

# SIEMENS AG.

## SIMETIC S7-300/400 Series

### Serial Driver

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Supported version    TOP Design Studio    V1.0 or higher



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We want to thank our customers who use the Touch Operation Panel.

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Refer to this section to check the data addresses which can communicate with an external device.

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# 1. System configuration

The system configuration of TOP and "SIEMENS AG. – S7-300/400 Series RK512" is as follows:

Series	CPU	Link I/F	Communication method	System setting	Cable
SIMETIC S7-300	CPU312 IFM	CP341	RS-232C	<a href="#">3. TOP communication setting</a> <a href="#">4. External device setting</a>	<a href="#">5. Cable table</a>
	CPU313				
	CPU314				
	CPU314 IFM				
	CPU315				
	CPU315(F)-2 DP				
	CPU315(F)-2 PN/DP				
	CPU316	CP341	RS-422 ( 4 wire ) / RS-485		
	CPU316-2 DP				
	CPU317-2 DP				
	CPU317F-2				
	CPU318-2				
	CPU317-2 PN/DP				
	CPU319-3 PN/DP				
	CPU614				
CPU388					
SIMETIC S7-400	CPU412-1	CP441-2	RS-232C		
	CPU412-2 DP				
	CPU413-1				
	CPU413-2 DP				
	CPU414-1				
	CPU414-2 DP				
	CPU414-3 DP				
	CPU416-1		RS-422 ( 4 wire ) / RS-485		
	CPU416-2 DP				
	CPU416-3 DP				
	CPU417-4				
	CPU414-3PN/DP				
	CPU416-3PN/DP				
	CPU417				
	CPU486				

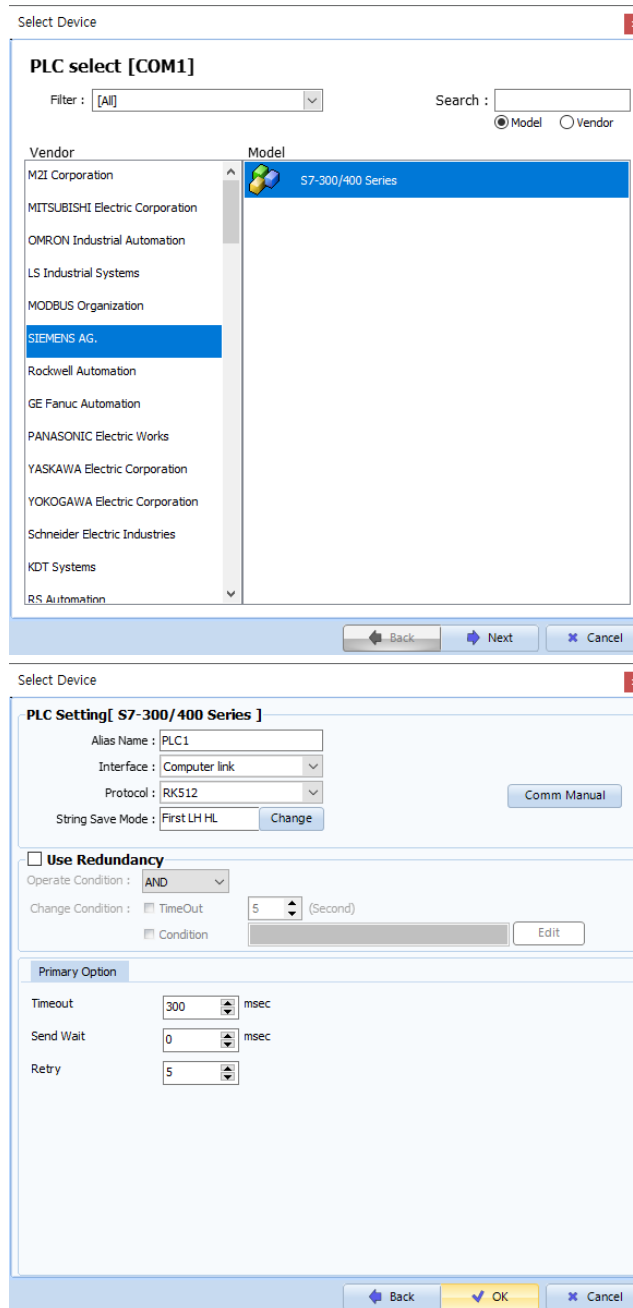
## ■ Connection configuration

- 1:1 connection



## 2. External device selection

- Select a TOP model and a port, and then select an external device.



