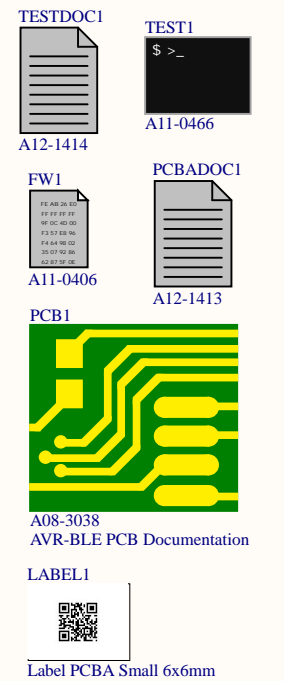
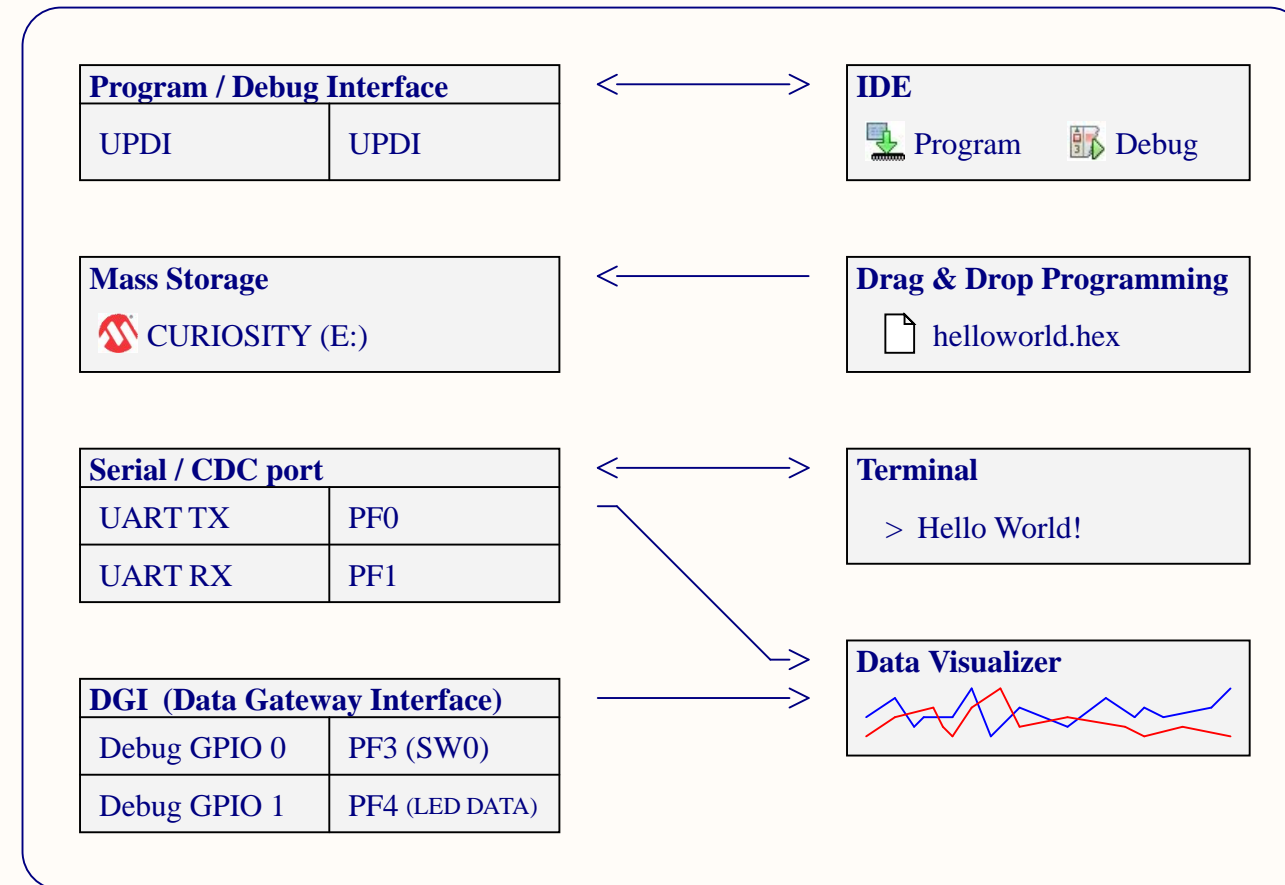
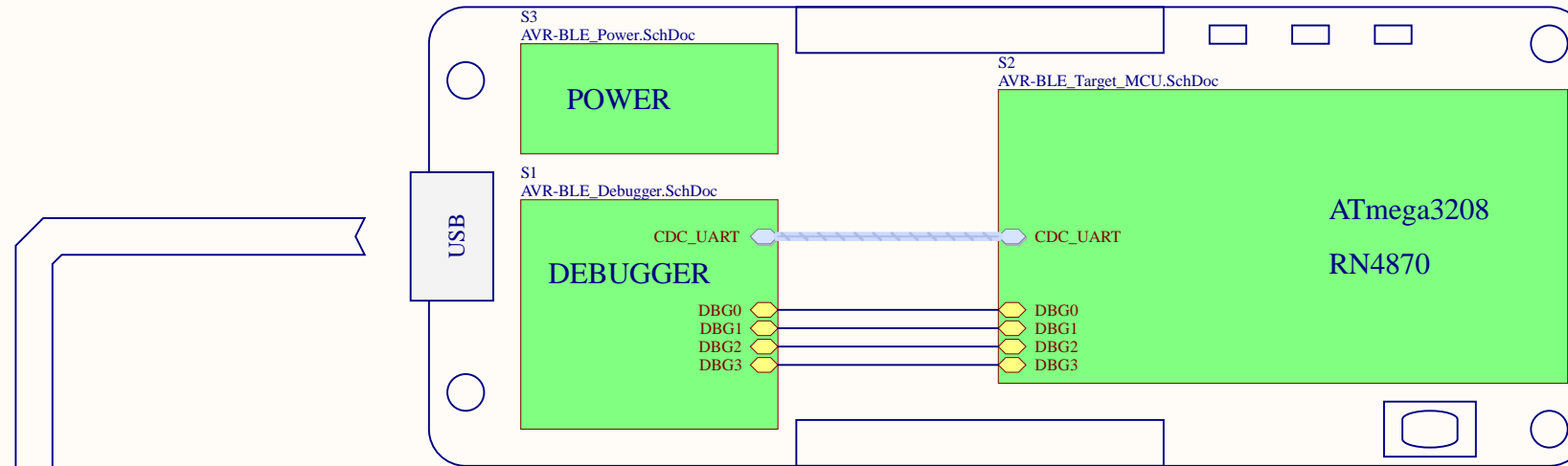


