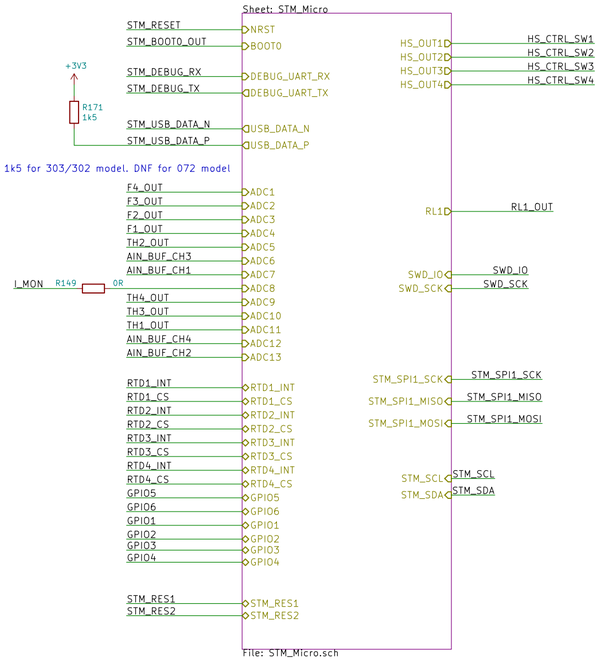
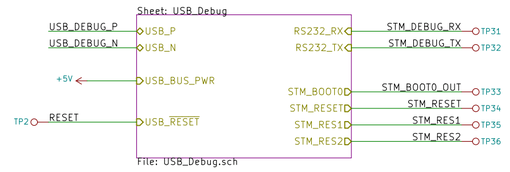
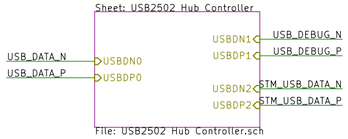
STM Microcontroller



