

Connecting UniOP to Omron PLCs with the FINS Ethernet Protocol

This Technical Note contains the information needed to connect UniOP to Omron controllers over an Ethernet network to the Ethernet module in the PLC, using the FINS command set.

The Omron FINS/ETH communication driver is delivered with the Designer file D32uplc206.dll.

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1 Introduction

To create a Designer project for FINS Ethernet communication to the Omron controller, select the driver “Omron FINS/ETH” from the list of drivers in the Configure Controller... dialog box.

The Omron controller must be equipped with an appropriate Ethernet interface or must have the interface built-in in the CPU module.

The operator panel must be equipped with the optional TCM10 or SCM11 communication module to support Ethernet UDP/IP communication.

UniOP currently supports only 10 Mb Ethernet over twisted pair.

2 Configuration with Designer

The UniOP project file must be properly configured for Ethernet communication with Omron controllers.

2.1 Panel Setup

The UniOP panel must be assigned a unique IP address.

There are multiple ways to assign an IP address to the panel; please refer to the User's Manual for detailed instructions.

The "Ethernet Board" option must be enabled in the Panel Setup dialog box under the tab "External Devices".

The panel IP address may be defined in the field "Ethernet Board" as shown in Figure 3 below.

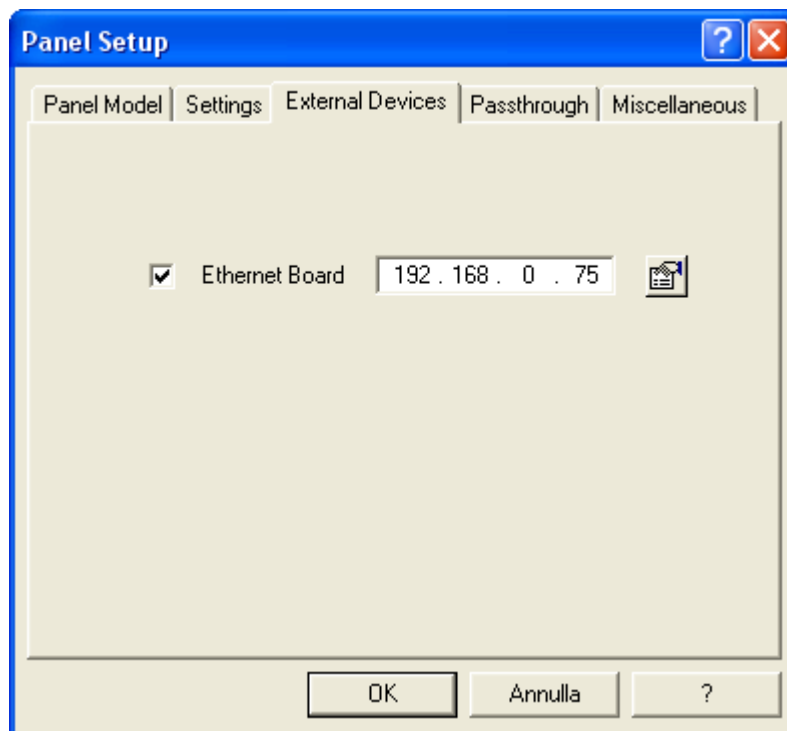


Figure 1 – IP Address in Panel Setup

If the field contains the IP address 0.0.0.0, then the panel will derive the IP address using one of the alternate methods.

2.2 Controller Setup

Figure 2 shows the Designer Controller Setup dialog box for the Omron FINS/ETH driver.

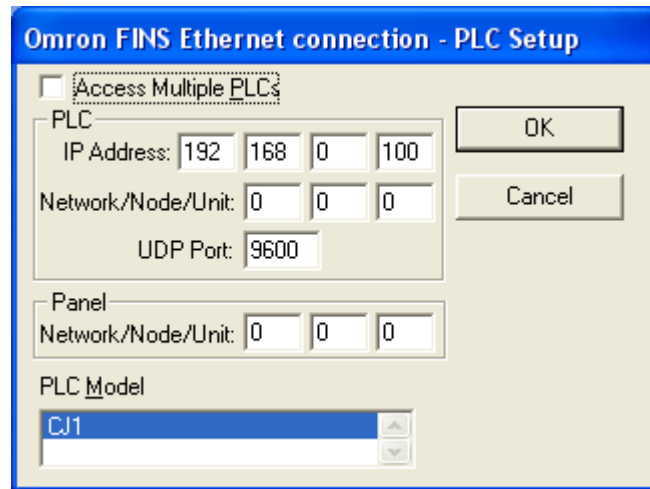


Figure 2– Controller Setup dialog box

The description of the various parameters is given below.

