

Mitsubishi Electric Corp.

Melsec-A Ethernet (TCP) Driver

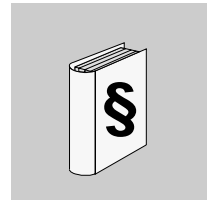
03/2012

Table of Contents



	Safety Information	5
	About the Book	7
Chapter 1	Melsec-A Ethernet (TCP) Driver	9
	System Structure	10
	Supported Device Addresses	11
	Consecutive Equipment Addresses	15
	Sample Ladder	16
	I/O Manager Configuration	17
	Equipment Configuration	18
	Device Address Configuration	20

Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

 **CAUTION**

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

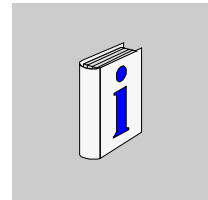
NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book



At a Glance

Document Scope

This manual describes the device driver communication settings in the Vijeo Designer screen editing software. Vijeo Designer enables you to design Magelis target machines that communicate with PLCs, drives, field devices, and other equipment.

For more information about Vijeo Designer and Magelis target machines, please refer to Vijeo Designer user documentation.

Validity Note

The data and illustrations found in this book are not binding. We reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be construed as a commitment by Schneider Electric.

Documentation Conventions

Target Machine: Human-Machine Interface (HMI) that runs user applications designed in Vijeo Designer screen editing software. A target machine is also known as a terminal.

Product Related Information

WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.*
- Each implementation of a Magelis XBTGT, HMISTO, HMISTU, HMIGTO, XBTGH, XBTGK, XBTGC, iPC, and XBTGTW must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

* For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control."

User Comments

We welcome your comments about this document. You can reach us by e-mail at techcomm@schneider-electric.com.

Melsec-A Ethernet (TCP) Driver

1

Subject of this Chapter

This chapter explains the Mitsubishi Melsec-A Ethernet (TCP) Driver.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
System Structure	10
Supported Device Addresses	11
Consecutive Equipment Addresses	15
Sample Ladder	16
I/O Manager Configuration	17
Equipment Configuration	18
Device Address Configuration	20

System Structure

Overview

The following table describes the basic system setup for connecting the target machine to Mitsubishi Melsec-A Series PLCs.

Connection

Series	CPU	Ethernet Module*1
MELSEC-A Series	A2A A3A A2U-S1 A2N	AJ71E71
	A2US A1SJH	A1SJ71E71

*1. If the Ethernet module has a Binary/ASCII switch, make sure it's set to Binary.

Note:

- Use a 100BASE-TX connection for iPC Series, XBTGTW Series, XBTGT2000 Series or higher, XBTGH2000 Series, XBTGC2000 Series or higher, XBTGT1005 Series, HMIGTO Series, HMISTO Series, and HMISTU Series target machines.
- Use a 10BASE-T connection for XBTGT1130 target machines.

Supported Device Addresses

Overview

The following tables list the device address ranges you can enter from the Device Address keypad.

WARNING

UNINTENDED EQUIPMENT OPERATION

Design your system to avoid conflicting write processes between the target machine and PLC program. Make sure that:

- The target machine and PLC program do not simultaneously write to the same register.
- PLC programs or other devices do not write 16-bit word values to registers being accessed in a bitwise manner.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

For actual device address ranges supported by the PLC, refer to the corresponding PLC manual.

AnA Series

Device	Bit Address	Word Address	16 bit	32 bit
Input Relay	X00000-XFFFFF	X0000-XFFFF0 ^{*1}	L/H ^{*6}	L/H ^{*6}
Output Relay	Y00000-YFFFFF	Y0000-YFFFF0 ^{*1}		
Internal Relay	M0000-M8991	M0000-M8976 ^{*2}		
Latch Relay	L000000-L999999	L000000-L999984 ^{*2}		
Special Relay	M9000-M9991	M9000-M9976 ^{*2}		
Annunciator	F000000-F999999	F000000-F999984 ^{*2}		
Link Relay	B00000-BFFFFF	--		
Timer (contact)	TS00000-TS65535	--		
Timer (coil)	TC00000-TC65535	--		
Counter (contact)	CS00000-CS65535	--		
Counter (coil)	CC00000-CC65535	--		
Timer (current value)	--	TN00000-TN65535		
Counter (current value)	--	CN00000-CN65535		
Data Register ^{*3}	D0000:0-D65535:15	D0000-D65535 ^{*4}		
Special Register ^{*3}	D0000:0-D65535:15	D0000-D65535 ^{*4}		
Link Register ^{*3}	W0000:0-WFFFF:F	W0000-WFFFF ^{*5}		
File Register ^{*3}	R0000:0-R8191:15	R0000-R8191 ^{*4}		
Expanded File Register (0R-28R) ^{*3}	0R0000:0-0R8191:15	0R0000-0R8191 ^{*4}		
	1R0000:0-1R8191:15	1R0000-1R8191 ^{*4}		
	2R0000:0-2R8191:15	2R0000-2R8191 ^{*4}		
	3R0000:0-3R8191:15	3R0000-3R8191 ^{*4}		
		
	27R0000:0-27R8191:15	27R0000-27R8191 ^{*4}		
	28R0000:0-28R8191:15	28R0000-28R8191 ^{*4}		

*1 To use as word address, the bit number (last digit) must be 0.

