Sharp

Sharp JW Link (SIO) 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 feature.

- The types of target machines that are compatible with Pro-Designer will depend on the Pro-Designer version. For target unit compatibility information, please refer to the Pro-Designer Online Help feature.

1 System Structure

The following describes the system system setup for connecting the target machine to Sharp PLCs.

To View a cable diagram for a particular communication format, see Section 2 - *Cable Diagrams*.

Series	CPU	Link I/F	Comm. Format	Diagram
New Satellite JW Series	JW-21CU(H) JW-22CU(H)	Link I/F on CPU unit[*1]	RS-232C	Cable Diagram 1
		JW-21CM[*2]	RS-422 (4-wire type)	Cable Diagram 2
			RS-422 (2-wire type)	Cable Diagram 3
	JW-31CUH1	JW-21CM[*2]	RS-422 (4-wire type)	Cable Diagram 2
			RS-422 (2-wire type)	Cable Diagram 3
	JW-32CUH1 JW-32CUM1 JW-32CUM2 JW-33CUH1 JW-33CUH2 JW-33CUH3	Link I/F on CPU unit	RS-232C (Connected to PG/COMM2 port)	Cable Diagram 4
			RS-422 (4-wire type) (Connected to PG/COMM1 port or PG/COMM2 port)	Cable Diagram 5
		JW-21CM[*2]	RS-422(4-wire type)	Cable Diagram 2
			RS-422 (2-wire type)	Cable Diagram 3
	JW-50CU(H)	JW-10CM	RS-422 (4-wire type)	Cable Diagram 2
			RS-422 (2-wire type)	Cable Diagram 3
	JW-70CU(H) JW-100CU(H)	Link I/F on CPU unit[*1]	RS-232C	Cable Diagram 1
		JW-10CM	RS-422 (4-wire type)	Cable Diagram 2
			RS-422 (2-wire type)	Cable Diagram 3

*1 Connect to the CPU Module's (JW-22CU, JW-70CU, JW-100CU) communication port.

*2 When using JW-21CM, be aware that some link units have usage restrictions depending on the ROM version.

Version Seal	Usage Restrictions
30Hn	No restrictions.
30H	Cannot read/write File Registers 10 to 2C. Cannot read/write File Register Addresses 100000 to 176777.
No Seal	Cannot be used with JW30H series units.

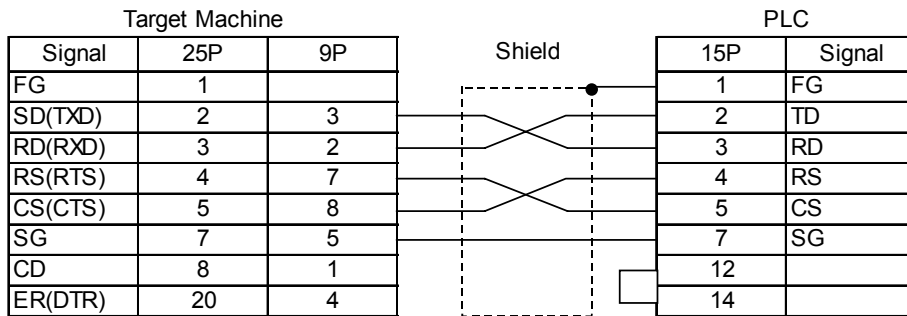MEMO • Places noted as RS-422 can also use RS-485 on the cable's PLC side.

2 Cable Diagrams

The cable diagrams illustrated below and the cable diagrams recommended by Sharp may differ, however, using these cables for your PLC operations will not cause any problems.

- Ground your PLC's FG terminal according to your country's applicable standard. For details, refer to the PLC's manual.
- If a communications cable is used, the SG (signal ground) must be connected.

Cable Diagram 1   RS-232C

Please create your own cable to connect the PLC to the target machine.

Target Machine	Cable / Adapter	Comments
GP,PS-P, PC/AT(PL), PS-G	User-Created Cable	Cable length: 15m max.

