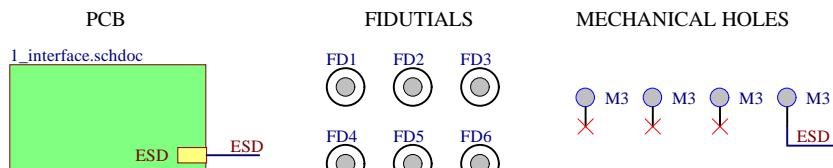


Rev	Description	Date	Author
0.1	- Initial release	01-Apr-2021	Andre M. P. Mattos

Revision History

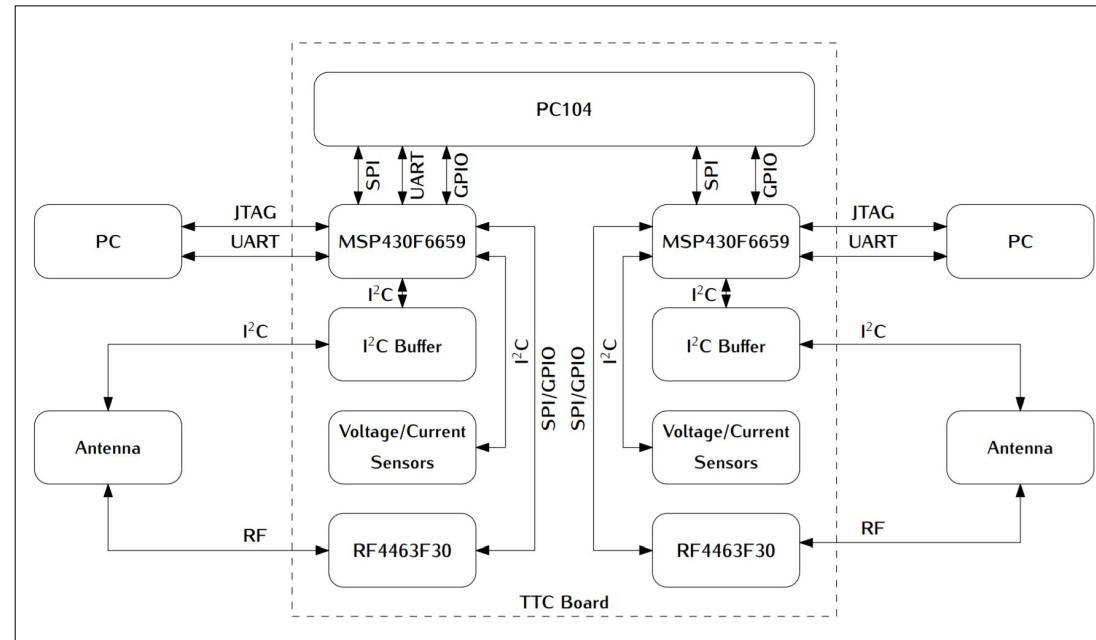


PCB Elements

TTC2 Hardware:

- Drawn by: André M. P. Mattos
- Reviewers: Yan C. Azeredo
- Based on FloripaSat-I TTC designed by: Sara V. Martinez
- Support: Gabriel M. Marcelino

Project Contributions



Block Diagram

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TTC2 Hardware
Based on the FloripaSat-I TTC

