Mitsubishi Electric

Melsec-A CPU (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.

- 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 Mitsubishi Melsec-A Series PLCs.
To view a cable connection diagram for a particular communication format, see Section 2 – *Cable Diagrams*.

Series	CPU[*1]	Link I/F	Comm. Format	Diagram
Melsec-A Series	A2A A3A A1N A2N A3N A1SJ A1SJH A1SH A2SH A2U A3U	CPU Direct	RS-232C	Cable Diagram 1
			RS-422(4-wire)	Cable Diagram 2
	A2U A3U A2U-S1 A2US A2USH-S1	2 Port Adapter II (Pro-face: GP070-MD11)	RS-422(4-wire)	Cable Diagram 3

*1   Connected to Programming Console interface.

2 Cable Diagrams

The illustrated cable diagrams and those recommended by Mitsubishi 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.

Diagram 1 RS-232C

To connect the target machine and the PLC, use the recommended cable.

Target Machine	Cable/Adapter	Note
GP, PS-P, PC/AT(PL), PS-G	RS-232C Cable (Data Link: RSCV-MF(25-pin) or Diatrend: DAFXIH-CAB(25-pin), DAFXIH-CAB(9-pin))	Be sure the cable used/selected fits the target unit's serial I/F connector. Cable length: 15m max.
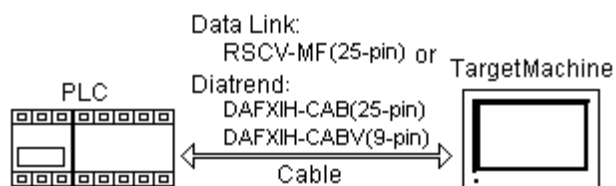
Cable Diagram 2 RS-422

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

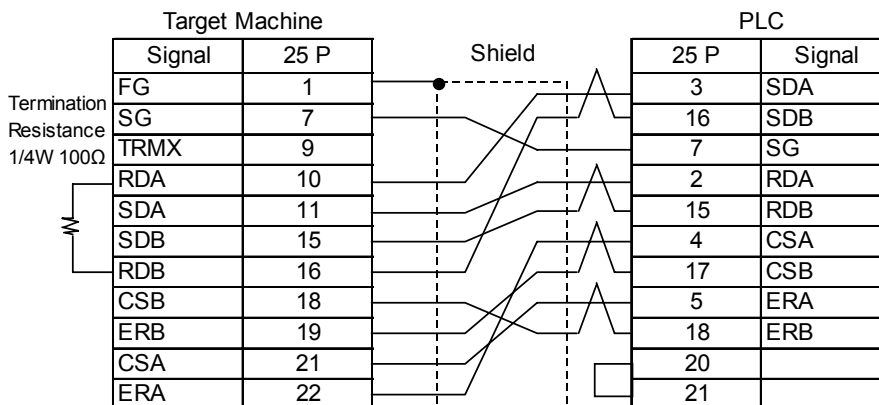| Target Machine	Cable / Adapter	Note
GP[*1], PS-P[*1]	User-created Cable	Cable length: 15m max.

*1 Connect to COM1.

Diagram 3 RS-422 (4-wire)

To connect the target machines and the PLC, use the recommended cable (and a pin adapter if necessary).

| Target Machine		Cable/Adapter	Note
GP[*1], PS-P[*1]	a	2Port Adapter II and RS-422 Cable (Pro-face: GP070-MDCB11)	Cable Length: 500m max.
	b	2Port Adapter II and User-created Cable[*2]	
PC/AT(PL), PS-G	b	2Port Adapter II, User-created Cable[*2] and RS-232C/RS422(485) adapter	

*1   Only COM1 can be used.

a. When use the 2Port Adapter II and RS-422 Cable(GP070-MDCB11).
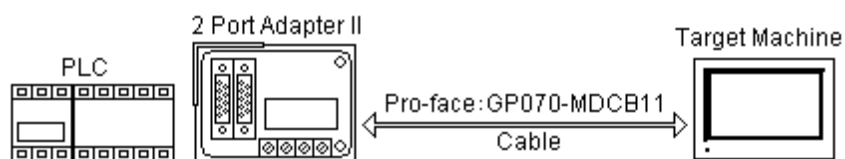
b. When use the 2Port Adapter II and User-created Cable.

