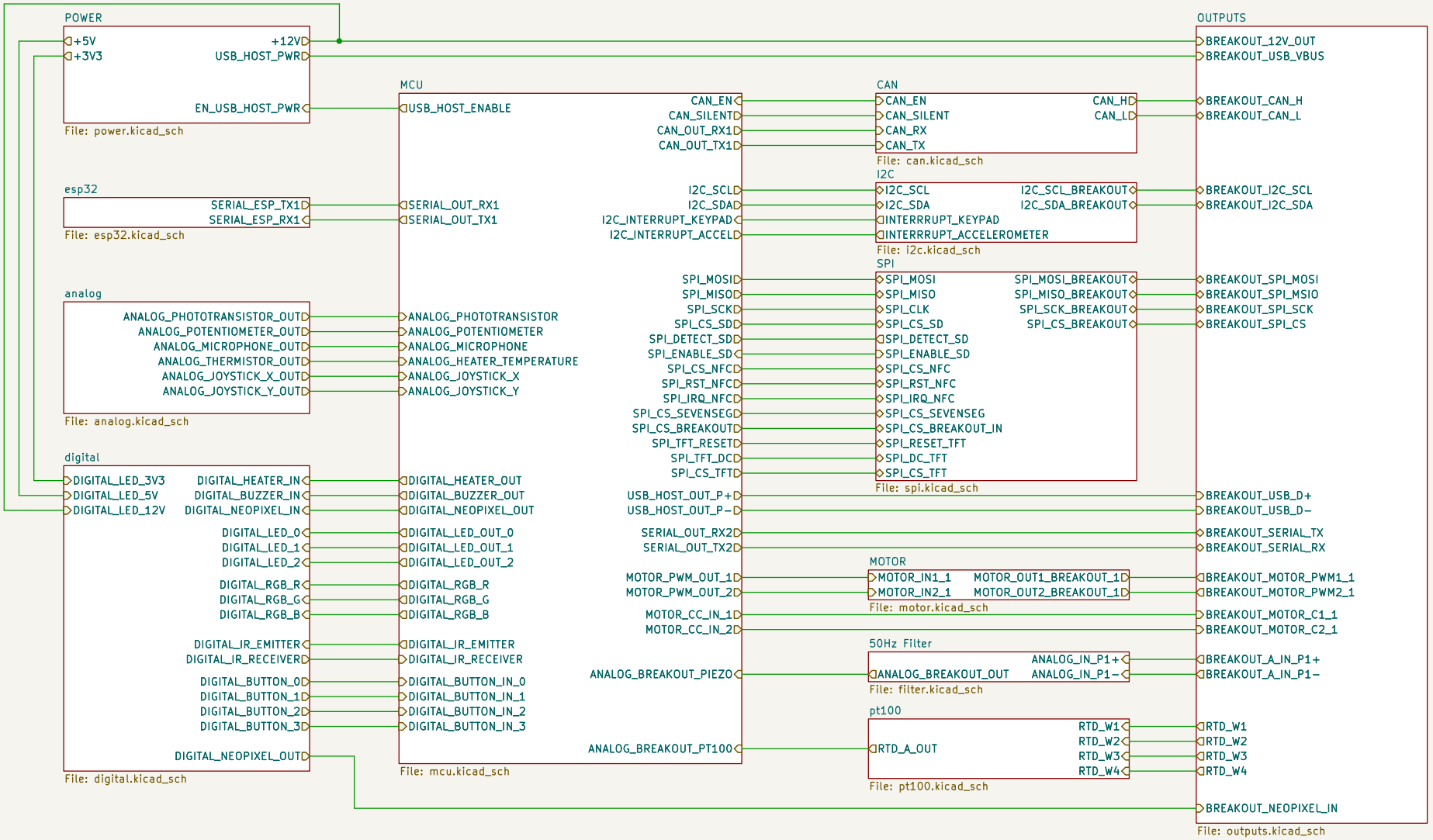
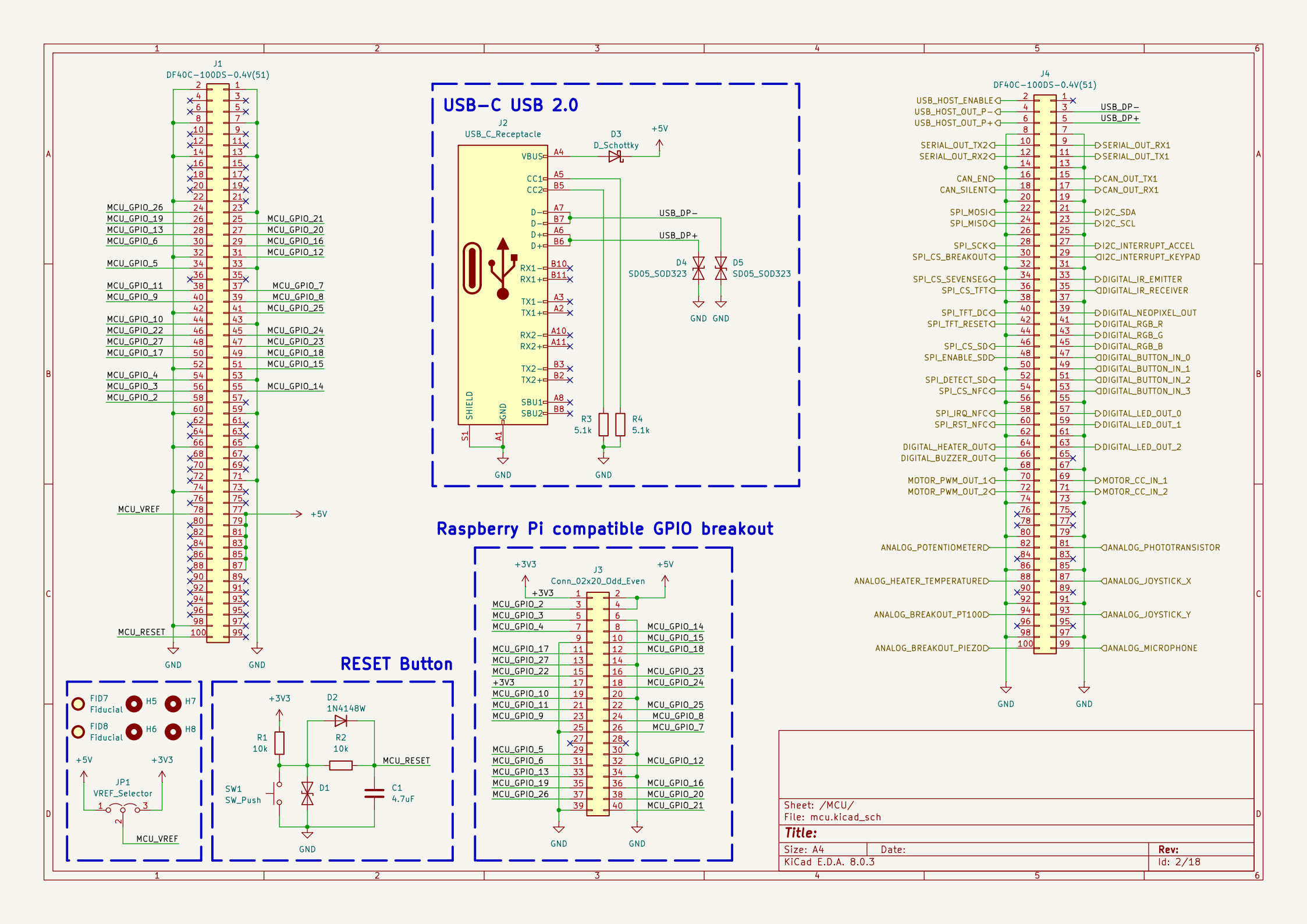
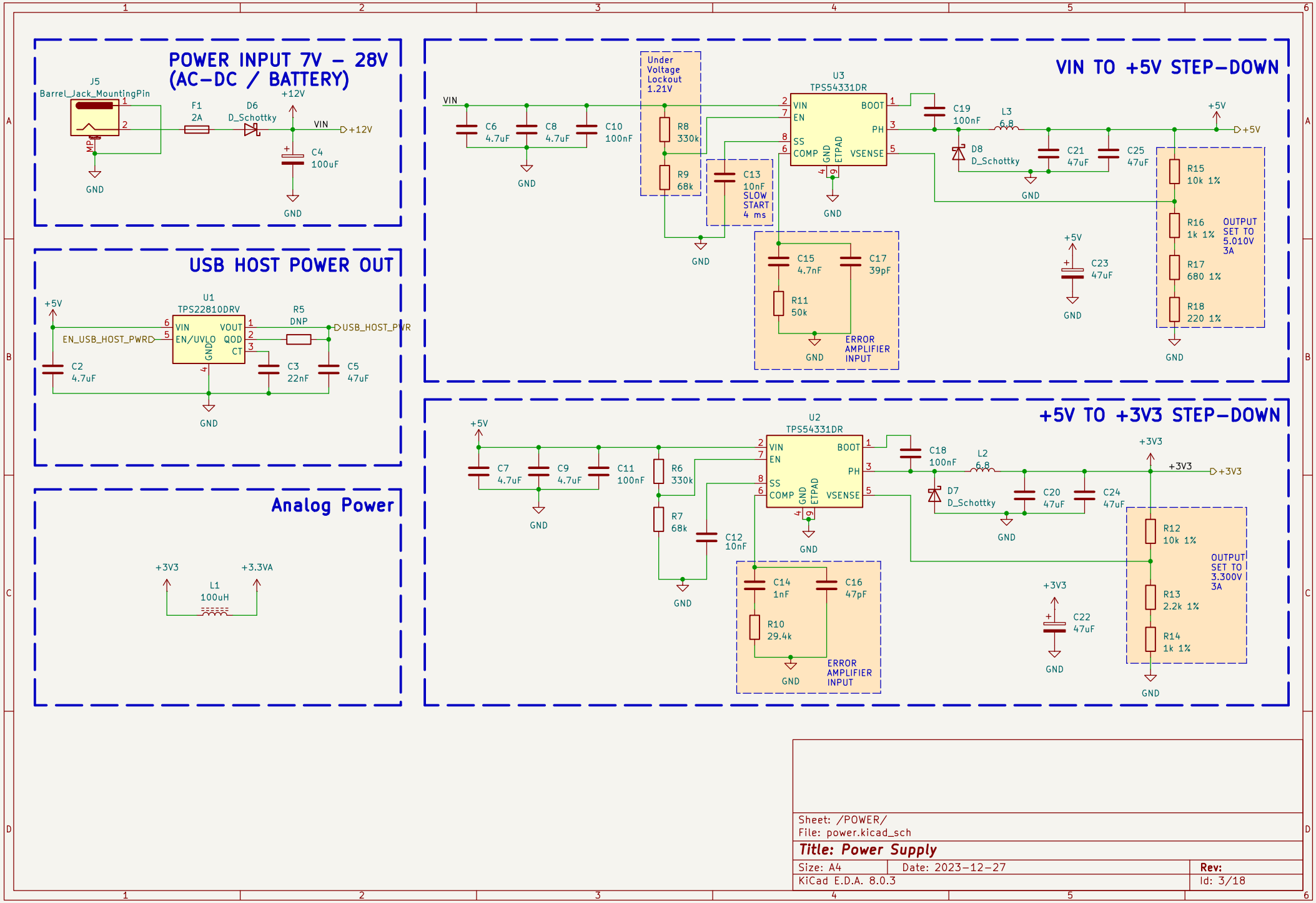
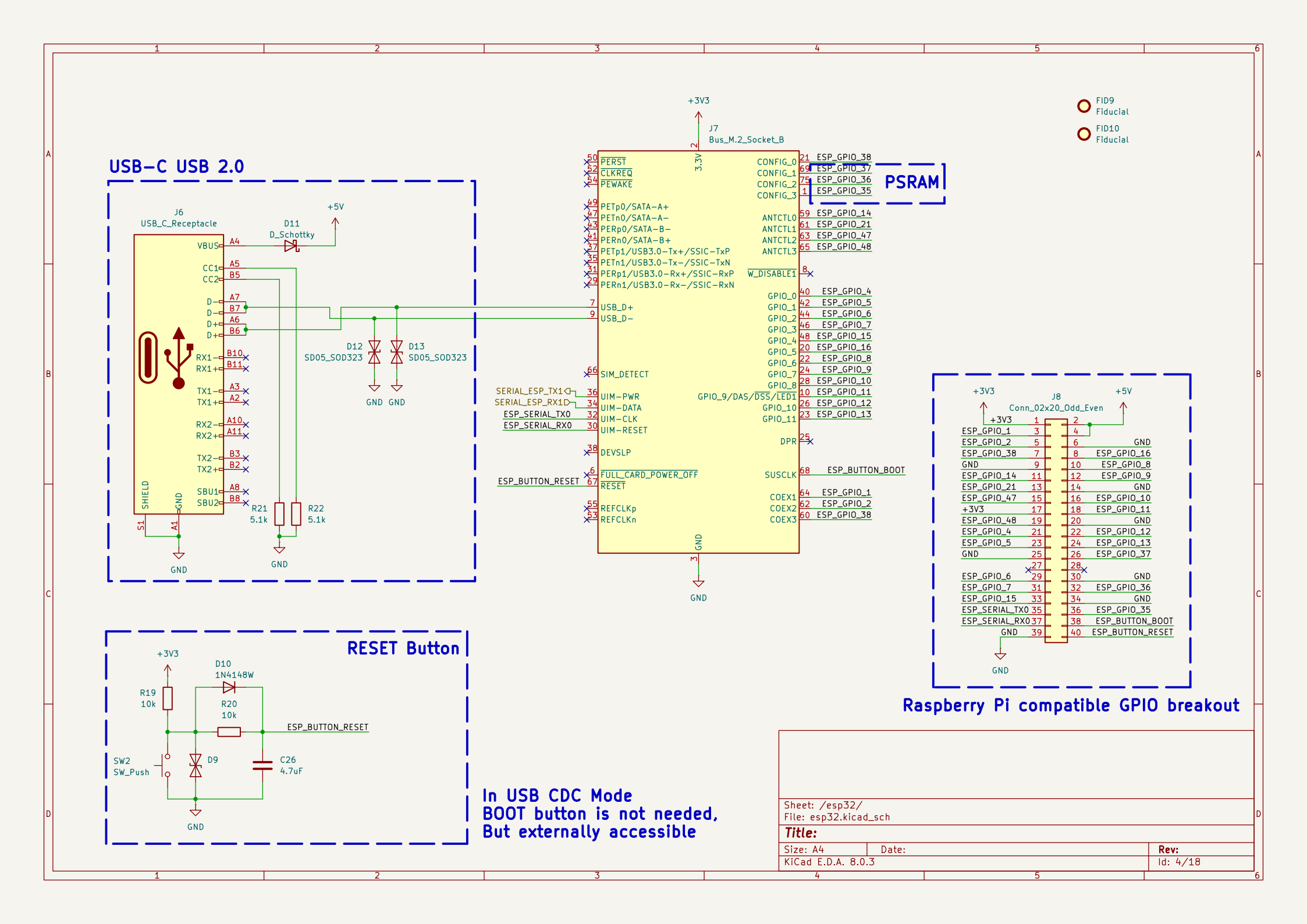
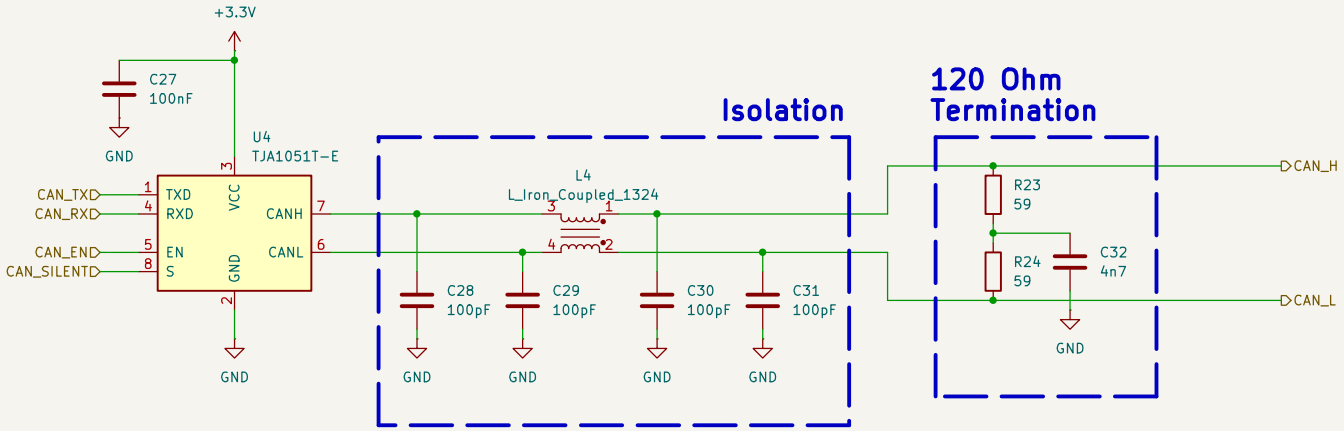

