

Rockwell Automation

Rockwell Automation Allen-Bradley EtherNet/IP Driver

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- This manual explains how to connect the target machine with other manufacturer devices. For information about how to use the Pro-Designer software, please refer to the Pro-Designer Online Help.
- The types of target machines that are compatible with Pro-Designer depends on the version of Pro-Designer. For information about the compatibility of target machines, please refer to the Pro-Designer Online Help.

1 System Structure

The following table describes the basic system setup for connecting the target machine to Allen-Bradley PLCs.

Series	CPU	Ethernet Module
ControlLogix Series	ControlLogix CPUs that support the I/O modules to the right	Ethernet Interface Module <ul style="list-style-type: none"> ● 1756-ENBx ● 1756-ENET/B ● 1756-ENET ● 1756-ENBT ● 1761-NET-ENI
MicroLogix Series	MicroLogix 1000 MicroLogix 1200 MicroLogix 1500	Ethernet Interface Module <ul style="list-style-type: none"> ● 1761-NET-ENI
PLC-5 Series	PLC-5 CPUs that support the Ethernet modules or Ethernet connections to the right	Ethernet Interface Module <ul style="list-style-type: none"> ● 1761-NET-ENI ● 1785-ENET^{*1} Ethernet communication channel ^{*2} <ul style="list-style-type: none"> ● PLC 5/20E, PLC 5/40E, PLC 5/80E
SLC500 Series	SLC5/03 SLC5/04 SLC5/05	Ethernet Interface Module <ul style="list-style-type: none"> ● 1761-NET-ENI Ethernet communication channel ^{*2} <ul style="list-style-type: none"> ● SLC5/05

*1 1785-ENET must be series A rev. D, or series B rev. A, or newer.

*2 PLC processors with built-in Ethernet ports may be using an older protocol, CSP Protocol. To successfully communicate with the EtherNet/IP protocol, flash upgrade the firmware to CIP series E rev. D.1, series D rev E.1, series C rev. N.1, or newer.

MEMO

Use a 10BASE-T connection for PS Series Type G, PS Series Type P, and GP2000 Series target machines.

2 Supported Device Addresses

The following tables list the device address ranges you can enter from the [Device Address keypad](#). For actual device address ranges supported by the PLC, refer to the corresponding PLC manual. Supported device addresses differ from protocol to protocol and between PLC models.

2.1 ControlLogix Series

Device	Bit Address ^{*1}	Word Address	16 bit	32 bit
BOOL	BOOL0:0/0–BOOL999:999/31	BOOL0:0–BOOL999:999	L/H ^{*3}	L/H ^{*3}
INT	INT0:0/0–INT999:999/15	INT0:0–INT999:999		
REAL	REAL0:0/0–REAL999:999/31	REAL0:0–REAL999:999		
DINT	DINT0:0/0–DINT999:999/31	DINT0:0–DINT999:999		
SINT ^{*2}	SINT0:0/0–SINT999:998/15	SINT0:0–SINT999:998		

*1 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 word 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.

*2 The element in SINT addresses must be even numbered. For example SINT0:11/5 is not valid. To access SINT file number 0, element 11, bit 5, define the address as **SINT0:10/13**.

*3 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)

MEMO

- File numbers do not repeat. In the address BOOL7:12, the file number is 7. If the file number 7 is already used, then it is not possible to have the address REAL7:34, since file number 7 is used by BOOL.
- To be able to use a ControlLogix address on the PLC, the address must be mapped using Allen-Bradley software. See Appendix, Section 2 - [Map ControlLogix PLC Addresses](#).

