



# WebAccess Driver Configuration Manual

Omron CP1L-EM30DR

ORMONDRV.DLL     Driver date: 2018/6/5

ORMONAPI.DLL     Driver date: 2009/4/4

English Version 1.0



# Revision History

Date	Version	Author	Reviewer	Description
2018-08-21	1.0	Neal.Chen	Neal.chen	Initial Release
2018-10-25	1.1	Neal.Chen	Joseph.Chiu	Update error code

## Table of Contents

<b>1.</b>	<b>Introduction to Omron FINS .....</b>	<b>2</b>
1.1	Omron I/O Memory Area .....	2
1.2	Overview of the Data Areas.....	3
1.3	Clearing and Holding I/O Memory .....	5
1.4	Using CX One Programmer to connect a PLC.....	6
<b>2.</b>	<b>Configure Omron PLC connection by using FINS TCP/UDP .....</b>	<b>7</b>
2.1	TCPIP Comport Properties.....	7
2.2	Device Setting.....	8
2.3	Parameter List.....	9
<b>3.</b>	<b>Error Code .....</b>	<b>9</b>

# 1. Introduction to Omron FINS

**FINS** (Factory Interface Network Service) is a network protocol used by Omron PLCs, over different physical networks like Ethernet, Controller Link, DeviceNet and RS-232C.

The FINS communications service was developed by Omron to provide a consistent way for PLCs and computers on various networks to communicate. Compatible network types include Ethernet, Host Link, Controller Link, SYSMAC LINK, SYSMAC WAY, and Toolbus. **FINS** allows communications between nodes up to three network levels. The FINS protocol can be used in one of two ways:

FINS/UDP - Omron FINS over UDP/IP and supported by all Ethernet connection types.

FINS/TCP - Omron FINS over TCP/IP and not supported on some earlier Ethernet modules, for example the CS1W-ETN11.

## 1.1 Omron I/O Memory Area

This region of memory contains the data areas that can be accessed as instruction operands. I/O memory includes the CIO Area, Work Area, Holding Area, Auxiliary Area, DM Area, Timer Area, Counter Area, Task Flag Area, Data Registers, Index Registers, Condition Flag Area, and Clock Pulse Area.

