

PX333

Mini DMX Controller

MANUAL



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

1. GENERAL DESCRIPTION

PX333 controller was designed for applications requiring a dynamic decorative lighting control - such as salons SPA, saunas and multirooms. It also perfectly fulfils its function as a controller for illumination of small architecture, interior or private apartments.

For communication with the environment it uses 8 on/off inputs (to which can be connected, for example, buttons, motion detectors or twilight switches) and LAN interface. This allows the PX333 controller to be connected to the Accesspoint and thereby control the device using the Android™ smartphone. It is also possible to control it from your computer. The PXM company provides a program to operate the device on PCs with Windows® XP, VISTA™, Windows® 7 or Windows® 8, Linux™ (Debian and Ubuntu), Mac OS X® operating systems and on smartphones with Android™ system, iPhones® and iPads®.

PX333 sends 64 DMX-512 channels and has 3 OC outputs with a load capacity of 1500 mA each, allowing for direct control of LEDs. DMX output channels can be divided into 16 zones controlled independently.

The device is designed to control both rapid and slow changes in lightning; it is also suitable for controlling intelligent devices. PX333 memory allows you to store thirty-two scenes and eight programs.

The Mini DMX Controller comes with implemented support for the Modbus protocol which allows you to control the controller using external devices.

Starting with the firmware version 2.0 and application version 2.0, new functions have been made available, such as:

- the possibility to run multiple elements at once,
- zoning, increasing the number of lists of elements,
- adding client account.

2. SAFETY CONDITIONS

PX333 is 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. DESCRIPTION OF THE CONTROLLER OPERATION

PX333 allows you to save 32 scenes and 8 programs with 64 steps each.

SCENE - a static set of values at the output channels for which rise time, duration and fall time are given.

PROGRAM - a set of consecutive scenes. For the program, you can set the speed, the master program and smoothness of transitions between steps. It is also possible to play a program in the loop.

Scenes and programs may be added to the group (groups are not inter-territorial). There are 16 groups available.

The selected scene or program can be started using the application, or, using an appropriately programmed control inputs.

Events are used to program a response to signals from the control inputs. The controller has 9 events: the first one is responsible for the response to the activation of the controller, the other one is responsible for the response to signals on subsequent inputs.

The following actions can be assigned to the events:

- enable / disable / switch for the scene,
- play / pause / stop/ switch and master function: increase, decrease, set for the program,
- next and previous for the list elements,
- enable / disable all: increase, decrease, set for the zone.

