

Dataforth isoLynx Device Driver Help

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DATAFORTH ISOLYNX Device Driver Help

Help version 1.003

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Overview

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Overview

The DATAFORTH ISOLYNX Device Driver was designed specifically for use with 32 bit OPC Server products and the Windows XP/2000/NT operating systems running on Intel microprocessor based computers. It is intended for use with all ISOLYNX SLX100 data acquisition systems.

This driver was created in partnership with DATAFORTH and DATAFORTH endorses the use of this driver as the ISOLYNX SLX100 official OPC interface for their products. In addition, this driver uses DATAFORTH supplied communication software modules that encapsulates the low-level communication details of the isoLynx Command Protocol.

Device Setup

Supported Devices

All ISOLYNX SLX100 data acquisition systems that support the ISOLYNX protocol.

Supported Protocols

ISOLYNX protocol over serial lines and Ethernet.

Networking

This driver supports communications over serial lines and Ethernet. See Section 7.0 of ISOLYNX hardware user's manual for complete discussion of ISOLYNX communications and connections.

Device Configuration

Each device on a network must be configured with a unique Address/ID. See ISOLYNX hardware user's manual Section on "Network Address selection" for an explanation of setting each device's network address.

Each additional panel within the system must also have its individual address configured. See ISOLYNX hardware user's manual Section on "Analog I/O expansion panel-Address selection" and "Digital I/O expansion panel-Network Address selection" for details.

The final step in the device setup process is to use the Dataforth supplied configuration utility to configure both the Interface and the I/O. See section 3.5 "Sample Applications" in the software manual for details. Note that it is possible to configure an I/O channel incorrectly or to configure a channel with no I/O module physically present. The best way to

verify correct I/O configuration is to perform an auto create of the tag database and then match the tags generated to the actual hardware I/O present.

The Ethernet interface board supports up to 4 simultaneous connections at a time. This means that there can only be up to 4 devices with same IP address running in the server at 1 time. These 4 Ethernet devices can be assigned to 1 or multiple channels.

When configuring a device's IP address and associated items using Dataforth's configuration utility pay special attention to the **Keep Alive** item. This item defines how long (in seconds) the Ethernet interface board will keep its connection alive when no activity is seen. If you will be using Multiple connections to the same device, it is strongly recommended that this item be set to a value of 1. If not, the server may not be able to re-establish a connection to the device when a break occurs in the connection.

Notes:

1. This driver is limited to 16 devices per channel.
2. The Ethernet interface board is limited to 4 simultaneous connections at a time.
3. This driver provides multi-threaded processing for optimum performance.
4. TCP/IP must be properly installed in order to use this driver with Ethernet devices. For more information on setting up TCP/IP, refer to Windows documentation.

See Also: [Cable Diagrams](#) and [Driver Setup](#).

Cable Diagrams

See Section 7.0 of ISOLYNX hardware user's manual for RS-232, RS-485 2-wire, RS-485 4-wire and Ethernet connections in addition to the following information.

Serial Connections

See ISOLYNX hardware user's manual, Appendix D-AN302 ISOLYNX I/O expansion Network configurations.

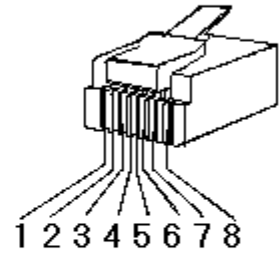
Ethernet Connections

Patch Cable (Straight Through)

TD + 1	OR/WHT	OR/WHT	1	TD +
TD - 2	OR	OR	2	TD -
RD + 3	GRN/WHT	GRN/WHT	3	RD +
4	BLU	BLU	4	
5	BLU/WHT	BLU/WHT	5	
RD - 6	GRN	GRN	6	RD -
7	BRN/WHT	BRN/WHT	7	
8	BRN	BRN	8	

