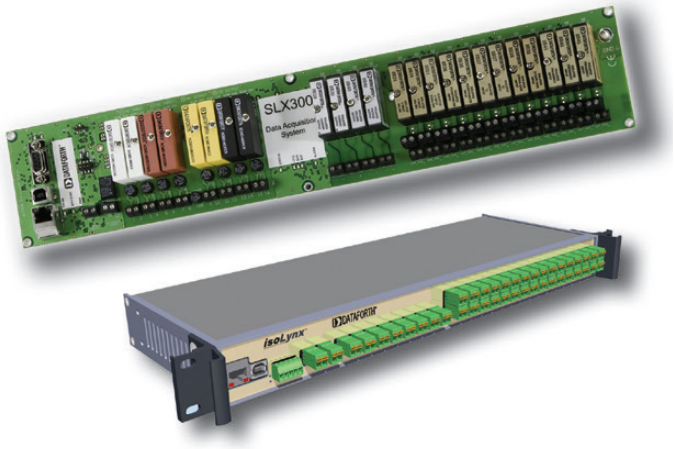
8B isoLynx® Systems

SLX300 Data Acquisition System



FEATURES

- Modbus® RTU and TCP Support
- 1500Vrms Input-to-Output & Channel-to-Channel Isolation
- 240Vrms Field-side Protection
- Wide I/O Selection:
  - Analog - 20 Families, 89 Models
  - Digital - 5 Families, 14 Models
- Mix and Match Analog & Digital I/O
- Advanced Features Including Alarms, Counters, Timers, PWMs, and More
- –40°C to +85°C Operating Temperature
- Free Configuration Software
- C-UL-US Listed (Class I, Division 2, Groups A, B, C, D)
- CE Compliant
- ATEX Compliant
- Manufactured per RoHS III Directive 2015/863

DESCRIPTION

Dataforth's 8B isoLynx® SLX300 data acquisition system builds on the proven reliability and outstanding performance of the SCM5B isoLynx® SLX200 DAQ system and miniature-sized SensorLex® 8B isolated signal conditioning modules to provide a compact, low-cost solution for wide ranging, rugged industrial applications. Like the SLX200, the SLX300 ensures superior reliability, accuracy, and isolation. Through the use of pluggable modules, the SLX300 offers maximum flexibility of analog and digital channel configuration for factory automation, process control, test and measurement, machine control, and data acquisition applications. The isoLynx SLX300 uses industry-standard Modbus® RTU and TCP protocols, thus enabling communication with a wide range of existing third-party software tools and HMI/SCADA packages.

Fast I/O Channel-to-Channel Isolated

Using Dataforth's SensorLex 8B analog modules and SCMD digital modules, the flexible, modular SLX300 design can be configured with up to twelve channels of isolated analog input, four channels of isolated analog output, and eight channels of isolated digital I/O (Figure 3). The isolation rating is 1500Vrms from input to output and from channel to channel. The system can be powered by +5VDC or a wide range 7 to 34VDC using the 8BPWR-2 module, and it can be either panel or DIN-rail mounted. Multiple powerful, high-speed microcontrollers and high-performance data converters at the heart of the system enable mix and match analog and digital I/O at sustained rates of up to 3.0kS/s. In addition, a burst mode of operation is provided for analog input that allows sampling up to 100kS/s on analog input channels.

Industry's Widest I/O Selection

The isoLynx SLX300 can be configured for any application by selecting from over 89 analog I/O modules and 14 digital I/O modules. These module selections enable monitoring of common industrial signals including millivolt, volt, milliamp, amp, linearized and non-linearized thermocouple, 3- and 4-wire RTD, potentiometer, slidewire, strain gauge, AC-to-True RMS output, frequency, 2-wire transmitter, and DC LVDT. Analog output modules provide isolated high-level voltage and current options. Industry-standard digital I/O solid-state relay modules provide AC/DC input and output monitoring and control. Both analog and digital output channels can be configured as alarm outputs. The ability to mix and match module types on a per-channel basis ensures maximum system flexibility. Operation and storage temperature for the isoLynx SLX300, as well as for all analog and digital I/O modules used in the most extreme environments, is –40ºC to +85ºC; the relative humidity range is 0 to 95% noncondensing. The SLX300 system is C-UL-US Listed, CE Compliant, and designed for operation in Class I, Division 2 Hazardous Locations.

