Mitsubishi Serial Driver Help

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Mitsubishi Serial Driver Help

Help version 1.025

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Overview

The Mitsubishi Serial Driver provides an easy and reliable way to connect Mitsubishi Serial devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It is intended for use with Mitsubishi A and Q Series devices communicating via the AJ71C24 and QJ71C24N communications cards (among other communication cards that support the specified communication protocols). For more information, refer to **Device Setup**.

Device Setup

Supported Devices
All A and Q Series PLCs.

Communication Protocol
Format 1 with Checksum Enabled for A Series.
Format 5 with Checksum Enabled for Q Series.

Supported Communication Parameters
Baud Rate: 300, 600, 1200, 2400, 9600, 19200 or 38400
Parity: None, Even or Odd
Data Bits: 5, 6, 7 or 8
Stop Bits: 1 or 2

Ethernet Encapsulation
This driver supports Ethernet Encapsulation, which allows the driver to communicate with serial devices attached to an Ethernet network using a serial-to-Ethernet terminal server. Ethernet Encapsulation mode may be invoked through the Communications tab in Channel Properties. For more information, refer to the server help file.

Maximum Number of Channels and Devices
The maximum number of channels supported by this driver is 100. The maximum number of devices supported is 32.

Device ID
This parameter specifies the station number of the device the driver will communicate with directly. This may be ultimate destination device for read and write commands or act as the bridge device to another network. The station number can range from 0 to 31.

Note: For more information, refer to **Multi-level Networks**.

Request Timeout
This parameter specifies the time the driver will wait on a response from the device before giving up and going on to the next request. Longer timeouts only affect performance if a device is not responding. The default setting is 1000 milliseconds. The valid range is 100 to 30000 milliseconds.

Retry Attempts
This parameter specifies the number of times the driver will retry a message before giving up and going on to the next message. The default setting is 3 retries. The valid range is 1 to 10.

Flow Control
When using an RS232/RS485 converter, the type of flow control that is required will depend upon the needs of the converter. Some converters do not require any flow control and others will require RTS flow. Consult the converter's documentation to determine its flow requirements. It is recommended that an RS485 converter that provides automatic flow control be used.

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

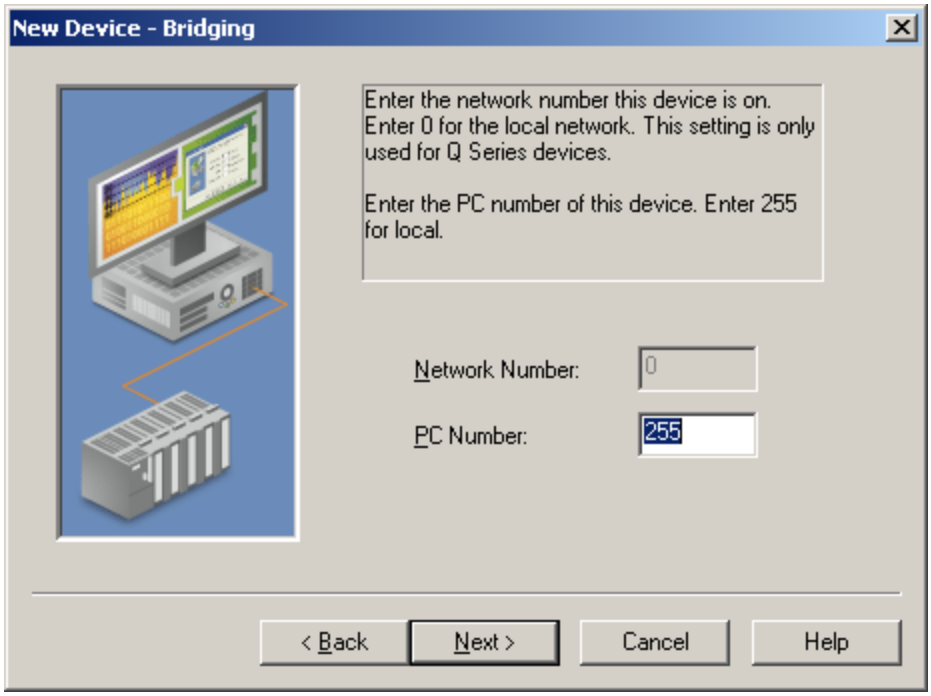
See Also: **PLC Setup**

Modem Setup

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

Bridging

The Bridging settings are used to specify the desired routing path. This device may communicate with devices on remote networks. For more information, refer to **Multi-level Networks**.



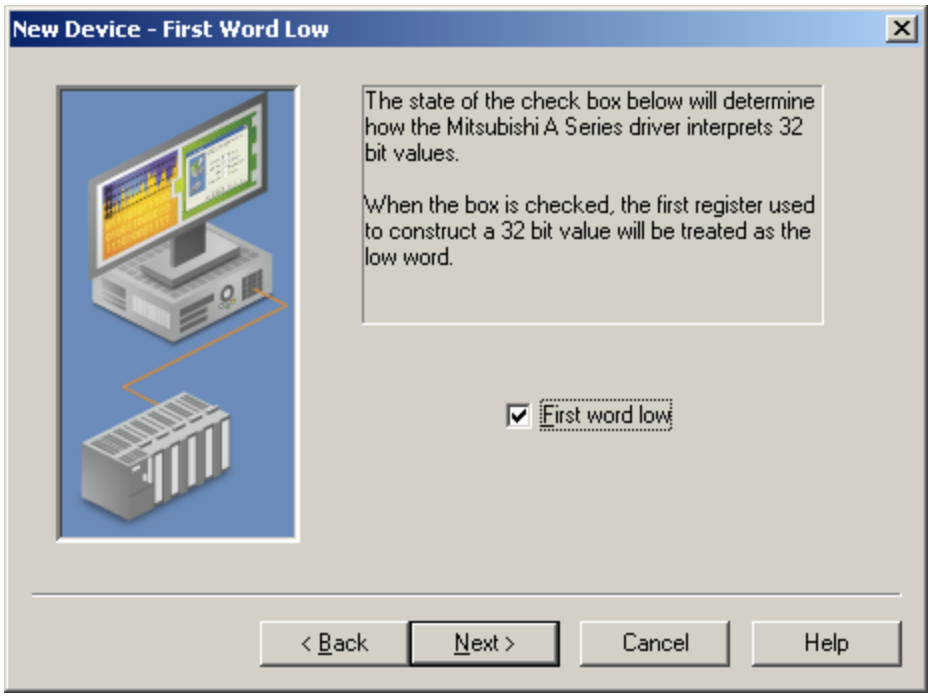
Descriptions of the parameters are as follows:

- **Network Number:** This parameter specifies the Network Number of the target device. The valid range is 0 to 255, with 0 being used for local connections. The default setting is 0.

