RS-485

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Issue
Describe procedures for RS-485 communication

General
RS-485 is a half-duplex circuit. Requests and responses appear on the same 2-wire circuit.

RS-232 is a full duplex circuit. Requests and responses appear on a different circuits.

ASE supplied hardware supports RS-232 only. ASE2000 software was primarily designed to utilize a full-duplex circuit (RS-232 or modem). Considerations have been made, where possible, for RS-485.

Hardware Setup
Connecting ASE’s BCOM-USB device to a RS-485 network requires purchase and installation of an external 485-to-232 converter. ASE does not offer such a device, but they are commonly available. Connecting to most computer COM ports also requires such an adapter. There may be native RS-485 COM port or USB-to-485 devices available, although ASE is not aware of any.

Since RS-485 is a half-duplex circuit (you can only talk in one direction at a time), there must be some model for deciding when the ASE2000 is transmitting and when it is listening. There are two common models. Some 232-to-485 converters:

- Detect data being transmitted on the RS-232 Tx pin. When it detects data, it enables the device for transmission. When it notices that data is not present, it enables the device for reception. If your converter uses this logic, it will work with no additional configuration
- Use the RS-232 RTS signal. When asserted, it enables the device for transmission. When de-asserted, it enables the device for reception. For these type of converters, the RTS signal be wired in the RS-232 cable going from the computer to the 232-to-485 converter

Procedures under the Software Setup section support both models.
Software Setup
Communication properties should be set as follows. Not all may be required depending on the characteristics of the converter, but they cannot hurt. That is, these settings will work in all cases.

- Set Carrier to “Switched RS485”
- Set Pre and post transmission mark to 1
- Check “Native Asynch Mode”. This option is only presented for ASE-supplied BCOM-USB devices. For other communication devices, native async mode is assumed, so need not be checked

ASE2000 Version 2, Tools and Properties
From ASE2000 version 1
Properties, Communication, Line

Master or RTU Simulation
Proceed with Master and RTU Simulation operation as for RS-232. There are no further considerations for RS-485.

Line Monitoring
RS-232 line monitoring requires two RS-232 connectors, one for communication from the master and another for communication from the remote device.

Since RS-485 is half duplex, there is only one communication circuit used for both the master and remote. Only one connection is required, and that circuit will present messages in both directions to the ASE2000.
Some protocols, such as **DNP3**, contain information in each message identifying the message direction. The ASE2000 uses this bit to parse each message correctly as a request or response. Even though messages in both directions are presented on one physical port, ASE2000 software processes them as if messages from the master to remote had arrived on one port, and messages from the remote to master on another port.

For a protocol such as **Modbus** that has no direction information, the ASE2000 cannot identify the direction. In this case, all messages are parsed as either requests or responses depending on where the RS-485 converter is connected. If, for example, it is connected to the channel where the ASE2000 expects to see responses, then all messages will be parsed as responses (messages from remote to master). All messages that actually are responses will be shown correctly. Messages that are requests will be parsed as responses and, since the structure is not the same, will be shown as errors.

If the converter is connected to the other port, then all requests will be shown OK, and all responses will be in error.