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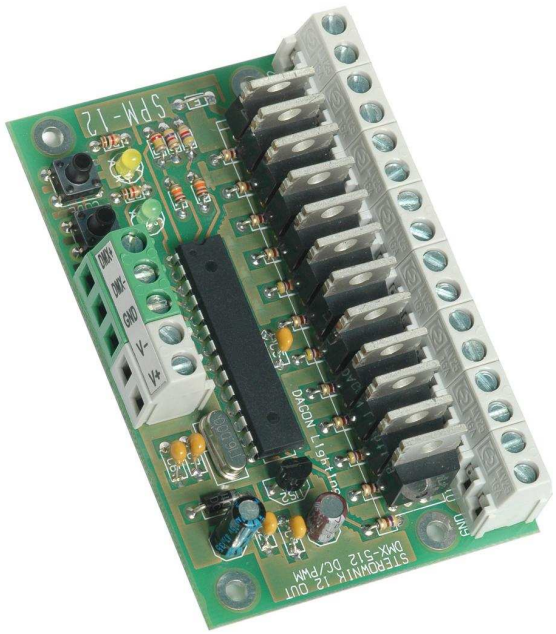
DAGON Lighting Product series

SPM-12

DMX-512 controller – 12 OUT DC / PWM

MANUAL INSTRUCTION



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1. Main description.

The SPM-12 Controller is an universal 12-channel converter DMX-512 signal to DC voltage signals / PWM. To the Q1-Q12 outputs of driver diodes can be connected, or LED strip white and color, as well as relays and other devices controlled by PWM signals or continuously-voltage. Load output is 3A per channel. If you need to supply more current receivers use additional degrees of power.

On the Figure 1 the proper way of wiring the power supply and receiver – LED diodes to control SPM-12 is shown. Remember to pick up the power cables of sufficient diameter relative to a flowing current - bold lines in Figure 1.