POWER
+5V
+3V3
+12V
USB_HOST_PWR
EN_USB_HOST_PWR
File: power.kicad_sch
esp32
SERIAL_ESP_TX1
SERIAL_ESP_RX1
File: esp32.kicad_sch
analog
ANALOG_PHOTOTRANSISTOR_OUT
ANALOG_POTENTIOMETER_OUT
ANALOG_MICROPHONE_OUT
ANALOG_THERMISTOR_OUT
ANALOG_JOYSTICK_X_OUT
ANALOG_JOYSTICK_Y_OUT
File: analog.kicad_sch
digital
DIGITAL_LED_3V3
DIGITAL_LED_5V
DIGITAL_LED_12V
DIGITAL_HEATER_IN
DIGITAL_BUZZER_IN
DIGITAL_NEOPIXEL_IN
DIGITAL_LED_0
DIGITAL_LED_1
DIGITAL_LED_2
DIGITAL_RGB_R
DIGITAL_RGB_G
DIGITAL_RGB_B
DIGITAL_IR_EMITTER
DIGITAL_IR_RECEIVER
DIGITAL_BUTTON_0
DIGITAL_BUTTON_1
DIGITAL_BUTTON_2
DIGITAL_BUTTON_3
DIGITAL_NEOPIXEL_OUT
File: digital.kicad_sch
MCU
USB_HOST_ENABLE
SERIAL_OUT_RX1
SERIAL_OUT_TX1
ANALOG_PHOTOTRANSISTOR
ANALOG_POTENTIOMETER
ANALOG_MICROPHONE
ANALOG_HEATER_TEMPERATURE
ANALOG_JOYSTICK_X
ANALOG_JOYSTICK_Y
DIGITAL_HEATER_OUT
DIGITAL_BUZZER_OUT
DIGITAL_NEOPIXEL_OUT
DIGITAL_LED_OUT_0
DIGITAL_LED_OUT_1
DIGITAL_LED_OUT_2
DIGITAL_RGB_R
DIGITAL_RGB_G
DIGITAL_RGB_B
DIGITAL_IR_EMITTER
DIGITAL_IR_RECEIVER
DIGITAL_BUTTON_IN_0
DIGITAL_BUTTON_IN_1
DIGITAL_BUTTON_IN_2
DIGITAL_BUTTON_IN_3
CAN_EN
CAN_SILENT
CAN_OUT_RX1
CAN_OUT_TX1
I2C_SCL
I2C_SDA
I2C_INTERRUPT_KEYPAD
I2C_INTERRUPT_ACCEL
SPI_MOSI
SPI_MISO
SPI_SCK
SPI_CS_SD
SPI_DETECT_SD
SPI_ENABLE_SD
SPI_CS_NFC
SPI_RST_NFC
SPI_IRQ_NFC
SPI_CS_SEVENSEG
SPI_CS_BREAKOUT
SPI_TFT_RESET
SPI_TFT_DC
SPI_CS_TFT
USB_HOST_OUT_P+
USB_HOST_OUT_P−
SERIAL_OUT_RX2
SERIAL_OUT_TX2
MOTOR_PWM_OUT_1
MOTOR_PWM_OUT_2
MOTOR_CC_IN_1
MOTOR_CC_IN_2
ANALOG_BREAKOUT_PIEZO
ANALOG_BREAKOUT_PT100
File: mcu.kicad_sch
CAN
CAN_EN
CAN_SILENT
CAN_RX
CAN_TX
CAN_H
CAN_L
File: can.kicad_sch
I2C
I2C_SCL
I2C_SDA
INTERRRUPT_KEYPAD
INTERRRUPT_ACCELEROMETER
I2C_SCL_BREAKOUT
I2C_SDA_BREAKOUT
File: i2c.kicad_sch
SPI
SPI_MOSI
SPI_MISO
SPI_CLK
SPI_CS_SD
SPI_DETECT_SD
SPI_ENABLE_SD
SPI_CS_NFC
SPI_RST_NFC
SPI_IRQ_NFC
SPI_CS_SEVENSEG
SPI_CS_BREAKOUT_IN
SPI_RESET_TFT
SPI_DC_TFT
SPI_CS_TFT
SPI_MOSI_BREAKOUT
SPI_MISO_BREAKOUT
SPI_SCK_BREAKOUT
SPI_CS_BREAKOUT
File: spi.kicad_sch
MOTOR
MOTOR_IN1_1
MOTOR_IN2_1
MOTOR_OUT1_BREAKOUT_1
MOTOR_OUT2_BREAKOUT_1
File: motor.kicad_sch
50Hz Filter
ANALOG_BREAKOUT_OUT
ANALOG_IN_P1+
ANALOG_IN_P1−
File: filter.kicad_sch
pt100
RTD_A_OUT
RTD_W1
RTD_W2
RTD_W3
RTD_W4
File: pt100.kicad_sch
OUTPUTS
BREAKOUT_12V_OUT
BREAKOUT_USB_VBUS
BREAKOUT_CAN_H
BREAKOUT_CAN_L
BREAKOUT_I2C_SCL
BREAKOUT_I2C_SDA
BREAKOUT_SPI_MOSI
BREAKOUT_SPI_MSIO
BREAKOUT_SPI_SCK
BREAKOUT_SPI_CS
BREAKOUT_USB_D+
BREAKOUT_USB_D−
BREAKOUT_SERIAL_TX
BREAKOUT_SERIAL_RX
BREAKOUT_MOTOR_PWM1_1
BREAKOUT_MOTOR_PWM2_1
BREAKOUT_MOTOR_C1_1
BREAKOUT_MOTOR_C2_1
BREAKOUT_A_IN_P1+
BREAKOUT_A_IN_P1−
RTD_W1
RTD_W2
RTD_W3
RTD_W4
BREAKOUT_NEOPIXEL_IN
File: outputs.kicad_sch
H1
H2
H3
H4
FID1 Fiducial
FID2 Fiducial
FID3 Fiducial
FID4 Fiducial
FID5 Fiducial
FID6 Fiducial
Sheet: /
File: PRODIGY−MOTHERBOARD.kicad_sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. 8.0.3
Id: 1/18


