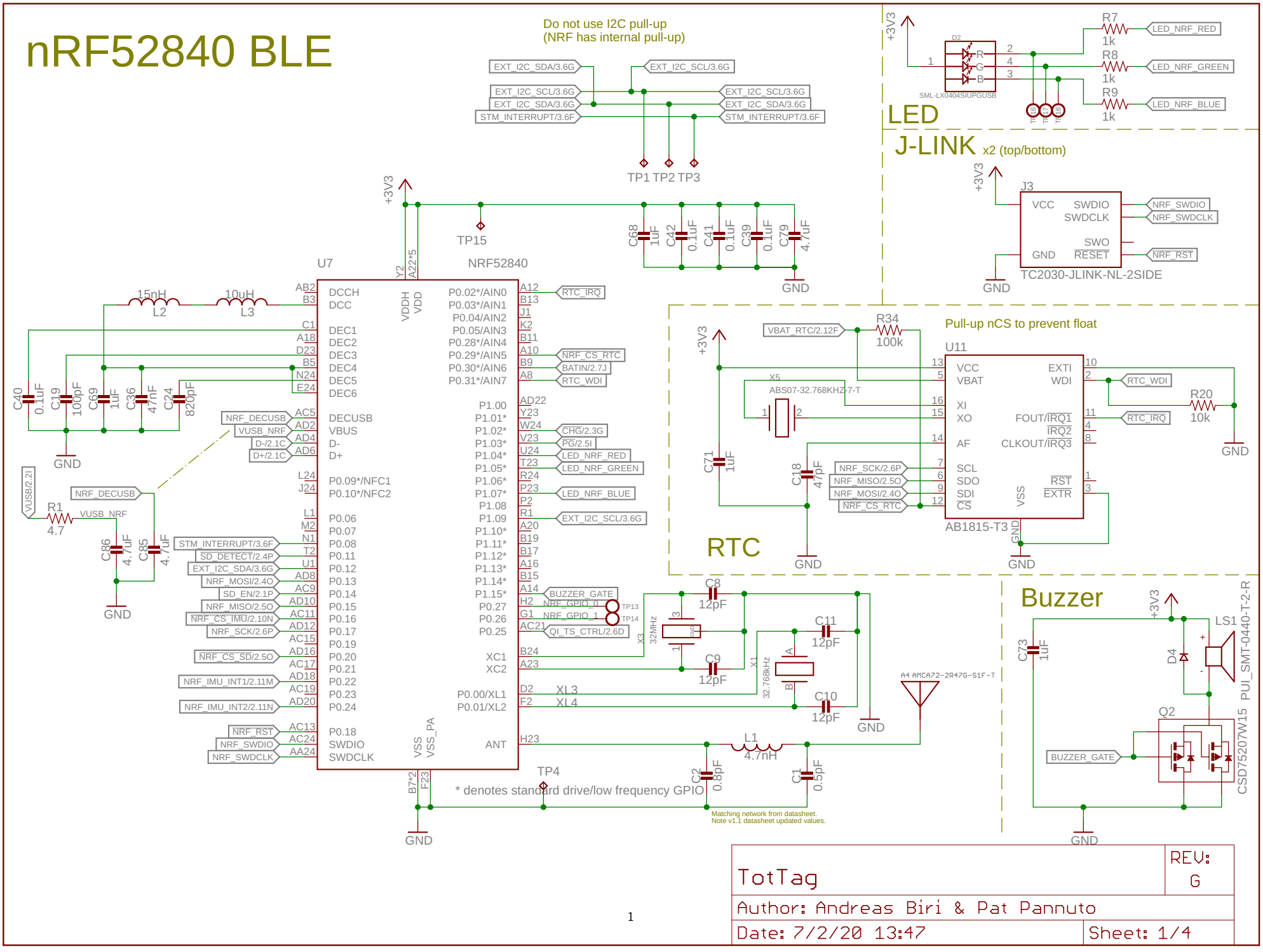
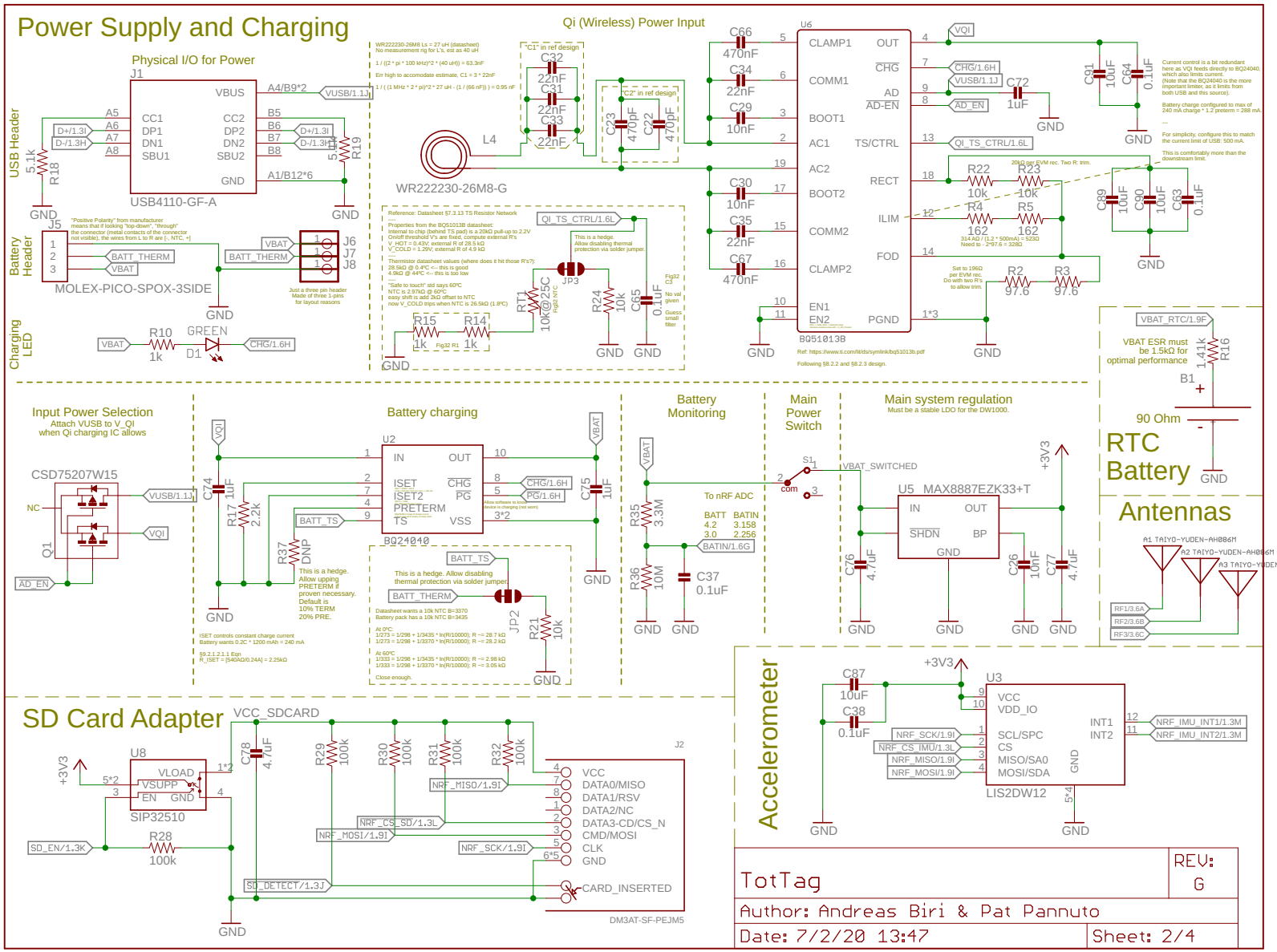
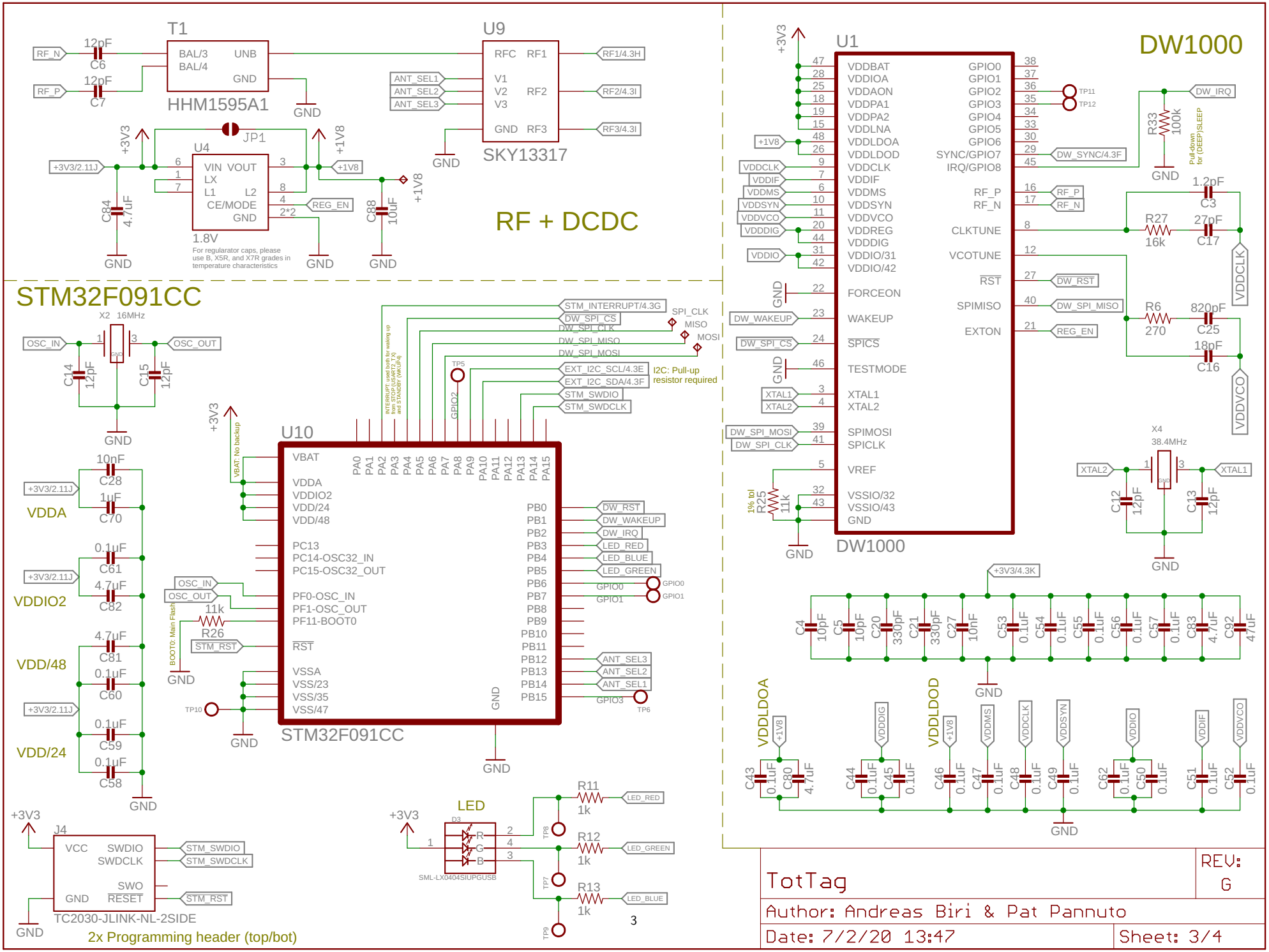

