Ethernet Connectivity for UniOP

This document describes the new Ethernet connectivity solutions for UniOP.
The new features are initially described in this separate manual; the information will be integrated in the online documentation when the new software will be officially released.

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1 Assigning IP Addresses to the Panel

Every device in an Ethernet network must have a unique IP address.
A UniOP operator panel with Ethernet connection capability must be assigned an IP address before it can communicate with a computer running the Designer software.
UniOP is providing the users with the maximum flexibility in the assignment of the IP address. In fact there are several methods to do it and some well-defined priority rules to sort which way will be the one active at a certain time.

The available methods to assign an IP address to a panel are:
- manual definition of the address when the panel is in Configuration Mode
- definition of IP address from Designer and UniDataExchanger when the panel is in Configuration Mode
- automatic assignment of IP address from DHCP server
- definition of IP address in the project file

The IP address is a number in the usual form nnn.nnn.nnn.nnn where nnn is a number from 0 to 255.
Two parameters need to be defined by the user in addition to the IP address:
Subnet Mask: it is a number in the form nnn.nnn.nnn.nnn where nnn is a number with value either 0 or 255
Gateway IP: it is the address of the router that allows connection to other network segments. It is a number in the usual form nnn.nnn.nnn.nnn where nnn is a number from 0 to 255.
This chapter gives a detailed description of these address input methods.

The UniOP panels show the IP address and the other Ethernet settings when it is in Configuration Mode.
The figure shows how this information is presented in Configuration Mode.

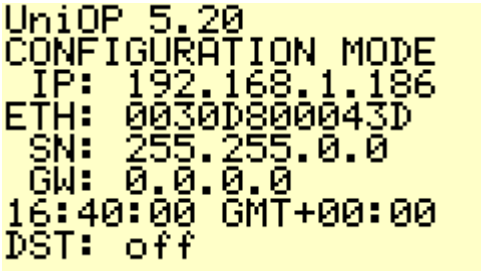

Figure 1 – Ethernet Settings in Configuration Mode

1.1 Manual Definition of IP Address

When the panel is in the Configuration Mode, the user can manually enter the value of the IP address and other network parameters.
The activation of the manual address entry procedure depends on the type of the HMI.

Touchscreen If the HMI has a touchscreen, just touch the address you want to edit. The HMI will show the address entry page.
When the introduction is complete, confirm with the Enter button.
The procedure can be aborted pressing the Clear button.

Keypad If the HMI has a keypad, you can enter the address entry mode pressing the two arrow keys Up and Down at the same time. Pressing the two arrow keys multiple time will cycle the data entry focus through all the available parameters.
When the introduction is complete, confirm with the Enter key.
The procedure can be aborted pressing the Clear key

The new IP address (or Subnet Mask or Gateway IP) becomes immediately effective when the data entry is confirmed with Enter.

Note: *Before assigning an IP address to the panel, make sure it is a unique address in the network. Duplicate IP addresses will cause network errors.*

The address assigned defined manually in Configuration Mode is persistent: once the IP address has been defined, the panel will use it until the user defines a new address.
To remove a manually defined IP address, define the IP address 0.0.0.0.

1.1.1 Address Definition with Keypad

The procedure to define manually an IP address using the keypad is the following:
- digits must be entered one by one
- use Up/Down arrow keys to select the value of each digit
- use Left/Right arrow keys to move from one digit to next

Please remind that the maximum value for each element of the IP address is 255. There is no address consistency check in the manual IP address definition procedure.

1.2 Definition of IP Address using Pick Panel in Designer

You can modify the IP address of the panel also using Designer.
Open the Pick Panel dialog box (you can use either the icon in the toolbar or the item Pick Panel in the Transfer menu) and select the Change IP Address Properties icon.

Note: *Before assigning or changing the IP address to the panel, make sure it is a unique address in the network. Duplicate IP addresses will cause network errors.*

Please see the appropriate chapter for the detailed description of Pick Panel.

The address assigned defined using Pick Panel in Configuration Mode is persistent: once the IP address has been defined, it will be used by the panel until a new address is defined with an higher priority address definition method.
To remove an address defined with Pick Panel, enter the IP address 0.0.0.0 with Pick Panel or manually from the panel touchscreen/keypad.

1.3 Assignment of IP Address from DHCP Server

UniOP contains an implementation of the DHCP client protocol and can receive its IP address from a DHCP server, if this is present in the network.

The panel will use the IP address assigned by the DHCP server unless another address has been defined using a method having higher priority than DHCP assignment.