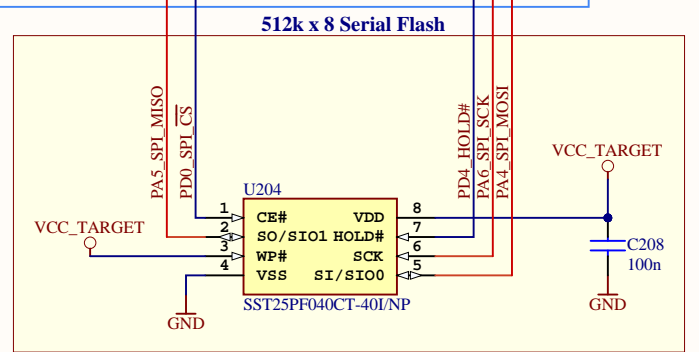
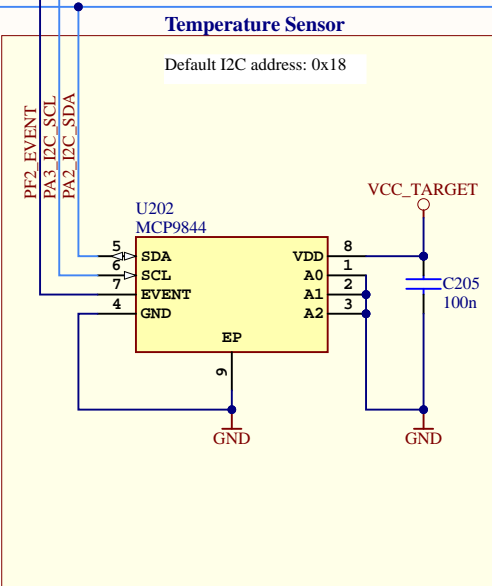
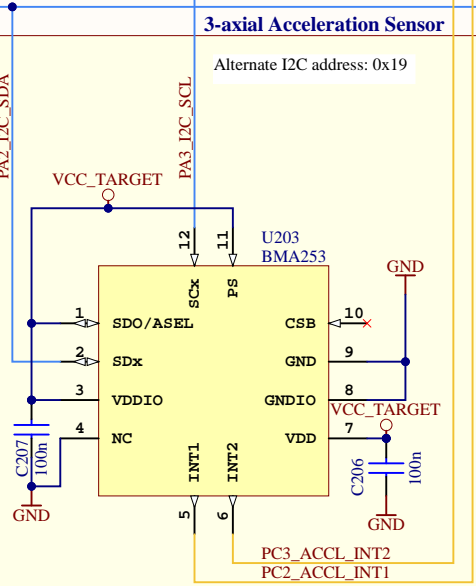
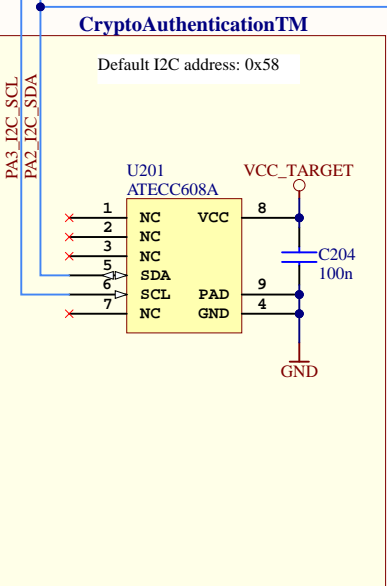
