



POWERED SPI LED CONTROLLER 2

User Manual

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SAFETY INSTRUCTIONS

Installation should be performed only by a competent person or professional electrician. Make sure that the installation complies with the standards and rules that apply in your country.

- **Do not use the device if it seems to be damaged.**
- **Use the device only as described in this user manual.**
Any other use or use under other operating conditions is improper and may result in personal injury or property damage.
- **No liability will be assumed for damages resulting from improper use.**
Never open the controller and do not attempt repairs yourself.
- **Do not place the device close to heat sources and always ensure enough ventilation.**
- **Do not place the unit on surfaces that are heat sensitive.**

This device has been designed for indoor use only. Do not expose the unit to direct sunlight. Do not allow this device to meet liquids. Electrical shock could result. Also, damage to the device, smoke, and overheating could result from contact with liquids. Clean the device components that are accessible from the outside regularly. The cleaning frequency depends on the operating environment: damp, smoky or particularly dirty environments can cause greater accumulation of dirt on the device components. Clean with a dry soft cloth. Stubborn dirt can be removed with a slightly dampened cloth.

- **Never use solvents or alcohol for cleaning.**
- **Establish all connections when the unit is switched off.**
Use the shortest possible high-quality cables for all connections.
Make sure that cables cannot cause a trip hazard.
- **Never touch the plug contacts with sharp or metal objects.**
- **Ensure that plastic bags, packaging, etc. are disposed of properly and are not within reach of babies and young children. Choking hazard!**
- **Ensure that children do not detach any small parts (e.g. screws, connectors or the like) from the unit. They could swallow the pieces and choke!**
- **Never let children unattended use electrical devices.**

DEVICE SPECIFICATION

POWERED SPI LED CONTROLLER 2

All-in-one pixel LED controller with built in Power Supply

Applications

- General illumination
- Decoration illumination
- Events, lounges, clubs
- Scenography
- Theatre
- Light show
- Special effects
- Showcase



Technical specification

Controls over	Art-Net™ (Wired or Wireless), DMX512, Stand-alone, http commands, App, web browser, external triggers, LED Strip Studio protocol (with license)
Operating voltage	86 ~ 264 VAC/47 ~ 63Hz
Self power consumption	5W
Maximum power consumption	100W
Power input connector	IEC C14
Power output / max current	3 variants exist: 5VDC/10A, 12VDC/5A, 24VDC/2.5A
Wired Ethernet port type	RJ-45 connector, 10/100 Mbps, Auto-MDIX
Wireless Ethernet type	2.4Ghz Wi-Fi 802.11 b/g/n, internal antenna
SD Card type	Micro SD Card (FAT32, up to 32GB), push-push
DMXin Channels total	7 in SD-card mode, 3-512 in pixel mode
DMXin port connector type	MALE 3pin XLR by default, 5pin XLR on request
DMXin port type	DMX512
DMXin port protection	Yes, ESD
DMXin isolated	No
DMXout port connector type	FEMALE 3pin XLR by default, 5pin XLR on request
DMXout port type	DMX512 (pass-through) or DMX512 generated by device
Trigger Input Channels total	2
Trigger Input port connector type	4-pin pitch 1.5mm JST ZH compatible
Trigger Input port electrical type	Analog trigger input 0-3.3V with internal 12k pull-ups
Trigger Input port contain power	Yes, output, 3.3V max 50mA

Trigger Input port protection	Yes, ESD
Trigger Input connector pins	GND, Trigger1, Trigger2, +3.3V
LED Output port connector type	4 pole pluggable terminal block pitch 5mm
LED Output port electrical type	Single ended TTL 5V synchronous/asynchronous
LED Output port contain power	Yes, Voltage and max. current depends on device variant
LED Output port protection	Yes, ESD
LED Output connector pins	GND, Clock, Data, +POWER
LED Output communication protocol	SPI: TM, WS, APA and more, check: www.ledstripstudio.com/wiki-category/ic-pixel-led-types/
Device menu	OLED monochrome display 64x128pix, 4x navigation push buttons
WPS/Reset	Push button accessible by paper clip
Status LEDs	Green: Status, Blue: DMX output generated by device
Maximum of RGB/RGBW pixels per Output	Typ. 1024/768* ((*Extra power supply needed if internal PS has lower current rating than needed))
Special features/options	Firmware updatable by user
Works with controller/software	Any Art-Net™ controller/software, Any DMX512 controller, LED Strip Studio (with license)
Operating air temperature	-10°C to 45°C
Storage air temperature	-10°C to 60°C
Relative humidity	5% to 80% non-condensing
Waterproof	No
Ingress protection	IP30
Weight	470g
Dimensions	150.6 x 48.1 x 85.2 mm
Enclosure	Aluminium
Mouting options	Side tabs with holes for screws, cable ties, clamps, safety wire

Default package content

- POWERED SPI LED CONTROLLER 2
- IEC C13 power cable with plug based on destination country
- 4 pole terminal block plug pitch 5mm
- micro SD card
- SD card adapter
- USB card reader



Front View



Top View



Dimensions

DEVICE VARIANTS

POWERED SPI LED CONTROLLER 2 exist in three physical variants based on power supply installed inside device.

- **5VDC/10A (50Watt) this variant provides 5V output voltage with maximum 10A current capability on LED output connector**
- **12VDC/5A (60Watt) this variant provides 12V output voltage with maximum 5A current capability on LED output connector**
- **24VDC/2.5A (60Watt) this variant provides 24V output voltage with maximum 2.5A current capability on LED output connector**

To recognize device variant check label on top of the device.

On special customer request POWERED SPI LED CONTROLLER 2 can be assembled with 5 pin XLR connectors for DMX in and DMX out. Contact us before ordering if you wish to get device with 5pin XLRs.

There is also possible to “activate” this device what enables you to control device with LED Strip Studio software by our custom Ethernet protocol.

Without activation you can still use LED Strip Studio software using Art-Net™ but purchasing Art-Net™ license for LED Strip Studio is required.

To recognize if device is activated for LED Strip Studio software check status of activation by the device menu or the device web interface.

DEVICE COMPATIBILITY

POWERED SPI LED CONTROLLER 2 can be controlled by any Art-Net™ controller/software. Few popular ones are:

- **LED Strip Studio software with Art-Net™ license for LED Strip Studio**
- **Madrix™**
- **ChamSys™**
- **grandMA™**
- **MadMapper**
- **Resolume**
- **and many others.**

Activated POWERED SPI LED CONTROLLER 2 can also use LED Strip Studio software without need of Art-Net™ license for LED Strip Studio.

OR

For easier installations can be controlled by any DMX512 source or completely stand alone.

POWERED SPI LED CONTROLLER 2 can control various types of individually addressable (AKA Digital or SPI) LED strips or pixels on its LED output. Check [Device details](#) chapter for more details.

POWERED SPI LED CONTROLLER 2 with longer cable run needs on LED output can be used with:

- **THE SYMMETRIZER**
- **TTL BUFFER**

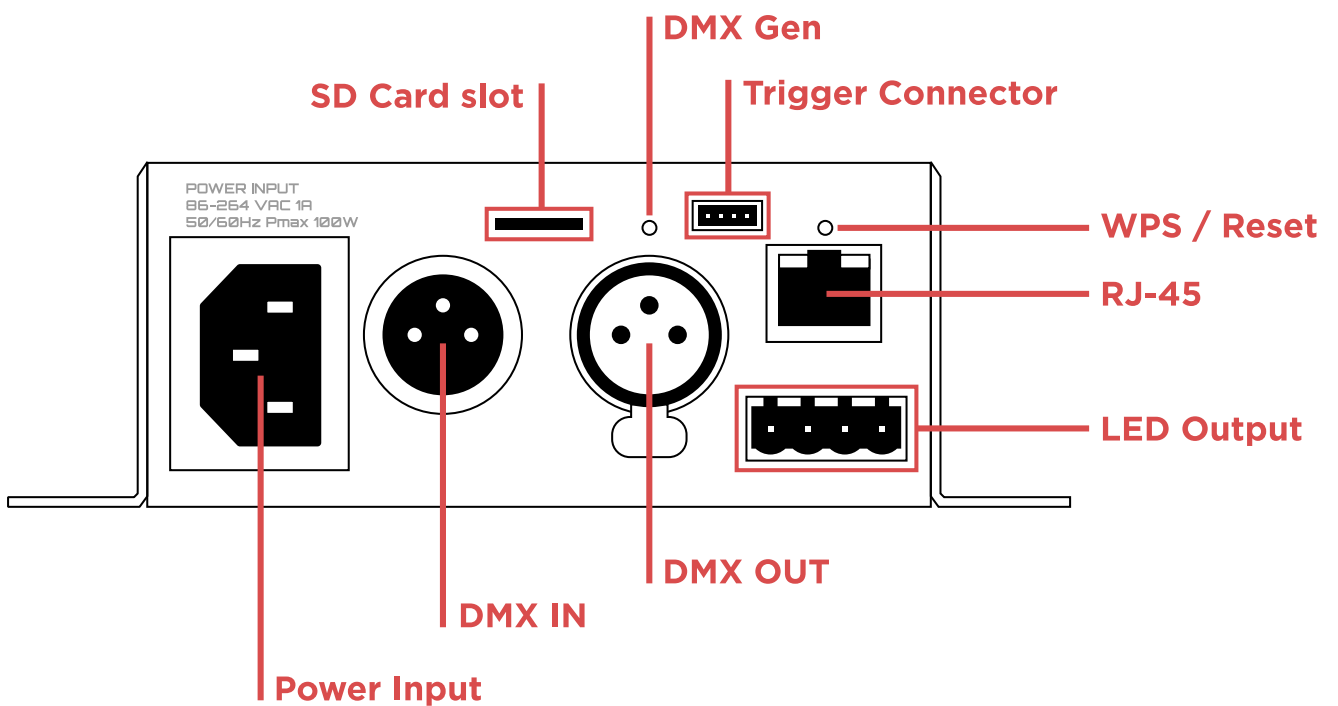
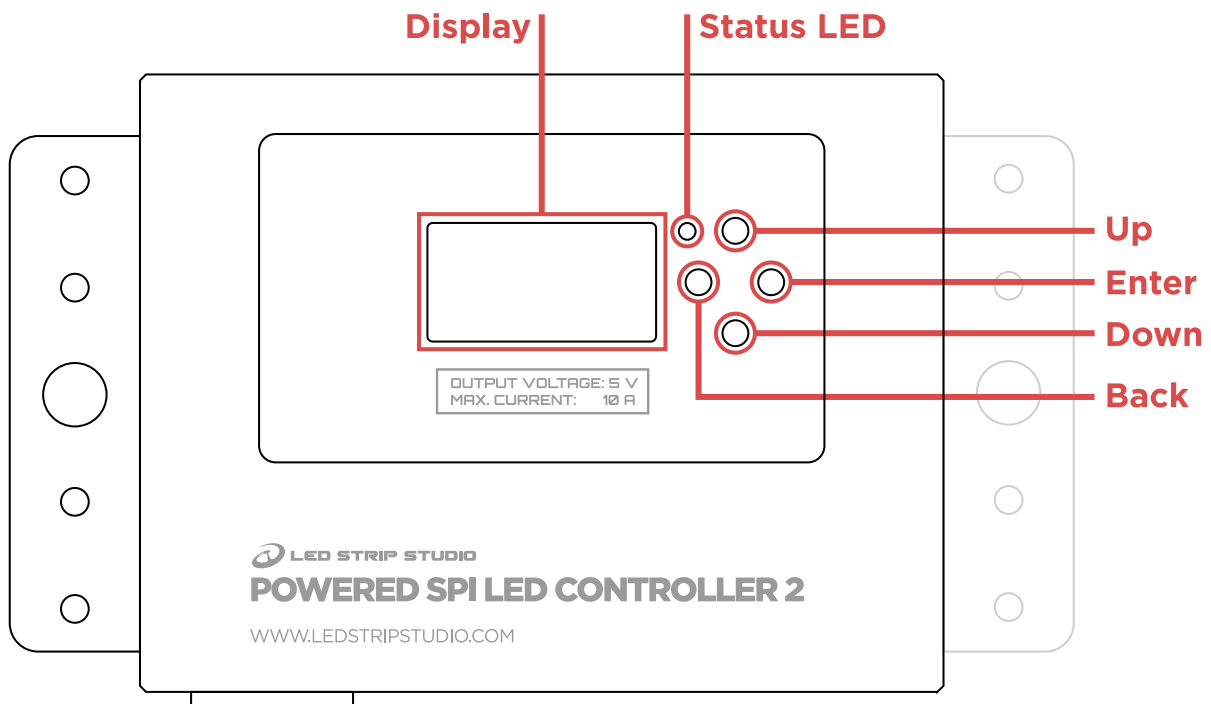
DMX output can be used to control any DMX512 compatible devices such as:

- **LADY DIMMER**
- **Another POWERED SPI LED CONTROLLER 2**
- **DMX dimmers and many more**

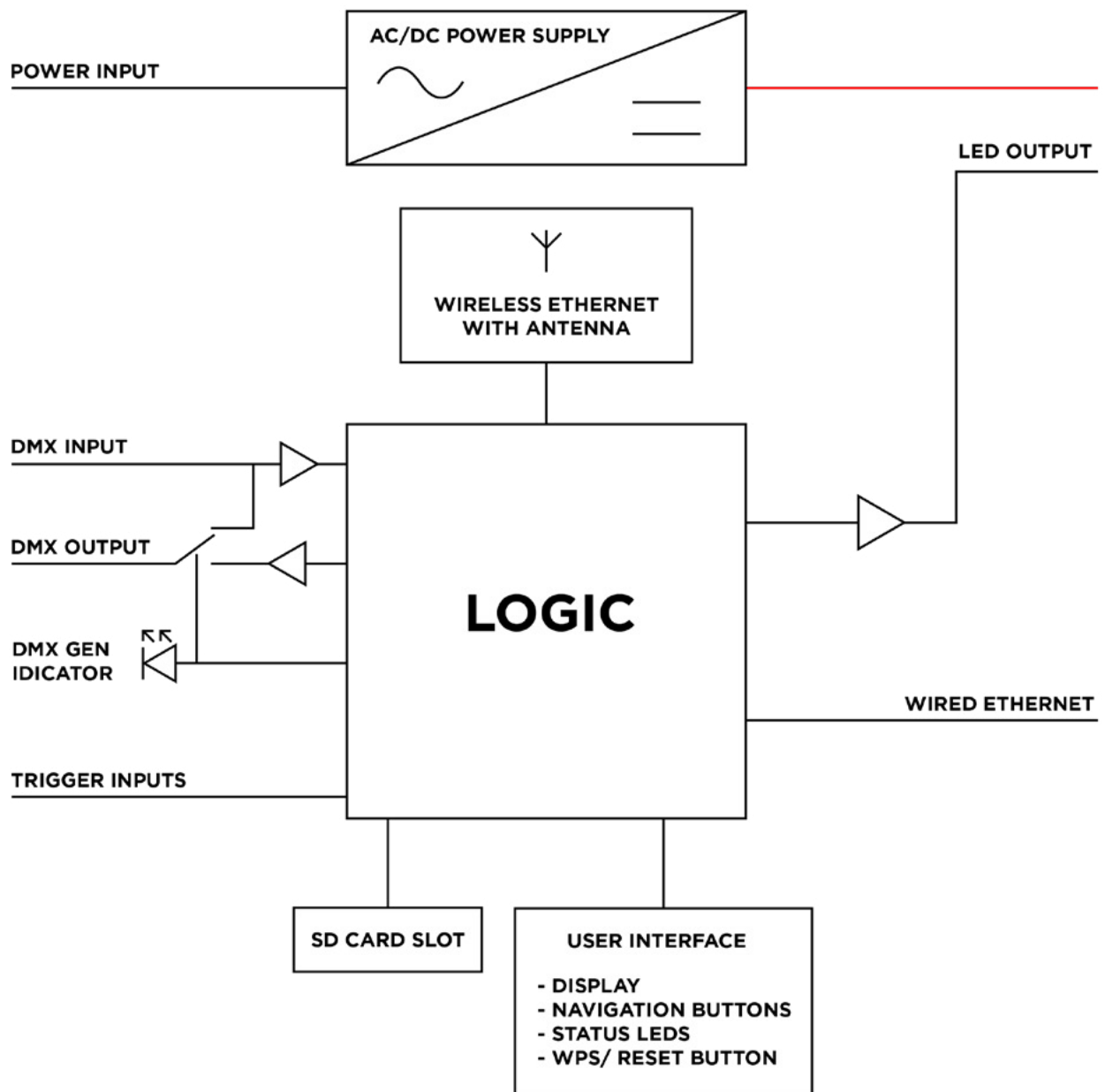
POWERED SPI LED CONTROLLER 2 Trigger inputs are compatible with wide variety of switches, push buttons or sensors.

For applications where more triggers are needed **DMX TRX** can be used to trigger blackout & 7 animations from SD card.

DEVICE DESCRIPTION



DEVICE BLOCK DIAGRAM



DEVICE DETAILS

POWERED SPI LED CONTROLLER 2 is very compact versatile device and it has been designed to meet wide variety of use cases.

Main function is to generate signal on its LED output which is able to power and control many kinds of individually addressable (AKA digital or SPI) LED strips or pixels.