nRF52840 BLE
Do not use I2C pull-up
(NRF has internal pull-up)
EXT_I2C_SDA/3.6G
EXT_I2C_SCL/3.6G
STM_INTERRUPT/3.6F
TP1 TP2 TP3
LED
SML-LX0404SIUPGUSB
R7 1k
R8 1k
R9 1k
LED_NRF_RED
LED_NRF_GREEN
LED_NRF_BLUE
J-LINK x2 (top/bottom)
J3
VCC
SWDIO
SWDCLK
SWO
GND
RESET
NRF_SWDIO
NRF_SWDCLK
NRF_RST
TC2030-JLINK-NL-2SIDE
+3V3
TP15
NRF52840
U7
C68 1uF
C42 0.1uF
C41 0.1uF
C39 0.1uF
C79 4.7uF
15nH L2
10uH L3
C40 0.1uF
C19 100pF
C69 1uF
C36 47nF
C24 820pF
DCCH
DCC
DEC1
DEC2
DEC3
DEC4
DEC5
DEC6
DECUSB
VBUS
D-
D+
P0.09*/NFC1
P0.10*/NFC2
P0.06
P0.07
P0.08
P0.11
P0.12
P0.13
P0.14
P0.15
P0.16
P0.17
P0.19
P0.20
P0.21
P0.22
P0.23
P0.24
P0.18
SWDIO
SWDCLK
VDDH
VDD
VSS
VSS_PA
ANT
P0.02*/AIN0
P0.03*/AIN1
P0.04/AIN2
P0.05/AIN3
P0.28*/AIN4
P0.29*/AIN5
P0.30*/AIN6
P0.31*/AIN7
P1.00
P1.01*
P1.02*
P1.03*
P1.04*
P1.05*
P1.06*
P1.07*
P1.08
P1.09
P1.10*
P1.11*
P1.12*
P1.13*
P1.14*
P1.15*
P0.27
P0.26
P0.25
XC1
XC2
P0.00/XL1
P0.01/XL2
RTC_IRQ
NRF_CS_RTC
BATIN/2.7J
RTC_WDI
CHG/2.3G
PG/2.5I
LED_NRF_RED
LED_NRF_GREEN
LED_NRF_BLUE
EXT_I2C_SCL/3.6G
BUZZER_GATE
NRF_GPIO_0
NRF_GPIO_1
QI_TS_CTRL/2.6D
XL3
XL4
NRF_DECUSB
VUSB_NRF
D-/2.1C
D+/2.1C
VUSB/2.2I
R1 4.7
C86 4.7uF
C85 4.7uF
STM_INTERRUPT/3.6F
SD_DETECT/2.4P
EXT_I2C_SDA/3.6G
NRF_MOSI/2.4O
SD_EN/2.1P
NRF_MISO/2.5O
NRF_CS_IMU/2.10N
NRF_SCK/2.6P
NRF_CS_SD/2.5O
NRF_IMU_INT1/2.11M
NRF_IMU_INT2/2.11N
NRF_RST
NRF_SWDIO
NRF_SWDCLK
C8 12pF
C9 12pF
C11 12pF
C10 12pF
X3 32MHz
X1 32.768kHz
A4 AMCA72-2R476-S1F-T
L1 4.7nH
C2 0.8pF
C1 0.5pF
TP4
* denotes standard drive/low frequency GPIO
Matching network from datasheet.
Note v1.1 datasheet updated values.
RTC
U11
AB1815-T3
VBAT_RTC/2.12F
R34 100k
Pull-up nCS to prevent float
X5
ABS07-32.768KHZ-7-T
C71 1uF
C18 47pF
R20 10k
VCC
VBAT
XI
XO
AF
SCL
SDO
SDI
CS
EXTI
WDI
FOUT/IRQ1
IRQ2
CLKOUT/IRQ3
RST
EXTR
VSS
NRF_SCK/2.6P
NRF_MISO/2.5O
NRF_MOSI/2.4O
NRF_CS_RTC
Buzzer
LS1
PUI_SMT-0440-T-2-R
C73 1uF
D4
Q2
CSD75207W15
BUZZER_GATE
TotTag
REV: G
Author: Andreas Biri & Pat Pannuto
Date: 7/2/20 13:47
Sheet: 1/4

