

# **SquareD Serial Driver Help**

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## SquareD Serial Driver Help

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Help version 1.014

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### Overview

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The SquareD Serial Driver provides an easy and reliable way to connect SquareD Serial devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with SquareD SY/MAX PLCs and SquareD PowerLogic power line monitors.

**Note:** This driver does not support unsolicited messages received from the SquareD Serial programmable controller.

## Device Setup

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### Supported Devices

SY/MAX Programmable Controllers and SquareD PowerLogic monitors.

### Communication Protocol

SY/MAX Point-to-Point Communications Protocol

### Supported Communication Parameters

Baud Rate: 300, 1200, 2400, 4800, 9600 or 19200

Parity: Even

Data Bits: 8

Stop Bits: 1

**Note:** Not all devices support the listed configurations.

### Maximum Number of Channels and Devices

The maximum number of supported channels is 100. The maximum number of devices supported per channel is 200.

### Device IDs

The Device ID consists of a network routing path linking the Master and PLC across a network. For more information, refer to [Setting a Route ID](#).

### Flow Control

When using an RS-232/RS-485 converter for the SY/MAX controller, the type of flow control that is required depends on the needs of the converter. Some converters do not require any flow control whereas others require RTS flow. To determine the converter's flow requirements, refer to its documentation. An RS-485 converter that provides automatic flow control is recommended.

**Note:** When using the manufacturer's supplied communications cable, it is sometimes necessary to choose a flow control setting of **RTS** or **RTS Always** under the Channel Properties.

## Modem Setup

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This driver supports modem functionality. For more information, please refer to the topic "Modem Support" in the OPC Server Help documentation.

## Setting a Route ID

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The SquareD Serial Driver's Device ID consists of a network routing path that links the Master and PLC across a network. The network route consists of up to 8 nodes that specify the path between the Master and the destination PLC. The last node is the destination.

### Direct Connection

The following demonstrates the Route ID for a direct connection between the computer and RS-422 port. It is entered as 255.255.255.255.255.255.255.

**Node1** 255

**Node2** 255

**Node3** 255

**Node4** 255

**Node5** 255

**Node6** 255

**Node7** 255

**Node8** 255

### Network Connection

Each node can contain a value within the following ranges: 0-201, 204 or 255. One exception is that Node1 can not be set to 204 (a "don't care" case for routing). Node entries are added starting with Node1, continuing up to Node8. If the Route ID does not need to use all 8 nodes, the first unused node and continuing up to the last node should contain 255. By default, the user only needs to enter in the necessary nodes which describes the network path. The driver defaults any unused nodes to 255.

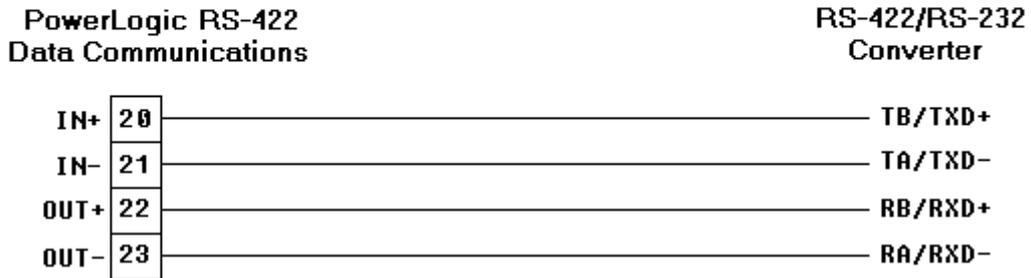
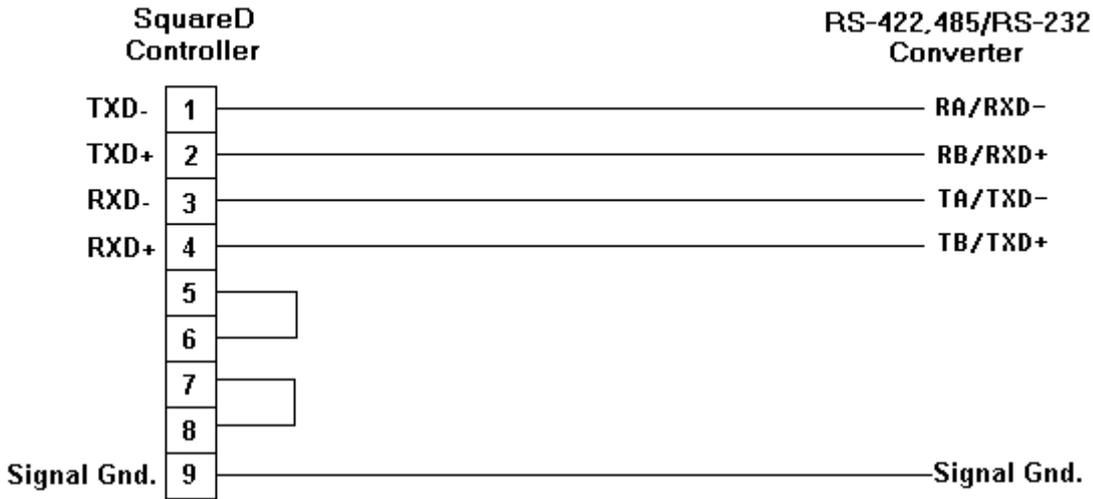
### Example