Compatible digital LED strips chips are:

- **TM family like TM1809, TM1804....**
- **WS family like WS2801, WS2811, WS2812, WS2812B, WS2813, WS2815....**
- **SK family like SK6812....**
- **APA family like APA 102, APA104....**
- **and many more**

For detailed LED IC compatibility check:

<https://ledstripstudio.com/wiki-category/ic-pixel-led-types/>

Source of control signal can be:

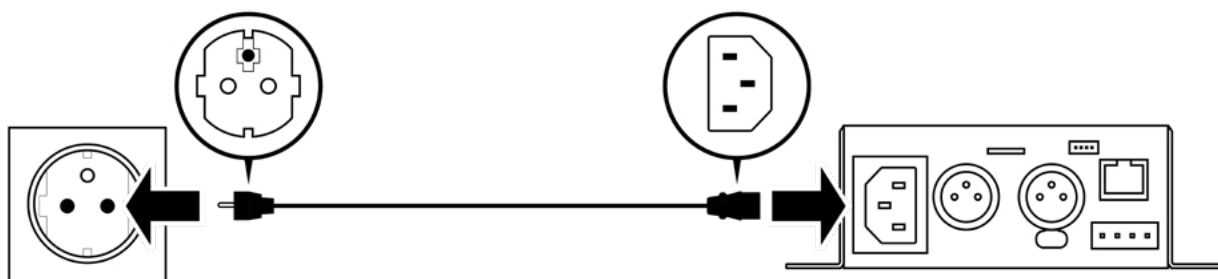
- **LED Strip Studio software**
- **Any Art-Net™ controller/software**
- **LSS REMOTE ([Android](#) and [IOS](#) smartphone application)**
- **Any DMX512 controller/software**
- **User programmable playlist from SD card with preloaded scenes/effects/shows**
- **User programmable events activated by device trigger inputs**
- **Test patterns**

Besides of controlling LED strips or pixels, POWERED SPI LED CONTROLLER 2 can be used as:

- **DMX512 source (generator)**
- **Art-Net™ to DMX512 converter (also called Art-Net™ node)**

DEVICE CONNECTION

Connecting POWERED SPI LED CONTROLLER 2 to power is easy and straight-forward. Just connect POWERED SPI LED CONTROLLER 2 to your AC outlet using attached IEC power cable.



**PLEASE NOTE THAT AC POWER SOCKET
MUST BE PROPERLY GROUNDED!**



Connecting POWERED SPI LED CONTROLLER 2 to network can be done by one of following ways:

- Direct wired connection
- Wired connection over a network switch
- Wirelessly in Wi-Fi client mode
- Wirelessly in Wi-Fi Access point (AP) mode

DIRECT WIRED CONNECTION



WIRED CONNECTION OVER A NETWORK SWITCH



WIRELESSLY IN WI-FI CLIENT MODE



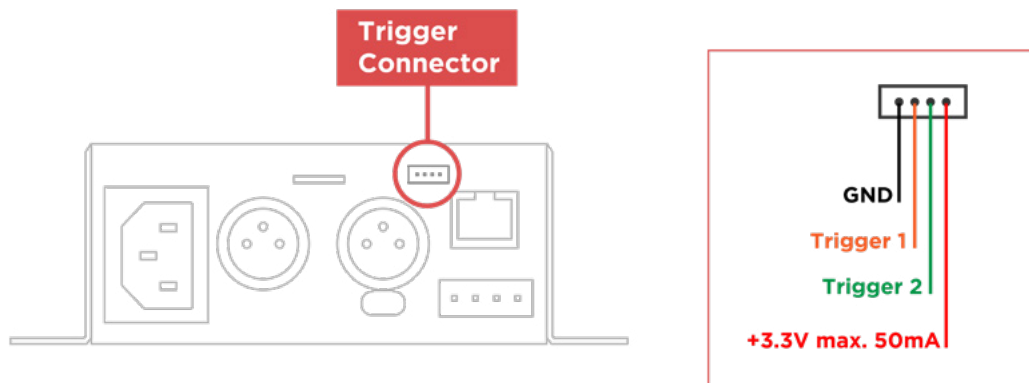
WIRELESSLY IN WI-FI ACCESS POINT (AP) MODE



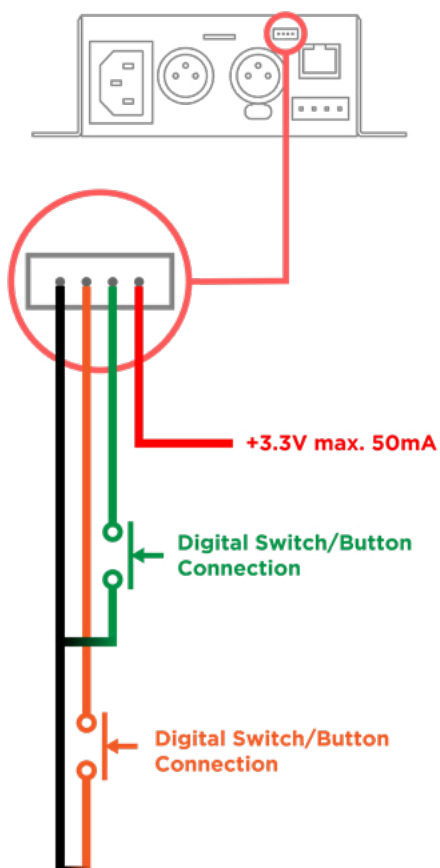
Typical POWERED SPI LED CONTROLLER 2 in DMX daisy chain connection diagram:



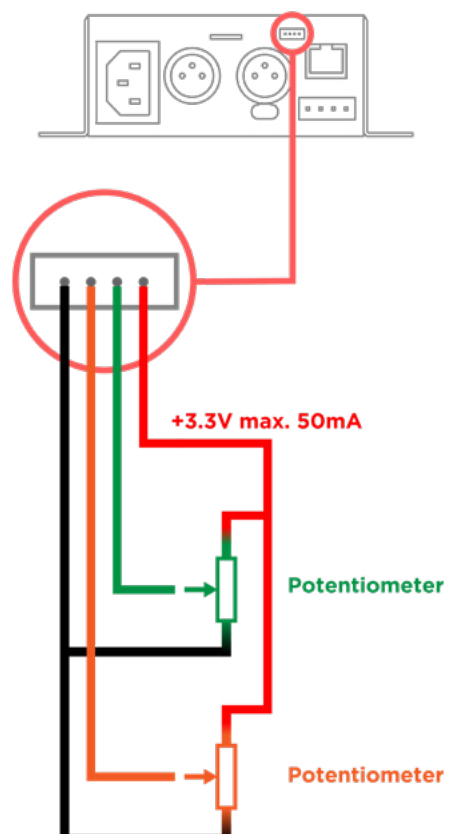
POWERED SPI LED CONTROLLER 2 trigger inputs connection diagram:



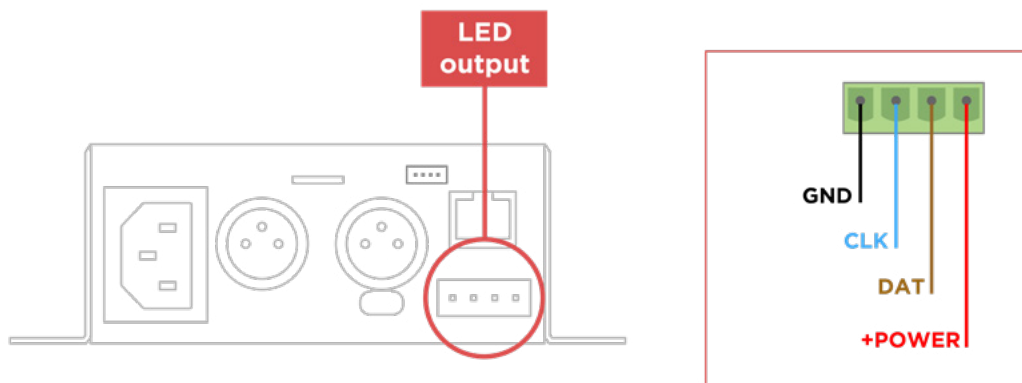
Digital trigger connection
(e.g. push buttons)
connection example:



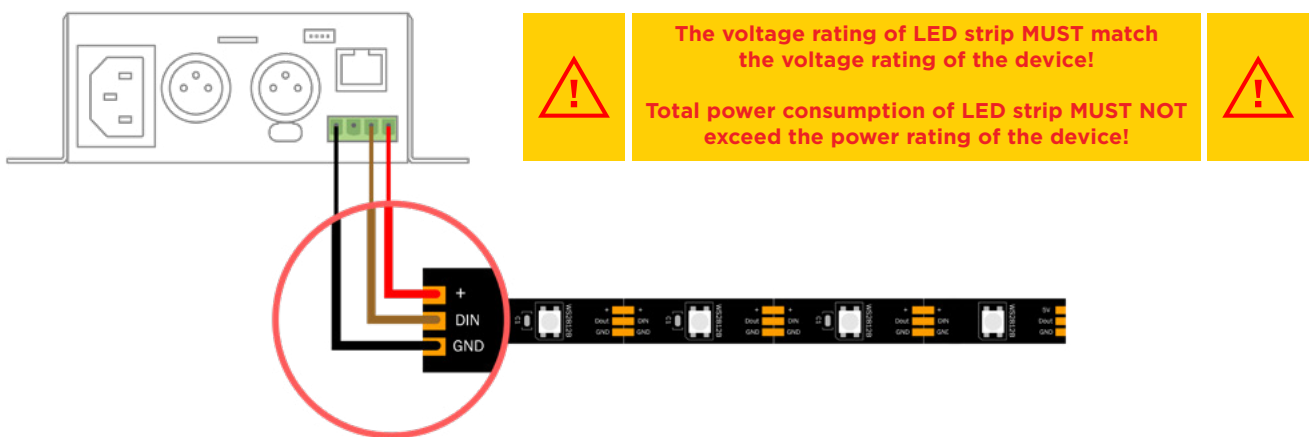
Analog trigger connection
(e.g. potentiometer)
connection example:



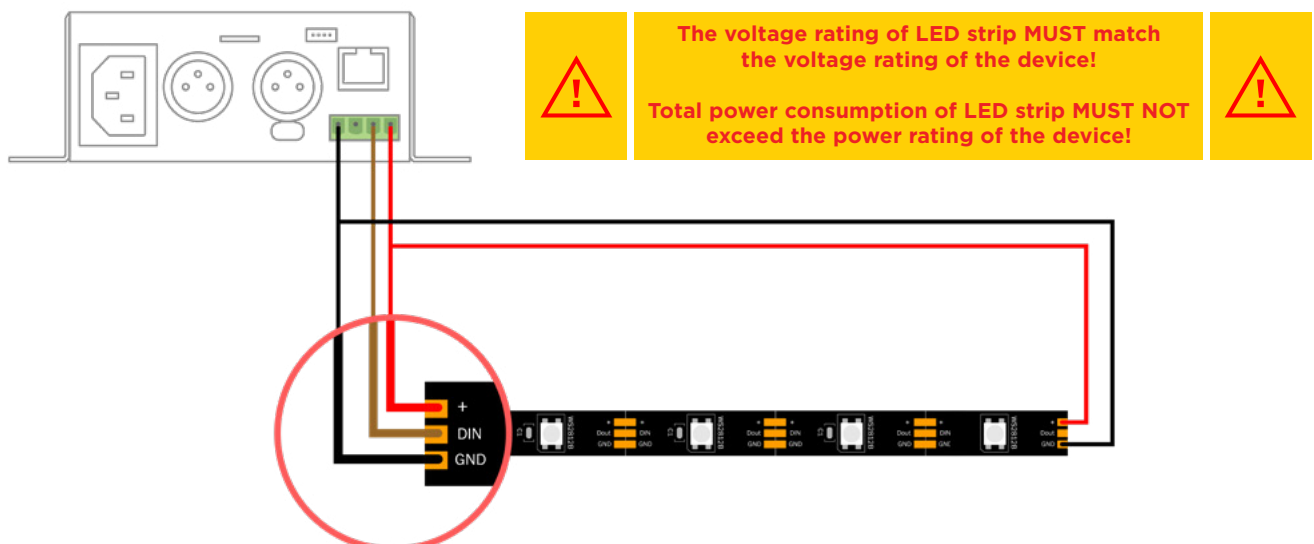
POWERED SPI LED CONTROLLER 2 LED output connection example diagrams:



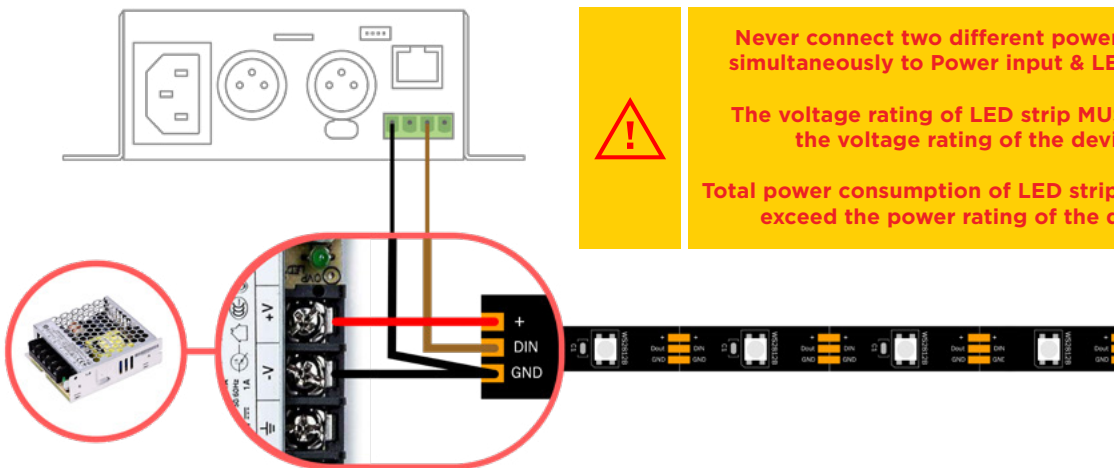
LED STRIP CONNECTION TO LED OUTPUT



LED STRIP CONNECTION TO LED OUTPUT WITH POWER INJECTION



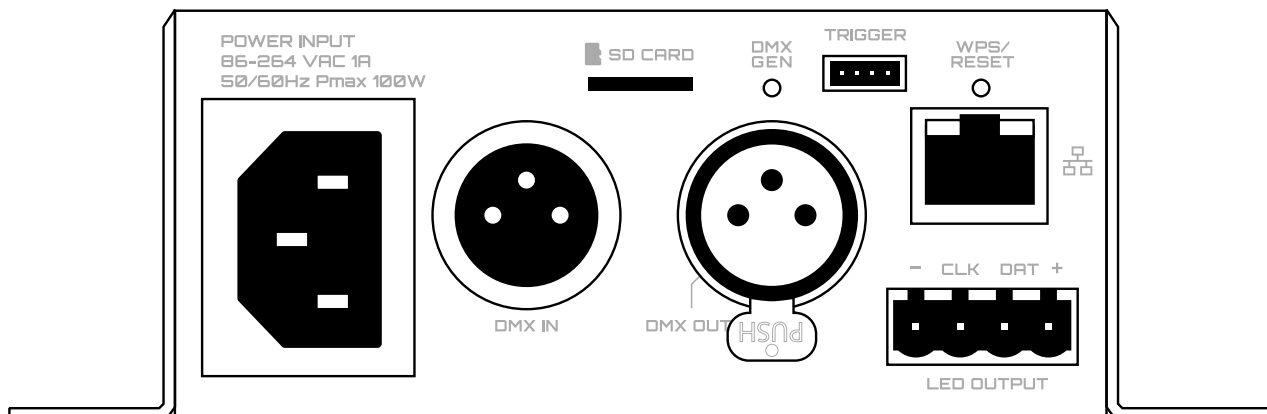
LED STRIP CONNECTION TO LED OUTPUT WITH EXTERNAL POWER SUPPLY FOR LED STRIP



Never connect two different power sources simultaneously to Power input & LED output

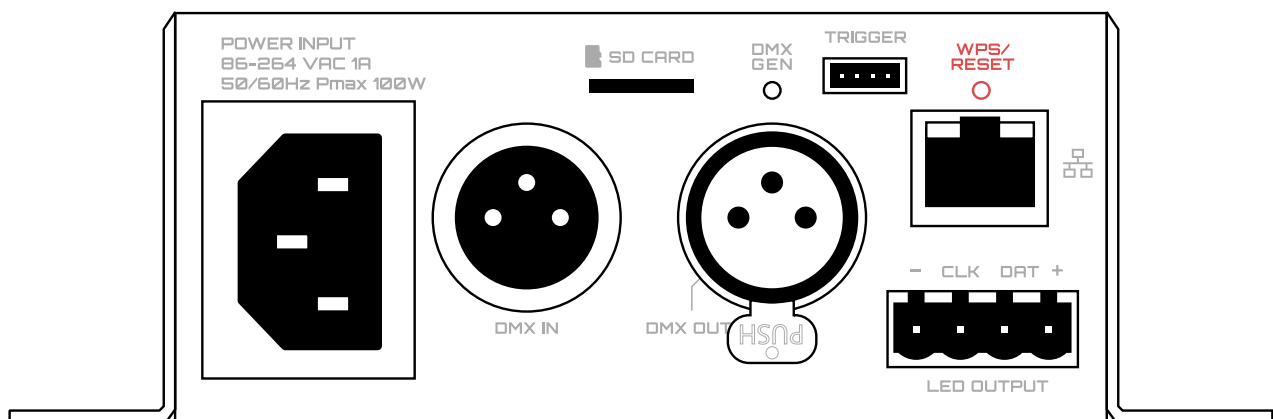
The voltage rating of LED strip MUST match the voltage rating of the device!

Total power consumption of LED strip MUST NOT exceed the power rating of the device!



