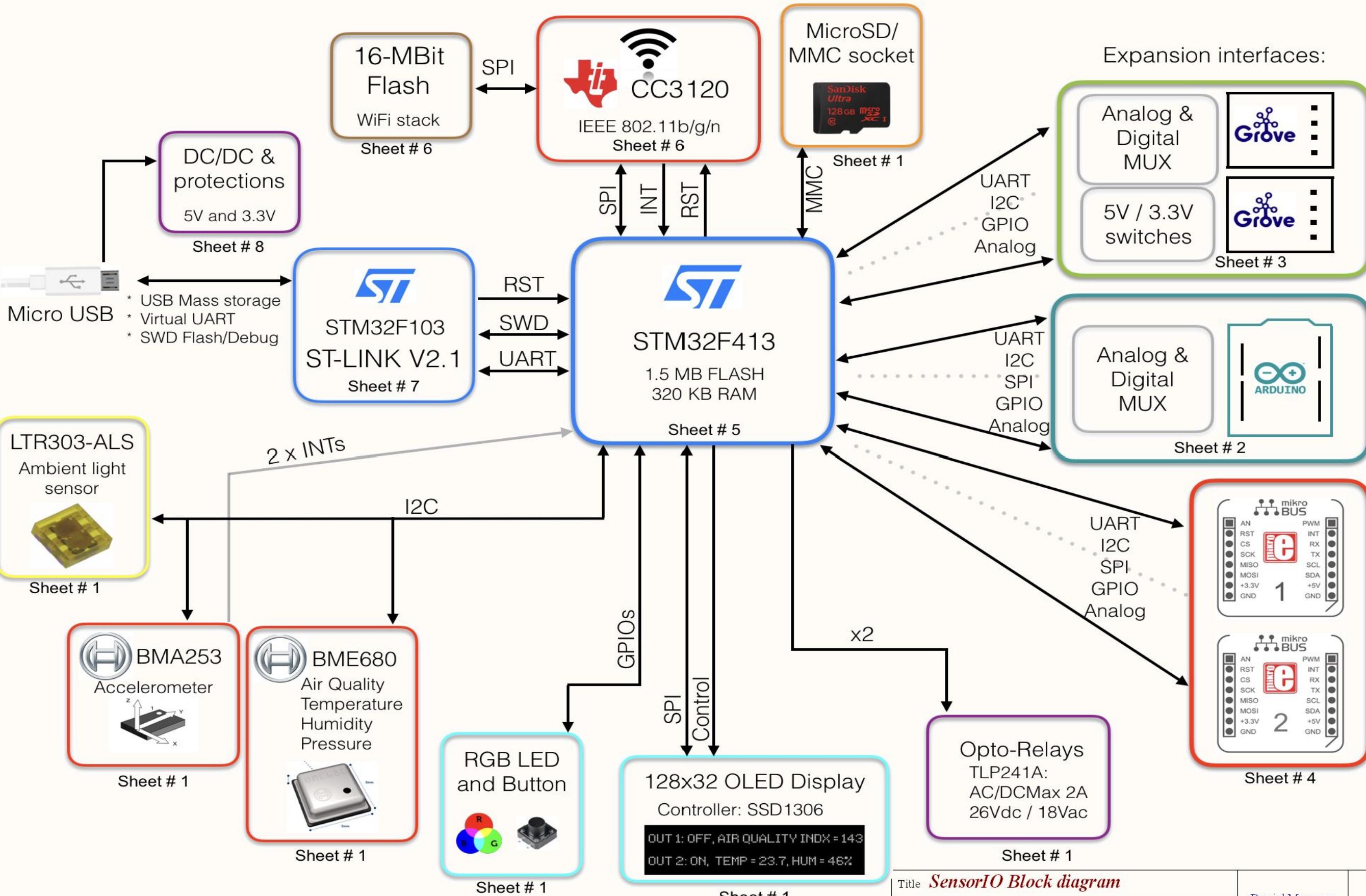


Block Diagram

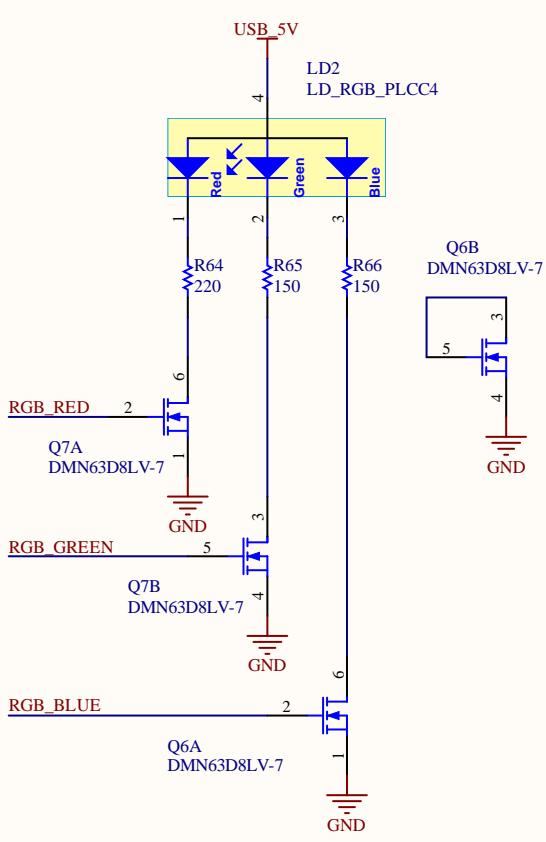
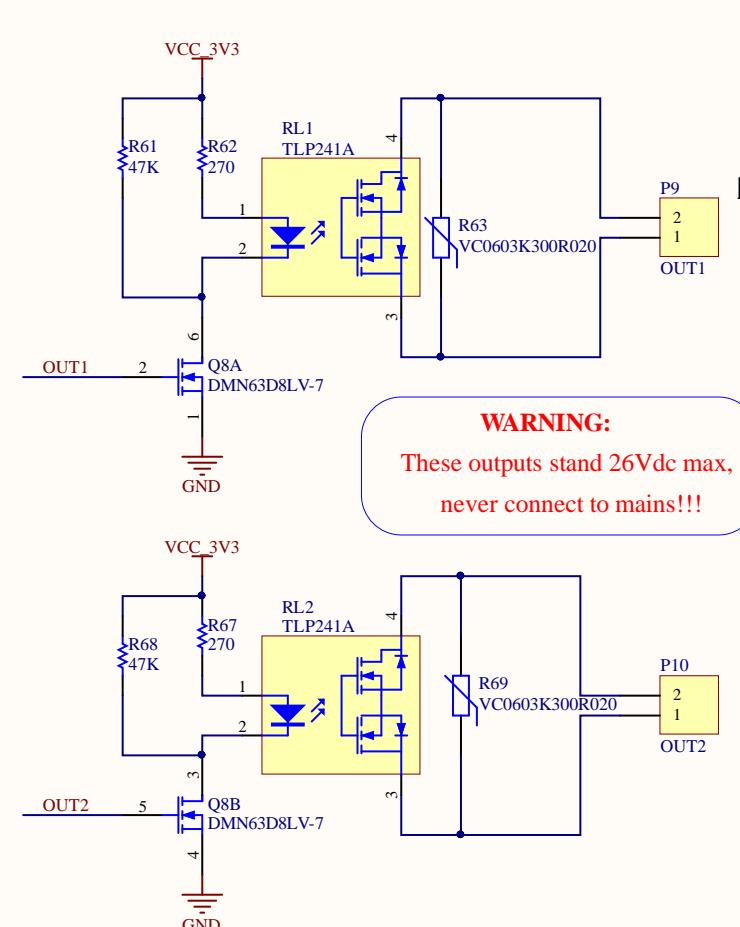


Title **SensorIO Block diagram**

Size: A4	Number: *	Revision: 1.0
Date: 26/07/2018	Time: 21:14:12	Sheet 1 of 9
File: Z:\Documents\Conrad\SensorIO\SensorIO_PCB\0_BlockDiagram.SchDoc		*

