



isoLynx[®]

**8B SLX300
LabVIEW VI Examples
User Manual**



8B isoLynx[®] SLX300 LabVIEW VI Examples User Manual
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Errata Sheets

Refer to the Technical Support area of Dataforth’s website (www.dataforth.com) for any errata information on this product.

1.0 Introduction

1.1 Overview

The 8B isoLynx® SLX300 system is shipped with five LabVIEW VI examples, which demonstrate how to run the 8B isoLynx® SLX300 with LabVIEW. These will enable users to develop LabVIEW VI applications. The five examples are:

- SLX300 Read Write Example: Demonstrates how to read and write data and other information from and to the SLX300 using Modbus commands.
- SLX300 R_W Chart Example: Demonstrates how to read and write data and other information from and to the SLX300 using Modbus commands and also provides a one-channel chart recorder to graphically display the data.
- SLX300 2CH Scope Example: Demonstrates how to use the Buffer Scan mode to acquire data and present it on a 2-channel oscilloscope display.
- SLX300 4CH Chart Example: Demonstrates how to use the Continuous Scan mode to acquire data and present it on a 4-channel chart recorder display.
- SLX300 Frequency Counter / Generator Example: Demonstrates how to use the frequency counter and frequency generator special functions.

These can use either the FieldTalk Modbus protocol drivers and DLL library or the National Instruments Modbus VI. Both are included on the SLX370 Software Tools CD.

1.2 Related Documents and Tools

The following documents are available from Dataforth Corporation:

- *MA1029 SLX300 Configuration Software Tool User Manual*
- *MA1030 SLX300 Quick Start Guide*
- *MA1031 SLX300 Hardware User Manual*
- *MA1032 SLX300 Software User Manual*

The following documents are available from the Modbus Organization (www.modbus.org):

- *Modbus Application Protocol Specification, V1.1a, June 2004*
- *Modbus over Serial Line Specification & Implementation Guide, V1.0, November 2004*
- *Modbus Messaging on TCP/IP Implementation Guide, V1.0a, June 2004*

The following tools and documents are available from FieldTalk* (www.modbusdriver.com):

- Modbus Protocol Drivers and DLL Libraries
 - *If the FieldTalk tools are used, the dynamic link library, libmbusmaster.dll, must be either in the same folder as the VI being executed or in the current environment path.
- *FieldTalk User Manual*

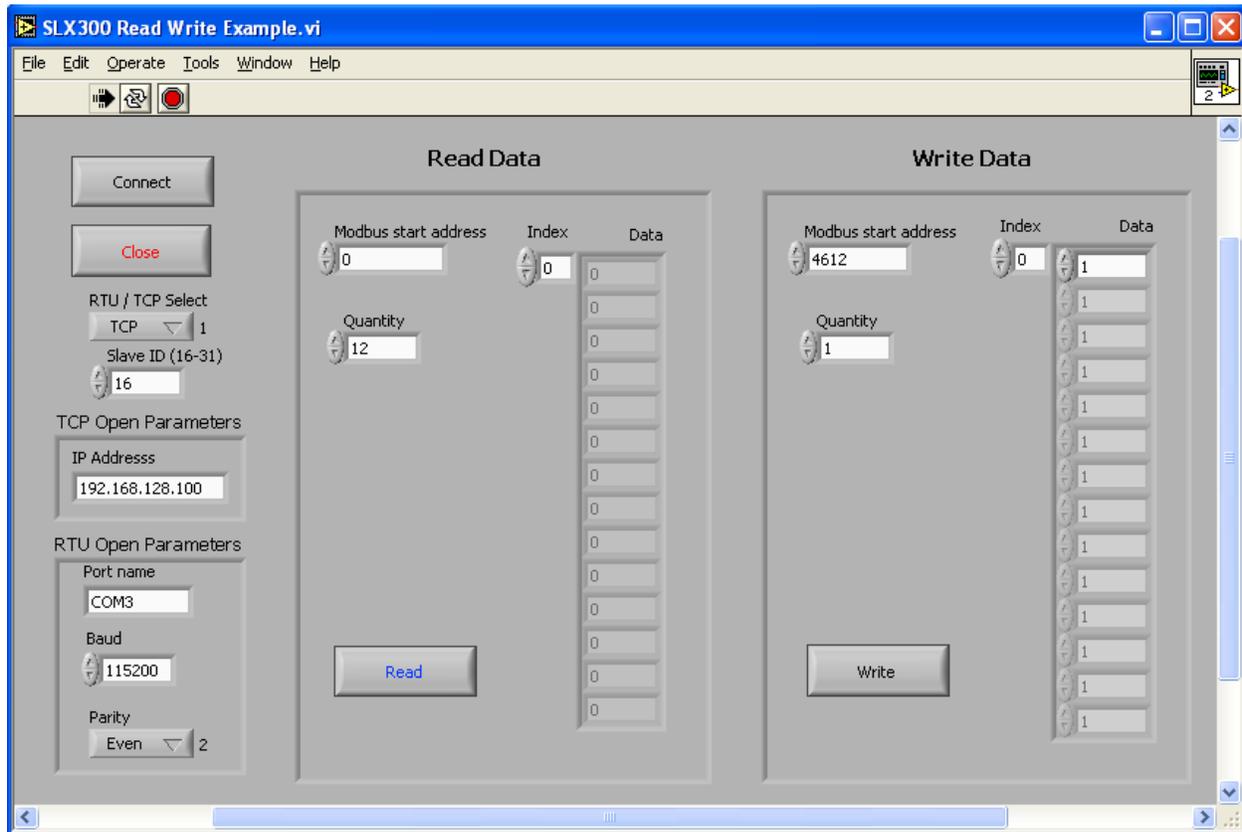
The following Tools and documents are available from National Instruments (www.ni.com):