2.2 MicroLogix Series

Device	Bit Address ^{*1}	Word Address	16 bit	32 bit
Status File	S:0/0–S:163/15	S:0–S:163	L/H ^{*4}	L/H ^{*4}
Bit File	B3:0/0–B3:0:0/15 B9:0/0–B999:999/15	B3:0 B9:0–B999:999		
Timer File	T4:0/BitField ^{*2} T9:0/BitField–T999:999/BitField ^{*2}	T4:0.WordField ^{*3} T9:0.WordField–T999:999.WordField ^{*3}		
Counter File	C5:0/BitField ^{*2} C9:0/BitField–C999:999/BitField ^{*2}	C5:0.WordField ^{*3} C9:0.WordField–C999:999.WordField ^{*3}		
Control File	R6:0/BitField ^{*2} R9:0/Bitfield–R999:999/Bitfield ^{*2}	R6:0.WordField ^{*3} R9:0.WordField–R999:999.WordField ^{*3}		
Integer File	N7:0/0N7:0/15 N9:0/0–N999:999/15	N7:0 N9:0–N999:999		
Floating Point File	--	F8:0 F9:0–F999:999		
String File	--	ST9:0–ST999:999		
Long Word File	L9:0/0–L255:255/31	L9:0–L255:255		

- *1 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 word 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.
- *2 BitField refers to a bit sub-element in the data. See Appendix, Section 1 - [Structured Files](#).
- *3 WordField refers to a word sub-element in the data. See Appendix, Section 1 - [Structured Files](#).
- *4 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)

2.3 PLC-5 Series

Device	Bit Address ^{*1}	Word Address	16 bit	32 bit
Input File ^{*2}	I:0/0–I:377/17	I:0–I:377	L/H ^{*5}	L/H ^{*5}
Output File ^{*2}	O:0/0–O:377/17	O:0–O:377		
Status File	S:0/0–S:163/15	S:0–S:163		
Bit File	B3:0/0–B3:0/15 B9:0/0–B999:999/15	B3:0 B9:0–B999:999		
Timer File	T4:0/BitField ^{*3} T9:0/BitField–T999:999/BitField ^{*3}	T4:0.WordField ^{*4} T9:0.WordField–T999:999.WordField ^{*4}		
Counter File	C5:0/BitField ^{*3} C9:0/BitField–C999:999/BitField ^{*3}	C5:0.WordField ^{*4} C9:0.WordField–C999:999.WordField ^{*4}		
Control File	R6:0/BitField ^{*3} R9:0/BitField–R999:999/BitField ^{*3}	R6:0.WordField ^{*4} R9:0.WordField–R999:999.WordField ^{*4}		
Integer File	N7:0/0–N7:0/15 N9:0/0–N999:999/15	N7:0 N9:0–N999:999		
Floating Point File	--	F8:0 F9:0–F999:999		
String File	--	ST9:0–ST999:999		
ASCII File	A9:0/0–A999:255/15	A9:0–A999:999		
BCD File	D9:0/0–D999:999/15	D9:0–D999:999		

- *1 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 word 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.
- *2 Input (I) and Output (O) element addresses are defined using Octal data format. Valid word address ranges are: 0-7, 10-17, 20-27, ... 360-367, 370-377. Valid bit address ranges are: 0/0-0/7 and 0/10-0/17, 1/0-1/7 and 1/10-1/17, ... 377/0-377/7 and 377/10-377/17.
- *3 BitField refers to a bit sub-element in the data. See Appendix, Section 1 - *Structured Files*.
- *4 WordField refers to a word sub-element in the data. See Appendix, Section 1 - *Structured Files*.
- *5 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)

2.4 SLC500 Series

Device	Bit Address ^{*1}	Word Address	16 bit	32 bit
Status File	S:0/0–S:163/15	S:0–S:163	L/H ^{*4}	L/H ^{*4}
Bit File	B3:0/0–B3:0/15 B9:0/0–B999:999/15	B3:0 B9:0–B999:999		
Timer File	T4:0/BitField ^{*2} T9:0/BitField–T999:999/BitField ^{*2}	T4:0.WordField ^{*3} T9:0.WordField–T999:999.WordField ^{*3}		
Counter File	C5:0/BitField ^{*2} C9:0/BitField–C999:999/BitField ^{*2}	C5:0.WordField–C5:0.WordField ^{*3} C9:0.WordField–C999:999.WordField ^{*3}		
Control File	R6:0/BitField ^{*2} R9:0/BitField–R999:999/BitField ^{*2}	R6:0.WordField ^{*3} R9:0.WordField–R999:999.WordField ^{*3}		
Integer File	N7:0/0–N7:0/15 N9:0/0–N999:999/15	N7:0 N9:0–N999:999		
Floating Point File	--	F8:0 F9:0–F999:999		
String File	--	ST9:0–ST999:999		
ASCII File	A9:0/0–A999:999/15	A9:0–A999:999		