BATTERY

HCP643450NZC, 3.7V, 1200mah
Bare raw cell: 6.4*34.5*50.5mm max. in T*W*L
Assemble size: 6.4*34.5*52 mm max. in T*W*L
Over-charge voltage: 4.28V
Over- discharge voltage: 3.0V
Continuous charge rate: 0.2C
Peak charge rate:1C
Continuous discharge rate: 0.2C
Peak discharge rate:1C, for 2-3ms
NTC, 10K B=3435
Wire: UL1571-28AWG#, 100mm, from left
Connector: MOLEX87439-3P, positive
PCM added




T1
HHM1595A1
U9
SKY13317
RF + DCDC
U4
1.8V
JP1
STM32F091CC
U10
STM32F091CC
U1
DW1000
DW1000
X2 16MHz
X4 38.4MHz
VDDA
VDDIO2
VDD/48
VDD/24
J4
TC2030-JLINK-NL-2SIDE
2x Programming header (top/bot)
LED
SML-LX0404SIUPGUSB
TotTag
REV: G
Author: Andreas Biri & Pat Pannuto
Date: 7/2/20 13:47
Sheet: 3/4
3

EXTERNAL SIGNALS

The following signals must be integrated into all designs using the design block:

Signals

- EXT_I2C_SCL/3.6G
- EXT_I2C_SDA/3.6G

Note: Additional I2C pull-up resistors required to +3V3

- DW_SYNC/3.10C
- STM_INTERRUPT/3.6F

Antennas

- RF1/3.6A
- RF2/3.6B
- RF3/3.6C

Guarantee 120° offset in-between antennas to maximize polarization difference and antenna diversity

RF traces should respect the keepout zones and be surrounded by a via shield.
Furthermore, try to keep them as short and straight as possible

Power Supply

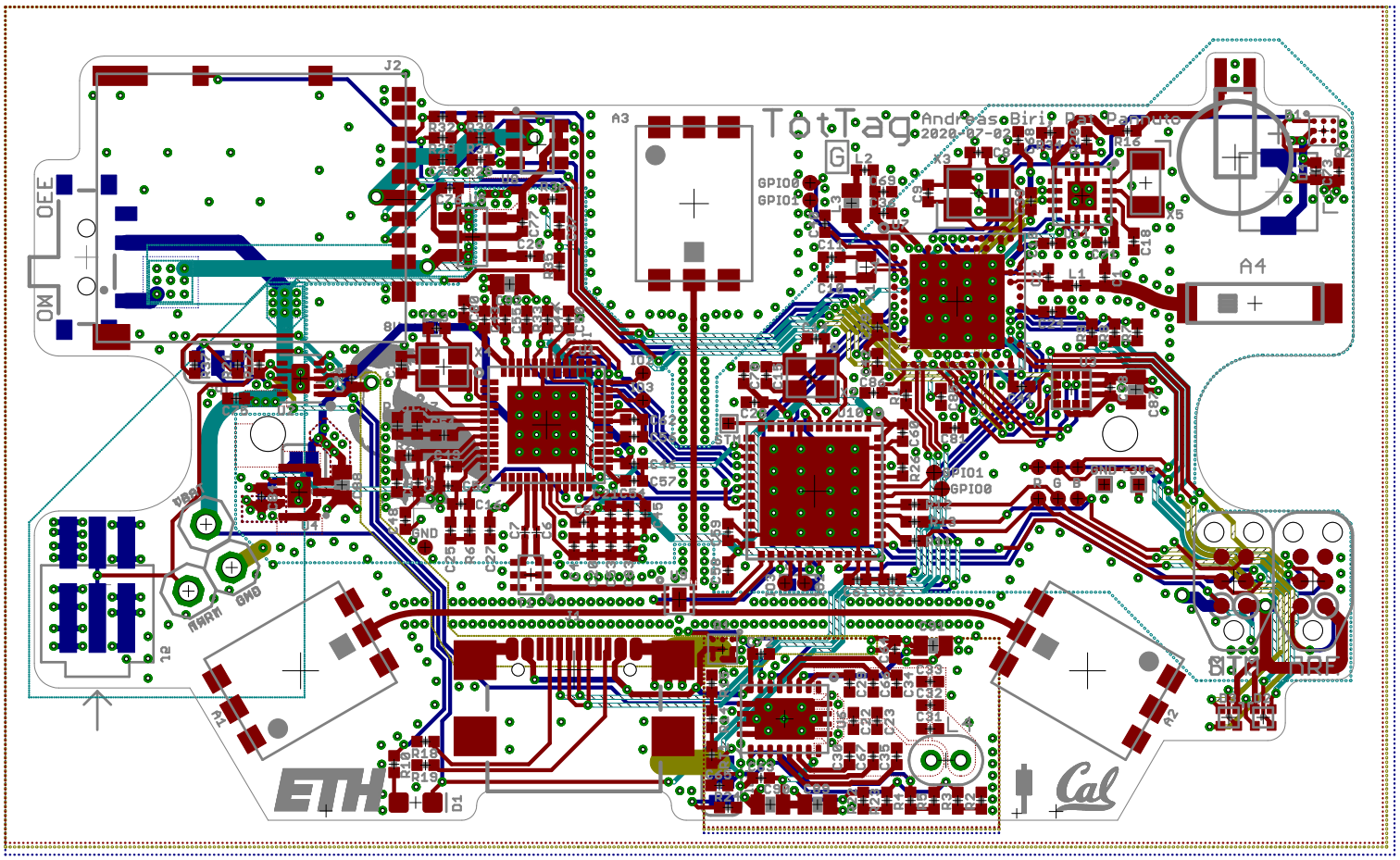
- +3V3/3.10K

Be aware that the DecaWave is very sensitive regarding its power supply.

