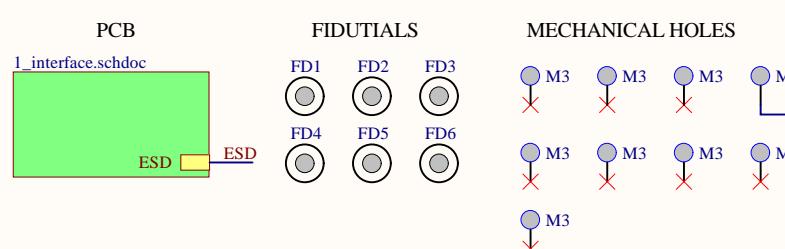


Rev	Description	Date	Author
0.1	- Initial release - Update beacon radio output - General updates for compliance with the SpaceLab hardware development standards	28-Aug-2020	Andre M. P. Mattos
0.2	- Added variant types for test and flight models, draftsman source and PDF output - Updated schematic templates	DD-MM-2021	Yan C. de Azeredo

Revision History



PCB Elements

EPS2 Hardware:

- Drawn by: André M. P. Mattos (updates from FloripaSat-I EPS)
- Based on FloripaSat-I OBDH designed by: Sara V. Martinez
- Reviewers: Kleber Gouveia and Yan C. Azeredo
- Support: Gabriel M. Marcelino

Project Contributions

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EPS2 Hardware
Based on the FloripaSat-I EPS

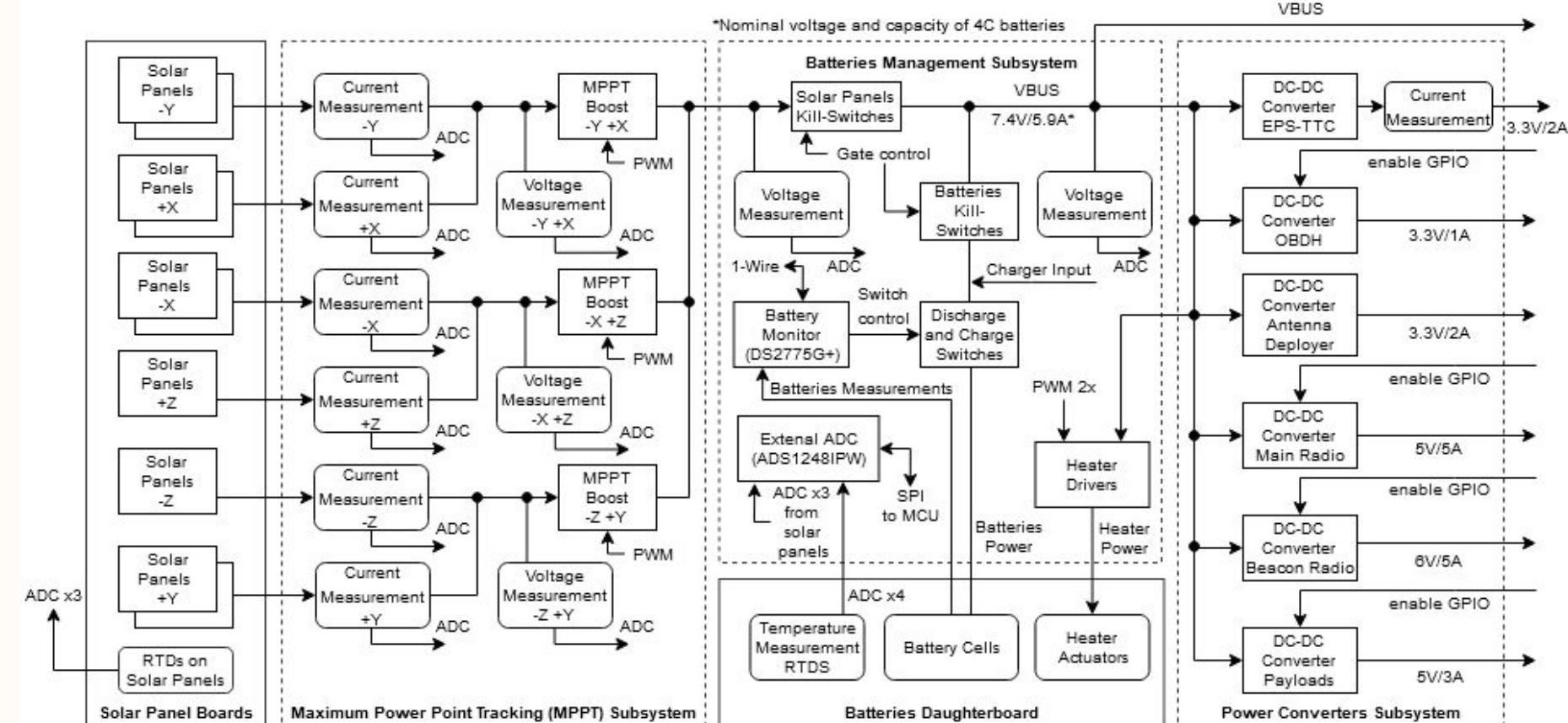
This work is licensed under the Creative Commons Attribution-ShareAlike 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-sa/4.0/>.

Github repository: <https://github.com/spacelab-ufsc/eps2>

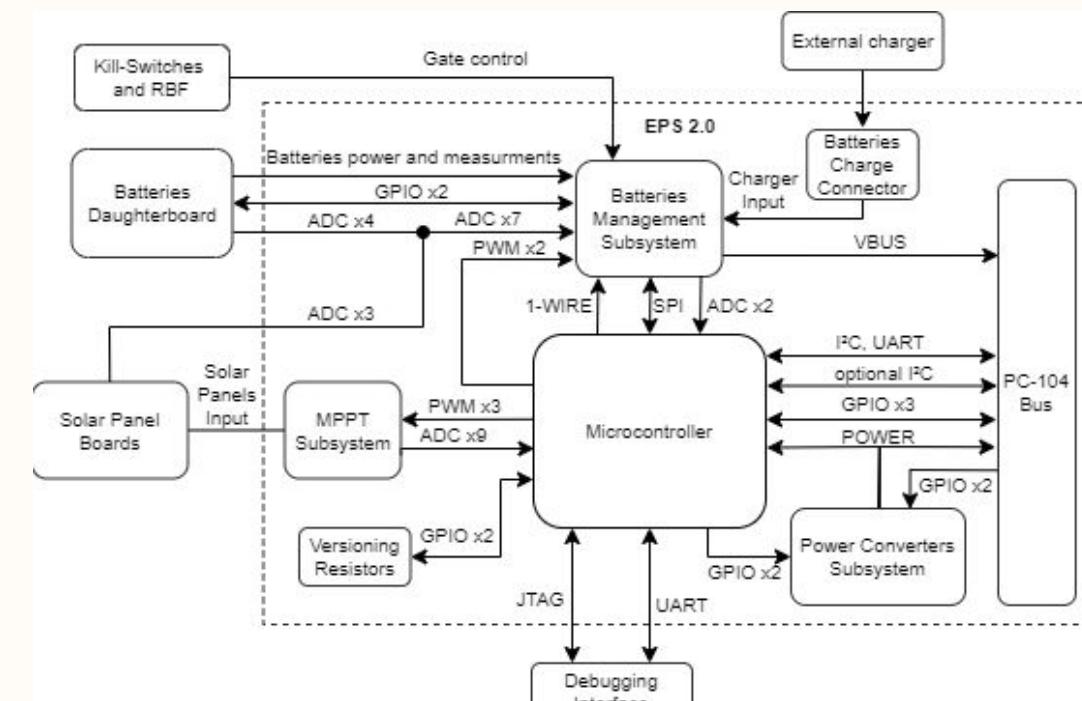
More info about SpaceLab: <https://spacelab.ufsc.br/>

