FutureNow FNIP-8x10A-12 and FNIP-8x10A-24

Installation Manual

rev 17.07.2014

TCP/IP and Web Controllable
Eight Channel DIN Rail Mountable Switch with Local Inputs

OVERVIEW

The FNIP-8x10A is an eight channel relay module used for switching any kind of load that do not exceed the specifications. The FNIP-8x10A can be controlled and monitored from standard network capable devices such as computers, smartphones, web-tablets, etc. either locally or via the Internet.

Figure 1. The FNIP-8x10A relay module

The module can be used independently or as part of a complex control system in residential and commercial installations.

In addition to the outputs, the FNIP-8x10A also provides local inputs for manual control, which gives the customer the ability of using the system even before a central controller is installed or the network is built, offering stand-alone operation. This also improves reliability since the operation of the relays via the inputs do not rely on a controller or networking components that are usually single points of failure.

The manual inputs are usually connected to momentary wall switches and function similarly to traditional light switches.

The inputs can also be used as independent digital inputs, for example to monitor the status of different contact sensors or if connected to a programmed output of a security system, its status (armed/disarmed/in alarm) can be determined remotely.

MAIN FEATURES

Robust Operation

- 8 x 230V/10A SPDT dry contact general purpose relay outputs each with both NO and NC contacts
- 8 x galvanically isolated multi-purpose inputs for manual control and connecting digital sensors

Ultimate Flexibility

- Monostable switching
- Standard DIN rail mount
- Available in both 12V DC and 24V DC powered versions
- Operation without a controller or network connection, via local inputs
- Digital inputs can also be used to monitor door/window contacts, motion, water leakage and any other sensor type

Enhanced Connectivity

- New TCP/IP interface offers remote control and advanced management
- Built-in web server for configuration, control and monitoring
- Control and monitoring via local computer network and over the Internet
- Remote control and monitoring from network enabled smartphones and tablets
- Multiple users with different user rights
- TCP communication with simple ASCII commands
- Automatic event reports about status changes of inputs and outputs
- Firmware upgrade via LAN

Industry-Wide Interoperability

- Full Integration with home controllers from most major vendors (Control4, AMX etc.)
- Interoperable with any momentary contact switches available on the market

INSTALLATION

WARNING! Since the module is connected to line voltage, the installation must be performed by a qualified electrician in accordance with the local electrical codes!

Turn off power (main circuit breaker) before installation!

Terminal connections

Each module has a wiring diagram on the front which can help the installer when connecting the modules at installation sites. See figure 2.

The terminal connections of the FNIP-8x10A are listed in Table 1.