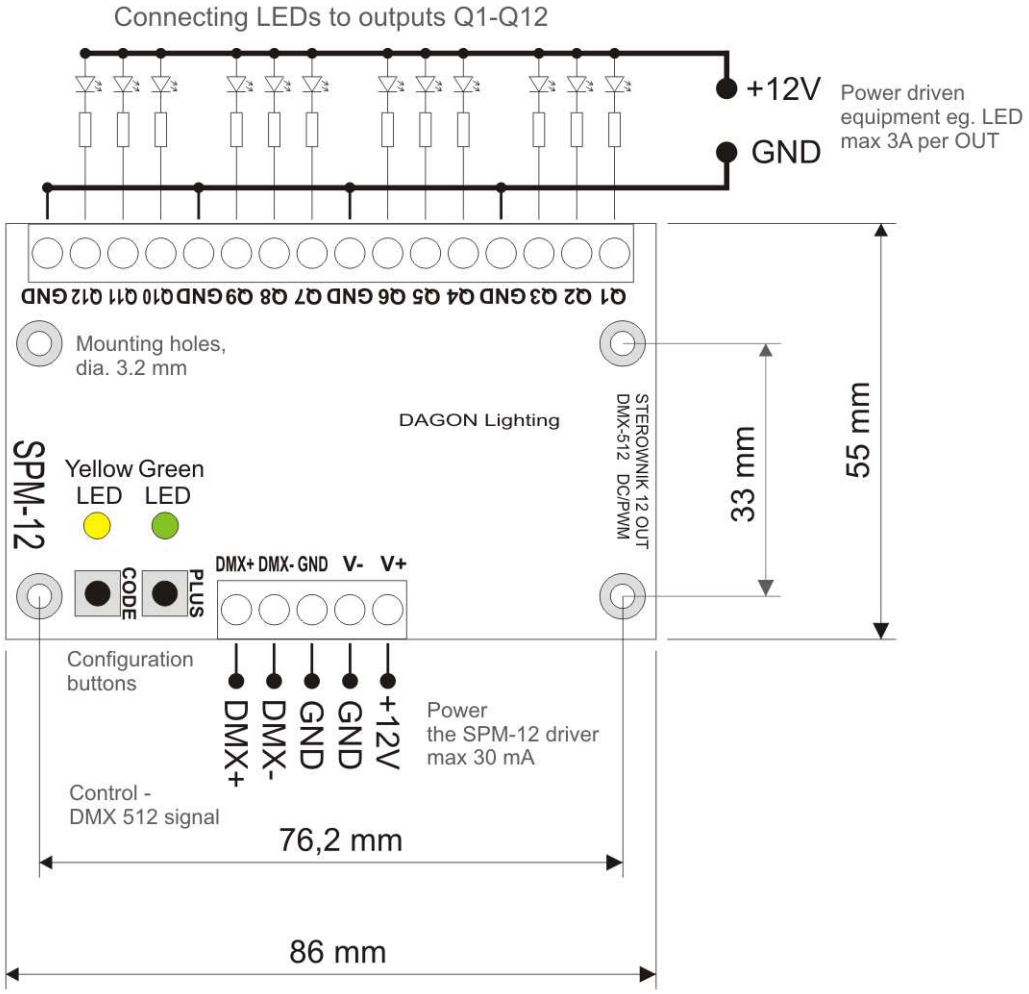

Fig 1. General arrangement and dimensions of the SPM-12 driver.

After connecting the power supply controller starts DMX-512 the signal receiving and control the outputs Q1-Q12. The green LED diode signalize the attendance of DMX-512 signal by fast blinking. While the lack of DMX-512 signal the green diode doesn't blink, just light in the continuous way. The yellow LED diode is off in the regular mode of controller work.

2. SPM-12 controller configuration.

The SPM-12 controller is a device freely programmable by the user. Configuration consists of entering the driver control 3 digit code (000 to 999), which determine the operation of the controller. To enter the codes 2 buttons have to be used marked as CODE and PLUS and also 2 signalization diodes – green and yellow, as shown in the Figure 1.
The meaning off all steering codes is mention in table 1 on page 6 of this manual.
Typically, correct and complete configuration of the driver SPM-12 requires to type a few control codes. This is the correct action from the user part.

2.1. Methods of entering the codes to SPM-12 controller.

To enter the code to the driver SPM-12 button CODE need to be pressed. The green diode will light off and the yellow one will light on.

Entering the first digit of code:

Button PLUS need to be press as many times as the first digit of code is from 0 to 9.
Every press is signalize by a short blinking of green diode.
After set in the first digit, button CODE need to be press one more time.
The yellow diode will blink (light off for half a second and light on again)
which is the signal to enter the second digit of code.

Entering the second digit of code:

Button PLUS need to be press as many times as the second digit of code is from 0 to 9.
Every press is signalize by a short blinking of green diode.
After set in the second digit button CODE need to be press one more time.
The yellow diode will blink and it is the signal to set in the third digit.

Entering the third digit of code:

Button PLUS need to be press as many times as the third digit of code is from 0 to 9.
Every press is signalize by a short blinking of green diode.
After set in the third digit button CODE need to be press one more time.
The yellow diode will light off and the green one light on – this is the signal
that the code is ready.

After entering the code SPM-12 controller passes for regular operation, and to control the outputs Q1-Q12 in the manner which is set out the current configuration – by control codes.

In order to enter another code, proceed similarly as described above. The same code can be entered multiple times, which has no negative influence to the operation of the controller.

Not all the codes (available from range 000-999) are used. When set in the codes which has no function it will not change the work of controller. This kind of code is signalized as the incorrect code by a triple blinking of yellow diode just after set-in all three digits of code.

Ale set-in codes are remembered in EEPROM memory of SPM-12 controller. Lack of power doesn't cause losing the settings made by CODE and PLUS buttons.

If any time, while configuration, the buttons CODE and PLUS will be not pressed by 1 minute, SPM-12 automatically stop configuration and goes to the regular work.