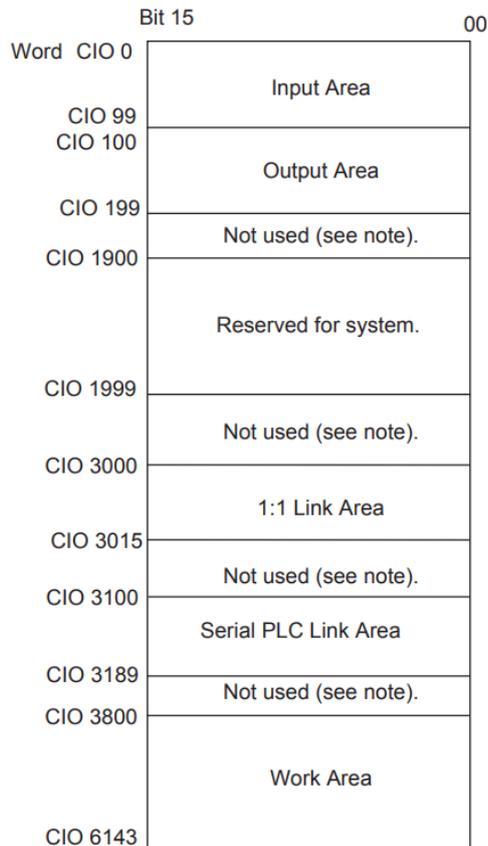
Area		Size	Range	Task usage	Allocation	Bit access	Word access	Access		Change from CX-Programmer	Forcing bit status						
								Read	Write								
CIO Area	I/O Area	Input Area	1,600 bits (100 words)	CIO 0 to CIO 99	Shared by all tasks	CP1L-EL/EM CPU Units and CP-series Expansion Units or Expansion I/O Units	OK	OK	OK	OK	OK	OK					
		Output Area	1,600 bits (100 words)	CIO 100 to CIO 199					OK	OK							
	1:1 Link Area		256 bits (16 words)	CIO 3000 to CIO 3015					1:1 Links	OK			OK	OK	OK	OK	OK
	Serial PLC Link Area		1,440 bits (90 words)	CIO 3100 to CIO 3189					Serial PLC Links	OK			OK	OK	OK	OK	OK
	Work Area		14,400 bits (900 words)	CIO 3800 to CIO 6143					---	OK			OK	OK	OK	OK	OK
Work Area		8,192 bits (512 words)	W000 to W511	---	OK	OK	OK	OK	OK	OK	OK						
Holding Area		8,192 bits (512 words)	H000 to H511 (Note 6)	---	OK	OK	OK	OK	OK	OK	OK						
Auxiliary Area		15,360 bits (960 words)	A000 to A959	---	OK	---	OK	Note 1	Note 1	Note 1	No						
TR Area		16 bits	TR0 to TR15	---	OK	OK	OK	OK	OK	No	No						
Data Memory Area		32,768 words	D00000 to D32767 (Note 7)	---	---	No (Note 2)	OK	OK	OK	OK	No						
Timer Completion Flags		4,096 bits	T0000 to T4095	---	OK	---	OK	OK	OK	OK	OK						
Counter Completion Flags		4,096 bits	C0000 to C4095	---	OK	---	OK	OK	OK	OK	OK						
Timer PVs		4,096 words	T0000 to T4095	---	---	OK	OK	OK	OK	OK	No (Note 4)						
Counter PVs		4,096 words	C0000 to C4095	---	---	OK	OK	OK	OK	OK	No (Note 5)						
Task Flag Area		32 bits	TK0 to TK31	---	OK	---	OK	No	No	No	No						
Index Registers		16 registers	IR0 to IR15	Function separately in each task (Note 3)	---	OK	OK	Indirect addressing only	Specific instructions only	No	No						
Data Registers		16 registers	DR0 to DR15		---	No	OK	OK	OK	No	No						

Figure 1.1 Omron I/O memory area for CP1L-EL/EM

## 1.2 Overview of the Data Areas

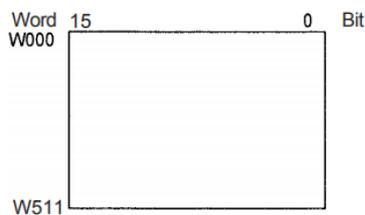
### CIO Area

It is not necessary to input the “CIO” acronym when specifying an address in the CIO Area. The CIO Area is generally used for data exchanges, such as I/O refreshing with PLC Units. Words that are not allocated to Units may be used as work words and work bits in the program.



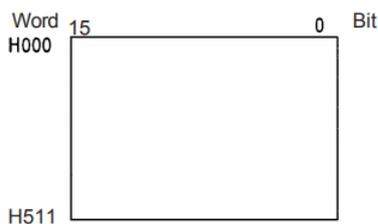
### Work Area (W)

Words in the Work Area can be used in programming; they cannot be used for I/O exchange with external I/O terminals. Use this area for work words and bits before any words in the CIO Area.



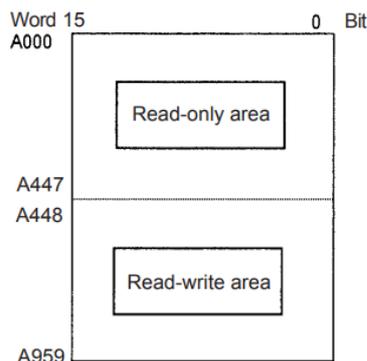
### Holding Area (H)

Words in the Holding Area can be used in programming. These words retain their content when the PLC is turned ON or the operating mode is switched between PROGRAM mode and RUN or MONITOR mode.



**Auxiliary Area (A)**

These words are allocated to specific functions in the system.