RJ45 RJ45

10 BaseT



Crossover Cable

TD + 1	OR/WHT	GRN/WHT	1	TD +
TD - 2	OR	GRN	2	TD -
RD + 3	GRN/WHT	OR/WHT	3	RD +
4	BLU	BLU	4	
5	BLU/WHT	BLU/WHT	5	
RD - 6	GRN	OR	6	RD -
7	BRN/WHT	BRN/WHT	7	
8	BRN	BRN	8	

RJ45 RJ45

8-pin RJ45

Driver Setup

This driver makes use of the ISOLYNX Data Acquisition Library which is comprised of the following 6 dynamic link libraries:

LYNXW32.DLL
 _ISOLYNX.DLL
 _SUPER.DLL
 SUPERCOM.DLL
 SCRS232.DLL
 SCTCPIP.DLL.

The OPC server setup will install these components into the Windows system directory when installing the driver.

Channel Properties

A channel represents a serial line connected to one of the computer's COM ports or an Ethernet network connected to the computer's default **Network Interface Card (NIC)**. Channel properties are used to specify the type of connection desired as well as other properties shared by devices on that network.

Note: For more information on general Channel Properties, refer to the main OPC server help documentation.

Communications Parameters

Interface Type

This parameter is used to select from either RS-232, RS-485/2, RS-485/4 and Ethernet.

COM Port

This parameter is used to select the COM port to use (1 to 255) for serial communications. COM1 is the default.

Baud Rate

This parameter is used to select the baud rate that should be used to configure the selected COM port. Supported baud rates are 1200, 2400, 4800, 9600 (default), 19200, 38400, 57600 and 115200.

Interface Option

Because there are no options available for RS-232, RS-485/4 and Ethernet, this setting will always be grayed out. **None** will be displayed. For RS-485/2, however, **Echo Off** and **Echo On** are available.

Note: The communication parameters selected must match those set up with the Dataforth configuration utility. Refer to section 3.5 "Sample Applications" and "Configuration Sample" in the software manual for details.

Device Properties

Each physical device to be polled must be represented by a device object in the server. For general Device Properties, refer to the main OPC server help documentation.

Ethernet**IP Address**

This parameter is used to specify the IP address of the device to poll.

Port Number

This parameter is used to configure the Ethernet port to be used when connecting to a remote terminal server. The default is 9000.

Note: The communication parameters selected must match those set up with the Dataforth configuration utility. For more information, refer to section 3.5 "Sample Applications", "Configuration Sample" in the software manual.

Automatic Tag Database Generation**Overview**

This driver makes use of the Automatic Tag Database Generation feature, which enables drivers to automatically create tags to access data. It does so by querying the device for its configuration and then using the information to build a tag database.

OPC Server Configuration

The Automatic Tag Database Generation feature can be customized to fit the application's needs. The primary control options can be set during the **Database Creation** step of the Device Wizard or later by clicking **Device Properties | Database Creation**. For more information on these settings, refer to the OPC Server's help documentation.

Operation

Depending on the configuration, tag generation may start automatically when the OPC Server project starts or be initiated manually at some other time. The OPC Server's event log will show when the tag generation process started, any errors that occurred while querying the device for its configuration and when the process completed.

Group and Tag Naming Conventions

A group is created for each analog and digital panel in the system and 3 subgroups are created under each panel's Group for configuration, inputs and outputs tags. The configuration Group contains tags that will be used for **device configuration** (Tag types: AOD, ASW and DOD). The inputs Group contains tags for **reading inputs** (Tag types: AIA, AIC and DI). And finally the outputs Group contains tags for **reading and writing to outputs** (Tag types: AO and DO).

Each tag name will include the panel, tag type and channel number.

Note: The following images illustrate a system with two analog panels and two digital panels. Note that the digital panels names are numbered starting at 0 even though they are physically addressed at 8 and up.

