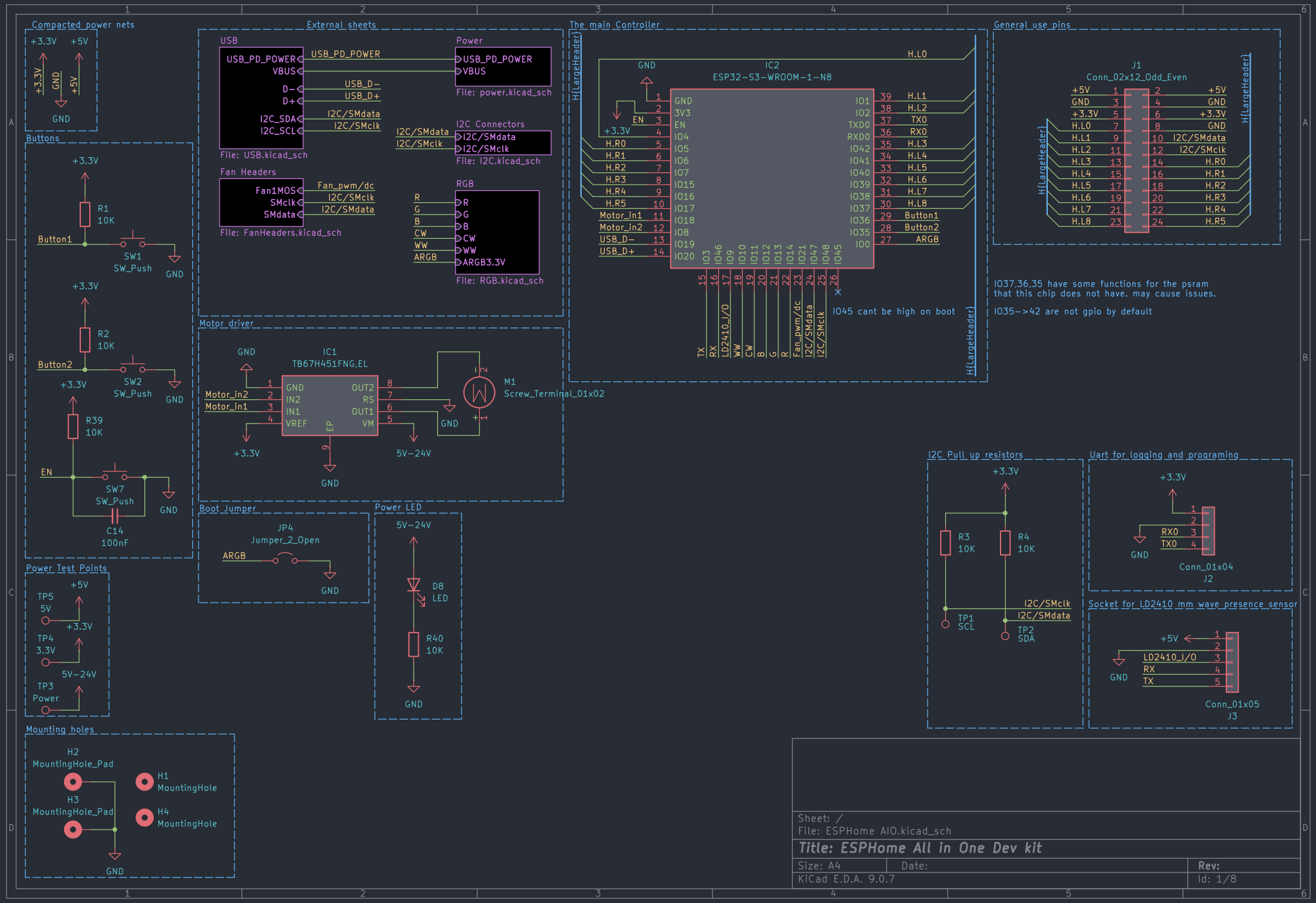
Compacted power nets
+3.3V
+5V
GND
Buttons
R1
10K
Button1
SW1
SW_Push
R2
10K
Button2
SW2
SW_Push
R39
10K
EN
SW7
SW_Push
C14
100nF
Power Test Points
TP5
5V
TP4
3.3V
TP3
Power
Mounting holes
H2
MountingHole_Pad
H1
MountingHole
H3
MountingHole_Pad
H4
MountingHole
External sheets
USB
USB_PD_POWER
VBUS
D-
D+
I2C_SDA
I2C_SCL
File: USB.kicad_sch
Power
File: power.kicad_sch
I2C Connectors
I2C/SMdata
I2C/SMclk
File: I2C.kicad_sch
Fan Headers
Fan1MOS
SMclk
SMdata
Fan_pwm/dc
File: FanHeaders.kicad_sch
RGB
R
G
B
CW
WW
ARGB
ARGB3.3V
File: RGB.kicad_sch
Motor driver
IC1
TB67H451FNG,EL
GND
IN2
IN1
VREF
OUT2
RS
OUT1
VM
Motor_in2
Motor_in1
5V-24V
M1
Screw_Terminal_01x02
