

# **SattBus Ethernet Driver Help**

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## SattBus Ethernet Driver Help

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Help version 1.020

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### Overview

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The SattBus Ethernet Driver provides an easy and reliable way to connect SattBus Ethernet devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with Sattcon devices communicating via the SattBus Ethernet interface.

**Note:** A standard Ethernet interface is used as the hardware for connecting PCs to a SattBus system with Ethernet capability.

## Device Setup

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### Supported Devices

Sattcon 200

**Note:** Any device that supports the SattBus protocol (and has the SattBus Ethernet interface/module present) will be supported.

### Communication Protocol

SattBus

### Device IDs

The Device ID is the device's IP address.

### Connection

Standard Ethernet connection.

### Overlapping

Overlapping affects the procedure of reading and writing certain addresses. By default, this option is set to "Yes" for compatibility with the SattBus Serial port driver. For more information, refer to [Overlapped Addressing vs. None-Overlapped Addressing](#).

## Communication Parameters

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These parameters specify the device's protocol and port numbers.

New Device - Communications Parameters

Set the protocol type and the used port numbers for this device.

Make sure no other device on a different channel is configured to use this Local Port/Network Adapter (channel property) pair.

Select whether or not dword registers are overlapped.

Protocol:

Overlapped addressing:

Port numbers used

Local:

Write to:

< Back   Next >   Cancel   Help

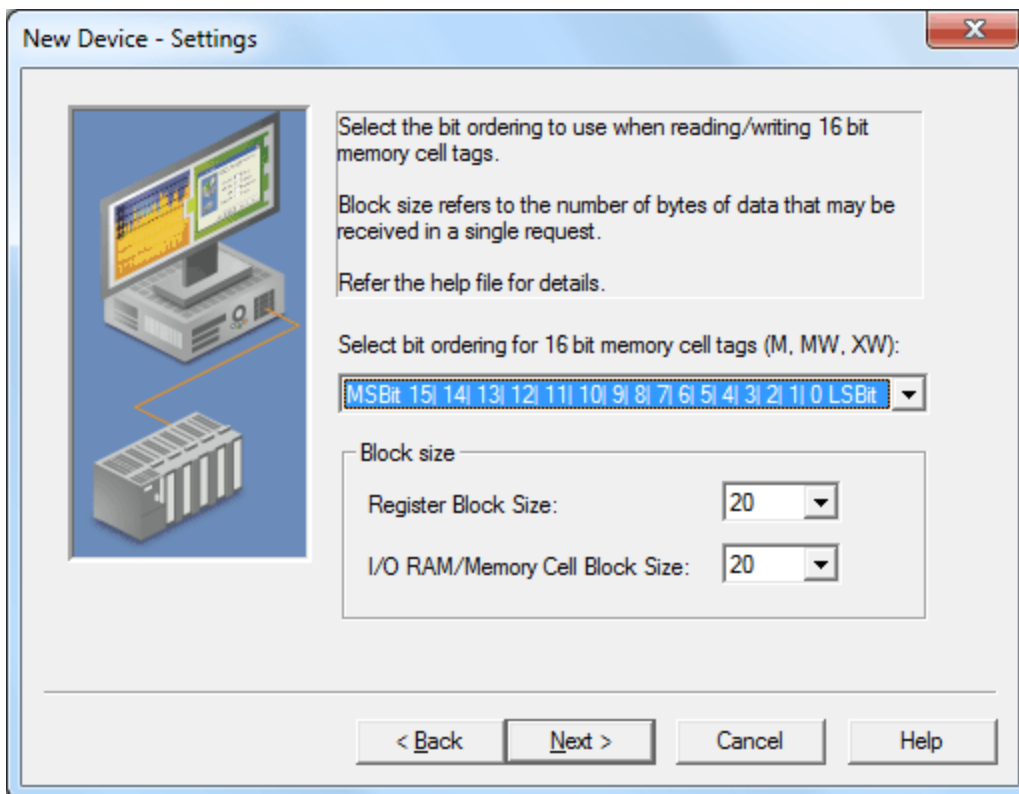
Descriptions of the parameters are as follows:

- **Protocol:** This parameter specifies the protocol type. The only protocol used for SattBus over Ethernet is UDP.
- **Overlapped Addressing:** This parameter specifies the addressing of register double-words. The default setting is Yes. For more information, refer to [Overlapped vs. None-Overlapped Addressing](#).
- **Local:** This parameter specifies the local port number to which the device will send messages. The default setting is 2999.

