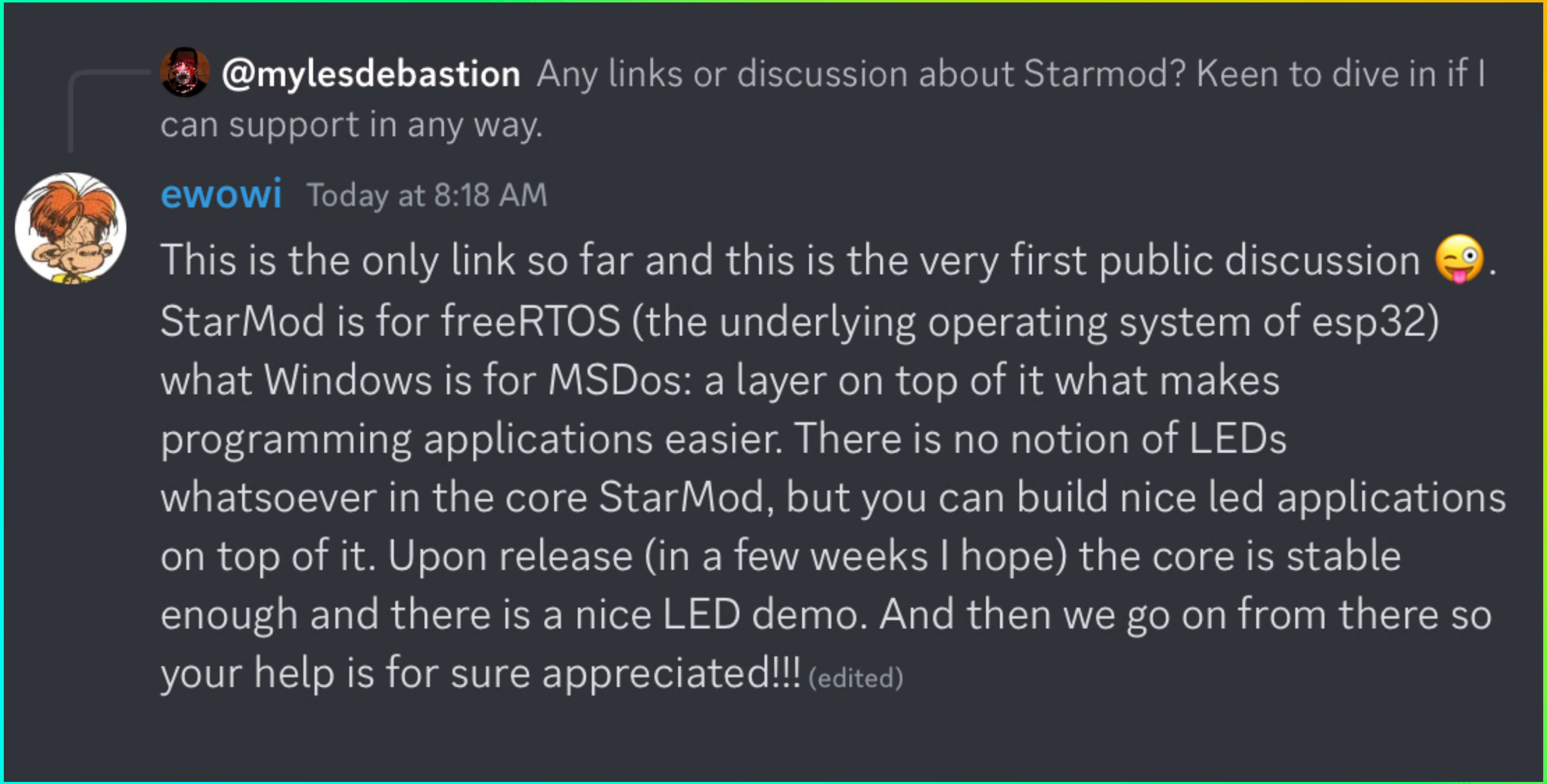
STARMOD 💫

BY MOONMODULES

What is StarMod 💫 ?



@mylesdebastion Any links or discussion about Starmod? Keen to dive in if I can support in any way.

ewowi Today at 8:18 AM

This is the only link so far and this is the very first public discussion 😜. StarMod is for freeRTOS (the underlying operating system of esp32) what Windows is for MSDos: a layer on top of it what makes programming applications easier. There is no notion of LEDs whatsoever in the core StarMod, but you can build nice led applications on top of it. Upon release (in a few weeks I hope) the core is stable enough and there is a nice LED demo. And then we go on from there so your help is for sure appreciated!!! (edited)

Why StarMod 💫 ?

StarMod 💫

* Mod

Everything is a module

Inspired by Design Patterns

For any IOT usecase

Makes software understandable and maintainable

Platform to do things not possible before

History

WLED Sound Reactive

WLED SR 2D

💡WLED OS ...