SPM-12 configuration described above allows you to enter configuration codes without the possibility of the subsequent preview, for example to check if the function is active or not. If you forget the function the code need to be re-enter.

However, reading the DMX address value can be very useful, that is why there was introduced the possibility of viewing the address in the driver SPM-12, see point 2.2.

2.2. Preview of DMX address SPM-12 driver.

To preview the DMX address of controller the button PLUS need to be pressed for 1 second. Green diode will light off and yellow will light on.

Preview of first digit of DMX-512 address:

Green diode will blink as many times as the first digit of DMX address is from 0 to 5.
Than yellow diode blinks once (light off for half a second and light on again)
which is the signal for display the second digit.

Preview of second digit of DMX-512 address:

Green diode will blink as many times as the second digit of DMX address is from 0 to 9.
Than yellow diode blinks once (light off for half a second and light on again)
which is the signal for display the third digit.

Preview of third digit of DMX-512 address:

Green diode will blink as many times as the third digit of DMX address is from 0 to 9.
Yellow diode will light off – DMX address is read off.

After the 2 seconds from reading DMX address in SPM-12 controller starts regular work, which means steering the outputs Q1-Q12 in requested work by the control codes.

Tabel 1.

List of configuration codes and their associated control functions for the SPM-12 driver.

Code	Function / Parameter / Value
001 … 512	DMX address of SPM-12 controller
610	SPM-12 work as without DMX-512 signal - active codes 630 ... 635
611	Outputs work Q1-Q12 in PWM mode: DMX = 0..255 – Q = PWM 0..100%
612	Outputs work Q1-Q12 in DC mode: DMX = 0..127 - Q = OFF / DMX = 128..255 - Q = ON
620	DIMMER OFF – function DIMMER is turn off
621	DIMMER ON 1 – function DIMMER is active – 0=min 255=max brightness
622	DIMMER ON 2 – function DIMMER is active – 0=max 255=min brightness
630	No reaction for lack of DMX signal – keeping the last value of outputs Q1-Q12
631	After lack of DMX signal – display effect
632	After lack of DMX signal – turn off all of outputs: Q1-Q12 = OFF
633	After lack of DMX signal – 20% PWM signals on Q1-Q12
634	After lack of DMX signal – 50% PWM signals on Q1-Q12
635	After lack of DMX signal – turn on all of outputs: Q1-Q12 = ON

2.3. Description of configuration codes of SPM-12.

Basic steering codes which need to be set-in to SPM-12 controller is the address of DMX controller, it means one code form range **001 to 512**. When user enter any code from 001 to 512 it will cause automatic change the previous value form this range and memorize new address od DMX in memory controller.

DMX address indicate number of channel in steering signal of DMX-512, from where the steering datas of outputs Q1-Q12 are collect. The controller's Q1-Q12 outputs will be reacting on the values from DMX channels numbered sequentially from *address DMX* to *address DMX + 11*.

Second important parameter is the manner of output's work Q1-Q12.
These outputs can be configured to work in PWM mode – **code 611** or in bistable DC status (ON/OFF) – **code 612**.

In PWM mode, the outputs Q1-Q12 PWM waveforms are generated by filling proportional to the value of DMX channel corresponding to output:

- PWM = 0..100% of the value of DMX channel = 0..255

In bistable mode DC (ON/OFF) outputs Q1-Q12 have only two states:

- OFF - turn off, when DMX value of output steering channels is from 0 to 127 range
- ON - turn on, when DMX value of output steering channels is from 128 to 255 range

After enter the **code 610** the SPM-12 will not react on DMX-512 signal even when this signal pass on in DMX+ and DMX- inputs. Reaction of SPM-12 controller will be the same as in lack of DMX-512 signal on inputs – see description codes 630...635.

Codes **621** and **622** activates function DIMMER available only in PWM mode, usually used for steering the LED brightness connected to outputs Q1- Q12.
DIMMER function allows for brightness regulation of all outputs at the same time by using only one DMX-512 channel, and activate additional 13 DMX channel with address *address DMX + 12*, where *address DMX* is code from 001..512 range – see above.