Project Information

EPS 2 power diagram



EPS 2 MCU diagram



SpaceLab - Federal University of Santa Catarina

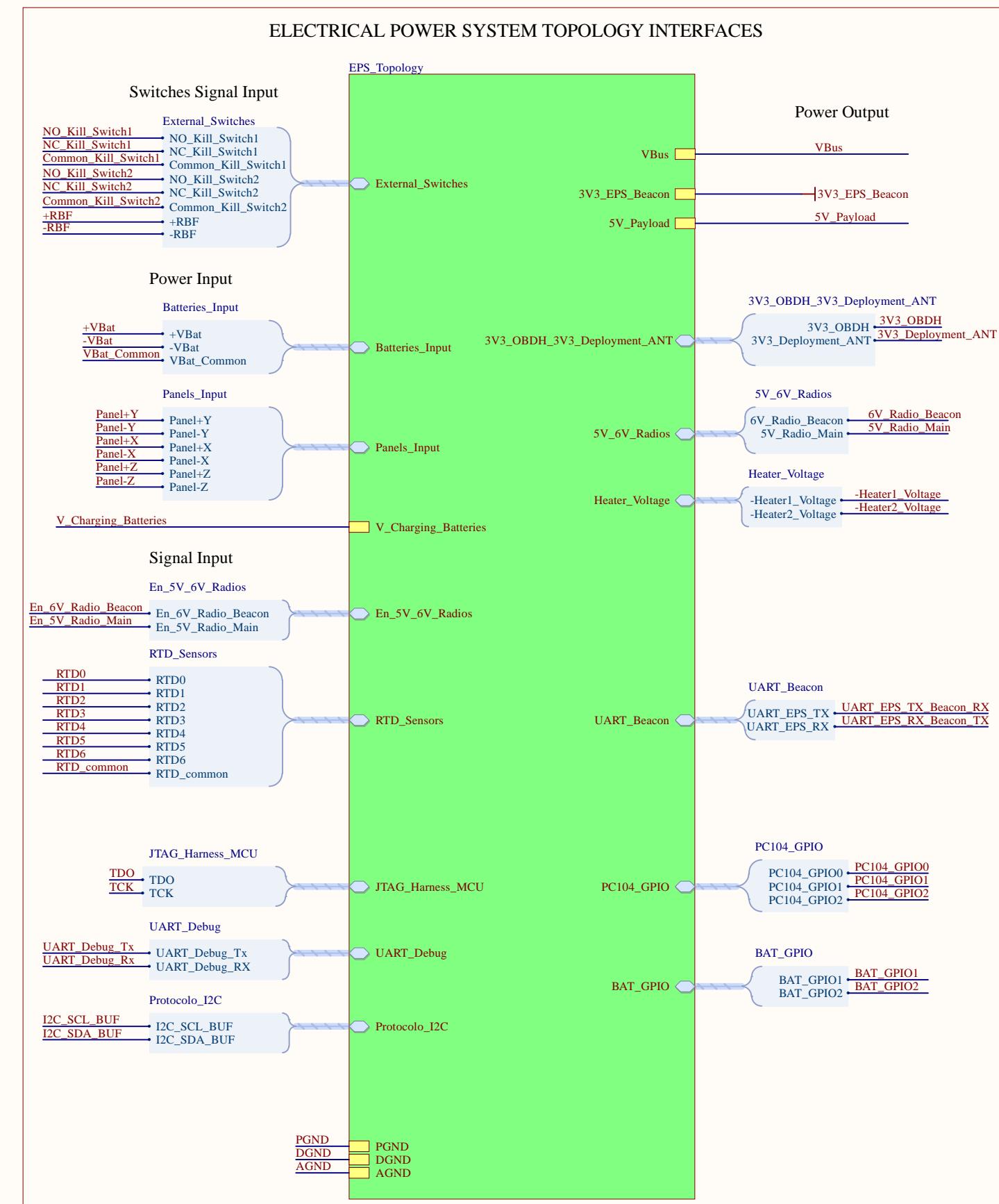
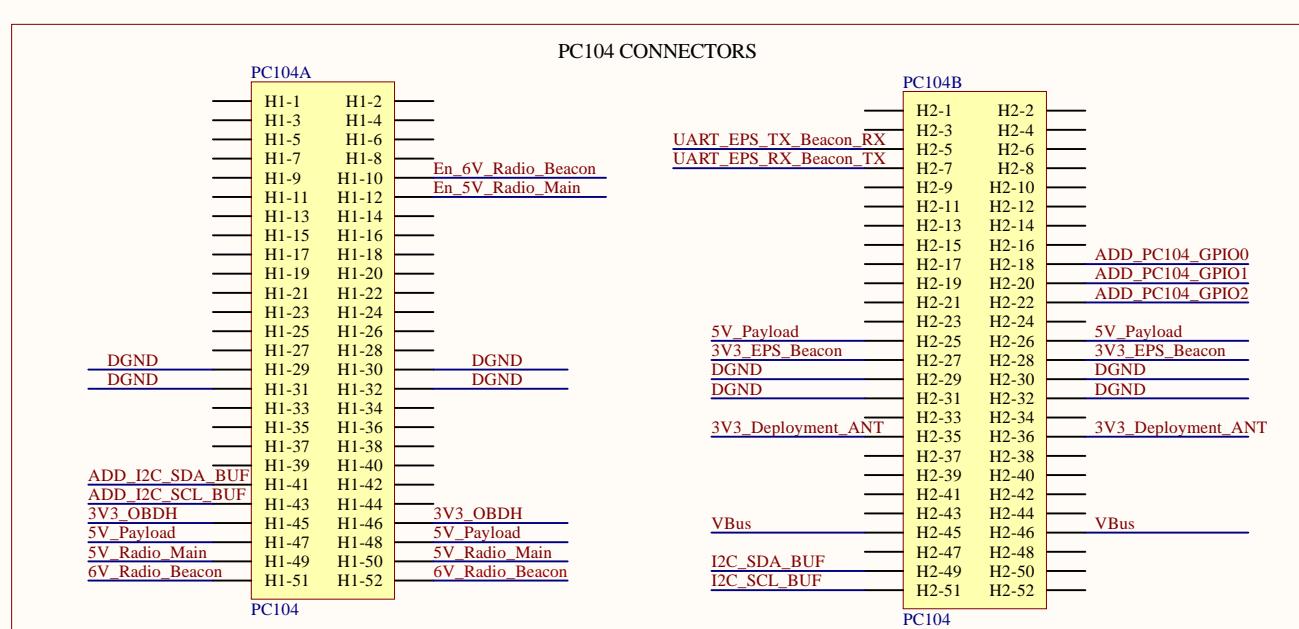
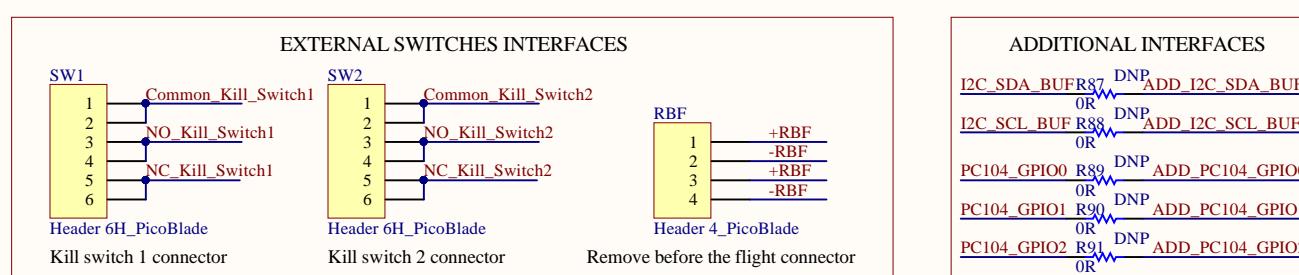
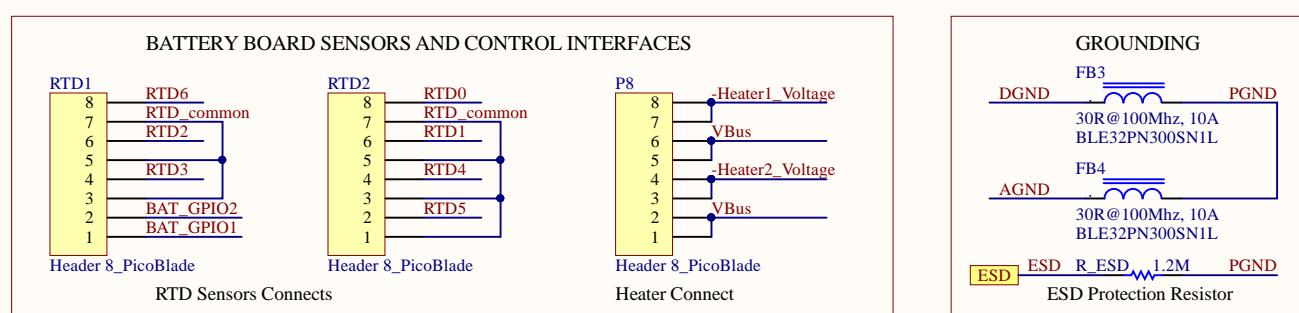
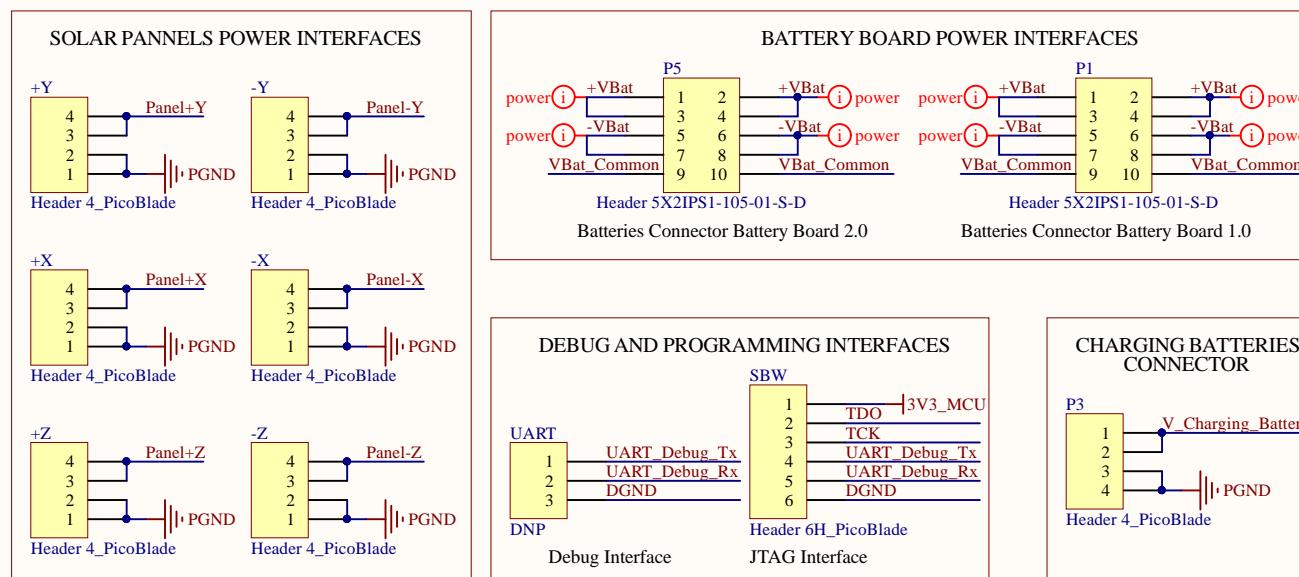
Project: [eps2_project.prjpcb](#) / [No Variations]

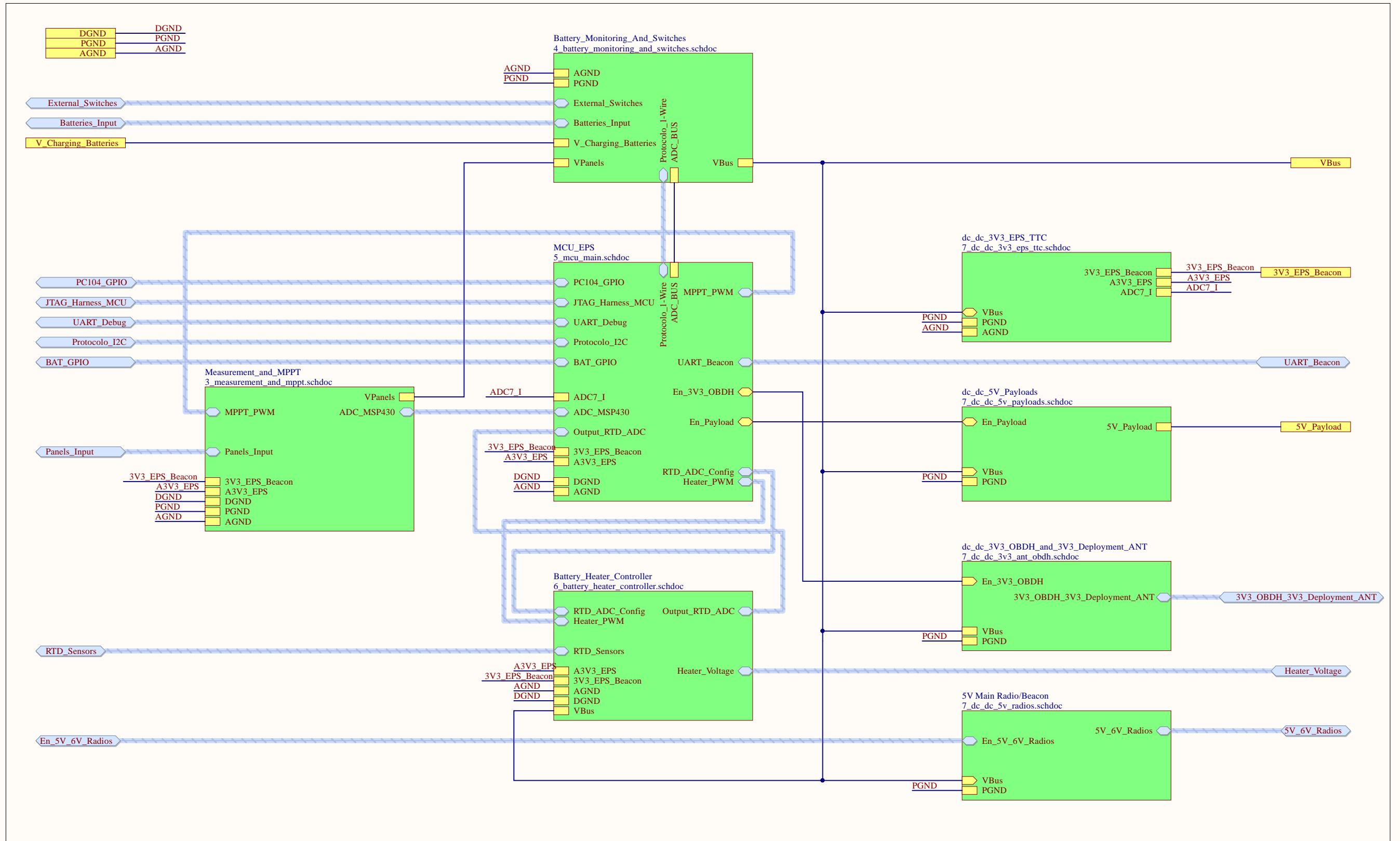
Title: [Block diagram](#)