- Free Modbus Protocol Drivers VI and Examples
- *LabVIEW User Manual*

2.0 SLX300 Read Write Example

2.1 Configuration

Before reading and writing data or other information from and to the 8B isoLynx® SLX300, basic configuration of the system must be performed. The following steps illustrate how to use the SLX300 read / write example.



2.1.1 RTU/TCP Select

The SLX300 system supports Modbus RTU over an RS-232 serial port, RS-485 serial port or USB port. It also supports Modbus TCP over Ethernet. The default protocol setting is TCP. Select RTU or TCP protocol for the port being used.

2.1.2 Slave ID

Select the Slave ID that matches the address set with jumpers on the system. The system is shipped with default Slave ID of 16. The valid range of Slave IDs is 16 - 31.

2.1.3 TCP Open Parameters

The TCP open parameters must be input once the Modbus TCP protocol has been selected. Enter the IP address into the IP Address box. The default IP address is 192.168.128.100.

2.1.4 RTU Open Parameters

The RTU open parameters are entered after the Modbus RTU protocol has been selected. There are three variable parameters:

- Port name: COM1-COM10. The default setting is COM3.
- Baud Rate: The valid baud rates are 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 and 921600. The default setting is 115200.
- Parity: Even, Odd, None. The default setting is Even.

2.2 Connect

After configuration, click the Connect button to connect the software to the 8B isoLynx® SLX300.

2.3 Read

The following steps describe how to read data from the 8B isoLynx® SLX300. Refer to the *8B isoLynx® SLX300 Software User Manual, Appendix A*, for the Modbus Address Map.

2.3.1 Read Modbus Start Address

Enter the start address in the Modbus start address box.

2.3.2 Read Quantity

Enter the quantity of data to read in the Quantity box.

2.3.3 Read Index and Data

The Index and Data display boxes are used to view the data.

2.3.4 Read Data

To read data, click the Read button. The text on the Read button will change to 'Stop' and the Data display boxes will show the data read from the system. To stop reading data, click the Stop button.

Example 1: Read 12-channel analog data from the Continuous Scan mode.
Set Modbus start address = 0, quantity = 12, then click the Read button.

Example 2: Read temperature register.
Set Modbus start address = 5633, quantity = 1, then click the Read button.

2.4 Write

The following steps describe how to write data to the 8B isoLynx® SLX300. Refer to the *8B isoLynx® SLX300 Software User Manual, Appendix A*, for the Modbus Address Map.

2.4.1 Write Modbus Start Address

Enter the start address in the Modbus start address box.

2.4.2 Write Quantity

Enter the quantity of data to be written in the Quantity box.

2.4.3 Write Index and Data

Enter the data to be written in the Write Data boxes.

2.4.4 Write Data

To write data, click the Write button.

Example 1: Write the Continuous Scan mode command to the SLX300 system.

Set Modbus start address = 4612, quantity = 1, data0 = 1, then click the Write button.

Example 2: Set Digital I/O channel states. Set channel 0 to output and channel 1 to input.

Set Modbus start address = 32810, quantity = 2, data0 = 2, data1 = 1, then click the Write button.

Example 3: Set Digital I/O channel value. Set channel 0 output value to 1.

Set Modbus start address = 32800, quantity = 1, data0 = 1, then click the Write button.