If the user wants to communicate with Node102 through Node2 on the network, the user would enter in the following Device ID: 2.102. The driver will automatically treat this ID's routing path as 2.102.255.255.255.255.255.

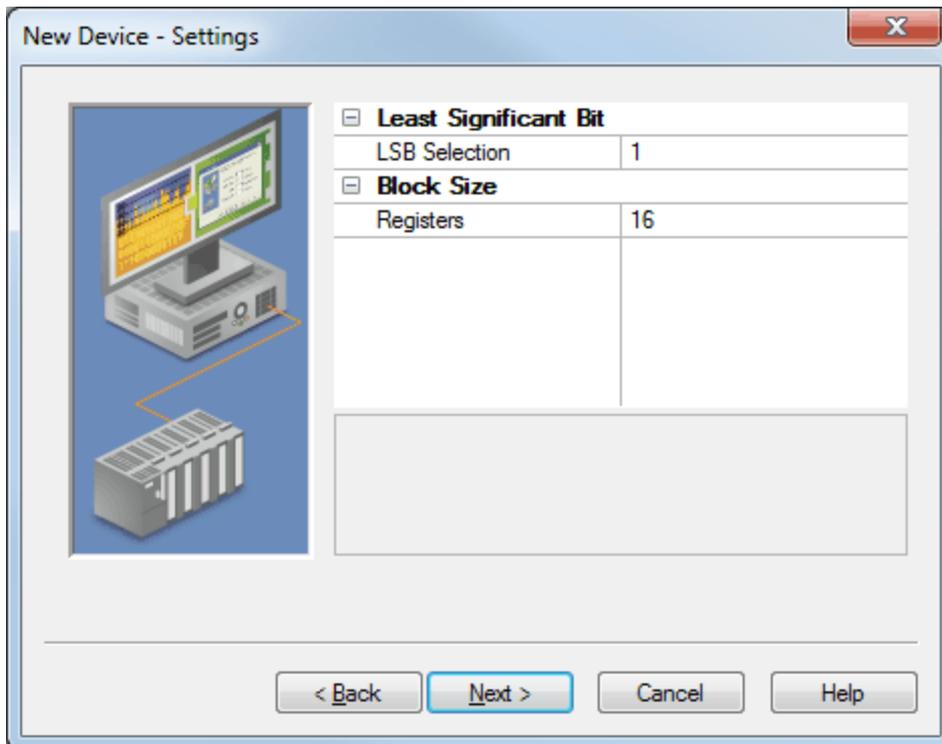
**Note:** For more information on Route IDs, refer to the SquareD SY/MAX documentation.

**Cable Diagram**

Using an RS-232/RS-422 converter or an RS-232/RS-485 converter for the SY/MAX controller, the cable pin-out between the converter and the programmable controller is as follows:



**Settings**



Descriptions of the parameters are as follows:

- **Least Significant Bit:** This parameter specifies whether bits within Short, Long, Word, or DWord data types will be referenced as zero-based or one-based. Options include 0 and 1. The default setting is 1.
- **Block Size:** This parameter specifies how many bytes will be read in a single request. Options include 16, 32, 64, and 128 registers. The default setting is 16 registers.