WLED 0.13 -> 0.14

WLED MoonModules

Hitting the boundaries of WLED

StarMod -> design rules

StarMod 💫 design rules

Everything is a module

ESP32 (++) only

Every module is a (singleton) class

Pragmatic use of DP / OO (ESP32 has limited resources)

No static variables

Understandable code

Minimal code

Tuned for performance / memory

Consistently applied (used rule is better then no rule)

Model / variables / JSON

StarMod core vs StarMod apps

Orthogonality

- Functional locality

- server / UI

StarMod 💫 Features

Instances dashboard view

Enable modules

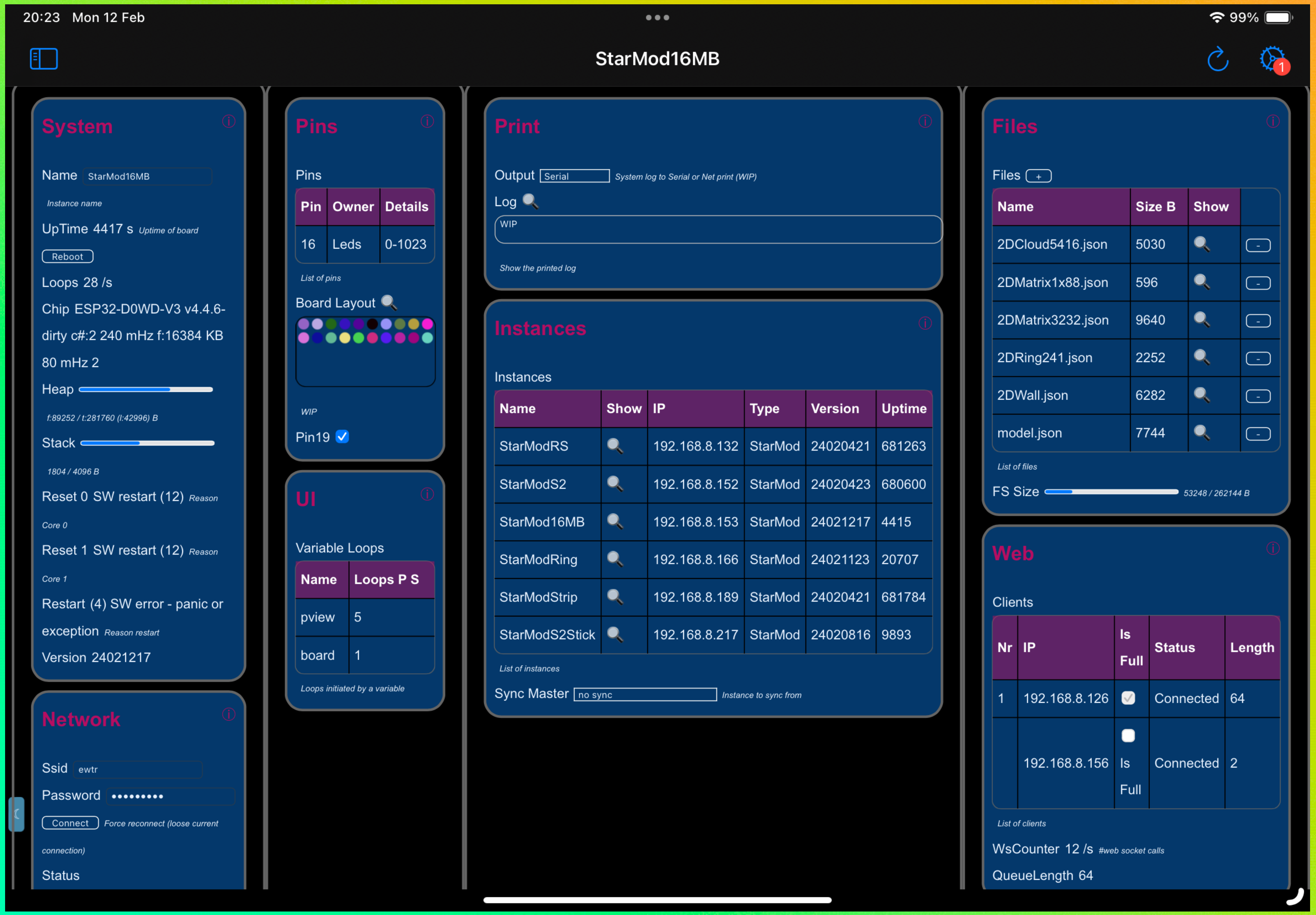
Print outputs

Themes

Tabs

Drag&Drop modules

Upload / Update / json commands



System

Name StarMod16MB

Instance name

UpTime 4417 s *Uptime of board*

Loops 28 /s

Chip ESP32-D0WD-V3 v4.4.6-dirty c#:2 240 mHz f:16384 KB 80 mHz 2

Heap

f:89252 / t:281760 (l:42996) B

Stack

1804 / 4096 B

Reset 0 SW restart (12) *Reason Core 0*

Reset 1 SW restart (12) *Reason Core 1*

Restart (4) SW error - panic or exception *Reason restart*

Version 24021217

Network

Ssid ewtr

Password •••••••••

Force reconnect (loose current connection)

Status

Pins

Pins

Pin	Owner	Details
16	Leds	0-1023

List of pins

Board Layout 🔍

WIP

Pin19 ☑

UI

Variable Loops

Name	Loops P S
pview	5
board	1

Loops initiated by a variable

Print

Output Serial *System log to Serial or Net print (WIP)*

Log 🔍

WIP

Show the printed log

Instances

Instances

Name	Show	IP	Type	Version	Uptime
StarModRS	🔍	192.168.8.132	StarMod	24020421	681263
StarModS2	🔍	192.168.8.152	StarMod	24020423	680600
StarMod16MB	🔍	192.168.8.153	StarMod	24021217	4415
StarModRing	🔍	192.168.8.166	StarMod	24021123	20707
StarModStrip	🔍	192.168.8.189	StarMod	24020421	681784
StarModS2Stick	🔍	192.168.8.217	StarMod	24020816	9893