Target Machine			Shield	PLC	
Signal	25P	9P		15P	Signal
FG	1			1	FG
SD(TXD)	2	3		2	TD
RD(RXD)	3	2		3	RD
RS(RTS)	4	7		4	RS
CS(CTS)	5	8		5	CS
SG	7	5		7	SG
CD	8	1		12	
ER(DTR)	20	4		14	

MEMO
- Fujikura Densen's 7P*7/0.18 57VV-SB is recommended for the connection cable.
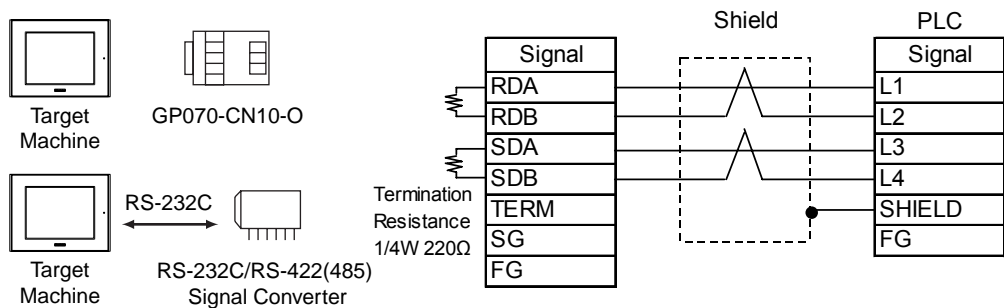
Cable Diagram 2   RS-422 (4-wire type)

Please choose the appropriate cable and adaptor for your target machine from the table below, or create your own cable to connect the PLC to the target machine.

Target Machine		Cable / Adapter	Comments
GP[*1],PS-P[*1]	a	RS-422 Connector Terminal Adapter (Pro-face: GP070-CN10-O)	Cable length: 500m max.
	b	User-Created Cable	
PC/AT(PL), PS-G	a	RS-232C/RS-422(485) Signal Converter	

*1   The available interface is COM1 only.
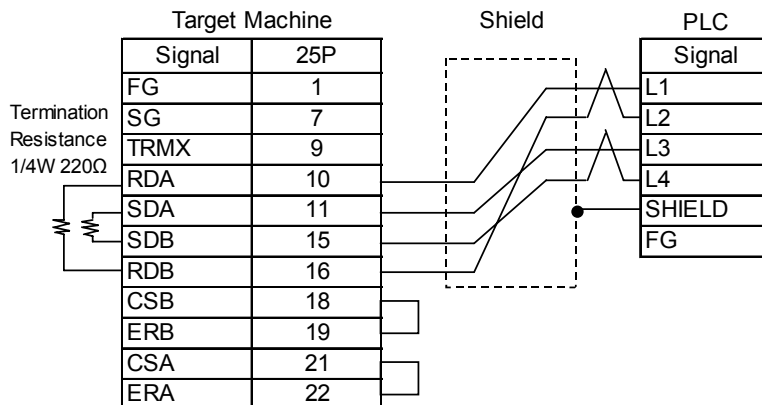
• Turn on the PLC's Termination Resistor switch.

a. RS-422 Connection Terminal Adapter (Pro-face: GP070-CN10-0)
   OR: RS-232C/RS-422(485) Signal Converter

MEMO
• As the RS-422(485) side of the RS-232C/RS-422(485) signal converter is a terminal, use any external line other than the communication line for the power cable.
• Follow the specifications for your RS-232C/RS-422(485) signal converter when connecting termination resistance on the RS-422(485) terminal.
• The RS-232C connection between the RS-232C/RS-422(485) signal converter and target machine depends on the signal converter. Refer to its specifications when connecting the signal converter and target machine.

b. User-created Cable

Termination Resistance 1/4W 220Ω

Signal	25P
FG	1
SG	7
TRMX	9
RDA	10
SDA	11
SDB	15
RDB	16
CSB	18
ERB	19
CSA	21
ERA	22

MEMO • When making your own cable connections, we recommend using Hitachi Densen's CO-SPEV-SB(A)3P*0.5 cable.

