

RS-232 Connections

Q: How do I connect "3-Wire" RS-232 using FOSTC Fiber Converters?

A: A "3-Wire" RS-232 supports TD, RD and GND connections. The RS-232 connection on the FOSTC is wired DCE like a modem. From a computer DB25M (male) RS-232 port, the cable is straight pin to pin. The DB9M (male) connector used on the original PC/AT changed pin numbers, but TD still connects to TD, RD to RD and GND to GND (see left side of the figure below). If the serial port on the RS-232 device is wired DCE like a modem, then a crossover of TD & RD between the device and the FOSTC is needed (see the right side of the figure below). Some RS-232 devices require hardware handshaking, but the the FOSTC and FOSTCDR don't support those signals, the connections are looped back. If needed, use models 232FLST or 9PFLST which support RTS/CTS connections. *Check FAQ for those models.*

Connection figure below: Set switch Sw 1:6 to OFF. Other switches have no effect on RS-232 operation. If using one end as RS-232, the other end as RS-422 or RS-485, the RS-232 side will match either the left or right side connections in Figure 1.

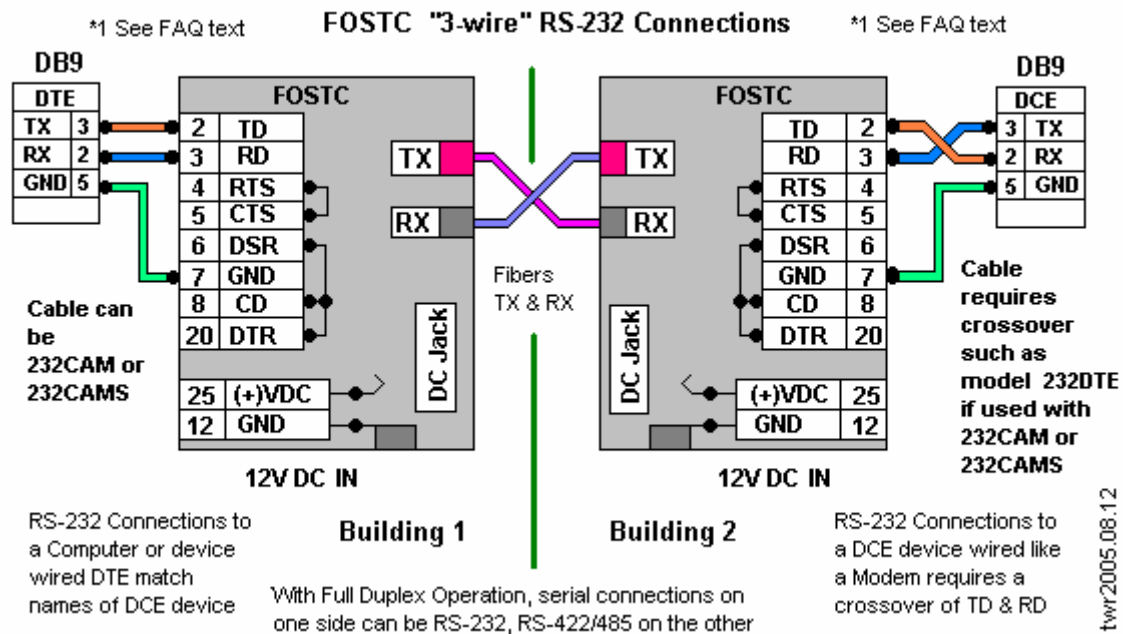


Figure 1: RS-232 Connections

1. The RS-232 device on the left side has **DTE** pinouts which match a computer with DB9M connector. Pin #3 is output (Tx), pin #2 is input (Rx), pin #5 is ground. See DTE figure for DB-25 pinouts. Signal flow for DTE and DCE is opposite.
2. The RS-232 device on the right side has **DCE** pinouts similar to a modem, so pin #3 on the device is input (Tx), pin #2 is output (Rx), #5 is ground, note crossover. See DCE figure for DB-25 pinouts.