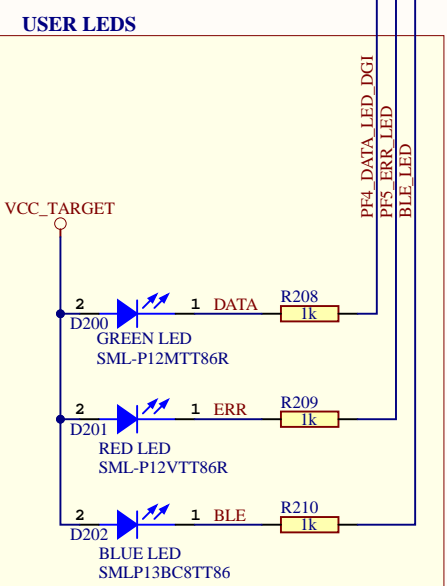
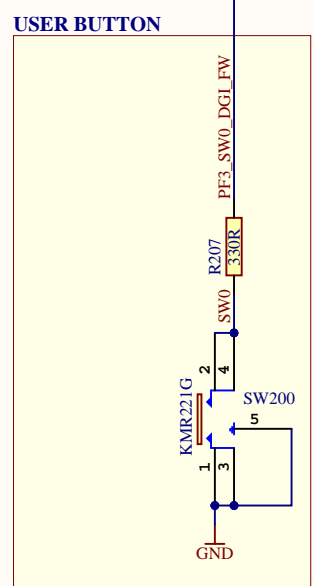
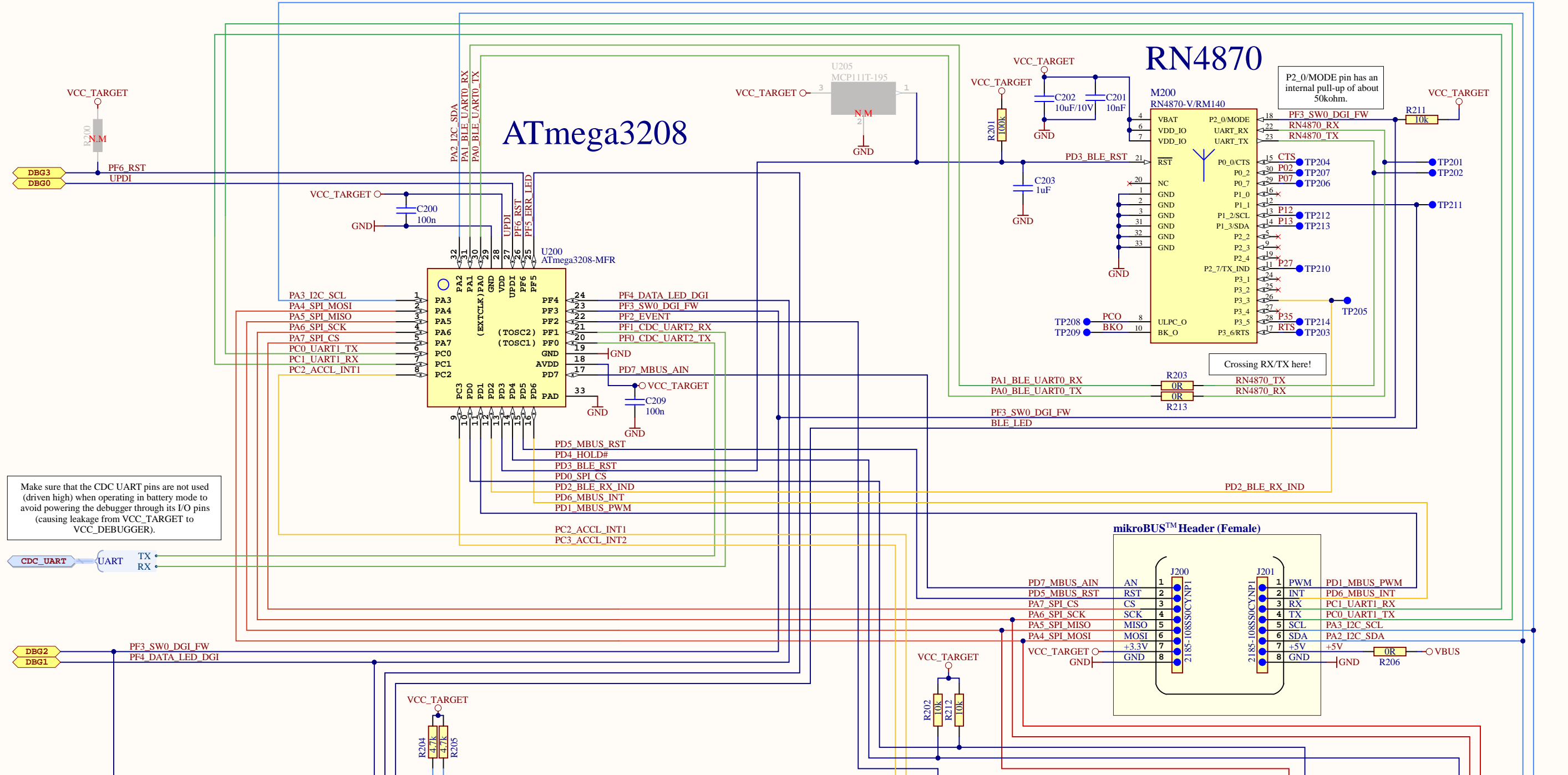
# AVR-BLE



