PX254

LED Driver
3 x 6A OC

MANUAL

CONTENTS

Manufacturer reserves the right to make modifications in order to improve device operation.

Rev 2.0

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1. GENERAL DESCRIPTION

PX254 driver is designed to control the LEDs. Built-in DMX receiver allows to control 3 DMX channels (R, G, B) directly with the DMX protocol. Wide range of power supply voltage and high current carrying capacity outputs (6A) permit a control of large quantities of LEDs. What is more the PX254 has built-in fuses that can be replaced by the user by himself.

PX254 can be either controlled by DMX, and act independently. In this case, the user is offered a fully programmable scene and 18 pre-programmed sequences, which can also freely change the playback speed and fluidity changes in steps. By using 16-bit resolution control of each channel is completely smooth. In addition, the PX254 driver gained control mode called effect mode to control the programs built into the driver and the simultaneous change the settings of parameters such as speed, brightness and fade using DMX-512 signal sent from the external controller.

The driver has a built-in tuning frequency signal system ("flicker free" technology), which makes it particularly useful in applications for the television industry. The RGB LEDs often differ quite substantially in parameters, this can cause problems in obtaining a white color (at full power especially). Therefore PX254 comes with a very useful function called "white balance". Thanks to it you can choose color correction for each set of LEDs controlled by the device to achieve at full power the color white. What's more, this feature also allows you to adjust the color temperature of white color.

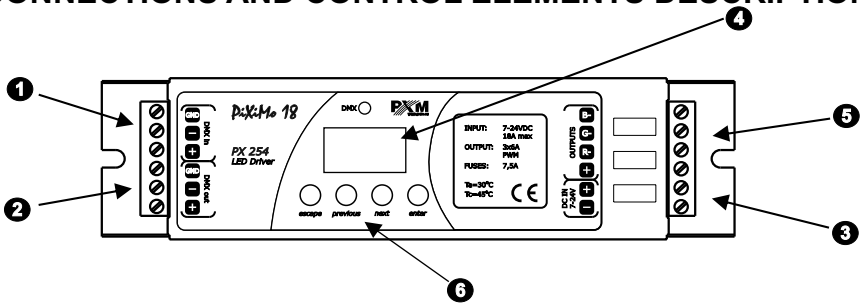
The PX254 is produced in common anode version - it allows LEDs connection on common anode.

2. SAFETY CONDITIONS

PX254 LED Driver 3 x 6A OC 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 may only be connected to 12 - 24 V DC with current-carrying capacity compatible with technical data.
2. All the conductors should be protected against mechanical and thermal damage.
3. In the event of damaging any conductor, it should be replaced with a conductor of the same technical data.
4. Connection of power supply can only be made with a conductor of minimum cross-section area of 2,5mm^2 and DMX signal with shielded conductor.
5. All repairs and connections of outputs or DMX signal can only be made with cut off power supply.
6. PX254 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 duster only.

3. CONNECTIONS AND CONTROL ELEMENTS DESCRIPTION



1. DMX-512 input
2. DMX-512 output
3. Power supply
4. Display
5. Control outputs
6. Programming keys

4. DESIGNATION OF DISPLAYED MESSAGES

- 001 DMX address of a device - a basic item in the MENU
- ALL setting parameters for all channels simultaneously
- Ind setting parameters for each channel individually
- Adr DMX address setting
- Cbn control method selection (RGB, LIGHTNESS / COLOUR, etc.)
- noS no DMX signal response method selection
- C-d MASTER / SLAVE mode settings
- 2bA LIGHTNESS /COLOUR control mode
- 3bA RGB control mode
- 3bd RGB Dimmer control mode
- HSL HSL control mode - HUE / SATURATION / LIGHTNESS
- EFF effect control mode
- onA all outputs at 100%
- oFF all outputs off
- ScA scene

P17 programme no. 17

Ad1 DMX address settings for first channel

CoA MASTER mode on / off

CHA number of channels being sent in the MASTER mode

bAL white colour balance setting

bLr red balance

bLG green balance

bLb blue balance

bCA white colour balance on / off

SPd program playback speed

FAd level of steps change smoothness in the program

rEd red during scene programming colour

GrA green colour during scene programming

bLu blue colour during scene programming

Fr9 basic frequency of brightness control

SCr screen and DMX signal LED blanking

Err. memory error message

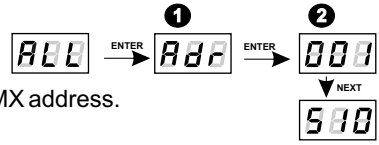
dF1. restore default device settings menu

5. DMX ADDRESS SETTING

The menu of the PX282 driver allows for setting the DMX address within a range between 1 and 506-511 depending on work mode of device. For example in RGB mode it occupies three consecutive DMX addresses. If start address is set to 510, the last channel is occupied by address 512.