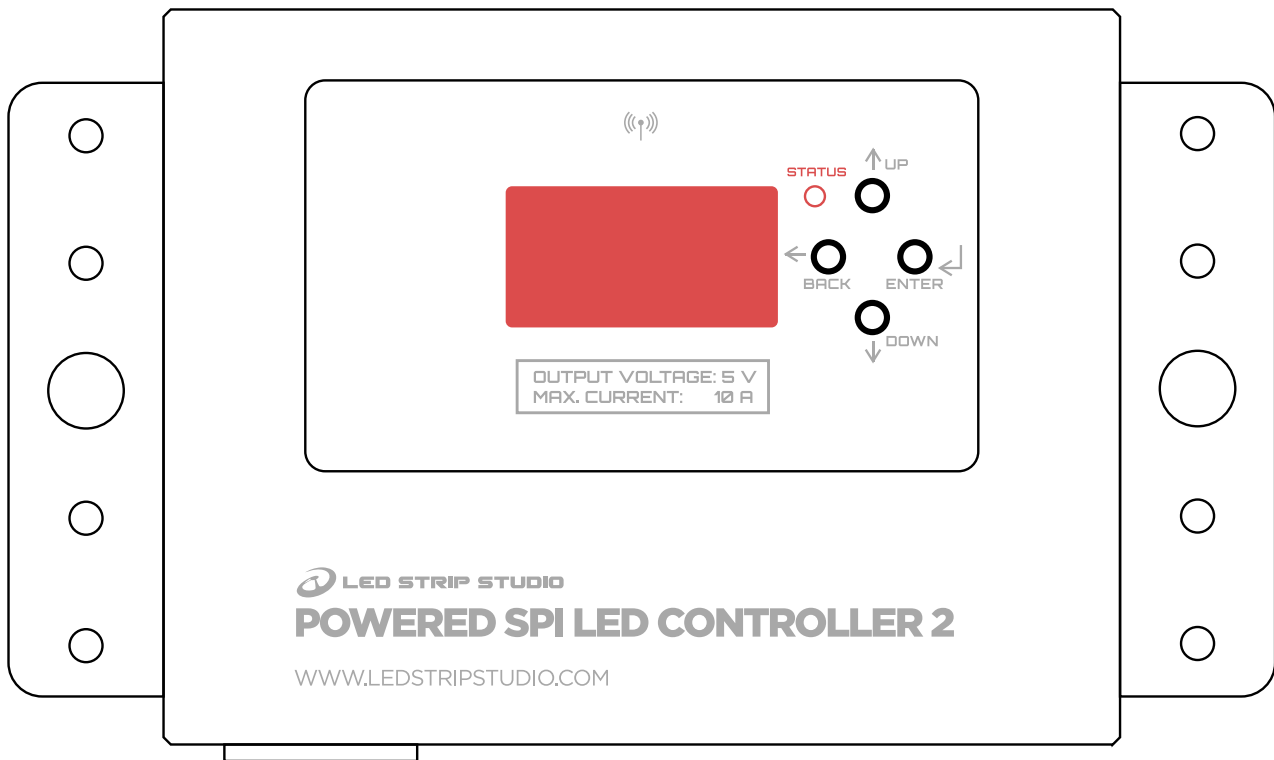
1. DEVICE USER INTERFACES & NETWORK CONDITIONS EXPLANATION

1.1 RESET/WPS PUSH BUTTON



- **Short press:** WPS procedure start/stop
- **Hold for 3-10 seconds:** Reset Wi-Fi credentials (blue LED blinks slowly)
- **Hold for more than 10 seconds:**
Reset of all settings (blue LED starts to blink rapidly)
- **Hold for more than 15 seconds during power ON cycle:**
Factory reset (back to original firmware)

1.2 STATUS LED AND DISPLAY



CONNECTION TYPE & STATUS

-  WI-FI AP MODE
-  WIRED DHCP CLIENT
-  WIRED STATIC IP
-  WIRED DHCP SERVER
-  WIFI CLIENT MODE - CONNECTED
-  WIFI CLIENT MODE - NOT CONNECTED
-  WIFI DISABLED, WIRED DHCP CLIENT - NOT CONNECTED



DEVICE AND DATA STATUS

- | | | | |
|--|---|--|--|
| 
SD CARD
INSERTED | 
SD CARD
NOT INSERTED | 
OUTPUT
DATA SENT | 
OUTPUT
DATA NOT SENT |
| 
DMX
CONNECTED | 
DMX
DISCONNECTED | 
SETTINGS
NOT SAVED | |

1.2.1. In Wi-Fi Access point (AP) mode

Status LED: ON

Display: status bar is showing the  icon



1.2.2. In Wi-Fi WPS pairing mode

Status LED: ON

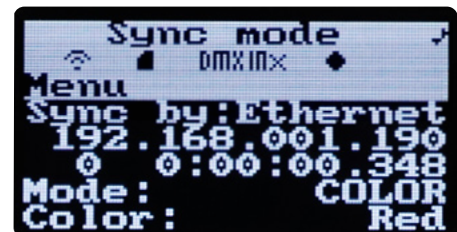
Display is showing **WPS SEARCHING...**



1.2.3. In Wi-Fi Client mode

Status LED: ON

Display: Status bar is showing the  icon



1.2.4. During & after firmware upgrade from SD card

When firmware update is in progress:

Status LED: blinks

Display: - Shows **Current FW -> New FW**
- Shows **progress bar with %**.



For short time after firmware update:

Green: OFF

Display: Progress bar shows **Verifying...**



1.2.5. Slave mode (device is in active zone)

Status LED: blinks 10times per second

Display is showing **Slave device**



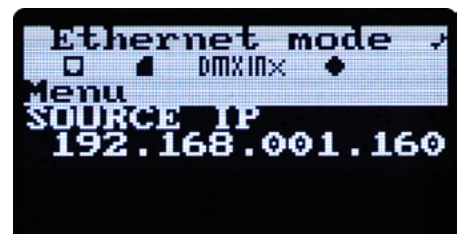
1.3 Wi-Fi

- POWERED SPI LED CONTROLLER 2 can operate as Wi-Fi Access point  (AP mode) or Wi-Fi client  (client mode)
- POWERED SPI LED CONTROLLER 2 is set to Wi-Fi AP mode by default
- in Wi-Fi AP mode
 - DHCP server is enabled, and its IP address is 192.168.4.1
 - when Wi-Fi credentials are set, device will be switched to Wi-Fi client mode
 - **IMPORTANT! Android devices requires connection confirmation to establish network connection to POWERED SPI LED CONTROLLER 2**
 - it is possible to connect another POWERED SPI LED CONTROLLER 2 device(s) as clients
- in Wi-Fi client mode
 - device is ALWAYS DHCP client
- Once active wired Ethernet connection is established (RJ45 cable connected to switch, router, PC...) Wi-Fi on POWERED SPI LED CONTROLLER 2 device is **automatically switched OFF**



1.4 WIRED ETHERNET CONNECTION (RJ45)

- Once active wired Ethernet connection is established (RJ45 cable connected to switch, router, PC...) Wi-Fi on POWERED SPI LED CONTROLLER 2 device is **automatically switched OFF**
- In wired Ethernet mode POWERED SPI LED CONTROLLER 2 device can be set as **DHCP client** , **DHCP server**  (192.168.3.1), or **Static IP** 



1.5 DMX

- After connection DMX IN the status bar will show **DMX IN** ✓. Depending on the device settings the device switches to the requested mode.

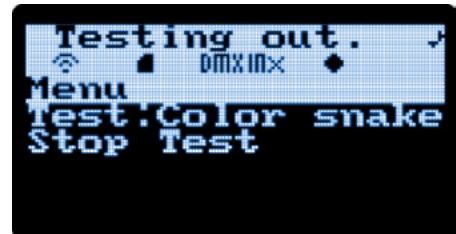


- DMX OUT can switch between THROUGH and DMX generation

2.CONTROL OPTIONS (LISTED FROM HIGHEST TO LOWEST PRIORITY)

2.1 TEST (HIGHEST PRIORITY)

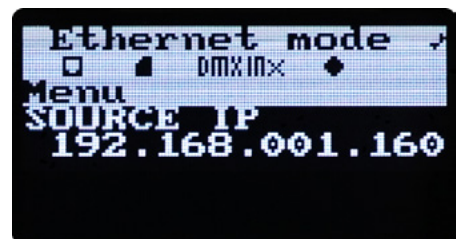
- Device generate a predefined color or animation for functional testing of connected pixel LEDs



- Always generate maximum possible pixel count signal for selected IC type

2.2 “ETHERNET” = LED STRIP STUDIO PROTOCOL (FROM LED STRIP STUDIO 3 SOFTWARE AKA LSS)

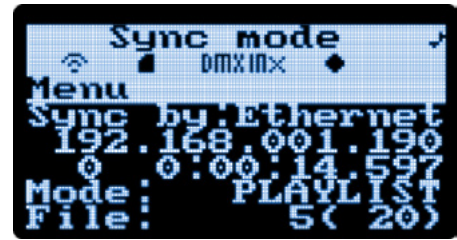
- Device generate signal for pixel LEDs from LSS, which allows live controlled pixels on multiple devices from PC.



- **IMPORTANT! This feature requires activation - request at info@ledstripstudio.com**

2.3 SYNCHRONIZATION MODE

- Mode when device is controlled/synchronized by another master device and it is used for smooth synchronization of multiple devices on same network and zone setting.



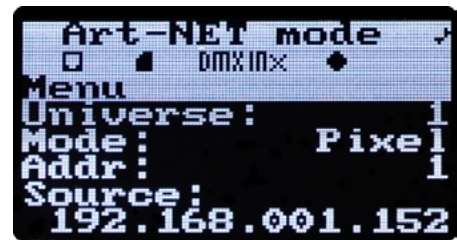
Note: Multiple zones (up to 255) may coexist on single network

- Only devices that have “Sync Mode” == Slave are affected.
(More in Settings)
- The synchronization signal can be transmitted via Ethernet communication (RJ-45 or Wi-Fi) or via DMX
- In order to use this mode, each Zone has to have one “Master” device
- In order to use this mode, device has to be set to “Slave” in Player synchronization setting
- In this mode device play same animation as master of same zone, with synchronized time stamp. So if brightness/contrast or speed of animation is changed on master, slave also apply same setting
- **IMPORTANT! Synchronization accuracy is network dependent. Network should be collision free, fast speed and low latency in order to achieve perfect results.**

2.4 ART-NET™ / DMX

2.4.1. Pixel mode

Incoming Art-Net™ / DMX data are sent to pixel LEDs on device LED output based on settings.



2.4.2. SD card mode

Incoming Art-Net™ / DMX data are used to trigger desired animation file from SD card and effect parameters like speed, brightness and recolor.



Channel list from starting address is following:

1. **Brightness**
2. **Animation index from SD-card**
3. **Speed of animation (0-stop, 128=100%, 255=300%)**
4. **Recolor animation to Red**
5. **Recolor animation to Green**
6. **Recolor animation to Blue**
7. **Recolor animation to White**

(this channel is received also in case when RGBW IC type is not selected)

- Red, Green, Blue and White recolor channels are used to set the color (it is not the intensity of color channels). Every color can be changed to value defined by recolor channel values (the brightness is transferred from the original color). In case all 4 recolor channels are set to 0, colors defined on SD card file are used
= original colors from animation file without change.

- Can be used also as a “Zone” control if device has set “Sync mode” to “Master”

2.5 AUTOPLAY (LOWEST PRIORITY)

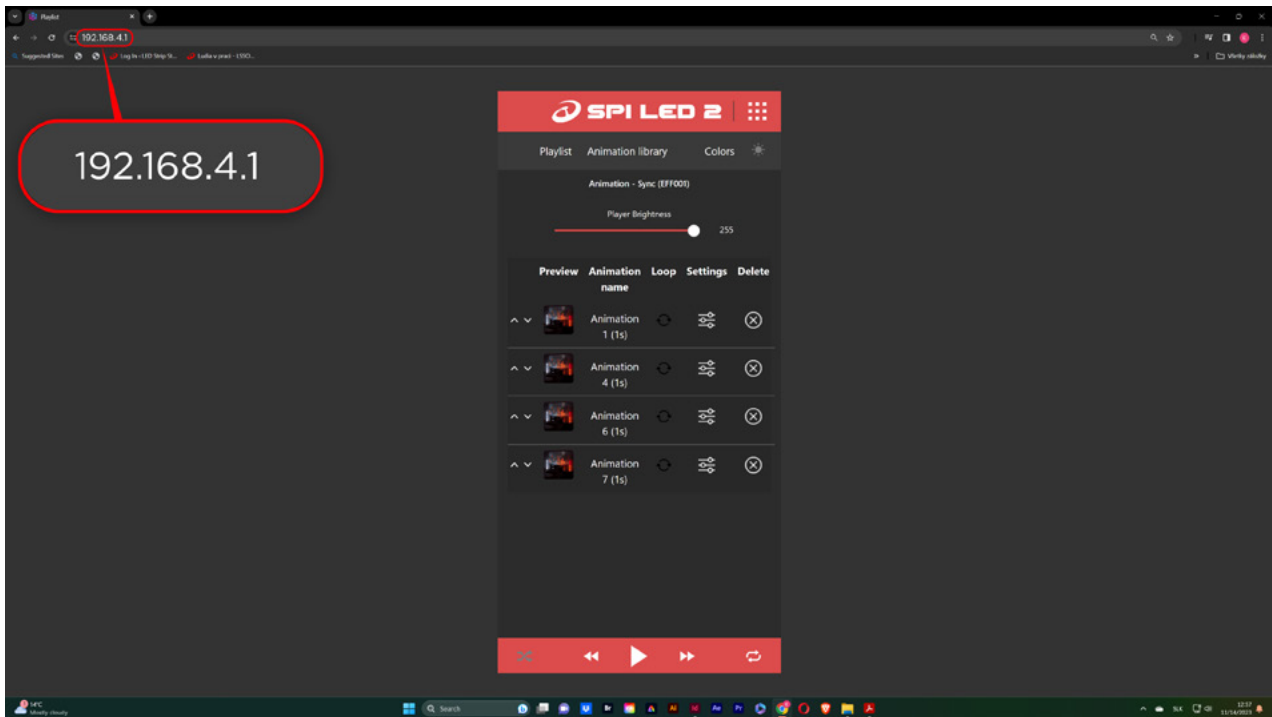
- Mode in which device play animation file(s) from SD card or static color
- Following options exist:
 - **Playlist (up to 32 files)**
user programable sequence of animations including looping, shuffle and few user settings
 - **Animation library (single animation file)**
 - **Colors (static color from color list)**
- Control can be done by:
 - **Web interface**
 - **HTTP commands**
 - **external trigger sources**
(like push buttons, switches, sensors...)
 - **Android/IOS mobile application**
 - **Autoplay control options has equivalent priority and latest takes precedence, so for example animation triggered by web interface can be changed by HTTP command and vice versa**
 - **Can be used also as a “Zone” control if device has set “Sync mode” to “Master”**



3. WEB INTERFACE

3.1 HOW TO OPEN WEB INTERFACE

- Use PC or mobile/tablet connected to same local network as POWERED SPI LED CONTROLLER 2. Run web browser (e.g. Chrome) and type in a device address in navigation bar. For example <http://192.168.4.1>



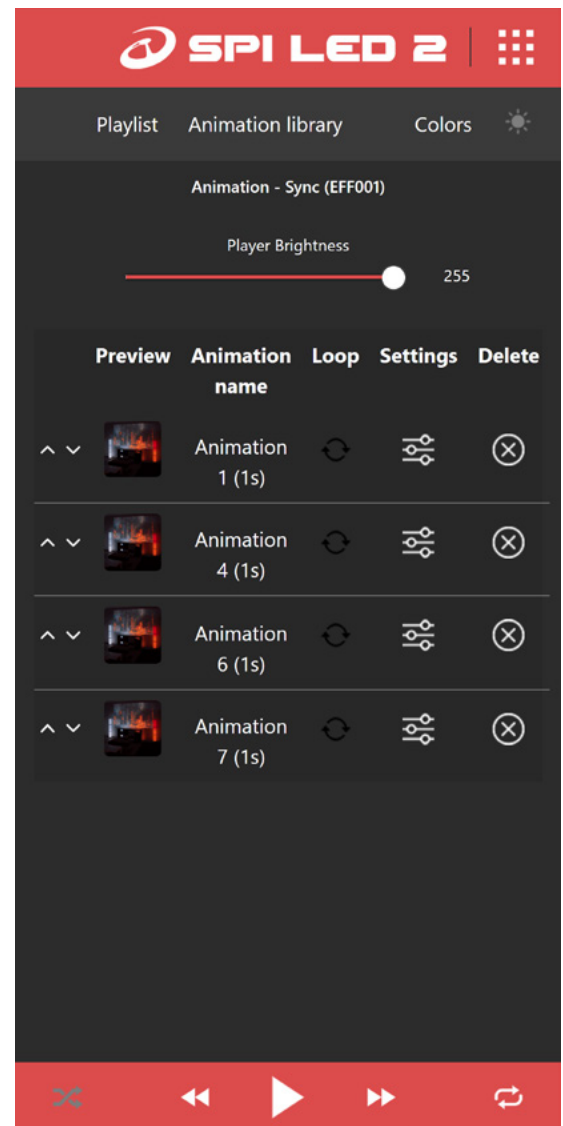
If you don't know device IP address, use our [Android](#) or [IOS](#) application which is able to search all devices on same local network. IP address can be also searched by [LSS 3 Software](#) and many Art-Net™ software or consoles.

