MIDI

USB_DP
USB_DN

INT_MIDI_TX
INT_MIDI_RX

RGB_DATA

File: pico.kicad_sch

Audio

INT_MIDI_RX
INT_MIDI_TX

File: audio.kicad_sch

Connectivity

USB2_N
USB2_P

File: connect.kicad_sch

LEDs

RGB_DATA

File: leds.kicad_sch

Power Supply

USB_DP
USB_DN

File: psu.kicad_sch

H1
MountingHole

H3
MountingHole

FID1
Fiducial

FID2
Fiducial

FID3
Fiducial

FID4
Fiducial

Sheet: /
File: pedalboard-hw.kicad_sch

Title: Open Pedalboard

Size: A4 | Date: 2023-10-20 | Rev: 3.0.2-RC
KiCad E.D.A. kicad-cli 7.0.8-7.0.8~ubuntu23.04.1 | Id: 1/6

+3V3

R1 33
R2 10
EXT_MIDI_TX
L2 120_100MHz
L3 120_100MHz
GND

J3 DIN5
J4 Jack 3.5mm
GND
+3V3
J24 JST XH 3
GND

L4 120_100MHz
R3 220
SM4007
TLP2761
U1
D1
L1 120_100MHz
EXT_MIDI_RX
J1 DIN5
C1 100n
GND
J2 Jack 3.5mm
GND
J23 JST XH 3
GND

SW1 Rotary
ROT_VOL_A A S1 SW_VOL
ROT_VOL_B B C S2

SW2 Rotary
ROT_GAIN_A A S1 SW_GAIN
ROT_GAIN_B B C S2
GND

H2 Midi Bites

MIDI Bites allow to remove some of the board material that is used to hold the DIN5 or 3.5mm Jack connectors and instead mount the connectors to the case and wire them up with J15

J11
1 USB_BOOT
2
Conn_01x02
GND

R8 1K
QSPI_SS
QSPI_SCLK

+3V3
R10 DNF
C14 100n
GND

U3 W25Q128JVS
CS VCC 8
DI(IO0) 5 QSPI_SD0
DO(IO1) 2 QSPI_SD1
IO2 3 QSPI_SD2
CLK IO3 7 QSPI_SD3
GND 4
GND

ABLS-12.000MHZ-B4-T
Y1
XIN
R11 1K
XOUT
27p C7
27p C18
GND

J12 Debug
1 SWCLK
2
3 SWD
GND

+1V1
C10 100n
C11 100n
GND
C13 1u
GND

Make sure C22 is close to pin 45 of RP2040
Make sure C24 is close to pin 44 of RP2040

+3V3
C9 100n C15 100n C16 100n C8 100n C17 100n C20 100n
GND
C12 1u
GND

R9 27
R7 27
USB_DP
Make sure R10 and R11 are close to RP2040
USB_DN

U4 Raspberry Pi RP2040

50 DVDD
23 DVDD
45 VREG_VOUT
44 VREG_IN
49 IOVDD
42 IOVDD
33 IOVDD
22 IOVDD
10 IOVDD
1 IOVDD
48 USB_VDD
43 ADC_AVDD

QSPI_SS 56 QSPI_SS
QSPI_SD0 53 QSPI_SD0
QSPI_SD1 55 QSPI_SD1
QSPI_SD2 54 QSPI_SD2
QSPI_SD3 51 QSPI_SD3
QSPI_SCLK 52 QSPI_SCLK

USB_DP 47
USB_DM 46

GPIO0 2 EXT_MIDI_TX
GPIO1 3 EXT_MIDI_RX
GPIO2 4 SW_C
GPIO3 5 SW_F
GPIO4 6 SW_E
GPIO5 7 SW_B
GPIO6 8 SW_A
GPIO7 9 SW_D
GPIO8 11
GPIO9 12
GPIO10 13
GPIO11 14 RGB_DATA
GPIO12 15
GPIO13 16
GPIO14 17
GPIO15 18
GPIO16 27 ROT_VOL_A
GPIO17 28 ROT_VOL_B
GPIO18 29 SW_VOL
GPIO19 30 ROT_GAIN_A
GPIO20 31 ROT_GAIN_B
GPIO21 32 SW_GAIN
GPIO22 34
GPIO23 35
GPIO24 36
GPIO25 37

