



isoLynx[®]

**8B SLX300
Data Acquisition System
Hardware User Manual**



**8B isoLynx[®] SLX300 Data Acquisition System Hardware User Manual
MA1031 Rev. A – July 2010
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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 Inspection Guidelines

1.1 Unpacking

Each 8B isoLynx[®] SLX300 unit is shipped in electro-static discharge (ESD) protective packaging. Use appropriate ESD protection measures while unpacking. Check visually for physical damage. If physical damage is noted, file a claim with the shipping carrier.

1.2 8B isoLynx[®] SLX300 Unit Package Contents

- 8B isoLynx[®] SLX300, p/n SLX300-10, -10D, -20, -20D, -30, -30D, -40, or -40D
- SLX147-01 USB Cable, Type A to Type B, 1m (included with SLC300-30, -30D only)
- CD-ROM which contains
 - SLX370 Software Tools
 - Configuration Sample
 - LabVIEW VIs
 - Programming Samples in Visual Basic, VB.NET, C++ and C#
 - Windows Driver for USB Interface
 - SLX380 Documentation Set
 - MA1029 SLX300 Configuration Software Tool User Manual
 - MA1030 SLX300 Quick Start Guide
 - MA1031 SLX300 Hardware User Manual (this manual)
 - MA1032 SLX300 Software User Manual
 - MA1033 SLX300 LabVIEW VI Examples User Manual

This completes the unpacking and visual inspection of the 8B isoLynx[®] SLX300 unit.

For rapid verification of basic functionality, reference the *8B isoLynx[®] SLX300 Quick Start Guide*.

For detailed instructions on installation and configuration in your system, reference the subsequent sections in this *8B isoLynx[®] SLX300 Hardware User Manual* and/or the *8B isoLynx[®] SLX300 Software User Manual* on CD-ROM.

2.0 System Overview

The 8B isoLynx® SLX300 is a fast, intelligent, fully isolated data acquisition system providing superior reliability, accuracy, and isolation for a wide range of rugged industrial applications. The flexible, modular design combines eight SCMD digital I/O channels, four 8B analog output channels and twelve 8B analog input channels into one single board.

The 8B isoLynx® implements the industry standard Modbus RTU and TCP protocols, thereby enabling communication with a wide variety of existing third-party software drivers and HMI/SCADA packages. Dataforth offers a Windows based, free Configuration Software Tool which makes it easy to make a few basic system connections and quickly start taking measurements.

The 8B isoLynx® is factory configured to communicate to a host PC using RS-232, RS-485, or USB serial links or Ethernet as its physical layer. Up to 16 systems can be multi-dropped on the RS-485 serial link.

2.1 Easy Installation

The 8B isoLynx® SLX300's compact footprint (16.235" x 3.47") allows it to fit easily into cramped system designs. Using the SCMXRK-002 metal bracket, it can be quickly mounted in industry standard 19" racks. Alternatively, by ordering DIN rail hardware elements, it can be just as readily mounted on a DIN rail.

2.2 Easy Connectivity and Communication

The 8B isoLynx® SLX300 system comes with one of four possible communication connectors, depending on the configuration of the board: RS-232 (DB9 Male), RS-485 (5-Pin Header with pluggable mating connector), USB (Type B), or Ethernet (RJ-45). The following is a detailed description of the connectors and default parameters for the communication settings. The default communication parameters are split into two categories: Serial and Ethernet. Serial applies to RS-232, RS-485, and USB.

The parameters are:

Parameter	Factory Default Setting
Serial	RS-232, RS-485, and USB
Data Rate	115,200bps (bits per second)
Parity	Even
Slave ID	16 (0x10)
4-Wire	4-wire (pertains only to RS-485)
Termination	Disabled (pertains only to RS-485)
Ethernet	
IP Address	192.168.128.100
Subnet Mask	255.255.0.0
Gateway	127.0.0.1
TCP Port	502

2.2.1 RS-232

The RS-232 Serial connector is a DB9 Male. Serial cables offered as accessories which can be used with the system are: SLX146-02 Null Modem Female DB-9 to Female DB-9 2m (5 ft) and SLX146-07 Null Modem Female DB-9 to Female DB-9 7m (25 ft). Refer to Section 7.0 Communication Connector Pinouts for RS-232 connector pinout.