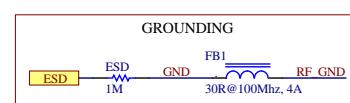
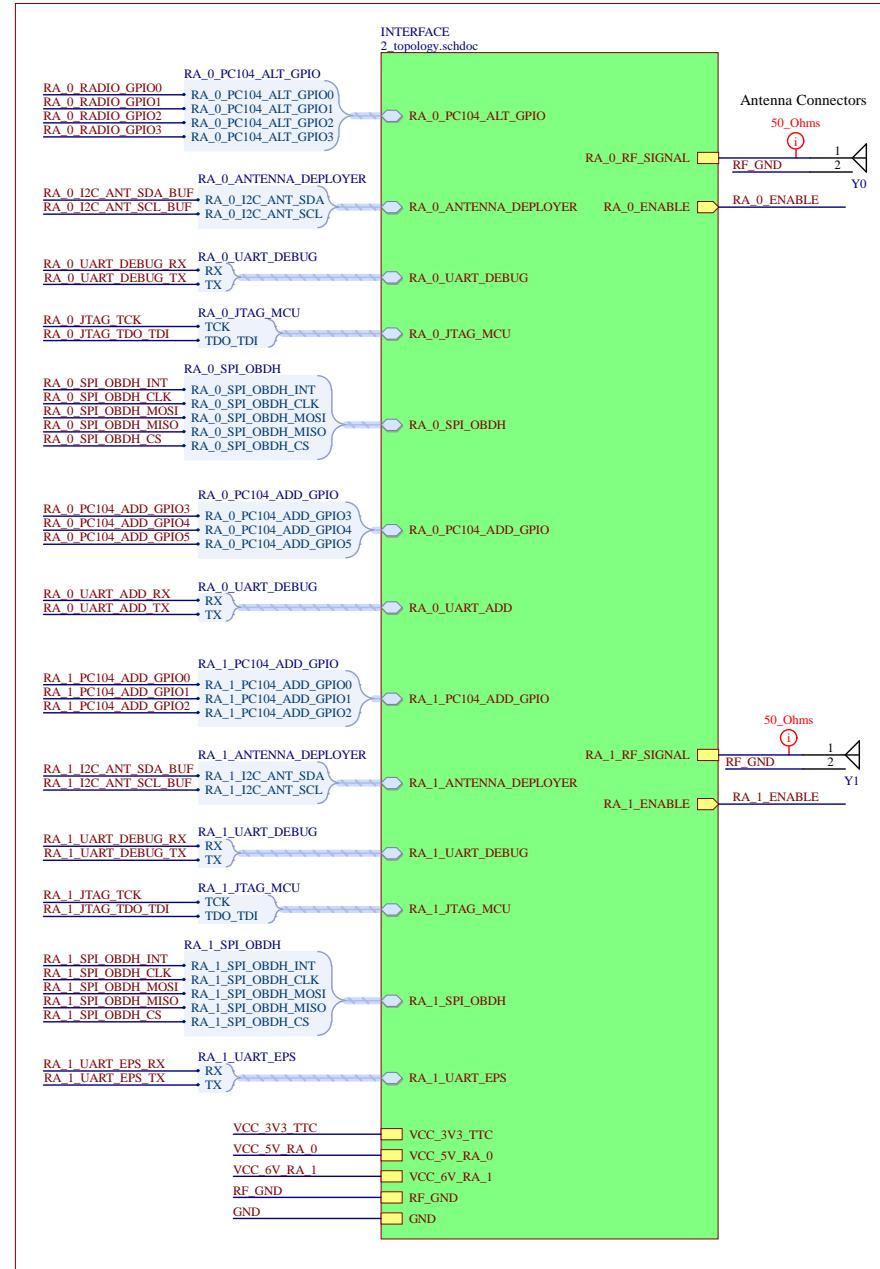
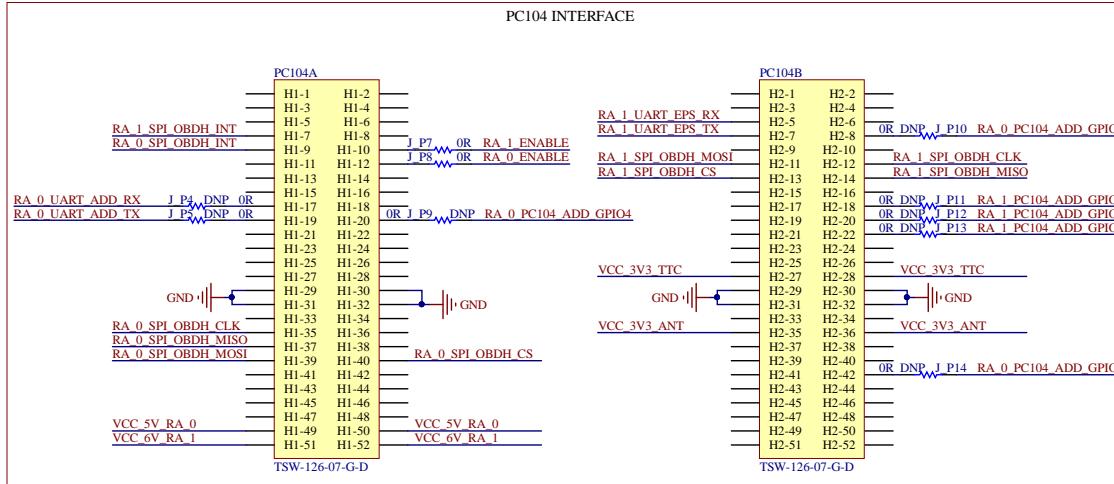
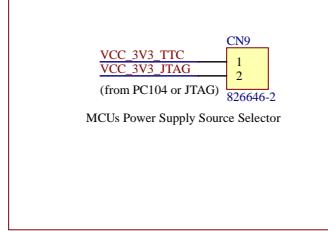
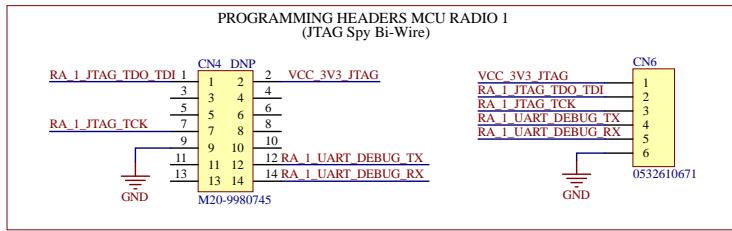
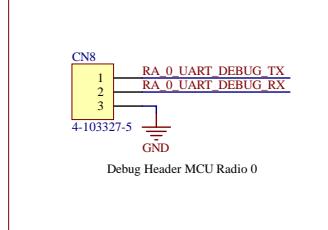
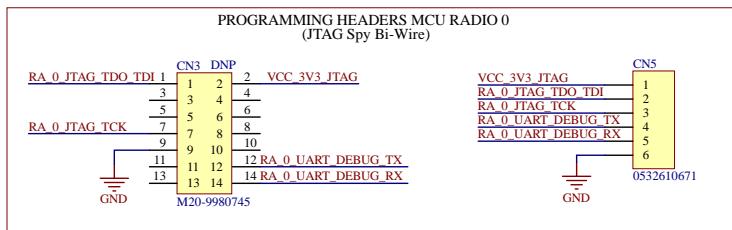
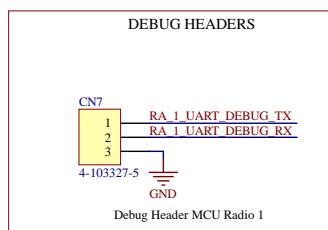
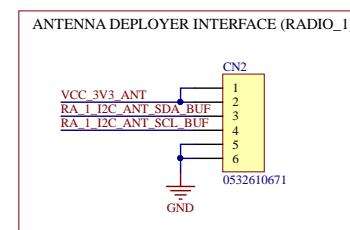
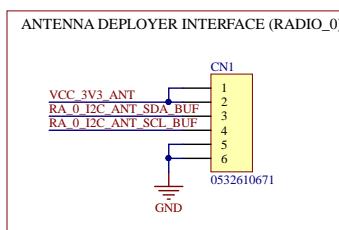
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To view a copy of this license, visit
<https://github.com/spacelab-ufsc/ttc2/blob/master/hardware/LICENSE>

Github repository: <https://github.com/spacelab-ufsc/ttc2>

More info about SpaceLab: <https://spacelab.ufsc.br/>

Project Information

SpaceLab - Federal University of Santa Catarina			
Project: ttc2_project.prjpcb / [No Variations]			
Title: Hardware Architecture			
Designed by: André M. P. Mattos			
Date: 6/15/2021	Revision: v0.1	Sheet 0 of 6	Size: A4



SpaceLab - Federal University of Santa Catarina			
Project: <i>ttc2_project.prjpcb</i> / [No Variations]			
Title: <i>Interface</i>			
Engineer: <i>André M. P. Mattos</i>			
Date: <i>6/15/2021</i>	Revision: <i>v0.1</i>	Sheet <i>1</i> of <i>6</i>	Project Code: <i>TTC2</i>
Size: <i>A3</i>			