XIN 20 XIN
XOUT 21 XOUT
26 RUN

SWCLK 24 SWCLK
SWD 25 SWD

GPIO26_ADC0 38
GPIO27_ADC1 39 A_EXP2
GPIO28_ADC2 40 A_EXP1
GPIO29_ADC3 41

TESTEN 19 GND
GND 57 GND
RP2040

JP1 SJP INT_MIDI_TX
JP2 SJP INT_MIDI_RX
Alternative to USB connection between CM4 and Pico (Can be used for MIDI)

+3V3
R4 1K
J7 Jack 6.35mm
A_EXP1
GND

+3V3
R5 1K
J9 Jack 6.35mm
A_EXP2
GND

SW3 Tactile
SW_D
H5 Spacer
SW6 Tactile
SW_A
H9 Spacer

SW4 Tactile
SW_E
H6 Spacer
SW7 Tactile
SW_B
H10 Spacer

SW5 Tactile
SW_F
H8 Spacer
SW8 Tactile
SW_C
H13 Spacer
GND

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Source Code: https://github.com/pedalboard/pedalboard-hw

Sheet: /MIDI/
File: pico.kicad_sch
Title: Open Pedalboard
Size: A4   Date: 2023-10-20   Rev: 3.0.2-RC
KiCad E.D.A. kicad-cli 7.0.8-7.0.8~ubuntu23.04.1   Id: 2/6

CM1A
CM4

Serial Debug
J15
Debug
CM4_GPIO14
CM4_GPIO15
GND

Activity
D9 R16
LED Y 1K
CM4_LED_ACT
CM4_3V3
U7
74AHCT1G32SE-7
CM4_3V3 VCC Y
CM4_LED_PWR A
B
GND
R15
1K
D10
LED G
GND

CM4_3V3 +5VP
J25
HiFi Berry

GPIO (CM4 module, left block):

Pin	Signal		Pin	Signal
2	GND		1	GND
4	Ethernet_Pair1_P		3	Ethernet_Pair3_P
6	Ethernet_Pair1_N		5	Ethernet_Pair3_N
8	GND		7	GND
10	Ethernet_Pair0_N		9	Ethernet_Pair2_N
12	Ethernet_Pair0_P		11	Ethernet_Pair2_P
14	GND		13	GND
16	Ethernet_SYNC_IN(1.8v)		15	Ethernet_nLED3(3.3v)
18	Ethernet_SYNC_OUT(1.8v)		17	Ethernet_nLED2(3.3v)
20	EEPROM_nWP		19	Ethernet_nLED1(3.3v)
22	GND		21	PI_nLED_Activity

audio_out_stereo 24 GPIO26
audio_pcm_fs 26 GPIO19
CM4_GPIO13 28 GPIO13
CM4_GPIO6 30 GPIO6
32 GND
CM4_GPIO5 34 GPIO5
CM4_ID_SD 36 ID_SD
CM4_GPIO11 38 GPIO11
CM4_GPIO9 40 GPIO9
42 GND
CM4_GPIO10 44 GPIO10
CM4_GPIO22 46 GPIO22
audio_in_stereo 48 GPIO27
CM4_GPIO17 50 GPIO17
52 GND
CM4_GPIO4 54 GPIO4
conf_i2c_scl 56 GPIO3
conf_i2c_sda 58 GPIO2
60 GND
62 SD_CMD
64 SD_DAT5
66 GND
68 SD_DAT4
70 SD_DAT7
72 SD_DAT6
74 GND
76 Reserved
78 GPIO_VREF(1.8v/3.3v_Input)
80 SCL0
82 SDA0
CM4_3V3 84 +3.3v_(Output) 600mA Max
86 +3.3v_(Output)
88 +1.8v_(Output) 600mA Max
90 +1.8v_(Output)
92 RUN_PG
94 AnalogIP1
96 AnalogIP0
98 GND
100 nEXTRST