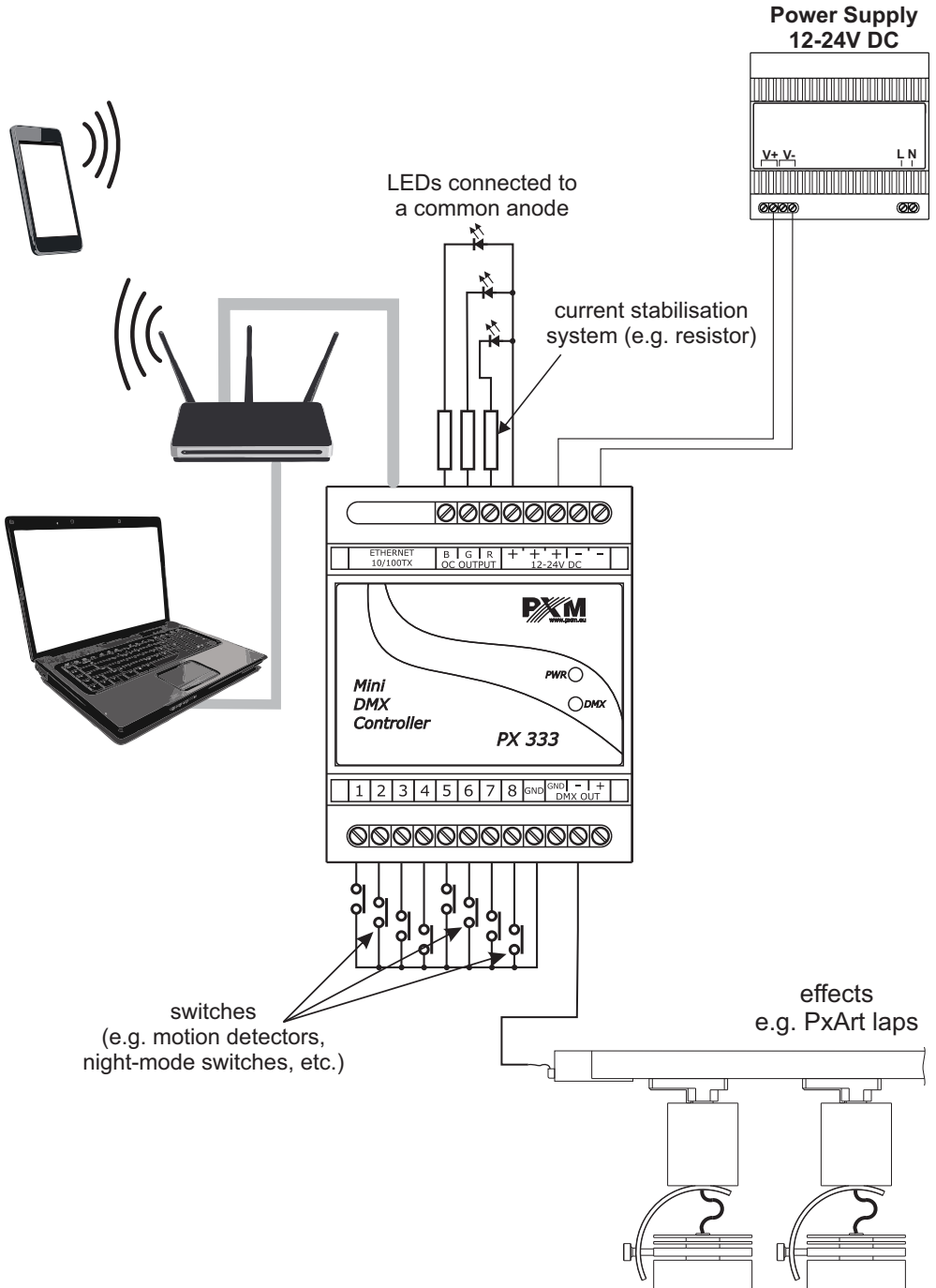
The controller has the ability to save a list of scenes and programs. They are used to start the selected scenes and programs in a given order using a single control button. Scenes and programs can be listed in any order; what is more, the list elements can be repeated.

To create scenes and programs in a more convenient way, in the driver you can save information about the devices assigned to the individual DMX channels. The program library contains 7 various devices which differ in the amount and type of channels.

The following are available:

- single-channel monochrome lamp,
- dual-channel Dynamic White lamp,
- three-channel RGB lamp,
- four-channel RGBW lamp,
- four-channel media player
- seven-channel EQ media player

4. CONNECTION DIAGRAM



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

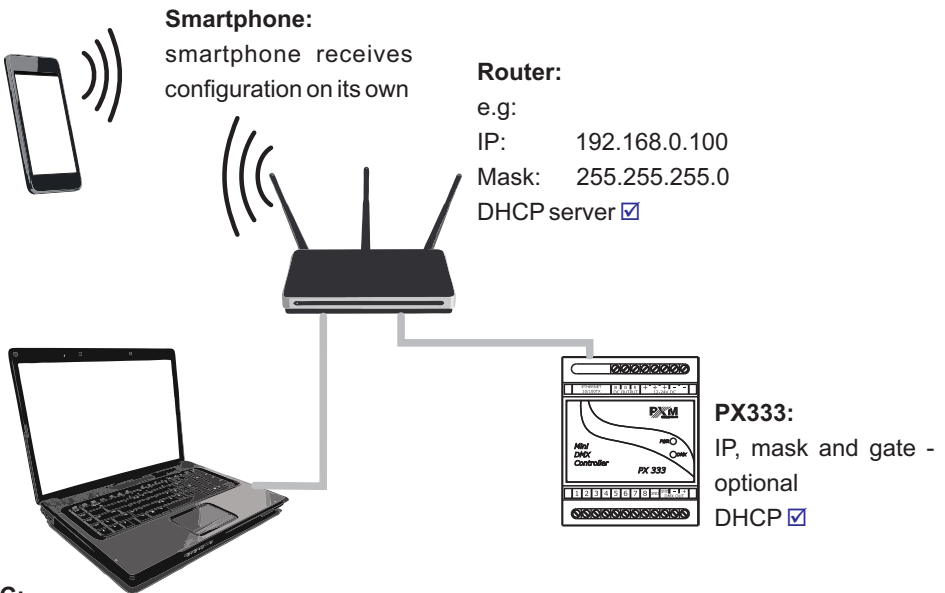
Should the controller operate in automatic mode in the network and receive IP address from the DHCP server, the detaching of the network cable will result in the loss of IP address and another attempt to get the new IP address from the DHCP server. If that fails, the controller switches to operate with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