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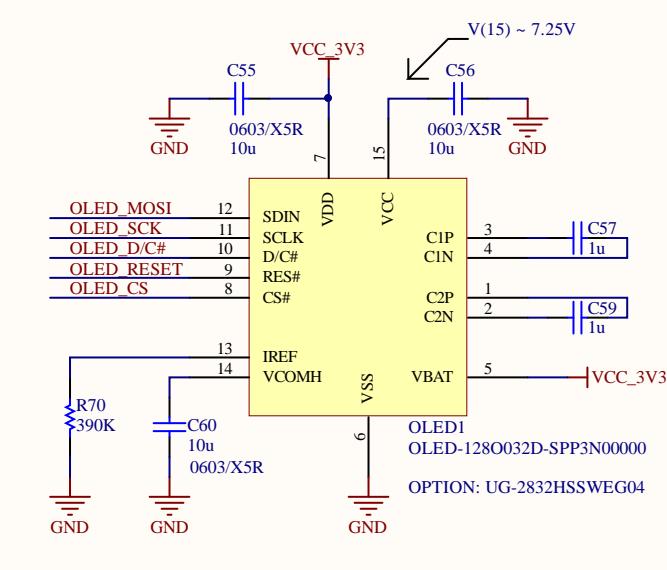
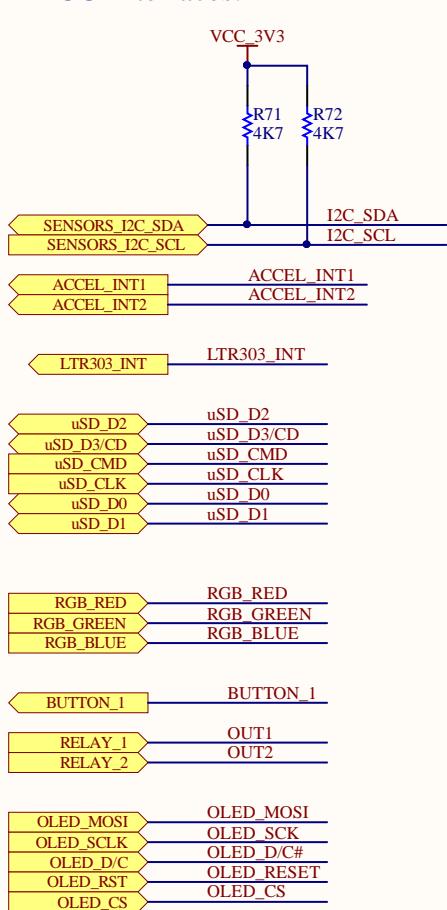
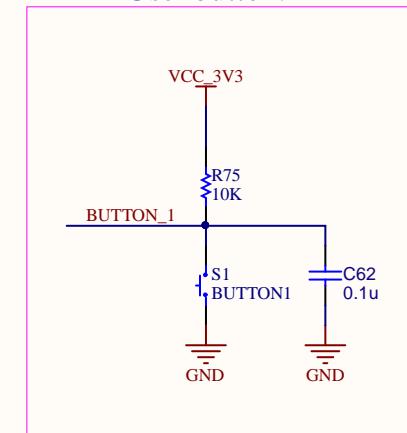
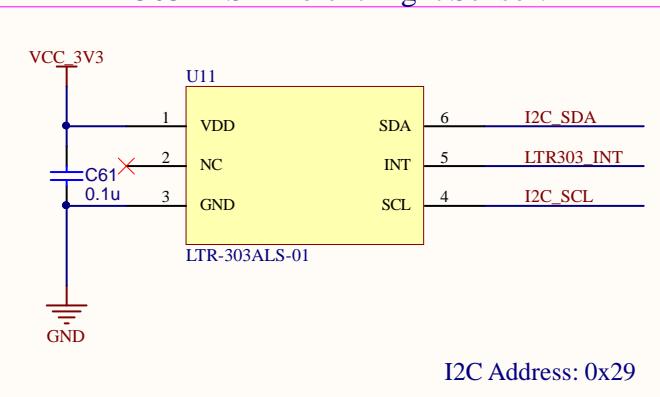
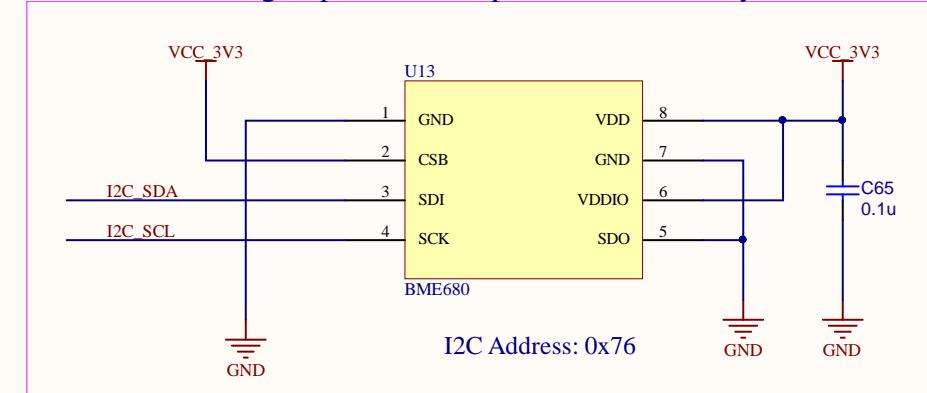
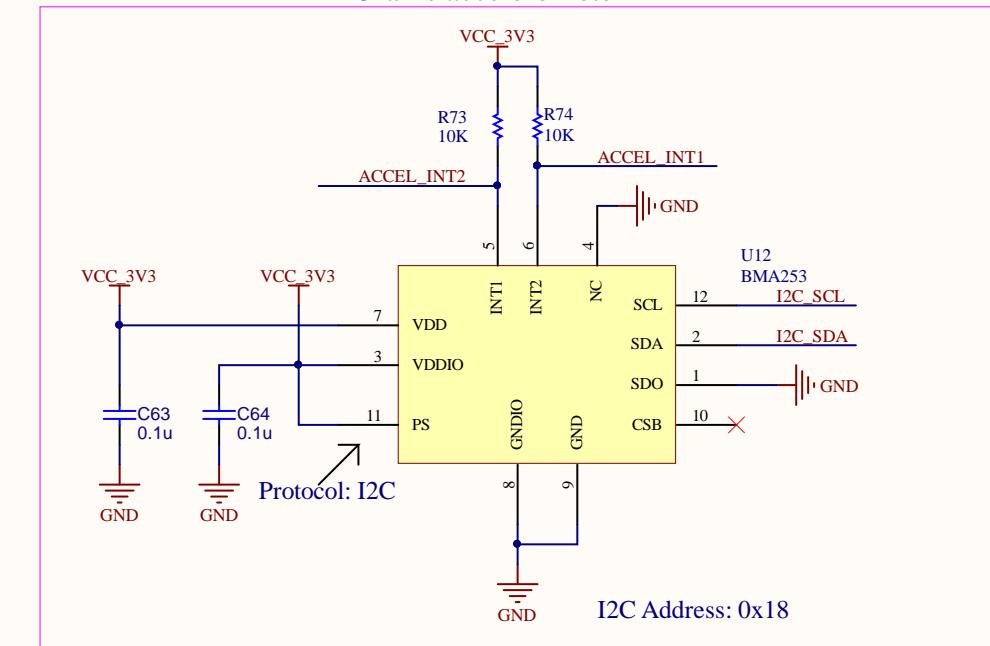


User RGB LED:**AC/DC optocoupled outputs:****Outputs characteristics:**

- * ON-state current: 2.0 A max. continuous (6A pulsed)
- * ON-state resistance: 150mOhm (continuous)
- * Isolation Voltage: 5000 Vrms
- * Maximum DC voltage: 26V
- * Maximum AC voltage: 18Vrms

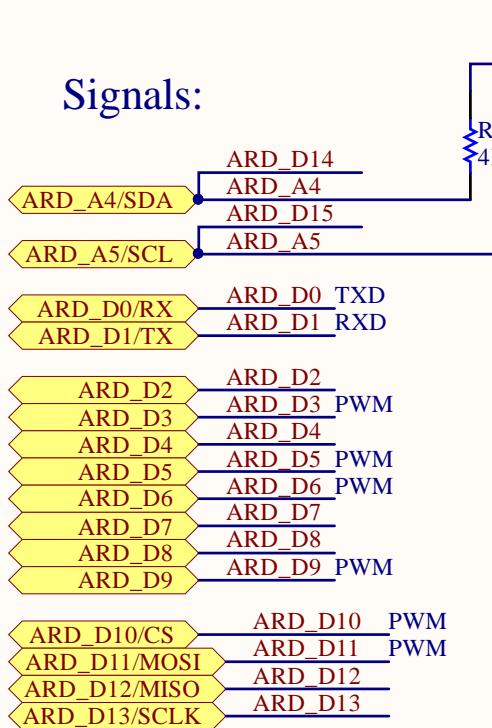
Recommended loads:

These outputs can be used to control small AC/DC motors, solenoids, bigger relay or contactors coils.
Care has to be taken regarding the inrush current, that with some loads can be 10x bigger than the nominal, therefore the recommended maximum nominal current for inductive loads is 600mA.