Settings		Contents					
TOP	Model	Check the display and process of TOP to select the touch model.					
External device	Vendor	Select the vendor of the external device to be connected to TOP. Select "SIEMENS AG."					
	PLC	Select an external device to connect to TOP. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: black; color: white;">Model</th> <th style="background-color: black; color: white;">Interface</th> <th style="background-color: black; color: white;">Protocol</th> </tr> </thead> <tbody> <tr> <td>S7-300/400 Series</td> <td>Computer Link</td> <td>RK512</td> </tr> </tbody> </table> <p>Please check the system configuration in Chapter 1 to see if the external device you want to connect is a model whose system can be configured.</p>	Model	Interface	Protocol	S7-300/400 Series	Computer Link
Model	Interface	Protocol					
S7-300/400 Series	Computer Link	RK512					

### 3. TOP communication setting

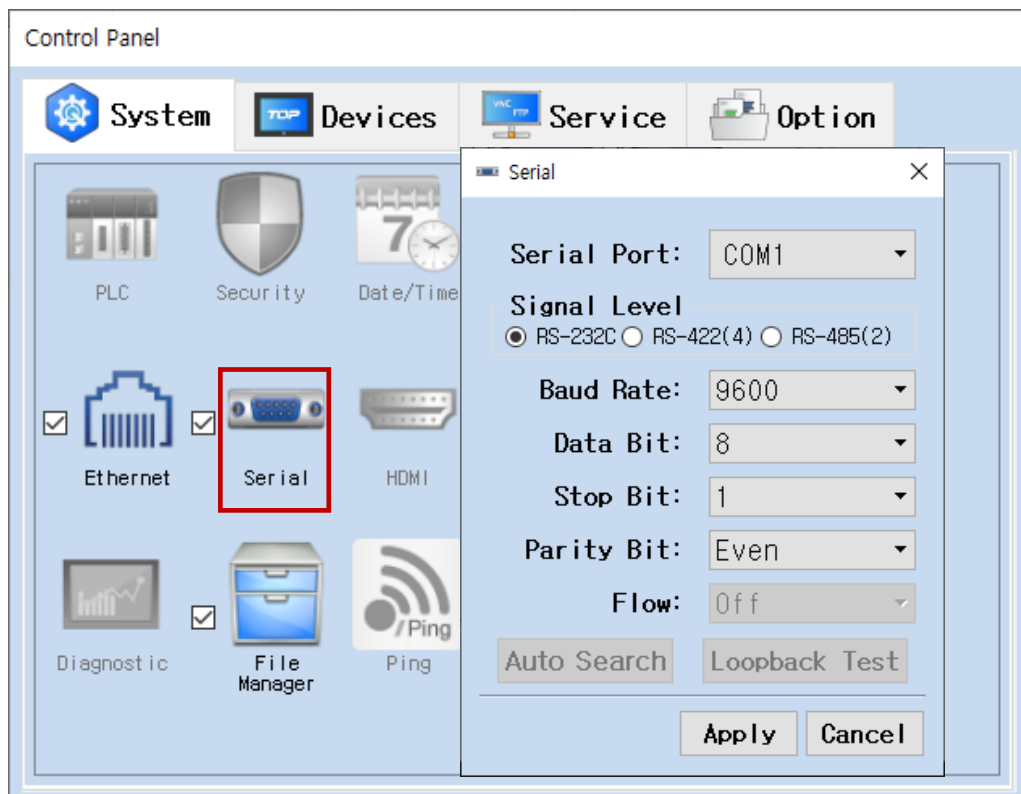
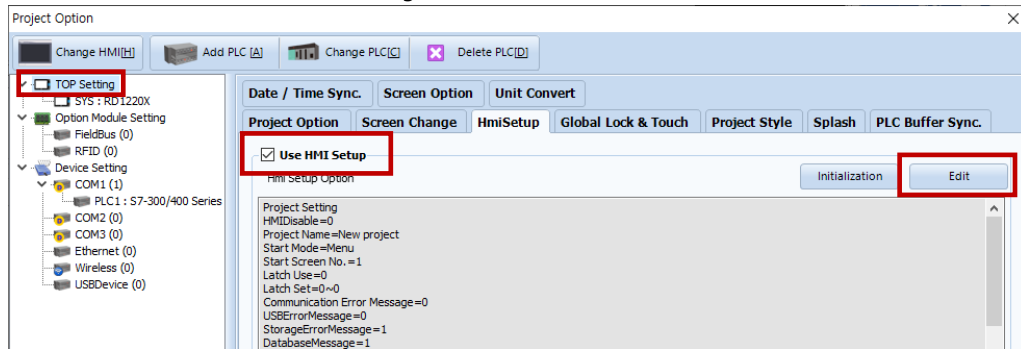
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