List of instances

Sync Master no sync *Instance to sync from*

Files

Files

Name	Size B	Show	
2DCloud5416.json	5030	🔍	-
2DMatrix1x88.json	596	🔍	-
2DMatrix3232.json	9640	🔍	-
2DRing241.json	2252	🔍	-
2DWall.json	6282	🔍	-
model.json	7744	🔍	-

List of files

FS Size *53248 / 262144 B*

Web

Clients

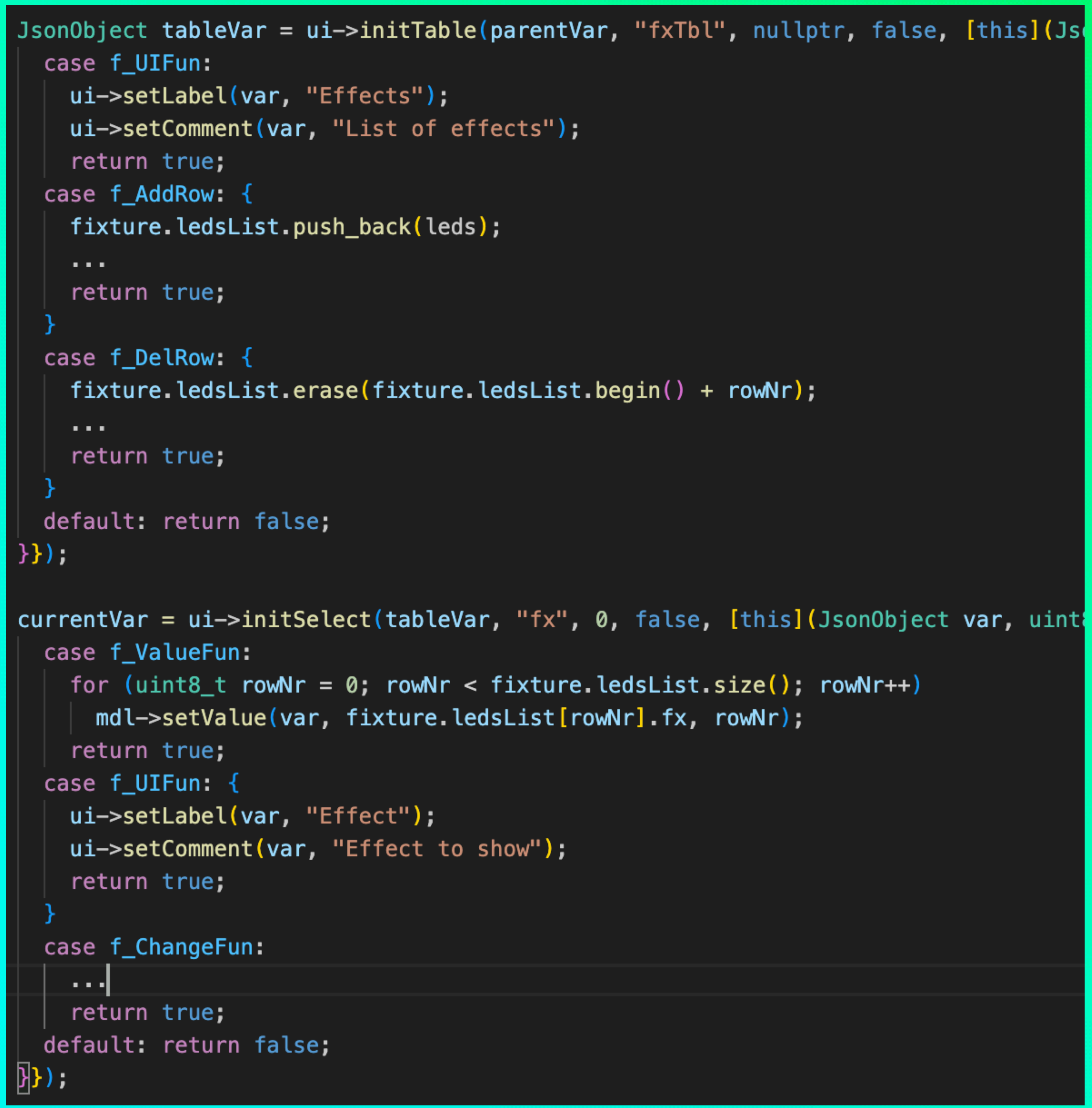
Nr	IP	Is Full	Status	Length
1	192.168.8.126	☑	Connected	64
	192.168.8.156	□ Is Full	Connected	2