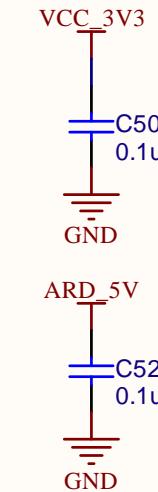
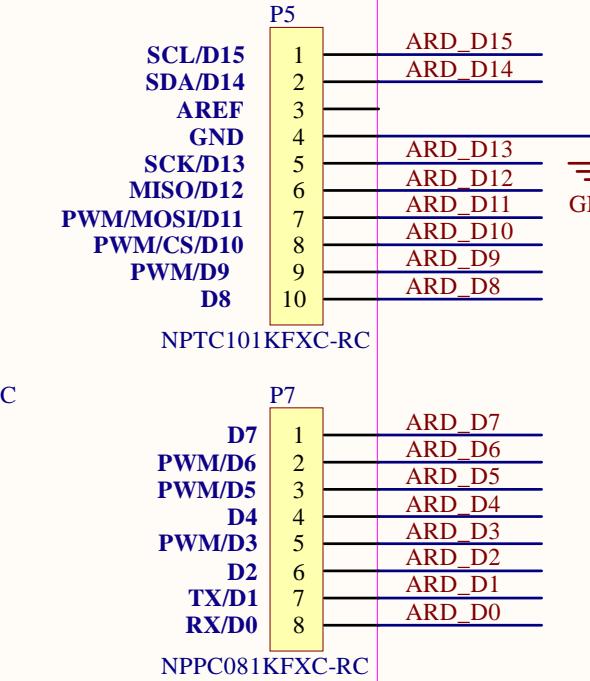
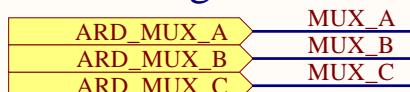
0.9" 128 x 32 Graphic OLED**MCU Interfaces:****User button:****LTR-303ALS Ambient Light Sensor:****Bosch BME680:
VOC gas, pressure, temperature & humidity****Bosch Sensortec BMA253:
3-axis accelerometer****Title *Peripherals***

Size: A3	Number: 1	Revision: 1.0	Daniel Mancuso dmancuso@ohmtech.io
Date: 26/07/2018	Time: 21:14:13	Sheet 1 of 8	*
File: Z:\Documents\Conrad\SensorIO\SensorIO_PCB\1_Peripherals.SchDoc			ohmtech.io

Arduino UNO R3 socket: 3.3V and 5V shields compatible

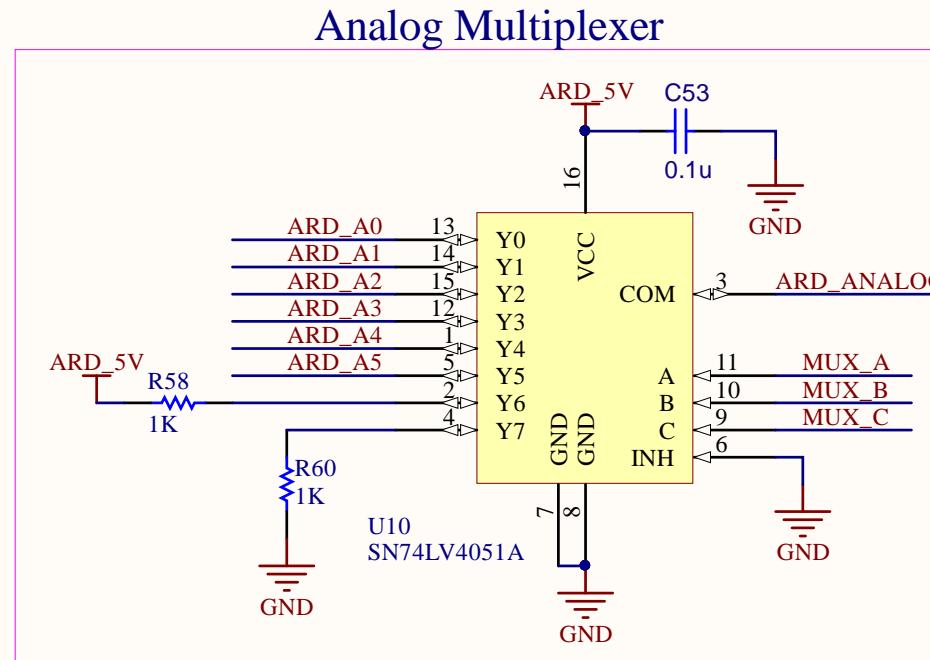
**NOTE:**

The MCU's GPIOs are 5V tolerant, but in order to ensure full compatibility with 3.3V and 5V shields, the voltage drop of about 350mV on the Schottky Diode will ensure that the output-high level of the MCU fall into the safe Input-High level for all the logic families present on the 5V-only shields.

**Config:**

Analog channel selection:

Control lines:			Channel Selected:
A	B	C	
0	0	0	A0
0	0	1	A1
0	1	0	A2
0	1	1	A3
1	0	0	A4 *
1	0	1	A5 *
1	1	0	CALIB HIGH
1	1	1	CALIB LOW

**NOTE:**

Pins A4 and A5 are internally connected to D14 and D15 in some shields, therefore, remember to configure D14 (PB4) and D15 (PA8) in high impedance mode (set as INPUT) to use these analog inputs

NOTE:

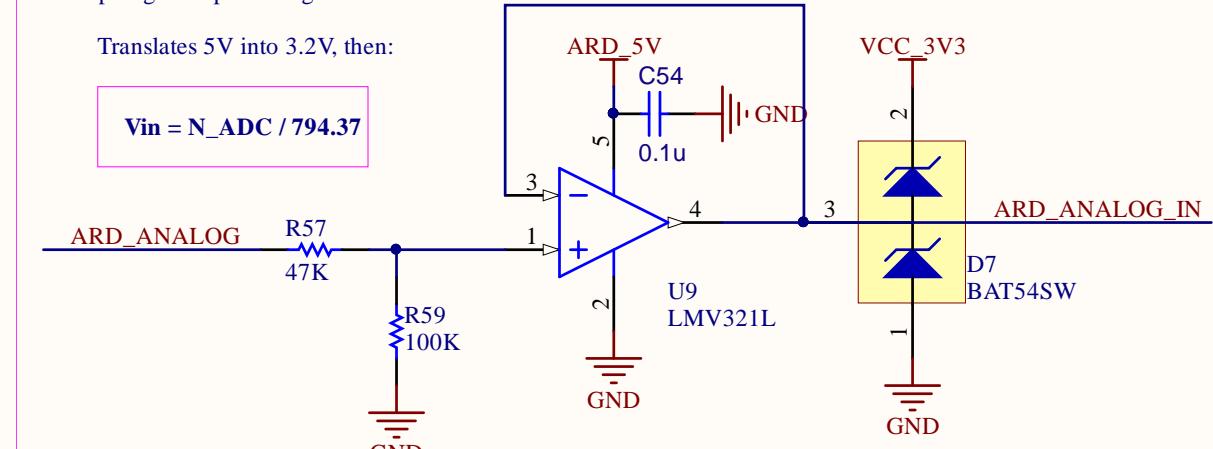
MUX values 6 and 7 can be used to calibrate the Analog Inputs to the Max and Min values respectively.

