

## CPU Unit Serial Gateway Function Specifications

Item	Specification
Pre-conversion data	FINS (via FINS network, Host Link FINS, toolbus, NT Link, or CPU bus)
Conversion functions	FINS commands addressed to serial port 1 or 2 on the CPU Unit are converted to CompoWay/F commands (after removing the header) if the FINS command code is 2803 hex and to Modbus-RTU commands (after removing the header) if the FINS command code is 2804 hex.
Post-conversion data	CompoWay/F command or Modbus-RTU command
Serial communications method	1:N half-duplex
Maximum number of nodes	31
Enabling serial communications mode	Serial Gateway Mode
Response timeout	The time from when a message converted to a different protocol is set until a response is received is monitored by the serial gateway function. Default: 5 s, User setting: 0.1 to 25.5 s <b>Note</b> A FINS response code of 0205 hex (response timeout) is sent to the source of the FINS command if a timeout occurs.
Send delay function	None

**Note** If a CJ-series Serial Communications Unit is connected via a CJ Unit Adapter, messages can also be converted to Modbus-ASCII or Host Link FINS. Refer to the *SYSMAC CS/CJ Series Serial Communications Boards/Units Operation Manual (W336)* for details.

## 6-1-5 Serial PLC Links

### Overview

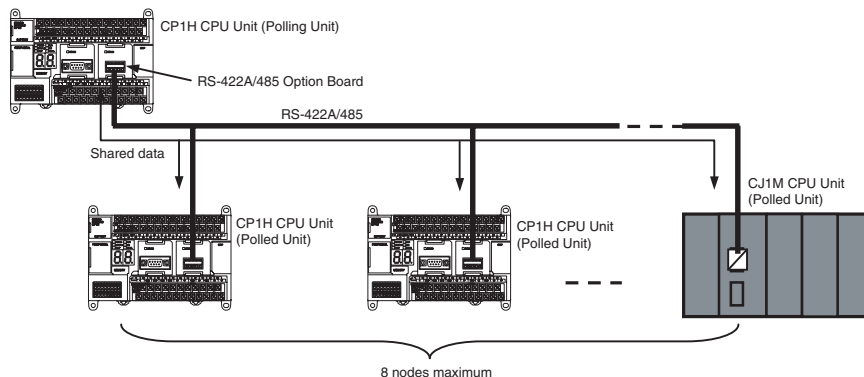
Serial PLC Links can be used to allow data to be exchanged among CP1H and CJ1M CPU Units via the RS-422A/485 or RS-232C Option Boards mounted to the CPU Units without requiring special programming. The communications mode in the PLC Setup must be set to the Serial PLC Link Mode to enable this functionality.

- Either serial port 1 or 2 can be used. (See note.)
- Words are allocated in memory in the Serial PLC Link Words (CIO 3100 to CIO 3199).
- A maximum of 10 words can be transferred by each CPU1H CPU Unit, but the number of linked words can be set to fewer words. (The size must be the same for all CP1H CPU Units.)

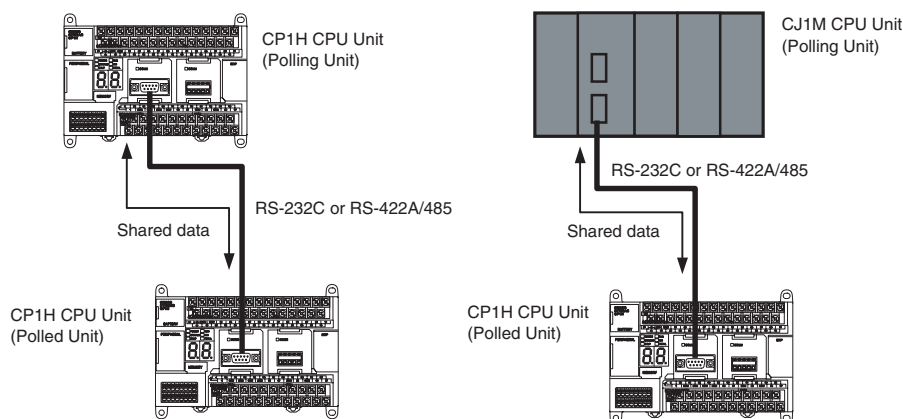
**Note** Serial PLC Links cannot be used on serial ports 1 and 2 at the same time. If one port is set as a Serial PLC Link slave or master, it will not be possible to set the other port for a Serial PLC Link. A PLC Setup error will occur if an attempt is made to set both ports for Serial PLC Links.

