

SECTION 9

Ethernet Option Board

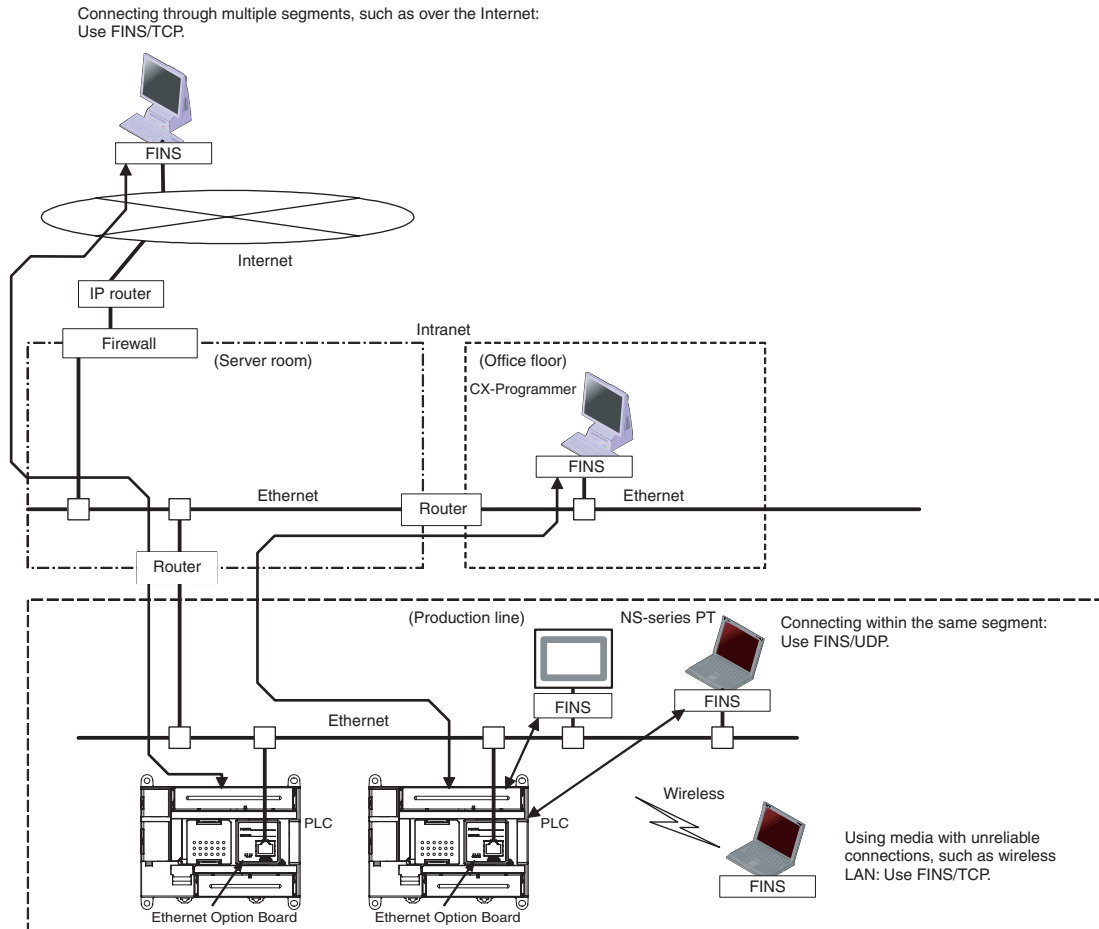
This section gives an outline of the Ethernet Option Board, explains how to install and remove the Ethernet Option Board, and how to monitor and make settings required for operation. It also lists the errors during operation and provides countermeasures for troubleshooting.

9-1	Ethernet Option Board Function Guide	552
9-1-1	Overall system configuration example	552
9-1-2	Connecting the CX-Programmer to PLCs Online via Ethernet	553
9-1-3	Receiving Data from OMRON PLCs using Ethernet	554
9-2	Differential Monitoring	555
9-3	System Configuration	556
9-3-1	System Configuration	556
9-3-2	Devices Required for Constructing a Network	556
9-4	Specifications	557
9-5	FINS Communications	558
9-5-1	FINS Communications Service Specifications	558
9-5-2	Overview of FINS Communication Service	559
9-6	Part Names	560
9-7	Comparison with Previous Models	561
9-8	Installation and Initial Setup	562
9-8-1	Overview of Startup Procedure	562
9-8-2	Installation and Removing	563
9-8-3	Network Installation	564
9-8-4	Web Browser Setting Function	567
9-9	Memory Allocations	569
9-9-1	CIO Area Allocation	569
9-9-2	DM Area Allocation	571
9-10	Web Browser Setup and Display	575
9-10-1	Multi-language Function	575
9-10-2	Overview of Web Browser Function	575
9-10-3	System	576
9-10-4	HTTP	578
9-10-5	IP Address Table	579
9-10-6	IP Router Table	580
9-10-7	FINS/TCP	581
9-10-8	Unit Information	582
9-10-9	Unit Status	583
9-10-10	FINS Status	584
9-10-11	Error Log	585
9-11	Trouble Shooting	586
9-11-1	Error Log	586
9-11-2	Trouble-shooting with Indicators and Error Code Display	589
9-11-3	Error Status	590
9-12	Sample Application	591

9-1 Ethernet Option Board Function Guide

9-1-1 Overall system configuration example

Ethernet Option Board provides receiving commands by OMRON standard protocol FINS for CP1L and CP1H programmable controllers. The Ethernet Network Interface allows you to easily connect CP1L and CP1H Programmable Controllers onto new or existing Ethernet network and upload/download programs, communicate between controllers (do not support real-time scanning I/O on Ethernet Option Board).



- Note**
1. Please use CX-Programmer version 8.1 or higher (CX-ONE version 3.1 or higher).
 2. Please use CX-Integrator version 2.33 or higher (CX-ONE version 3.1 or higher) to make the routing table. Except making the routing table for CP1W-CIF41, other functions, such as transferring the parameters and network structure, are not supported by CX-Integrator.
 3. Use the Web browser to set the CP1W-CIF41.
 4. NS-series HMI version 8.2 or higher can use CP1W-CIF41 through Ethernet.

9-1-2 Connecting the CX-Programmer to PLCs Online via Ethernet

Connecting within the Same Segment

Use the UDP/IP version of the FINS communications service (i.e., FINS/UDP). FINS/UDP is supported by many OMRON products and is compatible with earlier Ethernet Units (CS1W-ETN01/ETN11/ETN21 and CJ1W-ETN11/ETN21). The CX-Programmer can be connected and used with FINS/UDP.

Connecting through Multiple Segments

Use the TCP/IP version of the FINS communications service (i.e., FINS/TCP). It provides automatic recovery at the TCP/IP layer from communications errors (such as packet loss) that occur during multilevel routing. For CX-Programmer, FINS/TCP can be used to directly connect to the PLC online.

Using Media with Unreliable Connections, Such as a Wireless LAN

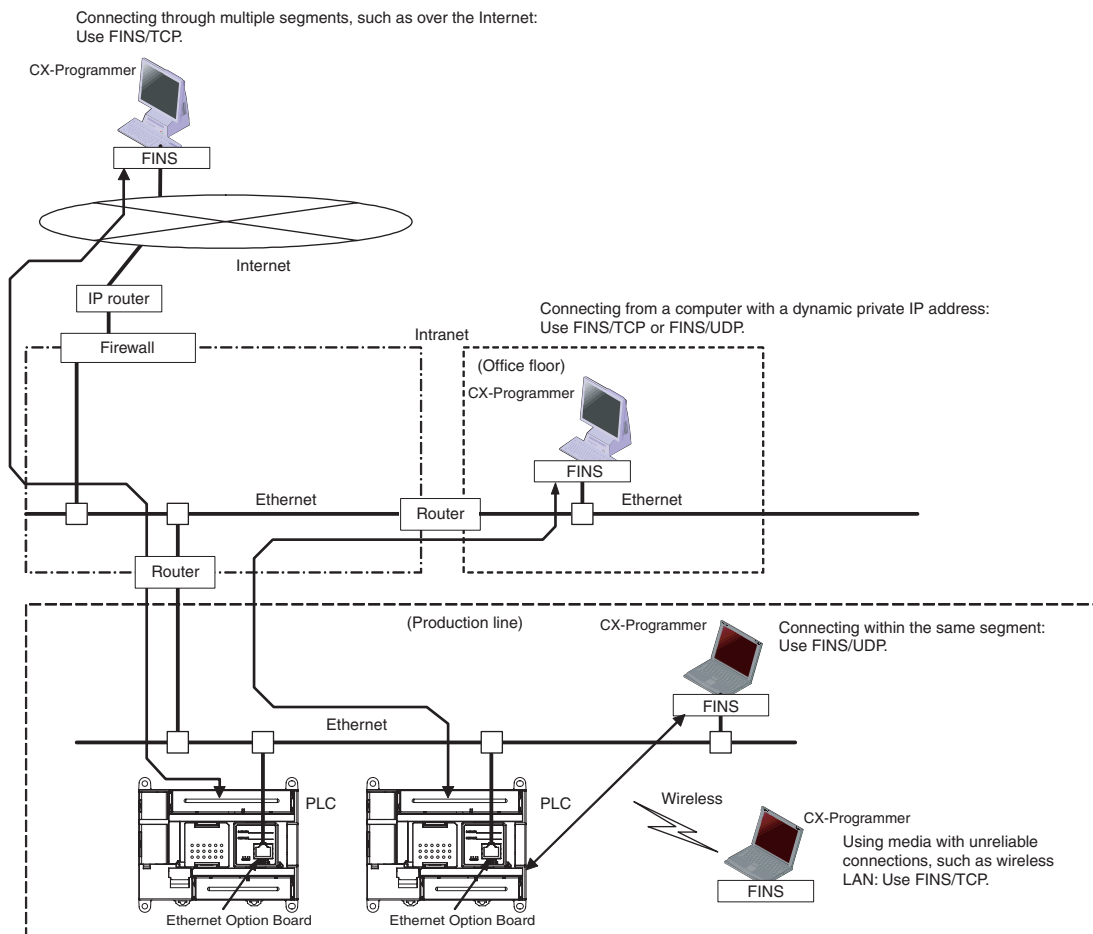
Use the TCP/IP version of the FINS communications service (i.e., FINS/TCP). It provides automatic recovery at the TCP/IP layer from communications errors (such as packet loss) resulting from unreliable connections. For CX-Programmer, FINS/TCP can be used to directly connect to the PLC online.

Connecting from a Personal Computer with a Dynamic Private IP Address

Depending on whether or not the connection will be within the same segment, either use an IP address conversion method for dynamic IP addresses in the UDP/IP version of the FINS communications service or use the TCP/IP version of the FINS communications service.

It is possible to connect online to a PLC using the CX-Programmer from a computer serving as a temporarily connected node or a permanent DHCP client.

For CX-Programmer, FINS/TCP can be used to directly connect to the PLC online.



9-1-3 Receiving Data from OMRON PLCs using Ethernet

The CP1W-CIF41 Ethernet Option Board can only support receiving FINS commands from OMRON PLCs using Ethernet.

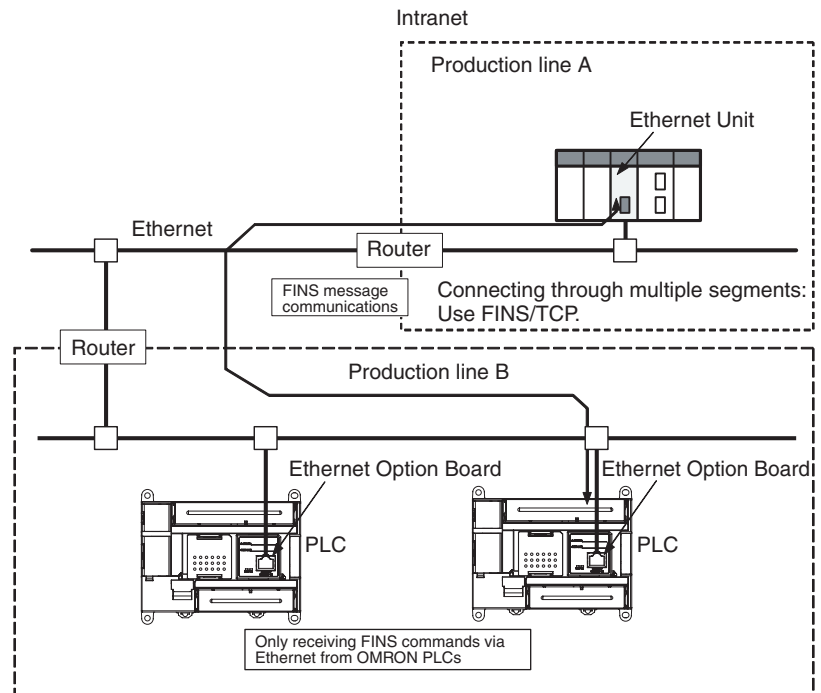
Connecting within the Same Segment

Use the UDP/IP version of the FINS communications service (i.e., FINS/UDP), and construct applications using the SEND(090), RECV(098), and CMND(490) instructions in the ladder program. FINS/UDP is supported by many OMRON products, and is compatible with earlier Ethernet Units (CS1W-ETN01/ETN11/ETN21 and CJ1W-ETN11/ETN21). The protocol processing for FINS/UDP is simpler than for FINS/TCP, giving FINS/UDP certain advantages in terms of performance. Another feature of FINS/UDP is that it can be used for broadcasting.