To set the DMX address:

1. Set the ***Adr*** function.
2. Use the "next" or "previous" buttons to set the selected DMX address.



6. DISPLAY FLIP FUNCTION

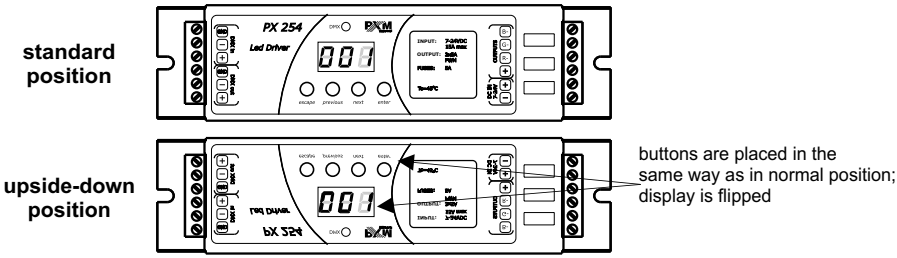
As the driver should be installed in a small distance from the controlled LEDs, the lack of space may force the necessity of mounting the device upside-down.

In such case the displayed messages become illegible, that does not have the influence on device operation, but makes the programming much more difficult.

That is why the PX254 driver has a display flip feature available. It turns the screen 180°. The keys order is reversed as well.

To activate this both middle buttons (PREVIOUS and NEXT) of the driver have to be pressed in the same time for about 3s. To deactivate function the procedure is the same.

The figure below shows how flip function works.

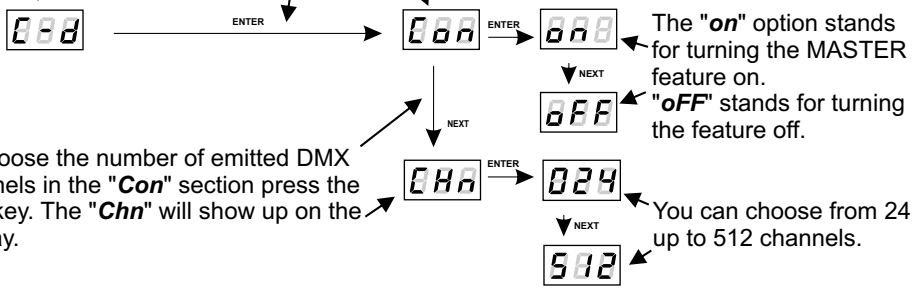


7. MASTER / SLAVE FUNCTION

The PX254 module has a built-in DMX-512 receiver and can be controlled from any desktop or controller running in this standard. Moreover, it is equipped with a programmable function of response to no DMX signal (***noS***). With 18 built-in default programs, it is possible to obtain interesting effects without an external controller. However, in larger installations, several PX254 drivers implementing the same program cannot provide a full reproduction synchronisation. Therefore, PX254 has a MASTER feature. When it is activated, the module changes from a DMX receiver into a transmitter of this signal and sends self-realized programs to the other modules (which are set as SLAVE). With this solution, it is possible to make a precise synchronization even in very large installations.

To turn on the MASTER feature you must enter the "***C-d*** " section.

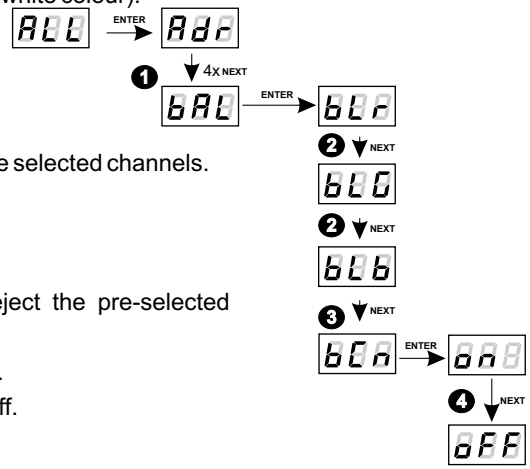
Press the „enter" key, the "***Con***" message will show up on a display.



CAUTION:
PX254 basically sends three channels (R, G, B), but because the DMX standard defines the minimal emitted channels number as 24, these three channels are duplicated eight times. If there is such a necessity, you can increase them up to 512 channels (this setting is not recommended because of the decrease of a transmission speed).

8. WHITE BALANCE

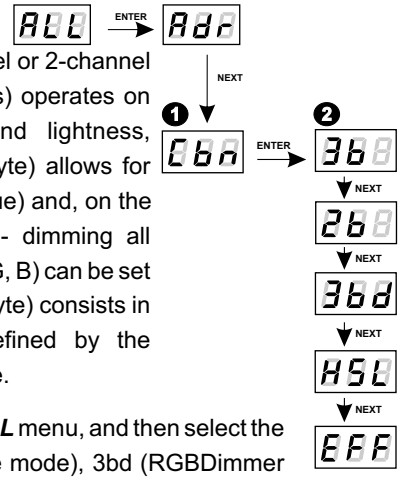
Sometimes, there can be problems with getting white colour on the RGB series LEDs. This may be a result of using diodes with different technical parameters. For this reason, the PX254 module is equipped with a white balance function. This option allows for choosing a correct colour temperature for full activation of all 3 outputs (white colour).