Boot Jumper
JP4
Jumper_2_Open
ARGB
Power LED
D8
LED
R40
10K
The main Controller
IC2
ESP32-S3-WROOM-1-N8
H[LargeHeader]
IO45 cant be high on boot
IO37,36,35 have some functions for the psram
that this chip does not have. may cause issues.
IO35->42 are not gpio by default
General use pins
J1
Conn_02x12_Odd_Even
I2C Pull up resistors
R3
10K
R4
10K
TP1
SCL
TP2
SDA
Uart for logging and programing
RX0
TX0
Conn_01x04
J2
Socket for LD2410 mm wave presence sensor
LD2410_I/O
RX
TX
Conn_01x05
J3
Sheet: /
File: ESPHome AIO.kicad_sch
Title: ESPHome All in One Dev kit
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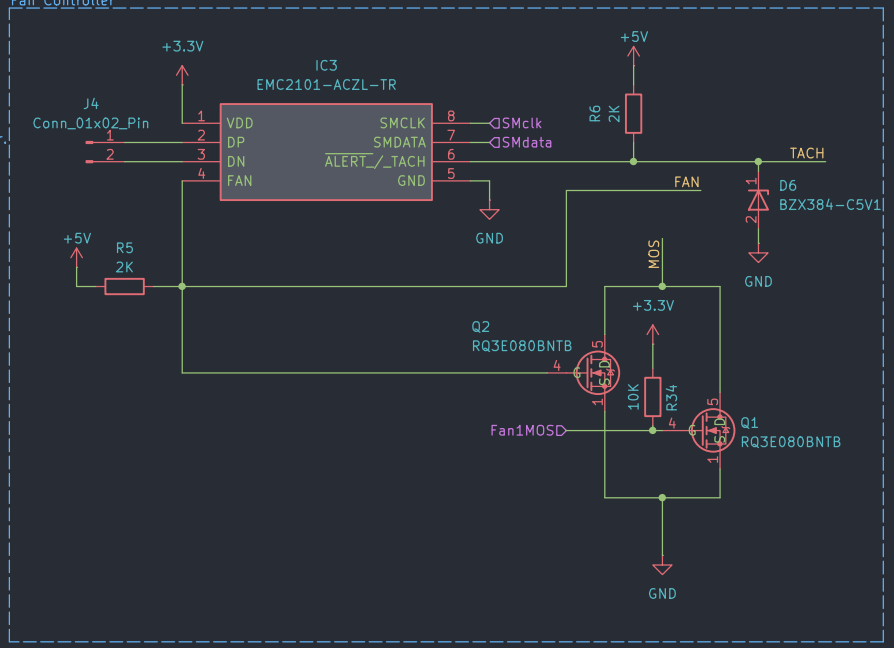
Date:
Rev:
KiCad E.D.A. 9.0.7
Id: 1/8