- *1 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 word 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.
- *2 BitField refers to a bit sub-element in the data. See Appendix, Section 1 - [Structured Files](#).
- *3 WordField refers to a word sub-element in the data. See Appendix, Section 1 - [Structured Files](#).
- *4 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)

3 Consecutive Device Addresses

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.

MEMO

- To speed up data communication, use consecutive device addresses on the same panel screen.
- The following situations increase the number of times that the device is read, and reduces the data communication speed between the target machine and the PLC:
 - when the number of consecutive addresses exceeds the maximum
 - when an address is designated for division
 - when different device types are used

3.1 ControlLogix Series

Device	Words Per Element	Max. Consecutive Elements	Gap Span
BOOL	2	60	6
INT	1	120	12
REAL	2	60	6
DINT	2	60	6
SINT	1 byte	120	12

3.2 MicroLogix Series

Device	Words Per Element	Max. Consecutive Elements	Gap Span
Status File (S)	1	1	--
Bit File (B)	1	103	10
Timer File (T)	3	1	--
Counter File (C)	3	1	--
Control File (R)	3	1	--
Integer File (N)	1	103	10
Floating Point File (F)	2	51	5
String File (ST)	42	1	--
Long Word File (L)	2	51	5

3.3 PLC-5 Series

Device	Words Per Element	Max. Consecutive Elements	Gap Span
Input File (I)	1	120	12
Output File (O)	1	120	12
Status File (S)	1	1	--
Bit File (B)	1	120	12
Timer File (T)	3	1	--
Counter File (C)	3	1	--
Control File (R)	3	1	--
Integer File (N)	1	120	12
Floating Point File (F)	2	60	6
String File (ST)	42	1	--
ASCII File (A)	1	120	12
BCD (D)	1	120	12

3.4 SLC500 Series

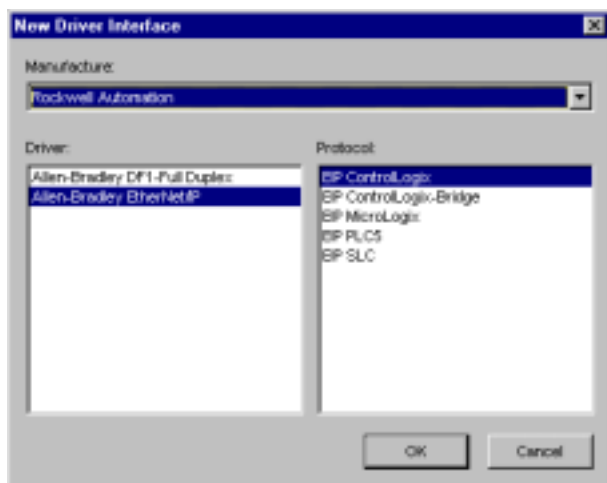
Device	Words Per Element	Max. Consecutive Elements	Gap Span
Status File (S)	1	1	--
Bit File (B)	1	103	10
Timer File (T)	3	1	--
Counter File (C)	3	1	--
Control File (R)	3	1	--
Integer File (N)	1	103	10
Floating Point File (F)	2	51	5
String File (ST)	42	1	--
ASCII File (A)	1	103	10

4 I/O Manager Configuration

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

MEMO

For information on how to display the [New Driver Interface] dialog box, see the online help.



5 Protocol Configuration

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

MEMO

For information on how to display the [Protocol Configuration] dialog box, see the online help.

5.1 ControlLogix, MicroLogix, PLC-5, SLC500 Series

**IP Address**

Enter the IP address of the PLC node.