To set the white balance:

1. Enter the ***bAL*** function.
2. Select an appropriate value for each of the selected channels.
   - ***bLr*** - for red
   - ***bLG*** - for green
   - ***bLb*** - for blue
3. Enter the ***bCn*** option to accept or reject the pre-selected values.
4. ***on*** means that white balance is turned on.
5. ***oFF*** means that white balance is turned off.

9. COLOUR MODE



The PX254 driver can operate in the 4-channel, 3-channel or 2-channel ***HSL*** mode. The ***HSL*** mode (Hue, Saturation, Lightness) operates on three channels, responsible for hue, saturation and lightness, respectively. Working in the 3bd mode (4-channel, 4-byte) allows for setting each colour individually: R (red), G (green), B (blue) and, on the fourth channel, the Dimmer function is implemented - dimming all outputs. In the 3-channel mode (3 -byte), each colour (R, G, B) can be set separately. Whereas working in the 2-channel mode (2-byte) consists in selecting lightness and one of the 256 colours defined by the manufacturer. ***EFF*** (effect) mode is described on next page.

To select the colour mode, enter the ***Cbn*** function in the ***ALL*** menu, and then select the desired colour mode: 2b for the 2-byte mode, 3b (3-byte mode), 3bd (RGBDimmer mode), ***HSL*** or ***EFF*** for the Effect Mode. After setting one of the mode in the individual settings menu (see section 10), the number of editable channels will be limited in accordance with the selected mode (e.g. up to 2 channels for 2b-2byte).

Description guide of ***EFF*** mode settings

EFF mode (effect) channels desription						
CHANNEL1 RED	CHANNEL2 GREEN	CHANNEL3 BLUE	**CHANNEL4 – MODE**	CHANNEL5 SPEED	CHANNEL6 FADE	CHANNEL7 BRIGHTNESS
-	-	-	**< 0 - 7 > Program1**	x	x	x
-	-	-	**< 8 - 15 > Program2**	x	x	x
-	-	-	**< 16 - 23 > Program3**	x	x	x
-	-	-	**< 24 - 31 > Program4**	x	x	x
-	-	-	**< 32 - 39 > Program5**	x	x	x
-	-	-	**< 40 - 47 > Program6**	x	x	x
-	-	-	**< 48 - 55 > Program7**	x	x	x
-	-	-	**< 56 - 63 > Program8**	x	x	x
-	-	-	**< 64 - 71 > Program9**	x	x	x
-	-	-	**< 72 - 79 > Program10**	x	x	x
-	-	-	**< 80 - 87 > Program11**	x	x	x
-	-	-	**< 88 - 95 > Program12**	x	x	x
-	-	-	**< 96 - 103 > Program13**	x	x	x
-	-	-	**< 104 - 111 > Program14**	x	x	x
-	-	-	**< 112 - 119 > Program15**	x	x	x
-	-	-	**< 120 - 127 > Program16**	x	x	x
-	-	-	**< 128 - 135 > Program17**	x	x	x
-	-	-	**< 136 - 143 > Program18**	x	x	x
-	-	-	**< 144 - 151 > OFF**	-	-	-
x	x	x	**< 152 - 169 > Strobo 10%**	x	-	x
x	x	x	**< 170 - 199 > Strobo 20%**	x	-	x
x	x	x	**< 200 - 229 > Strobo 50%**	x	-	x
x	x	x	**< 230 - 255 > RGBD**	-	-	x

Channel 4 - work mode selection

CHANNEL1 - red component
CHANNEL2 - green component
CHANNEL3 - blue component
CHANNEL4 - operating mode selection
CHANNEL5 - speed settings (higher value - quicker changes)
CHANNEL6 - fade settings (higher value - smoother transition)
CHANNEL7 - lightness settings (higher value - stronger glow)

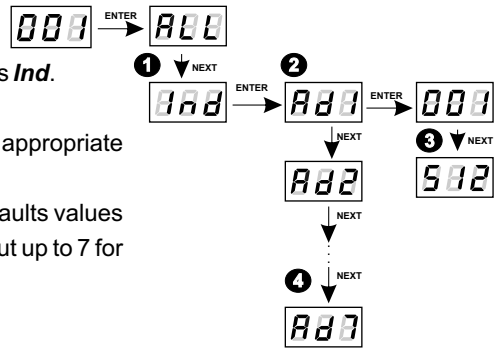
character ("x") - possibility to control a given parameter of a selected mode
character ("-") - no possibility to control a given parameter of a selected mode

10. INDIVIDUAL SETTINGS

The PX254 module has an option that allows for changing individual settings. It enables assigning any DMX address to every output channel. The simplest example of implementation of this function is to control the lightness of one-colour LEDs connected to all outputs. In this example, the same address must be assigned to all channels so that all outputs are controlled by one slider on the control panel.