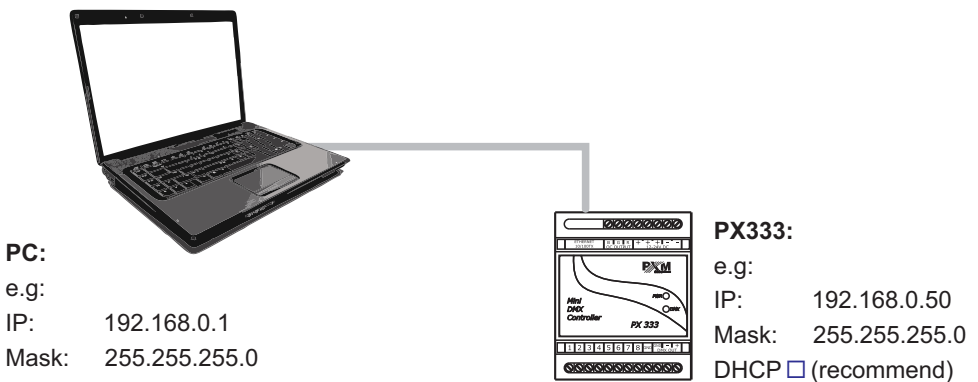
Below are some typical examples of network configuration:

a) Automatic addressing



PC:
„Obtain an IP address automatically”

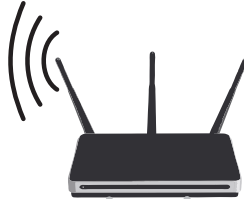
b) Connecting controller directly to the computer (no DHCP server)



c) Static addressing

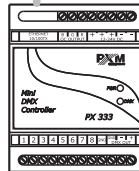
Smartphone:

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



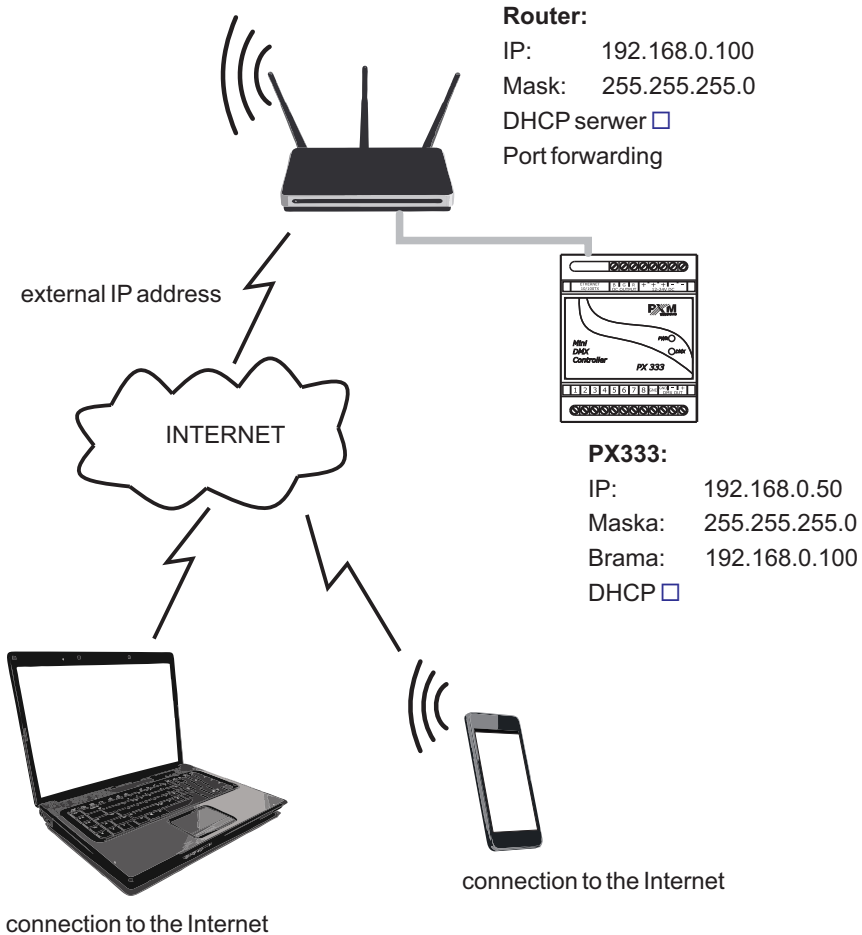
PX333:

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) Remote connection



In order to be able to connect through the Internet, it is necessary:

- for your router to have an external IP address, and for you to have the ability to establish connections from the outside;
- to redirect any two of the ports (they need to be consecutive ones) to the IP address of the controller in the internal network, and to ports 50001 and 50002 (the lower numbered port needs to be redirected to 50001, and the other one to 50002);

By way of example:

1)

50001 -> ip_333_in_local_network:50001 (TCP)

50002 -> ip_333_in_local_network:50002 (TCP)

and, if other ports are selected, e.g.:

2)

4444 -> ip_333_in_local_network: 50001

4445 -> ip_333_in_local_network: 50002

- to unblock selected ports in the router firewall;

- the controller address in the internal network needs always to be the same (a static one, or if an address is obtained from DHCP, the controller needs to always get the same address).


In such a case, on the “**Connect to device**” screen, in the “**Address**” field, enter the IP address or the domain name of the router, and in the “**Port**” field - the lower numbered of the two ports being redirected (in scenario 1: 50001 - the default one, in scenario 2: 4444).

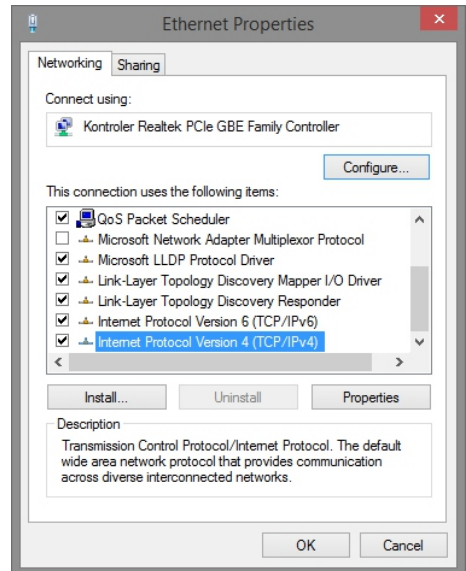
Next, select the “**Connect**” button so that the application can download the configuration.

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)**]





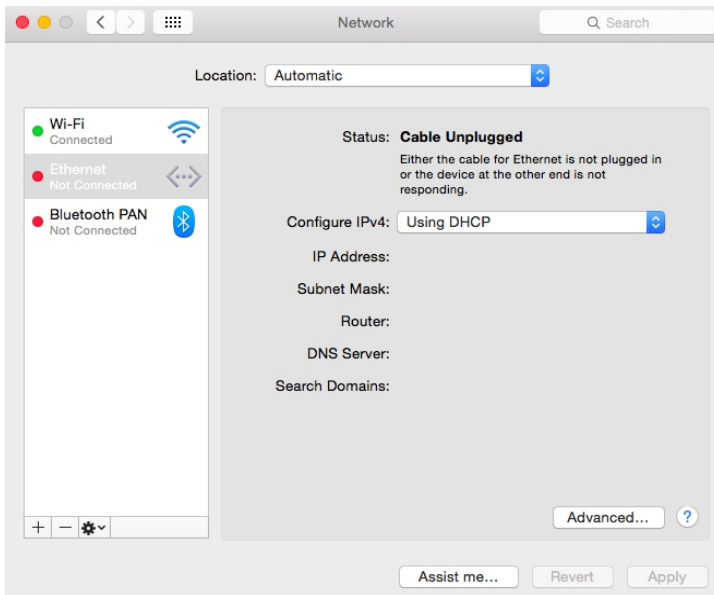
9. Select **[Use the Following IP address:]**

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 gateway: 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 gateway: 192.168.0.100

5.2 Restoring default settings

To restore default settings during the normal operation of the device, press the physical button located on the device housing and hold it for about 5 seconds (see figure below). If the DMX indicator lights for 2 seconds, it means that default settings are restored.

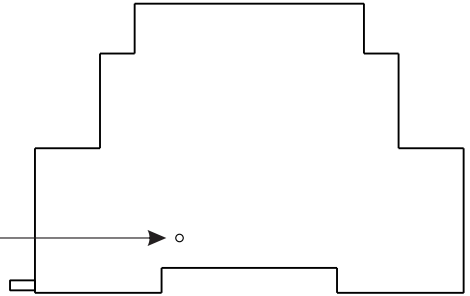
Then, it is recommended to turn off and on the power supply.

If default settings are restored, it will delete the created setup, users, and network configuration.