2.2.2 RS-485

The RS-485 Serial connector is a 5-pin header with 5.08mm spacing. A vertical entry pluggable mating connector is provided to interface to this connector. Refer to Section 7.0 Communication Connector Pinouts for RS-485 connector pinout.

RS-485 Termination:

In general for RS-485 trunk line lengths over 100 ft (30.5m), the two devices at the extreme ends of the trunk line should be terminated and all other devices in between should not be terminated. The 8B isoLynx[®] SLX300 system offers built-in terminations for 2-wire and 4-wire networks accessed through a register address via Modbus command (refer to the *8B isoLynx[®] SLX300 Software Manual*). Default configuration is RS-485 Termination Disabled.

Four-wire Networks:

When using the RS-485 Serial connector, the factory default mode of operation is 4-wire.

Two-wire Networks:

This mode uses only the TX+ and TX- pins of the RS-485 Serial connector. This mode is selected through a register address accessed via Modbus command (refer to the *8B isoLynx[®] SLX300 Software Manual*). Once this selection is made, the system must be rebooted for the change to take effect.

2.2.3 USB

The USB Serial connector is a Type B. Any Type A to Type B cable can be used provided the cable does not exceed 15' in length. USB cables offered as accessories which can be used with the system are: SLX147-01 Type A to Type B 1m, SLX147-02 Type A to Type B 2m, and SLX147-05 Type A to Type B 5m. When using this interface the user must install a Windows driver which is provided on the CD-ROM shipped with the unit, so that when the connection is made the computer will see a virtual Serial COM port. The user must know the COM port number assigned by the computer to the USB virtual Serial COM port as it will be requested by the SLX300 Configuration Software when initiating communication. Refer to Section 7.0 Communication Connector Pinouts for USB connector pinout.

2.2.4 Ethernet

This interface is compatible with 10Base-T Ethernet or 10/100Base-T networks. Connecting to Ethernet is as easy as inserting one end of a cable with RJ-45 modular phone plug into the modular phone jack on the 8B isoLynx[®] SLX300 and then inserting the other end with RJ-45 modular phone plug into a modular phone jack at the Ethernet hub or host computer, if so equipped. The Ethernet connection should always be made using a Category 5 twisted-pair cable. Ethernet cables offered as accessories which can be used with the system are SLX141-01 (1m), SLX141-02 (2m), and SLX141-07 (7m). Crossover cables are also offered with part numbers SLX141-X01 (1m), SLX141-X02 (2m), and SLX141-X07 (7m). It is up to the user to determine if straight through or crossover cables are required in a given application. Refer to Section 7.0 Communication Connector Pinouts for Ethernet connector pinout and connector details. The host computer Ethernet port must be configured with a fixed IP Address of 192.168.xxx.xxx, which does not match the static IP Address of the SLX300, and Subnet Mask of 255.255.0.0 when the 8B isoLynx[®] SLX300 Ethernet port is used.

2.2.5 Communication Interface Reset Jumper

For situations in which the 8B isoLynx[®] has been put into a state with unknown communication parameters (i.e., baud rate, RS-485 4-wire, RS-485 2-wire), a hardware reset jumper has been provided. This jumper is located at the top left side of the board, in line with the +5V power connector, and is labeled RESET as shown in Figure 1 below. Placing the mini-link shunt jumper over pins 1 and 2 and cycling power will reset the board to its factory default communication parameters as listed in Section 2.2

Easy Connectivity and Communication. Once the board has completed boot up, the mini-link shunt jumper over pins 1 and 2 can be removed and placed over pins 2 and 3.