GPIO

23 GND
25 GPIO21 audio_pcm_dout
27 GPIO20 audio_pcm_din
29 GPIO16 CM4_GPIO16
31 GPIO12 CM4_GPIO12
33 GND
35 ID_SC CM4_ID_SC
37 GPIO7 CM4_GPIO7
39 GPIO8 CM4_GPIO8
41 GPIO25 CM4_GPIO25
43 GND
45 GPIO24 CM4_GPIO24
47 GPIO23 CM4_GPIO23
49 GPIO18 audio_pcm_clk
51 GPIO15 CM4_GPIO15 INT_MIDI_RX
55 GPIO14 CM4_GPIO14 INT_MIDI_TX
57 SD_CLK
59 GND
61 SD_DAT3
63 SD_DAT0
65 GND
67 SD_DAT1
69 SD_DAT2
71 GND
73 SD_VDD_Override GND
75 SD_PWR_ON +5VP
77 +5v_(Input)
79 +5v_(Input)
81 +5v_(Input)
83 +5v_(Input)
85 +5v_(Input)
87 +5v_(Input)
89 WiFi_nDisable
91 BT_nDisable
93 nRPIBOOT
95 nPI_LED_PWR CM4_LED_PWR
97 Camera_GPIO
99 Global_EN

NB SD signals are only available on modules without eMMC

CM4_LED_ACT

HiFi Berry (J25) right block:
3V3 3V3 5V 5V

CM4_ID_SD 27 ID_SD/GPIO0 GPIO14/TXD 8 CM4_GPIO14
CM4_ID_SC 28 ID_SC/GPIO1 GPIO15/RXD 10 CM4_GPIO15
conf_i2c_sda 3 SDA/GPIO2 GPIO16 36 CM4_GPIO16
conf_i2c_scl 5 SCL/GPIO3 GPIO17 11 CM4_GPIO17
CM4_GPIO4 7 GCLK0/GPIO4 GPIO18/PWM0 12 audio_pcm_clk
CM4_GPIO5 29 GCLK1/GPIO5 GPIO19/MISO1 35 audio_pcm_fs
CM4_GPIO6 31 GCLK2/GPIO6 GPIO20/MOSI1 38 audio_pcm_din
GPIO21/SCLK1 40 audio_pcm_dout
CM4_GPIO7 26 CE1/GPIO7
CM4_GPIO8 24 CE0/GPIO8 GPIO22 15 CM4_GPIO22
CM4_GPIO9 21 MISO0/GPIO9 GPIO23 16 CM4_GPIO23
CM4_GPIO10 19 MOSI0/GPIO10 GPIO24 18 CM4_GPIO24
CM4_GPIO11 23 SCLK0/GPIO11 GPIO25 22 CM4_GPIO25
GPIO26 37 audio_out_stereo
CM4_GPIO12 32 PWM0/GPIO12 GPIO27 13 audio_in_stereo
CM4_GPIO13 33 PWM1/GPIO13

41 in_R- out_5V 47
42 in_R+ out_R 48
43 in_GND out_GND 49
44 in_GND out_GND 50
45 in_L+ out_5V 51
46 in_L- out_L 52

39 GND 34 GND 30 GND 25 GND 20 GND 14 GND 9 GND 6 GND
GND

J17
Jack 6.35mm
S R RN T TN

J18
Jack 6.35mm
S SN R RN T TN

GND_out

in_R+
J16
Jack 6.35mm
TN T RN R SN S
in_R-
GND_in_R

audio_in_stereo
J20
Jack 6.35mm
TN T RN R SN S
GND_in_L
in_L+
in_L-

audio_out_stereo
SJP
JP4
SJP
JP3

H7 MountingHole
H4 MountingHole
H11 MountingHole
H12 MountingHole

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Source Code: https://github.com/pedalboard/pedalboard-hw

Sheet: /Audio/
File: audio.kicad_sch
Title: Open Pedalboard
Size: A4   Date: 2023-10-20   Rev: 3.0.2-RC
KiCad E.D.A. kicad-cli 7.0.8-7.0.8~ubuntu23.04.1   Id: 3/6

5.5mm x 2.1mm, Center Negative.