**Temporary Relay Area (TR)**

The TR Area contains bits that record the ON/OFF status of program branches. Refer to the CP1H/CP1L Programming Manual for details.

**Data Memory Area (D)**

The DM Area is a multi-purpose data area that is normally accessed only in word-units. These words retain their content when the PLC is turned ON or the operating mode is switched between PROGRAM mode and RUN or MONITOR mode.

**Time Area (T)**

There are two parts to the Timer Area: the Timer Completion Flags and the timer Present Values (PVs). Up to 4,096 timers with timer numbers T0 to T4095 can be used.

Timer Completion Flags

These flags are read as individual bits. A Completion Flag is turned ON by the system when the corresponding timer times out (i.e., when the set time elapses).

Timer PVs

The PVs are read and written as words (16 bits). The PVs count up or down as the timer operates.

**Condition Flags**

These flags include the Arithmetic Flags, such as the Error Flag and Equals Flag, which indicate the results of instruction execution as well as the Always ON and Always OFF Flags. The Condition Flags are specified with symbols rather than addresses.

**Clock Pulses**

The Clock Pulses are turned ON and OFF by the CPU Unit’s internal timer. These bits are specified with symbols rather than addresses.

**Task Flag Area (TK)**

A Task Flag will be ON when the corresponding cyclic task is in executable (RUN) status and OFF when the cyclic task hasn’t been executed (INI) or is in standby (WAIT) status.

**Index Registers (IR)**

Index registers (IRO to IR15) are used to store PLC memory addresses (i.e., absolute memory addresses in RAM) to indirectly address words in I/O memory. The Index Registers can be used separately in each task or they can be shared by all tasks.

**Data Registers (DR)**

Data registers (DR0 to DR15) are used together with Index Registers. When a Data Register is input just before an Index Register, the content of the Data Register is added to the PLC memory address in the Index Register to offset that address. The Data Registers can be used separately in each task or they can be shared by all tasks.

**1.3 Clearing and Holding I/O Memory**

Area		Mode changed <sup>1</sup>		Fatal error generated				PLC power turned ON			
				Execution of FALS		Other fatal errors		PLC Setup set to clear IOM Hold Bit status <sup>2</sup>		PLC Setup set to hold IOM Hold Bit status <sup>2</sup>	
		IOM Hold Bit OFF	IOM Hold Bit ON	IOM Hold Bit OFF	IOM Hold Bit ON	IOM Hold Bit OFF	IOM Hold Bit ON	IOM Hold Bit OFF	IOM Hold Bit ON	IOM Hold Bit OFF	IOM Hold Bit ON
CIO Area	I/O Area	Cleared	Retained	Retained	Retained	Cleared	Retained	Cleared	Cleared	Cleared	Retained
	Serial PC Link Area										
	Internal I/O Area										
Work Area (W)		Cleared	Retained	Retained	Retained	Cleared	Retained	Cleared	Cleared	Cleared	Retained
Holding Area (H)		Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained
Auxiliary Area (A)		Status treatment depends on address.									
Data Memory Area (D)		Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained
Timer Completion Flags (T)		Cleared	Retained	Retained	Retained	Cleared	Retained	Cleared	Cleared	Cleared	Retained
Timer PVs (T)		Cleared	Retained	Retained	Retained	Cleared	Retained	Cleared	Cleared	Cleared	Retained
Counter Completion Flags (C)		Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained
Counter PVs (C)		Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained	Retained
Task Flags (TK)		Cleared	Cleared	Retained	Retained	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
Index Registers (IR)		Cleared	Retained	Retained	Retained	Cleared	Retained	Cleared	Cleared	Cleared	Retained
Data Registers (DR)		Cleared	Retained	Retained	Retained	Cleared	Retained	Cleared	Cleared	Cleared	Retained

Figure 1.2 Clearing and Holding I/O Memory

### 1.4 Using CX One Programmer to connect a PLC

From the file menu at the top of CX-programmer, start new project and it will get the change dialog box or you can use the auto online function to connect the CP1L.



