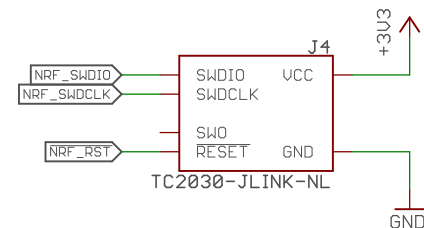
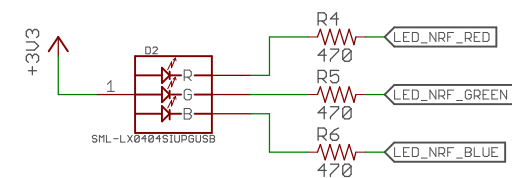
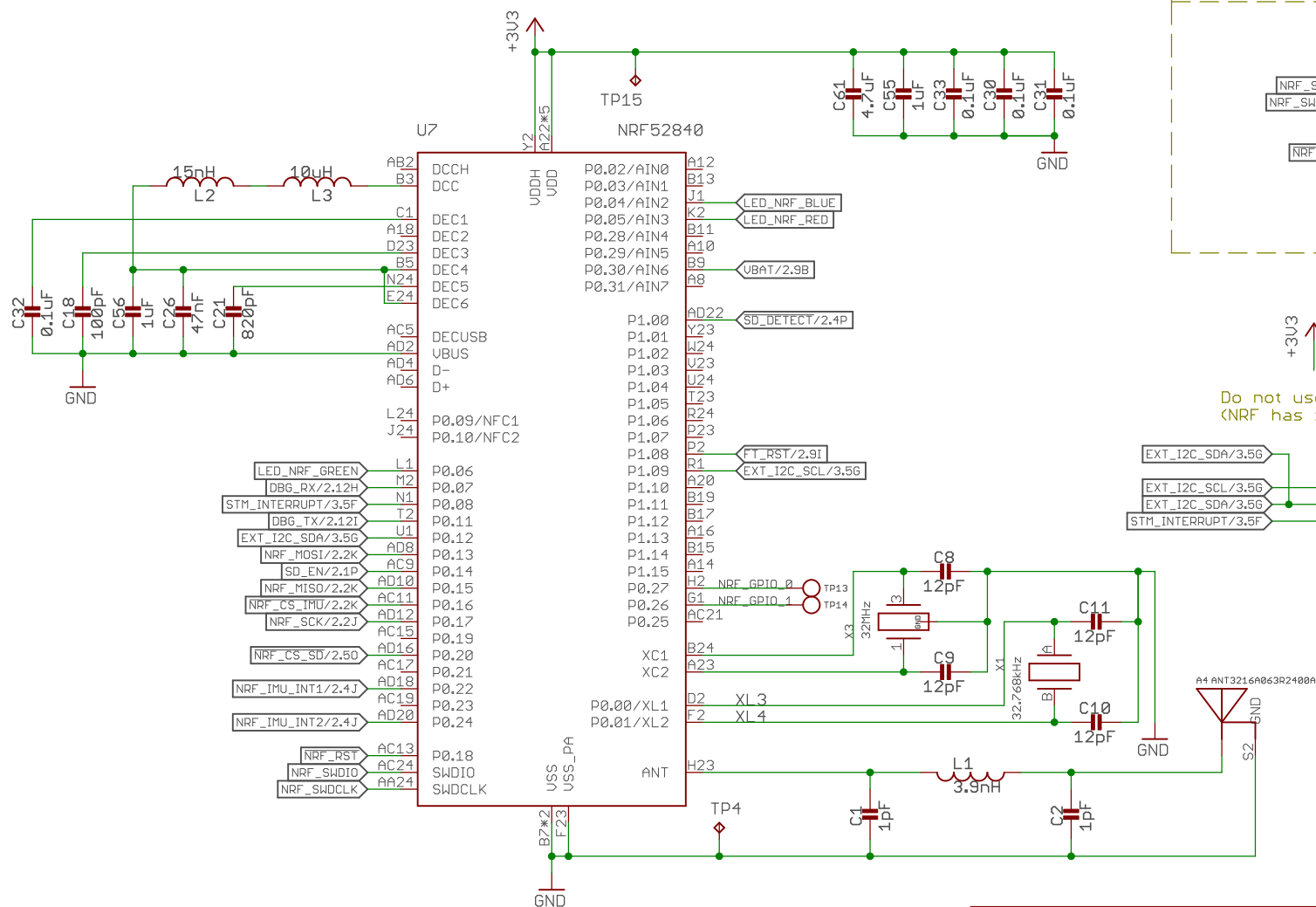
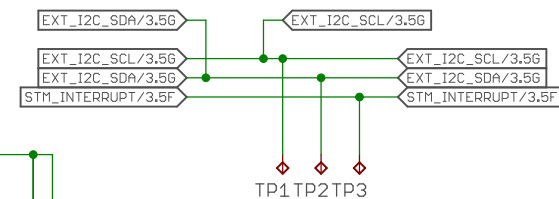


