Funiki SPLASH Users Guide

Analog LED Controller Visualizer

- Technical Description and Operational Guide
- Eurorack module

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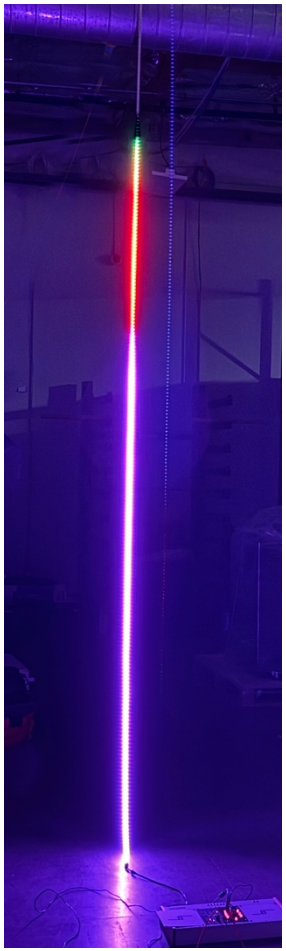
Description

- Funiki SPLASH is a single 16HP Eurorack module that visually displays an analog control voltage (CV) signal onto large LED strips
- The module directly drives a set of up to three LED strips, similar to a large voltage meter
- The control voltage input is measured and displayed on a set of LED strips, which can be several meters in length
- An external trigger input can be used for synchronizing the displays and patterns
- Selectable manual or automatic random control of the LED colors and pattern displays
- Custom patterns can be made by programming the externally accessible memory chip
- Compatible with Eurorack systems and with LED strip repeater systems



Front Panel Controls (1/2)

DC Input - External power supply input for driving the LED display strips. Requirements are 12Vdc, 5Amp minimum. Connector is barrel type, 5.5/2.1mm, center positive. Any different voltage or polarity will damage the module and your LED strips!
OL - Overload indicator lights if too much power is being drawn through the module.

Pattern Controls - Selects the patterns and actions of the LED meter display.
A is for the top section of the LED display
B is for the bottom section of the LED display
C turns on manual control of patterns

Range - Selects what control voltage range you are using for the Analog Input.
0/+ is used for a range of 0 volts and +10 or +5 volts.
-/+ is used for a -10v or -5v and +10v or +5v range

Setup Switches - These are configure options for the module. See the Setup Switch page for these functions.

Analog Input - Main control voltage input signal for displaying onto the LED strip meter displays. The signal range for this input is -10v to +10v.

TOP, BOTTOM - Manual pattern control for the LED display strips. Top controls the LEDs above the analog input value, Bottom controls the LEDs below the analog input value

Front Panel Controls (2/2)

LED OUTPUTS - Output power and signal lines to LED strips. Plug LED strips directly into these connectors.