S4  
AVR-BLE\_Revision\_History.SchDoc

Drawn By: Microchip Norway		
Engineer: TF/PB		
Project Title <b>AVR-BLE</b>		
Sheet Title <b>Top Level</b>		
Size A3	PCB Assembly Number: A09-3314	PCBA Revision: 3
	PCB Number: A08-3038	PCB Revision: 2
File: AVR-BLE_TopLevel.SchDoc		Page: 1 of 5

Designed with  
**Altium**  
Altium.com



Drawn By: Microchip Norway  
 Engineer: TF

Project Title: **AVR-BLE**  
 Sheet Title: Target MCU

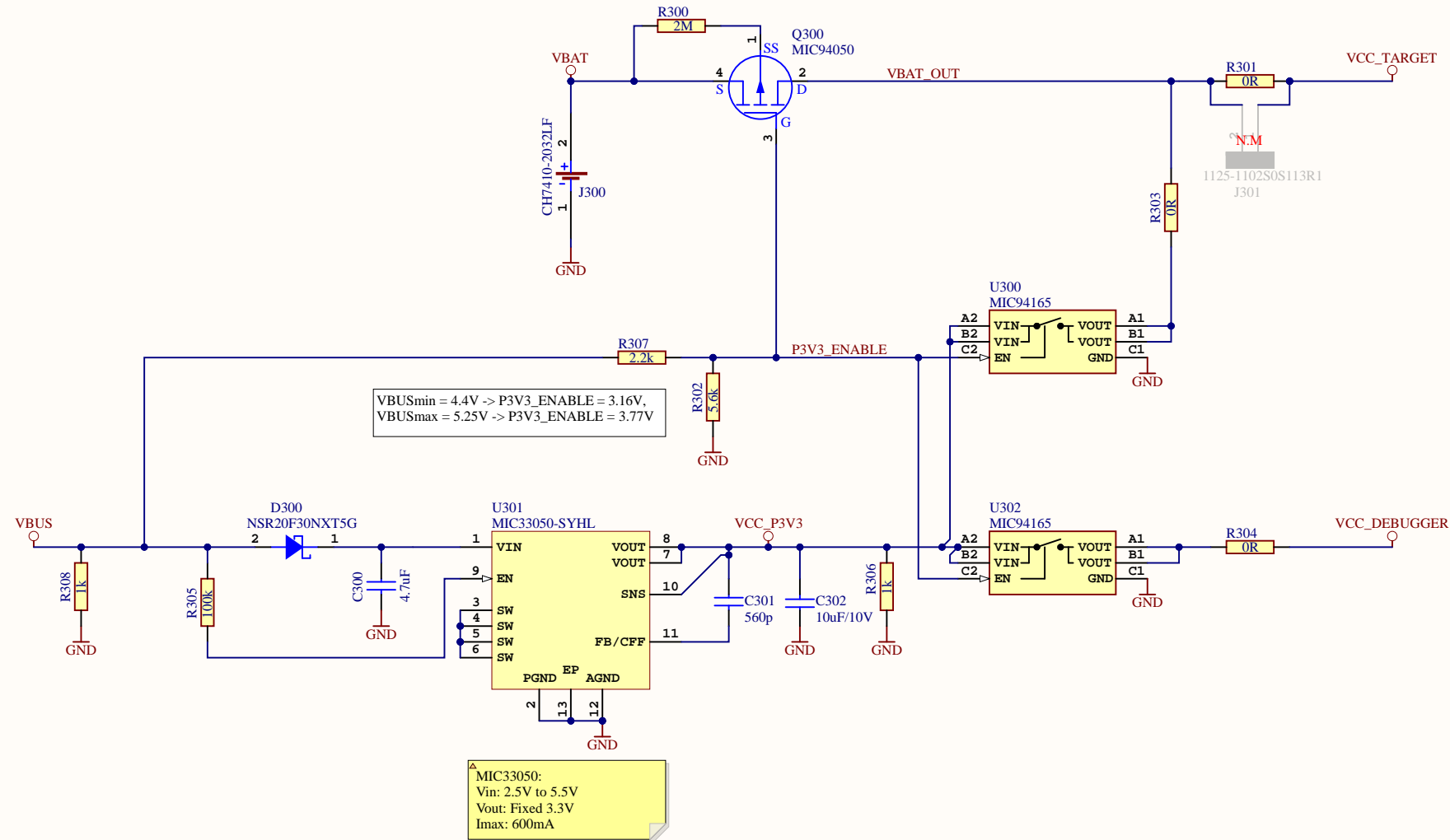
Size: A3  
 PCB Assembly Number: A09-3314  
 PCB Number: A08-3038



PCBA Revision: 3  
 PCB Revision: 2

Date: 1/14/2020  
 Page: 2 of 5

Designed with **Altium**  
 Altium.com

# POWER



Drawn By: Microchip Norway		
Engineer: TF		
Project Title <b>AVR-BLE</b>	Designed with  Altium.com	
Sheet Title <b>Power</b>		
Size A3	PCB Assembly Number: A09-3314	PCBA Revision: 3
	PCB Number: A08-3038	PCB Revision: 2
File: AVR-BLE_Power.SchDoc	Date: 1/14/2020	Page: 3 of 5



# Revision History

## PCB Assembly Rev 1:


Design Changes:  
-----  
Initial Design  
-----  
PCB:  
-----  
PCB revision 1

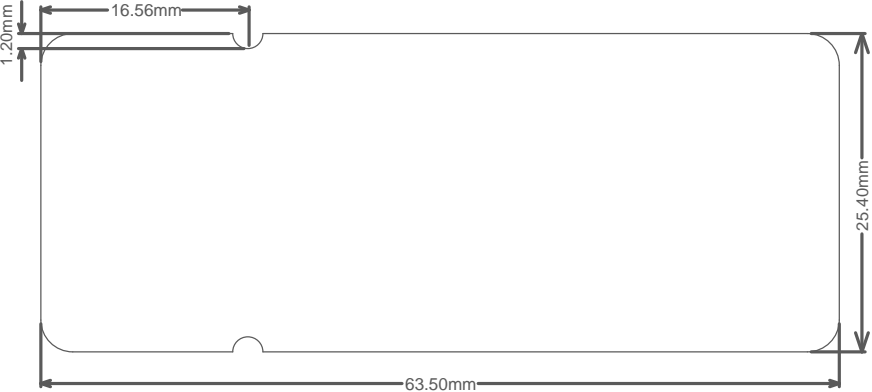
## PCB Assembly Rev 2:

Design Changes:  
-----  
- Removed 100nF cap on RESET for U100: SAMD21  
- Added 100k pull-down on gate on Q100  
- Added Level-shifter on DBG0 (UPDI) to prevent leakage from VCC\_TARGET  
- Added Level-shifter on DBG1 (UPDI) to prevent leakage from VCC\_TARGET  
- Added Level-shifter on DBG2 (UPDI) to prevent leakage from VCC\_TARGET  
- Added 0-ohm resistors on UART lines to RN4870 module  
- Added footprint for MCP111T-195 on reset line to RN4870 module  
- Added missing decoupling on AVDD on target MCU.  
- Removed vias in center pad in target MCU footprint  
-----  
PCB:  
-----  
PCB revision 2