Configuration

Tag Name	Address	Data Type	Scan Rate	Scaling	Description
Panel0_AOD_Channel0	00:AOD:00	Long	100	None	Panel0_AOD_Channel0
Panel0_AOD_Channel10	00:AOD:0A	Long	100	None	Panel0_AOD_Channel10
Panel0_AOD_Channel2	00:AOD:02	Long	100	None	Panel0_AOD_Channel2
Panel0_AOD_Channel4	00:AOD:04	Long	100	None	Panel0_AOD_Channel4
Panel0_AOD_Channel6	00:AOD:06	Long	100	None	Panel0_AOD_Channel6
Panel0_AOD_Channel8	00:AOD:08	Long	100	None	Panel0_AOD_Channel8
Panel0_ASW_Channel1	00:ASW:01	Long	100	None	Panel0_ASW_Channel1
Panel0_ASW_Channel11	00:ASW:0B	Long	100	None	Panel0_ASW_Channel11
Panel0_ASW_Channel3	00:ASW:03	Long	100	None	Panel0_ASW_Channel3
Panel0_ASW_Channel5	00:ASW:05	Long	100	None	Panel0_ASW_Channel5
Panel0_ASW_Channel7	00:ASW:07	Long	100	None	Panel0_ASW_Channel7
Panel0_ASW_Channel9	00:ASW:09	Long	100	None	Panel0_ASW_Channel9

Inputs

Tag Name	Address	Data Type	Scan Rate	Scaling	Description
Panel0_AIA_Channel1	00:AIA:01	Long	100	None	Panel0_AIA_Channel1
Panel0_AIA_Channel11	00:AIA:0B	Long	100	None	Panel0_AIA_Channel11
Panel0_AIA_Channel3	00:AIA:03	Long	100	None	Panel0_AIA_Channel3
Panel0_AIA_Channel5	00:AIA:05	Long	100	None	Panel0_AIA_Channel5
Panel0_AIA_Channel7	00:AIA:07	Long	100	None	Panel0_AIA_Channel7
Panel0_AIA_Channel9	00:AIA:09	Long	100	None	Panel0_AIA_Channel9
Panel0_AIC_Channel1	00:AIC:01	Long	100	None	Panel0_AIC_Channel1
Panel0_AIC_Channel11	00:AIC:0B	Long	100	None	Panel0_AIC_Channel11
Panel0_AIC_Channel3	00:AIC:03	Long	100	None	Panel0_AIC_Channel3
Panel0_AIC_Channel5	00:AIC:05	Long	100	None	Panel0_AIC_Channel5
Panel0_AIC_Channel7	00:AIC:07	Long	100	None	Panel0_AIC_Channel7
Panel0_AIC_Channel9	00:AIC:09	Long	100	None	Panel0_AIC_Channel9

Outputs

Tag Name	Address	Data Type	Scan Rate	Scaling	Description
Panel0_AO_Channel0	00:AO:00	Long	100	None	Panel0_AO_Channel0
Panel0_AO_Channel10	00:AO:0A	Long	100	None	Panel0_AO_Channel10
Panel0_AO_Channel2	00:AO:02	Long	100	None	Panel0_AO_Channel2
Panel0_AO_Channel4	00:AO:04	Long	100	None	Panel0_AO_Channel4
Panel0_AO_Channel6	00:AO:06	Long	100	None	Panel0_AO_Channel6
Panel0_AO_Channel8	00:AO:08	Long	100	None	Panel0_AO_Channel8

Data Types Description

Data Type	Description
-----------	-------------

Boolean	Library returns a signed 32 bit value which is either a 0 or 1
Long*	Library returns a signed 32 bit value

*Even though the data type is long, all analog values are limited to range of +32,767 to -32,768.

Address Descriptions

The following table lists the address syntax for all of the supported addresses.

