

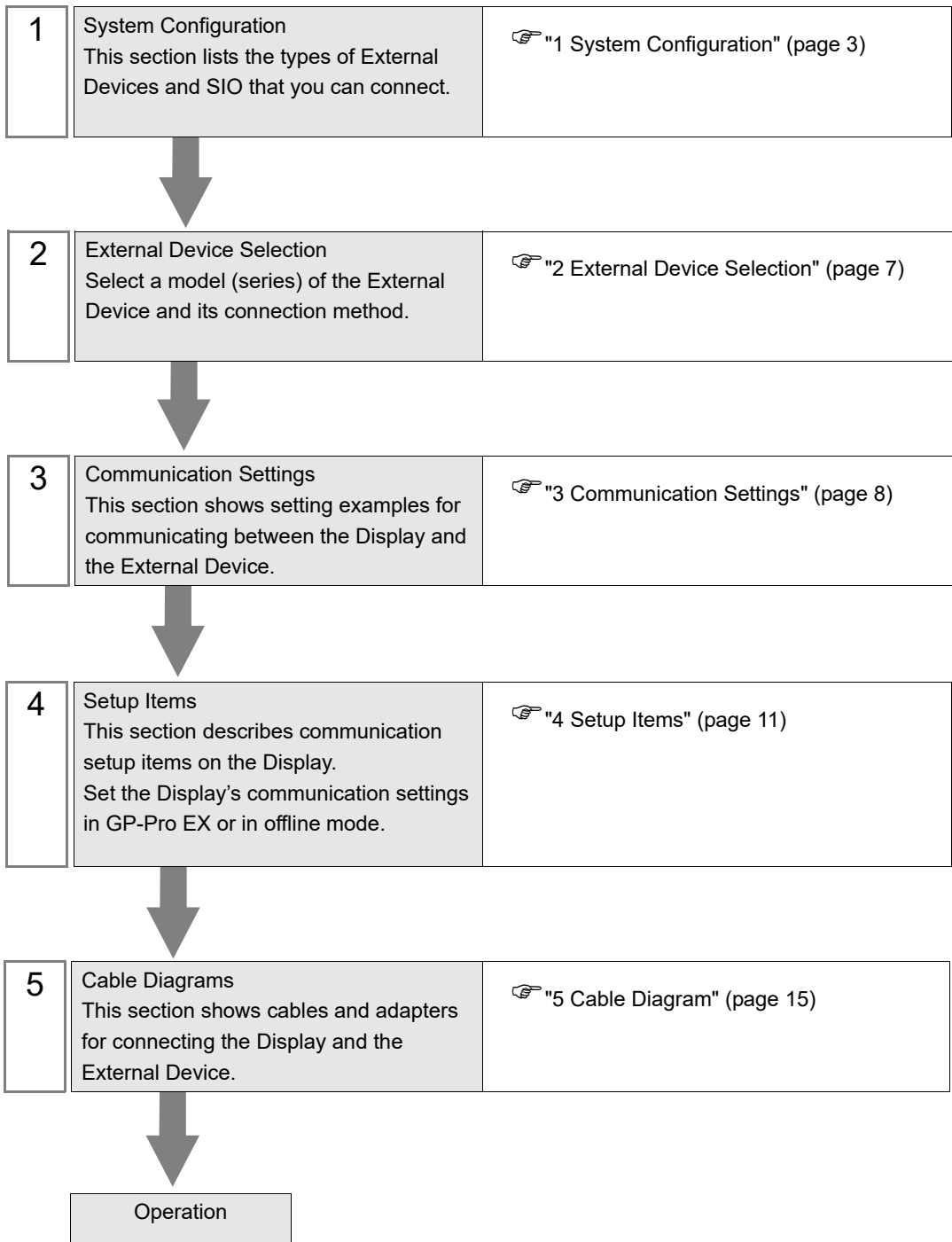
# SIMATIC S5 3964(R) Driver

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## Introduction

This manual describes how to connect the Display and the External Device (target PLC).