To program individual settings:

1. Enter the individual settings function marked as ***Ind***.
2. Go to the first output settings marked as ***Ad1***.
3. Using the „next" or „previous" buttons set an appropriate value. You can choose from 1 up to 512.
4. Set the address for the remaining outputs (defaults values are subsequent values from 1 for the first output up to 7 for the seventh output).

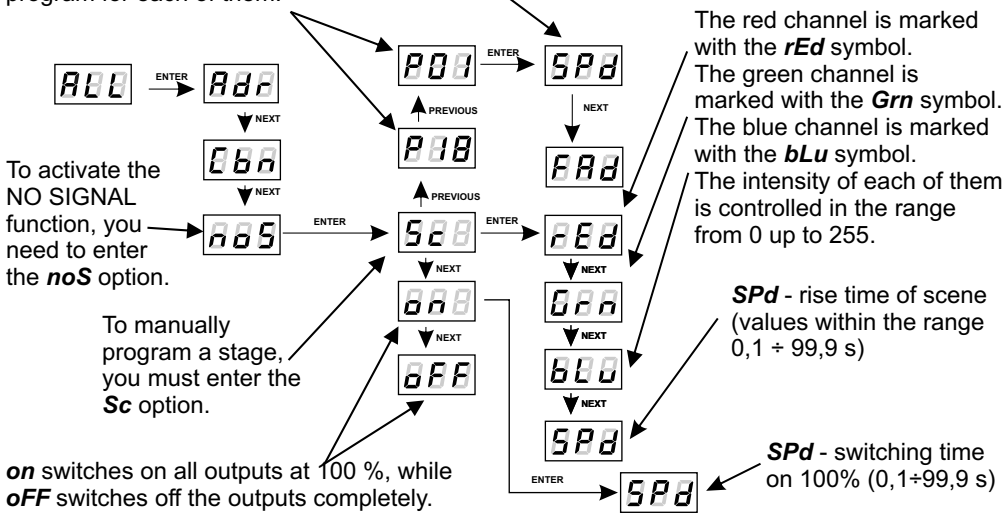


11. NO DMX SIGNAL RESPONSE

This function is used both to protect the installation against the DMX signal loss and to obtain control over LEDs without connecting an external controller. Once it is activated, if there is no DMX signal the module will realize a desired function independently. Reconnecting the DMX signal will automatically break the realized function and the module will once again follow the commands transmitted via the DMX line.

You can also use the 18 preset programs.
It is also possible to set the reproduction speed and step change smoothness in the program for each of them.

To set the reproduction speed, you must press the „enter" button in the tab of a given program. The ***SPd*** message appears. Press the "enter" button again and select an appropriate value in the range from 0.1 up to 99.9 seconds. To confirm these setting, press „enter".



The FAd function - to change the rate of step change, you need to click *enter* on the tab of a program you are interested in. Then, click the „next" or „previous" buttons to set the ***FAd*** parameter. Then, press the „enter" button and enter a chosen value between 0 (abrupt transition) up to 100 (completely smooth transition) using the „previous" or „next" buttons. Confirm these settings by pressing the „enter" button.

12. DESCRIPTION OF PROGRAMS

The following tables show the values for each output channel - R, G and B in programs from 1 up to 18 (P01 - P18). The value of 255 corresponds to the maximum lightness level on a given channel, 127 - 50% of power level, 0 - full channel blanking.

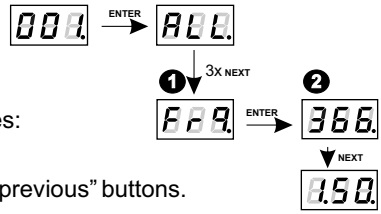
		P01	P02	P03	P04	P05	P06	P07	P08	P09	P10
step 1	R	255	0	0	0	255	255	0	255	0	255
	G	0	0	0	0	0	0	255	0	255	0
	B	0	255	0	0	0	0	255	0	0	0
step 2	R	0	0	255	0	255	255	255	0	0	0
	G	255	255	0	0	255	0	0	255	0	0
	B	0	0	0	255	0	255	255	0	255	255
step 3	R	0	255	0	0	0	0	255			
	G	0	0	0	0	255	0	255			
	B	255	0	0	0	0	255	0			
step 4	R			0	0	0	0				
	G			255	255	255	255				
	B			0	0	255	255				
step 5	R			0	0	0	0				
	G			0	0	0	255				
	B			0	0	255	0				
step 6	R			0	255	255	255				
	G			0	0	0	255				
	B			255	0	255	0				

		P11	P12	P13	P14	P15	P16	P17	P18
step 1	R	0	0	0	255	0	0	0	0
	G	0	0	0	0	255	0	127	0
	B	0	0	0	0	0	255	255	0
step 2	R	255	0	0	255	127	127	127	255
	G	0	255	0	127	255	0	255	255
	B	0	0	255	0	0	255	127	255
step 3	R				255	0	0	255	
	G				0	255	0	127	
	B				0	0	255	0	
step 4	R				255	0	0	127	
	G				0	255	127	0	
	B				127	127	255	127	

13. LIGHT CONTROL FREQUENCY

The ***Frq*** function allows for setting the basic control frequency for the LEDs. This function is extremely useful in applications for the television industry. By applying the "flicker free" technology, it is possible to avoid the unpleasant flickering effect which is caused by improper signal synchronization that controls the LEDs. The user can choose from the available frequency range from 366 Hz up to 1.5 kHz which can be smoothly changed using the *previous* or *next* buttons and selecting a different value.