Powerful Functionality

The SLX300 has many features and special-purpose functions specifically for data acquisition and control. Current sampled data from analog input channels is stored to a 192k sample buffer. Data is available as minimum, maximum, and average readings with selectable averaging weight. A burst mode of operation allows up to 100kS/s sampling rate on analog input channels and also provides a waveform generator function using the analog output channels. Continuous scan mode scans up to 16 input channels, and burst sampling mode can be set up with a 48-entry scan list to specify scan sequence, scan rate, and scan count. In addition to performing standard digital I/O, the eight digital I/O channels can be configured to perform seven different special functions: pulse/frequency counter, pulse/frequency counter with de-bounce, waveform measurement, time between events, frequency generator, pulse width modulation (PWM) generator, and one-shot generator. The SLX300 also allows four alarm states – high, high-high, low, and low-low – to be set on the analog input and digital I/O special function channels with alarm output mapped to a user-selectable analog or digital output channel.

Configurable analog and digital default output values ensure output signals are set to safe values upon system startup or when unexpected power outages or brownouts occur. System status and mode LEDs constantly display communication activity, mode of operation, and alarm status.

Flexible Communications and Configuration

The isoLynx SLX300 interfaces to a host system through a choice of communication links. RS-232 or RS-485 serial links operate from 2.4kbps to 921.6kbps, use true fail-safe transceivers, and have software-controlled termination networks, eliminating the need for dip switches. A USB Virtual Communications Port provides a common connection to computers and a 10/100 Base-T Ethernet connection is also available. Up to 32 systems can be multi-dropped on the RS-485 serial link and up to 4 sockets are supported on Ethernet.

The Modbus® RTU protocol used on serial and USB interfaces, and the Modbus TCP protocol used on the Ethernet interface are open, industry standard protocols that define how devices on a network communicate with each other. This ensures that the system can be integrated seamlessly onto existing Modbus networks using common Modbus function codes.

Free configuration software is provided for quick and easy system setup (see Figure 1 and Figure 2). Channel I/O setup, communication, default output, and other parameters are stored in non-volatile memory. A LabVIEW™ VI library enables fast application development using industry-standard tools. The SLX300 system can be either panel or DIN-rail mounted. It is also available in a rack-mounted or bench-top 1U enclosure.