On the other hand, with FINS/UDP it is necessary to provide measures, such as retries, for handling communications errors.

Connecting through Multiple Segments

Use the TCP/IP version of the FINS communications service (i.e., FINS/TCP), and construct applications using the SEND(090), RECV(098), and CMND(490) instructions in the ladder program. FINS/TCP is the initial function supported by this Ethernet Option Board (CP1W-CIF41). It provides automatic recovery at the TCP/IP layer from communications errors (such as packet loss) that occur during multilevel routing.



9-2 Differential Monitoring

Compatibility and Speed

The transmission medium of Ethernet side has been upgraded to 100Base-TX, while compatibility with some functions and application interfaces of the existing Ethernet Unit models for CS/CJ series has been maintained.

Limited by the Toolbus protocol used on the serial side, the processing speed is only 115.2kbps, slower than the existing Ethernet Unit. The FINS frame length is less than 1,004 bytes, so the system response performance for the same FINS message applications is longer than the existing Ethernet Unit.

Various Protocols Available on Ethernet

A variety of protocols make a wide range of applications for use on an Ethernet network. The protocols that can be selected include receiving commands by OMRON's standard protocol FINS and reading Ethernet Option Board settings and status by HTTP.

A communications service can be selected according to need, allowing the PLC to be flexibly integrated with the Ethernet information network.

Improved FINS Message Communications

The following functions have been maintained according to the existing Ethernet Unit models for CS/CJ series.

- The maximum number of nodes is 254.
- Communications are enabled even if the host computer's IP address is dynamic.
- An automatic client FINS node address allocation function makes it possible to connect online to the PLC even if no FINS node address has been set for the host computer.
- FINS message communications are enabled in both UDP/IP and TCP/IP, but it are only enabled in TCP/IP with up to 2 simultaneous connections .
→Previously it are enabled in TCP/IP with up to 16 simultaneous connections and all can be set to client.
- Multiple FINS applications, such as the CX-Programmer, on the same computer can be connected online to the PLC via Ethernet.

Use Web Function to Read Ethernet Option Board Settings and Status

A Web function is provided in Ethernet Option Board.

This enables use of a Web browser to read the Ethernet Option Board's system settings and statuses.

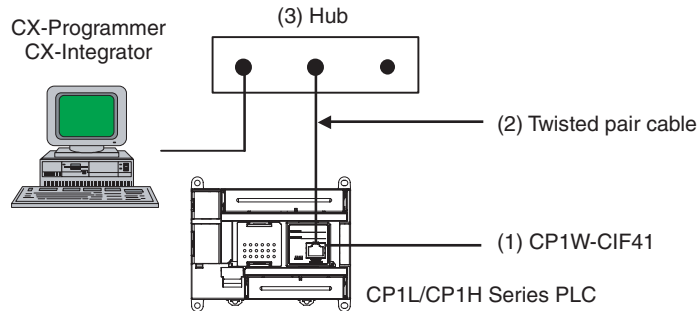
Full Range of Functions for Handling Troubles

A full range of functions is provided for promptly handling any troubles.

- Self-diagnostic function when power is turned ON.
- Error log for recording error information when an error occurs.

9-3 System Configuration

9-3-1 System Configuration



9-3-2 Devices Required for Constructing a Network

The basic configuration for a 100Base-TX Ethernet System consists of one hub to which nodes are attached in star form using twisted-pair cable. The devices shown in the following table are required to configure a network with 100Base-TX-type CP1W-CIF41, so prepared them in advance.

Network device	Contents
(1) Ethernet Option Board (CP1W-CIF41)	The Ethernet Option Board is a Communication Unit that connects a CP1H series or CP1L series PLC to 100Base-TX Ethernet networks. (They can also be used as 10Base-T.)
(2) Twisted-pair cable	This is twisted-pair cable for connecting 100Base-TX type Ethernet Option Board to the hub, with an RJ45 Modular Connector at each end. Use a category 3, 4, 5, or 5e UTP (unshielded twisted pair) or STP (shielded twisted-pair) cable.
(3) Hub	This is a relay device for connecting multiple nodes in a star LAN.

Recommended Hubs

For detail on recommended devices for constructing a network, refer to 9-8-3 *Network Installation*.

9-4 Specifications

Item		Specifications	
Model number		CP1W-CIF41	
Type		100/10Base-TX (Auto-MDIX)	
Applicable PLCs		CP1L and CP1H PLCs	
Unit classification		CP1 option port unit	
Mounting location		CP1L and CP1H micro PLC option port	
Number of Units that can be mounted		1 set. (each type of CP1L and CP1H PLC can only mount 1 set Ethernet Option Board) (See note.)	
Size of Buffers		8K bytes	
Transfer	Media access method	CSMA/CD	
	Modulation method	Baseband	
	Transmission paths	Star form	
	Baud rate	100 Mbit/s (100Base-TX)	10 Mbit/s (10Base-T)
		<ul style="list-style-type: none"> • Half/full auto-negotiation for each port • Link speed auto-sensing for each port 	
Transmission media	<ul style="list-style-type: none"> • Unshielded twisted-pair (UDP) cable Categories: 5, 5e • Shielded twisted-pair (STP) cable Categories: 100Ω at 5, 5e 	<ul style="list-style-type: none"> • Unshielded twisted-pair (UDP) cable Categories: 3, 4, 5, 5e • Shielded twisted-pair (STP) cable Categories: 100Ω at 3, 4, 5, 5e 	
Transmission Distance	100 m (distance between hub and node)		
Current consumption (Unit)		130 mA max. at 5 V DC	
Vibration resistance		Conforms to JIS 0040. 10 to 57Hz: 0.075-mm amplitude, 57 to 150 Hz: acceleration 9.8 m/s ² in X, Y, and Z directions for 80 minutes each (sweep time: 8 minutes×10 sweeps = 80 minutes)	
Shock resistance		Conforms to JIS 0041. 147m/s ² , 3 times each in X, Y, and Z directions	
Ambient operating temperature		0 to 55°C	
Ambient humidity		10% to 90% (with no condensation)	
Atmosphere		Must be free of corrosive gas.	
Ambient storage temperature		-20 to 75°C	
Weight		23 g max.	
Dimensions		36.4×36.4×28.2 mm (W×H×D)	

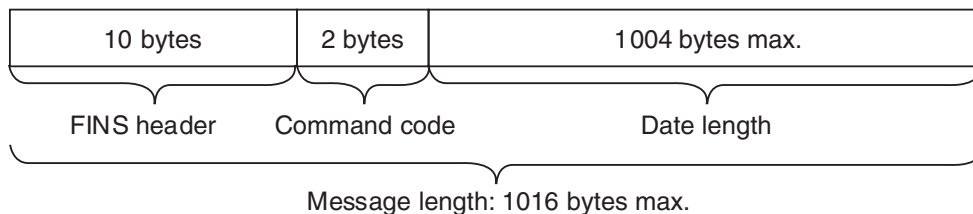
Note If two CP1W-CIF41 Ethernet Option Boards are mounted in the CP1L/H system, the CP1W-CIF41 mounted on option board slot 1 will be abnormal and ERR indicator will be ON, the CP1W-CIF41 on option board slot 2 will work normally.

9-5 FINS Communications

9-5-1 FINS Communications Service Specifications

Item	Specification	
Number of nodes	254	
Message Length	1016 bytes max.	
Date Length	1004 bytes max. (See note)	
Number of buffer	14 (1016 bytes×6+240 bytes×8)	
Protocol name	FINS/UDP method	FINS/TCP method
Protocol used	UDP/IP	TCP/IP
	The selection of UDP/IP or TCP/IP is made by means of the FINS/TCP Tab in the CX-Programmer's Unit Setup.	
Number of connections	---	2
Port number	9600 (default)	9600 (default)
	Can be changed.	Can be changed.
Protection	No	Yes (Specification of client IP addresses when unit is used as a server)
Other	Items set for each UDP port	Items set for each connection
	<ul style="list-style-type: none"> • Broadcast • Address conversion method 	<ul style="list-style-type: none"> • Server specification • Remote IP address spec. Server: specify IP addresses of clients permitted to connect. • Automatic FINS node address allocation Specify automatic allocation of client FINS node addresses
Internal table	<p>This is a table of correspondences for remote FINS node addresses, remote IP addresses, TCP/UDP, and remote port numbers. It is created automatically when power is turned ON to the PLC or when the unit is restarted, and it is automatically changed when a connection is established by means of the FINS/TCP method or when a FINS command received.</p> <p>The following functions are enabled by using this table.</p> <ul style="list-style-type: none"> • IP address conversion using the FINS/UDP method • Automatic FINS node address conversion after a connection is established using the FINS/TCP method • Automatic client FINS node address allocation using the FINS/TCP method • Simultaneous connection of multiple FINS applications 	

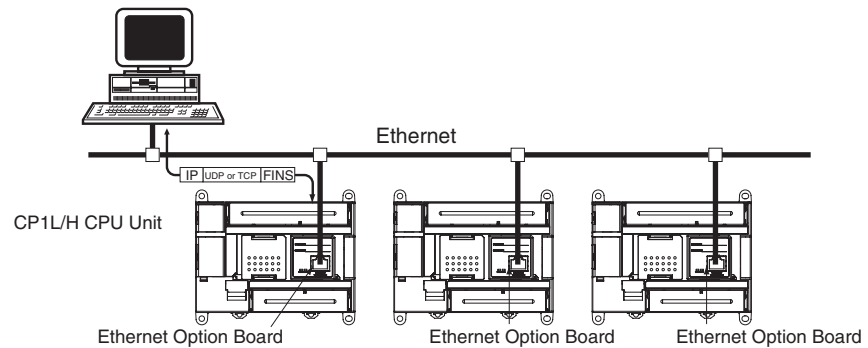
Note Refer to the following diagram for the relation between message length and date length.



9-5-2 Overview of FINS Communication Service

Basic Functions

FINS commands can be received from other PLCs or computers on the same Ethernet network by executing SEND(090), RECV(098), or CMND(490) instructions in the ladder diagram program. This enables various control operations such as the reading and writing of I/O memory between PLCs, mode changes, and file memory operations.



Executing, from the host computer, FINS commands with UDP/IP or TCP/IP headers enables various control operations, such as the reading and writing of I/O memory between PLCs, mode changes, and file memory operations.

For example, it is possible to connect online via Ethernet from FINS communications applications such as the CX-Programmer, and to perform remote programming and monitoring.

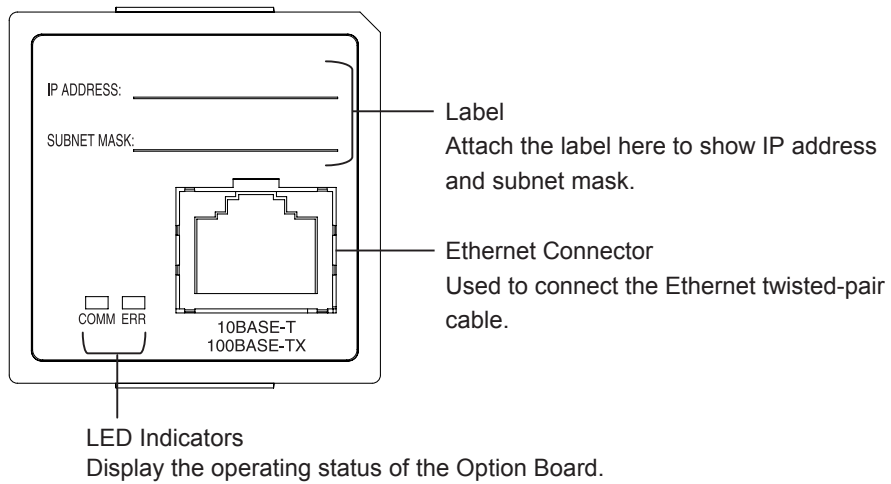
Upgraded Functions

With the CP1W-CIF41, the following functions have been upgraded.