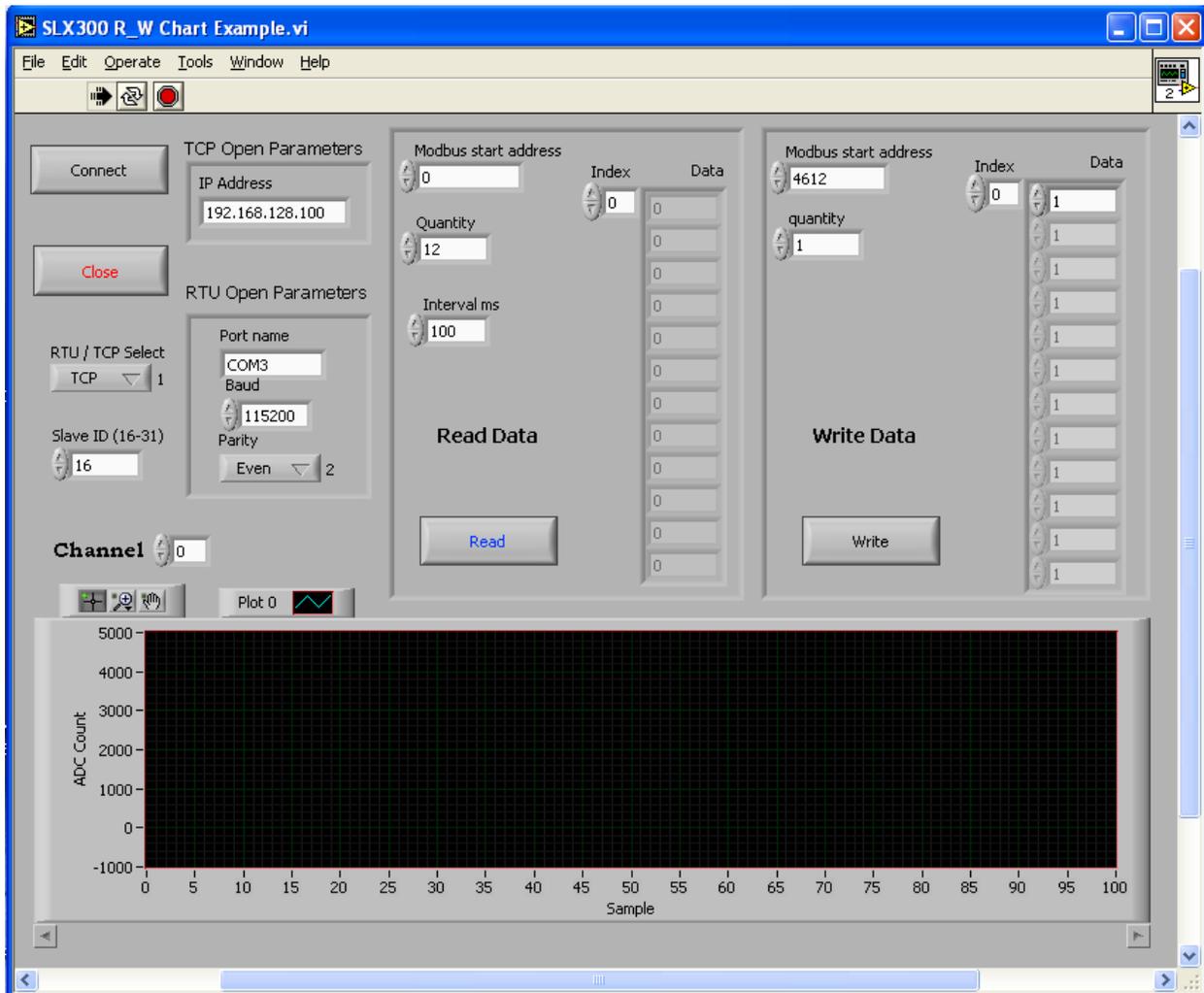
2.5 Close

To close the SLX300 Read Write Example, click the Close button.

3.0 SLX300 R_W Chart Example

3.1 Configuration

Before reading and writing data or other information from and to the 8B isoLynx® SLX300, basic configuration of the system must be performed. The following steps illustrate how to use the SLX300 read and write chart example.



3.1.1 RTU/TCP Select

The SLX300 system supports Modbus RTU over an RS-232 serial port, RS-485 serial port or USB port. It also supports Modbus TCP over Ethernet. The default protocol setting is TCP. Select RTU or TCP protocol for the port being used.

3.1.2 Slave ID

Select the Slave ID that matches the address set with jumpers on the system. The system is shipped with default Slave ID of 16. The valid range of Slave IDs is 16 - 31.

3.1.3 TCP Open Parameters

The TCP open parameters must be input once the Modbus TCP protocol has been selected. Enter the IP address into the IP Address box. The default IP address is 192.168.128.100.

3.1.4 RTU Open Parameters

The RTU open parameters are entered after the Modbus RTU protocol has been selected. There are three variable parameters:

- Port name: COM1-COM10. The default setting is COM3.
- Baud Rate: The valid baud rates are 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 and 921600. The default setting is 115200.
- Parity: Even, Odd, None. The default setting is Even.

3.2 Connect

After configuration, click the Connect button to connect the software to the 8B isoLynx® SLX300.

3.3 Read

The following steps describe how to read data from the 8B isoLynx® SLX300. Refer to the *8B isoLynx® SLX300 Software User Manual, Appendix A*, for the Modbus Address Map.

3.3.1 Read Modbus Start Address

Enter the start address in the Modbus start address box.

3.3.2 Quantity

Enter the quantity of data to read in the Quantity box.

3.3.3 Interval

The interval is specified in milliseconds and sets the time between consecutive scans of the 12 analog input channels when the system is operated in Continuous Scan mode. The default interval setting is 100ms.

3.3.4 Read Index and Data

The Index and Data display boxes are used to view the data.

3.3.5 Read Data

To read data, click the Read button. The text on the Read button will change to 'Stop' and the Data display boxes will show the data read from the system. To stop reading data, click the Stop button.

Example 1: Read 12-channel analog data from the Continuous Scan mode.
Set Modbus start address = 0, quantity = 12, then click the Read button.

Example 2: Read temperature register.
Set Modbus start address = 5633, quantity = 1, then click the Read button.