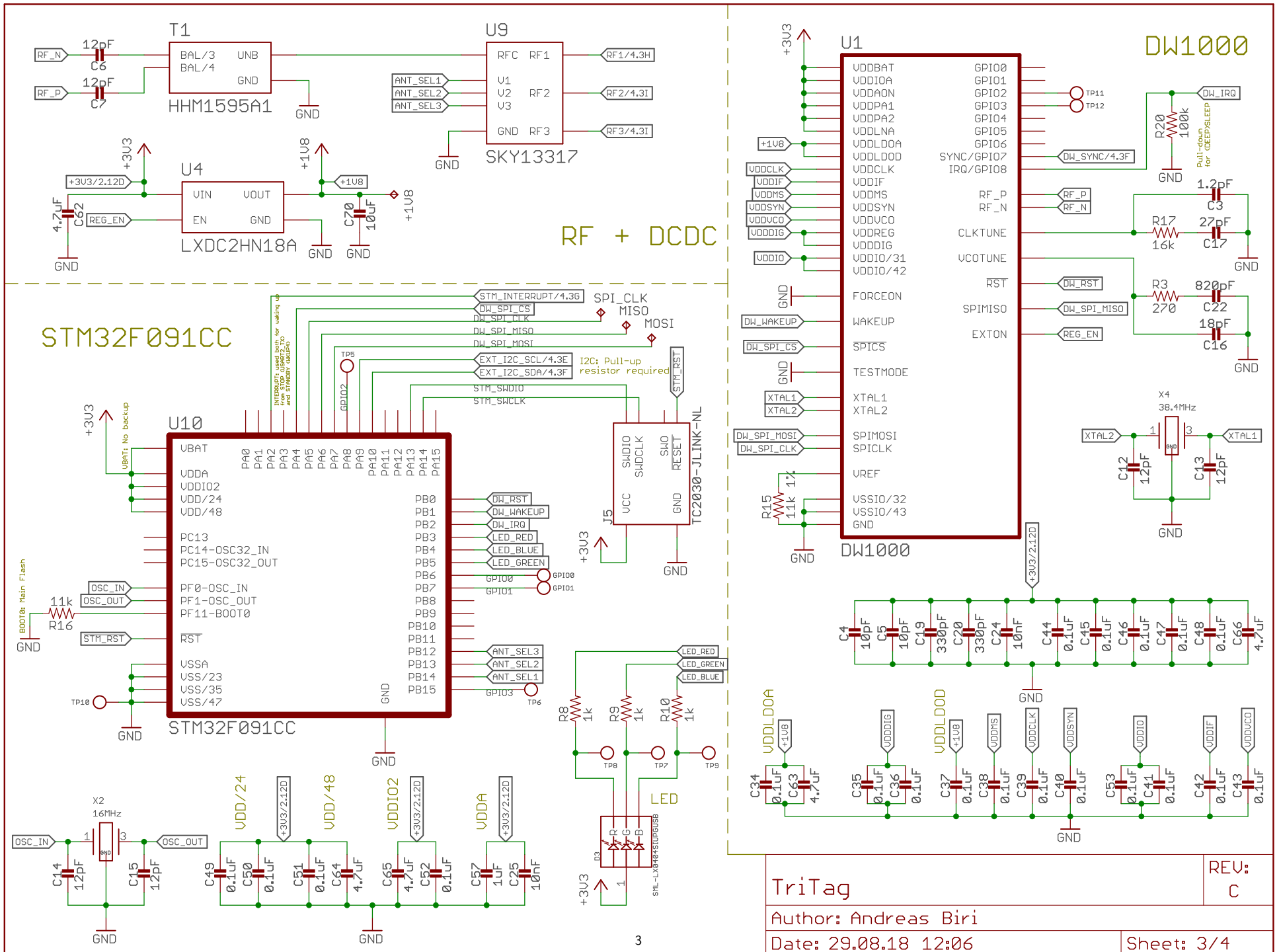
## nRF52840 BLE



Do not use I2C pull-up  
(NRF has internal pull-up)







TriTag

Author: Andreas Biri

Date: 29.08.18 12:06

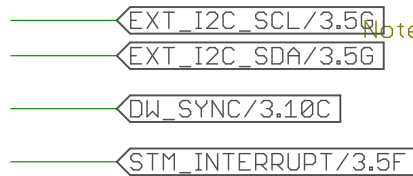
REV:  
C

Sheet: 3/4

## EXTERNAL SIGNALS

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

### Signals



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

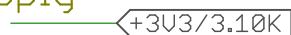
### Antennas



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



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/polypoint/pcb/tritag](https://github.com/lab11/polypoint/pcb/tritag).