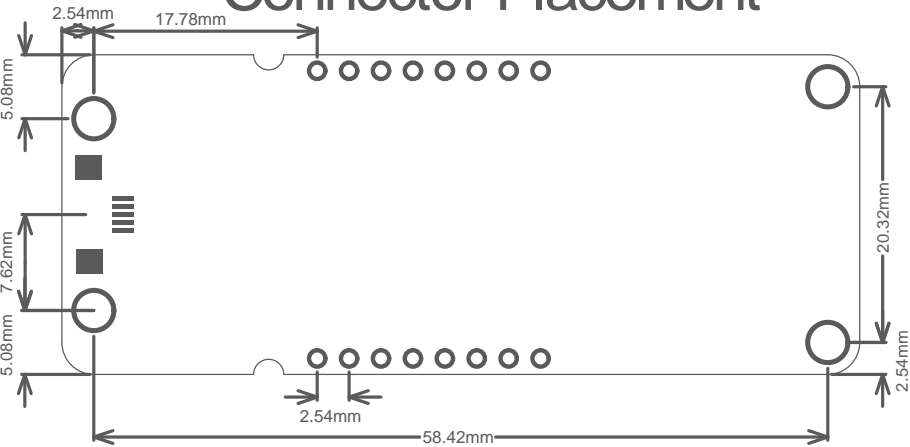
## PCB Assembly Rev 3:

Design Changes:  
-----  
- Changed RN4870 to rev 1.40  
- Renamed PD2\_BLE\_RX\_INT to PD2\_BLE\_RX\_IND  
-----  
PCB:  
-----  
PCB revision 2

Drawn By: Microchip Norway			
Engineer: TF			
Project Title <b>AVR-BLE</b>	<i>Designed with</i> <b>Altium</b> <a href="http://Altium.com">Altium.com</a>		
Sheet Title <b>Revision History</b>			
Size A3	PCB Assembly Number: A09-3314	PCBA Revision: 3	Date: 1/14/2020
	PCB Number: A08-3038	PCB Revision: 2	Page: 5 of 5
File: AVR-BLE_Revision_History.SchDoc			