3.2 PAGE “PLAYER”

- Is used to control Autoplay mode and it is divided into sub-pages (Playlist, Animation library, Colors)
- Can be used ONLY in Autoplay (lowest priority) mode.
- Operations performed are automatically saved to SD card if inserted. When the SD card is not inserted, all changes will disappear.
- During device power-on sequence last state is loaded from SD card and applied. Few exceptions exist on last state loading:
 - If playlist was used, it will start always from beginning
 - If playlist was used and paused, pause will be ignored and playlist will start always from beginning
 - If “Default file” is set in device settings, then default file defined will be started after device power on
- Sub-page contains:
 - Menu (playlist, animation library, colors)
 - “Output Enable” button for disabling Autoplay
 - **which forces blackout on device pixel LED output (animation is still playing in background)**
 - **“Output Enable” can be also set by external trigger, setting page, or Android/IOS mobile application**
- Real time preview of pixel LED output content
 - **this require MAPPING.Is2 file on SD card**
 - **real time preview of pixel LED output content is refreshed about 5-times per second (depending on network connectivity and load)**
 - **in case there is no file on the card, this part is hidden**
 - **Active device operation mode including details (actually played file, or IP address of content source)**
 - **Actual brightness setting (this brightness is independent of “HW brightness” set in device settings)**

3.2.1. Player Sub-page “Playlist”

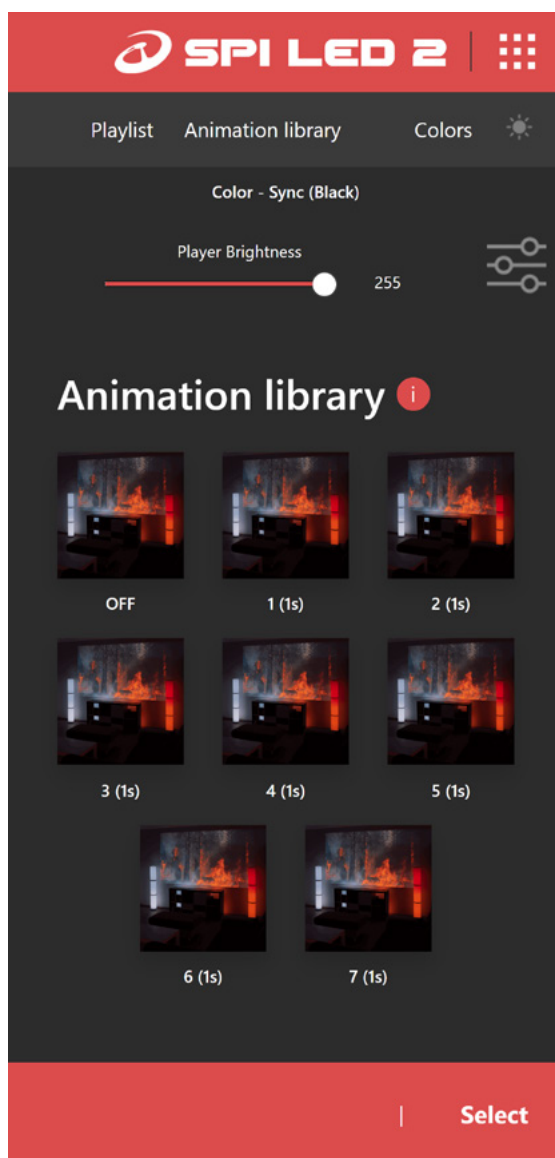
- Is used to create a short Playlist from animation files on SD card with a maximum of 32 items.
- Playlist is fully user programmable/ manageable.
- In order to add files to Playlist use Select button on the bottom of sub-page “Animation library”
- Playlist can be used “once” or “loop” or “shuffle” or even with infinite loop on desired animation
- With shuffle enabled, but loop disabled, Playlist will stop once last animation from Playlist is executed
- User can add same animation multiple times
- Each Playlist entry contain also following settings:
 - **animation “LOOP”**
 - can be set on single animation entry in Playlist
 - when using the same animation repeatedly, this setting is irrelevant.
 - **individual settings (speed, contrast)**
applied for all identical animations simultaneously. These settings are shared with the “Animation library”.



Playlist Sub-page

3.2.2. Player Sub-page “Animation library”

- Display all available .In2 files based on their index on SD card and their duration in seconds
- Is used for fast trigger of animation from SD card
- Has “individual setting” for selected animation (contrast, speed)
- Bottom part of this sub-page has Select button which is used to copy animations to sub-page “Playlist”



Animation Library Sub-page

3.2.3. Player Sub-page “Colors”

- Display list of few basic static color presets
- Is used to quick run static color to device pixel LED output
- Static color is sent to ALL pixels on device pixel LED output
- Has setting to adjust brightness
- This mode is automatically selected in Autoplay mode if SD card is not inserted



Colors Sub-page

R	G	B	W	Name
0	0	0	0	Black
255 (0)	255 (0)	255 (0)	0 (255)	12% White*
255 (0)	255 (0)	255 (0)	0 (255)	24% White*
255 (0)	255 (0)	255 (0)	0 (255)	37% White*
255 (0)	255 (0)	255 (0)	0 (255)	50% White*
255 (0)	255 (0)	255 (0)	0 (255)	62% White*
255 (0)	255 (0)	255 (0)	0 (255)	75% White*
255 (0)	255 (0)	255 (0)	0 (255)	87% White*
255 (0)	255 (0)	255 (0)	0 (255)	100% White*
255	0	0	0	Red
255	165	0	0	Orange
255	191	0	0	Amber
255	255	0	0	Yellow
127	255	0	0	Chartreuse
0	255	0	0	Green
0	255	63	0	Malachite
0	255	159	0	Spring Green
0	255	255	0	Cyan
0	127	255	0	Azure
0	63	255	0	Blue Ribbon
0	0	255	0	Blue
127	0	255	0	Violet
223	0	255	0	Phlox
255	0	191	0	Purple
255	0	127	0	Rose

* based on IC setting RGB (RGBW)

3.3 PAGE “STATUS”

Displays following device parameters:

- **Device**

- **Controller name**
The name or identifier of the controller device
- **Firmware version**
- **Build time**
- **Hardware version**
- **Serial number**
- **Activated (variable)**
- **Run time**
- **SD-Card inserted (variable)**
- **Control mode (variable)**
- **Trigger 1 (variable)**
Value of the first trigger input, with a note that the value represents the actual analog input on Trigger 1
- **Trigger 2 (variable)**
Value of the second trigger input, with a note that the value represents the actual analog input on Trigger 2

- **Network**

- **Net state (variable)**
- **Wifi is (variable, hidable)**
- **Current WiFi (variable, hidable)**
- **SSID**
- **MAC addr**
- **IP addr**
- **Mask**
- **Gateway**

SPI LED 2	
Device	
Controller name:	SPI LED 2
Firmware version:	Test S6.3.1
Build time:	Jan 25 2024 09:18:41
Hardware version:	6.0
Serial number:	1488
Activated:	Yes
Run time:	0 00:27:48.164 (D HH:MM:SS.MILS)
SD-Card inserted:	Yes
Control mode:	Color - Sync (Black)
Network	
Net state:	WiFi Client - connected
Wifi is:	ON
Current WiFi:	Showtacle
SSID:	Reactivo_1488
MAC addr:	90:4e:91:c0:0d:ca
IP addr:	192.168.1.178
Mask:	255.255.255.0
Gateway:	192.168.1.1
Output	
Autoplay output:	ON
LED Strip type (IC):	TM1809 800kHz
Color order:	G R B
Current FPS:	24
Is drawing:	OFF
DMX	
DMX IN:	OFF
Triggers	
Trigger 1:	255
Trigger 2:	255

Status Page

- **Output**
 - Autoplay output (variable)
 - LED Strip type (IC) (variable)
 - Color order (variable)
 - Current FPS (variable)
 - Is drawing (variable)
- **Art-Net™**
 - First universe (variable)
 - Enable Hold Art-Net™ mode after signal lost (variable)
 - Art-Net™ mode (variable)
 - Art-Net™ Address (variable)
 - Animation step size (variable, hidable)
 - Use Art-Net™ animation delay (variable, hidable)
 - Number of pixels (variable, hidable)
 - LEDs per pixel (variable, hidable)
- **DMX**
 - DMX IN status (variable)
 - DMX OUT mode (variable)
 - Enable Hold DMX mode after signal lost (variable)
 - DMX mode (variable)
 - DMX Address (variable)
 - Animation step size (variable, hidable)
 - Use DMX animation delay (variable, hidable)
 - Number of pixels (variable, hidable)
 - LEDs per pixel (variable, hidable)

- **Triggers**

- **Trigger 1 (variable)**
Value of the first trigger input, with a note that the value represents the actual analog input on Trigger 1
- **Trigger 2 (variable)**
Value of the second trigger input, with a note that the value represents the actual analog input on Trigger 2

- **Synchronization**

- Mode
- Sync source IP (variable, hidable)
- Allowed sync types (variable, hidable)
- Sync by (variable, hidable)
- Turn off after master signal lost (variable, hidable)
- Synchronization keep alive duration [s] (variable, hidable)
- Timecode (DDD HH:MM:SS.MMM) (variable, hidable)
- Player mode (variable, hidable)
- Index (variable, hidable)
- Color (variable, hidable)
- File (variable, hidable)
- Zone name (variable, hidable)
- Zone ID (variable, hidable)
- Brightness (variable, hidable)
- Speed (variable, hidable)
- Contrast (variable, hidable)
- Send out (variable, hidable)
- R (variable, hidable)
- G (variable, hidable)
- B (variable, hidable)

Triggers Page

- W (variable, hidable)
 - Repeat (variable, hidable)
 - Play (variable, hidable)
-
- Parameters marked as “variable” are automatically refreshed when web page is opened
 - parameters marked as “hidable” are not always shown

3.4 PAGE “TRIGGERS”

- Allows user to add, remove, configure and reset trigger options
- Allows user to set up various (and multiple) events based on external trigger input events
- Each event is defined by following settings:
 - **Source**
defines trigger input using which event should be executed
 - **Trigger type**
defines a method of processing value gotten from a source
 - **Action**
defines what event to be executed once a valid trigger occurs
- Each trigger entry has:
 - **Name (up to 32 characters)**
A user-defined name for a particular trigger setting, limited to a maximum of 32 characters
 - **Active**
Enables selected Trigger
 - **Trigger type**
Type of the Trigger (Digital, Analog, On Press, ...)
 - **Source**
Select Trigger for Event
 - **Source value**
Shows to user actual reading of corresponding Trigger input in % or absolute value (displaying % or absolute value is based on device setting)
 - **Action**
Select type of Action for your Trigger
 - **Standard settings**
 - **Advanced settings (only shown if desired)**
are separated from standard setting by a tab and are also color separated with following meaning:
 - o **dark purple:** Trigger type
 - o **green:** Source
 - o **blue:** Action

Default triggers are set to:

**Source: TRIG 1, Trigger type: press,
Action: ANIMATION NEXT/PREV (NEXT)**

- connecting trigger1 input to GND will play next animation in library

**Source: TRIG 2, Trigger type: analog,
Action: BRIGHTNESS**

- connecting trigger2 input to voltage 0-3.3V (for example by potentiometer) in respect to GND will adjust pixel LED output brightness 0-100%

3.4.1. Trigger Source

- Defines trigger input using which event should be executed (trigger input 1 or 2)
- One trigger source can be used for multiple events
- Setting options are independent from *Trigger type* and *Action*
- Setting options:
 - **TRIG 1 – represent physical Trigger1 pin on device trigger connector**
 - **TRIG 2 – represent physical Trigger2 pin on device trigger connector**

**When using one trigger input for multiple events, conflicts may occur!
User has to pay attention to NOT set contradictory events.**

- Standard settings:
 - nothing to set
- Advanced settings options are dependent on *Trigger type*, but independent on *Action*
- Advanced settings are:
 - **INVERT**
Used to invert incoming value. So value used = 255 – incoming value.
 - **PRESS**
 - o **Press Delay [ms]**
Time window between pressing button multiple times.

- **DIGITAL**

- o **Minimal active time [ms]**

- Minimal duration of the trigger pulse to activate the trigger. Prevents accidental signal interruption (noise).

3.4.2. Trigger type

- Defines a method of processing value received from a source
- Setting options are independent from *Source* and *Action* settings
- Setting options are:
 - **DIGITAL**
Incoming values 0-127 are processed as “true” other values as “false”
 - **ANALOG**
Incoming values 0-255 are used “as they are”
[0-255 or 0-100% respectively]
 - **PRESS**
Similar to “DIGITAL” but counts toggles from state False to state True.
(useful for defining events on let’s say 3 button presses)
- Trigger type settings options are independent on Source settings, but **dependent on Action settings**
- Standard settings:
 - nothing to set
- Advanced settings:
 - **DIGITAL**
 - o **Delay [ms]**
Defines an event *Action* execution postponed in milliseconds
 - o **Duration [ms]**
Defines how long (in milliseconds) an event *Action* is performed
 - **ANALOG**
 - o **Smooth (feature which provides input signal filtering)**
when enabled, value used is average of last 16 measurements

o **values dependent on Action:**

BRIGHTNESS/SPEED

- **Min Trigger [0-255 or 0-100% respectively]**
 - Sets minimum threshold value on which Action reacts
 - Together with “Max Trigger” defines an sensitivity range, in which incoming trigger value is calculated by interpolation to value used, based on “Min Value” a “Max Value” setting.
 - Values lower than “Min Trigger” will be used as “Min Value”
- **Max Trigger [0-255 or 0-100% respectively]**
 - Sets maximum threshold value on which Action is performed
 - Together with “Min Trigger” defines sensitivity range, in which incoming trigger value is calculated by interpolation to value used, based on “Min Value” a “Max Value” setting.
 - Values higher than “Max Trigger” will be used as “Max Value”
- **Set current value as Min**
 - Will set current value as “Min Trigger”
- **Set current value as Max**
 - Will set current value as “Max Trigger”
- **Min Value [0-255 or 0-100% respectively]**
 - Together with “Max Value” defines threshold levels of used value, which will be calculated by interpolation from range defined by “Min Trigger” and “Max Trigger”
- **Max Value [0-255 or 0-100% respectively]**
 - Together with “Min Value” defines an threshold levels of used value, which will be calculated by interpolation from range defined by “Min Trigger” and “Max Trigger”

- o **ON/OFF**

Hysteresis - Range of a safe interval when both the bottom and top thresholds are triggered. This is particularly useful when the input signal is not stable.

- **PRESS**

- o **Delay [ms]**

Defines an event *Action* execution postponed in milliseconds

- o **Duration [ms]**

Defines how long (in milliseconds) an event *Action* is performed

- o **Press count [1-65535]**

Defines after how many PRESSES required event is executed if same *Source* and *Action* has been set.

3.5 TRIGGER ACTION

- Declare what event to execute when valid *Source* occur
- Multiple events with same *Action* settings can exist
- Settings options are **dependent on Trigger type**, but independent on *Source*

- Settings options:

- **DIGITAL, PRESS**

- o **BRIGHTNESS**

will set brightness to desired value

- o **BRIGHTNESS UP/DOWN**

will change brightness by defined step value

- o **ANIMATION**

will change actual animation/color to desired animation/color

- o **ANIMATION NEXT/PREV**

will change actual animation/color to next or previous in order

- o **SPEED**

will set speed to desired value

- o **SPEED UP/DOWN**

will change speed by defined step value

- **ON/OFF**
will disable/enable output blackout for Autoplay
- **ANALOG**
 - **BRIGHTNESS**
will set brightness to trigger input value
 - **SPEED**
will set speed to trigger input value
 - **ON/OFF**
will disable/enable output blackout for Autoplay
- Standard settings:
 - **DIGITAL, PRESS** has option to:
 - **BRIGHTNESS**
 - **Brightness [0-255 or 0-100% respectively]**
will set user defined value
 - **Test**
it will cause to force *Action* with desired value
(used to test the trigger and action)
 - **BRIGHTNESS UP/DOWN**
 - **Change Behavior**
this setting is to define a various behavior on change
- options are:
 - **Increase:** causes to increase value up to max
 - **Decrease:** causes to decrease value up to min
 - **Switch:** causes to increase up to max or decrease value up to min, and will change its direction when it hits its max or min. (ping pong effect)
 - **ANIMATION**
 - **Player mode**
defines if animation will be used from *Animation library* or from *Colors*
 - **Main animation**
 - is shown only when “Player mode” is set to *Animation*
 - shows only file indexes which exist on SD card
 - it is used to select animation to play

- **Select Color**
 - is shown only when “Player mode” is set to *Colors*
 - it is used to select color to use

o **ANIMATION NEXT/PREV**

- **Player mode**
defines what to send to pixel LED output.
File from *Animation library* or static color from *Colors*
- **Following Animation**
defines if next or previous animation to use.
Relatively to actually used.

o **SPEED**

- **Speed [0-255 or 0-100% respectively]**
 - set a value to use

o **SPEED UP/DOWN**

- **Change Behavior**
this setting is to define a various behavior on change
 - options are:
 - **Increase:** causes to increase value up to max
 - **Decrease:** causes to decrease value up to min
 - **Switch:** causes to increase up to max or decrease value up to min, and will change its direction when it hits its max or min. (ping pong effect)

o **ON/OFF**

- **Change On/Off**
this setting is to define a behavior on change
 - options are:
 - **On**
 - **Off**
 - **Switch:** Causes to toggle actual state to opposite state

- **ANALOG**

For each option Source value will be used as desired value (modified based on *Trigger type* settings)

- o **BRIGHTNESS**

- nothing to set

- o **SPEED**

- nothing to set

- o **ON/OFF**

- nothing to set

- Advanced settings:

- **DIGITAL, PRESS**

- o **BRIGHTNESS**

- nothing to set

- o **BRIGHTNESS UP/DOWN**

- **Min** - lowest possible value for parameter
 - **Max** - highest possible value for parameter
 - **Step** - value step size for parameter

- o **ANIMATION (Animation library)**

- **Start Animation**

- animation to play prior to desired animation (like intro animation)
 - duration is counted only for main animation (without intro or outro animation)

- **End Animation**

- animation to play after desired animation (like outro animation)

- Any next animation will be started only after end of “End Animation”

- **Repeat count [0-1024]**

- define how many times a main animation will be played
 - in case this parameter is set, parameter “Duration” from trigger type is ignored (not used, not shown)

