



TRINAMIC
MOTION CONTROL

www.TRINAMIC.com
TMC-Evaluation-Platform:
TMC4671-EVAL
Interfaces:
SPI, UART, S/D

v1.1



open source
hardware

GND ADC_I0_INN ADC_I1_INN AENC_WY_INN AENC_UN_INN DBG_SPI_TRG DBG_SPI_MISO DBG_SPI_SCK GP102 GP101 GP100 +5V +3V3



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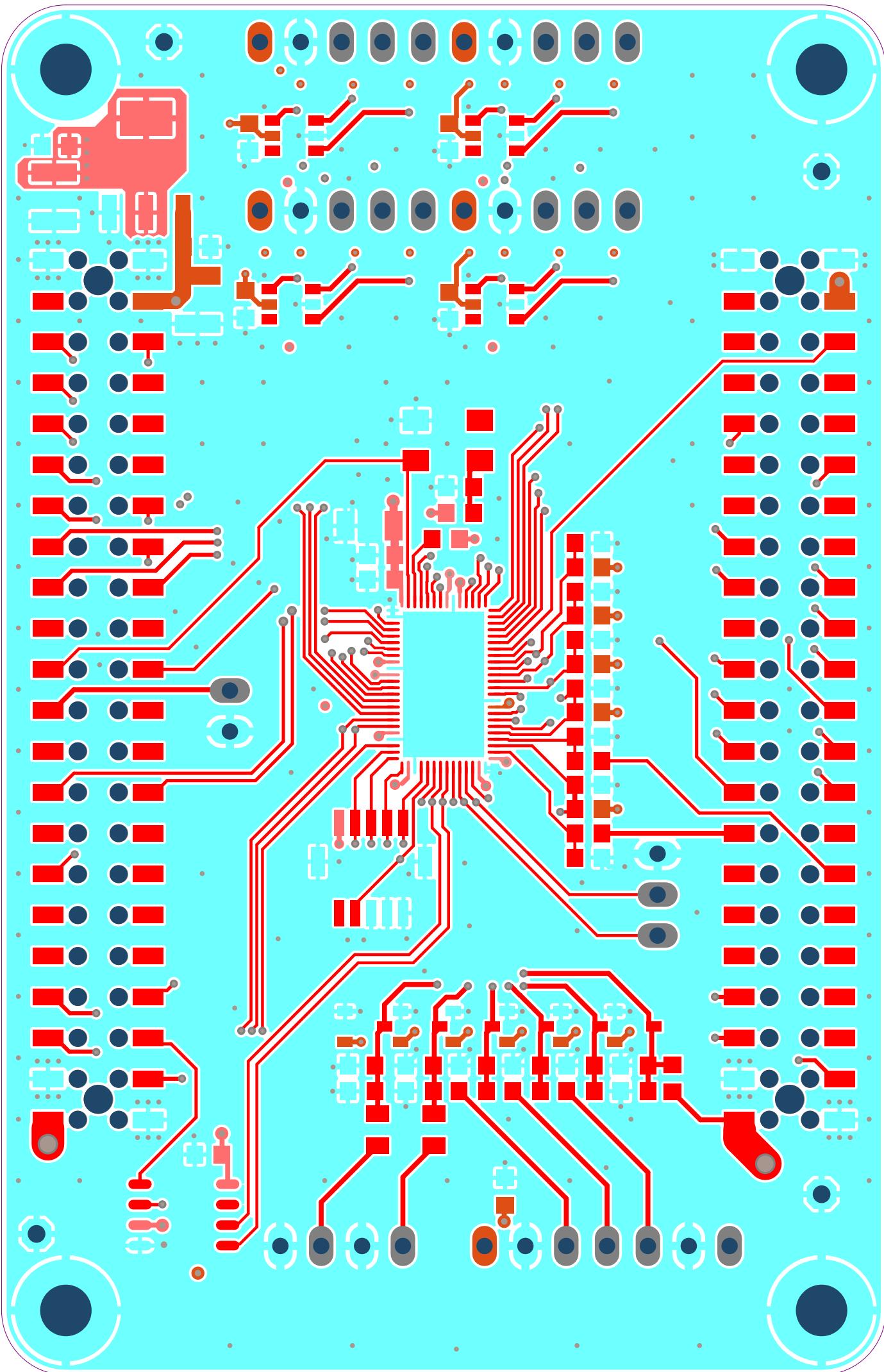
- TMC-Evaluation-Platform:
- TMC4671-EVAL
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- SPI, UART, S/D