The address assigned by DHCP is persistent, that is, once the IP address has been assigned, it will be used by the panel even id the DHCP server is no longer present in the network. An IP address assigned by DHCP can be canceled either defining an address using a method that has higher priority.

1.4 Definition of IP Address in the Project File

You can define the IP address of the panel in the project file. To define the IP address open Panel Setup and select the External Devices tab.
The Ethernet Settings dialog box is shown in the figure below.

Note that the IP address defined in the project file will be active only when the panel is in Operation Mode.
When the panel will switch to Configuration Mode, it may change its IP address depending on previous settings.

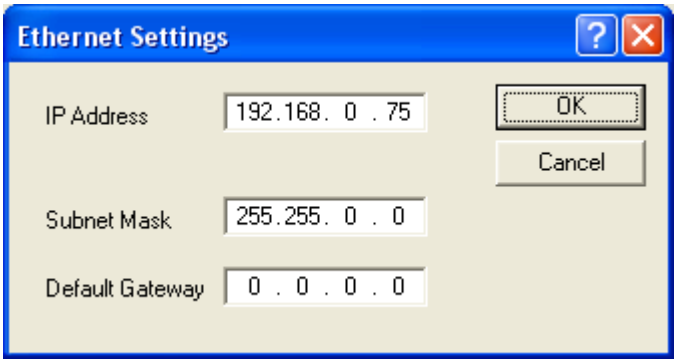

Figure 2 – Ethernet Settings dialog box

IP Address	The current IP address of the panel. You can enter here an IP address in the form nnn.nnn.nnn.nnn where nnn is a number from 0 to 255.
Subnet Mask	it is a number in the form nnn.nnn.nnn.nnn where nnn is a number with value either 0 or 255.
Default Gateway	it is the address of the router that allows connection to other network segments. It is a number in the usual form nnn.nnn.nnn.nnn where nnn is a number from 0 to 255.

Note: *Before assigning the IP address to the panel, make sure it is a unique address in the network. Duplicate IP addresses will cause network errors.*

If you do not want to define an IP address in the project file, enter the IP Address 0.0.0.0 in the Ethernet Settings dialog box. If you do so, when the panel will be in Operation Mode, it will use either the address assigned by DHCP or the address defined manually by the user.

1.5 Priority of IP Address Definition Methods

There is a fixed priority scheme defining which IP address will be valid under all conditions. This priority scheme is necessary because there are multiple independent methods to define the IP address in the panel.
The table below defines the priority of the various address definition methods.
The UniOP panel will use the address that has been defined by the method with the highest priority, if present.

Priority	Configuration Mode	Operation Mode
Highest	Manual Definition Definition with Pick Panel	Manual Definition Definition with Pick Panel
		Definition in the Project File
Lowest	Assignment by DHCP	Assignment by DHCP

Example 1
A brand new panel with Ethernet interface is connected to a network that has a DHCP server. While the panel is in Configuration Mode it will receive the IP address by DHCP. The IP address assigned by DHCP will be shown on the display.
If the user wants to change this address, or the Subnet Mask, can activate the IP address edit mode and enter the new address manually.
Once the IP address has been defined manually, it will be persistent and will be maintained even when the power is cycled.
The only way to reset the manual definition and return to DHCP is to enter the IP address 0.0.0.0.

Example 2
A brand new panel with Ethernet interface is connected to a network that has no DHCP server. While the panel is in Configuration Mode, it will show the IP address 0.0.0.0 on the display.
Start Designer and recall the Pick Panel dialog box.
The Pick Panel dialog box will show one panel in the list, the Physical Address will be present but there will be no IP Address.
Select Change IP Address Properties and enter a valid IP Address. The new address will be defined in the panel when you will press the confirmation button.
Once the IP address has been defined by Designer, it will be persistent and will be maintained even when the power is cycled.
The only way to reset the manual definition and return to DHCP is to enter the IP address 0.0.0.0.

2 Selecting Ethernet Communication in Designer

To select Ethernet communication in Designer, select Transfer/Options and choose Ethernet Port as shown in the figure below.

