Tech-note

Connecting UniOP to Mitsubishi FX Series with Ethernet

This Technical Note contains the information needed to connect UniOP to Mitsubishi FX3U controllers using an Ethernet connection to the FX3U-ENET module

Sitek S.p.A.
Tn263
Ver. 1.0

Contents

1 Introduction

The Mitsubishi FX Ethernet communication driver is delivered with the Designer file D32uplc213.dll. To create a Designer project for Ethernet communication to the Mitsubishi FX3U controllers, select the driver “Mitsubishi FX E” from the list of drivers in the Configure Controller… dialog box.

The FX3U controller must be equipped with an appropriate Ethernet interface. The following Ethernet communication modules can be used for communication:
FX3U-ENET

The UniOP communication driver implements the MELSEC-F (or MC) communication protocol described in the Mitsubishi document “FX3U-ENET USER’S MANUAL”, chapter 8 “Communication using MC protocol”.

The operator panel must be equipped with the optional SCM11 or TCM10 communication module to support Ethernet communication or have a built-in Ethernet port.

2 Configuration with Designer

The UniOP project file must be properly configured for Ethernet communication with Mitsubishi 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 1 below.

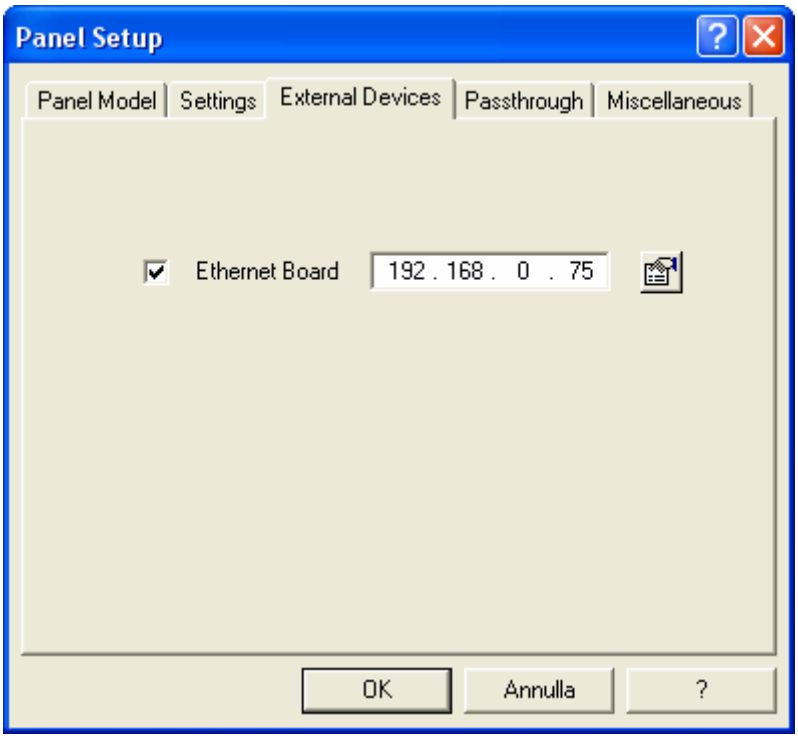

Figure 1 – IP Address in Panel Setup

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 Mitsubishi FX E driver.
The Ethernet IP address of the controller connected to the operator panel must be entered in the "IP address" field.
The field "Port" contains the port number used in the communication with the PLC. Most applications will use the default value.

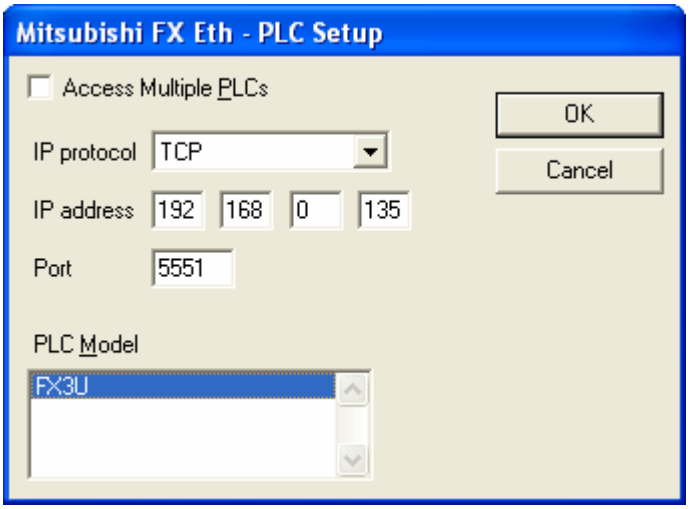

Figure 2– Controller Setup dialog box

The protocol supports both UDP and TCP connection. The IP protocol can be selected from the specific list box in the Controller Setup.
As a general principle the UDP protocol may result in higher performance than TCP, but TCP is more reliable than UDP. The decision on which protocol to use shall be taken depending on network configuration and target performance considerations.

The protocol implementation supports the connection of multiple controllers to one operator panel, as shown in Figure 3. To set-up multiple connections, check the “Access Multiple Drives” checkbox in the Controller Setup dialog box, see Figure 2.