  Note: This setting only applies to the Q Series model.
- **PC Number:** This parameter specifies the PC Number of the target device. The valid range is 0 to 64, with 255 being used for local connection. The default setting is 255.

First Word Low

Two consecutive register addresses in a Mitsubishi device are used for 32 bit data types.

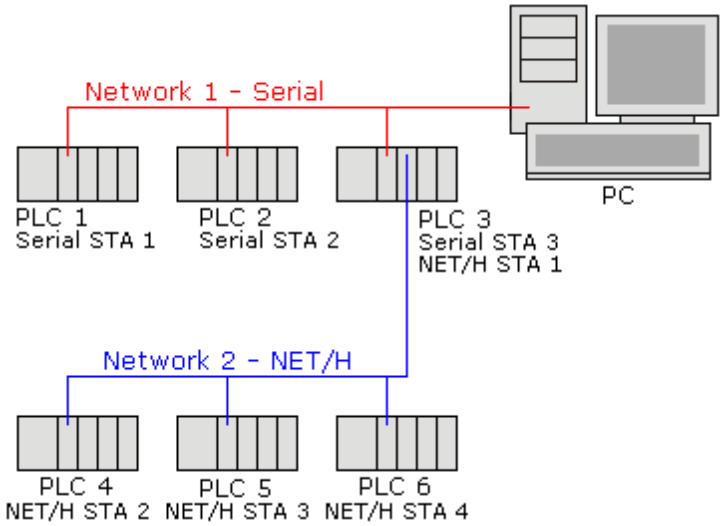


Description of the parameter is as follows:

- **First Word Low:** This option specifies whether the driver should assume the first word is the low word or the high word of the 32 bit value. The default setting is first word low (checked).

Multi-level Networks

The Q Series model can be used to communicate with devices on remote networks. In the example shown below, PLC 1, PLC 2, and PLC 3 are on the local serial network. PLC 4, PLC 5, and PLC 6 are on a remote NET/H network. PLC 3 serves as a relay device connecting the two networks.



Note: For more information, refer to **Device Setup**.

For example, imagine that PLC 1, PLC 2, and PLC 3 have QJ71C24N serial communication modules configured as serial stations 1, 2, and 3 respectively. In addition to the serial module, PLC 3 also has a QJ71BR11 NET/H module configured as NET/H station 1. PLC 4, PLC 5, and PLC 6 have NET/H modules configured as NET/H stations 2, 3, and 4 respectively.

To communicate with all 6 PLCs, 6 devices must be created in the server project. The Device IDs and network settings should be as shown below.

PLC	Device ID	Network Number	PC Number	Comment
1	1	0	255	Local network, local PC
2	2	0	255	Local network, local PC
3	3	0	255	Local network, local PC
4	3	2	2	Network 2, PC 2 (NET/H STA 2), via PLC 3 (serial STA 3)
5	3	2	3	Network 2, PC 3 (NET/H STA 3), via PLC 3 (serial STA 3)
6	3	2	4	Network 2, PC 4 (NET/H STA 4), via PLC 3 (serial STA 3)

Note 1: For more information, refer to **Bridging**.

Note 2: A relay device may take 5 or more seconds to report a failed Read and Write to a remote device. It is recommended that the request timeout for remote devices be set accordingly. For more information, refer to **Device Setup**.

PLC Setup

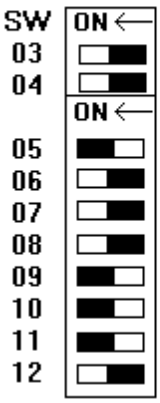
For more information on a specific PLC's setup, click a link from the list below.

A1SJ71C24-R2
A1SJ71C24-R4
AJ71C24-S8
QJ71C24N

Note: The AJ71C24 and QJ71C24N family of communications modules occupy ranges of X and Y memory. Writing to this memory with the Mitsubishi Serial Driver may disable the module causing a loss of communications. For more information, refer to the communications module manual.

A1SJ71C24-R2 Settings and Diagrams

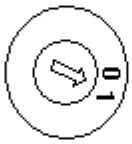
Switch Settings for the A1SJ71C24-R2
The switch positions shown match the driver defaults.



SW	Item	ON	OFF
03	Unused	--	--
04	Write During Run	Enable	Disable
05 06 07	Transmission Speed Setting	See Table Below	
08	Data bit setting	8	7
09	Parity bit setting	Set	Not Set
10	Parity Even/Odd	Even	Odd
11	Stop bit setting	2 Bits	1 Bit
12	Sum Check setting	Set	Not Set

Baud Rate	300	600	1200	2400	4800	9600	19200
SW05	OFF	ON	OFF	ON	OFF	ON	OFF
SW06	OFF	OFF	ON	ON	OFF	OFF	ON
SW07	OFF	OFF	OFF	OFF	ON	ON	ON