J1
DF40C-100DS-0.4V(51)
MCU_GPIO_26
MCU_GPIO_19
MCU_GPIO_13
MCU_GPIO_6
MCU_GPIO_5
MCU_GPIO_11
MCU_GPIO_9
MCU_GPIO_10
MCU_GPIO_22
MCU_GPIO_27
MCU_GPIO_17
MCU_GPIO_4
MCU_GPIO_3
MCU_GPIO_2
MCU_GPIO_21
MCU_GPIO_20
MCU_GPIO_16
MCU_GPIO_12
MCU_GPIO_7
MCU_GPIO_8
MCU_GPIO_25
MCU_GPIO_24
MCU_GPIO_23
MCU_GPIO_18
MCU_GPIO_15
MCU_GPIO_14
MCU_VREF
+5V
MCU_RESET
GND
GND
USB-C USB 2.0
J2
USB_C_Receptacle
D3
D_Schottky
+5V
VBUS
CC1
CC2
D-
D-
D+
D+
USB_DP-
USB_DP+
RX1-
RX1+
TX1-
TX1+
RX2-
RX2+
TX2-
TX2+
SBU1
SBU2
SHIELD
GND
S1
A1
D4
SD05_SOD323
D5
SD05_SOD323
GND GND
R3
5.1k
R4
5.1k
GND
GND
Raspberry Pi compatible GPIO breakout
J3
Conn_02x20_Odd_Even
+3V3
+5V
+3V3
MCU_GPIO_2
MCU_GPIO_3
MCU_GPIO_4
MCU_GPIO_17
MCU_GPIO_27
MCU_GPIO_22
+3V3
MCU_GPIO_10
MCU_GPIO_11
MCU_GPIO_9
MCU_GPIO_5
MCU_GPIO_6
MCU_GPIO_13
MCU_GPIO_19
MCU_GPIO_26
MCU_GPIO_14
MCU_GPIO_15
MCU_GPIO_18
MCU_GPIO_23
MCU_GPIO_24
MCU_GPIO_25
MCU_GPIO_8
MCU_GPIO_7
MCU_GPIO_12
MCU_GPIO_16
MCU_GPIO_20
MCU_GPIO_21
GND
GND
J4
DF40C-100DS-0.4V(51)
USB_HOST_ENABLE
USB_HOST_OUT_P-
USB_HOST_OUT_P+
SERIAL_OUT_TX2
SERIAL_OUT_RX2
CAN_END
CAN_SILENT
SPI_MOSI
SPI_MISO
SPI_SCK
SPI_CS_BREAKOUT
SPI_CS_SEVENSEG
SPI_CS_TFT
SPI_TFT_DC
SPI_TFT_RESET
SPI_CS_SD
SPI_ENABLE_SDD
SPI_DETECT_SD
SPI_CS_NFC
SPI_IRQ_NFC
SPI_RST_NFC
DIGITAL_HEATER_OUT
DIGITAL_BUZZER_OUT
MOTOR_PWM_OUT_1
MOTOR_PWM_OUT_2
ANALOG_POTENTIOMETER
ANALOG_HEATER_TEMPERATURE
ANALOG_BREAKOUT_PT100
ANALOG_BREAKOUT_PIEZO
USB_DP-
USB_DP+
SERIAL_OUT_RX1
SERIAL_OUT_TX1
CAN_OUT_TX1
CAN_OUT_RX1
I2C_SDA
I2C_SCL
I2C_INTERRUPT_ACCEL
I2C_INTERRUPT_KEYPAD
DIGITAL_IR_EMITTER
DIGITAL_IR_RECEIVER
DIGITAL_NEOPIXEL_OUT
DIGITAL_RGB_R
DIGITAL_RGB_G
DIGITAL_RGB_B
DIGITAL_BUTTON_IN_0
DIGITAL_BUTTON_IN_1
DIGITAL_BUTTON_IN_2
DIGITAL_BUTTON_IN_3
DIGITAL_LED_OUT_0
DIGITAL_LED_OUT_1
DIGITAL_LED_OUT_2
MOTOR_CC_IN_1
MOTOR_CC_IN_2
ANALOG_PHOTOTRANSISTOR
ANALOG_JOYSTICK_X
ANALOG_JOYSTICK_Y
ANALOG_MICROPHONE
GND
GND
FID7
Fiducial
H5
H7
FID8
Fiducial
H6
H8
+5V
+3V3
JP1
VREF_Selector
MCU_VREF
RESET Button
+3V3
D2
1N4148W
R1
10k
R2
10k
MCU_RESET
SW1
SW_Push
D1
C1
4.7uF
GND
Sheet: /MCU/
File: mcu.kicad_sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. 8.0.3
Id: 2/18

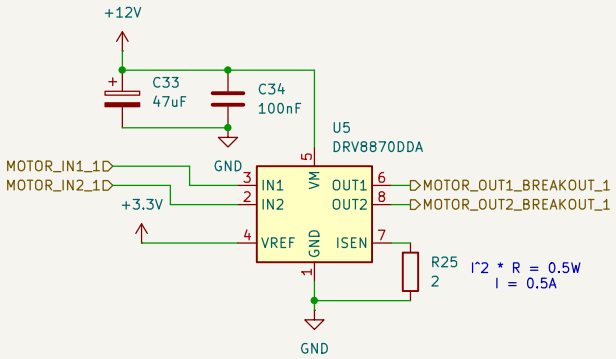


Sheet: /POWER/		
File: power.kicad_sch		
Title: Power Supply		
Size: A4	Date: 2023-12-27	**Rev:**
KiCad E.D.A. 8.0.3		Id: 3/18