The frequency value in the upper range (e.g. 1.50 = 1.5 kHz) helps avoid the flickering effects that are visible in video cameras.

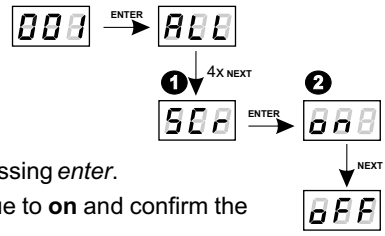


To set the selected range of basic frequencies:

1. Set the ***Frq*** function.
2. Set the selected value using the „next" or „previous" buttons.

14. SCREEN SAVING (SCREEN BLANKING)

The device is equipped with a feature that allows for turning off the backlight. This option is marked with the **SCr** sign. With this feature, the display is turned off after 5s (if the keys of the device are not pressed). Of course, the device continues its operation without interfering with other parameters. Press any key to restore the backlight.



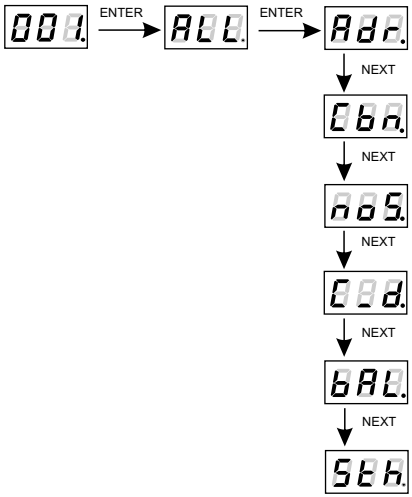
To activate the screen saving feature:

1. Set the **SCr** function and confirm the selection by pressing *enter*.
2. Use the *next* or *previous* buttons to change the value to **on** and confirm the selection by pressing *enter*.

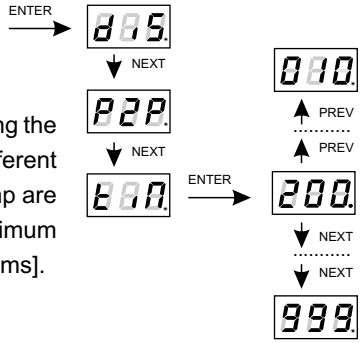
Similarly, select "oFF" to turn off the function.

15. SMOOTH

The driver is equipped with a smoothing option. Smooth feature allows for smooth changes in lightness and colour. When the transition between successive DMX values sent to the lamp is turned on (e.g. corresponding to changes in lightness) the changes are smooth with no visible twitches, which prevents the common light "vibrations" effect. Two consecutive DMX values sent to the lamp are smoothed linearly between the DMX signal packets for the selected P2P. option or the time interval set in the tIM. menu.



The smoothing function may slightly slow down the lamp's response rate to changes in the DMX signal; therefore, it is possible to disable this option. This can be done by checking the doS. parameter and confirming the selection by pressing „enter".



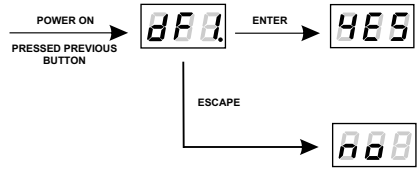
Time smoothing tIM. enables changing the time parameter in which subsequent, different values of the DMX signal sent to the lamp are smoothed between each other. The minimum value is 10 [ms] and the maximum is 999 [ms].

16. DEFAULT SETTINGS AND MEMORY ERROR (Err)

The device has a feature that allows for restoring default settings.
To use this option, PX254 must be disconnected from the power supply. Before restoring the power, press and hold the „previous" button. After turning the device on, the dEF message will appear on the screen (when turning on the power until displaying the previous dEF message, the „previous" button must be pressed).
This menu designation restores default settings. Accepting this message by pressing the „enter" key restores default settings. It is also possible to exit this menu without returning to default settings by pressing the „escape" key.

• Please note that all set parameters of the PX254 device after restoring the default settings will be changed to those shown below:

- DMX address - 1,
- driver operating mode - RGB (3b - 3-byte),
- master mode - off,
- number of sent DMX channels - 128,
- white balance - off
- no signal operating mode - Program 1
- smoothing function (smooth) - off
- temperature limitation - off



Err message - memory error

The device is equipped with a built-in memory work control function.
If there are problems with the memory operation on the PX254 display, the Err. message appears - memory error.
In this situation, select the "enter" key. The device will reload the default configuration and upload it to the memory. If after this operation, the Err. message remains on the screen, the memory is permanently damaged and the unit must be sent to the service point.

