

# **FutureNow FNIP-6x2AD**

## **Installation and Operation Manual**

rev 28.04.2020

6 Channel Smart Dimmer with Local Inputs

/DIN Rail and Surface mountable/



**The FNIP-6x2AD dimmer**

## Contents

MAIN FEATURES .....	3
INSTALLATION.....	4
Terminal connections .....	4
Wiring .....	6
Outputs .....	7
Local inputs .....	8
Status LED indicators .....	9
Input status LEDs .....	9
Run LED .....	9
Input power LED .....	9
Communication LEDs.....	10
Output status LEDs .....	10
CONFIGURATION.....	11
Configuration via the web interface .....	11
Connecting to the web server of the module .....	11
Network settings .....	12
Users and user rights .....	14
Channel settings .....	15
Dim settings .....	16
Combining channels.....	17
Scenes .....	18
Firmware Upgrade .....	19
OPERATION.....	20
Operation via local inputs .....	20
Input modes.....	20
Operation via the built-in web server .....	22
Operation via TCP .....	24
TECHNICAL SPECIFICATIONS .....	25
REFERENCES.....	26
CONTACT DETAILS .....	26

## MAIN FEATURES

### Fail-safe Operation

- All-in-one dimmer
- 6 outputs for switching and dimming 6 lighting circuits
- 6 galvanically isolated multi-purpose inputs for direct control or connecting digital sensors
- Temperature monitoring
- Overheat protection (both from software and hardware)
- Overcurrent protection

### Ultimate Flexibility

- Switching on/off any loads (certain limitations apply)
- Both trailing and leading-edge dimming
- Automatic load type detection
- Possibility to combine two outputs for more wattage
- Standard DIN rail mount
- Voltage, frequency, power consumption metering
- 100 dim levels (800 level hardware resolution)
- Preset dim level – outputs will go to the specified level when turned on
- Dim level memory (if preset dim level is set to zero)
- Adjustable minimum and maximum dim levels
- Adjustable ramp rates
- Delayed off mode with adjustable duration
- Lighting scenes

### Enhanced Connectivity

- Built-in web server for configuration, control and monitoring
- Multiple users with different rights
- TCP communication with simple ASCII commands
- Automatic event reports of status changes of inputs and outputs
- Firmware upgrade via LAN

### Industry-Wide Interoperability

- Full Integration with home controllers from most major vendors
- Compatible with any momentary contact switches available on the market

## INSTALLATION

**WARNING! The module is connected to mains/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!**

**This equipment shall be installed in a closed cabinet with no access to live parts. Only the top enclosure of the equipment (where the label is affixed) is allowed to be accessed by the operator.**

### Terminal connections

Every FutureNow module has a wiring diagram on the front to help the installer when connecting the modules at installation sites. See Figure 2.

The terminal connections of the FNIP-6x2AD are listed in Table 1.