**Configuration**

**1:N Connections between CP1H/CJ1M CPU Units (8 Nodes Maximum)**



**1:1 Connections between CP1H/CJ1M CPU Units**



**Specifications**

Item	Specifications
Applicable serial ports	Serial port 1 or 2. Both ports cannot be used for PLC Links at the same time. If both ports are set for PLC Links (either as polling node or polled node), a PLC Setup setting error (non-fatal error) will occur and the PLC Setup Setting Error Flag (A40210) will turn ON.
Connection method	RS-422A/485 or RS-232C connection via RS-422A/485 or RS-232C Option Board.
Allocated data area	Serial PLC Link Words: CIO 3100 to CIO 3199 (Up to 10 words can be allocated for each CPU Unit.)
Number of Units	9 Units max., comprising 1 Polling Unit and 8 Polled Units (A PT can be placed on the same network in an 1:N NT Link, but it must be counted as one of the 8 Polled Units.)
Link methods (data refresh methods)	Complete link method or Polling Unit link method

**Data Refresh Methods**

The following two methods can be used to refresh data.

- Complete link method
- Polling Unit link method

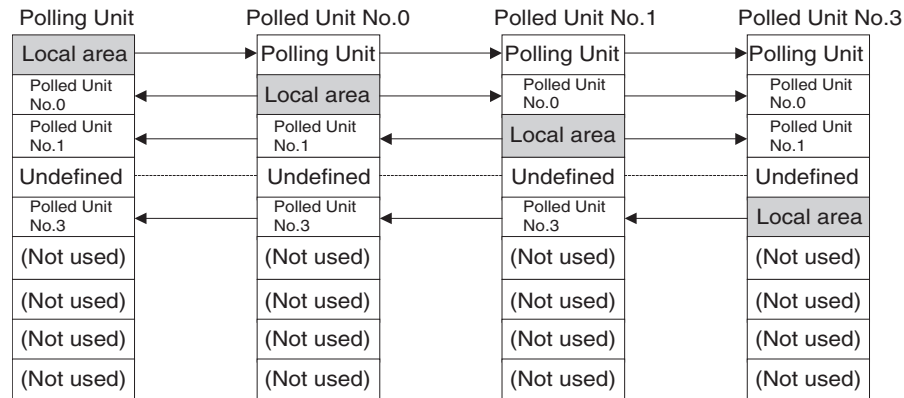
**Complete Link Method**

The data from all nodes in the Serial PLC Links are reflected in both the Polling Unit and the Polled Units. (The only exceptions are the address allocated

to the connected PT's unit number and the addresses of Polled Units that are not present in the network. These data areas are undefined in all nodes.)

