

November 9, 2009

RS-485 Notes

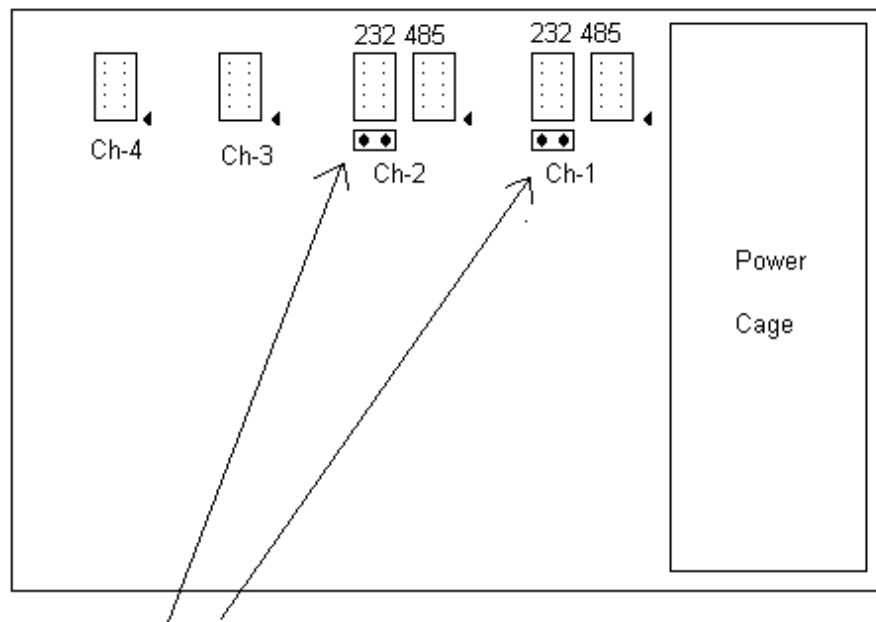
These notes apply only to SPT4-NET units with serial numbers SP-20000 or higher

The SPT4-NET contains four serial ports. Ports 1 and 2 can be configured for native RS-232 or RS-485 communication. Ports 3 and 4 are RS-232 only. As delivered, all four ports are configured for RS-232. Both hardware and software (data base) adjustments are required to configure a channel for RS-485 operation.

Hardware Configuration

To configure a SPT4-NET channel for RS-485 communication:

- Remove power from the SPT4-NET box
- Remove four screws from the bottom of the enclosure
- Remove the top cover to show a set of 10-pin headers and jumpers for the four communication channels



120 Ω terminating resistor

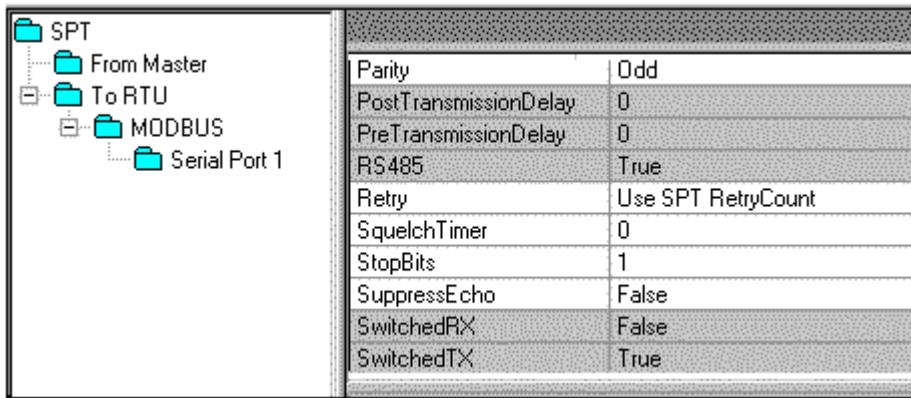
- Move the 10-pin ribbon cable for channels 1 and/or 2, as required, from the RS-232 header to the corresponding RS-485 header
- If required, insert a jumper over the 120 Ω terminating resistor header. RS-485 standards specify that this resistor should be inserted for one device in a RS-485 communication network
- Replace the cover

RS-285 communication uses pins 1 and 2

Pin	Function
1	RX/TX +
2	RX/TX -

Software Configuration

RS-485 communication requires adjustment of several Serial Port properties, which can be modified through the SPT Configuration Editor. Properties that require special consideration for RS-485 communication are shaded in the drawing below. These are not the only serial port properties that may require modification. Others, such as Baud Rate, which apply equally to RS-232 and RS-485, are not discussed.



Property adjustments are required because of two differences between most RS-232 and RS-485 communication. Please read the following discussions to make sure these differences are applicable. While items below describe operation of the SPT4-NET's internal RS-485 circuits, information is applicable for operation with an external RS-232 to RS-485 converter.

1. RS-485 communication is half-duplex, meaning that the master and RTU/IED/PLC cannot both communicate at the same time. RS-232 is typically full duplex. For RS-485 communication, a transmitting device should relinquish the transmitter as the last bit has been sent
2. RS-485 does not support modem control signals such as RTS, CTS, or DCD. It can (and does in SPT4-NET hardware) use RTS to control transmission. External RS-232 to RS-485 converters may or may not operate in this way

PostTransmissionDelay defines the number of milliseconds between transmitting the final bit of a message and relinquishing the transmit circuit. The default (corresponding to RS-232 communication) is 8 milliseconds. This should be changed to 0 for RS-485 (see point 1, above). A larger value may cause the SPT to lose the first few bits or bytes of an incoming message

PreTransmissionDelay define the number of milliseconds between acquiring the transmit circuit and transmitting the first bit of a message. The default is 20 milliseconds. RS-485 devices typically do not require a delay, so it can be set to 0. The only negative impact of a larger value would be slower communication

RS-485 must be true to utilize the SPT4-NET internal RS-485 circuit. If false, the RS-232 circuit is used

SwitchedRx instructs the SPT4-NET to ignore incoming data when DCD is false. Since RS-485 communication does not use DCD, this property must be set false

SwitchedTx instructs the SPT4-NET to assert RTS before each message is sent and to de-assert RTS when message transmission is complete. This must be true when using the SPT4-NET's internal RS-485 hardware. (For RS-232 operation, SwitchedTx also requires CTS to be true before transmission starts. SPT software does not impose CTS dependency when the RS-485 property is true.)