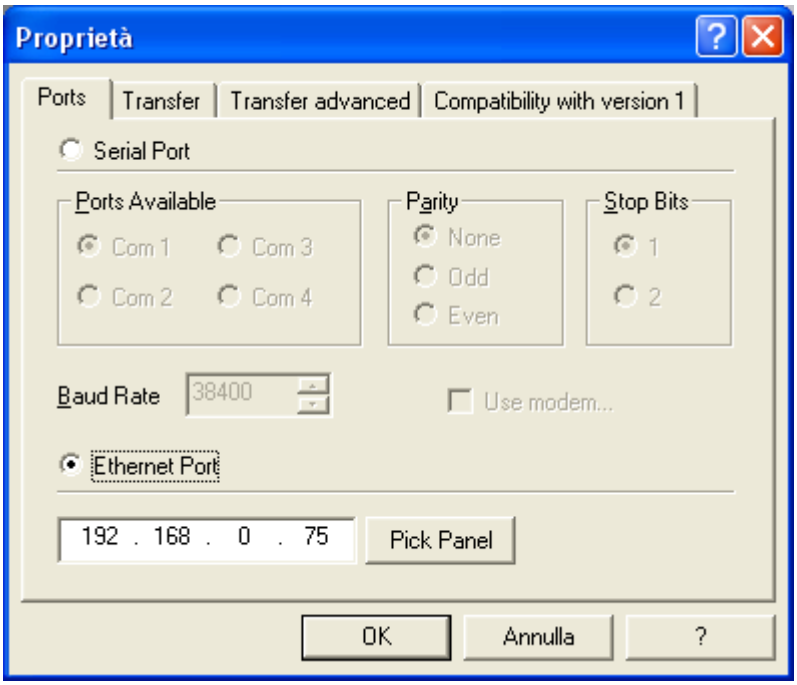

Figure 3 – Transfer Options dialog box

You can enter manually the IP address of the panel you want to connect to Designer. If you do not know the IP address of the panel, open the Pick Panel dialog box and select one of the panels in the list.

Note: *If you want to communicate with a certain panel you must enter its IP address. Unlike the normal serial communication between Designer and panels, Ethernet connectivity allows you to have multiple panels networked with Designer and you need to select the one you want to program.*

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3 Pick Panel: the Ethernet Control Panel

Pick Panel is the tool provided by Designer to efficiently manage UniOP panels connected to an Ethernet network.
Using Pick Panel you can:

- select one panel in the network
- change the IP address, the Subnet Mask and the Default Gateway of the panel you have selected
- change the mode of the panel from Configuration to Operation or from Operation to Configuration

This chapter describes in details the features of Pick Panel

3.1 Selecting Panels in the Ethernet Network

Pick Panel will search the network for UniOP panels and will show them in a list. Note that Pick Panel will not show all network nodes but only UniOP panels.

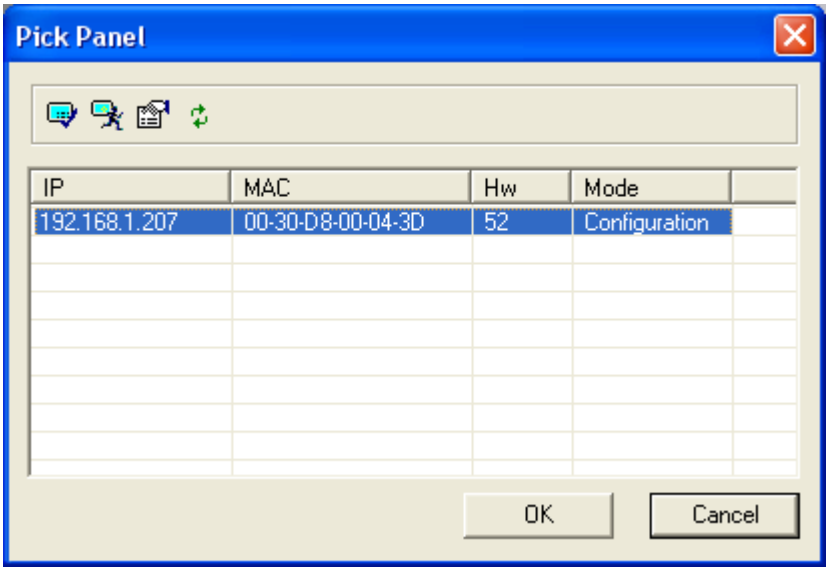

Figure 4 – Pick Panel dialog box

For each panel in the list, Pick Panel will show:

IP Address	It is the IP address assigned to the panel. If no IP address has been assigned to the panel, this field will show 0.0.0.0
Physical Address	It is the MAC identification number of the Ethernet interface in the panel. This is a fixed parameter and it is unique for each panel.
Hw	Hardware type of the panel. This is not enough to identify the panel model but it is useful information.
Mode	Current operating mode of the panel. It can be either Configuration or Operation.