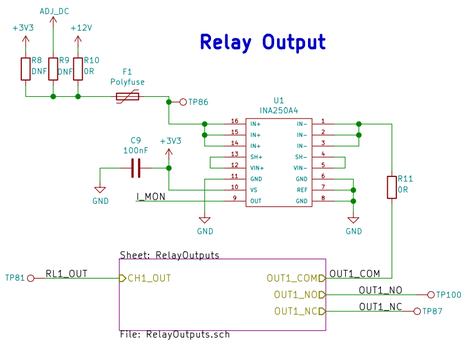
USB Debug



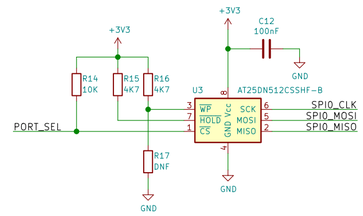
USB Hub Controller



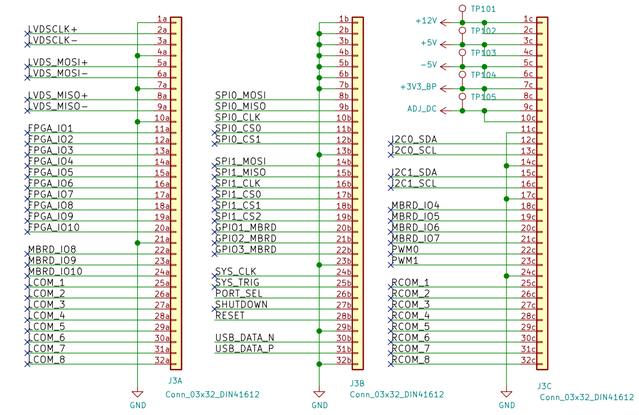
Relay Output



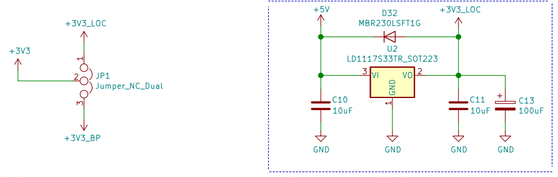
Onboard EEPROM



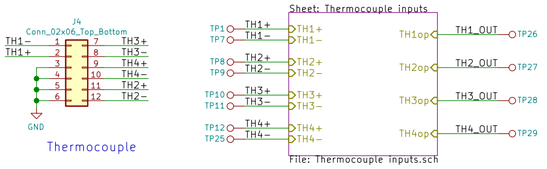
96Way Backplane Connector



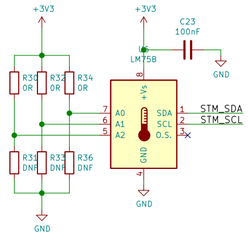
3.3V Regulator



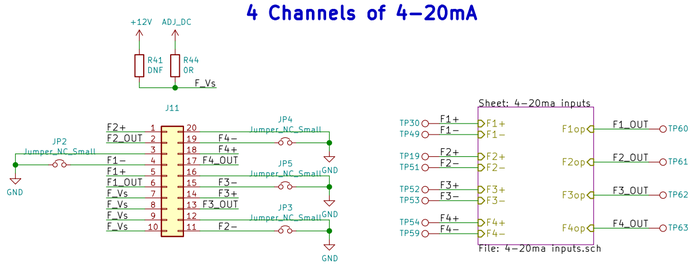
4 Channels of Thermocouple



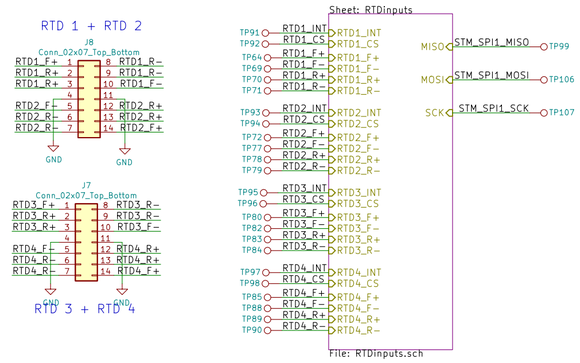
Onboard temperature sensor



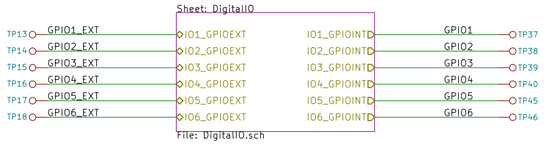
4 Channels of 4−20mA



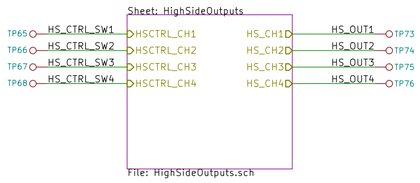
4 Channels of RTD



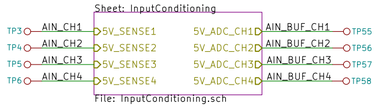
6x GPIO's

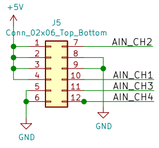


4 High Side Switches

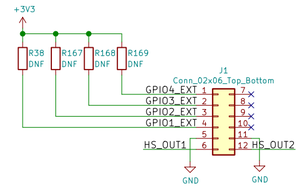


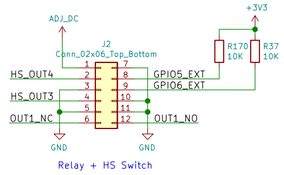
4 Channels of Analogue Inputs (0−5V)



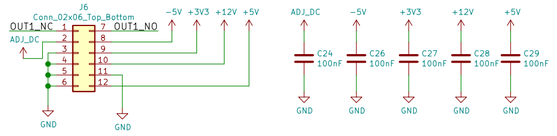


Misc Connectors





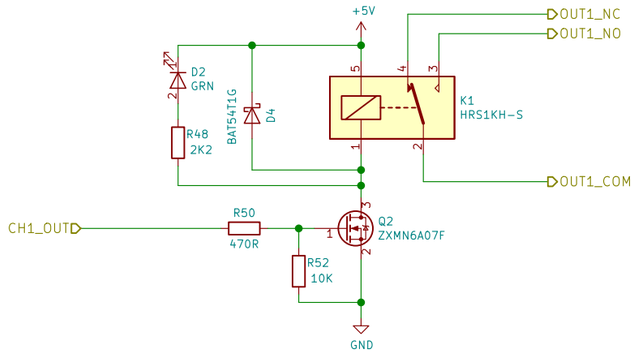
Relay + PSU O/P Connector



Part No: 304−007
Devtank Ltd
Sheet: /
File: Sensi_Board.sch

Title: Sensi Board

Size: A2	Date: 2019−11−01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1−2build2		Id: 1/11

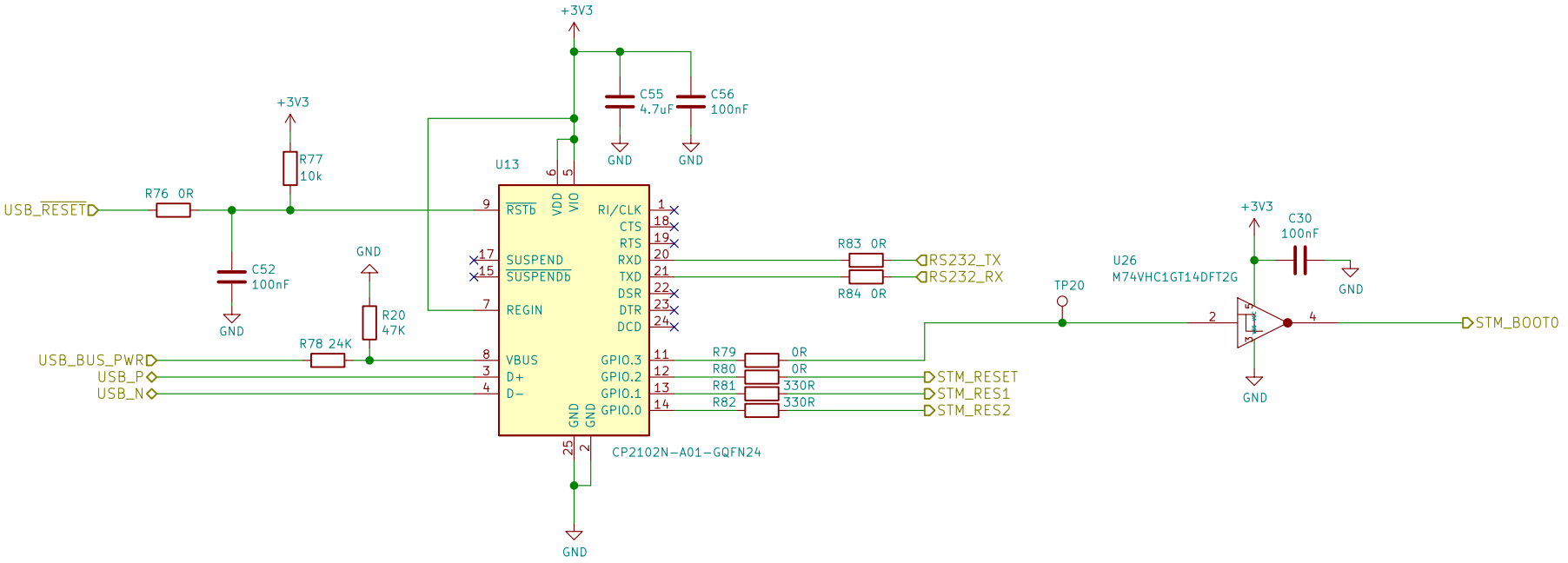


Part No: 304-007
Devtank Ltd

Sheet: /RelayOutputs/
File: RelayOutputs.sch

Title: Sensi Board

Size: A3	Date: 2019-11-01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 2/11