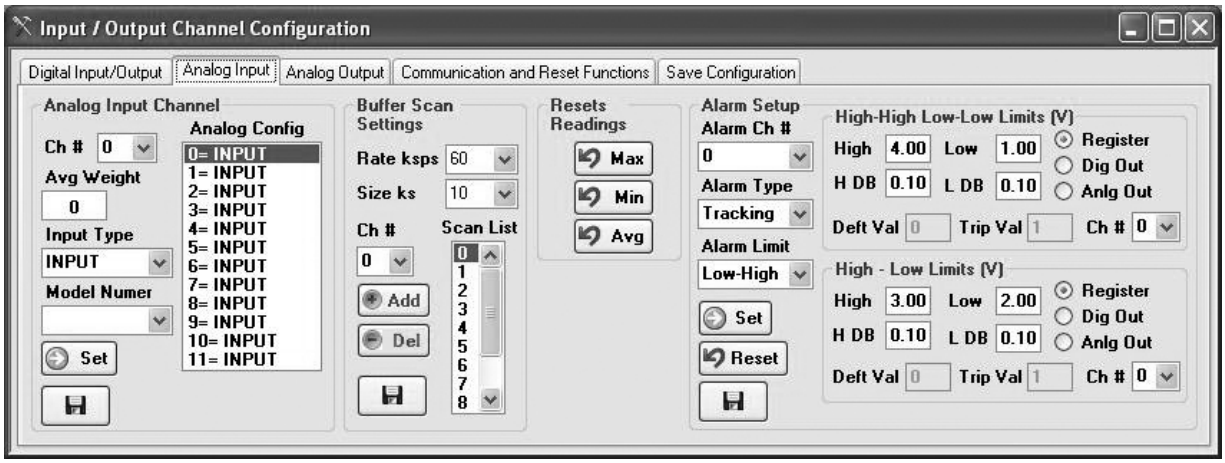


Figure 1: Configuration Tool - System Setup

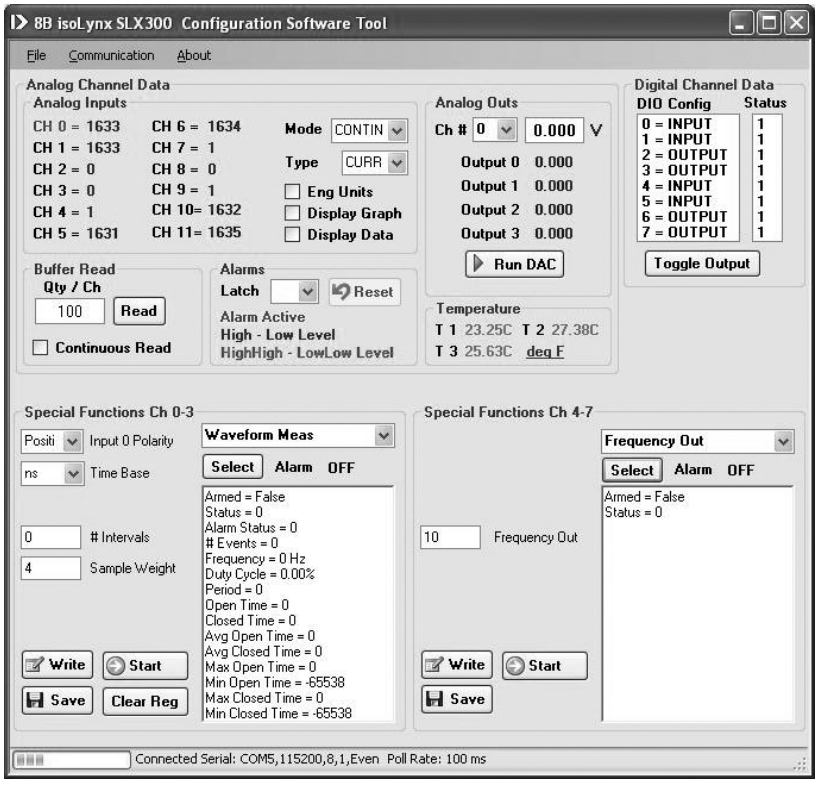


Figure 2: Configuration Tool - Channel Monitoring and Data Display

Specifications

Typical* at T_A = +25°C and +5VDC Power

8B isoLynx® SLX300	
Analog Input	
Channel Count	12
Module Type	Mix and Match-input Types on a Per-channel Basis 8B30/31/32/33/34/35/36/37/ 38/40/41/42/43/45/47/50/51/PT All Models with 0-5V Output
Accuracy(1)	±0.07%
Resolution	±0.024%
Cold-junction Compensation	
Accuracy, +25ºC	±0.5ºC
Accuracy, –40ºC to +85ºC	±1.5ºC
Input Protection	240VAC Continuous, ESD per EN61000-6-2
Isolation (Input-to-Output and Ch-to-ch)	1500Vrms (max)
Throughput(2)	3.0kS/s (max) Continuous, 100ks/s (max) Burst(3), Programmable
Sampling Buffer	192k Sample, 384k Bytes
Scan List	Up to 48 Entries in Any Order
Averaging	Selectable Weight
Alarm	Program High/High-High/Low/Low-Low Per Channel
Alarm Response	Programmable Analog Out, Digital Out
Analog Output	
Channel Count	4
Module Type	Mix and Match-output Types on a Per-channel Basis 8B39/49 All Models with 0-5V Input
Accuracy(1)	±0.07%
Resolution	±0.024%
Output Protection	40VAC (max), ESD per EN61000-6-2
Isolation (Output-to-Input and Ch-to-ch)	1500Vrms (max)
Throughput(2)	1.0ks/s (max) Continuous 4.0ks/s (max) Burst, Programmable
Programmable Waveform	16k Samples Per Channel
Digital I/O	
Channel Count	8
Module Type	Mix and Match-I/O Types on a Per-channel Basis SCMD-MIAC5x, SCMD-MIDC5x SCMD-MOAC5x, SCMD-MODC5x SCMD-MORx5, SCMD-PT
Isolation (Input-to-Output and Ch-to-ch)	1500Vrms (max)
Throughput(2)	2.0ks/s (max) Continuous

8B isoLynx® SLX300 (continued)	
Digital I/O Special Functions	
Pulse/Frequency Counter	Frequency to 80kHz, Count to 10M, RPM to 65k
Pulse/Frequency Counter with De-bounce	Frequency to 50Hz, Count to 10M