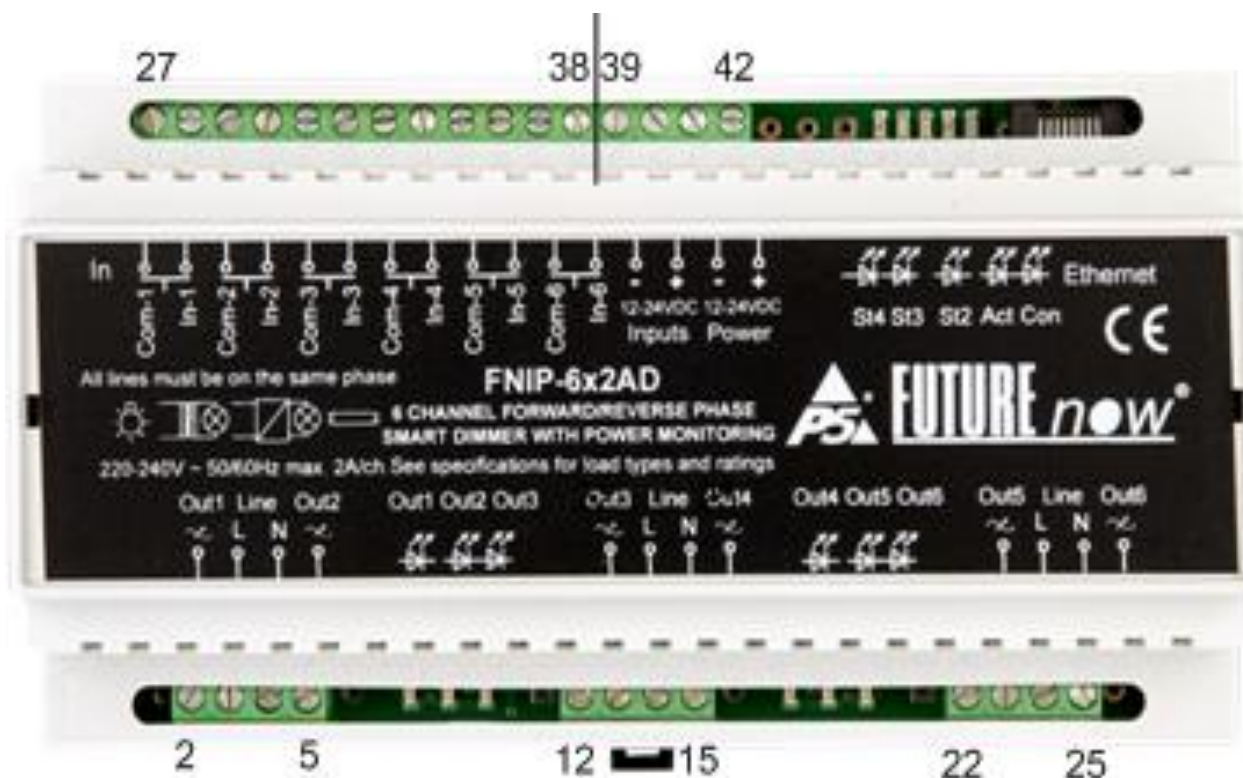


Figure 2. FNIP-6x2AD front view with terminal connectors

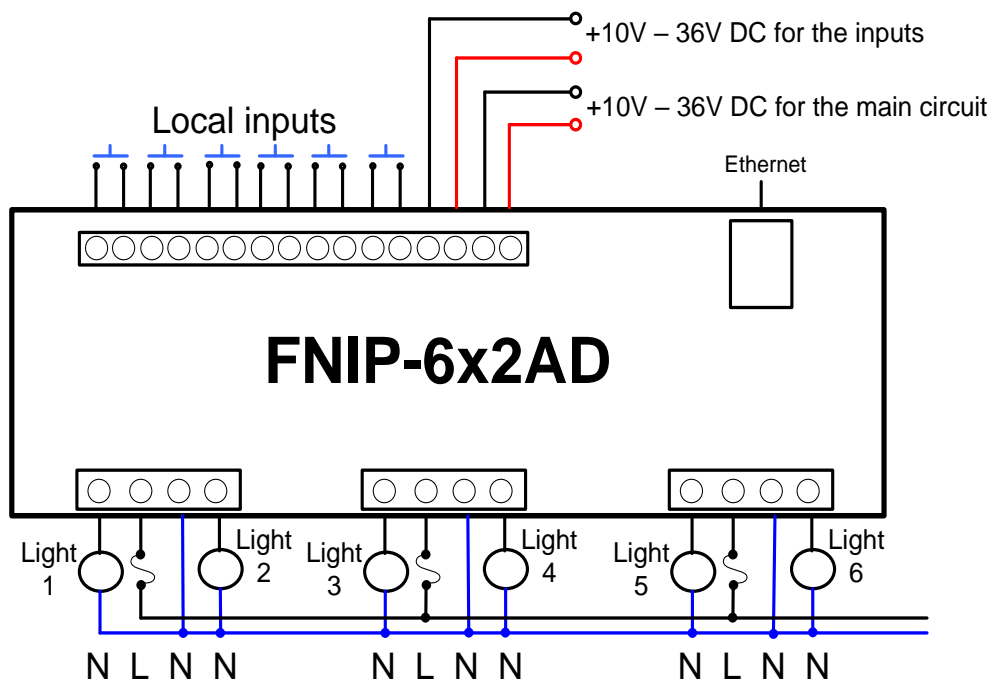
Load		Control	
No.	Description	No.	Description
2.	Output 1 Live	27.	Inputs Common
3.	230V Mains Input Live for ch1 and ch2	28.	Input 1
4.	Neutral <b>INPUT</b>	29.	Inputs Common
5.	Output 2 Live	30.	Input 2
12.	Output 3 Live	31.	Inputs Common
13.	230V Mains input Live for ch3 and ch4	32.	Input 3
14.	Neutral <b>INPUT</b>	33.	Inputs Common
15.	Output 4 Live	34.	Input 4
22.	Output 5 Live	35.	Inputs Common
23.	230V Main Input Live for ch5 and ch6	36.	Input 5
24.	Neutral <b>INPUT</b>	37.	Inputs Common
25.	Output 6 Live	38.	Input 6
Low voltage inputs for the module			
No.	Description		
39.	Power for the Inputs GND		
40.	Power for the Inputs +10V.. +36V DC		

41.	Power for the Main Circuit GND
42.	Power for the Main Circuit <b>+10V.. +36V DC</b>

**Table 1: FNIP-6x2AD terminal connections**

## Wiring

A typical wiring diagram is shown in Figure 3.



**Figure 3. Wiring diagram**

**All line inputs must be on the same phase and on the same circuit breaker!**

### Recommended wire types

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

Mains/line voltage wiring must be kept physically separated from Ethernet and signal wiring.

### Power requirements

The module requires **10V DC - 36V DC** through terminals 41 and 42.

If local inputs are to be used, **10V DC - 36V DC** through terminals 39 - 40 is also required.

**Please make sure that the polarity is correct!**

The galvanic isolation of the inputs is only effective when a separate power supply is used for powering the inputs. The FNIP-6x2AD has separate power input terminals (39 and 40) for this purpose. If you choose not to use the extra protection the isolated inputs offer, you can use the same power to supply both the main circuit and the inputs. In that case, simply connect terminal 39 to terminal 41 and terminal 40 to terminal 42.

**Apply 230V 50 Hz AC live on terminals 3, 13 and 23 and neutral on terminal 4 and 14 and 24.**

**Please make sure that all the three line inputs (terminal 3, 13 and 23) are on the same phase and on the same circuit breaker! Different phase connection would create a short circuit and damage the module!**

**Live on terminal 3 powers output 1 and output 2, live on terminal 13 powers output 3 and output 4, live on terminal 23 powers output 5 and output 6.**

**The loads should be connected between the outputs of the module (terminal 2, 5, 12, 15, 22, 25) and a neutral point somewhere outside the module.**

**Connecting the Neutral legs of the loads to the module could damage the module. This will void the warranty.**

## **Ethernet connection**

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

## **Outputs**

The FNIP-6X2AD supports both trailing and leading edge dimming modes. It handles most any lighting load be it resistive, inductive or capacitive, such as incandescent, line voltage and low voltage halogens with both electronic and iron core transformers, phase-cut dimmable fluorescents and compact fluorescents.

Phase-cut dimmable line voltage LEDs and LED Drivers must be controlled in trailing edge dimming mode.

**Do not attach any other type of load to the outputs if dimming of the outputs is enabled! Using an improper load can damage both the attached device and the FNIP-6x2AD, creating a potential fire hazard!**

**Only use lights with built-in ballasts/drivers that meet CE emission standards. For example, spikes generated by certain LED drivers can damage the dimmer.**

Apart from dimming, the FNIP-6x2AD can also be used to switch (on/off only) non-dimmable loads that don't exceed the specifications.