Analog Voltage adaptation and ADC protection

- Adapt higher input voltage for the ADC -

Translates 5V into 3.2V, then:

$$Vin = N_{ADC} / 794.37$$



Title *Arduino socket*

Size: A4	Number: 2	Revision: 1.0
Date: 26/07/2018	Time: 21:14:13	Sheet 2 of 8
File: Z:\Documents\Conrad\SensorIO\SensorIO_PCB\2_Arduino_socket.SchDoc		

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3.3V and 5V modules supported

Grove signal multiplexing and conditioning

Signals:

GROVE1_TXD	GROVE1_P2_TXD
GROVE1_RXD	GROVE1_P1_RXD
GROVE1_P1_PWM	GROVE1_P1_PWM
GROVE1_P2_PWM	GROVE1_P2_PWM
GROVE1_AI1	GROVE1_AI1
GROVE1_AI2	GROVE1_AI2
GROVE2_TXD	GROVE2_P2_TXD
GROVE2_RXD	GROVE2_P1_RXD
GROVE2_P1_PWM	GROVE2_P1_PWM
GROVE2_P2_PWM	GROVE2_P2_PWM
GROVE2_AI1	GROVE2_AI1
GROVE2_AI2	GROVE2_AI2
GROVE_SCL	GROVE1_P1_SCL
GROVE_SDA	GROVE1_P2_SDA
GROVE_SDA	GROVE2_P2_SDA

Config:

GROVE1_SW_3_5	GROVE1_SW_5V
GROVE2_SW_3_5	GROVE2_SW_5V
GROVE1_MUX_A	GROVE1_MUXA
GROVE1_MUX_B	GROVE1_MUXB
GROVE2_MUX_A	GROVE2_MUXA
GROVE2_MUX_B	GROVE2_MUXB

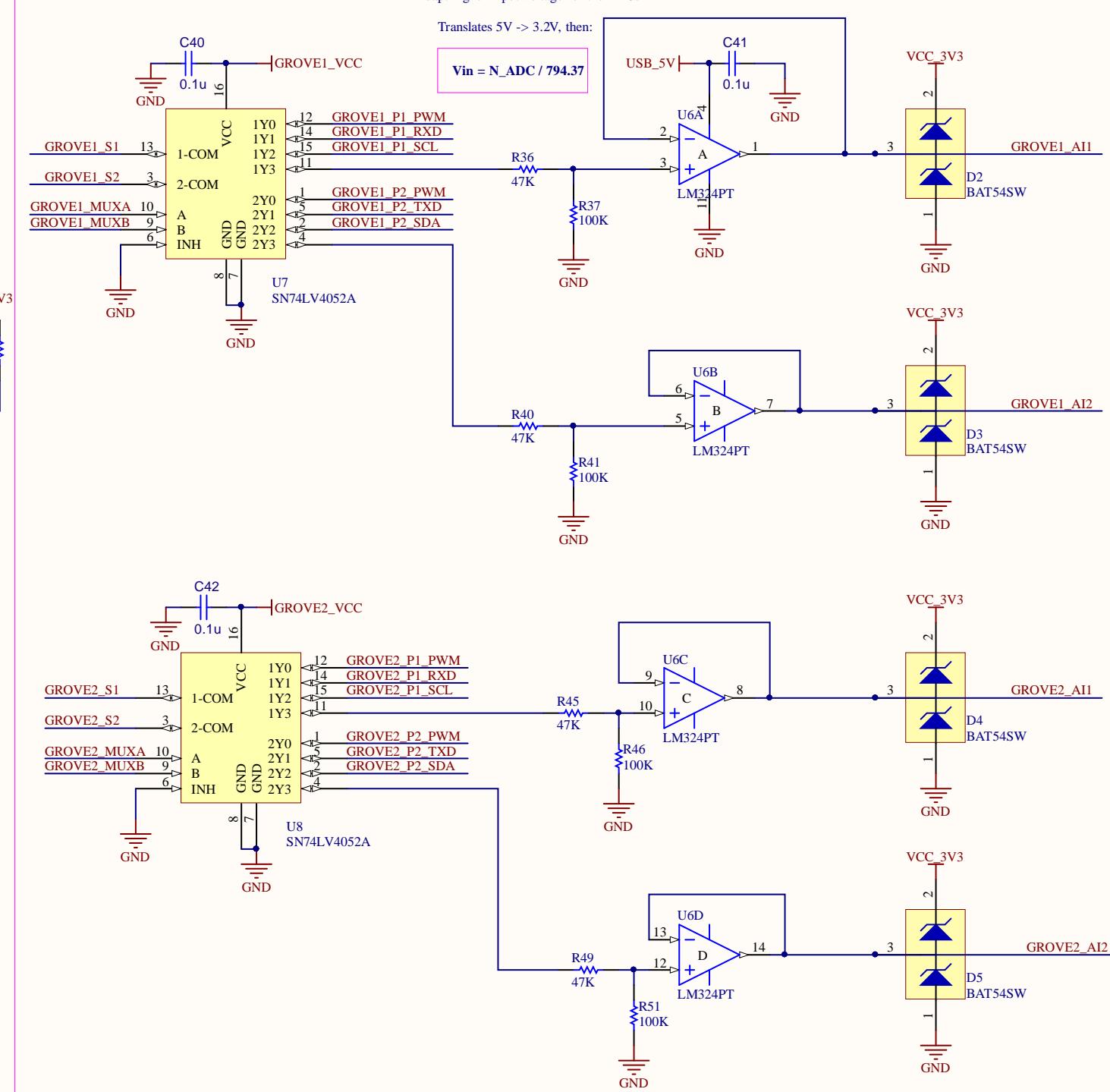
Grove 1/2 mode selection:

Control line:	n_MUX_B	n_MUX_A	Mode:
	0	0	PWM
	0	1	UART
	1	0	I2C
	1	1	ANALOG IN

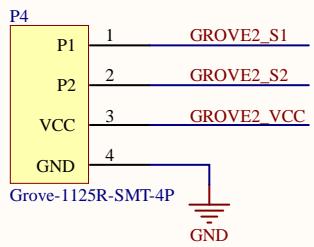
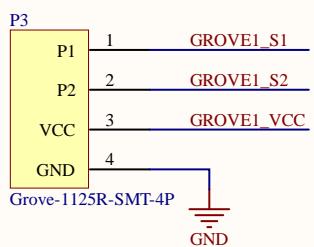
- Adapt higher input voltage for the ADCs -

Translates 5V → 3.2V, then:

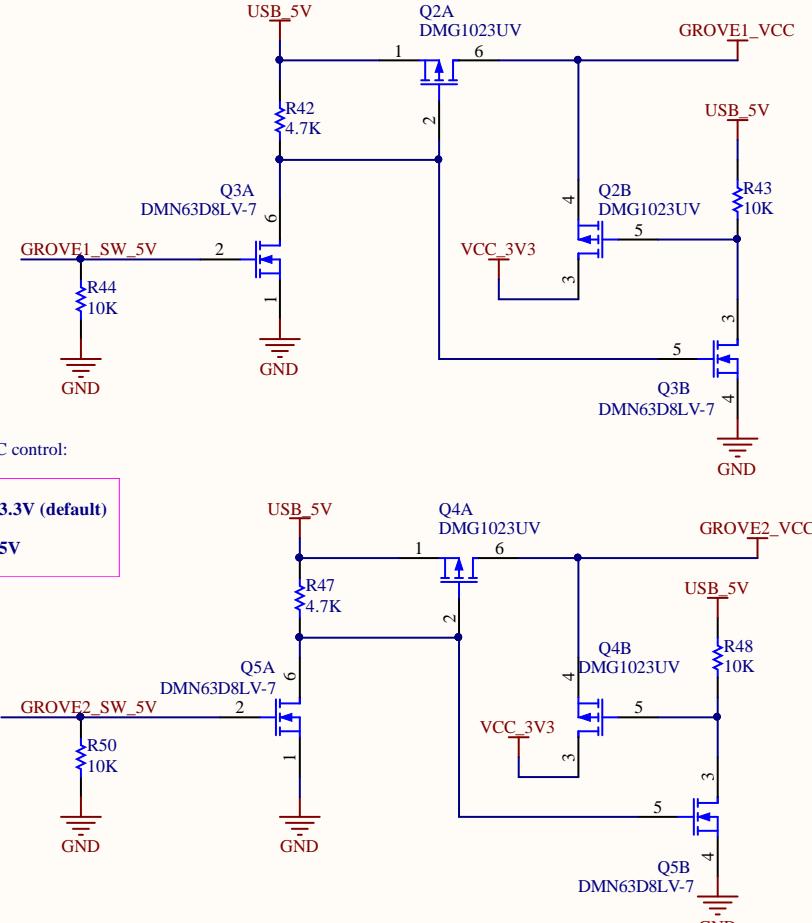
$$Vin = N_{ADC} / 794.37$$



Grove 4-pin connectors



Grove Power control (3.3V / 5V)