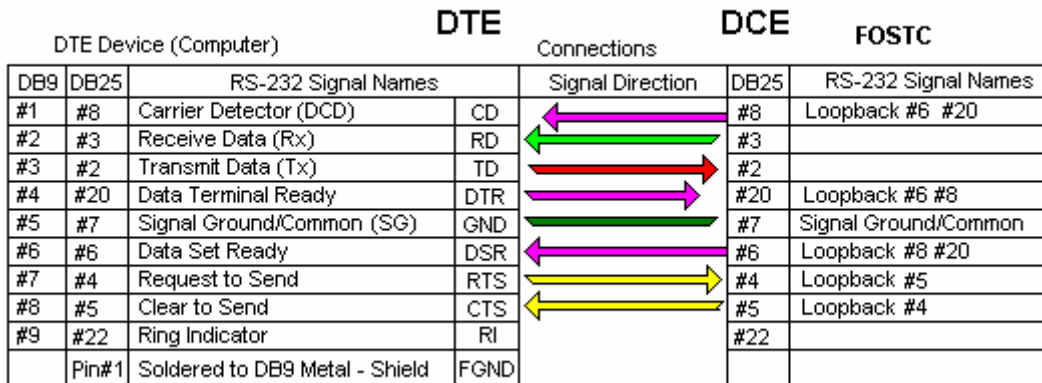
How to identify which line should connect to Pin#2 (Input) from the RS-232 device:

Use a DC voltmeter to measure from the ground wire to each of the other two RS-232 wires, while the RS-232 device is powered up. Usually one lead has a minus (-) DC voltage, typically between -11.5 volts and -3 volts. Whichever lead has a minus voltage is the lead to connect to

our Pin#2. The other lead usually has nothing or noise relative to ground. If neither lead has a minus (or positive) voltage on it relative to ground, recheck for OPEN cable connections to the RS-232 device or the device pinouts. If the device can be configured multiple ways, make sure all the jumpers and such are set to RS-232. If you can make the device send data, set the meter to AC mode and see if from the GND lead to the other two leads, one shows a AC voltage jump on the meter during data. That lead is the output to connect to our input. Voltage will be less than 5 volts.

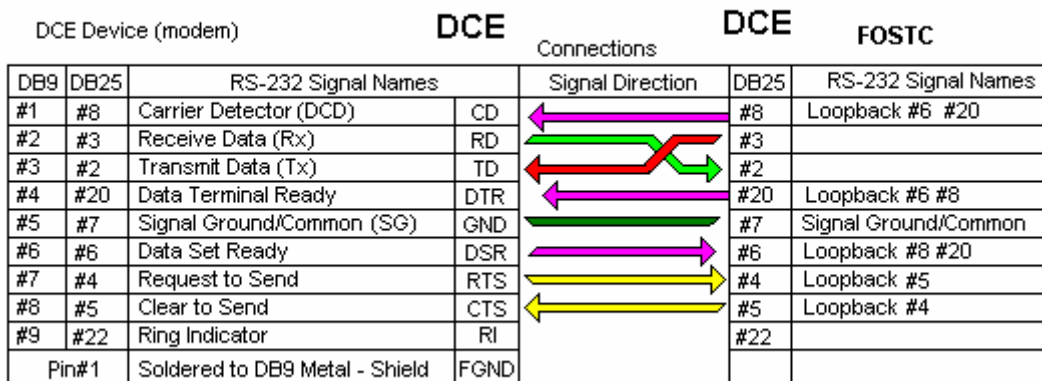
RS-232 testers which show the active signal lines, Low or High can be used instead of a meter. 9PMTT for DB9, or 232BOB1 for DB25. Connect first to one side, check light on TD or RD, then disconnect that side, connect to other side, if the same light is lighted, a crossover is needed.

Rule of Thumb for RS-232 Cable Connectios – If the device connects to a computer with a straight through cable, the device is DCE, and will need a crossover cable to connect to the FOSTC. If it connects using a Crossover cable (null modem type) then the device is wired DTE, and it should connect to our FOSTC directly with a straight through cable.



Wires for RTS/CTS & DTR/DSR/CD loopbacks may be needed.

Figure 2: DTE to DCE Connections



Wires for RTS/CTS & DTR/DSR/CD loopbacks may be needed.

Figure 3: DCE to DCE Connections

This converter provides RS-232 loopbacks internally, but they are only needed if the software or devices require them to operate. If the output is looped back and active, the matching input will be active. The figures show straight wires for RTS/CTS and DTR/DSR, but if crossed, work the same. On a host computer, software may choose to ignore them (Hardware Flow Control: None) if not used or may use them only to verify a cable is connected. Connections to a computer can

use a standard Modem Cable (not Null Modem) such as the DB9F to DB25M, 232CAM (6 feet) or 232CAMS (6 inches). Connections to a Modem device require a crossover such as the 232DTE with adapter cable or custom wiring.

