PX340

DMX Controller

MANUAL

TABLE OF CONTENTS

1. General description....3

2. Safety conditions....3

3. Device design and description of connectors....4

4. Connection method....5

5. Network settings for the driver....9

5.1 Changing the network configuration of the computer....15

6. Installing software....17

6.1. Windows® platform....17
6.2. Mac OS X® platform....17
6.3. Android™ platform....18

7. Controller configuration....19

8. Controller operation....26

8.1 Calculation of output values....26
8.2 Modbus....27
8.3 Logging....34
8.4 Live mode....34
8.5 Indication lights....35
8.6 RESET button operation, restoring default settings....35
8.7 Core mode, FTP support....36

9. Technical specifications....37

10. Technical drawing....38

Declaration of conformity....39

The manufacturer reserves the right to change the operation and handling of the controller in order to improve the product.

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1. GENERAL DESCRIPTION

The PX340 DMX Controller is an advanced architectural lighting controller that allows for controlling even the most complex lighting systems.
With programmable functions, the device enables the control of lighting, multimedia, and other devices that are operated based on the DMX protocol. After the configuration, the controller operates independently.

The controller has 1 DMX output line (512 channels), 1 DMX input line, and it allows for triggering multiple configuration items at the same time. Events can be triggered by an astronomical clock, a real time clock, programmed timers, analogue or digital inputs, mobile device applications or via the Modbus protocol.

An advanced PC application (Windows®, Mac®) allows for programming the device. The application has a built-in library of devices that can be distributed on a graphic project, which facilitates the creation of complex light shows, including ones that are synchronized with sound.
The controller comes with an application for mobile devices (Android™) which enables simple control.

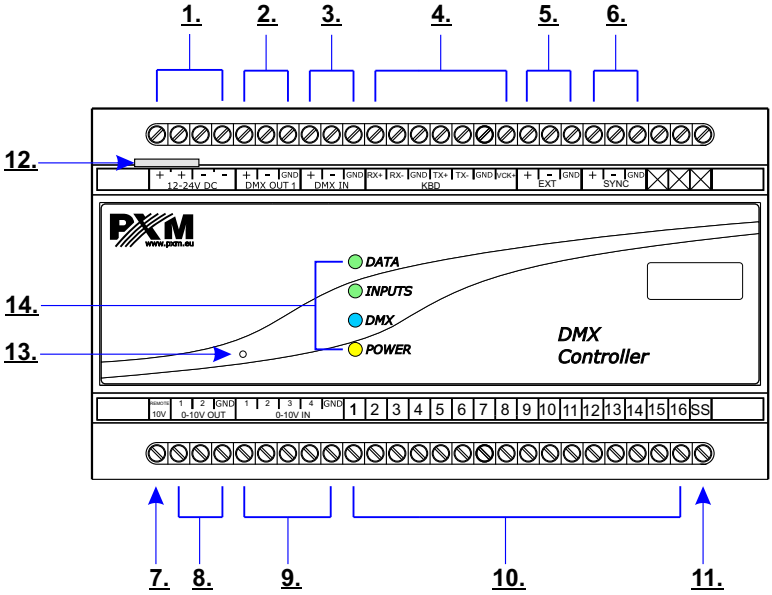
The controller can be used to create up to 8 users with different access rights. There is an option to remotely log on to the controller from the external network.

2. SAFETY CONDITIONS

Controller PX340 DMX Controller s a device powered with safe voltage 12-24 V; however, during its installation and use the following rules must be strictly observed:

1. The device can be connected to 12-24 V DC (stabilised voltage) with current-carrying capacity compatible with technical data.
2. All the conductors should be protected against mechanical and thermal damage.
3. In case of damage to a conductor, it should be replaced with a conductor of the same technical parameters.
4. Connection of DMX signal can be made with a shielded conductor only.
5. All repairs, connecting and disconnecting of cables can only be made with cut off power supply.
6. The device should be strictly protected against contact with water and other liquids.
7. All sudden shocks, particularly dropping, should be avoided.
8. The device cannot be turned on in places with humidity exceeding 90%.
9. The device cannot be used in places with temperature lower than +2°C or higher than +40°C.
10. Clean with damp cloth only.

3. DEVICE DESIGN AND DESCRIPTION OF CONNECTORS

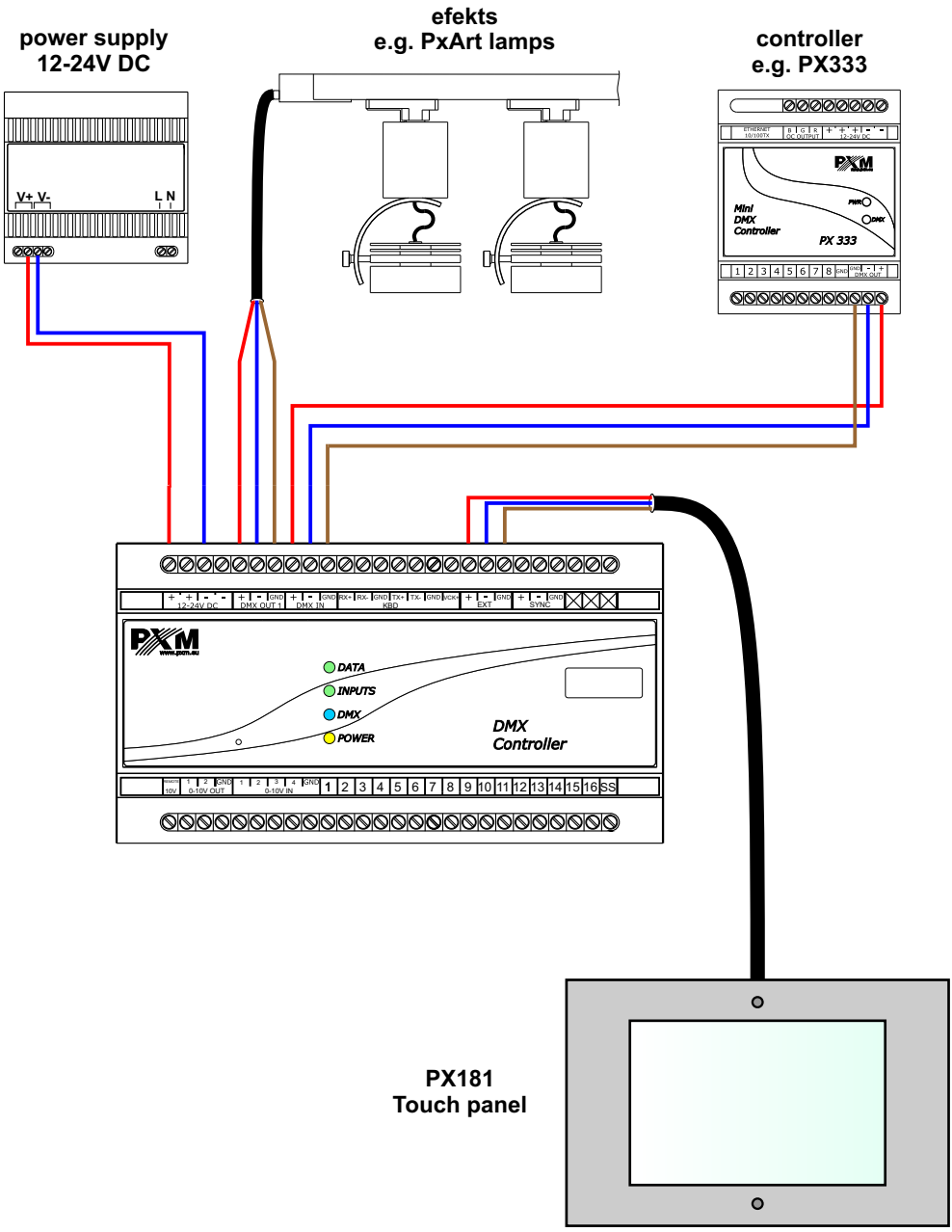


Designations:

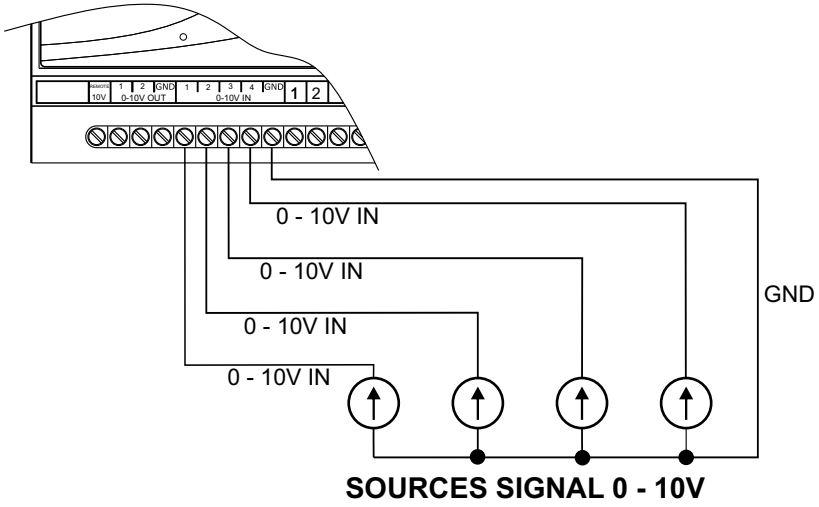
1. Power supply
2. DMX output (512 channels)
3. DMX input (512 channels)
4. KBD - for future applications
5. EXT - connection to an external touch panel
6. Synchronization - for future use
7. 10V + additional power supply for analogue inputs
8. 2 analogue outputs (0-10V)
9. 4 analogue inputs (0-10V)
10. 16 ON/OFF inputs
11. Sink/Source pin
12. Ethernet connector
13. Reset
14. 4 indicator lights