The Emc2101 is the only fan controll ic curently supported by esphome.

Connector for external temp sensor transistor.
refrence design uses a MMBT3904.

Fan Controller



Low side driving of a fan makes the tacho pin useless.
If you want to know the speed switch to p-cahnnel mosfets to high side drive 3pin fans.

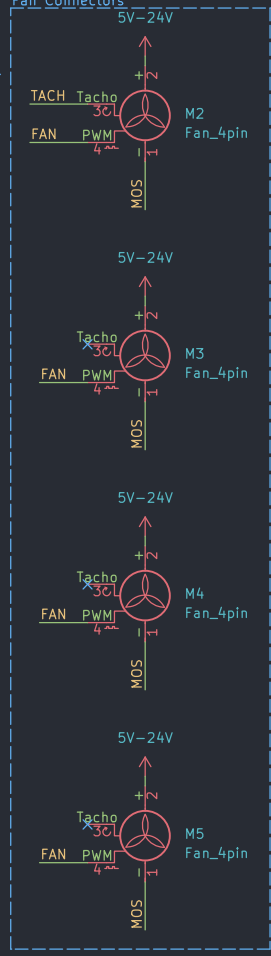
Only fan header M2 has the Tach connected.
The fan controller will adjust pwm only depending on the speed of M2.
So make sure to use M2 first.
Also i suggest not mixing fans.

Avoid Hot-pluging fans.

Turn off fan1MOS for 3Pin/DC Mode

At 5V using 4 fans might be too much current for the mosfet.
At 12v you could connect way more fans.
Keep an eye on the temprature of the mosfets.