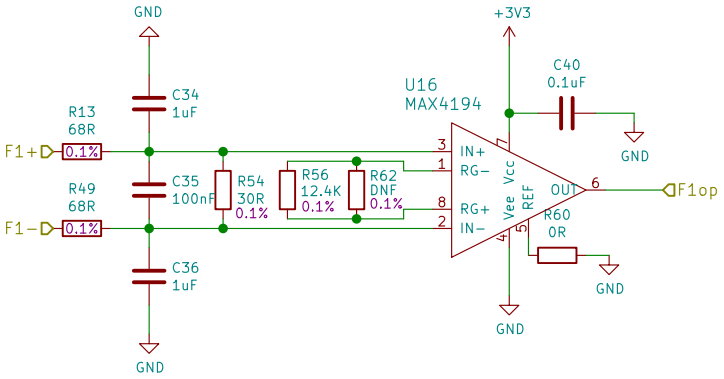


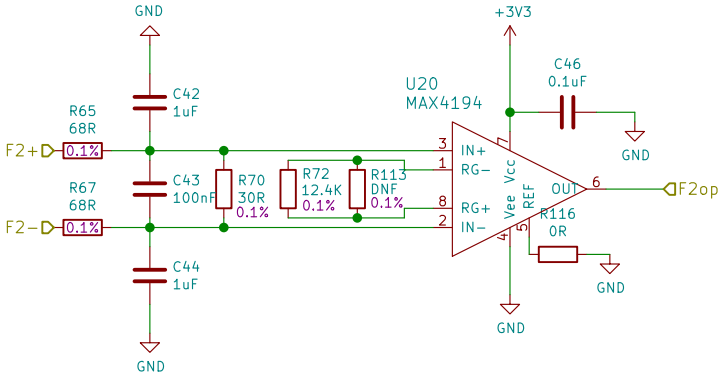
Part No: 304-007
Devtank Ltd

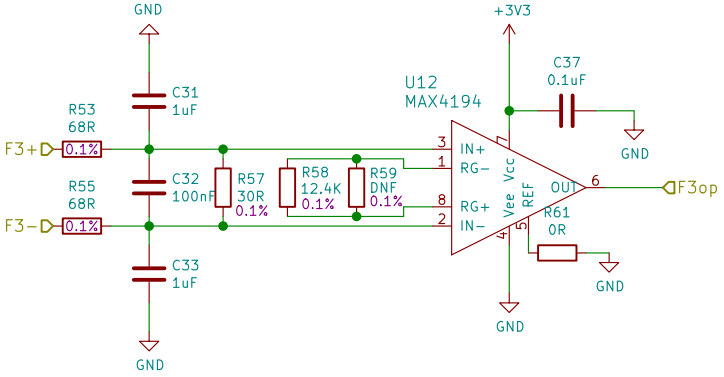
Sheet: /USB_Debug/
File: USB_Debug.sch

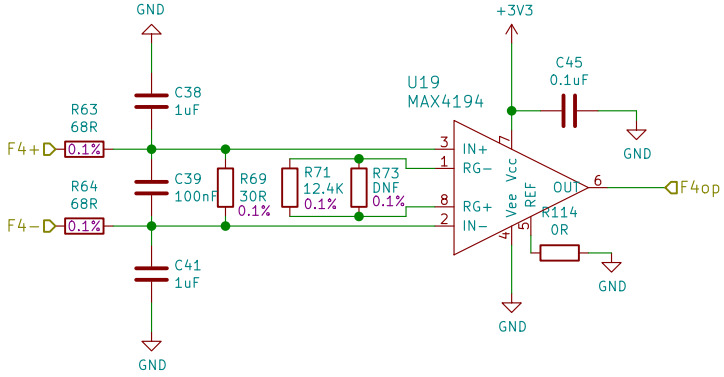
Title: Sensi Board

Size: A4	Date: 2019-11-01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 3/11









Updated calculation for sense resistor 30R. Replace 12.5K resistor with 11.5K.

Low pass filter
F = (1 / (2 x pi x 10R x 1uF)) = 15.92KHz

Volt drop across input resistor
V = 10R x 20mA = 0.2V

Gain resistor calculation
Gain = 5
RG = (50Kohms / (5−1)) = 12.5Kohms

Sense resistor calculation
3.2(allow for some loss) / 5 = 0.64V
RS = (0.64 / (20mA)) = 32ohms

ADC
4mA is equivalent to 0.6mV as secified by chip
20mA is equivalent to 3.2V

Sense resistor calculation
RS = 30ohms x 20mA =0.6V
Gain = 3.2V(allow for some loss) / 0.6V = 5.33