- **Write To:** This parameter specifies the port number on which the device will receive messages. The default setting is 2999.

**Note:** Although the driver supports the configuration of communication port numbers, the actual port numbers that the Sattbus device expects for successful communication are fixed. In order to communicate with the Sattbus device, both the Local and Write To port numbers must be 2999.

## Settings



Descriptions of the parameters are as follows:

- **Select Bit Ordering for 16 Bit Memory Cell Tags (M, MW, XW):** These parameters configure the bit ordering that will be used when reading or writing Word memory cell tags. The default setting is MSBit 7| 6| 5| 4| 3| 2| 1| 0| 15| 14| 13| 12| 11| 10| 9| 8 LBit.
- **Register Block Size:** This parameter specifies the number of bytes of Register data (such as R tags) that may be requested from a device at one time. To refine the driver's performance, configure the block size to one of the following settings: 20, 32, 64, 128, 256, or 510. The default setting is 20 bytes.
- **I/O RAM/Memory Cell Block Size:** This parameter specifies the number of bytes of I/O RAM/Memory Cell data (such as X, XB, XW, M, MW, I, O or IO tags) that may be requested from a device at one time. To refine the driver's performance, configure the block size to one of the following settings: 20, 32, 64, 128, or 255. The default setting is 20 bytes.

## Bit Ordering for Memory Cells

For more information on a selection, select a link from the list below.

[MSBit 0| 1| 2| 3| 4| 5| 6| 7| 8| 9| 10| 11| 12| 13| 14| 15 LBit](#)  
[MSBit 15| 14| 13| 12| 11| 10| 9| 8| 7| 6| 5| 4| 3| 2| 1| 0 LBit](#)  
[MSBit 7| 6| 5| 4| 3| 2| 1| 0| 15| 14| 13| 12| 11| 10| 9| 8 LBit](#)

**Note:** Addresses are in octal.

**MSBit 0| 1| 2| 3| 4| 5| 6| 7| 8| 9| 10| 11| 12| 13| 14| 15 LBit**

This is how the DOX10 programming software represents the memory cells. In this condition, the most significant bit (MSBit) of the tag being read or written is equal to the address of the tag.

1. For the Word tag 'MW00' (address '0'), the most significant bit (MSBit) is the memory cell address '0'. The least significant bit (LSBit) is memory cell address '17' as shown below:

----- MW00 -----																	
<b>MSBit</b>	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	<b>LSBit</b>

#### Read

If memory addresses '2' and '13' are ON, and rest all are OFF as shown below:

----- MW00 -----																	
State	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	=>16416
<b>MSBit</b>	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	<b>LSBit</b>

then the value that the tag 'MW00' will read is: 16416.

#### Write

Writing a value '1' to the tag 'MW00', will set the bit memory addresses as shown below:

----- MW00 -----																	
State	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	=>1
<b>MSBit</b>	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	<b>LSBit</b>

2. For the Word tag 'MW11'\*(address '11'), the most significant bit (MSBit) is the memory bit '11'. The least significant bit (LSBit) is memory bit '31' as shown below:

**Note:** Word access at non-byte boundaries is not allowed in the DOX10 programming software.

----- MW11 -----																	
<b>MSBit</b>	11	12	13	14	15	16	17	20	21	22	23	25	26	27	30	31	<b>LSBit</b>

#### Read

If memory addresses '14' and '27' are ON, and rest all are OFF as shown below:

----- MW11 -----																	
State	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	=>4100
<b>MSBit</b>	11	12	13	14	15	16	17	20	21	22	23	25	26	27	30	31	<b>LSBit</b>

then the value that the tag 'MW11' will read is: 4100.

#### Write

Writing a value '258' to the tag 'MW11', will set the bit memory addresses as shown below:

----- MW11 -----																	
State	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	=>258	
<b>MSBit</b>	11	12	13	14	15	16	17	20	21	22	23	25	26	27	30	31	<b>LSBit</b>

**Note:** Due to the nature of this bit ordering option, care is needed when addressing 8-bit memory that is close to 16-bit addresses.