Fan Connectors



Sheet: /Fan Headers/	
File: FanHeaders.kicad_sch	
Title: ESPHome All in One Dev kit	
Size: A4	Date:
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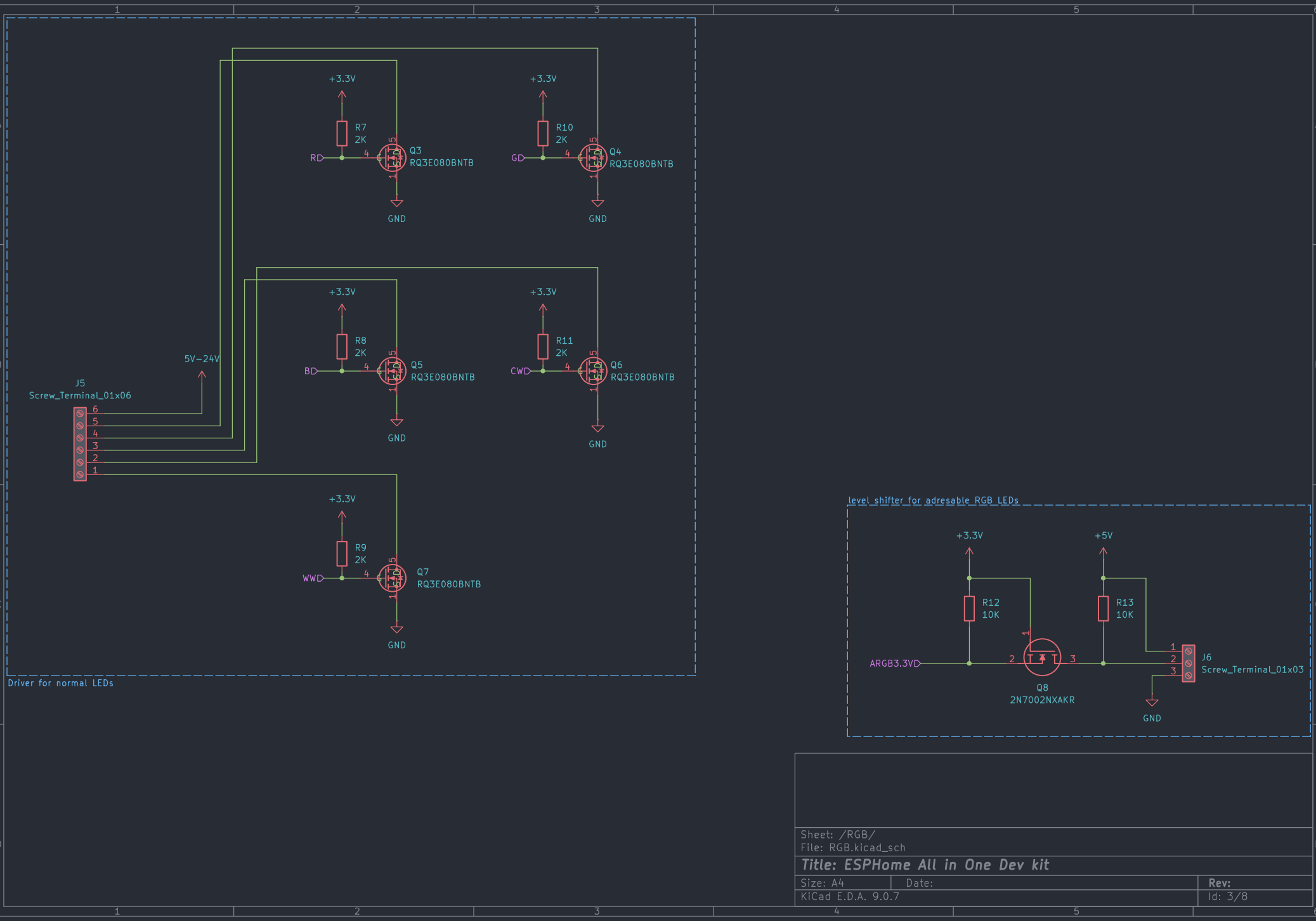
+3.3V
R7
2K
RD
Q3
RQ3E080BNTB
GND
+3.3V
R10
2K
GD
Q4
RQ3E080BNTB
GND
5V–24V
J5
Screw_Terminal_01x06
6
5
4
3
2
1
+3.3V
R8
2K
BD
Q5
RQ3E080BNTB
GND
+3.3V
R11
2K
CWD
Q6
RQ3E080BNTB
GND
+3.3V
R9
2K
WWD
Q7
RQ3E080BNTB
GND
Driver for normal LEDs
level shifter for adresable RGB LEDs
+3.3V
+5V
R12
10K
R13
10K
ARGB3.3VD
Q8
2N7002NXAKR
J6
Screw_Terminal_01x03
GND
Sheet: /RGB/
File: RGB.kicad_sch
Title: ESPHome All in One Dev kit
Size: A4
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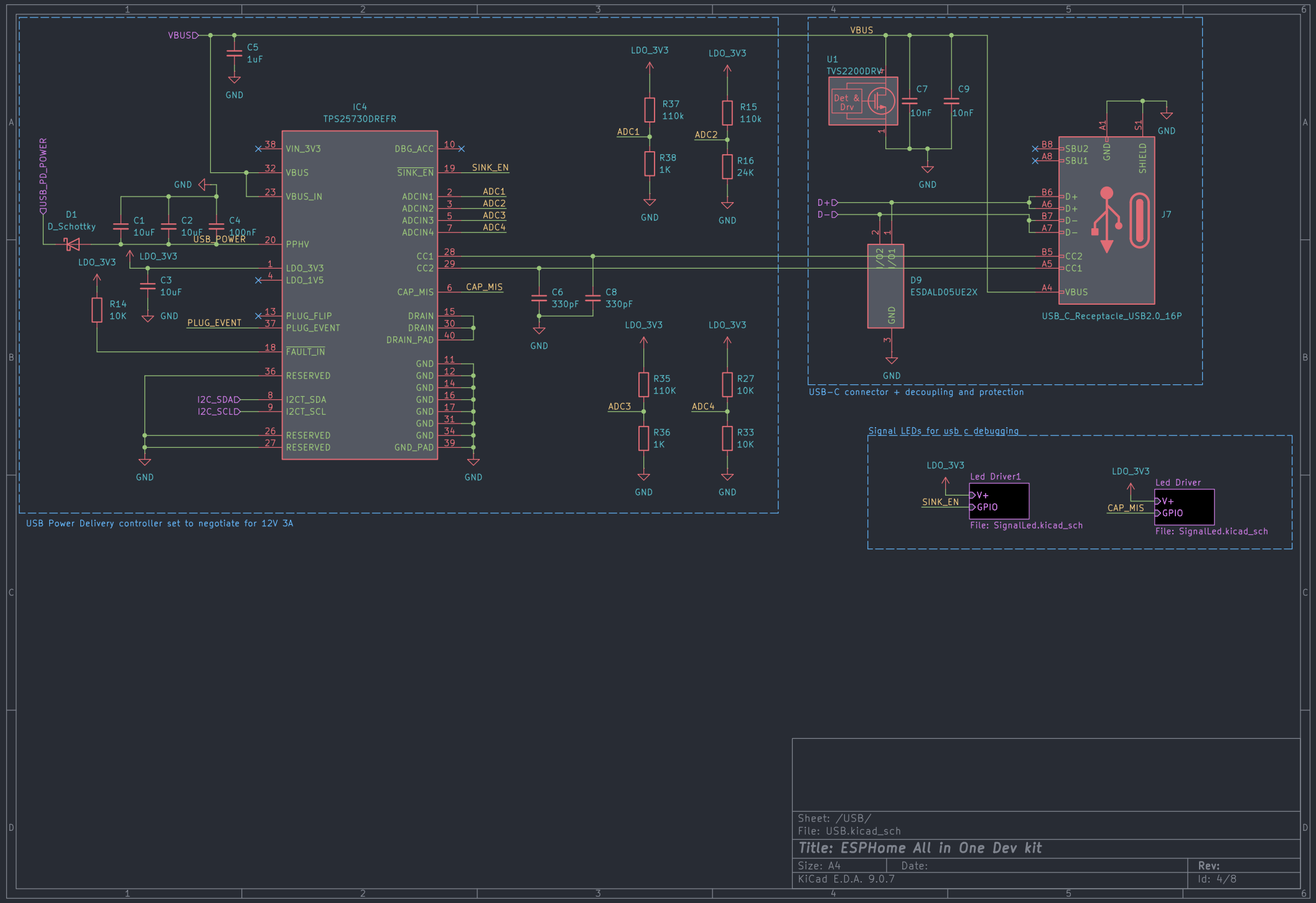
VBUSD
C5
1uF
GND
IC4
TPS25730DREFR
VIN_3V3
VBUS
VBUS_IN
PPHV
LDO_3V3
LDO_1V5
PLUG_FLIP
PLUG_EVENT
FAULT_IN
RESERVED