As a precaution, dimming of the outputs is disabled by default. If you use dimmable loads, you must enable dimming for each channel.

## 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. Voltage for the inputs is supplied by the module itself.

**WARNING!** Avoid supplying voltage on these terminals!

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

The galvanic isolation is only effective when an independent power supply is used for powering the inputs. The FNIP-6x2AD has separate power input terminals for this purpose. 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.

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 states are displayed via LEDs.

Use the board layout drawing in Figure 4. to locate the status LEDs.

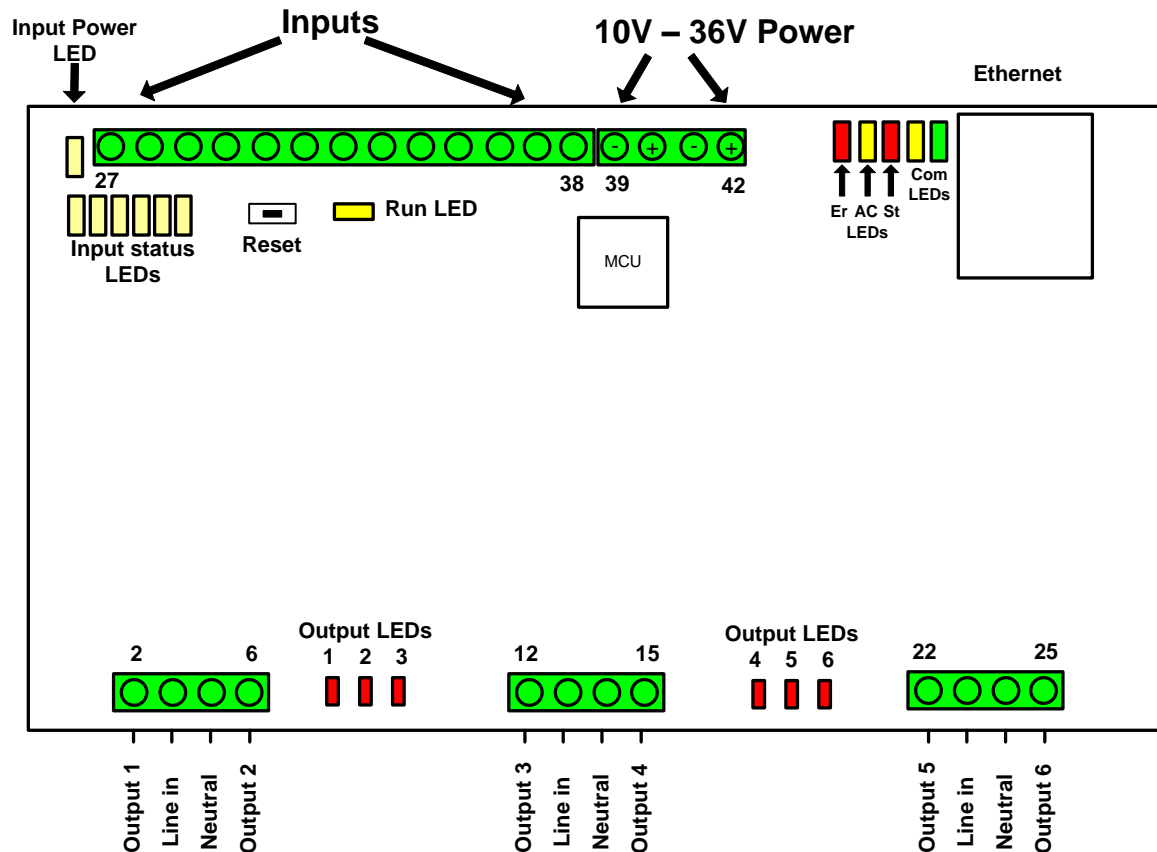


Figure 4. The board layout of the FNIP-6x2AD

### Input status LEDs

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

### Run LED

When on, it indicates that the Central Unit of the module works properly.

### Input power LED

When illuminated, it 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**

Indicates communication via Ethernet

## **Status LEDs**

### **St LED**

It is illuminated while the boot loader is active and it is blinking during a firmware upload procedure. This should only happen during hardware resets and in the second phase of firmware updates.

### **AC LED**

Indicates the presence of the 50/60Hz line voltage

### **Er LED**

The Er LED turns on if the module gets overheated. This LED will not turn off until the module is power cycled or the temperature of the heat sink drops below 40°C.

## **Output status LEDs**

Each output has a dedicated status LED that illuminates solid red when the corresponding output is activated. In case of overcurrent the corresponding LED starts flashing. The error condition resets when the output is turned on again.

## CONFIGURATION

Configuration can be done either via the built-in website or via TCP/IP connection.

### Configuration via the web interface

The FNIP-6x2AD automatically receives an IP address from a DHCP server.

In the lack of a DHCP server or when DHCP option is disabled on the network configuration page of the module, 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 using an Ethernet cross cable (no DHCP server).