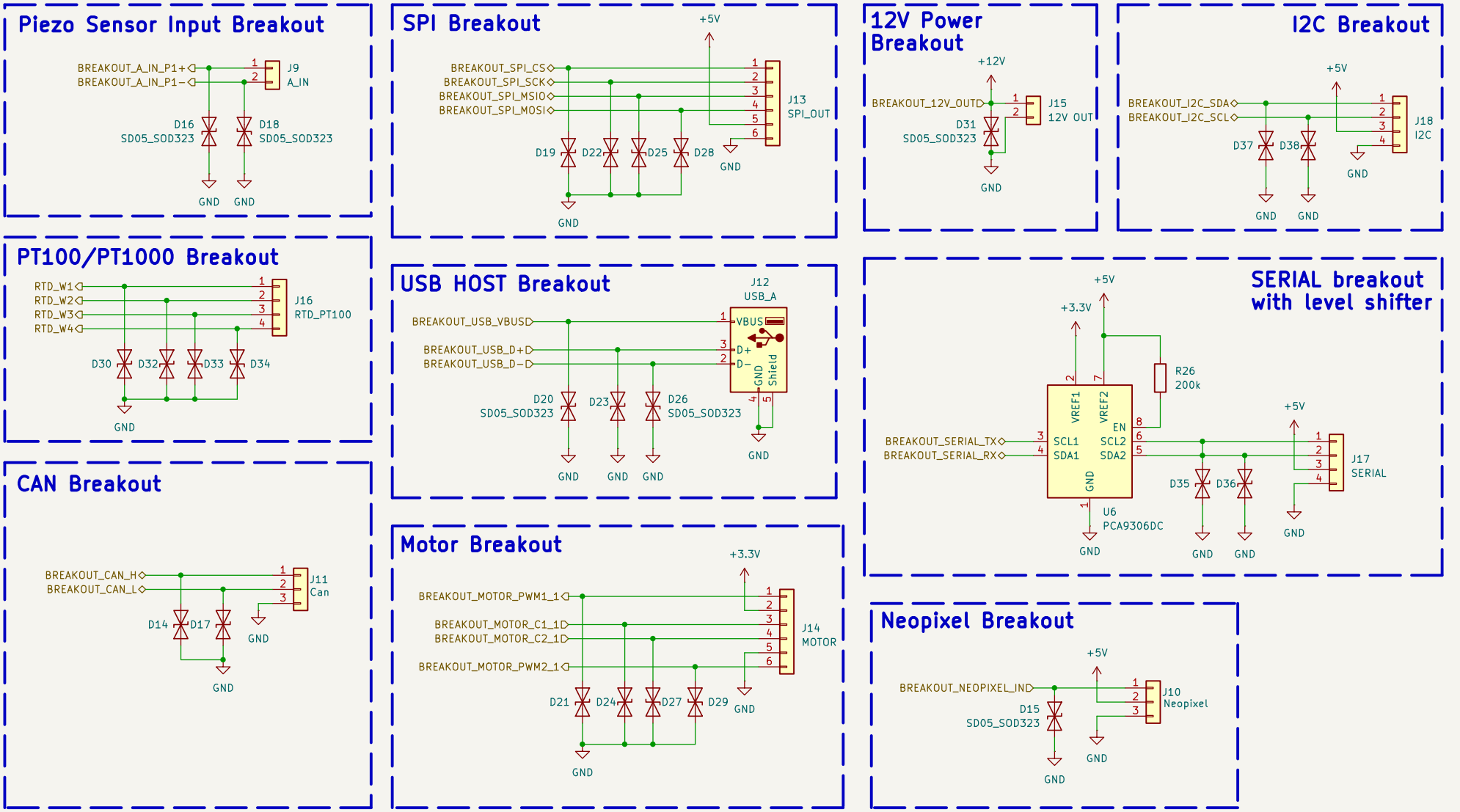

USB-C USB 2.0
J6
USB_C_Receptacle
VBUS
CC1
CC2
D-
D-
D+
D+
RX1-
RX1+
TX1-
TX1+
RX2-
RX2+
TX2-
TX2+
SBU1
SBU2
SHIELD
GND
D11
D_Schottky
+5V
R21
5.1k
R22
5.1k
D12
SD05_SOD323
D13
SD05_SOD323
J7
Bus_M.2_Socket_B
+3V3
PERST
CLKREQ
PEWAKE
PETp0/SATA-A+
PETn0/SATA-A-
PERp0/SATA-B-
PERn0/SATA-B+
PETp1/USB3.0-Tx+/SSIC-TxP
PETn1/USB3.0-Tx-/SSIC-TxN
PERp1/USB3.0-Rx+/SSIC-RxP
PERn1/USB3.0-Rx-/SSIC-RxN
USB_D+
USB_D-
SIM_DETECT
UIM-PWR
UIM-DATA
UIM-CLK
UIM-RESET
DEVSLP
FULL_CARD_POWER_OFF
RESET
REFCLKp
REFCLKn
SERIAL_ESP_TX1
SERIAL_ESP_RX1
ESP_SERIAL_TX0
ESP_SERIAL_RX0
ESP_BUTTON_RESET
CONFIG_0
CONFIG_1
CONFIG_2
CONFIG_3
ANTCTL0
ANTCTL1
ANTCTL2
ANTCTL3
W_DISABLE1
GPIO_0
GPIO_1
GPIO_2
GPIO_3
GPIO_4
GPIO_5
GPIO_6
GPIO_7
GPIO_8
GPIO_9/DAS/DSS/LED1
GPIO_10
GPIO_11
DPR
SUSCLK
COEX1
COEX2
COEX3
ESP_GPIO_38
ESP_GPIO_37
ESP_GPIO_36
ESP_GPIO_35
ESP_GPIO_14
ESP_GPIO_21
ESP_GPIO_47
ESP_GPIO_48
ESP_GPIO_4
ESP_GPIO_5
ESP_GPIO_6
ESP_GPIO_7
ESP_GPIO_15
ESP_GPIO_16
ESP_GPIO_8
ESP_GPIO_9
ESP_GPIO_10
ESP_GPIO_11
ESP_GPIO_12
ESP_GPIO_13
ESP_BUTTON_BOOT
ESP_GPIO_1
ESP_GPIO_2
ESP_GPIO_38
PSRAM
FID9
Fiducial
FID10
Fiducial
J8
Conn_02x20_Odd_Even
Raspberry Pi compatible GPIO breakout
RESET Button
R19
10k
R20
10k
D10
1N4148W
SW2
SW_Push
D9
C26
4.7uF
In USB CDC Mode
BOOT button is not needed,
But externally accessible
Sheet: /esp32/
File: esp32.kicad_sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. 8.0.3
Id: 4/18

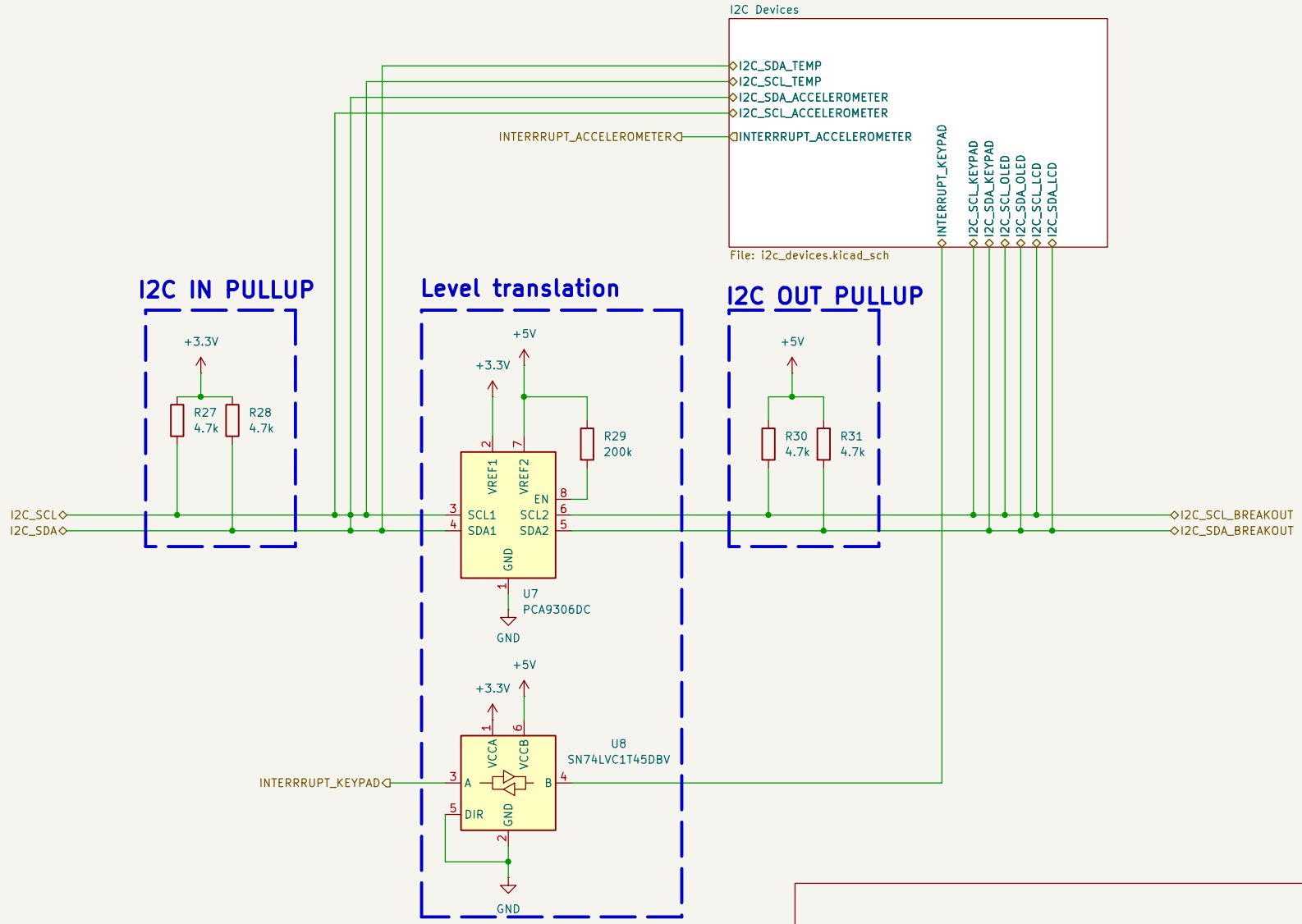


Sheet: /CAN/		
File: can.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.3		Id: 5/18