3.4 Chart Recorder

The following steps describe how to use the chart recorder.

3.4.1 Channel Select

Select the channel to display on the chart recorder in the Channel box.

3.4.2 Set X and Y Scales

To change the X and Y scales, click the scale text and enter the desired value.

3.4.3 View Data

The chart recorder will start to record data after the Read button is clicked to initiate communication with the system. Review the data using the built-in tools.

3.5 Write

The following steps describe how to write data to the 8B isoLynx[®] SLX300. Refer to the *8B isoLynx[®] SLX300 Software User Manual, Appendix A*, for the Modbus Address Map.

3.5.1 Write Modbus Start Address

Enter the start address in the Modbus start address box.

3.5.2 Write Quantity

Enter the quantity of data to be written in the Quantity box.

3.5.3 Write Index and Data

Enter the data to be written in the Write Data boxes.

3.5.4 Write Data

To write data, click the Write button.

Example 1: Write the Continuous Scan mode command to the SLX300 system.

Set Modbus start address = 4612, quantity = 1, data0 = 1, then click the Write button.

Example 2: Set Digital I/O channel states. Set channel 0 to output and channel 1 to input.

Set Modbus start address = 32810, quantity = 2, data0 = 2, data1 = 1, then click the Write button.

Example 3: Set Digital I/O channel value. Set channel 0 output value to 1.

Set Modbus start address = 32800, quantity = 1, data0 = 1, then click the Write button.

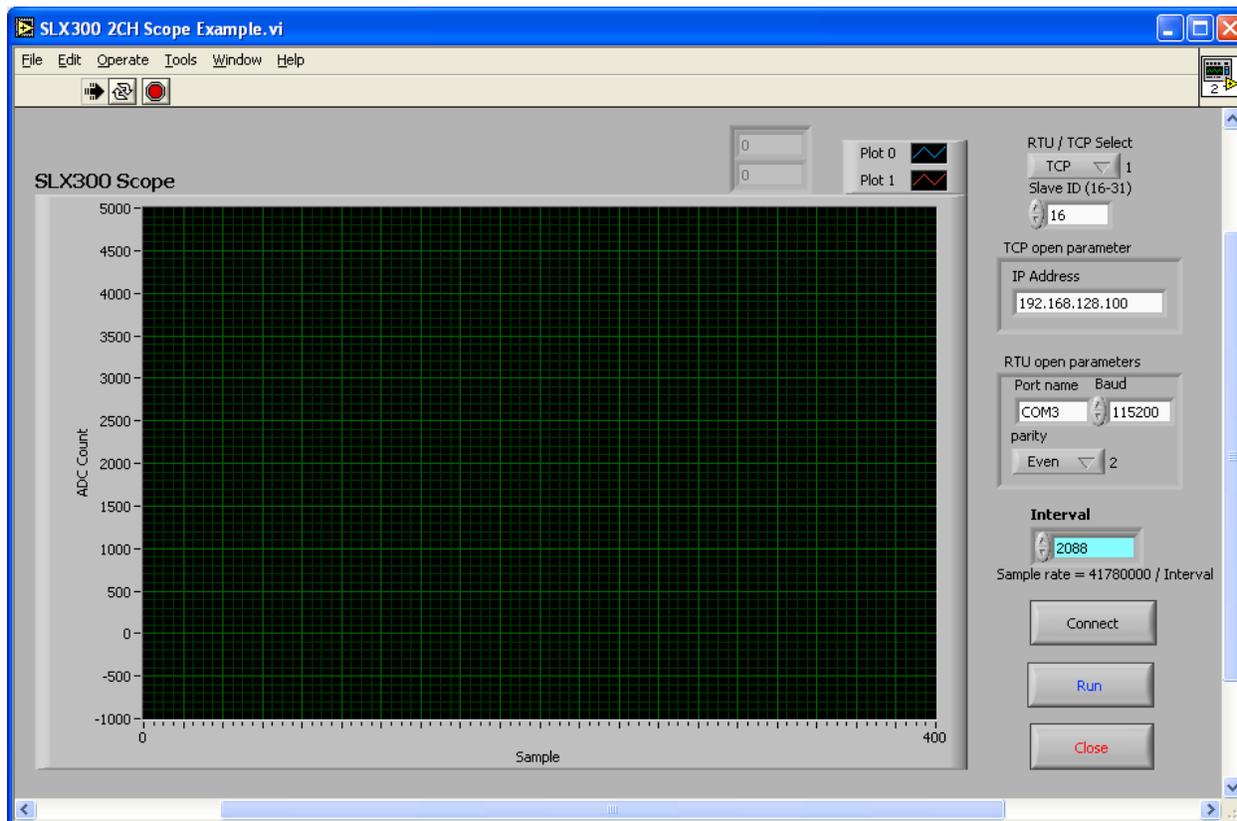
3.6 Close

To close the SLX300 R_W Chart Example, click the Close button.

4.0 SLX300 2CH Scope Example

4.1 Configuration

Before running the 2-channel scope example, basic configuration of the system must be performed. The following steps illustrate how to use the SLX300 2-channel scope example.