In this manual, the connection procedure is described in the sections identified below:



# 1 System Configuration

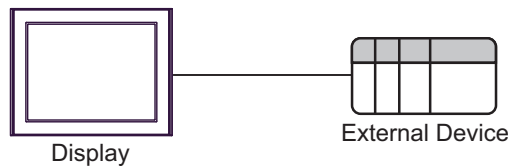
The following section shows system configurations for connecting the Siemens AG External Device and the Display.

Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
SIMATIC S5 Series	90U 95U 100U	CP521 SI	RS-232C	Setting Example 1 (page 8)	Cable Diagram 1 (page 15)
	115U 135U 155U	CP524 CP525	RS-232C		
	115U(CPU 944) 135U/155U(CPU 928B)	SI2 port on CPU unit	RS-232C		

**NOTE** • Set the execution time of the logic functions in the Display to “100 ms” or less. If the longer time is set, an error may occur in the communication with the external device.

## ■ Connection Configuration

- 1:1 Connection



## ■ IPC COM Port

When connecting IPC with an External Device, the COM port used depends on the series and SIO type. Please refer to the IPC manual for details.

### Usable port

Series	Usable Port		
	RS-232C	RS-422/485(4 wire)	RS-422/485(2 wire)
PS-2000B	COM1 <sup>*1</sup> , COM2, COM3 <sup>*1</sup> , COM4	-	-
PS-3450A, PS-3451A, PS3000-BA, PS3001-BD	COM1, COM2 <sup>*1*2</sup>	COM2 <sup>*1*2</sup>	COM2 <sup>*1*2</sup>
PS-3650A (T41 model), PS-3651A (T41 model)	COM1 <sup>*1</sup>	-	-
PS-3650A (T42 model), PS-3651A (T42 model)	COM1 <sup>*1*2</sup> , COM2	COM1 <sup>*1*2</sup>	COM1 <sup>*1*2</sup>
PS-3700A (Pentium®4-M) PS-3710A	COM1 <sup>*1</sup> , COM2 <sup>*1</sup> , COM3 <sup>*2</sup> , COM4	COM3 <sup>*2</sup>	COM3 <sup>*2</sup>
PS-3711A	COM1 <sup>*1</sup> , COM2 <sup>*2</sup>	COM2 <sup>*2</sup>	COM2 <sup>*2</sup>
PS4000 <sup>*3</sup>	COM1, COM2	-	-
PL3000	COM1 <sup>*1*2</sup> , COM2 <sup>*1</sup> , COM3, COM4	COM1 <sup>*1*2</sup>	COM1 <sup>*1*2</sup>
PE-4000B Atom N270	COM1, COM2	-	-
PE-4000B Atom N2600	COM1, COM2	COM3 <sup>*4</sup> , COM4 <sup>*4</sup> , COM5 <sup>*4</sup> , COM6 <sup>*4</sup>	COM3 <sup>*4</sup> , COM4 <sup>*4</sup> , COM5 <sup>*4</sup> , COM6 <sup>*4</sup>
PS5000 (Slim Panel Type Core i3 Model) <sup>*5*6</sup>	COM1, COM2 <sup>*4</sup>	COM2 <sup>*4</sup>	COM2 <sup>*4</sup>
PS5000 (Slim Panel Type Atom Model) <sup>*5*6</sup>	COM1, COM2 <sup>*7</sup>	COM2 <sup>*7</sup>	COM2 <sup>*7</sup>
PS5000 (Enclosed Panel Type) <sup>*8</sup>	COM1	-	-
PS5000 (Modular Type PFXPU/PFXPP) <sup>*5*6</sup> PS5000 (Modular Type PFXPL2B5-6)	COM1 <sup>*7</sup>	COM1 <sup>*7</sup>	COM1 <sup>*7</sup>
PS5000 (Modular Type PFXPL2B1-4)	COM1, COM2 <sup>*7</sup>	COM2 <sup>*7</sup>	COM2 <sup>*7</sup>
PS6000 (Advanced Box) PS6000 (Standard Box)	COM1 <sup>*9</sup>	*10	*10
PS6000 (Basic Box)	COM1 <sup>*9</sup>	COM1 <sup>*9</sup>	COM1 <sup>*9</sup>

\*1 The RI/5V can be switched. Use the IPC's switch to change if necessary.