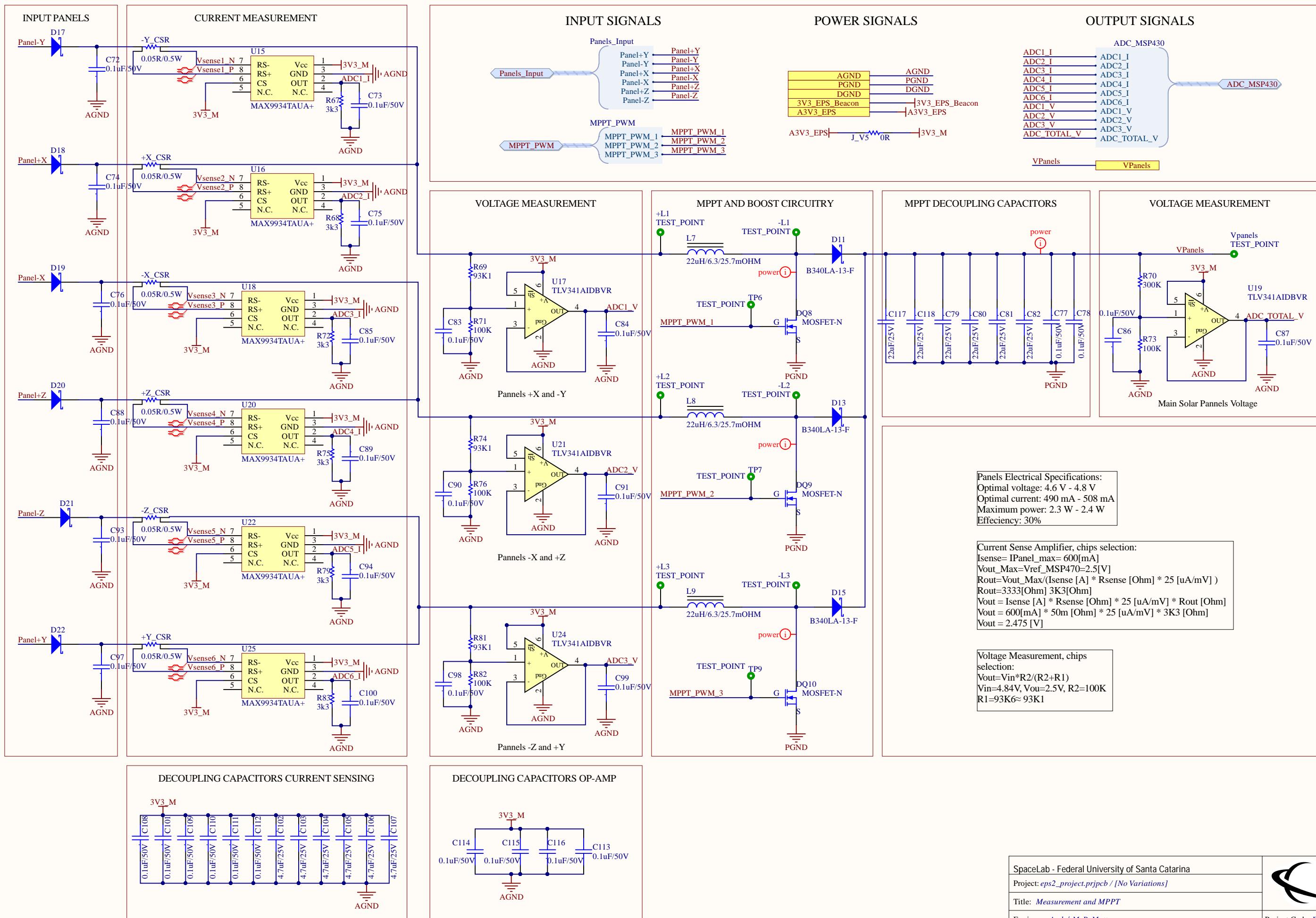
Engineer: [André M. P. Mattos](#)

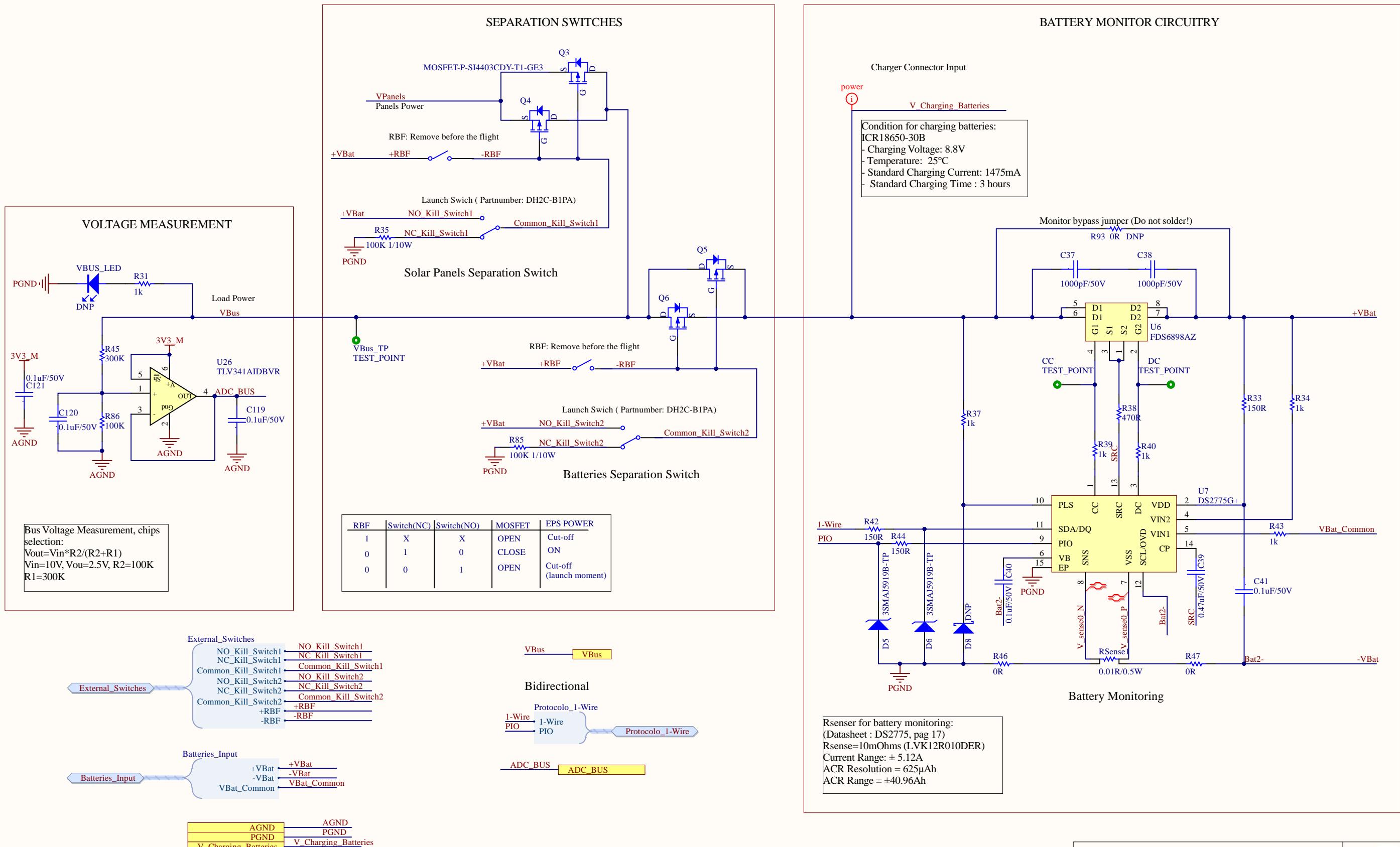
Date: 07/03/2021 Revision: v0.1 Sheet 1 of 11 Size: A3