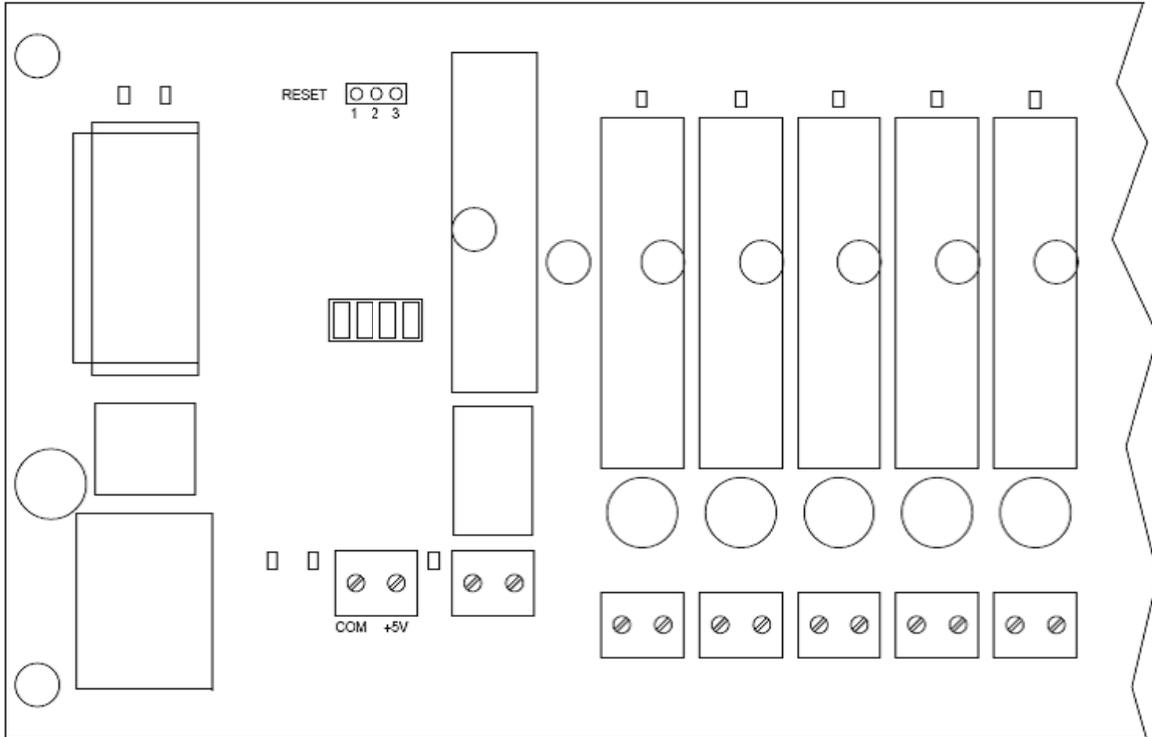


Figure 1: Reset Jumper Location

3.0 Dimensions and Mounting Considerations

The 8B isoLynx® SLX300 system has two mounting options. Models with no letter suffix are intended to be mounted in an industry standard 19" cabinet using the SCMXRK-002 metal mounting rack, or on a flat surface such as a NEMA-rated electrical enclosure using screws inserted through the swaged standoffs on the 8B isoLynx® SLX300. Models with a D suffix can be mounted on an industry standard 35 x 7.5 or 35 x 15 gull-wing DIN rail. DIN rail is offered as an accessory under part numbers SCMXRAIL1-01 or -02 (DIN EN50022-35x7.5) or SCMXRAIL2-01 or -02 (DIN EN50022-35x15), where the suffix indicates rail length in meters. Sections 3.1 19" Cabinet Mount or Panel Mount and 3.2 DIN Rail Mount show the dimensions and mounting options for the 8B isoLynx® SLX300 system. Be sure to select a mounting location that avoids or protects against the following environmental hazards:

- Flying metal chips that may result from installation or subsequent machine construction and conductive dusts, liquids, or condensing humidity. If any of these conditions exist, mount the 8B isoLynx® SLX300 system and expansion components in a NEMA 4 or NEMA 12 rated enclosure.
- Mounting locations that are in close proximity to devices that produce Electromagnetic Interference (EMI) or Radio Frequency Interference (RFI). Devices such as motor starters, relays, large power transformers, and ultrasonic welding apparatus fall into this category. Although the 8B isoLynx® SLX300 system is designed to work in such conditions, best performance is obtained when the system is mounted in a shielded enclosure with a solid connection to earth ground.