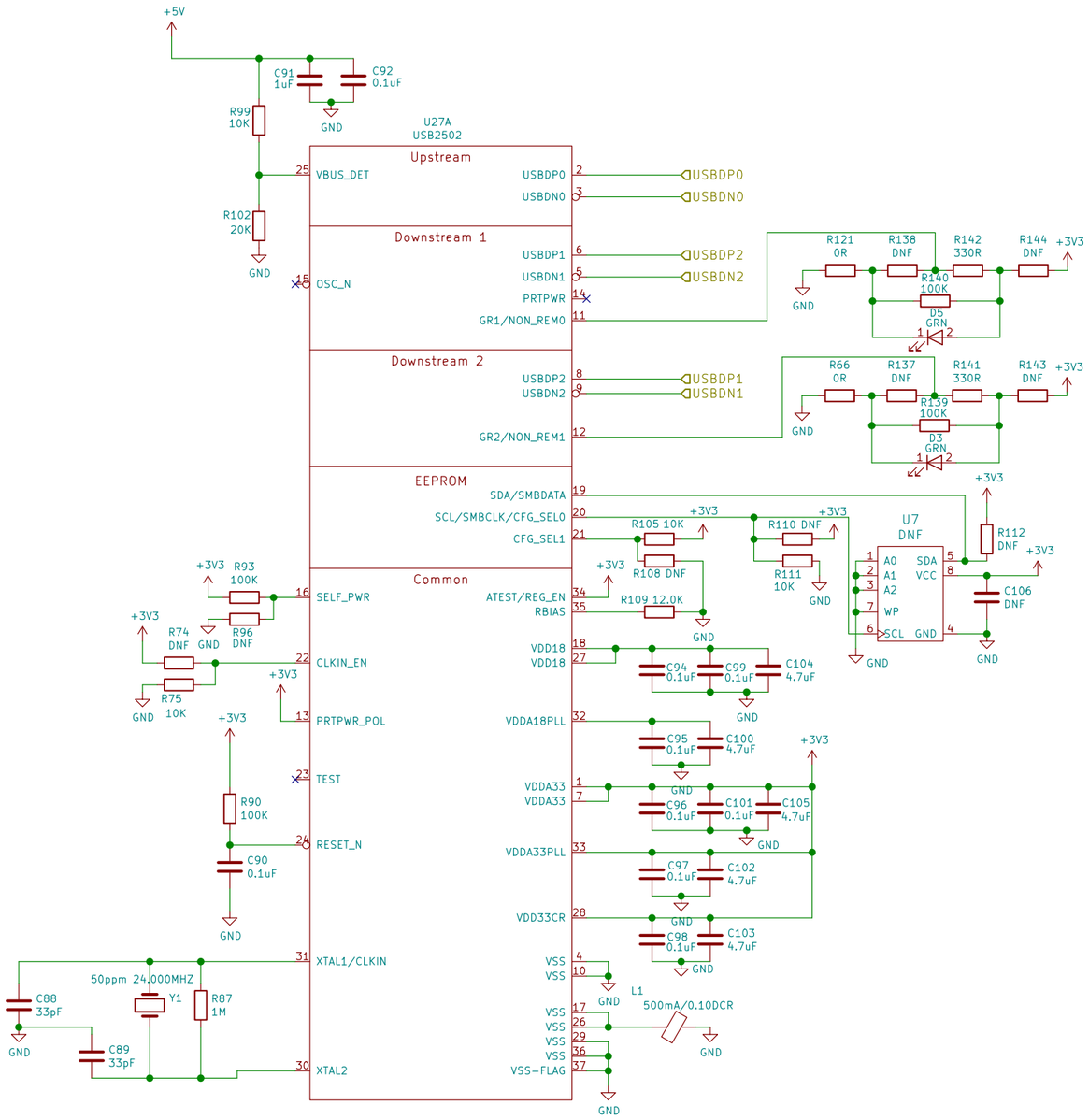
Gain resistor calculation
Gain = 5.33
RG = (50Kohms / 5.33−1) = 11.5Kohms

ADC
4mA x 30R = 0.12V = 0 Bar
20mA x 30R = 0.6V = 150 Bar

Part No: 304−007
Devtank Ltd
Sheet: /4−20ma inputs/
File: 4−20ma inputs.sch

Title: Sensi Board

Size: A4	Date: 2019−11−01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1−2build2		Id: 4/11