\*2 Set up the SIO type with the DIP Switch. Please set up as follows according to SIO type to be used.

- \*3 When making communication between an External Device and COM port on the Expansion slot, only RS-232C is supported. However, ER (DTR/CTS) control cannot be executed because of the specification of COM port.  
For connection with External Device, use user-created cables and disable Pin Nos. 1, 4, 6 and 9. Please refer to the IPC manual for details of pin layout.
- \*4 Set up the SIO type with the BIOS. Please refer to the IPC manual for details of BIOS.
- \*5 When setting up communication between an External Device and the RS-232C/422/485 interface module, use the IPC (RS-232C) or PS5000 (RS-422/485) cable diagrams. However, when using PFXZPBMPR42P2 in a RS-422/485 (4-wire) configuration with no flow control, connect 7.RTS+ and 8.CTS+, and connect 6.RTS- and 9.CTS-.  
When using RS-422/485 communication with External Devices, you may need to reduce the transmission speed and increase the TX Wait time.
- \*6 To use RS-422/485 communication on the RS-232C/422/485 interface module, the DIP Switch setting is required. Please refer to "Knowledge Base" (FAQs) on the support site. (<http://www.pro-face.com/trans/en/manual/1001.html>)

Settings	FAQ ID
PFXZPBMPR42P2, RS422/485 change method	FA263858
PFXZPBMPR42P2 termination resistor setting	FA263974
PFXZPBMPR44P2, RS422/485 change method	FA264087
PFXZPBMPR44P2 termination resistor setting	FA264088

- \*7 Set up the SIO type with the DIP Switch. Please refer to the IPC manual for details of DIP Switch. The BOX Atom has not a switch to set the RS-232C, RS-422/485 mode. Use the BIOS for the setting.
- \*8 For the connection with the External Device, on the user-created cable read as if the connector on the Display-side is a M12 A-coding 8 pin socket. The pin assignment is the same as described in the cable diagram. For the M12 A-coding connector, use PFXZPSCNM122.
- \*9 In addition to COM1, you can also use the COM port on the optional interface.
- \*10 Install the optional interface in the expansion slot.

## DIP Switch settings (PL3000 / PS3000 Series)

### RS-232C

DIP Switch	Setting	Description
1	OFF*1	Reserved (always OFF)
2	OFF	SIO type: RS-232C
3	OFF	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	OFF	Short-circuit of SDA (TXA) and RDA (RXA): Not available
8	OFF	Short-circuit of SDB (TXB) and RDB (RXB): Not available
9	OFF	RS (RTS) Auto control mode: Disabled
10	OFF	

\*1 When using PS-3450A, PS-3451A, PS3000-BA and PS3001-BD, turn ON the set value.

## RS-422/485 (4 wire)

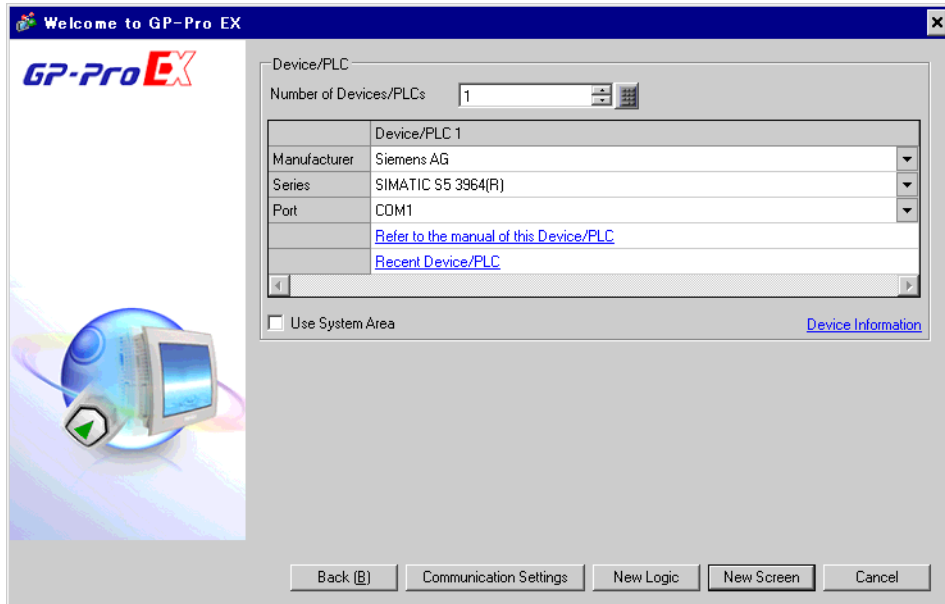
DIP Switch	Setting	Description
1	OFF	Reserved (always OFF)
2	ON	SIO type: RS-422/485
3	ON	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	OFF	Short-circuit of SDA (TXA) and RDA (RXA): Not available
8	OFF	Short-circuit of SDB (TXB) and RDB (RXB): Not available
9	OFF	RS (RTS) Auto control mode: Disabled
10	OFF	