#### 3.1 Communication setting in TOP Design Studio

##### (1) Communication interface setting

■ [ Project > Project Property > TOP Setting ] → [ HMI Setup > “Use HMI Setup” Check > Edit > Serial ]

– Set the TOP communication interface in TOP Design Studio.



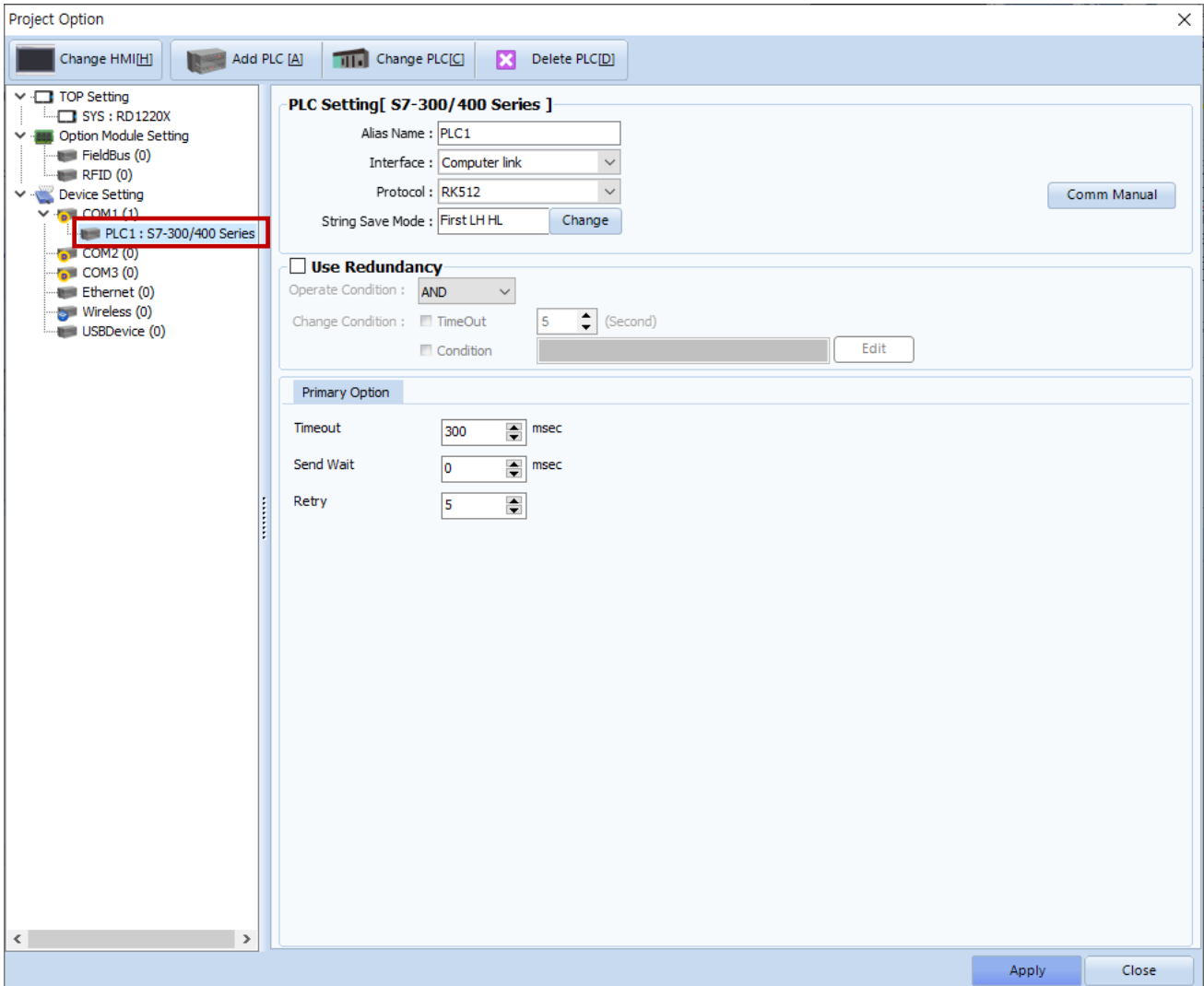
Items	TOP	External device	Remarks
Signal Level		RS-232C	
Baud Rate		9600	
Data Bit		8	
Stop Bit		1	
Parity Bit		Even	