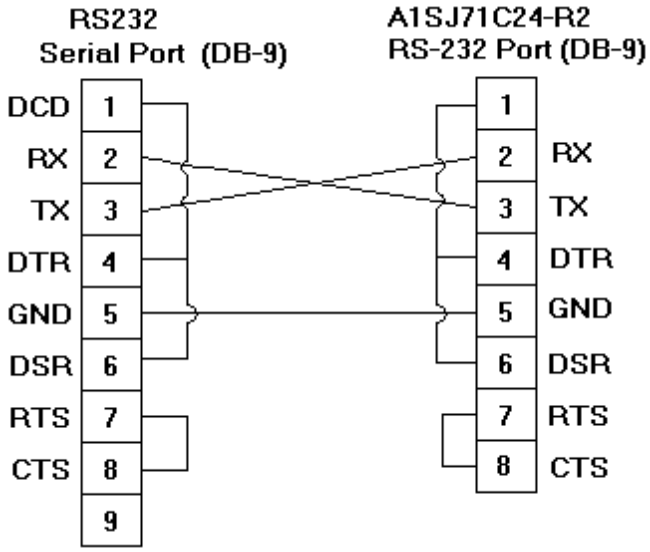
Mode Setting Switch



Mode Setting MUST be set to Protocol 1

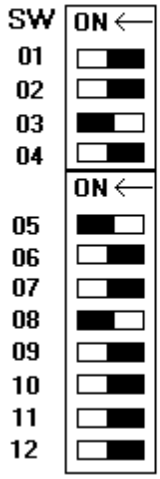
For models of the AJ71C24 which support multidrop operation, the Station Number must be set between 0 and 31. The A1SJ71C24-R2 uses a set station number of 0.

Cable Connections


RS232
Serial Port (DB-9)
A1SJ71C24-R2
RS-232 Port (DB-9)
DCD 1
RX 2
TX 3
DTR 4
GND 5
DSR 6
RTS 7
CTS 8
9
1
2 RX
3 TX
4 DTR
5 GND
6 DSR
7 RTS
8 CTS

A1SJ71C24-R4 Settings and Diagrams

Switch Settings for the AJ71C24-R4
The switch positions shown match the driver defaults.



SW	Item	ON	OFF
SW1	Unused	-----	----
SW2	ComputerLink/Multi	CompL	Multi
SW3	Unused	-----	-----
SW4	Write During Run	Enable	Disable
SW5 SW6 SW7	Transmission Speed Setting	See Table Below	
SW8	Data bit setting	8	7
SW9	Parity bit setting	Set	Not Set
SW10	Parity Even/Odd	Even	Odd
SW11	Stop bit setting	2 Bits	1 Bit
SW12	Sum Check setting	Set	Not Set

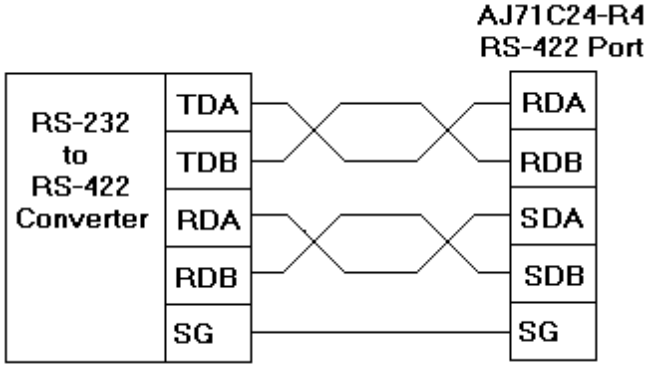
Baud Rate	300	600	1200	2400	4800	9600	19200
SW05	OFF	ON	OFF	ON	OFF	ON	OFF
SW06	OFF	OFF	ON	ON	OFF	OFF	ON
SW07	OFF	OFF	OFF	OFF	ON	ON	ON

Mode Setting Switch

The AJ71C24R4 MUST be set for Protocol 1. This means the Mode switch must be set to position 5.

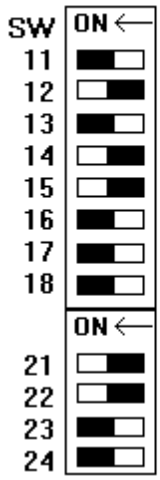
For models of the AJ71C24 which support multidrop operation, the Station Number must be set between 0 and 31.

The Dip switch positions shown here are for Computer Link operation with Writes enabled, Protocol 1, 19200, 7,E,2, and check sum enabled.



AJ71C24-S8 Setting and Diagrams

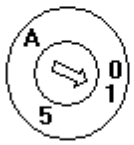
Switch Settings for the AJ71C24-S8
The switch positions shown match the driver defaults.



SW	Item	ON	OFF
11	Main Channel	RS-422	RS-232
12	Data bit setting	8	7
13 14 15	Transmission Speed Setting	See Table Below	
16	Parity bit setting	Set	Not Set
17	Parity Even/Odd	Even	Odd
18	Stop bit setting	2 Bits	1 Bit
21	Sum Check setting	Set	Not Set
22	Write During Run	Enable	Disable
23	Send Terminator	Present	Absent
24	Receive Terminator	Present	Absent

Baud Rate	300	600	1200	2400	4800	9600	19200
SW13	OFF	ON	OFF	ON	OFF	ON	OFF
SW14	OFF	OFF	ON	ON	OFF	OFF	ON
SW15	OFF	OFF	OFF	OFF	ON	ON	ON

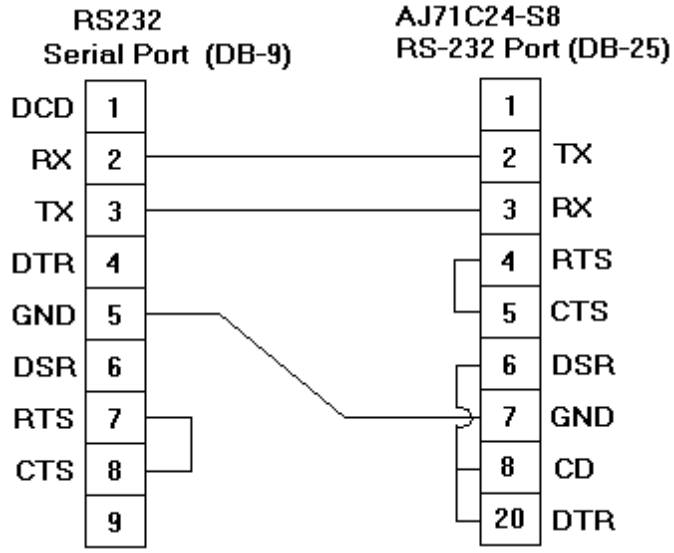
Mode Setting Switch

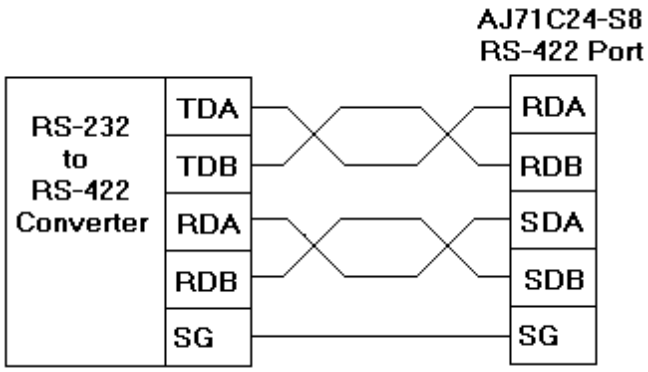


The AJ71C24 MUST be set for Protocol 1. This means the mode switch can be set to Mode 1, 5, and A.