4.1.1 RTU/TCP Select

The SLX300 system supports Modbus RTU over an RS-232 serial port, RS-485 serial port or USB port. It also supports Modbus TCP over Ethernet. The default protocol setting is TCP. Select RTU or TCP protocol for the port being used.

4.1.2 Slave ID

Select the Slave ID that matches the address set with jumpers on the system. The system is shipped with default Slave ID of 16. The valid range of Slave IDs is 16 - 31.

4.1.3 TCP Open Parameters

The TCP open parameters must be input once the Modbus TCP protocol has been selected. Enter the IP address into the IP Address box. The default IP address is 192.168.128.100.

4.1.4 RTU Open Parameters

The RTU open parameters are entered after the Modbus RTU protocol has been selected. There are three variable parameters:

- Port name: COM1-COM10. The default setting is COM3.
- Baud Rate: The valid baud rates are 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 and 921600. The default setting is 115200.
- Parity: Even, Odd, None. The default setting is Even.

4.1.5 Interval

The interval determines the sample rate when the system is operated in Burst Scan mode. The sample rate is calculated by:

$$\text{Sample rate} = 41780000 / \text{Interval}$$

The maximum sample rate is 100kS/second and the default interval setting is 2088 = 20kS/second.

4.2 Connect

After configuration, click the Connect button to connect the software to the 8B isoLynx® SLX300.

4.3 Scope

The following steps describe how to use the oscilloscope.

4.3.1 Run

Click the Run and Stop buttons to operate the scope.

4.3.2 Set X and Y Scales

To change the X and Y scales, click the scale text and enter the desired values.

4.3.3 View Data

The system will scan analog channels 0 and 1 and plot the data on the oscilloscope display after the Run button is clicked. The current readings will be displayed in the Data display boxes. Review the data using the built-in tools.

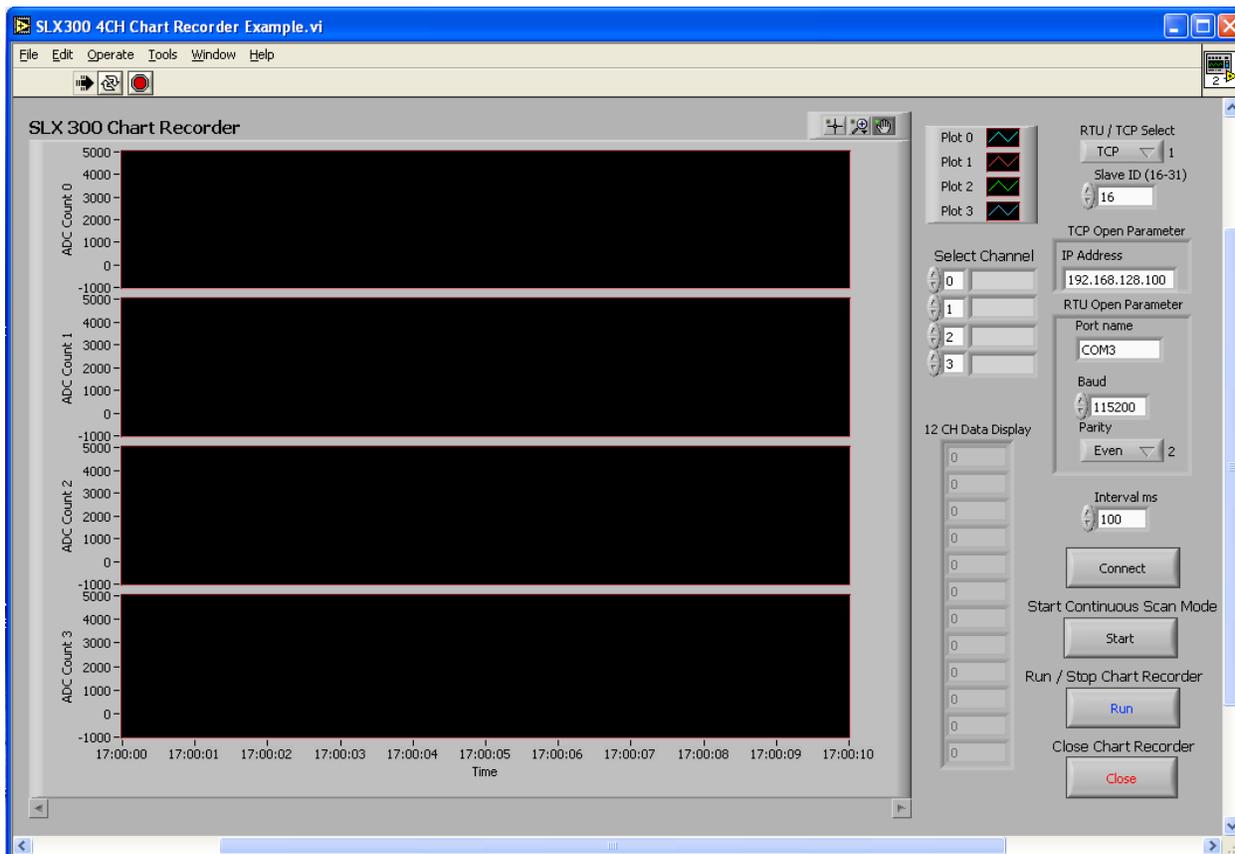
4.4 Close

To close the SLX300 2CH Scope Example, click the Close button.