Address	Description	Syntax	Access	Data type
AIC	analog input current	PP:AIC:CC PP (panel) range: 00-03 CC (channel) range: 00-0F	Read Only	Long*
AIA	analog input Average	PP:AIA:CC PP (panel) range: 00-03 CC (channel) range: 00-0F	Read Only	Long*
DI	digital input	PP:DI:CC PP (panel) range: 08-0F CC (channel) range: 00-0F	Read Only	Boolean
AO	analog output	PP:AO:CC PP (panel) range: 00-03 CC (channel) range: 00-0F	Read/Write	Long*
ASW**	analog sample weight	PP:ASW:CC PP (panel) range: 00-03 CC (channel) range: 00-0F	Read/Write	Long*
DO	digital output	PP:DO:CC PP (panel) range: 08-0F CC (channel) range: 00-0F	Read/Write	Boolean
AOD	analog output default	PP:AOD:CC PP (panel) range: 00-03 CC (channel) range: 00-0F	Read/Write	Long*
DOD	digital output default	PP:DOD:CC PP (panel) range: 08-0F CC (channel) range: 00-0F	Read/Write	Boolean

*Even though the data type is long, all analog values are limited to range of +32,767 to -32,768.

**Tag type ASW (analog sample weight) is a special case in that the value is limited to powers of 2 up to a Maximum value of 16384. If an attempt is made to write a value that is not a power of 2, then the next power of 2 will be derived from that value and then written into the device. For example, if a value of 5 is written to an ASW tag, then 5 will be rounded up to 8 and then written to the device. Therefore, when reading back the value written, it will be 8 instead of 5. See also Section 3.3.4.9 "IOATTR_ISOLYNX_AIOPTION_STRUCT" in Software manual.

Notes:

1. Both panel and channel numbers are hexadecimal.

2. Analog panel 0 ONLY has a channel range of 0 to B.
3. The 1st digital panel's panel number would be 8 even though the physical address of the board would be likely set to 0. See Section 6.0 "IsoLynx Digital I/O Backpanel Description" in Hardware manual.

Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

[Missing address](#)

[Device address '<address>' contains a syntax error](#)

[Address '<address>' is out of range for the specified device or register](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is Read Only](#)

Device Status Messages

[Device '<device name>' is not responding](#)

[Unable to write to '<address>' on device '<device name>'](#)

Driver Error Messages

[Device '<device name>' responded with error '<Error Code>' \(Tag '<address>'\)](#)

[Device '<device name>' responded with error '<Error Code>' \(Tag '<address>'\) during Connect](#)

Automatic Tag Database Generation Messages

[Unable to Connect to Device or IO Inquire error](#)

Dataforth Data Acquisition Library Error Code Descriptions

The following lists the Error Codes returned by the Dataforth Data Acquisition Library.

Error Code	Description
0	Success
1000	Client already initialized
1001	Failed to initialize client
1002	Client not initialized
1003	Logging not enabled
1004	Failed to find error text
1005	Invalid library link type
1006	Invalid library callback type
1007	Log file full
1008	Memory pointer null
1009	Failed to allocate memory
1010	Failed to create thread
1011	Invalid checksum type
2000	Invalid communications processor type
2001	Communications processor library does not exist
2002	Failed to open communications processor device
2003	Invalid communications processor device handle
2004	Communications processor virtual function does not exist
2005	Communications processor API function does not exist
2006	Communications timeout

2007	Communications cancelled
2008	Invalid communications processor configuration type
2009	Communications receive buffer pointer null
2010	Communications send buffer pointer null
2011	Communications send buffer empty
2012	Non-blocking communications operation in progress
2012	Communications port not initialized
2030	Communications send operation with echo failed
-2000	Non-blocking communications operation pending
-2020	COM receive buffer overflow
3000	Invalid I/O processor type
3001	I/O processor library does not exist
3002	Failed to open I/O processor device
3003	Invalid I/O processor device handle
3004	I/O processor virtual function does not exist
3005	I/O processor API function does not exist
3006	I/O timeout
3007	I/O cancelled
3008	Failed to add I/O device to list
3009	Invalid I/O channel type
3010	Invalid I/O channel list count
3011	Invalid I/O channel panel
3012	Invalid I/O channel number
3013	I/O channel duplicate
3014	I/O channel not configured
3015	Invalid I/O channel group
3016	Invalid I/O channel order
3017	Failed to add I/O channel to list
3018	Failed to parse I/O channel configuration
3019	Invalid I/O channel attribute type
3020	Invalid I/O channel attribute list count
3021	Invalid I/O channel read/write control type
3022	I/O processor function not implemented
3023	Invalid I/O channel read/write samples
3024	Invalid I/O channel read/write channel list count
3025	Non-blocking I/O operation in progress
3026	Invalid I/O processor command state
3027	Invalid I/O response
3028	Invalid I/O response length
3029	Invalid I/O response checksum or CRC
3030	I/O command not acknowledged
-3000	Non-blocking I/O operation pending
3100	Invalid analog I/O range
5000	Invalid date type
5001	Invalid date string
6000	String not found in file
6001	Value not found in file
6002	Error writing string to file