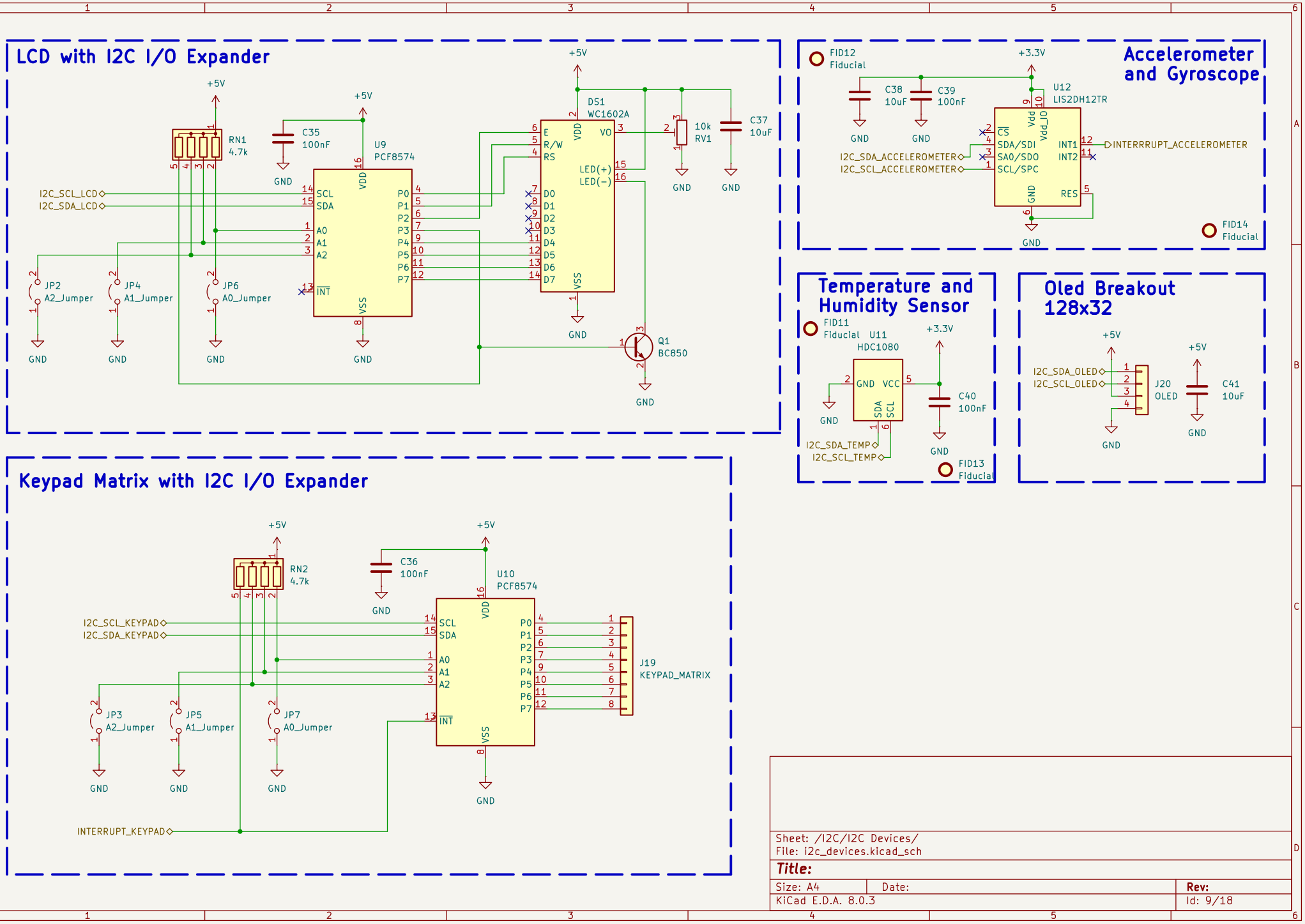


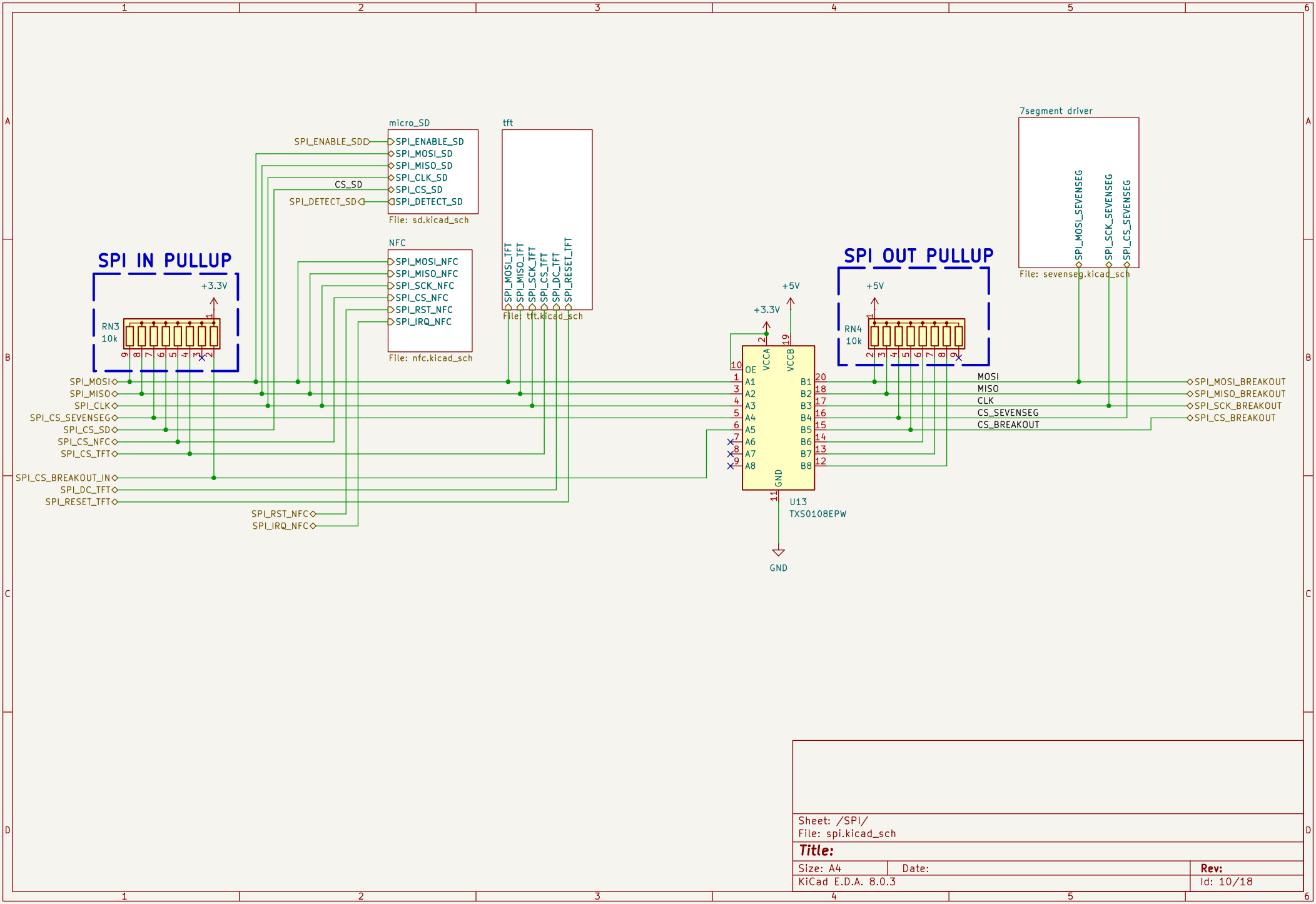
Sheet: /MOTOR/		
File: motor.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.3		Id: 6/18

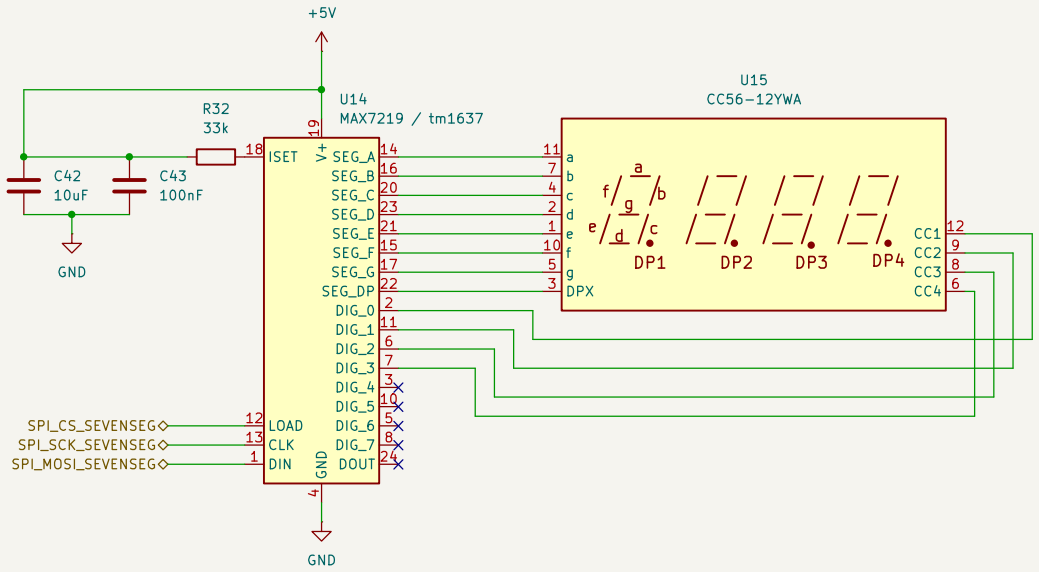

Piezo Sensor Input Breakout
BREAKOUT_A_IN_P1+
BREAKOUT_A_IN_P1-
J9
A_IN
D16
SD05_SOD323
D18
SD05_SOD323
GND
GND
SPI Breakout
+5V
BREAKOUT_SPI_CS
BREAKOUT_SPI_SCK
BREAKOUT_SPI_MSIO
BREAKOUT_SPI_MOSI
J13
SPI_OUT
D19
D22
D25
D28
GND
GND
12V Power Breakout
+12V
BREAKOUT_12V_OUT
J15
12V OUT
D31
SD05_SOD323
GND
GND
I2C Breakout
+5V
BREAKOUT_I2C_SDA
BREAKOUT_I2C_SCL
J18
I2C
D37
D38
GND
GND
GND
PT100/PT1000 Breakout
RTD_W1
RTD_W2
RTD_W3
RTD_W4
J16
RTD_PT100
D30
D32
D33
D34
GND
USB HOST Breakout
J12
USB_A
BREAKOUT_USB_VBUS
BREAKOUT_USB_D+
BREAKOUT_USB_D-
VBUS
D+
D-
GND
Shield
D20
SD05_SOD323
D23
D26
SD05_SOD323
GND
GND
GND
GND
SERIAL breakout with level shifter
+5V
+3.3V
R26
200k
VREF1
VREF2
EN
SCL1
SDA1
SCL2
SDA2
GND
U6
PCA9306DC
BREAKOUT_SERIAL_TX
BREAKOUT_SERIAL_RX
J17
SERIAL
D35
D36
GND
GND
GND
GND
CAN Breakout
BREAKOUT_CAN_H
BREAKOUT_CAN_L
J11
Can
D14
D17
GND
GND
Motor Breakout
+3.3V
BREAKOUT_MOTOR_PWM1_1
BREAKOUT_MOTOR_C1_1
BREAKOUT_MOTOR_C2_1
BREAKOUT_MOTOR_PWM2_1
J14
MOTOR
D21
D24
D27
D29
GND
GND
Neopixel Breakout
+5V
BREAKOUT_NEOPIXEL_IND
J10
Neopixel
D15
SD05_SOD323
GND
GND
Sheet: /OUTPUTS/
File: outputs.kicad_sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. 8.0.3
Id: 7/18



