Configuring EIA-485
Common Mistakes Configuring EIA-485 for Modbus and BACnet

RLE Technologies

EIA-485

EIA-485 (formerly known as RS-485 or RS485) is a specification for the physical layer of a network that uses the difference in voltages between 2 wires.
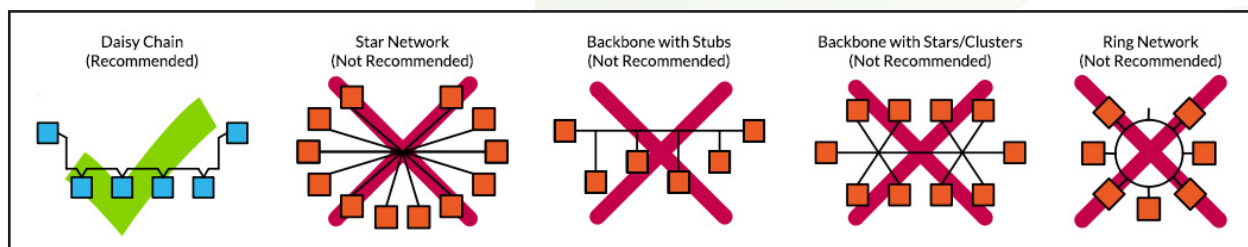
Simply, if one wire is high (digital 1) the other will be low (digital 0), and vice versa. This simplicity allows data to be transmitted up to 4000 ft.

Wiring

RLE recommends wiring in a daisy chain configuration. Other layouts are prone to electrical reflections that can cause difficult to diagnose problems.

A wire gauge of 22AWG or 24AWG should be used. RLE uses the A+ and B- polarity convention, but other manufacturers may use A- and B+, D+ and D-, or just + and -. With any of these cases, match the (+) to (+) and (-) to (-). Shield is sometimes referred to as ground or common, often shortened to GND or C.

Recommended vs. Non Recommended Wiring

Daisy Chain (Recommended) | Star Network (Not Recommended) | Backbone with Stubs (Not Recommended) | Backbone with Stars/Clusters (Not Recommended) | Ring Network (Not Recommended)

How To Diagnose EIA-485 Problems On RLE Products

1. **Check The LEDs**
   a. If only the RX LED is blinking, then the controller is receiving the signal but is not transmitting. This is likely a configuration issue. Check #2 for a resolution.
   b. If only the TX LED is blinking, the controller thinks it is transmitting. This is not possible without receiving first. Try reversing the wires.
   c. If No LEDs are blinking, make sure that the BMS that is initiating communication is transmitting as expected. Check that the end device is powered on.

2.   **Configuration Issues**

    a.   RLE products are configured to transmit with 8 data bits, no parity, and 1 stop bit in Modbus RTU. RLE products do not transmit in Modbus Ascii.

    b.   Make sure that the baud rate is the same across all devices along the daisy chain.

    c.   It is recommended that the Max Master is set to 127 when initially configuring your RLE device. After communications have successfully been established, this can be lowered to the largest number server device on the daisy chain to speed up communications.

    d.   Check for duplicate server device numbers. Duplicate server device numbers can cause intermittent errors.

3.   **Wire Quality And Length**

    a.   Poor wire quality can cause the signal to degrade. Lowering the baud rate can help to resolve this problem.

    b.   EIA-485 can transmit 4,000 feet, but at longer lengths the signal can degrade and is prone to interference. If you are using a longer run, lowering the baud rate can help resolve the problem.

4.   **Termination Resistors**

    a.   RLE recommends placing a 120Ω termination resistor on the final device on the daisy chain. This can prevent electrical reflections.

    b.   Some RLE products have a termination resistor built into the board. If the device is the last in the daisy chain, you can flip the termination resistor switch down (engaged). If the device in not the last in the daisy chain, leave the termination resistor switch up (disengaged).

5.   **Contact RLE Tech Support**

    If you are still unable to resolve your communication issues, you can reach out to RLE Tech Support at (800) 518-1519 or support@rletech.com.

Supported Products Capable of EIA-485	
SeaHawk	LD1000, LD1500, LD2100, LD5200, LDRA6, 10K
Falcon	FMS, WiNG-MGR, WiNG-MGR v2
Raptor	BMS-LD3Z, BMS-1WIRE, BMS-WiNG, Protocol Convertor