LED ON/OFF - Turns on/off main power from DC Input to the LED strips

Trigger Enable - Enables the Trigger Input to control the module

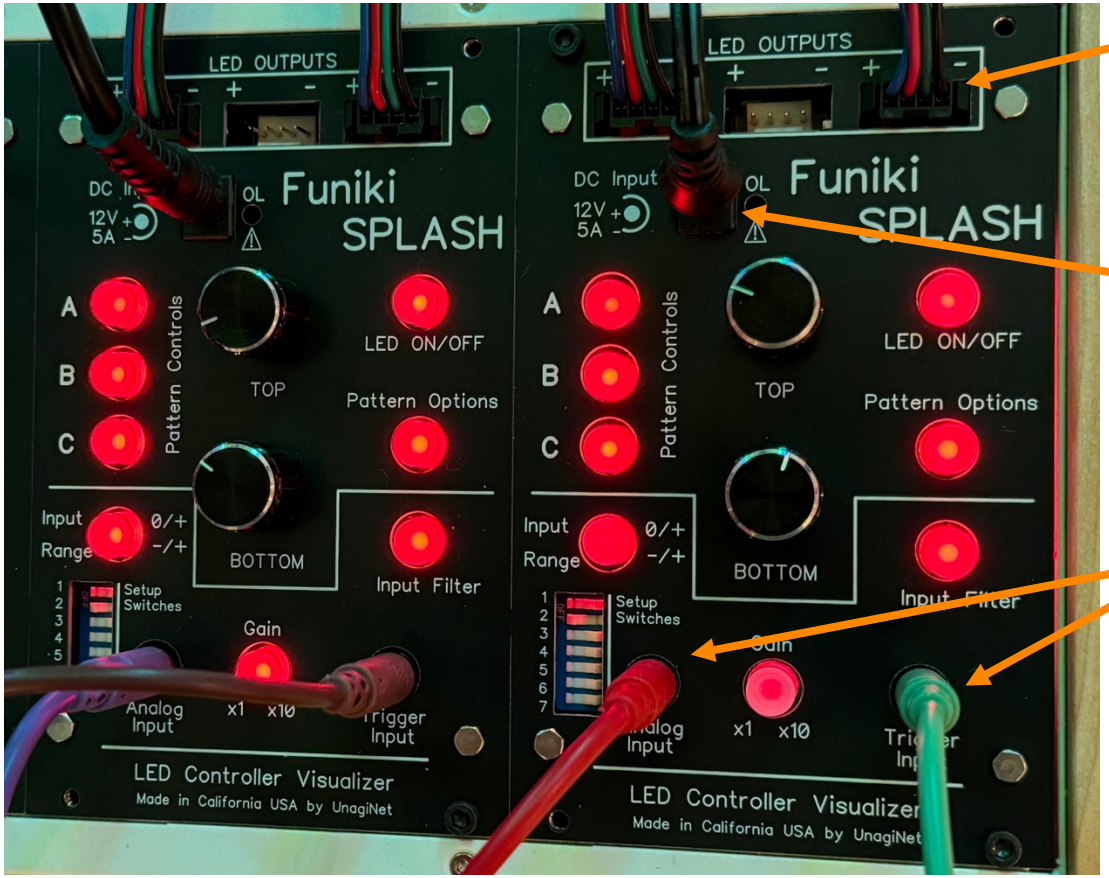
LP Filter - Activates a low pass filter for the Analog Input to filter out unwanted noise and high-frequency signals

Trigger Input - Signal input for activating Trig options of the module. The trigger signal range is 0 to 5vdc, active high.

Gain - Analog Input gain selector. x1 is -10 to +10 volt range or -5 to +5 volt (see Setup switch 6); x10 is -1 to +1 or -0.5 to +0.5 volt range. Note the gain selector is for the Analog Input only.

Connecting up the module

Here is a typical connection setup for the Funiki SPLASH module. The pictured module below is installed in a small Eurorack. There is an external power supply for the LEDs connected and two LED strips are wired up to the outputs.



LED strips plugged into module

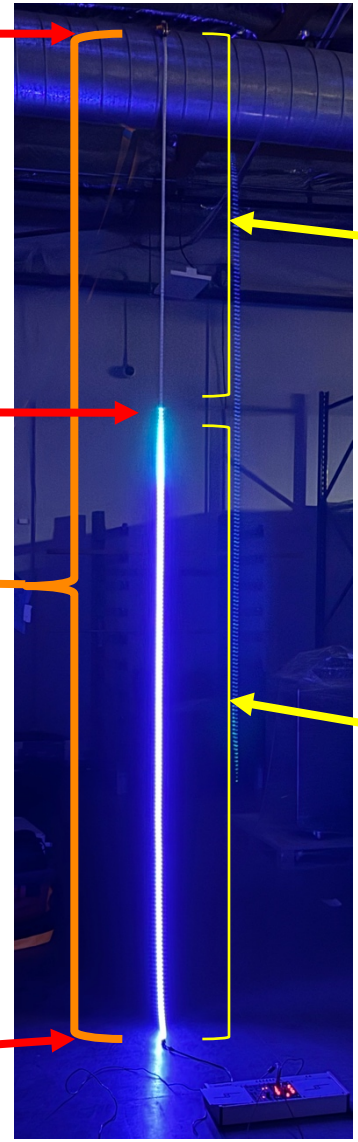
DC power supply connected to DC Input

Inputs connected to other sources

Display Patterns and Colors (1/2)