5.0 SLX300 4CH Chart Recorder Example

5.1 Configuration

Before running this 4-channel chart recorder example, basic configuration of the system must be performed. The following steps illustrate how to use the SLX300 4-channel chart recorder example.



5.1.1 RTU/TCP Select

The SLX300 system supports Modbus RTU over an RS-232 serial port, RS-485 serial port or USB port. It also supports Modbus TCP over Ethernet. The default protocol setting is TCP. Select RTU or TCP protocol for the port being used.

5.1.2 Slave ID

Select the Slave ID that matches the address set with jumpers on the system. The system is shipped with default Slave ID of 16. The valid range of Slave IDs is 16 - 31.

5.1.3 TCP Open Parameters

The TCP open parameters must be input once the Modbus TCP protocol has been selected. Enter the IP address into the IP Address box. The default IP address is 192.168.128.100.

5.1.4 RTU Open Parameters

The RTU open parameters are entered after the Modbus RTU protocol has been selected. There are three variable parameters:

- Port name: COM1-COM10. The default setting is COM3.
- Baud Rate: The valid baud rates are 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 and 921600. The default setting is 115200.
- Parity: Even, Odd, None. The default setting is Even.

5.1.5 Interval

The interval is specified in milliseconds and sets the time between consecutive scans of the 12 analog input channels when the system is operated in Continuous Scan mode. The default interval setting is 100ms.

5.2 Connect

After configuration, click the Connect button to connect the software to the 8B isoLynx® SLX300.

5.3 Start Continuous Scan Mode

Start Continuous Scan mode by clicking the Start button.

5.4 Chart Recorder

The following steps describe how to use the 4-channel chart recorder.

5.4.1 Run

Click the Run and Stop buttons to operate the chart recorder.

5.4.2 Select Channel

Use the Select Channel button to choose one of the 12 analog input channels to display on the chart recorder. Repeat for up to three more channels.

5.4.3 Set X and Y Scales

To change the X and Y scales, click the scale text and enter the desired values.

5.4.4 View Data

The system will scan analog input channels 0 through 11 and plot the data on the chart recorder display after the Run button is clicked. The current readings will be displayed in the 12 CH Data Display boxes. Review the data using the built-in tools.