Sheet: /I2C/		
File: i2c.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.3		Id: 8/18


LCD with I2C I/O Expander
+5V
RN1
4.7k
C35
100nF
U9
PCF8574
I2C_SCL_LCD
I2C_SDA_LCD
SCL
SDA
A0
A1
A2
INT
VDD
VSS
P0
P1
P2
P3
P4
P5
P6
P7
JP2
A2_Jumper
JP4
A1_Jumper
JP6
A0_Jumper
GND
DS1
WC1602A
E
R/W
RS
VO
LED(+)
LED(-)
D0
D1
D2
D3
D4
D5
D6
D7
10k
RV1
C37
10uF
Q1
BC850
Keypad Matrix with I2C I/O Expander
RN2
4.7k
C36
100nF
U10
PCF8574
I2C_SCL_KEYPAD
I2C_SDA_KEYPAD
JP3
A2_Jumper
JP5
A1_Jumper
JP7
A0_Jumper
J19
KEYPAD_MATRIX
INTERRUPT_KEYPAD
FID12
Fiducial
Accelerometer and Gyroscope
+3.3V
C38
10uF
C39
100nF
U12
LIS2DH12TR
CS
SDA/SDI
SA0/SDO
SCL/SPC
Vdd
Vdd_IO
GND
RES
INT1
INT2
I2C_SDA_ACCELEROMETER
I2C_SCL_ACCELEROMETER
INTERRRUPT_ACCELEROMETER
FID14
Fiducial
Temperature and Humidity Sensor
FID11
Fiducial
U11
HDC1080
VCC
SDA
SCL
C40
100nF
I2C_SDA_TEMP
I2C_SCL_TEMP
FID13
Fiducial
Oled Breakout 128x32
J20
OLED
C41
10uF
I2C_SDA_OLED
I2C_SCL_OLED
Sheet: /I2C/I2C Devices/
File: i2c_devices.kicad_sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. 8.0.3
Id: 9/18

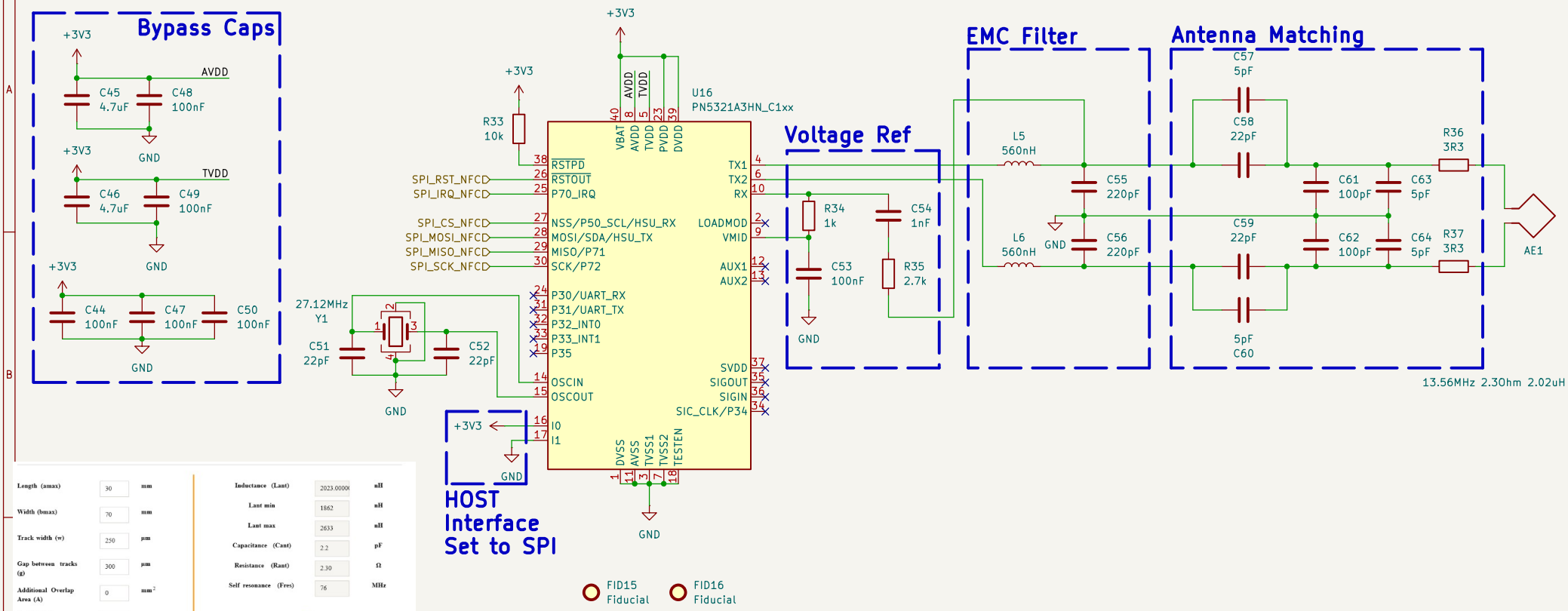

SPI IN PULLUP
+3.3V
RN3
10k
SPI_MOSI
SPI_MISO
SPI_CLK
SPI_CS_SEVENSEG
SPI_CS_SD
SPI_CS_NFC
SPI_CS_TFT
SPI_CS_BREAKOUT_IN
SPI_DC_TFT
SPI_RESET_TFT
SPI_RST_NFC
SPI_IRQ_NFC
micro_SD
SPI_ENABLE_SDD
SPI_ENABLE_SD
SPI_MOSI_SD
SPI_MISO_SD
SPI_CLK_SD
CS_SD
SPI_CS_SD
SPI_DETECT_SD
SPI_DETECT_SD
File: sd.kicad_sch
NFC
SPI_MOSI_NFC
SPI_MISO_NFC
SPI_SCK_NFC
SPI_CS_NFC
SPI_RST_NFC
SPI_IRQ_NFC
File: nfc.kicad_sch
tft
SPI_MOSI_TFT
SPI_MISO_TFT
SPI_SCK_TFT
SPI_CS_TFT
SPI_DC_TFT
SPI_RESET_TFT
File: tft.kicad_sch
+3.3V
+5V
VCCA
VCCB
OE
A1
A2
A3
A4
A5
A6
A7
A8
B1
B2
B3
B4
B5
B6
B7
B8
GND
U13
TXS0108EPW
GND
SPI OUT PULLUP
+5V
RN4
10k
MOSI
MISO
CLK
CS_SEVENSEG
CS_BREAKOUT
SPI_MOSI_BREAKOUT
SPI_MISO_BREAKOUT
SPI_SCK_BREAKOUT
SPI_CS_BREAKOUT
7segment driver
SPI_MOSI_SEVENSEG
SPI_SCK_SEVENSEG
SPI_CS_SEVENSEG
File: sevenseg.kicad_sch
Sheet: /SPI/
File: spi.kicad_sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. 8.0.3
Id: 10/18

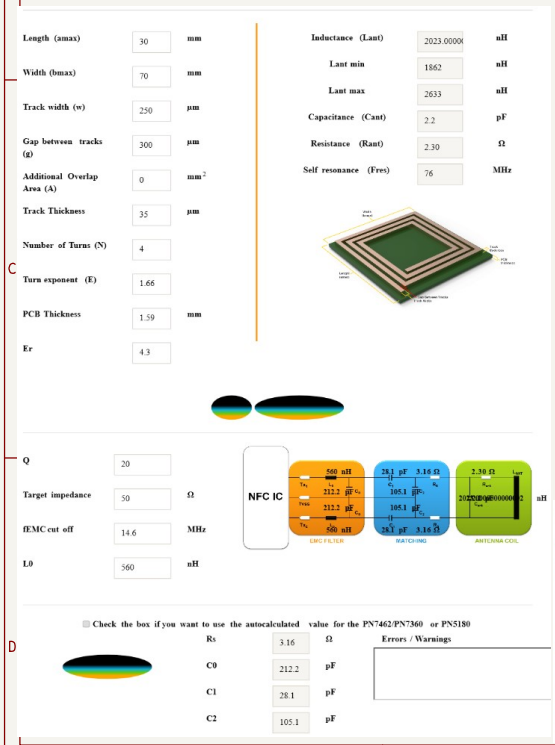


Sheet: /SPI/7segment driver/
File: sevenseg.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.3		Id: 11/18





The firmware must copy the value of the pads I0 and I1 to respectively selif[0] and selif[1].