- **Main Animation play till end**

- this will force animation to be played till the end of animation without interruption by another trigger

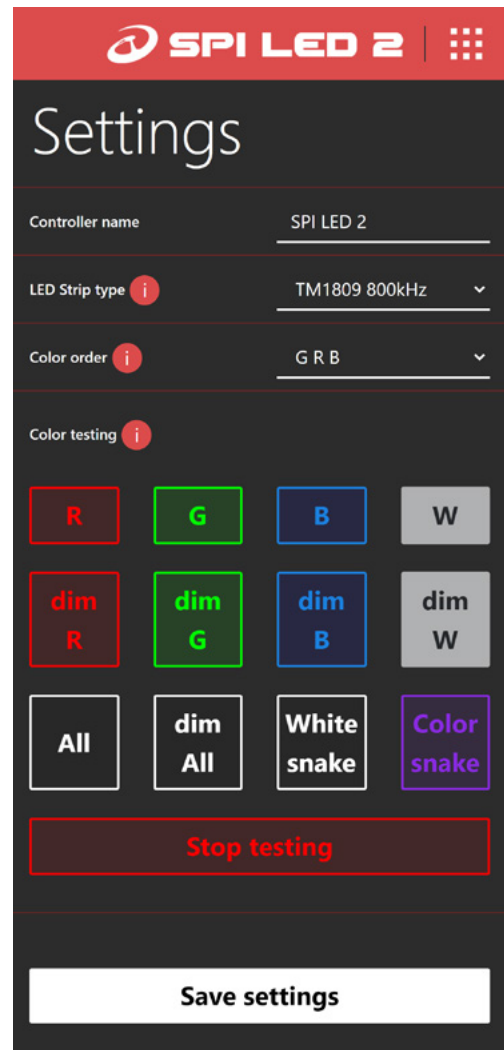
- **ANIMATION (Color)**
 - nothing to set
- **ANIMATION NEXT/PREV**
 - nothing to set
- **SPEED**
 - nothing to set
- **SPEED UP/DOWN**
 - **Min** - lowest possible value for parameter
 - **Max** - highest possible value for parameter
 - **Step** - value step size for parameter
- **ON/OFF**
 - nothing to set
- **ANALOG**
 - **BRIGHTNESS**
 - nothing to set
 - **SPEED**
 - nothing to set
 - **ON/OFF**
 - **Threshold bottom [0-255 or 0-100% respectively]**
Together with “Threshold top” defines range, in which output blackout for Autoplay will disabled/enabled
 - **Threshold top [0-255 or 0-100% respectively]**
Together with “Threshold bottom” defines range, in which output blackout for Autoplay will disabled/enabled
 - **Set current value as TH bottom**
Will set current value as “Threshold bottom”
 - **Set current value as TH top**
Will set current value as “Threshold top”

3.6 SETTINGS

- Used to set all POWERED SPI LED CONTROLLER 2 settings divided into separate pages according to the type of setting.
- Any change will be applied immediately (except network setting change)
- **Changes MUST be saved by user**
- All “save” buttons save all settings
- An Android/iOS app can be also used to change Settings
- Available settings pages:

- o **Device Settings**

- **Controller name**
 - User can change the name of the device in Android/IOS mobile application
 - Can be up to 18 characters long
 - By default controller name consist of Controller type and its serial number (example.: **POWERED SPI LED CONTROLLER 2_1234**)



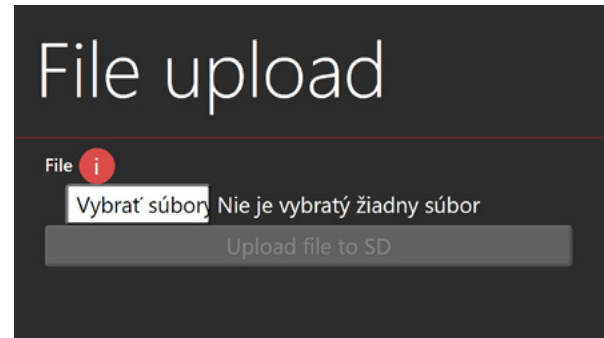
Settings Page

- **LED Strip type**
 - Defines pixel LED output data format/protocol for supported IC chips
 - List of supported ICs can be found [here](#)
 - Default setting is: TM1804 800kHz (same as most common WS2811, WS2812B, SK6812 etc...)
- **Color order**
 - Defines color order on pixel LED output
 - Can be set to any combination of RGB. Like RBG, GRB etc...
 - If RGBW strip type is used, then W is always sent as last
 - Default value is: GRB
- **Color testing**
 - Will generate simple test patterns to pixel LED output, with maximum pixel count for currently selected IC

- Test patterns which contain W channel (RGBW) are deactivated when non-RGBW strip type is selected
- Test patterns are:
 - **solid: R, G, B, W, all**
 - **dimming: R, G, B, W, all**
 - **and snake test patterns**

o File upload

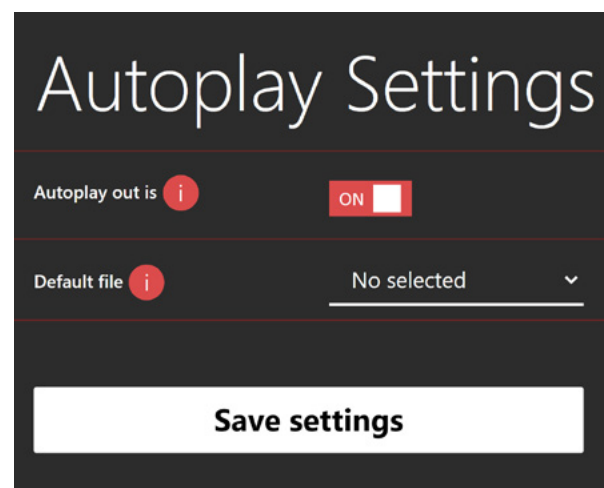
- **File**
 - to use this feature, SD card must be inserted
 - transfer of multiple files at one time is possible
 - default filter is set to LN2 files, but with filter disabled, user may upload to SD card any file/files. (Example: Firmware file)
 - files with same name are automatically overwritten
 - during the transfer, a tmp.bin file is created and then automatically renamed, making it possible to replace the playing file without stopping.
- **Activate**
 - used to load special activation file (sold on request), which enables to use device with LED Strip Studio 3 software
 - SD card not required for the activation
 - **Once the device is activated, the 'Activate' feature is not visible anymore**



File Upload and Activate Section

o Autoplay settings

- **Autoplay out**
 - enables user to enable/disable pixel LED output in Autoplay mode (also known as blackout)
 - this item is shared with the blackout from the Autoplay page, it is saved to the card, and it is not necessary to press the save button
- Default value is: ON



Autoplay Settings Section

- **Default file**
- defines which file from Animation library play after device power on when no file is chosen, device will play last Autoplay state is used (SD card must be inserted)
- Default value is: No selected

o **Art-Net™ settings**

- used to set parameters for Art-Net™ communication
- following options are always visible:

- **First universe [1-256]**

- defines first Art-Net™ universe to be received by device
- default value is: 1

- **Enable Hold Art-Net™ mode after signal lost**

- when enabled, device will stay in Art-Net™ mode even after Art-Net™ signal is lost
- lower priority modes are then disabled
- in Pixel mode, last frame received is freezed on pixel LED output
- in SD card mode, last animation selected by Art-Net™ keeps playing on pixel LED output
- default value is: OFF

- **Art-Net™ mode:**

SD card

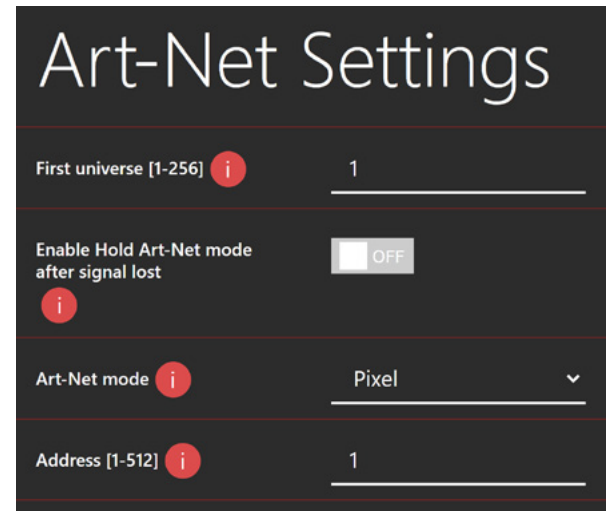
Incoming Art-Net™ signal is used to select file to play from SD card, and control various aspects of animations such as Speed, Brightness and more

Pixel

Incoming Art-Net™ signal is translated to pixel LED output as RGB/ RGBW data based on selected parameters

- default setting is: Pixel

- **Address [1-512]**



Art-Net Settings Section

Define what address to use from device First universe default value is: 1

o **SD card mode section**

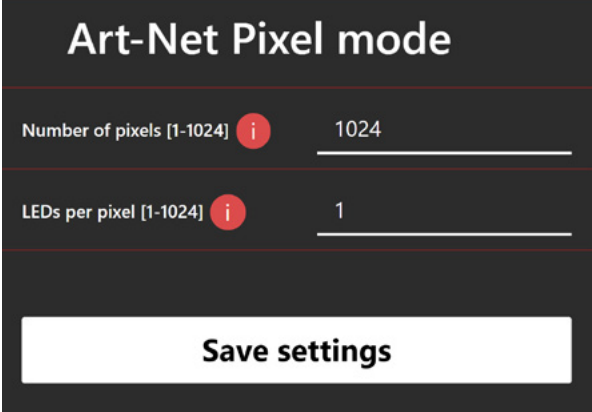
This section is shown only when “Art-Net™ mode” is set to SD card

- **Animation step size [1-255]**
 - determine “width” value of animation control channel.
 - used for easier operation with physical sliders on Art-Net™ console.
 - Animation index played equals to value received divided by Animation step size
 - default value is: 1
- **Use Art-Net™ animation delay**
 - used to stabilize short glitches on animation control channel
 - changes on animation control channel shorter than defined time will be ignored if this feature is ON
 - default value is: OFF
- **Art-Net™ animation delay time [ms] [100-65535]**
 - determine for how long value received need to be stable to take place
 - this setting is shown only when “Art-Net™ animation delay time” is ON
 - default value is: 250

o **Pixel Mode section**

this section is shown only when “Art-Net™ mode” is set to Pixel

- **Number of pixels [1-1024]**
 - define how many pixels from incoming Art-Net™ stream to process by POWERED SPI LED CONTROLLER 2 device



Art-Net Pixel mode

Number of pixels [1-1024] i	1024
LEDs per pixel [1-1024] i	1

Save settings

Art-Net Pixel mode Settings Section

- 1 pixel are 3 channels when RGB strip type is used or 4 channels when RGBW strip type is used
- Number of pixels * LEDs per pixel is limited by current LED strip type (IC) used
- default value is: 1024
- **LEDs per pixel [1-1024]**
 - defines how many pixels on POWERED SPI LED CONTROLLER 2 pixel LED output will act as 1 pixel of incoming data
 - Number of pixels * LEDs per pixel is limited by current led strip type (IC) used
 - default value is: 1

o **DMX**

- **If the device is a slave and has DMX synchronization enabled, it is not possible to set DMX, which is notified to the user with the possibility of redirection to the synchronization setting**

o **DMX communication settings**

- positions always displayed:
- **Enable Hold DMX mode after signal lost**
- After switching on, the device will stay in DMX mode even after the DMX signal is lost
- it is not possible to switch the control mode with low priority
- in case of Pixel mode, the last received frame remains on the output
- in SD card mode the last selected animation is played according to the last received parameters
- default value: OFF
- **DMX mode:**
 - SD card**
 - The DMX signal is used to start the playback of the substring and to set its parameters

Pixel

Translates the incoming DMX signal to RGB/RGBW values according to the selected settings

- default value: Pixel

- **Address [1-512]**

- the first address that is used to receive data
- default value: 1

o SD card mode section

- section is displayed when “DMX mode” == SD card

- **Animation step size [1-255]**

- how large the channel controlling which animation is triggered must be changed to change the animation
- the resulting animation is the received value / set value
- default value: 1

- **Use DMX animation delay**

- how quickly the device will respond to a channel change with animation
- if the value appears for a shorter time than set, the change is ignored
- default value: OFF

- **DMX animation delay time [ms] [100-65535]**

- only displayed when “Use DMX animation delay” == on
- time after which the animation will change after a change in the animation channel
- default value: 250

o Pixel Mode section

- section is displayed when “DMX mode” == Pixel

- **Number of pixels [1-170]**
 - How many pixels of the incoming signal will be used
 - 1 pixel == 3 channels for RGB or 4 channels for RGBW
 - Number of pixels * LEDs per pixel is limited by the maximum number of LEDs for the set IC
 - default value: 170
- **LEDs per pixel [1-1024]**
 - How many LEDs per output are controlled as 1 pixel
 - Number of pixels * LEDs per pixel is limited by the maximum number of LEDs for the set IC
 - default value: 1

o **DMX IN**

- Displays the incoming DMX signal values in a real-time table
- Displays the sent status when DMX IN is disconnected
- In the table the used channels are highlighted (from the dmx address onwards, according to the number of channels needed)
- **For SD card mode**
 - Channel highlighting starts at the DMX address
 - 7 channels are highlighted (Brightness, Animation, Speed, R, G, B, W)
 - The channels used are listed in front of the table with a description
- **For Pixel mode**
 - Channels are highlighted with a color representing the RGB/RGBW pixel composition (may be affected by the color order setting)
 - Channel highlighting starts at the DMX address
 - The number of highlighted channels depends on the Number of pixels and the number of channels for the IC
- **When synchronising via DMX**
 - Channel highlighting starts at channel 501
 - 12 channels are used

- The values needed for the user are displayed in front of the table with a description (Brightness, Speed, Animation, Time, Play, Repeat, Send Out)

o **Synchronization Settings**

- feature which enables you to synchronize multiple devices by using zone
- synchronization is used to eliminate little time offsets of multiple devices which should play same content (or synchronized split content)
- following entries are always shown:

- **Player synchronization mode**

OFF

- POWERED SPI LED CONTROLLER 2 zone synchronization is disabled
- this is default value

MASTER

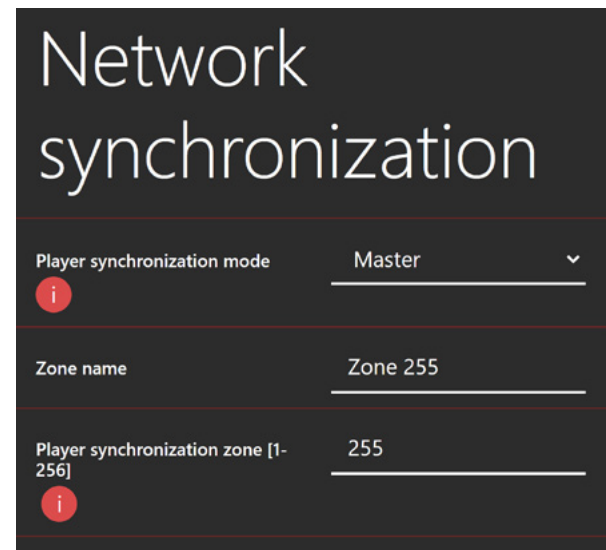
- Zone mode in which device send its current Player settings to network independently on source of start signal (Autoplay, Art-Net™ - SD card, DMX - SD Card)
- In Master zone setting device has not limited usability
- Synchronization signal is broadcast-ed to network to all devices on same local area network

SLAVE

- Zone mode in which device is listening to Synchronization signal on its local area network and its behavior is based on signal from master
- Synchronization signal is processed based on Synchronization parameters
- In Slave zone setting device has limited usability

o **Master settings section**

- **LSS Ethernet Sync**



Network Sync Settings Section

- Transmission of synchronization signal via network (both wired and wifi)
- Transmitted information:
 - zone
 - animation type (playlist, animation, color)
 - index
 - speed (for playlist and animation)
 - contrast (for playlist and animation)
 - brightness
 - timecode (for playlist and animation)
 - send
 - red (for playlist and animation)
 - green (for playlist and animation)
 - blue (for playlist and animation)
 - white (for playlist and animation)
 - repeat (for playlist and animation)
 - play (for playlist)
- Using LSS Ethernet sync
- Enables/disables the use of this type of synchronization
- **Zone name**
 - User adjustable zone name which is used for easy user zone identification in Android/iOS mobile application
 - Can be up to 18 characters
 - default value is: Zone #ID (Zone 1)
- **Player synchronization zone [1-256]**
 - ID of synchronization zone
 - **Multiple masters with same player synchronization zone setting on single local area network will cause unexpected behavior and collisions!**
 - default value is: 1
- **LSS DMX Sync**
 - Synchronization signal transmission via DMX
 - Only animation from the Animation library is transmitted
 - Information transmitted:
 - animation

- speed
 - brightness
 - timecode
 - send out
 - repeat
 - play
- Use LSS DMX Sync
 - Enables/disables the use of this type of synchronization

o Slave settings section

- Turn off after master signal lost
 - determine if device will be set to standard mode once synchronization signal is lost or not
 - when set to OFF, current animation triggered by master continues but is no more synchronized
 - when set to ON, device will exit synchronization mode after time specified (by synchronization keep alive duration) elapses and then it is possible to control device normally/manually till synchronization signal is not present
 - default value is: OFF
-
- Synchronization keep alive duration [s] [1-255]
 - shown only when “Turn off after master signal lost” is set to “ON”
 - specifies time to exit synchronization mode after synchronization signal is lost
-
- Apply master settings
 - when set to ON, all parameters from Master device are used
 - when set to OFF, only animation type, timecode and animation index to play from master is used. This means you can change Speed, Brightness and Contrast independently. **Please note that changing the speed might de-synchronize the animation**
 - default value is: ON
-
- LSS Ethernet Sync
 - Transmission of synchronization signal via network (both wired and wifi)

- Transmitted information:
 - zone
 - animation type (playlist, animation, color)
 - index
 - speed (for playlist and animation)
 - contrast (for playlist and animation)
 - brightness
 - timecode (for playlist and animation)
 - send
 - red (for playlist and animation)
 - green (for playlist and animation)
 - blue (for playlist and animation)
 - white (for playlist and animation)
 - repeat (for playlist and animation)
 - play (for playlist)

- Using LSS Ethernet sync
 - Enables/disables the use of this type of synchronization
 - Sync zone [1-256]
- Sync Zone ID
- Slave devices with this ID receive a signal from a Master device with the same ID
- signal from Master device with different ID is ignored
- after receiving a synchronization signal with the requested ID, this device cannot be controlled independently
- default value: 1

- LSS DMX Sync
 - Synchronization signal transmission via DMX
 - Only animation from the animation library is transmitted
 - Information transmitted:
 - animation
 - speed
 - brightness
 - timecode
 - send out

- repeat
- play
- Use LSS DMX Sync
- Enables/disables the use of this type of synchronization

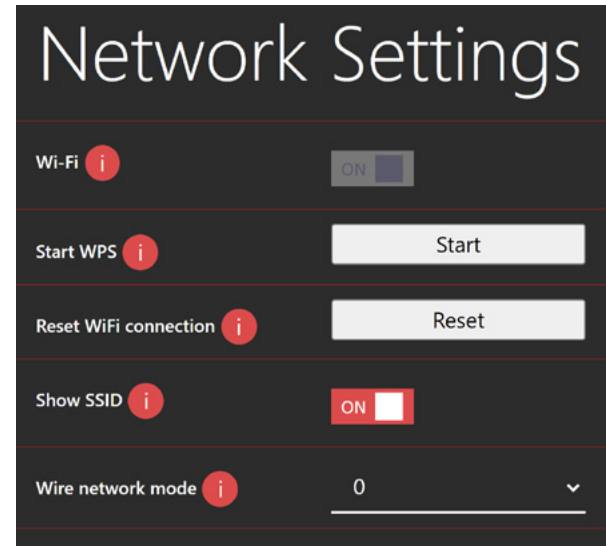
o Network Settings

All changes in network settings are applied ONLY after changes are saved and device is restarted !