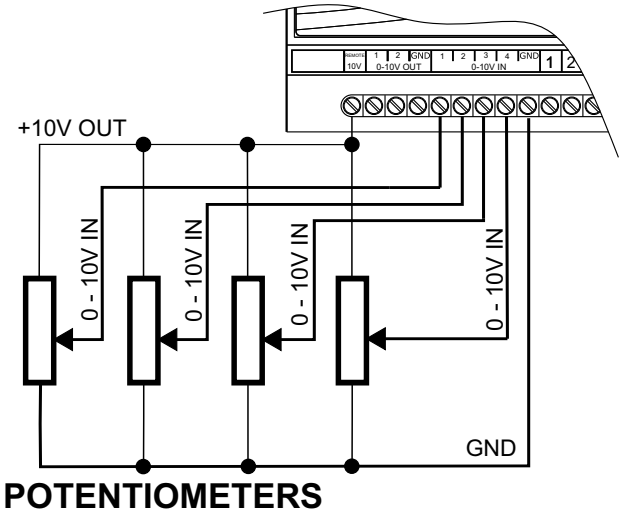
4. CONNECTION METHOD

a) power connection for DMX output, DMX input, and the PX181 panel



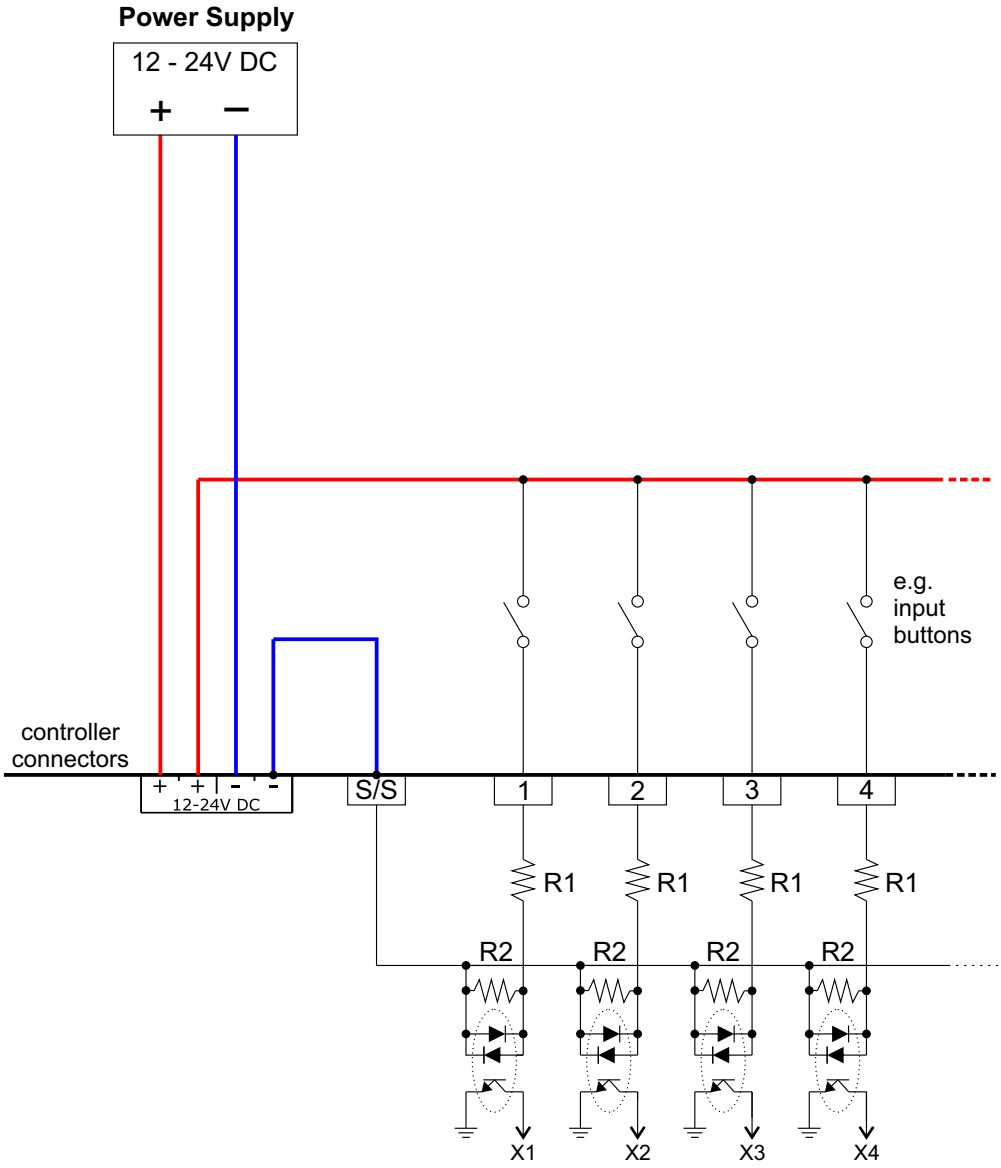
b) connection of analogue inputs



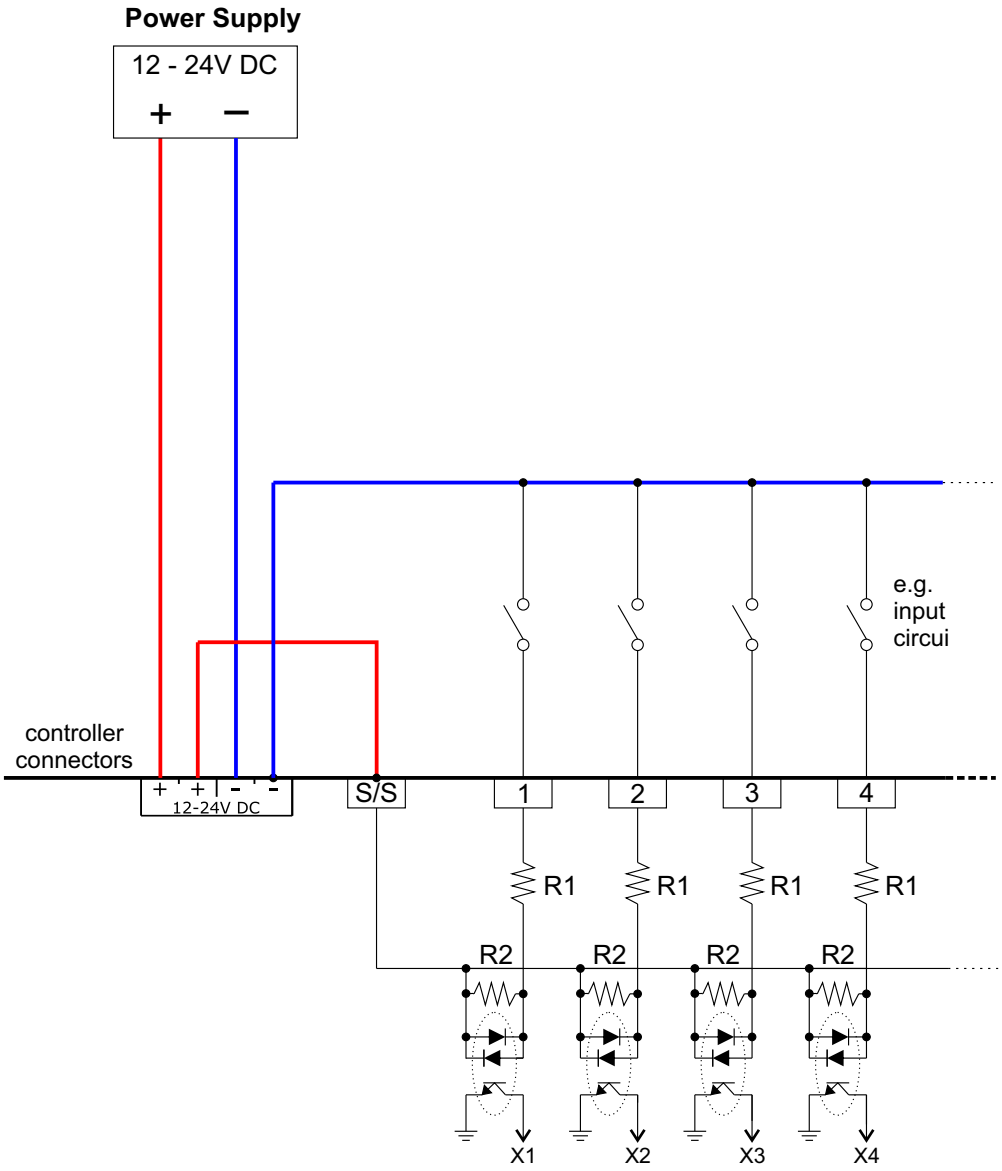


c) connection of digital inputs

- **Sink in type** - positive logic input - "joint plus"



• **Source in type** - negative logic input - "joint mass"



5. NETWORK SETTINGS OF THE CONTROLLER

The controller stores the static network configuration. It is always used when static addressing mode was selected or in automatic addressing mode, when it was not possible to get the configuration settings from the DHCP server.