3.1 19" Cabinet Mount or Panel Mount

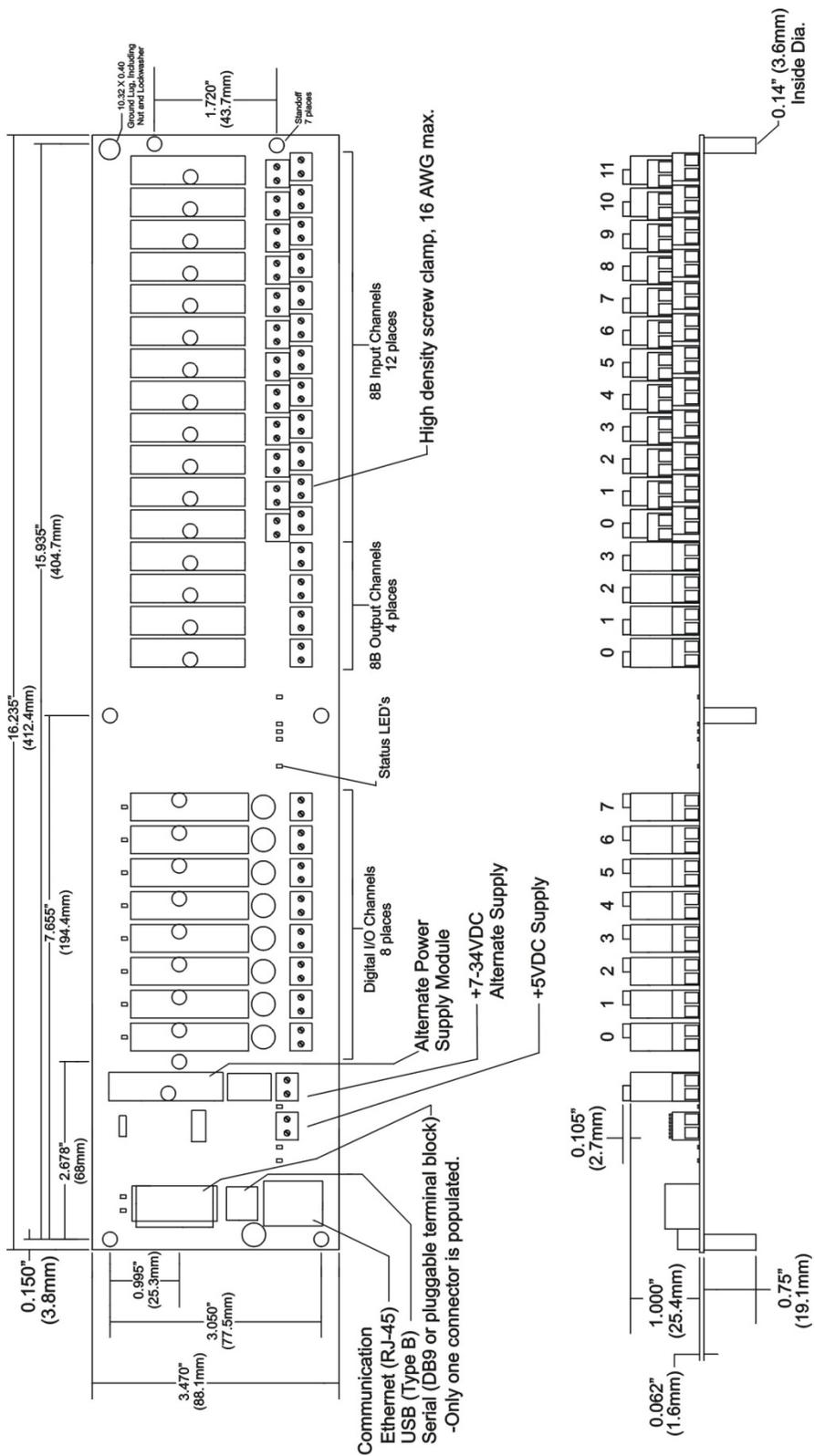


Figure 2: 8B isoLynx® SLX300 Block Diagram

3.2 DIN Rail Mount

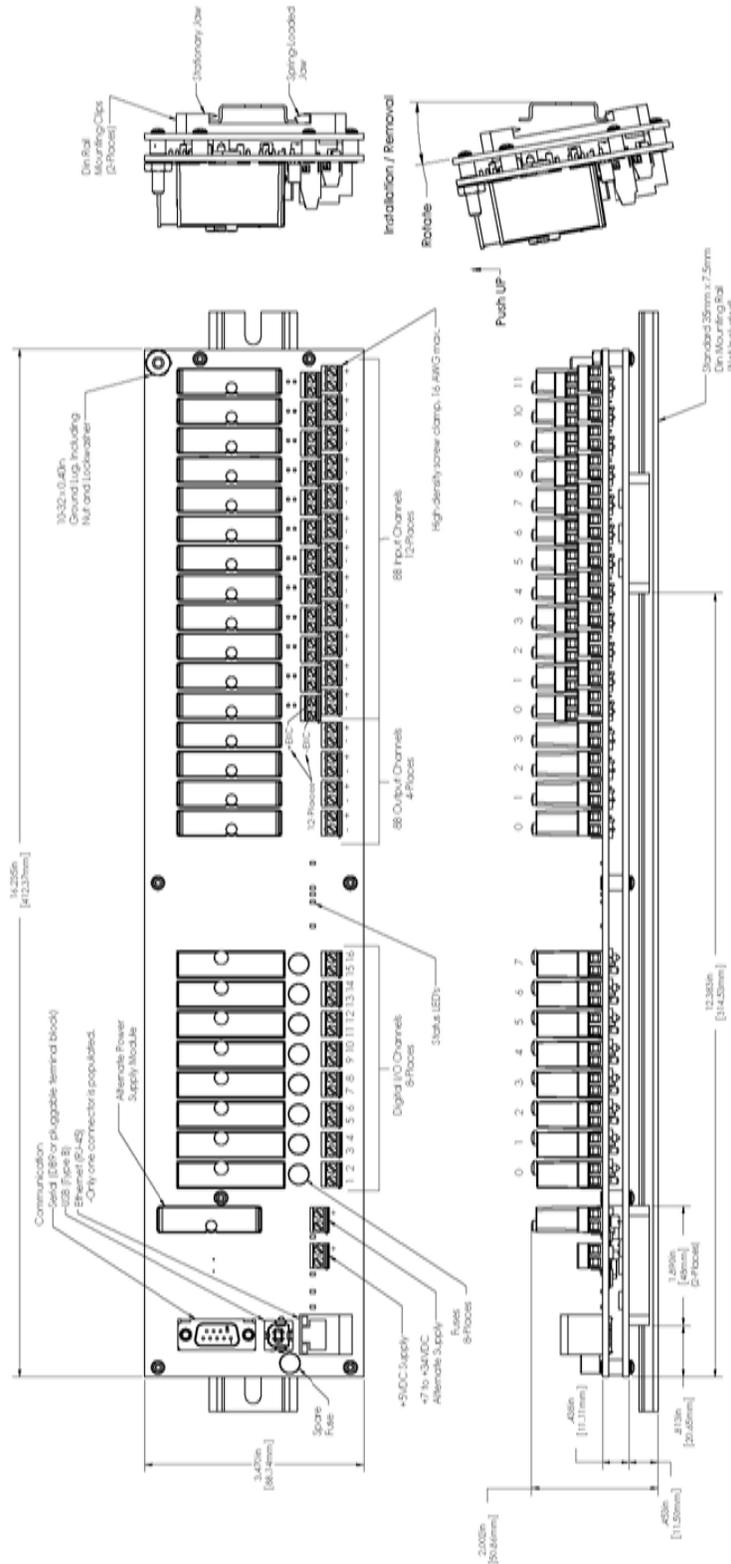


Figure 4: 8B isoLynx® SLX300 DIN Rail Mount Assembly

4.0 8B isoLynx[®] SLX300 Controller

4.1 Indicators: LEDs

4.1.1 Power

LEDs located next to the power input terminal blocks will light up when power is applied. The system can be powered from a 5VDC $\pm 5\%$ source applied to the Main Power terminal block, or it can be powered from a 7 to 34VDC source applied to the Alternate Power terminal block. When the Alternate Power input is used, an 8BPWR-2 module must be installed in the socket above the Alternate Power terminal block.

4.1.2 Ethernet

An LED on the PCB next to the Ethernet connector indicates Ethernet status. When an Ethernet cable is properly connected, the ETH STAT LED will blink at a 1 second interval. Additionally, there are two LEDs integrated in the Ethernet connector which light to indicate LINK and ACT status.

4.1.3 Communication

RX and TX LEDs located at the top left corner of the board are used to indicate communication between the host computer and the 8B isoLynx[®] SLX300 system over any of the communication ports: RS-232, RS-485, USB or Ethernet. The RX LED will light up anytime a command from the host computer is received by the 8B isoLynx[®] SLX300 system and the TX LED will light up anytime a response from the 8B isoLynx[®] SLX300 is sent to the host computer.

4.1.4 Status

Located in the middle of the board, these LEDs are: STATUS, CFG (Configuration), SCN (Continuous Scan), BUF (Buffer Scan), and ALARM.