IP Address the Ethernet IP address of the controller connected to the operator panel

UDP Port contains the port number used in the communication with the PLC. The UDP Port number must match the value specified in the PLC configuration; the default value is 9600. Most application will use the default value.

Network/Node/Unit parameters that define the FINS address of the device. There is a conversion rule to determine the IP address of a device starting from the FINS address in the Omron network. When using the FINS communication service, it is necessary to specify the node addressing according to the FINS addressing schme. Even in this case, data must be sent and received on the Ethernet network using IP addresses. Therefore, IP addresses are converted from FINS addresses. **Error! Reference source not found.** below shows an example taken from the Omron Ethernet Units Operation Manual.

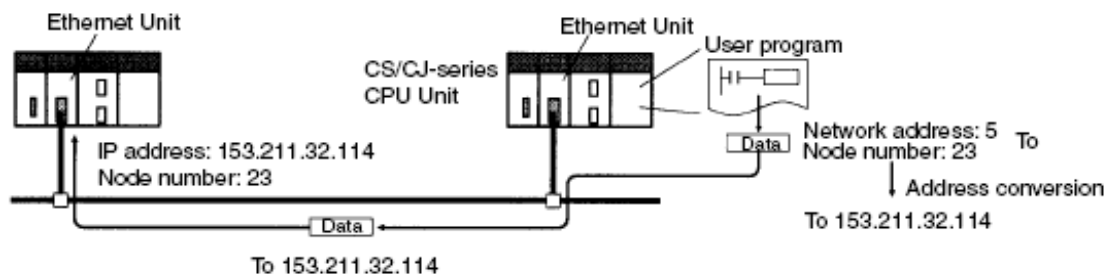


Figure 3

There are three ways to convert the FINS addresses into the corresponding IP address; they are:

- Automatic generation (default)
- IP address table
- Combined method (uses Automatic and IP address table)

The Omron documentation contains all the details related to determine the IP address of the controller depending on the FINS address assigned to it. The Network/Node/Unit parameters assigned to UniOP should be compatible with the ones assigned in the Omron network to the PLC:

- **Network Number** must match the one specified for the PLC
- **Node Number** should match the last number of the UniOP IP address
- **Unit** represent the possible different network cards over the same node; for UniOP should be always set to zero since there is always only one communication unit.

The protocol implementation supports the connection of multiple controllers to one operator panel, as shown in Figure 4. To set-up multiple connections, check the “Access Multiple Drives” checkbox in the Controller Setup dialog box, see Figure 2.

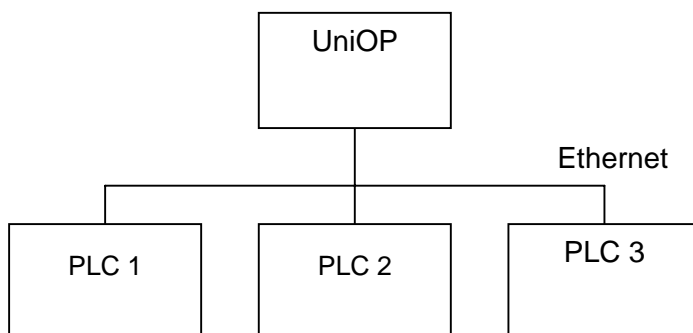


Figure 4– Multiple controller connection

Depending on the PLC configuration, it is also possible to connect more than one panel to the same controller.

2.3 RDA Setup

The Real Time Clock information in the Reserved Data Area (RDA) is coded in binary and is arranged as shown in Table 1.

Dn	0	Day of the week
Dn+1	Day	Month
DBn+2	Year	Hour
DBn+3	Minutes	Seconds

Table 1. RTC information in the RDA

The Current Page and the Page Request registers in the RDA are coded in binary. The RDA can be freely positioned within the Data Registers in the PLC memory.