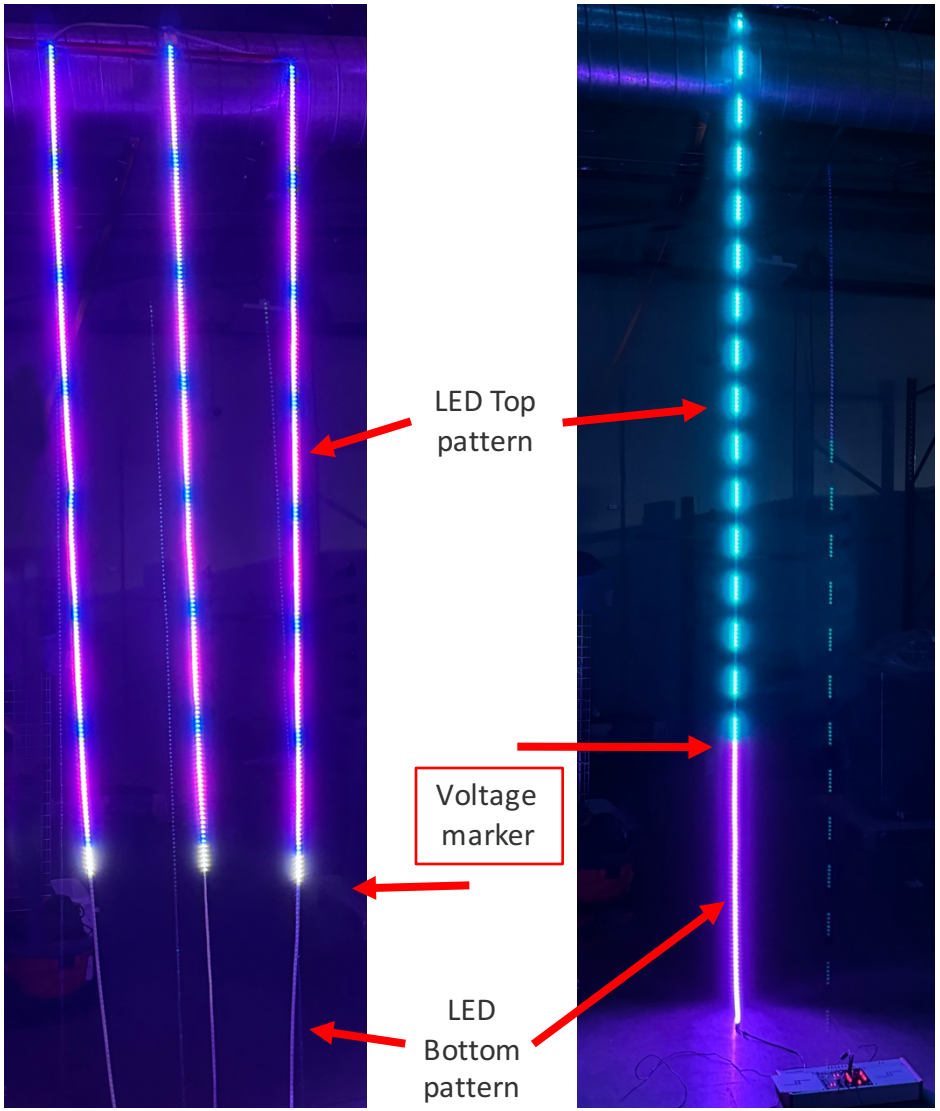
Funiki SPLASH measures the Analog Input and calculates where on the strip is the voltage marker. This spot is proportional to the entire length of the LED strip as scaled to the entire control voltage range (0 to +Vmax or -Vmax to +Vmax). This is similar to a large volt meter display. Vmax is either 5 volts or 10 volts, depending on Setup switch 6.

The module divides the LED strip into two separate patterns, above and below the voltage marker (Top & Bottom). This allows for different colors and patterns to be set for each section independently. See the photo at right.



Display Patterns and Colors (2/2)