The controller can run in one of the two modes:

- **Automatic addressing**: DHCP ☑
- **Static addressing**: DHCP ☐

In automatic mode (DHCP), after connecting to the network, the controller attempts to get the network configuration from a DHCP server (e.g. router). Thanks to this, manual configuration of network parameters is not needed. In the absence of a DHCP server on the network, the controller will operate according to the static configuration (manual setup).
When choosing static addressing, you should configure network parameters in such a way that the controller is able to operate on the subnet and there is no conflict of IP addresses (devices in the network must have unique IP addresses).

The default network settings of the controller:

DHCP: Included ☑
IP: 192.168.0.50
Mask: 255.255.255.0
Gate: 192.168.0.1

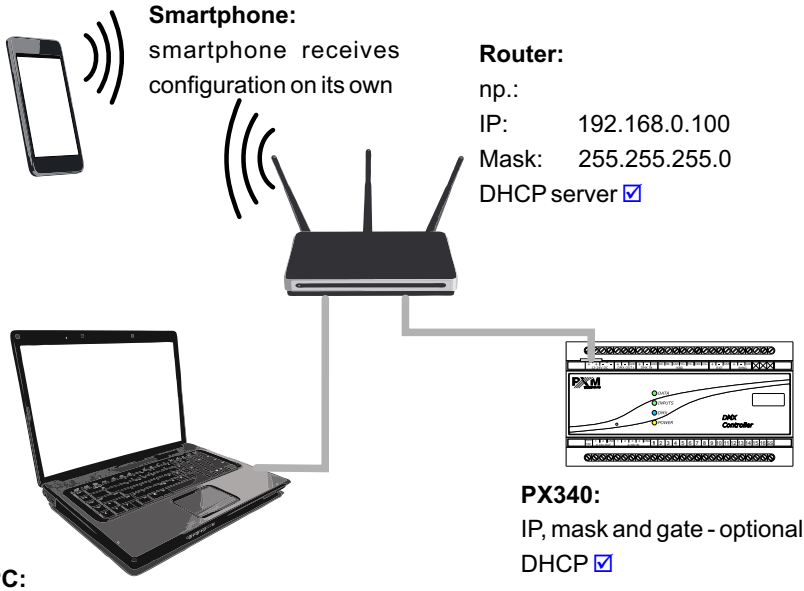
Should the controller operate in automatic mode in the network and receive IP address from the DHCP server, the detaching of the network cable will result in the loss of IP address and another attempt to get the new IP address from the DHCP server. If that fails, the controller switches to operate with a static configuration.

It is recommended to use automatic addressing and connect the controller to the network with a running DHCP server.

Should the controller be connected directly to the computer (no DHCP server), you must manually set the network parameters of both the computer and the controller to operate in one network.

Below are some typical examples of network configuration:

a) Automatic addressing



Smartphone:
smartphone receives configuration on its own

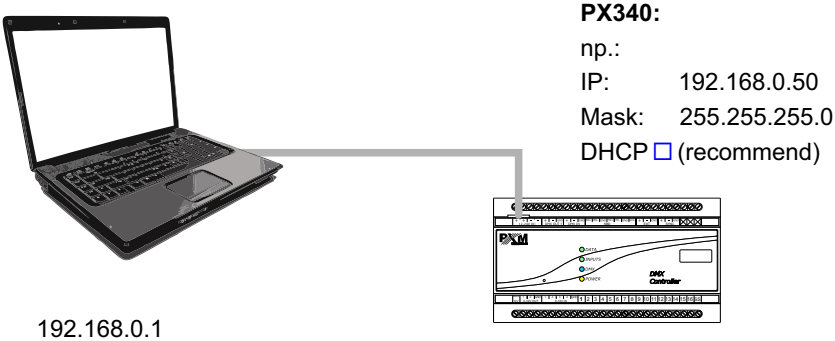
Router:
np.:
IP: 192.168.0.100
Mask: 255.255.255.0
DHCP server ☑

PX340:
IP, mask and gate - optional
DHCP ☑

PC:
„Obtain an IP address automatically”

b) Connecting controller directly to the computer (no DHCP server)

When connecting the controller directly to a computer it is recommended to use a braided cable. Newer network cards will work both on a braided cable or a non-braided cable, but older ones may require a braided cable.



PX340:
np.:
IP: 192.168.0.50
Mask: 255.255.255.0
DHCP ☐ (recommend)

PC:
np.:
IP: 192.168.0.1
Mask: 255.255.255.0

c) Static addressing

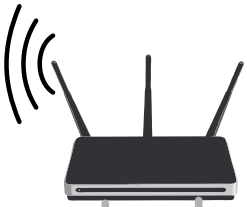


Smartphone:

IP: 192.168.0.2

Mask: 255.255.255.0

Default gateway: 192.168.0.100



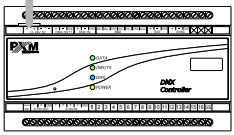
Router:

IP: 192.168.0.100

Mask: 255.255.255.0

DHCP server ☐





PX340:

IP: 192.168.0.50

Mask: 255.255.255.0

Gate: 192.168.0.100

DHCP ☐

PC:

IP: 192.168.0.1

Mask: 255.255.255.0

Gate: 192.168.0.100

d) External connection

To connect via the Internet:

- Have an external IP address on the router assigned by your ISP, and have the possibility to connect externally (incoming packets are not blocked by the ISP's firewall),
- Forward any two ports (must be one after the other) to the IP address of the controller working in the internal network, and to ports 50000 and 50001 UDP/TCP (port forwarding),
- Unblock the selected ports on the router firewall,
- The address of the controller/controllers on the internal network cannot change (the controller must have the address set statically or the DHCP server in the network must assign the same IP address to the same devices every time).

Most routers on the market usually have several parameters in the port forwarding options.
These are:

- **Name of forwarding** (any)
- **Forwarding port** (or range of ports)
- **Protocol type** (TCP/UDP or both)
- **Local IP address** (to which you want to forward)

FOR EXAMPLE:

1. One device/controller operates on the internal network

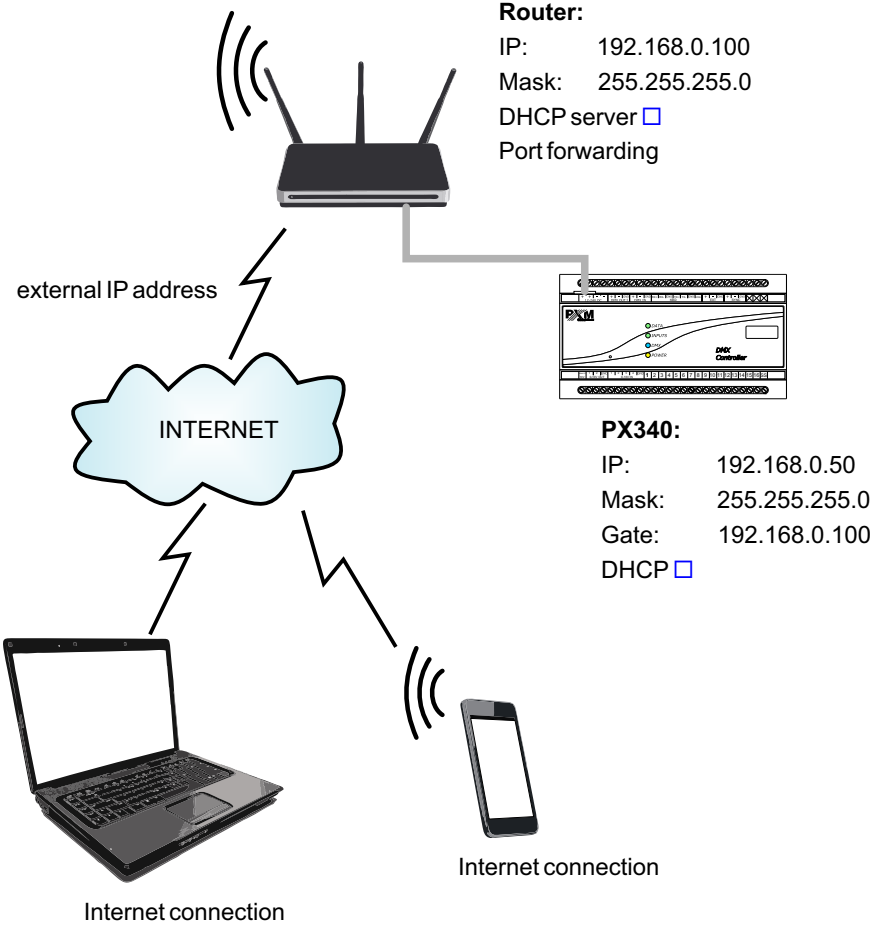
Assumptions:

- **Name of forwarding**: it can be arbitrary but different for any forwarding
- **External IP address**: 188.188.188.188 (here, for example, replace it with the address received from the ISP)
- **Forwarded ports (from the Internet)**: 50000 and 50001
- **IP address on the local network (controller address)**: 192.168.0.50
- **Destination ports (for the controller)**: 50000 and 50001
- **Protocol:** TCP/UDP (sometimes you can find the following options: "Both", "All", etc.)

The port with the lower address must be forwarded to the lower destination address of the controller, and the port with the higher address - to the higher destination address of the controller. If the port range setting option is not available, you need to create two forwarding rules for each port individually (for 50000 and 50001).

Then, to connect to the controller via the Internet, in the application window "Connect to device" in the "Address" field enter the IP address of the router (assigned by your ISP), which in this case is 188.188.188.188, and in the "port" field enter the lower of the forwarded ports, in this case port 50000.

See: figure on the next page.

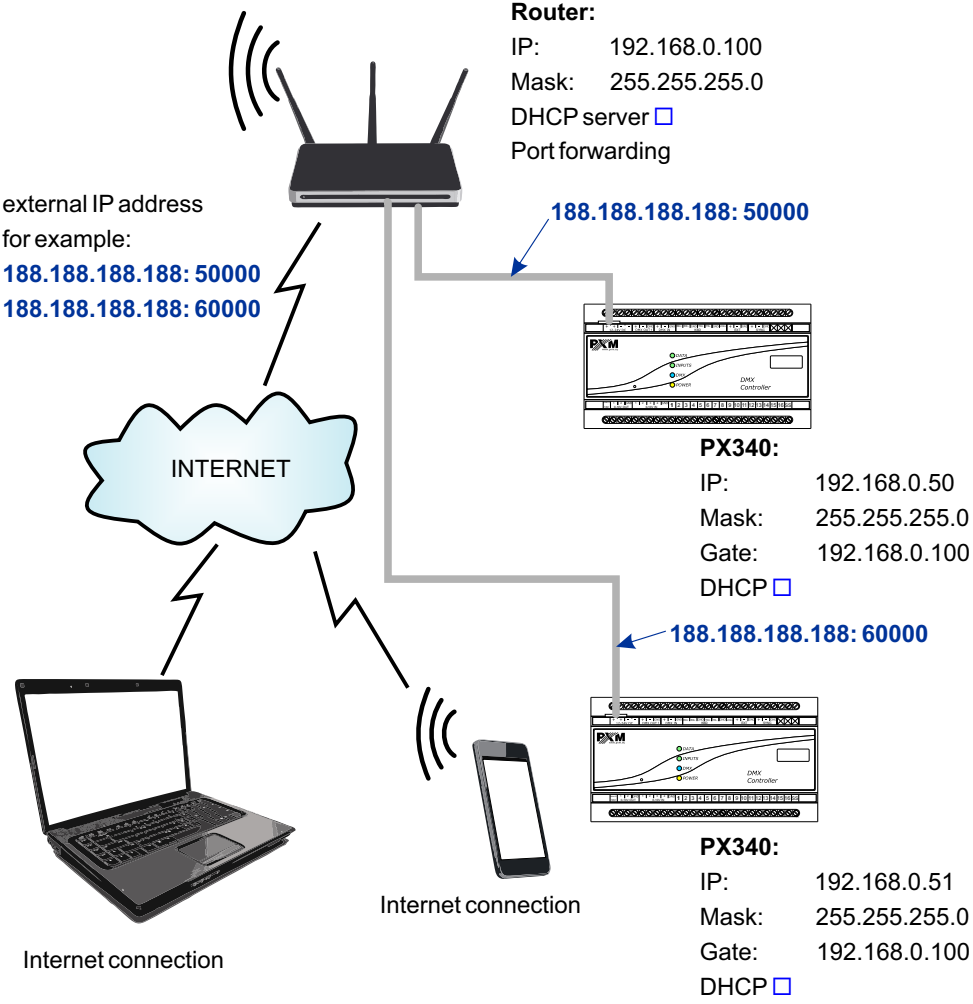


2. Two or more devices/controllers working in the internal network

Assumptions:

- **External IP address:** 188.188.188.188 (here, for example, replace it with the address received from the ISP)
- **IP address of the first controller:** 192.168.0.50
- **IP address of the second controller:** 192.168.0.51
- **Forwarded ports:** 50000 and 50001 for the first controller, and 60000 and 60001 for the second controller
- **Destination ports (for the first forwarding and the second forwarding):** 50000 and 50001
- **Protocol:** TCP/UDP (sometimes you can find the following options: “Both”, “All”, etc.)

If the port range setting option is not available you need to create two forwarding rules for each port individually (for 50000 and 50001, and also 60000 and 60001).



Then, to connect to the controller via the Internet, in the application window "Connect to device" in the "Address" field enter the IP address of the router (assigned by your ISP), which in this case is 188.188.188.188, and in the "port" field enter the lower of the forwarded ports for the first controller, in this case port 50000. To connect to the second controller, change the port to the lower one of the ports forwarded to the second controller (in the example: 60000).

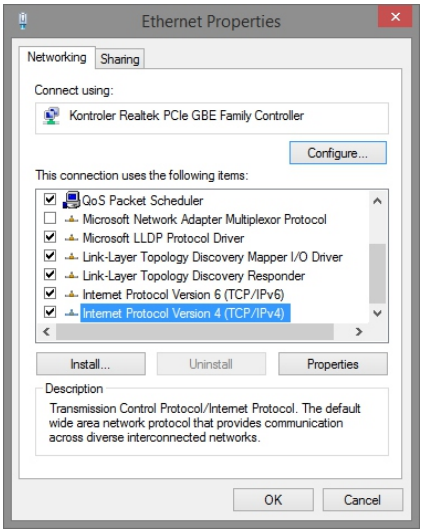
NOTE: In both cases, it is essential to follow the principle that you should forward two ports side by side, and the lower of the forwarded ports must be forwarded to the IP address of the device in the internal network and port 50000, and the higher of the forwarded ports must be forwarded to the IP address of your device in the internal network and port 50001.

5.1 Change of the computer network configuration

The procedure for changing the computer network configuration varies depending on the operating system. Windows® 7 system is an example here.

Change of the computer network configuration in the Windows® operating system is done in the following way:

1. Click Start menu
2. Select [**Control Panel**] tab
3. Go to [**Network and Internet**] tab
4. Enter [**Network and Sharing Center**]
5. In the left panel, select the [**Change adapter settings**]
6. Right-click on [**Local area connection**]
7. Select [**Properties**] from the context menu
8. Double-click [**Internet Protocol Version 4 (TCP/IPv4)**]



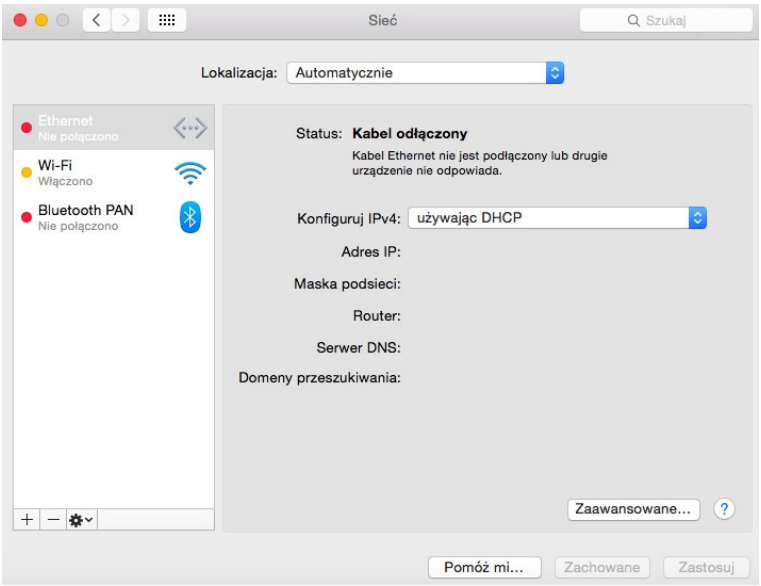
9. Select [**Use the Following IP address:**]

To connect directly (computer-controller) with a new controller (with preloaded default configuration), use the sample settings:

IP address:	192.168.0.1
Subnet mask:	255.255.255.0
Default gareway:	192.168.0.100

Change of the computer network configuration in Mac OS X® operating system is done in the following way:

1. Click Start menu
2. Select the tab [**System Preferences...**]
3. Go to the tab [**Network**]
4. Highlight [**Ethernet**]



5. Configure IPv4: [**Using DHCP**]
6. Click [**Apply**]

Example settings:

IP address:	192.168.0.1
Subnet mask:	255.255.255.0
Default gareway:	192.168.0.100

6. INSTALLING SOFTWARE

6.1. Windows® platform

The software can be installed on Windows® 7 or Windows® 8. The procedure for installing the software varies depending on the operating system on the computer. Windows® 7 system is an example here.