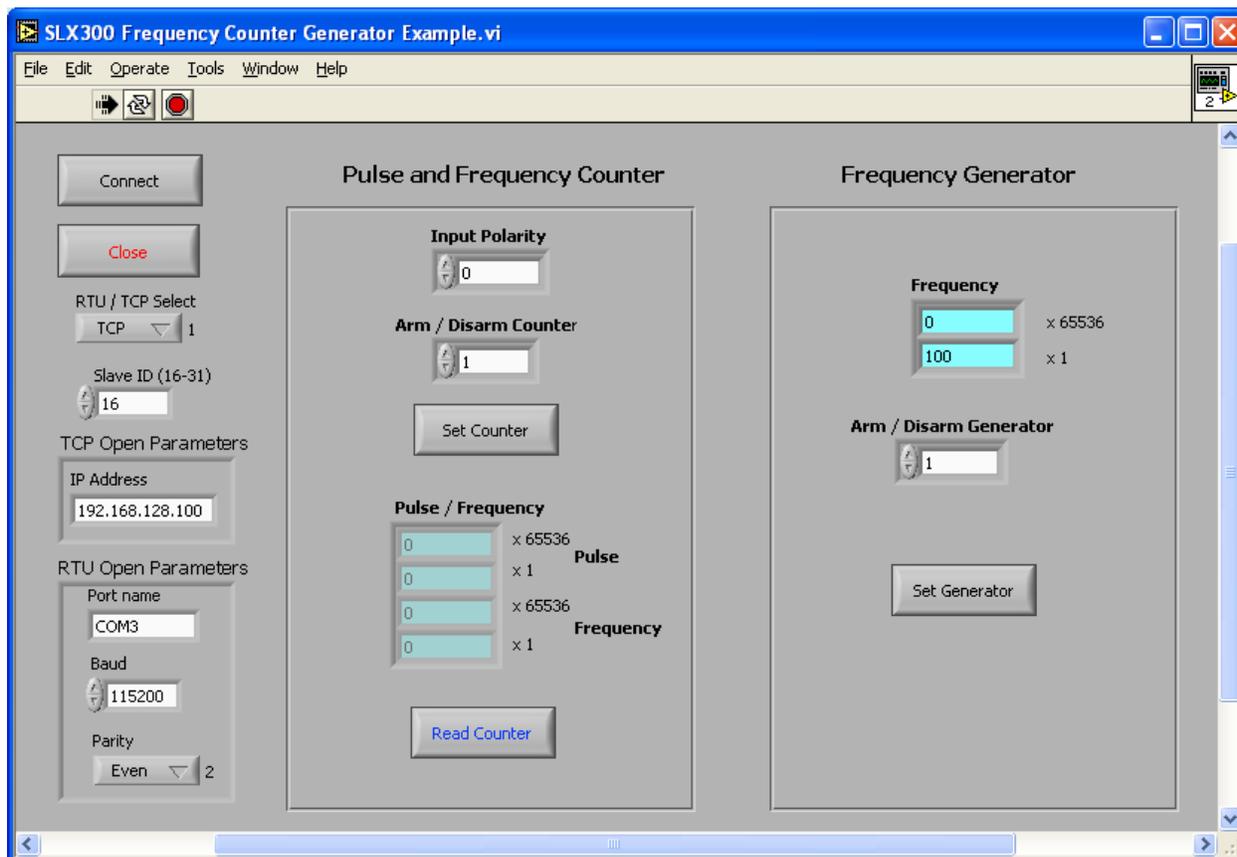
5.5 Close

To close the SLX300 4CH Chart Recorder Example, click the Close button.

6.0 SLX300 Frequency Counter / Generator Example

6.1 Configuration

Before running the frequency counter and frequency generator example, basic configuration of the system must be performed. The following steps illustrate how to use the SLX300 frequency counter/generator example.



6.1.1 RTU/TCP Select

The SLX300 system supports Modbus RTU over an RS-232 serial port, RS-485 serial port or USB port. It also supports Modbus TCP over Ethernet. The default protocol setting is TCP. Select RTU or TCP protocol for the port being used.

6.1.2 Slave ID

Select the Slave ID that matches the address set with jumpers on the system. The system is shipped with default Slave ID of 16. The valid range of Slave IDs is 16 - 31.

6.1.3 TCP Open Parameters

The TCP open parameters must be input once the Modbus TCP protocol has been selected. Enter the IP address into the IP Address box. The default IP address is 192.168.128.100.

6.1.4 RTU Open Parameters

The RTU open parameters are entered after the Modbus RTU protocol has been selected. There are three variable parameters:

- Port name: COM1-COM10. The default setting is COM3.
- Baud Rate: The valid baud rates are 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 and 921600. The default setting is 115200.
- Parity: Even, Odd, None. The default setting is Even.

6.2 Connect

After configuration, click the Connect button to connect the software to the 8B isoLynx® SLX300.

6.3 Frequency Generator

The following steps describe how to use the frequency generator.

6.3.1 Set Frequency

Input the desired frequency in Hz using both the lower and upper Frequency register boxes. Data values for each box are 0 to 65536. The desired frequency is represented by the value in the lower register box plus the value in the upper register box multiplied by 65536.

$$\text{Total frequency} = \text{value in lower box} + (\text{value in upper box} * 65536) \text{ Hz.}$$

The default setting is 100Hz.

The upper limit when using an SCMD isolated module is 11kHz.

The upper limit when using the non-isolated SCMD-PT is 100kHz.

6.3.2 Set Arm / Disarm Generator Register

Set the Arm / Disarm Generator register. 1 = Arm the generator and 0 = Disarm the generator.

6.3.3 Start Generator

Click the Set Generator button to start the generator. Digital I/O Channel 2 will output the frequency if armed.

6.4 Pulse and Frequency Counter

The following steps describe how to use the pulse and frequency counter.

6.4.1 Set Input Polarity

Set the input polarity in the Input Polarity box. 0 = positive (rising) and 1 = negative (falling).

6.4.2 Set Arm / Disarm Counter Register

Set the Arm / Disarm Counter register. 1 = Arm the counter and 0 = Disarm the counter.

6.4.3 Set Counter

Connect the signal to be counted to Digital I/O Channel 4. Click the Set Counter button then start the counter.

6.4.4 Read Counter

Click the Read Counter button. The pulse and frequency counts will be displayed in the Pulse / Frequency display boxes.

6.5 Close

To close the SLX300 Frequency Counter / Generator Example, click the Close button.

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c. **Limitation on Damages.**

(1) IN NO EVENT SHALL DATAFORTH, ITS SUPPLIERS, LICENSORS, SERVICE PROVIDERS, EMPLOYEES, AGENTS, OFFICERS, AND DIRECTORS BE LIABLE FOR INDIRECT, SPECIAL, INCIDENTAL, COVER, ECONOMIC, PUNITIVE, ACTUAL, EXEMPLARY, CONSEQUENTIAL OR OTHER DAMAGES OF ANY NATURE INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR REVENUES, COSTS OF REPLACEMENT PRODUCTS, LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE ANY DATAFORTH PRODUCT.

(2) IN NO EVENT SHALL DATAFORTH BE LIABLE FOR DIRECT, SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE RESULTING FROM BUYER’S NONCOMPLIANCE (IN ANY FORM) WITH ALL NECESSARY OR MANDATORY APPLICABLE LAWS, REGULATIONS, PROCEDURES, GOVERNMENT POLICIES OR REQUIREMENTS RELATED TO THE USE, SALE OR IMPORTATION OF PRODUCTS.