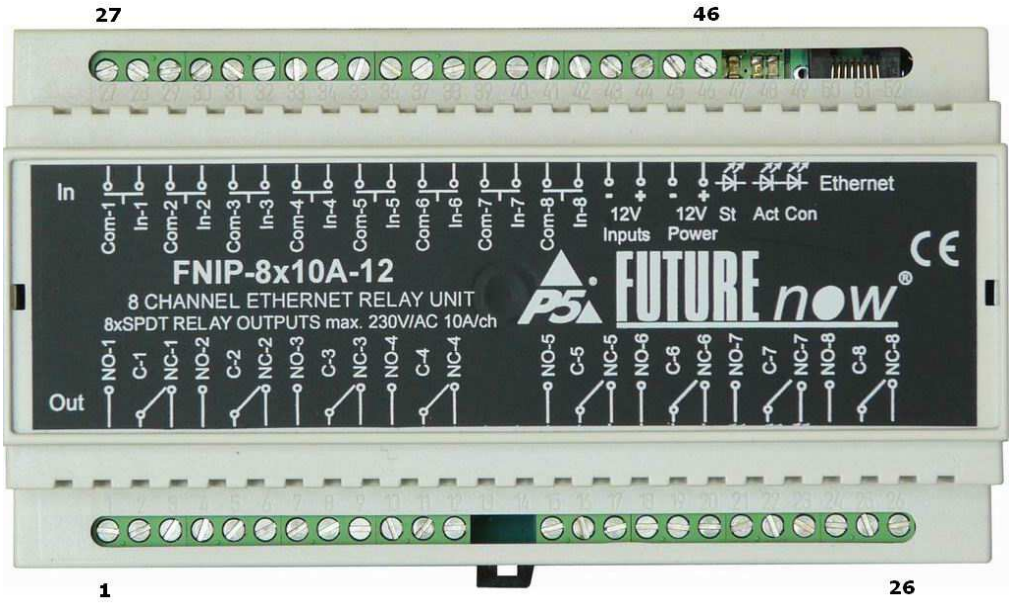

Figure 2. FNIP-8x10A front view with terminal connectors

No.	Description	No.	Description
1.	Output 1 N.O.	27.	Inputs Common
2.	Output 1 C.	28.	Input 1
3.	Output 1 N.C.	29.	Inputs Common
4.	Output 2 N.O.	30.	Input 2
5.	Output 2 C.	31.	Inputs Common
6.	Output 2 N.C.	32.	Input 3
7.	Output 3 N.O.	33.	Inputs Common
8.	Output 3 C.	34.	Input 4
9.	Output 3 N.C.	35.	Inputs Common
10.	Output 4 N.O.	36.	Input 5
11.	Output 4 C.	37.	Inputs Common
12.	Output 4 N.C.	38.	Input 6
13.	-	39.	Inputs Common
14.	-	40.	Input 7
15.	Output 5 N.O.	41.	Inputs Common
16.	Output 5 C.	42.	Input 8
17.	Output 5 N.C.	43.	Power for the Inputs GND
18.	Output 6 N.O.	44.	Power for the Inputs +12V (FNIP-8x10A-12) or +24V (FNIP-8x10A-24)
19.	Output 6 C.	45.	Power for the Main Circuitry GND
20.	Output 6 N.C.	46.	Power for the Main Circuitry +12V FNIP-8x10A-12) or +24V (FNIP-8x10A-24)
21.	Output 7 N.O.	47.	-
22.	Output 7 C.	48.	-
23.	Output 7 N.C.	49.	-
24.	Output 8 N.O.	50.	-
25.	Output 8 C.	51.	-
26	Output 8 N.C.	52	-

Table 1: FNIP-8x10A terminal connectors

Wiring

A typical wiring diagram is shown in figure 3.

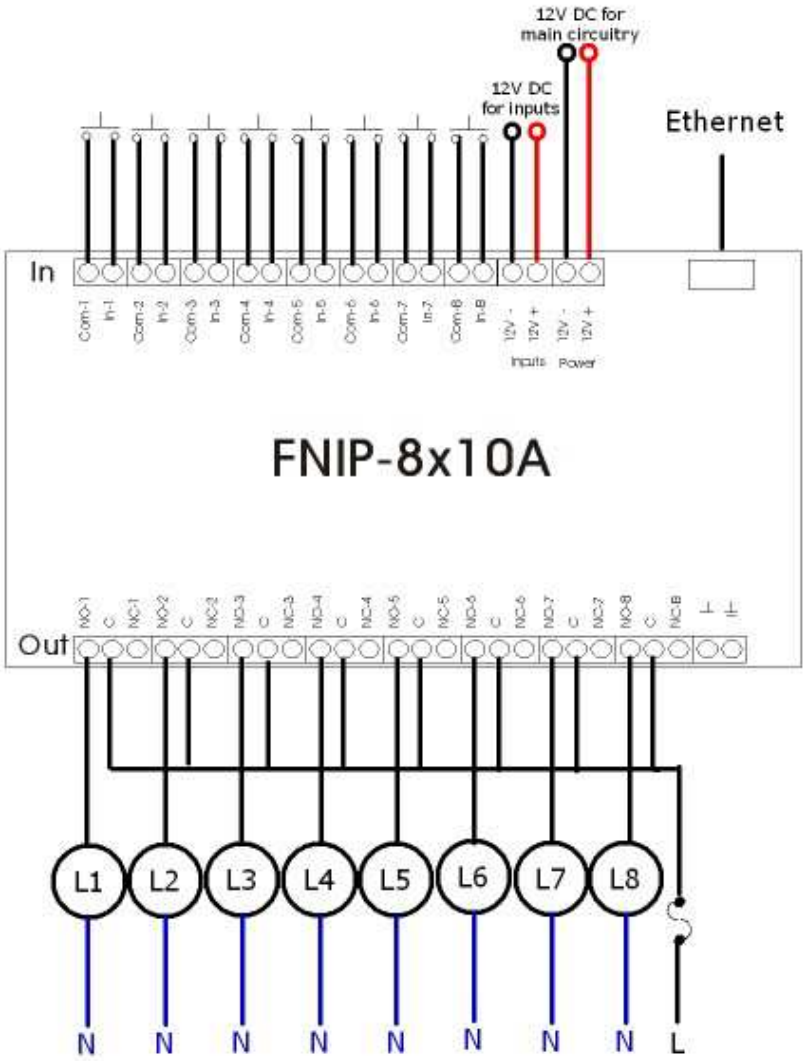

Figure 3. Wiring diagram. All outputs in this example are used to switch line voltage on the same phase. Since the outputs provide dry contacts, any voltage that doesn't exceed the specifications can also be switched.