## RS-422/485 (2 wire)

DIP Switch	Setting	Description
1	OFF	Reserved (always OFF)
2	ON	SIO type: RS-422/485
3	ON	
4	OFF	Output mode of SD (TXD) data: Always output
5	OFF	Terminal resistance (220Ω) insertion to SD (TXD): None
6	OFF	Terminal resistance (220Ω) insertion to RD (RXD): None
7	ON	Short-circuit of SDA (TXA) and RDA (RXA): Available
8	ON	Short-circuit of SDB (TXB) and RDB (RXB): Available
9	ON	RS (RTS) Auto control mode: Enabled
10	ON	

## 2 External Device Selection

Select the External Device to be connected to the Display.



Setup Items	Setup Description
Number of Devices/PLCs	Enter an integer from 1 to 4 to define the number of Devices/PLCs to connect to the display.
Manufacturer	Select the manufacturer of the External Device to connect. Select "Siemens AG".
Series	Select the External Device model (series) and the connection method. Select "SIMATIC S5 3964(R)". In System configuration, make sure the External Device you are connecting is supported by "SIMATIC S5 3964(R)". ☞ "1 System Configuration" (page 3)
Port	Select the Display port to connect to the External Device.
Use System Area	Check this option to synchronize the system data area of the Display and the device (memory) of the External Device. When synchronized, you can use the External Device's ladder program to switch the display or display the window on the Display. Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)" This feature can also be set in GP-Pro EX or in the Display's offline mode. Cf. GP-Pro EX Reference Manual "System Settings [Display Unit] - [System Area] Settings Guide" Cf. Maintenance/Troubleshooting Guide "Main Unit - System Area Settings"

## 3 Communication Settings

This section provides examples of communication settings recommended by Pro-face for the Display and the External Device.

### 3.1 Setting Example 1

#### ■ GP-Pro EX Settings

#### ◆ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

The screenshot shows the 'Device/PLC 1' configuration window. It is divided into several sections:

- Summary:** Manufacturer: Siemens AG, Series: SIMATIC S5 3964(R), Port: COM1. A 'Change Device/PLC' link is visible.
- Text Data Mode:** Set to 1 with a 'Change' link.
- Communication Settings:**
  - SIQ Type:** Radio buttons for RS232C (selected), RS422/485(2wire), and RS422/485(4wire).
  - Speed:** Dropdown menu set to 19200.
  - Data Length:** Radio buttons for 7 and 8 (8 is selected).
  - Parity:** Radio buttons for NONE, EVEN (selected), and ODD.
  - Stop Bit:** Radio buttons for 1 (selected) and 2.
  - Flow Control:** Radio buttons for NONE (selected), ER(DTR/CTS), and XON/XOFF.
  - Timeout:** Spin box set to 3 (sec).
  - Retry:** Spin box set to 2.
  - Wait To Send:** Spin box set to 3 (ms).
- RI / VCC:** Radio buttons for RI (selected) and VCC. A note states: 'In the case of RS232C, you can select the 9th pin to RI (Input) or VCC (5V Power Supply). If you use the Digital's RS232C Isolation Unit, please select it to VCC.' A 'Default' button is present.
- Device-Specific Settings:**
  - Allowable Number of Devices/PLCs: 1. An 'Add Device' button is next to it.
  - A table with columns 'No.', 'Device Name', and 'Settings'. The first row shows '1', 'PLC1', and 'There is no setting item.' An 'Add Indirect Device' button with a plus sign is to the right.