A

A

B

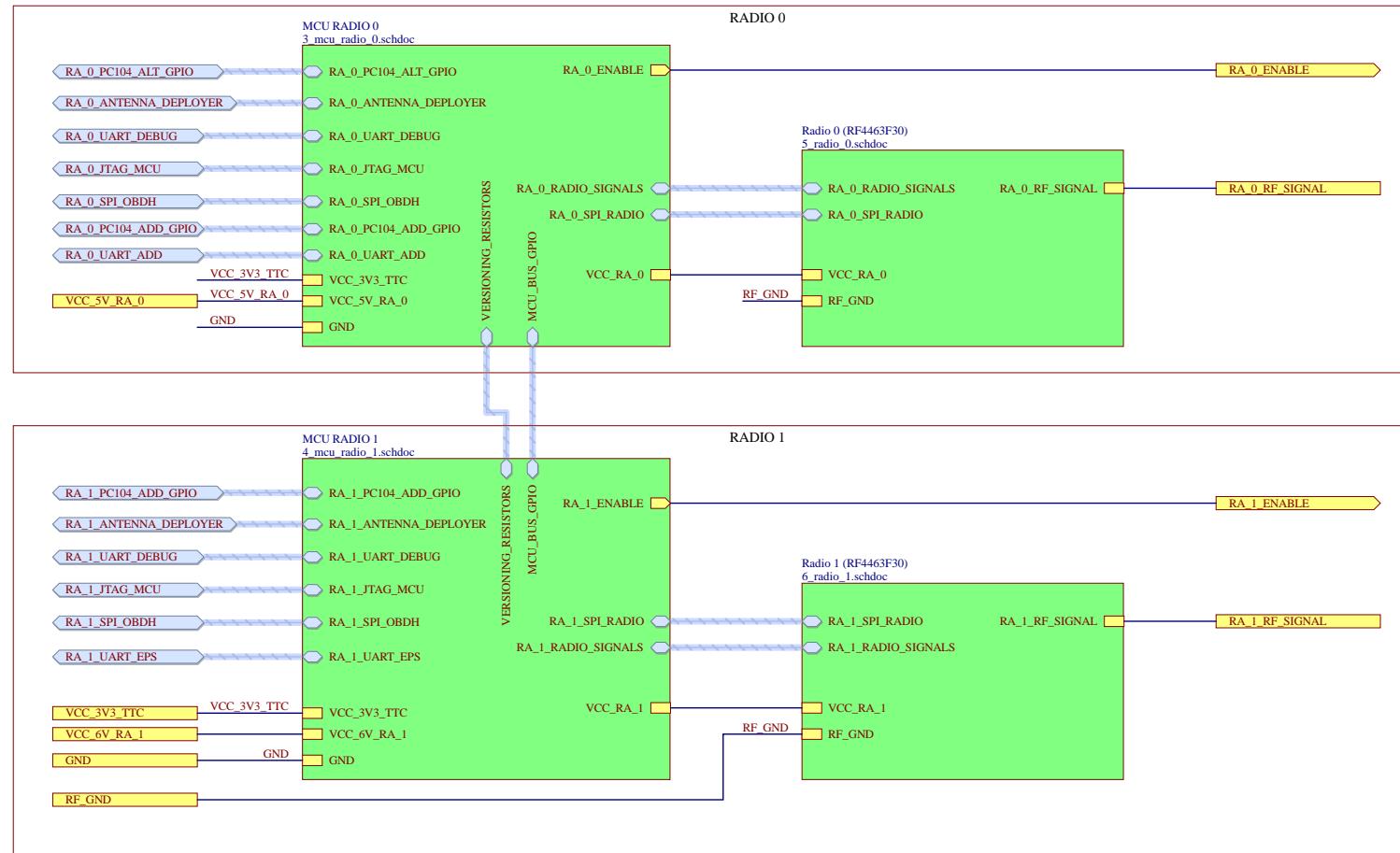
B

C

C

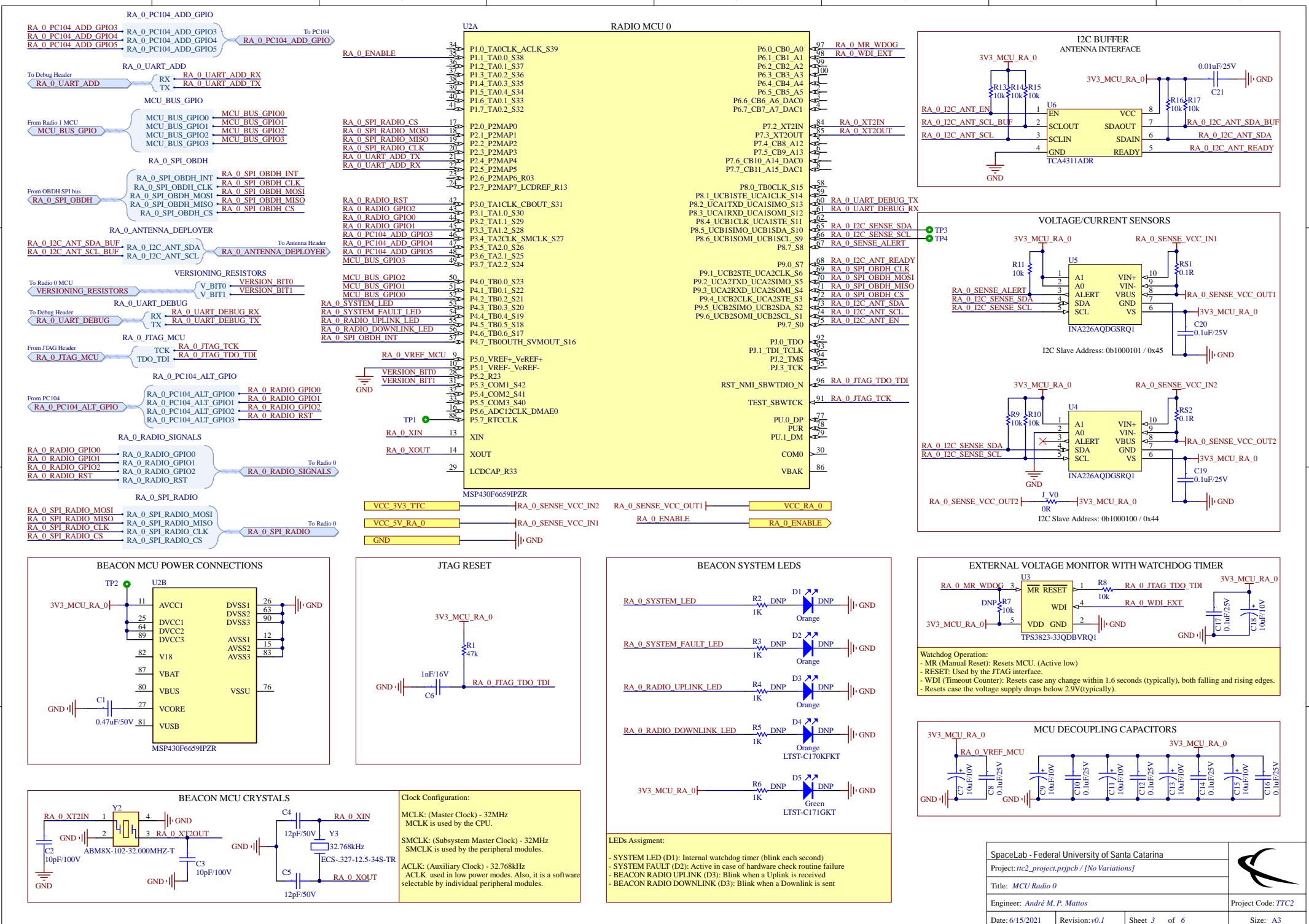
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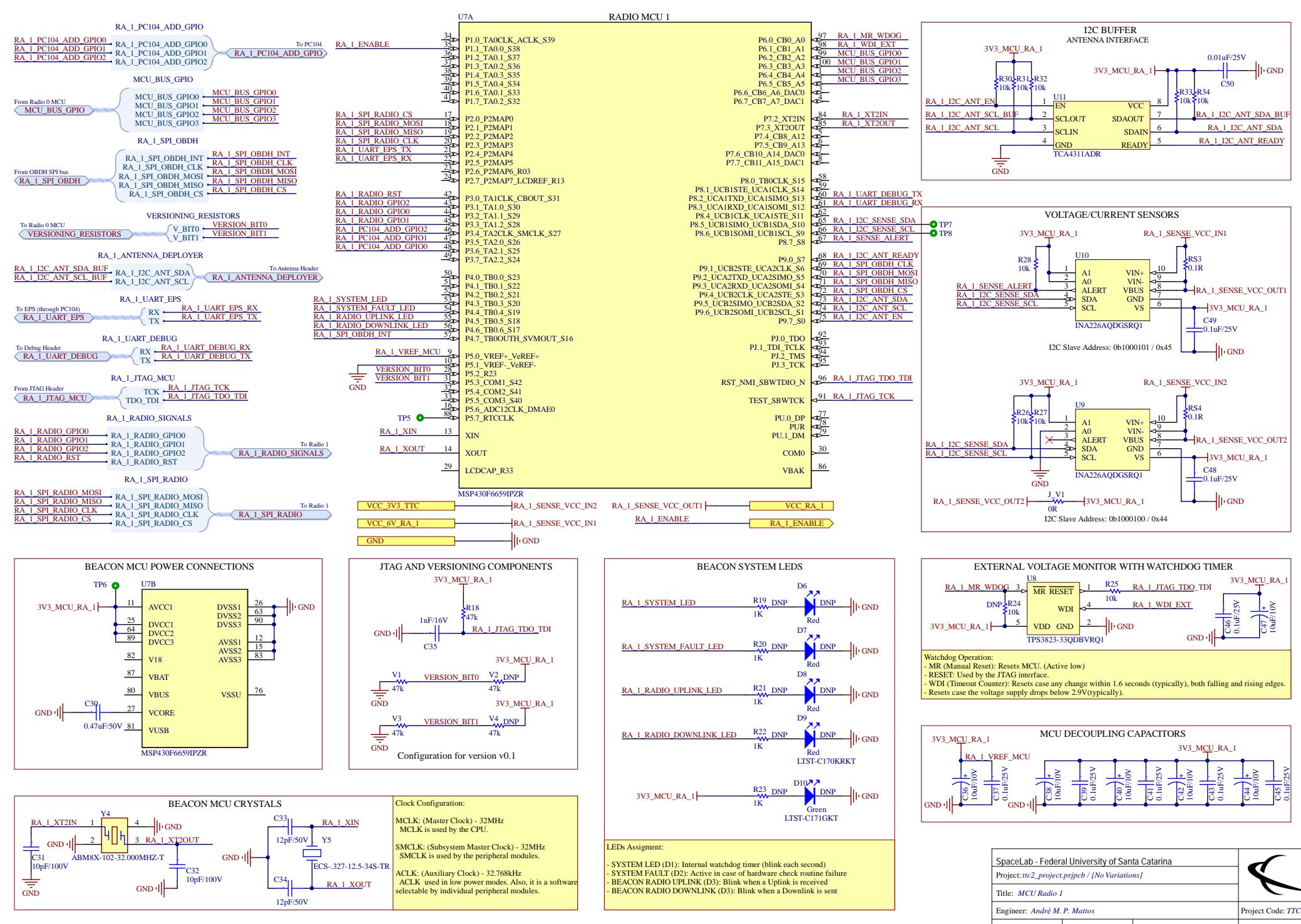
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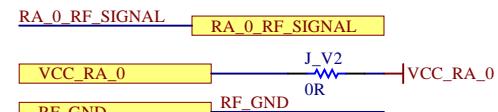