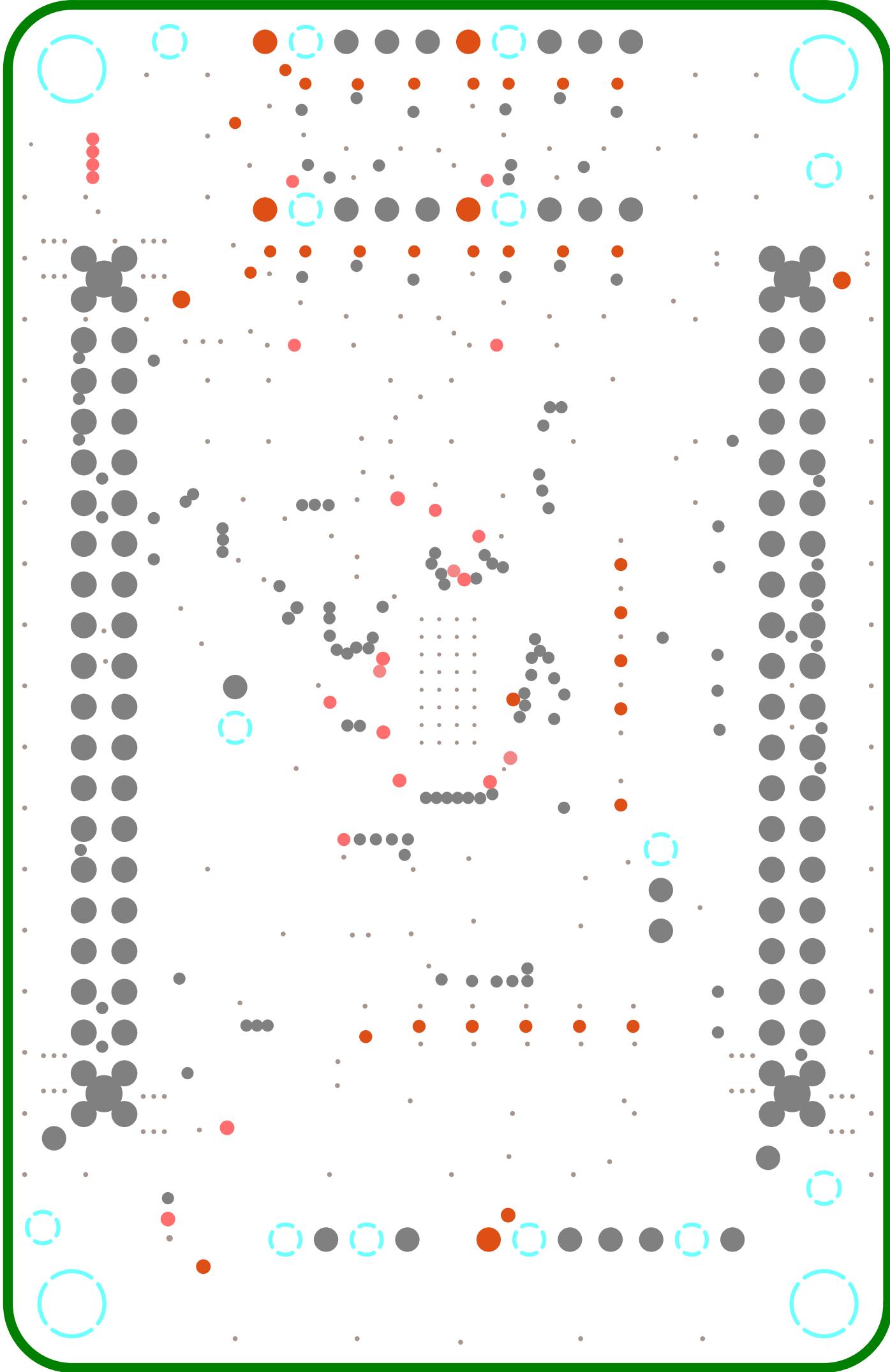
v1.1

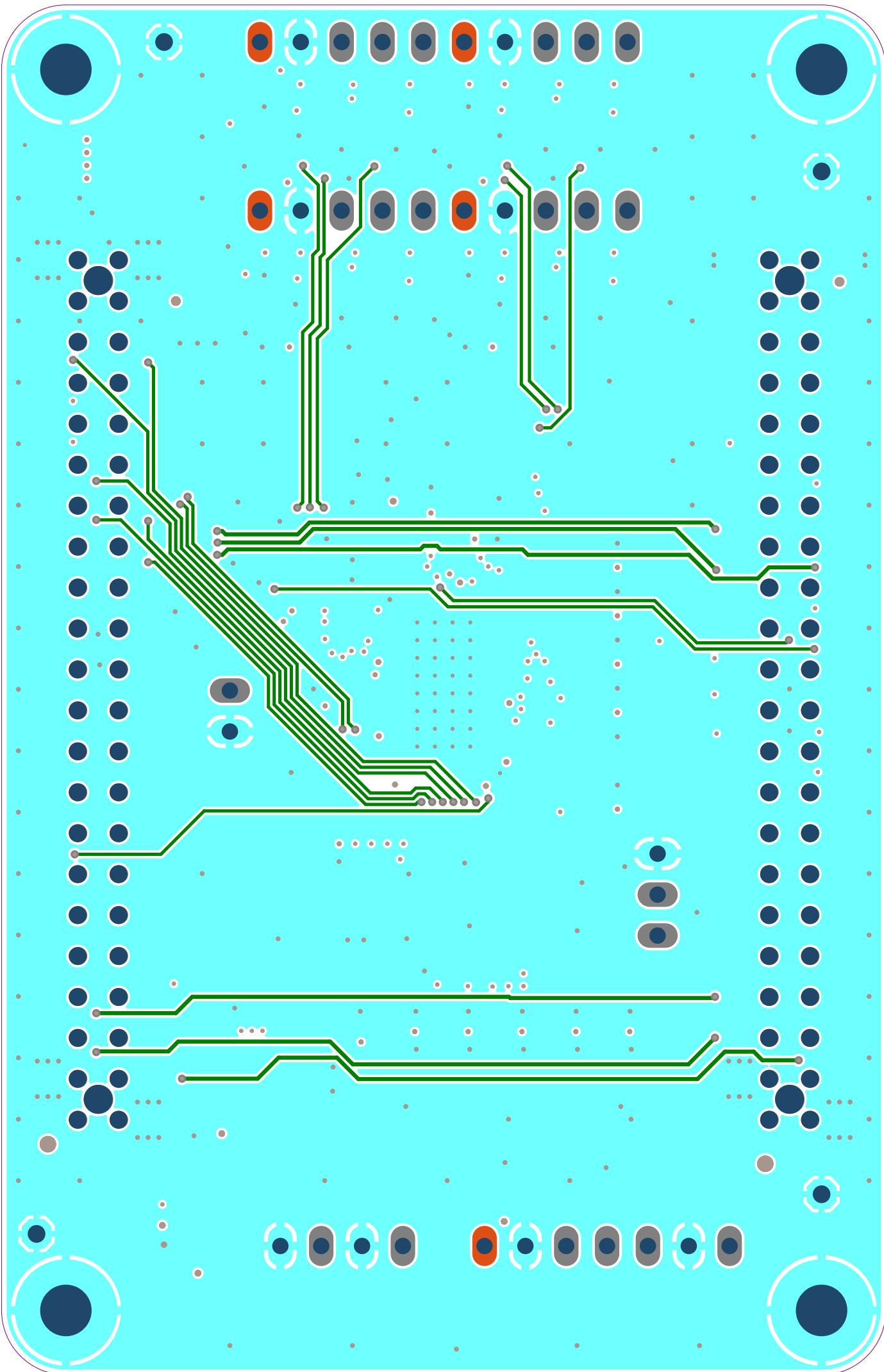