Installation is as follows:

1. Open an installation file, click [**Next**] to go to the software installation.

The installation file is attached to the driver on a CD, or available for download from the http://pxm.pl

2. Select the folder in which the software is to be installed. Confirm your selection by clicking the [**Next**] button.
3. Select components that you want to install, and then click [**Next**].
4. Read the license agreement carefully; if you agree to the terms of this agreement, click [**Next**] to continue the installation.
5. Select the start menu in which you want to create a shortcut to the program. You can also rename the directory, then click [**Next**].
6. The installer will ask again whether you want to install the software, click [**Install**] if you agree.
7. When the window indicating that the installation procedure was successful pops up, click [**Finish**] to exit the installation wizard. If you want to go to the program, in the selection window select [**Run PXDesigner now**].
8. Windows® displays a security alert of the system, and to be able to use the PXDesigner software, you need to allow access.

6.2. Mac OS® X platform

The application can be installed on Mac OS X®, version 10.8 or later.
Software installation is similar as in the case of Windows® platform.

6.3. Android™ platform

The application can be installed on Android 4.0 or later.

To install software:

1. Upload **.apk* installation file available on the CD supplied with the device or downloaded from the PXM website to your phone, or download an app from the Play Store using QR code:



2. Go to your phone settings and then check “Allow installation of apps from sources other than the Play Store ” in the [**Security**] tab.
3. Open the application through the system [**File Manager**].

The screen for the installed new software pops up. This screen displays information on the phone functions that the application will use.

4. To install the application, press the "Install” button.

After a successful installation process, the application will be available in the application menu of the phone.

7. CONTROLLER CONFIGURATION

The controller operates in accordance with the loaded configuration which is created and uploaded using the PxDesigner application. The method of creation of a configuration file is described in the manual for PXDesigner_M_pl_1-0. As part of the configuration, you can set the parameters for all inputs and outputs, create users and relevant configuration items:

AREA/ZONE

A physical area (e.g. in the project) in which devices are distributed. Since the devices in the project are properly addressed - DMX output channels can be connected to the area. There is always one default global area in the controller that contains all the output channels. A scene, a mask, or a programme can be assigned to one area (by default they are assigned to the global area). The element operates only on channels that are associated with the area to which the item is assigned.

The DMX output channel can be associated with a number of areas.

When controlling with a smartphone, the control areas are visible as subsequent tabs ("desktops"). Users can have access to selected areas.

Area parameters:

- name
- default value of the master parameter
- assignment of channels to area

SCENE

A scene is a set of values for all DMX output channels.

Scene parameters:

- name
- rise time
- duration
- drop time
- zone to which it belongs
- group of associated items to which it belongs
- value for all DMX channels of the zone
- is it editable using a smartphone
- default master value

The rise time, duration, and drop time are in the range 0 - 24h with an accuracy of 0.01 s. In addition, the duration can be set to infinite. The sum of all three times cannot be 0.

Once the "turn on scene" action is triggered, the scene will be activated with the rise time, and will last as long as the duration and will turn off automatically with the drop time. If, before the expiry of the duration the "turn off scene" action is triggered, the scene will also be turned off with the drop time.

PROGRAM

A program is a system of subsequent scenes along with a defined input time and duration.
Program parameters:

- name
- zone to which it belongs
- number of repetitions/loop
- number of steps
- event at the end of the program
- drop time of the last step
- drop time of the interrupted program
- default master value
- default value of speed acceleration
- list of steps:
  - scene assigned to a step
  - rise time
  - duration

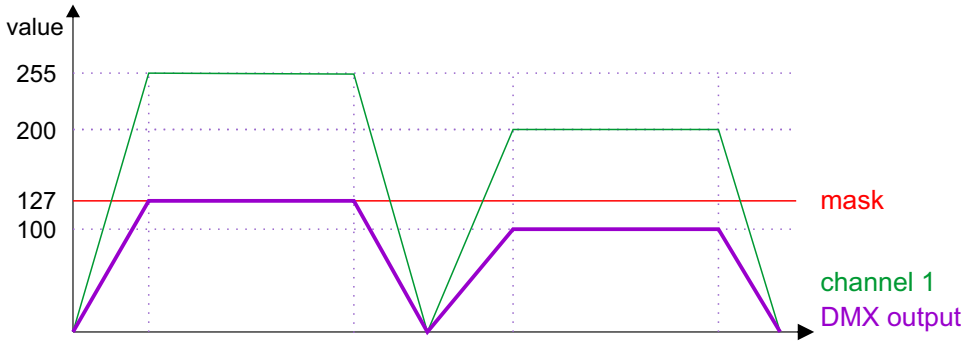
The pool of program steps is separable from the scene pool.
Each step comes with its input time, lasts as long the duration, and drops with the rise time of the next step. The last step drops with its drop time, if this is the end of the program, or with the rise time of the first step, if the program is looped or played back repeatedly.
All times are multiplied by the current value of the "speed acceleration" parameter. The value of 100 is a neutral value, and a default value. For 255, all the times are extended 2.5 times. For 1, the times are divided by 100. For the value of 0, all the times are shortened to the minimum value (0.01s) - if the time was set to 0 - it remains 0.
The transition between the values of the following steps (at the moment when one of them is turned on and the other is turned off) is linear between the values.
If the program is turned off, it drops when the interrupted program fades, or, if it is not defined - with the drop time of the current step.

MASK

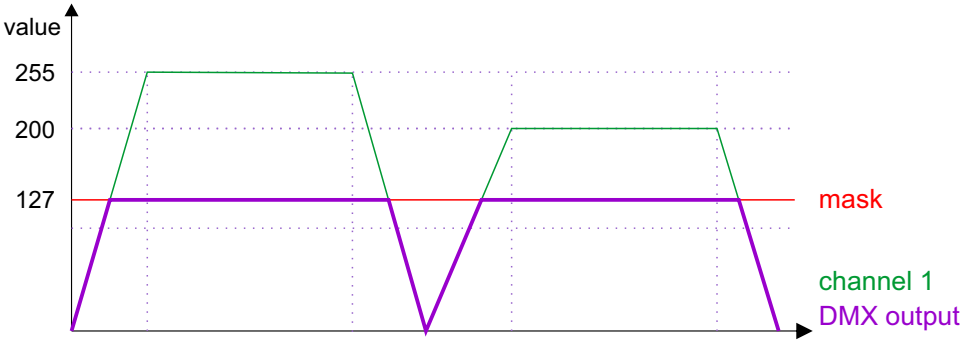
A mask is a set of values assigned to output channels, which modifies a value at the DMX output. Masks take precedence over scenes and programs.

There are 3 types of masks:

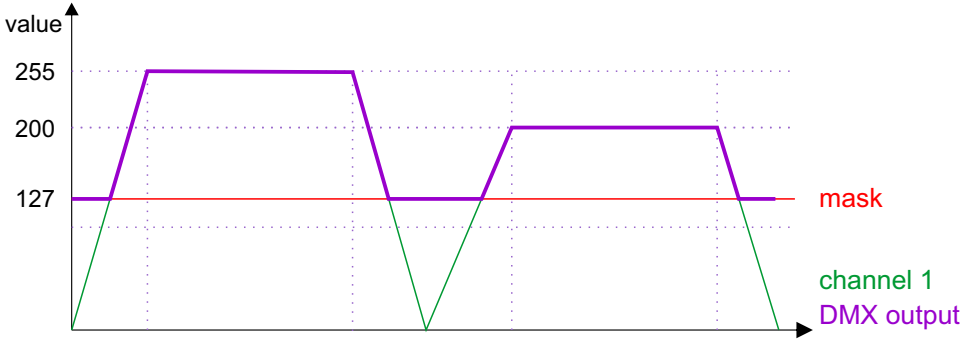
- **proportional** - it changes all values in the channel proportionally to the value of the mask



- **maximal** - it converts all the values in the channel that are greater than the value of the mask to the value of the mask



- **minimal** - it changes all the values in the channel that are smaller than the value of the mask to the value of the mask



Mask parameters:

- name
- rise time
- duration
- drop time
- zone to which it belongs
- value for all DMX channels of the zone
- type:
  - proportional
  - minimum value
  - maximum value

If several masks are turned on at a time:

- From all the proportional masks turned on in the zone, the lowest value for each channel is taken into account.
- From all the minimum masks turned on in the zone, the highest value for each channel is taken into account.
- From all the maximum masks turned on in the zone, the lowest value for each channel is taken into account.
- If for any channel 2 masks are turned on which exclude themselves with their effects - the channel is set to 0.