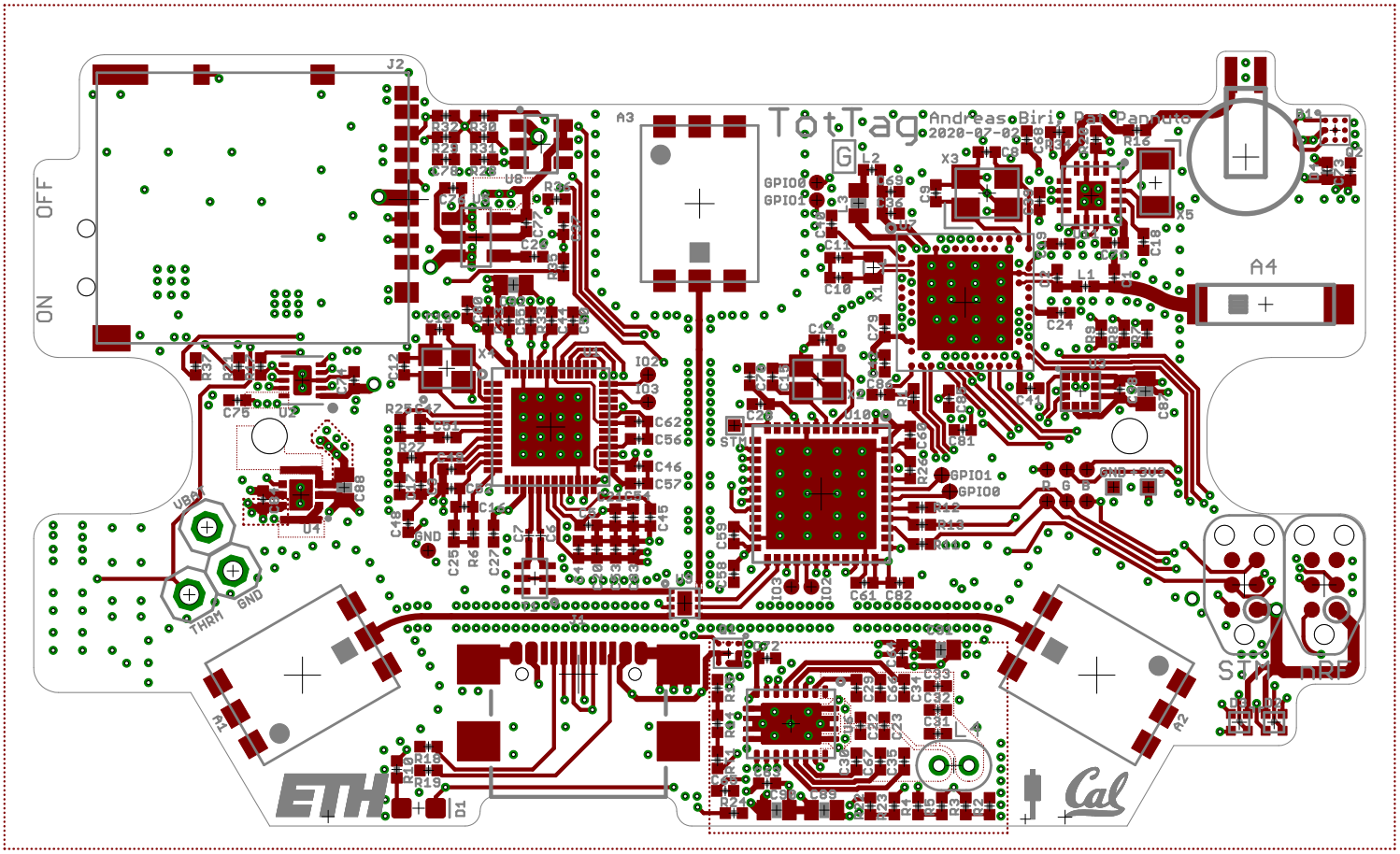
We suggest using the "MAX8887EZK33+T" from Maxim Integrated.
You can find a reference layout at github.com/lab11/totternary/hardware/tottag.