# Connector Placement



GND

J101

GND

D300  
R305  
C300

U301

R308  
R307

F100

R304

Q300

POWER  
DEBUGGER

R114  
Q100  
R108

D100  
R100  
C101  
C102

U100

R200  
R106  
R109  
Q102  
R113  
C103  
Q103

R103  
R110  
R102  
R101  
R104  
R112

Q101

ISNS

J301

C301  
C302

R306  
R301

U302

U300

R303

U205

MCP9844 BMA253 ECC608

R107  
R105  
R111

SECURE SMART CONNECTED

PD7|PD5|PA7|PA6|PA5|PA4  
AN|RST|CS|SCK|SDO|SDI|3V3|GND

J200

PWM|INT|RX|TX|SCL|SDA|5V|GND  
PD1|PD6|PC1|PC0|PA3|PA2

J201

R206

C204  
U201

R204 R205

C200

U200

U203  
C206  
C209

U202  
C205

ATmega3208

U204

C208  
R212

R201 mikro BUS  
C203

D200  
R208

DATA

AVR-BLE

D201  
R209

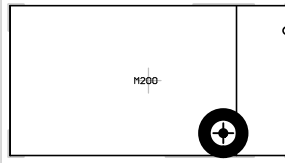
ERR

D202  
R210

BLE

C202  
C201

GND



TX R213  
RX R203

RN4870 BLUETOOTH LE

R211  
R207

SWO  
GND  
SH200



GND

BOOT  
TP100

GND

PCBA  
LABEL



J100

CR2032

J300

CR2032

Microchip © 2019

A08-3038 Rev2

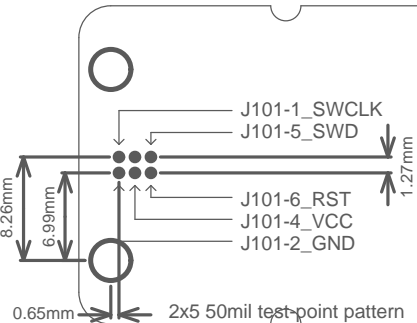


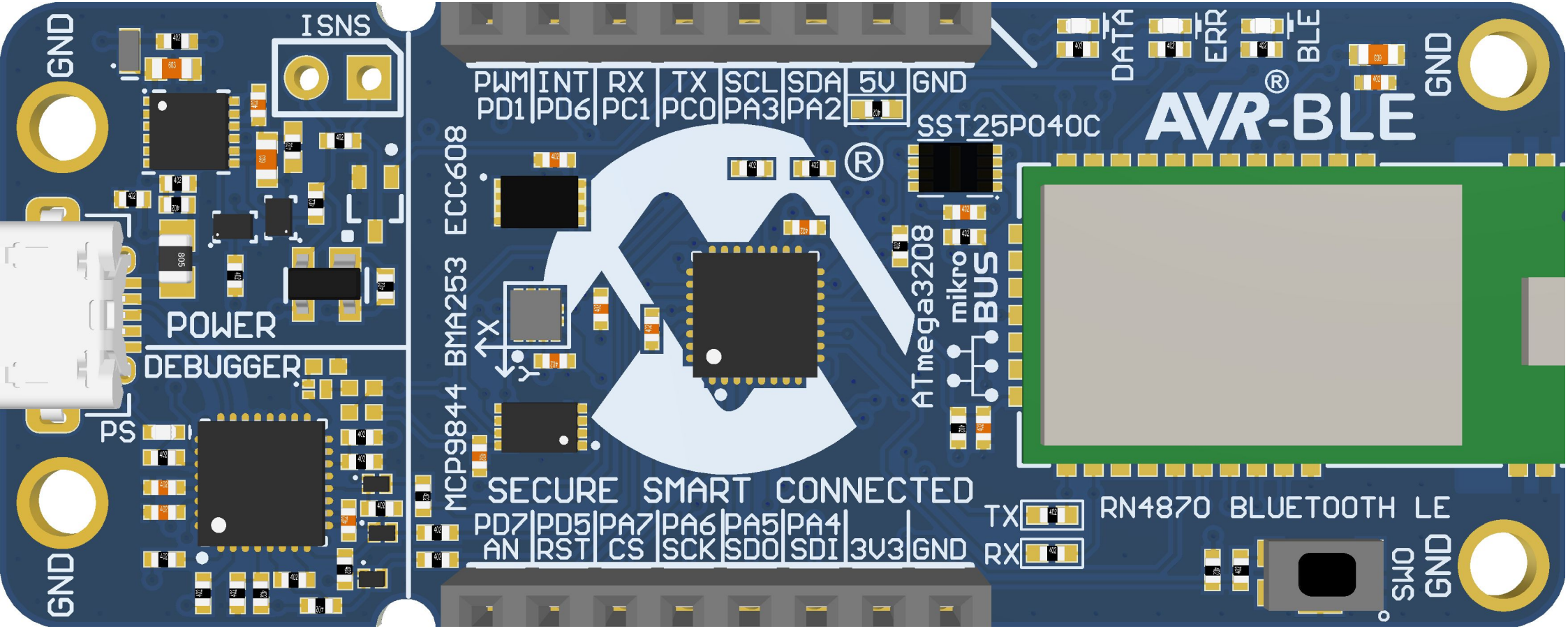
®

TP208 TP209 TP210 TP211 TP212 TP213 TP214  
P35 P13 P12 P11 P27 BK0 PC0 GND