## ■ External Device Settings

Use the program controller (SIMATIC PG615) to configure communication settings for the External Device.  
Refer to your External Device manual for details.

- 1 Set the RUN/STOP switch on the CPU unit to STOP.
- 2 Turn the program controller power ON to check that it is configured as shown below.

Setup Items	Setting Value
ON-LINE	YES
SYSTEM OP	YES
WORD ADDR	YES

### NOTE

- If there are any items set differently from the above settings, set the cursor to the item using the up key or the down key and press key 1.

- 3 Define the BLOCK OB.  
Press the ENTER key to move to the INIT.STATE menu.
- 4 Select the INPUT menu.
- 5 Select the INPUT PC menu.
- 6 Select the DX.
- 7 Press key 2.
- 8 Press the ENTER key to display [KH•••KC].
- 9 Press key 1 to display the first address [0000:KH=].
- 10 Set each address as shown below.

To move the address, press the down key.

Address	Setting Value	Address	Setting Value
0000	4D41	0008	0000
0001	534B	0009	0000
0002	5832	0010	0000
0003	0020	0011	0000
0004	4409	0012	0000
0005	0000	0013	0000
0006	0000	0014	4D00
0007	0000	0015	0020

- 11 After all addresses are set, press the ENTER key to display [OVERWRITE?].
- 12 Press the ENTER key to move to the INIT.STATE menu.
- 13 Define the BLOCK DB.  
Press key 1 to move to the INPUT menu.
- 14 Select the INPUT PC menu.
- 15 Select the DB.
- 16 Press key 9.
- 17 Press the ENTER key to display [KH•••KC].

18 Press key 1 to display the first address [0000:KH=].

19 Set each address as shown below.

To move the address, press the down key.

Address	Setting Value	Address	Setting Value
0000	0009	0006	0000
0001	0002	0007	0000
0002	0008	0008	0000
0003	0001	0009	0000
0004	0000	0010	0000
0005	0002		

20 After all addresses are set, press the ENTER key to display [OVERWRITE?].

21 Press the ENTER key to move to the INIT.STATE menu.

22 Once the communication settings are complete, set the RUN/STOP switch on the CPU to RUN.

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**NOTE**

- If input was unsuccessful, press the CE key to clear, or press the BRK key to return to the original menu.
  - If the RUN/STOP switch on the CPU is not set to RUN, communication is not executed.
-

## 4 Setup Items

Set up the Display's communication settings in GP-Pro EX or in the Display's offline mode.

The setting of each parameter must match that of the External Device.

☞ "3 Communication Settings" (page 8)

### 4.1 Setup Items in GP-Pro EX

#### ■ Communication Settings

To display the setup screen, from the [Project] menu, point to [System Settings] and select [Device/PLC].

Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device. <b>IMPORTANT</b> In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display. If you select an SIO type that the serial interface does not support, proper operation cannot be guaranteed. Refer to your Display manual for details on the serial interface specifications.
Speed	Select the communication speed between the External Device and the Display.
Data Length	Display the data length.
Parity	Select how to check parity.
Stop Bit	Select the stop bit length.

continued on next page

Setup Items	Setup Description
Flow Control	Select the communication control method to prevent transmission and reception data overflow.
Timeout	Enter the time (seconds) for which the Display waits for the response from the External Device, from "1 to 127".
Retry	In case of no response from the External Device, use an integer from 0 to 255 to enter how many times the Display retransmits the command.
Wait To Send	Enter the standby time (milliseconds) from when the Display receives packets until it transmits the next command, from "0 to 255".
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS-232C for SIO type. When connecting with the IPC, change RI/5V with the IPC changeover switch. Please refer to the IPC manual for more details.

**NOTE**

- Refer to the GP-Pro EX Reference Manual for Indirect Device.

Cf. GP-Pro EX Reference Manual "Changing the Device/PLC at Runtime (Indirect Device)"

## 4.2 Setup Items in Offline Mode

**NOTE**

- Refer to the Maintenance/Troubleshooting guide for information on how to enter offline mode or about the operation.  
Cf. Maintenance/Troubleshooting Guide "Offline Mode"
- The number of the setup items to be displayed for 1 page in the offline mode depends on the Display in use. Please refer to the Reference manual for details.