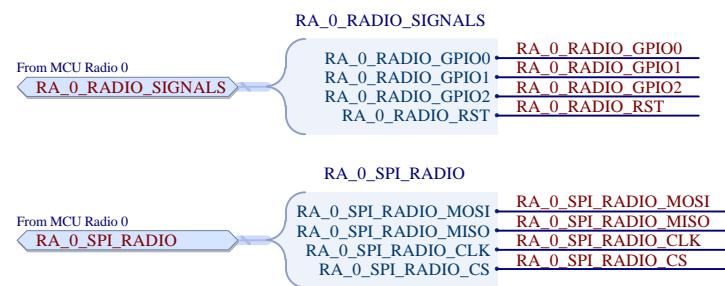
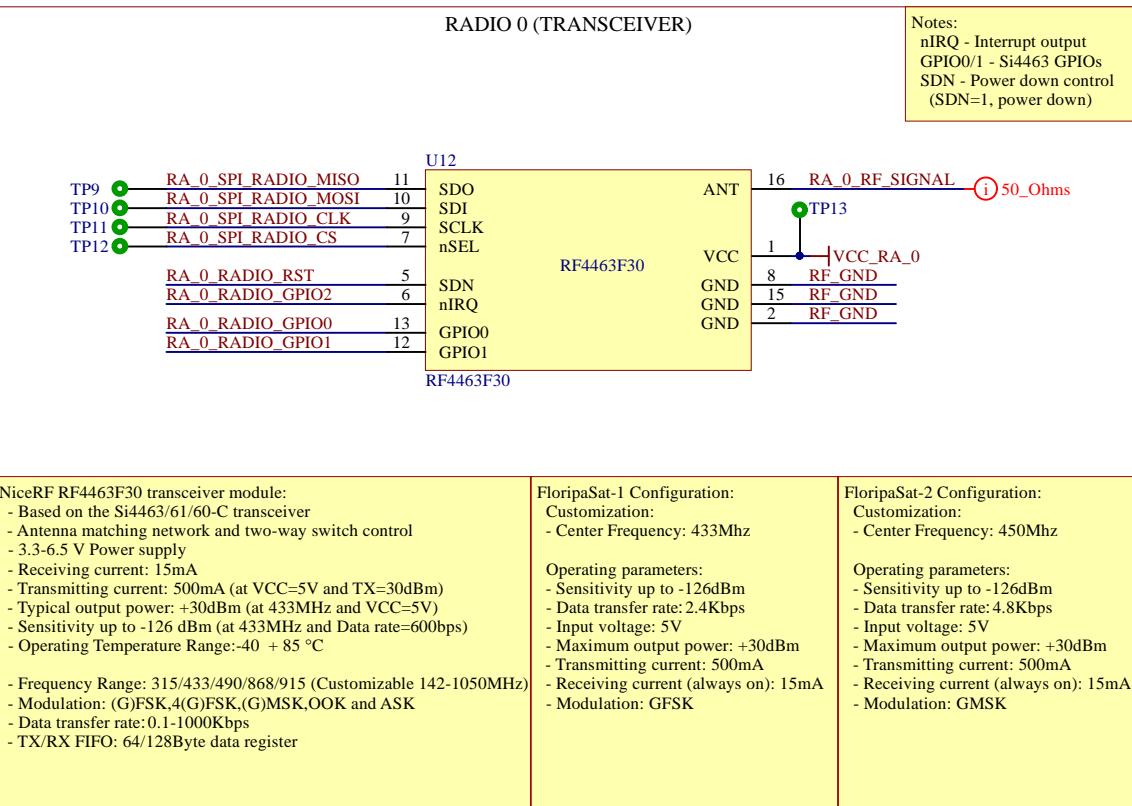
SpaceLab - Federal University of Santa Catarina		
Project: ttc2_project.prjpcb / [No Variations]		
Title: Topology		
Engineer: André M.P. Mattoz		
Date: 6/15/2021	Revision:v0.1	Sheet 2 of 6
Size: A3		