RESERVED
I2CT_SDA
I2CT_SCL
RESERVED
DBG_ACC
SINK_EN
ADCIN1
ADCIN2
ADCIN3
ADCIN4
CC1
CC2
CAP_MIS
DRAIN
DRAIN
DRAIN_PAD
GND
GND_PAD
USB_PD_POWER
D1
D_Schottky
C1
10uF
C2
10uF
C4
100nF
USB_POWER
C3
10uF
R14
10K
PLUG_EVENT
I2C_SDAD
I2C_SCLD
ADC1
ADC2
ADC3
ADC4
SINK_EN
CAP_MIS
C6
330pF
C8
330pF
R37
110k
R38
1K
R15
110k
R16
24K
R35
110K
R36
1K
R27
10K
R33
10K
USB Power Delivery controller set to negotiate for 12V 3A
VBUS
U1
TVS2200DRV
Det & Drv
C7
10nF
C9
10nF
D+
D−
D9
ESDALD05UE2X
J7
SBU2
SBU1
SHIELD
CC2
CC1
VBUS
USB_C_Receptacle_USB2.0_16P
USB-C connector + decoupling and protection
Signal LEDs for usb c debugging
Led Driver1
Led Driver
V+
GPIO
File: SignalLed.kicad_sch
Sheet: /USB/
File: USB.kicad_sch
Title: ESPHome All in One Dev kit
Size: A4
Date:
Rev:
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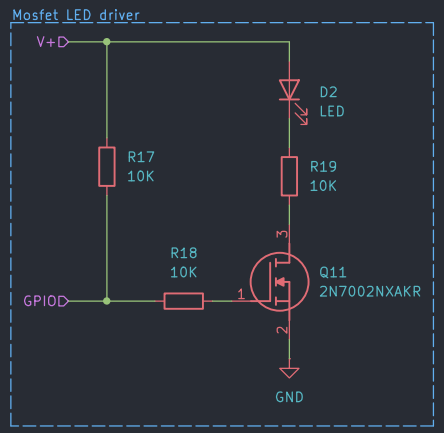