TotTag	REV: G
Author: Andreas Biri & Pat Pannuto	
Date: 7/2/20 13:47	Sheet: 4/4

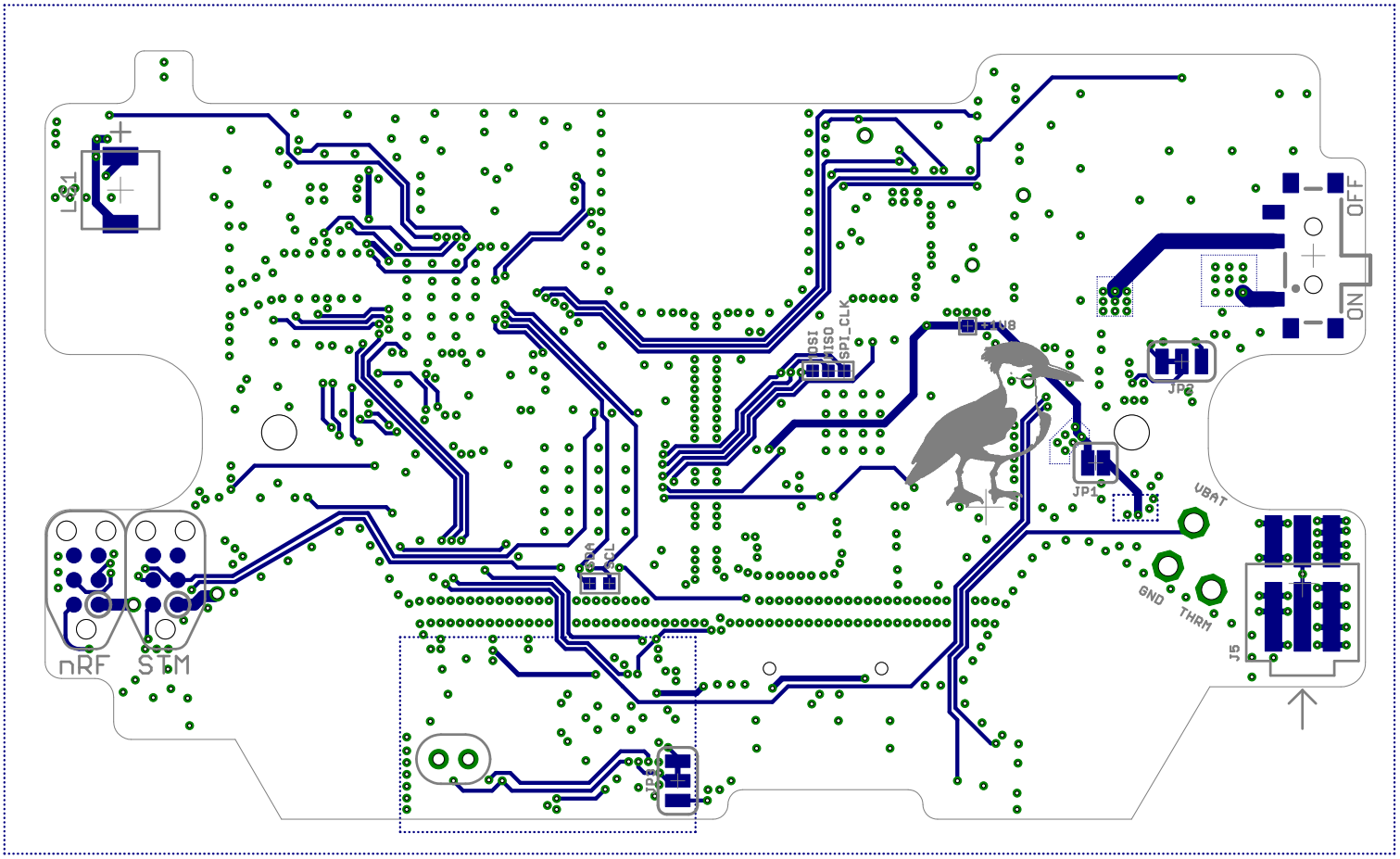
Top and Bottom Layers



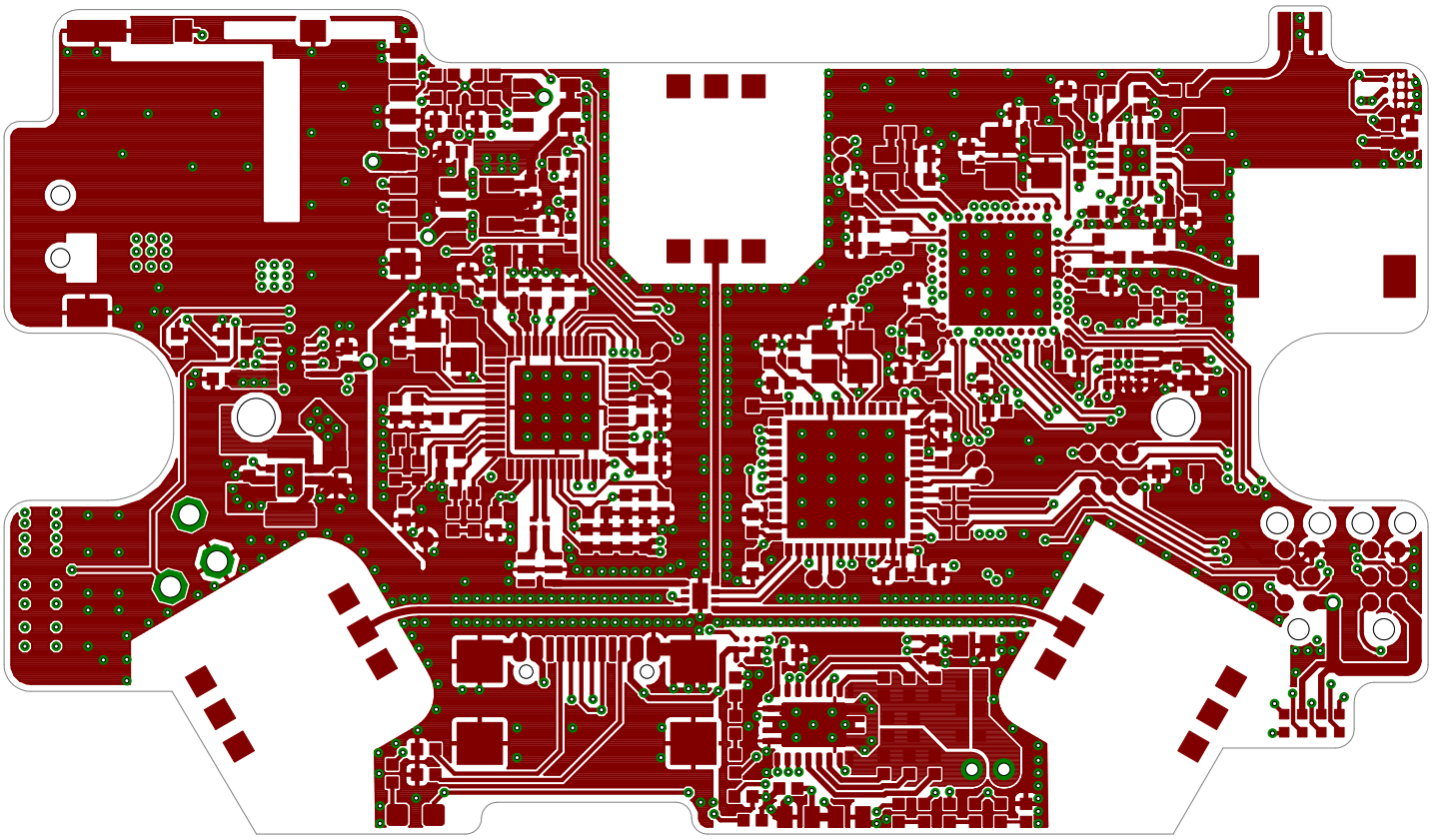
Top Layer


TotTag
Andreas Biri, D-ITET, Pappuccino
2020-07-02
OFF
ON
A3
A4
J2
GPIO0
GPIO1
GND
THRM
VBAT
ETH
Cal
SWD