## Data Types Description

---

Data Type	Description
Boolean	Single bit
Word	Unsigned 16 bit value bit 0 is the low bit (bit 1 if LSB is set to 1) bit 15 is the high bit (bit 16 if LSB is set to 1)
Short	Signed 16 bit value bit 0 is the low bit (bit 1 if LSB is set to 1) bit 14 is the high bit (bit 15 if LSB is set to 1) bit 15 is the sign bit (bit 16 if LSB is set to 1)
DWord	Unsigned 32 bit value bit 0 is the low bit (bit 1 if LSB is set to 1) bit 31 is the high bit (bit 32 if LSB is set to 1)
Long	Signed 32 bit value bit 0 is the low bit (bit 1 if LSB is set to 1) bit 30 is the high bit (bit 31 if LSB is set to 1) bit 31 is the sign bit (bit 32 if LSB is set to 1)
Float	32 bit floating point value  The driver interprets two consecutive registers as a floating point value by making the second register the high word and the first register the low word.

## Address Descriptions

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Address specifications vary depending on the model in use. Select a link from the following list to obtain specific address information for the model of interest.

[SY/MAX Addressing](#)

[SquareD Serial PowerLogic Addressing](#)

## SYMAX Addressing

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### The SquareD Serial Protocol Support - Addresses

The SquareD Serial Driver's address format is  $S o . b [ rows ] [ cols ]$ . Description of the syntax is as follows:

- $S$  denotes a data word register, which is the only memory type supported by the SquareD Serial Driver.
- $o$  is the register in the PLC's memory to which the user wants access. Valid ranges for Read/Write registers are 1-8192. Valid ranges for Read Only registers are 1-32768.
- $.$  is a bit delimiter, used when users want access to an individual bit within a Word, Short, DWord or Long. Users cannot access a bit within a float. The use of a delimiter is optional.
- $b$  is the bit number within the register. For Word and Short types, this can be 0-15 (or 1-16 if the LSB is set to 1). For DWord and Long types, this can be 0-31 (or 1-32 if the LSB is set to 1). Users cannot access a bit within a Float. The use of a bit is optional. For more information, refer to [Settings](#).
- $[ rows ]$  is a rows parameter used when users want to read and/or write an array of data to the PLC. Arrays cannot be used for Boolean types or any type where the bit parameter is used. The use of a row parameter is optional.
- $[ cols ]$  is a columns parameter used when users want to read and/or write an array of data to the PLC. Arrays cannot be used for Boolean types or any type where the bit parameter is used. The use of a row parameter is optional.

**Note:** When multiplied, rows and columns cannot exceed 100 for Word and Short types (or 50 for DWord, Long and Float types). This means that a block of data can read and write up to 100 words at one time.

### The SquareD Serial Protocol Support - Data Types

The data types supported by this memory type are as follows: Boolean, Word, Short, DWord, Long and Float. The default data types are Boolean and Word.

**Note 1:** A dot (.) notation is used to determine whether the address should be referenced as Boolean or Word. For dynamic tags, an address of S2 will be referenced as a Word; an address of S2.1 will be referenced as a Boolean. For dynamic tags that reference an array of data, the array is referenced as a Word.

**Note 2:** The actual number of addresses of each type depends on the SquareD Serial device in use. For more information, refer to the device's documentation.

**See Also:** [Data Types Description](#)

## SquareD Serial PowerLogic Addressing

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### PowerLogic Protocol Support - Addresses

The PowerLogic's address format is  $S o [ rows ] [ cols ]$ . Description of the syntax is as follows:

- $S$  denotes a data word register, which is the only memory type supported by the SquareD Serial Driver.
- $o$  is the register in the PowerLogic's memory to which the user wants access. Valid ranges for Read/Write registers are 1-8192.
- $[ rows ]$  is a rows parameter used when users want to read and/or write an array of data to the PowerLogic monitor. The use of a row parameter is optional.
- $[ cols ]$  is a columns parameter used when users want to read and/or write an array of data to the PowerLogic monitor. The use of a row parameter is optional.

**Note:** When multiplied, rows and columns cannot exceed 100 for Word and Short types (or 50 for DWord, Long and Float types). This means that a block of data can read and write up to 100 words at one time.

#### Examples

1. S1003 Current, Phase A
2. S1014 Voltage, Phase A-B

### PowerLogic Protocol Support - Data Types

The data types supported by this memory type are as follows: Word, Short, DWord, Long and Float. The default data type is Short.

**Note:** The actual number of addresses of each type depends on the PowerLogic device in use. For more information, refer to the PowerLogic device's documentation Appendix E.