SEQUENCE

A sequence is a set of successive steps, each of which may trigger several actions in parallel, and take a set amount of time.

Sequence parameters are:

- name
- number of steps
- list of steps
  - step duration
  - list of actions

The sequence is not assigned to the area.

A launched sequence plays all the steps one by one. For each step it performs all the actions from its list, and then it waits for the duration of a given step and moves to the next step.

The list of possible actions is as for the event.

The sequence may trigger other sequences, including itself.

STATUS

A status is an internal state of the device that allows for a conditional start of selected actions. The status can be switched on and off. The fact whether the selected status is turned on or off determines the execution of another action (e.g. Scene start).

GROUP OF ASSOCIATED ITEMS

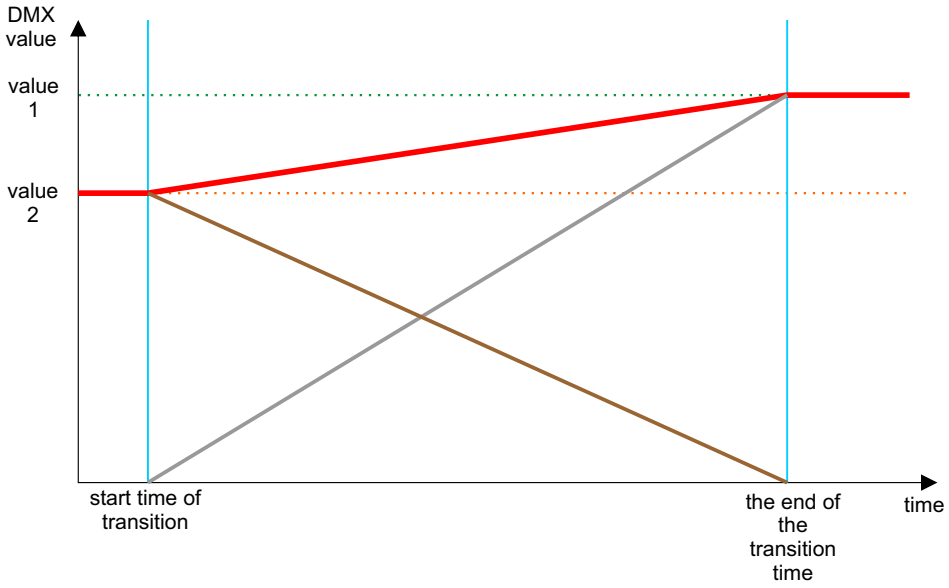
Scenes and programs belonging to the same area can be within one group of associated items. Items that are associated cannot be run at the same time, which is why turning on an item belonging to a group turns off all other elements belonging to this group.

Each element can belong to one group only.

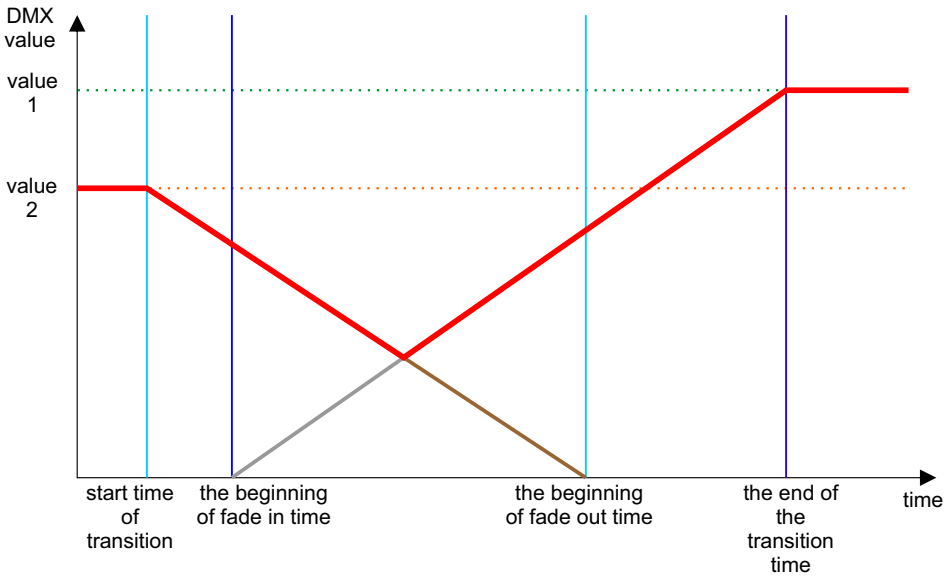
Within the group there may be items from the same area only.

The transition between the values of the associated items (at the moment when one of them is turned on and the other is turned off) is linear from value to value.

An example of a value transition in a channel for associated items:



An example of a value transition in a channel for non-associated items:



EVENT

An event is the execution of a list of actions as a reaction to a specific signal. Events can be generated in different ways:

- **internal** - can be triggered by:
  - touch panel
  - smartphone
  - controller start
  - end of program
  - an internal event can have a value (e.g. events caused by the slider on the touch panel)
- **from ON/OFF inputs** - two events assigned to each input:
  - rising edge
  - trailing edge
- **from multi-value inputs** - (DMX input, analogue input, Modbus), depending on the settings of a given input - one or 2 events
- **from the clock** - timers and astronomical clock:
  - sunrise and sunset - with a possibility to move forward or backward (24h)
  - timers
- **delays** - can be triggered by:
  - other event
  - end of program

ACTION LIMITATIONS

Each action on the list may have its conditions that must be met to trigger the action. All conditions for a given action must be met at a given time.

a) **Daily limitation**

- only during the day - from sunrise to sunset
- only at night - from sunset to sunrise
- from sunrise to set hours
- from sunset to set hours
- from set hours to sunrise
- from set hours to sunset

While calculating the sunrise/sunset time, the movement of the sunrise/sunset entered by the user is taken into account.

b) **Status limitation**

For each status, an action can:

- ignore its state
- start only if a status is set
- start only if a status is not set

An action will be triggered if all the conditions of the statuses are met in a given moment.

DELAY

The delay is a list of actions (such as for the event) which will be executed after the set time expires.

The delay must be activated by another event.

Delay parameters:

- name
- countdown time
- list of actions

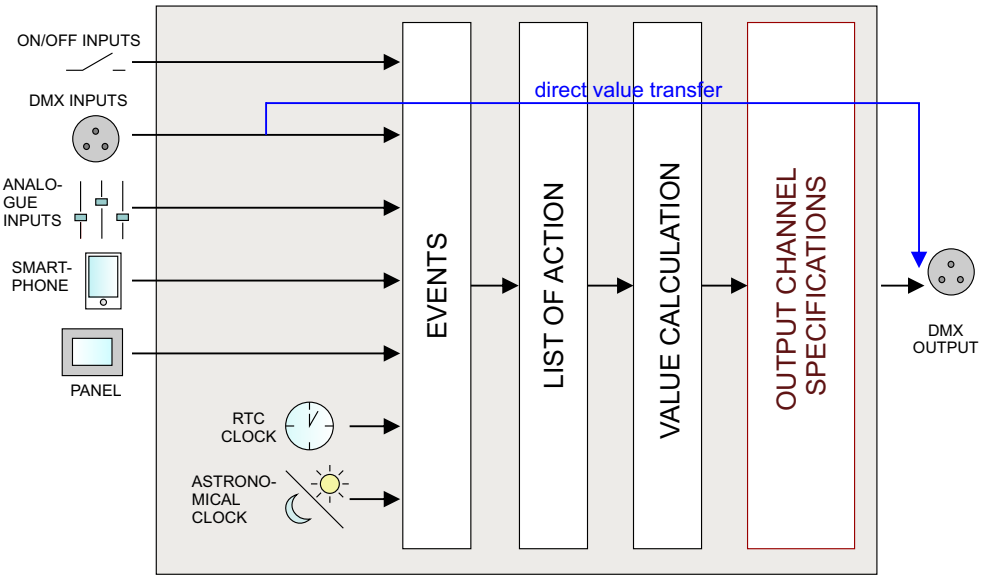
The start of the delay starts the counting of the set time. If the time runs out, the list of actions is triggered. If the delay is switched off before the set time, the countdown will be stopped, and the actions will not be executed. The restart of the delay starts the counting from the beginning.