List of clients

WsCounter 12 /s *#web socket calls*

QueueLength 64

StarMod 💫 Variables, Model, FS and UI



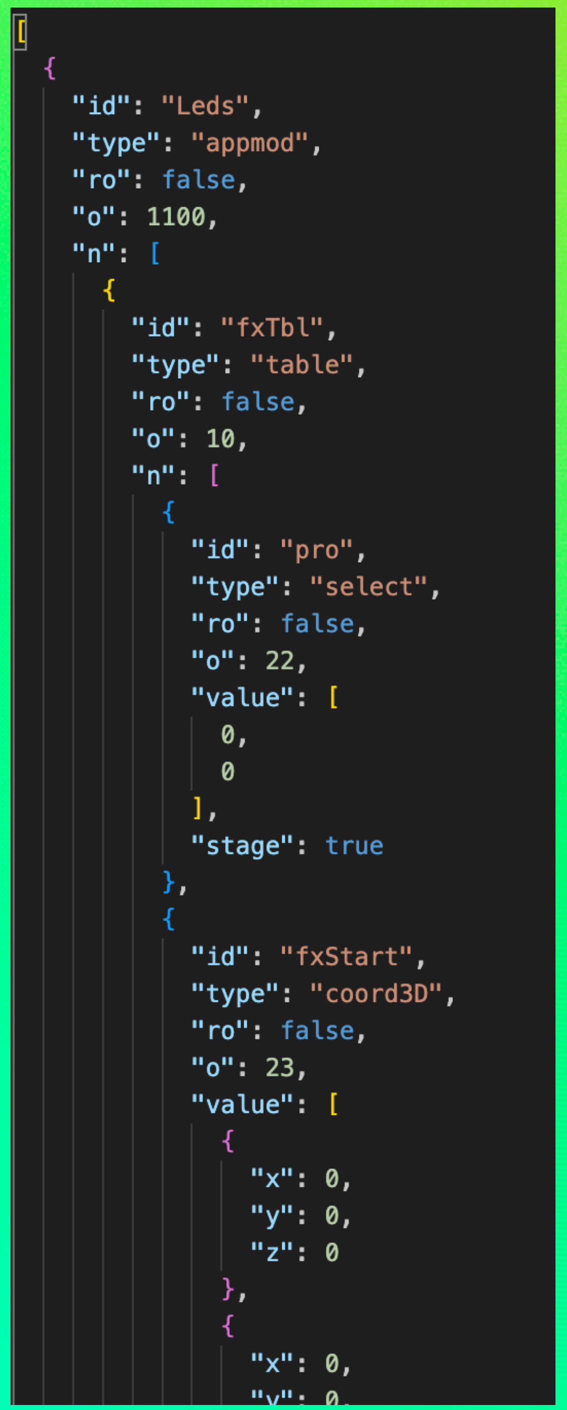
```
JsonObject tableVar = ui->initTable(parentVar, "fxTbl", nullptr, false, [this](Js
  case f_UIFun:
    ui->setLabel(var, "Effects");
    ui->setComment(var, "List of effects");
    return true;
  case f_AddRow: {
    fixture.ledsList.push_back(leds);
    ...
    return true;
  }
  case f_DelRow: {
    fixture.ledsList.erase(fixture.ledsList.begin() + rowNr);
    ...
    return true;
  }
  default: return false;
}});

currentVar = ui->initSelect(tableVar, "fx", 0, false, [this](JsonObject var, uint
  case f_ValueFun:
    for (uint8_t rowNr = 0; rowNr < fixture.ledsList.size(); rowNr++)
      mdl->setValue(var, fixture.ledsList[rowNr].fx, rowNr);
    return true;
  case f_UIFun: {
    ui->setLabel(var, "Effect");
    ui->setComment(var, "Effect to show");
    return true;
  }
  case f_ChangeFun:
    ...
    return true;
  default: return false;
}});
```

Variable 'Class'

📉

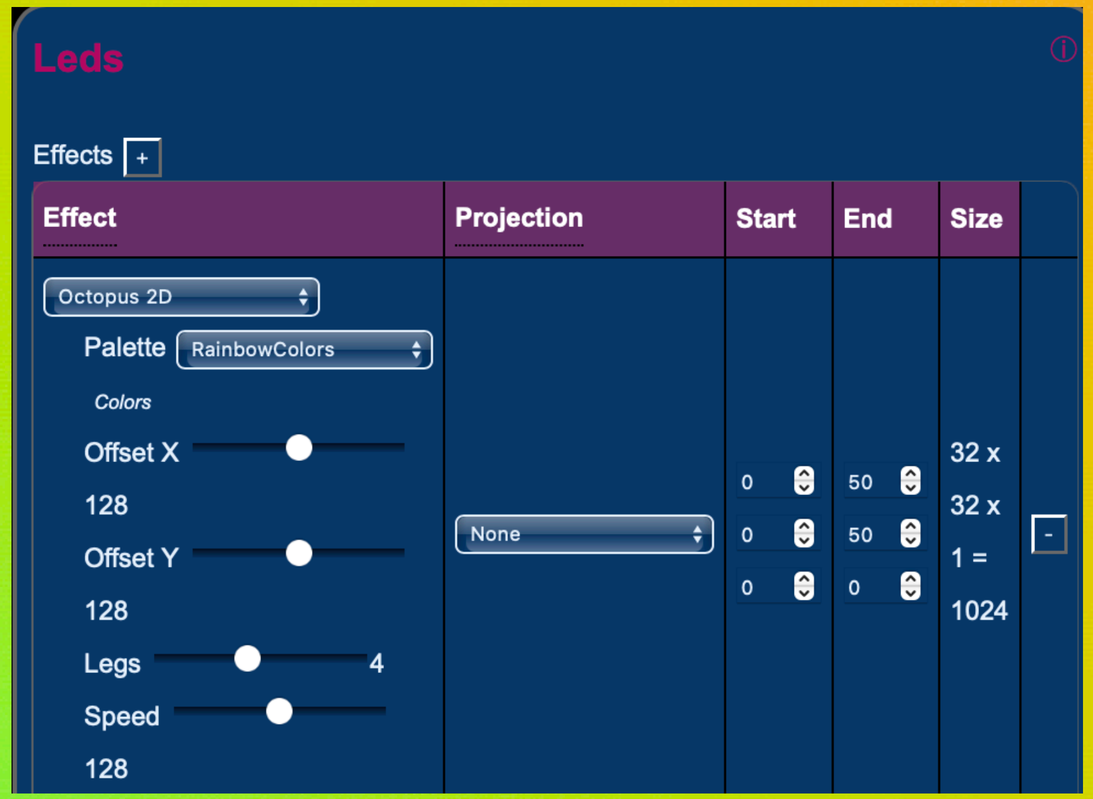
Web



```
[
  {
    "id": "Leds",
    "type": "appmod",
    "ro": false,
    "o": 1100,
    "n": [
      {
        "id": "fxTbl",
        "type": "table",
        "ro": false,
        "o": 10,
        "n": [
          {
            "id": "pro",
            "type": "select",
            "ro": false,
            "o": 22,
            "value": [
              0,
              0
            ],
            "stage": true
          },
          {
            "id": "fxStart",
            "type": "coord3D",
            "ro": false,
            "o": 23,
            "value": [
              {
                "x": 0,
                "y": 0,
                "z": 0
              },
              {
                "x": 0,
                "y": 0
```