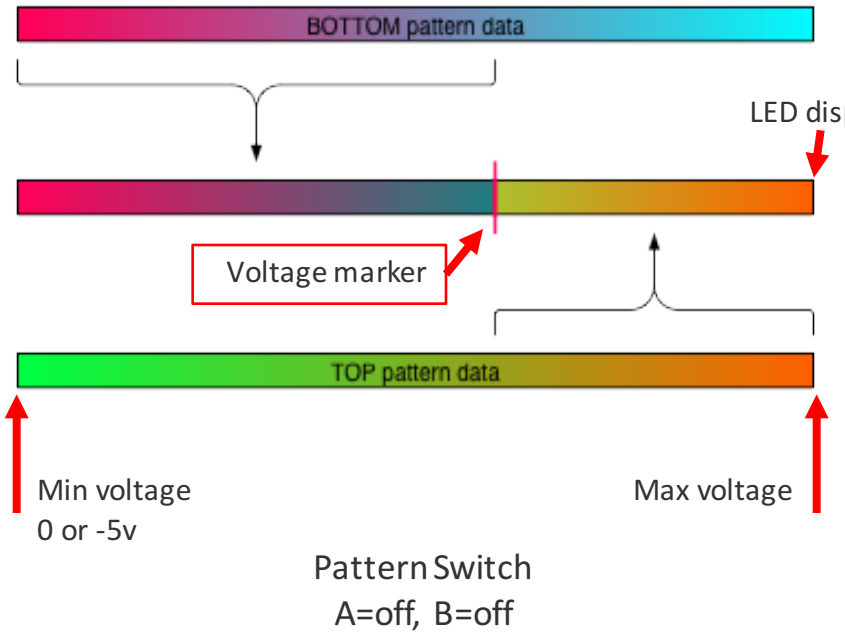
These photos show how changing top and bottom patterns can give a completely different display.

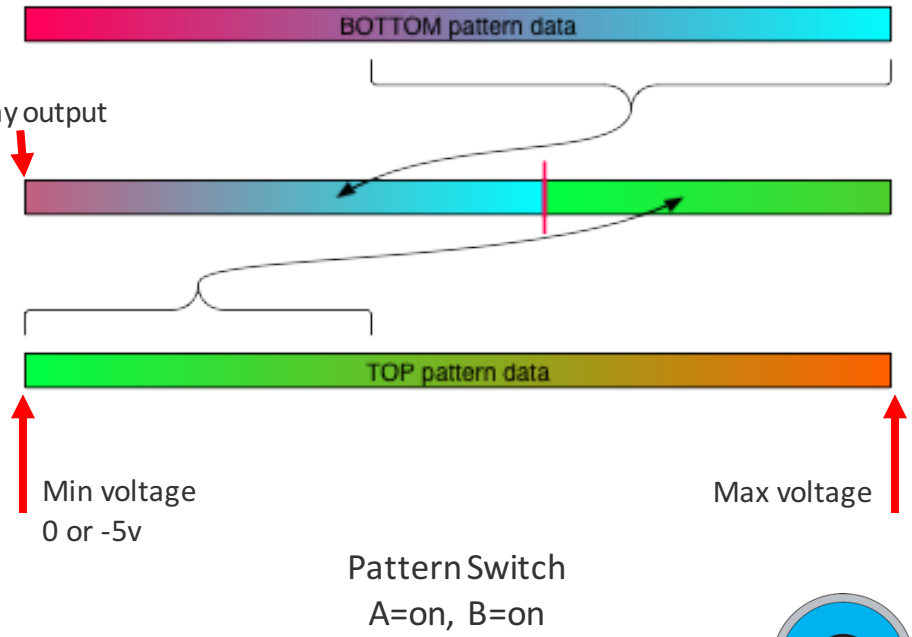


Static and Dynamic Display Options

In addition to separate display options for the Top and Bottom portion of the LED display, there are options for the pattern movements. The patterns span the entire length of the LED display and they normally start at the bottom end of the display. Alternatively, the patterns can start at the Voltage Marker point instead. This means that a pattern start position moves along with the marker, giving the effect of the entire pattern sliding up or down with the input voltage.

The Static and Dynamic display options are set with pattern switch A and B. A for the Top pattern and B for the Bottom pattern. When selected, the pattern shifts and moves with the voltage marker position.





Pattern Control Details

TOP, BOTTOM control knobs

Each knob selects between 64 different patterns that have been programmed into the memory chip on the module. One knob for the top pattern and one knob for the bottom pattern.