3.2 Changing the Operating Mode of Panels

Using Pick Panel you can change the operating mode of the panel you have selected.
You can:

Switch to Configuration Mode	If the panel is in Operation Mode, it will be changed to Configuration Mode. This command is only available using Ethernet and is not available using serial communication with the panel. Changing the panel to Configuration Mode may take a few seconds.
Switch to Operation Mode	If the panel is in Configuration Mode and if it contains a valid project file, it will be changed to Operation Mode. Changing the panel to Operation Mode may take a few seconds.

Warning: *Please note that the Switch to Configuration Mode command will work whatever is the current status of the panel: the panel will change to Configuration Mode even if it is showing alarms or even if it is in the middle of a data entry session. Special care is needed if the panel connected via Ethernet is not visible from the operator using the Designer software and it all cases it is operating any kind of machinery.*

3.3 Definition of IP Address

Pick Panel allows you to change online the IP address and its properties.
From the Pick Panel dialog box, select the Change IP Address Properties icon.
The dialog box shown in the figure below will appear.

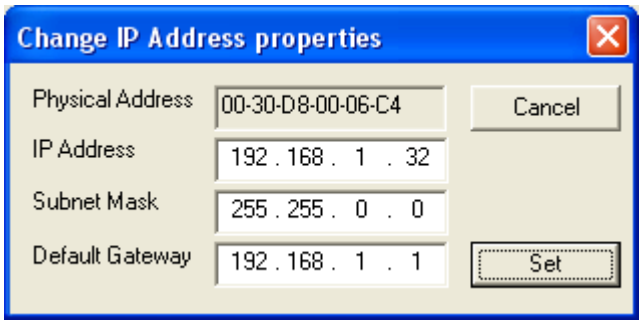

Figure 5 – Change IP Address Properties dialog box

The dialog box includes the following elements:

Physical Address	MAC ID of the Ethernet hardware in the panel. This number cannot be changed by the user.
IP Address	The current IP address of the panel. You can enter here a new IP address in the form nnn.nnn.nnn.nnn where nnn is a number from 0 to 255.
Subnet Mask	it is a number in the form nnn.nnn.nnn.nnn where nnn is a number with value either 0 or 255.
Default Gateway	it is the address of the router that allows connection to other network segments. It is a number in the usual form nnn.nnn.nnn.nnn where nnn is a number from 0 to 255.

Note: *Before assigning or changing the IP address to the panel, make sure it is a unique address in the network. Duplicate IP addresses will cause network errors.*

If you want to reset an IP address that has been defined manually in the pane, enter the IP Address 0.0.0.0 in the IP field in the dialog box. If you do so, the panel will use the IP address assigned by DHCP (if available) or the IP address eventually defined in the project file.

The address assigned defined using Pick Panel in Configuration Mode is persistent: once the IP address has been defined, it will be used by the panel until a new address is defined with an higher priority address definition method.
To remove an address defined with Pick Panel, enter the IP address 0.0.0.0 with Pick Panel or manually from the panel touchscreen/keypad.

4 Clock Synchronization with the SNTP Protocol

UniOP supports the standard SNTP protocol for clock synchronization.
If the network contains a time server, the panel will connect to the server and will synchronize its real time clock with the server.

This is a simple and powerful method to ensure that all the clocks of the panels in the network are synchronized.

5 Using UniDataExchanger to Access Information in the Panel via Ethernet

UniDataExchanger is a simple but powerful tool that allows you to access data in the panels as well as downloading firmware updates.
UniDataExchanger supports both Ethernet and serial communication; please note, however, that some options are only available if the panel is connected via Ethernet.

This chapter will describe only new commands available with the Ethernet connection.

5.1 Download Recipe Data

This command is available both with serial and Ethernet connection. When the panel is connected via Ethernet, however, the command has been enhanced and recipe data can be transferred also when the panel is in Operation Mode.

5.2 Upload Recipe Data

This command is available both with serial and Ethernet connection. When the panel is connected via Ethernet, however, the command has been enhanced and recipe data can be transferred also when the panel is in Operation Mode.

5.3 Upload Trend Data

This command is available both with serial and Ethernet connection. When the panel is connected via Ethernet, however, the command has been enhanced and trend data can be transferred also when the panel is in Operation Mode.

5.4 Upload Event List

The command Upload Event List allows UniDataExchanger to retrieve the Event List from the panel.
This command is available only with the Ethernet connection.
The Event List data will be saved to a disk file in .csv format.
The content of the file will be as shown in the figure below.