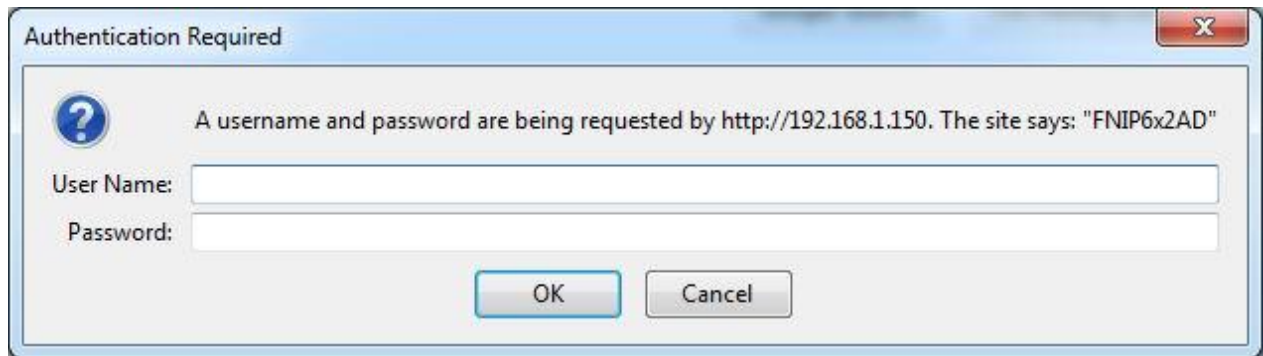
Use the FNIP Network Discovery Utility or other network discovery software to find all FutureNow IP devices on your network.

### Connecting to the web server of the module

Connect to the web interface of the module by using a web browser. Clicking on one of the units found by the FNIP Network Discovery Tool will automatically do that for you.

You can also access **the web interface of the module via an internet browser using the hostname of the module (FNIP-6x2AD by default)** or its IP address. See the list of supported browsers in the specifications below.

Once you are connected, you will be asked to identify yourself, as seen in Figure 5.



**Figure 5. Authentication window**

Default user name: **admin**

Default password: **futurenow**

You will be logged in as an administrator with access to all settings and functions.

Once logged in, you will automatically be directed to the **Control** page. You can use the tabs on the top of the screen to navigate between the different control and configuration pages.

## Network settings

To make basic network settings click the **Network** tab. The network configuration page is shown in Figure 6.

You can choose between using DHCP or static IP address here.

### Enable HTTP authentication

HTTP authentication can be disabled to make HTTP communication easier.

### Enable broadcast messages

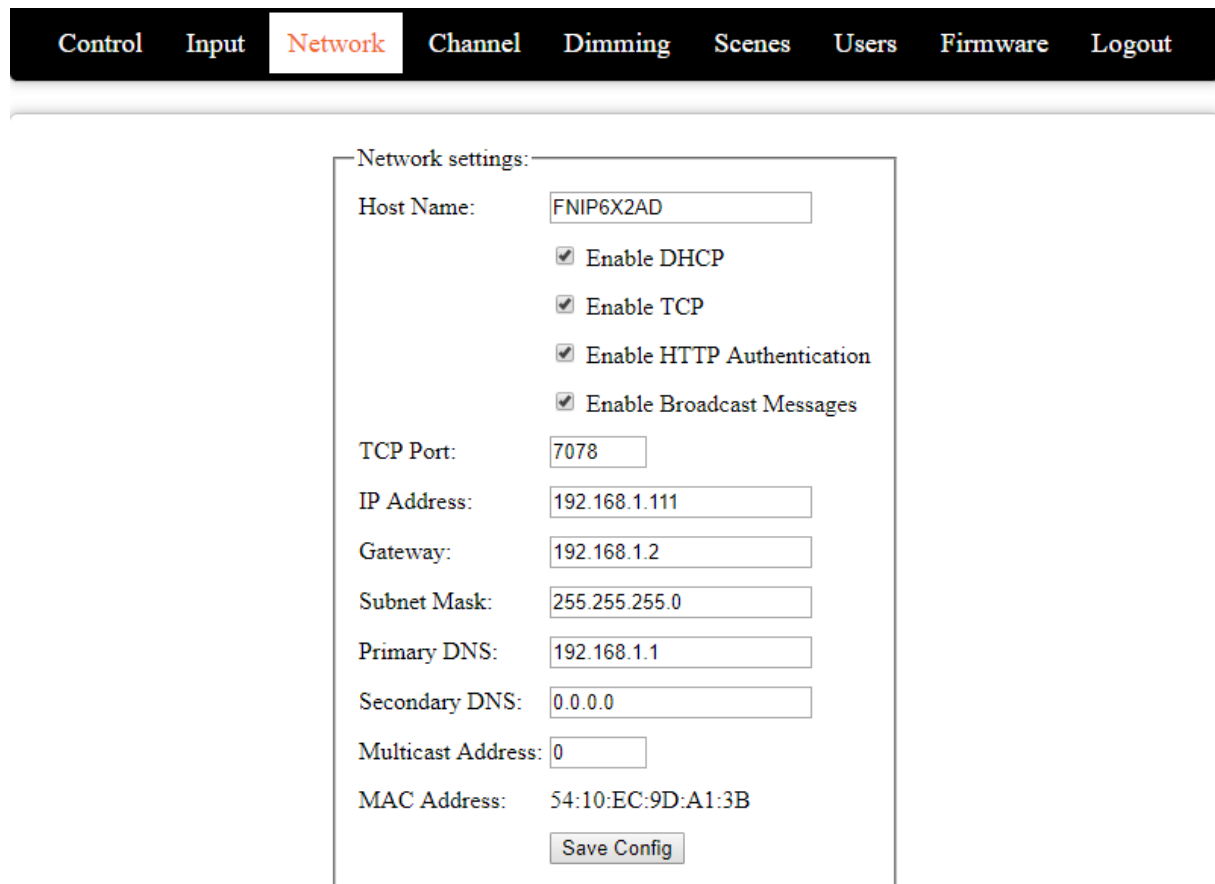
All FNIP modules periodically send out heartbeat broadcast messages with basic information about themselves. This helps discovery tools and mobile apps to find them. These broadcasts can be disabled if constant traffic on the network is a problem.

Please note disabling broadcast messages will hinder the Discovery Tool and the setup of the mobile applications.

## Multicast address

Used to create groups of FNIP modules that react to scene activation commands only if set to the same multicast address as the scene activator module.

More information about the scenes is in the Scenes chapter.



