Siemens

Siemens Simatic S7-300/400 Series MPI Driver

- 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 Siemens Series PLCs over a serial connection.

To view a cable connection diagram for a particular communication format, see Section 2 – *Cable Diagrams*.

| Series	CPU	Link I/F	Comm. Format	Diagram
Simatic S7-300/400 Series	CPU312IFM CPU313 CPU314 CPU315 CPU315-2DP CPU413-2DP	MPI Port	RS-232C	Cable Diagram 1

2 Cable Diagrams

The illustrated cable diagrams and those recommended by Siemens may differ. However, Pro-face recommends using the following diagrammed connections.

- Ground the PLC's FG terminal according to your country's applicable standard. For details, refer to the PLC manual.
- When making your own communication cable, be sure to connect the SG signal.

Diagram 1   RS-232C

To connect the target machine and the PLC, create your own cable using the following specifications.

Target Machine	Cable / Adapter	Comments
GP, PS-P, PC/AT(PL), PS-G	Cable for Siemens MPI Port Adapter (Pro-face: GP070-MPI-41)	- When connecting to a 9pin port on the target machine, use a 9/25 pin adapter. - GP070-MPI-41 cable uses male connections.
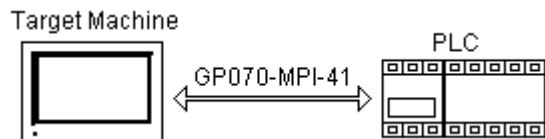
3 Supported Device Addresses

The following table lists 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.

Device	Bit Address[*1]	Word Address	16 bit	32 bit
Input[*2]	I00000.0-I65535.7	IW00000-IW65534[*7]	H/L[*8]	H/L[*8]
Output[*2]	Q00000.0-Q65535.7	QW00000-QW65534[*7]		
Internal Bit[*2]	M00000.0-M65535.7	MW00000-MW65534[*7]		
Data Block[*2*6]	DBX1.DBX00000.0 - DBX65535.DBX65535.7	DB1.DBW00000 - DB65535.DBW65534[*7]		
Timer Word[*3*4*5]	—	T00000-T65535		
Counter Word[*3*4*5]	—	C00000-C65535		

*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 new word address to the PLC. If the ladder program writes data to this word address during the bit read/write process, the resulting data may be incrorrect.
*2   Device size is 1 byte.
*3   Device size is 2 bytes, or 1 word.
*4   Valid range in BCD is 0000 to 0999.
*5   Read-only.
*6   Data blocks are created by the user. Available addresses depend on what the user has created.
*7   PLC word addresses defined for integer, float, and string variables must be even-numbered. i.e., IW5 is not a valid device address for an integer variable. Must be either IW4 or IW6.
*8   16-bit and 32-bit data, High and Low, refer to data as defined in the following examples.

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

4   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

Device	Max. Consecutive Addresses	Gap Span
Input (I)		
Output (Q)	222 bytes (Bit Access)[1]	22 bytes (Bit Access)[1]
Internal Bit (M)		
Data Block (DBX)		
Input (IW)		
Output (QW)		
Internal Bit (MW)	111 words (Word Access)[2]	11 words (Word Access)[2]
Data Block (DBW)		
Timer Word (T)		
Counter Word (C)		

[1]   Pro-Designer Runtime accesses bit addresses in byte units. For example, when the bit address IW101.3 is assigned to a Pro-Designer discrete variable, the entire byte address (IW101) is read. The bit address gap span can have up to 22 byte addresses.

[2]   Pro-Designer Runtime accesses word addresses in even-numbered bytes (2 bytes = 1 word). For example, when the byte address IW100 is assigned to a Pro-Designer 16bit integer variable, a word (IW100, IW101) is read. The word address gap span can have up to 11 word addresses.

5   Environment Setup

The following table lists the communication settings, recommended by Pro-face, for the target machine and Siemens PLC.

For details, see Section 7 – *Driver Configuration* and Section 8 – *Protocol Configuration*.

	Target Machine Settings		PLC Settings	
Driver	Serial Interface	RS-232C	Connection Format	RS-232C
	Flow Control	DTR(ER)/CTS	—	
	Transmission Speed	115,200 bps	Baud Rate	115,200 bps
	Retry Count	2	—	
	Parity Bit	Odd	—	
	Stop Bit	1 bit	—	
	Data Length	8 bits	—	
	Rcv Time Out	10 s	—	
	TX Wait Time	0 ms	—	
Protocol	Local Node[*1]	0-126	MPI Address[*2]	0-126
	Target Node[*2]	0-126	—	
	Highest Node Number[*3]	15/31/63/126	Highest Node Number[*3]	15/31/63/126

*1   The Local Node (target machine) must NOT match the MPI Address (PLC).

*2   The Target Node (target machine) must match the MPI Address (PLC).

*3   The Highest Node Number, which identifies the highest possible node address on the network, must be the same on the target machine and PLC. The Local Node, Target Node, and MPI addresses must be less than or equal to the Highest Node Number.