- The FINS communications service can be executed not only with UDP/IP but also with TCP/IP, and it is even possible to use FINS communications with both UDP/IP and TCP/IP together on the same network. Using TCP/IP makes FINS communications highly reliable.
- Even if the IP address and UDP port number of the host computer (a DHCP client computer) are changed, it is still possible for the host computer to send FINS commands to PLCs on the Ethernet network and to receive responses. When UDP is used, either the automatic generation (dynamic) method or the IP address table method must be selected for IP address conversion. When TCP is used, changes in IP address and TCP port numbers are handled automatically.
- Multiple FINS applications (CX-Programmer and user-created application programs) at the same computer can be connected online to a PLC via Ethernet (using either TCP/IP or UDP/IP).

Note The message service does not guarantee that a message will reach the destination node. A message may be lost during transmission due to factors such as noise. To prevent this from occurring when using message services, it is common to set up retry processing at the node from which instructions are issued. With the SEND(090), RECV(098), and CMND(490) instructions, retry processing is executed automatically by specifying the number of retries, so specify a number other than 0.

9-6 Part Names



LED Indicators

Indicator	Color	Status	Meaning
COMM	Yellow	Not lit	Not sending or receiving data.
		Flashing	Sending or receiving data.
ERR	Red	Not lit	Unit normal.
		Lit	An fatal error has occurred at the Unit.
		Flashing	An no-fatal error has occurred at the unit.

9-7 Comparison with Previous Models

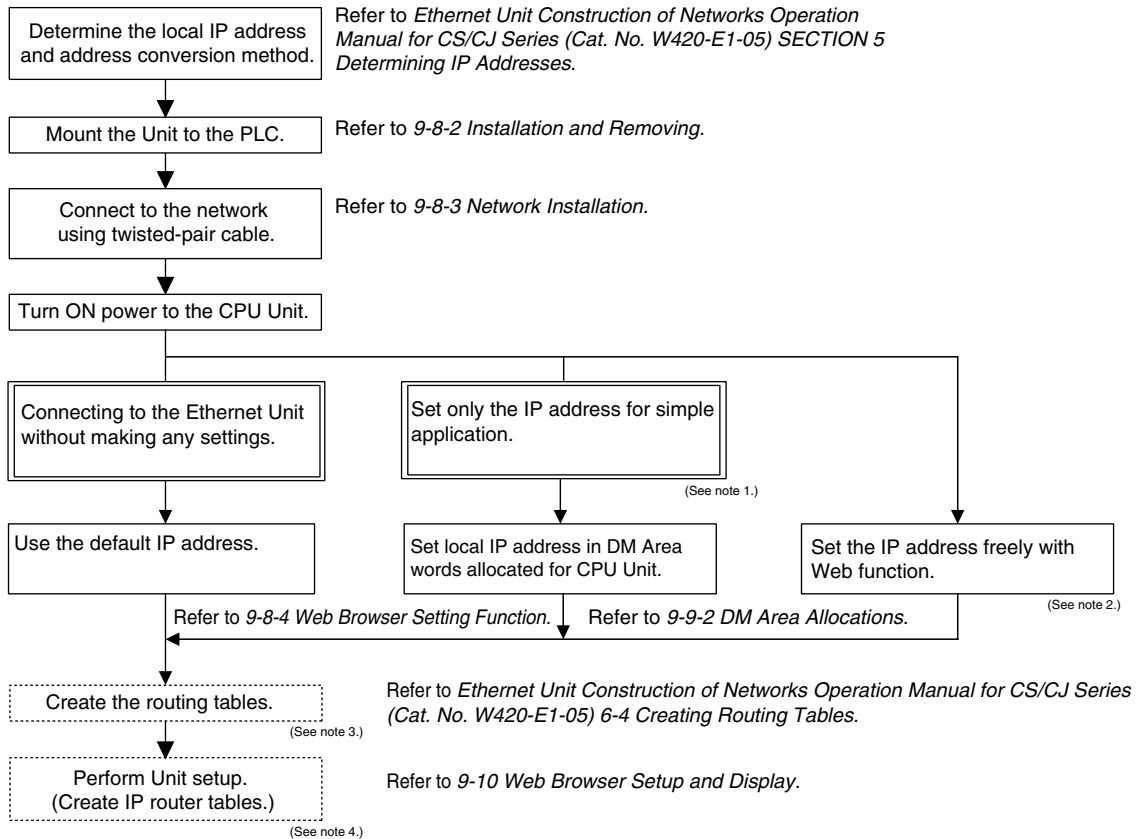
Item		Previous Models	New Models
Model number		CS1W-ETN21 CJ1W-ETN21	CP1W-CIF41
Physical layer		100/10Base-TX	100/10Base-TX (Auto-MDIX)
Number of nodes		254	254
PLC maintenance via the Internet		Can send commands, including FINS commands, by e-mail over the Internet from a computer to the PLC.	Not supported
Server specification		Specification by IP address or by host name	Not supported
FINS communications service	Automatic IP address acquisition	A computer automatically acquiring IP addresses can send commands to the PLC and receive responses.	Same as previous models
	FINS communication with computer without fixed node address	Possible, with Automatic allocation by Ethernet Option Board (Client FINS automatic node address allocation function, TCP/IP only)	Same as previous models
	Handling TCP/IP	With FINS communications, both UDP/IP and TCP/IP (with up to 16 simultaneous connections and all can be set to client) possible.	With FINS communications, both UDP/IP and TCP/IP (with up to 2 simultaneous connections) possible.
	Simultaneous connection of multiple applications in a computer	Possible (with both UDP/IP and TCP/IP)	Same as previous models
Mail functions		Supported	Not Supported
FTP server function		Supported	Not Supported
Socket services function		Supported	Not Supported
Automatic clock information adjustment		Supported	Not Supported
FINS frame length		2012	1016
Buffer numbers		392 (2K bytes×392)	14 (1016 bytes×6+240 bytes×8)
Inner bus		Parallel	Serial port

Note Limited by the CP1W-CIF41 inner bus protocol (Toolbus, 115200kbps), the system response performance is longer than the existing Ethernet Unit. Please consider the FINS command processing time and buffer limitation when using the CP1W-CIF41 Ethernet Option Board.

9-8 Installation and Initial Setup

9-8-1 Overview of Startup Procedure

The following procedure is the same for the CS Series and CJ Series.



- Note**
1. When using this method, always leave the local IP address of system setup in the Ethernet Option Board set to the value of 0.0.0.0. If this area contains any other value, any setting made in the allocated CIO words will be overwritten with it.
 2. The local IP address and other parameters can be set from the Web browser.
 3. It is not necessary step, and the CX-Integrator version 2.33 or higher (CX-ONE version 3.1 or higher) is required.
When the FINS communications service is used, routing tables must be created in advance. Routing tables are required in the following circumstances.
 - When communicating with a PLC or computer on another network (e.g. remote programming or monitoring using FINS message or a CX-programmer)
 - When multiple Communications Units are mounted to a single PLC (e.g. CPU unit)
 - When routing tables are used for one or more other nodes on the same network
 4. It is not necessary step, and the Web browser is required.

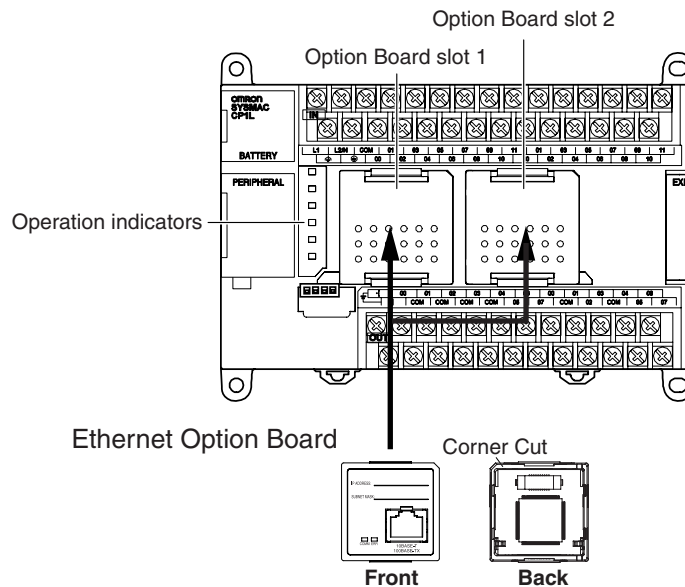
9-8-2 Installation and Removing

The following processing explains how to install and remove an Ethernet Option Board.

Caution Always turn OFF the power supply to the CPU unit and wait until all the operation indicators go out before installing or removing the Ethernet Option Board.

Installation

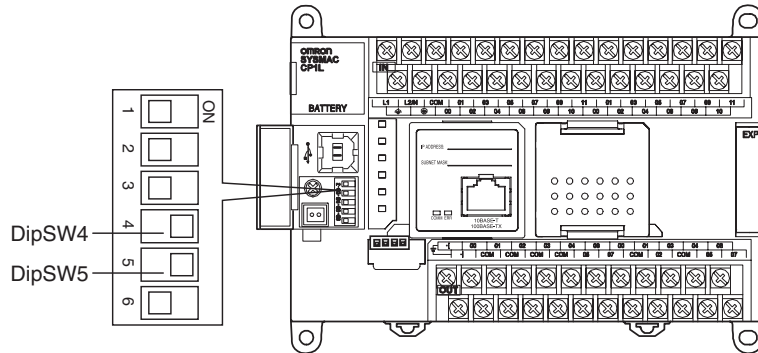
- 1,2,3... 1. Press the up/down lock-levers on both sides of the Option Board slot cover at the same time to unlock the cover, and then pull the cover out.
2. Check the alignment to make the corner cut of the Ethernet Option Board fit in the Option Board slot, and firmly press the Ethernet Option Board in until it snaps into place.



Note Only one CP1W-CIF41 can be mounted in one CP1L and CP1H PLC. If two CP1W-CIF41 Ethernet Option Boards are mounted in the PLC, the CP1W-CIF41 mounted on Option Board slot1 (left side) will run in abnormal status and ERR indicator will be ON. If the ladder program operates the with CP1W-CIF41 fatal error, the PLC will generate the non-fatal error.

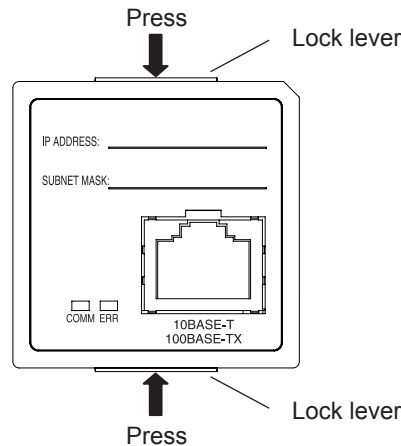
- 3. For CPU Units with 30, 40 or 60 I/O points, switch DipSW4 of the CPU unit to ON, if the Ethernet Option Board is mounted on the Option Board slot 1 (left side). Switch DipSW5 of the CPU unit to ON, if the Ethernet Option Board is mounted on the Option Board slot 2 (right side). For CPU Units with 14 or 20 I/O points, switch DipSW4 of the CPU unit to ON.

Note DipSW4 and DipSW5 are OFF at shipment.



Removing

Press the up/down lock-levers on both sides of the Ethernet Option Board at the same time to unlock the Ethernet Option Board, and then pull it out.



9-8-3 Network Installation

Basic Installation Precautions

- Take the greatest care when installing the Ethernet System, being sure to follow ISO 802-3 specifications. You must obtain a copy of these specifications and be sure you understand them before attempting to install an Ethernet System. Unless you are already experienced in installing communications systems, we strongly recommend that you employ a professional to install your system.
- Do not install Ethernet equipment near sources of noise. If noise-prone environments are unavoidable, be sure to take adequate measures against noise interference, such as installing network components in grounded metal cases, using optical links in the system, etc.

Recommended products

The following products are recommended for use with the Ethernet Option Board.