- AP mode
- IP address of device is 192.168.4.1
- Wi-Fi
 - is not possible to turn OFF if in use
 - use password for AP
 - user can setup password for AP
 - default value is: OFF
- Wi-Fi AP password
 - is shown only when Use password for AP is ON
 - password length must be 8 to 64 characters
- Start WPS
 - will set device to WPS connection mode (read your Wi-Fi router user manual on how to use WPS). After successful WPS connection, device will be switched to Wi-Fi client mode
- Reset Wi-Fi connection
 - performs all Wi-Fi related settings reset to default
- Show SSID
 - determine if SSID of POWERED SPI LED CONTROLLER 2 is shown or hidden
 - default value is: ON
- Wire network mode
 - determine wired network behavior/settings

Options are:

- DHCP client
 - POWERED SPI LED CONTROLLER 2 will obtain its IP address,



Network Settings Section

sub-net mask and gateway address from DHCP server

- DHCP SERVER
 - enables DHCP server on POWERED SPI LED CONTROLLER 2 wired network
 - **It is important that on physical network only ONE DHCP server exist! Otherwise network issues may occur**
 - IP address of POWERED SPI LED CONTROLLER 2 device is 192.168.3.1 and cannot be changed while its DHCP server is enabled
- STATIC IP
 - enables user to set any IP address, sub-net mask and gateway address to device wired network adapter
 - possibility to load all current settings exist (let's say to set IP settings obtained from DHCP server to static IP)
 - **device sub-net mask has to be correctly set! Typically same as all other devices on same local area network**
 - **device IP address has to be correctly set! Typically with respect to sub-net mask setting**
 - **device IP address has to be different from all other devices on same local area network !!!**
- Client mode
 - Wi-Fi
 - is not possible to turn OFF if in use
 - Start WPS
 - will set device to WPS connection mode
(read your Wi-Fi router user manual on how to use WPS)
 - Reset Wi-Fi connection
 - performs all Wi-Fi related settings reset to default
- Wire network mode
 - determine wired network behavior/settings
 - options are:
 - DHCP client
 - POWERED SPI LED CONTROLLER 2 will obtain its IP address, sub-net mask and gateway address from DHCP server
 - DHCP server

- enables DHCP server on POWERED SPI LED CONTROLLER 2 wired network
- **It is important that on physical network only ONE DHCP server exist! Otherwise network issues may occur**
- IP address of POWERED SPI LED CONTROLLER 2 device is 192.168.3.1 and cannot be changed while its DHCP server is enabled
- Static IP
 - enables user to set any IP address, sub-net mask and gateway address to device wired network adapter
 - possibility to load all current settings exist (let's say to set IP settings obtained from DHCP server to static IP)
 - **device sub-net mask has to be correctly set! Typically same as all other devices on same local area network**
 - **device IP address has to be correctly set! Typically with respect to sub-net mask setting**
 - **device IP address has to be different from all other devices on same local area network !!!**
- Wire connected
- Wi-Fi
 - determine if device Wi-Fi network adapter is enabled after wired network link is down
 - default value is: ON
- Start WPS
 - is shown only when “Wi-Fi” setting is set to “ON” and wired network is not connected
 - will set device to WPS connection mode (read your Wi-Fi router user manual on how to use WPS). After successful WPS connection, device will be switched to Wi-Fi client mode
- Reset Wi-Fi connection
 - is shown only when “Wi-Fi” setting is set to “ON”
 - performs all Wi-Fi related settings reset to default
- Wire network mode
 - determine wired network behavior/settings
Options are:
 - DHCP client
 - POWERED SPI LED CONTROLLER 2 will obtain its IP address, sub-net mask and gateway address from DHCP server
 - DHCP server

- enables DHCP server on POWERED SPI LED CONTROLLER 2 wired network
- **It is important that on physical network only ONE DHCP server exist! Otherwise network issues may occur**
- IP address of POWERED SPI LED CONTROLLER 2 device is 192.168.3.1 and cannot be changed while its DHCP server is enabled
- Static IP
 - enables user to set any IP address, sub-net mask and gate way address to device wired network adapter
 - possibility to load all current settings exist (let's say to set IP settings obtained from DHCP server to static IP)
 - **device sub-net mask has to be correctly set! Typically same as all other devices on same local area network**
 - **device IP address has to be correctly set! Typically with respect to sub-net mask setting**

Device IP address has to be different from all other devices on same local area network !!!

o Advanced settings

• File upload

File

- uploading a file to the SD card requires an SD card inserted
- it is possible to upload multiple files at once
- the default filter for files is *.LN2, but it can be switched to all files
- in case there is a file with the same name on the SD card, this subfile is replaced only after a successful transfer of the whole file. The file is saved to tmp.bin during the upload and only after its complete transfer is it renamed to the desired name

Activate

- uploading the activation file needed to use LSS 3 Software
- no SD card required

- the file is only displayed on devices that are not activated

• Use percentage values

- determine if some values will be in percentage or numeric values
- default value is: OFF

• Send Out to DMX

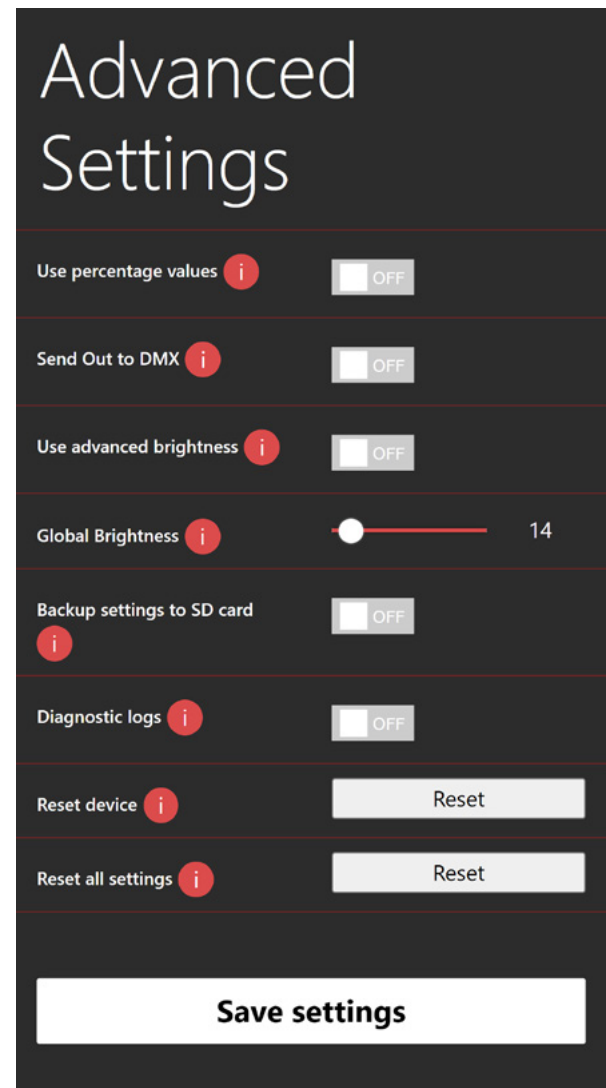
- Sends the first 512 values from the SPI output signal to DMX OUT

• Use advanced brightness

- used to enable/disable advanced brightness setting options:
 - OFF:

Global Brightness

sets Hardware and Software brightness together based on strip type (based on how many brightness steps currently selected strip type supports)



Advanced Settings section

- **on some specific strip type IC settings strange behavior may occur. If this is the case, it is recommended to use “Advanced Settings = ON ” where Hardware and Software brightness can be individually set**

- **ON:**

- Hardware and Software brightness can be individually set

Hardware brightness

- must be supported by currently selected strip type causes that usable software brightness steps are not lowered

- the range (either in percentage or 0-255) is interpolated to a range according to the IC (which can be 0-4, 0-16... or none)

- **some strip type ICs has low count of Hardware (global) brightness steps and thus small changes on Hardware brightness may not be visible**

Software brightness

- **causes lowering usable brightness steps**

- is not dependent on strip type used

- Backup settings to SD card

- causes that all settings/changes are automatically stored on SD card

- backup is stored to file:

POWERED SPI LED CONTROLLER 2: „SL2_XXXX.bcp“, where xxxx is device serial number

- backup file is related to serial number and IS NOT usable on any other device

- **causes slightly longer time to save when user hits “save” buttons**

- Diagnostic logs

- enables to save diagnostic logs to SD card

- to use, SD card MUST be inserted

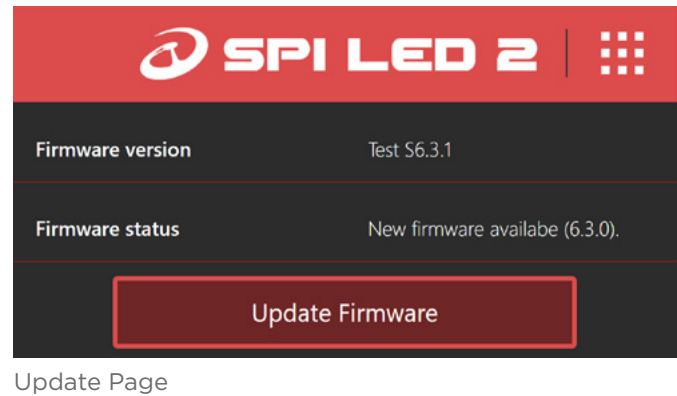
- **may cause device slowdown, including lagging on pixel LED output. It is highly recommended to use ONLY when diagnostic is needed**

- **may cause SD card wear out sooner**

- **Reset device**
 - will “turn OFF” and then “turn ON” device, similar to power cycle
- **Reset all settings**
 - will delete all device settings including Autoplay settings

3.7 UPDATE

- Firmware version
 - shows actual device firmware version as well as the type of device (numbers == REACTIVO, E + numbers == REACTIVO 2, S + numbers == LSS SPI 2)
 - in case special firmware is loaded, it will be indicated in the description
- Firmware status
 - shows what firmware is actually available online and if update is possible
- Firmware change-log
 - will redirect user to web page with detailed firmware/device change-log
- Update FW button
 - use to automatic device firmware update
- Update status bar
 - shows progress of firmware update



3.8 SUPPORT

- will redirect user to web page with technical support of device
<https://www.ledstripstudio.com/contact-us/>

3.9 DIAGNOSTIC LOGS

- can be used to device diagnostic
- shows actual log from device SD card
- in order to use it, it is necessary to turn ON „Diagnostic logs” in Advanced settings and SD card MUST be inserted
- accessible by web browser on local network at IP/logs.html (for example 192.168.4.1/logs.html)

3.10 SetAutoplay

- Enables user to control device by html commands
- Detailed manual including examples is accessible by web browser on local network at IP/ SetAutoplay.html
(for example 192.168.4.1/SetAutoplay.html)
- automatic parsing is possible
- parsing format: parameter=value
- SetAutoplay web page consist of 3 sections
 - [changes]
 - shown only after http command received
 - shown on beginning of web page and contain only changed parameters (one line for each parameter)
 - [status]
 - mode – current mode of Autoplay
 - onOff – shows if Autoplay is ON or OFF
 - only for Color mode:
 - color – color currently sent to pixel LED output
 - only for Animation library mode:
 - anim – Animation index currently sent to pixel LED output
 - speed – Speed of actual animation
 - contrast – Contrast of actual animation
 - brightness – actual brightness setting of Player
 - files – list of animation loaded on SD card (empty when no SD card inserted)
 - colors – list of colors available, possible to set in human readable names (**necessary to set by index**)
 - [;]
 - It is a line starting with the ‘;’ character, used for displaying the manual and is not necessary for parsing

3.11 UPDATE FIRMWARE

3.11.1. Using web browser

- **Internet connection is necessary**
- device web page for firmware update is: IP/update.html
- Firmware status shows if new firmware for device is available
 - in case when special firmware is loaded in device, update to standard firmware from web is allowed also in case when actual device firmware is higher/newer
- Firmware update process starts after hitting „Update Firmware“ button and update progress is shown by status bar under the button
- After firmware update user have to check if firmware version is equal to firmware number in firmware status
- When updating, the display shows information about the versions being updated, including from which version to what version, as well as the status of the update.

3.11.2. Using SD card

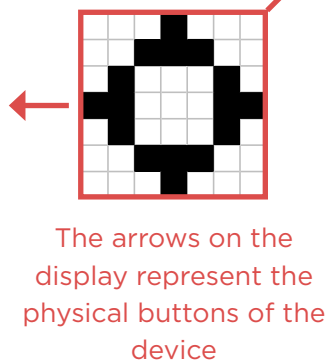
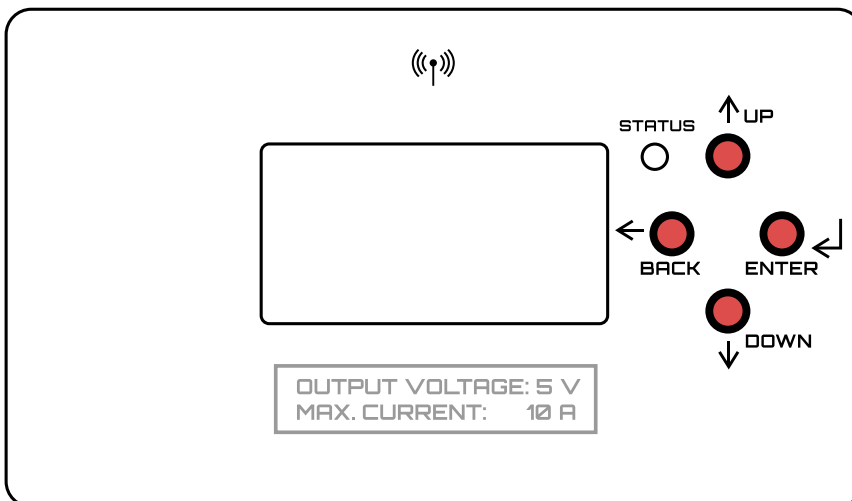
- **Obviously SD card is necessary**
- suitable for devices without active internet connection
- user needs firmware *.bin file
 - FW sources:
 - link for actual firmware
 - Firmware file
<https://download.ledstripstudio.com/reactivo/reactivo2.bin>
 - Changelog:
<https://download.ledstripstudio.com/reactivo/versionDetailsS2.txt>
 - for more firmware options you can contact us
 - Update options
 - uploading manually to SD card:
 - user may load to SD card *.bin file by PC
 - checking of actual firmware number is possible by Android/IOS mobile application or by web browser
 - insert SD card with firmware to device which is turned ON
 - wait about 1 minute for update.
Progress of update can be checked by device status LEDs (see Status LEDs section of this manual)
 - user may check if firmware version is changed fw by Android/IOS mobile application or by web browser
 - uploading remotely to SD card:
 - checking of actual firmware number is possible by Android/IOS mobile application or by web browser
 - load *.bin file using web browser using Settings/File upload
 - restart device by power cycle, or using by reset button via web browser in Settings
 - wait about 1 minute for update. Progress of update can be checked by device status LEDs (see Status LEDs section of this manual)
 - user may check if firmware version is changed fw by Android/IOS mobile application or by web browser

4. DISPLAY

- Used to display information about the status of the device, as well as to set it up
- The main screen displays the current control mod, status bar, menu link and content specific to the particular control mod.