Grove VCC control:

0 (LOW) → 3.3V (default)

1 (HIGH) → 5V

Title **Grove socket**

Size: A3 Number: 3 Revision: 1

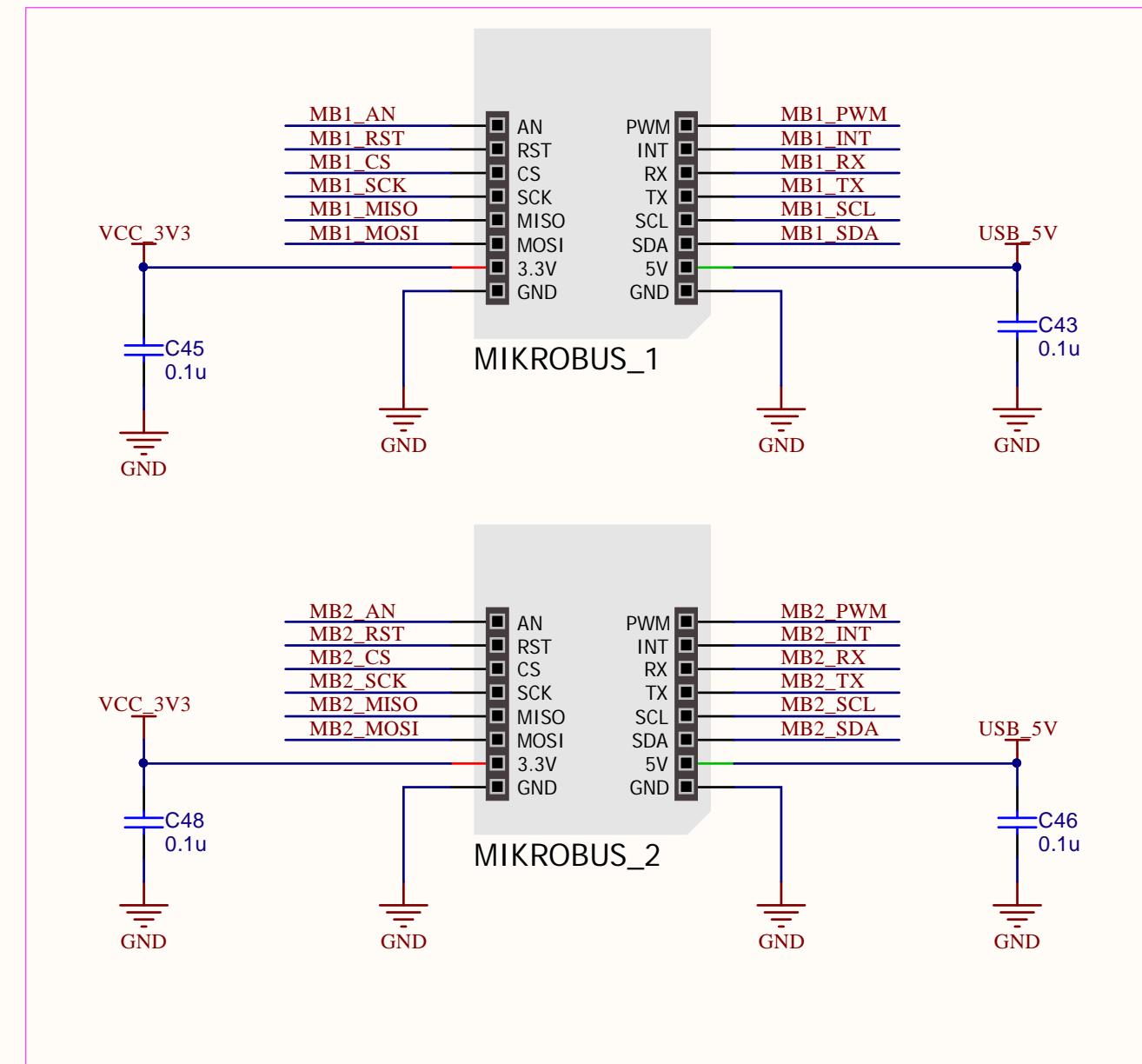
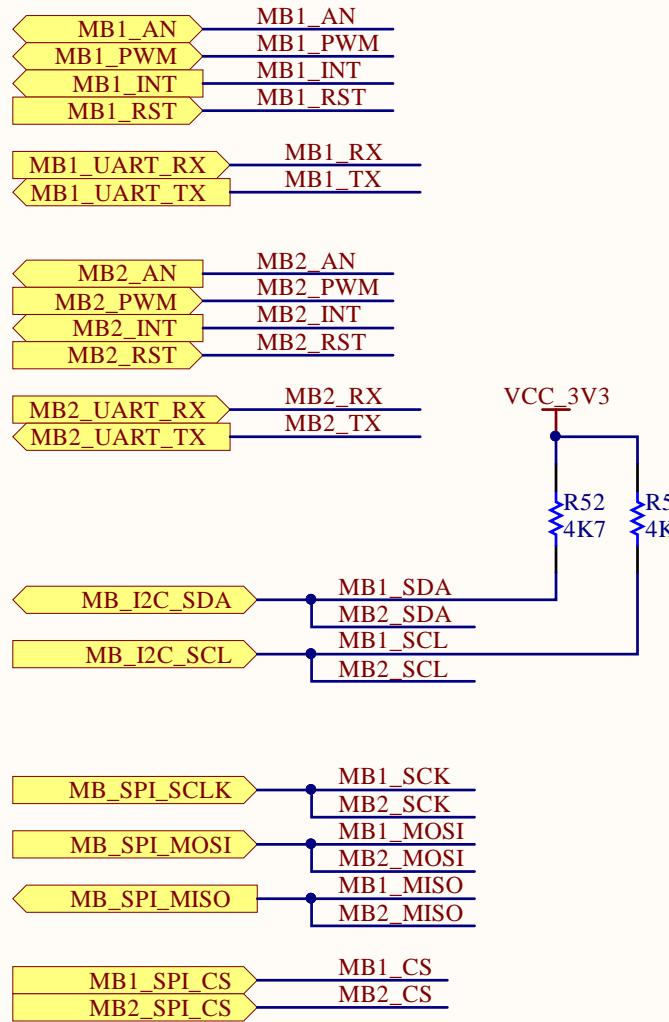
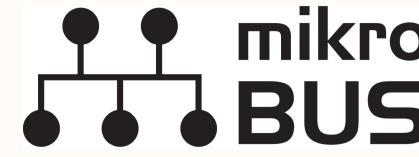
Date: 26/07/2018 Time: 21:14:13 Sheet 3 of 8 *