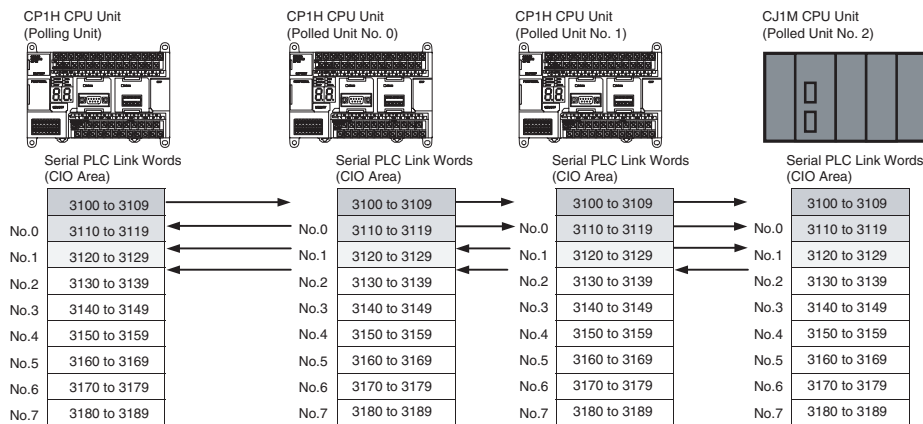
**Example: Complete Link Method, Highest Unit Number: 3**

In the following diagram, Polled Unit No. 2 is either a PT or is a Unit not present in the network, so the area allocated for Polled Unit No. 2 is undefined in all nodes.



**Example: Complete Link Method, Number of Link Words: 10**

Each CPU Unit (either CP1H or CJ1M) sends data to the same words in all other CPU Units for the Polling Unit and all Polled Units. The Polling Unit is a CP1H CPU Unit in the following example, but it could also be a CJ1M CPU Unit.

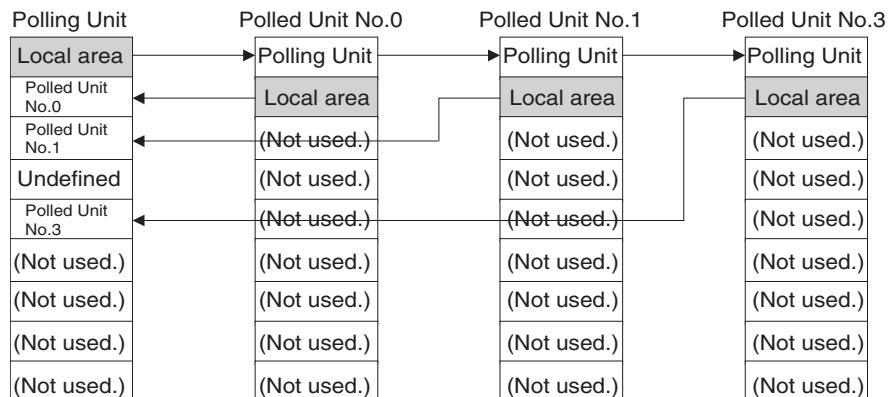


**Polling Unit Link Method**

The data for all the Polled Units in the Serial PLC Links are reflected in the Polling Unit only, and each Polled Unit reflects the data of the Polling Unit only. The advantage of the Polling Unit link method is that the addresses allocated for the local Polled Unit data are the same in each Polled Unit, allowing data to be accessed using common ladder programming. The areas allocated for the unit numbers of the PT or Polled Units not present in the network are undefined in the Polling Unit only.

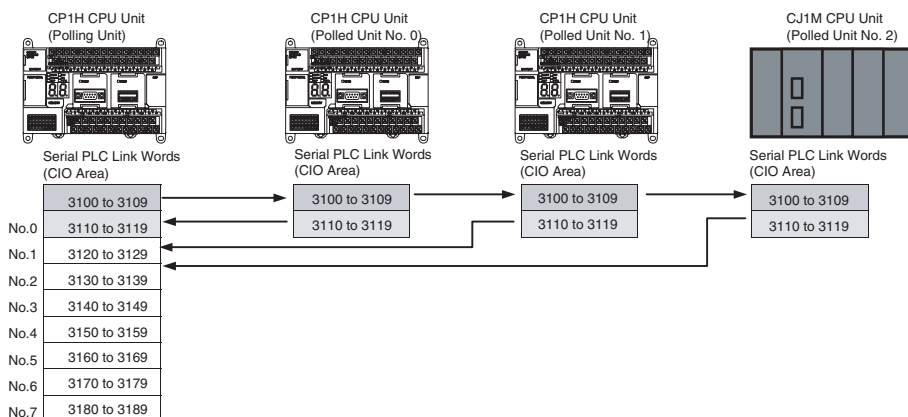
**Example: Polling Unit Link Method, Highest Unit Number: 3**

In the following diagram, Polled Unit No. 2 is a PT or a Unit not participating in the network, so the corresponding area in the Polling Unit is undefined.