Part	Maker	Model number	Specifications	Inquires
Hub	100BASE-TX			
	OMRON	W4S1-03B	10/100 Mbit/s 3-port hub	
	OMRON	W4S1-05B (C)	10/100 Mbit/s 5-port hub	
	PHOENIX CONTACT	SWITCH 5TX	10/100 Mbit/s 5-port hub	
	Allied Telesis	RH509E	9-port hub	Allied Telesis (0120) 86-0442 (in Japan only)
		MR820TLX	9-port hub with 10Base-5 backbone port	
	10BASE-T			
	Allied Telesis	RH509E	9-port hub	Allied Telesis (0120) 86-0442 (in Japan only)
MR820TLX		9-port hub with 10Base-5 backbone port		
Twisted-pair cable	100BASE-TX			
	Fujikura	F-LINK-E 0.5mm x 4P	STP (shielded twisted-pair) cable: Category 5, 5e Note: Impedance is limited to 100 Ω.	---
	Fujikura	CTP-LAN5 0.5mm x 4P	UTP (unshielded twisted-pair) cable: Category 5, 5e	
	10BASE-T			
	Fujikura	F-LINK-E 0.5mm x 4P	STP (shielded twisted-pair) cable: Category 3, 4, 5, 5e Note: Impedance is limited to 100 Ω.	
	Fujikura	CTP-LAN5 0.5mm x 4P	UTP (unshielded twisted-pair) cable: Category 3, 4, 5, 5e	
Connectors (Modular plug)	STP Plug			
	Panduit Corp	MPS588	---	
	UTP Plug			
	Panduit Corp	MP588-C	---	

Precautions on Laying Twisted-pair Cable

Basic Precautions

- Press the cable connector in firmly until it locks into place at both the hub and the Ethernet Option Board.
- After laying the twisted-pair cable, check the connection with a 10Base-T cable tester.

Environment Precautions

- The UTP cable is not shielded, and the hub is designed for use in OA environments. In environments subject to noise, construct a system with shielded twisted-pair (STP) cable and hubs suitable for an FA environment.

- Do not lay the twisted-pair cable together with high-voltage lines.
- Do not lay the twisted-pair cable near devices that generate noise.
- Do not lay the twisted-pair cable in locations subject to high temperature or high humidity.
- Do not lay the twisted-pair cable in locations subject to excessive dirt and dust or to oil mist or other contaminants.
- Do not install the hub near devices that generate noise.
- Do not install the hub in locations subject to high temperature or high humidity.
- Do not install the hub in locations subject to excessive dirt and dust or to oil mist or other contaminants.

Hub Installation Environment Precautions

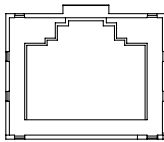
Hub Connection Methods

If more hub ports are required, they can be added by connecting more than one hub. There are two possible connection methods for hubs: Cascade and stacked.

Ethernet Connectors

The following standards and specifications apply to the connectors for the Ethernet twisted-pair cable.

- Electrical specifications: Conforming to IEEE802.3 standards
- Connector structure: RJ45 8-pin Modular Connector (conforming to ISO8877)



Connector Pin	Signal Name	Abbr.	Signal Direction
1	Transmission data +	TD+	Output
2	Transmission data -	TD-	Output
3	Reception data +	RD+	Input
4	Not used	---	---
5	Not used	---	---
6	Reception data -	RD-	Input
7	Not used	---	---
8	Not used	---	---
Hood	Frame ground	FG	---

Connecting the Cable

Caution Turn OFF the PLC's power supply before connection or disconnecting twisted-pair cable.

Caution Allow enough space for the bending radius of the twisted-pair cable.

- 1,2,3...**
1. Lay the twisted-pair cable.
 2. Connect the cable to the hub. Be sure to press in the cable until it locks into place.
Request cable installation from a qualified professional.
 3. Connect the cable to the connector on the Ethernet Option Board. Be sure to press in the cable until it locks into place.

9-8-4 Web Browser Setting Function

The Ethernet Option Board’s system settings can be set using the Web browser of a personal computer or other device. The Ethernet Option Board’s Web window is displayed by accessing the following URL from the Web browser.

English page: http://(Ethernet Option Board’s IP address)/E00.htm

Japanese page: http://(Ethernet Option Board’s IP address)/J00.htm

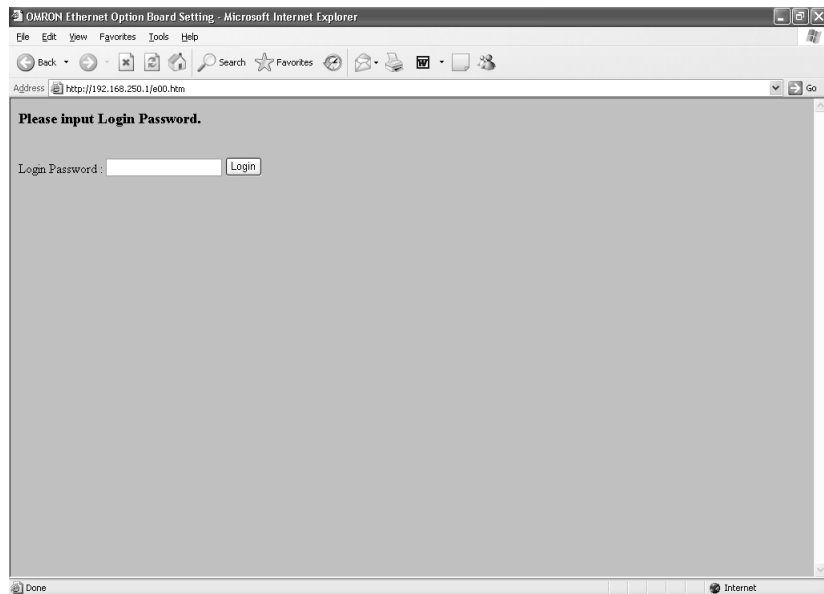
Chinese page: http://(Ethernet Option Board’s IP address)/C00.htm

In this example, use the following procedure to set the IP address using Internet Explorer version 6.0 and the Ethernet Option Board’s English Web pages.

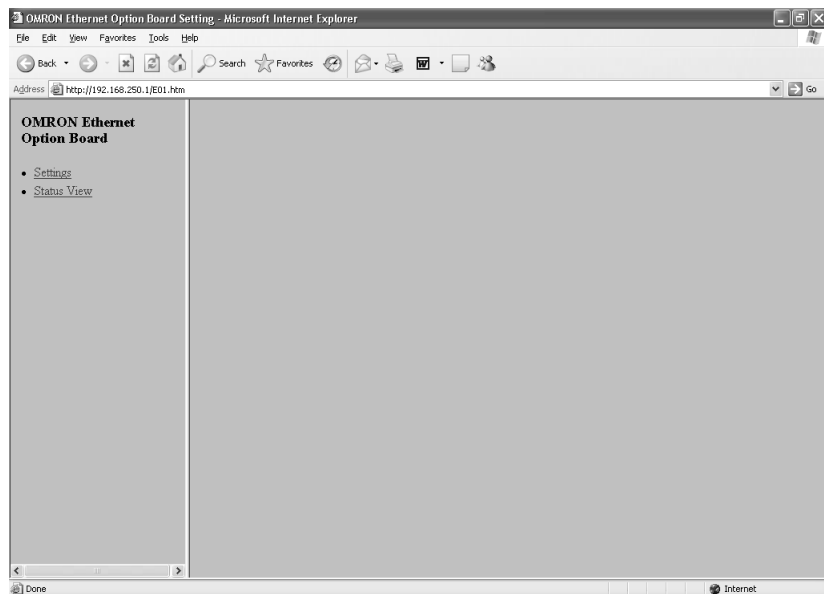
1,2,3...

1. Connect to the Ethernet Option Board from the Web browser using the Ethernet Option Board’s default IP address.

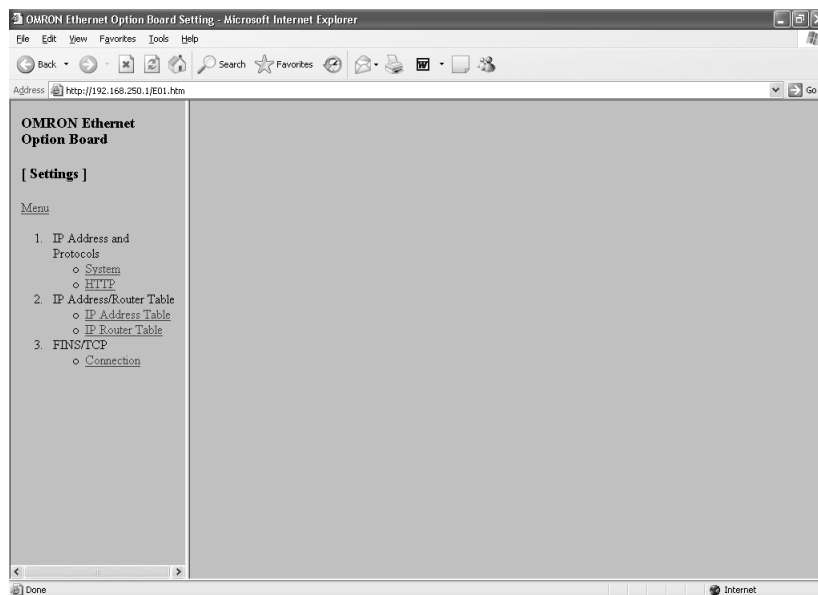
http://192.168.250.1/E00.htm



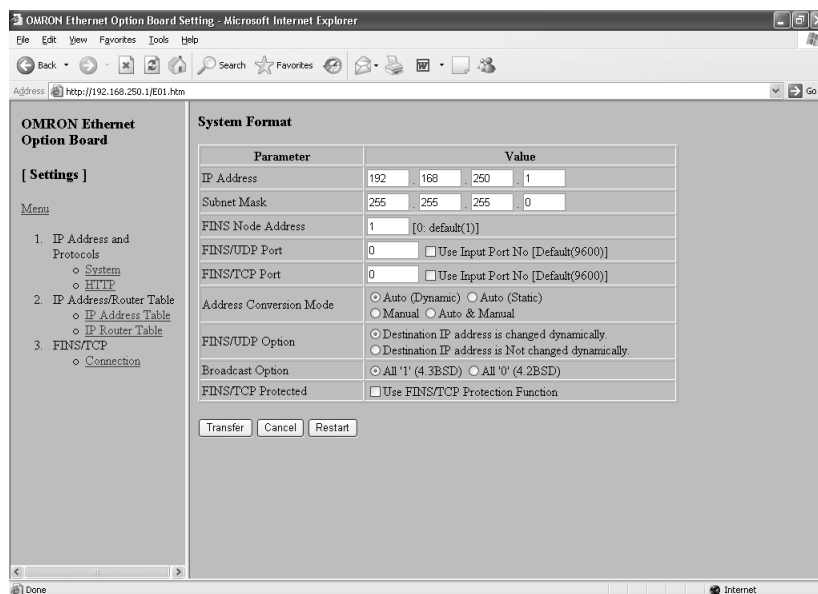
2. Input the default password “ETHERNET” and click the **Login** Button.



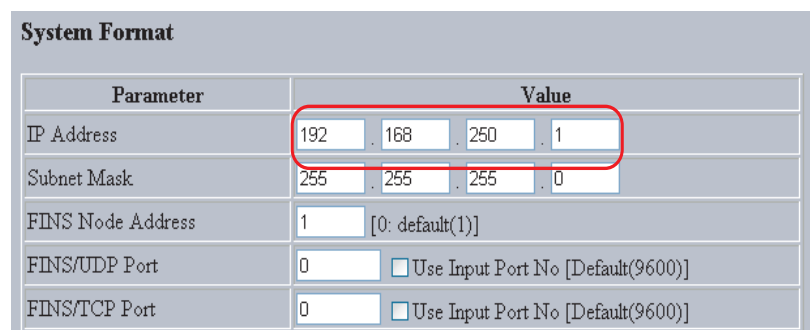
3. Select **Settings** from the menu on the left side of the window to display the Settings Menu.



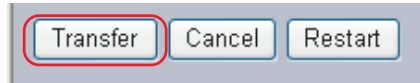
4. Select **1. IP address and Protocols - System** to display System menu.



5. Make the required settings (i.e., the IP address in this example).



- After entering the correct values, click the Transfer Button to transfer the settings to the Ethernet Option Board.



- To enable the new settings, turn the power to the Ethernet Option Board OFF and ON again, or click the Restart Button.

9-9 Memory Allocations

9-9-1 CIO Area Allocation

The memory allocation about communication services status in the CIO area of PLC is shown as the following diagram. The beginning CIO channel m is calculated by the following equation:

$$m = \text{CIO2980} + 10 \times (\text{0xFD} - \text{Unit Address})$$

Offset	D15	D0
m	Service Status	
m+1	Error Status	
m+2	FINS/TCP Connection Status	

The following table describes the unit address for each option port.