After making all connections, check if the outputs can be toggled via the inputs (only applicable if input power is connected across terminals 43-44.) The status LEDs will assist you in tracking the status of the outputs and see if the inputs work properly.

Recommended wire types

- Ethernet cable: Twisted pair, CAT5 or better.
- Outputs: According to the load attached to the outputs (current and voltage ratings).
- Inputs: A pair of low or high voltage cables. The inputs use low voltage signals.

All wires used and the way they are run must be in accordance with the local electrical codes.

Keep line voltage wiring physically separated from Ethernet and signal wiring.

Power requirements

The module must be powered through terminals 45 and 46 by 12VDC (FNIP-8x10A-12) or 24VDC (FNIP-8x10A-24).

Please pay attention to the correct polarity.

The galvanic isolation of the inputs is only effective if a separate power supply is used for powering the inputs. The FNIP-8x10A has separate power input terminals (43 and 44) for this purpose. If you choose not to use the extra protection the isolated inputs offer (not recommended), you can use the same power to supply both the main circuitry and the inputs. In that case, simply connect terminal 43 to terminal 45 and terminal 44 to terminal 46.

Ethernet connection

Connect the module to the LAN via the RJ45 Ethernet socket.

Outputs

The FNIP-8x10A has eight heavy duty relay outputs. Almost any equipment used in households or offices can be switched directly with the output relays. However, if the load exceeds the specifications, an additional relay must be connected between the output and the load. (for example in case of saunas, three-phase equipment, driveway heaters, industrial machines, etc.)

All outputs have dry contacts, no power is provided for the connected circuits!

Since all the outputs provide dry contacts, they can be used for switching low or high voltage circuits or be used as general purpose mechanical contact switches (e.g. non-dimming light switches). The outputs can be used everywhere where mechanical switches are used by connecting the output in series the same way the switch is.

Use the outputs the exact same way as if they were mechanical contact switches.

Local Inputs

For each output, there is a local input to allow for manual operation. If you do not wish to use local inputs, this section may be skipped.

Connect dry contacts (pushbuttons, momentary switches, relay contacts, etc.) or open collector transistor outputs across the appropriate input terminals and the input common terminal.

WARNING! Avoid supplying voltage on these terminals!

All input ports are optically isolated to protect the module against unwanted effects of ground loops, overvoltage or misconnections.

It should be noted that the galvanic isolation is only effective when an independent power supply is used for powering the inputs. See section "Power Requirements" if you don't want to use two separate power supply units.

To assure an additional level of safe and reliable operation, the inputs are also software protected against the effects of noise spikes that usually occur when heavy inductive loads (motors, fans, etc.) are switched nearby. In most systems lacking this level of protection, these spikes may result in unwanted operation.

Three-way switches can be implemented by simply connecting multiple momentary switches in parallel.

Status LED Indicators

In order to make installation and debugging easier, communication and channel status are displayed via LEDs.
Use the board layout drawing in Figure 4. to locate the status LEDs.