File: Z:\Documents\Conrad\SensorIO\SensorIO_PCB\3_Grove.SchDoc

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A



Title **MikroBUS sockets**

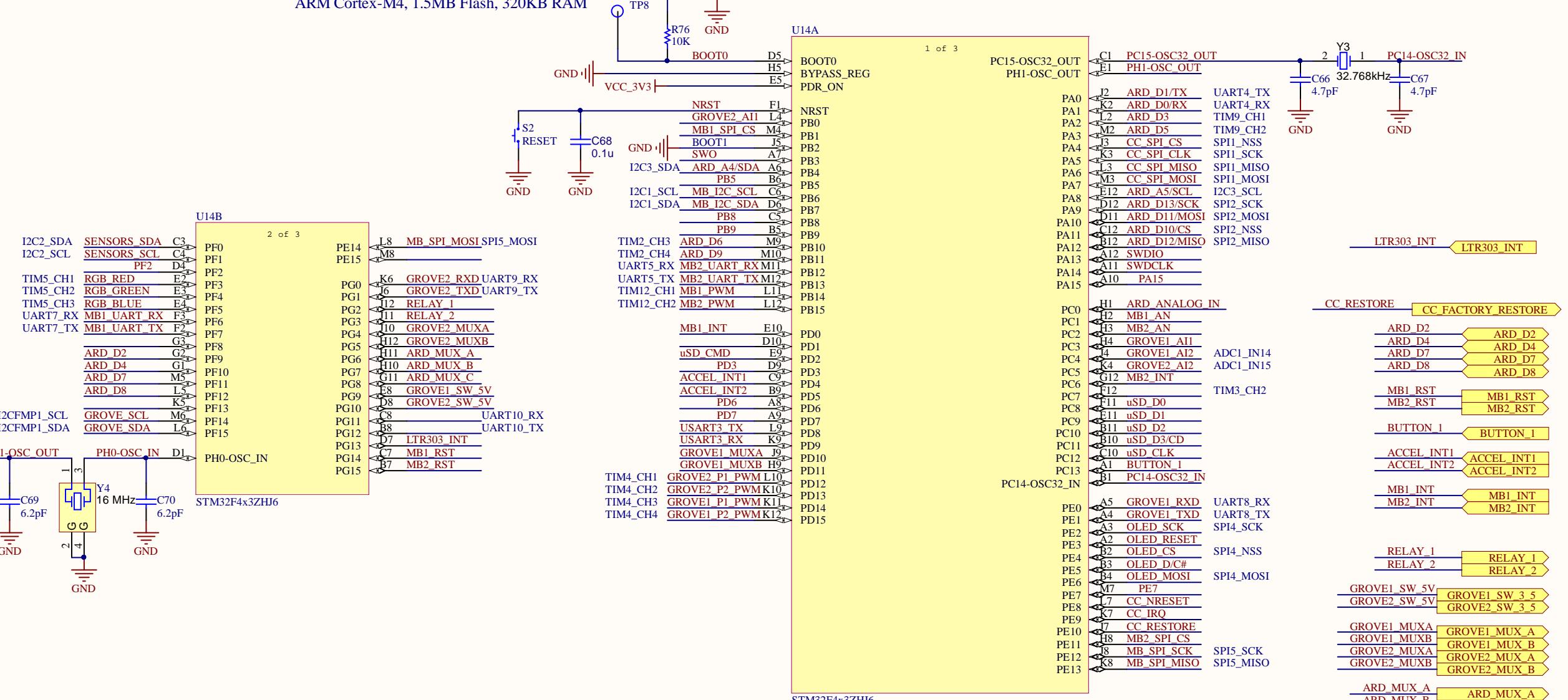
Size: A4	Number: 4	Revision: 1.0
Date: 26/07/2018	Time: 21:14:14	Sheet 4 of 8
File: Z:\Documents\Conrad\SensorIO\SensorIO_PCB\4_MikroBus.SchDoc		

Daniel Mancuso
damancuso@ohmtech.io
*



Main MCU: STM32F413ZHJ6

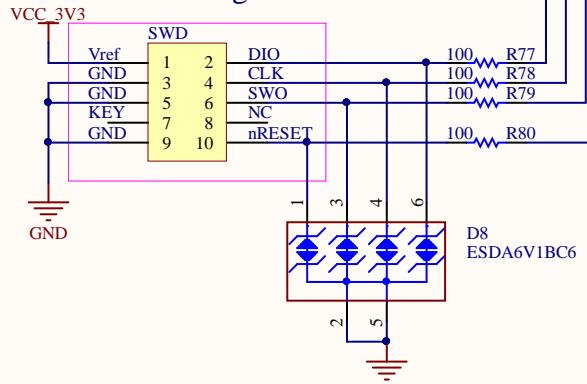
ARM Cortex-M4, 1.5MB Flash, 320KB RAM



To ST-LINK/V2.1 interface



Cortex-M Debug SWD



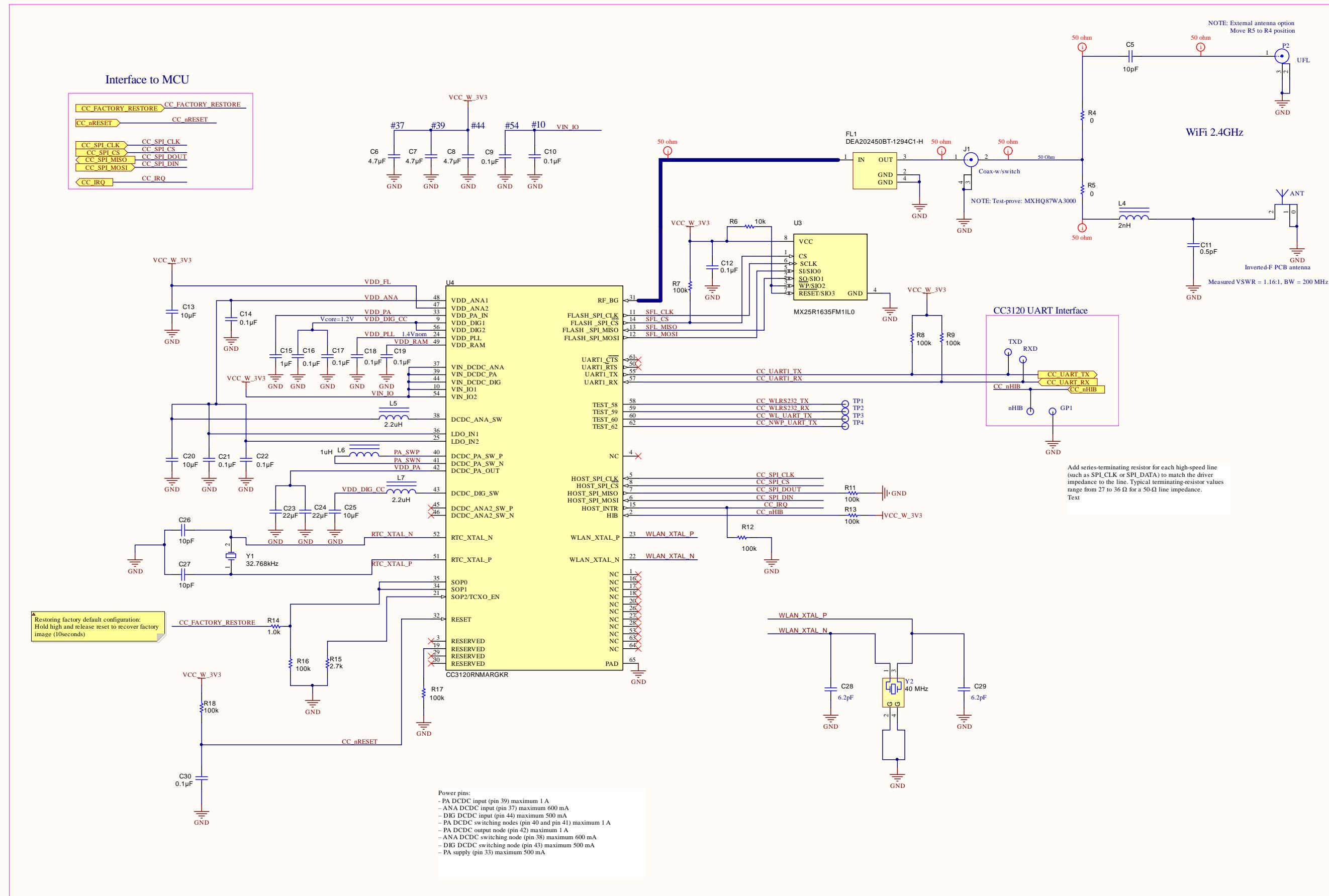
Title **Main MCU**

Size: A3	Number: 5	Revision: 1.0
Date: 26/07/2018	Time: 21:14:14	Sheet 5 of 8
File: Z:\Documents\Conrad\SensorIO\SensorIO_PCB\5_MainMCU.SchDoc		*