### ■ Communication Settings

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Equipment Settings] in offline mode.

Touch the External Device you want to set from the displayed list.

Comm.	Option			
SIMATIC S5 3964(R)		[COM1]	Page 1/1	
SIO Type	RS232C			
Speed	19200			
Data Length	8			
Parity	<input type="radio"/> NONE <input checked="" type="radio"/> EVEN <input type="radio"/> ODD			
Stop Bit	<input checked="" type="radio"/> 1 <input type="radio"/> 2			
Flow Control	NONE			
Timeout(s)		3	▼▲	
Retry		2	▼▲	
Wait To Send(ms)		3	▼▲	
Exit		Back		2008/08/20 10:07:20

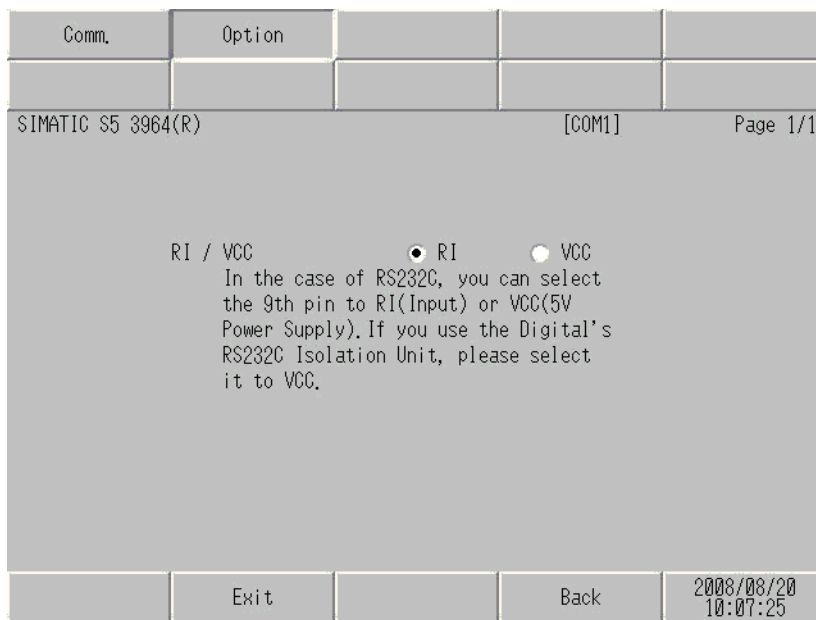
Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device. <b>IMPORTANT</b> In the communication settings, set [SIO Type] correctly according to the serial interface specifications of the Display. If you select an SIO type that the serial interface does not support, proper operation cannot be guaranteed. Refer to your Display manual for details on the serial interface specifications.
Speed	Select the communication speed between the External Device and the Display.
Data Length	Display the data length.
Parity	Select how to check parity.
Stop Bit	Select the stop bit length.
Flow Control	Select a communication control method to prevent transmission and reception data overflow.

continued on next page

Setup Items	Setup Description
Timeout (s)	Enter the time (seconds) for which the Display waits for the response from the External Device, from "1 to 127"
Retry	In case of no response from the External Device, use an integer from 0 to 255 to enter how many times the Display retransmits the command.
Wait To Send (ms)	Enter the standby time (milliseconds) from when the Display receives packets until it transmits the next command, from "0 to 255".

## ■ Option

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings]. Touch the External Device you want to set from the displayed list, and touch [Option].



Setup Items	Setup Description
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS232C for SIO type. When connecting with the IPC, change RI/5V with the IPC changeover switch. Please refer to the IPC manual for more details.

### NOTE

- GP-4100 series, GP-4\*01TM, GP-Rear Module, LT-4\*01TM and LT-Rear Module do not have the [Option] setting in the offline mode.

## 5 Cable Diagram

The following cable diagram may be different from the cable diagram recommended by Siemens AG. Please be assured there is no operational problem in applying the cable diagram shown in this manual.