- STATUS LED: Blinks at a 1 second interval to indicate system status is normal and system is operational. When in Buffer Scan mode, the STATUS LED will remain in the state it was in when the mode was entered until the Buffer Scan has completed.
- CFG LED: Lights when Configuration Mode is selected.
- SCN LED: Lights when Continuous Scan Mode is selected.
- BUF LED: Lights when Buffer Scan Mode is selected.
- ALARM LED: Lights when an alarm condition has been reached.

After power up, the system will default to the Configuration Mode.

4.2 Slave ID Selection

4.2.1 Modbus RTU Slave ID Selection

The lower four bits of the Modbus RTU Slave ID are set using the jumpers located above the 5V Power connector as shown in Figure 5 below. The four jumpers allow 16 addresses. The LSB (Least Significant Bit) is the jumper on the right, designated LSB on the PCB. A mini-link shunt jumper placed over both pins of any jumper position corresponds to a 0 (zero) in the address, and a mini-link jumper placed over only one pin or completely removed in any jumper position corresponds to a 1 (one) in the address. To

obtain the lower four bits of a particular Slave ID, arrange jumpers in the binary weighted pattern of the value desired as shown in Table 1.

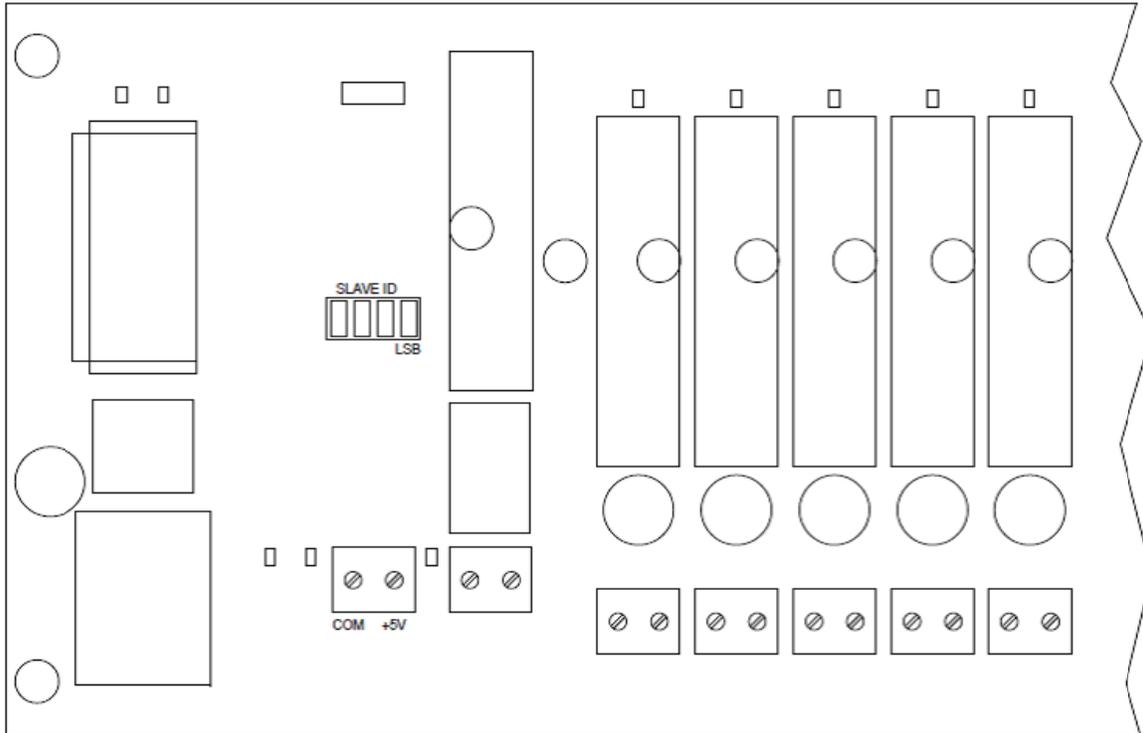


Figure 5: Location of Slave ID Jumpers

Table 1: Slave ID Jumper Location vs. Address

MSB			LSB	Slave ID
1	1	1	1	31
1	1	1	0	30
* * * *				
0	0	0	1	17
0	0	0	0	16
0 = Jumper In 1 = Jumper Out				

The factory default setting is all jumpers installed 0000 (decimal = 0). The upper four bits are 0001 (decimal 16), so the resulting factory default Slave ID is 0001 0000 (decimal = 16). The upper four bits cannot be changed.