A



SpaceLab - Federal University of Santa Catarina			
Project: ttc2_project.prjpcb / [No Variations]			
Title: Radio 0			
Designed by: André M. P. Mattos			
Date: 6/15/2021	Revision: v0.1	Sheet 5 of 6	Project Code: TTC2
Size: A4			

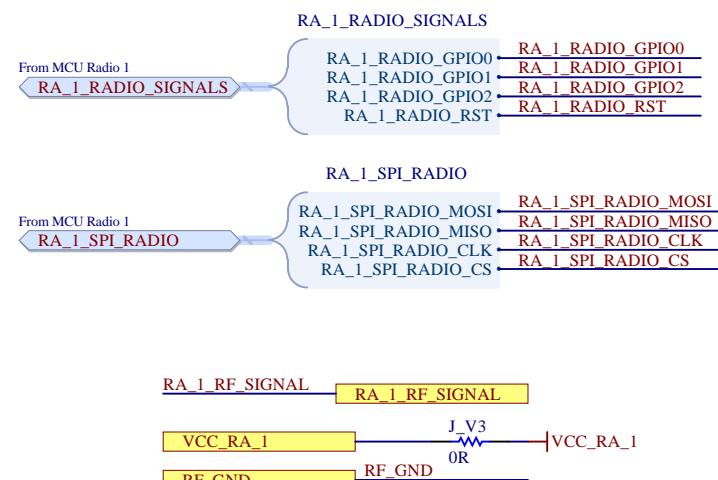
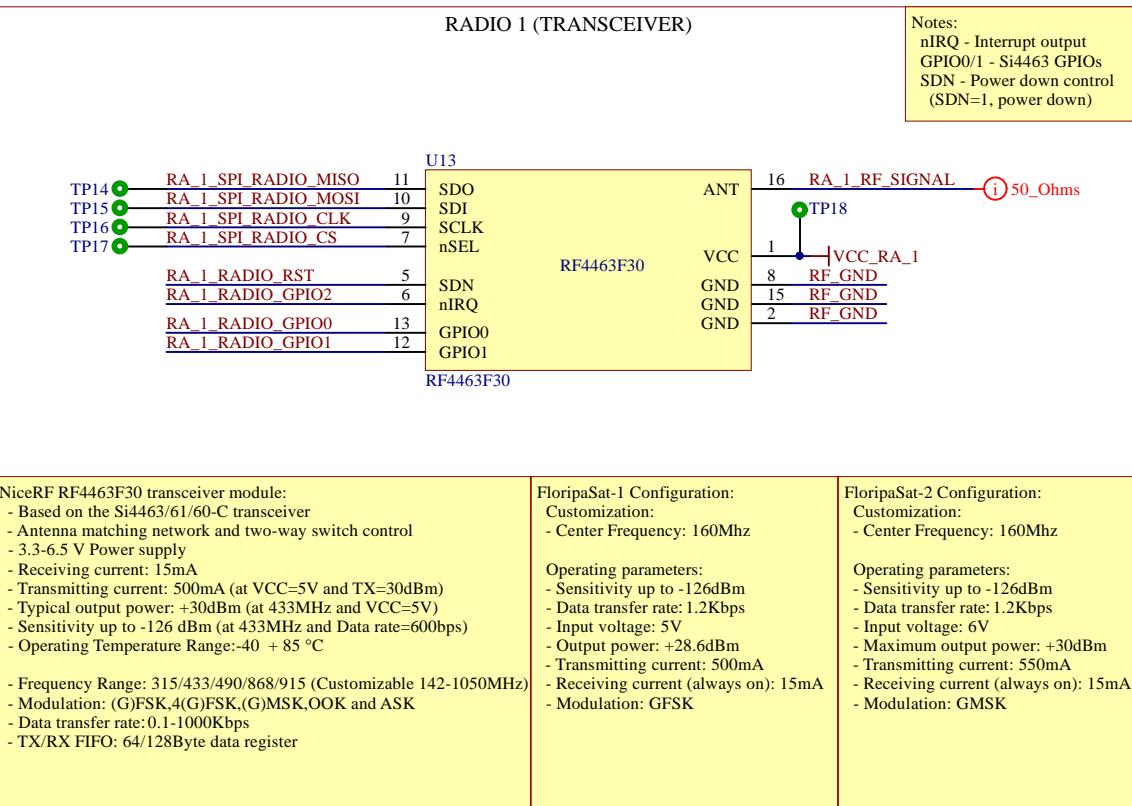
A

B

C

D

A



SpaceLab - Federal University of Santa Catarina			
Project: ttc2_project.prjpcb / [No Variations]			
Title: Radio 1			
Designed by: André M. P. Mattos			
Date: 6/15/2021	Revision: v0.1	Sheet 6 of 6	Project Code: TTC2
Size: A4			

A

B

C

D

A

A

B

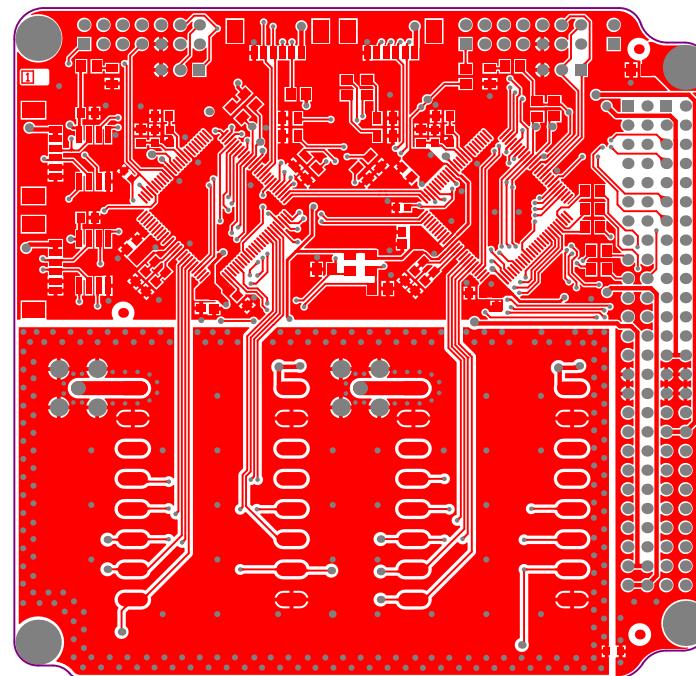
B

C

C

D

D



LAYER	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay		0.010mm		
2	Top Solder	Solder Resist	0.010mm	3.5	
3	Top Layer	Copper	0.035mm		
4	Dielectric		1.520mm	4.2	
5	Bottom Layer	Copper	0.035mm		
6	Bottom Solder	Solder Resist	0.010mm	3.5	
7	Bottom Overlay		0.010mm		

Fabrication specifications:

- Copper base 10Z
- PCB Material: Prepeg FR4—Standard
- PCB Thickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Blue
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