#### MSBit 15| 14| 13| 12| 11| 10| 9| 8| 7| 6| 5| 4| 3| 2| 1| 0 LSBit

In this condition, the least significant bit (LSBit) of the tag being read or written is equal to the address of the tag.

1. For the Word tag 'MW00' (address '0'), the most significant bit (MSBit) is the memory cell address '17'. The least significant bit (LSBit) is memory cell address '0' as shown below:

----- MW00 -----																	
<b>LSBit</b>	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	<b>MSBit</b>

#### Read

If memory addresses '2' and '13' are ON, and rest all are OFF as shown below:

----- MW00 ----->																	
State	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	=>2052	
LSBit	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	MSBit

then the value that the tag 'MW00' will read is: 2052.

#### Write

Writing a value '1' to the tag 'MW00', will set the bit memory addresses as shown below:

----- MW00 ----->																	
State	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	=>1
LSBit	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	MSBit

2. For the Word tag 'MW11'(address '11'), the most significant bit (MSBit) is the memory bit '31'. The least significant bit (LSBit) is memory bit '11' as shown below:

**Note:** Word access at non-byte boundaries is not allowed in the DOX10 programming software.

----- MW11 ----->																	
LSBit	11	12	13	14	15	16	17	20	21	22	23	25	26	27	30	31	MSBit

#### Read

If memory addresses '14' and '27' are ON, and rest all are OFF as shown below:

----- MW11 ----->																	
State	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	=>8200
LSBit	11	12	13	14	15	16	17	20	21	22	23	25	26	27	30	31	MSBit

then the value that the tag 'MW11' will read is: 8200.

#### Write

Writing a value '258' to the tag 'MW11', will set the bit memory addresses as shown below:

----- MW11 ----->																	
State	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	=>258
LSBit	11	12	13	14	15	16	17	20	21	22	23	25	26	27	30	31	MSBit

#### MSBit 7| 6| 5| 4| 3| 2| 1| 0| 15| 14| 13| 12| 11| 10| 9| 8 LSBit

This condition, which is the default, is similar to the second selection described above, but with the bytes swapped.

1. For the Word tag 'MW00' (address '0'), the most significant bit (MSBit) is the memory cell address '7'. The least significant bit (LSBit) is memory cell address '10' as shown below:

----- MW00 ----->																	
LSBit	10	11	12	13	14	15	16	17	0	1	2	3	4	5	6	7	MSBit

#### Read

If memory addresses '2' and '13' are ON, and rest all are OFF as shown below:

----- MW00 ----->																	
State	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	=>1032
LSBit	10	11	12	13	14	15	16	17	0	1	2	3	4	5	6	7	MSBit

then the value that the tag 'MW00' will read is: 1032.

#### Write

Writing a value '1' to the tag 'MW00', will set the bit memory addresses as shown below:

----- MW00 ----->																	
State	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	=>0
LSBit	10	11	12	13	14	15	16	17	0	1	2	3	4	5	6	7	MSBit

State	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	=>1
LSBit	10	11	12	13	14	15	16	17	0	1	2	3	4	5	6	7	MSBit	

2. For the Word tag 'MW11'\*(address '11'), the most significant bit (MSBit) is the memory bit '20'. The least significant bit (LSBit) is memory bit '21' as shown below:

**Note:** Word access at non-byte boundaries is not allowed in the DOX10 programming software.

<----- MW11 ----->																	
LSBit	21	22	23	25	26	27	30	31	11	12	13	14	15	16	17	20	MSBit

**Read**

If memory addresses '14' and '27' are ON, and rest all are OFF as shown below:

<----- MW11 ----->																	
State	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	=>2080
LSBit	21	22	23	25	26	27	30	31	11	12	13	14	15	16	17	20	MSBit

then the value that the tag 'MW11' will read is: 2080.

**Write**

Writing a value '258' to the tag 'MW11', will set the bit memory addresses as shown below:

<----- MW11 ----->																	
State	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	=>258
LSBit	21	22	23	25	26	27	30	31	11	12	13	14	15	16	17	20	MSBit

**Note:** Due to the nature of this bit ordering option, care is needed when addressing 8-bit memory that is close to 16-bit addresses.