TriTag

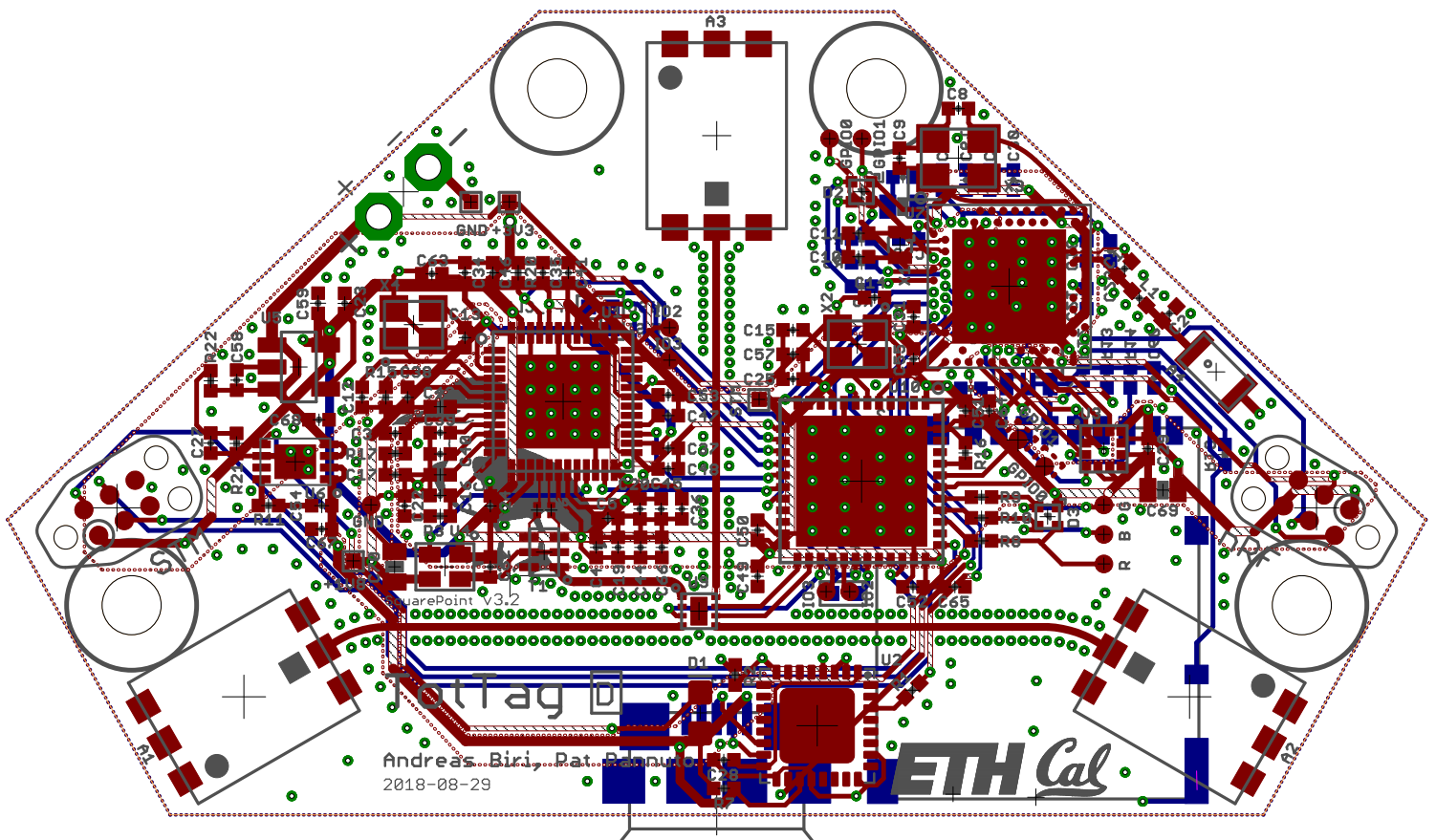
REV:  
C

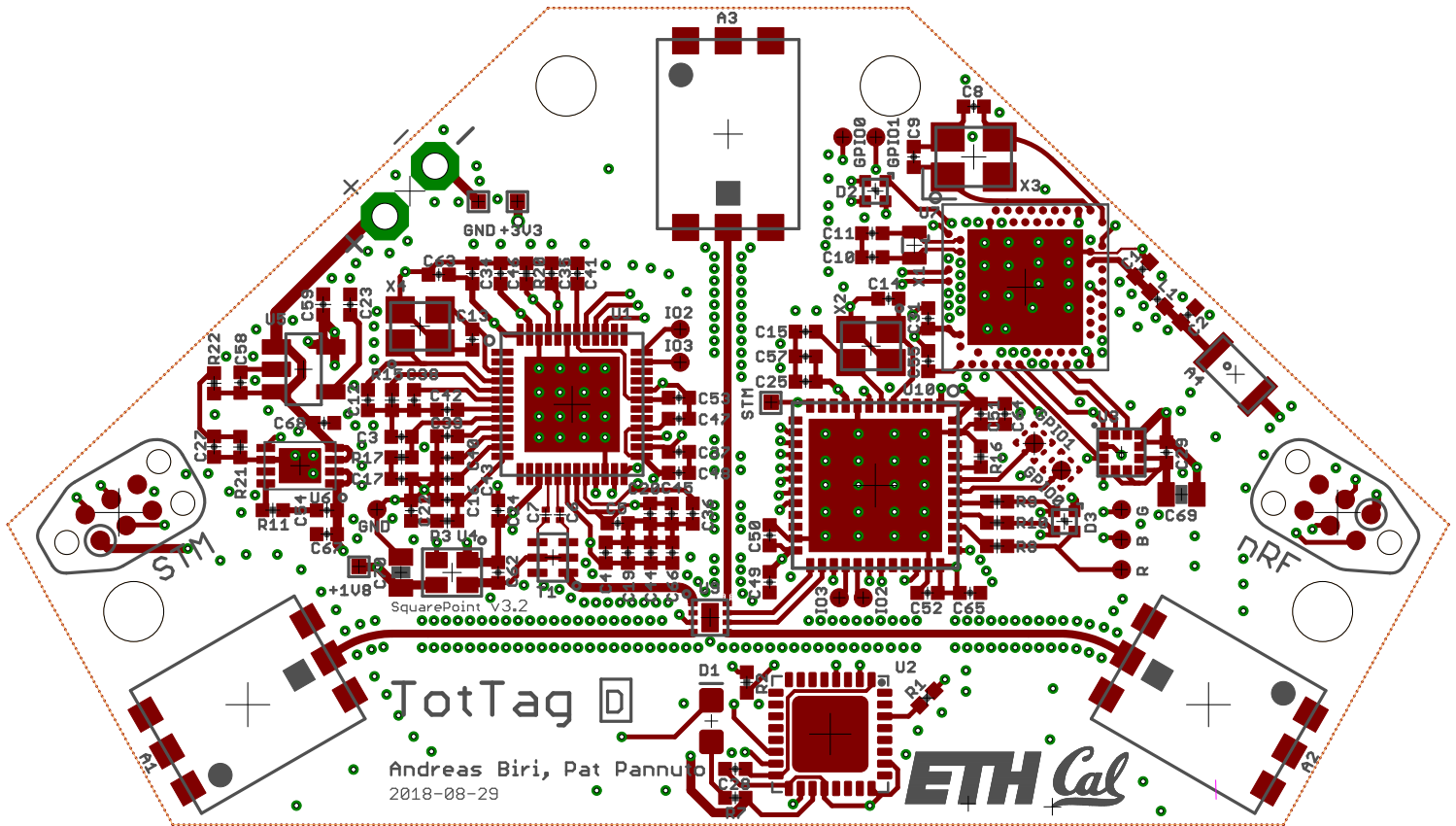
Author: Andreas Biri

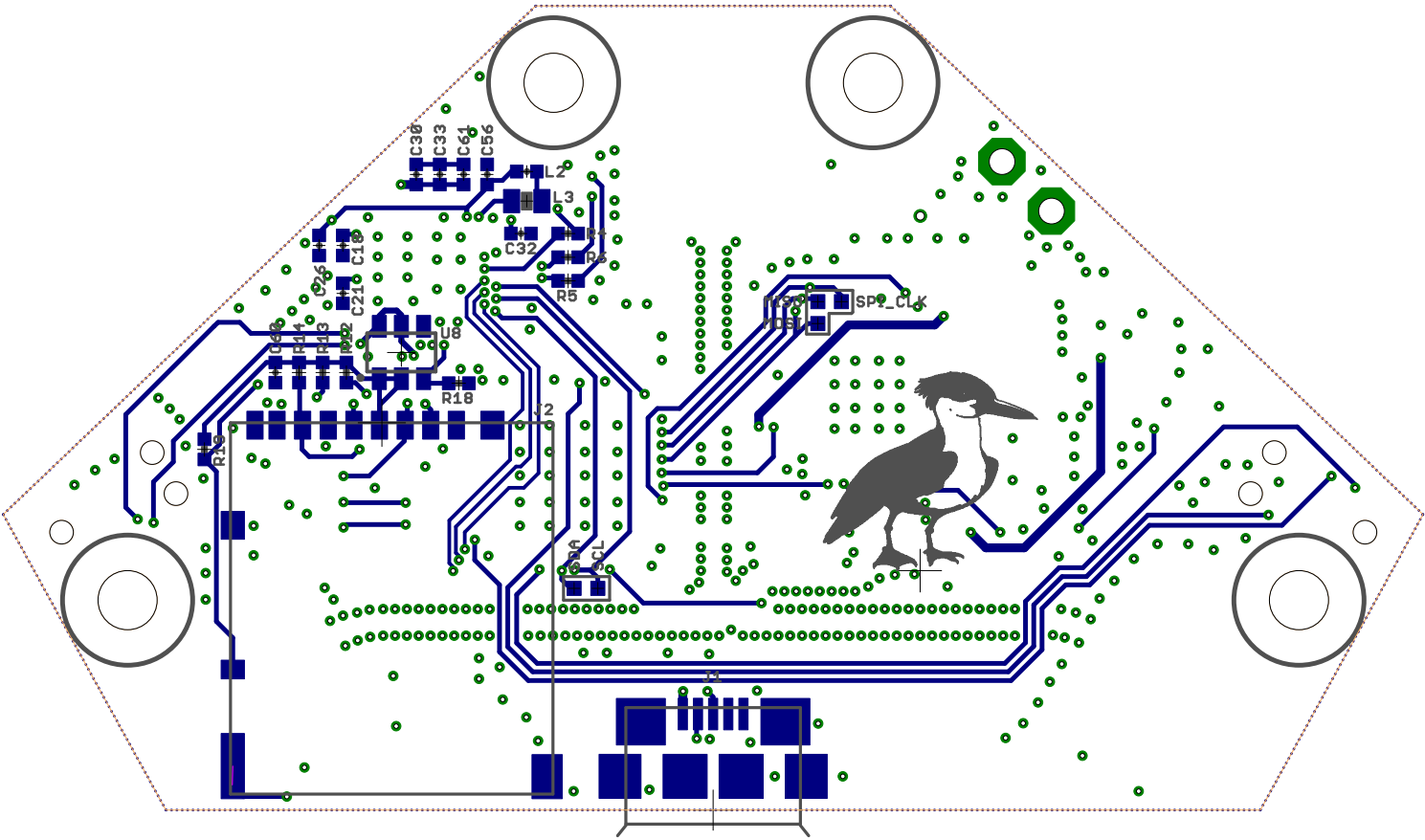
Date: 29.08.18 12:06

Sheet: 4/4

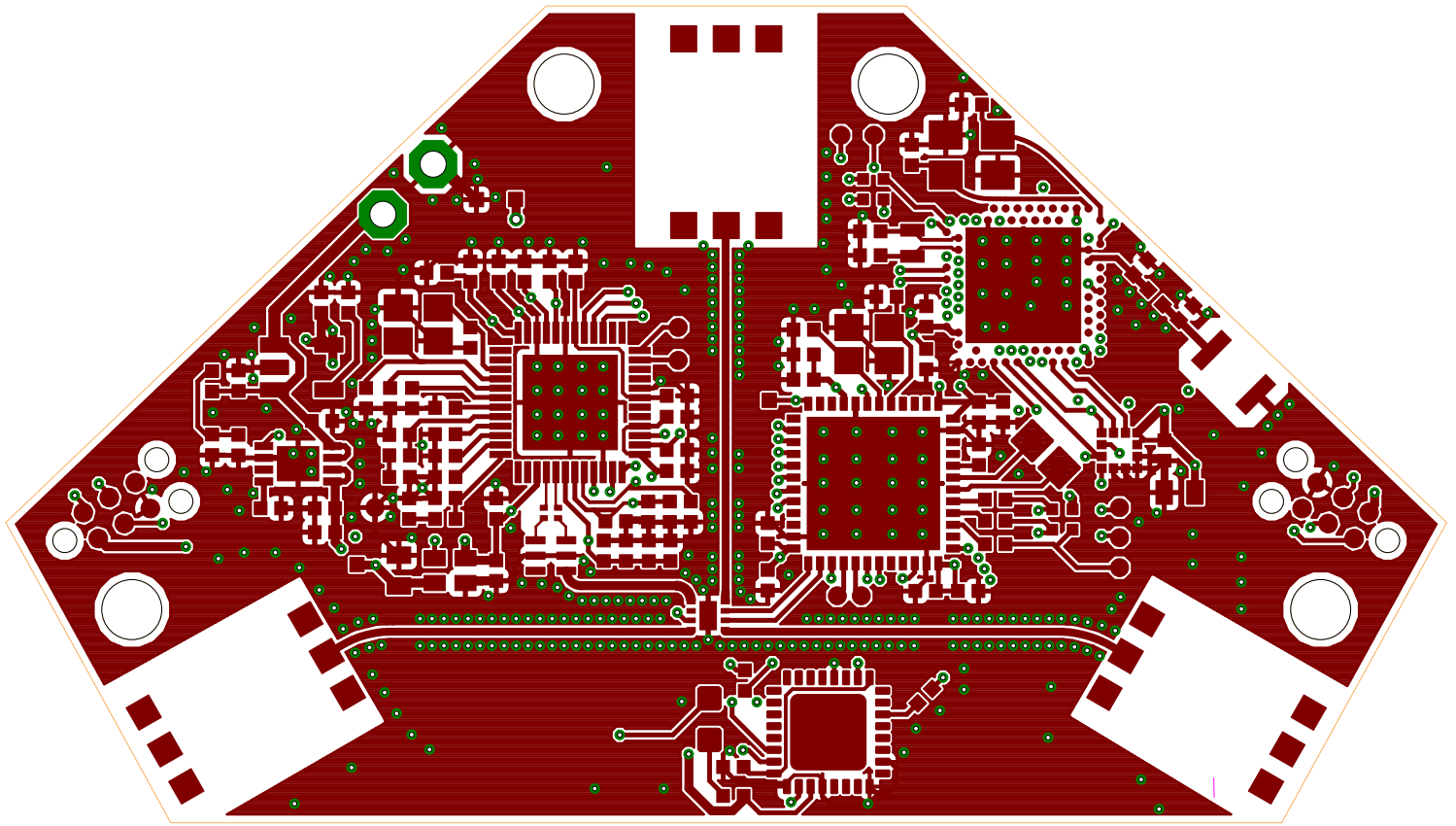
## Top and Bottom Layers



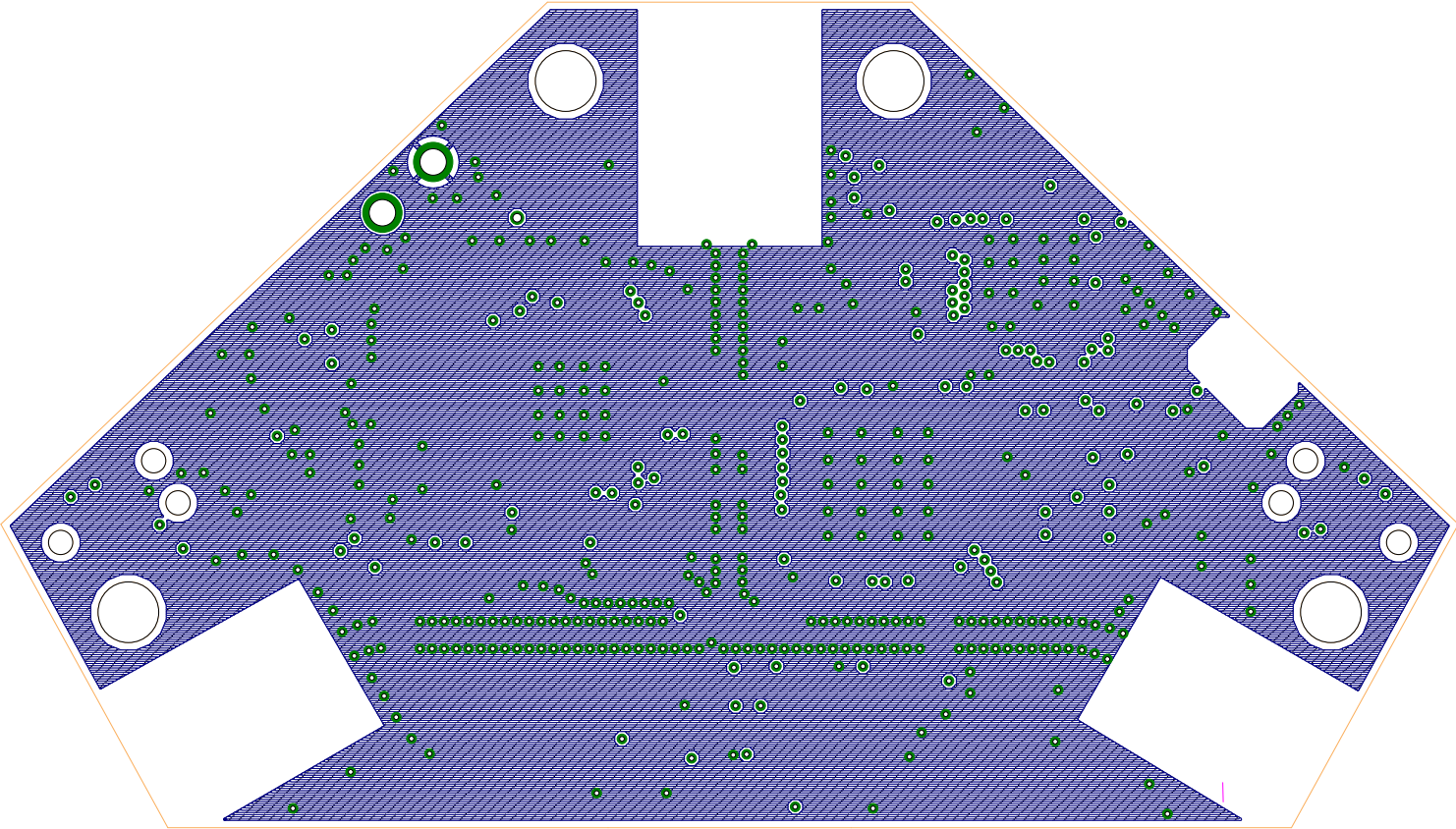


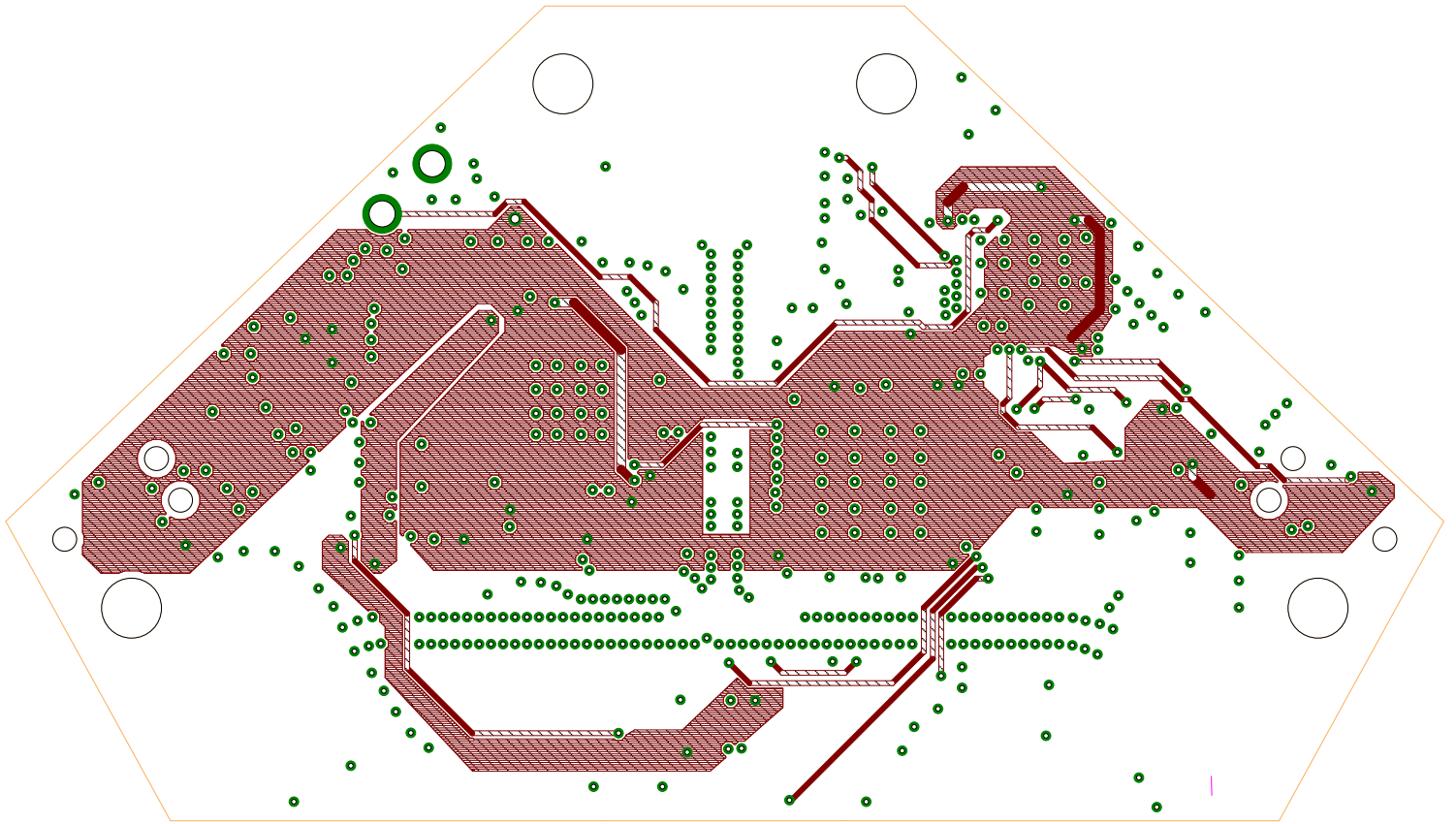


# Top Copper Layer

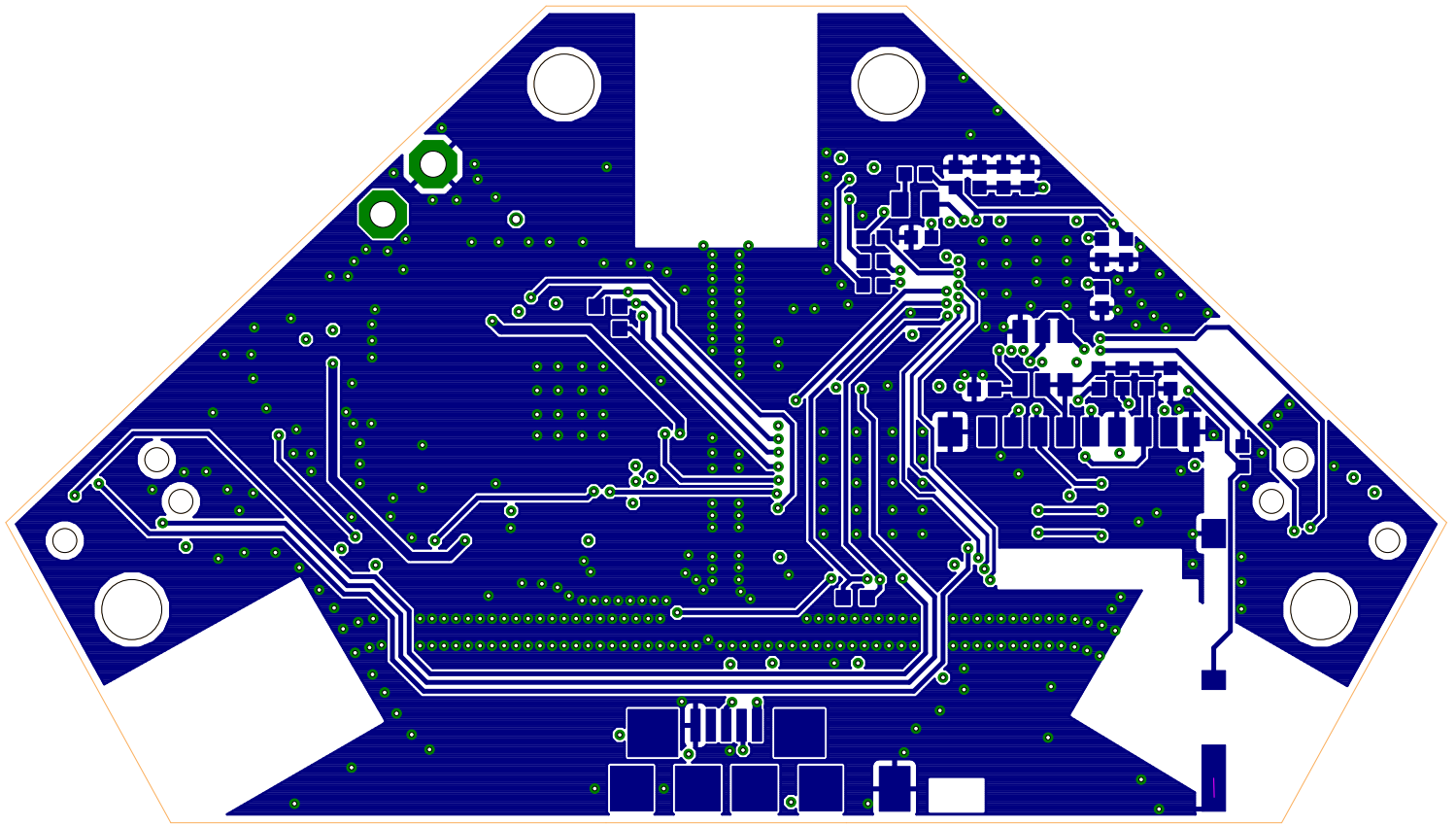


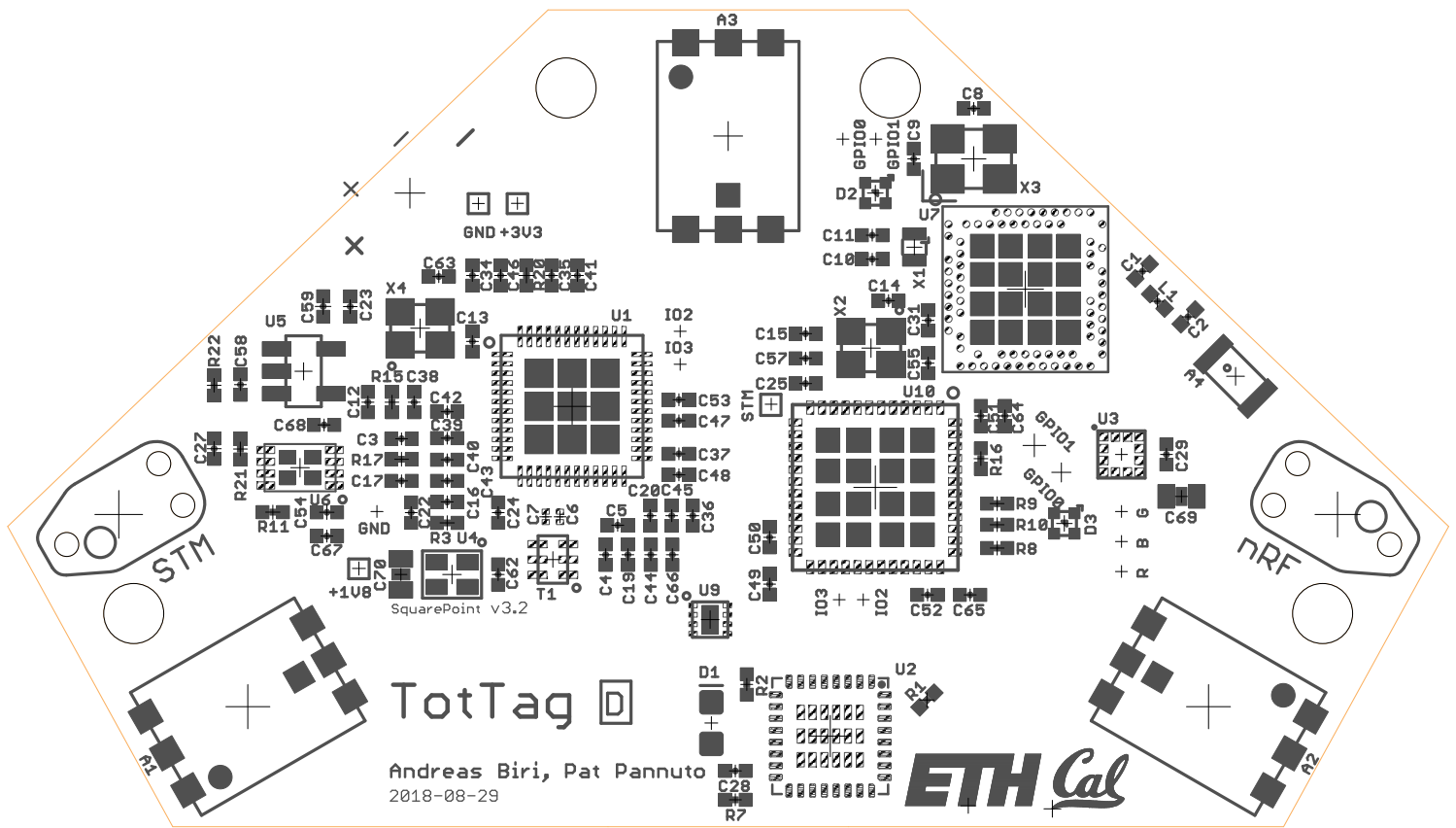




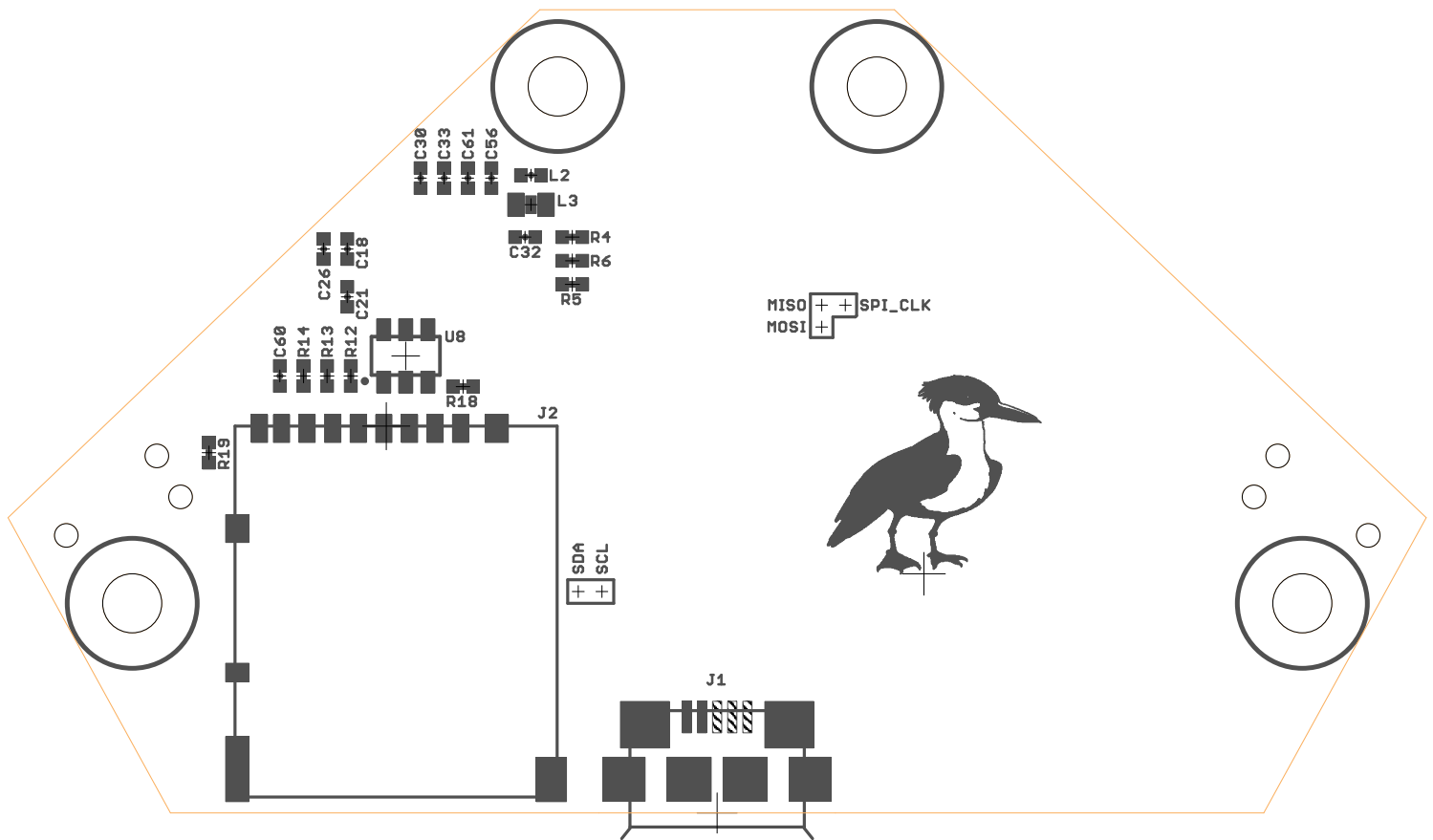


# Bottom Copper Layer

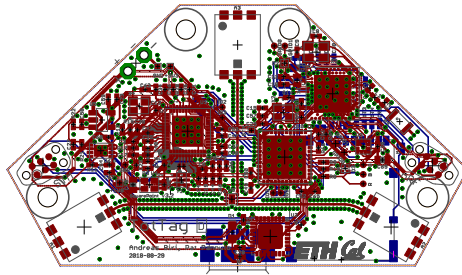




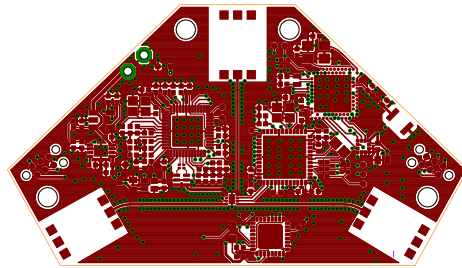
# Bottom Paste Layer with Silkscreen

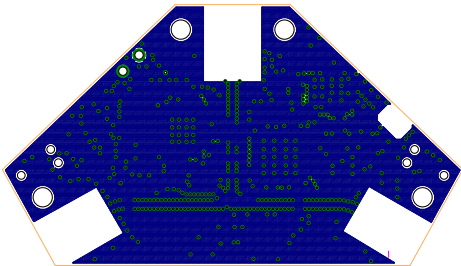


