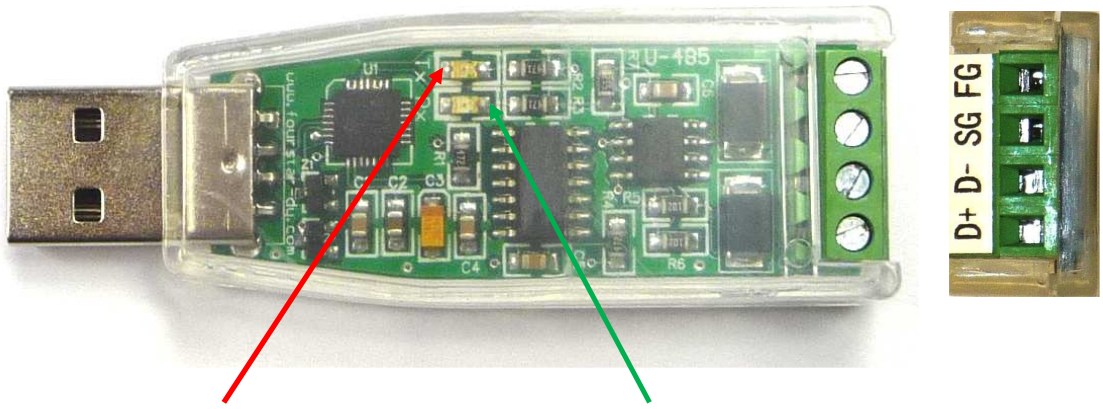
USB_RS485 Converter Setup Guide

The USB-RS-485 converter provides a USB powered serial port with RS-485 signaling, with "zero delay" switch-over between transmitting and receiving, removing the software overhead of controlling the transceiver drive control signal. Bauds rates from 300 to 1Meg Baud are supported by the converter, with 7 or 8 bit data, 1 or 2 stop bits, and odd/even/no parity. Working temperature range is -20C to 70C. Typical distances supported are speed dependent, with up to 1000 meters at 115.2kbps, and 3000 meters at 4800bps, using suitable shielded twisted pair and proper termination resistors.

The drivers should be installed from the included CD-ROM prior to connecting the converter to the USB port of the PC.



The converter has four output signal connections:

- D+ is the positive data signal. This is also referred to as A in RS-485 networks. Internally this pin is pulled to +5v through a 1k resistor.
- D- is the negative data signal. This is also referred to as B in RS-485 networks. Internally this pin is pulled to Signal Ground through a 1k resistor.
- SG is the signal ground connection – 0v signal reference.
- FG is the field ground connection and is connected to the shell of the USB connector. It is used for any shield connections on the cable to provide a discharge path to earth ground via the computer case. The shield of the cable should typically only be connected at one end of the cable.

The converter has two Light Emitting Diodes which indicate when the unit is Transmitting (Red) or Receiving (Green) data. These are useful in troubleshooting communications issues.

NOTE: This converter DOES NOT provide galvanic isolation between the PC and RS-485 Signals.

The twisted pair used for the data bus should have a 0.5mm^2 minimum cross-sectional area (20 AWG), and should have an impedance of 120 ohms, nominal. Shielding is suggested for longer runs, or runs in proximity to noisy signals. For safety and noise reasons, the communications signals should not be run adjacent to line power or high voltage signals.

Although very short data busses (up to a couple of meters) may work adequately without termination, standard runs and even short runs in noisy environments should be terminated. The data bus should be wired in a linear fashion, minimizing any stub lengths to minimize bus reflections and resulting signal degradation. The bus should be terminated at both ends with 120 ohm effective impedances. Internal to the USB-RS485 converter are biasing resistors for the network. These are 1K resistors from D+ to +5v and from D- to 0v. Adding the 120 ohm termination resistor results in a 0.27v bias on the network when no transmitters are active. A similar network of 1k from +5v to D+ (A), 120 ohm between D+ (A) and D- (B), and 1k from D- to 0v should be used at the far end of the network. A minimum of +0.2v is needed to guarantee a high level is detected by the transceivers; this helps prevent loss of characters following an inactive period on the bus.

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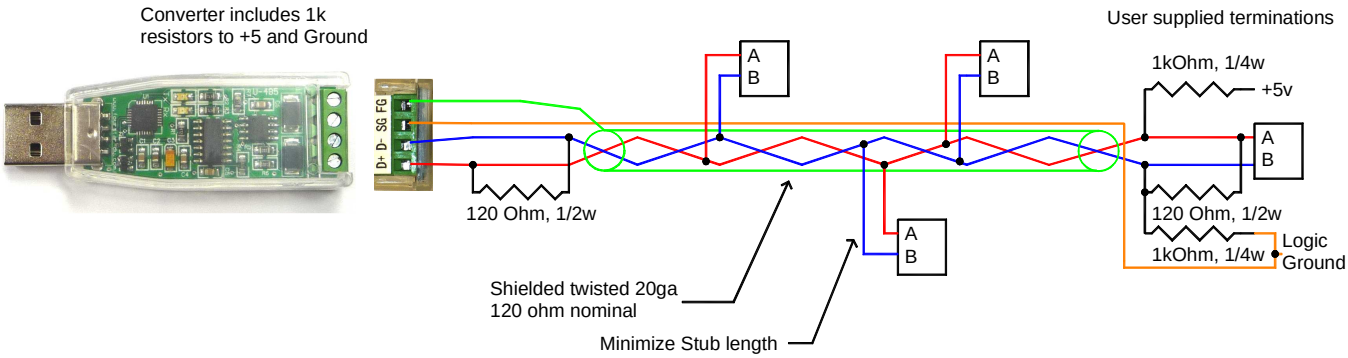

The above figure shows a bus with the converter and four RS485 transceivers. The stubs from the bus should be kept reasonably short (~ 1 meter or less) to minimize reflections on the bus. The bus needs to be terminated at both ends. The converter includes the 1k resistors to +5 and SG internally. The far end of the bus needs the termination resistor as well as the 1k resistors to +5 and logic Ground.