6003	Error writing value to file
-6000	Maximum number of files exceeded
11000	Failed to initialize Serial COM port
11001	Failed to open Serial COM port
11002	Invalid Serial COM port
11003	Serial COM port not present
11004	Serial COM port already in use
11005	Invalid Serial COM IRQ
11006	Invalid Serial COM flow control
11007	Invalid Serial COM parity
12000	Failed to initialize Socket COM port
12001	Failed to open Socket COM port
12002	Invalid Socket COM port
12003	Failed to connect to Socket COM server
21000	Invalid IsoLynx script
21001	Invalid IsoLynx address
21002	Invalid IsoLynx panel
21020	Invalid IsoLynx I/F type
21021	Invalid IsoLynx I/F options
21022	Invalid IsoLynx I/F baudrate
21030	Invalid IsoLynx analog input range
21031	Invalid IsoLynx analog input average weight
21040	Invalid IsoLynx analog output range
21041	Invalid IsoLynx analog output initial data
21060	Invalid IsoLynx digital output initial data
21100	IsoLynx I/O command not acknowledged
21101	IsoLynx I/O command not acknowledged-Error Code 01
21102	IsoLynx I/O command not acknowledged-Error Code 02
21103	IsoLynx I/O command not acknowledged-Error Code 03
21104	IsoLynx I/O command not acknowledged-Error Code 04
21105	IsoLynx I/O command not acknowledged-Error Code 05
21106	IsoLynx I/O command not acknowledged-Error Code 06
21107	IsoLynx I/O command not acknowledged-Error Code 07
21108	IsoLynx I/O command not acknowledged-Error Code 08
21109	IsoLynx I/O command not acknowledged-Error Code 09
21116	IsoLynx I/O command not acknowledged-Error Code 10
21117	IsoLynx I/O command not acknowledged-Error Code 11
21118	IsoLynx I/O command not acknowledged-Error Code 12
21119	IsoLynx I/O command not acknowledged-Error Code 13
21120	IsoLynx I/O command not acknowledged-Error Code 14
21121	IsoLynx I/O command not acknowledged-Error Code 15
21122	IsoLynx I/O command not acknowledged-Error Code 16
21123	IsoLynx I/O command not acknowledged-Error Code 17
21200	Invalid IsoLynx IP address
21201	Invalid IsoLynx subnet mask
21202	Invalid IsoLynx gateway
21203	Invalid IsoLynx DNS server
21204	Invalid keepalive timeout value

-21000	IsoLynx I/O configuration does not match script
-21001	IsoLynx I/F configuration does not match script
-21030	IsoLynx analog input options do not match script
-21040	IsoLynx analog output options do not match script
-21050	IsoLynx digital input options do not match script
-21060	IsoLynx digital output options do not match script
-21200	IsoLynx network options do not match script

Address Validation

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

[Missing address](#)

[Device address '<address>' contains a syntax error](#)

[Address '<address>' is out of range for the specified device or register](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is Read Only](#)

Missing address

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has no length.

Solution:

Re-enter the address in the client application.

Device address '<address>' contains a syntax error

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically contains one or more invalid characters.

Solution:

Re-enter the address in the client application.