Option Port No.	I/O Capacity	Unit Address	Range of Status Area
Option port 1	14/20	0xFC	CIO2990 to CIO2992
	30/40/60	0xFD	CIO2980 to CIO2982
Option port 2	30/40/60	0xFC	CIO2990 to CIO2992

Service Status

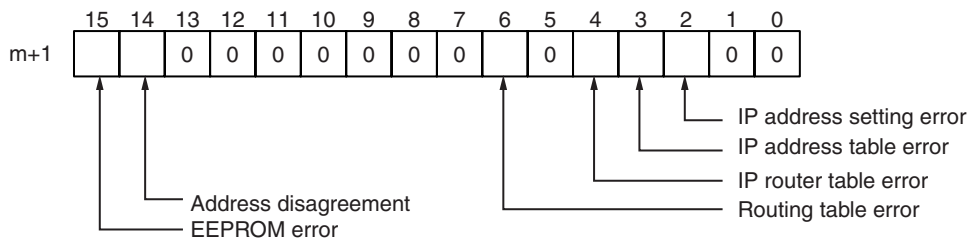
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
m	1		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bit	Name	Unit operation
0 to 13	Reserved	Always 0.
14	Link Status	0: The link between hubs is terminated. 1: A link is established between hubs.
15	Reserved	Always 1.

Caution Bit 15 is used for detect power condition of PLC, so do not change it at any time. Otherwise the CP1W-CIF41 Ethernet Option Board will generate error.

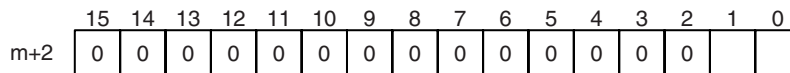
Error Status

The status of errors that occur at the Ethernet Option Board is reflected as shown in the following diagram.



Bit	Name	Correction
0 to 1	Reserved	Always 0.
2	IP address setting error	The following cannot be used as IP address settings. <ul style="list-style-type: none"> • Host IDs that are all 0 or all 1. • Network IDs that are all 0 or all 1. • Subnetwork IDs that are all 1. • Addresses beginning with 127 (7F hex). Reset the IP address.
3	IP address table error	Correct the IP address table. If the problem cannot be resolved, replace the CPU Unit.
4	IP router table error	Correct the IP router table. If the problem cannot be resolved, replace the CPU Unit.
5	Reserved	Always 0.
6	Routing table error	Correct the routing tables. If the problem cannot be resolved, replace the CPU Unit.
7 to 13	Reserved	Always 0.
14	Address disagreement	Make sure that the node number and the last byte of the IP address are the same and then set other host IDs to 0. Change the address conversion method.
15	EEPROM error	Restart the PC. If the problem cannot be resolved, replace the Ethernet Option Board.

FINS/TCP Connection Status



Bit	Switch	Unit operation
0	FINS/TCP Connection No.1	0: The connection is terminated. 1: A connection is established.
1	FINS/TCP Connection No.2	0: The connection is terminated. 1: A connection is established.
2 to 15	Reserved	Always 0.

9-9-2 DM Area Allocation

The memory allocation about system setup is shown as the following diagram. These data will be allocated to the DM area of PLC. The beginning DM channel n is calculated by the following equation.

- Note**
1. DM area from n to $n+154$ can only display all of the settings stored in the unit. Modification in this area is invalid to the CP1W-CIF41 Ethernet Option Board.
 2. DM area $n+155$ and $n+156$ will display the IP address used by the CP1W-CIF41 when the power is turned ON.
 3. When the IP address is illegal, such as using CLASS D, CLASS E IP address, the values in words $n+3$ and $n+155$ will be different, and the CP1W-CIF41 will temporarily use the default IP address (192.168.250.1). Use this IP address to modify the IP address settings through Web browser.

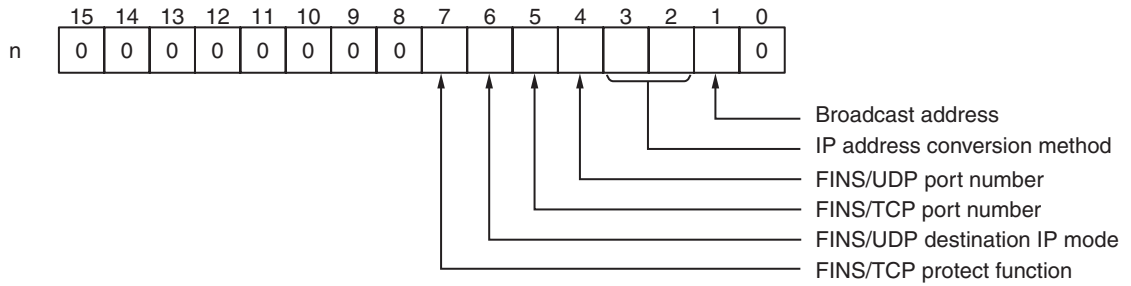
$$n = \text{DM32000} + 300 \times (\text{0xFD} - \text{Unit Address})$$

Offset	D15	D0
n	Mode setting (2 bytes)	
$n+1$	FINS/TCP port number (2 bytes)	
$n+2$	FINS/UDP port number (2 bytes)	
$n+3$	IP address (4 bytes)	
$n+5$	Subnet mask (4 bytes)	
$n+7$	Reserved (2 bytes)	
$n+8$	IP address table (194 bytes)	
$n+105$	IP router table (66 bytes)	
$n+138$	FINS/TCP connection setup (22 bytes)	
$n+149$	HTTP server setup (10 bytes)	
$n+154$	FINS node address (2 bytes)	
$n+155$	Using IP Address Display/Setting Area (4 bytes)	

The following table describes the unit address for each option port.

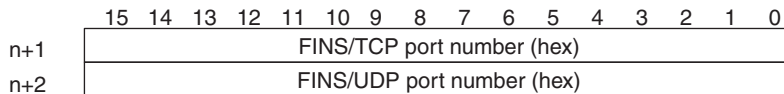
Option Port No.	I/O Capacity	Unit Address	Range of Status Area
Option port 1	14/20	0xFC	DM32300 to DM32456
	30/40/60	0xFD	DM32000 to DM32156
Option port 2	30/40/60	0xFC	DM32300 to DM32456

Mode Setting



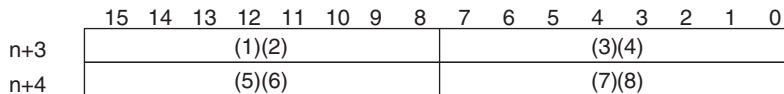
Bit	Mode	Settings
0	Reserved	Always 0.
1	Broadcast address	0: 4.3BSD specifications 1: 4.2BSD specifications
2 to 3	IP address conversion method	00, 01: Automatic generation method 10: IP address table reference method 11: Combined method
4	FINS/UDP port number	0: Default (9600) 1: Unit setup value
5	FINS/TCP port number	0: Default (9600) 1: Unit setup value
6	FINS/UDP destination IP mode	0: Enable (Dynamically) 1: Disable (Static)
7	FINS/TCP protect function	0: Disable (Only FINS/TCP Server) 1: Enable (Only FINS/TCP Server)
8 to 15	Reserved	Always 0.

FINS/TCP and FINS/UDP Port Number



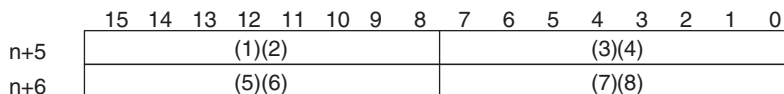
When displaying 0000, the port number is 9600.

IP Address



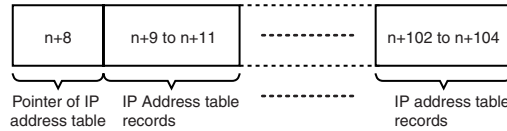
The IP address is (1)(2).(3)(4).(5)(6).(7)(8) (hex)

Subnet Mask



The Subnet mask is (1)(2).(3)(4).(5)(6).(7)(8) (hex)

IP Address Table

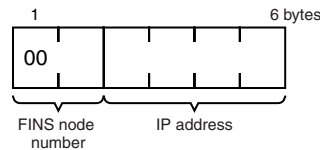


Pointer of IP Address Table

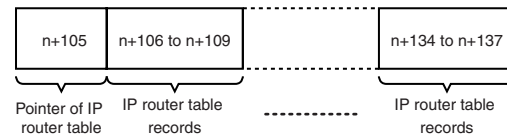
Point to the last recorder in IP address table. For example, if the last recorder number in IP address table is 6, the value of this channel is 6.

IP Address Table Records

Each IP address table record has 6 bytes. The max number of records is 32. The configuration of the 6 bytes of data in each record is as shown in the following diagram.



IP Router Table

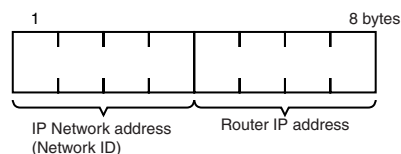


Pointer of IP Router Table

Point to the last recorder in IP router table. For example, if the last recorder number in IP router table is 6, the value of this channel is 6.

IP Router Table Records

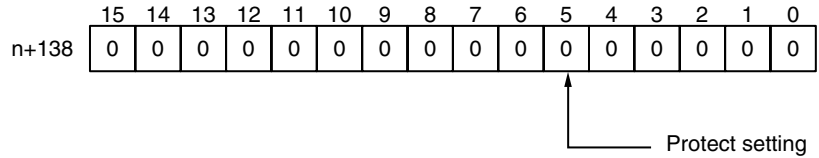
Each IP router table record has 8 bytes. The max number of records is 8. The configuration of the 8 bytes of data in each record is as shown in the following diagram.



FINS/TCP Connection Setup

Offset	15	8	7	0
n+138	FINS/TCP Port Settings			
n+139	FINS/TCP connection No.1		FINS/TCP connection No.1	
n+140	FINS/TCP connection No.1		FINS/TCP connection No.1	
n+141	FINS/TCP connection No.1		FINS/TCP connection No.2	
n+142	FINS/TCP connection No.2		FINS/TCP connection No.2	
n+143	FINS/TCP connection No.2		FINS/TCP connection No.2	
n+144	Reserved (Always 0)			
:				
n+148				

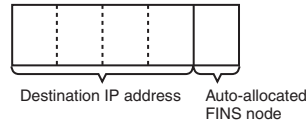
FINS/TCP Port Settings



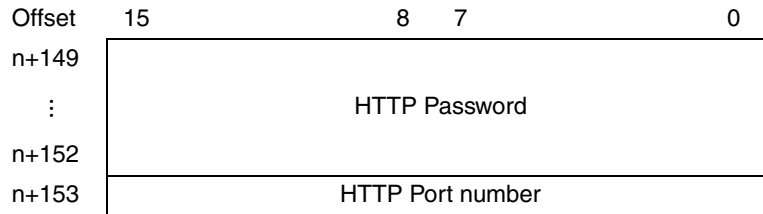
Bit	Settings	Unit operation
0 to 4	Reserved	Always 0.
5	Protect setting	0: The IP address of FINS/TCP connection No.2 is not under the protection.
6 to 15	Reserved	Always 0.

FINS/TCP Connection No.1 to 2

Each FINS/TCP connection number has 5 bytes. The configuration of the 5 bytes of data in each number is as shown in the following diagram.

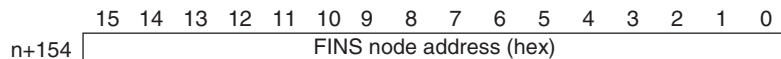


HTTP Server Setup



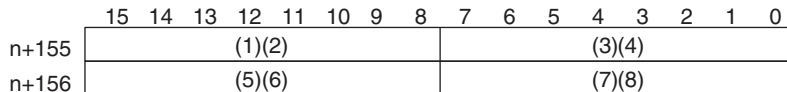
If the password for accessing the Ethernet Option Board's Web page is forgotten, find out it in this area. It is written in ASCII format.

FINS Node Address



The setting range is 0~ FE (hex).

Using IP Address Display/Setting Area



The IP address is (1)(2).(3)(4).(5)(6).(7)(8) (hex)

If the local IP address in the system setup is set to a value other than 0.0.0.0, this area will act as an IP address display area and the local IP address in the system setup will be read and stored here when the power is turned ON or the Ethernet Option Board restarted.

If the local IP address in the system setup is set to 0.0.0.0, this area will act as an IP address setting area. The value will be read by the Ethernet Option Board when the power is turned ON or the Ethernet Option Board restarted and is used as the local IP address.

If the IP address for accessing the Ethernet Option Board through Web browser is forgotten, find out it in this area.

Note When IP address in system setup area and DM area are all set to 0.0.0.0, the IP address will be 192.168.250.1 (FINS node address).

9-10 Web Browser Setup and Display

9-10-1 Multi-language Function

The WEB server supports the multi-language function. The supported languages are English, Chinese and Japanese.

Before setting, users should select the appropriate language in the following ULC.