Pattern Control switches A, B, C

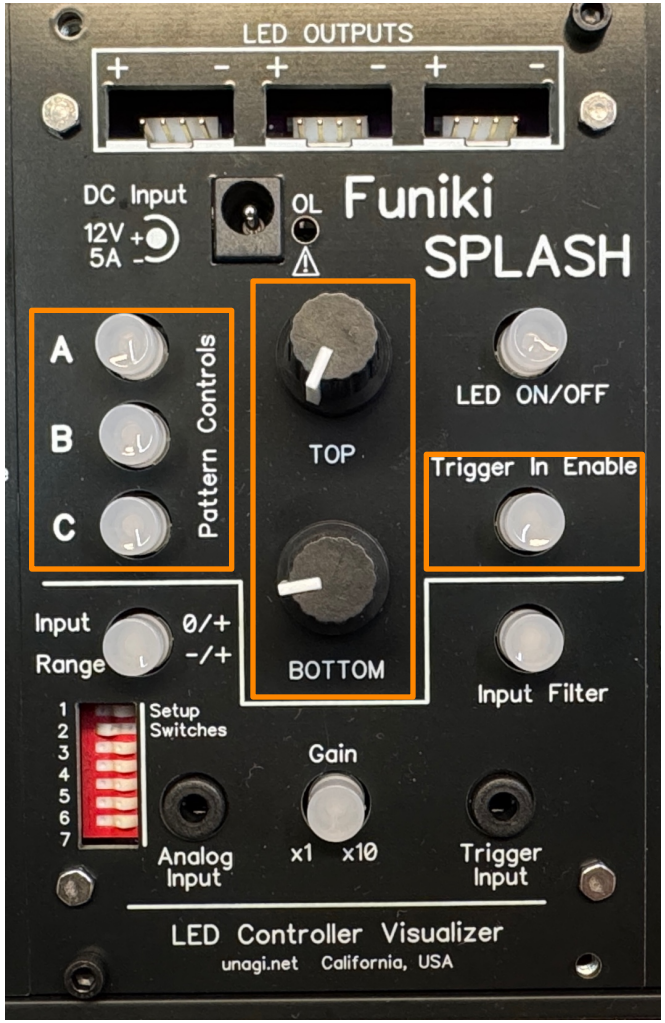
A - Selects between a static pattern or dynamic pattern behavior for the Top LED area

B - Selects between a static pattern or dynamic pattern behavior for the Bottom LED area

C - Selects between manual pattern selection (using the knobs) or activates an internal random pattern selection option

Trigger In Enable

If on, enables the Trigger Input to select patterns. If off, then Trigger Input is ignored.

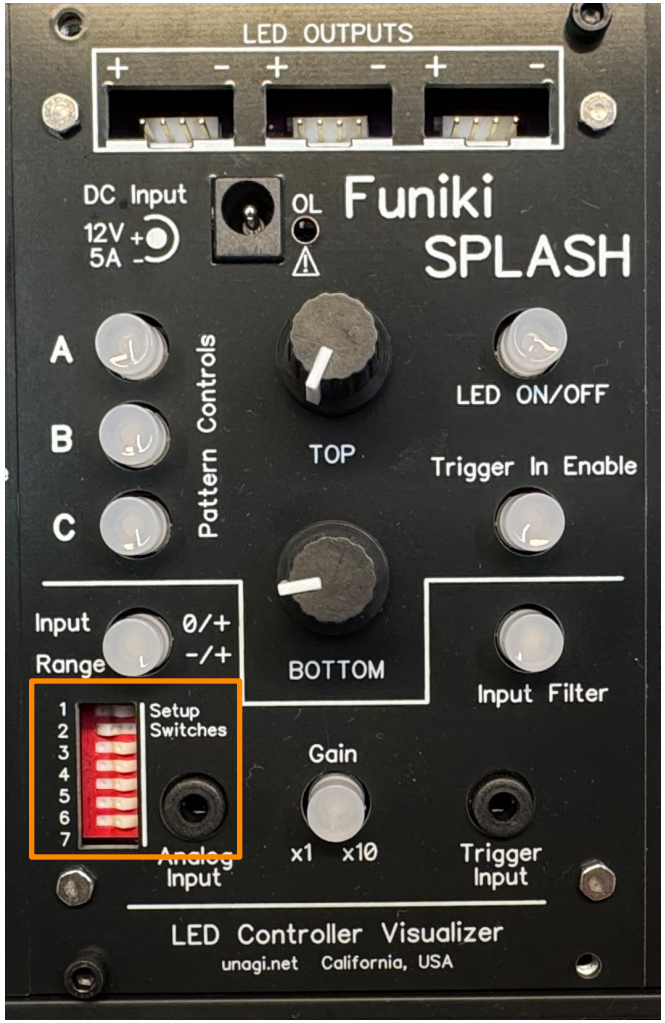


Setup Switches

The Setup Switches configure the module for several functions which are not frequently used or changed. See the list below for their functions:

- DIP 1- Sample&Hold; ON= the analog input value is latched at every external trigger event
- DIP 2- Pattern Change Source; ON= the external trigger input changes patterns; OFF= the Analog input changes patterns after 12 max levels are detected
- DIP 3- Random Overrides Switch A & B; ON= random value changes switch A & B state
- DIP 4- Enable Partial Patterns; ON= random patterns can pick partial pattern sets for display
- DIP 5- Dim Display; ON= the LED display runs at a minimum (low) intensity
- DIP 6- Max Input Range; ON=5 volts ; OFF=10 volts
- DIP 7- unused

OFF ------> ON
switch position



LED Power DC Input

The LED strips can not use power from inside the Eurorack case. The LEDs use far too much power and no rack power supply can handle this load. Therefore, an external LED power supply must be plugged into the module to supply power to all the LED strips.

The LED power supply must be 12vdc and be capable of supplying 5 amps of current. The power supply connector is a barrel type, 5.5mm OD / 2.1mm ID. The center conductor is Positive (+) power. Plugging in any other type of supply will damage your LED strips and the module.

The power input is protected with a resettable fuse that triggers if too much power is drawn through to the LED strips. If the overload protection is triggered, the OL LED will light up.

To reset the overload, turn the LED power off, using the LED ON/OFF switch, and wait 30 seconds.

Power overload can be triggered by running too many LEDs at too high a brightness. If this occurs often, try changing to a dimmer pattern or connect less LEDs to the output.

LED Strips

Compatibility

The Funiki SPLASH module is capable of directly driving a variety of available LED strips, as long as they use the WS2815 LED component. Note that only 12 volt strips are supported; no other voltages are compatible with the module. Using an LED strip that has other types of LEDs can damage both the LED strips and the module.

The module drives 256 LEDs on a strip, depending on the module settings. If a longer strip is attached, only the first 256 LEDs will be driven by the module. You may attach shorter strips, but the LED pattern will be truncated to the length of the actual strip.

We have designed several custom LED strips that work directly with the module. See our website for more information on the LED strips and aluminum channels.

Power draw and overloads

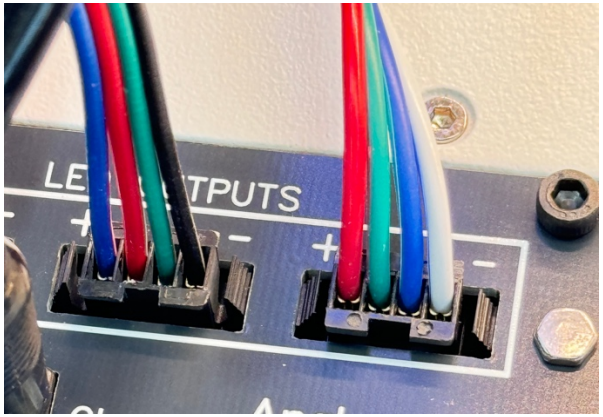
A fully lit LED strip draw can draw a significant amount of power to light all the LEDs. Having three strips connected is an even greater power draw. The module has an overload protection circuit that will trigger if the LED strips continuously draw more than 5 amps of total current. If an overload does occur, the OL indicator will light up and power will be removed from the LED strips. To reset the overload, turn off the LED power via the LED ON/OFF switch and wait 30 seconds.

LED Outputs

The LED strips connect directly to the module using the LED output connectors. The module has 4-pin male headers which connect to the female connector on the LED strips. They only connect one way!

The LED power should be OFF before connecting the LED strips to prevent damage and power surges.

Make sure the LED strips are correctly installed BEFORE turning on the power. Otherwise you will damage the LEDs and the module.



Custom LED Pattern Programming

Funiki SPLASH has a set of 64 built-in LED patterns which are programmed on a flash memory chip, located on the back of the module. We make this chip accessible so it is possible for users to program their own custom LED patterns. The programming requires removing the EEPROM chip and re-programming it for new patterns.

There is a technical programming reference guide available from our support team, so please contact them if you are interested in customizing the patterns in your module.

Unagi Tech Support: techinfo@unagi.net