*2 To use as word address, must be multiple of 16.

*3 Read-modify-write. When you write to one of these bit addresses, the target machine reads the entire word address, sets the defined bit, then returns the new value to the PLC. If the ladder program writes data to this word address during the bit read/write process, the resulting data may be incorrect.

*4 You can define a bit address by adding a colon followed by the bit position (0~15) at the end of the word. (e.g. D0000:15)

*5 You can define a bit address by adding a colon followed by the bit position (0~F) at the end of the word. (e.g. W0000:F)

*6 16-bit and 32-bit data, High and Low, refer to data as defined in the following examples.

Byte	16 bit				Word	32 bit			
0	7	...	0	L (Low)	0	15	...	0	L (Low)
1	15	...	8	H (High)	1	31	...	16	H (High)

AnN Series

Device	Bit Address	Word Address	16 bit	32 bit
Input Relay	X0000-XFFFF	X0000-XFFF0 ^{*1}	L/H ^{*6}	L/H ^{*6}
Output Relay	Y0000-YFFFF	Y0000-YFFF0 ^{*1}		
Internal Relay	M0000-M8991	M0000-M8976 ^{*2}		
Latch Relay	L0000-L8991	L0000-L8976 ^{*2}		
Special Relay	M9000-M9991	M9000-M9976 ^{*2}		
Annunciator	F0000-F9999	F0000-F9984 ^{*2}		
Link Relay	B00000-BFFFFFF	--		
Timer (contact)	TS000-TS999	--		
Timer (coil)	TC000-TC999	--		
Counter (contact)	CS000-CS999	--		
Counter (coil)	CC000-CC999	--		
Timer (current value)	--	TN000-TN999		
Counter (current value)	--	CN000-CN999		
Data Register ^{*3}	D0000:0-D9999:15	D0000-D9999 ^{*4}		
Link Register ^{*3}	W0000:0-WFFFF:F	W0000-WFFFF ^{*5}		
File Register ^{*3}	R0000:0-R8191:15	R0000-R8191 ^{*4}		
Expanded File Register (0R-28R) ^{*3}	0R0000:0-0R8191:15	0R0000-0R8191 ^{*4}		
	1R0000:0-1R8191:15	1R0000-1R8191 ^{*4}		
	2R0000:0-2R8191:15	2R0000-2R8191 ^{*4}		
	3R0000:0-3R8191:15	3R0000-3R8191 ^{*4}		
		
	27R0000:0-27R8191:15	27R0000-27R8191 ^{*4}		
	28R0000:0-28R8191:15	28R0000-28R8191 ^{*4}		

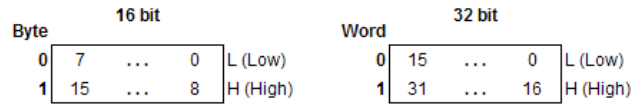
*1 To use as word address, the bit number (last digit) must be 0.

*2 To use as word address, must be multiple of 16.

*3 Read-modify-write. When you write to one of these bit addresses, the target machine reads the entire word address, sets the defined bit, then returns the new value to the PLC. If the ladder program writes data to this word address during the bit read/write process, the resulting data may be incorrect.

*4 You can define a bit address by adding a colon followed by the bit position (0~15) at the end of the word. (e.g. D0000:15)

- *5 You can define a bit address by adding a colon followed by the bit position (0~F) at the end of the word. (e.g. W0000:F)
- *6 16-bit and 32-bit data, High and Low, refer to data as defined in the following examples.



Consecutive Equipment Addresses

Overview

The following table lists the maximum number of consecutive addresses that can be read by each PLC. Refer to this table when using block transfers.

Note:

- To speed up data communication, use consecutive variable addresses on the same panel screen.
- The following situations increase the number of times that the equipment is read, which reduces the data communication speed between the target machine and the equipment:
 - when the number of consecutive addresses exceeds the maximum
 - when different register/device types are used.

AnA, AnN Series

Device	Max. Consecutive Addresses	Gap Span		
Input Relay (X)	256 bits	47 bits		
Output Relay (Y)				
Internal Relay (M)				
Latch Relay (L)				
Special Relay (M)				
Annunciator (F)				
Link Relay (B)				
Timer [contact] (TS)				
Timer [coil] (TC)				
Counter [contact] (CS)				
Counter [coil] (CC)				
Data Register (D)			256 words	25 words
Special Register (D)				
Link Register (W)				
File Register (R)				
Expanded File Register (OR-28R)				
Timer [current value] (TN)				
Counter [current value] (CN)				

Sample Ladder

The following ladder program illustrates Schneider Electric's recommended communication settings for the PLC.