Cable Diagram 3   RS-422 (2-wire type)

Please choose the appropriate cable and adaptor for your target unit from the table below, or create your own cable to connect the PLC to the target machine.
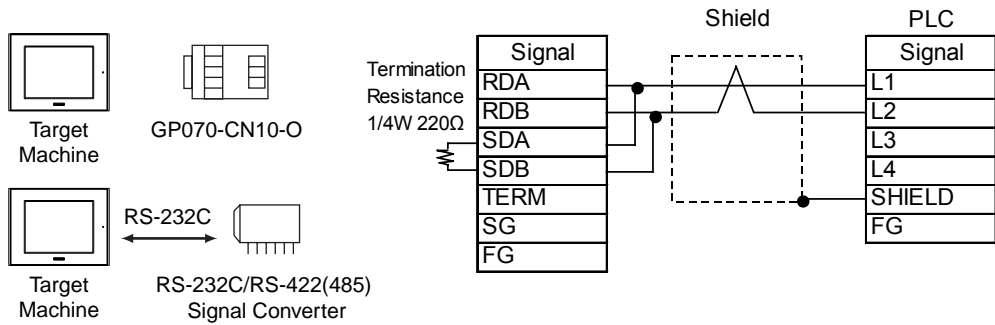
Target Machine		Cable / Adapter	Comments
GP[*1],PS-P[*1]	a	RS-422 Connector Terminal Adapter (Pro-face: GP070-CN10-O)	Cable length: 500m max.
	b	User-Created Cable	
PC/AT(PL), PS-G	a	RS-232C/RS-422(485) Signal Converter	

*1   The available interface is COM1 only.

⚠ CAUTION

🚫 Do not use pin Nos. 14 and 15 for connection with the target machine since their voltage is +5V.
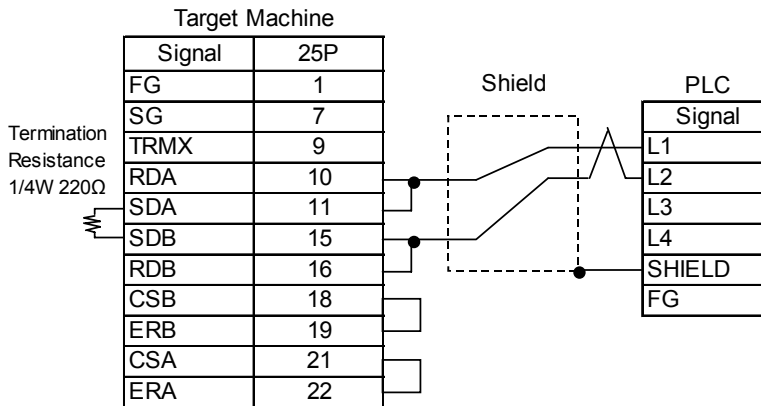
a. RS-422 Connection Terminal Adapter (Pro-face: GP070-CN10-0)
   OR: RS-232C/RS-422(485) Signal Converter

Target Machine

GP070-CN10-O

Target Machine

RS-232C

RS-232C/RS-422(485) Signal Converter

Termination Resistance 1/4W 220Ω

Shield

PLC

Signal
RDA
RDB
SDA
SDB
TERM
SG
FG

Signal
L1
L2
L3
L4
SHIELD
FG

MEMO
- Connect terminals SD A and RD A to terminal base L1, and SD B and RD B to terminal block's L2 line.
- As the RS-422(485) side of the RS-232C/RS-422(485) signal converter is a terminal, use any external line other than the communication line for the power cable.
- Follow the specifications for your RS-232C/RS-422(485) signal converter when connecting termination resistance on the RS-422(485) terminal.
- The RS-232C connection between the RS-232C/RS-422(485) signal converter and target machine depends on the signal converter. Refer to its specifications when connecting the signal converter and target machine.