Control Input **Network** Channel Dimming Scenes Users Firmware Logout

Network settings:

Host Name:

☒ Enable DHCP

☒ Enable TCP

☒ Enable HTTP Authentication

☒ Enable Broadcast Messages

TCP Port:

IP Address:

Gateway:

Subnet Mask:

Primary DNS:

Secondary DNS:

Multicast Address:

MAC Address: 54:10:EC:9D:A1:3B

**Figure 6. Network configuration page**

## Users and user rights

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

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

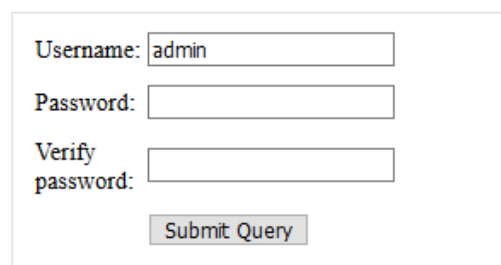
**Actors** are allowed to control the outputs and monitor the status of the inputs and the outputs, but are not allowed to change any settings.

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

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



### Username and password settings

A form with four input fields and a submit button. The fields are labeled 'Username:', 'Password:', 'Verify password:', and 'Submit Query'. The 'Username' field contains the text 'admin'.

### User Administration

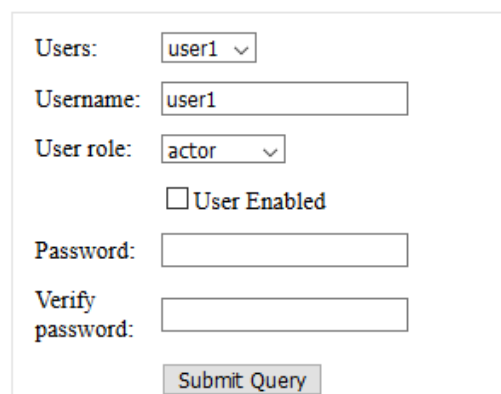
A form for user administration with several fields and a submit button. The fields are labeled 'Users:', 'Username:', 'User role:', 'User Enabled', 'Password:', 'Verify password:', and 'Submit Query'. The 'Users' field is a dropdown menu showing 'user1'. The 'Username' field contains 'user1'. The 'User role' field is a dropdown menu showing 'actor'. There is an unchecked checkbox for 'User Enabled'. The 'Password' and 'Verify password' fields are empty.

Figure 7. User configuration page

## Channel settings

On the **Channel** page the outputs and inputs can be renamed. Input modes can also be chosen 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 section of this document.

You can also choose the dimming method on the Channel page. As a general rule, leading edge dimming can be used with resistive and inductive loads, while capacitive loads require trailing edge dimming. If you are not sure which mode to set, click on **Detect** and the module will automatically test the connected load type and set the mode that suits best. For some loads you have to experiment to see which mode works best. For example some phase-cut dimmable fluorescents and LEDs work better with trailing edge dimming while others require leading edge dimming. The channel settings page is shown in Figure 8.

Control
Input
Network
**Channel**
Dimming
Scenes
Users
Firmware
Logout

Output labels:	Input labels:	Input modes:	Scene no.	Monostab. duration:	Operation mode:	Detect op. mode
Channel1	Input1	Toggle	1	10	Trailing E.	Detect
Channel2	Input2	Toggle	1	3	Trailing E.	Detect
Channel3	Input3	Toggle	1	10	Trailing E.	Detect
Channel4	Input4	Toggle	1	10	Leading E.	Detect
Channel5	Input5	Toggle	1	10	Trailing E.	Detect
Channel6	Input6	Toggle	1	10	Trailing E.	Detect

Detect all

**Other settings:**

Resume light levels after power outage: ☐

Save Settings

**Figure 8. Channel settings page**

## Dim settings

### Preset level:

If other than zero, the output will go to the specified level when turned on. Zero means the output will go to the last used dim level.

### Minimum level:

Some load types cannot be dimmed down all the way to zero. They cut off at some point and show some strange behavior (flickering or pulsing) below that dim level. Light bulbs also need a minimum dim level to produce visible light. Setting the minimum level slightly above these cut-off points makes these loads dimmable all the way down more smoothly.

### Maximum level:

The output will not go past this level. One reason may be to extend the lifespan of the bulb or to limit the brightness to suit the environment.

### Default ramp rate:

This is the time it takes for the light to go from zero to 100% when turned on/off via the inputs, via the website, or TCP commands. Shorter ramps will take a proportionally shorter time. For example, going from zero to 50% will take half the time than what the ramp rate is set to.

### Hold ramp rate:

The time it takes for the light to go from zero to 100% when the corresponding input is held. Shorter ramps will take a proportionally shorter time. For example, going from zero to 50% will take half the time than what the ramp rate is set to.

### Dimming enabled:

There are loads that are not dimmable. Examples are most fluorescents and some LED lights. These lights can only be turned on and off. Apart from dimming dimmable lights, the FNIP-6x2AD can be used to only switch On/Off any types of load that does not exceed the specifications. You can disable dimming by unchecking the corresponding checkbox. Please note that dimming is disabled by factory default.

**Never enable dimming for non-dimmable loads. Doing so can damage the device connected to the output, possibly creating a fire hazard!**



## Combining channels

If dimming or switching a higher load than what a single channel can handle is required, it is possible to combine two outputs. Ch1 can be combined with Ch2, Ch3 with Ch4 and Ch5 with Ch6. Outputs of a combined channels will always produce the same dim level. There are two ways to combining channels.