6　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.
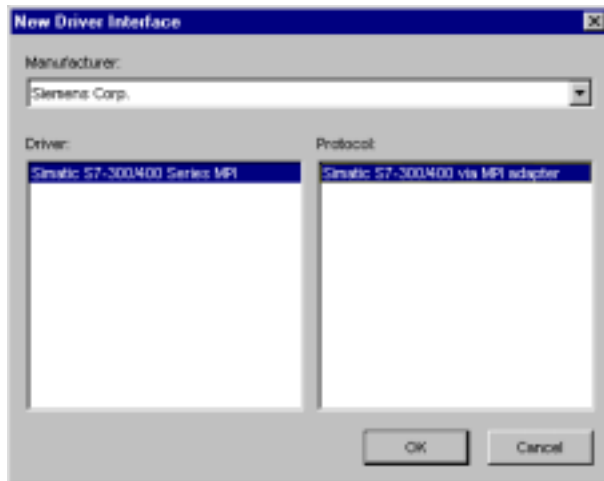
7   Driver Configuration

To configure the communication settings of the serial driver in the target machine, use the [Driver Configuration] dialog box. Make sure the settings match those of the PLC.
For an overview of the driver and protocol settings, see Section 5 – *Environment Setup.*

MEMO   For information on how to display the [Driver Configuration] dialog box, see the online help.
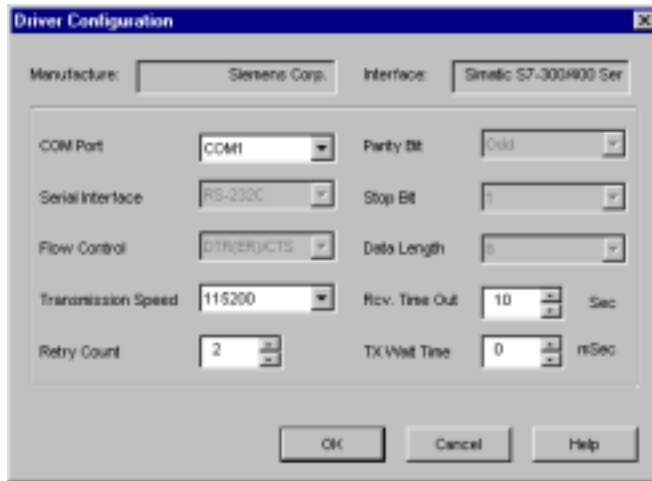
Manufacturer
Displays the name of the PLC manufacturer.

Interface
Displays the type of serial connection used to connect the target machine to the PLC.

COM Port
Defines which COM port to use on the target machine, for connecting to the PLC.

MEMO   Select COM1 for PS Series Type G target machines. Connection is not possible using COM2.

Serial Interface
Defines the serial connection as RS-232C.
For details about the supported connections, see Section 2 – *Cable Diagrams.*

Flow Control
Defines the signals that control the data flow.

Transmission Speed
Sets the communication speed in bits per second. This setting must match the PLC baud rate.

Retry Count
Defines the number of times the driver tries to send or receive data when there is an error.

Parity Bit
For detecting communication errors, sets the parity bit to Odd.

Stop Bit
Defines the stop bit as 1.

Data Length
    Defines the length of each unit of data as 8 bits.

Rcv. Timeout
    Defines the length of time the target machine waits for a response before it outputs a timeout error or sends another communication.

TX Wait Time
    Defines the number of milliseconds that the target machine waits, after receiving a communication packet, before sending a response.
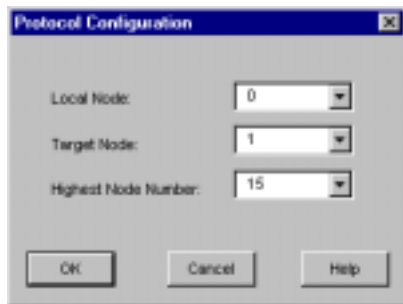
8 Protocol Configuration

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

For an overview of the driver and protocol settings, see Section 5 – *Environment Setup*.

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

Local Node

Enter a value [0 to Highest Node Number (HNN)] to identify the target machine. This value must NOT be the same as the MPI Address set up on the PLC.

Target Node

Enter a value (0 to HNN) to identify the PLC. This value must be the same as the MPI Address set up on the PLC.

Highest Node Number

Enter a value (15, 31, 63 or 126) to identify the Highest Node Number (HNN).

9 Device Address Configuration

To set up a PLC variable in the Variable List, use the Device Address Keypad from the variable properties.
See Section 3 – *Supported Device Addresses.*

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

Memory Area

Lists the PLC devices.

Data Block

Available when the Memory Area is DB (Data Block). Data Blocks are memory areas created by the user.
Click the ellipsis ... to display the [Data Block Selector] keypad, which assists you in entering a valid data block number.

Address

Enter the device address number here.
When mapping an integer, float, or string variable to a PLC device, you can enter only even addresses.
When mapping a discrete variable to a PLC device, you can enter both odd or even addresses.

In the Address field, click the ellipsis $\boxed{\cdots}$ to display the [Address Selector] keypad, which assists you in entering a valid device address.

Bit

Available when mapping discrete variables to a PLC device. Lists the available bits (0-7).