

Technote 06 - Modbus Debugging

Tips for solving Modbus device problems with the AcquiSuite

This document covers some basic techniques for solving Modbus communications problems using the AcquiSuite A8811 and any number of Modbus devices.

General:

The AcquiSuite can communicate with 32 Modbus devices on a RS485 in a daisy-chain configuration. The default communications speed is 9600. Confirm the RS485 speed in the Modbus/Setup section of the AcquiSuite configuration web page.

Because 2 wire RS485/Modbus is a shared line, half duplex system, a wiring fault may cause all devices to stop working. In addition, each device must have a unique address. If multiple devices are configured with the same address, all such devices will fail to respond.

To troubleshoot a Modbus problem with an A8811 AcquiSuite, you should take the following steps.

View the Modbus Device List on the AcquiSuite.

The Modbus device list on the AcquiSuite will report a list of all discovered Modbus devices. On the A8811 AcquiSuite, one of these devices is number 250, the internal pulse and analog inputs on the AcquiSuite itself.

Confirm that device 250 is present and working. Click on the device number 250 and verify the point details page does not report any errors.

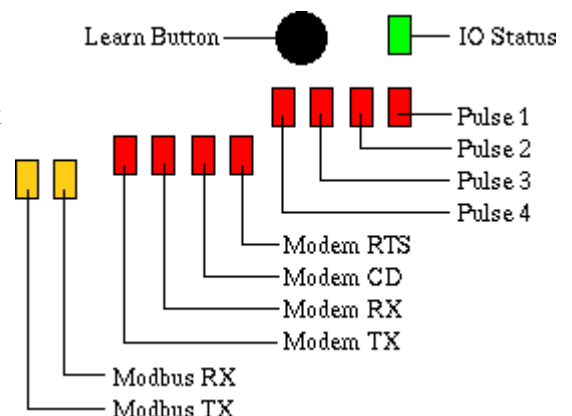
If there are errors accessing device 250: There may be an RS485 wiring problem that is preventing any attached device from working. Disconnect the RS485 line from the RS485 terminals on the AcquiSuite. This will help rule out any wiring problems. Try device 250 again. If device 250 responds, the problem is likely a wiring problem with the RS485 line. If device 250 still fails with no external RS485 connections present, there may be a problem with the AcquiSuite.

Verify the RS485 Modbus LEDs on the AcquiSuite:

During normal operation, the TX RS485 led (yellow, left) should blink several times per second, and the RX RS485 led (yellow, right) should be off most of the time, but may blink when specific devices are queried. The led placement is shown to the right.

If the TX RS485 led (yellow, left) is on solid, the ribbon cable to the lower left has come off the connector. It may be the connection on the back of the AcquiSuite main board, and not the one on the front however. On the back board, the connection is the terminal on the left.

If the RX RS485 led (yellow, right) is on solid, there is a short between the RS485+ and RS485 shield in your Modbus wiring. Disconnect the RS485 from the Acquisuite and confirm the LED goes out.



In either case, device 250, the "internal IO" will not operate while this problem persists. If device 250 is not working, try disconnecting the RS485 wire from the AcquiSuite. If this does not correct the problem, contact technical support.

Wiring issues:

If the AcquiSuite is functioning and device 250 is working, you can trouble shoot external Modbus devices by connecting them one at a time. Attach only one Modbus device to the AcquiSuite, possibly using temporary wiring. This will eliminate a large number of possible wiring problems and allow you to focus on only one length of cable, and one Modbus device.

Once the first device is working, attach one additional device. Again, confirm the new device appears in the device list on the AcquiSuite. It is important to stop and check the device list after each new device is attached. The device detection feature in the AcquiSuite may take 3 to 5 minutes to discover the new device, so it is best to be patient. Rebooting the AcquiSuite will not speed up the device probe feature.

Repeat: add one new Modbus device at a time until all the Modbus devices are attached.

The remainder of the document contains details for specific Modbus devices.

Notes for the Veris H8328 MCM:

First, confirm the MCM dipswitch setting. MCM dipswitch settings should be:

- position 1: any. (6 or 8 meter configuration)
- position 2: OFF: 2 wire
- position 3: OFF: baud 9600
- position 4: ON: baud 9600
- position 5: OFF: parity (E)
- position 6: OFF: parity disabled.

Verify the RS485 wire is daisy-chained from the MCMs to the AcquiSuite. The 3 wire connection should attach to the MCM using the following connections:

- MCM "TX+RX+" terminal to the AcquiSuite RS485+ terminal.
- MCM "TX-RX-" terminal to the AcquiSuite RS485- terminal.
- MCM "SHLD" terminal to the AcquiSuite shield terminal.
- MCM "TX+" terminal is not connected.
- MCM "TX-" terminal is not connected.

You should see the H8238 Alive LED blinking every second, and the H8238 RX led blink 2-3 times per second. If the RX led is not blinking, then there is an RS485 wiring issue between the AcquiSuite and the H8238.

After any changes are made, wait 5 minutes, and then select the "Modbus status" from the LCD menu, and check if more devices are listed. You must wait 5 minutes to allow the AcquiSuite to scan and detect the new devices.

Notes for the Veris H663 and H704 BCM:

Verify the RS485 wire is daisy-chained from the BCMs to the AcquiSuite. The 3 wire connection should attach to the BCM using the following connections:

- BCM "TX+RX+" terminal to the AcquiSuite RS485+ terminal.
- BCM "TX-RX-" terminal to the AcquiSuite RS485- terminal.
- BCM "SHLD" terminal to the AcquiSuite shield terminal.
- BCM "TX+" terminal is not connected.
- BCM "TX-" terminal is not connected.

Next, verify the switch settings on the BCM:

- position 1: OFF (not used)
- position 2: ON: 2 wire
- position 3: OFF: baud 9600
- position 4: ON: baud 9600
- position 5: OFF: parity disabled.
- position 6: OFF: parity disabled.
- Position 7: OFF: (not used)
- Position 8: OFF: (not used)

Verify the BCM has a unique address set for each BCM. ie, number them 1,2,3 in order. It is important that no two devices have the same address. This includes any non-BCM devices in the system.

After any changes are made, wait 5 minutes, and then select the "Modbus status" from the LCD menu, and check if more devices are listed. You must wait 5 minutes to allow the AcquiSuite to scan and detect the new devices.