b. User-created Cable

Target Machine

Termination Resistance 1/4W 220Ω

Shield

PLC

Signal	25P
FG	1
SG	7
TRMX	9
RDA	10
SDA	11
SDB	15
RDB	16
CSB	18
ERB	19
CSA	21
ERA	22

Signal
L1
L2
L3
L4
SHIELD
FG

MEMO
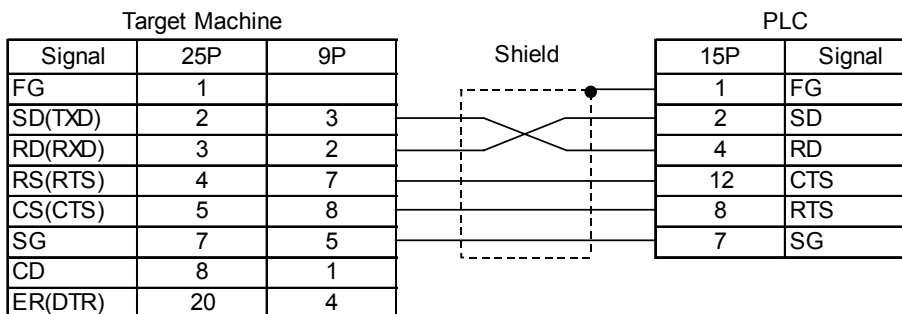- When making your own cable connections, we recommend using Hitachi Densen's CO-SPEV-SB(A)3P*0.5 cable.

Cable Diagram 4   RS-232C

Please create your own cable to connect the PLC to the target machine.

Target Machine	Cable / Adapter	Comments
GP,PS-P, PC/AT(PL), PS-G	User-Created Cable	Cable length: 15m max.

⚠ CAUTION

🚫 Do not use pin Nos. 14 and 15 for connection with the target machine since their voltage is +5V.

Target Machine			Shield	PLC	
Signal	25P	9P		15P	Signal
FG	1			1	FG
SD(TXD)	2	3		2	SD
RD(RXD)	3	2		4	RD
RS(RTS)	4	7		12	CTS
CS(CTS)	5	8		8	RTS
SG	7	5		7	SG
CD	8	1			
ER(DTR)	20	4			

Cable Diagram 5   RS-422 (4-wire type)

Please choose the appropriate cable and adaptor for your target unit from the table below, or create your own cable to connect the PLC to the target machine.
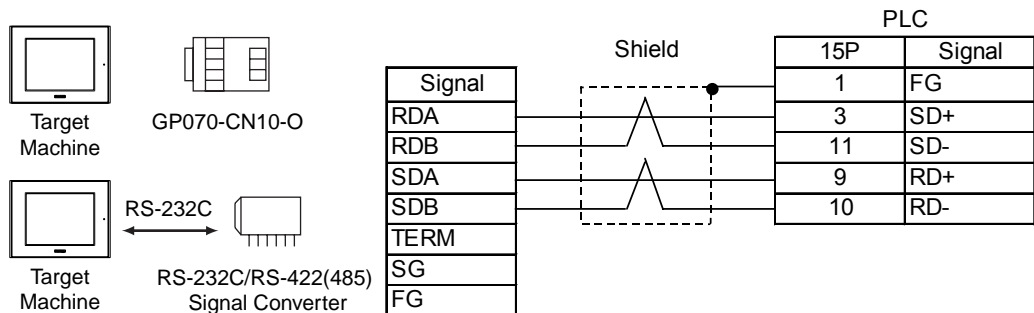
Target Machine		Cable / Adapter	Comments
GP[*1],PS-P[*1]	a	RS-422 Connector Terminal Adapter (Pro-face: GP070-CN10-O)	Cable length: 500m max.
	b	RS-422 Cable (Pro-face: GP230-IS11-O 5m)	
	c	User-Created Cable	
PC/AT(PL), PS-G	a	RS-232C/RS-422(485) Signal Converter	

*1   The available interface is COM1 only.