8. CONTROLLER CONFIGURATION

The controller works in accordance with a preloaded configuration: in response to relevant events it executes the programmed actions that can turn on or off the selected configuration items.
Triggering events and starting configuration elements is done in the master controller. Expansion modules only have additional DMX outputs.

8.1. Calculation of output values

The value on the DMX output depends on currently run scenes, programs and masks, and the settings of the DMX output channels, and the activated signal transmission from the input.
For each output channel, the highest value of this channel from all running scenes and programs is taken into account. The scenes and programs are affected by their "master" parameters. In addition, the calculated value is modified by the "master" zone parameter to which a given channel belongs.
This calculated value passes through the limitations set by the currently running masks and limitations set for various DMX output channels.
If signal transmission from one input is turned on, then depending on the settings, the value for the output channel is taken directly from the input or merged with a value calculated by the controller in accordance with the pre-set function.
The controller calculates and sends to the output as many channels as there are set in the settings of the DMX output in the configuration.

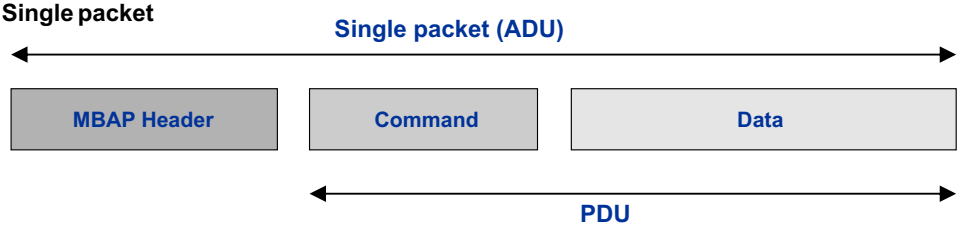


8.2. Modbus

The controller supports the Modbus protocol. A PX340/PX345/PX710 controller operates as a server (slave) to which an application / a device operating as a client (master) connects. The master establishes a connection through TCP port 502 (a standard Modbus port) using the current IP address of the controller. Information is exchanged on the following principle: question from master → answer from slave. At any given time, only one master can be connected to the controller.

In Modbus TCP protocol, data are transmitted in packets referred to as ADUs (application data units). An ADU is composed of a header (MBAP header) and a PDU (protocol data unit). According to the standard, all data sent using the Modbus protocol are represented as big endian (most significant byte coming first).

Single packet



Field	Description	Size
MBAP		
Transaction ID	Packet number - for purposes of simplification it can be be equal to 0	2B
Protocol ID	For the Modbus protocol it is **always equal to 0**	2B
Length	The number of subsequent data (after this field) transmitted – in bytes	2B
Unit ID	It is always equal to 0 or 255	1B
PDU		
Function Code	A Modbus command – supported commands are set out in table (a)	1B
Address/Action	For standard Modbus commands, these are register addresses – table (d), for special commands these are action numbers - table (c)	2B
Parameters	Command-dependent – available in table (c)	Size in the table (c)

EXAMPLE 1:

A query about 10 first DMX channels in hexadecimal notation reads as follows:

00 00 00 00 00 06 00 03 20 00 00 0A

PDU explained:

03 – Modbus function code: 03 or "Read Holding Registers"

20 00 – address of the register being read - 0x2000 = 8192 – corresponds to DMX output channels

00 0A – number of registers requested - 0x000A = 10 – DMX channels

Expected response:

00 00 00 00 00 17 00 03 14 00 xx 00 xx 00 xx 00 xx 00 xx 00 xx 00 xx 00 xx 00 xx 00 xx

Except for the "Length" field, the header is always the same as in the query.
The function code is copied from the query.

14 – 0x14 = 20 or the number of bytes read.

00 xx – the values of subsequent DMX channels, where xx is within the range 0x0000 to 0x00FF, i.e. from 0 to 255.

EXAMPLE 2:

Writing a value of 255 to the first Modbus register. The controller will treat the register as a Modbus input channel. You can set the response of the controller to a change of value in the channel in the tab "Input → Modbus" (see PXDesigner_M_pl_1-1 manual, page 13).

00 00 00 00 00 06 00 06 00 00 00 FF

PDU explained:

06 – Modbus function code: 06 or "Write Single Register"

00 00 – register address 0x0000 = 0 (registers are addressed from 0)

00 FF – channel value (range 0-255)

The controller will respond with the same message.

EXAMPLE 3:

Hexadecimal notation for a TCP frame that triggers scene No 1:

00 00 00 00 00 0B 00 45 01 00 00 00 01 00 00 00 00

lub

00 00 00 00 00 07 00 45 01 00 00 00 01

PDU explained:

45 – Modbus function code: 0x45 = 69, triggering an action

01 – "scene start" action

00 00 00 01 – first argument - scene number

00 00 00 00 – second argument – not used in this case

It can be omitted in respect of actions that do not require a second argument (but remember to change the value of "Length" field from 0x0B to 0x07).

Scene and program numbers are assigned when the configuration is uploaded into the controller. In order to identify the index of a scene or a program uploaded into the controller, start the relevant element and read the number as shown in the controller preview.

When sending or receiving multiple parameters using a single command (e.g. "Write Multiple Registers" - function code 0x10) you can transmit up 125 values in one message.

Below there are presented Modbus commands supported by the controller:

a) Commands

Modbus command		Controller reaction
standard		
1	Read Coils	*not supported*
3	Read Holding registers	returns the state of digital inputs in bits
4	Read Input Registers	returns the status of the controller
5	Write Single Coil	*not supported*
6	Write Single Register	sets the value of a single input channel of the Modbus
15	Write Multiple Coils	*not supported*
16	Write Multiple Register	sets the value of many input channels of the Modbus
own		
65	Internal event	triggers an internal event with no value, the argument is the number of a virtual event
66	Internal event	triggers several internal events without values, the arguments are the numbers of virtual events
67	Internal event	triggers an internal event with a value, the first argument is the number of virtual events, the second is the value of the event
68	Internal event	triggers several internal events with values, the arguments are the numbers of virtual events
69	Action	triggers a specific action
70	Action	triggers many actions

In the case of the “Write single Register” command, the Modbus input is treated as a multi-value input with 512 channels. The parameters of each channel are set in the same manner as in the case of a DMX input.

b) Returned states

Element	Size	Description
Scene status data	2B	state
	2B	master
	4B	time left [ms]
	8B	reserved
Program status data	2B	state
	2B	master
	2B	speed
	2B	repeat count
	2B	current step
	4B	step time left [ms]
	8B	reserved
Mask status data	2B	state
	2B	master
	4B	time left [ms]
	8B	reserved
Sequence status data	2B	state
	2B	current step
	4B	time left [ms]
	8B	reserved
Delay status data	2B	state
	4B	left time [ms]
	8B	reserved
Film status data (playing)	2B	state
	2B	master
	2B	speed
	2B	repeat count
	4B	current step
	8B	reserved

c) Action

Number	Action		Parameters	
0	Scene	no action	scene number	-
1		ON	scene number	-
2		OFF	scene number	-
3		SOLO	scene number	-
4		TOGGLE	scene number	-
5		PAUSE	scene number	-
6		RESUME	scene number	-
7		SET MASTER	scene number	master value
8		INCREASE MASTER	scene number	-
9		DECREASE MASTER	scene number	-
10	Mask	ON	mask number	-
11		OFF	mask number	-
12		SOLO	mask number	-
13		TOGGLE	mask number	-
14		PAUSE	mask number	-
15		RESUME	mask number	-
16		SET MASTER	mask number	master value
17		INCREASE MASTER	mask number	-
18		DECREASE MASTER	mask number	-
19	Program	ON	program number	-
20		OFF	program number	-
21		TOGGLE	program number	-
22		PAUSE	program number	-
23		SOLO	program number	-
24		RESTART	program number	-
25		SET MASTER	program number	master value
26		INCREASE MASTER	program number	-
27		DECREASE MASTER	program number	-
28		SET SPEED	program number	speed value
29		ACCELERATE	program number	-
30		SLOW DOWN	program number	-
31		NEXT STEP	program number	-
32		PREVIOUS STEP	program number	-