MEMO

Consult your network administrator when setting up the IP address.

5.2 ControlLogix-Bridge Series

**IP Address**

Enter the IP address of the PLC node.

MEMO

Consult your network administrator when setting up the IP address.

ControlLogix Controller Slot Number

Define the slot number in the rack where the CPU is located.

6 Device Address Configuration

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

See Section 2 – [Supported Device Addresses](#).

MEMO

For information on how to display the Device Address Keypad, see the online help.



File Type

Lists file identifiers supported by the PLC.

File Number

Defines the file number. PLC types may support different ranges of file numbers.

Element

Defines the word element.

Sub-Element

This field becomes available only when the variable data type is discrete, or when you select a [structured file type](#).

When the variable data type is discrete, defines the bit position.

```
B9:3/15
  B = Bit File
  9 = File Number
  3 = Element Number
  / = Bit indicator
  15 = Sub-Element (Bit)
```

When the File Type is a structured file type, defines the structured element.

```
T9:3/EN
  B = Bit File
  9 = File Number
  3 = Element Number
  / = Bit indicator
  EN = Sub-Element (Enable)
```



Appendix

- 1 [Structured Files](#)
- 2 [Map ControlLogix PLC Addresses](#)

1 Structured Files

Structured files are supported by MicroLogix, PLC-5, and SLC500 Series PLCs.

The following file types are structured files.

- Timer
- Counter
- Control

Each element in a structured file has sub-elements that show the status of an operation, • trigger operations, or store information.

To access a sub-element:

- Use a slash (/) to denote a discrete sub-element.

```
T4:5/EN      // Timer File 4, Timer Element 5, Sub-element EN
              (discrete)
```

```
R255:255/FD  // Control File 255, Control Element 255, Sub-element
              FD (discrete)
```

- Use a period (.) to denote a word sub-element.

```
C12:1.POS    // Counter File 12, Counter Element 1, Sub-element POS
              (word)
```

Timer

The following structured elements are available in a Timer file.

Mnemonic	Structured Element	Size	Format
.EN	Enable	1 bit	Discrete
.TT	Timing	1 bit	Discrete
.DN	Done	1 bit	Discrete
.PRE	Preset Value	2 bytes	2's Complement Integer
.ACC	Accumulated Value	2 bytes	2's Complement Integer

Counter

The following structured elements are available in a Counter file.

Mnemonic	Structured Element	Size	Format
.CE	Up Enable	1 bit	Discrete
.CD	Down Enable	1 bit	Discrete
.DN	Done	1 bit	Discrete
.OV	Overflow	1 bit	Discrete
.UN	Underflow	1 bit	Discrete
.UA		1 bit	Discrete
.PRE	Preset Value	2 bytes	2's Complement Integer
.ACC	Accumulated Value	2 bytes	2's Complement Integer