⚠ CAUTION

🚫 Do not use pin Nos. 14 and 15 for connection with the target machine since their voltage is +5V.
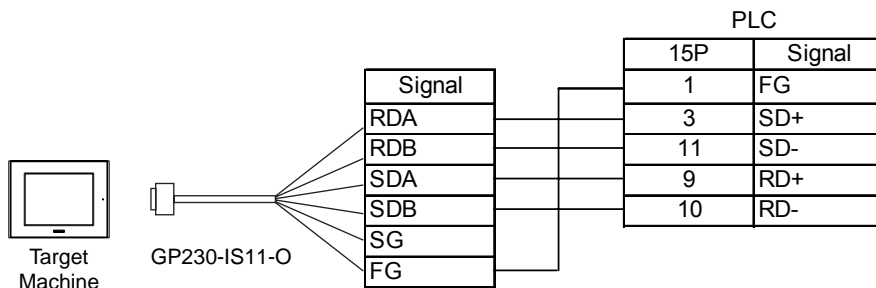
a. RS-422 Connection Terminal Adapter (Pro-face: GP070-CN10-0)
   OR: RS-232C/RS-422(485) Signal Converter

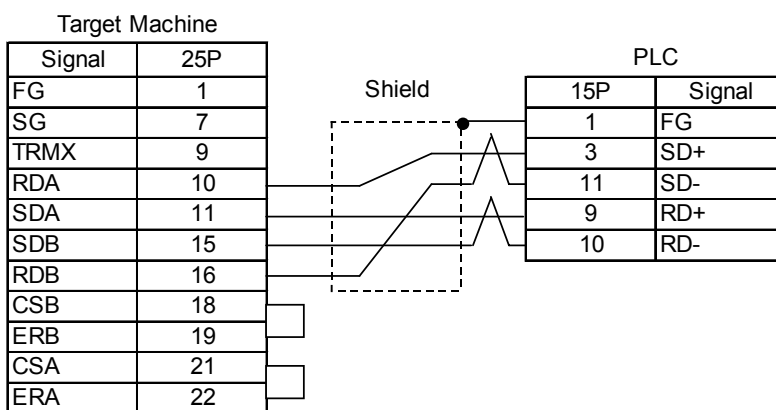| Signal		PLC 15P	Signal
RDA		1	FG
RDB		3	SD+
SDA		11	SD-
SDB		9	RD+
TERM		10	RD-
SG			
FG			

MEMO
- As the RS-422(485) side of the RS-232C/RS-422(485) signal converter is a terminal, use any external line other than the communication line for the power cable.
- Follow the specifications for your RS-232C/RS-422(485) signal converter when connecting termination resistance on the RS-422(485) terminal.
- The RS-232C connection between the RS-232C/RS-422(485) signal converter and target machine depends on the signal converter. Refer to its specifications when connecting the signal converter and target machine.

b. RS-422 Cable (Pro-face: GP230-IS11-O)

Signal		PLC	
		15P	Signal
Signal		1	FG
RDA		3	SD+
RDB		11	SD-
SDA		9	RD+
SDB		10	RD-
SG			
FG			

Target Machine   GP230-IS11-O

c. User-created Cable

Target Machine

Signal	25P	Shield	PLC	
FG	1		15P	Signal
SG	7		1	FG
TRMX	9		3	SD+
RDA	10		11	SD-
SDA	11		9	RD+
SDB	15		10	RD-
RDB	16			
CSB	18			
ERB	19			
CSA	21			
ERA	22			

MEMO

• When making your own cable connections, we recommend using Hitachi Densen's CO-SPEV-SB(A)3P*0.5 cable.

3 Supported Device Addresses

The following tables list the device address ranges you can enter from in Pro-Frame. For actual device address ranges supported by the PLC, refer to the PLC's manual.