Part No: 304-007

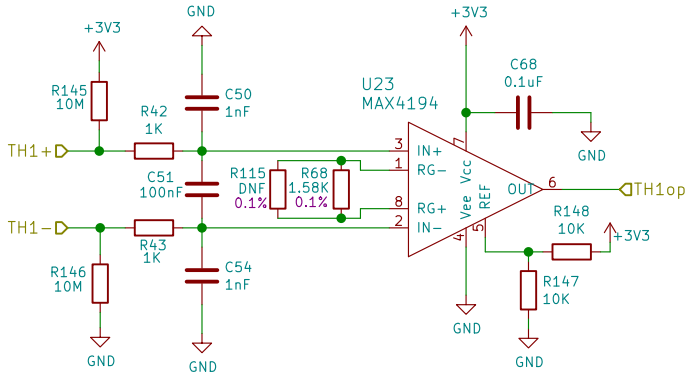
Devtank Ltd

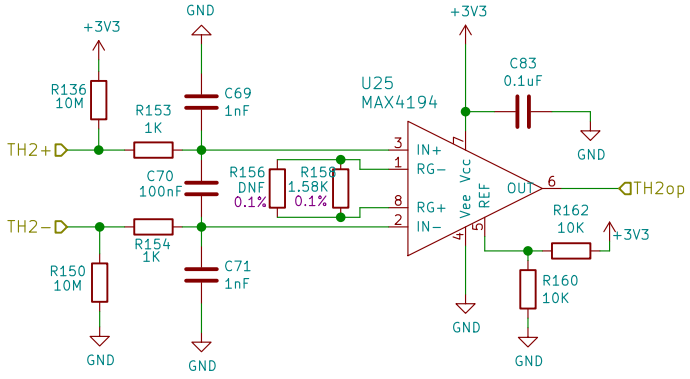
Sheet: /USB2502 Hub Controller/

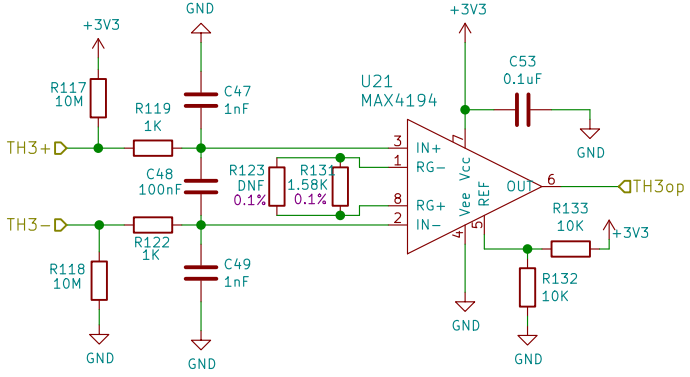
File: USB2502 Hub Controller.sch

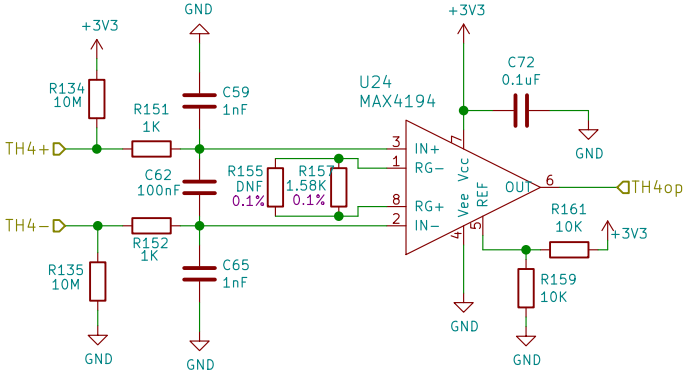
Title: Sensi Board

Size: A3	Date: 2019-11-01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 5/11









Temp input	Vout	ThermoV
−200degC	0V	−5.891mV
1250degC	3.3V	50.751+(0.0036x3)=50.7618mV

Original Gain
Gain = 3.3V / ((50.7618mV) − (−5.891mV) = 58.25
RG = (50Kohms(58.26−1)) = 873.36ohms

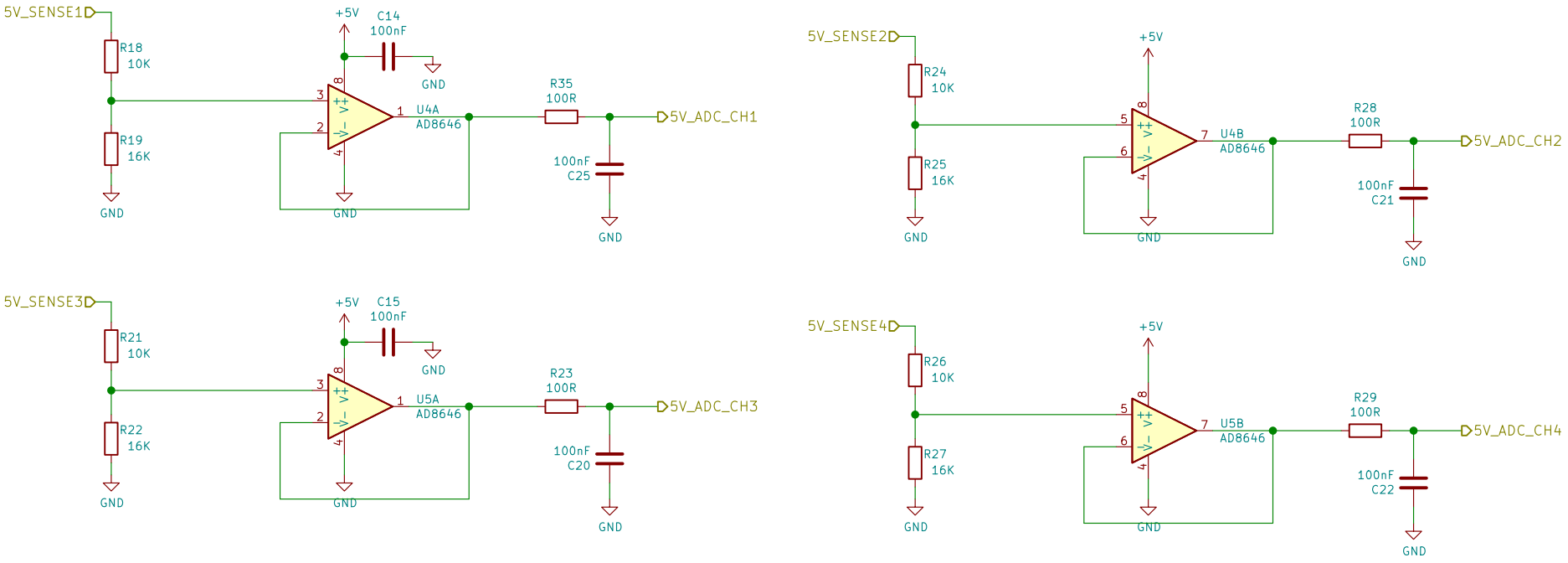
Scaled down gain calculation for offset of 2.5V
3.3V − 1.65V = 1.65V
1.65V / 50.7618mV = 32.505
32.505 x (−5.891mV) = −0.1915V
RG = (50Kohms / (32.505−1)) = 1.587Kohms