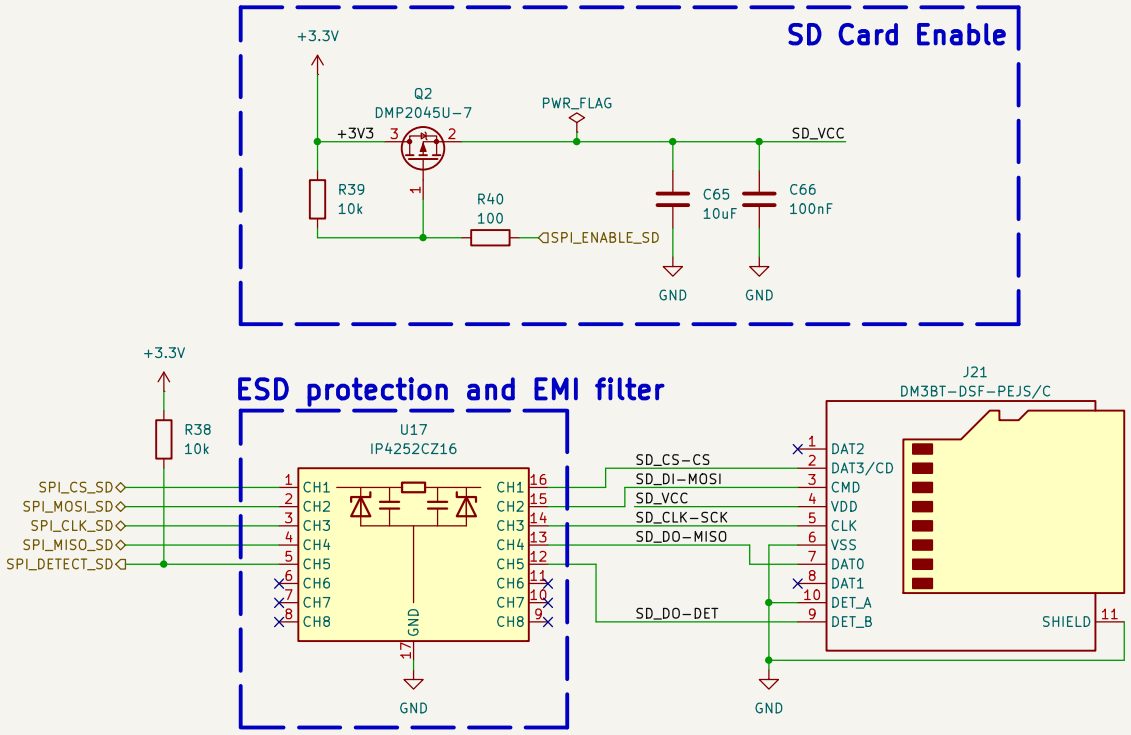
Table 72. HOST interface selection

Selif [1:0]	00	01	10	11
Host interface selected	HSU	SPI	I²C	Reserved
Pin number				
27	HSU_RX	NSS	P50_SCL	-
28	HSU_TX	MOSI	SDA	-
29	P71	MISO	P71	-
30	P72	SCK	P72	-

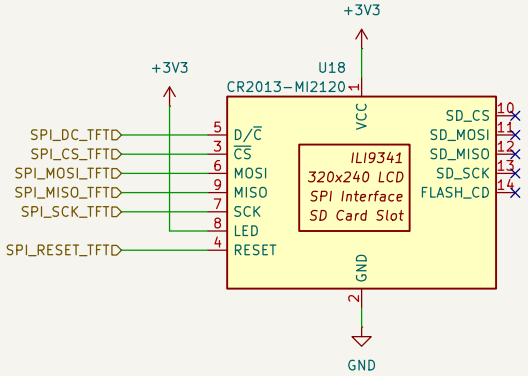
Sheet: /SPI/NFC/
File: nfc.kicad_sch

Title:

Size: A4 | Date: | **Rev:**
KiCad E.D.A. 8.0.3 | Id: 12/18



Sheet: /SPI/micro_SD/		
File: sd.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.3		Id: 13/18



Sheet: /SPI/tft/
File: tft.kicad_sch

Title:

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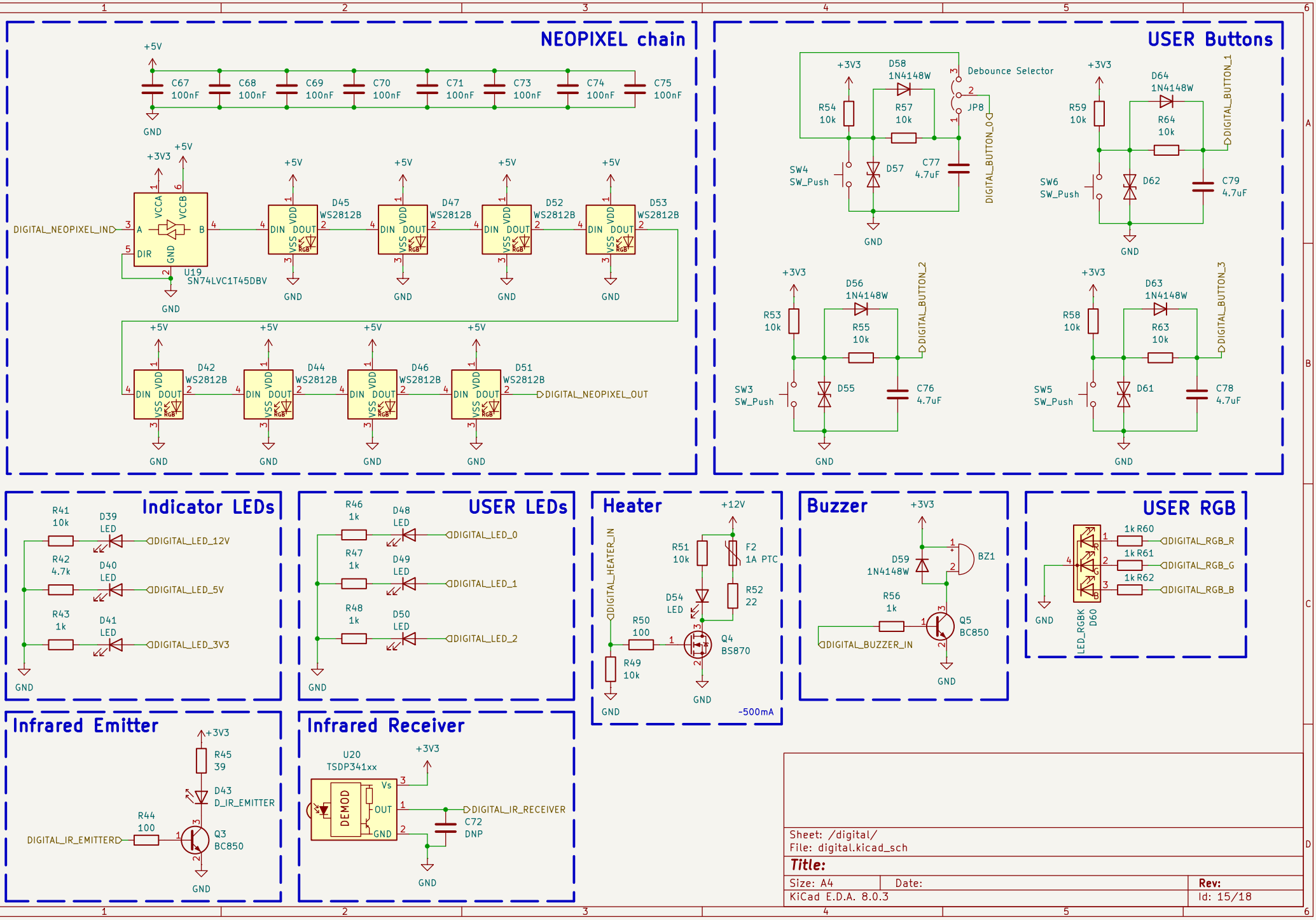
NEOPIXEL chain
+5V
C67 100nF
C68 100nF
C69 100nF
C70 100nF
C71 100nF
C73 100nF
C74 100nF
C75 100nF
GND
+3V3
VCCA
VCCB
DIGITAL_NEOPIXEL_IN
A
B
DIR
GND
U19
SN74LVC1T45DBV
D45 WS2812B
D47 WS2812B
D52 WS2812B
D53 WS2812B
DIN DOUT VDD VSS RGB
D42 WS2812B
D44 WS2812B
D46 WS2812B
D51 WS2812B
DIGITAL_NEOPIXEL_OUT
USER Buttons
D58 1N4148W
Debounce Selector
JP8
R54 10k
R57 10k
SW4 SW_Push
D57
C77 4.7uF
DIGITAL_BUTTON_0
D64 1N4148W
R59 10k
R64 10k
DIGITAL_BUTTON_1
SW6 SW_Push
D62
C79 4.7uF
D56 1N4148W
R53 10k
R55 10k
DIGITAL_BUTTON_2
SW3 SW_Push
D55
C76 4.7uF
D63 1N4148W
R58 10k
R63 10k
DIGITAL_BUTTON_3
SW5 SW_Push
D61
C78 4.7uF
Indicator LEDs
R41 10k
D39 LED
DIGITAL_LED_12V
R42 4.7k
D40 LED
DIGITAL_LED_5V
R43 1k
D41 LED
DIGITAL_LED_3V3
USER LEDs
R46 1k
D48 LED
DIGITAL_LED_0
R47 1k
D49 LED
DIGITAL_LED_1
R48 1k
D50 LED
DIGITAL_LED_2
Heater
+12V
DIGITAL_HEATER_IN
R51 10k
F2 1A PTC
D54 LED
R52 22
R50 100
Q4 BS870
R49 10k
~500mA
Buzzer
D59 1N4148W
BZ1
R56 1k
Q5 BC850
DIGITAL_BUZZER_IN
USER RGB
1k R60
1k R61
1k R62
DIGITAL_RGB_R
DIGITAL_RGB_G
DIGITAL_RGB_B
LED_RGBK D60
Infrared Emitter
R45 39
D43 D_IR_EMITTER
R44 100
DIGITAL_IR_EMITTER
Q3 BC850
Infrared Receiver
U20
TSDP341xx
DEMOD
Vs
OUT
DIGITAL_IR_RECEIVER
C72 DNP
Sheet: /digital/
File: digital.kicad_sch
Title:
Size: A4
Date:
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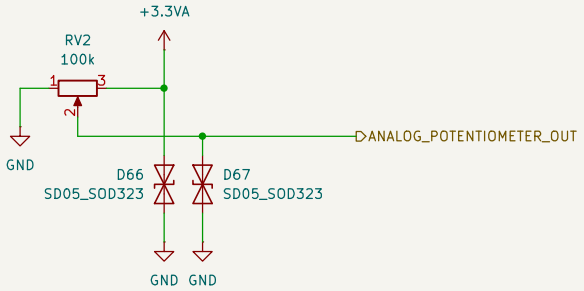
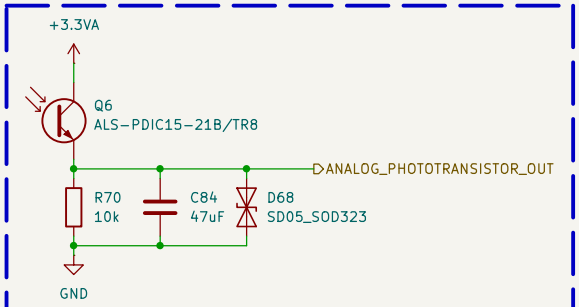
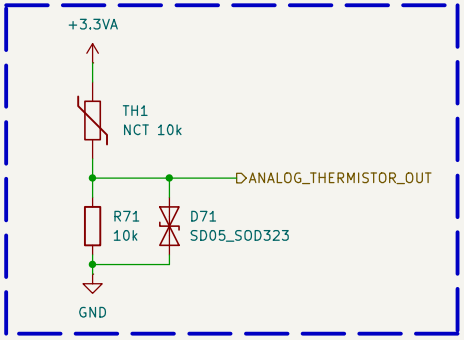
Potentiometer