Sheet: /USB/Led Driver/
File: SignalLed.kicad_sch

Title: ESPHome All in One Dev kit

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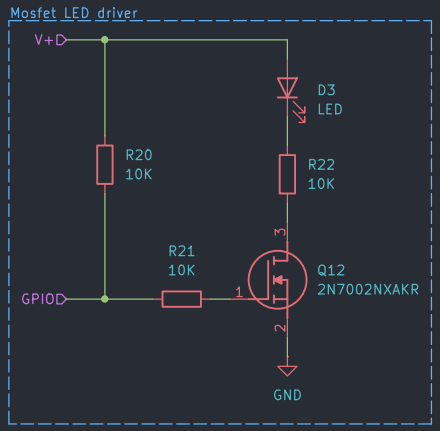
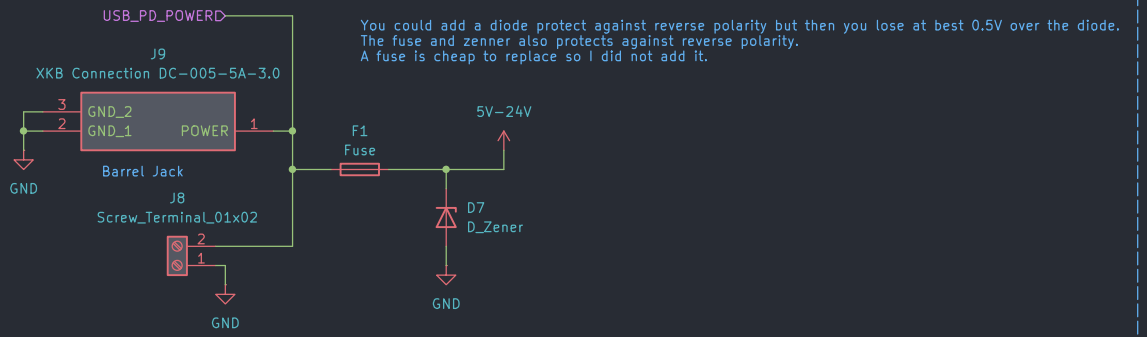


Sheet: /USB/Led Driver1/		
File: SignalLed.kicad_sch		
Title: ESPHome All in One Dev kit		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.7		Id: 6/8