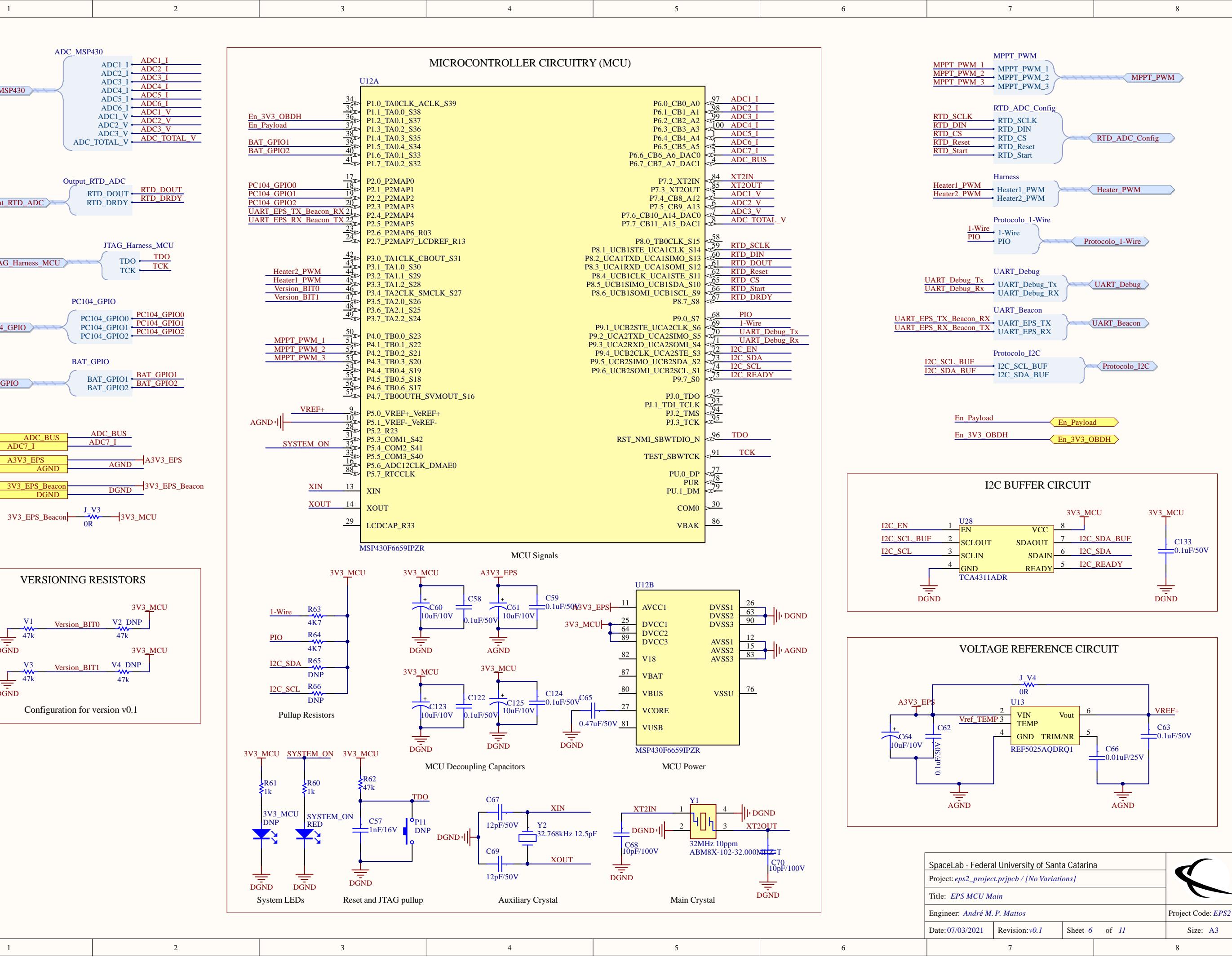


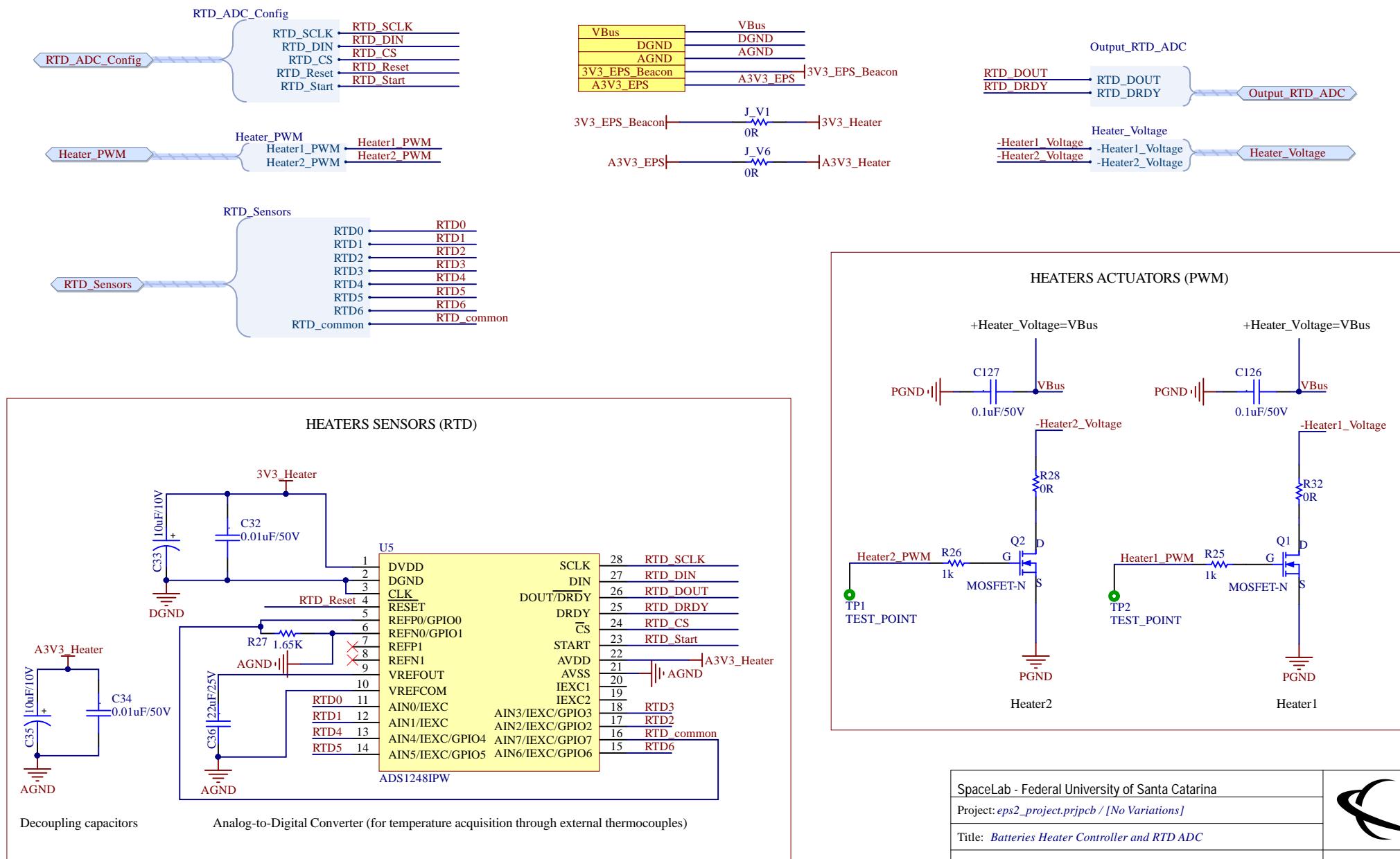


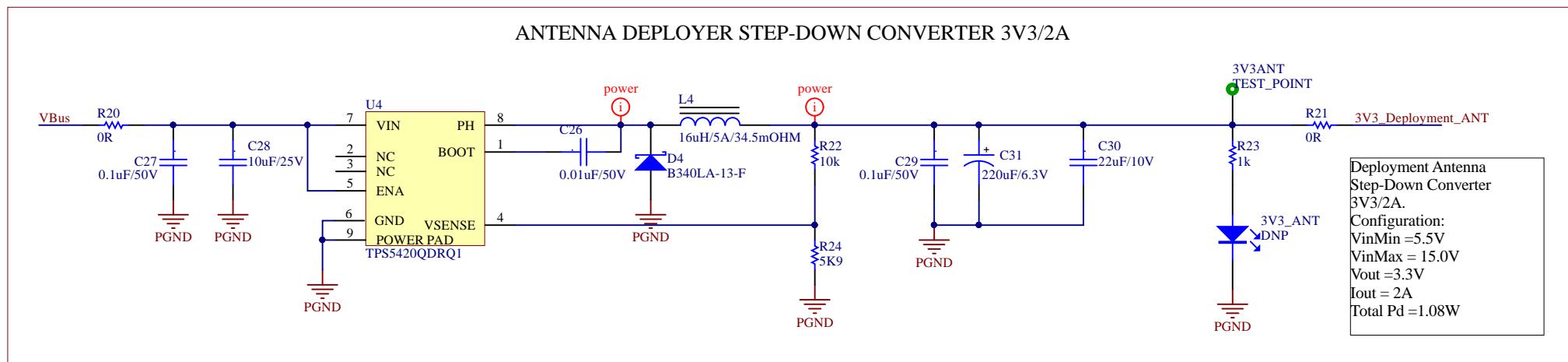
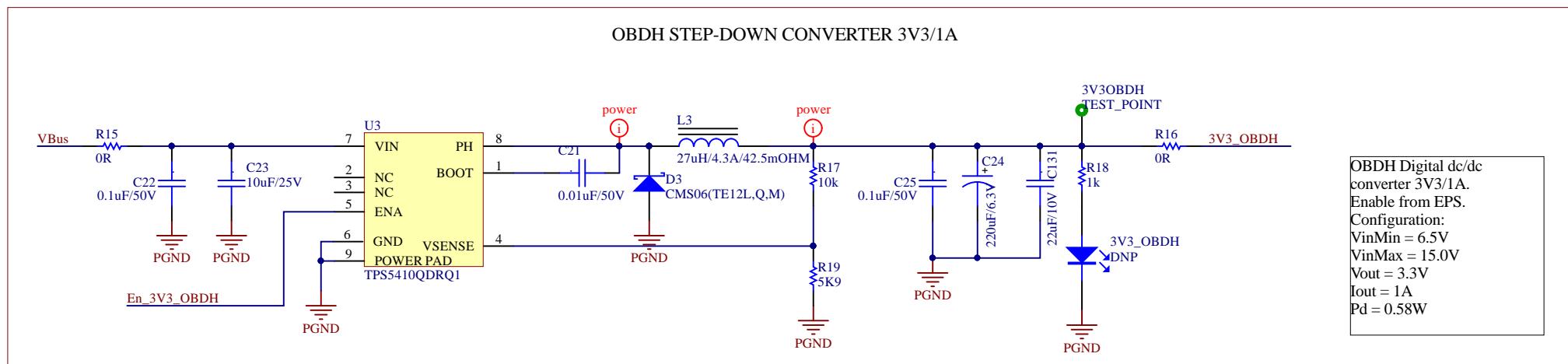










**Input****Output**

SpaceLab - Federal University of Santa Catarina

Project: *eps2_project.prjpcb* / [No Variations]Title: *OBDH and Antenna Deployment Step-Down (3V3/1A and 3V3/2A)*

Designed by: André M. P. Mattos

Project Code: *EPS2*

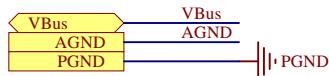
Date: 07/03/2021

Revision: v0.1

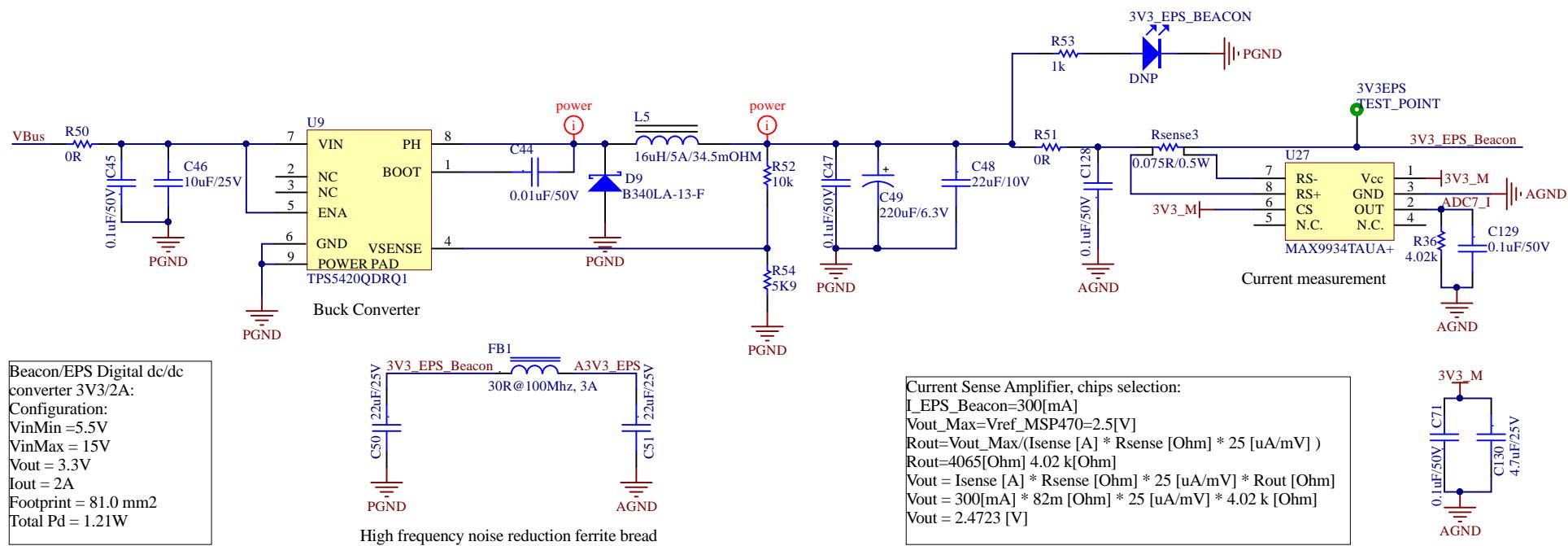
Sheet 8 of 11

Size: A4

A



EPS/BEACON STEP-DOWN CONVERTER 3V3/2A



SpaceLab - Federal University of Santa Catarina

Project: [eps2_project.prjpcb / \[No Variations\]](#)Title: [EPS/Beacon Step-Down Converter \(3V3/2A\)](#)

Designed by: André M. P. Mattos

Project Code: [EPS2](#)