Number	Action		Parameters	
33	Sequence	ON	sequence number	-
34		OFF	sequence number	-
35		OFF ALL	sequence number	-
36	Delay	ON	delay number	-
37		OFF	delay number	-
38		RESTART	delay number	-
39	Status	SET	status number	-
40		DELETE	status number	-
41		TOGGLE	status number	-
42	Transmission	DMX INPUT ON	-	-
43		DMX INPUT OFF	-	-
44	Send a signal to the panel		address panel	signal number
45	Zone	SET MASTER	zone number	master value
46		INCREASE MASTER	zone number	-
47		DECREASE MASTER	zone number	-
48		OFF ALL	zone number	-
49	Modbus	TRANSMISSION ON	-	-
50		TRANSMISSION OFF	-	-
51	Analog inputs	TRANSMISSION ON	-	-
52		TRANSMISSION OFF	-	-
53	Film	ON	film number	-
54		OFF	film number	-
55		SOLO	film number	-
56		TOGGLE	film number	-
57		STOP	film number	-
58		RESTART	film number	-
59		SET MASTER	film number	master value
60		INCREASE MASTER	film number	-
61		DECREASE MASTER	film number	-
62		SET SPEED	film number	speed value
63		ACCELERATE	film number	-
64		SLOW DOWN	film number	-
65		TURN ON RECORDING	film number	-
66		RESUME RECORDING	film number	-
67		TURN OFF RECORDING	film number	-

d) Register addresses

Addressing	size	data	read/write
0x0000 - 0x01FF	1 kB	Modbus input channels	R/W
0x0400 - 0x05FF	1 kB	DMX input channels	R
0x0800 - 0x09FF	1 kB	analogue input channels	R
0x0C00 - 0x0FFF	2 kB	digital inputs	R
0x1400 - 0x15FF	1 kB	statuses	R
0x2000 - 0x23FF	2 kB	DMX output channels	R
0x4000 - 0x49FF	5 kB	films	R
0x6000 - 0x75FF	11264 B	programs	R
0x9000 - 0xAFFF	16 kB	scenes	R
0xD000 - 0xD7FF	4 kB	masks	R
0xE000 - 0xE3FF	2 kB	sequences	R
0xE800 - 0xF5FF	7168 B	delays	R

8.3. Logging

In the controller you can log in to one of the user accounts created in the currently loaded configuration. The ADMIN's account is always available.
From the level of a smartphone, it is acceptable for multiple users to log in simultaneously, and to log in to the same account at the same time.
From the level of the PC application, only one person at a time can log in to the account. If an attempt to log in to the administrator account is made, other users will be logged out. If someone is already logged into the administrator account, he or she can be logged out using the "force login" option.

8.4. Live mode

When connected to a computer or a smartphone, the controller can be switched to live mode. In this mode, the controller operates normally in the background; however, at the output it sends the currently edited scene or a program step (only for those channels that are covered by the zone to which a scene or program belongs - on other channels it sends the calculated values).
The Live Mode is also activated while editing a scene from a smartphone.
Where there are several controllers connected to each other in a system, then at a given moment live mode can be activated only on one of the controllers.

8.5. Indication lights

The controller is equipped with 4 indicator lights:

Indicator light	Function
DATA	data collection; • when data packets are collected from the PC or smartphone application - the indicator light flashes
INPUTS	digital inputs state; • each short-circuit of one of the inputs causes the light to flash
DMX	DMX output state; • when the DMX signal is sent, the indicator light flashes
POWER	device state; • when the device is turned on and runs in normal mode - the indicator light in on permanently, • when the device is turned on and off in the core mode - light flashes quickly (the DMX light does not flash) • when the device is in normal mode but there is no preloaded configuration - the light flashes slowly (the DMX light flashes as well)

8.6. RESET button operation, restoring default settings

Action	Reaction
Holding down the button when the power supply is turned on	Switching the device to the core mode
Holding down the button for 2 seconds when the device is in the core mode	Switching the device to the normal operating mode
Holding down the button for 5 seconds when the device is in the core mode	Uploading a configuration from the built-in memory to the device
Holding down the button for 5 seconds in the normal operating mode	Network settings reset - signalled by lighting up the DMX diode and the POWER diode
Holding down the button for 10 seconds in the normal operating mode	Reset of all settings (including the name of the controller), ADMIN account password and erasing the configuration uploaded into the device – these are signalled by all the four indicator diodes illuminating.

NOTE: Default parameters are:

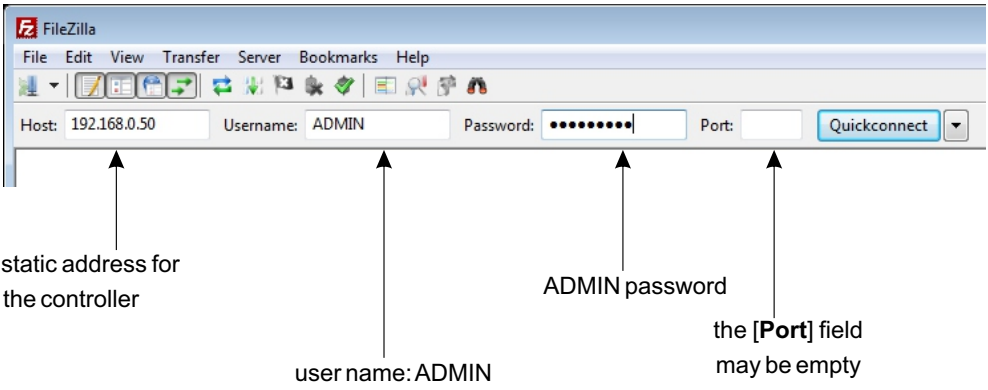
IP: 192.168.0.50
MASK: 255.255.255.0
Device name: PX340-[serial number]
ADMIN account password: [serial number]

8.7. Core mode, FTP support

After switching to the core mode (stop in the bootloader), you can connect to the controller using the FTP protocol. In this mode, you should always connect to the default static address of the controller from the ADMIN account level, by providing the default password (device serial number) – even if it has been changed.

Direct connection (cable) - assumptions:

- a computer with a stable IP in the same sub-network as the controller
- the controller in the core mode, i.e. the PWR diode flashes



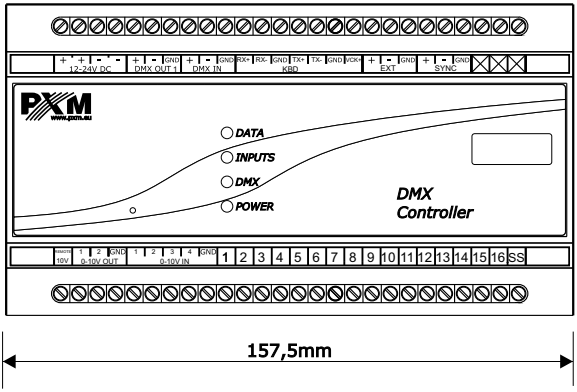
The connection to the controller via FTP can be useful when it is not possible to upload the firmware update via the application. Then, replace the "UPGRADE.UPG" file in the controller and exit the core mode (by force). The controller will be automatically updated.
Using the FTP you can also delete the preloaded configuration.

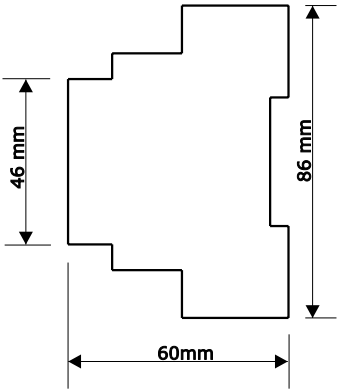
9. TECHNICAL SPECIFICATIONS

- power supply: 12 - 24 V DC
- max.current consumption: 400 mA
- weight: 0,3 kg
- dimensions: width: 157,5 mm (9 DIN rail modules)
  height: 86 mm
  depth: 60 mm

	PX340
DMX output channels	512
DMX input channels	512
ON/OFF inputs	16
Analogue inputs	4
Analogue outputs	2
Ethernet	yes
Modbus	TCP
Scenes and program steps	251 000
Number of scenes running simultaneously	200
Editable scenes (smartphone)	yes
Maskes	200
Programs	512 / running 40
Sequences	128
Statuses	256
Data stream (recording input DMX)	yes
Internal events	1024
Zones	16
TouchPanel	max. 16
Timer (formerly delay)	1024
Clock event	1024
Actions	30 000
Action limitations	30 000
Modbus channels	512
Sequence steps	10 000
Users (including ADMIN)	8

10. TECHNICAL DRAWING





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DECLARATION OF CONFORMITY

PXM Marek Żupnik spółka komandytowa
Podłęże 654, 32-003 Podłęże

declares under our sole responsibility that the product:

Product name: **DMX Controller**
Product code: **PX340**

compiles with the following standards and harmonized standards:

PN-EN 50581:2013,	**EN 50581:2012**
PN-EN 55103-2:2012,	**EN 55103-2:2009**
PN-EN 61000-4-2:2011,	**EN 61000-4-2:2009**
PN-EN 61000-6-1:2008,	**EN 61000-6-1:2007**
PN-EN 61000-6-3:2008,	**EN 61000-6-3:2007**

and is in conformity with the provisions of the following EC Directives:

2011/65/UE **DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL** of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment Text with EEA relevance.

2014/30/UE **DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL** of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast) Text with EEA relevance.

Marek Żupnik spółka komandytowa
32-003 Podłęże, Podłęże 654
NIP 677-002-54-53

Podłęże, 23.02.2017 mgr inż. Marek Żupnik.