Device	Bit Address	Word Address	16 bit	32 bit
Relay	00000-15777	A0000 - A1576[*1*4] (⊐0000 - ⊐1576)		
	20000-75777	A2000 - A7576[*1*4] (⊐ 2000 - ⊐7576)		
Timer (contact)	T0000-T1777	-		
Counter (contact)	C0000-C1777	-		
Timer/Counter (current value)	B0000:00-B3776:15	B0000 - B3776[*1*2*3] (b0000 - b3776) (T0000 - T3776)		
Register[*1*2*3]	09000:00-09776:15	09000-09776		
	19000:00-19776:15	19000-19776		
	. . . . .	. . . . .		
	89000:00-89776:15	89000-89776		
	99000:00-99776:15	99000-99776		
	E0000:00-E0776:15	E0000-E0776		
	E1000:00-E1776:15	E1000-E1776		
	. . . . .	. . . . .	[*6] L/H	[*6] L/H
	E6000:00-E6776:15	E6000-E6776		
	E7000:00-E7776:15	E7000-E7776		
File Register[*1*2*3*5]	1000000:00-1177776:15	1000000-1177776		
	2000000:00-2177776:15	2000000-2177776		
	. . . . .	. . . . .		
	6000000:00-6177776:15	6000000-6177776		
	7000000:00-7177776:15	7000000-7177776		
	F10000000:00-F10177776:15	F10000000-F10177776		
	F11000000:00-F11177776:15	F11000000-F11177776		
	. . . . .	. . . . .		
	F1E000000:00-F1E177776:15	F1E000000-F1E177776		
	F1F000000:00-F1F177776:15	F1F000000-F1F177776		
	F20000000:00-F20177776:15	F20000000-F20177776		
	F21000000:00-F21177776:15	F21000000-F21177776		
	. . . . .	. . . . .		
	F2B000000:00-F2B177776:15	F2B000000-F2B177776		
	F2C000000:00-F2C177776:15	F2C000000-F2C177776		

*1 Word addresses are designated using even numbers.
*2 You can define a bit address by adding a colon followed by the bit position (0~15) at the end of the word address.
*3 When the bit write operation is performed, the Target Machine reads the PLC's corresponding word address and turns a bit ON, then send back to PLC. Do not write to the word address from the ladder program in the middle of this operation.

*4   The PLC manual uses the values displayed in parenthesis for the Relay and Timer/Counter (current value) (B) word addresses; as a result, when entering this data in Pro-Frame, be sure to use **A**XXXX or **B**XXXX.

*5   The file register consists of a file number and an address.

    E.g.   **1 000000**

                               Address

                     File number

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

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

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

4 Consecutive Device Addresses

The following table lists the maximum number of consecutive addresses that can be read by each PLC. Refer to these tables to utilize *Block Transfer*.

MEMO
- When the device is setup using the methods below, the Data Communication Speed slows by the number of times the device is read.
  - When consecutive addresses exceed the maximum data number range
  - When an address is designated for division
  - When device types are different

To speed up data communication, use consecutive device addresses on a single target machine.

Device	Maximum Consecutive Addresses	Gap Span
Relay	256 words	25 words
Timer (contact)	1 bit	None
Counter (contact)		
Timer/Counter (current value)	256 words	25 words
Register		
File Register		

5 Environment Setup

The following tables list Pro-face's recommended communication settings for the target machine and PLC.