Low Pass filter
F = (1 / (2 x pi x 1Kohms x 100nF)) = 159.155KHz

Part No: 304−007
Devtank Ltd
Sheet: /Thermocouple inputs/
File: Thermocouple inputs.sch

Title: Sensi Board

Size: A4	Date: 2019−11−01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1−2build2		Id: 6/11

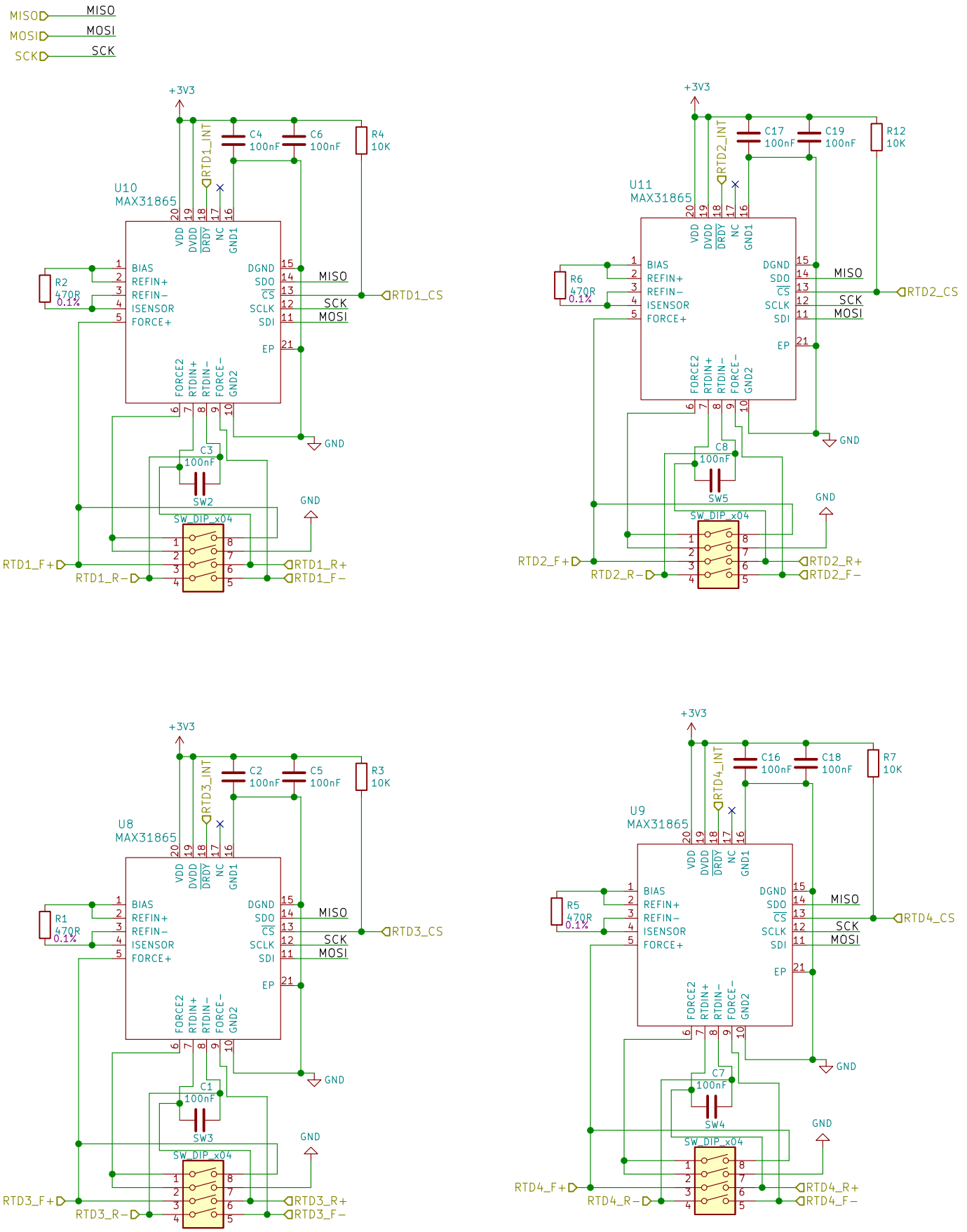


Part No: 304-007
Devtank Ltd

Sheet: /InputConditioning/
File: InputConditioning.sch

Title: Sensi Board

Size: A4	Date: 2019-11-01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 7/11