17. RDM

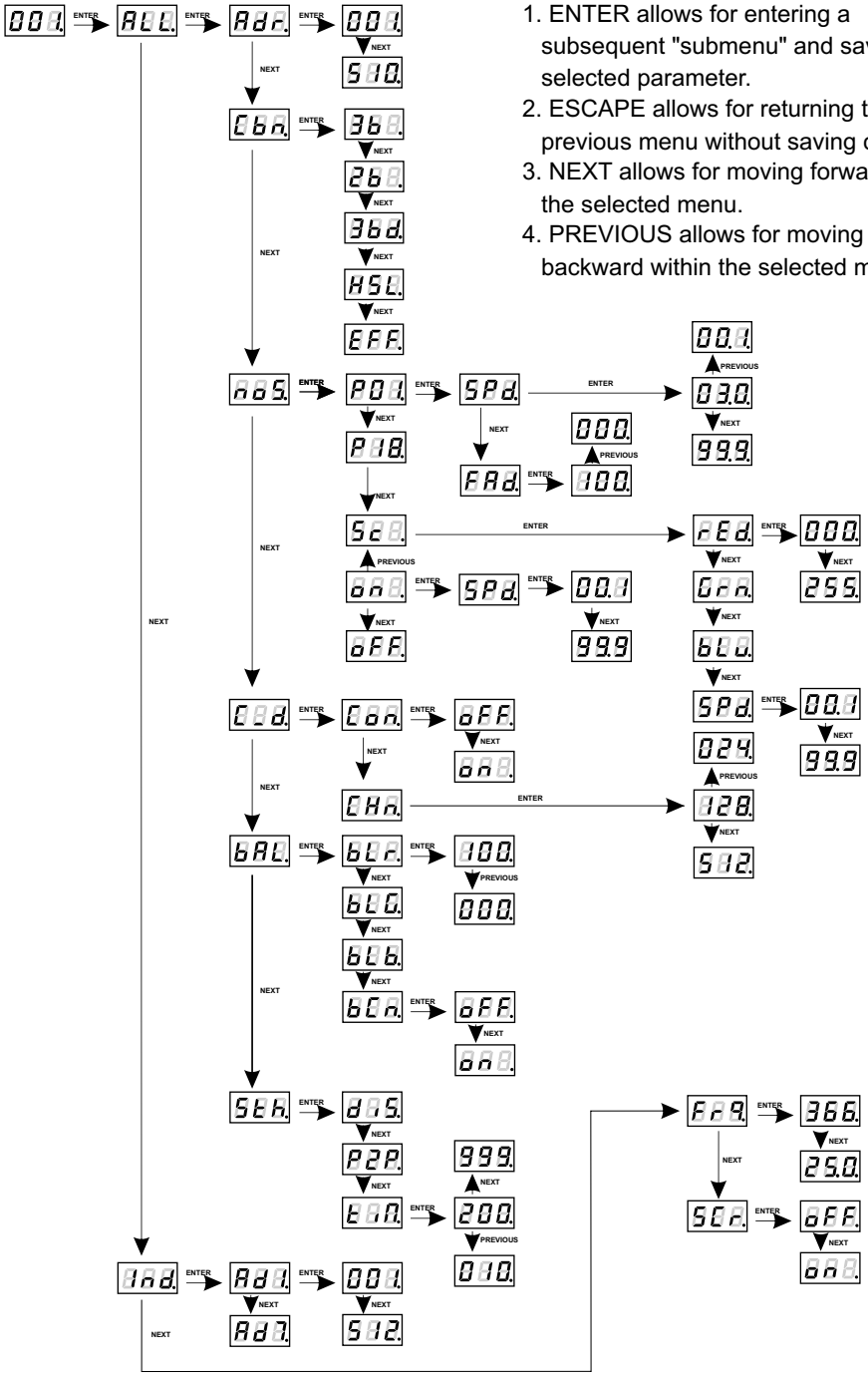
The PX254 supports the DMX-RDM protocol. DMX protocol allows only of a one-way data transmission, while its extension the RDM protocol can transmit information in two directions. This makes possible to simultaneously send and receive information, and hence the possibility of monitoring activities of the compatible devices. Thanks to RDM some available settings of compatible devices may be programmed using this protocol.

Below is a list of RDM parameters supported by the PX254:

- SUPPORTED_PARAMETERS - all supported parameters - **PID: 0x0050**;
- PARAMETER_DESCRIPTION - additional parameters description - **PID: 0x0051**;
- DEVICE_INFO - information about device - **PID: 0x0060**;
- SOFTWARE_VERSION_LABEL - firmware version of device - **PID: 0x00C0**;
- DMX_START_ADDRESS - start DMX address of device - **PID: 0x00F0**,
  Editable parameter. Minimal value is 1 and max. 512. According to the RDM standard for the device, whose footprint is 0, the value of this parameter may be 65535 and then the initial address settings of entire device can not change. DMX addres can be set only for subdevices;
- IDENTIFY_DEVICE - allows to identify a device - **PID: 0x1000**,
  Editable parameter. You can set it into two states: the identification disabled (0x00), and identifying enabled (value 0x01);
- STATUS_MESSAGES - information about device status - **PID: 0x0030**;
- DEVICE_MODEL_DESCRIPTION - device description e.g. name - **PID: 0x0080**;
- MANUFACTURER_LABEL - e.g. name of manufacturer - **PID: 0x0081**;
- DEVICE_LABEL - additional device description - **PID: 0x0082**,
  Editable parameter. It is possible to enter additional description of the device using up to 32 ASCII characters (characters available on a standard QWERTY keyboard);
- DMX_PERSONALITY - DMX working mode - **PID: 0x00E0**,
  Editable parameter. The selectable DMX work modes are listed below:
  1) RGB mode (see item 9 of this manual) - a value of 1;
  2) 2B mode (see point 9) - a value of 2;
  3) RGBD mode (see point 9) - a value of 3;
  4) The HSL mode (see point 9) - the value of 4;
  5) EFFECT mode (see point 9) - the value of 5;
- DMX_PERSONALITY_DESCRIPTION - description of particular work modes - **PID: 0x00E1**;
- DEVICE_HOURS - operating time counted in hours - **PID: 0x0400**;
- BALANS_RED - value of control level of red chanel balance - **PID: 0x8011**,
  Editable parameter. Minimum value is 0 and maximum is 100 (the value equals to pecentage of control level). For the maximum value (100) the LEDs work with maximum brightness. Default value is 100.
- BALANS_GREEN - value of control level of green chanel balance - **PID: 0x8012**,
  Editable parameter. Similar as in the preceding paragraph only for green channel;
- BALANS_BLUE - value of control level of blue chanel balance - **PID: 0x8013**,
  Editable parameter. Similar as in the preceding paragraph only for blue channel;

- SMOOTH_DIS_0/P2P_1/TIM_2 - the choice of options relating to the Smooth function - **PID: 0x801A**, **Editable parameter.** At 0 value Smooth is turned off, for a value of 1 Smooth mode is set to a Packet to Packet (P2P) and for the value of 2 Smooth is in time mode (TIM-description in 14th point). The default value is 0 - Smooth off;
- SMOOTH_TIME – Smooth time for TIM function chosen in subsection above - **PID: 0x801B, Editable parameter**. Unit in [ms]. Minimal value of this parameter is 10 and maximal 999 [ms]. Default value is 200.
- NO_SIG_P1-18|SC_19|ON_20|OFF_21 - choice of work mode for No DMX signal - **PID: 0x801C**, **Editable parameter**. Minimal Value is 1, maximal 21. For values 1-18 menu allows to chose program from 1 to 18 which is played during no DMX signal detection. For the 19 value a scene saved in memory is set and for the 20 value all outputs are set to ON with maximum value. The value 21 sets to OFF all outputs during time with no DMX signal received. Default value is 21;
- SCENE_RED - settings of red channel value for scene saved in PX282 - **PID: 0x801D, Editable parameter**. Minimal value is 0, maximal 255 (maximal brightness). By defualt value set to 255;
- SCENE_GREEN - settings of green channel value for scene saved in PX282 - **PID: 0x801E, Editable parameter**. Similarly as in the subsection above;
- SCENE_BLUE - settings of blue channel value for scene saved in PX282 - **PID: 0x801F, Editable parameter.** Similarly as in the subsection above;
- SCREENSAVER_ON/OFF - settings of screensaver (display backlight in PX282) - **PID: 0x8024**, **Editable parameter**. With the 0 value display blanking is not active, the 1 value means screensaver active. Default value is 0;
- PROGRAM_SPEED - programs playback speed settings (playing next steps of program) - **PID: 0x8025, Editable parameter.** Minimum value is 1 and maximal 999 (maximum speed). By default it is set to 10. Value 1 represents 0,1s, and 999 - 99,9s;
- PROGRAM_FADE - settings of smooth transition between following steps of a program - **PID 0x8026, Editable parameter.** The minimum value is 0 (step transition) a maximum of 100 (transition completely smooth). The default value is 100;
- BALANCE ON / OFF - to activate or deactivate the balance of output channels - **PID 0x8027, Editable parameter.** A value of 0 is a balance off, a value of 1 active balance. The default value is set to 0;
- PWM_FREQENCY - LEDs refresh frequency - **PID 0x8028, Editable parameter.** The minimum value is 366 and the maximum is 25000. The unit is [Hz] and the default value is 366.
- SERIAL_NUMBER - device serial number - **PID: 0x8030**, **Editable parameter**. The minimum value is 0, and the maximum is 4294836225. The default value is 0.
- DISPLAY_FLIP - inverting the meter display 180 degrees - **PID: 0x8031**, **Editable parameter**. The minimum value is 0, and the maximum is 1. The default value is 0.