English page: [http://\(Ethernet Option Board's IP address\)/E00.htm](http://(Ethernet Option Board's IP address)/E00.htm)

Japanese page: [http://\(Ethernet Option Board's IP address\)/J00.htm](http://(Ethernet Option Board's IP address)/J00.htm)

Chinese page: [http://\(Ethernet Option Board's IP address\)/C00.htm](http://(Ethernet Option Board's IP address)/C00.htm)

9-10-2 Overview of Web Browser Function

System setup for the Ethernet Option Board is as follows.

	Setting Item	Reference Page
System	IP Address	576
	Subnet Mask	576
	FINS Node Address	576
	FINS/UDP Port	576
	FINS/TCP Port	576
	Address Conversion Mode	576
	FINS/UDP Option	576
	Broadcast Option	577
	FINS/TCP Protected	577
	HTTP	WEB Password
Port No.		578
IP Address Table	FINS Node Address	579
	IP Address	579
IP Router Table	IP Network Address	580
	Router IP Address	580
FINS/TCP	IP Address	581
	Auto-allocated FINS Node	581

Monitor status for the Ethernet Option Board is as follows.

Status	Reference Page
Unit information	582
Unit status	583
FINS status	584
Error log	585

9-10-3 System

OMRON Ethernet Option Board

[Settings]

[Menu](#)

1. IP Address and Protocols
 - [System](#)
 - [HTTP](#)
2. IP Address/Router Table
 - [IP Address Table](#)
 - [IP Router Table](#)
3. FINS/TCP
 - [Connection](#)

System Format

Parameter	Value
IP Address	192 . 168 . 250 . 1
Subnet Mask	255 . 255 . 255 . 0
FINS Node Address	1 [0: default(1)]
FINS/UDP Port	0 <input type="checkbox"/> Use Input Port No [Default(9600)]
FINS/TCP Port	0 <input type="checkbox"/> Use Input Port No [Default(9600)]
Address Conversion Mode	<input checked="" type="radio"/> Auto (Dynamic) <input type="radio"/> Auto (Static) <input type="radio"/> Manual <input type="radio"/> Auto & Manual
FINS/UDP Option	<input checked="" type="radio"/> Destination IP address is changed dynamically. <input type="radio"/> Destination IP address is Not changed dynamically.
Broadcast Option	<input checked="" type="radio"/> All '1' (4.3BSD) <input type="radio"/> All '0' (4.2BSD)
FINS/TCP Protected	<input type="checkbox"/> Use FINS/TCP Protection Function

System Format

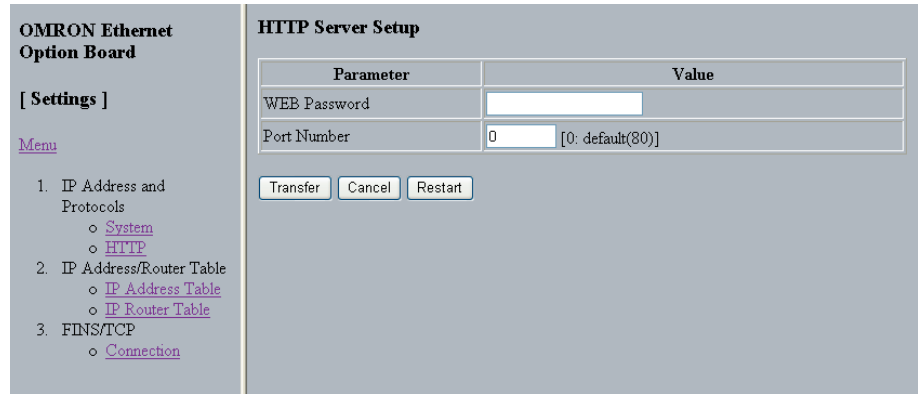
Item	Contents	Default
IP Address	Set the local IP address for the Ethernet Option Board. • Setting range: 00.00.00.00 to 223.255.255.255	192.168.250.1
Subnet Mask	Set the subnet mask for the Ethernet Option Board. This is required if a method other than the IP address table method is used for address conversion.	255.255.255.0
FINS Node Address	Set the local FINS node address for the Ethernet Option Board. • Setting range: 1 to 254	1
FINS/UDP Port	Specify the local UDP port number to be used for the FINS communications service. The UDP port number is the number used for UDP identification of the application layer (i.e., FINS communications service). • Setting range: 1 to 65,535	9,600
FINS/TCP Port	Specify the local TCP port number to be used for the FINS communications service. The TCP port number is the number used for TCP identification of the application layer (i.e., the FINS communications service in this case). • Setting range: 1 to 65,535 Note Make the settings so that TCP port number 80 for HTTP does not overlap. The port number setting only has an effect on the FINS/TCP server function, not on the FINS/TCP client function. FINS/TCP client port will switch from 3000 to 65535 automatically for connection.	9,600
Use Input Port No.	Check this checkbox, if you want the user defined port number for UDP or TCP to be in effect.	Unchecked
Address Conversion Mode	Select any of the following as the method for finding and converting IP addresses from FINS node addresses. (Enabled for FINS/UDP only.) • Auto (dynamic): Automatic generation (dynamic) • Auto (static): Automatic generation (static) • Manual: IP address table method • Auto & Manual: Combined method	Auto (dynamic)
FINS/UDP Option	Select to dynamically change the remote (destination) IP address for FINS/UDP or not. To prohibit dynamic changes, check the second box.	Change dynamically

Item	Contents	Default
Broadcast Option	Set the method for specifying IP addresses for broadcasting in FINS/UDP. <ul style="list-style-type: none"> • All '1' (4.3BSD): Broadcast with host number set to all ones. • All '0' (4.2BSD): Broadcast with host number set to all zeros. Normally the default setting should be used.	All '1' (4.3BSD)
FINS/TCP Protected	When this option is selected, if the FINS/TCP connection is set to a server, and if an IP address other than 0.0.0.0 is set to destination IP address, any connection request from other than the setting IP address will be denied. Select this option to prevent faulty operation (by FINS commands) from specific nodes from affecting the PLC.	Unchecked

The functions of the buttons are as follows.

Button	Function
Transfer	Transfer the entered values from the personal computer to the Ethernet Option Board. (The new settings are invalid until the Ethernet Option Board has been reset.)
Cancel	Cancel the entered values.
Restart	Restart the Ethernet Option Board to enable the new settings after transfer. The Restart button is invalid to the PLC.

9-10-4 HTTP



HTTP Server Setup

Item	Contents	Default
WEB Password	Set the password for accessing the Ethernet Option Board's settings and status monitoring information.	ETHERNET
Port Number	Set the port No. used to connect to the Web browser.	80

The functions of the buttons are as follows.

Button	Function
Transfer	Transfer the entered values from the personal computer to the Ethernet Option Board. (The new settings are invalid until the Ethernet Option Board has been reset.)
Cancel	Cancel the entered values.
Restart	Restart the Ethernet Option Board to enable the new settings after transfer. The Restart button is invalid to the PLC.

9-10-5 IP Address Table

Set the IP address table that defines the relationship between FINS node addresses and IP addresses. With FINS/UDP, this is enabled only when the IP address table method is set to the IP address conversion method.

OMRON Ethernet Option Board

[Settings]

[Menu](#)

- IP Address and Protocols
 - [System](#)
 - [HTTP](#)
- IP Address/Router Table
 - [IP Address Table](#)
 - [IP Router Table](#)
- FINS/TCP
 - [Connection](#)

IP Address Table

Setting Form

Parameter	Value
FINS Node Address	<input type="text"/> [Range: 1 - 254]
IP Address	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>

Transfer Cancel Restart

Setting List

No	FINS Node Address	IP Address
01		

01 Show Delete

Item	Contents	Default
FINS Node Address	Set the node address for the remote device.	None
IP Address	Set the related IP address for the remote device.	None

The functions of the buttons are as follows.

Button	Function
Transfer	Transfer the entered values from the personal computer to the Ethernet Option Board. (The new settings are invalid until the Ethernet Option Board has been reset.)
Cancel	Cancel the entered values.
Restart	Restart the Ethernet Option Board to enable the new settings after transfer. The Restart button is invalid to the PLC.
Show	Show the FINS node address and IP address of the selected No.
Delete	Delete the IP address table of the selected No.

9-10-6 IP Router Table

Set the IP router table when the Ethernet Option Board is to communicate through the IP router with nodes on another IP network segment.

OMRON Ethernet Option Board

[Settings]

[Menu](#)

- IP Address and Protocols
 - [System](#)
 - [HTTP](#)
- IP Address/Router Table
 - [IP Address Table](#)
 - [IP Router Table](#)
- FINS/TCP
 - [Connection](#)

IP Router Table

Setting Form

Parameter	Value
IP Network Address	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>
Router IP Address	<input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>

Transfer Cancel Restart

Setting List

No	IP Network Address	Router IP Address
01		

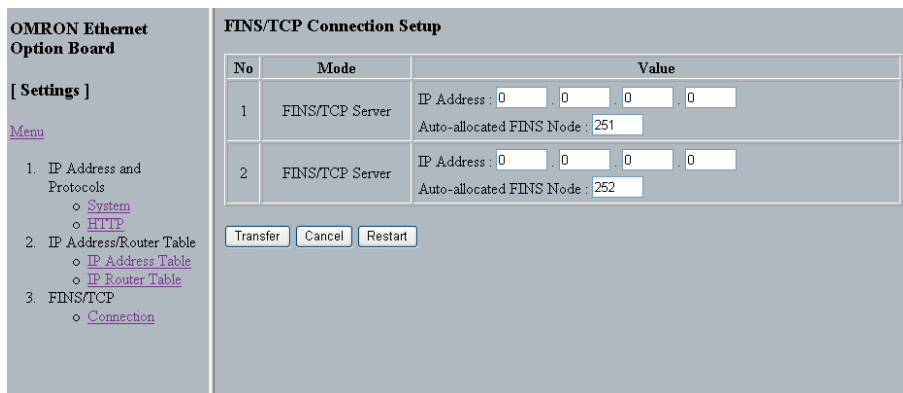
01 Show Delete

Item	Contents	Default
IP Network Address	Set the network ID from the IP address.	None
Router IP Address	Set the related IP address of a router connected to a network.	None

The functions of the buttons are as follows.

Button	Function
Transfer	Transfer the entered values from the personal computer to the Ethernet Option Board. (The new settings are invalid until the Ethernet Option Board has been reset.)
Cancel	Cancel the entered values.
Restart	Restart the Ethernet Option Board to enable the new settings after transfer. The Restart button is invalid to the PLC.
Show	Show the IP network address and Router IP address of the selected No.
Delete	Delete the IP router table of the selected No.

9-10-7 FINS/TCP



FINS/TCP Connection Setup

Item	Contents	Default
No.	Shows the connection number. This is a network API used when TCP is used for the FINS communications service. Up to 2 can be used at a time, and they are identified by connection numbers 1 to 2. The Ethernet Option Board can thus simultaneously execute the FINS communications service by TCP with up to 2 remote nodes.	---
IP Address	<ul style="list-style-type: none"> When the Ethernet Option Board is used as a server: If the option is selected to use IP addresses to protect, set the IP addresses as required at clients from which connection is permitted. If not set for those connections, the default setting can be used. When the Ethernet Option Board is used as a client: Set the IP address for the remote Ethernet Unit (i.e., the server) that is to be connected by FINS/TCP. It is required that an IP address be set for the remote Ethernet Unit. 	0.0.0.0
Auto-allocated FINS node	If the client (normally a personal computer) application supports FINS/TCP, and if FINS node addresses are not fixed, the client will take 0 as its node address. Then, when a FINS command arrives, the number set here (from 251 to 252) will automatically be allocated as the client's FINS node address.	From 251 to 252, for connection No. 1 to 2

The functions of the buttons are as follows.

Button	Function
Transfer	Transfer the entered values from the personal computer to the Ethernet Option Board. (The new settings are invalid until the Ethernet Option Board has been reset.)
Cancel	Cancel the entered values.
Restart	Restart the Ethernet Option Board to enable the new settings after transfer. The Restart button is invalid to the PLC.