Reverse Polarity Protection
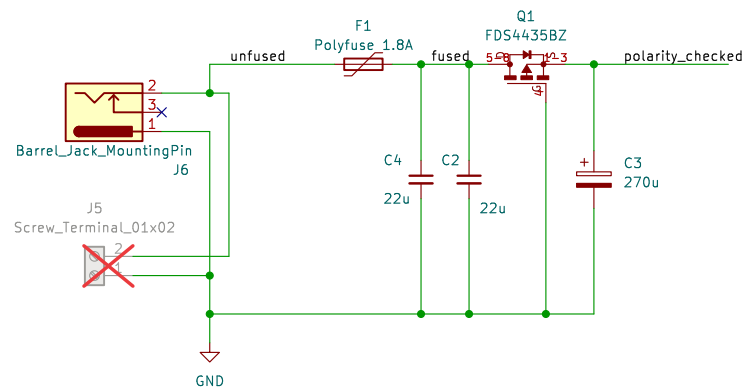
RP2040 power
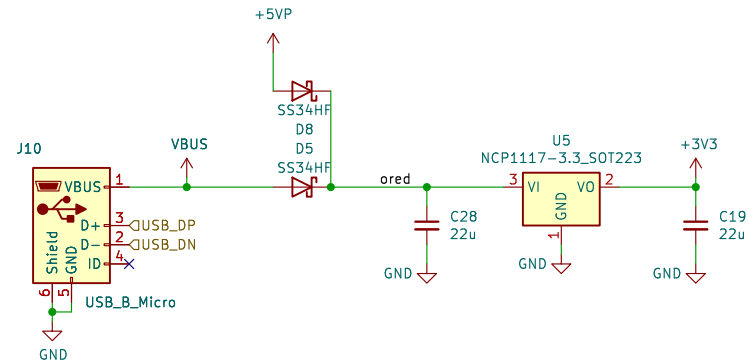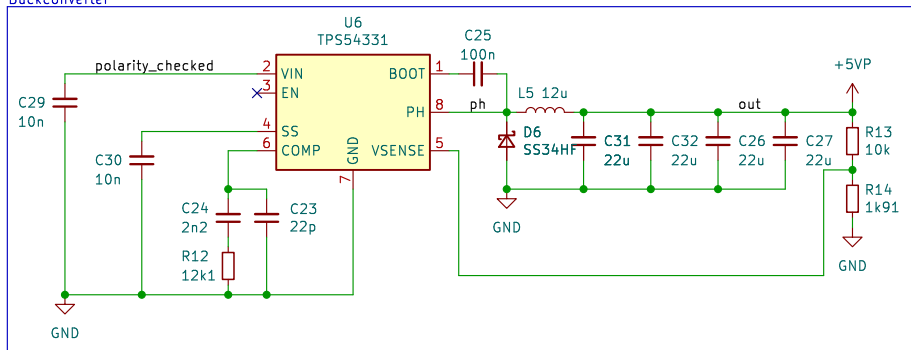
unfused

F1
Polyfuse 1.8A

fused

Q1
FDS4435BZ

polarity_checked

+5VP

SS34HF
D8
D5
SS34HF

Barrel_Jack_MountingPin
J6

C4
22u

C2
22u

C3
270u

J5
Screw_Terminal_01x02

GND

J10
USB_B_Micro

VBUS

VBUS
D+
D-
ID

USB_DP
USB_DN

Shield
GND

GND

ored

C28
22u

GND

U5
NCP1117-3.3_SOT223

VI
GND
VO

GND

+3V3

C19
22u

GND

Buckconverter

U6
TPS54331

polarity_checked

C29
10n

VIN
EN
SS
COMP

GND

BOOT
PH
VSENSE

C25
100n

L5 12u

ph

D6
SS34HF

+5VP

C30
10n

C24
2n2

C23
22p

R12
12k1

GND

C31
22u

C32
22u

C26
22u

C27
22u

out

GND

R13
10k

R14
1k91

GND

GND

Title: *Open Pedalboard*

Size: A4 | Date: 2023-10-20 | Rev: 3.0.2-RC
KiCad E.D.A. kicad-cli 7.0.8-7.0.8~ubuntu23.04.1 | Id: 4/6