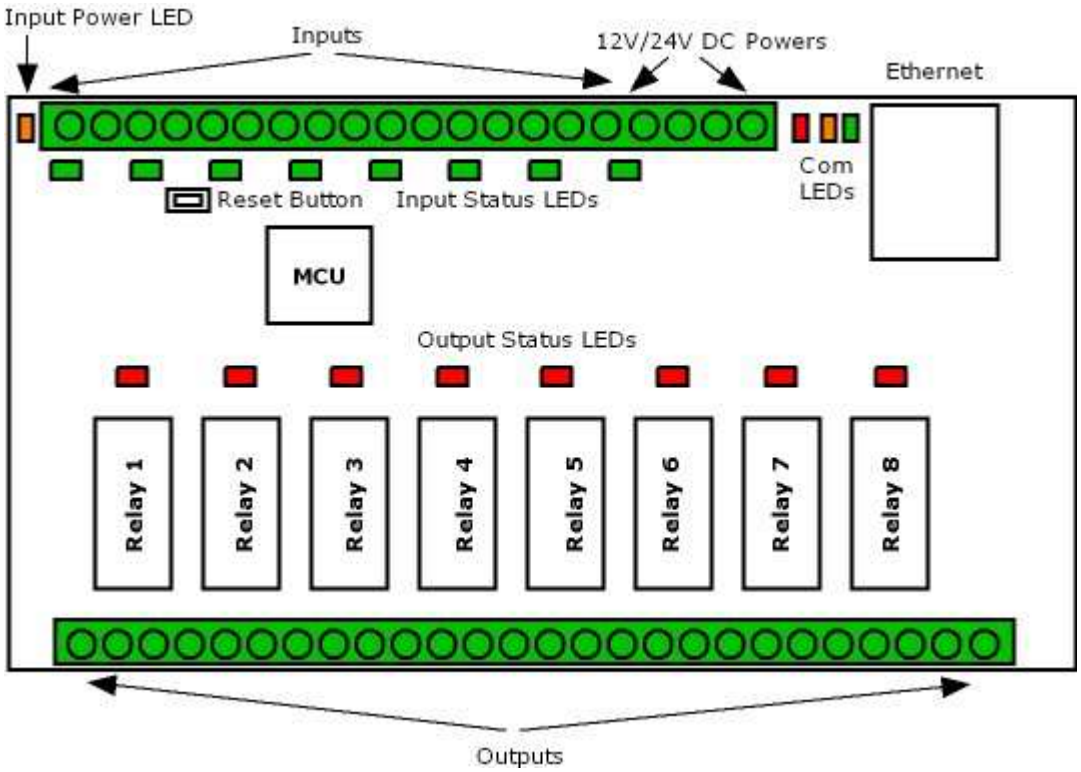

Figure 4. The board layout of the FNIP-8x10A

Output status LEDs
Each output has a dedicated status LED that illuminates solid red when the corresponding output is on.

Input status LEDs
Each input has a dedicated status LED that illuminates solid green when the corresponding input is activated.

Input power LED
When on, indicates that the input power is present.

Communication LEDs

Con LED
The Con LED is on when the module is connected to the Ethernet network.

Act LED
It indicates that communication via Ethernet is in progress.

St LED
The status LED indicates that the boot loader of the module is active. This should only happen during firmware update.
Please never disconnect power from the module while this LED is on!
If this LED stays on after the firmware update, please contact your distributor!

CONFIGURATION

Configuration can be done either via the built-in website or via TCP/IP connection. In the latter case the configuration interface the controller provides is used.

Configuration via the web interface

Use the FNIP Network Discovery Utility software to find all FutureNow IP devices on your network.

Connecting to the module's web server
After the scan is over you can click on one of the modules found to open its website in a browser.

You can also access the module's internal website from an Internet browser by typing **FNIP8x10A** (default hostname) or whatever the hostname has been changed to, or the IP address in the URL window.

Each module automatically obtains an IP address from a DHCP server by default.

In the lack of a DHCP server the default IP address of 192.168.1.25 will be assigned. The same IP address will be assigned when connecting the module directly to your computer (not running a DHCP server) with an Ethernet cross cable.

Authentication
Once you are connected to the module's website, you will be asked to identify yourself, as seen in figure 5.

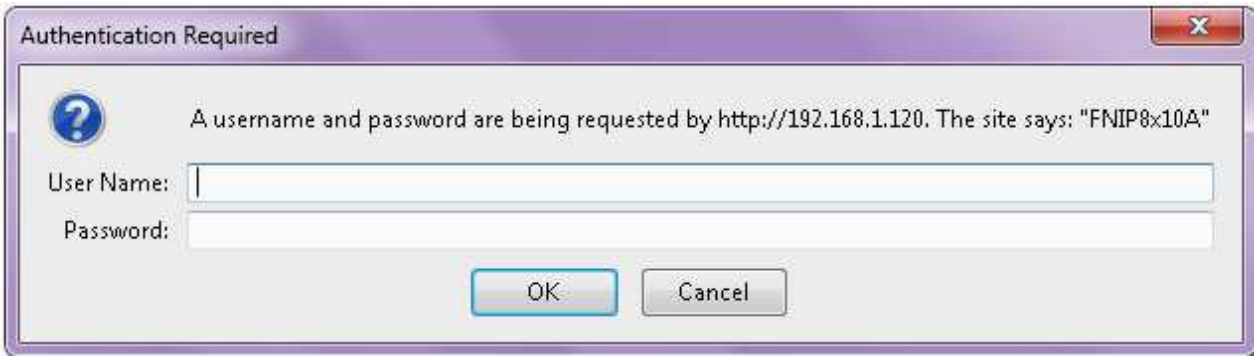

Figure 5. Authentication Window

The default user name is:**admin**
The default password is:**futurenow**

The default user has administrator rights and can access all settings and functions.