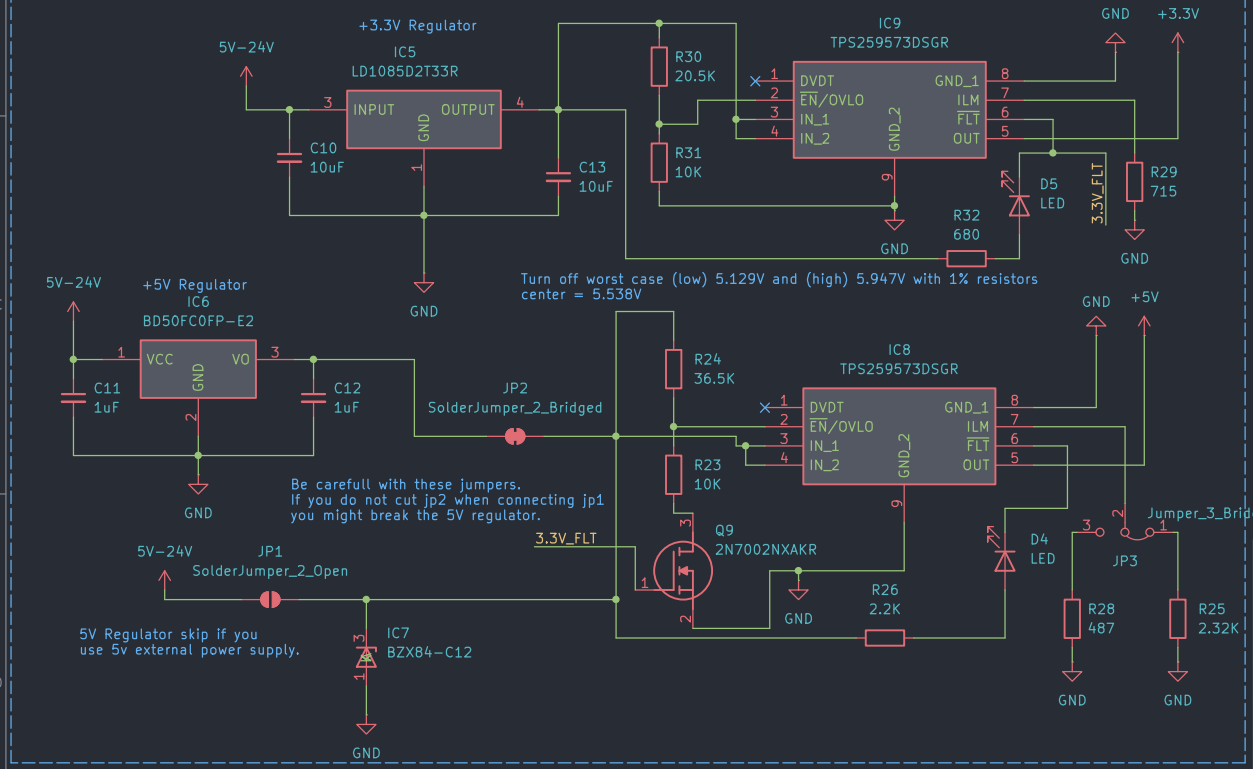
Alternative power connectors and basic circuit protection



You could add a diode protect against reverse polarity but then you lose at best 0.5V over the diode.
The fuse and zenner also protects against reverse polarity.
A fuse is cheap to replace so I did not add it.

Don't use a fuse above 5A.
Use a fuse apropriate for your power supply and current consumption.
Example: If you use a 5V 3A power supply, acidetaly reverse polarity and use a fuse larger than 3A
the zener diode might burn before the fuse breaks.
This is because some power supplys will be able to clamp the current to its max rating
while dropping the voltage to in this case the forward voltage of the zener.
Lets say a forward voltage of 1V current of 3A so 3W of power.
The total power dissipation(Tamb ≤ 25 °C) of the zener with the sandard footprint is 0.682W.
The zener will let out the magic smoke and then all the other components that can not withstand reverse polarity.

Power regulators



All resistor values are calculated to garantee function with a 1% tollerance

with a margin of 0.07A and a 1% resistor R25 the max current will be 910.78mA
R28 is set to 4A max for the electronic fuse.
Move jumper when using an external 5V suply capable of suplying more than 1A
If you need more than 4A on 5V rail change resistor acording to the datasheet.
R28 is a suggestion for a 4A limit sparing your replacable fuse.