Assembly specifications:

- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom available
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina	
Project: TTC2	
Layer: Top Layer Board Edge	
Designed by: Andre M. P. Mattos	Project Code: TTC2
Date: 6/15/2021	Version: v0.1
	Size: A4

A

B

C

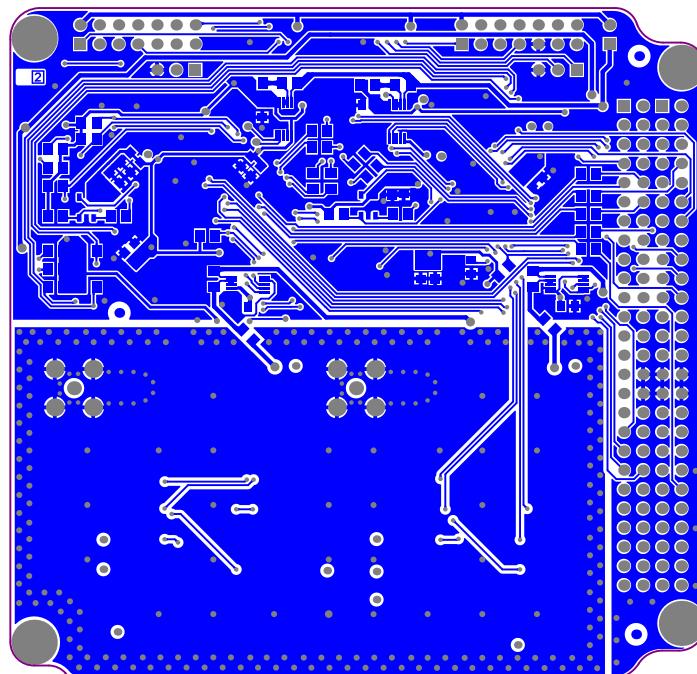
D

A

B

C

D



LAYER	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay				
2	Top Solder	Solder Resist	0.010mm	3.5	
3	Top Layer	Copper	0.035mm		
4	Dielectric		1.520mm	4.2	
5	Bottom Layer	Copper	0.035mm		
6	Bottom Solder	Solder Resist	0.010mm	3.5	
7	Bottom Overlay				

Fabrication specifications:

- Copper base 10Z
- PCB Material: Prepeg FR4—Standard
- PCB Thickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Blue
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

Assembly specifications:

- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom available
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina	
Project: TTC2	
Layer: Bottom Layer Board Edge	
Designed by: Andre M. P. Mattos	
Date: 6/15/2021	Project Code: TTC2
Version: v0.1	Size: A4

A

A

B

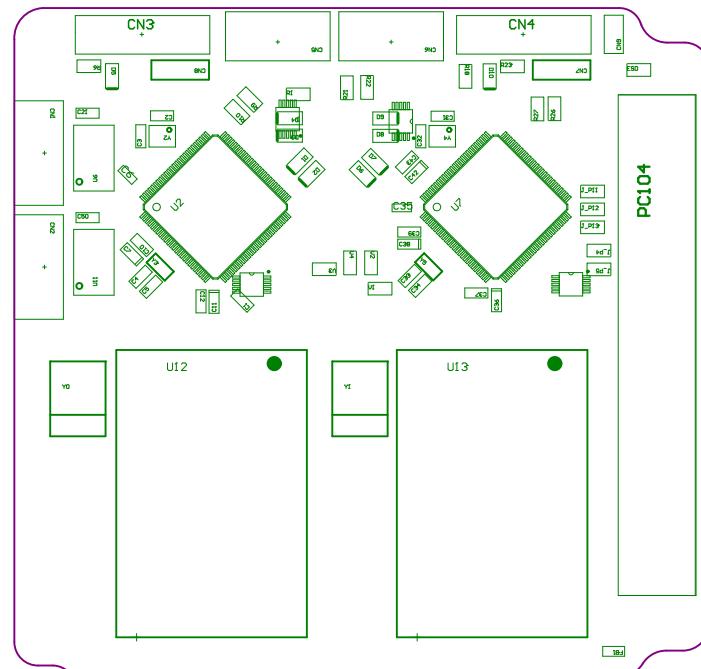
B

C

C

D

D



LAYER	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay		0.010mm	3.5	
2	Top Solder	Solder Resist	0.010mm	3.5	
3	Top Layer	Copper	0.035mm		
4	Dielectric		1.520mm	4.2	
5	Bottom Layer	Copper	0.035mm		
6	Bottom Solder	Solder Resist	0.010mm	3.5	
7	Bottom Overlay		0.010mm		

Fabrication specifications:

- Copper base 10Z
- PCB Material: Prepeg FR4—Standard
- PCB Thickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Blue
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

Assembly specifications:

- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom available
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina

Project: TTC2

Layer: **ASM Top** **Board Edge**

Designed by: Andre M. P. Mattos

Project Code: TTC2

Date: 6/15/2021

Version: v0.1

Size: A4

A

A

B

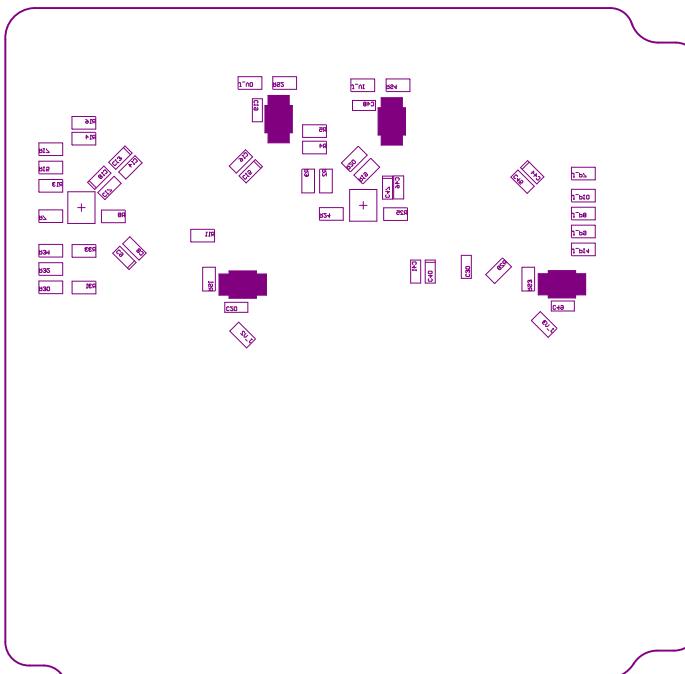
B

C

C

D

D



LAYER	Name	Material	Thickness	Constant	Board Layer Stack
1	Top Overlay				
2	Top Solder	Solder Resist	0.010mm	3.5	
3	Top Layer	Copper	0.035mm		
4	Dielectric		1.520mm	4.2	
5	Bottom Layer	Copper	0.035mm		
6	Bottom Solder	Solder Resist	0.010mm	3.5	
7	Bottom Overlay				

Fabrication specifications:

- Copper base 1OZ
- PCB Material: Prepeg FR4—Standard
- PCB Thickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Blue
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