When use the 2Port Adapter II, User-created Cable, and RS-232C/RS-422(485) adapter.
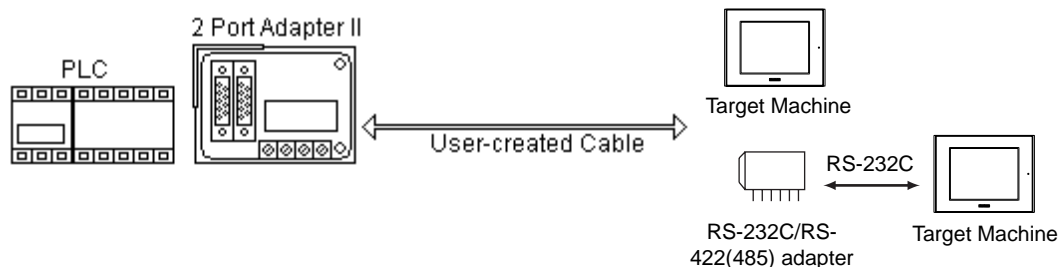
MEMO   When creating your own cable, refer to the Mitsubishi Melsec 2 Port Adapter II Manual for cable connections.

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.

3.1 AnA Series

Device	Bit Address	Word Address	16 bit	32 bit
Input Relay	X0000-X1FFF	X0000-X1FF0[*1]		
Output Relay	Y0000-Y1FFF	Y0000-Y1FF0[*1]		
Internal Relay	M0000-M8191	M0000-M8176[*2]		
Latch Relay	L0000-L8191	L0000-L8176[*2]		
Special Relay	M9000-M9255	M9000-M9240[*2]		
Annunciator	F0000-F2047	F0000-F2032[*2]		
Link Relay	B0000-B0FFF	--		
Timer (contact)	TS0000-TS2047	--		
Timer (coil)	TC0000-TC2047	--	LH[*6]	LH[*6]
Counter (contact)	CS0000-CS1023	--		
Counter (coil)	CC0000-CC1023	--		
Timer (current value)	--	TN0000-TN2047		
Counter (current value)	--	CN0000-CN1023		
Data Register[*3]	D0000:0-D8191:15	D0000-D8191[*4]		
Special Register[*3]	D9000:0-D9255:15	D9000-D9255[*4]		
Link Register[*3]	W0000:0-W1FFF:F	W0000-W1FFF[*5]		
File Register[*3]	R0000:0-R8191:15	R0000-R8191[*4]		

*1 To use as word address, the bit number (last digit) must be 0.
*2 To use as word address, must be multiple of 16.
*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 You can define a bit address by adding a colon followed by the bit position (0~15) at the end of the word. (e.g. D0100:8)
*5 You can define a bit address by adding a colon followed by the bit position (0~F) at the end of the word. (e.g. W0001:A)
*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)

3.2 AnN Series

Device	Bit Address	Word Address	16 bit	32 bit
Input Relay	X0000-X07FF	X0000-X07F0[*1]		
Output Relay	Y0000-Y07FF	Y0000-Y07F0[*1]		
Internal Relay	M0000-M2047	M0000-M2032[*2]		
Latch Relay	L0000-L2047	L0000-L2032[*2]		
Special Relay	M9000-M9255	M9000-M9240[*2]		
Annunciator	F000-F255	F000-F240[*2]		
Link Relay	B0000-B03FF	--		
Timer (contact)	TS000-TS255	--	LH[*6]	LH[*6]
Timer (coil)	TC000-TC255	--		
Counter (contact)	CS000-CS255	--		
Counter (coil)	CC000-CC255	--		
Timer (current value)	--	TN000-TN255		
Counter (current value)	--	CN000-CN255		
Data Register[*3]	D0000:0-D1023:15	D0000-D1023[*4]		
Link Register[*3]	W0000:0-W03FF:F	W0000-W03FF[*5]		
File Register[*3]	R0000:0-R8191:15	R0000-R8191[*4]		

*1 To use as word address, the bit column (last column) must be 0.
*2 To use as word address, must be multiple of 16.
*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 You can define a bit address by adding a colon followed by the bit position (0~15) at the end of the word. (e.g. D0100:8)
*5 You can define a bit address by adding a colon followed by the bit position (0~F) at the end of the word. (e.g. W0001:A)
*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)

3.3 AnU Series

Device	Bit Address	Word Address	16 bit	32 bit
Input Relay	X0000-X1FFF	X0000-X1FF0[*1]		
Output Relay	Y0000-Y1FFF	Y0000-Y1FF0[*1]		
Internal Relay	M0000-M8191	M0000-M8176[*2]		
Latch Relay	L0000-L8191	L0000-L8176[*2]		
Special Relay	M9000-M9255	M9000-M9240[*2]		
Annunciator	F0000-F2047	F0000-F2032[*2]		
Link Relay	B0000-B1FFF	--		
Timer (contact)	TS0000-TS2047	--		
Timer (coil)	TC0000-TC2047	--	LH[*6]	LH[*6]
Counter (contact)	CS0000-CS1023	--		
Counter (coil)	CC0000-CC1023	--		
Timer (current value)	--	TN0000-TN2047		
Counter (current value)	--	CN0000-CN1023		
Data Register[*3]	D0000:0-D8191:15	D0000-D8191[*4]		
Special Register[*3]	D9000:0-D9255:15	D9000-D9255[*4]		
Link Register[*3]	W0000:0-W1FFF:F	W0000-W1FFF[*5]		
File Register[*3]	R0000:0-R8191:15	R0000-R8191[*4]		