5.0 Analog and Digital Modules

5.1 8B Analog Input Modules

The twelve channels on the right end of the 8B isoLynx® SLX300 system are intended for SensorLex® 8B Isolated Analog Input Modules. These channels are labeled ANALOG IN inside the 8B module outline. Refer to the 8B isoLynx® SLX300 system datasheet for available modules. Only 8B input modules with a unipolar 0 to 5V output can be used in the 8B isoLynx® SLX300 system. The system has over-range clamps and protection but the use of a module with output range beyond this limit may damage the system after prolonged operation.

5.1.1 CJC Jumper

A 2-pin jumper is located between each analog input channel and the field side terminal blocks; this is used to connect or disconnect the CJC sensor from the 8B input module. Default configuration from the factory is CJC sensor connected to the 8B module with a mini-link shunt jumper installed over both pins of each jumper.

Jumper usage is as follows:

8B30/31/32/33/34/36/37/39/40/41/42/43/45/47/49/50/51/PT – Mini-link shunt jumper remains installed over both pins.

8B35/38 – Mini-link shunt jumper must be removed and installed over one pin only.

5.2 8B Analog Output Modules

To the left of the analog input channels there are four analog output channels. These are labeled ANALOG OUT inside the 8B module outline. Refer to the 8B isoLynx® SLX300 system datasheet for available modules. Only 8B output modules with a unipolar 0 to 5V input can be fully utilized in the 8B isoLynx® system. Modules with a wider input range can be used but the full output range will not be available. Alarm conditions can be mapped to the analog output channels. Refer to the *8B isoLynx® SLX300 Software User Manual* for details.

5.3 SCMD Modules

The eight channels on the left end of the 8B isoLynx® SLX300 system accept industry standard SCMD miniature solid-state relay modules. Refer to the 8B isoLynx® SLX300 system datasheet for available modules. Each channel is protected with a 4A/250V fuse between the module and the field side terminal block. An extra fuse is provided next to the communication connectors. Many high-level functions are provided using the digital input/output channels, including pulse/frequency counter, pulse/frequency counter with de-bounce, waveform measurement, time between events, frequency generator, PWM generator, one-shot pulse generator, and alarm output. Refer to the *8B isoLynx® SLX300 Software User Manual* for details.

6.0 Power Considerations

6.1 Power Supply

The 8B isoLynx® SLX300 can be powered by either +5VDC \pm 5% (Main Power) or 7 to 34VDC (Alternate Power). Separate terminal blocks are provided for each power input as shown in Figure 6. When a wide range 7 to 34VDC source is used, an 8BPWR-2 module must be installed in the socket above the Alternate Power terminal block.