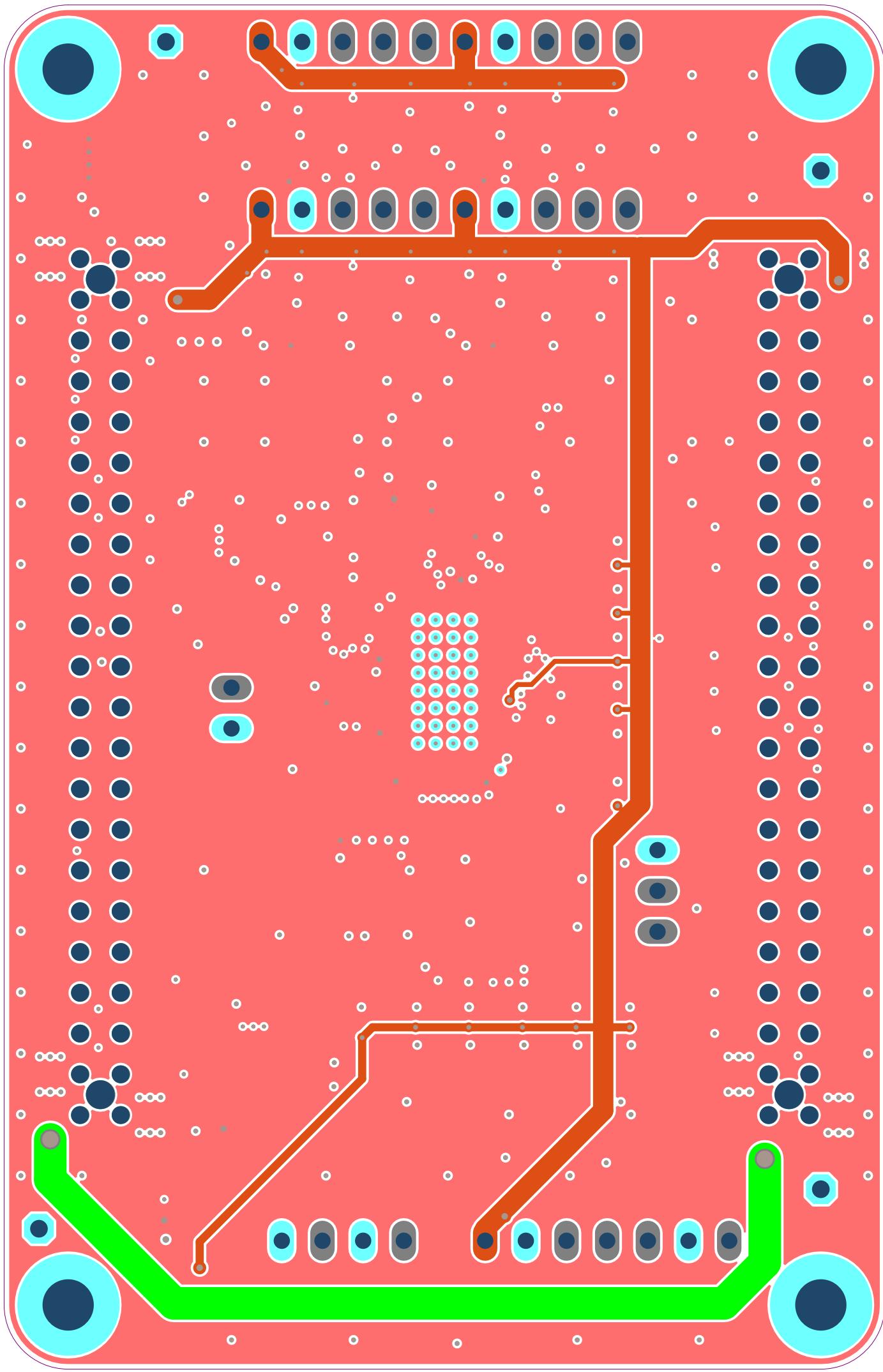
open source
hardware