**See Also:** [Data Types Description](#)

## 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](#)

[Device address '<address>' is not supported by model '<model name>'](#)

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

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

[Array size is out of range for address '<address>'](#)

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### Serial Communications

[COMn does not exist](#)

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[The SquareD Serial device appears to be sending unsolicited messages](#)

## 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](#)

[Device address '<address>' is not supported by model '<model name>'](#)

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

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

[Array size is out of range for address '<address>'](#)

[Array support is not available for the specified address: '<address>'](#)

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

---

**Device address '<address>' is not supported by model '<model name>'**

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified dynamically references a location that is valid for the communications protocol but not supported by the target device.

**Solution:**

Verify that the address is correct; if it is not, re-enter it in the client application. Also verify that the selected model name for the device is correct.

---

**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.

---

**Array size is out of range for address '<address>'**

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified dynamically is requesting an array size that is too large for the address type or block size of the driver.

**Solution:**

Re-enter the address in the client application to specify a smaller value for the array or a different starting point.

---

**Array support is not available for the specified address: '<address>'**

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified dynamically contains an array reference for an address type that doesn't support arrays.

**Solution:**

Re-enter the address in the client application to remove the array reference or correct the address type.

**Serial Communications**

---

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

**Serial Communications**

[COMn does not exist](#)

[Error opening COMn](#)

[COMn is in use by another application](#)

[Unable to set comm parameters on COMn](#)

[Communications error on '<channel name>' \[<error mask>\]](#)

**COMn does not exist**

---

**Error Type:**

Fatal

**Possible Cause:**

The specified COM port is not present on the target computer.

**Solution:**

Verify that the proper COM port has been selected.

**Error opening COMn**

---

**Error Type:**

Fatal

**Possible Cause:**

The specified COM port could not be opened due to an internal hardware or software problem on the target computer.

**Solution:**

Verify that the COM port is functional and may be accessed by other Windows applications.

**COMn is in use by another application**

---

**Error Type:**

Fatal

**Possible Cause:**

The serial port assigned to a device is being used by another application.

**Solution:**

1. Verify that the correct port has been assigned to the channel.
2. Verify that only one copy of the current project is running.

**Unable to set comm parameters on COMn**

---

**Error Type:**

Fatal

**Possible Cause:**

The serial parameters for the specified COM port are not valid.

**Solution:**

Verify the serial parameters and make any necessary changes.

## **Communications error on '<channel name>' [<error mask>]**

---

### **Error Type:**

Serious

### **Error Mask Definitions:**

**B** = Hardware break detected.

**F** = Framing error.

**E** = I/O error.

**O** = Character buffer overrun.

**R** = RX buffer overrun.

**P** = Received byte parity error.

**T** = TX buffer full.

### **Possible Cause:**

1. The serial connection between the device and the Host PC is bad.
2. The communications parameters for the serial connection are incorrect.

### **Solution:**

1. Verify the cabling between the PC and the device.
2. Verify that the specified communications parameters match those of the device.

## **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 serial connection between the device and the Host PC is broken.
2. The communications parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.
4. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device setting.

### **Solution:**

1. Verify the cabling between the PC and the device.
2. Verify the specified communications parameters match those of the device.
3. Verify the Network ID given to the named device matches that of the actual device.
4. Increase the Request Timeout setting so that the entire response can be handled.

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

---

### **Error Type:**

Serious

### **Possible Cause:**

1. The serial connection between the device and the Host PC is broken.
2. The communications parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.

### **Solution:**

1. Verify the cabling between the PC and the device.
2. Verify the specified communications parameters match those of the device.
3. Verify the Network ID given to the named device matches that of the actual device.

## **Device Specific Messages**

---

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

**Device Specific Messages**

**Bad address in block [<start address> to <end address>] on device '<device name>'**  
**The SquareD Serial device appears to be sending unsolicited messages**

**Bad address in block [<start address> to <end address>] on device '<device name>'**

---

**Error Type:**

Serious

**Possible Cause:**

An attempt has been made to reference a nonexistent location in the specified device.

**Solution:**

Verify that the tags assigned to addresses in the specified range on the device and eliminate ones that reference invalid locations.

**The SquareD Serial device appears to be sending unsolicited messages, which the driver does not support. Modify the SquareD Serial device logic and restart the server**

---

**Error Type:**

Serious

**Possible Cause:**

Devices must not be sending Read/Write requests through the port that the driver is communicating on, otherwise the device messages will overburden the driver and this error will result.

**Solution:**

Ensure that the devices are not sending Read/Write requests through the port that the driver is communicating on. Modify the SquareD Serial device logic then restart the OPC server.

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