Default network configuration will be restored:

IP address: 192.168.0.1
Subnet mask: 255.255.255.0
Default gateway: 192.168.0.100
DHCP: Enabled

button for the restoration of
default settings



5.3 Signalling of indicators

The controller is equipped with two indicator lights:

Indicator	Normal operation	Bootloader mode
PWR	indicator lights continuously	indicator blinks
DMX	indicator blinks	indicator is off

6. SOFTWARE INSTALLATION

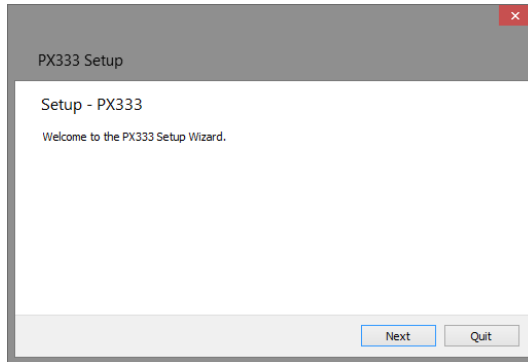
6.1. Windows® System

The software can be installed on Windows® XP, VISTA™, 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.

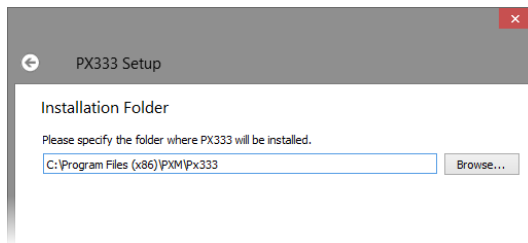
Installation is as follows:

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

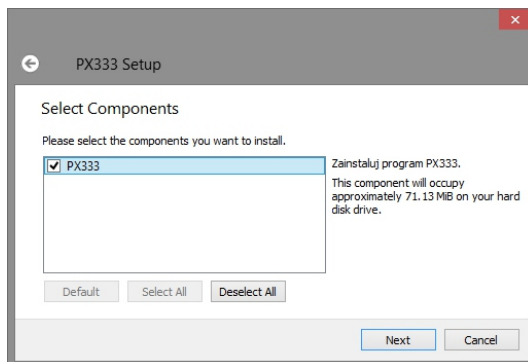
The installation file is attached to the driver on a CD, or available for download from the <http://pxm.pl>



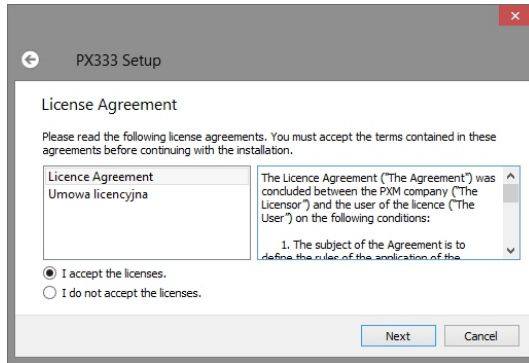
2. Select the folder in which the software is to be installed. Confirm your selection by clicking the [**Next**] button.



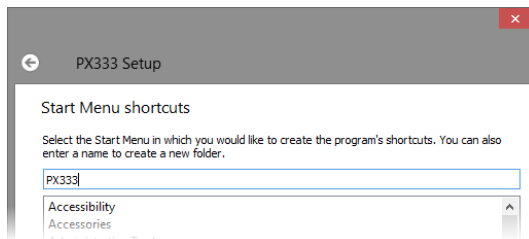
3. Select components that you want to install, and then click [**Next**].



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 PX333 now]**.
8. Windows® displays a security alert of the system, and to be able to use the PX333 software, you need to allow access.



6.2. 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.

6.3. 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.

6.4. Linux™ Platform

The application can be installed on Linux™ (it was tested on version 8.0).
Software installation is similar as in the case of Windows® platform.

6.5. iOS® Platform: iPad® i iPhone®

The application can also be installed on iOS®: iPhone® and iPad®. The application is available for download at the link QR code:



7. FIRMWARE UPGRADE

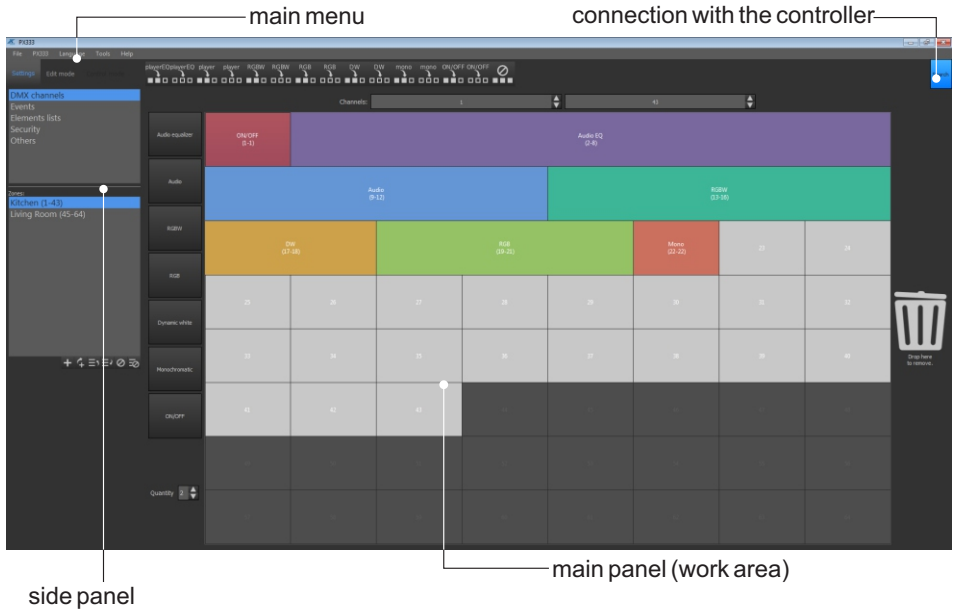
The procedure for firmware upgrade on the PX333 controller:

1. Connect the controller directly to the computer using a network cable. For older computers, it is recommended to use a crossover cable – the cable is attached to the controller.
2. Set the following parameters on the computer network interface card:

IP address:	192.168.0.1
subnet mask:	255.255.255.0

(For more information, see chapter 5.1: “Change of computer network configuration”)
3. It is recommended to disable other network interface / wireless cards.
4. While holding down the default settings button (located in the hole in the side of the controller housing), turn on the power supply of the controller.
5. The orange PWR indicator of the controller should blink (the blue DMX indicator is inactive).
6. Run the “PX333_FLASHER.exe” program on your computer.
7. Click on “Search”, the controller should be displayed on the list.
8. Select the controller from the list and click on “Login” (leave the password blank).
9. Click on “Upgrade firmware”, select the *.upg file with upgrade and click OK.
10. After the upgrade, the controller should automatically reset.

7. CONSTRUCTION AND FUNCTIONALITY OF THE APPLICATION WINDOW FOR PCs



The information presented in the program are grouped on the left side panel, divided into the following tabs: **[Settings]**, **[Edit mode]**, **[Control mode]**, and in the main menu as a drop-down menu: **[File]**, **[PX333]**, **[Language]**, **[Tools]**, **[Help]**. In addition, the central part of the application window is a work area (main panel).

The contents of the main panel are changed depending on the tab selected in the left panel.

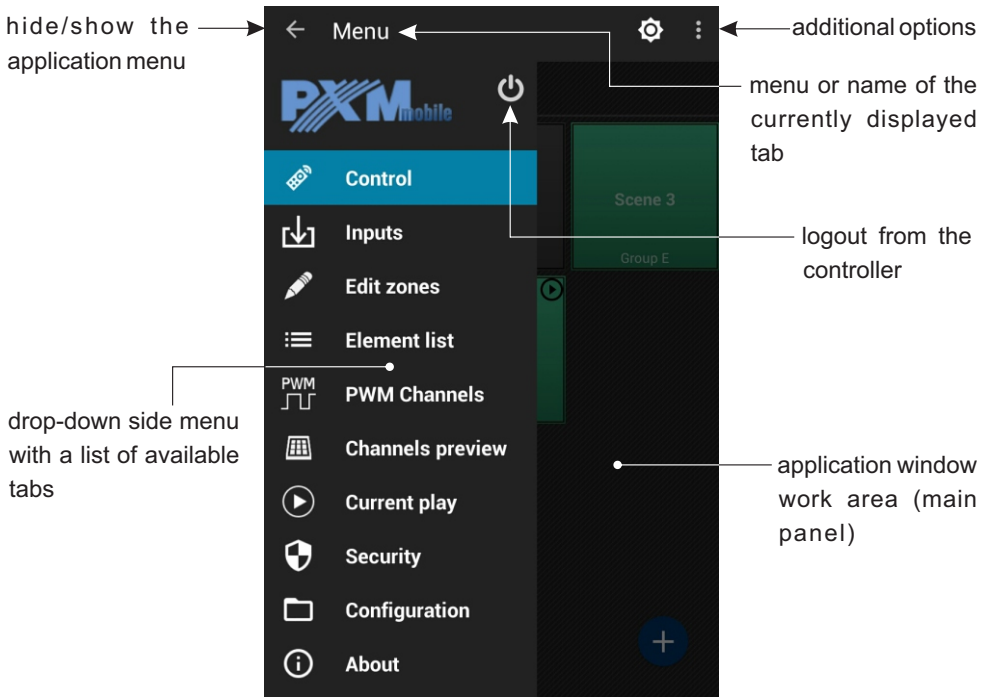
The left panel consists of three tabs:

[Settings] - edition of zones, devices, events, lists, security options in the controller, a preview of DMX channels (only where it is connected to the controller) and **[Others]** - i.e. PWM settings and a description of the controller

[Edit mode] - editing programs and scenes

[Control mode] - ability to turn on and off scenes and programs directly from the application; it is active only when connected to the controller

8. CONSTRUCTION AND FUNCTIONALITY OF MOBILE APPLICATION WINDOW



The contents of the main panel are changed depending on the tab selected in the left panel. The main menu on devices with high resolution is still visible on the left side of the screen. For smaller devices it is available in drop-down side panel.

Side panel tabs and their functions:

- [Control]** - list of areas and elements located in a given area, their adding and editing, turning on and off
- [Inputs]** - ability to turn on and off scenes and programs directly from the application; it is active only when connected to the controller
- [Edit zones]** - creating areas of DMX channels and assigning selected devices to them
- [Element list]** - adding elements to the list of elements for the zones
- [PWM Channels]** - setting addresses for three PWM inputs
- [Channels preview]** - preview of values on DMX channel grid
- [Current play]** - displaying the currently running items
- [Security]** - option to change the administrator password, and activate user accounts
- [Configuration]** - saving introduced settings in a file on the phone, uploading the existing configuration from the phone memory, return to factory settings
- [About]** - general software information, contact details of the manufacturer

9. MODBUS PROTOCOL

The PX333 controller comes equipped with slave implementation of the ModBus TCP/IP protocol. The protocol allows the user to control the operation of the controller, by activating scenes/programmes, and to obtain information on the status of individual components.

Below are examples of functions supported by the ModBus protocol.

Parameter reading:

- DMX channel values
- digital input status
- scene/programme status

Control:

- triggering events
- operation of areas
- scene/programme actions
- operation of element lists

A master device will connect with the controller through the standard Modbus/TCP port (port 502).

Table 1 is divided into two sections: read-only parameters (READ ONLY) and write-only parameters (WRITE ONLY). The first column contains parameter names and the number of these parameters. Column 2 sets out the ModBus function that should be used. Column 3 shows the addresses of individual parameters to which a command should be sent. The addresses are expressed both in decimal and hexadecimal notation. The right-most column shows allowed value ranges for individual parameters. In the case of the read functions, the allowed values are expected response values, while for the write functions (control functions) these are the values being transmitted. Table 2 sets out interpretations and brief descriptions of values for each parameter.

Table 1. Description of Modbus functions

	Parameter	Modbus function	Address		Value		
			dec	hex			
R E A D O N L Y	DMX OUT	Read Holding Registers	0	0000	0-255		
	64		1	0001			
					
			63	003F			
	DIGITAL INPUT	Read Holding Registers	4096	1000	0-1		
	8		4097	1001			
					
			4103	1007			
	SCENE STATUS	Read Holding Registers	8192	2000	0-3		
	32		8193	2001			
					
			8223	201F			
PROGRAM STATUS	Read Holding Registers	12288	3000	0-3			
8		12289	3001				
					
		12295	3007				
W R I T E O N L Y	EVENT	Write Single Register	16384	4000	0-8		
	1						
	SCENE ACTION	Write Single Register	20480	5000	0-2		
	32					20481	5001
					
						20511	501F
	PROGRAM ACTION	Write Single Register	20736	5100	0-7		
	8					20737	5101
					
						20743	5107
	PROGRAM MASTER ACTION	Write Single Register	20992	5200	0-100		
	8					20993	5201
					
						20999	5207
	PROGRAM X-FADE ACTION	Write Single Register	21248	5300	0-100		
	8					21249	5301
					
						21255	5307
	PROGRAM SPEED ACTION	Write Single Register	21504	5400	0-255		
	8					21505	5401
					
						21511	5407
LIST ACTION	Write Single Register	21760	5500	0-2			
16					21761	5501	
					
					21775	550F	
ZONE ACTION	Write Single Register	22016	5600	0-1			
16					22017	5601	
					