RGB_DATA

R6
220

U2
74AHCT1G32SE-7

VCC
Y
A
B
GND
GND

+5VP

C5 100n
C6 100n
C21 100n
C22 100n

GND

+5VP

D2 SK6812
DIN VDD DOUT VSS RGB
D3 SK6812
DIN VDD DOUT VSS RGB
D4 SK6812
DIN VDD DOUT VSS RGB
D7 SK6812
DIN VDD DOUT VSS RGB

GND

+5VP

J13 LED-Ring
J22 LED-Ring
J19 LED-Ring

GND

+5VP

J14 LED-Ring
J8 LED-Ring
J21 LED-Ring

JST XH 3

J26

GND

Either the single LEDs or the LED rings can be populated.
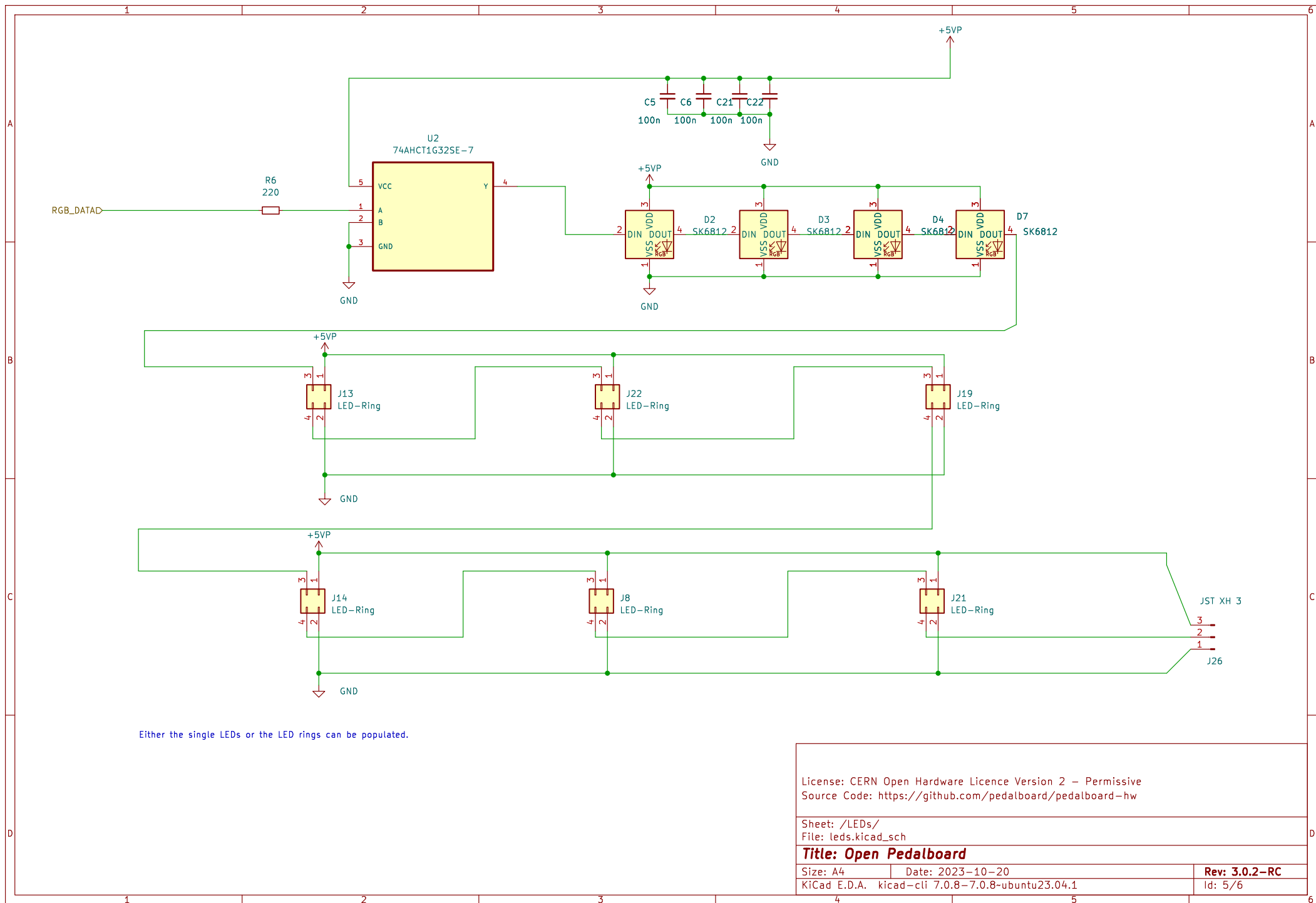
Sheet: /LEDs/
File: leds.kicad_sch
Title: Open Pedalboard
Size: A4   Date: 2023-10-20   Rev: 3.0.2-RC
KiCad E.D.A. kicad-cli 7.0.8-7.0.8~ubuntu23.04.1   Id: 5/6