\* The above settings are examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

**(2) Communication option setting**

- [ Project > Project Property > Device Settings > COM > "PLC1 : S7-300/400 Series" ]
- Set the options of the S7-300/400 Series RK512 communication driver in TOP Design Studio.

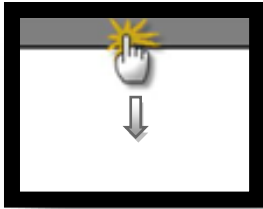


Items	Settings	Remarks
Interface	Select "Computer link".	<a href="#">Refer to "2. External device selection"</a> .
Protocol	Select "RK512".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Retry	Configure the amount of redelivery attempts from TOP to external device.	

### 3.2. Communication setting in TOP

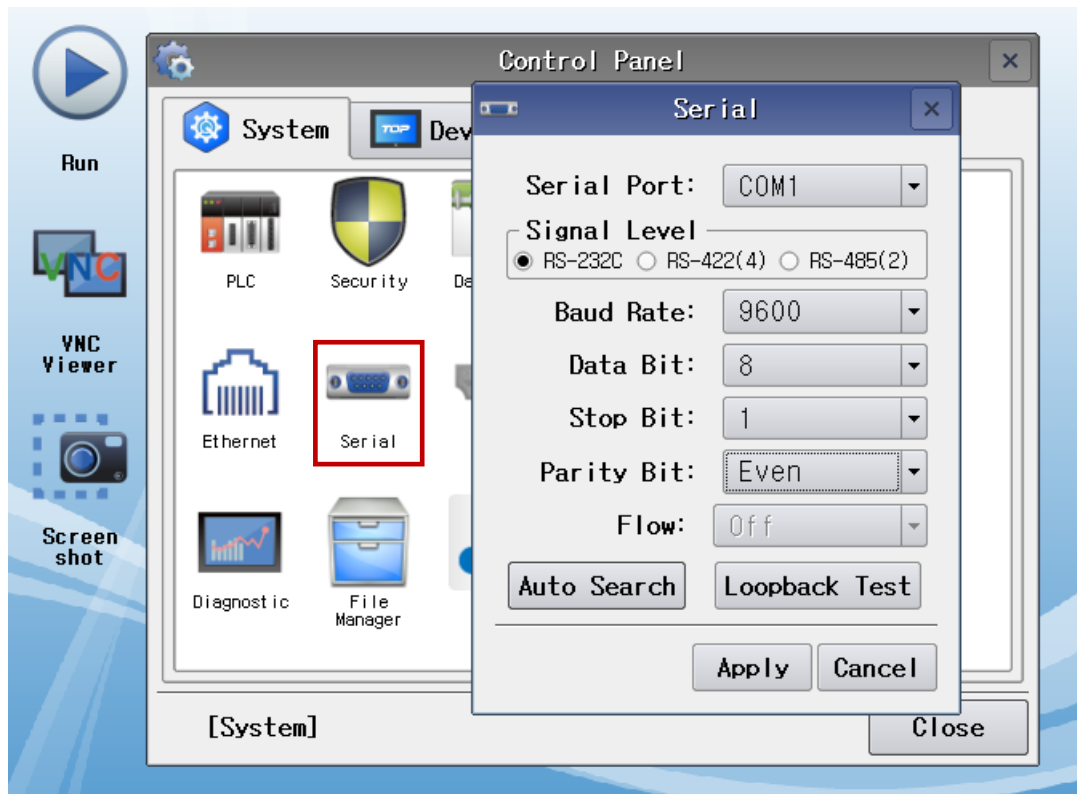
\* This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.

- Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.



#### (1) Communication interface setting

- [ Main Screen > Control Panel > Serial ]



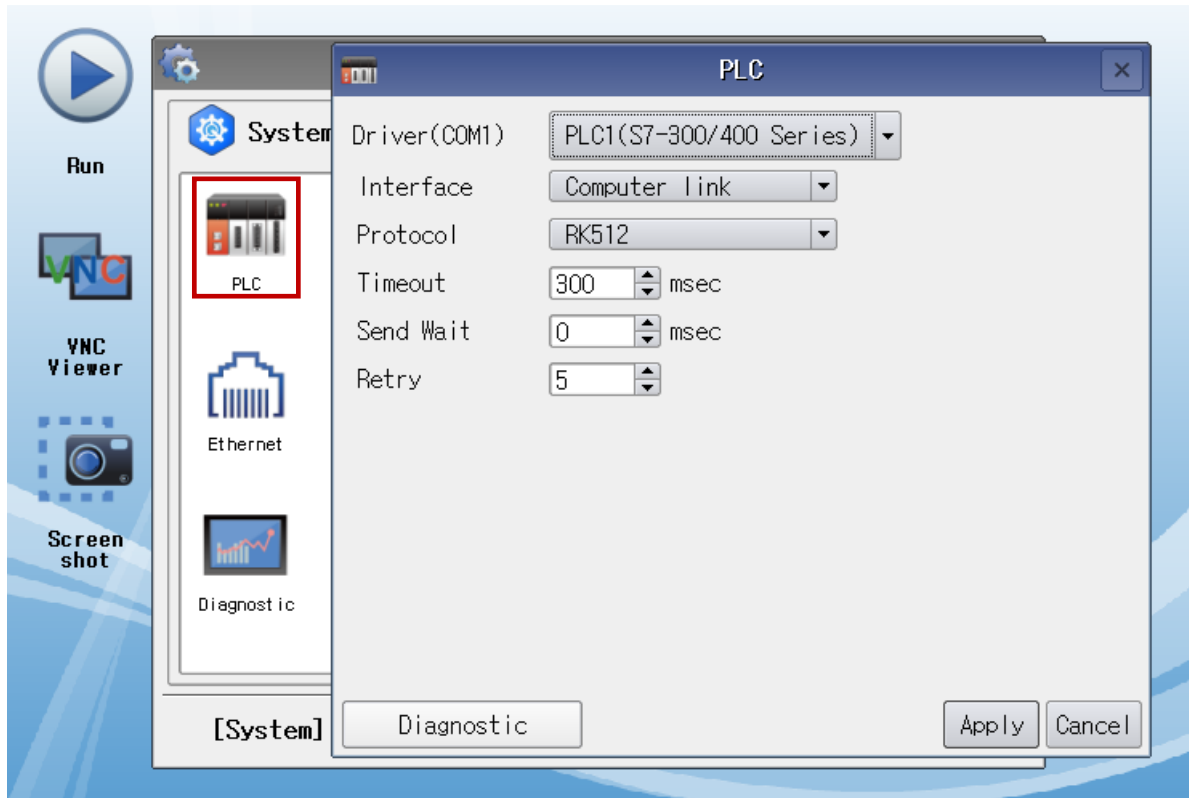
Items	TOP	External device	Remarks
Signal Level		RS-232C	
Baud Rate		9600	
Data Bit		8	
Stop Bit		1	
Parity Bit		Even	

\* The above settings are setting examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

■ [ Main Screen > Control Panel > PLC ]



Items	Settings	Remarks
Interface	Select "Computer link".	<a href="#">Refer to "2. External device selection".</a>
Protocol	Select "RK512".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
Retry	Configure the amount of redelivery attempts from TOP to external device.	