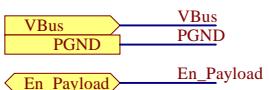
Date: 07/03/2021

Revision: v0.1

Sheet 9 of 11

Size: A4

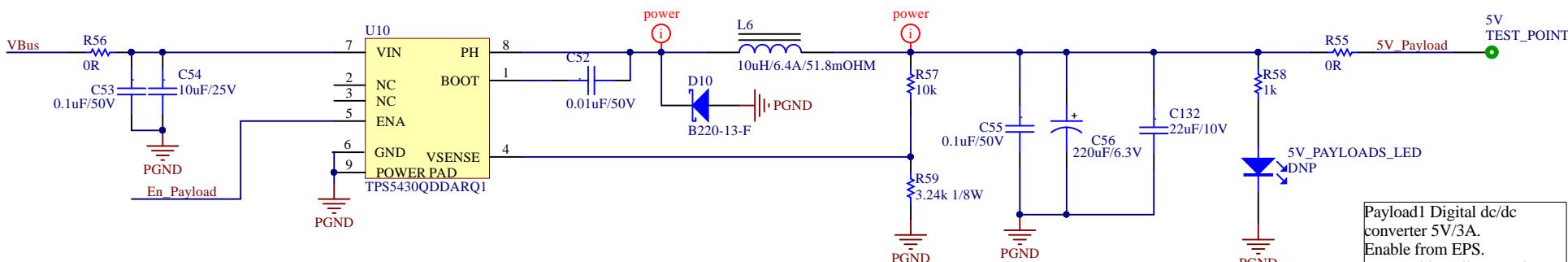
Input

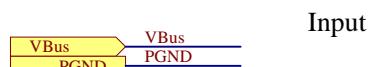
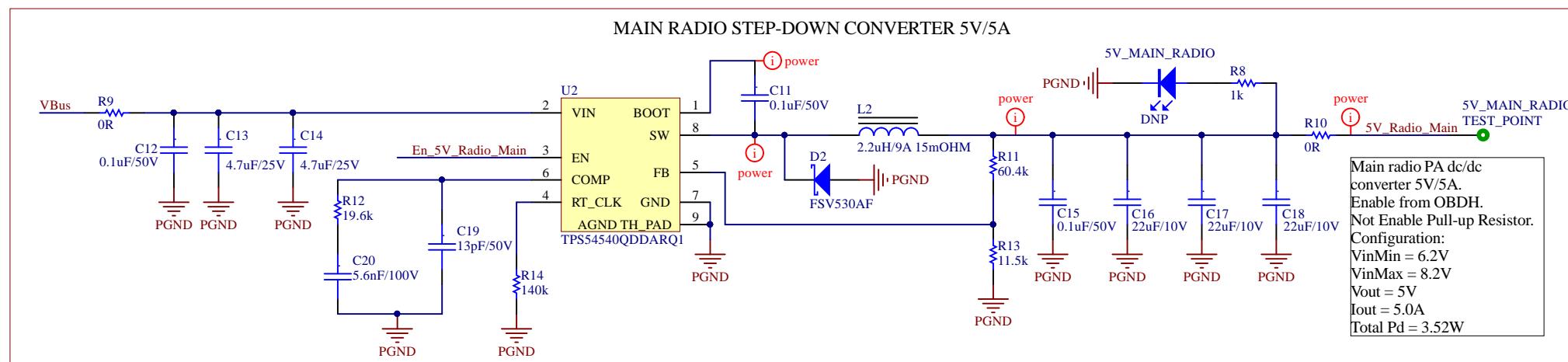
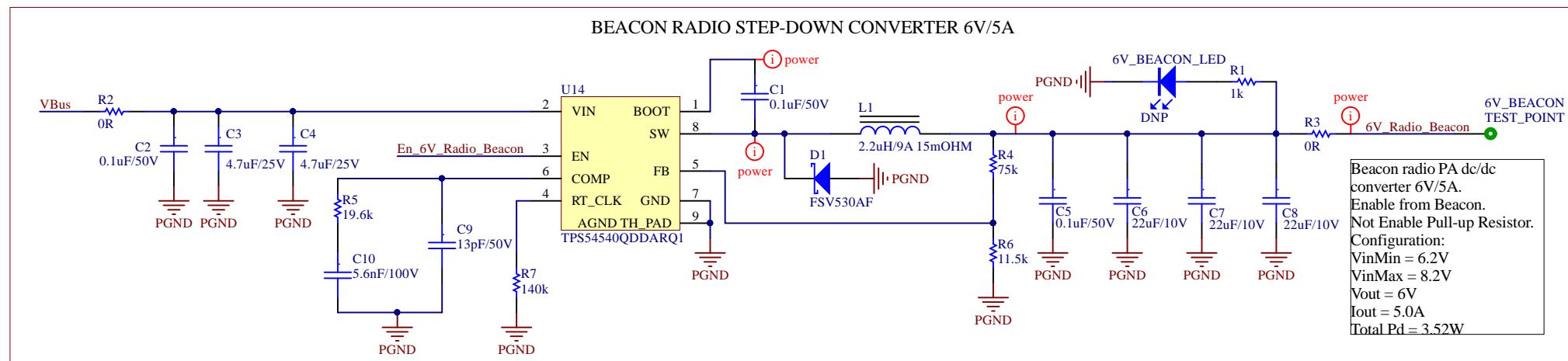


Output



PAYLOAD STEP-DOWN CONVERTER 5V/3A





En_5V_6V_Radios
En_5V_Radio_Beacon
En_5V_Radio_Main



SpaceLab - Federal University of Santa Catarina

Project: *eps2_project.prjpcb* / [No Variations]

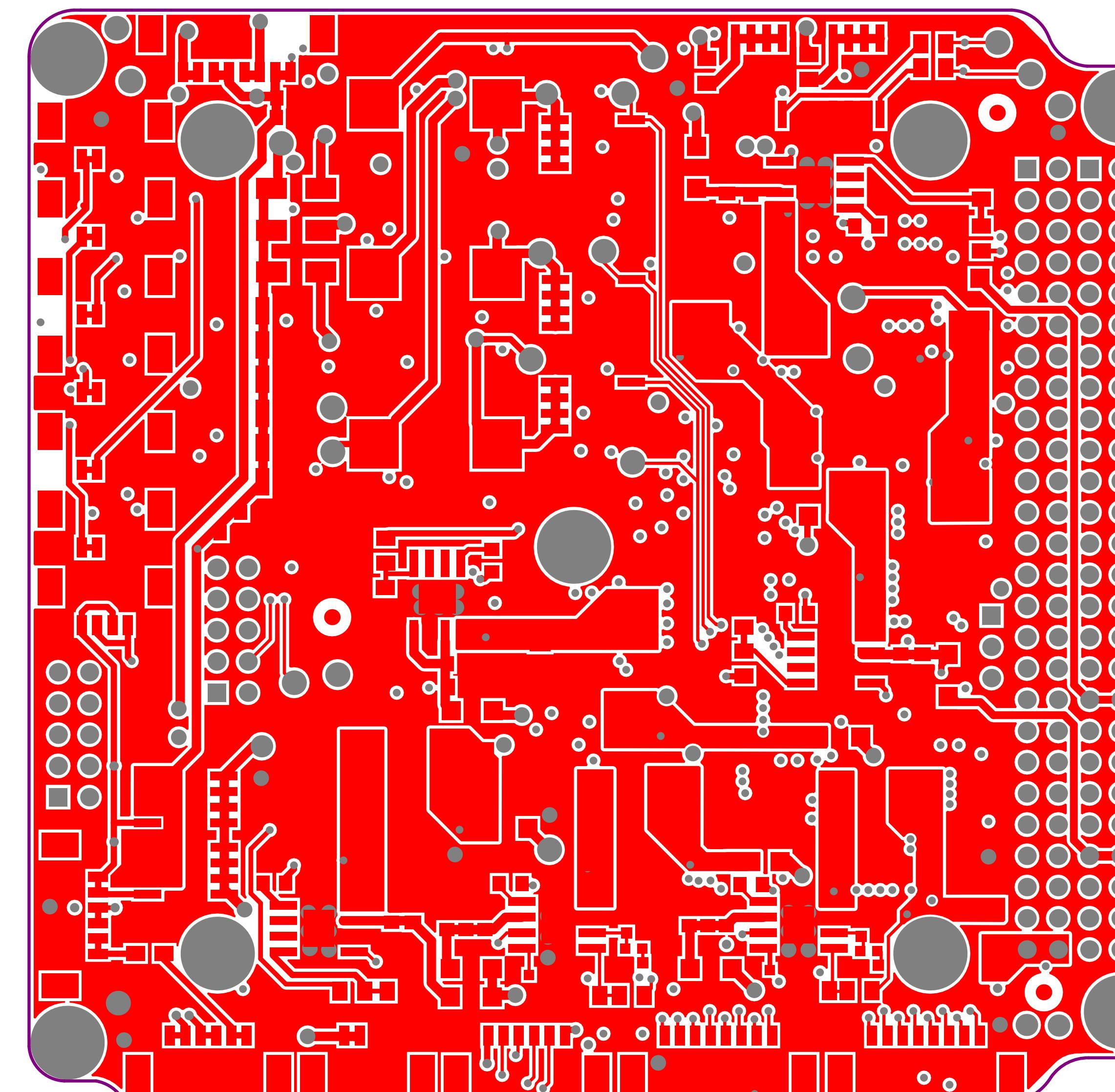
Title: *Beacon and Main Radio Step-Down Converters (6V/3A and 5V/3A)*

Designed by: André M. P. Mattos

Date: 07/03/2021 Revision: v0.1 Sheet 11 of 11 Project Code: EPS2



Size: A4



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		0,100mm	4,2	
5	Signal Layer 1	Copper	0,018mm		
6	Core	FR-4	1,265mm	4,2	
7	Signal Layer 2	Copper	0,018mm		
8	Dielectric 2		0,100mm	4,2	
9	Bottom Layer	Copper	0,035mm		
10	Bottom Solder	Solder Resist	0,010mm	3,5	
11	Bottom Overlay				

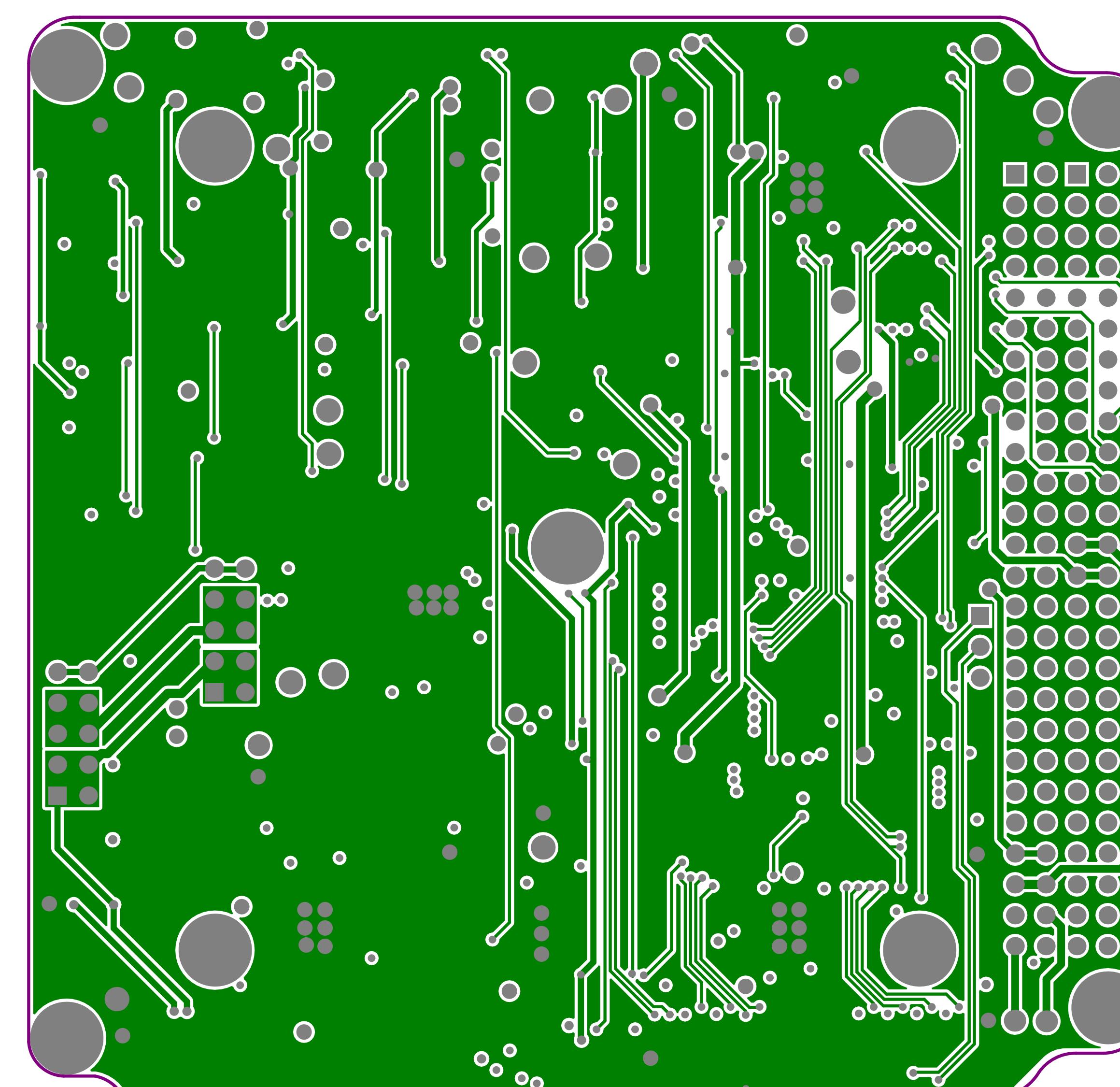
Fabrication specifications:

- 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: Green
- 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: EPS2	
Layer: Top Layer	
Designed by: Andre M. P. Mattos (based on FSat-I EPS)	
Date: 07/03/2021	Project Code: EPS2
Version: v0.1	Size: A4



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		0,100mm	4,2	
5	Signal Layer 1	Copper	0,018mm		
6	Core	FR-4	1,265mm	4,2	
7	Signal Layer 2	Copper	0,018mm		
8	Dielectric 2		0,100mm	4,2	
9	Bottom Layer	Copper	0,035mm		
10	Bottom Solder	Solder Resist	0,010mm	3,5	
11	Bottom Overlay				

Fabrication specifications:

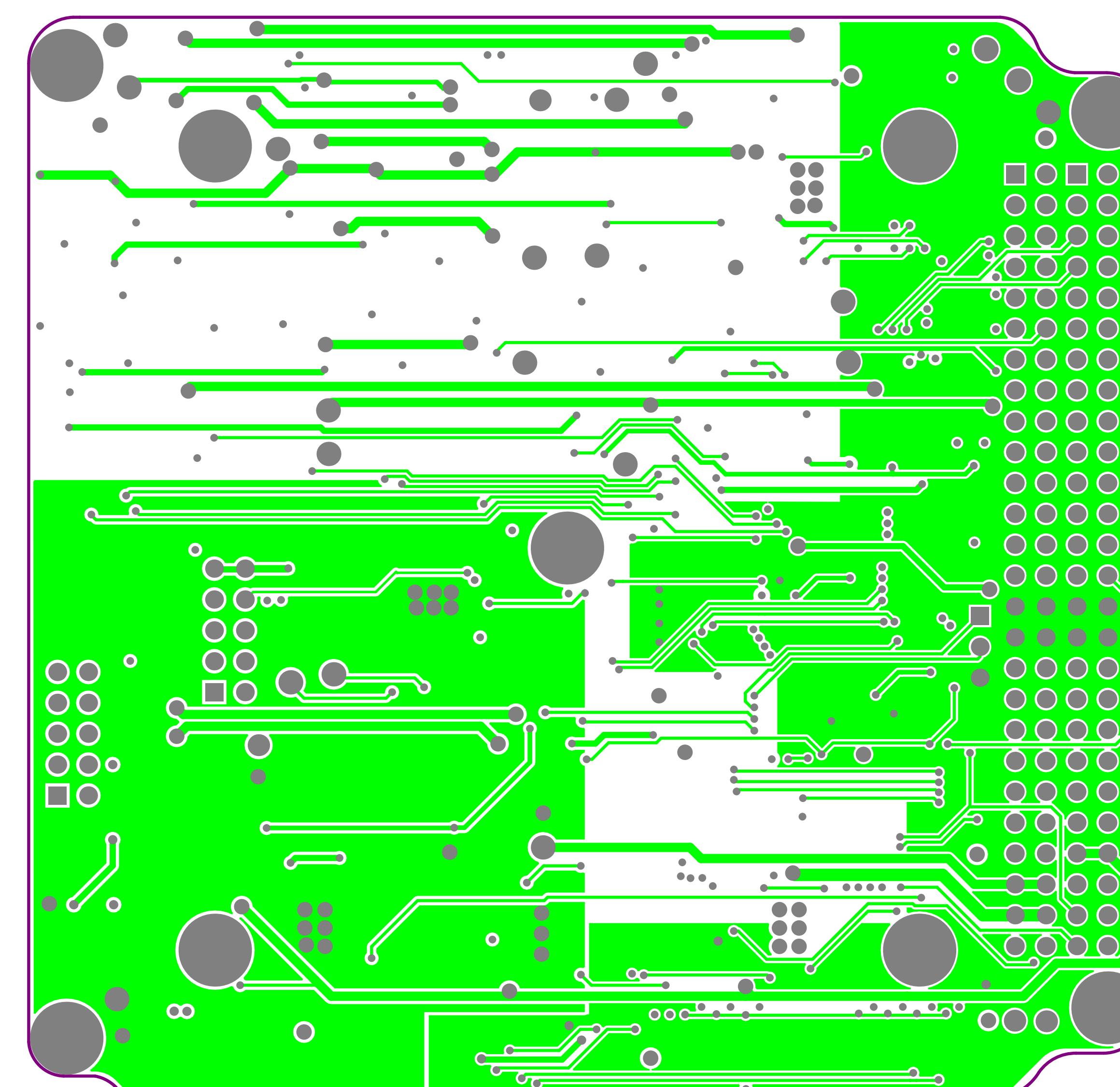
- Copper base 10Z:
- PCB Material: Prepeg FR4—Standard
- PCB Thickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Green
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

Assembly specifications:

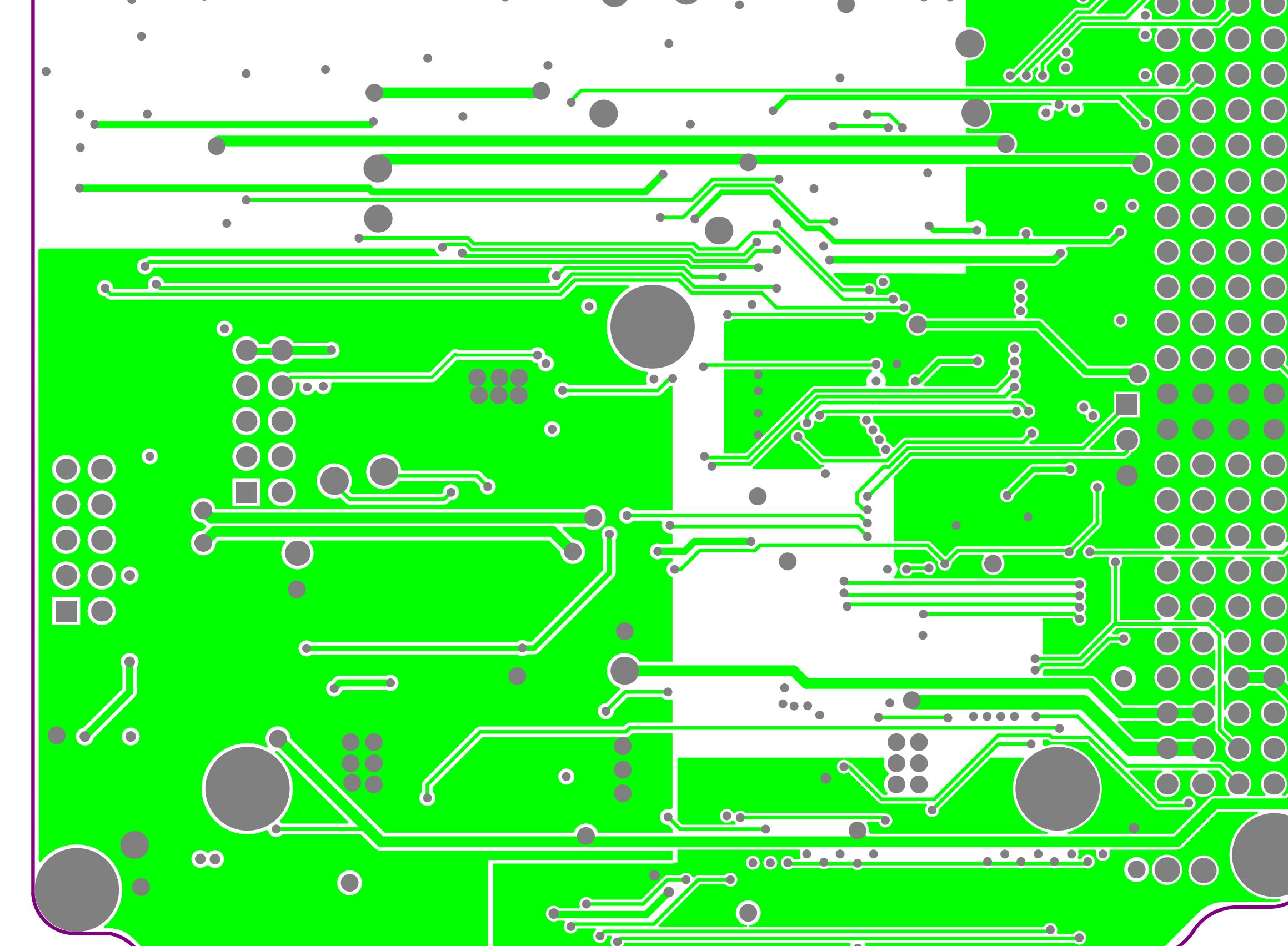
- Solder composition: Include lead
- Fiducials: 3 top and 3 bottom available
- Check BOM for not placed components

SpaceLab - Federal University of Santa Catarina	
Project: EPS2	
Layer: Signal Layer 1	
Designed by: Andre M. P. Mattos (based on FSat-I EPS)	
Date: 07/03/2021	Project Code: EPS2
Version: v0.1	Size: A4

A



B



C

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		0,100mm	4,2	
5	Signal Layer 1	Copper	0,018mm		
6	Core	FR-4	1,265mm	4,2	
7	Signal Layer 2	Copper	0,018mm		
8	Dielectric 2		0,100mm	4,2	
9	Bottom Layer	Copper	0,035mm		
10	Bottom Solder	Solder Resist	0,010mm	3,5	
11	Bottom Overlay				

Fabrication specifications:

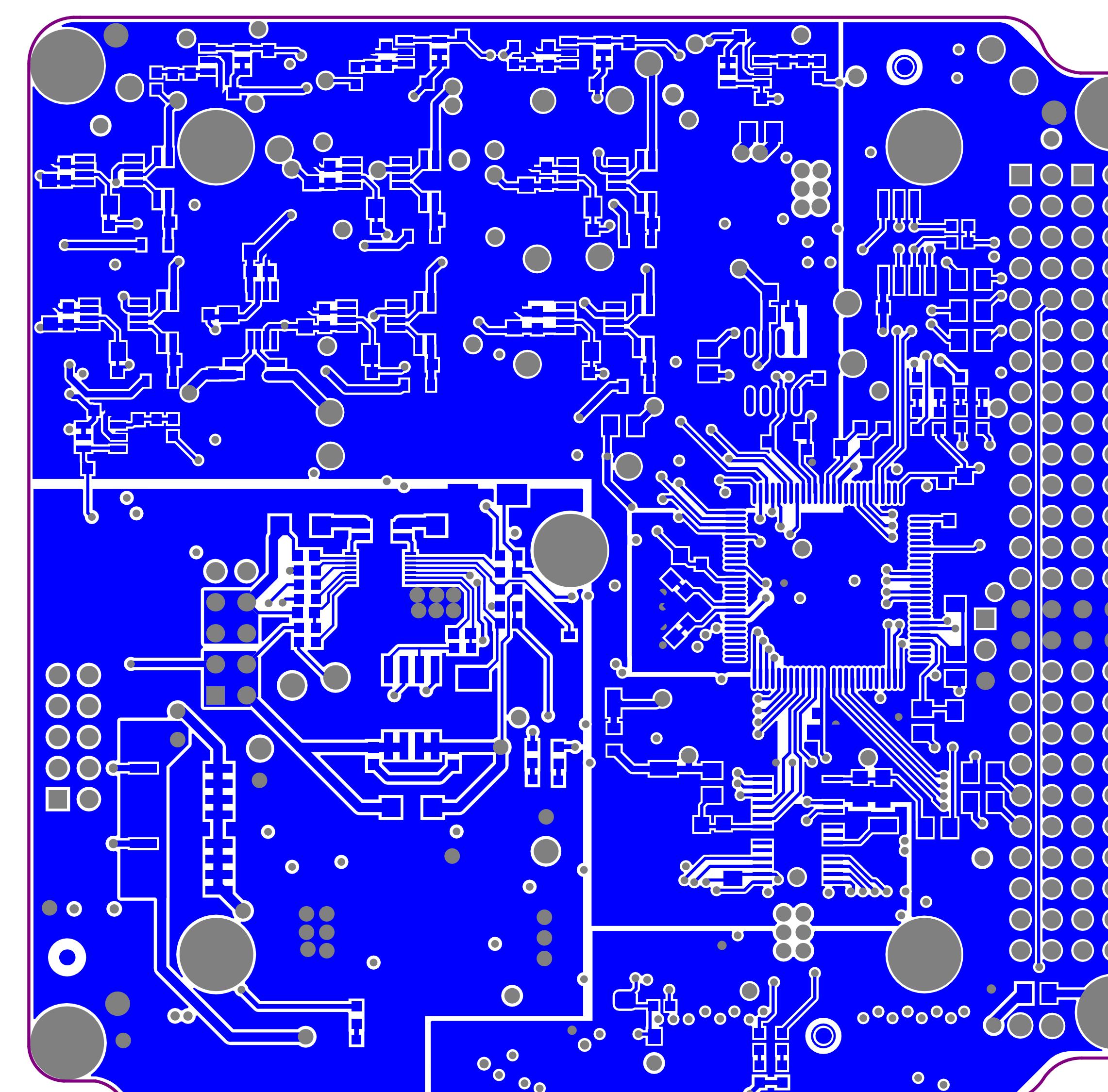
- Copper base 10Z:
- PCB Material: Prepeg FR4—Standard
- PCB Thickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Green
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

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: EPS2	
Layer: Signal Layer 2	
Designed by: Andre M. P. Mattos (based on FSat-I EPS)	
Date: 07/03/2021	Project Code: EPS2
Version: v0.1	Size: A4

A



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		0,100mm	4,2	
5	Signal Layer 1	Copper	0,018mm		
6	Core	FR-4	1,265mm	4,2	
7	Signal Layer 2	Copper	0,018mm		
8	Dielectric 2		0,100mm	4,2	
9	Bottom Layer	Copper	0,035mm		
10	Bottom Solder	Solder Resist	0,010mm	3,5	
11	Bottom Overlay				

B

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: Green
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

C

Assembly specifications:

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

D

SpaceLab - Federal University of Santa Catarina	
Project: EPS2	
Layer: Bottom Layer	
Designed by: Andre M. P. Mattos (based on FSat-I EPS)	
Date: 07/03/2021	Project Code: EPS2
Version: v0.1	Size: A4

A



B

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		0,100mm	4,2	
5	Signal Layer 1	Copper	0,018mm		
6	Core	FR-4	1,265mm	4,2	
7	Signal Layer 2	Copper	0,018mm		
8	Dielectric 2		0,100mm	4,2	
9	Bottom Layer	Copper	0,035mm		
10	Bottom Solder	Solder Resist	0,010mm	3,5	
11	Bottom Overlay				

C

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: Green
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

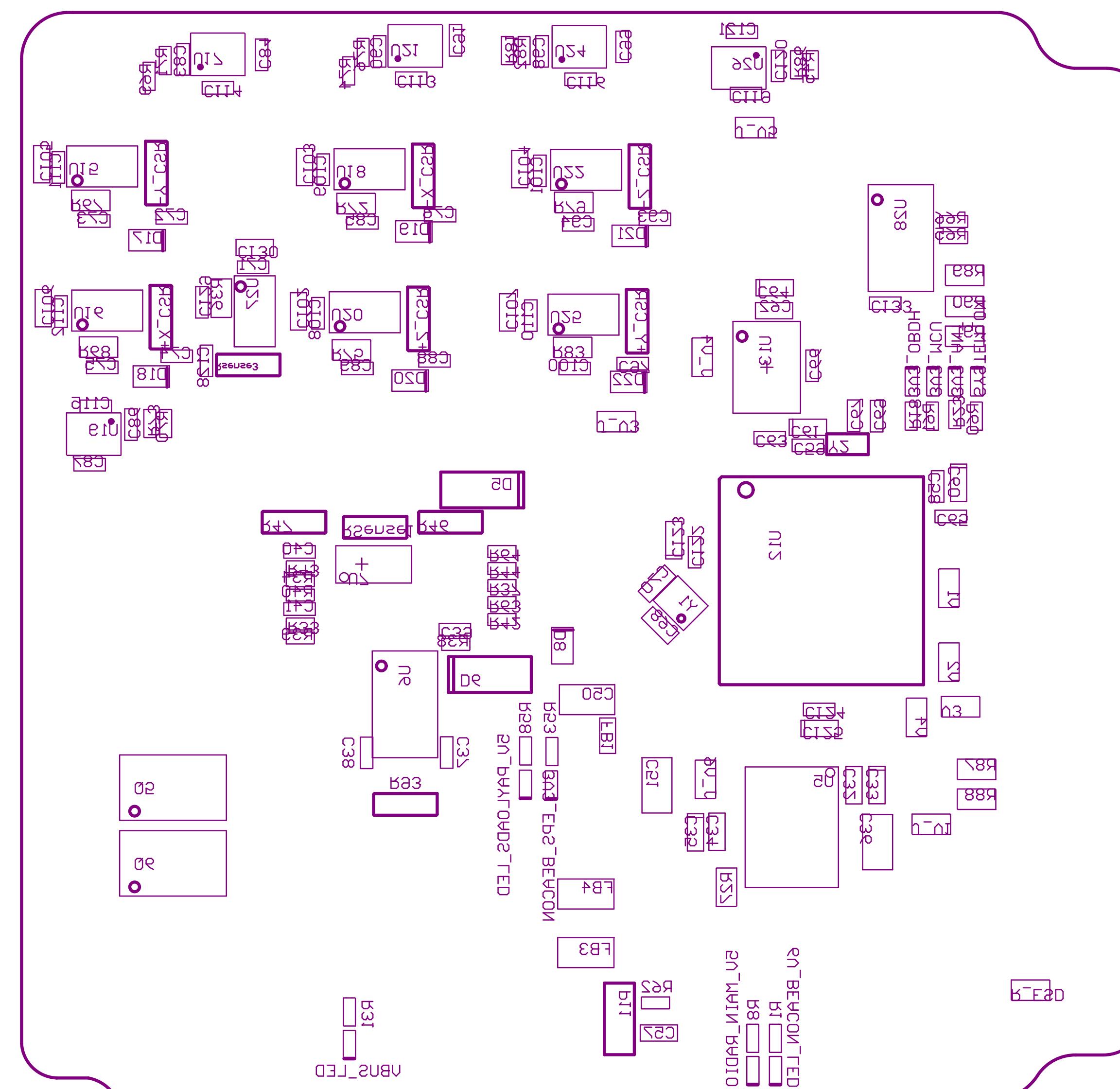
D

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: EPS2	
Layer: ASM Top	
Designed by: Andre M. P. Mattos (based on FSat-I EPS) Project Code: EPS2	

A



B

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		0,100mm	4,2	
5	Signal Layer 1	Copper	0,018mm		
6	Core	FR-4	1,265mm	4,2	
7	Signal Layer 2	Copper	0,018mm		
8	Dielectric 2		0,100mm	4,2	
9	Bottom Layer	Copper	0,035mm		
10	Bottom Solder	Solder Resist	0,010mm	3,5	
11	Bottom Overlay				

C

Fabrication specifications:

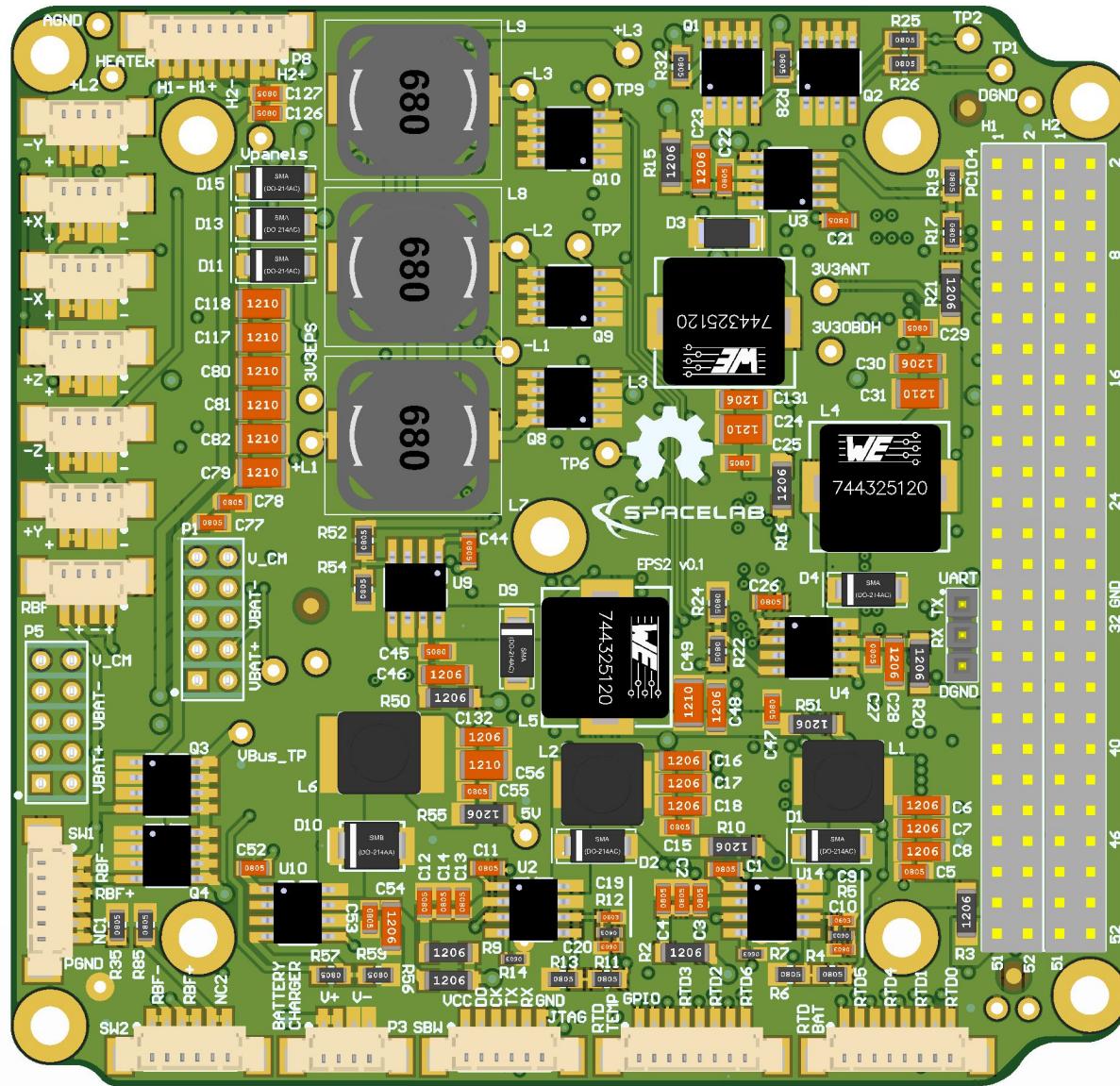
- Copper base 10Z:
- PCB Material: Prepeg FR4—Standard
- PCB Thickness: 1.6mm
- PCB Surface: HASL (with lead)
- Silkscreen Color: White (top and bottom)
- Soldermask Color: Green
- Vias: Force Complete Tenting
- Special: Stack-up (herein included)