CM1B
CM4

USB_OTG_ID is tied to GND. See Chapter 2.4

102	PCIe_CLK_nREQ	USB_OTG_ID 101
104	Reserved	USB2_N 103
106	Reserved	USB2_P 105
108	GND	GND 107
110	PCIe_CLK_P	PCIe_nRST 109
112	PCIe_CLK_N	VDAC_COMP 111
114	GND	GND 113
116	PCIe_RX_P	CAM1_D0_N 115
118	PCIe_RX_N	CAM1_D0_P 117
120	GND	GND 119
122	PCIe_TX_P	CAM1_D1_N 121
124	PCIe_TX_N	CAM1_D1_P 123
126	GND	GND 125
128	CAM0_D0_N	CAM1_C_N 127
130	CAM0_D0_P	CAM1_C_P 129
132	GND	GND 131
134	CAM0_D1_N	CAM1_D2_N 133
136	CAM0_D1_P	CAM1_D2_P 135
138	GND	GND 137
140	CAM0_C_N	CAM1_D3_N 139
142	CAM0_C_P	CAM1_D3_P 141
144	GND	HDMI1_HOTPLUG 143
146	HDMI1_TX2_P	HDMI1_SDA 145
148	HDMI1_TX2_N	HDMI1_SCL 147
150	GND	HDMI1_CEC 149
152	HDMI1_TX1_P	HDMI0_CEC 151
154	HDMI1_TX1_N	HDMI0_HOTPLUG 153
156	GND	GND 155
158	HDMI1_TX0_P	DSI0_D0_N 157
160	HDMI1_TX0_N	DSI0_D0_P 159
162	GND	GND 161
164	HDMI1_CLK_P	DSI0_D1_N 163
166	HDMI1_CLK_N	DSI0_D1_P 165
168	GND	GND 167
170	HDMI0_TX2_P	DSI0_C_N 169
172	HDMI0_TX2_N	DSI0_C_P 171
174	GND	GND 173
176	HDMI0_TX1_P	DSI1_D0_N 175
178	HDMI0_TX1_N	DSI1_D0_P 177
180	GND	GND 179
182	HDMI0_TX0_P	DSI1_D1_N 181
184	HDMI0_TX0_N	DSI1_D1_P 183
186	GND	GND 185
188	HDMI0_CLK_P	DSI1_C_N 187
190	HDMI0_CLK_N	DSI1_C_P 189
192	GND	GND 191
194	DSI1_D3_N	DSI1_D2_N 193
196	DSI1_D3_P	DSI1_D2_P 195
198	GND	GND 197
200	HDMI0_SCL	HDMI0_SDA 199

High Speed Serial

USB2_N
USB2_P

GND

GND