Top and Bottom Layers 1:1 Scale



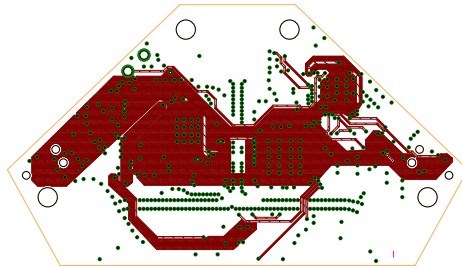
Top Layer 1:1 Scale



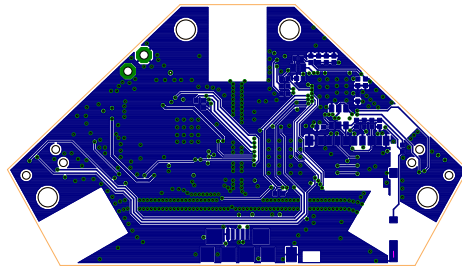




### Layer 3 Copper 1:1 Scale



Bottom Copper Layer 1:1 Scale



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Qty	Parts	Value	Can Substitute
3	A1,A2,A3	TAIYO-YUDEN-AH086M	N
1	A4	ANT3216A063R2400A	N
2	C1,C2	1pF	Y
1	C3	1.2pF	Y
2	C4,C5	10pF	Y
2	C6,C7	12pF	N
8	C8,C9,C10,C11,C12	12pF	Y
1	C16	18pF	Y
1	C17	27pF	Y
1	C18	100pF	Y
2	C19,C20	330pF	Y
2	C21,C22	820pF	Y
3	C23,C24,C25	10nF	Y
1	C26	47nF	Y
27	C27,C28,C29,C30,C0	1uF	Y
4	C54,C55,C56,C57	1uF	Y
11	C58,C59,C60,C61,C4	7uF	Y