18. PROGRAMMING - MENU TREE



NOTES:

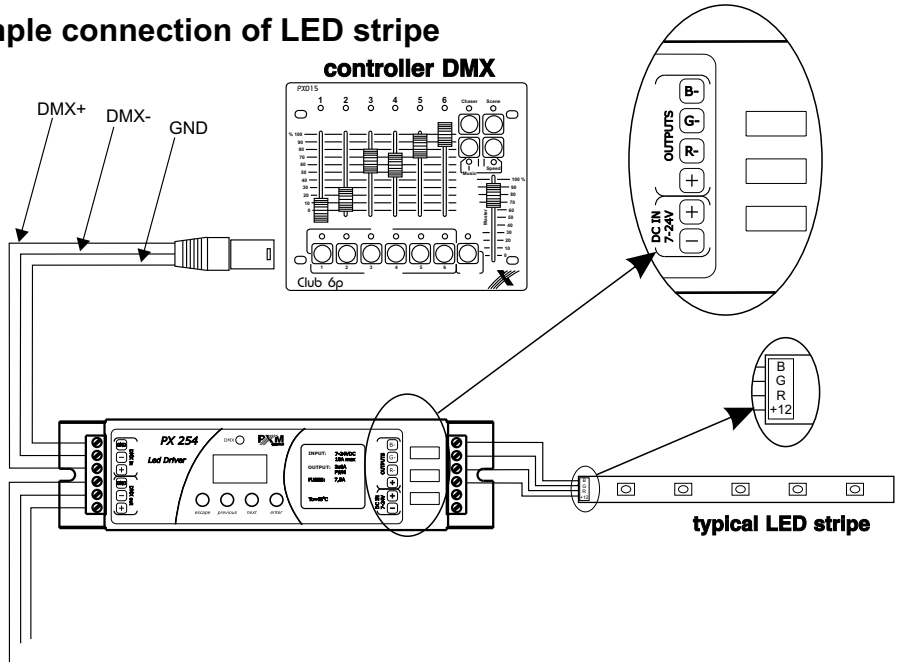
1. ENTER allows for entering a subsequent "submenu" and saving a selected parameter.
2. ESCAPE allows for returning to the previous menu without saving changes.
3. NEXT allows for moving forward within the selected menu.
4. PREVIOUS allows for moving backward within the selected menu.

19. CONNECTION SCHEME

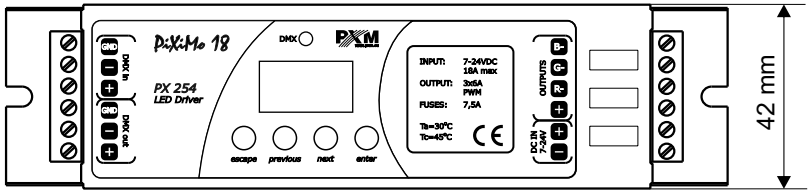
PX254 uses active type DMX, therefore there is no need to use terminators at the end of the DMX line. With this solution applied, there is no limitation of number devices that can be connected to the DMX controller (connected in series).

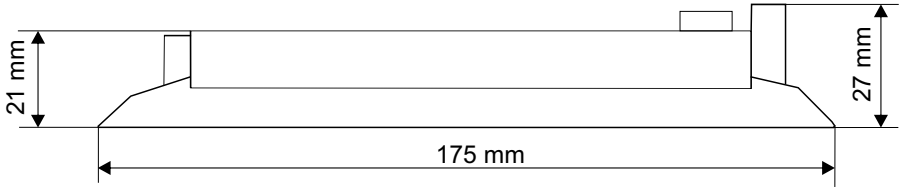
Connections must be made using cables of suitable thickness.
Properly made connections reduce the risk of damaging and improve its reliability. Apply only shielded cables to connect the DMX signal.
Note: In case of loosing power supply in any devices that work connected in series the following devices in chain will loose connection with main controller.

sample connection of LED stripe



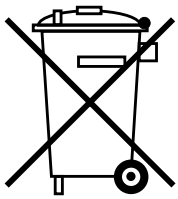
20. DIMENSIONS





21. TECHNICAL DATA

- DMX channels	512
- power supply	7 - 24 V DC
- current consumption	max. 18 A
- no-load current consumption	30 mA for 12 V DC
	40 mA for 24 V DC
- output channels number	3
- control accuracy	16 bit
- programmable scenes	1
- built-in programs	18
- outputs load capacity	6 A / channel
- output sockets	terminal blocks
- MASTER mode	YES
- weight	0,15 kg
- dimensions:,	
- width	175 mm
- heigth	43 mm
- depth	27 mm (including terminal block)



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DECLARATION OF CONFORMITY

according to guide lines 2004/108/EC and 2006/95/EC

Name of producer: PXM Marek Żupnik sp. k.

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

We declare that our product:

Product name: **LED Driver 3 x 6A OC**

Product code: **PX254**

complies with the following standards:

LVD: **PN-EN 61347-2-13:2008**
EMC: **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.

PXM
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30-701 Kraków, ul. Przemysłowa 12
NIP 677-002-54-53

Kraków, 15.07.2014

mgr inż. Marek Żupnik.