9-10-8 Unit Information

OMRON Ethernet Option Board

[Status View]

[Menu](#)

1. [Unit Information](#)
2. [Unit Status](#)
3. [FINS Status](#)
4. [Error Log](#)

Unit Information

Parameter	Value
Model	CP1W-CIF41
Version	V1.05
IP Address	192.168.250.1
Subnet Mask	255.255.255.0
FINS/UDP Port Number	9600
Use Input Port Number	Unused
Broadcast Setting	All '1' (4.3BSD)
IP Address Conversion	Auto (Dynamic)
Ethernet Address	00-00-0A-3A-C0-05

Parameter	Contents
Model	Show the model information of the Ethernet Option Board.
Version	Show the version information of the Ethernet Option Board.
IP Address	Show the IP address of the Ethernet Option Board.
Subnet Mask	Show the subnet mask of the Ethernet Option Board.
FINS/UDP Port Number	Show the FINS/UDP port number of the Ethernet Option Board.
Use Input Port Number	Show the effective port number setting mode.
Broadcast Setting	Show the broadcast setting of the Ethernet Option Board.
IP Address Conversion	Show the IP address conversion method of the Ethernet Option Board.
Ethernet Address	Show the MAC ID of the Ethernet Option Board.

9-10-9 Unit Status

OMRON Ethernet Option Board

[Status View]

[Menu](#)

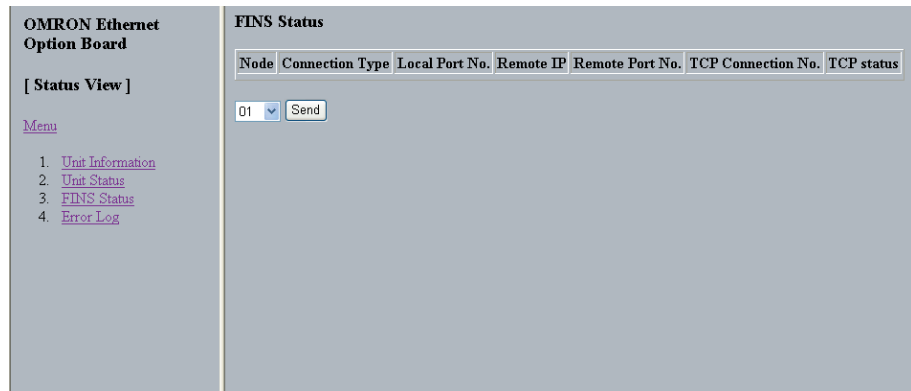
1. [Unit Information](#)
2. [Unit Status](#)
3. [FINS Status](#)
4. [Error Log](#)

Unit Status

	Parameter	Value
Error Flags	IP Address Error	Normal
	IP Address Table Error	Normal
	IP Router Table Error	Normal
	Router Table Error	Normal
	Address Disagreement	Normal
	EEPROM Error	Normal
Total Number of Packets Received		0
Total Number of Receive Errors		0
Total Number of Packets Sent		0
Total Number of Errors Sent		0

Parameter	Contents
Error Flags	Indicate the operating status and errors that occurred when the Ethernet Option Board is turned ON.
Total Number of Packets Received	Show the total number of packets received by the Ethernet Option Board.
Total Number of Receive Errors	Show the total number of errors detected while the Ethernet Option Board was receiving. The types of errors detected are short packet errors, alignment errors, CRC errors, frame length errors and communication controller overflow errors.
Total Number of Packets Sent	Show the total number of packets sent by the Ethernet Option Board.
Total Number of Errors Sent	Show the total number of errors detected while the Ethernet Option Board was sending.

9-10-10 FINS Status



Parameter	Contents
Node	Show the FINS node address.
Connection Type	Show the protocol used by connection with the related node address.
Local Port No.	Show the port number of the Ethernet Option Board for connection with the related node address.
Remote IP	Show the IP address of the related node address.
Remote Port No.	Show the remote port number of the related node address for connection.
TCP Connection No.	If the connection is the FINS/TCP, show the connection number (1 to 4).
TCP Status	If the connection is the FINS/TCP, show the current connection status.

The details of TCP status are listed as the following table.

Status	Meaning
CLOSED	Connection closed
LISTEN	Waiting for connection
SYN SENT	SYN sent in active status
SYN RECEIVED	SYN received and sent
ESTABLISHED	Already established
CLOSE WAIT	FIN received and waiting for completion
FIN WAIT1	Completed and FIN sent
CLOSING	Completed and exchanged FIN. Awaiting ACK.
LAST ACK	FIN sent and completed. Awaiting ACK.
FIN WAIT2	Completed and ACK received. Awaiting FIN.
TIME WAIT	After closing, pauses twice the maximum segment life (2MSL).

The function of the button is as follows.

Button	Function
Send	Show the FINS status of the selected No.

9-10-11 Error Log



Parameter	Contents
No.	Show the error recorder number.
Error Code	Show the error code of the error recorder.
Detail Code	Show the detail error code of the error recorder.
Date	Show the date of the error recorder.

The functions of the buttons are as follows.

Button	Function
Send	Show the error log of the selected No.
Clear Error Log	Clear the error log table.

9-11 Trouble Shooting

9-11-1 Error Log

The Ethernet Option Board provides an error log that records errors occurred during Ethernet Option Board operation. The contents of the error log can be read or cleared from the Web Browser.

Logged Errors

The following errors are recorded in the error log.

- Errors in network operation
- Errors in data transfers
- Error in the CPU unit

Error Log Table

Each error is recorded as one record in an error log table. Up to 64 records can be saved. If more than 20 errors occur, the oldest errors will be deleted from the error log and the most recent error will be recorded.

The following information is recorded in the error log table.

- Main error code (see table later in this section)
- Detailed error code (see table later in this section)
- Time stamp (from the clock in the CPU unit)

Note During the initialization of the Ethernet Option Board, if an error occurs, the error log time stamp will record as 2000-00-00 00:00:00.

Error Log Location

When an error is detected, the error codes and time stamp are recorded in the error log in RAM inside the Ethernet Option Board. Serious errors are also recorded in EEPROM. The maximum number of errors that can be saved to EEPROM is 20 for the CP1L and CP1H. The errors recorded in EEPROM will be saved even if the unit is restarted or power is turned OFF.

Error Codes

Error code	ERR LED	Meaning	Detailed error code		Correction	EEPROM
			1st byte	2nd byte		
0002	LIT	CPU Unit service monitoring error	Monitor time (ms)		Check and correct the CPU Unit's operating environment. Note Recovery is possible for this error. When operation is restored, operations will return to normal.	Saved
0012	FLASH	CPU unit memory error	01: Read error 02: Write error	03: outing table 05: CPU Bus Unit Words (CIO/DM)	01: Recreate the data specified by the 2nd byte of the detailed error code. 02: Clear memory using procedure in the PLC operation manual.	Saved
0013	FLASH	CPU unit protected	00	00	Remove protection from CPU Unit memory.	Saved
0014	FLASH	CPU Unit Power Failure			Restart the PLC (Power OFF and Power ON)	---
0015	FLASH	CPU Unit fatal error			Eliminate the cause of the error in the CPU Unit.	---

Error code	ERR LED	Meaning	Detailed error code		Correction	EEPROM
			1st byte	2nd byte		
010E	---	No routing table entry (send failed)	Commands Bit 15: OFF Bits 08 to 14: SNA Bits 00 to 07: SA1 Responses Bit 15: ON Bits 08 to 14: DNA Bits 00 to 07: DA1		Set the local node, remote node, and relay nodes in the routing tables.	---
010F	---	Routing table error (send failed)			Create the routing tables correctly.	---
0110	---	Too many relay points (send failed)			Reconstruct the network or correct the routing tables so that commands are sent to within a 3-level network range.	---
0111	---	Command too long (send failed)			Check the command format and set the correct command data.	---
0112	---	Header error (send failed)			Check the command format and set the correct command data.	---
0117	---	Internal buffers full; packet discarded			Change the network so that traffic is not concentrated.	---
0120	---	Unexpected routing error			Check the routing tables.	---
0123	---	Internal send buffers full; packet discarded			Change the network so that traffic is not concentrated.	---
0125	---	Time out error			Resend the command.	---
021A	FLASH	Logic error in setting table	00	02: Network parameters 03: Routing tables 04: Unit Setup 05: CPU Bus Unit Words (CIO/DM)	Recreate the data specified by the 2nd byte of the detailed error code.	Saved
03C0	FLASH	FINS/TCP setting error	01 to 02: Connection No.	01: Automatically allocated FINS node address duplication 02: Destination IP address error 03: Destination port number error	Set the FINS/TCP settings correctly.	---
03C2	---	FINS/TCP packet discarded	01 to 02: Connection No.	03: Reception error	Resend the command.	---
				04: Transmission error	There is too much load (traffic) on the Ethernet Option Board. Correct the system so that traffic is not concentrated.	---

Error code	ERR LED	Meaning	Detailed error code		Correction	EEPROM
			1st byte	2nd byte		
03C3	---	FINS/UDP Packet discarded	00	01 to FE Node address	The automatic generation (static) method was used as the IP address conversion method, so remote IP address information in internal memory could not be changed.	---
03C8	---	Socket Error	Arbitrary		Resend the packet or the destination node is not in the network.	---
03D0	FLASH	System setup sum value error			Reset the value of system setup area, Restart CPU Unit.	Saved
0601	LIT	Option Board error	Arbitrary		Restart the CPU Unit. If the problem persists, replace the Ethernet Option Board.	Saved
0602	LIT	Option Board memory error	01: Read error 02: Write error	04: System setup 06: Error log 09: Identity data 11: Mac ID	Restart the CPU Unit. If the problem persists, replace the Ethernet Option Board.	Saved (except error log)

9-11-2 Trouble-shooting with Indicators and Error Code Display

ERR Indicator	Error	Probably Cause	Error code (hex)	Correction
Lit	CPU Unit service monitoring error	Service from the CPU Unit was not completed within the fixed interval. The monitoring time is normally 11s.	0002	Check and correct the CPU Unit's operating environment. Check whether the related DIP SW is on. Refer to <i>9-8-2 Installation and Removing</i> . Note Recovery is possible for this error. When operation is restored, it will return to normal.
	Two option boards installed	Two option boards have been installed on the CPU Unit.	---	Uninstall the Ethernet Option Board in one serial port of the CPU Unit and restart the CPU unit.
	Option board error	An error occurred in the Ethernet Option Board.	0601	Restart the CPU Unit. Replace the Ethernet Option Board if the error recurs.
	Option board memory error	An error occurred in the Unit's non-volatile memory itself. This error will occur while writing or reading the error log, system setup, identity data, MAC ID.	0602	Restart the CPU Unit. Replace the Ethernet Option Board if the error recurs.
Flashing	CPU Unit memory error	A parity error occurred during an operation such as reading the routing tables.	0012	Register the routing table in the CPU Unit again and restart the CPU Unit. Replace the CPU Unit if the error recurs.
	CPU Unit protected	CPU Unit protected.	0013	Remove protection from CPU Unit memory.
	CPU Unit fatal error	A fatal error occurred in the CPU Unit.	0015	Eliminate the cause of the error in the CPU Unit.
	CPU Unit power failure	CPU Unit power OFF, Ethernet Option Board is still running.	0014	Restart the PLC (Power OFF and power ON).
	IP address setting error	The IP address is set incorrectly.	021A	Correct the IP address. Do not set any of the following IP addresses. <ul style="list-style-type: none"> • Host IDs that are all 0 or all 1. • Network IDs that are all 0 or all 1. • Subnetwork IDs that are all 1. • Addresses beginning with 127 (7F hex).
	IP address table error	The IP address table is set incorrectly.	021A	Correct the IP address table.
	IP Router table setting error	The IP Router table is set incorrectly.	021A	Correct the IP Router table.

ERR Indicator	Error	Probably Cause	Error code (hex)	Correction
Flashing	Address Disagreement	The node number set for the option board does not agree with the host ID in the IP address. This probably occurs when the address conversion method is set for automatic address generation.	021A	Make sure that the node number and the last byte of the IP address are the same and then set other host IDs to 0. Change the address conversion method.
	Logic error in setting table	There is a logic error in the setting table.	021A	Recreate the data specified by the 2nd byte of the detailed error code.
	System setup Sum check error	The Checksum of System setup is incorrect.	03D0	Reset the value of system setup area. Restart the CPU Unit.
	FINS/TCP setting error	The settings of FINS/TCP are incorrect.	03C0	Refer to operation manual and set the FINS/TCP setting correctly.

9-11-3 Error Status

The status of errors that occur at the Ethernet Option Board is reflected in CIO relation area, Refer to 9-9-1 *CIO Area Allocation, Error Status* for details.