For models of the AJ71C24 which support multidrop operation, the Station Number must be set between 0 and 31.

Cable Connections



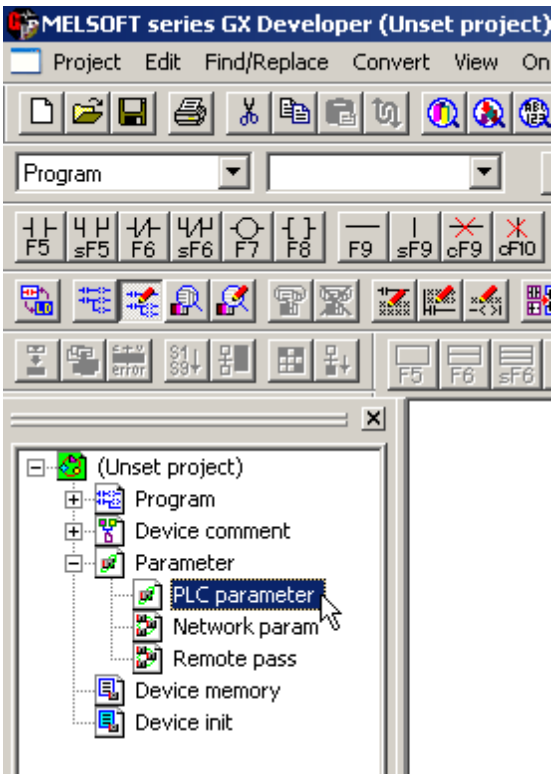


QJ71C24N Configuration

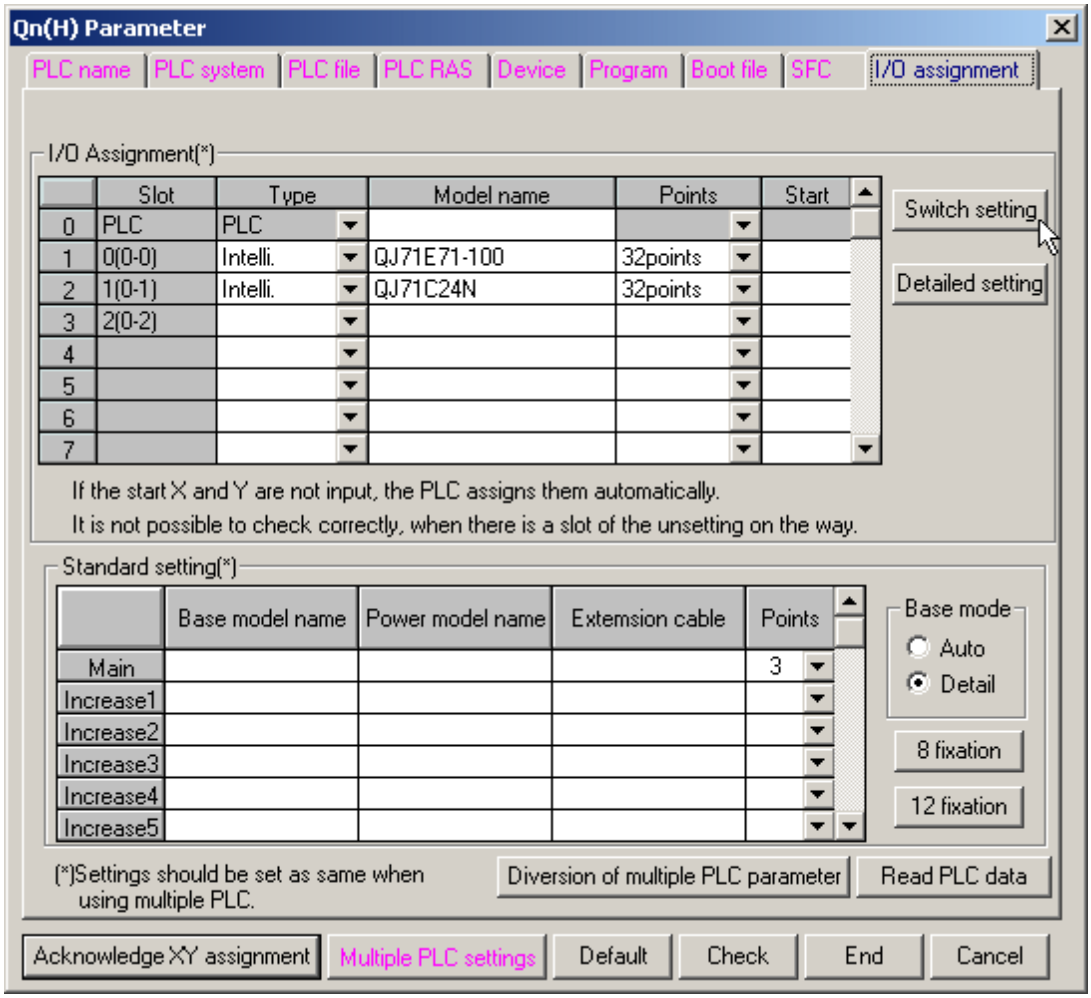
The QJ71C24N communications module is configured with the GX Developer programming software, which is available from Mitsubishi PLC dealers.

1. To begin configuring the PLC to work with this driver, open an existing **GX Developer** project. Alternatively, read the current **PLC Parameter** configuration from the device.