### 3.3 Communication diagnostics

- Check the interface setting status between the TOP and an external device.
  - Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.
  - Check if the COM port settings you want to use in [Control Panel > Serial] are the same as those of the external device.
  
- Diagnosis of whether the port communication is normal or not
  - Touch "Communication diagnostics" in [Control Panel > PLC ].
  - The Diagnostics dialog box pops up on the screen and determines the diagnostic status.

<b>OK</b>	<b>Communication setting normal</b>
<b>Time Out Error</b>	<b>Communication setting abnormal</b> - Check the cable, TOP, and external device setting status. <b>(Reference: Communication diagnostics sheet)</b>

■ Communication diagnostics sheet

- If there is a problem with the communication connection with an external terminal, please check the settings in the sheet below.

Items	Contents	Check		Remarks	
System configuration	How to connect the system	OK	NG	<a href="#">1. System configuration</a>	
	Connection cable name	OK	NG		
TOP	Version information	OK	NG	<a href="#">2. External device selection</a> <a href="#">3. Communication setting</a>	
	Port in use	OK	NG		
	Driver name	OK	NG		
	Other detailed settings	OK	NG		
	Relative prefix	Project setting	OK		NG
		Communication diagnostics	OK		NG
	Serial port setting	Baud Rate	OK		NG
		Data Bit	OK		NG
Stop Bit		OK	NG		
Parity Bit		OK	NG		
External device	CPU name	OK	NG	<a href="#">4. External device setting</a>	
	Communication port name (module name)	OK	NG		
	Protocol (mode)	OK	NG		
	Setup Prefix	OK	NG		
	Other detailed settings	OK	NG		
	Serial port setting	Baud Rate	OK		NG
		Data Bit	OK		NG
		Stop Bit	OK		NG
Parity Bit		OK	NG		
Check address range		OK	NG	<a href="#">6. Supported addresses</a>	



## 4. External device setting

For more detailed setting method than that described in this example, refer to the PLC user manual.  
Set as below using SIEMTIC S7 Ladder Software.

**Step 1.** Create a new project with [New Project] in the top bar of the main menu of [SIMATIC Manager].

**Step 2.** Choose Menu [Insert] > [Station] > [1 SIMATIC 400 Station] or [2 SIMATIC 300 Station]. → CPU add

**Step 3.** Double-click the added "[SIMATIC 400(1)]" or [SIMATIC 300(1)] CPU > Double-click [Hardware] on that CPU.. → [HW Config] window newly appears

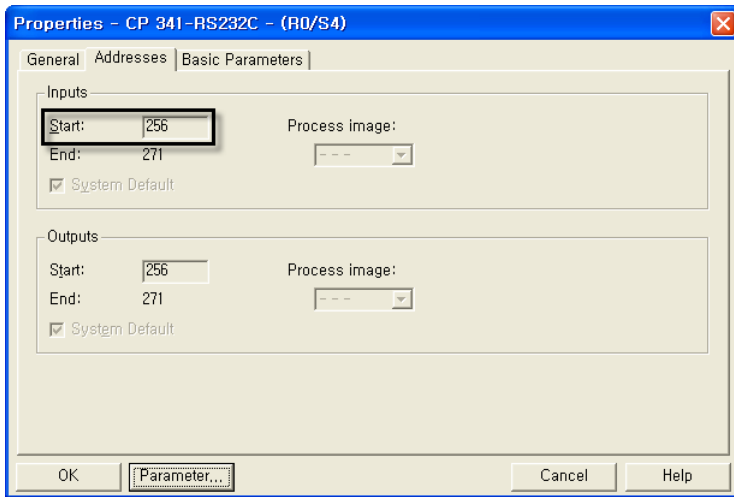
**Step 4.** In the left tree panel of the [HW Config] window, open "[SIMATIC 400] > [RACK-400]" or "[SIMATIC 300] > [RACK-300]" to select the Base unit model that you use and register by dragging & dropping it to the bottom right of the window.