Waveform Measurement	Frequency to 15kHz, # Periods, Pulse Width, Period, Duty Cycle
Time Between Events	Min, Max, Avg, Selectable Timebase
Frequency Generator	Up to 100kHz
PWM Generator	Selectable Timebase
One-Shot Generator	20µs (min) Pulse, Programmable Pre- and Post-delay
Alarm	Program High/High-High/Low/Low-Low per function
Alarm Response	Programmable Digital Out
Communications	
RS-232	2.4kbps to 921.6kbps, DB-9 Connector
RS-485	2.4kbps to 921.6kbps, Pluggable Screw Terminal Connector
USB	USB-to-Serial Bridge (Virtual Communications Port), Type B
Ethernet	10/100 Base-T, Static IP, RJ-45 Connector
Protocol	
RS-232, RS-485, USB	Modbus® RTU
Ethernet	Modbus TCP
Software Tools	Free Configuration Software Tool
Power	
+5VDC	270mA(4)
7-34VDC (8BPWR-2 Required)	320mA(4)
Physical	
Dimensions (l)(w)(h)	
Panel Mount	16.24" x 3.47" x 1.92" (413mm x 88mm x 49mm)
DIN-rail Mount	16.24" x 3.47" x 2.00" (413mm x 88mm x 51mm)
Bench-Top 1U Enclosure	16.73" x 6.0" x 1.72" (424.9mm x 152.4mm x 43.7mm)
Mounting	Panel or DIN-rail Rack-Mounted or Bench-Top 1U Enclosure
Environmental	
Operating Temp. Range	–40ºC to +85ºC
Storage Temp. Range	–40ºC to +85ºC
Relative Humidity	0 to 95% Noncondensing
Emissions, EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity, EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) System accuracy does not include module accuracy or SLX300 CJC accuracy. SLX300 CJC accuracy replaces CJC accuracy in 8B37/47 module datasheets. Reference module datasheets for further details.
(2) Throughput varies with system configuration.
(3) Burst Mode Scan rate is reduced when CJC, linearization, averaging, and/or alarm functions are enabled.
(4) Does not include module power consumption. Reference module datasheets for further details.