					22031	560F	
ZONE MASTER ACTION	Write Single Register	22272	5700	0-100			
16					22273	5701	
					
					22287	570F	

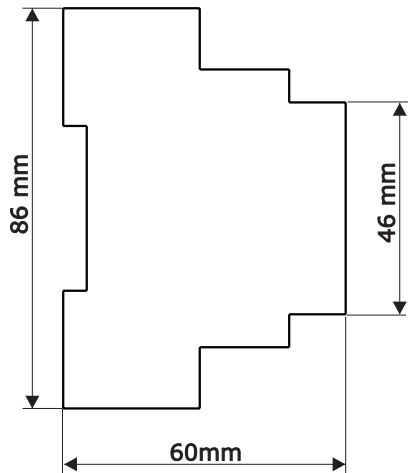
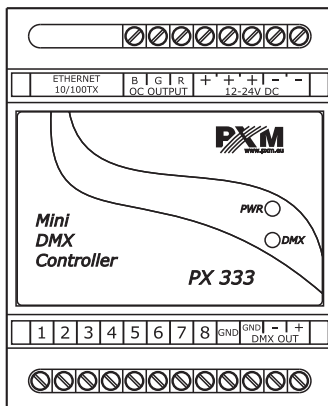
Table 2. Description of parameters

	Parameter	Range	Description
R E A D O N L Y	DMX OUT	0-255	Get DMX channel value
	DIGITAL INPUT	0-1	Get digital input state 0: OFF 1: ACTIVE
	SCENE STATUS	0-3	Get scene status 0: OFF 1: RISING 2: ON 3: FALLING
	PROGRAM STATUS	0-3	Get program status 0: OFF 1: PLAYING 2: PAUSED 3: FALLING
W R I T E O N L Y	EVENT	0-8	Trigger event 0-7: DIGITAL INPUT EVENT 8: CONTROLLER POWER ON
	SCENE ACTION	0-2	Trigger scene action 0: ON 1: OFF 2: TOGGLE
	PROGRAM ACTION	0-7	Trigger program action 0: PLAY 1: PAUSE 2: STOP 3: TOGGLE 4: RESTART 5: RESUME
	PROGRAM MASTER	0-100	Set program master
	PROGRAM X-FADE	0-100	Set program x-fade
	PROGRAM SPEED	0-255	Set program speed
	Speed formula: $StepTime = Value * NominalStepTime / 100$		Step time = 0.01s 25: 0.25x NominalStepTime 50: 0.5x NominalStepTime 100: 1x NominalStepTime 150: 1.5x NominalStepTime 200: 2x NominalStepTime 255: 2.55x NominalStepTime
	LIST ACTION	0-2	Trigger element list action 0: NEXT 1: PREV 2: OFF
	ZONE ACTION	0-1	Trigger zone action 0: ALL ON 1: ALL OFF
	ZONE MASTER	0-100	Set zone master

10. TECHNICAL SPECIFICATION

- power supply:	12 - 24V DC
- no-load current consumption:	70 mA for 12V DC 40 mA for 24V DC
- DMX output channels:	64
- control inputs on / off type:	8
- control outputs:	3
- communication port:	LAN
- OC outputs load capacity:	1500mA / channel
- programmable:	
scenes:	32
programs:	8
zones:	16
element lists:	16
- programmable time range:	
scenes / steps:	0,1 s - 24 h
- weight:	0,11 kg
- dimensions:	Width: 70 mm (4 DIN rail modules) Height: 86 mm Depth: 60 mm

11. TECHNICAL DRAWING





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30-701 Kraków, Poland

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fax: +48 12 626 46 94

e-mail: info@pxm.pl
http://www.pxm.pl

DECLARATION OF CONFORMITY according to guide line 2004/108/EC

Name of producer: PXM Marek Żupnik sp. k.

Manufacturer's address: ul. Przemysłowa 12
30-701 Kraków

We declare that our product:

Mini DMX Controller

Product name:

PX333

Product code:

complies with the following standards:

EMC:

PN-EN 55103-1:2012
PN-EN 55103-2:2012
PN-EN 61000-4-2:2011
PN-EN 61000-6-1:2008
PN-EN 61000-6-3:2008

Additional information:

The DMX-512 output must be shielded and the shielding must be connected to the ground responding to the DMX connectors.



Marek Żupnik spółka komandytowa
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Kraków, 02.09.2014

mgr inż. Marek Żupnik (M.Sc. Eng.)