Once logged in, you will automatically be directed to the control page.

There is a menu on the top of each web page to navigate between the different control and configuration pages.

Configuring network settings
To change basic network settings, click **Network** in the top menu. You can choose between using DHCP or static IP address and make all necessary network settings on this page, as shown in Figure 6.

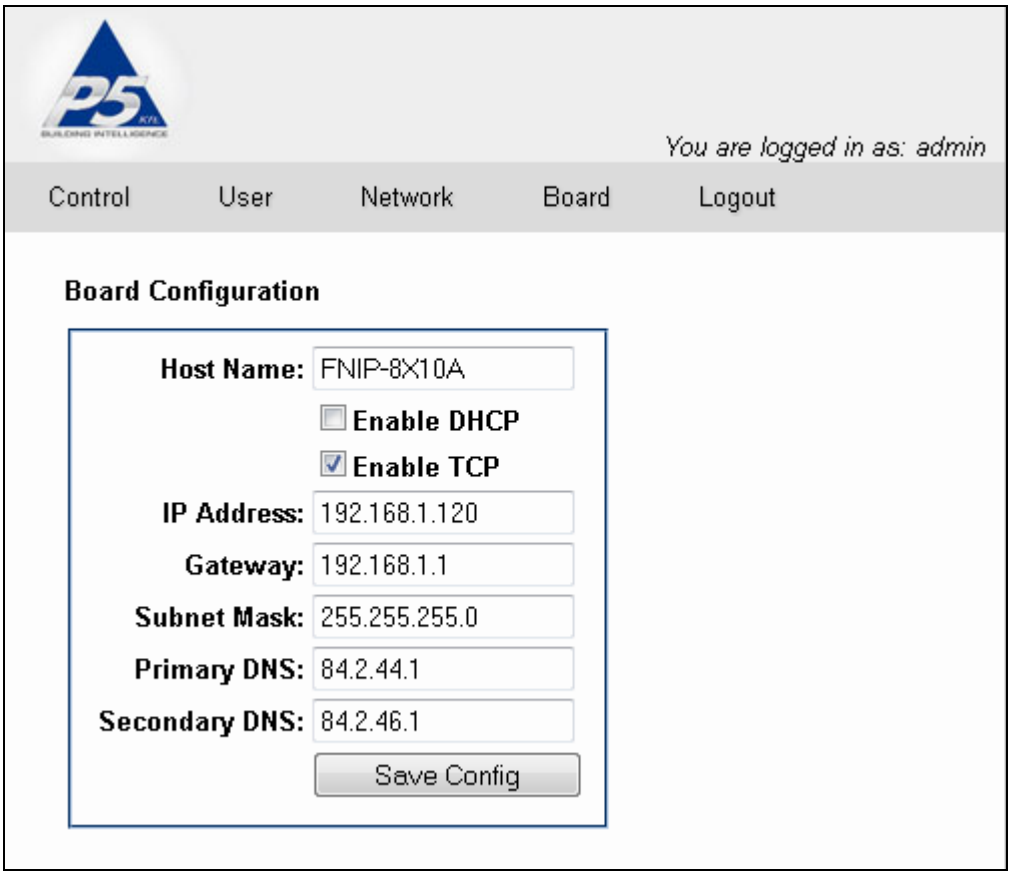

Figure 6. Network Configuration Page

Adding users and setting up user rights

Three different users can be defined, each with three different user rights: **admin**, **actor** and **observer**.

As a factory default, there's only one user enabled, with administrator rights.

Admins have access to all functionality, including control of the outputs, monitoring the status of the inputs and outputs and changing all the settings.

Actors are allowed to control the outputs and monitor the status of the inputs and outputs, but are not allowed to change any settings.

Observers are allowed to monitor the status of the inputs and outputs but not allowed to control the outputs, nor can they change any settings.

To modify user settings, click on **User** in the top menu. The user configuration page is shown in Figure 7.

The name of the currently logged in user is displayed at the top right corner of the page.