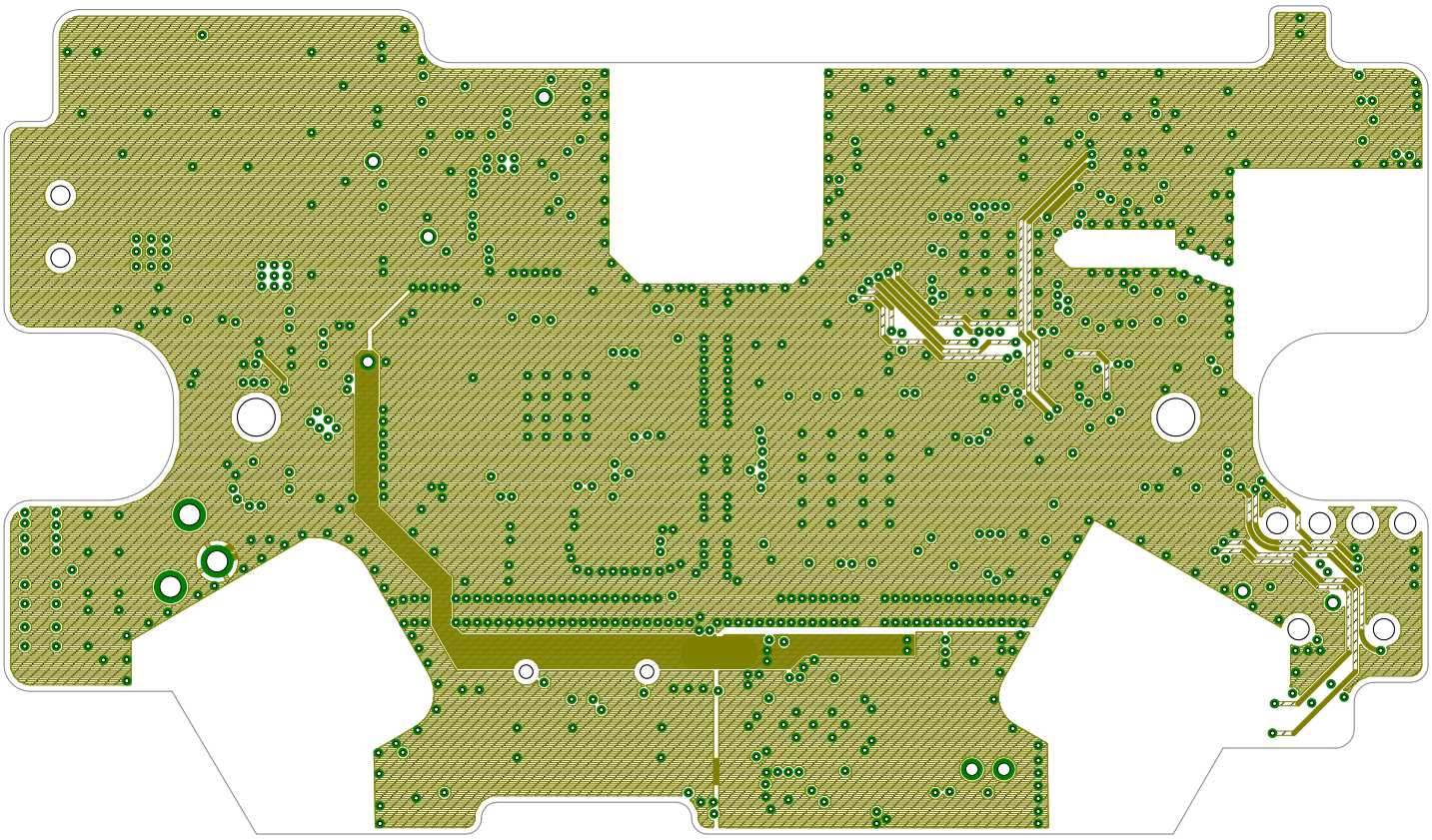
Bottom Layer



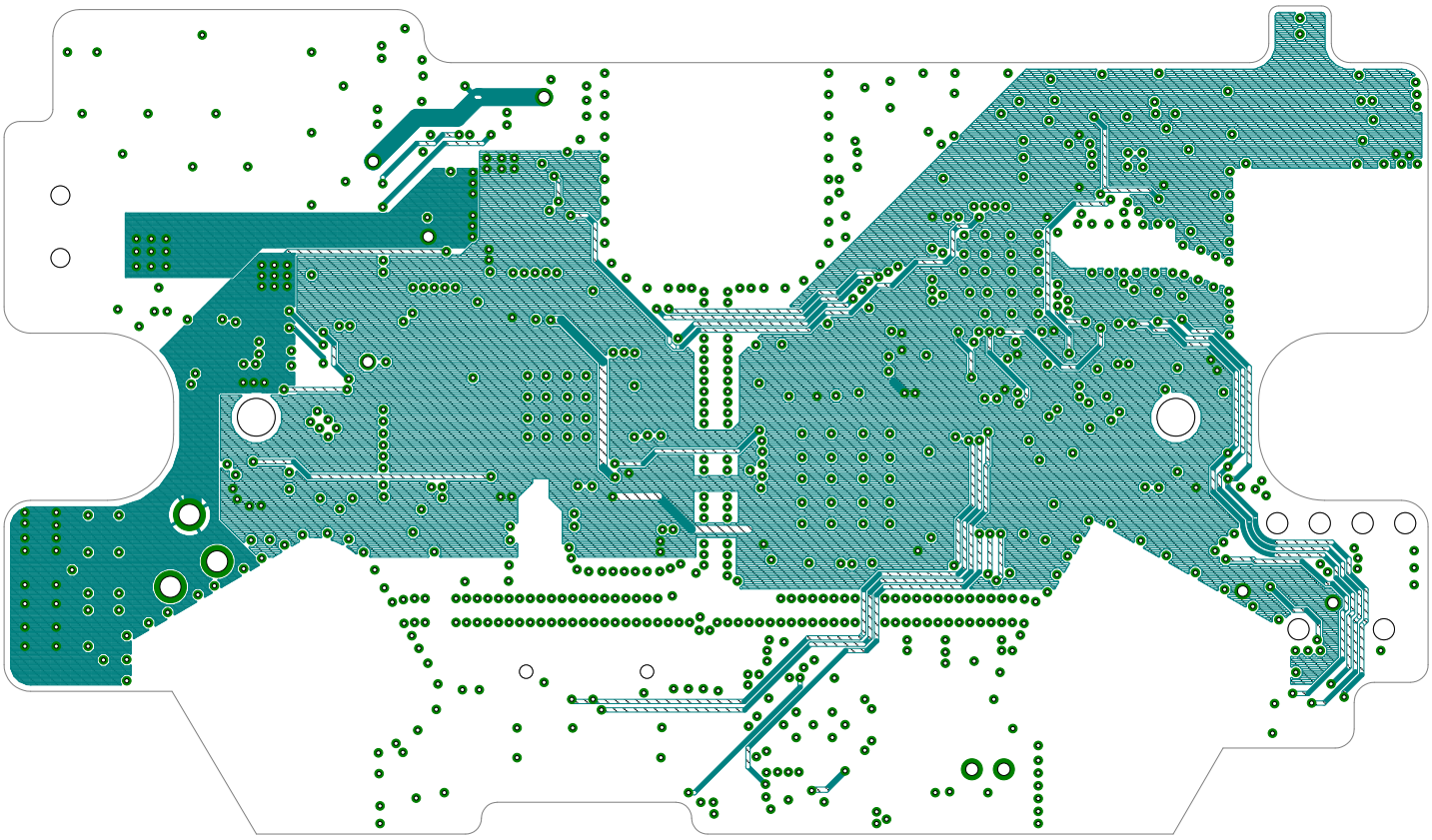
Top Copper Layer



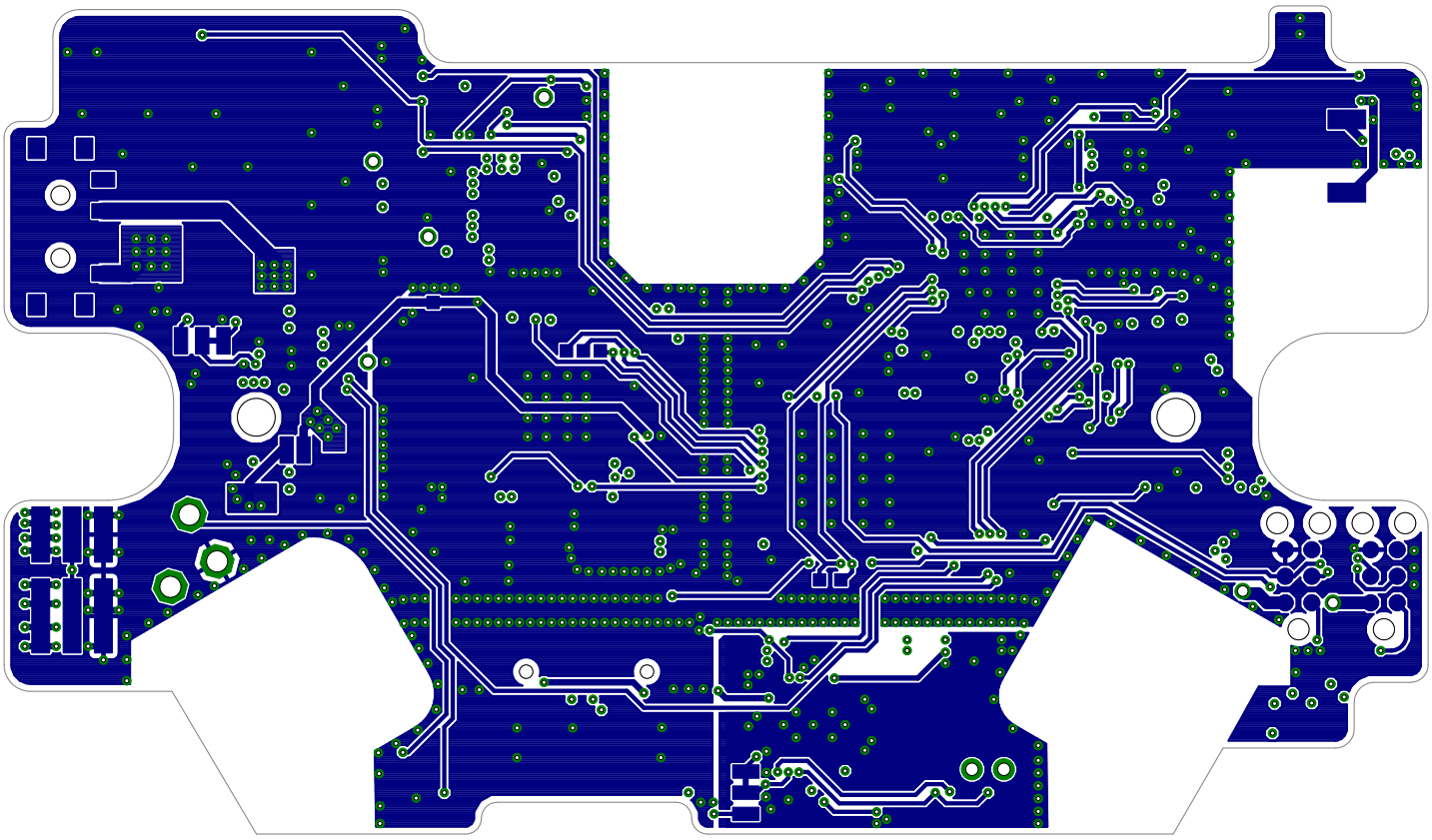
Layer 2 Copper

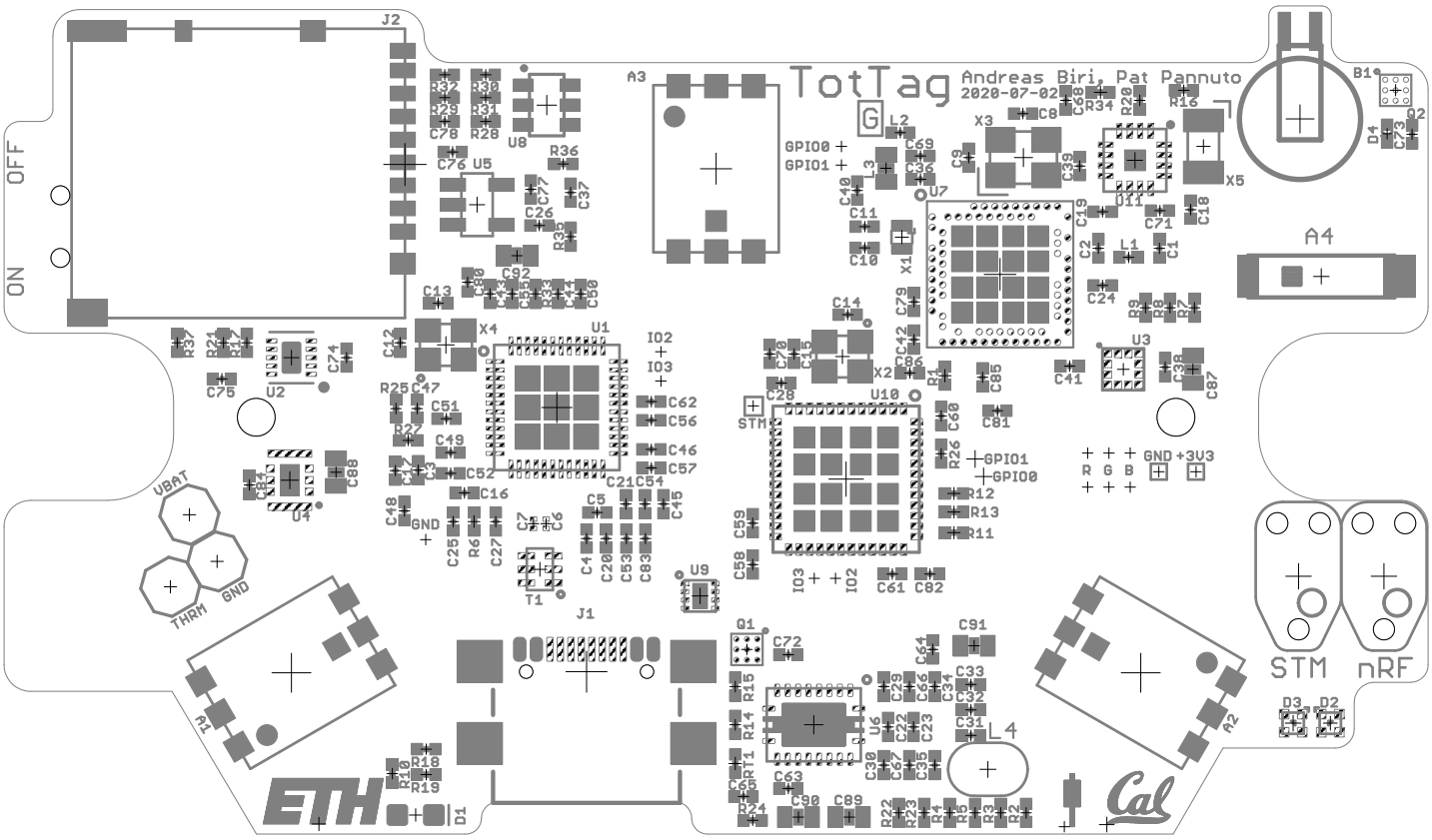


Layer 3 Copper