When the signal DMX-512 increased for code **621**, the brightness of LED will also increased.

When the signal DMX-512 increased for code **622**, the brightness of LED will decreased.

If the function DIMMER is not necessary code **620** need to be enter to turn it off and release the 13 channel DMX.

Codes **630 to 635** settle the way of reaction SPM-12 controller for lack of DMX-512 signal. One second after lack of DMX-512 signal take place the reaction determine by the enter code.

The re-apperance of DMX-512 signal at the inputs DMX+ and DMX- an immediate return to the control outputs Q1-Q12 data from the received signal DMX-512 (except when code 610 is entered forcing the driver SPM-12 to work without the DMX signal).

The way of response of SPM-12 driver for DMX signal loss for the individual codes is described in Table 1.
The demonstration effect for the code **631** is smoothly dimming and lightening of LEDs connected to the outputs Q1-Q12 in an alternate driver for the outputs of odd and even numbers, and with the average brightness LEDs.

Some combinations of input control codes are especially noteworthy, eg:

- Entering codes 610 and 630 will continuous disable the state outputs Q1-Q12 (regardless of DMX-512 signal), because after the reboot power all outputs of controller SPM-12 are reset, code 630 does not change the output status, and the code 610 prevents receiving the DMX-512 signal;
- Entering codes 610 and 633 will generate a continuous PWM signal at the outputs of the fulfillment of 20%, eg dim the LEDs connected to the outputs Q1-Q12;
- Entering codes 612 forcing the work of Q1-Q12 in DC mode should not be link with 631, 633, 634 codes, because in case of loss of DMX-512 signal at the outputs of the PWM waveform will appear, which may cause malfunction of receivers designed to control DC (ON / OFF), such as relay coils;

2.4. Example configuration of the controller SPM-12:

001 - address DMX = 1 (address of output Q1 = 1, address of output Q12 = 12)
611 - outputs work Q1-Q12 in PWM mode
621 - DIMMER active on channel number 13th - DMX
631 - display effect is active while lack of DMX-512 signal

These 4 codes need to be set in into SPM-12 to ensure work in requested way.
Sequence of entering the codes is optional.

3. Safety and correct conditions of using SPM-12 controller.

- comply with power supply conditions according to technical datas
- for connection diodes and power supply to outputs Q1-Q12 have to be use wires with the diameter huge enough, depends on electric current
- to connect the DMX-512 should be used special DMX shielded cable
- all wires need to be protect against mechanical and thermal damages
- all the operation with connecting wires and assembly have to be carry out with disconnected power supply
- all the equipment need to be protect against water and humidity
- do not use lightning steering by the SPM-12 driver close to the rapidly rotating equipment or it's elements; it may cause the stroboscope's effects what may cause the stillness effect on the rotating equipment's which is light by impulse lights; it may cause dangerous situation for life and healthy.

4. SPM-12 Technical data.

Power supply:	9-24V DC
Current consumption - terminal V+ V-:	max 30mA
Number of outputs:	12 – Q1-Q12
Outputs type:	OC (open collector, N-MOSFET)
Polarization of outputs:	common plus (common anode)
Load capacity of each output:	3A
Method of outputs work:	DC (ON/OFF) or PWM
Signals resolution PWM:	8 bit
Signals frequency PWM:	100.55 Hz
Method of control:	DMX-512 signal
Number of DMX occupied channels:	12 or 13 - DIMMER is active
Range of temperature and work condition:	+5°C - +45°C, dry rooms
Controller dimension:	86 x 55 x 25 mm

The frequency of used SPM-12 signals PWM more than 100Hz cause the effect of blinking lights (make by LED diodes connected to outputs Q1-Q12) which is not visible for human's eyes. The visible light is stable.

Always remember to work with SPM-12 with all safety conditions, see point 3.