RTD SW Settings

	1	2	3	4
2 Wire	OFF	ON	ON	ON
3 Wire	ON	OFF	OFF	ON
4 Wire	OFF	ON	OFF	OFF

Default Config 3 Wire

Part No: 304-007

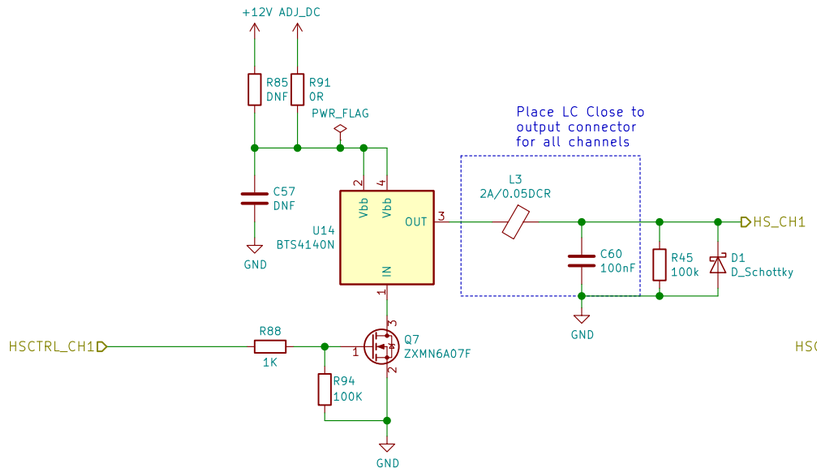
Devtank Ltd

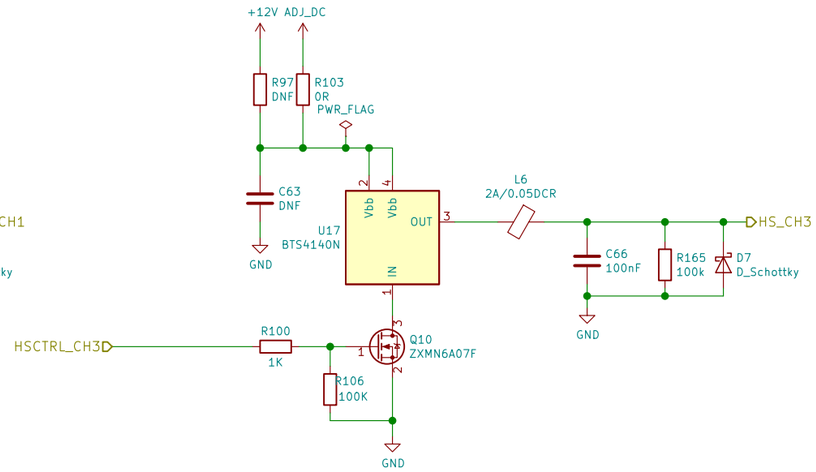
Sheet: /RTDinputs/

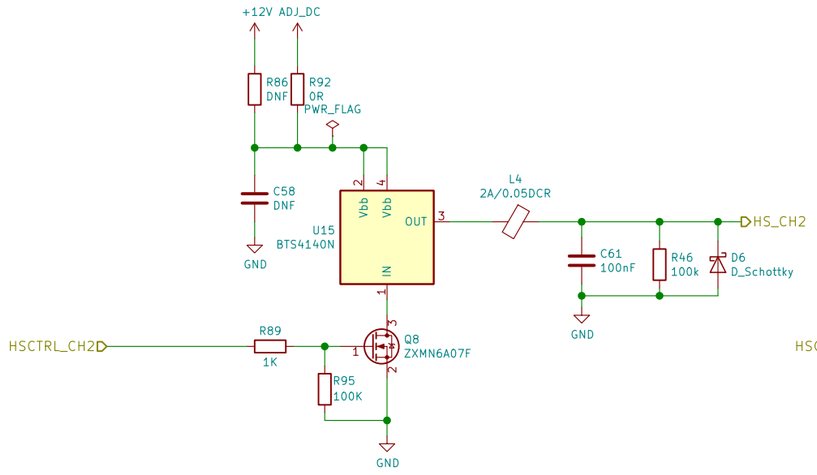
File: RTDinputs.sch

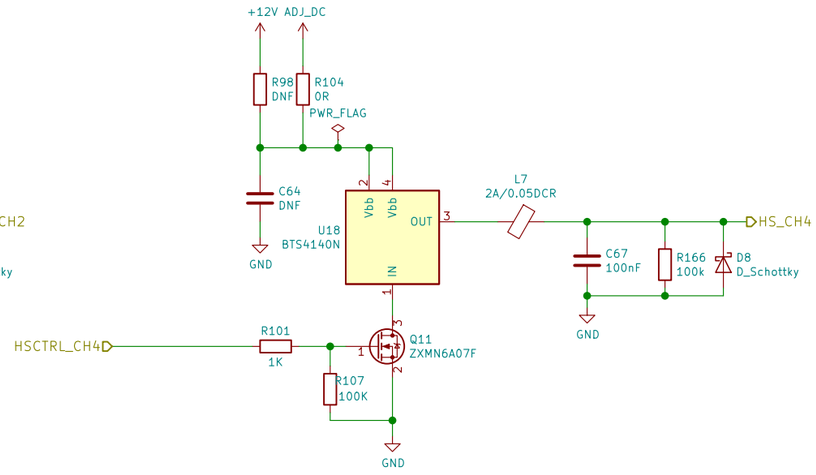
Title: Sensi Board

Size: A4	Date: 2019-11-01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 8/11