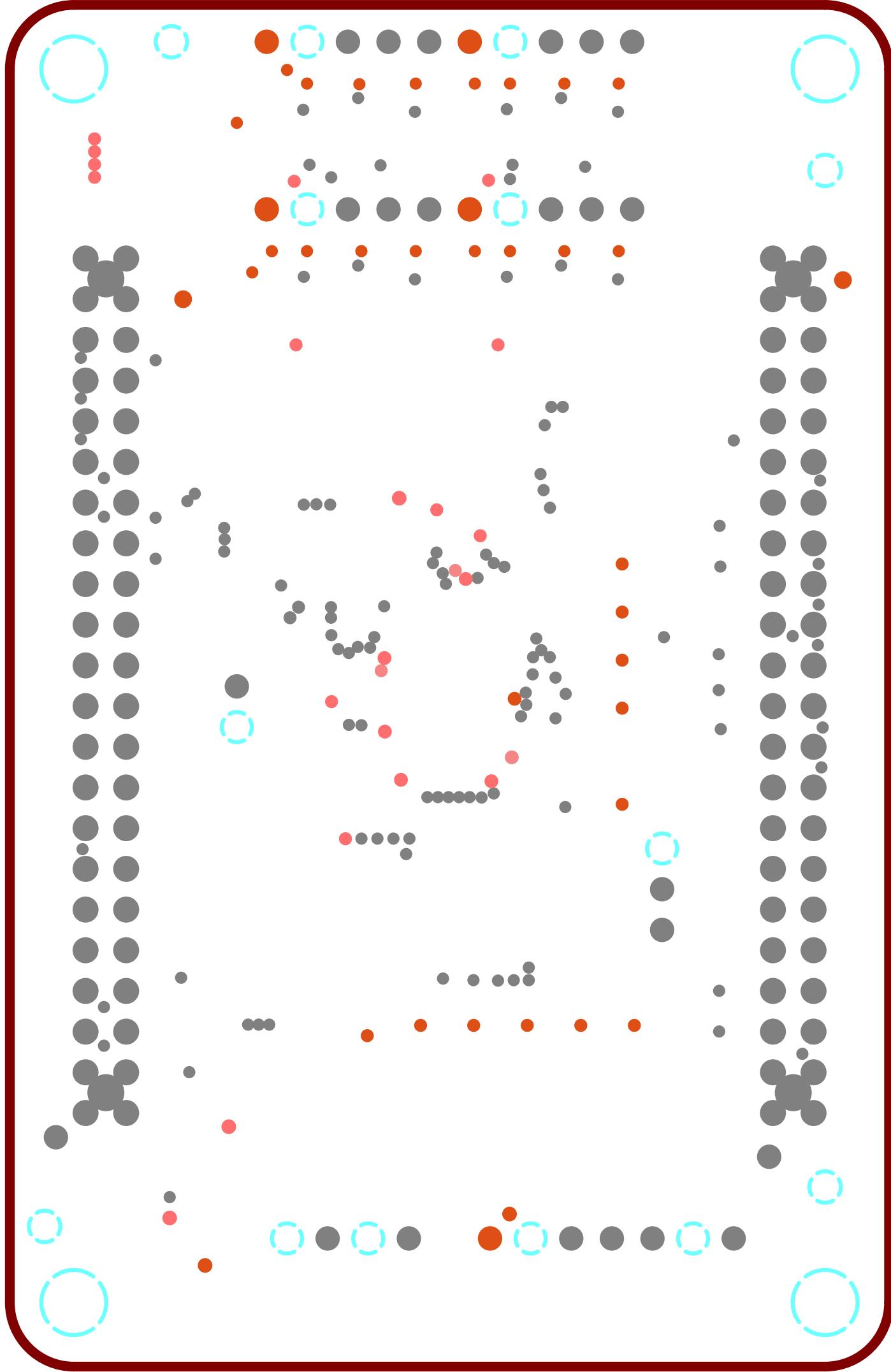
GND ADC_I0_INN ADC_I1_INN AENC_WY_INN AENC_UN_INN DBG_SPI_TRG DBG_SPI_MISO DBG_SPI_SCK GP102 GP101 GP100 +5V +3V3