Model.json

PSRam

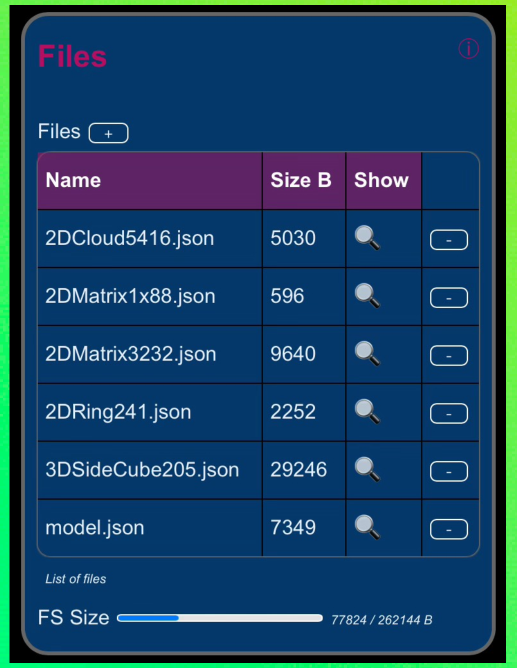


Leds

Effects +

Effect	Projection	Start	End	Size	
Octopus 2D Palette RainbowColors *Colors* Offset X 128 Offset Y 128 Legs 4 Speed 128	None	0 0 0	50 50 0	32 x 32 x 1 = 1024	-

UI



Files

Files +

Name	Size B	Show	
2DCloud5416.json	5030	🔍	-
2DMatrix1x88.json	596	🔍	-
2DMatrix3232.json	9640	🔍	-
2DRing241.json	2252	🔍	-
3DSideCube205.json	29246	🔍	-
model.json	7349	🔍	-