Part No: 304-007
Devtank Ltd

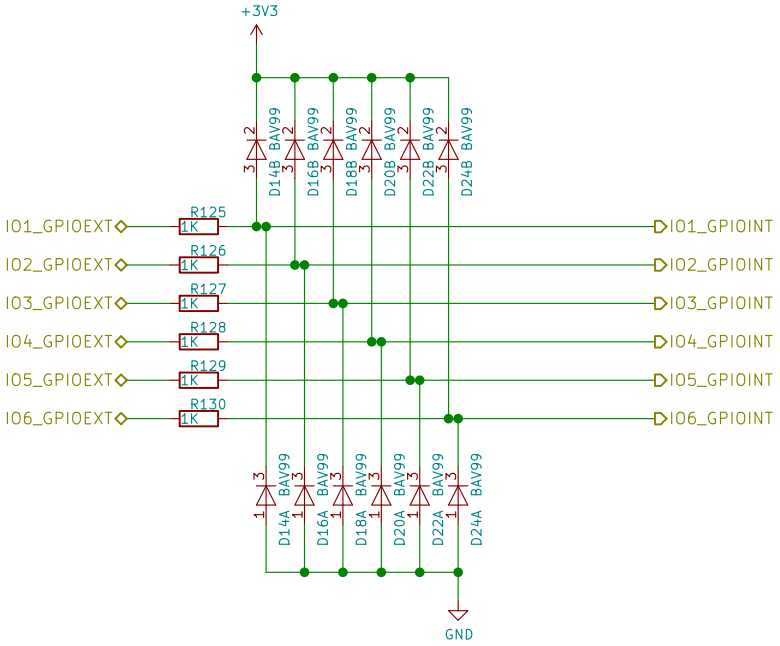
Sheet: /HighSideOutputs/
File: HighSideOutputs.sch

Title: Sensi Board

Size: A3	Date: 2019-11-01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 9/11

3V3 BI-DIRECTIONAL IO (5V TOLERANT)

Max 3mA per GPIO

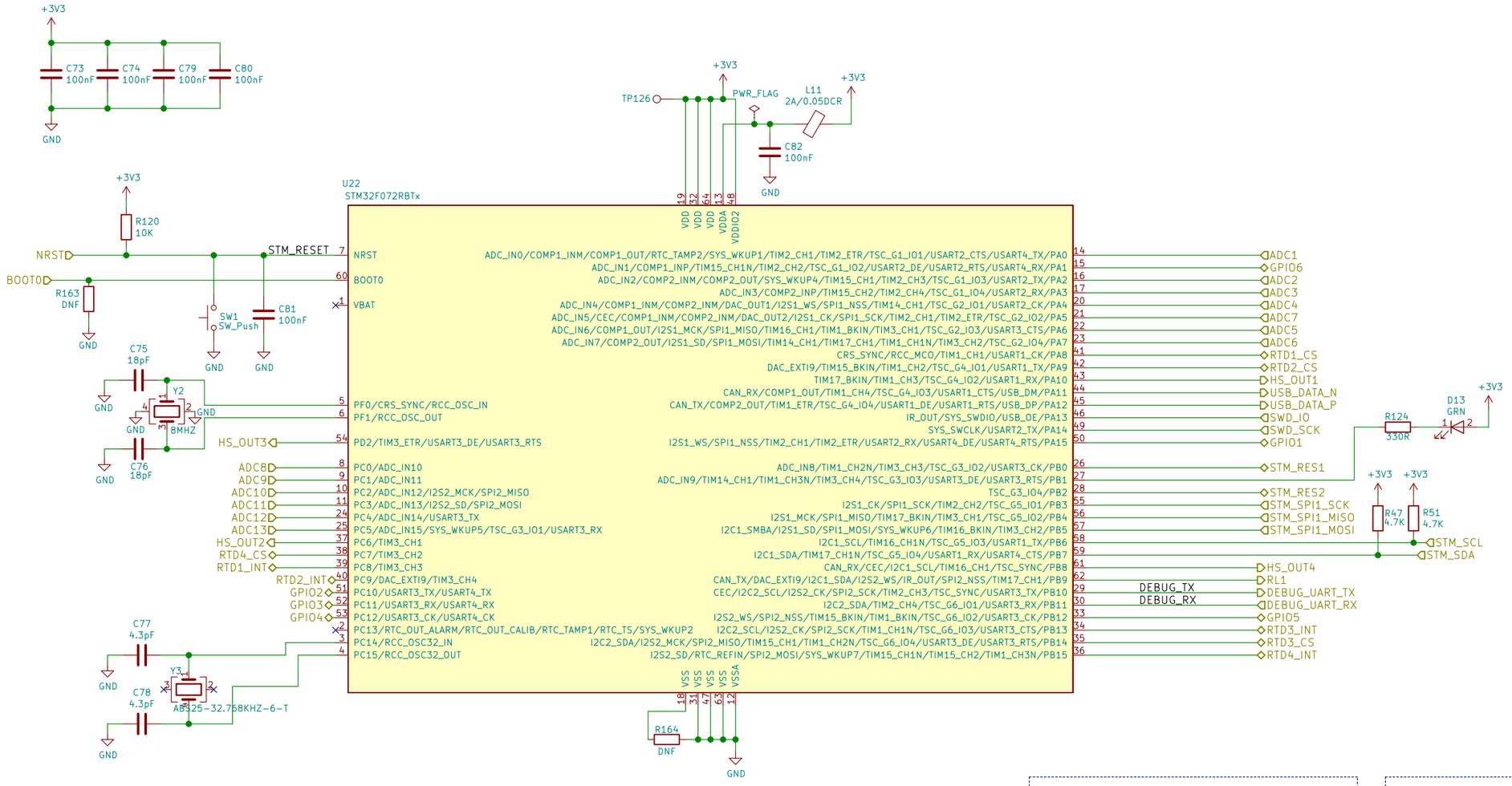


Part No: 304-007
Devtank Ltd

Sheet: /DigitalIO/
File: DigitalIO.sch

Title: Sensi Board

Size: A4	Date: 2019-11-01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 10/11



Note: only for stm32f072 fit 0R to gnd. for 303/302 model DNF

Part No: 304-007
Devtank Ltd
Sheet: /STM_Micro/
File: STM_Micro.sch

Title: Sensi Board

Size: A3	Date: 2019-11-01	**Rev: A**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 11/11