Sheet: /Power/
File: power.kicad_sch

Title: ESPHome All in One Dev kit

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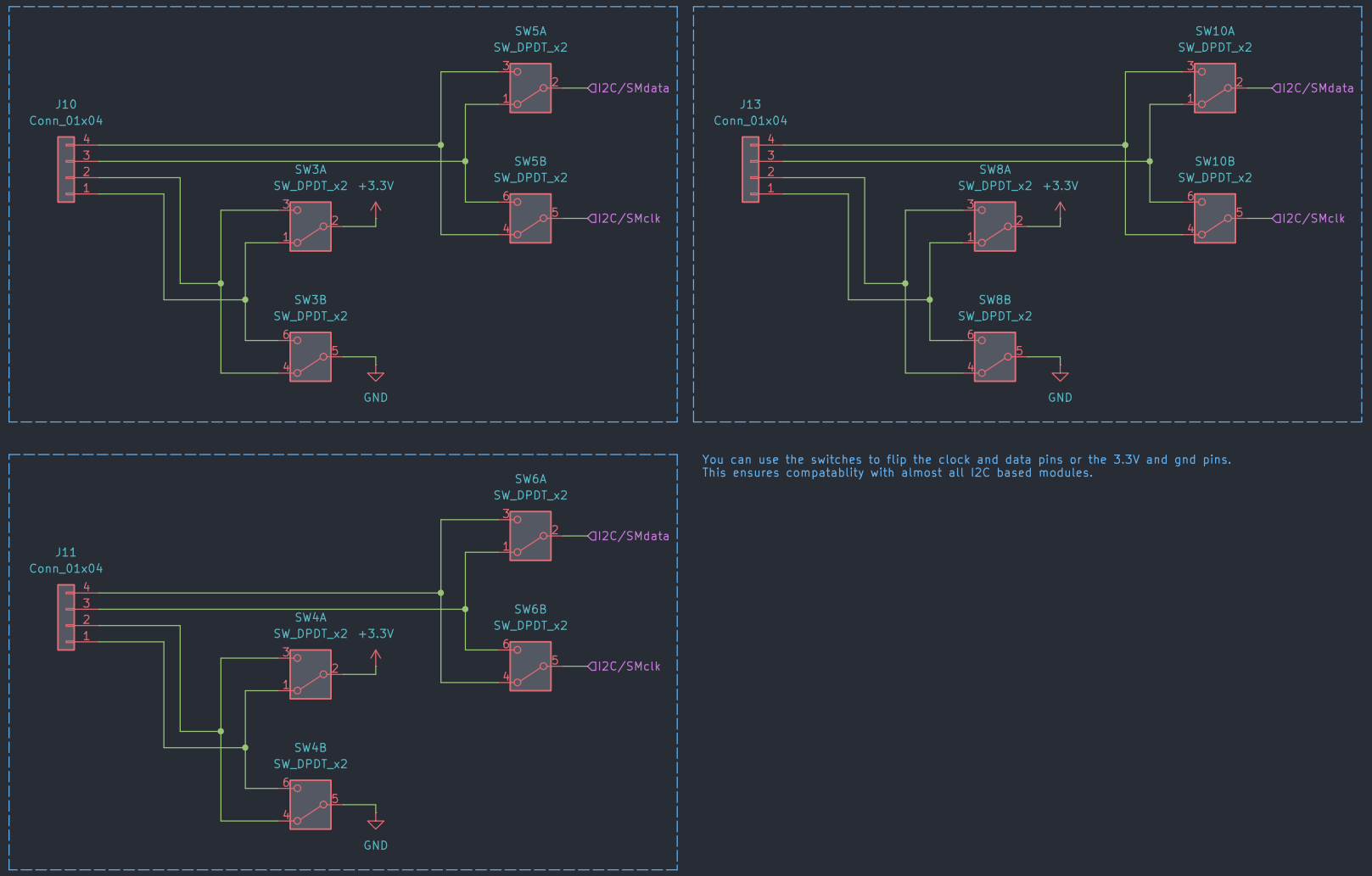

You can use the switches to flip the clock and data pins or the 3.3V and gnd pins.
This ensures compatablity with almost all I2C based modules.

Sheet: /I2C Connectors/
File: I2C.kicad_sch

Title: ESPHome All in One Dev kit

Size: A4	Date:	Rev:
KiCad E.D.A. 9.0.7		Id: 11/8