Ordering Information

Model	Description
SLX300-10(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, Panel Mount
SLX300-20(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, Panel Mount
SLX300-30(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP), Panel Mount
SLX300-40(S)*	12-ch AI, 4-ch AO, 8-ch DIO, Ethernet, Panel Mount
SLX300-10D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, DIN-rail Mount
SLX300-20D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, DIN-rail Mount
SLX300-30D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP), DIN-rail Mount
SLX300-40D(S)*	12-ch AI, 4-ch AO, 8-ch DIO, Ethernet, DIN-rail Mount
SLX300-10U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-232, SD Card, 1U Box
SLX300-20U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, RS-485, SD Card, 1U Box
SLX300-50U(S)*	12-ch AI, 4-ch AO, 8-ch DIO, USB (VCP) & Ethernet, SD Card, 1U Box
SLX146-02, -07	Null Modem Serial Cable, Female DB-9 to Female DB-9; 2m, 7m
SLX147-01, -02, -05	USB Cable, Type A to Type B; 1m, 2m, 5m
SLX370(1)	Software Tools, Config Sample, LabVIEW™ VI
SLX380(1)	Quick Start Guide, Hardware Manual, Software Manual
SLX141-01, -02, -07	Ethernet Cable, 1m, 2m, 7m
SLX141-X01, -X02, -X07	Ethernet Crossover Cable, 1m, 2m, 7m
SCMXRK-002	19" Metal Rack for Mounting Backpanels
SCMXRAIL1-XX	DIN EN50022-35x7.5 (Slotted Steel), Length -XX in meters
SCMXRAIL3-XX	DIN EN50022-35x15 (Slotted Steel), Length -XX in meters
8B30-04, -05, -06	mV Input-modules, 3Hz BW
8B31-04, -05, -06, -08, -10, -13	Voltage-input Modules, 3Hz BW
8B32-01, -02	Current-input Modules, 3Hz BW
8B34-01, -02, -03, -04	2- and 3-wire RTD-input Modules, 3Hz BW
8B35-01, -02, -03, -04	4-wire RTD-input Modules, 3Hz BW
8B36-01, -02, -03, -04	Potentiometer-input Modules, 3Hz BW
8B37J, K, T, R, S	Thermocouple-input Modules, Non-linearized, 3Hz BW

Model	Description
8B38-06, -07, -08	Strain-gauge Input Modules, 3kHz BW
8B38-36, -37, -38	Strain-gauge Input Modules, 3Hz BW
8B39-01, -03	Current-output Modules, 100Hz BW
8B40-04, -05, -06	mV-input Modules, 1kHz BW
8B41-04, -05, -06, -08, -10, -13	Voltage-input Modules, 1kHz BW
8B42-01, -02	2-wire Transmitter-input Modules, 100Hz BW
8B43-11 through -15	DC LVDT-input Modules, 1kHz BW
8B45-01 through -08	Frequency-input Modules
8B47J-xx, K-xx, T-xx	Thermocouple-input Modules, Linearized, 3Hz BW
8B49-01, -02	Voltage-output Modules, 100Hz BW
8B50-04, -05, -06	mV-input Modules, 20kHz BW
8B51-04, -05, -06, -08, -10, -13	Voltage-input Modules, 20kHz BW
8BPT	Non-isolated Signal Pass Thru Module
8BPWR-2	Power Supply Module, 7-34VDC-input
SCMD-MIAC5x	Miniature Digital AC-input Modules
SCMD-MIDC5x	Miniature Digital DC-input Modules
SCMD-MOAC5x	Miniature Digital AC-output Modules
SCMD-MODC5x	Miniature Digital DC-output Modules
SCMD-MORx5	Miniature Relay-output Modules
SCMD-PT	Miniature Pass-thru Module
SCMXPRT-001	Power Supply, 5VDC, 1A, 120VAC-input
SCMXPRE-001	Power Supply, 5VDC, 1A, 220VAC-input
SCMXPRT-003	Power Supply, 5VDC, 3A, 120VAC-input
SCMXPRE-003	Power Supply, 5VDC, 3A, 220VAC-input
PWR-4505	Power Supply, 5VDC, 5A, 85-264VAC-input
PWR-PS5R15W	Power Supply, 24VDC, 0.65A, 100-240VAC-input
PWR-PS5R30W	Power Supply, 24VDC, 1.3A, 100-240VAC-input
PWR-PS5R60W	Power Supply, 24VDC, 2.5A, 100-240VAC-input
PWR-PS5R120W	Power Supply, 24VDC, 5.0A, 100-240VAC-input