- Please ground the FG pin of the External Device body. Use a grounding resistance of  $100\Omega$  2mm<sup>2</sup> or thicker wire, or your country's applicable standard. Refer to your External Device manual for more details.
- The SG and FG are connected inside the Display. When connecting the External Device to the SG, design your system to avoid short-circuit loops.
- Connect an isolation unit if the communication is not stable due to noise or other factors.

Cable Diagram 1

Display (Connection Port)	Cable		Notes
GP3000 (COM1) GP4000* <sup>1</sup> (COM1) SP5000* <sup>2</sup> (COM1/2) SP-5B00 (COM1) ST3000 (COM1) ST6000 (COM1) STM6000 (COM1) STC6000 (COM1) ET6000 (COM1) LT3000 (COM1) IPC* <sup>3</sup> PC/AT	1A	User-created cable	Cable length: 15m or less.
GP-4105 (COM1) GP-4115T (COM1) GP-4115T3 (COM1)	1B	User-created cable	Cable length: 15m or less.
LT-4*01TM (COM1) LT-Rear Module (COM1)	1C	RJ45 RS-232C Cable (5m) by Pro-face PFXZLMCBJR21	Cable length: 5m or less.

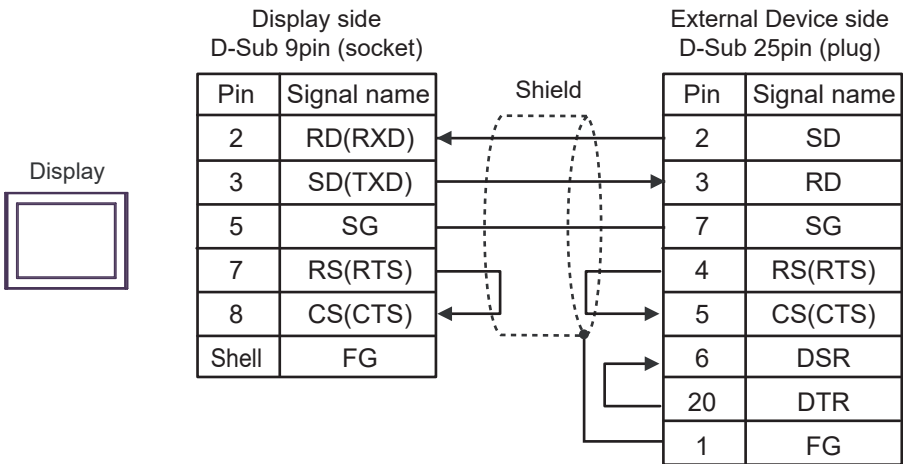
\*1 All GP4000 models except GP-4100 Series and GP-4203T

\*2 Except SP-5B00

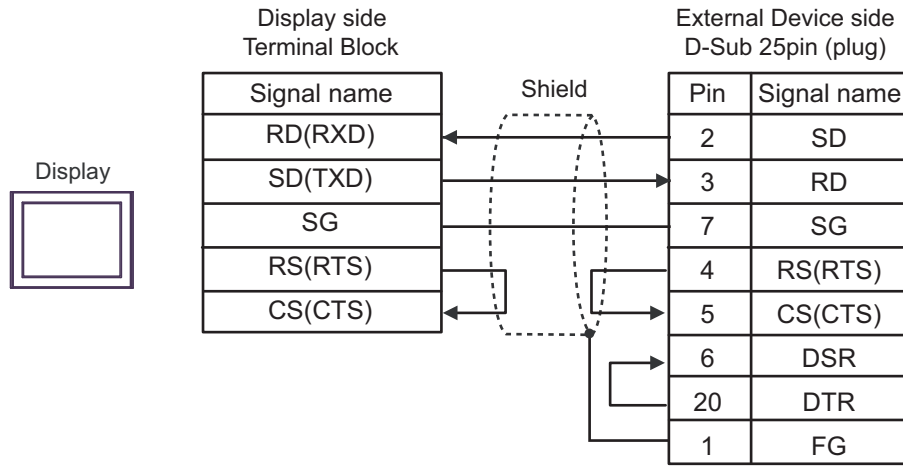
\*3 Only the COM port which can communicate by RS-232C can be used.