### Software only combination:

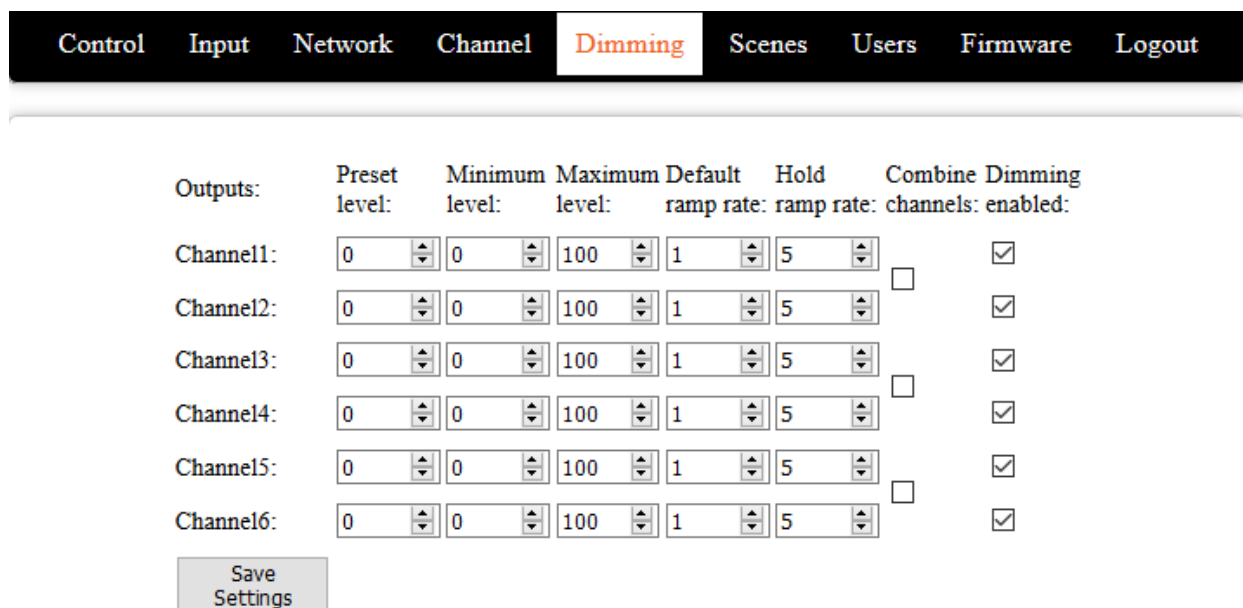
The channels can be combined by software only, by ticking the respective checkboxes on the Dim Settings page. The combined pairs will be tied together, they will always be at the same dim level but they are separate hardware outputs with different loads connected to them.

### Hardware and software combination:

Besides software combination, combined output pairs can also be combined by hardware, by connecting them in parallel. They will then drive the same load. For example, output 1 and output 2 can be connected in parallel.

The rating of the combined output pairs will be slightly lower than double the rating of a single channel.

**Connecting outputs that are not combined by software in parallel is dangerous. It can damage the module, possibly creating a fire hazard!**



Outputs:	Preset level:	Minimum level:	Maximum level:	Default ramp rate:	Hold ramp rate:	Combine Dimming channels:	enabled:
Channel11:	0	0	100	1	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Channel12:	0	0	100	1	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Channel13:	0	0	100	1	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Channel14:	0	0	100	1	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Channel15:	0	0	100	1	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Channel16:	0	0	100	1	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Save Settings

**Figure 9. Dim settings page**

## Scenes

Scenes are predefined states of the outputs on the module.

FNIP scenes can be used in standalone applications without any third-party controller. FNIP modules (module groups) support 9 scenes.

If a module receives a **Scene Activation Command (SAC)**, the designated outputs will go to the defined state. Any module in the group can send and receive this command. SAC can be triggered by an input change on this module, or on any module in the group

Each module in the group must have the same **Multicast address** set on the Network page. Modules in other groups will not receive the SAC.

**Definition of the scenes happens on this page by the following steps:**

1. Select a scene
2. Define the action of the desired outputs.
3. Save the settings
4. Select another scene...

Control
Input
Network
Channel
Dimming
**Scenes**
Users
Firmware
Logout

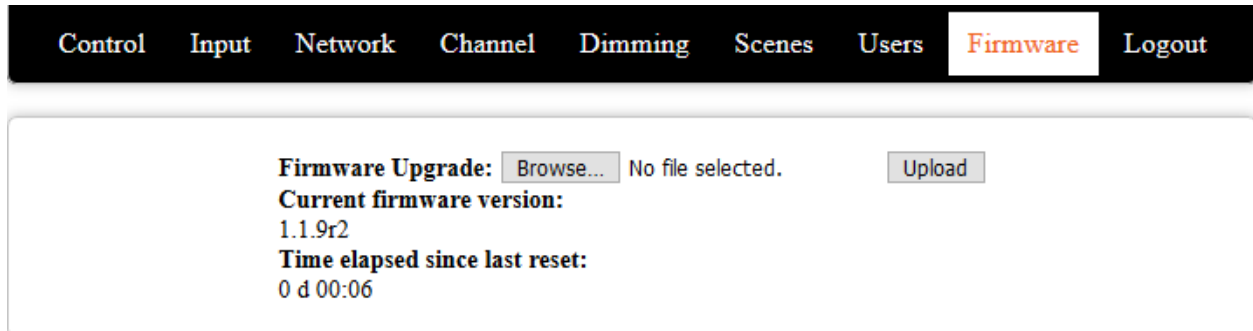
Scene no: 1

Outputs	Action	Level	Ramp Rate
Channel1	<input type="radio"/> No action <input checked="" type="radio"/> Go to level	10	1
Channel2	<input checked="" type="radio"/> No action <input type="radio"/> Go to level	0	0
Channel3	<input checked="" type="radio"/> No action <input type="radio"/> Go to level	0	0
Channel4	<input checked="" type="radio"/> No action <input type="radio"/> Go to level	0	0
Channel5	<input checked="" type="radio"/> No action <input type="radio"/> Go to level	0	0
Channel6	<input checked="" type="radio"/> No action <input type="radio"/> Go to level	0	0

Reset all
All on
All off
Save

**Figure 10. Scene setting page**

## Firmware Upgrade



Control Input Network Channel Dimming Scenes Users **Firmware** Logout

Firmware Upgrade:  No file selected.