We Keep The Light On

The FOSTC (and FOSTCDR) keep the light in the fiber turned on when no data is transmitted and the input signal is in the MARK state (idle). If light is lost or too low, the electrical signals go to the SPACE state. The input signal turns the light Off/On in step with the data. This model has no indicator for Transmit or Receive, if no light is received, the RD output will be positive relative to GND (normally negative), and in RS-422 or RS-485 mode, no light will set the TD(A)- line high relative to TD(B)+. The usual voltage with light in the fiber and no signal sets the B line high relative to A (about 4.4 Volts DC no termination). To check, connect a fiber patch cable from the TX connector into the RX connector.

RS-485 Connections

Q: How do I connect “2-Wire” RS-485 devices with FOSTC Fiber Converters to isolate and extend the Bus?

A: See Figure 4 for “2-Wire” RS-485.

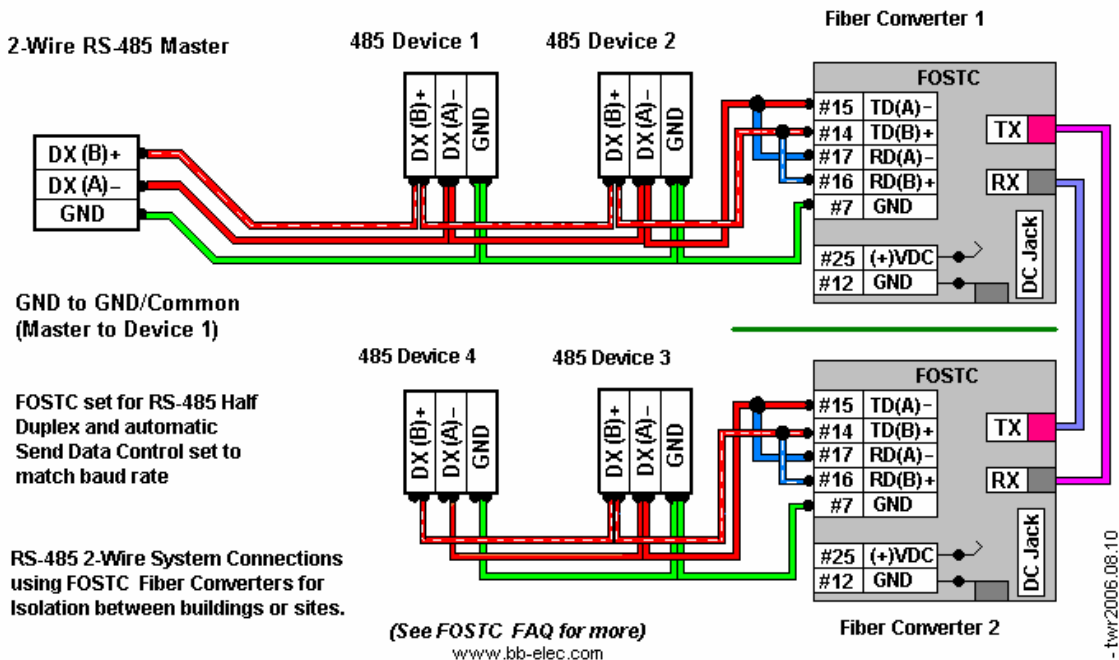


Figure 4: 2-Wire RS-485 Connections

In 2-Wire RS-485 mode, the receiver and transmitter must be connected together, and internal switches #7 and #8 set to On. Set the baud rate switches to match the baud rate of the data so that data is not lost. Not all RS-485 devices are marked correctly for Data (+) and (-), so if the slave devices don't respond after going through the fiber converters, try swapping the polarity of wire pairs to each converter. When there is no light received from the fiber in, the TD(B)+ line will be Low relative to the TD(A)-. You can interconnect or loop back the transmit fiber on one unit to verify that the state of TD(A) and TD(B) change with/without the fiber. Normal bias on RD(B) to RD(A) before termination is about 3.8 to 4.0 VDC, Data (+) to (-). See our RS-422/485 Application note for more information on biasing. **Fiber data has Priority.**