List of files

FS Size *77824 / 262144 B*

FS
Persistent

StarMod 💫 UI

The ugly: UI

The good: 100% modular

Themes

Tabs

Drag n drop

StarMod 💫 Leds

Any fixture 0D to 3D

Preview 0D to 3D

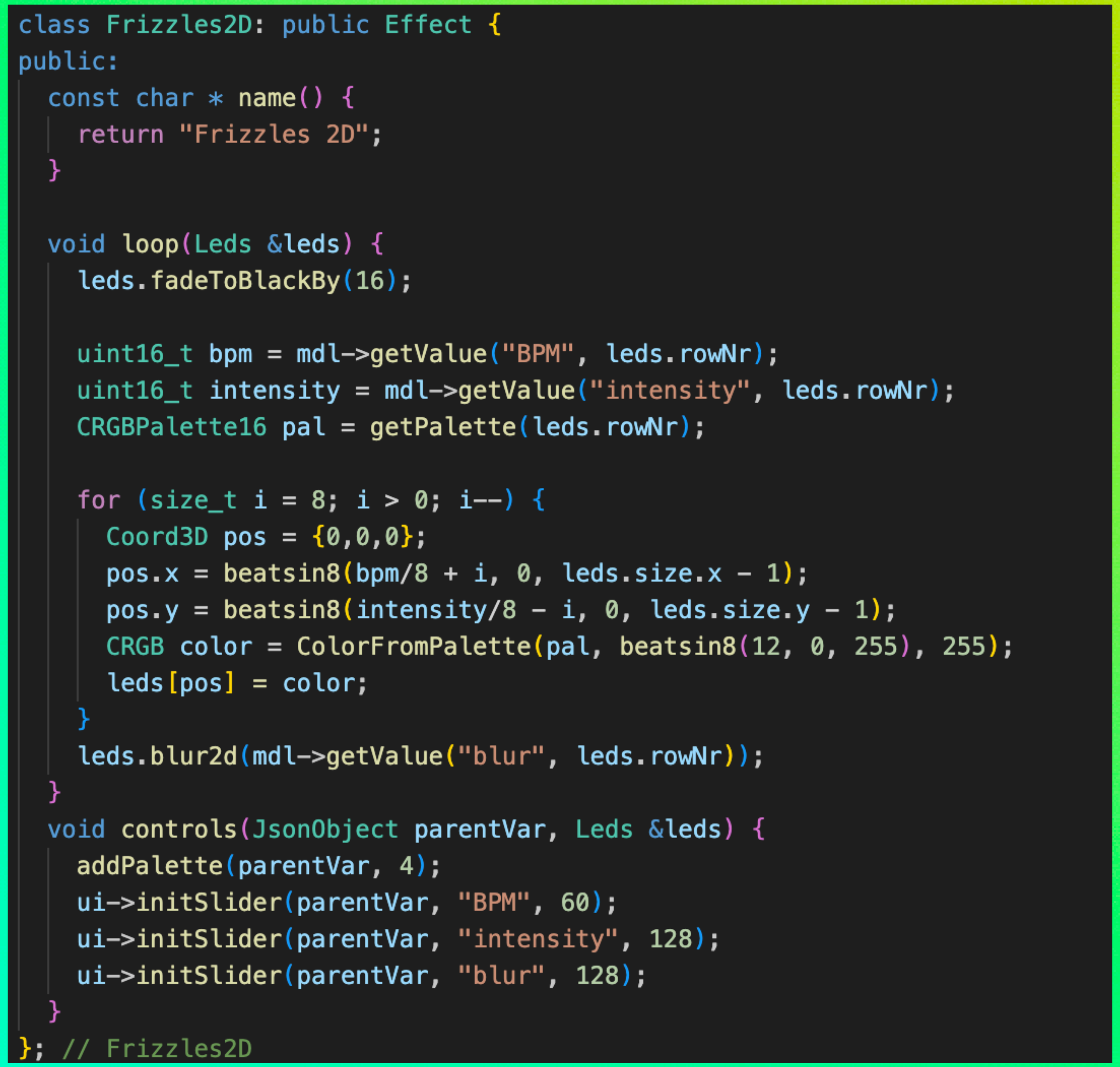
Projections 0D to 3D

Multiple effects with unlimited controls of any type

FastLed (Gamma, blending etc for free)

Usermods (Audio, HA, DMX, ...)

StarMod 💫 Leds Effects



```
class Frizzles2D: public Effect {
public:
  const char * name() {
    return "Frizzles 2D";
  }

  void loop(Leds &leds) {
    leds.fadeToBlackBy(16);

    uint16_t bpm = mdl->getValue("BPM", leds.rowNr);
    uint16_t intensity = mdl->getValue("intensity", leds.rowNr);
    CRGBPalette16 pal = getPalette(leds.rowNr);

    for (size_t i = 8; i > 0; i--) {
      Coord3D pos = {0,0,0};
      pos.x = beatsin8(bpm/8 + i, 0, leds.size.x - 1);
      pos.y = beatsin8(intensity/8 - i, 0, leds.size.y - 1);
      CRGB color = ColorFromPalette(pal, beatsin8(12, 0, 255), 255);
      leds[pos] = color;
    }
    leds.blur2d(mdl->getValue("blur", leds.rowNr));
  }
  void controls(JsonObject parentVar, Leds &leds) {
    addPalette(parentVar, 4);
    ui->initSlider(parentVar, "BPM", 60);
    ui->initSlider(parentVar, "intensity", 128);
    ui->initSlider(parentVar, "blur", 128);
  }
}; // Frizzles2D
```