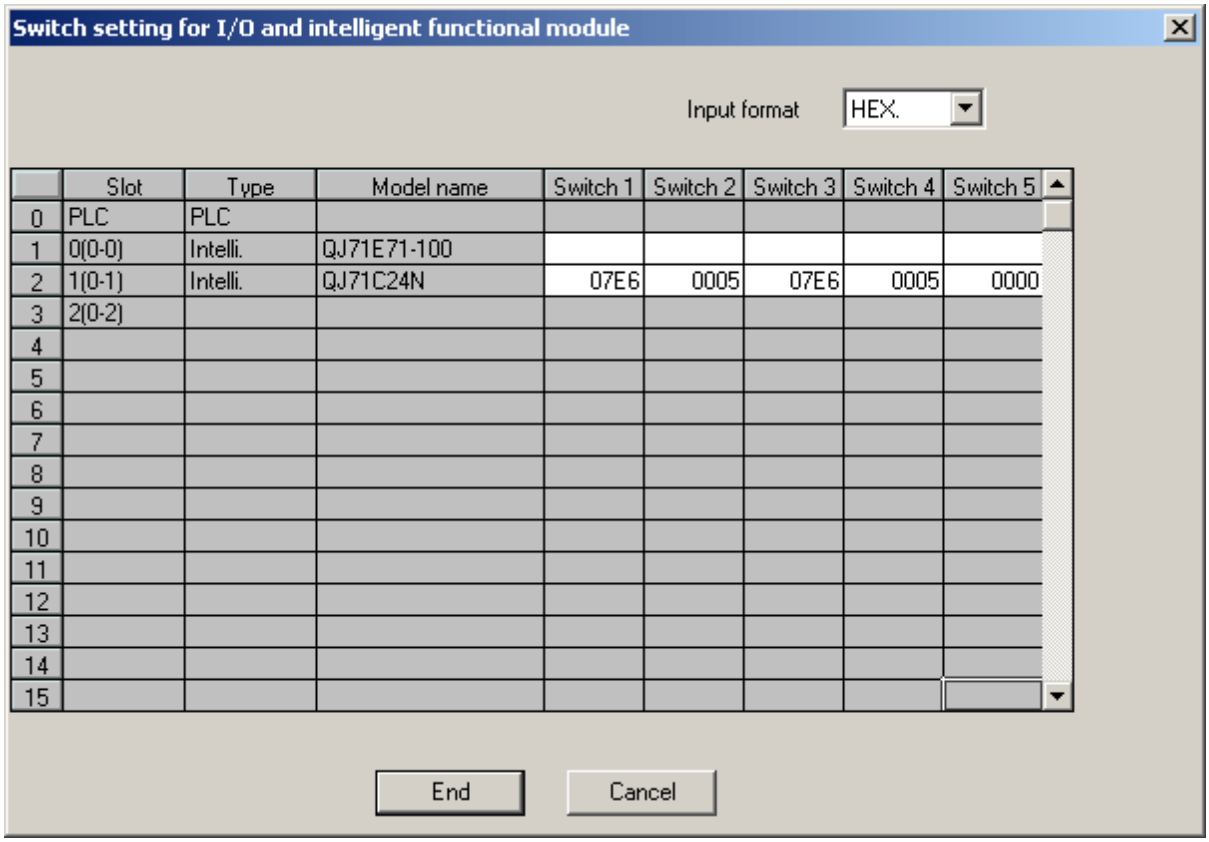
2. Next, edit the **PLC Parameter** settings.



3. Open the **I/O Assignment** tab and then click **Switch Setting** to configure the QJ71C24N module. In the example shown below, the PLC has a QJ71E71-100 Ethernet communications module in slot 0 and a QJ71C24N serial communications module in slot 1.



Note: The recommended software switch settings are shown below.



4. Entries for switch settings can be calculated from the following tables. Switches 1 and 2 are for channel 1 and switches 3 and 4 are for channel 2. For more information, refer to the tables and examples below.

Switch 1/Switch 3 Transmission Setting

Bit	Description	OFF (0)	ON (1)	Remark
0	Operational	Independent	Link	Must be OFF on channel 1
1	Data bits	7	8	
2	Parity bit	No	Yes	
3	Even/Odd Parity	Odd	Even	
4	Stop bit	1	2	
5	Check Sum	No	Yes	Must be ON for use with this driver
6	Write during RUN	Prohibited	Allowed	ON to write data externally
7	Setting modifications	Prohibited	Allowed	

Note: To use this driver with its default communications settings (8 data bits, odd parity, 1 stop bit, check sum) and to allow writes during RUN and setting modification, set bits 0 through 7 to 01100111 (0xE6).

Switch 1/Switch 3 Communications Setting

Baud	Bits 8 to 15
300	0x00
600	0x01
1200	0x02
0x03	2400
0x04	4800
9600	0x05
14400	0x06
19200	0x07
28800	0x08
38400	0x09
57600	0x0A
115200	0x0B

Note: To use this driver with its default baud rate of 19200, set bits 8 through 15 to 0x07.

Switch 2/Switch 4 Protocol Setting

Setting	Description
0x00	GX Developer
0x01	Mode 1*
0x02	Mode 2
0x03	Mode 3
0x04	Mode 4
0x05	Mode 5**
0x06	Non-procedure
0x07	Bidirectional
0x08	For linked operation
0x09 - 0x0D	Prohibited
0x0E	ROM/RAM/switch test
0x0F	Loop back test

*Must be used with A Series driver model.
**Must be used with Q Series driver model.

Note: To use this driver with the Q Series model selected, set switch 2 (or 4) to 0x05. This driver can also be used with the A Series model selected if switch 2 (or 4) is set to 0x01.