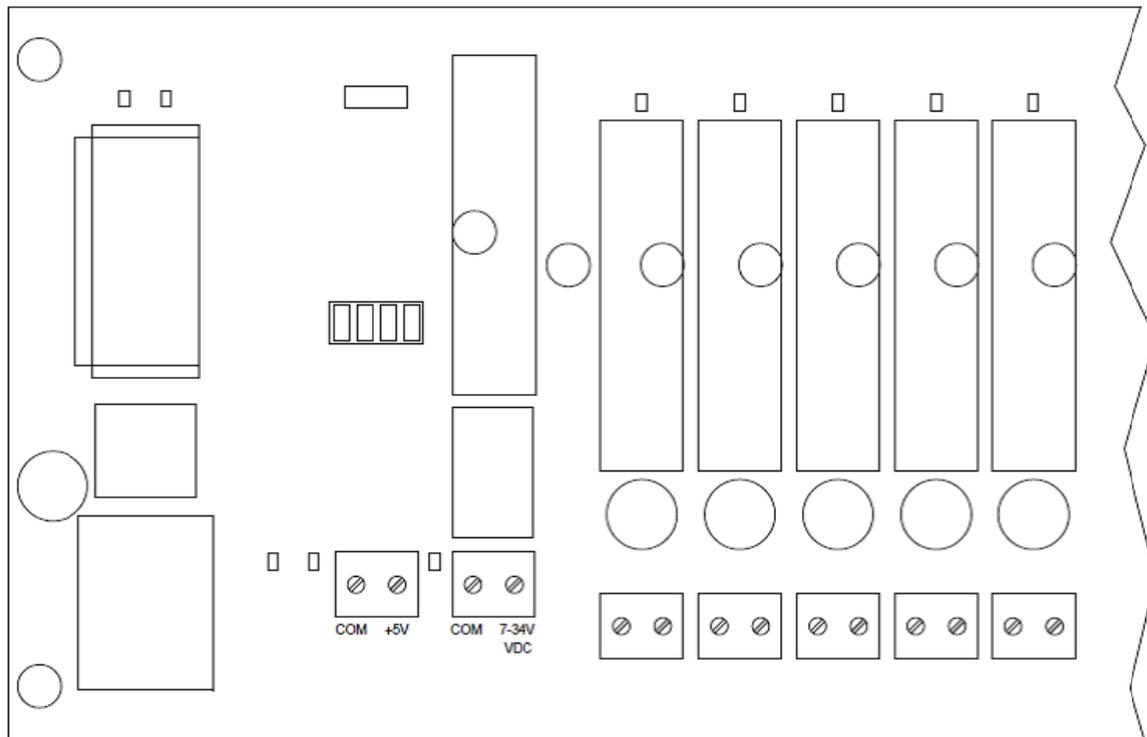


Figure 6: Power Supply Terminal Blocks

If desired, power supplies can be connected to both power inputs to provide redundant power. When power is applied to both inputs, internal circuitry will select the +5VDC source.

Base system current draw is 270mA typical at +5VDC and 320mA typical at 7 to 34VDC. Total system current draw must take into account the current draw from the user's choice of analog and digital I/O modules.

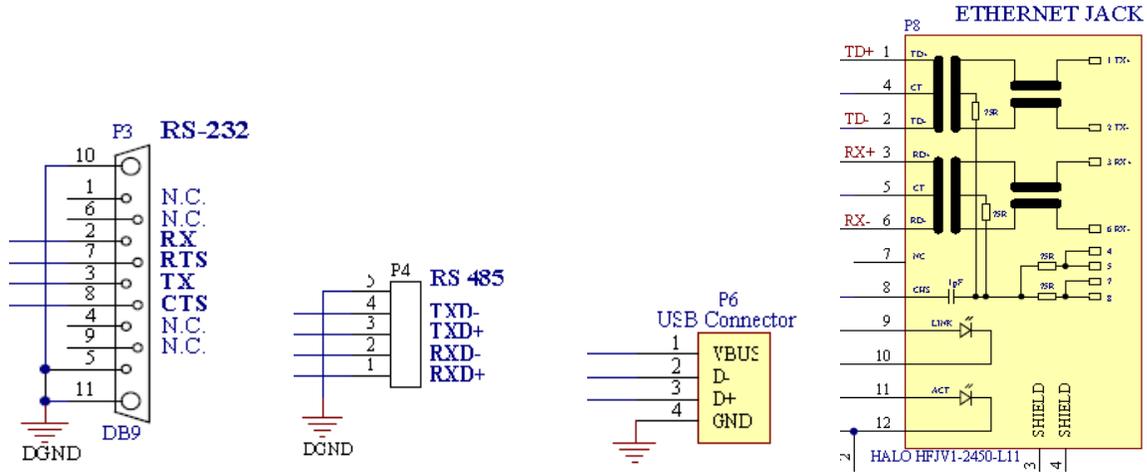
Power supplies offered as accessories are as follows:

- SCMXPRT-001 5VDC, 1A, 120VAC Input
- SCMPRE-001 5VDC, 1A, 220VAC Input
- SCMXPRT-003 5VDC, 3A, 120VAC Input
- SCMPRE-003 5VDC, 3A, 220VAC Input
- PWR-4505 5VDC, 5A, 85-264VAC Input

- PWR-PS5RB 24VDC, 0.6A, 100-240VAC Input
- PWR-PS5RC 24VDC, 1.3A, 100-240VAC Input
- PWR-PS5RD 24VDC, 2.1A, 100-240VAC Input
- PWR-PS5RE 24VDC, 4.2A, 100-240VAC Input

When the 7 to 34VDC Alternate Power is used in conjunction with the 8BPWR-2 7-34VDC to 5VDC converter module, the maximum output which the 8BPWR-2 can provide is 2A. The user must ensure that the system population with analog and digital I/O modules does not exceed this limitation.

7.0 Communication Connector Pinouts



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iii. for all special products, sixty (60) days from date of initial delivery; and

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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.

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

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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:

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