4.1 HEADER

- Control Mode Name
- Arrows showing which buttons do what



4.2 STATUS BAR

- Displays icons with the current status of the device



List of icons:

- Network



- WiFi AP mode



- WiFi client mode - not connected



- WiFi client mode - connected



- Wired DHCP client - connected



- Wired DHCP server



- Wired static IP



- WiFi disabled, Wired DHCP client - not connected

- SD card



- Not inserted



- Inserted

- DMX IN



- Not connected



- Connected

- Data Out



- Nothing is sent to the output



- Something is sent to the output

- Settings not saved



- The icon will only appear if no changes to the settings are saved

4.3 MAIN SCREEN OPTIONS

- **Autoplay**

- **Master device**

Will be displayed if the device is set as master



- **Mode**

[ANIMATION, PLAYLIST, COLOR]

- sets the mode in which the player operates



- **Index**

Displayed if the mode is set to Playlist. Indicates the currently played position in the playlist, this value CANNOT be changed



- **Color**

Displayed when the mode color is set. Displays the currently played color, this value can be changed



- **File**

Displayed when animation mode is selected, this value can be changed



- **NO SD CARD**

Displayed if no card is inserted and the mode is set to playlist or animation



- o **NO FILE**

Will be displayed if a card without animation is inserted and the mode is set to playlist or animation



- **DMX**

- o **Master device**

Displayed if the device is set as master and dmX mode is SD card

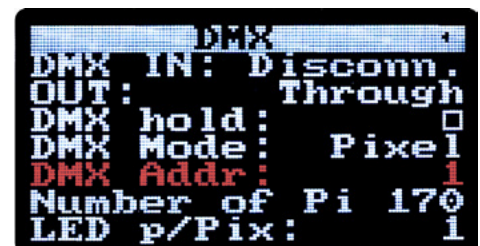


- o **DMX mode** [SD card, Pixel]

Sets the mode in which DMX operates



- o **DMX addr** [1-512] - sets the DMX address of the device



- o **DMX IN CHANNELS**

- Displays a list of used channels with label and value
- In SD card mode, 7 channels (Brightness, Animation, Speed, R, G, B, W) are displayed
- In Pixel mode, the values for the pixels (RGB/RGBW) starting at the DMX address up to the end of the DMX signal are displayed. Only whole pixels are displayed



- o **DMX IN**

- Displays all DMX channels with their index and value



- Used channels are highlighted with ><



- **Art-net**

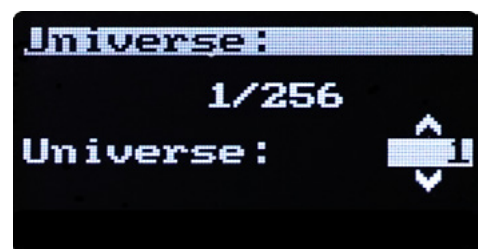
- o **Master device**

Will be displayed if the device is set as master and Art-Net mode is SD card



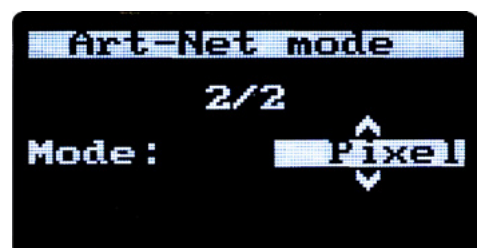
- o **Universe**

Sets the first used Art-Net universe



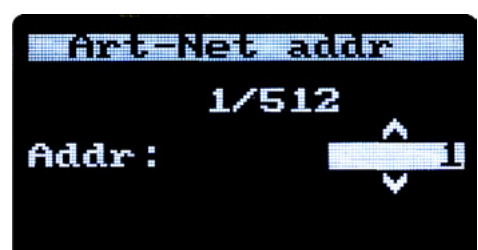
- o **Mode** [SD card, Pixel]

Sets the mode in which Art-Net operates



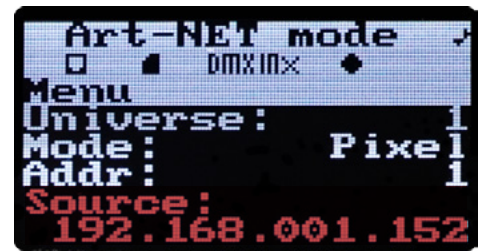
- o **Addr** [1-512]

Sets the Art-Net address of the device



- o **Source**

The source of the Art-Net signal



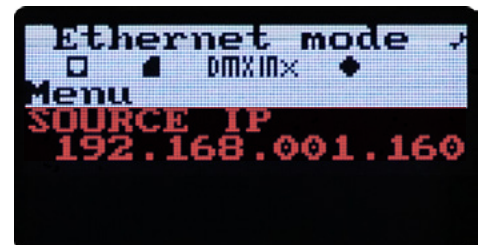
- o **[1-255].[0-255].[0-255].[1-255].[1-255] / [holding]**

Displays the IP address where the signal is coming from or the word “holding” when the signal stops coming

- **Ethernet**

- o **SOURCE IP**

The source of the Ethernet signal



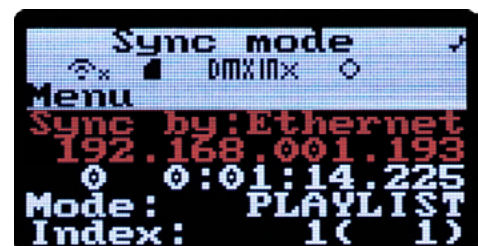
- o **[1-255].[0-255].[0-255].[1-255].[1-255]**

IP address of the device from which the LSS3 software is connected to the device

- **Sync**

- o **Sync by [Ethernet, DMX, Holding]**

Shows which type of synchronization is currently in use

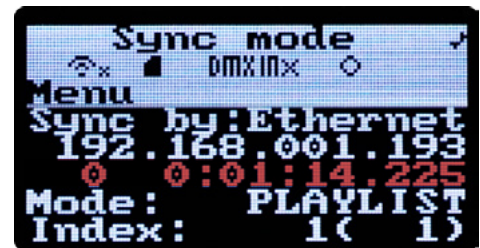


- o **[1-255].[0-255].[0-255].[1-255].[1-255]**

If Ethernet sync is used, the source of the master signal is displayed

- o **[DDD HH:MM:SS.MMM]**

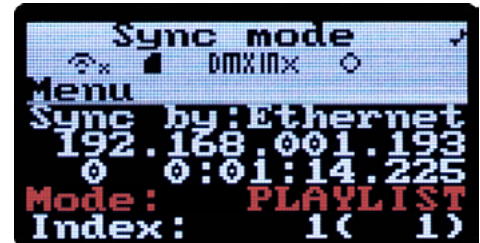
Received timecode



- o **Mode**

[ANIMATION, PLAYLIST, COLOR]

What type of player is used



- o **Index [0-32]**

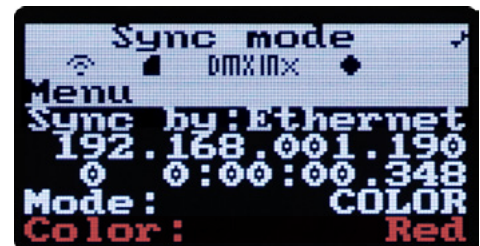
When using a playlist, tells which item from the playlist is being played



- o **Color**

[Black, 12% White, 24% White, 37% White, 50% White, 62% White, % White, 87% White, % White, Red, Orange, Amber, Yellow, Chartreuse, Green, Malachite, SpringGrn, Cyan, Azure, BlueRibbon, Blue, Violet, Phlox, Purple, Rose]

When using Color, tells which color is used



- o **File [0-255]**

When using Animation library, tells which animation is being played



- **Test**

- Displayed when a test is run via the web interface or app
- Includes a field to select the test and a field to stop the test

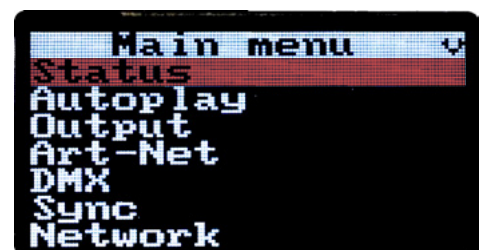


The menu screen contains a combination of links to submenus, parameters to set and information lines.

- After 60 seconds in the menu without interaction, the menu closes
- When closing the menu after a change, the device asks if you want to save the changes
- When making changes to network settings, it asks if you want to reset the device to apply the changes

4.4 MAIN MENU STRUCTURE

- **Status**



- **Device**

- **FW ver** - firmware version

- **HW ver** - hardware version

- **SN**

Serial number of the device

- **Activated** [Yes, No]

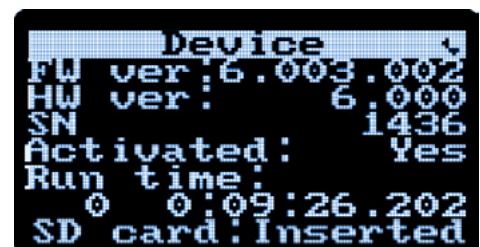
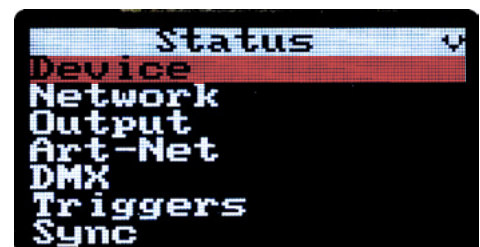
Whether the device is licensed to use LSS3

- **Run time - device run time**

[DDD HH:MM:SS.MMM]

- **SD card** [Inserted, Not ins.]

Whether or not an SD card is inserted



- o **Control mode**

The mode through which the device is controlled

[Playlist, Color, Autoplay, Art-Net, DMX, Ethernet, Testing]

[Sync, Pixel, Identify]



- o **Source IP**

Additional information from which device the device is controlled (if needed)

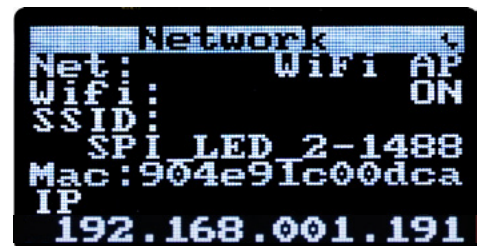
[1-255].[0-255].[0-255].[1-255]



- **Network**

- o **Net** *[WiFi AP, WiFi disconn, WiFi connect, WIRED, WIRED DHCP S, ETH. STATIC, all is OFF]*

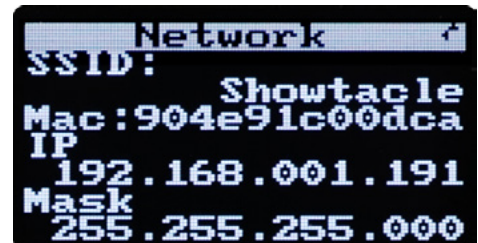
What network interface is currently in use



- o **WiFi** *[ON, OFF]* - whether WiFi is on

- o **SSID** *[text]*

The name of the wifi to which the device is connected. If the device is in ap mode, the name of the device is written



- o **Mac** - mac address of the device

- o **IP** *[1-255].[0-255].[0-255].[1-255]* - ip address of the device

- o **Mask** *[1-255].[0-255].[0-255].[1-255]*

Network mask of the device

- **Output**

- **Autoplay out** *[On, Off]*

Shows if something is sent to the output in autoplay mode

- **IC** *[D705 1000kHz, APA102-*

65536 2600kHz, TM1809 800kHz, TM1809 400kHz, SM16716 1300kHz, WS2801 1000kHz, APA102 1300kHz, APA102_DOUBLE 1300kHz, UCS9812 1100kHz, MBI6120 475kHz, LPD8806 2000kHz, TM1829 1600kHz, TM1829 800kHz, WS2811_RGBW 800kHz, TM1814 800kHz, UCS8903 800kHz]

The type of strip that is output

- **Col.Order** *[RGB, RBG, BRG, BGR, GRB, GBR]*

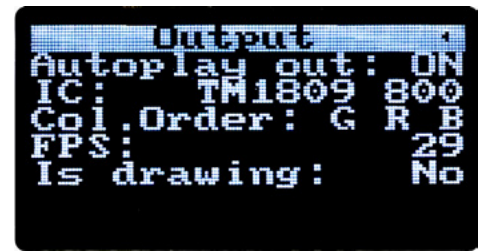
The order of colors on the output

- **FPS** *[0-9999]*

Number of frames per second on the output

- **Is drawing** *[Yes, No]*

Information if something is sent to the output



- **Art-Net**

- **Art-Net Net** *[1-128]*

Art-Net Net network number

- **1st Universe** *[1-256]*

Number of the first Art-Net universe used

- **Hold** *[true, false]*

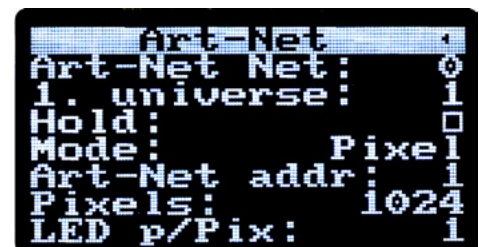
Whether the device remains in Art-Net mode when it stops receiving Art-Net signal

- **Mode** *[SD card, Pixel]* - mode of incoming data processing

- **Art-Net addr** *[1-512]* - Address from which data is taken

- **Pixels** *[1-1024]*

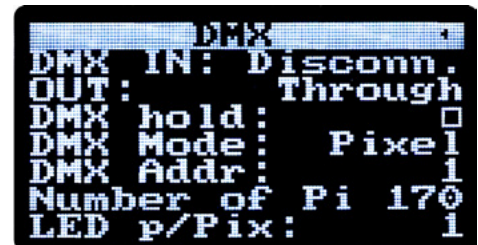
Number of pixels used from the input signal in Pixel mode



- **LED p/Pix** [1-1024]
Number of LEDs used in 1 pixel in Pixel mode
- **Step size** [1-255]
Specifies the number of channel steps that represent 1 animation
- **Use anim delay** [true, false]
Specifies whether a delayed response to a channel change with an animation can be used
- **Delay [ms]** [100-65535]
The length of the wait after a channel change with animation after which the change is applied

- **DMX**

- **DMX IN** [Conn., Disconn.]
Informs if the DMX IN cable is connected



- **OUT**
[Out, Through, From strip]
Informs in which mode DMX OUT is working
- **DMX hold** [true, false]
Whether the device remains in DMX mode when it stops receiving DMX signal
- **DMX Mode** [SD card, Pixel]
Mode of incoming data processing
- **DMX Addr** [1-512] - address from which data is taken
- **Number of Pixels** [1-170]
Number of pixels used from the input signal in Pixel mode
- **LED p/Pix** [1-1024]
Number of LEDs used in 1 pixel in Pixel mode
- **Step size** [1-255]
Specifies the number of channel steps that represent 1 animation

- o **Use anim delay** [*true, false*]

Specifies whether a delayed response to a channel change with an animation can be used

- o **Delay [ms]** [*100-65535*]

The length of the wait after a channel change with animation after which the change is applied

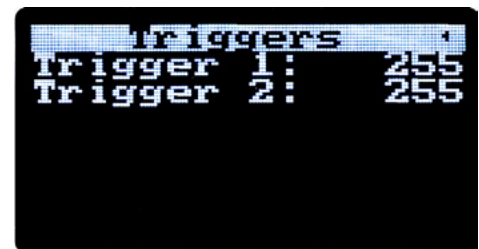
- **Triggers**

- o **Trigger 1** [*0-255*]

Current value on TRG1 pin

- o **Trigger 2** [*0-255*]

Current value on TRG2 pin



- **Sync**

- o **Mode** [*OFF, Master, Slave*]

The sync mode in which the device is in

- o **[DDD HH:MM:SS.MMM]**

Transmitted timecode

- o **Sync by**

[*Ethernet, DMX, holding*]

Shows which type of synchronization is currently in use.