**Step 5.** Select [SIMATIC 400] > [PS-400] or [PS-300] to select the power unit used to drag & drop on the current rack.

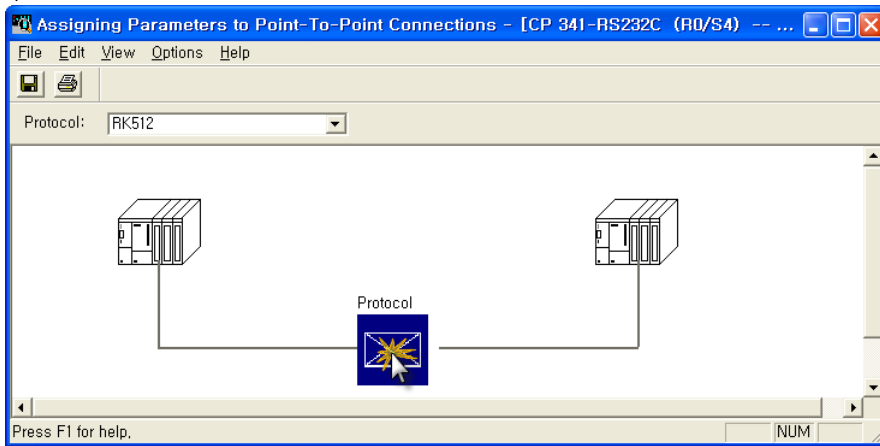
**Step 6.** Select [SIMATIC 400] > [CPU-400] or [CPU-300] to select the CPU unit, then drag & drop on the current rack. (If the Properties – PROFIBUS interface DP window is new, press the [Cancel] key to exit the window.)

S...	Module	Order number	Firmw...	MPI address	I address	Q address	Comment
1							
2	CPU 315-2 PN/DP	6ES7 315-2EH13-0AB0	V2.6	2			
X1	MP/DP			2	2047*		
X2	PN-ID				2046*		
X2 P1	Port 1				2045*		
3							
4	CP 341-RS232C	6ES7 341-1AH01-0AE0			256...271	256...271	
5							
6							
7							
8							
9							
10							
11							

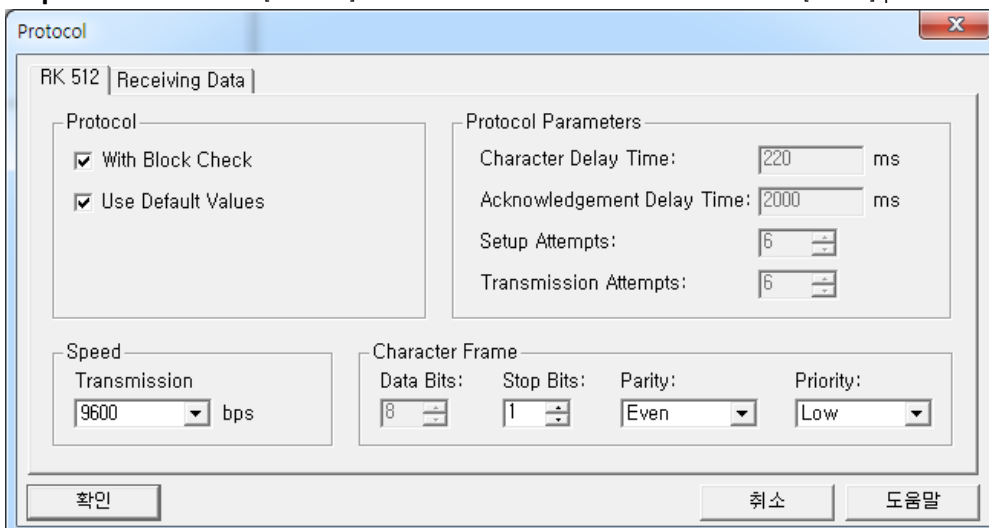
**Step 7.** Double-click on the registered CPU Name. → A new [Properties] window for that CPU appears..



**Step 8.** On the [General] tab of the [Properties] window, select [Interface] > [Properties] to launch the [Properties – protocol] pop-up window.