Assembly specifications:

- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom available
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina



Project: TTC2

Layer: ASM Bottom Board Edge

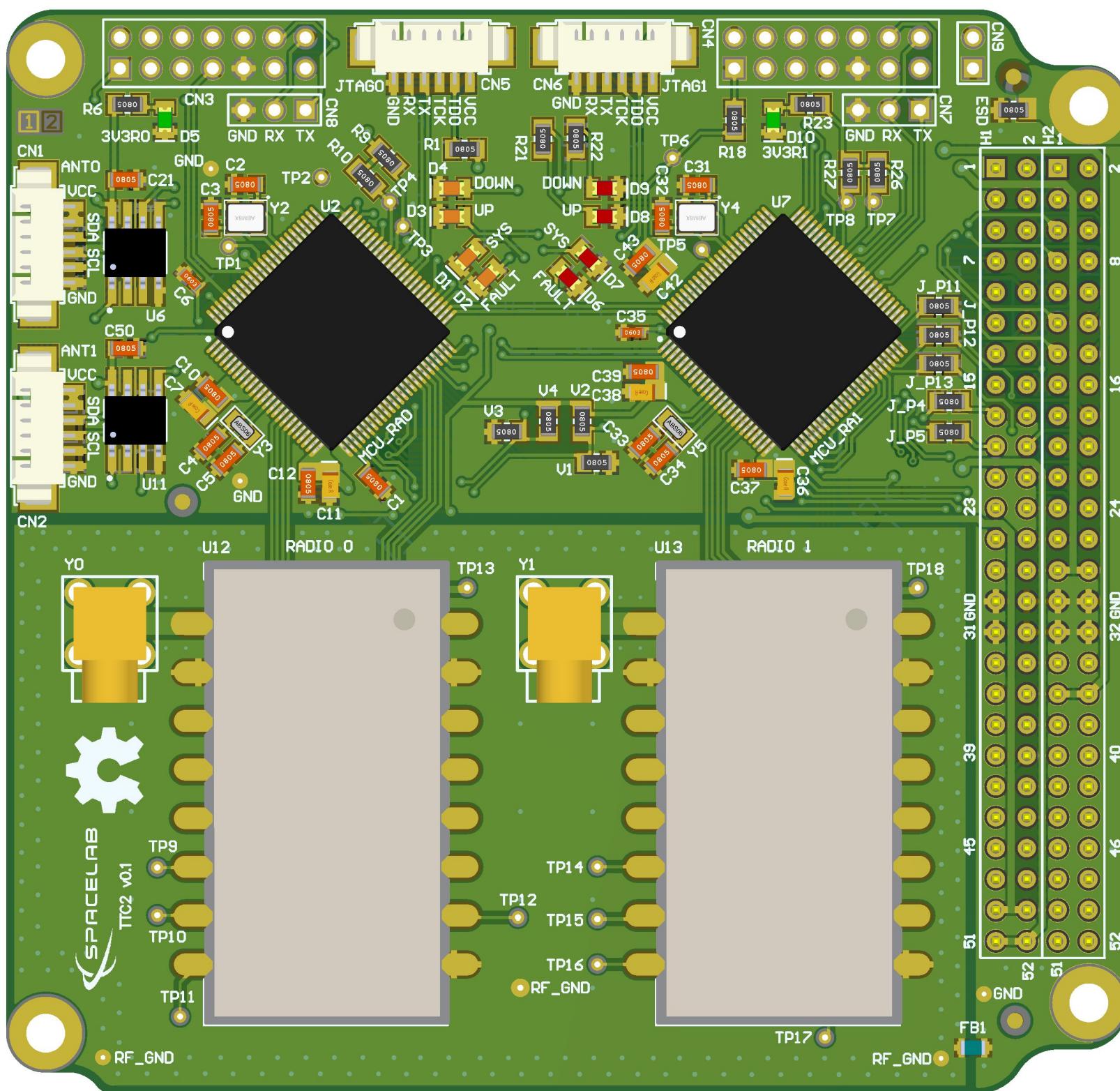
Project Code: TTC2

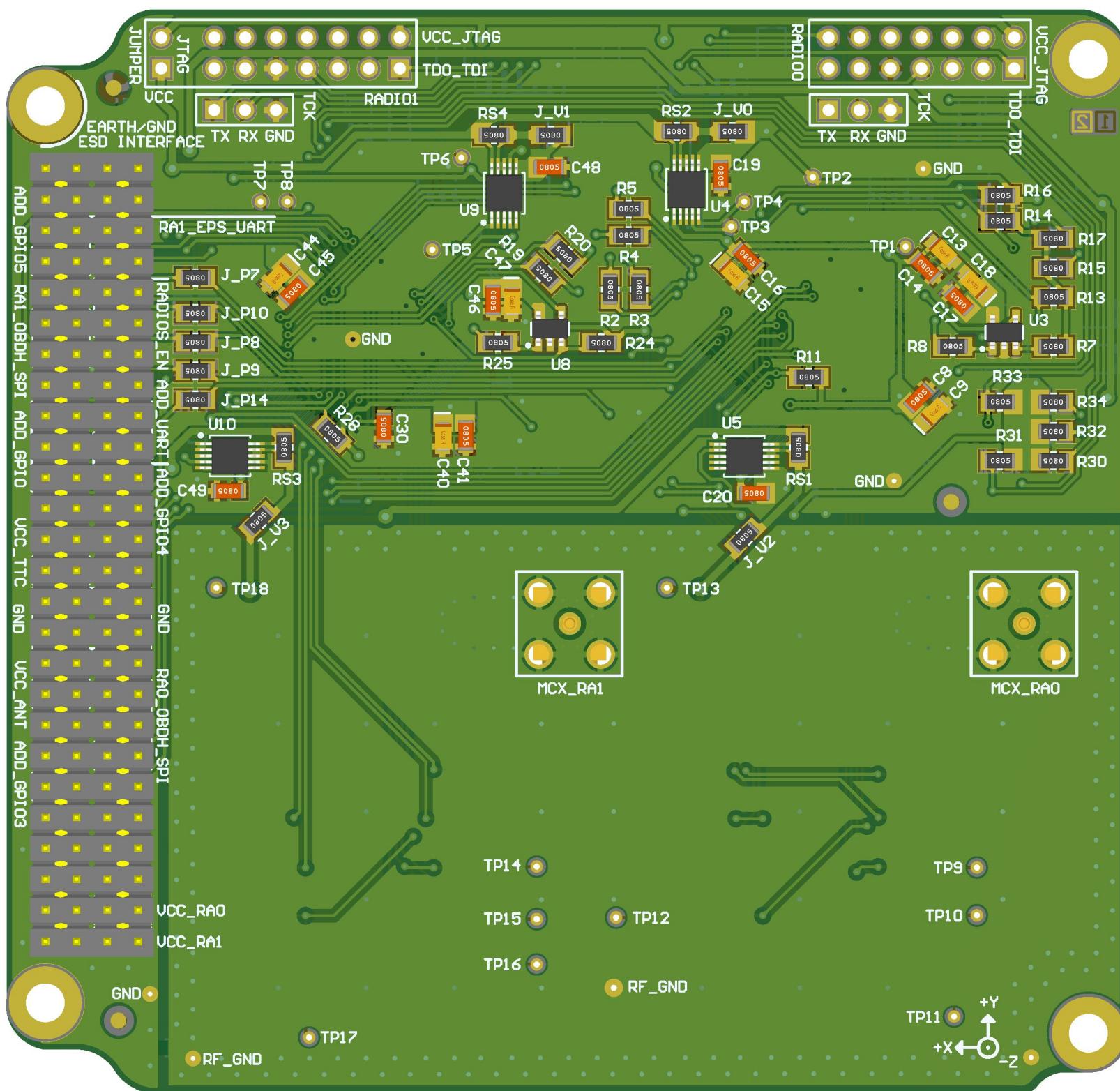
Designed by: Andre M. P. Mattos

Size: A4

Date: 6/15/2021

Version: v0.1







Bill of Materials

Source Data From:	ttc2_project.prjpcb
Project:	ttc2_project.prjpcb
Variant:	None
Project Code:	TTC2
Report Date:	6/15/2021 6:01:15 PM
Print Date:	15/06/2021 18:01:32

#	Designator	Quantity	Manufacturer	Manufacturer Part Number	Partnumber	Description	Column Name Error:Pa	Footprint	Column Name Error:Pa	Fitted
1	R7, R8, R9, R10, R11, R13, R14, R15, R16, R17, R24, R25, R26, R27, R28, R30, R31, R32, R33, R34	20			CRCW080510K0FKEA	RES 10K OHM 1/8W 1% 0805		0805		Fitted
2	C8, C10, C12, C14, C16, C17, C19, C20, C37, C39, C41, C43, C45, C46, C48, C49	16			CC0805KRX7R8BB104	CAP CER 0.1UF 25V 10% X7R 0805		CC0805		Fitted
3	J_P4, J_P5, J_P7, J_P8, J_P9, J_P10, J_P11, J_P12, J_P13, J_P14, J_V0, J_V1, J_V2, J_V3	14			CRCW08050000Z0EA	RES OR OHM 1/8W JUMPER 0805		0805		Fitted
4	C7, C9, C11, C13, C15, C18, C36, C38, C40, C42, C44, C47	12			TPSP106M010R2000	CAP Tantalum 10uF 10V 20% 0805		CC0805_Tantalum		Fitted
5	R2, R3, R4, R5, R6, R19, R20, R21, R22, R23	10			RC0805FR-071KL	RES 1.0 OHM 1/8W 1% 0805		0805		Fitted
6	R1, R18, V1, V2, V3, V4	6			RC0805FR-0747KL	RES 47k OHM 1/8W 1% 0805		0805		Fitted
7	RS1, RS2, RS3, RS4	4			SR732ATTER100F	RES 0.1R OHM 1/3W 1% 0805		0805		Fitted
8	C2, C3, C31, C32	4			08051A100FA72A	CAP CER 10pF 100V 0805		CC0805		Fitted
9	C4, C5, C33, C34	4			CL21C120FBANNNC	CAP CER 12pF 50V 0805		CC0805		Fitted
10	CN1, CN2, CN5, CN6	4			0532610671	PicoBlade 6 Position Right Angle Connector Header Surface Mount 0.049" (1.25mm)		PICOBLADE 6PIN Right Angle		Fitted
11	U4, U5, U9, U10	4	Texas Instruments		INA226AQIDGSRQ1	High-Side Measurement, Bi-Directional Current/Power Monitor w/I2C Interface		DGS10		Fitted