Current firmware version:  
1.1.9r2

Time elapsed since last reset:  
0 d 00:06

**Figure 11. Firmware upgrade page**

Upgrading the firmware in the module is possible via the network.

On the **Firmware** page click browse and find the new firmware on your PC. The latest firmware versions are always downloadable from the website of P5. Then click **Upload**. The **St** LED turns on and stays on or blinks during firmware update. After uploading the new firmware – which takes about a minute – the module will automatically restart.

The version of the current firmware and the time since the last reset is also displayed on this page.

### Resetting to factory defaults

Holding the reset button for at least 2 sec while powering up the module will set all the settings to factory defaults.

# OPERATION

## Operation via local inputs

The inputs can be activated by shorting or opening (depending on the settings of the Channel Settings) an input terminal and 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 10V - 36V DC must be applied across terminals 39 and 41. If the inputs are not used, this power connection is not necessary.

## Input modes

The inputs are factory defaulted to toggle mode and can be changed via the web interface of the dimmer or by TCP/IP commands. The input modes work as follows.

### 1. Toggle mode (factory default)

Each short button press toggles the corresponding output. Holding the button for less than 0.5s will dim up and down (always in the opposite direction then last time) the output until the button is let go of or the minimum or maximum dim level is reached.

### 2. Independent inputs

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 for monitoring 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

The status the outputs will follow the state of the corresponding input. The output will be on while the momentary switch is pressed and off while it is released.

#### **4. Toggle with no dimming mode**

Each press of the button toggles the corresponding output. Holding the button has no function. Dimming is inhibited.

#### **5. Monostable mode**

The outputs can be programmed to turn on only for an adjustable amount of time when the respective input is triggered then turn off. An example is a staircase lighting.

#### **6. Switch mode**

This mode makes it possible to use maintained (standard light switches) instead of momentary switches on the inputs. Each trigger 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 determine the status of the output.

#### **7. Scene on open mode**

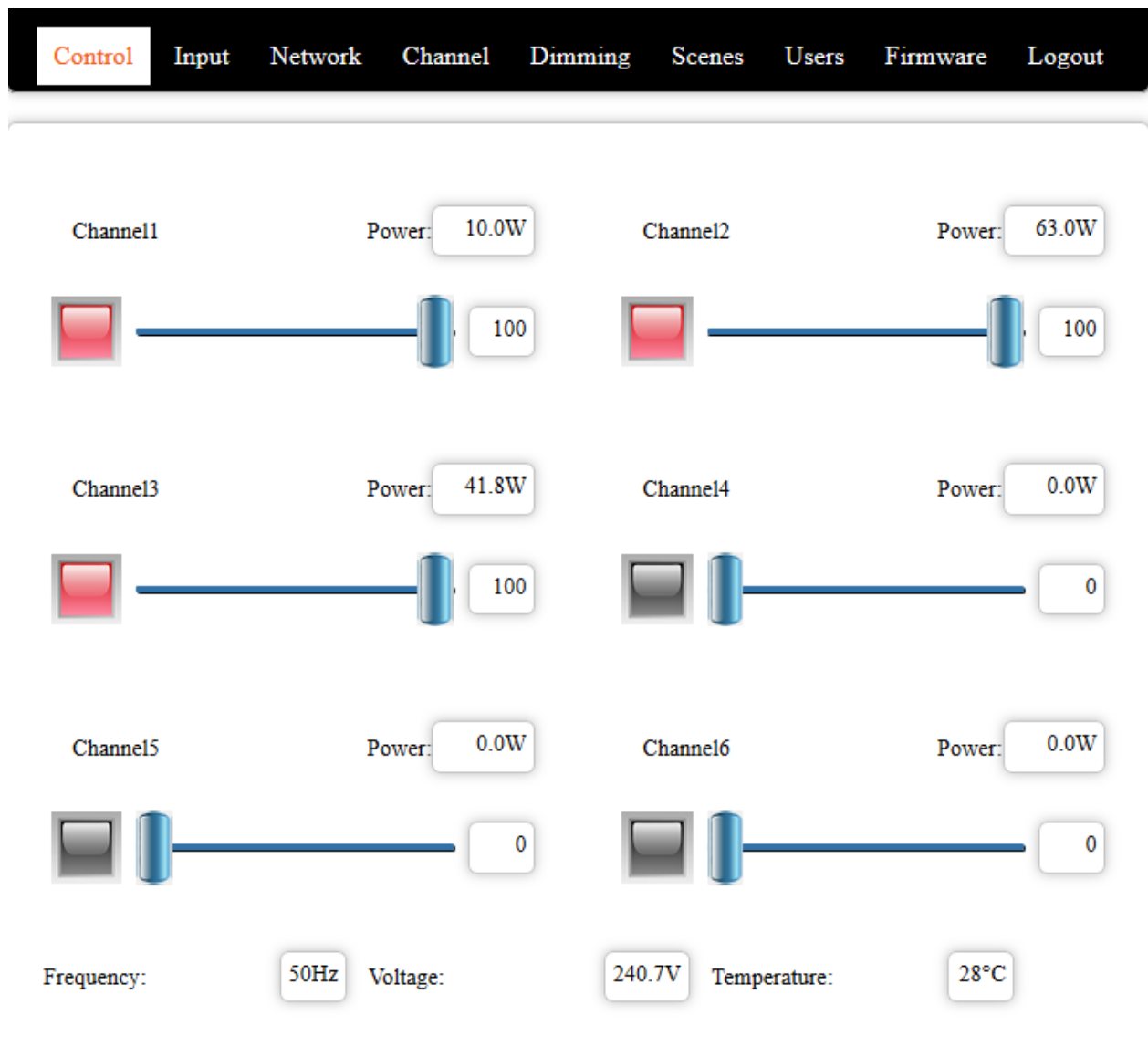
If an input gets opened the scene assigned to the input on the channel configuration page will be executed.