Address '<address>' is out of range for the specified device or register

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is beyond the range of supported locations for the device.

Solution:

Verify the address is correct; if it is not, re-enter it in the client application.

Data Type '<type>' is not valid for device address '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has been assigned an invalid data type.

Solution:

Modify the requested data type in the client application.

Device address '<address>' is Read Only

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has a requested access mode that is not compatible with what the device supports for that address.

Solution:

Change the access mode in the client application.

Device Status Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Status Messages

[Device '<device name>' is not responding](#)

[Unable to write to '<address>' on device '<device name>'](#)

Device '<Device name>' is not responding

Error Type:

Serious

Possible Cause:

1. The connection between the device and the host PC is broken.
2. The IP address or ID assigned to the device is incorrect.
3. Interface type, com port or baud rate on device are configured incorrectly.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify the IP address or ID given to the named device matches that of the actual device.
3. Verify that Communications channel properties match those used when the device was configured with Dataforth configuration utility. Refer to the section in the hardware user's manual on use of "Communications Interface reset jumper".
4. Cycle power to device.

Unable to write to '<address>' on device '<device name>'

Error Type:

Serious

Possible Cause:

1. The connection between the device and the host PC is broken.
2. The IP address or ID assigned to the device is incorrect.
3. Interface type, com port or baud rate on device are configured incorrectly.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify the IP address or ID given to the named device matches that of the actual device.
3. Verify that Communications channel properties match those used when the device was configured with Dataforth configuration utility. Refer to the section in the hardware user's manual on use of "Communications Interface reset jumper".

Driver Error Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Driver Error Messages

[Device '<device name>' responded with error '<Error Code>' \(Tag '<address>'\)](#)

[Device '<device name>' responded with error '<Error Code>' \(Tag '<address>'\) during Connect](#)

Device 'device name' responded with error 'Error Code' (Tag 'address')

Error Type:

Serious

Possible Cause:

1. The connection between the device and the host PC is broken.
2. The IP address or ID assigned to the device is incorrect.
3. Interface type, com port, or baud rate on device are configured incorrectly.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify the IP address or ID given to the named device matches that of the actual device.
3. Verify that Communications channel properties match those used when the device was configured with Dataforth configuration utility. Refer to the section in the hardware user's manual on use of "Communications Interface reset jumper".

Note:

The error code detailed in the message was returned by Dataforth data acquisition library.

See Also:

[Dataforth Data Acquisition Library Error Code Descriptions](#)

Device 'device name' responded with error 'Error Code' (Tag 'address') during Connect

Error Type:

Serious

Possible Cause:

1. The connection between the device and the host PC is broken.
2. The IP address or ID assigned to the device is incorrect.
3. Interface type, com port, or baud rate on device are configured incorrectly.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify the IP address or ID given to the named device matches that of the actual device.
3. Verify that Communications channel properties match those used when the device was configured with Dataforth configuration utility. Refer to the section in the hardware user's manual on use of "Communications Interface reset jumper".

Note:

The error code detailed in the message was returned by Dataforth data acquisition library while trying to connect to device.

See Also:

[Dataforth Data Acquisition Library Error Code Descriptions](#)

Automatic Tag Database Generation Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Automatic Tag Database Generation Messages

[Unable to Connect to Device or IO Inquire error](#)

Unable to Connect to Device or IO Inquire error during tag Database Creation**Error Type:**

Serious

Possible Cause:

1. The connection between the device and the host PC is broken.
2. The IP address or ID assigned to the device is incorrect.
3. Interface type, com port, or baud rate on device are configured incorrectly.
4. I/O configuration set with Dataforth configuration utility is incorrect.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify the IP address or ID given to the named device matches that of the actual device.
3. Verify that Communications channel properties match those used when the device was configured with Dataforth configuration utility. Refer to the section in the hardware user's manual on use of "Communications Interface reset jumper".
4. Run Dataforth configuration utility and verify I/O configuration matches physical hardware.

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