If Ethernet sync is used, the

source of the master signal is displayed [*1-255*].[*0-255*].[*0-255*].[*1-255*].[*1-255*]

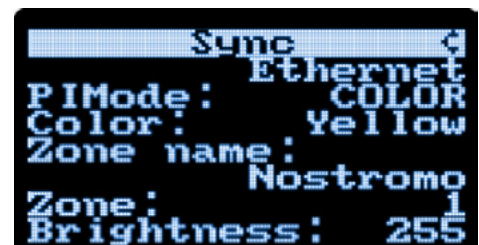
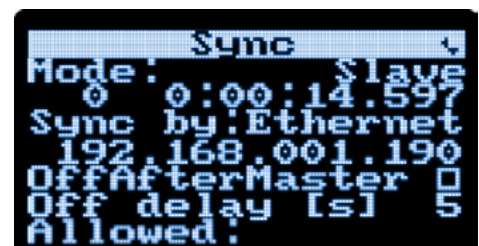
- o **Allowed** [*Ethernet, DMX*]

Shows which synchronization methods are allowed

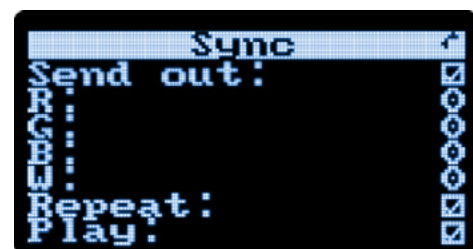
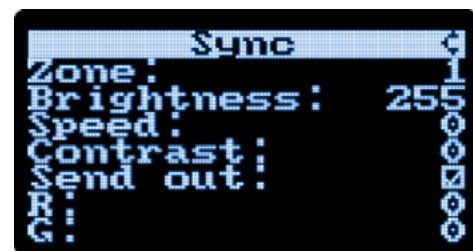
- o **PIMode**

[*ANIMATION, PLAYLIST, COLOR*]

Which type of player is used



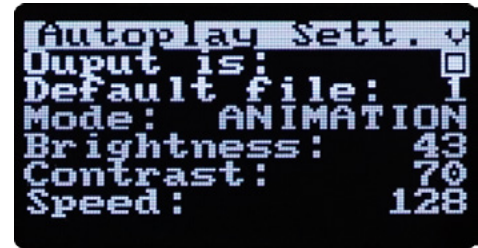
- **Index** [0-32]
 When using a playlist, tells which item from the playlist is being played
- **Color** [Black, 12% White, 24% White, 37% White, 50% White, 62% White, % White, 87% White, % White, Red, Orange, Amber, Yellow, Chartreuse, Green, Malachite, SpringGrn, Cyan, Azure, BlueRibbon, Blue, Violet, Phlox, Purple, Rose]
 When using Color, tells which color is used
- **File** [0-255]
 When using Animation library, tells which animation is being played
- **Zone name** [text] - the name of the zone
- **Zone** [1-256] - zone ID
- **Brightness** [0-255] - brightness value
- **Speed** [0-255] - the transmitted speed
- **Contrast** [0-255] - contrast value
- **Send out** [true, false]
 Whether to send to output
- **R** [0-255] - R recolouring overloaded
- **G** [0-255] - G recolouring overloaded
- **B** [0-255] - B recolouring overwritten
- **W** [0-255] - W recolouring
- **Repeat** [true, false]
 Changes whether the animation/playlist is played over and over
- **Play** [true, false]
 Pass whether the playlist is playing or paused



- **Autoplay**

- **Output is** *[true, false]*

Sets whether something is sent to the output in autoplay mode



- **Default file** *[0-255]*

Sets which animation is started when the device is switched on. If the value is 0, the device uses the last selected state

- **Autoplay mode** *[ANIMATION, PLAYLIST, COLOR]*

The mode in which autoplay works

- **Brightness** *[0-255]* - brightness for Autoplay

- **Contrast** *[0-255]*

Sets the contrast for the animation in Animation library/Playlist

- **Speed** *[0-255]*

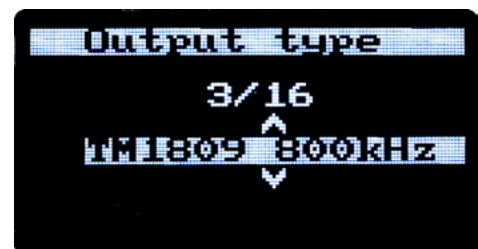
Sets the speed for the animation in Animation library/Playlist

- **Output**

- **Output type**

[D705 1000kHz, APA102-65536 2600kHz, TM1809 800kHz, TM1809 400kHz, SM16716 1300kHz, WS2801 1000kHz, APA102 1300kHz, APA102_ DOUBLE 1300kHz, UCS9812 1100kHz, MBI6120 475kHz, LPD8806 2000kHz, TM1829 1600kHz, TM1829 800kHz, WS2811_RGBW 800kHz, TM1814 800kHz, UCS8903 800kHz]

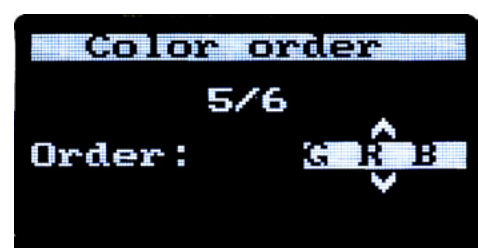
Sets the type of strip that is output



- **Color order**

[RGB, RBG, BRG, BGR, GRB, GBR]

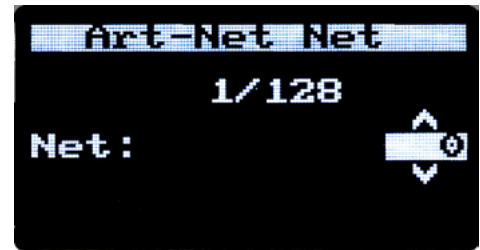
The order of colors on the output



- **Art-Net**

- o **Art-Net Net** [1-128]

Art-Net Net network number



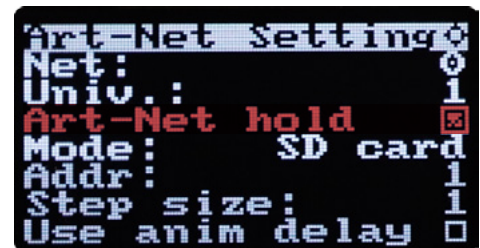
- o **First Universe** [1-256]

Number of the first used Art-Net universe



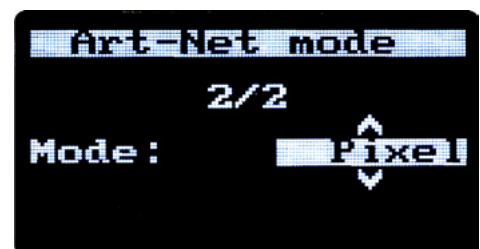
- o **Art-Net hold** [true, false]

Whether the device remains in Art-Net mode when it stops receiving Art-Net signal



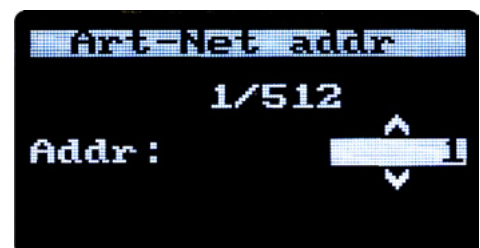
- o **Art-Net mode** [SD card, Pixel]

Mode of incoming data processing



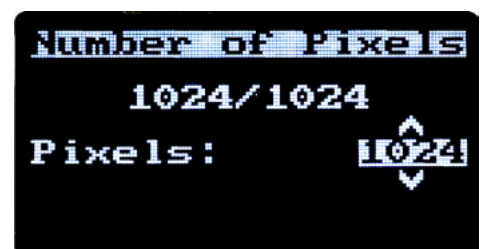
- o **Art-Net addr** [1-512]

Address from which the data is taken

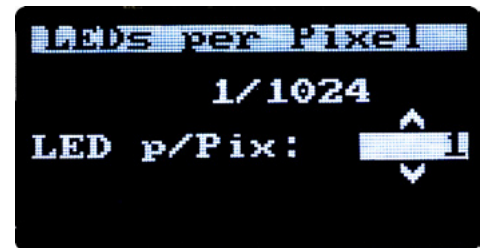


- o **Number of Pixels** [1-1024]

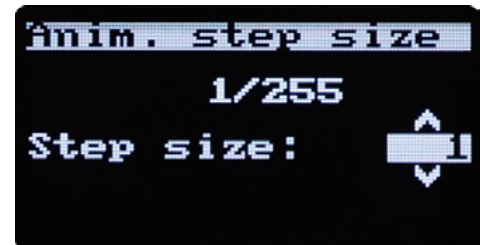
Number of pixels used from the input signal in Pixel mode



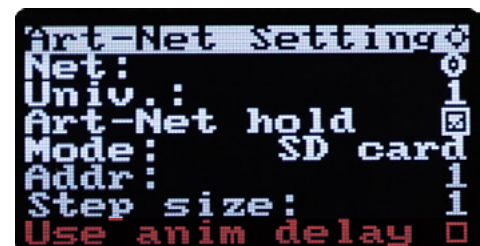
- o **LEDs per Pixel** [1-1024]
Number of LEDs used in 1 pixel in Pixel mode



- o **Anim. step size** [1-255]
Specifies the number of channel steps that represent 1 animation



- o **Use anim delay** [true, false]
Specifies whether a delayed response to a channel change with an animation can be used

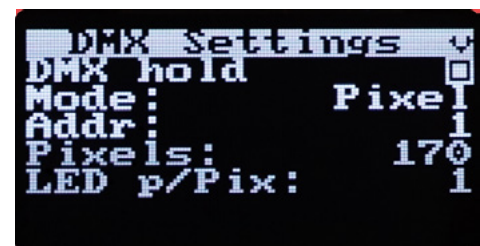


- o **Anim. delay** [ms] [100-65535]
The length of the wait after a channel change with animation after which this change is applied



- **DMX**

- o **DMX hold** [true, false]
Whether the device stays in DMX mode when it stops receiving DMX signal



- o **DMX mode** [SD card, Pixel]
Mode of incoming data processing

- o **DMX addr** [1-512] - address from which data is taken

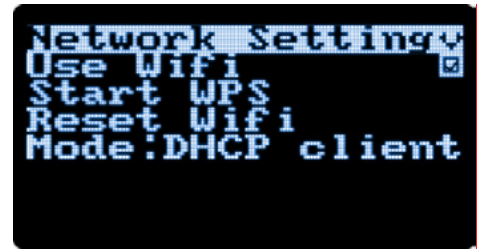
- o **Number of Pixels** [1-170]
Number of pixels used from the input signal in Pixel mode

- o **LEDs per Pixel** [1-1024]
Number of LEDs used in 1 pixel in Pixel mode

- o **Anim. step size** [1-255]
Specifies the number of channel steps that represent 1 animation
- o **Use anim delay** [true, false]
Specifies whether a delayed response to a channel change with an animation can be used
- o **Anim. delay** [ms] [100-65535]
The length of the wait after a channel change with animation after which this change is applied
- **Sync**
 - o **Sync mode** [OFF, Master, Slave]
Sets the sync mode in which the device operates
 - o **OffAfterMaster** [true, false]
If the device is a slave, it determines whether the synchronization is turned off when the master signal stops coming
 - o **Off delay** [s] [1-255]
Time in seconds, how long it waits for disconnection from synchronization
 - o **UseLssEthSync** [true, false]
Enables the use of LSS Ethernet synchronization
 - o **Sync zone** [1-256] - set the synchronization zone number
 - o **Use Master Set.** [true, false]
Sets whether all transferred data is applied or only timecode, type and “animation number”
 - o **Use DMX Sync** [true, false]
Enables the use of LSS DMX synchronization

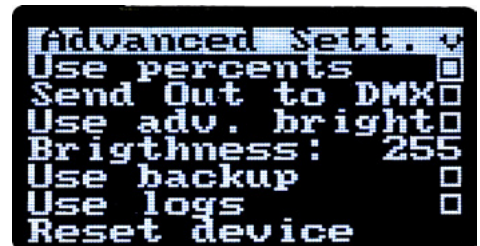
- **Network**

- **Use WiFi** *[true, false]*
Enables/disables WiFi
- **Start WPS** - start wps
- **Reset Wifi** - resets network settings
- **Ethernet mode** *[DHCP client, DHCP server, Static IP]*
Sets the mode in which the wired network connection is used
- **Static IP** *[1-255].[0-255].[0-255].[1-255]*
Set the static IP address
- **Static mask** *[1-255].[0-255].[0-255].[0-255].[1-255]*
Set the static mask
- **Static gateway** *[1-255].[0-255].[0-255].[0-255].[1-255]*
Setting the static gateway

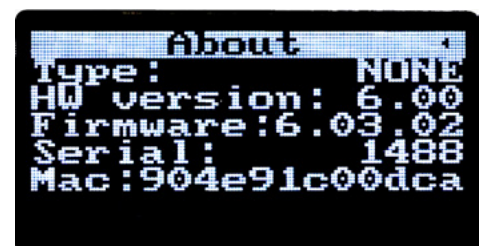


- **Advanced**

- **Use percents** *[true, false]*
Switches between percents and values for web interface and app (not in display menu yet)
- **Send out to DMX** *[true, false]*
Enables sending the first 512 values from the spi output signal to DMX OUT
- **Use adv. brightness** *[true, false]*
Switches between using brightness and advanced brightness (HW+SW brightness)
- **Brightness** *[1-255]*
Sets HW and SW brightness together according to IC type (how many steps the IC has at HW brightness)
- **HW brightness** *[1-255]*



- o **SW brightness** [1-255]
 - o **Use backup** [true, false]
All settings are automatically backed up to SD card
 - o **Use logs** [true, false]
Saves diagnostic information to SD card
 - o **Reset device** - turns the device off and on
 - o **Reset all sett.**
Erases all changes made to the device settings
- **Test** - used to run the output test
[stop test, Red dimming, Green dimming, Blue dimming, White dimming, All dimming, Snake, Color snake, Blackout, Red solid, Green solid, Blue solid, White solid, All solid]
- **About**
 - o **Type** - device type [SPI LED 2]
 - o **HW version** - version of hardware
 - o **Firmware** - firmware version
 - o **Serial** - serial number of device
 - o **Mac** - mac address of device



4.5 SPECIAL SCREENS

o Start screen

- Displayed only when the device is started
- Displays animated logo and FW version number



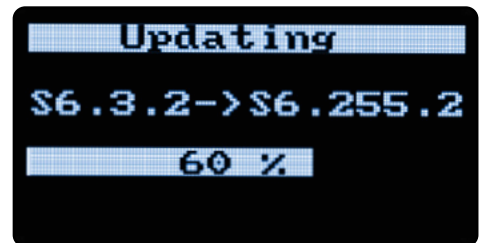
o Identify

- Displayed only when the device is identified
- Displays a black “IDENTIFY...” on a white background alternating with a white “IDENTIFY...” on a black background



o Update

- Displayed when updating (both from SD card and web interface)
- Informs from which FW number the update is being made and to which FW number, as well as the status of the update



WHAT IS DMX?

DMX512 (DMX in short) is a lighting protocol created in 1986 mainly to standardize control method for dimming lights in theaters and on stages. Even it is old it is still widely used today. It is very simple and quite robust protocol where controller sends 512 values AKA 512 Channels. Each channel is just value in range 0-255. You can find a lot of information about DMX on the Internet.

WHAT IS ART-NET™?

Art-Net is a communications protocol for transmitting the one or multiple DMX512 lighting control protocols over the User Datagram Protocol (UDP) of the Internet protocol suite. Basically, it is multiple DMX lines send over standard Ethernet wired or wireless network.

HOW MANY METERS OF LED STRIP CAN BE CONNECTED TO POWERED SPI LED CONTROLLER 2?

To answer this question there are few factors and few limitations to be explained. First factor is how many pixels per meter are on LED strip you want to use. Please note that pixel count per meter can be smaller than LED count per meter. Then there is a power limitation which can POWERED SPI LED CONTROLLER 2 deliver to its LED output. For example, in case of 12V/5A it is 60W. However, if more power is needed, extra power can be delivered to LED strip from external power supply, thus power limitation of POWERED SPI LED CONTROLLER 2 is not important in case you use external power supply. Another limitation is LED IC type and number of color channels (RGB or RGBW). For very common type of 12V WS2815 RGB digital LED strip with 60pixels per meter with power consumption 8.64W per meter following rules apply:

Maximum pixel count for this type of RGB IC is 1024pixels. Thus signal generated from for POWERED SPI LED CONTROLLER 2 is capable of control $1024\text{pix}/60\text{pix}/\text{meter} = 17\text{m}$. But 60W power limitation give you possibility to power up $60\text{W}/8.64\text{W}/\text{meter} = 6.9\text{m}$. Thus you can power & control 6.9m of this LED strip by POWERED SPI LED CONTROLLER 2.

But it is pretty easy to add external power supply and use POWERED SPI LED CONTROLLER 2 only as a signal generator. Then you can control 17m and take power from another power supply.

HOW MANY METERS OF SIGNAL CABLE CAN BE RUN FROM LED OUTPUT TO LED STRIP?

General rule of thumb is that 5-10m works without problem in most cases. In case you need to use longer cable we suggest making a test to confirm if it is working. Please note that long cable runs may behave problematic on specific environment cases such as power cables (source of noise) nearby etc.

For longer signal cable runs we suggest using a pair of THE SYMMETRIZERS which provides trouble-free long signal cable runs.

WHERE IS THE WI-FI ANTENNA LOCATED?

Wi-Fi antenna is located almost in the middle of device. This area must not be covered by electrically conductive materials or cables when Wi-Fi is enabled on device. Maintain antenna location as free from obstacles as possible.

WARRANTY

This device has been designed and made using high quality components with several quality checks and testings. Therefore we are proud to provide **2 year** limited warranty for this device.

This limited warranty is valid for company or person (user) who purchased new device from us, or our authorized dealer/distributor and warranty period starts from date when user receive this device.

Limited warranty cover:

- **material defects**
- **assembly failures**
- **device malfunction**
- **this device only**

Limited warranty DO NOT cover and is void when this device:

- **has been used for different usage as specified in this manual**
- **has been opened without our permission**
- **has been modified or disassembled without our permission**
- **has been operated wrong wa, e.g. over-voltage, over-current, exposed to high electromagnetic fields/discharges such as lighting strikes or ESD events with parameters way outside of HBM model**
- **has been stored or used outside of storage/operating temperature and humidity**
- **has been used in aggressive environment, corrosive environment, dusty environment or in environment with increased vibrations**
- **has been in contact with liquids**
- **has been connected wrong way, e.g. short circuits, reverse polarity etc.**
- **has been mechanically damaged**
- **got unofficial attempts to firmware updates**

Limited warranty DO NOT cover:

- **shipping expenses to handle defective device.**
- **failures or damage of other equipments connected to this device**
- **user expenses caused by defective device**

For limited warranty claim process:

- **user must be able provide sufficient proof of purchase**
- **use email info@ledstripstudio.com with detailed description of device failure**
- **takes less than 30 days to resolve. This period starts from day we physically receive defective device (device return)**

DISPOSAL OF YOUR OLD DEVICE

This device is an electronic device, and can be categorized as hazardous waste in your country. Dispose of this device through an approved waste disposal firm or through your local waste facility. When discarding the device, comply with the rules and regulations that apply in your country. If in doubt, consult your local waste disposal facility.

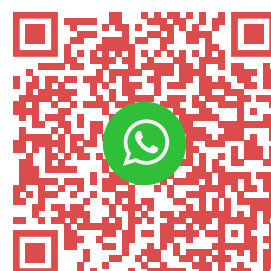
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-  instagram.com/ledstripworld/



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