**Example: Polling Unit Link Method, Number of Link Words: 10**

The CPU Unit that is the Polling Unit (either CP1H or CJ1M) sends its data (CIO 3100 to CIO 3109) to the same words (CIO 3100 to CIO 3109) in all other CPU Units. The Polled Units send their data (CIO 3110 to CIO 3119) to consecutive sets of 10 words in the Polling Unit. The Polling Unit is a CP1H CPU Unit in the following example, but it could also be a CJ1M CPU Unit. (Only the first three Polled Units are shown below.)



**Allocated Words**

**Complete Link Method**

Address

CIO 3100

Serial PLC  
Link Words

CIO 3199

Link words	1 word	2 words	3 words	to	10 words
Polling Unit	CIO 3100	CIO 3100 to CIO 3101	CIO 3100 to CIO 3102		CIO 3100 to CIO 3109
Polled Unit No. 0	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Polled Unit No. 1	CIO 3102	CIO 3104 to CIO 3105	CIO 3106 to CIO 3108		CIO 3120 to CIO 3129
Polled Unit No. 2	CIO 3103	CIO 3106 to CIO 3107	CIO 3109 to CIO 3111		CIO 3130 to CIO 3139
Polled Unit No. 3	CIO 3104	CIO 3108 to CIO 3109	CIO 3112 to CIO 3114		CIO 3140 to CIO 3149
Polled Unit No. 4	CIO 3105	CIO 3110 to CIO 3111	CIO 3115 to CIO 3117		CIO 3150 to CIO 3159
Polled Unit No. 5	CIO 3106	CIO 3112 to CIO 3113	CIO 3118 to CIO 3120		CIO 3160 to CIO 3169
Polled Unit No. 6	CIO 3107	CIO 3114 to CIO 3115	CIO 3121 to CIO 3123		CIO 3170 to CIO 3179
Polled Unit No. 7	CIO 3108	CIO 3116 to CIO 3117	CIO 3124 to CIO 3126		CIO 3180 to CIO 3189
Not used.	CIO 3109 to CIO 3199	CIO 3118 to CIO 3199	CIO 3127 to CIO 3199		CIO 3190 to CIO 3199

**Polling Unit Link Method**

Address

CIO 3100

Serial PLC  
Link Words

CIO 3199

Link words	1 word	2 words	3 words	to	10 words
Polling Unit	CIO 3100	CIO 3100 to CIO 3101	CIO 3100 to CIO 3102		CIO 3100 to CIO 3109
Polled Unit No. 0	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Polled Unit No. 1	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Polled Unit No. 2	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Polled Unit No. 3	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Polled Unit No. 4	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Polled Unit No. 5	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Polled Unit No. 6	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Polled Unit No. 7	CIO 3101	CIO 3102 to CIO 3103	CIO 3103 to CIO 3105		CIO 3110 to CIO 3119
Not used.	CIO 3102 to CIO 3199	CIO 3104 to CIO 3199	CIO 3106 to CIO 3199		CIO 3120 to CIO 3199

**Procedure**

The Serial PLC Links operate according to the following settings in the PLC Setup in the Polling Unit and Polled Units.

**Settings at the Polling Unit**

- 1,2,3...**
1. Set the serial communications mode of serial port 1 or 2 to Serial PLC Links (Polling Unit).
  2. Set the link method to the Complete Link Method or Polling Unit Link Method.
  3. Set the number of link words (up to 10 words for each Unit).
  4. Set the maximum unit number in the Serial PLC Links (0 to 7).