#### **8. Scene on close mode**

If an input gets closed the scene assigned to the input on the channel configuration page will be executed.

## Operation via the built-in web server

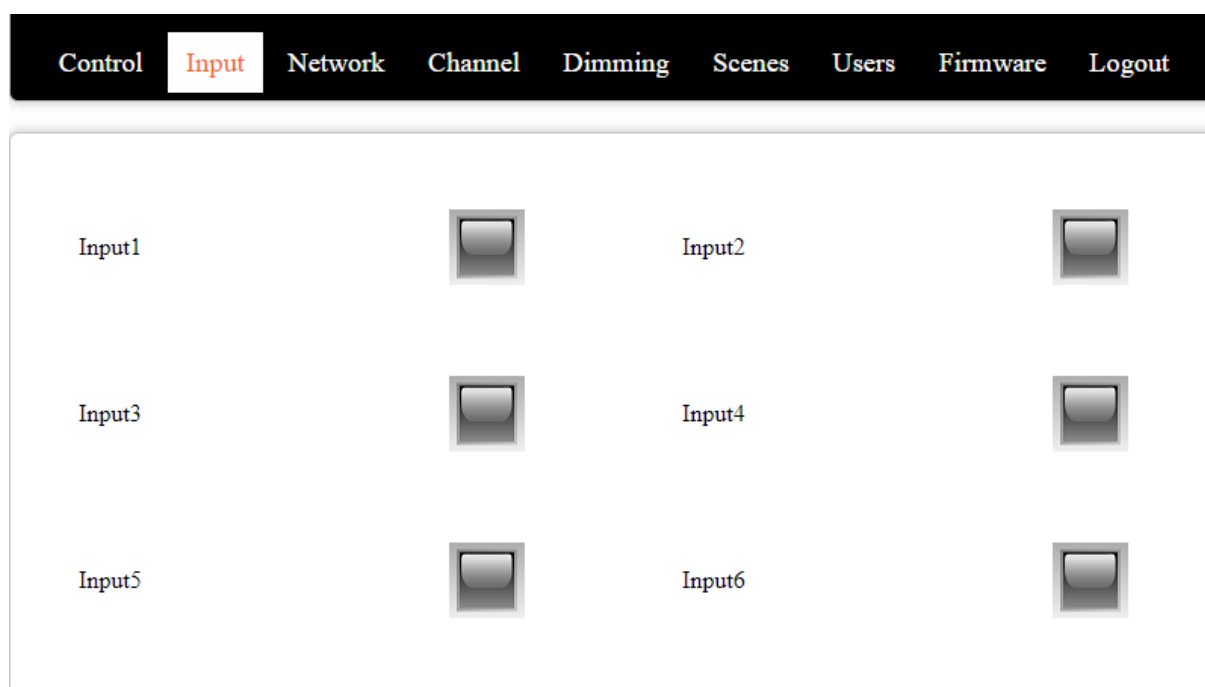
The outputs can be controlled on the Control page. Clicking the **Channel icon** will toggle, moving the slider will dim the outputs. A grey status icon means that the output is off. An active output is indicated by a red icon. The current power usage is displayed for each channel. A common temperature of the module is also displayed as well as the frequency of the mains voltage. The Control page is shown in Figure 11.



**Figure 11. Control page**

## Input status page

The status of the inputs is displayed on the Input status page. A grey icon means that the corresponding input is inactive (input circuit open). An active input (input circuit closed) is indicated by a green icon. The Input Status page is shown in Figure 12.



**Figure 12. Input status 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 Communication Protocol Description is available upon request.

### Event notifications

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

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

Most third-party automation controllers that can implement the simple communication protocol of the FNIP-6x2AD and they are able to control the FutureNow FNIP-6x2AD. The following are the most widely used:

- AMX
- Control4
- Crestron
- RTI
- Savant
- Extron
- DemoPad

Software modules/plugin-ins for the above controllers are available or P5 will provide full assistance in creating them.

Android and iOS applications are also available.



## TECHNICAL SPECIFICATIONS

### Power requirements

Main circuit: 10 -36 V DC, max. 80mA@12V

Inputs: 10 -36 V DC, max. 30mA@12V

Line: 220-240VAC +/-10%, 50/60Hz

### Outputs

Load: Incandescent, 230V halogens: max. 500W/channel

Fluorescents and electronic low voltage transformers: max. 500W/channel

Compact fluorescents: max. 400W/channel

LEDs: max. 200W/channel

**– WARNING – Only use the dimmer to control LED ballasts/drivers that conform to EMC emission standards. For example, some LED drivers can generate spikes that can damage the dimmer.**

All channels combined: max 3000W

(in case of all output load is incandescent)

The above ratings are for 25°C ambient temperature.

### Inputs

Type: 6 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, Dim, Switch, Scene activation) or Independent

### Terminals

Type: Screw terminals for max. 2.5 mm<sup>2</sup> 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: 4

HTTP via built-in web server

### **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 = 157mm x 86mm x 57mm (9 DIN unit width)

Weight: 0,48 kg

Color: Light grey with black cover plate

### **Standards**

EN 60669-2-1

RoHS

### **Test methods**

EN 55015:2013

EN 61547:2010

## **REFERENCES**

FNIP Search Utility: [FNIP Discovery Tool](#) (Registration needed on [www.P5.hu](http://www.P5.hu))

FNIP-6x2AD TCP Communication Protocol Description

(Please send an email to [support@p5.hu](mailto:support@p5.hu) )

## **CONTACT DETAILS**

[support@p5.hu](mailto:support@p5.hu)

<http://p5.hu/index.php/support/contact-technical-support>