NI 9871 Module Testing
Progress Report

Aaron Brown
Detector Support Group
August 21, 2019
Contents

• Overview
  – Module being tested: NI-9871

• Technical Specifications

• Tests
  – LabVIEW code

• Problems Faced

• Moving Forward

• Conclusion
NI-9871

- 4-Port RS485/RS422

Serial Module
  - Used in conjunction with NI USB-to-485 4-Port Serial Interface Device
# Technical Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>NI-9871</th>
<th>NI USB-485</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/N</td>
<td>1A71D6E</td>
<td>1A3FAC6</td>
</tr>
<tr>
<td>Max Baud Rate</td>
<td>3686.4 kbps</td>
<td>460.8 kbps</td>
</tr>
<tr>
<td>Voltage Range</td>
<td>8-28 VDC</td>
<td>9-30 VDC</td>
</tr>
</tbody>
</table>

Both module and USB-485 are connected to their own 24 VDC power supplies.
Tests

• Read/write capability tests
  – Can module read from USB-485 and write back to it? ✓
  – Are there any special characters that this module cannot handle?
  – Does this module read back *exactly* what has been written to it?
  – Does this module write *exactly* what it has been instructed to write?

• Test different baud rates (in development)
LabVIEW front panel for NI-9871 serial module test. User changeable port selection and baud rate. Read and write buffers, and error messages.
Problems Faced

• Ethernet cable
  – Module requires RJ-50 cable, but only RJ-45 cables available.
  – Solution: Purchased RJ-50 cable.

• Serial cable adapter
  – To connect module to USB-485 serial interface via Ethernet cable an adapter was needed that could support an RJ-50 Ethernet cable.
  – Solution: Purchased breakout board and DB9 serial adapter.
Problems Faced (cont’d)

• Read/write
  – Could not read from either USB-to-serial interface or module in National Instruments Measurement & Automation Explorer (NI MAX), but could write from both.
  – Solution: Changed timeout from 2 s to 4 s on both module and USB-485 serial interface. This appears to have fixed timeout error.

• Baud rates
  – Unsuccessfully attempted to increase rates (from 9600 bps to 14400 bps) for both module and USB-485. Only worked for USB-485.
  – Maximum baud rate for module is significantly higher than that of USB-to-485, so there is a limit to how high it can be tested.
Moving Forward

- Decide how many times to run each test.

- Determine how to change baud rate for module.

- Test different baud rates, create random string generator, and compare read/write strings.

- Determine if these tests are enough to ensure that module works according to manufacturer’s specifications.
Conclusions

• The NI-9871 serial module behaves as it should under these specific conditions:
  – Baud rate of 9600 bps
  – Only for specific characters input for test
Thank You!