**Settings at the Polled Units**

- 1,2,3...**
1. Set the serial communications mode of serial port 1 or 2 to Serial PLC Links (Polled Unit).
  2. Set the unit number of the Serial PLC Link Polled Unit.

**PLC Setup**

**Settings at the Polling Unit**

Item		Set value	Default	Refresh timing
Serial port 1 or 2	Mode: Communications mode	PC Link (Master): PLC Link Polling Unit	Host Link	Every cycle
	Baud: Baud rate	38,400 bps, 115,200 bps	9,600 bps	
	PC link mode: PLC Link method	ALL: Complete link method Masters: Polling Unit method	ALL	
	Link words: No. of link words	1 to 10 words	10 words	
	PC Link Unit No.: Max. unit No.	0 to 7	0 hex	

**Settings at the Polled Unit**

Item		Set value	Default	Refresh timing
Serial port 1 or 2	Mode: Communications mode	PC Link (Slave): PLC Link Polled Unit	Host Link	Every cycle
	Baud: Baud rate	38,400 bps, 115,200 bps	9,600 bps	
	Unit number	0 to 7	0	

**Note** Both serial ports cannot be used for PLC Links at the same time. If both ports are set for PLC Links (either as polling node or polled node), a PLC Setup setting error (non-fatal error) will occur and the PLC Setup Setting Error Flag (A40210) will turn ON. If PLC Links is set for one serial port, set the other serial port to a different mode.

### Related Auxiliary Area Flags for Serial Port 1

Name	Address	Details	Read/write	Refresh timing
Serial Port 1 Communications Error Flag	A392.12	Turns ON when a communications error occurs at serial port 1. ON: Error OFF: Normal	Read	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• Turns ON when a communications error occurs at serial port 1.</li> <li>• Turns OFF when the port is restarted.</li> <li>• Disabled in peripheral bus mode and NT link mode.</li> </ul>
Serial Port 1 Communicating with PT Flags (See note.)	A394.00 to A394.07	When serial port 1 is being used in NT link mode, the bit corresponding to the Unit performing communications will be ON. Bits 00 to 07 correspond to unit numbers 0 to 7, respectively. ON: Communicating OFF: Not communicating	Read	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• Turns ON the bit corresponding to the unit number of the PT/Polled Unit that is communicating via serial port 1 in NT link mode or Serial PLC Link mode.</li> <li>• Bits 00 to 07 correspond to unit numbers 0 to 7, respectively.</li> </ul>
Serial Port 1 Restart Bit	A526.01	Turn ON this bit to restart serial port 1.	Read/write	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• Turn ON to restart serial port 1, (except when communicating in peripheral bus mode).</li> </ul> <p>Note: The bit is automatically turned OFF by the system when restart processing has been completed.</p>
Serial Port 1 Error Flags	A528.08 to A528.15	When an error occurs at serial port 1, the corresponding error bit is turned ON. Bit 08: Not used. Bit 09: Not used. Bit 10: Parity error Bit 11: Framing error Bit 12: Overrun error Bit 13: Timeout error Bit 14: Not used. Bit 15: Not used.	Read/write	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• When an error occurs at serial port 1, the corresponding error bit is turned ON.</li> <li>• The flag is automatically turned OFF by the system when serial port 1 is restarted.</li> <li>• Disabled during peripheral bus mode.</li> <li>• In NT link mode, only bit 05 (timeout error) is enabled.</li> </ul> <p>In Serial PLC Link mode, only the following bits are enabled.</p> <ul style="list-style-type: none"> <li>• Errors at the Polling Unit: Bit 05: Timeout error</li> <li>• Errors at Polled Units: Bit 05: Timeout error Bit 04: Overrun error Bit 03: Framing error</li> </ul>
Serial Port 1 Settings Changed Flag	A619.01	Turns ON when the communications conditions of serial port 1 are being changed. ON: Changed OFF: No change	Read/write	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• Turns ON while communications conditions settings for serial port 1 are being changed.</li> <li>• Turns ON when the CHANGE SERIAL PORT SETUP instruction (STUP(237)) is executed.</li> <li>• Turns OFF when the changes to settings are completed.</li> </ul>