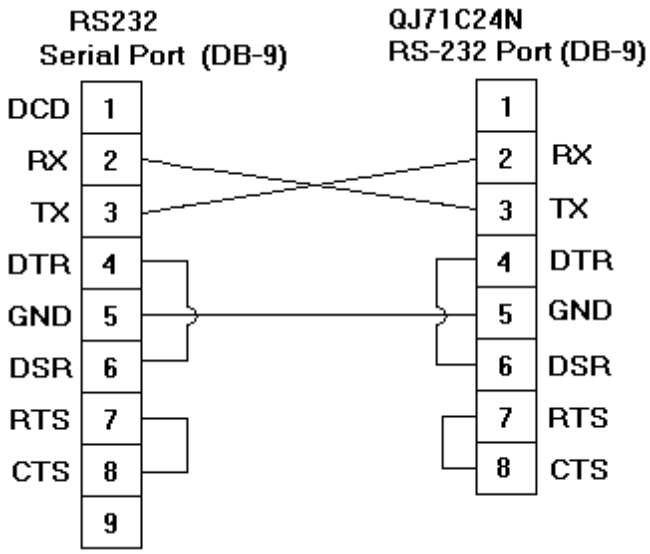
Switch 5 Channel Setting
Set communication objects as channels between 0 and 31 when multi-drop connection is selected. Set to 0 if 1:1 connection is selected.

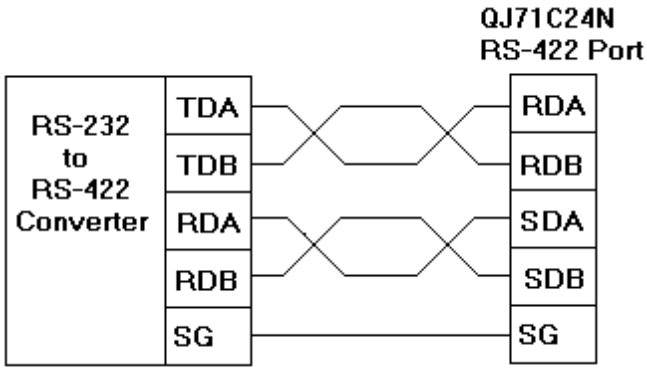
Note: Set switch 5 to 0x0000 to assign the station number 0 to the PLC.

5. Once the switch settings are entered, write the PLC Parameters back to the device.

6. Then, cycle the power on the PLC to make the new settings active.

Cable Connections




QJ71C24N
RS-422 Port
RS-232
to
RS-422
Converter
TDA
TDB
RDA
RDB
SG
RDA
RDB
SDA
SDB
SG

Data Types Description

The Mitsubishi Serial Driver supports the following data types.

Data Type	Description
Boolean	Single bit
Word	Unsigned 16 bit value bit 0 is the low bit bit 15 is the high bit
Short	Signed 16 bit value bit 0 is the low bit bit 14 is the high bit bit 15 is the sign bit
BCD	Two byte packed BCD Value range is 0-9999. Behavior is undefined for values beyond this range.
DWord	Unsigned 32 bit value bit 0 is the low bit bit 31 is the high bit
Long	Signed 32 bit value bit 0 is the low bit bit 30 is the high bit bit 31 is the sign bit
Float	32 bit floating point value
String	Null terminated ASCII string Support, includes HiLo LoHi byte order selection and string lengths up to 128 bytes.
LBCD	Four byte packed BCD Value range is 0 - 99999999. Behavior is undefined for values beyond this range.

Address Descriptions

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.

A Series
Q Series

Mitsubishi A Series Address Descriptions

Address specifications vary depending on the model in use. The default data types for dynamically defined tags are shown in **bold**.

Device Type	Range	Data Type	Access
Inputs*	X0000-X1FFF (hex) X0000-X1FF0 (hex) X0000-X1FE0 (hex)	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Outputs*	Y0000-Y1FFF (hex) Y0000-Y1FF0 (hex) Y0000-Y1FE0 (hex)	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Link Relays*	B0000-B1FFF (hex) B0000-B1FF0 (hex) BCD B0000-B1FE0 (hex)	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Internal Relays*	M0000-M8191 M0000-M8176 M0000-M8160	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Special Int. Relays *	M9000-M9255 M9000-M9240 M9000-M9224	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read Only
Latch Relays*	L0000-L8191 L0000-L8176 L0000-L8160	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Annunciator Relays*	F0000-F2047 F0000-F2032 F0000-F2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Step Relays*	S0000-S8191 S0000-S8176 S0000-S8160	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Timer Contacts*	TS0000-TS2047 TS0000-TS2032 TS0000-TS2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Timer Coils*	TC0000-TC2047 TC0000-TC2032 TC0000-TC2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write

Counter Contacts*	CS0000-CS1023 CS0000-CS1008 CS0000-CS0992	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Counter Coils*	CC0000-CC1023 CC0000-CC1008 CC0000-CC0992	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write

*Users can specify a Long data type by appending a space and an "L" to the address. For example, "D00000" would be entered as "D00000 L". This does not apply to arrays or bit accessed registers.

Note 1: In a typical A-series PLC memory configuration, L, S and M addresses all map to the same M memory in the PLC.

Note 2: All Boolean device types can be accessed as Short, Word, BCD, Long, DWord and LBCD. However, the device must be addressed on a 16 bit boundary.

Device Type	Range	Data Type	Access
Timer Value	TN0000-TN2047 TN0000-TN2047	Boolean **Short**, Word, BCD	Read/Write
Counter Value	CN0000-CN1023 CN0000-CN1023	Boolean Short, **Word**, BCD	Read/Write
Data Registers***	D0000-D8191 D0000-D8190	**Short**, Word, BCD Long, DWord, LBCD, Float	Read/Write
Data Register Bit Access	D0000.00-D8191.15* D0000.00-D8190.31*	**Short,**Word, BCD, Boolean** Long, DWord, LBCD	Read/Write
Data Registers String Access HiLo Byte Ordering	DSH00000.002-DSH08190.002 DSH00000.128-DSH08127.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
Data Registers String Access LoHi Byte Ordering	DSL00000.002-DSL08190.002 DSL00000.128-DSL08127.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
Special Data Registers***	D90000-D9255 D9000-D9254	**Short**, Word, BCD Long, DWord, LBCD, Float	Read Only
Data Register Bit Access	D90000.00-D9255.15* D90000.00-D9254.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read Only
Link Registers***	W0000-W1FFF (hex)	**Short**, Word, BCD	Read/Write