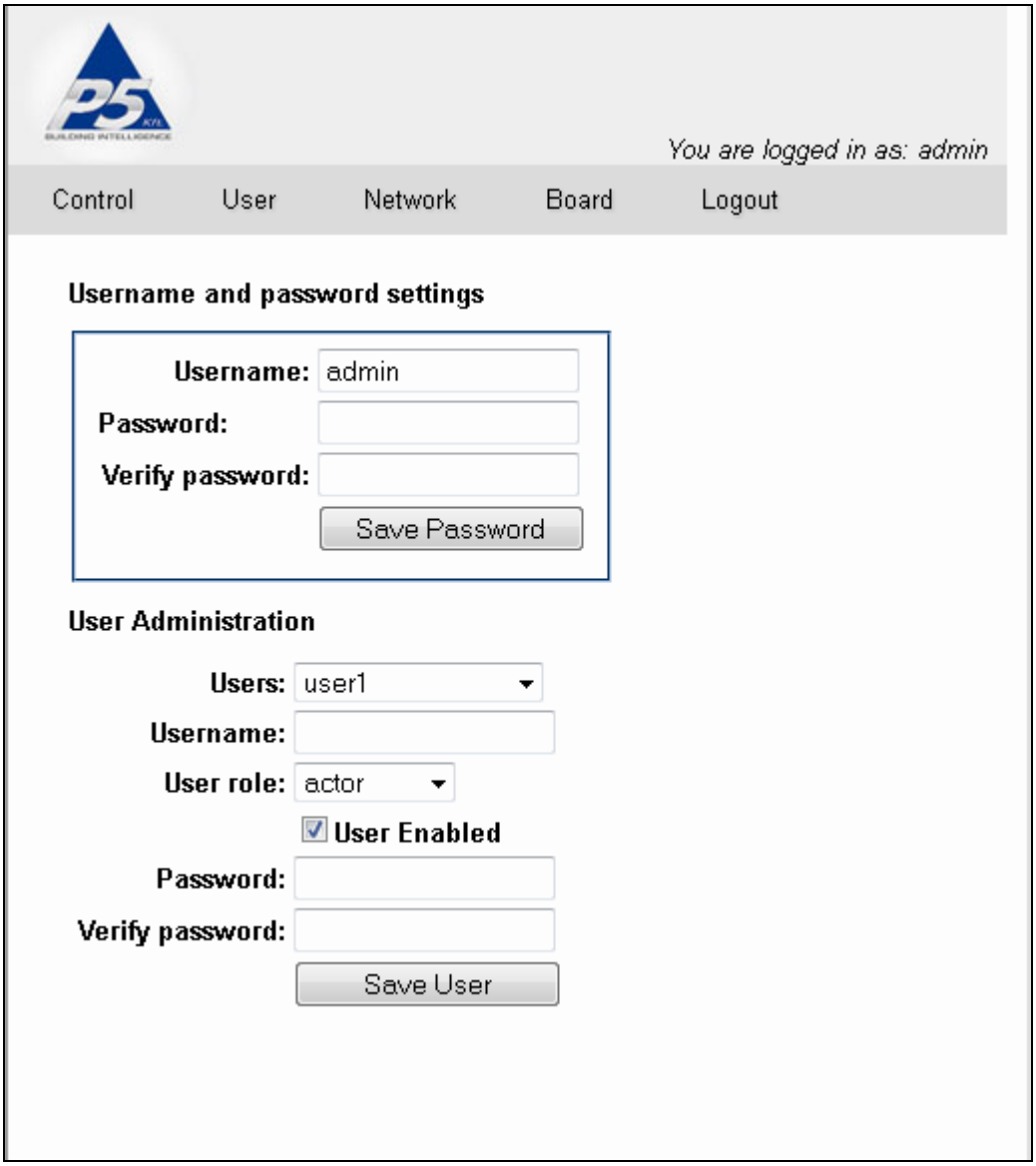

Figure 7. User Configuration Page

Board configuration

Clicking on **Board** in the top menu takes you to the board configuration page, where custom labels can be created and modified for each outputs and inputs. The input modes can also be defined here. The input mode determines the logical connection between the input and the output of the same channel. For details on possible input modes and how they work, see **Operation via local inputs** paragraph of this document below. Updating the firmware is also possible via this page.