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dmancuso@ohmtech.io

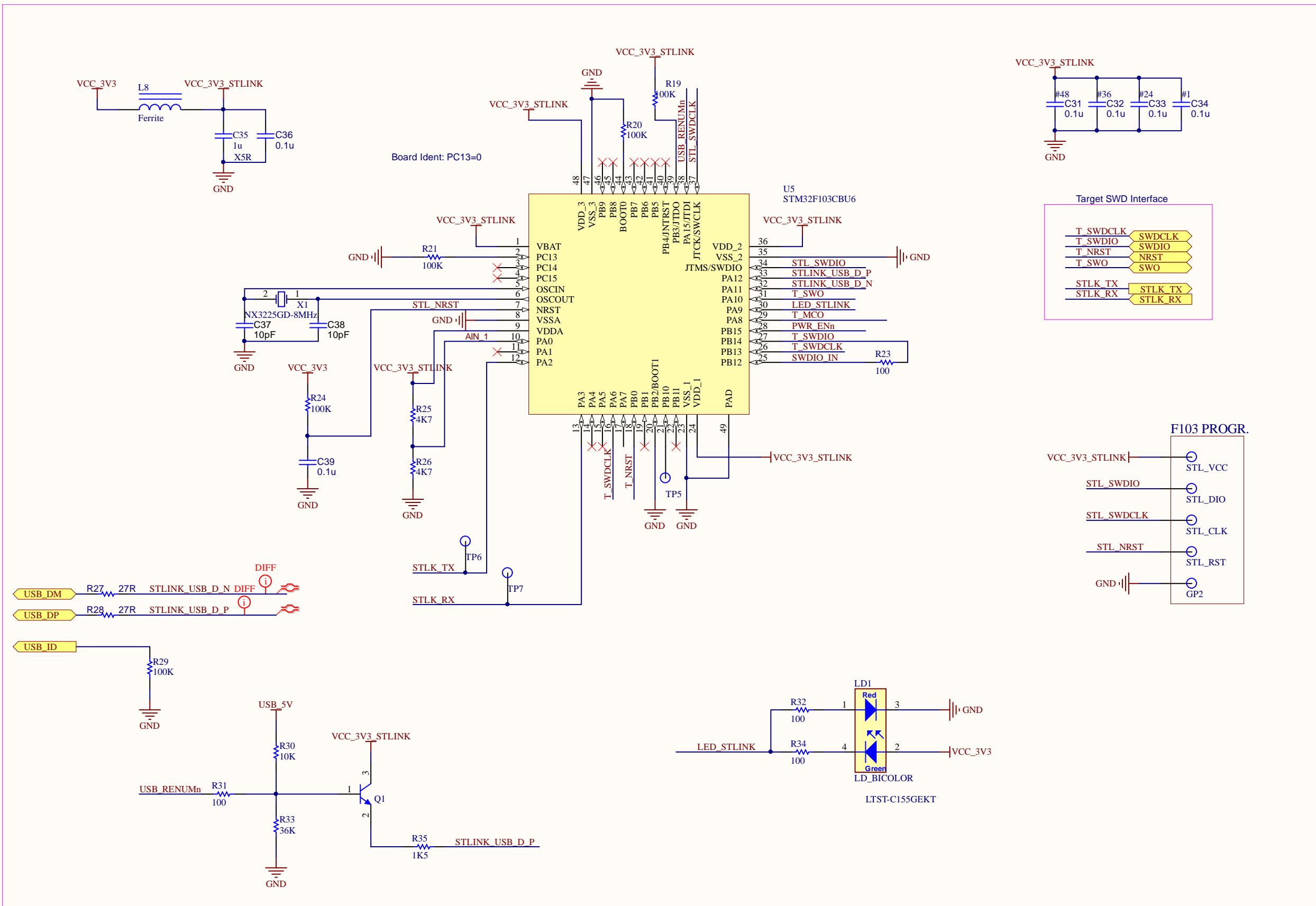


CC3120 SoC: WiFi Network Processor

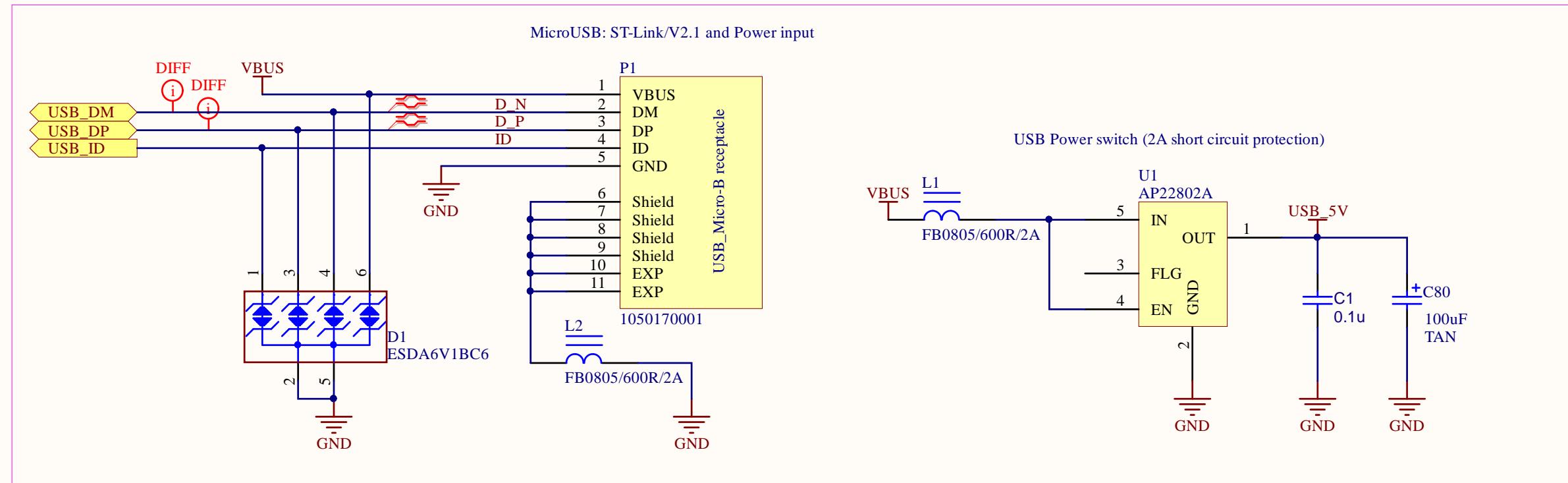


Title	WiFi Network Processor	Daniel Mancuso dmancuso@ohmtech.io	 ohmtech.io
Size:	C	Number: 6	Revision: 1.0
Date:	26/07/2018	Time: 21:14:15	Sheet 6 of 8
File:	Z:\Documents\Conrad\SensorIO\SensorIO_PCB\6 WiFi.SchDoc		