 ■ IPC COM Port (page 4)

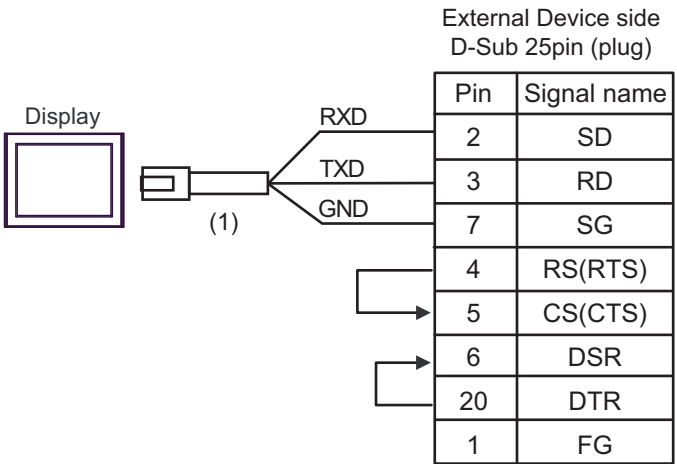
1A)



1B)



1C)






Legend	Name	Notes
(1)	RJ45 RS-232C Cable (5m) by Pro-face PFXZLMCBJR21	



## 6 Supported Device Addresses

The following section shows the range of supported device addresses. Please note that the actual supported range of the devices vary depending on the External Device to be used. Please check the actual range in the manual of your External Device.

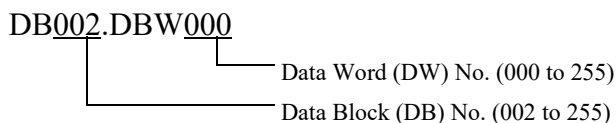
 : This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Remarks
Data Block	DB002.DBX000.0 - DB255.DBX255.15	 DB002.DBW000 - DB255.DBW255		*1*2*3

\*1 When changing bit addresses, the Display reads the corresponding word address from the External Device, then changes the defined bit in the word, and then returns the updated word value to the word address. In the meantime, if the word address on the External Device is edited as a result of a ladder program or other means, this value is overwritten with the word value from the Display.

\*2 To use Data Blocks, allocate them on the External Device.

\*3 Data Block addressing is as follows:  
Example: In the case of DB002.DBW000:



### NOTE

- Refer to the GP-Pro EX Reference Manual for system data area.  
Cf. GP-Pro EX Reference Manual "LS Area (Direct Access Method Area)"
- Refer to the precautions on manual notation for icons in the table.

 "Manual Symbols and Terminology"

## 7 Device Code and Address Code

Use device code and address code if you select "Device Type & Address" for the address type in Data Displays.

Device	Device Name	Device Code (HEX)	Address Code
Data Block	DB	0000	Value of (Data Block (DB) No. $\times$ 0x10000) + Data Word (DW) No.

## 8 Error Messages

Error messages are displayed on the Display screen as follows: "No.: Device Name: Error Message (Error Occurrence Area)". Each description is shown below.

Item	Description
No.	Error number.
Device Name	Name of the External Device where an error has occurred. Device name is the title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Error Message	Displays messages related to an error that has occurred.
Error Occurrence Area	<p>Displays the IP address or device address of the External Device where an error has occurred, or error codes received from the External Device.</p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• IP address is displayed as "IP address (Decimal): MAC address (Hex)".</li> <li>• Device address is displayed as "Address: Device address".</li> <li>• Received error codes are displayed as "Decimal [Hex]".</li> </ul>

Examples of Error Messages

"RHAA035: PLC1: Error has been responded for device write command (Error Code: 2[02H])"

**NOTE**

- Refer to your External Device manual for details on received error codes.
- Refer to "Display-related errors" in "Maintenance/Troubleshooting Guide" for details on the error messages common to the driver.

### ■ Error Codes Unique to External Device

Error Code	Error Description
0x0A	Parameter error Definition error by data exchange process
0x0C	Parameter error Command (packet) error
0x14	Parameter error Command (packet) error
0x2A	Communication process error other than command (packet) error
0x32	DB/DX access error
0x34	Command (packet) error
0x36	Communication process error other than command (packet) error