For the parts of the RDA organized in bits (Keyboard Status, LED Control, Alarms, UniOP Status Word and PLC Command Word), the first bit in the RDA corresponds to the first bit in the PLC (i.e. the LSB bit in the register). For example, if the Keyboard Status area is positioned at address D0, then the key F1 will be mapped to bit 0, the key F8 will be mapped to bit 7 and so on as listed in Table 2.

	.15	.14	.13	.12	.11	.10	.9	.8	.7	.6	.5	.4	.3	.2	.1	.0
D0	F16	F15	F14	F13	F12	F11	F10	F9	F8	F7	F6	F5	F4	F3	F2	F1
D1																F17

Table 2. RDA bit information

Similarly, if the UniOP Status Word is positioned at the address D12, then the status bit S0 will be mapped to D12.0, the bit S7 will be mapped to D12.7 while the bit S8 will be mapped to D13.0.

3 PLC Configuration

The Omron system must be properly configured for Ethernet communication using the Omron CX-programmer.

Figure 4 below shows one example of network configuration for Ethernet communication.

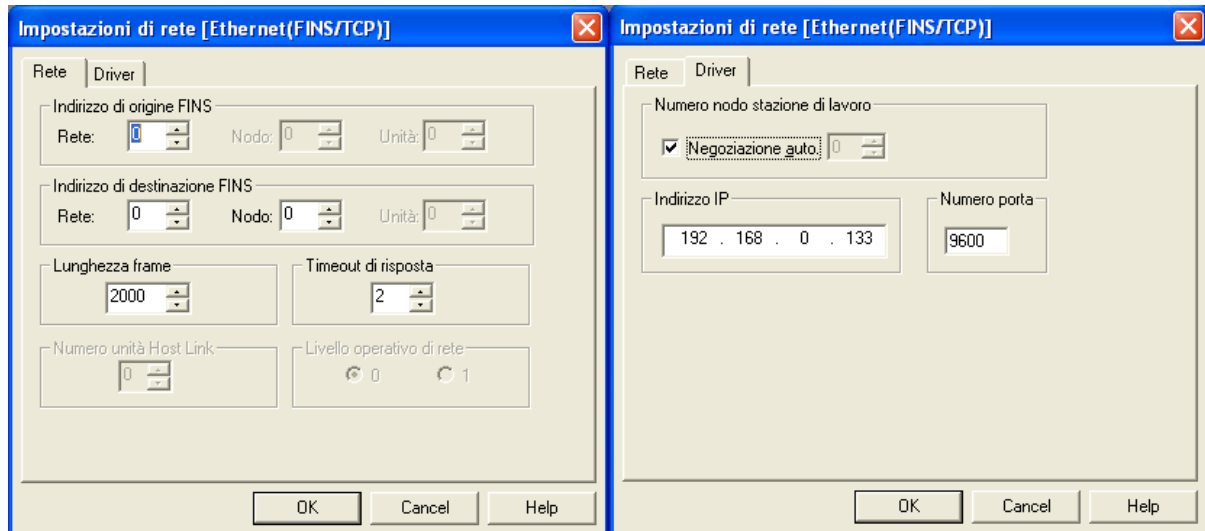


Figure 5

Appendix A. Communication Error Codes

Current communication status is displayed on the system page of the UniOP. Beside the string, describing current state of the communication (OFF, ON, ERR), there is an additional error code representing the last (which may be not the current one) error encountered. The codes are:

Code	Description	Notes
00	No error	There are no communication errors and there have been no errors since start-up.
04	Wrong ICF	Wrong ICF (Information Control Field) response (should be 0xC0)
05	Time-out (receiving)	The panel has not received a response from the PLC within the timeout interval
06	Wrong FINS node	Wrong Network/Node/Unit address in response frame
07	Unknown error	Unspecified internal protocol error, please contact Technical Support for more information
09	Time-out error (sending)	Internal protocol error; timeout occurred while preparing the request frame
12	Completion Code Error	The request sent by the panel has been processed with errors and could not be completed successfully
16	SID error	Service ID error; request Service ID does not match the response Service ID