12	D1, D2, D3, D4	4			LTST-C170KFKT	LED Orange SMD - Orange 605nm LED Indication - Discrete 2V 0805 (2012 Metric)		0805-ORANGE-LED		Fitted
13	D6, D7, D8, D9	4			LTST-C170KRKT	LED Red SMD - Red 631nm LED Indication Discrete 2V 0805 (2012 Metric)		0805-RED-LED		Fitted
14	C21, C50	2			CL21B103KAANNNC	CAP CER 0.01uF 25V 10% X7R 0805		CC0805		Fitted
15	C1, C30	2			C0805C474K5RACTU	CAP CER 0.47uF 50V 10% X7R 0805		CC0805		Fitted
16	C6, C35	2			C0603X102J4RECAUTO	CAP CER 1nF 16V 0603 5%		CC0603		Fitted
17	CN7, CN8	2	TE Connectivity AMP	4-103327-5	4-103327-5	Connector Header Through Hole 3 position 0.100" (2.54mm)		HDR 1X3		Fitted
18	Y2, Y4	2			ABM8X-102-32.000MHZ-T	32MHz ±10ppm Crystal 10pF 60 Ohm -40°C - 125°C		XTAL_ABM8X		Fitted
19	Y0, Y1	2			133-3701-311	MCX Connector Jack, Female Socket 50Ohm Through Hole, Right Angle Solder		CONN MCX JACK R/A 50 OHM SMD		Fitted
20	Y3, Y5	2			ECS-327-12.5-34S-TR	32.768kHz ±20ppm Crystal 12.5pF 70 KOhm -40°C - 125°C		ABS06 0805		Fitted
21	D5, D10	2			LTST-C171GKT	Connector Header Through Hole 14 position 0.100" (2.54mm)		0805-GREEN-LED		Fitted
22	CN3, CN4	2	Harwin	M20-9980745		Connector Header Through Hole 14 position 0.100" (2.54mm)		CONN HEADER VERT 14POS 2.54MM		Fitted
23	U2, U7	2	Texas Instruments		MSP430F6659IP2R	CPUXV2 series Microcontroller IC 16-Bit 20MHz 512KB (512K x 8) FLASH 100-LOPF (14x14)		LOFP-100		Fitted
24	U12, U13	2			RF4463F30	RF4463F30 High Power Wireless Transceiver Module		RF4463F30		Fitted
25	U6, U11	2			TCA4311ADR	IC SIGNAL BUFFER I2C 8SOIC HOTSWAP		SOIC8		Fitted
26	U3, U8	2	Texas Instruments		TPS3823-33QDBVRQ1	Processor Supervisory Circuit, 1 Supply Monitored, -40 to 85 degC, 5-Pin SOT-23 (DBV), Green (RoHS & no Sb/Br)		DBV0005A_N		Fitted
27	ESD	1			RMCF0805FG1M00	RES 1000K OHM 1/8W 1% 0805		0805		Fitted
28	FB1	1			BLM21PG300SN1D	Ferrite Bead 30 OHM 4A 100MHz		IND0805		Fitted
29	CN9	1			826646-2	Connector Header Through Hole P2 position 0.100" (2.54mm)		HDR 1X2		Fitted
30	PC104	1			SSW-126-04-G-D	Connector Header Through Hole P2 position 0.100" (2.54mm) - PC104 used in the TTC module		PC104_TTC		Fitted