(3) IN NO EVENT WILL THE COLLECTIVE LIABILITY OF DATAFORTH AND ITS SUPPLIERS, LICENSORS, SERVICE PROVIDERS, EMPLOYEES, AGENTS, OFFICERS, AND DIRECTORS TO ANY PARTY (REGARDLESS OF THE FORM OF ACTION, WHETHER BASED UPON WARRANTY, CONTRACT, TORT, OR OTHERWISE) EXCEED THE GREATER OF EITHER US\$1000.00 (ONE THOUSAND DOLLARS U.S.A. CURRENCY) OR THE AMOUNT PAID TO DATAFORTH FOR THE APPLICABLE PRODUCT OR SERVICE OUT OF WHICH LIABILITY AROSE.

(4) DATAFORTH'S LIABILITY ARISING OUT OF THE PRODUCTION, SALE OR SUPPLY OF PRODUCTS OR THEIR USE OR DISPOSITION, WHETHER BASED UPON WARRANTY, CONTRACT, TORT OR OTHERWISE, SHALL NOT EXCEED THE GREATER OF EITHER US\$1000.00 (ONE THOUSAND DOLLARS U.S.A. CURRENCY) OR THE ACTUAL PURCHASE PRICE PAID BY BUYER FOR DATAFORTH'S PRODUCTS. DATAFORTH'S LIABILITY FOR ANY CLAIM OF ANY KIND SHALL IN NO CASE EXCEED THE OBLIGATION OR LIABILITY SPECIFIED IN THIS WARRANTY.

d. **Technical Assistance.** Dataforth 's Warranty as hereinabove set forth shall not be enlarged, diminished or affected by, and no obligation or liability shall arise or grow out of, Dataforth's rendering of technical advice, facilities or service in connection with buyer's order of the products furnished hereunder.

e. **Warranty Procedures.** Buyer shall notify Dataforth of any products which it believes to be defective during the applicable warranty period and which are covered by the Warranty set forth above. Buyer shall not return any products for any reason without the prior authorization of Dataforth and issuance of a Return Material Authorization ("RMA") number. After issuance of a RMA number, such products shall be promptly returned by buyer (and in no event later than thirty (30) days after the Warranty expiration date), transportation and insurance prepaid, to Dataforth's designated facility for examination and testing. Dataforth shall either repair or replace any such products found to be so defective and promptly return such products to buyer, transportation and insurance prepaid. Should Dataforth's examination and testing not disclose any defect covered by the foregoing Warranty, Dataforth

shall so advise buyer and dispose of or return the products in accordance with buyer's instructions and at buyer's sole expense, and buyer shall reimburse Dataforth for testing expenses incurred at Dataforth's then current repair rates.

f. **Repair Warranty.** Dataforth warrants its repair work and/or replacement parts for a period of ninety (90) days from receipt by buyer of the repaired or replaced products or for the remainder of the warranty period for the initial delivery of such order as set forth in paragraph a above, whichever is greater.

g. **Critical Applications.** Certain applications using Dataforth's products may involve potential risks of death, personal injury, or severe property or environmental damage ("Critical Applications"). DATAFORTH'S PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS, SAFETY EQUIPMENT, NUCLEAR FACILITY APPLICATIONS OR OTHER CRITICAL APPLICATIONS WHERE MALFUNCTION OF THE PRODUCT CAN BE EXPECTED TO RESULT IN PERSONAL INJURY, DEATH OR SEVERE PROPERTY DAMAGE. BUYER USES OR SELLS SUCH PRODUCTS FOR USE IN SUCH CRITICAL APPLICATIONS AT BUYER'S OWN RISK AND AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS DATAFORTH FROM ANY AND ALL DAMAGES, CLAIMS, PROCEEDINGS, SUITS OR EXPENSE RESULTING FROM SUCH USE.

h. **Static Sensitive.** Dataforth ships all product in anti-static packages. Dataforth's Warranty as hereinabove set forth shall not cover warranty repair, replacement, or refund on product or devices damaged by static due to buyer's failure to properly ground.

Application Support

Dataforth provides timely, high-quality product support. Call 1-800-444-7644 TOLL-FREE.

Returns/Repair Policy

All warranty and repair requests should be directed to the Dataforth Customer Service Department at (520) 741-1404. If a product return is required, request a Return Material Authorization (RMA) number. You should be ready to provide the following information:

1. Complete product model number.
2. Product serial number.
3. Name, address, and telephone number of person returning product.
4. Special repair instructions.
5. Purchase order number for out-of-warranty repairs.

The product should be carefully packaged, making sure the RMA number appears on the outside of the package, and ship prepaid to:

Dataforth Corporation
3331 E. Hemisphere Loop
Tucson, AZ 85706 USA

The information provided herein is believed to be reliable; however, DATAFORTH assumes no responsibility for inaccuracies or omissions. DATAFORTH assumes no responsibility for the use of this information, and all use of such information shall be entirely at the user's own risk. Application information is intended as suggestions for possible use of the products and not as explicit performance in a specific application. Prices and specifications are subject to change without notice. No patent rights or licenses to any of the circuits described herein are implied or granted to any third party. DATAFORTH does not authorize or warrant any DATAFORTH product for use in life support devices and/or systems.