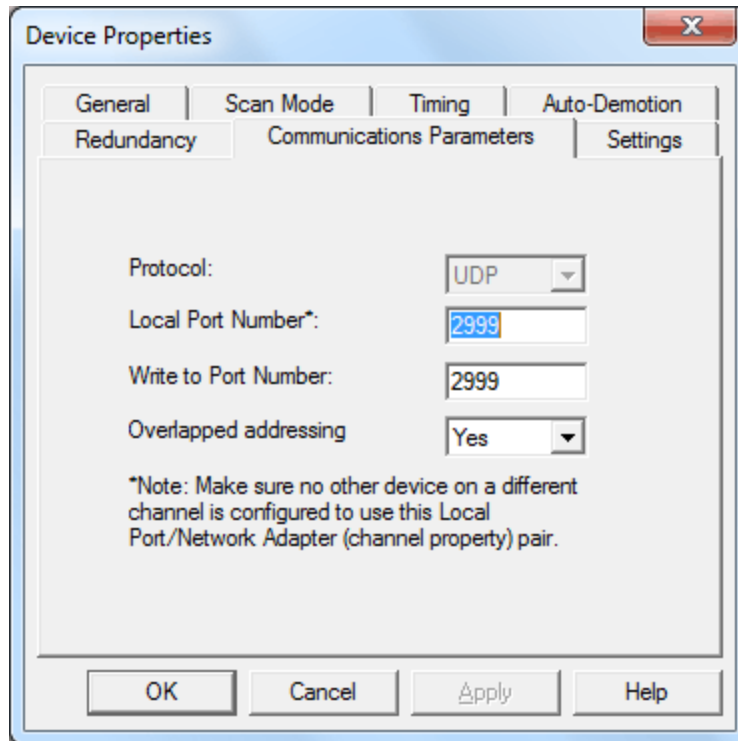
**Changing the Local Port Number and Network Adapter Settings**

For information on changing the Local Port Number and the Network Adapter settings, refer to the instructions below.

**Changing the Local Port Number Setting**

1. To start, right-click on the device and then select **Properties**.
2. Next, click on the **Communication Parameters** tab and refer to the **Local Port Number** field.
3. Make changes to the setting as desired.

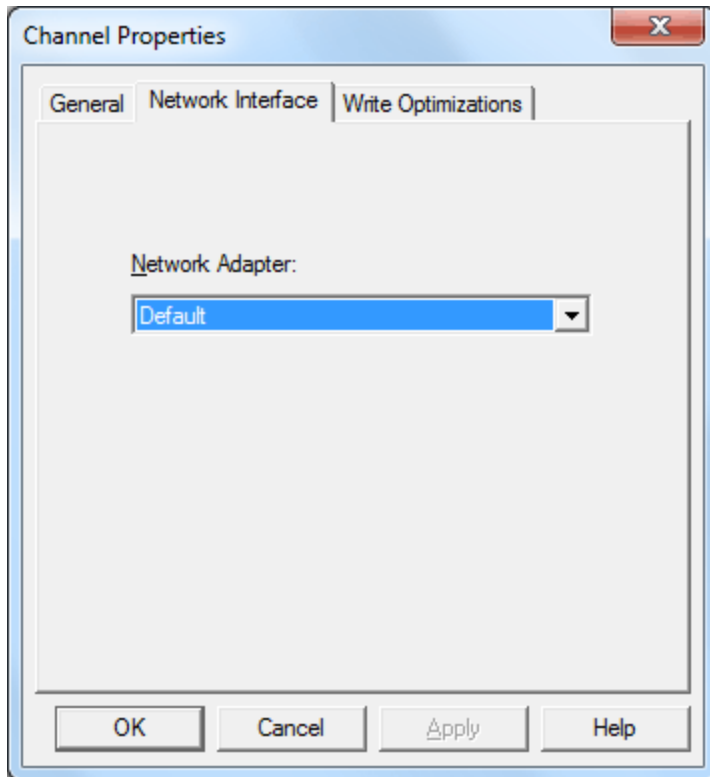




**Caution:** Some SattBus Ethernet modules are configured to send responses to a fixed, predefined port number (such as 2999) on the PC. As such, when the local port number is changed, the bind may succeed although the actual communications fail.