	A	B	C	D
1	Type	Alarm	Value	Time
2	on	0	0x20202020	1/20/2004 17:09
3	on	1	0x20202020	1/20/2004 17:09
4	on	2	0x20202020	1/20/2004 17:09
5	on	11	0x20202020	1/20/2004 17:09
6	off	12	0x20202020	1/20/2004 17:09
7	off	13	0x20202020	1/20/2004 17:09
8	off	14	0x20202020	1/20/2004 17:09
9	ack	0	0x20202020	1/20/2004 17:10

Figure 6 – Format of the Event List file

5.5 Upload Alarm List

The command Upload Alarm List allows UniDataExchanger to retrieve the Alarm List from the panel. This command is available only with the Ethernet connection.
The Alarm List data will be saved to a disk file in .csv format.
The content of the file will be as shown in the figure below.

	A	B	C	D	E	F	G	H	I
1	; Static flags	Dynamic flags	On time	Off time	Value	Link flags	Log flags	Fg/Bg colors	Fg/Bg ACK colors
2	ALUSED | ALCLR	NONE	1/1/2004 0:00	1/1/2004 0:00	0	0	NONE	00/00	00/00
3	ALUSED	NONE	1/1/2004 0:00	1/1/2004 0:00	0	0	NONE	00/00	00/00
4	ALUSED	NONE	1/1/2004 0:00	1/1/2004 0:00	0	0	NONE	00/00	00/00

Figure 7 – Format of the Alarm List file

The meaning of the various fields is the following:

Static flags	Attribute of alarms as defined in the project file
Dynamic flags	Current status of the alarm at the moment of the upload
On time	Time when the alarm went on
Off time	Time when the alarm went off
Value	Not used
Link flags	Specifies if the alarm is linked to an help screen
Log flags	Not used
Fg/Bg colors	Foreground/Background colors defined for the alarm; 00/00 means no colors used
Fg/Bg ACK colors	Foreground/Background colors defined for the alarm when acknowledge is required; 00/00 means no colors used

Static flags	
ALUSED	Alarm enabled
ALCLR	Alarm requires acknowledgement
ALPRON	Print alarm on event
ALPROF	Print alarm off event
ALPRAC	Print alarm acknowledgement
ALWARN	"Message-only alarm" (does not turn on Alarm LED)
ALLOGEV	Events for this alarm are not logged to Event List

Dynamic flags	
ALON	Alarm is on
ALACK	Alarm requires acknowledgement
ALSILENT	Silent alarm (set for "event-only" alarms)

Link flags	
0	Alarm non linked to alarm page
1	Alarm linked to alarm page

5.6 Selecting Ethernet Communication in UniDataExchanger

To select Ethernet communication in UniDataExchanger, select Options/Communication and choose Ethernet Port as shown in the figure below.

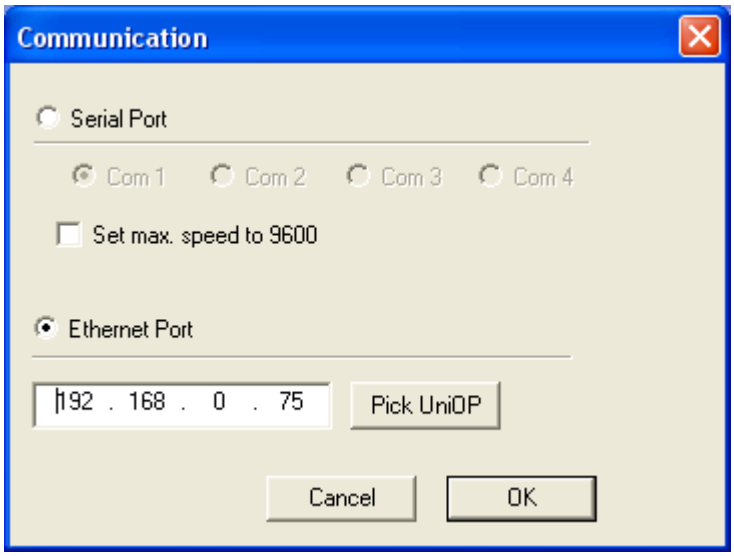

Figure 8 – Communication Options in UniDataExchanger

You can enter manually the IP address of the panel you want to connect to UniDataExchanger. If you do not know the IP address of the panel, open the Pick Panel dialog box and select one of the panels in the list.

Note: *If you want to communicate with a certain panel you must enter its IP address. Unlike the normal serial communication between UniDataExchanger and panels, Ethernet connectivity allows you to have multiple panels networked with UniDataExchanger and you need to select the one you want to connect.*

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6 Basic Ethernet Diagnostic with Ping

UniOP supports the Ping protocol as a very simple network diagnostic method.
Just enter the Ping command, followed by the IP address of the panel, from any node in the network.
If the panel can be reached, it will respond to Ping.

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