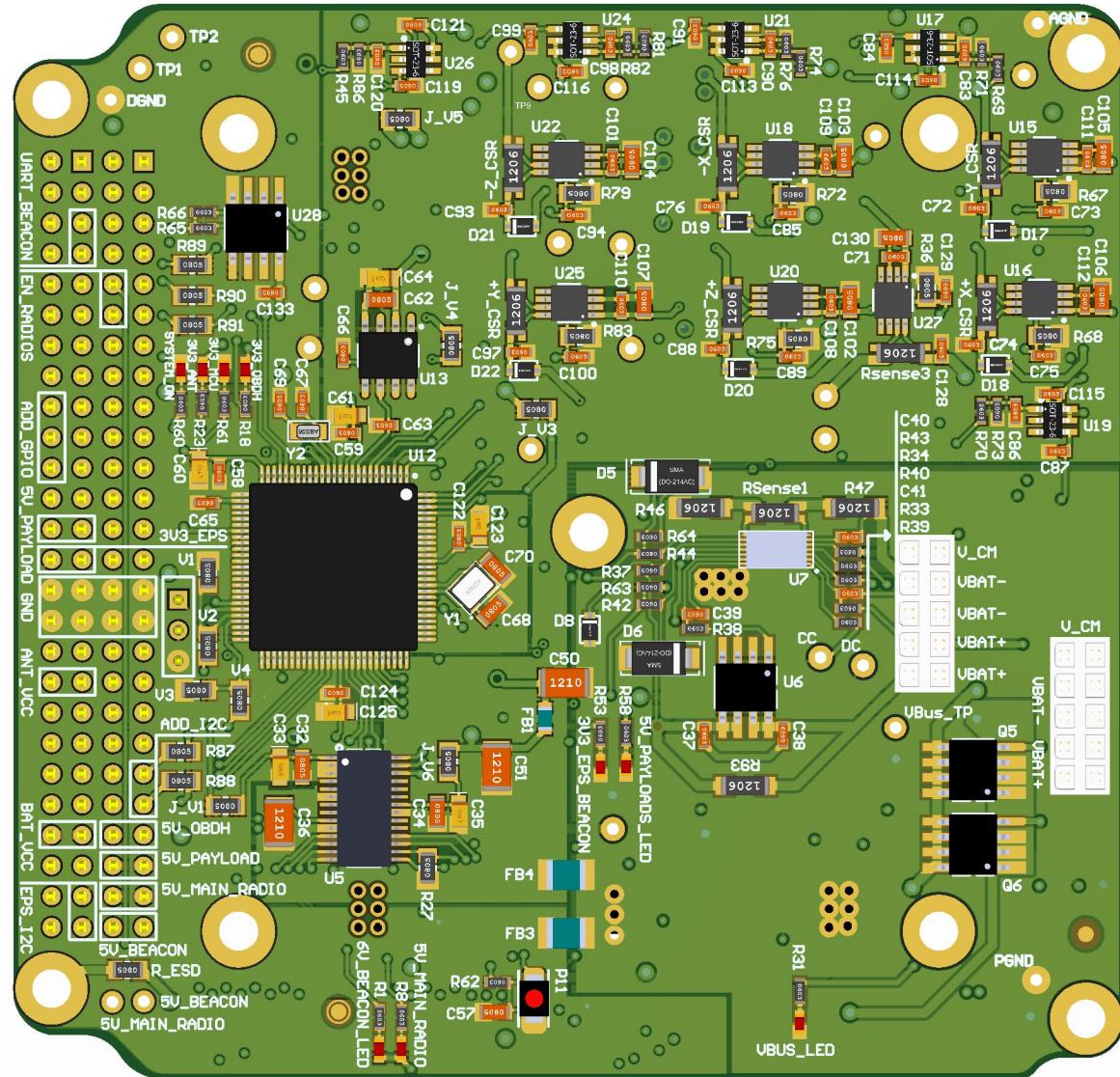
D

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: EPS2	
Layer: ASM Bottom	
Designed by: Andre M. P. Mattos (based on FSat-I EPS)	
Date: 07/03/2021	Project Code: EPS2
Version: v0.1	Size: A4





Item	Descriptor	Quantity	Manufacturer	Manufacturer Part Number	Part Number	Description	Item Name/Error Pn		Footprint	Mount	Fitter			
							Socia/Defects							
							Prod/Project/Argus							
							Variant							
1	Descriptor	Quantity	Manufacturer	Manufacturer Part Number	Part Number	Description	Item Name/Error Pn		Footprint	Mount	Fitter			
1	Cap, CER 0.1UF 50V 10% X7R 0603	44	Tango	CC0203R7V7R088104	CC0203R7V7R088104	CAP CER 0.1UF 50V 10% X7R 0603	CC0203		Surface Mount	Fitted				
2	Cap, CER 0.1UF 50V 10% X7R 0603	19	Tango	CC0203R7V7R088104	CC0203R7V7R088104	CAP CER 0.1UF 50V 10% X7R 0603	CC0203		Surface Mount	Fitted				
3	Res, 0.1 OHM 1W 1% 0603	15	Stackpole Electronics	HJ120470800	HJ120470800	RES 0.1 OHM 1W 1% 0603	0603		Surface Mount	Fitted				
4	Cap, CER 0.1UF 50V 10% X7R 0603	14	Vishay	MCT0403C1001FF500	MCT0403C1001FF500	CAP CER 0.1UF 50V 10% X7R 0603	0603		Surface Mount	Fitted				
5	Cap, CER 0.1UF 50V 10% X7R 0603	13	Vishay	0W0305K050032EA	0W0305K050032EA	CAP CER 0.1UF 50V 10% X7R 0603	0603		Surface Mount	Fitted				
6	Cap, CER 0.1UF 50V 10% X7R 0603	11	Tango	CC0203R7V7R088147S	CC0203R7V7R088147S	CAP CER 0.1UF 50V 10% X7R 0603	CC0203		Surface Mount	Fitted				
7	Cap, CER 0.1UF 50V 10% X7R 0603	10	Murata	GRM210R71A2244ET1G	GRM210R71A2244ET1G	CAP CER 0.1UF 50V 10% X7R 0603	CC1206		Surface Mount	Fitted				
8	Cap, CER 0.1UF 50V 10% X7R 0603	9	Murata	GRM210R71E1224AE15A	GRM210R71E1224AE15A	CAP CER 0.1UF 50V 10% X7R 0603	CC1210		Surface Mount	Fitted				
9	Cap, CER 0.1UF 50V 10% X7R 0603	8	Wurth Electronics	1500609575000	1500609575000	SMD Green LED	0603-LED		Surface Mount	Fitted				
10	Cap, CER 0.1UF 50V 10% X7R 0603	8	Molex	53396-0471	53396-0471	Header, 4 Pin	H0484 Pinheader		Surface Mount	Fitted				
11	Cap, CER 0.1UF 50V 10% X7R 0603	7	Kyocera AVE	IPS0104020401000	IPS0104020401000	Cap, Tankard 0.1UF 50V 10% X7R 0603	C0805_Tankard		Surface Mount	Fitted				
12	Cap, CER 0.1UF 50V 10% X7R 0603	7	ON Semiconductor	NDS00210M00021G	NDS00210M00021G	Cap, SMD 0.1UF 50V 10% X7R 0603	S0032SF		Surface Mount	Fitted				
13	Cap, CER 0.1UF 50V 10% X7R 0603	7	Maxim	M85091A1010A0A	M85091A1010A0A	MAX91A1010A0A	MSD-B		Surface Mount	Fitted				
14	Cap, CER 0.1UF 50V 10% X7R 0603	6	Kyocera AVE	080512103A47A	080512103A47A	Cap 0.1UF 50V 10% X7R 0603	C0805		Surface Mount	Fitted				
15	Cap, CER 0.1UF 50V 10% X7R 0603	6	Chemitek	CPW03050003	CPW03050003	Current Sensing 0.5A - 3MΩ 0.05% 5.4% Terminal	1206_ohm		Surface Mount	Fitted				
16	Cap, CER 0.1UF 50V 10% X7R 0603	6	UCC Connectivity Networks	CPW05050003	CPW05050003	RES 0.001 OHM 10% 1% 0603	0603		Surface Mount	Fitted				
17	Cap, CER 0.1UF 50V 10% X7R 0603	5	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
18	Cap, CER 0.1UF 50V 10% X7R 0603	5	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
19	Cap, CER 0.1UF 50V 10% X7R 0603	5	Vishay Silvaco	SH4020211-GE3	SH4020211-GE3	RES 0.001 OHM 10% 1% 0603	0603		Surface Mount	Fitted				
20	Cap, CER 0.1UF 50V 10% X7R 0603	5	Texas Instruments	TUV31420BWR	TUV31420BWR	TUV31420BWR	S0128_Mount		Surface Mount	Fitted				
21	Cap, CER 0.1UF 50V 10% X7R 0603	4	Vishay	0W03050003K9EA	0W03050003K9EA	RES 0.001 OHM 10% 1% 0603	0603		Surface Mount	Fitted				
22	Cap, CER 0.1UF 50V 10% X7R 0603	4	Murata	GRM210R71E0040K2L	GRM210R71E0040K2L	Cap 0.05UF 50V 10% X7R 0603	C21096		Surface Mount	Fitted				
23	Cap, CER 0.1UF 50V 10% X7R 0603	4	Murata	GRM210R71E0040K2L	GRM210R71E0040K2L	Cap 0.05UF 50V 10% X7R 0603	C21096		Surface Mount	Fitted				
24	Cap, CER 0.1UF 50V 10% X7R 0603	4	Panasonic	eH7220MAB	eH7220MAB	Cap 0.05UF 50V 10% X7R 0603	C17170		Surface Mount	Fitted				
25	Cap, CER 0.1UF 50V 10% X7R 0603	4	Vishay Silvaco	SH4020211-GE3	SH4020211-GE3	RES 0.001 OHM 10% 1% 0603	0603		Surface Mount	Fitted				
26	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	0W03050003K9EA	0W03050003K9EA	RES 0.001 OHM 10% 1% 0603	0603		Surface Mount	Fitted				
27	Cap, CER 0.1UF 50V 10% X7R 0603	3	Texas Instruments	TUV31420BWR	TUV31420BWR	TUV31420BWR	TUV31420BWR		Surface Mount	Fitted				
28	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	0W03050003K9EA	0W03050003K9EA	RES 0.001 OHM 10% 1% 0603	0603		Surface Mount	Fitted				
29	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	0W03050003K9EA	0W03050003K9EA	RES 0.001 OHM 10% 1% 0603	0603		Surface Mount	Fitted				
30	Cap, CER 0.1UF 50V 10% X7R 0603	3	Maxim	M85091A1010A0A	M85091A1010A0A	MAX91A1010A0A	MSD-B		Surface Mount	Fitted				
31	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
32	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
33	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
34	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
35	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
36	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
37	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
38	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	0603		Surface Mount	Fitted				
39	Cap, CER 0.1UF 50V 10% X7R 0603	3	Vishay	C8102051002	C8102051002	RES 10K OHM 0.1W 1% 0603	06							