### Changing the Network Adapter Setting

1. To start, right-click on the channel and then select **Properties**.
2. Next, click on the **Network Interfaces** tab and refer to the **Network Adapter** field.



**Note:** If only a single Network Interface Card (NIC) is in the machine, users will have to multi-home the PC. Once completed, the "Default" adapter should not be selected for any of the other channels.

## Data Types Description

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Data Type	Description
Boolean	Single bit
Byte	Unsigned 8 bit value bit 0 is the low bit bit 7 is the high bit
Char	Signed 8 bit value bit 0 is the low bit bit 6 is the high bit bit 7 is the sign bit
Word	Unsigned 16 bit value byte 0 is the high byte byte 1 is the low byte
Short	Signed 16 bit value byte 0 is the high byte byte 1 is the low byte bit 0 is the sign bit
DWord	Unsigned 32 bit value byte 0 is the high byte byte 7 is the low byte
Long	Signed 32 bit value byte 0 is the high byte byte 7 is the low byte bit 0 is the sign bit

## Address Descriptions

The default data types for dynamically defined tags are shown in **bold**.

Address Type	Range	Data Type	Access
Register. Addresses are in decimal.	R0-R32767 R0.00-R32767.00 ... R0.15-R32767.15 RW0-RW32767 RW0.00-RW32767.00 ... RW0.15-RW32767.15 RD0-RD32766**	<b>Word</b> , Short <b>Boolean</b> <b>Word</b> , Short <b>Boolean</b> <b>DWord</b> , Long	Read/Write Read Only Read/Write Read Only Read/Write
I/O RAM bits. Addresses are in octal.	0-77777 IO0-IO77777 IO-I77777 OO-O77777 X0-X77777	<b>Boolean</b> <b>Boolean</b> <b>Boolean</b> <b>Boolean</b> <b>Boolean</b>	Read/Write
I/O RAM. Addresses are in octal; bit numbers are in decimal.*	XB0-XB77770 XW0.00-XW77760.00 ... XW0.15-XW77760.15 XW0-XW77760	<b>Byte</b> , Char  <b>Boolean</b>  <b>Word</b> , Short	Read/Write
Memory Cell in I/O RAM. Bit numbers are in decimal.	M0-M77760 M0.00-M77760.00 ... M0.15-M77760.15 MW0-MW77760 MW0.00-MW77760.00 ... MW0.15-MW77760.15	<b>Word</b> , Short <b>Boolean</b> <b>Word</b> , Short <b>Boolean</b>	Read/Write

\*Addresses can be on non-byte boundary (non-multiples of 10 octal).

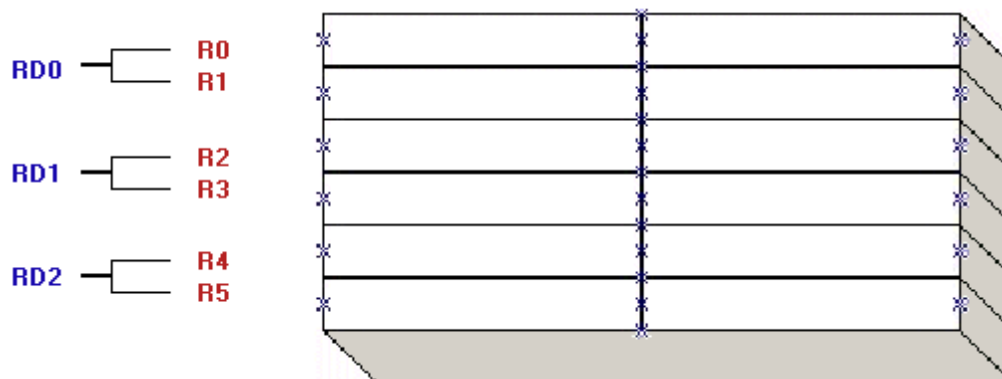
\*\*For more information, refer to [Overlapped Vs. None-Overlapped Addressing](#).

## Overlapped vs. None-Overlapped Addressing

This device setting influences the addressing of register double-words. By default, the driver is set to Overlapped Mode for compatibility with the SattBus Serial driver.