Control

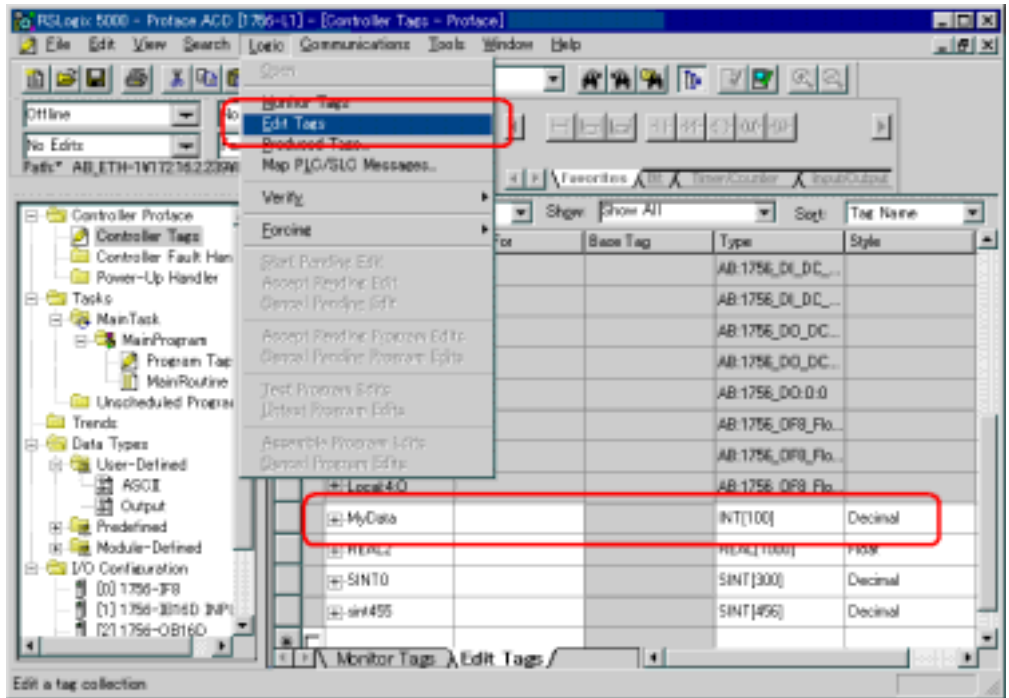
The following structured elements are available in a Control file.

Mnemonic	Structured Element	Size	Format
.EN	Enable	1 bit	Discrete
.EU	Enable Unloading	1 bit	Discrete
.DN	Done	1 bit	Discrete
.EM	Empty	1 bit	Discrete
.ER	Error	1 bit	Discrete
.UL	Unload	1 bit	Discrete
.IN	Inhibit Comparison	1 bit	Discrete
.FD	Found	1 bit	Discrete
.LEN	Length	2 bytes	2's Complement Integer
.POS	Position	2 bytes	2's Complement Integer

2 Map ControlLogix PLC Addresses

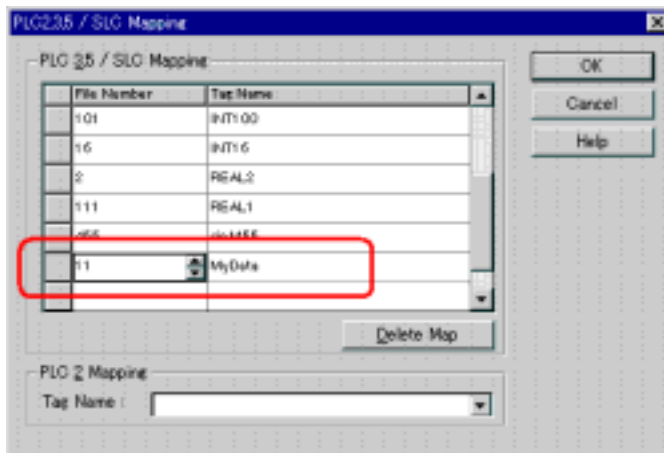
The following defines how to map the address used in Pro-Designer with the PLC, using RSLogix5000 software.

1. In RSLogix5000, create tag definitions and define the number of array elements.



In the example, the **Tag Name** is MyData, and in the **Type** we defined 100 elements of type DINT.

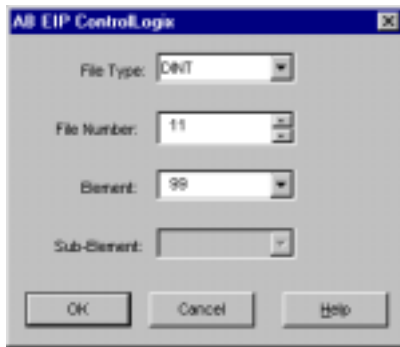
2. After defining the Tag Name, map the **Tag Name** to a **File Number**.



In the example, MyData is mapped to File Number 11.

3. Save the project and download it to the ControlLogix PLC.
The PLC can now use MyData tags in its logic program.

- In Pro-Designer, ignore the Tag Name defined in RSLogix5000. Use the File Number (11) and the data type to work with the PLC data.



For example, to access the hundredth element in the tag MyData, enter **DINT11:99** as the word address.