TP207 TP206 TP205 TP204 TP203 TP202 TP201  
RXD TXD RTS CTS P33 P07 P02 GND

# Test Point Placement





GND

ISNS

PWMINT | RX | TX | SCL | SDA | 5V | GND  
PD1 | PD6 | PC1 | PC0 | PA3 | PA2

SST25P040C

AVR-<sup>®</sup>BLE

GND

POWER  
DEBUGGER

PS

MCP9844 BMA253 ECC608

ATmega3208  
mikro  
BUS

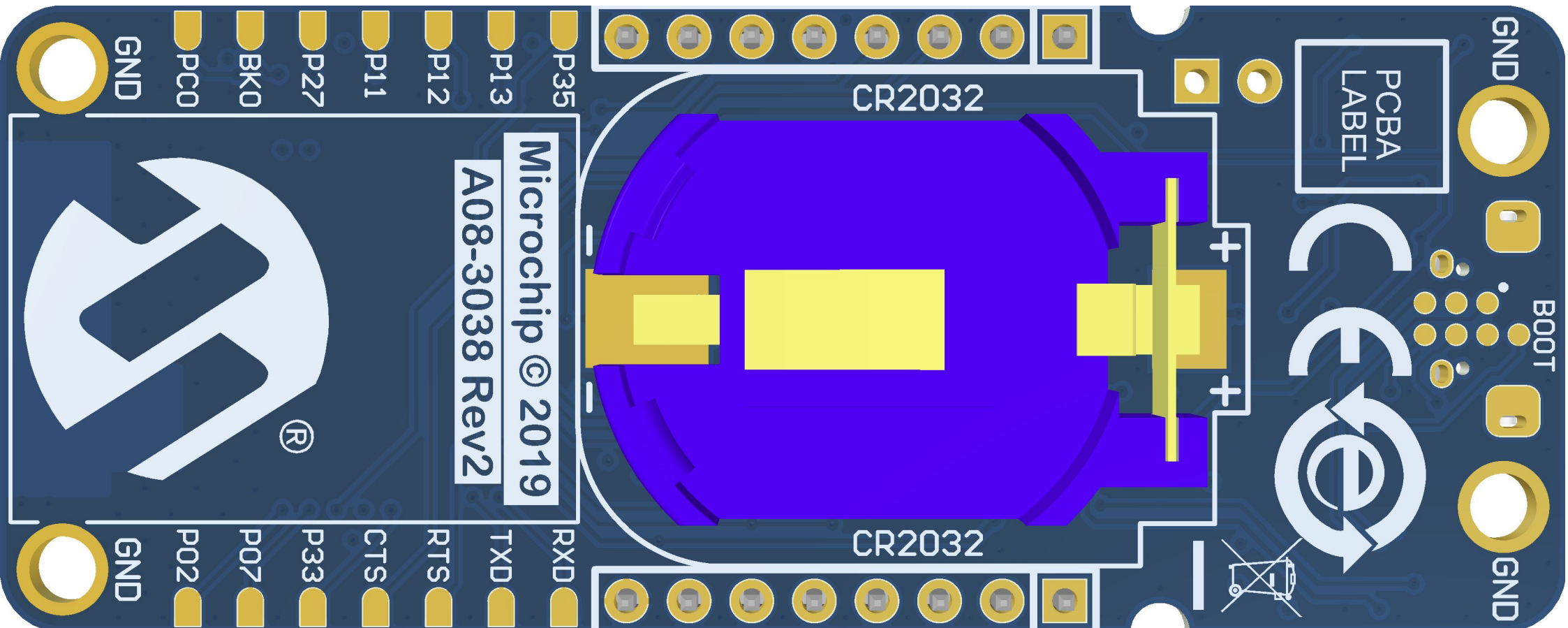
SECURE SMART CONNECTED

PD7 | PD5 | PA7 | PA6 | PA5 | PA4 |  
AN | RST | CS | SCK | SDO | SDI | 3V3 | GND

TX | RX | RN4870 BLUETOOTH LE

SWD  
GND

GND



GND

BOOT

GND

PCBA LABEL



CR2032

CR2032

Microchip © 2019  
A08-3038 Rev2



GND

PC0

BK0

P27

P11

P12

P13

P35

GND

P02

P07

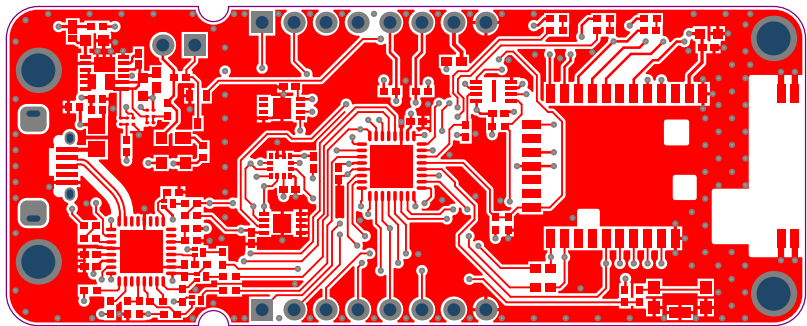
P33

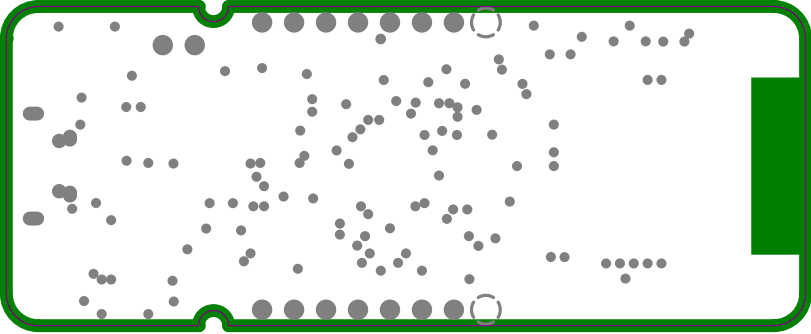
CTS

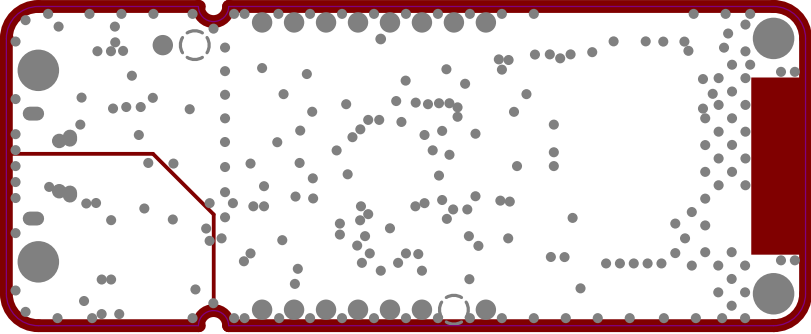
RTS

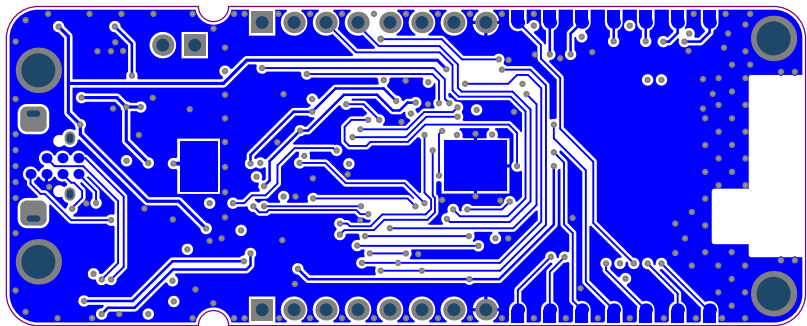
TXD

RXD











# Component list

Bill of Materials Fitted for Variant [Default Assembly] of Project [AVR-BLE.PrjPcb] (No PCB Document Selected)

Source Data From: AVR-BLE.PrjPcb  
 Project: AVR-BLE.PrjPcb  
 Variant: Default Assembly

Report Date: 1/14/2020 12:27 PM  
 Print Date:



Fitted	Designator	Quantity	Value	Manufacturer	MPN	Description
Fitted	C101	1	1u	Kemet	C0402C105K9PAC	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-10% (de26942)
Fitted	C102, C103, C200, C204, C205, C206, C207, C208, C209	9	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C201	1	10nF	Murata	GRM155R71E103KA01D	Ceramic capacitor, SMD 0402, X7R, 25V, 10%
Fitted	C202, C302	2	10uF/10V	AVX	0603ZD106MA12A	Ceramic capacitor, SMD 0603, X5R, 10V, 10UF A± 20%
Fitted	C203	1	1uF	AVX	0402ZD105KA12A	Ceramic capacitor, SMD 0402, X5R, 10V, ±10 %
Fitted	C300	1	4.7uF	WALSIN Technology Corporation	0603X475K100CT	Ceramic capacitor, SMD 0603, X5R, 10V, 10% (de31036)
Fitted	C301	1	560p			Ceramic capacitor, SMD 0402, X7R, 50V, +/-10%
Fitted	D100, D200	2	GREEN LED	ROHM	SML-P12MT186R	LED, SMD 0402, Green, Wave length=569nm, 2.1mcd @ (1mA, 1.9Vf)rohm
Fitted	D201	1	RED LED	ROHM	SML-P12VT186R	LED, SMD 0402, Red, Wave length=630nm, 2.1mcd @ (1mA, 1.7Vf)rohm
Fitted	D202	1	BLUE LED	ROHM	SMLP13BC8TT86	LED, SMD 0402, Blue, Wave length=470nm, 25mcd @ (5mA, 2.9Vf)rohm
Fitted	D300	1	NSR20F30NXT5G	ON Semiconductor	NSR20F30NXT5G	NSR20F30NXT5G Schottky Diode, Icontinuous = 2.0A, Vdrop = 0.48V @ 2A, 0603 package
Fitted	F100	1	MC36213	Multicomp	MC36213	Resetable PTC fuse, Ih = 0.5A, It = 1.0A, 0805 package
Fitted	FW1	1	nEDBG firmw are			nEDBG firmw are
Fitted	J101	1	MU-MB0142AB2-269	Allen Creations Corp.	MU-MB0142AB2-269	USB micro AB, Surface mount signals and DIP shield
Fitted	J200, J201	2	2185-108SS0CYNP1	WCON	2185-108SS0CYNP1	1x8 receptacle pin header, 2.54mm pitch THM, PIP
Fitted	J300	1	CH7410-2032LF	Multicomp	CH7410-2032LF	Battery Holder, SMT, 20 mm
Fitted	LABEL1	1	Label PCBA Small 6x6mm	ACT Logimark AS	505462	PCBA identification label PIP Top White Gloss
Fitted	M200	1	RN4870-V/RM140	Microchip	RN4870-V/RM140	Bluetooth LE Module
Fitted	PCB1	1	AVR-BLE PCB Documentation			AVR-BLE PCB Documentation
Fitted	PCBA DOC1	1	AVR-BLE PCBA Documentation			AVR-BLE PCBA Documentation
Fitted	Q101, Q102, Q103	3	DMN65D8LFB	Diodes Incorporated	DMN65D8LFB-7	N channel MOSFET, DFN1006-3 (SOT883), 60V, 330mA, 40hm
Fitted	Q300	1	MIC94050	Microchip	MIC94050YM4-TR	MIC94050 4-terminal P-channel MOSFET with separate substrate pin
Fitted	R100, R104, R208, R209, R210, R306, R308	7	1k	ASJ Holdings	CR10-1001-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R101, R102, R106, R109, R112, R113, R115, R201, R305	9	100k	ASJ Holdings	CR10-1003-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R103, R105, R107, R110, R111, R207	6	330R	Yageo	RC0402FR-07330RL	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R202, R211, R212	3	10k	Yageo	RC0402FR-0710KL	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R203, R206, R213, R301, R303, R304	6	0R	(n/a)	RMCF0402ZTOR00	RES 0.0 OHM 1/16W 0402 SMD
Fitted	R204, R205	2	4.7k	Yageo	RC0402FR-074K7L	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R300	1	2M	Yageo	RC0402FR-072ML	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R302	1	5.6k	Yageo	RC0402FR-075K6L	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R307	1	2.2k	ASJ Holdings	CR10-2201-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	SW200	1	KMR221G	ITT Corporation	KMR221G	Microminiature Tact Sw Itch for SMT
Fitted	TEST1	1	AVR-BLE TEST			Fixture Test for AVR-BLE
Fitted	TESTDOC1	1	AVR-BLE TEST Instructions			AVR-BLE TEST Instructions
Fitted	U100	1	SAMD21E18A-MUT	Microchip	ATSAMD21E18A-MUT	Atmel 32-bit RISC MCU 32pin
Fitted	U200	1	ATmega3208-MFR	Microchip	ATmega3208-MFR	MCHP MCU 8-Bit 20MHz 32K FLASH VQFN-32
Fitted	U201	1	AITECC608A I2C (Google Cloud)	Microchip	AITECC608A-MAH1H-S	AITECC608A with an I2C Interface and a 8 Pin UDFN
Fitted	U202	1	MCP9844	Microchip	MCP9844T-BEMNY	A±1°C Maximum Accuracy Digital Temperature Sensor, I2C/SMBus, 1.7V - 3.6V, 8TDFN 2x3mm
Fitted	U203	1	BMA253	Bosch Sensortec	BMA253	Digital, triaxial acceleration sensor, LGA12 2x2x1.0mm
Fitted	U204	1	SST25PF040CT-40INP	Microchip	SST25PF040CT-40INP	4mB 512K X 8 SPI Serial Flash 2.3-3.6V USON-8 2X3mm
Fitted	U300, U302	2	MIC94165	Microchip	MIC94165CS-TR	Loadsw Itch, Rds(on) = 14.5mohm, 1.0mm x 1.5mm WLCSF, reverse blocking, 2.7ms Soft Start
Fitted	U301	1	MIC33050-SYHL	Microchip	MIC33050-SYHL-TR	3.3V Fixed, 4MHz, 600mA, Buck regulator with internal inductor with HyperLight Load
Not Fitted	J301	0	1125-1102S0S113R1	WCON	1125-1102S0S113R1	1x2 pin header, 2.54mm pitch, Pin-in-Paste THM
Not Fitted	Q100	0	DMN65D8LFB	Diodes Incorporated	DMN65D8LFB-7	N-channel MOSFET, DFN1006-3 (SOT883), 60V, 330mA, 40hm
Not Fitted	R114	0	100k	ASJ Holdings	CR10-1003-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Not Fitted	R200	0	10k	Yageo	RC0402FR-0710KL	Thick film resistor, SMD 0402, 1/16W, 1%
Not Fitted	U205	0	MCP111T-195	Microchip	MCP111T-195ILB	Micropower Voltage Detector/Supervisor, SC-70, 3-pin, Vtrip=1.90V

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Approved

Notes