No vars 📉

StarMod 💫 Fixture Generation

Any fixture in 3D space

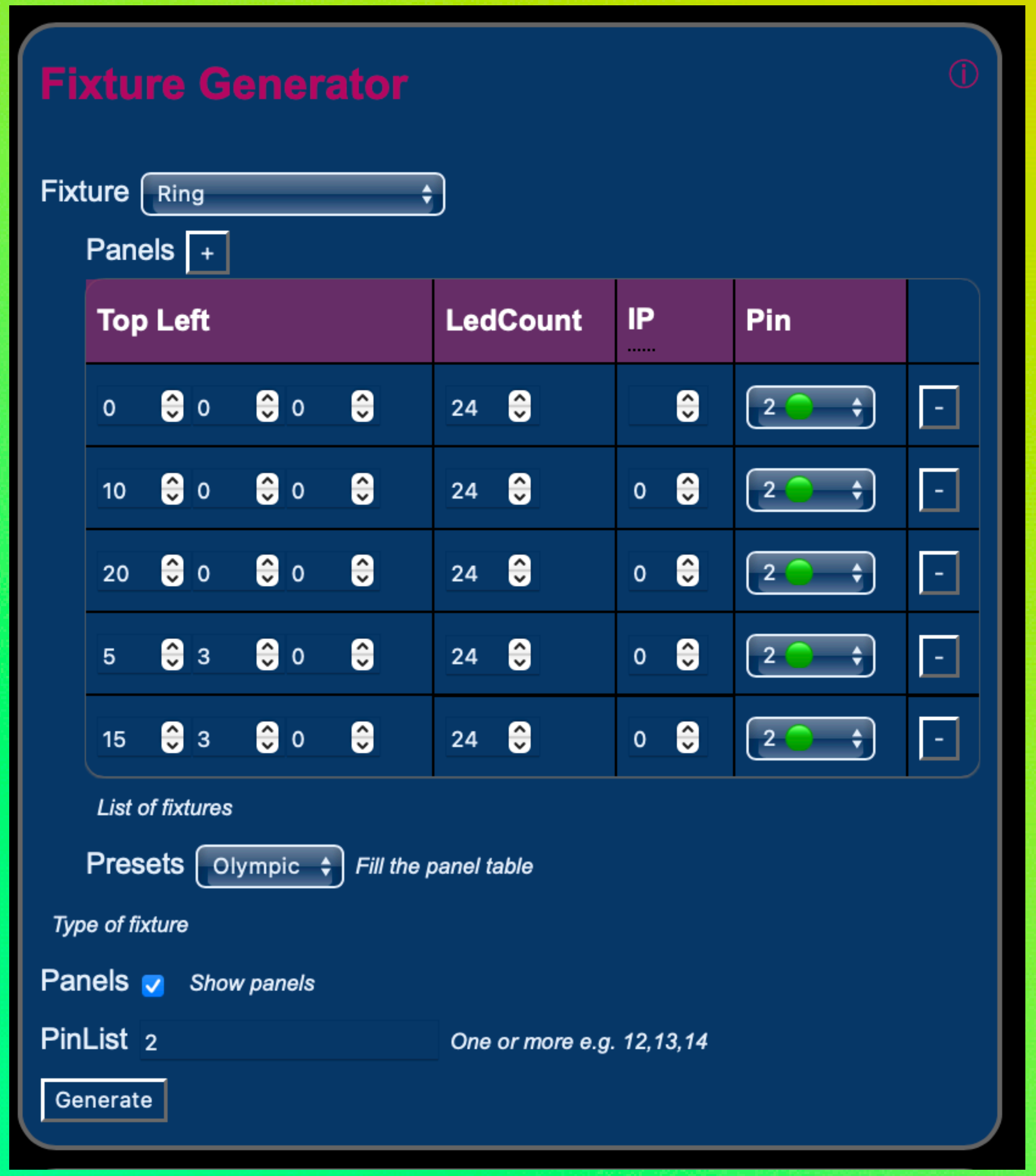
Manually create F_ixture.json

Generate

Panels

Presets (your fixture)

IP / Pin



Fixture Generator

Fixture Ring

Panels +

Top Left			LedCount	IP	Pin	
0	0	0	24		2	-
10	0	0	24	0	2	-
20	0	0	24	0	2	-
5	3	0	24	0	2	-
15	3	0	24	0	2	-

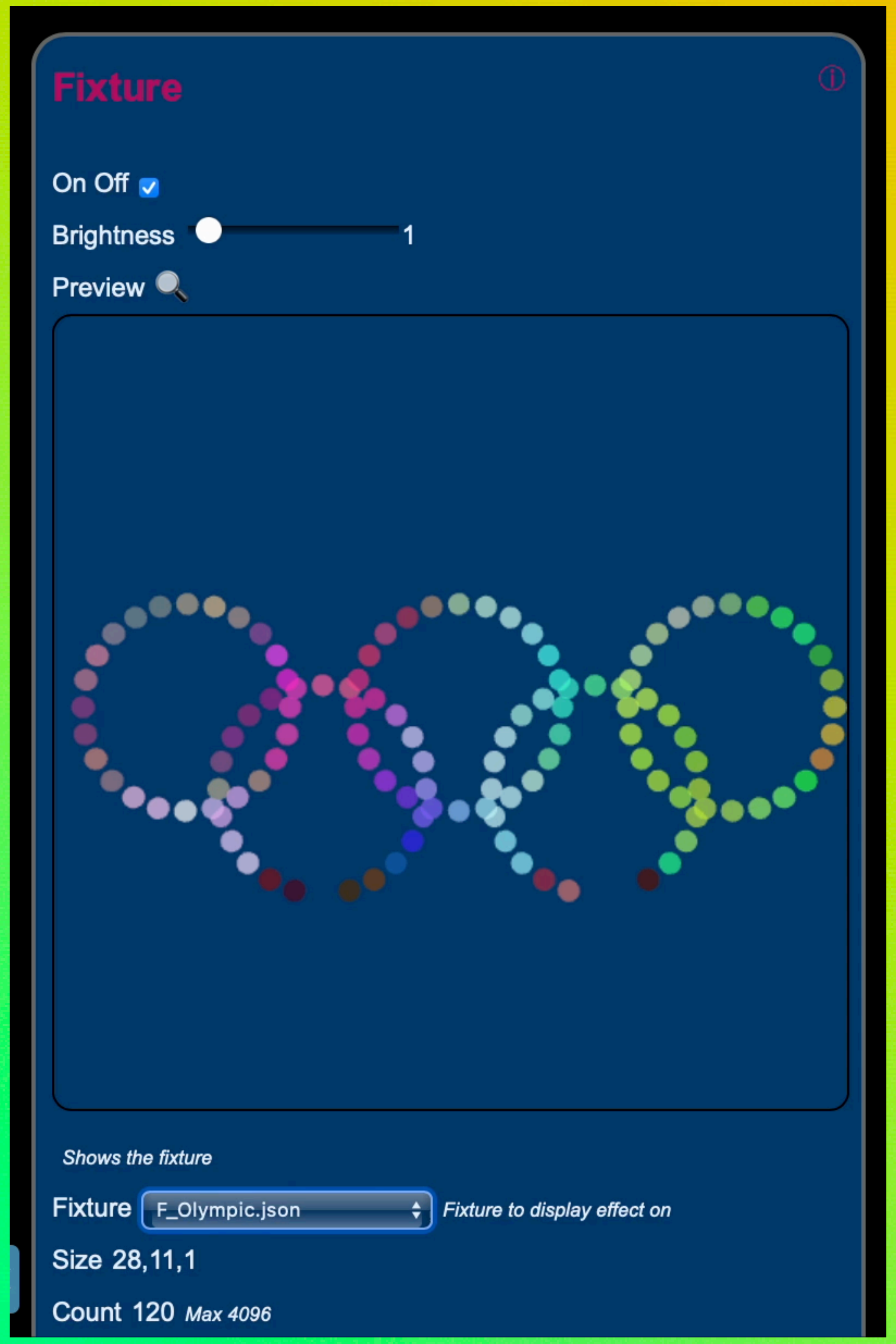
List of fixtures

Presets Olympic *Fill the panel table*

Type of fixture

Panels ☑ *Show panels*

PinList 2 *One or more e.g. 12,13,14*



Fixture

On Off ☑

Brightness 1

Preview 🔍

Shows the fixture

Fixture F_Olympic.json *Fixture to display effect on*

Size 28,11,1

Count 120 *Max 4096*

StarMod 💫 LED Projections

F_ixture.json: physical coordinates

Projection:

- maps virtual coordinates (eg multiply)
- manipulates virtual coordinates (e.g. rotate)

Start- end: Effects applied to (part of) fixture

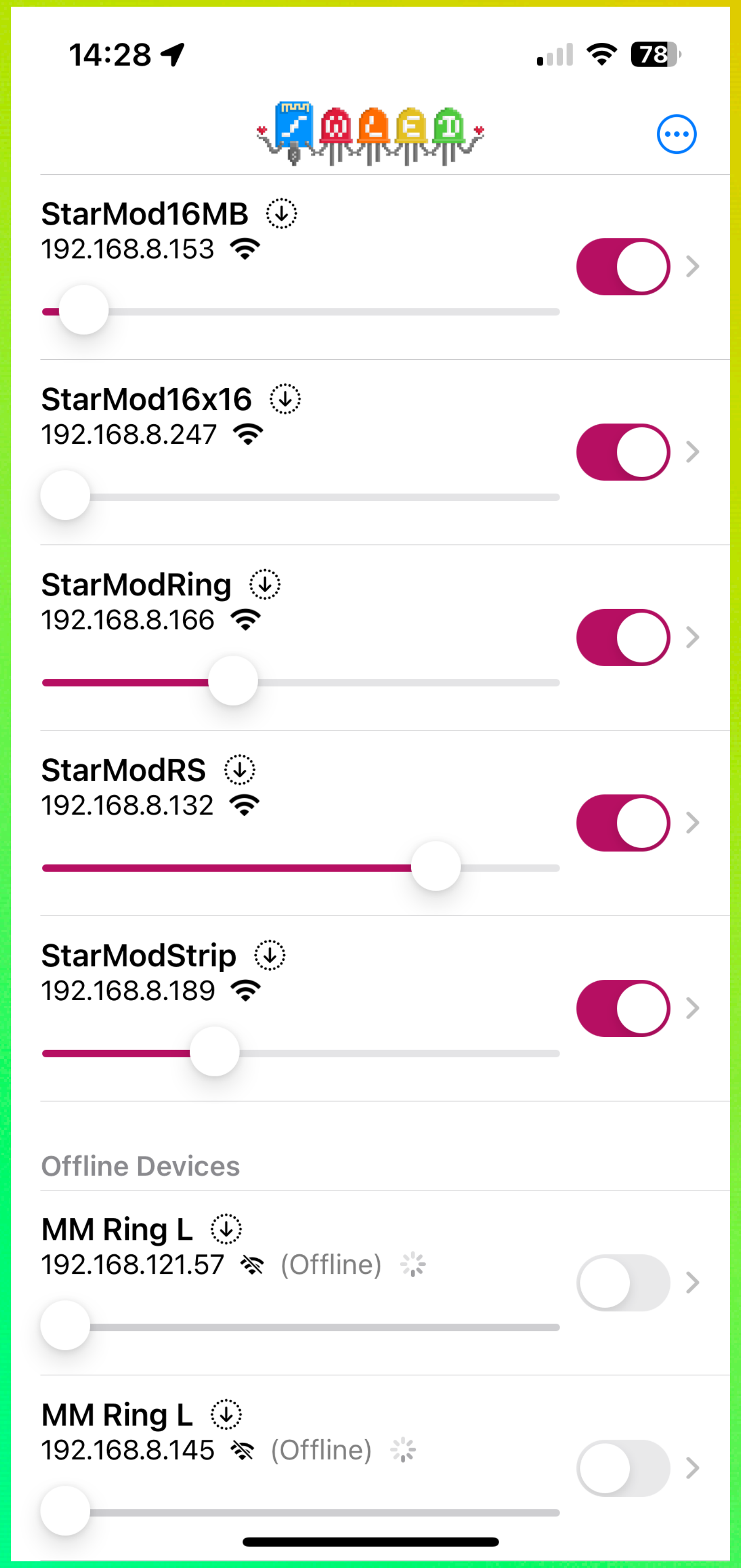
Multiple effects - multiple projections

WLED compatibility

WLED Native

Audio sync

Instances (MM)



14:28

StarMod16MB
192.168.8.153

StarMod16x16
192.168.8.247

StarModRing
192.168.8.166

StarModRS
192.168.8.132

StarModStrip
192.168.8.189

Offline Devices

MM Ring L
192.168.121.57 (Offline)

MM Ring L
192.168.8.145 (Offline)

WLED - StarMod dictionary

Segment -> Leds

Segment.data -> sharedData

cfg.json -> model.json

...

StarMod 💫 Basic setup

Set instance name

Set WiFi credentials

Save model

Connect WiFi

Create and set fixture

Set effect(s)

StarMod 💫 Release planning

UI tuning

DMX (send and receive)

Pin manager

Instance sync

Display

Peripherals (pir, gyro, ...)

StarDocs

HA

Effects

Audio

Super-Sync

Projections

Peripherals (moving heads, ...)

Presets

StarMod 💫 getting started

Developer:

- Fork StarMod
- VSCode / PIO
- GitHub issue -> design -> Pull request

End-User:

- Flash a StarMod Binary
- connect to AP
- Follow the workflow
- use (i) for documentation (WIP)
- contribute to documentation
- submit fixtures
- flash updates

Github issues

Discord

Final

GPL v3

Libraries:

FastLed

ArduinoJson v7

ESPAsyncWebServer (PsychicHttp)

ESPAsyncE131

WLED-Sync

Thanks to:

NetMindz

SoftHack007

Sören

Troy