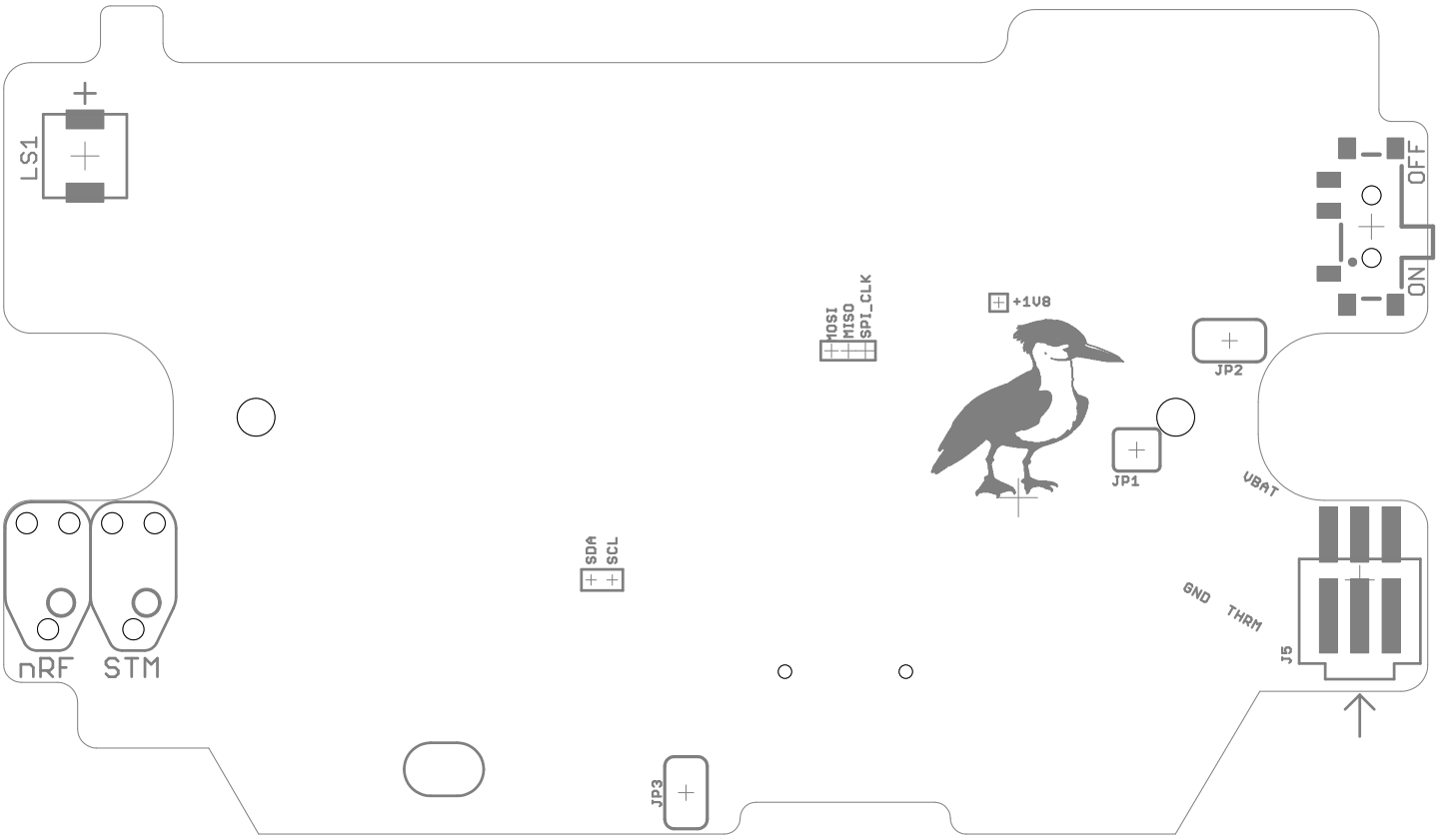


Bottom Copper Layer

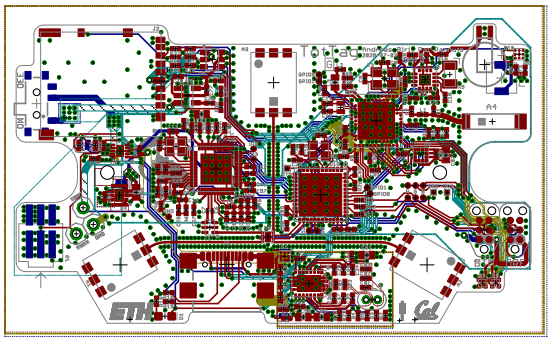



TotTag
Andreas Biri, Pat Pannuto
2020-07-02
ON
OFF
VBAT
THRM
GND
STM
nRF
ETH
Cal
GPIO0
GPIO1
+3V3
R G B

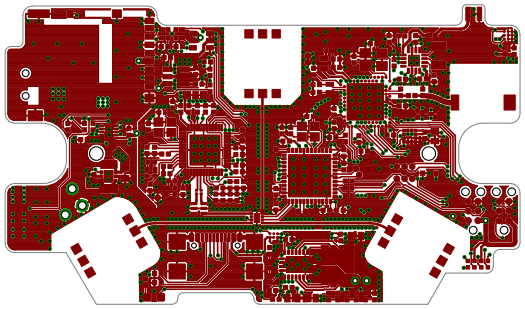