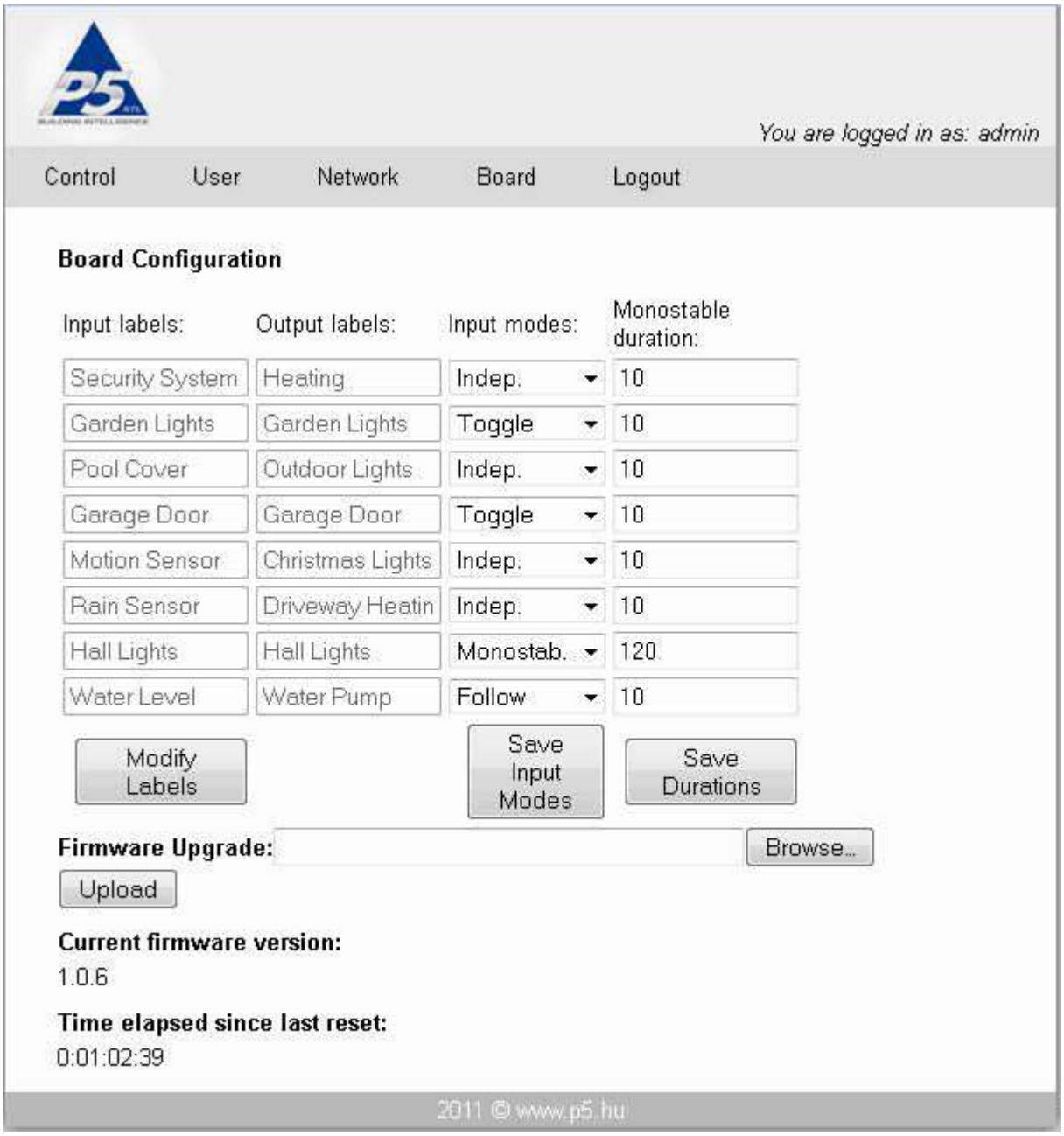

Figure 8. Board Configuration Page

Logging out

A user can log out of the module's web site by clicking on **Log Out**.

Resetting to factory defaults

Holding the reset button for more than 5 seconds while powering up the module will set all settings to factory default.

OPERATION

Operation via the local inputs

The inputs can be activated by shorting the appropriate input terminal to the input common terminal.

Throughout this section it is assumed that momentary switches are connected to the local inputs.

In order to use the local inputs, an input power of 8-16V must be applied across terminals 45 and 46. In case local inputs are not needed, this power connection is not necessary.

Input Modes

There are different input modes. Setting the input mode is possible via the web interface or by TCP commands.
The inputs are factory defaulted to **toggle** mode. The meaning of the different input modes is as follows:

1. Toggle mode (input mode 1 / factory default mode)
Each press of the button toggles the corresponding output.

2. Independent inputs (input mode 0)
Inputs can be detached from their corresponding outputs, in which case they will have no effect on them. However, the status changes of the digital inputs will still be reported via the open TCP/IP sockets and on the **Control** page of the built-in website. This can be used to monitor the status of digital sensors connected to the inputs or to activate lighting scenes or macros whenever the input gets triggered.