	W0000-W1FFE (hex)	Long, DWord, Float, LBCD	
Link Register Bit Access	W0000.00-W1FFF.15* W0000.00-W1FFE.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read/Write
Link Registers String Access HiLo Byte Ordering	WSH0000.002-WSH1FFE.002 WSH0000.128-WSH1FBF.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
Link Registers String Access LoHi Byte Ordering	WSL0000.002-WSL1FFE.002 WSL0000.128-WSL1FBF.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
File Register***	R0000-R8191 R0000-R8190	**Short**, Word, BCD Long, DWord, Float, LBCD	Read/Write
File Register Bit Access	R0000.00-R8191.15* R0000.00-R8190.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read/Write
File Registers String Access HiLo Byte Ordering	RSH00000.002-RSH08190.002 RSH00000.128-RSH08127.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
File Registers String Access LoHi Byte Ordering	RSL00000.002-RSL08190.002 RSL00000.128-RSL08127.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write

*For register memory, the data types Short, Word, BCD, DWord, Long, Boolean and LBCD can append an optional ".bb" (dot bit) or a ":bb" (colon bit) to the address in order to reference a bit in a particular value. The valid ranges for the optional bit is 0-15 for Short, Word, BCD, and Boolean; and 0-31 for Long, DWord and LBCD. Strings use the bit number to specify length. The valid length of a string in D memory is 2 to 128 bytes. The string length must be even numbers. Float types do not support bit operations. The bit number is always in decimal notation.
**When accessing register memory as Boolean, a bit number is required.
***Users can specify a Long data type by appending a space and an "L" to the address. For example, "D00000" would be entered as "D00000 L". This does not apply to arrays or bit accessed registers.

Array Access

Device types can be accessed as arrays of Short, Word, BCD, Long, DWord, LBCD or Float. The default setting is Word. The maximum allowed array size depends on the data type and device type. The maximum array size for register device types is 32 for Long, DWord, Float and LBCD data type and 64 for Word, Short, and BCD data types. The maximum array size for bit device types except TC, TS, CC, CS is 16 for Long, DWord and LBCD data types and 32 for Word, Short, and BCD data types. For TC, TS, CC, CS device types the maximum array size is 15 for Word data types and 7 for DWord data types. Arrays can be either 1 dimension or 2. Regardless of the dimensions, the array size must not exceed the limits already stated.

Important: Due to protocol limitation, the largest bit device type array that can be successfully written to is 10 Words (5 DWords).

Array Examples

1. D100 [4] Single dimension includes the following register addresses: D100, D101, D102, D103.

2.M016 [3][4] Two Dimensions includes the following device addresses as words: M016, M032, M048, M064, M080, M096, M112, M128, M144, M160, M176, M192 3 rows x 4 columns = 12 words 12 x 16 (word) = 192 total bits.

Additional Device Examples

1. Access X device memory as Word : X??? where the ??? is a hex number on 16 bit boundaries such as 010, 020, 030 and so forth.

2. Access M device memory as Long : M???? where the ???? is a decimal number on 16 bit boundaries such as 0, 16, 32, 48 and so forth.

Mitsubishi Q Series Address Descriptions

Address specifications vary depending on the model in use. The default data types for dynamically defined tags are shown in **bold**.

Device Type	Range	Data Type	Access
Inputs*	X0000-X3FFF (Hex) X0000-X3FF0 (Hex) X0000-X3FE0 (Hex)	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Direct Inputs*	DX0000-DX3FFF (Hex) DX0000-DX3FF0 (Hex) DX0000-DX3FE0 (Hex)	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Outputs	Y0000-Y3FFF (Hex) Y0000-Y3FFF (Hex) Y0000-Y3FF0 (Hex)	**Boolean** Short, Word, BCD	Read/Write
Direct Outputs*	DY0000-DY3FFF (Hex) DY0000-DY3FF0 (Hex) DY0000-DY3FE0 (Hex)	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Link Relays*	B0000-B3FFF (Hex) B0000-B3FF0 (Hex) B0000-B3FE0 (Hex)	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Special Link Relays	SB0000-SB07FF (Hex) SB0000-SB07F0 (Hex) SB0000-SB07E0 (Hex)	**Boolean** Short, Word, BCD Short, Word, BCD	Read/Write
Internal Relays*	M0000-M16383 M0000-M16368 M0000-M16352	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Special Int. Relays*	SM0000-SM2047 SM0000-SM2032 SM0000-SM2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Latch Relays*	L0000-L16383 L0000-L16368	**Boolean** Short, Word, BCD	Read/Write

	L0000-L16352	Long, DWord, LBCD	
Annunciator Relays*	F0000-F2047 F0000-F2032 F0000-F2016	**Boolean** Short, Word, BCD, Long, DWord, LBCD	Read/Write
Edge Relays*	V0000-V2047 V0000-V2032 V0000-V2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Step Relays*	S0000-S16383 S0000-S16368 S0000-S16352	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Timer Contacts*	TS0000-TS2047 TS0000-TS2032 TS0000-TS2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Timer Coils*	TC0000-TC2047 TC0000-TC2032 TC0000-TC2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Integrating Timer Contacts*	SS0000-SS2047 SS0000-SS2032 SS0000-SS2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Integrating Timer Coils*	SC0000-SC2047 SC0000-SC2032 SC0000-SC2016	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Counter Contacts*	CS0000-CS1023 CS0000-CS1008 CS0000-CS0992	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write
Counter Coils*	CC0000-CC1023 CC0000-CC1008 CC0000-CC0992	**Boolean** Short, Word, BCD Long, DWord, LBCD	Read/Write

*Users can specify a Long data type by appending a space and an "L" to the address. For example, "D00000" would be entered as "D00000 L". This does not apply to arrays or bit accessed registers.

Note: All Boolean device types can be accessed as Short, Word, BCD, Long, DWord and LBCD. However, the device must be addressed on a 16 bit boundary.