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

RS-232C

		Target Machine Settings	Communication Port Settings	
Driver Configuration	Serial Interface	RS-232C	—	
	Flow Control	DTR(ER)/CTS	—	
	Transmission Speed	9600 bps	Baud Rate	9600 bps
	Retry Count	2	—	
	Parity Bit	Even	Parity Bit	Even
	Stop Bit	2 bits	Stop Bit	2 bits
	Data Length	7 bits	Data Bit	7 bits
	Rcv. Time Out	10 sec	—	
	TX Wait Time	0 msec	—	
Protocol Configuration	Station No.	1	Station No.	1

RS-422 (4-wire type)

		Target Machine Settings		Communication Port Settings	
		GP, PS-P	PC/AT(PL), PS-G		
Driver Configuration	Serial Interface	RS-422 (4-wire type)	RS-232C[*1]	Comm Mode (SIO Line#)	4-wire type
	Flow Control	None	DTR(ER)/CTS	–	
	Transmission Speed[*2]	19200 bps		Baud Rate[*2]	19200 bps
	Retry Count	2		–	
	Parity Bit	Even		Parity Bit	Even
	Stop Bit	2 bits		Stop Bit	2 bits (fixed)
	Data Length	7 bits		Data Bit	7 bits (fixed)
	Rcv. Time Out	10 sec		–	
	TX Wait Time	0 msec		–	
		—		Function Setup Switch (S0)	Computer Link
Protocol Configuration	Station No.	1		Station No.	1

*1 By using a RS-232C/RS-422(485) signal converter, you can use RS-422 connections with PC/AT(PL Series) and PS Series Type G target machines. In such a configuration , make sure you set the Driver's Serial Interface to RS-232C.
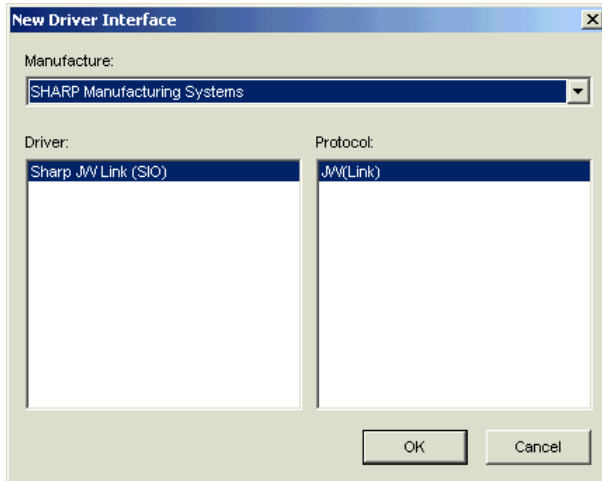
*2 115,200bps can be used with JW-32CUH1, W-32CUM1, W-32CUM2, JW-33CUH1, JW-33CUH2, and JW-33CUH3.

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 Configuraton

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: RS-232C, RS-422 (4-wire), or RS-422 (2-wire).
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
Sets either a parity bit [Even or Odd] for use in detecting communication errors, or [None] at all.

Stop Bit
>Defines the stop bit: 1 bit , 1.5 bits, or 2 bits.

Data Length
>Defines the length of each unit of data: 7 bit or 8 bit.

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.
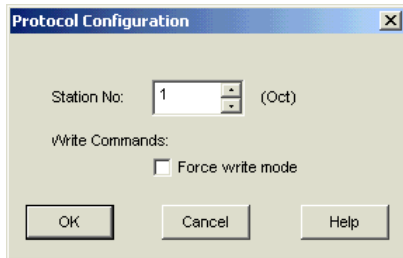
8   Protocol Configuraton

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.

Station No.
Enter the octal number that identifies the PLC. (1-37)

Write Commands: Force write mode

The PLC prevents write commands by a Pro-Designer Runtime application when Write Mode is OFF.
Select Force write mode so the PLC changes to Write Mode when Pro-Designer Runtime attempts a write operation.
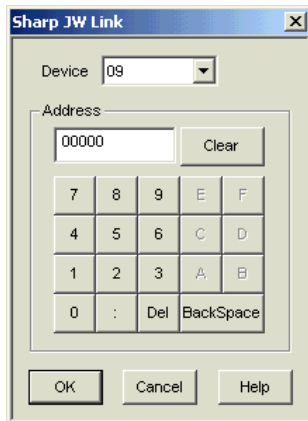
9 Device Address Configuration

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.

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.