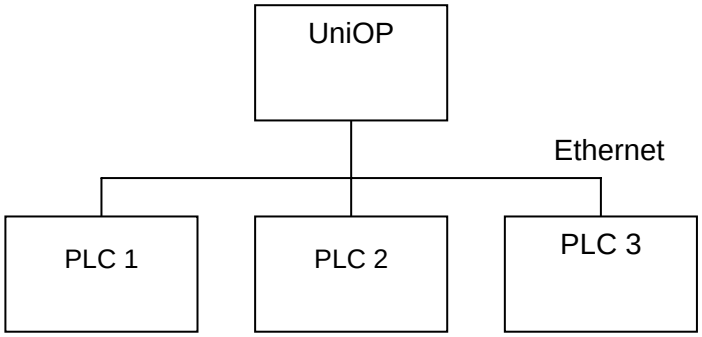

Figure 3– Multiple Controller Connection

Depending on the PLC configuration, there is also the possibility to connect more than one panel to the same controller. Please refer to the Mitsubishi documentation for instructions about how to configure the number of available connections; some notes are also reported in the “PLC Configuration” chapter later in this document.

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 page number displayed and the page number requested 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 Mitsubishi FX3U system must be properly configured for Ethernet communication using the Mitsubishi FX Configurator 1.00 (SW1D5C-FXENET-EL) or higher.

The Figure 4 below shows an example of network configuration for Ethernet communication. In the controller Configurator settings are required for “Operation settings” and “Open settings” areas.

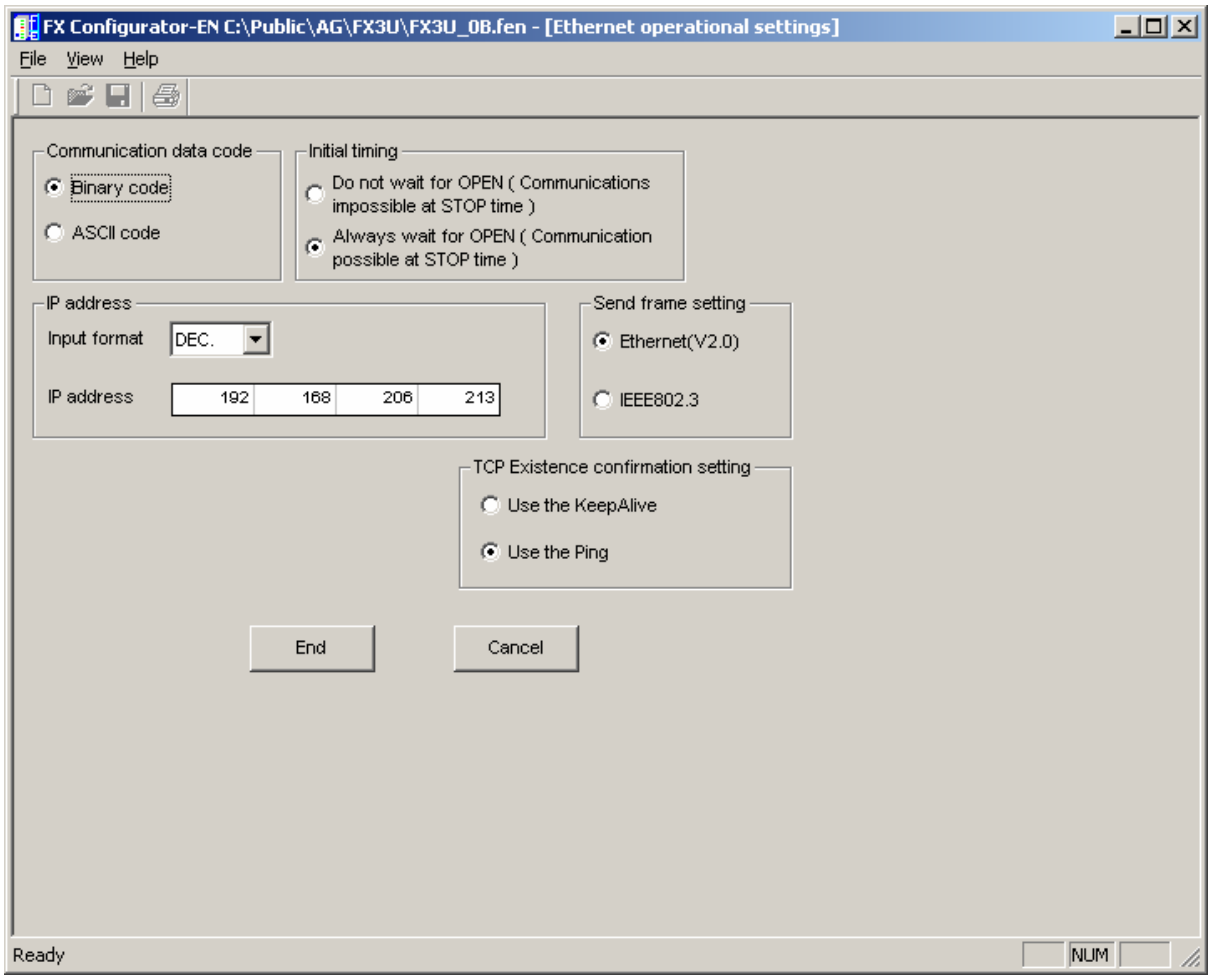

Figure 4 – Operational settings

Please note that the UniOP communication protocol supports **only** Binary code communication.