2	C69,C70	10uF	Y
1	D1	GREEN	Y
2	D2,D3	SML-LX0404SIUPGUSB	Y
1	J1	CON_MICRO_SDDM3AT-SF-PEJM5	N
1	J2	MICRO_USB_B_HIROSE_ZX62-B-5PA(11)	N
1	L1	3.9nH	Y
1	L2	15nH	Y
1	L3	10uH	Y
2	R1,R2	0	Y
1	R3	270	Y
3	R4,R5,R6	470	Y
4	R7,R8,R9,R10	1k	Y
1	R11	2k 1%	Y
3	R12,R13,R14	10k	Y
2	R15,R16	11k 1%	Y
1	R17	16k	Y
3	R18,R19,R20	100k	Y
1	R21	2.2M	Y
1	R22	10M	Y
1	T1	HHM1595A1	N
1	U1	DW1000	N
1	U2	FT232RQ	N
1	U3	LIS2DW12	N
1	U4	LXDC2HN18A	N
1	U5	MAX8887EZK33+T	N
1	U6	MCP73831	N
1	U7	NRF52840	N
1	U8	SIP32510	N
1	U9	SKY13317	N
1	U10	STM32F091CC	N
1	X1	32.768kHz	N
1	X2	16MHz	N
1	X3	32MHz	N
1	X4	38.4MHz	N

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Device	Package	Description