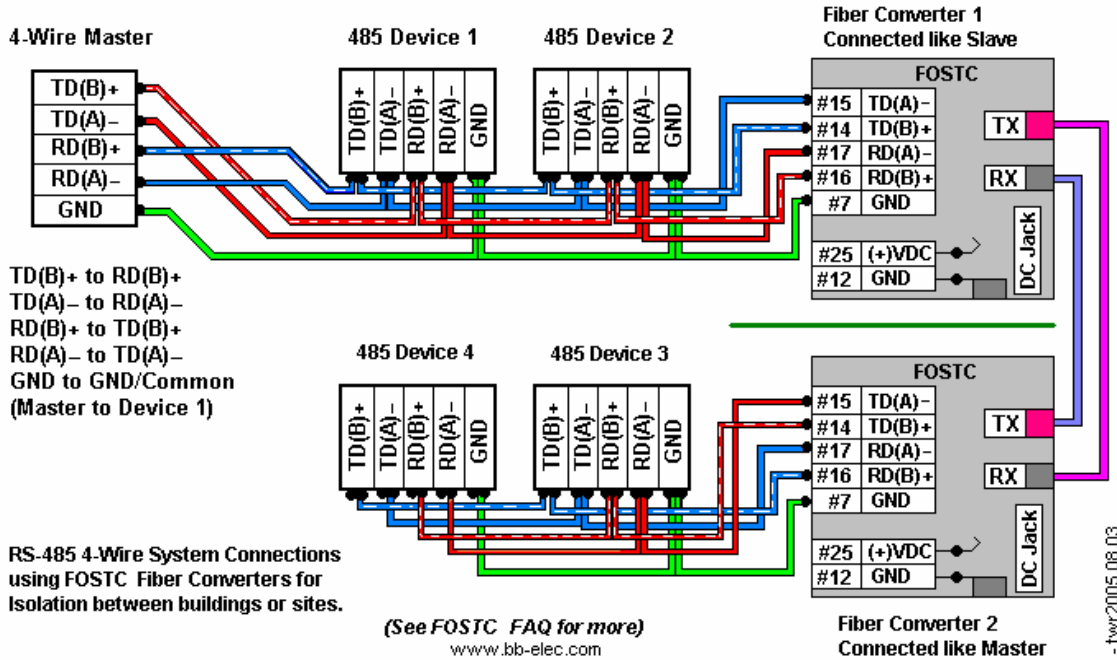


Figure 5: "4-Wire"RS-485 Connections

Set switch #7 to On for RS-485 transmit, to Off for RS-422 mode transmit. Set switch #8 to Off to enable the receiver. A faint red light can be seen in the transmit ST connector when the fiber is removed.

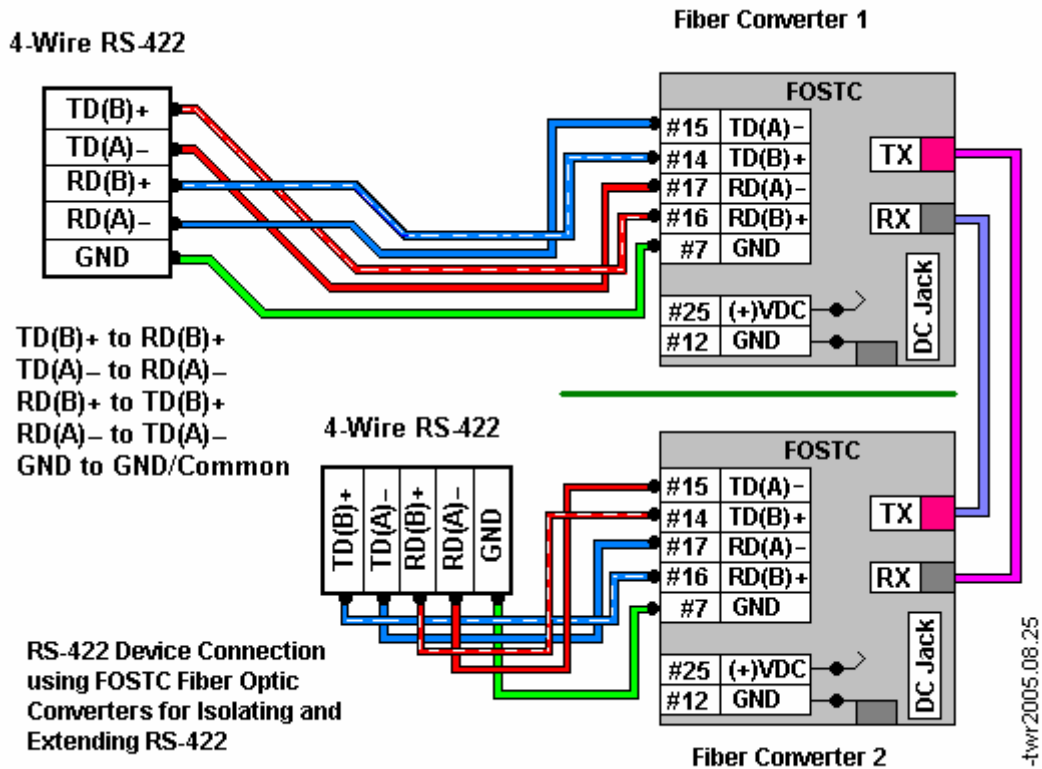


Figure 6: "4-Wire"RS-422 Connections