**Step 9.** Double-click the [Protocol] box in the middle of the screen to enter the [RK512] protocol detailed settings as shown below.



**Step 10.** In the Project Tree of the [SIMATIC Manager] window, select Registered CPU Name from [HW Config], select [Blocks], and double-click [OB1]. (If the [Properties] window pops up, click [ok].) → Run Ladder software [LAD/STL/FBD]

**Step 11.** Set parameters in Ladder software [LAD/STL/FBD]. Set one of the examples below according to [Language for Selected Blocks] > [STL] or [LAD].

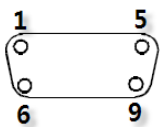
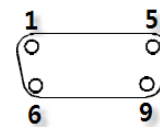
[Language for selected Blocks] > [STL]	[Language for selected Blocks] > [LAD]
<pre>CALL "P_RCV_RK" , DB7 EN_R      :=TRUE R         :=FALSE LADDR    :=256 DB_NO     := DBB_NO   := L_TYP    := L_NO     := L_OFFSET := L_CF_BYT := L_CF_BIT := NDR      := ERROR    := LEN      := STATUS   :=</pre>	<p style="text-align: center;">(Example) [Libraries] &gt; [CP 341] &gt; [FB7 P_RCV_RK CP341]</p>

Items	Contents
DB7	The DB number that P_RCV_RK will use to receive communication
EN_R	"EN-R" must be ON to communicate.
R	Reset input
LADDR	Input Start Address Number confirmed in order 12.
DB_NO	Input DB you will use. Only the areas you assign can be read and written through communication.

## 5. Cable table

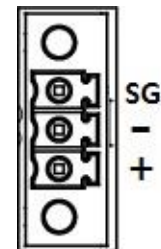
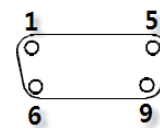
This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device.  
 (The cable diagram described in this section may differ from the recommendations of "SIEMENS AG.")

### ■ RS-232C

TOP			External device		
Pin arrangement* <i>Note 1)</i>	Signal name	Pin number	Pin number	Signal name	Pin arrangement* <i>Note 1)</i>
 <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p>	RD	2	2	RD	 <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p>
	SD	3	3	SD	
	SG	5	5	SG	

\**Note 1)* The pin arrangement is as seen from the connecting side of the cable connection connector.

### ■ RS-485

TOP		External device		
Pin arrangement* <i>Note 1)</i>	Signal name	Pin number	Signal name	Pin arrangement* <i>Note 1)</i>
 <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p>	+			 <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p>
	-			
	SG	3	TRX+	
		5	SG	
		8	TRX-	

\**Note 1)* The pin arrangement is as seen from the connecting side of the cable connection connector.

## 6. Supported addresses

The devices available in TOP are as follows:

The device range (address) may differ depending on the CPU module series/type. The TOP series supports the maximum address range used by the external device series. Please refer to each CPU module user manual and be take caution to not deviate from the address range supported by the device you want to use.

Device	Bit address	Word address	Double word address*Note 1)Note 2)	R/W	Remarks
Input relay	I00000.0 – I16383.7	IW00000 – IW16382	ID00000 – ID16382	R/W	Cannot be written
Output relay	Q00000.0 – Q16383.7	QW00000 – QW16382	QD00000 – QD16382	R/W	Cannot be written
Data block	DB00001.DBX00000.0 – DB00255.DBX00511.7	DB00001.DBW00000 – DB00255.DBW00510	DB00001.DBD00000 – DB00254.DBD00510	R/W	
Internal memory	M00000.0 – M08191.7	MW00000 – MW08190	MD00000 – MD08190	R/W	Cannot be written
Timer	T00000.0 – T00255.15	T00000 – T00255	T00000 – T00254	R	
Counter	C00000.0 – C00255.15	C00000 – C00255	C00000 – C00254	R	

\*Note 1) 32 bits of data are stored in 16 bits in the order of high/low for word addresses.

(Example) MW00000 (32bit data, 0x12345678) → MW00000(16bit, 0x1234) MW00002(16bit, 0x5678)

\*Note 2) For 32 bit address, style → notation form →check "word swap" function.