Figure 1.3 Using Auto Online to connect CP1L

The user can use the direct connection or the hub connection to connect the CP1L.

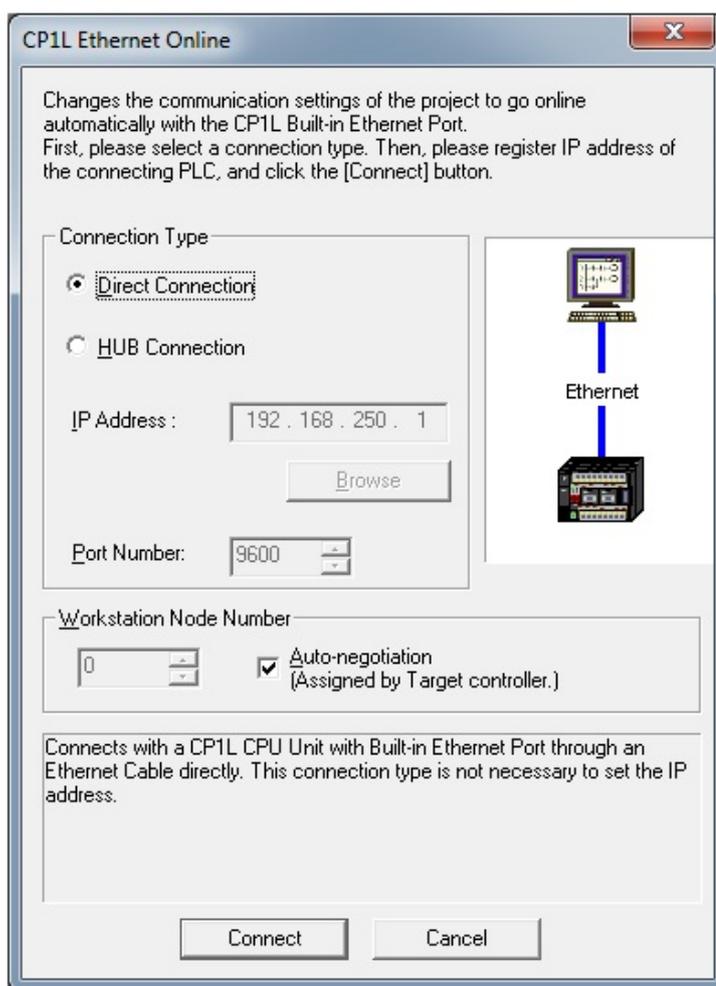


Figure 1.4 Connection type setting of the CX-programmer

The user can use PLC memory interface to transfer to or from PLC to check the memory data as