*1   To use as word address, the bit column (last column) must be 0.
*2   To use as word address, must be multiple of 16.
*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   You can define a bit address by adding a colon followed by the bit position (0~15) at the end of the word. (e.g. D0100:8)
*5   You can define a bit address by adding a colon followed by the bit position (0~F) at the end of the word. (e.g. W0001:A)
*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 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

4.1   AnA, AnU Series

Device	Max. Consecutive Addresses	Gap Span
Input Relay (X)	256 bits	47 bits
Output Relay (Y)		
Internal Relay (M)		
Latch Relay (L)		
Special Relay (M)		
Annunciator (F)		
Link Relay (B)		
Timer [contact] (TS)		
Timer [coil] (TC)		
Counter [contact] (CS)		
Counter [coil] (CC)		
Data Register (D)	64 words	6 words
Link Register (W)		
File Register (R)		
Special Register (D)		
Timer [current value] (TN)		
Counter [current value] (CN)		

4.2   AnN Series

Device	Max. Consecutive Addresses	Gap Span
Input Relay (X)	32 bits	31 bits
Output Relay (Y)		
Internal Relay (M)		
Latch Relay (L)		
Special Relay (M)		
Annunciator (F)		
Link Relay (B)		
Timer [contact] (TS)		
Timer [coil] (TC)		
Counter [contact] (CS)		
Counter [coil] (CC)		
Data Register (D)	64 words	16 words
Link Register (W)		
File Register (R)		
Timer [current value] (TN)		
Counter [current value] (CN)		

5 Environment Setup

The following table lists the communication settings, recommended by Pro-face, for the target machine and Mitsubishi Melsec PLCs.
For details, see Section 7 – *Driver Configuration,* and Section 8 – *Protocol Configuration.*

RS-232C

	Target Machine Settings		PLC Settings
	Serial Interface	RS-232C	--
	Flow Control	None	--
	Transmission Speed	9600 bps	--
	Retry Count	2	--
Driver	Parity Bit	Odd	--
	Stop Bit	1 bit	--
	Data Length	8 bit	--
	Rcv Time Out	10 s	--
	TX Wait Time	0 ms	--

RS-422 (4-wire)

	Target Machine			PLC Settings
		GP, PS-P	PC/AT(PL), PS-G	
	Serial Interface	RS-422(4 Wire)	RS-232C[*1]	--
	Flow Control	None		--
	Transmission Speed	9600 bps		--
	Retry Count	2		--
Driver	Parity Bit	Odd		--
	Stop Bit	1 bit		--
	Data Length	8 bits		--
	Rcv Timeout	10 sec		--
	TX Wait Time	0 msec		--

*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.
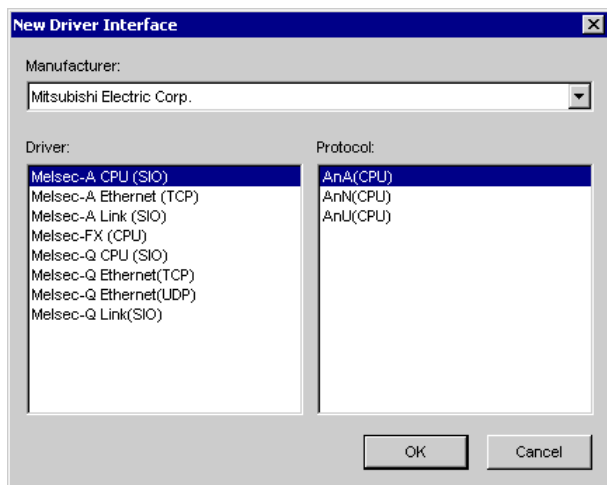
MEMO   The PLC program cycle time slows by approximately 8% when you connect the target machine to the programming port.

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: RS-232C or RS-422 (4-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, 1.5, 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.
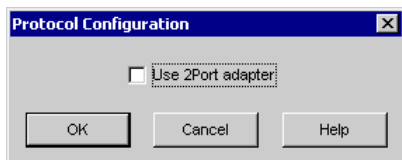
8   Protocol Configuration

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.

2Port Adapter
Select when connecting the 2Port Adapter II to the CPU programming port. The 2Port Adapter II enables one RS-422 and one RS-232C connection.
When using the 2Port Adpater II, monitor commands are disabled.

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.