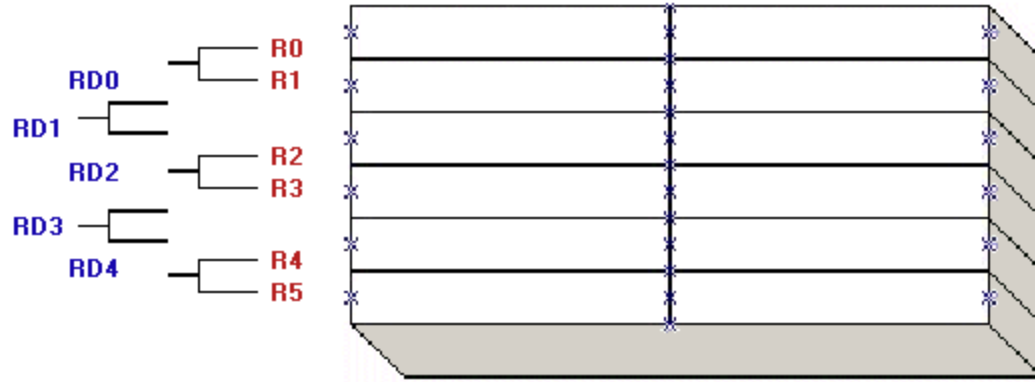
### None-Overlapped Mode

In None-Overlapped Mode, RD1 starts with the byte following the second byte of RD0.



### Overlapped Mode

In Overlapped Mode, the byte address matches the first byte of the double word. For example, RD3 is the first byte of double word RD3.



## Error Descriptions

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

### Address Validation

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

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

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

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

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

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

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

[Missing address](#)

### Device Status Messages

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

[Unable to bind to adapter: '<adapter name>' for device '<device name>'. Connection failed](#)

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

## Address Validation

---

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

### Address Validation

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

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

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

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

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

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

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

[Missing address](#)

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

---

### Error Type:

Warning

### Possible Cause:

A tag address that has been specified statically 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.

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

---

### Error Type:

Warning

### Possible Cause:

A tag address that has been specified statically 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 statically 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.

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

---

**Error Type:**

Warning

**Possible Cause:**

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

**Solution:**

Modify the requested data type in the client application.

**Device address '<address>' contains a syntax error**

---

**Error Type:**

Warning

**Possible Cause:**

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

**Solution:**

Re-enter the address 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 statically 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.

**Device address '<address>' is Read Only**

---

**Error Type:**

Warning

**Possible Cause:**

A tag address that has been specified statically 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.

**Missing address**

---

**Error Type:**

Warning

**Possible Cause:**

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

**Solution:**

Re-enter the address in the client application.

## Device Status Error 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 bind to adapter: '<adapter name>' for device '<device name>'. Connection failed](#)

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

### Device '<device name>' is not responding

---

#### Error Type:

Serious

#### Possible Cause:

1. The Ethernet connection between the device and the Host PC is broken.
2. The named device may have been assigned an incorrect Network ID.
3. The communication parameters for the Ethernet connection are incorrect.
4. The Ethernet configuration for the LAN adapter is incorrect.
5. 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 that the Network ID given to the named device matches that of the actual device.
3. Verify that the specified communication parameters match those of the device.
4. Verify that the LAN adapter is correctly configured: that the device driver functions properly, the TCP/IP protocol is installed and that the PLC has a valid IP address.
5. Increase the Request Timeout setting so that the entire response can be handled.

### Unable to bind to adapter: '<adapter name>' for device '<device name>'. Connection failed

---

#### Error Type:

Fatal

#### Possible Cause:

Some other device in the driver has already been bound to the adapter/port combination.

#### Solution:

Change the adapter/port combination so that it is unique.

#### Note:

In order for the device to successfully bind to the local adapter, the combination of adapter and local port number must be unique.

#### See Also:

[Changing the Local Port Number and Network Adapter Settings](#)

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

---

#### Error Type:

Serious

#### Possible Cause:

1. The Ethernet connection between the device and the Host PC is broken.
2. The named device may have been assigned an incorrect Network ID.
3. The communication parameters for the Ethernet connection are incorrect.
4. The Ethernet configuration for the LAN adapter incorrect.

#### Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the Network ID given to the named device matches that of the actual device.
3. Verify that the specified communication parameters match those of the device.
4. Verify that the LAN adapter is correctly configured: that the device driver functions properly, the TCP/IP protocol is installed and that the PLC has a valid IP address.





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