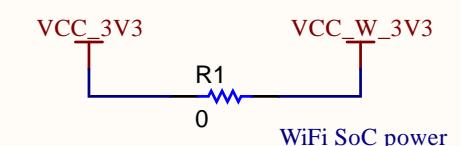
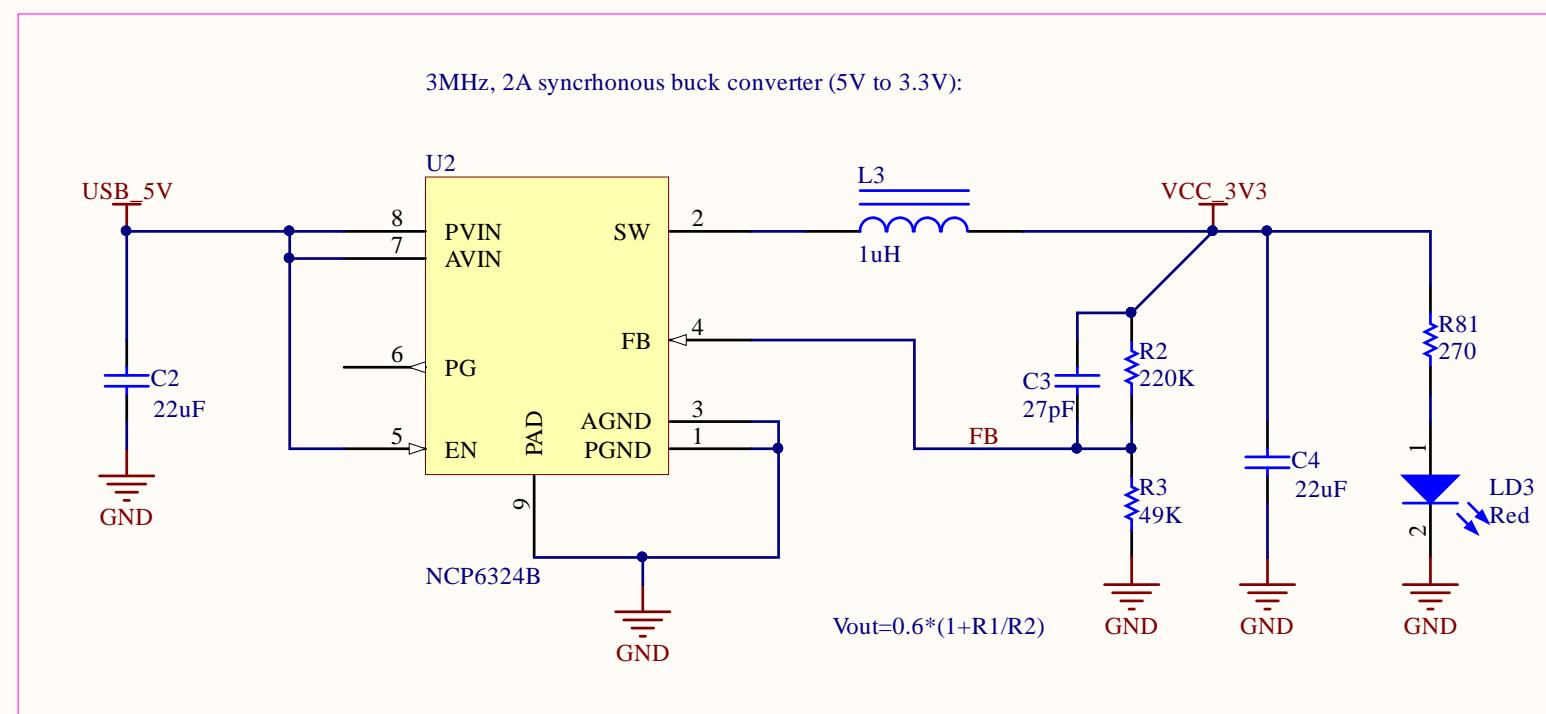
ST-Link-V2.1 programmer / debugger



Micro USB connector and protections



DC to DC converter

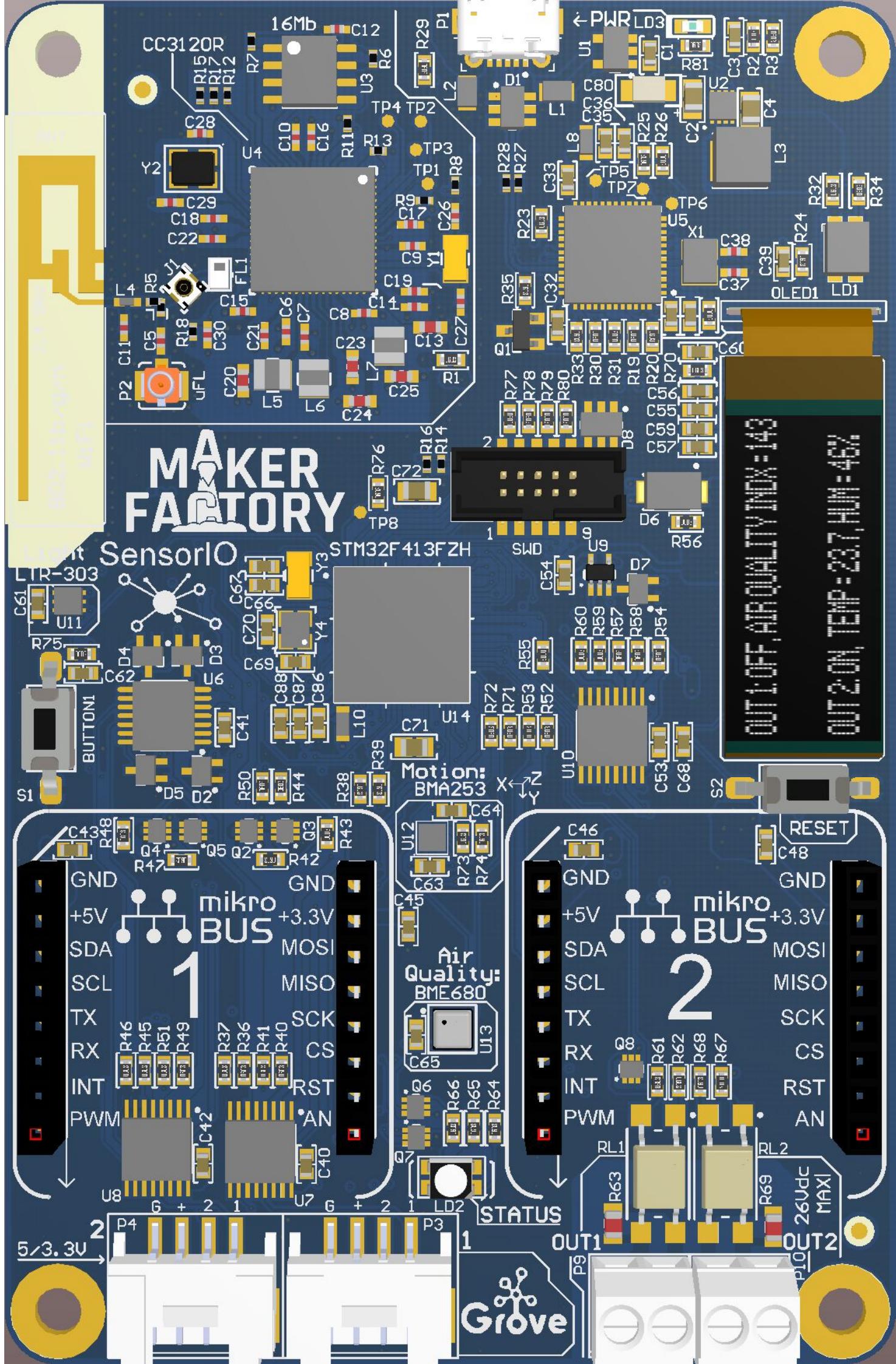


To ensure WLAN performance, ripple on the 2.1- to 3.3-V supply must be less than ± 300 mV.

MAX TX Power = 272mA (mod: 1DSSS)

Peak calibration current: 450mA (17mJoules over 24ms)

Title Power supply & USB connector		
Size: A4	Number: 8	Revision: 1.0
Date: 26/07/2018	Time: 21:14:16	Sheet 8 of 8
File: Z:\Documents\Conrad\SensorIO\SensorIO_PCB\8_PowerSupply.SchDoc		



M3 size



CC3120 UART1:

F103 SWD:
3V3 GND CLK
RST DIO

RXD
TXD
nHIB
GND



WEEE-Reg.-Nr.
DE28001718

distributed by
Conrad Electronic SE
Klaus-Conrad-Str. 1
D-92240 Hirschau



rev.B, 7.2018



Sensor 1.0

C79
C74
C76
C75
C78
C73
C77

P6

POWER
RESET
3v3
5v
GND
GND
Vin

ANALOG

Arduino UNO R3
3.3V and 5V shields compatible

Designed by



ohmtech.io

P5
SCL
SDA
AREF
GND
I013
I012
I011
I010
I09
I08
I07
I06
I05
I04
I03
I02
I01
I00
P7
P11
RA2
RA1
C58
Micro SD