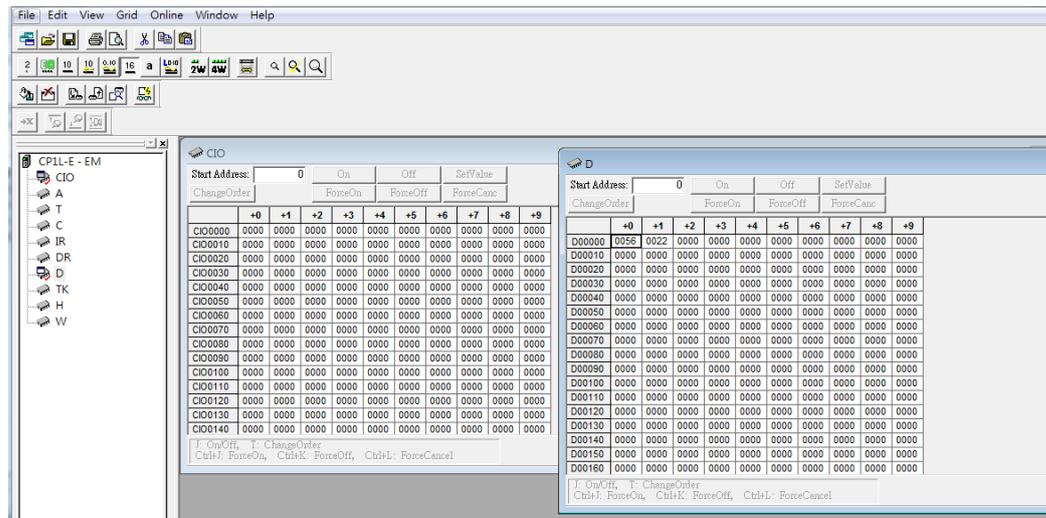


Figure 1.5 PLC memory of CX-programmer

## 2. Configure Omron PLC connection by using FINS TCP/UDP

The steps, in summary, are:

1. Start Internet Explorer **Web Browser**.
2. Enter IP address of the **Project Node**.
3. Use **WebAccess Configuration**.
4. Open or Create a **Project**.
5. Configure a **SCADA node** (the PC that will connect to the automation hardware).
6. Configure a **Comport** for the SCADA Node that is a **TCPIP type Comport**.

---

*Note - It is recommended to select a Comport number greater than 2 so that it does not conflict with a Serial comport that you may want to use later.*

---

### 2.1 TCPIP Comport Properties

The TCPIP Comport is usually associated with an Ethernet Network Interface Card on the SCADA Node PC. Any TCPIP compatible medium is supported as long as it complies with Microsoft TCPIP protocol stack. The user should give the setting of comport number, scan time, timeout, retry count, auto recover time & scan devices in parallel by the actual connection requirements.

Create New Comport		[Cancel]	Submit
Interface Name	TCPIP		
Comport Number	2		
Description	Description		
Scan Time	1	<input type="radio"/> MilliSecond <input checked="" type="radio"/> Second <input type="radio"/> Minute <input type="radio"/> Hour	
Timeout	1000	MilliSecond	
Retry Count	3		
Auto Recover Time	60	Second	
Backup Port Number	0		
Scan Devices in Parallel	<input checked="" type="radio"/> Yes <input type="radio"/> No		
		[Cancel]	Submit

Figure 2.1 TCPIP Comport properties

## 2.2 Device Setting

The user needs to set the device name, unit number, device type and the IP address and port number by the Omron PLC setting. The default port number of the FINS protocol is "9600". If the user wants to use FINS/TCP, the parameter of "USE TCP" should be 1. The "USE TCP" is 0 for the FINS/UDP.

**The Omron PLC should not be connected by FINS/TCP and FINS/UDP at the same time.**

Create New Device				[Cancel]	Submit
Device Name	CP1L				
Description					
Unit Number	0				
Device Type	OmronCP				
Primary	IP Address	192.168.250.2			
	Port Number	9600			
	Device Address	if other than Unit Number			
Secondary	IP Address				
	Port Number				
	Device Address				
Fins Network No.	0	FINS Node No.	0		
TCP/IP Packet Size	100	USE TCP	1		

Figure 2.2 OmronCP FINS setting properties

### 2.3 Parameter List

Parameter	Date Type	Description	Address format
A	Analog	Work Area	Axxxx
C	Analog	Counter Completion Flag	Cxxxx
CIO	Analog	I/O Area	CIOxxxx
D	Analog	Data Memory Area	Dxxxx
DR	Analog	Data Registers	DRxxxx
H	Analog	Holding Area	Hxxxx
IR	Analog	Index Registers	IRxxxx
T	Analog	Timer PVs	Txxxx
TK	Analog	Task Flag Area	TKxxxx
W	Analog	Work Area	Wxxxx

## 3. Error Code

### Serial

**8100 : Open serial port error**

**8200 : Received data error**

**8300 : Received data error**

### TCP/UDP

**8100 : Received data error( ICF error)**

**8200 : Received data error (SID error)**

**8210 : Received data error**

**E000 : FINS API error**

**800X : FINS ICF error**

**8YXX FINS Y:main error, XX:sub error**

**80XX FINS XX: sub error code**