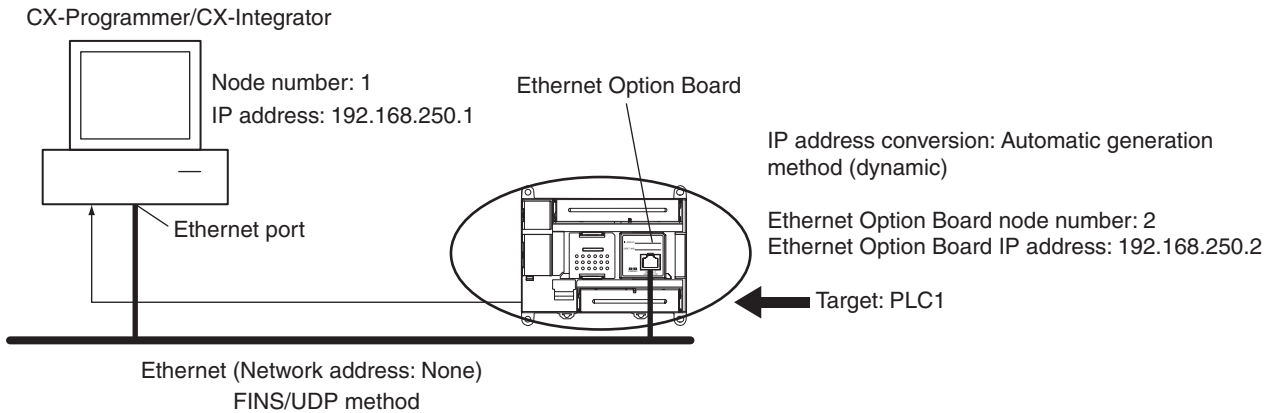
9-12 Sample Application

The following examples show how to connect online from a CX-Programmer on an Ethernet network to a PLC on the Ethernet network.

Note Please use CX-Programmer version 8.1 or higher (CX-ONE version 3.1 or higher).

■ **System Configuration Example 1: No Routing**

In this example, an online connection is made by FINS/UDP to a PLC on an Ethernet network (PLC1 in the diagram below) from a CX-Programmer / CX-Integrator connected to the Ethernet network.



Web Browser Setting

Item	Setting
Broadcast	All ones (4.3BSD)
FINS/UDP port	Default (9600)
IP address	192.168.250.2
Subnet mask	255.255.255.0
FINS Node Address	2
IP address conversion	Automatic generation method (dynamic)
Baud rate	Automatic Detaction
IP router tabel	None

OMRON Ethernet Option Board

[Settings]

[Menu](#)

1. IP Address and Protocols
 - o [System](#)
 - o [HTTP](#)
2. IP Address/Router Table
 - o [IP Address Table](#)
 - o [IP Router Table](#)
3. FINS/TCP
 - o [Connection](#)

System Format

Parameter	Value
IP Address	192 . 168 . 250 . 2
Subnet Mask	255 . 255 . 255 . 0
FINS Node Address	2 [0: default(1)]
FINS/UDP Port	0 <input type="checkbox"/> Use Input Port No [Default(9600)]
FINS/TCP Port	0 <input type="checkbox"/> Use Input Port No [Default(9600)]
Address Conversion Mode	<input checked="" type="radio"/> Auto (Dynamic) <input type="radio"/> Auto (Static) <input type="radio"/> Manual <input type="radio"/> Auto & Manual
FINS/UDP Option	<input checked="" type="radio"/> Destination IP address is changed dynamically. <input type="radio"/> Destination IP address is Not changed dynamically.
Broadcast Option	<input checked="" type="radio"/> All '1' (4.3BSD) <input type="radio"/> All '0' (4.2BSD)
FINS/TCP Protected	<input type="checkbox"/> Use FINS/TCP Protection Function

Transfer Cancel Restart

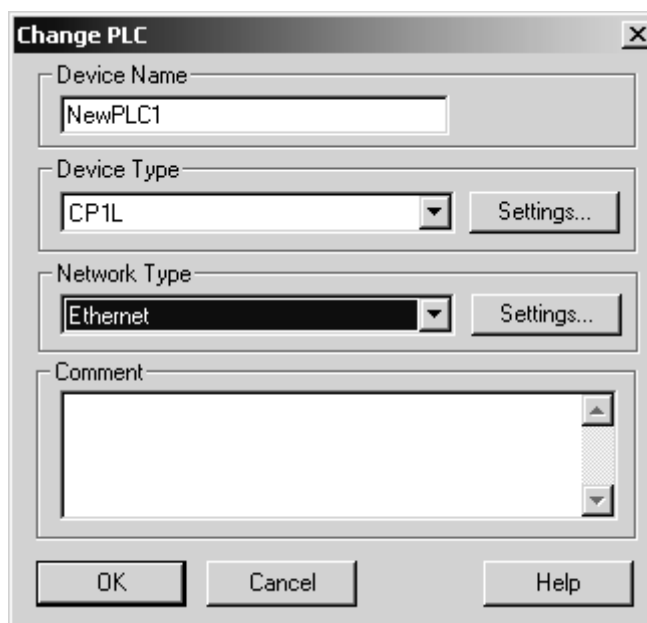
CX-Programmer's Change PLC Dialog Box

Item		Setting	
PLC name		PLC1	
Network classification		Ethernet	
Network Tab	FINS transmission source address	0	
	FINS destination	Network number	0
		Node address	2
	Frame length	1,004bytes	
	Response monitor time	5 seconds	
Driver Tab	Workstation node address	1	
	Automatic generation method	Not selected	
	Ethernet Option Board IP address	192.168.250.2	
	Port number	9600	

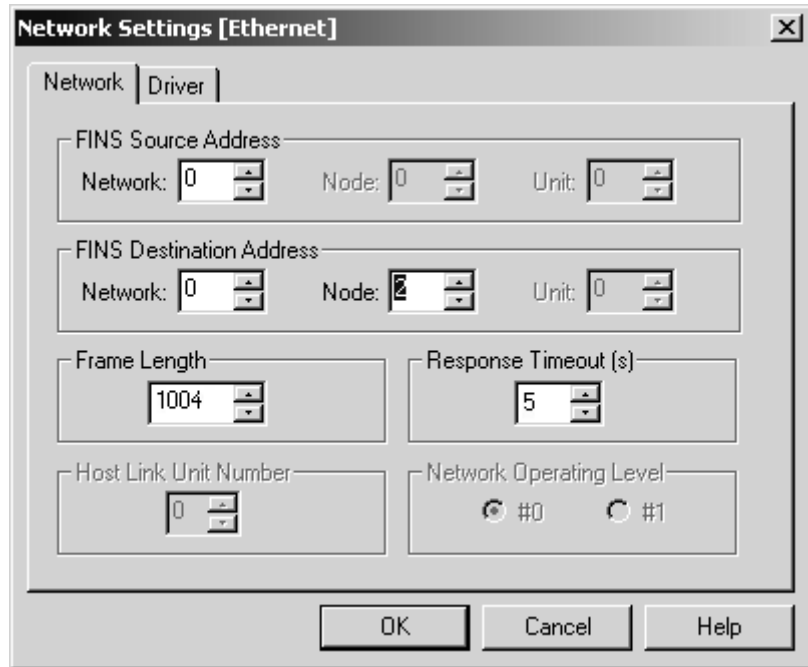
Note Limited by the CP1W-CIF41 inner bus protocol (Toolbus), the frame length and response monitor time are different from the existing Ethernet unit.

Inputs to the CX-Programmer's Setup Window

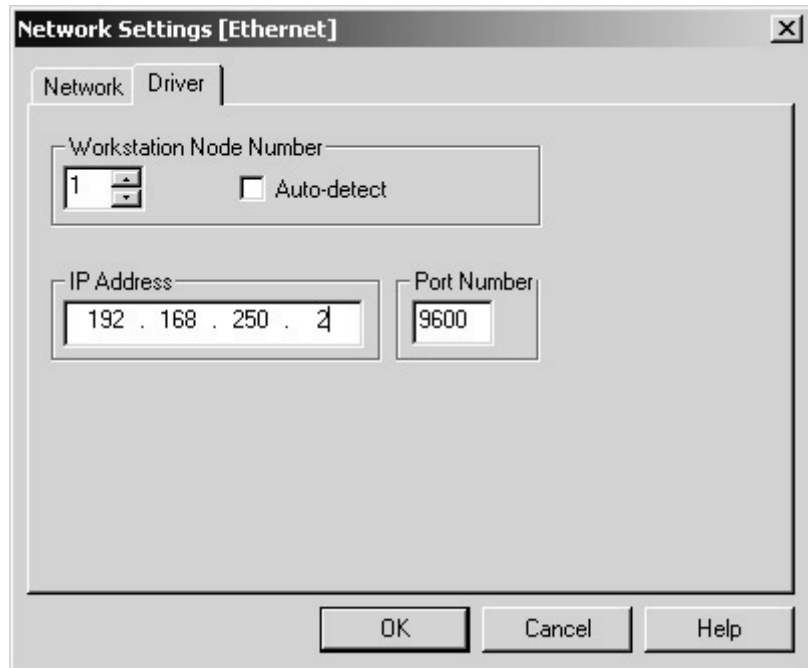
Change PLC Settings



Network Settings (Network Tab)

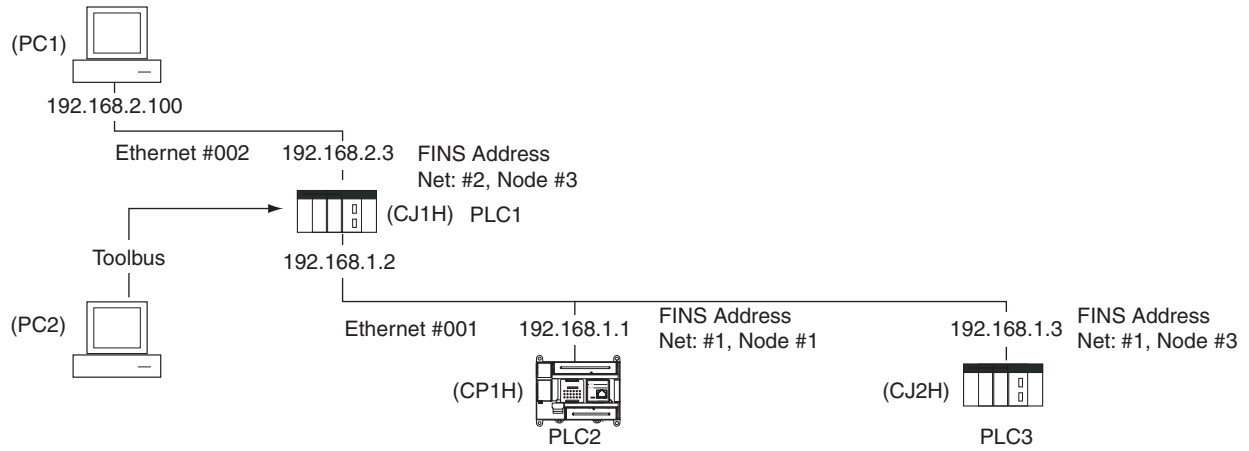


Network Settings (Driver Tab)



■ **System Configuration Example 2: Using Routing Tables**

In this example, an online connection is made via the Ethernet to a PLC on a Controller Link network (PLC3 in the diagram below) from a CX-Programmer / CX-Integrator connected to the Ethernet network.



Web Browser Setting

Same as for *System Configuration Example 1*.

CX-Programmer's Change PLC Dialog Box

Settings for target PLC (PLC1)'s Change PLC Dialog Box		Setting	
PLC name		PLC2	
Network classification		PLC1	
Network Tab	FINS transmission source address	2	
	FINS destination	Network number	1
		Node address	1
	Frame length	542bytes (default)	
	Response monitor time	5 seconds	

Routing Table Settings and Transfer to Each PLC

Set the routing tables with CX-Integrator, and transfer them.

- 1,2,3...**
- Using CX-Integrator, connect online, and select **Routing table - Settings**. Then create FINS local routing tables (a local network table and a relay network table).

Example: PLC 1 Routing Table Settings

- Local Network Table

Unit number	Local network number
0	1
1	2

- Relay Network Table (None)

Example: PLC 2 and PLC 3 Routing Table Settings

- Local Network Table

Option port No.	I/O capacity	Unit address	Local network number
Option port 1	14/20	252(0xFC hex)	1
	30/40/60	253(0xFD hex)	1
Option port 2	30/40/60	252(0xFC hex)	1

- Relay Network Table

In order to relay from PLC2/3 to the final network number 2, it is necessary to relay via node address 1 on relay network number 2.

Final network number	Relay network number	Relay node address
2	1	2

- Save the routing table file (File - Save local routing table file).
- Select **New** from the Project Menu, and save with a file name. Then select **Add Device** from the Project Menu. For each PLC, register a PLC with a direct serial connection (node address: 0), and select it.
- With CX-Integrator, select **Open** from the PLC Menu.
- Select **Routing table - Setup**, read the saved file, and select **Options - Transfer to PLC**. Click **Yes** to transfer the routing tables to the connected PLCs.