3. Input follow mode (input mode 2)
The status of outputs will follow the status of the corresponding inputs, as in case of a regular maintained switch. (The output will be on while the momentary switch is hold and off while it is released).

4. Monostable mode (input modes 3 and 4)
The outputs can be programmed to turn on (or off for input mode 4) for an adjustable amount of time when the corresponding input is triggered (staircase lighting).

5. Switch mode

This mode makes it possible to use maintained (standard switches) instead of momentary switches on the inputs. Each transition of the switch (on or off) will toggle the outputs. Please note that the position of the switch – similarly to three-way switches - will not indicate the status of the output.

Operation via the built-in web server

Clicking on **Control** in the top menu, the control page in Figure 9. will open. Via this page the outputs can be controlled and the status of both the inputs and outputs are displayed. A grey icon means that the corresponding input/output is inactive. An active output is indicated by a red icon, while an active input is represented by a green icon.

Figure 9. Control Page

Operation via TCP

To achieve the easiest integration with most controllers used in home and commercial applications, the module can be controlled by raw TCP protocol using simple ASCII based commands.

The TCP/IP communication can be enabled/disabled via the Network settings screen.

There are TCP commands for:

Turning an output On/Off, Toggling an output, turning an output on for a certain time, querying the status of the inputs and outputs, setting and retrieving the mode of inputs, etc.

The TCP Communication Protocol Description is available upon request.

Event notifications
Automatic event notifications are sent to clients via the open socket connections whenever the status of an input or output changes.

Basically, any third party controller that can implement the FNIP-8x10A's simple communication protocol can control the FutureNow FNIP-8x10A. The following controllers are the most widely used:

- AMX
- Control4
- Crestron
- RTI

Software modules/plug-ins for controllers are either available or P5 will provide full assistance in creating them.

Besides these special-purpose controllers, there are many applications for embedded industrial PC boards, PCs and smartphones running Linux, Windows, Mac OS.

Firmware upgrade
Upgrading the firmware of the module is possible via LAN or WAN.
On the Board Configuration page of the module's internal website, navigate to the location on your PC where the new firmware file is saved. Then click **Upload**. The St LED turns on and stays on during firmware update. After uploading the new firmware –which takes no more than a few seconds- the module will automatically restart.

The version of the currently running firmware is displayed at the bottom left corner of the Board Configuration page.

TECHNICAL SPECIFICATIONS

Power requirements

FNIP-8x10A-12:
Main circuitry**:** 9-13.8V DC max. 330mA@12V (when all outputs are on plus communication is in progress)
Inputs: 8-16V DC, max. 80mA@12V
FNIP-8x10A-24:
Main circuitry**:** 18-27V DC max. 250mA@24V (when all outputs are on plus communication is in progress)
Inputs: 10-25V DC, max. 90mA@24V

Outputs

Type: 8 x SPDT NO, NC dry contacts
Load**:** max. 10A@230VAC or 30V DC for resistive (cosfi=1) loads and
max. 8A@230V AC or 30V DC for inductive (cos(fi)=0.4) loads
max. voltage 230V AC or 125V DC

Inputs

Type: 8 x galvanically isolated, noise protected common GND digital inputs for dry contacts or open collector transistor outputs
Functions: Assigned to the corresponding output (Toggle, Follow, Monostable) or Independent

Terminals

Type: Screw terminals for max. 2.5 mm^2 wires

Communication

10Mb/s Ethernet via RJ45 Ethernet connector
Simple ASCII based TCP commands via port 7078
Number of socket connections that are allowed to be opened simultaneously:2
or
via its built-in web page (http)
Supported web browsers
Mozilla Firefox, Google Chrome, Safari, Internet Explorer 7 or greater, Opera

Other parameters

Operating temperature: 0 °C – 40 °C (32-104 °F)
Dimensions: W x H x D = 157 mm x 86 mm x 57 mm (9 DIN unit width)
Weight: 0,38 kg
Color: Light grey with black cover plate

Standards

EN 61000-6-1:2007
EN 61000-6-3:2007

EN 60669-2-1
RoHS

Test methods

EN 55022:2010
EN 61000-4-3:2006/A1:2008/A2:2010
EN 61000-4-4:2005/A1:2010
EN 61000-4-6:2007
EN 61000-4-2:2009

REFERENCES

FNIP Network Discovery Utility
FNIP-8x10A TCP Communication Protocol Description

CONTACT DETAILS

support@p5.hu