Device Type	Range	Data Type	Access
Timer Value	TN0000-TN2047	**Short**, Word, BCD	Read/Write
Integrating Timer Value	SN0000-SN2047	**Short**, Word, BCD	Read/Write
Counter Value	CN0000-CN1023	Short, **Word,** BCD	Read/Write
Data Registers***	D00000-D12287	**Short**, Word, BCD	Read/Write

	D00000-D12286	Long, DWord, Float, LBCD	
Data Register Bit Access	D00000.00 D12287.15* D00000.00 D12286.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read/Write
Data Registers String Access HiLo Byte Ordering	DSH00000.002-DSH12286.002 DSH00000.128-DSH12223.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
Data Registers String Access LoHi Byte Ordering	DSL00000.002-DSL12286.002 DSL00000.128-DSL12223.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
Special Data Registers***	SD0000-SD2047 SD0000-SD2046	**Short**, Word, BCD Long, DWord, Float, LBCD	Read/Write
Data Register Bit Access	SD0000.00-SD2047.15* SD0000.00-SD2046.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read/Write
Link Registers***	W0000-W3FFF (Hex) W0000-W3FFE (Hex)	**Short**, Word, BCD, Long, DWord, Float, LBCD	Read/Write
Link Register Bit Access	W0000.00-W3FFF.15* W0000.00-W3FFE.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read/Write
Link Registers String Access HiLo Byte Ordering	WSH0000.002-WSH3FFE.002 WSH0000.128-WSH3FBF.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
Link Registers String Access LoHi Byte Ordering	WSL0000.002-WSL3FFE.002 WSL0000.128-WSL3FBF.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
Special Link Registers***	SW0000-SW07FF (Hex) SW0000-SW07FE (Hex)	**Short**, Word, BCD Long, DWord, Float, LBCD	Read/Write
Link Register Bit Access	SW0000.00-SW07FF.15* SW0000.00-SW07FE.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read/Write
File Register***	R00000-R32767 R00000-R32766	**Short**, Word, BCD Long, DWord,	Read/Write

		Float, LBCD	
File Register Bit Access	R00000.00-R32767.15* R00000.00-R32766.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read/Write
File Registers String Access HiLo Byte Ordering	RSH00000.002-RSH32766.002 RSH00000.128-RSH32703.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
File Registers String Access LoHi Byte Ordering	RSL00000.002-RSL32766.002 RSL00000.128-RSL32703.128 The string length may also be specified using a colon. The string length must be between 2-128 bytes and even.	**String**	Read/Write
Index Registers***	Z00-Z15 Z00-Z14	**Short**, Word, BCD Long, DWord, Float, LBCD	Read/Write
Index Register Bit Access	Z00.00-Z15.15* Z00.00-Z14.31*	**Short**, Word, BCD, Boolean** Long, DWord, LBCD	Read/Write

*For register memory, the data types Short, Word, BCD, DWord, Long, Boolean and LBCD can append an optional ".bb" (dot bit) or ":bb" (colon bit) to the address in order to reference a bit in a particular value. The valid ranges for the optional bit is 0-15 for Short, Word, Boolean and BCD; and 0-31 for Long, DWord and LBCD. Strings use the bit number to specify length. The valid length of a string in D memory is 2 to 128 bytes. The string length must also be even numbers. Float types do not support bit operations. The bit number is always in decimal notation.
**When accessing register memory as Boolean, a bit number is required.
***Users can specify a Long data type by appending a space and an "L" to the address. For example, "D00000" would be entered as "D00000 L". This does not apply to arrays or bit accessed registers.

Array Access

All device types can be accessed in arrays of Short, Word, BCD, Long, DWord, Float or LBCD format. The default data type is Word. The size of the array depends on the data type and device type. All Register device types can access up to 64 elements for Short, Word and BCD; and 32 elements for Long, DWord, Float, and LBCD. All Bit memory types can be accessed with up to 32 elements for Short, Word, and BCD; and 16 elements for Long, DWord, Float and LBCD. Arrays can either 1 dimension or 2. Regardless of the dimensions, the array size must not exceed the limits already stated. Appending array notation onto a normal device reference enters arrays.

Array Examples

1. D100 [4] Single dimension includes the following register addresses: D100, D101, D102, D103.

2. M016 [3][4] Two Dimensions includes the following device addresses as words: M016, M032, M048, M064, M080, M096, M112, M128, M144, M160, M176, M192 3 rows x 4 columns = 12 words 12 x 16 (word) = 192 total bits.

Additional Device Examples

1. Access X device memory as Word : X??? where the ??? is a hex number on 16 bit boundaries such as 010, 020, 030, and so forth.

2. Access M device memory as Long : M???? where the ???? is a decimal number on 16 bit boundaries such as 0, 16, 32, 48, and so forth.

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

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>]

Device Status Messages

Device '<device name>' is not responding
Unable to write to '<address>' on device '<device name>'

Device Specific Messages

Device '<device name>' reported an invalid address in the range <start address> to <end address>
Possible Network Number problem with device '<device name>'
Possible PC Number problem with device '<device name>'
Error code '<error code>' received from device

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

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 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.

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 via DDE 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.

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.

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>' 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.

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 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:
Verify that the correct port has been assigned to the channel.

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 PLC 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 PLC device.
2. Verify that the specified communications parameters match those of the device.
3. Verify that 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 PLC device.
2. Verify that the specified communications parameters match those of the device.
3. Verify that 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
Device '<device name>' reported an invalid address in the range <start address> to <end address>
Possible Network Number problem with device '<device name>'
Possible PC Number problem with device '<device name>'
Error code '<error code>' received from device

Device '<device name>' reported an invalid address in the range <start address> to <end address>

Error Type:
Serious

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

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

Possible Network Number problem with device '<device name>'

Error Type:
Serious

Possible Cause:
The bridge device could not route a message to the destination network specified on the Bridging device property page.

Solution:
Verify the Network Number setting and hardware configuration. This number should be 0 if the ultimate destination device is on the local serial network (Q Series only).

See Also:
PLC Setup
Bridging

Possible PC Number problem with device '<device name>'

Error Type:
Serious

Possible Cause:
The bridge device could not route a message to the destination PC specified on the Bridging device property page.

Solution:
Verify the PC Number setting and hardware configuration. This number should be 255 if the ultimate destination device is on the local serial network.

See Also:
PLC Setup
Bridging

Error code '<error code>' received from device

Please consult the device manual for a description of the error code indicated.

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