Bottom Paste Layer with Silkscreen



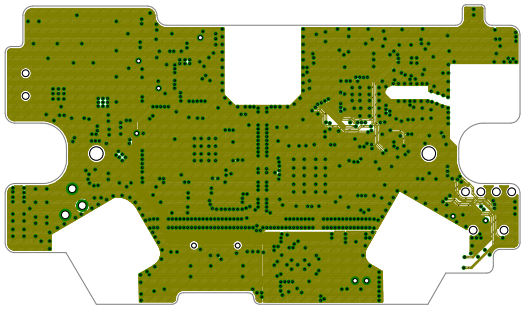
Top and Bottom Layers 1:1 Scale



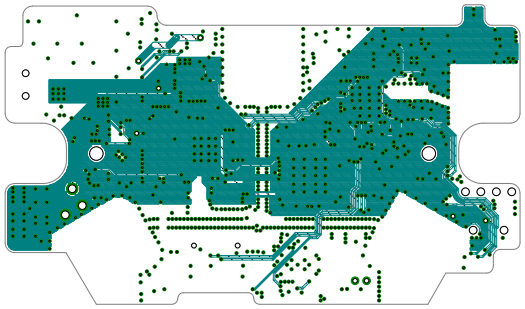
Top Layer 1:1 Scale



Layer 2 Copper 1:1 Scale



Layer 3 Copper 1:1 Scale



Bottom Copper Layer 1:1 Scale