NOTES: *Add an 'S' suffix to any SLX300 system part number to order the system bundled with ReDAQ® Shape software. (1) Downloadable from website.
LabVIEW™ VI is a trademark of National Instruments.

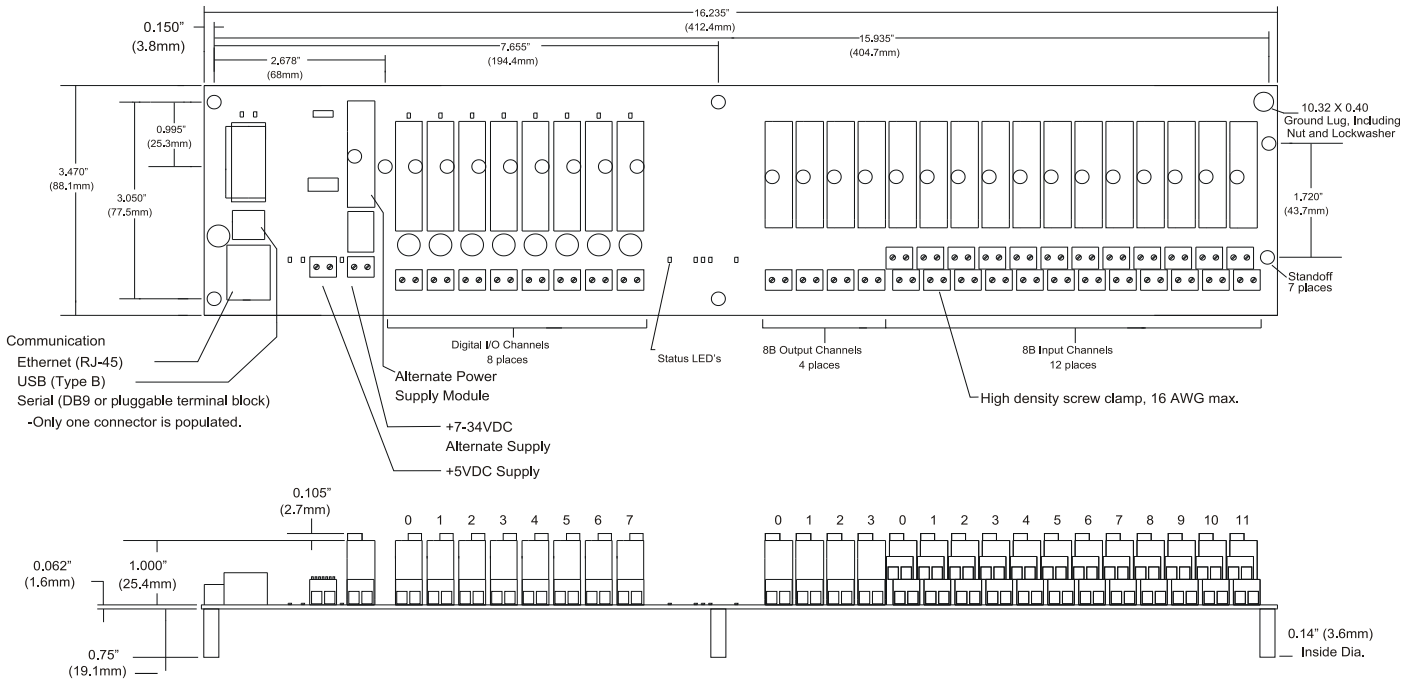


Figure 3: 8B isoLynx SLX300 Block Diagram