**Note** In the same way as for the existing 1:N NT Link, the status (communicating/not communicating) of PTs in Serial PLC Links can be checked from the Polling Unit (CPU Unit) by reading the Serial Port 1 Communicating with PT Flag (A394 bits 00 to 07 for unit numbers 0 to 7).

## Related Auxiliary Area Flags for Serial Port 2

Name	Address	Details	Read/write	Refresh timing
Serial Port 2 Communications Error Flag	A392.04	Turns ON when a communications error occurs at Serial Port 2. ON: Error OFF: Normal	Read	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• Turns ON when a communications error occurs at Serial Port 2.</li> <li>• Turns OFF when the port is restarted.</li> <li>• Disabled in peripheral bus mode and NT link mode.</li> </ul>
Serial Port 2 Communicating with PT Flags (See note.)	A393.00 to A393.07	When Serial Port 2 is being used in NT link mode, the bit corresponding to the Unit performing communications will be ON. Bits 00 to 07 correspond to unit numbers 0 to 7, respectively. ON: Communicating OFF: Not communicating	Read	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• Turns ON the bit corresponding to the unit number of the PT/Polled Unit that is communicating via Serial Port 2 in NT link mode or Serial PLC Link mode.</li> <li>• Bits 00 to 07 correspond to unit numbers 0 to 7, respectively.</li> </ul>
Serial Port 2 Restart Bit	A526.00	Turn ON this bit to restart Serial Port 2.	Read/write	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• Turn ON to restart Serial Port 2, (except when communicating in peripheral bus mode).</li> </ul> <p>Note: The bit is automatically turned OFF by the system when restart processing has been completed.</p>
Serial Port 2 Error Flags	A528.00 to A528.07	When an error occurs at Serial Port 2, the corresponding error bit is turned ON. Bit 00: Not used. Bit 01: Not used. Bit 02: Parity error Bit 03: Framing error Bit 04: Overrun error Bit 05: Timeout error Bit 06: Not used. Bit 07: Not used.	Read/write	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• When an error occurs at Serial Port 2, the corresponding error bit is turned ON.</li> <li>• The flag is automatically turned OFF by the system when Serial Port 2 is restarted.</li> <li>• Disabled during peripheral bus mode.</li> <li>• In NT link mode, only bit 05 (timeout error) is enabled.</li> </ul> <p>In Serial PLC Link mode, only the following bits are enabled.</p> <ul style="list-style-type: none"> <li>• Errors at the Polling Unit: Bit 05: Timeout error</li> <li>• Errors at Polled Units: Bit 05: Timeout error Bit 04: Overrun error Bit 03: Framing error</li> </ul>
Serial Port 2 Settings Changed Flag	A619.02	Turns ON when the communications conditions of Serial Port 2 are being changed. ON: Changed OFF: No change	Read/write	<ul style="list-style-type: none"> <li>• Cleared when power is turned ON.</li> <li>• Turns ON while communications conditions settings for Serial Port 2 are being changed.</li> <li>• Turns ON when the CHANGE SERIAL PORT SETUP instruction (STUP(237)) is executed.</li> <li>• Turns OFF when the changes to settings are completed.</li> </ul>

**Note** In the same way as for the existing 1:N NT Link, the status (communicating/not communicating) of PTs in Serial PLC Links can be checked from the Polling Unit (CPU Unit) by reading the Serial Port 2 Communicating with PT Flag (A393 bits 00 to 07 for unit numbers 0 to 7).