TAIYO-YUDEN-AH086M	TAIYO-YUDEN-AH0UWB	Antenna - 3.
ANT3216A063R2400A	ANT3216A063R240	Yageo 2.4GHz
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0201_CAP	0201_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0402_CAP	0402_CAP	SMD Capacitor
CAPACITOR0603_CAP	0603_CAP	SMD Capacitor
LED0603	LED-0603	LED (Generic)
SML-LX0404SIUPGUSB	1MM_SQ_4PAD	1mm^2 RGB LED
CON_MICRO_SDDM3AT-SF-PEJ	DM3AT-SF-PEJM5	CONN MICRO SD
MICRO_USB_B_HIROSE_ZX62-EUSB_MICRO_B-HIF		Connector Recepta
INDUCTOR0402	0402_CAP	A very specific indu
INDUCTOR0402	0402_CAP	A very specific indu
INDUCTOR0603	0603_CAP	A very specific indu
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
RESISTOR0402_RES	0402_RES	Resistor
HHM1595A1	EIA-0805	Description: Symbc
DW1000	QFN-48-DW1000	Description: The
FT232RQ	QFN32	Source: <a href="http://www">http://www</a>
LIS2DW12	LGA-12	ultra low power 3 a
LXDC2HN18A	LXDC2HN	Description: Symbc
MAX8887EZK33+T	SOT-23-5	IC REG LDO 3.3V
MCP73831	DFN-8-MCP	Description: Device
NRF52840	AQFN73	ultra-low power 2.
SIP32510	TSOT23-6	Load switch, slew r
SKY13317	MLPQ-UT-8	Description: Devic
STM32F091CC	UFQFPN-48	Description: STM3
ABS05-32.768KHZ-9-T	ABS05	32.768kHz Crystal
FA-20H	FA-20H	Description: Oscil
7V-32.000MAHV-T	TXC-7V	TXC CRYSTAL SM
FA-20H	FA-20H	Description: Oscil