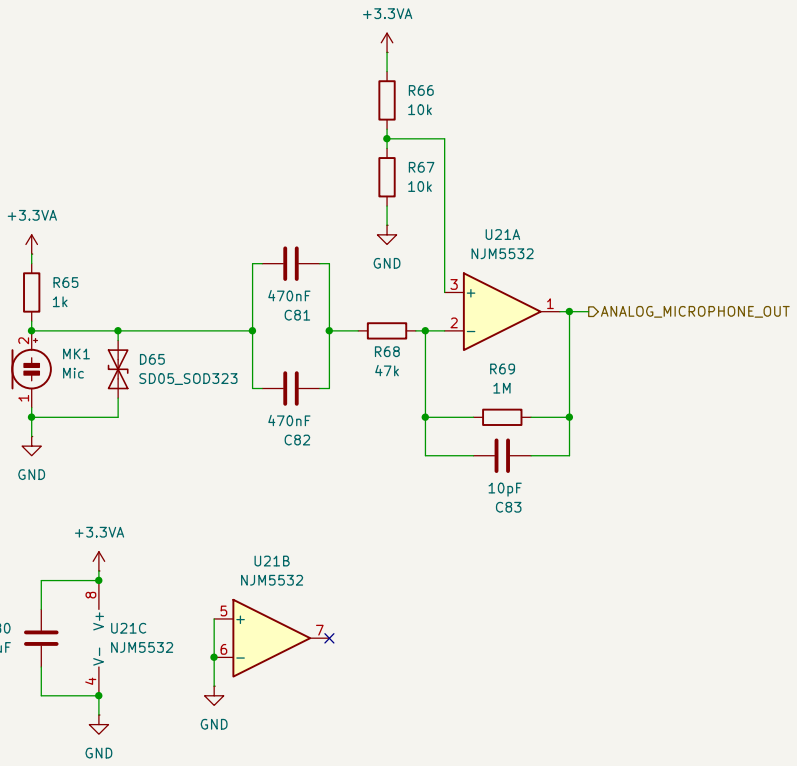
Phototransistor



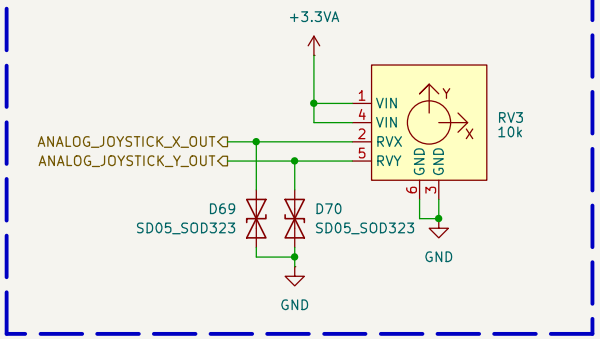
NC-Thermistor



Condensator Microphone with audio amplifier



2-Axis Joystick



Sheet: /analog/
File: analog.kicad_sch

Title:

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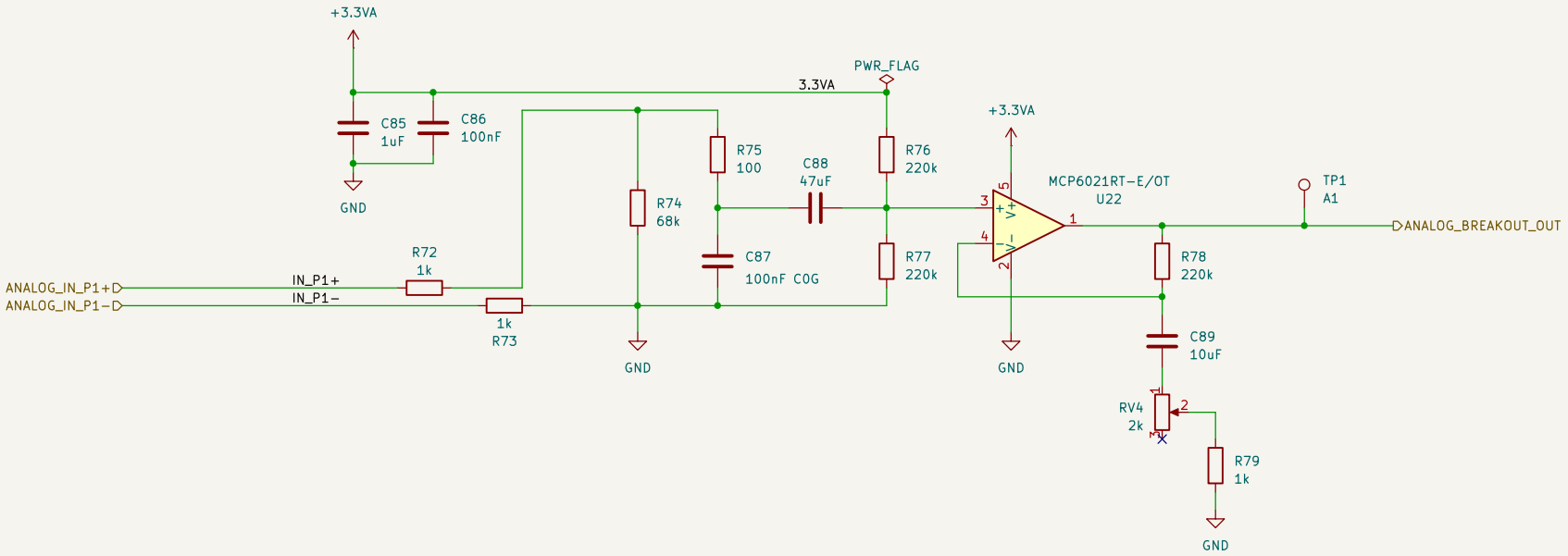
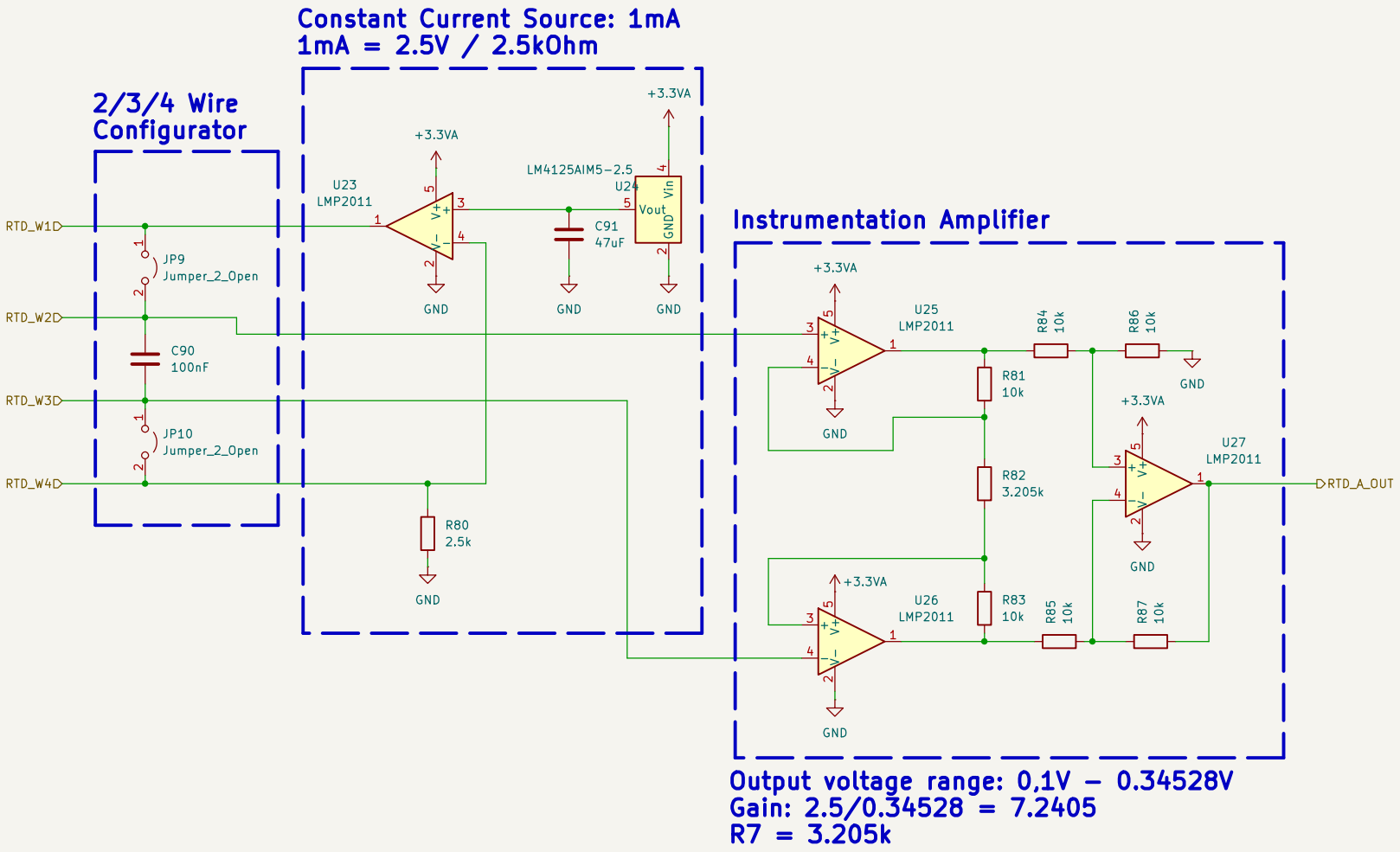


Sheet: /50Hz Filter/		
File: filter.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.3		Id: 17/18



Sheet: /pt100/		
File: pt100.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
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