The Figure 5 below shows the Ethernet “Open settings” configuration.
The detailed explanation of the meaning of each setting is available in Chapter 5.5 of the Mitsubishi “FX3U-ENET USER’S MANUAL”.

Please note that the use of more that one panel communicating with the same controller requires to define proper settings in the “Open settings” configuration dialog: one connection per each panel must be configured with proper properties.

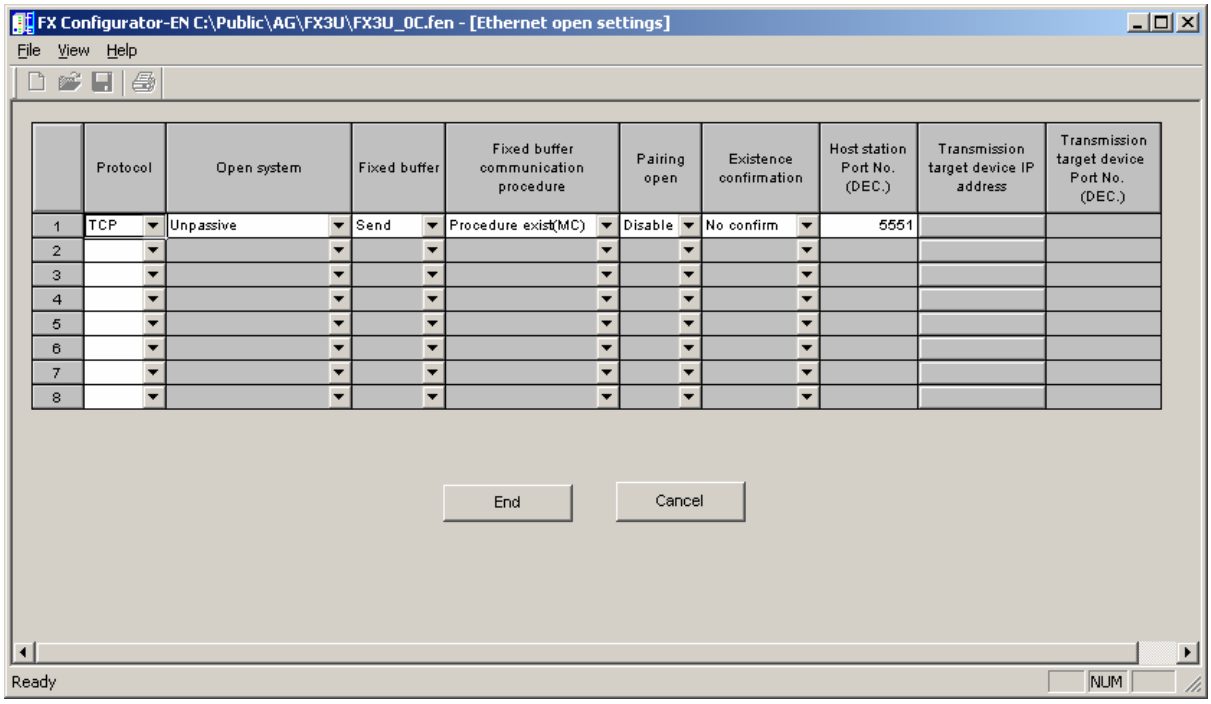
FX Configurator-EN C:\Public\AG\FX3U\FX3U_0C.fen - [Ethernet open settings]
File View Help
Protocol
Open system
Fixed buffer
Fixed buffer communication procedure
Pairing open
Existence confirmation
Host station Port No. (DEC.)
Transmission target device IP address
Transmission target device Port No. (DEC.)
1 TCP Unpassive Send Procedure exist(MC) Disable No confirm 5551
2
3
4
5
6
7
8
End
Cancel
Ready
NUM

Figure 5

Appendix A. Communication Error Codes

Current communication status is displayed in the System Menu of the UniOP.
A message and a numeric error code describe the error status.
The message reports the current communication status. The number shows the code of the current communication error or, if the communication is correct, the code of the last error encountered. When the error code 0 is shown, it means there have been no communication errors since this system start-up.

Code	Description	Notes
00	No error	There are no communication errors and there have been no errors since start-up.
04	NAK	Repeated NAK (not acknowledge) from slave device
05	Timeout	No response from slave within a certain time
06 **12**	Response error	The slave response frame has some invalid and unexpected contents.
07	Generic error	Unknown error; critical condition not handled by driver
09	Sending timeout	There was a timeout during preparation of request format for slave; could be related to problems between protocols and panel Ethernet card