**DESCRIPTION**


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RF ANT 3.5GHZ/5.6GHZ CHIP SLD  
 RF ANT 2.4GHZ CHIP SOLDER SMD  
 CAP CER 1PF 50V C0G/NP0 0402  
 CAP CER 1.2PF 50V C0G/NP0 0402  
 CAP CER 10PF 100V C0G/NP0 0402  
 CAP CER 12PF 25V C0G/NP0 0201  
 CAP CER 12PF 50V C0G/NP0 0402  
 CAP CER 18PF 50V C0G/NP0 0402  
 CAP CER 27PF 50V C0G/NP0 0402  
 CAP CER SMD 0402 100PF 5% X7R 50  
 CAP CER 330PF 50V X7R 0402  
 MLCC 1005(0402) C0G 820PF 5% 50V  
 CAP CER 10000PF 25V X7R 0402  
 CAP CER 0.047UF 16V X7R 0402  
 CAP CER 0.1UF 16V X5R 0402  
 CAP CER 1UF 10V X6S 0402  
 CAP CER 4.7UF 10V X5R 0402  
 CAP CER 10UF 10V X5R 0603  
 LED GREEN CLEAR SMD  
 LED RGB CLEAR SMD  
 CONN MICRO SD CARD PUSH-PUSH R/A  
 CONN RCPT USB MICRO B SMD R/A  
 FIXED IND 3.9NH 840MA 66 MOHM  
 FIXED IND 15NH 320MA 460 MOHM  
 FIXED IND 10UH 300MA 600 MOHM  
 RES SMD 0 OHM JUMPER 1/10W 0402  
 RES SMD 270 OHM 1% 1/16W 0402  
 RES SMD 470 OHM 1% 1/16W 0402  
 RES SMD 1K OHM 1% 1/5W 0402  
 RES SMD 2K OHM 1% 1/10W 0402  
 RES SMD 10K OHM 5% 1/10W 0402  
 RES SMD 11K OHM 1% 1/10W 0402  
 RES SMD 16K OHM 1% 1/16W 0402  
 RES SMD 100K OHM 1% 1/16W 0402  
 RES SMD 2.2M OHM 1% 1/16W 0402  
 RES SMD 10M OHM 5% 1/10W 0402  
 XFMR BALUN RF 3.0-8.0GHZ UWB SMD  
 IC RF TXRX 802.15.4 48-QFN  
 IC USB FS SERIAL UART 32-QFN  
 MEMS DIGITAL OUTPUT MOTION SENSO  
 DC/DC CONVERTER SMD  
 IC REG LIN 3.3V 300MA TSOT23-5  
 IC CONTROLLER LI-ION 4.2V 8DFN  
 NRF52840-QIAA QFN 73L  
 IC LOAD SWITCH SOT23-6  
 IC SWITCH RF SP3T 8-MLP  
 IC MCU 32BIT 256KB FLASH 48QFPN  
 32.768kHz  $\pm 20$ ppm Crystal 9pF 90 kOhms 2-SMD, No Lead  
 16MHz  $\pm 10$ ppm Crystal 8pF 80 Ohms 4-SMD, No Lead  
 32MHz  $\pm 30$ ppm Crystal 12pF 60 Ohms 4-SMD, No Lead  
 38.4MHz  $\pm 10$ ppm Crystal 8.5pF 40 Ohms 4-SMD, No Lead

DIGIKEY	MANUFACTURER
587-2204-1-ND	Taiyo Yuden
311-1542-1-ND	Yageo
712-1266-1-ND	Johanson Technology Inc.
490-3085-1-ND	Murata Electronics North America
732-12054-1-ND	Würth Electronics Inc.
712-1208-1-ND	Johanson Technology Inc.
490-11190-1-ND	Murata Electronics North America
490-14582-1-ND	Murata Electronics North America
1276-1153-1-ND	Samsung Electro-Mechanics
399-17545-1-ND	KEMET
311-3768-1-ND	Yageo
1276-6989-1-ND	Samsung Electro-Mechanics
399-1279-1-ND	KEMET
445-1264-1-ND	TDK Corporation
1276-1234-1-ND	Samsung Electro-Mechanics
1276-6805-1-ND	Samsung Electro-Mechanics
490-14306-1-ND	Murata Electronics North America
490-10474-1-ND	Murata Electronics North America
160-1446-1-ND	Lite-On Inc.
67-2125-1-ND	Lumex Opto/Components Inc.
HR1964CT-ND	Hirose Electric Co Ltd
H125270CT-ND	Hirose Electric Co Ltd
AISC-0402-3N9G-TCT-ND	Abracon LLC
587-1521-1-ND	Taiyo Yuden
445-6755-1-ND	TDK Corporation
P0.0JCT-ND	Panasonic Electronic Components
1276-3970-1-ND	Samsung Electro-Mechanics
541-4072-1-ND	Vishay Dale
541-3240-1-ND	Vishay Dale
P2.00KLCT-ND	Panasonic Electronic Components
P10KJCT-ND	Panasonic Electronic Components
P11.0KLCT-ND	Panasonic Electronic Components
YAG5263CT-ND	Yageo
541-3960-1-ND	Vishay Dale
541-4083-1-ND	Vishay Dale
P10MJCT-ND	Panasonic Electronic Components
445-3387-1-ND	TDK Corporation
1479-1001-1-ND	Decawave Limited
768-1008-1-ND	FTDI, Future Technology Devices Int
497-17718-1-ND	STMicroelectronics
490-12092-1-ND	Murata Electronics North America
MAX8887EZK33+TCT-ND	Maxim Integrated
MCP73831T-2ACI/MCCT-ND	Microchip Technology
1490-1071-1-ND	Nordic Semiconductor ASA
SIP32510DT-T1-GE3CT-ND	Vishay Siliconix
863-1056-1-ND	Skyworks Solutions Inc.
497-15813-ND	STMicroelectronics
535-11897-1-ND	Abracon LLC
SER4201CT-ND	EPSON
887-1913-1-ND	TXC CORPORATION
SER3631CT-ND	EPSON

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MPN	MOUSER	Notes
AH086M555003-T		
ANT3216A063R2400A		
500R07S1R0BV4T		
GJM1555C1H1R2CB01D		
885012005074		
250R05L120GV4T	609-250R05L120GV4T	Out of stock at DigiKey – ave
GJM1555C1H120FB01D		
GRM1555C1H180JA01J		Out of stock at DigiKey – car
CL05C270JB5NNNC		Out of stock at DigiKey – car
C0402C101J5RACAUTO		Out of stock at DigiKey – car
CC0402JRX7R9BB331		
CL05C821JB5NFNC		
C0402C103J3RACTU		
C1005X7R1C473K050BC		Out of stock at DigiKey – car
CL05A104KO5NNNC		Out of stock at DigiKey – car
CL05X105KP5NNNC		Out of stock at DigiKey – car
GRM155R61A475MEAAD		Out of stock at DigiKey – car
GRM188R61A106KE69D		
LTST-C191KGKT		
SML-LX0404SIUPGUSB		
DM3AT-SF-PEJM5		
ZX62-B-5PA(33)		
AISC-0402-3N9G-T		
HK100515NJ-T		
MLZ1608N100LT000		Out of stock at DigiKey – car
ERJ-2GE0R00X		
RC1005F271CS		
CRCW0402470RFKEDC		Out of stock at DigiKey – car
RCA04021K00FKEDHP		
ERJ-2RKF2001X		Must be 1% or better
ERJ-2GEJ103X		
ERJ-2RKF1102X		Must be 1% or better
AC0402FR-0716KL		
CRCW0402100KFKEDC		Out of stock at DigiKey – car
CRCW04022M20FKEDC		
ERJ-2GEJ106X		
HHM1595A1	810-HHM1595A1	
DW1000-I-TR13		
FT232RQ		
LIS2DW12TR	511-LIS2DW12TR	
LXDC2HN18A-097		Can be mailed by us on Cu
MAX8887EZK33+T		
MCP73831T-2ACI/MC	579-MCP73832T-2ACIMC	
NRF52840		
SIP32510DT-T1-GE3		
SKY13317-373LF		
STM32F091CCU6	511-STM32F091CCU6	
ABS05-32.768KHZ-9-T		
FA-20H 16.0000MF10Z-AJ5		
7M-32.000MAAE-T		
FA-20H 38.4000MF10Z-AS3		

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**it Tape (still have 23 of them, last one can be left and will be populated by us)**