MELSEC-A Series (AJ71E71, A1SJ71E71 Ethernet Interface Unit)

```
LD M9038
DMOVP Haabbccdd D100 (PLC IP address)*1
MOVP K0 D110
MOV H8000 D116 (TCP Unpassive communication configuration)
MOV K1024 D124 (PLC port No. <example uses 1024>)
LD M9036
TOP H0000 H0000 D100 K50
LD X0019
MOV K5 D113
TOP H0000 K13 D113 K1
LD M9036
OUT Y0019
LD M9036
OUT Y0008

END
```

Note:

- Refer to the Mitsubishi AJ71E71 or A1SJ71E71 Ethernet Interface Unit User's Manual for configuration details.

*1. Confirm the IP address with your network administrator. aabbccdd is the IP address in hexadecimal. Do not set up duplicate addresses.

I/O Manager Configuration

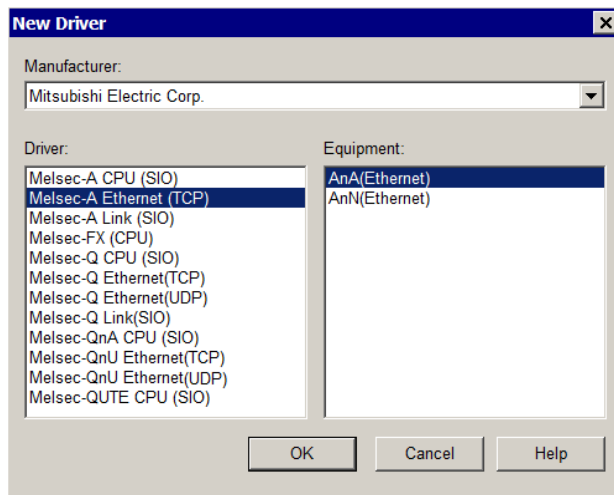
Overview

The driver and equipment, which enable communication between the target machine and the PLC, depends on the PLC type.

Note:

For information on how to display the [New Driver] dialog box, see the Vijeo Designer Help.

Screen example of I/O Manager Configuration



Equipment Configuration

Overview

WARNING

UNINTENDED EQUIPMENT OPERATION

Read and understand the instructions in this section to ensure data is properly transferred. If you do not follow these instructions, incorrect data could be written to the PLC and the target machine.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

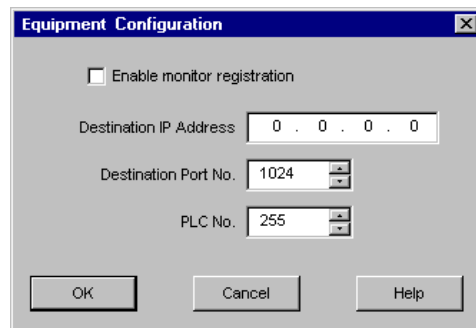
To set up details about the communication process between the target machine and the PLC, use the [Equipment Configuration] dialog box.

For an overview of the driver and equipment settings, see *I/O Manager Configuration*.

Note:

- For information on how to display the [Equipment Configuration] dialog box, see the Vijeo Designer Help.

Screen example of Equipment Configuration



Screen Description

Area	Description
Enable monitor registration	Select to use Monitor Registration with the PLC. To increase communication efficiency, use monitor registration so the target machine registers, with the PLC, which device addresses to monitor. When this setting is selected, if there are many non-continuous addresses, communication will be performed more efficiently.
Destination IP Address	Specifies the Destination IP address (PLC).
Destination Port No.	Enter a integer value (1024-65535) to match the PLC's Ethernet port number.
PLC No.	Designates the PLC number when communicating via the network. Specify an integer value between 0 and 64, both inclusive to identify the communicating PLC. If not communicating via the network, enter 255.

Note:

- Only one target machine using one protocol is allowed to be registered to one PLC. If registering multiple protocols to the same PLC, the operation will not be successful.

Device Address Configuration

Overview

WARNING

UNINTENDED EQUIPMENT OPERATION

Read and understand the instructions in this section to ensure data is properly transferred. If you do not follow these instructions, incorrect data could be written to the PLC and the target machine.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

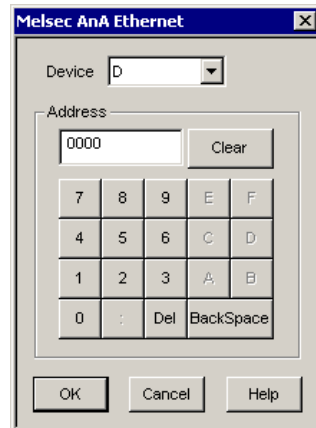
To set up a PLC variable in the Variable List, use the Device Address Keypad from the variable properties.

See *Supported Device Addresses*.

Note:

- For information on how to display the Device Address Keypad, see the Vijeo Designer Help.

Screen example of Device Address Keypad



Screen Description

Area	Description
Device	Lists the PLC's discrete and word device types.
Address	Enter the device address for the PLC variable. The keypad ensures that you enter the correct format for bit and word devices.