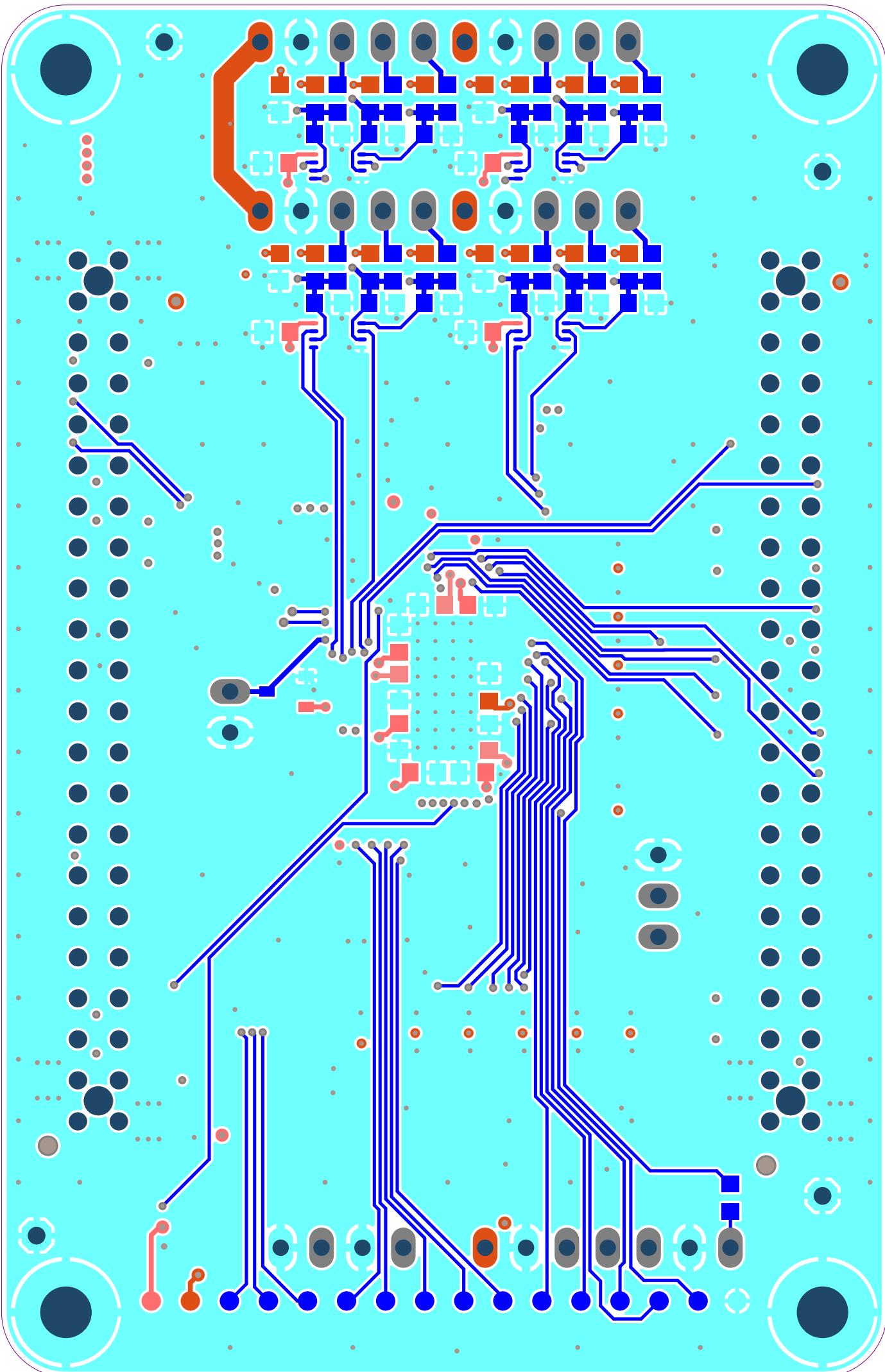


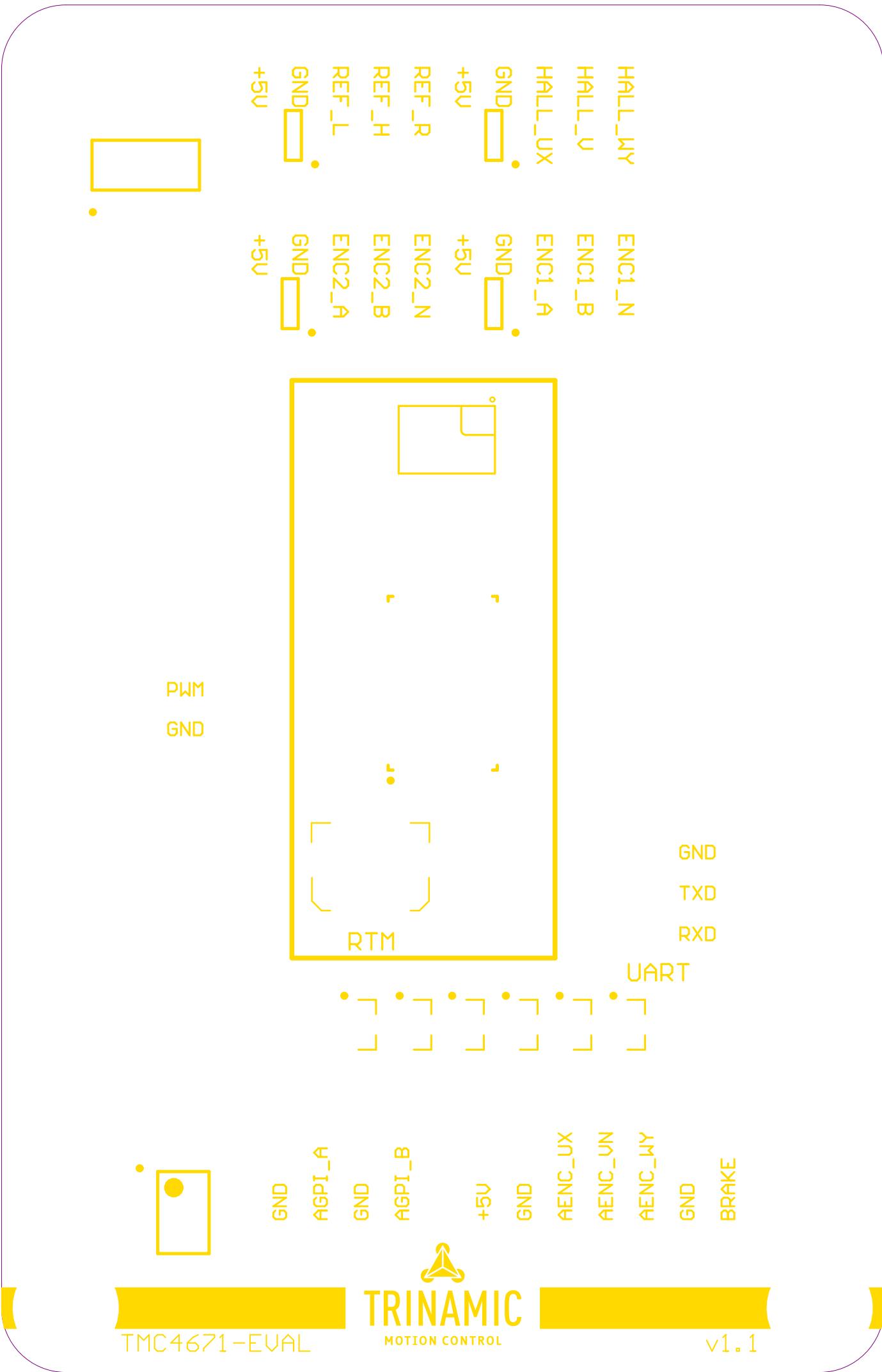














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TMC-Evaluation-Platform:

TMC4671-EVAL

Interfaces:

SPI, UART, S/D

v1.1



open source
hardware

+3V3

GPI00

GPI01

GPI02

DBG-SPI-MISO

DBG-SPI-TRG

DBG-SPI-SCK

DBG-UX-INN

DBG-SPI-TRG

DBG-SPI-MISO

DBG-SPI-TRG

DBG-SPI-SCK

DBG-SPI-TRG

DBG-SPI-SCK

DBG-SPI-TRG

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DBG-SPI-TRG

DBG-SPI-SCK

DBG-SPI-TRG

DBG-SPI-SCK

DBG-SPI-TRG

DBG-SPI-SCK

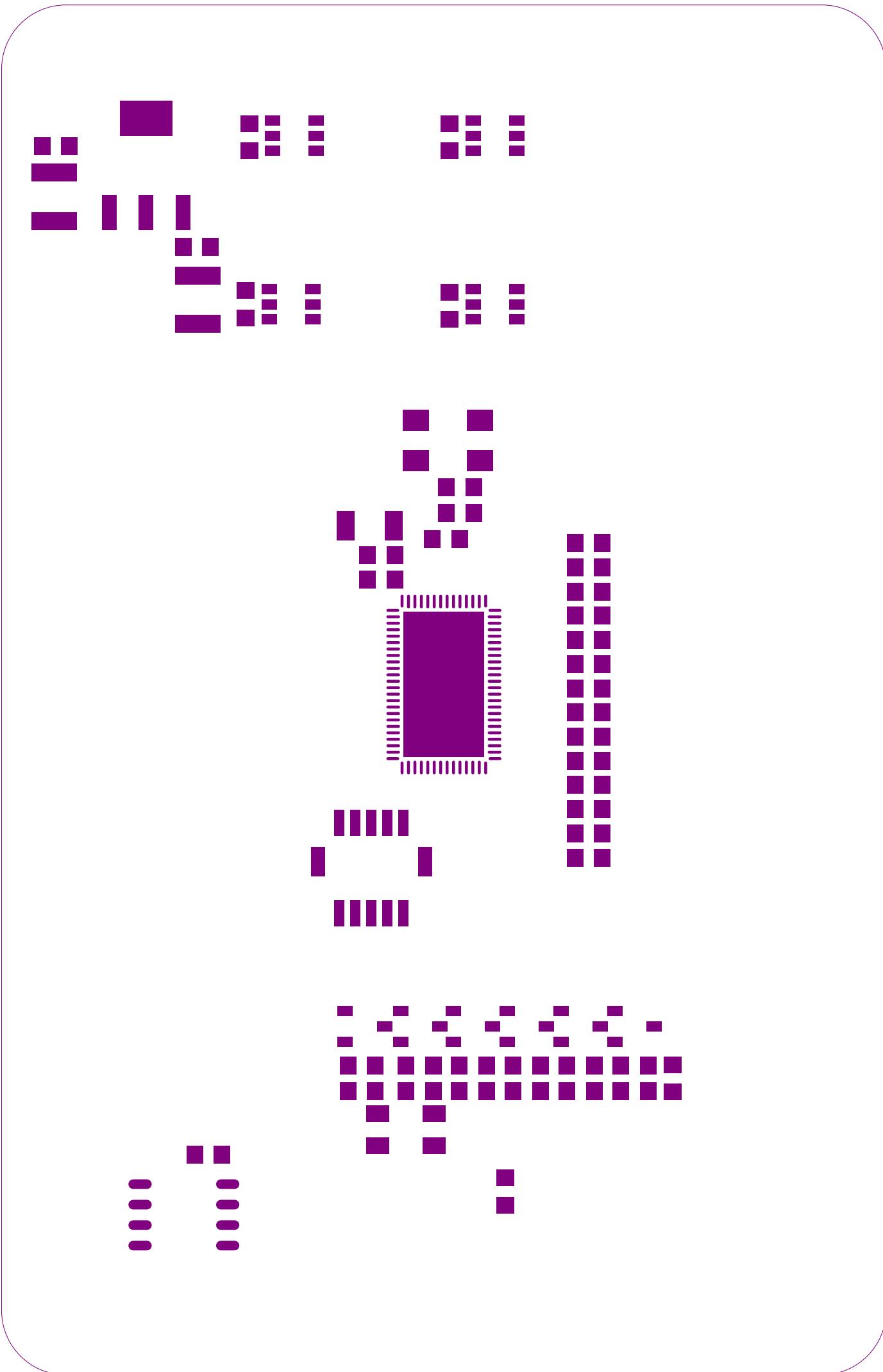
ADC_10_INN

AENC_WY_INN

AENC_UN_INN

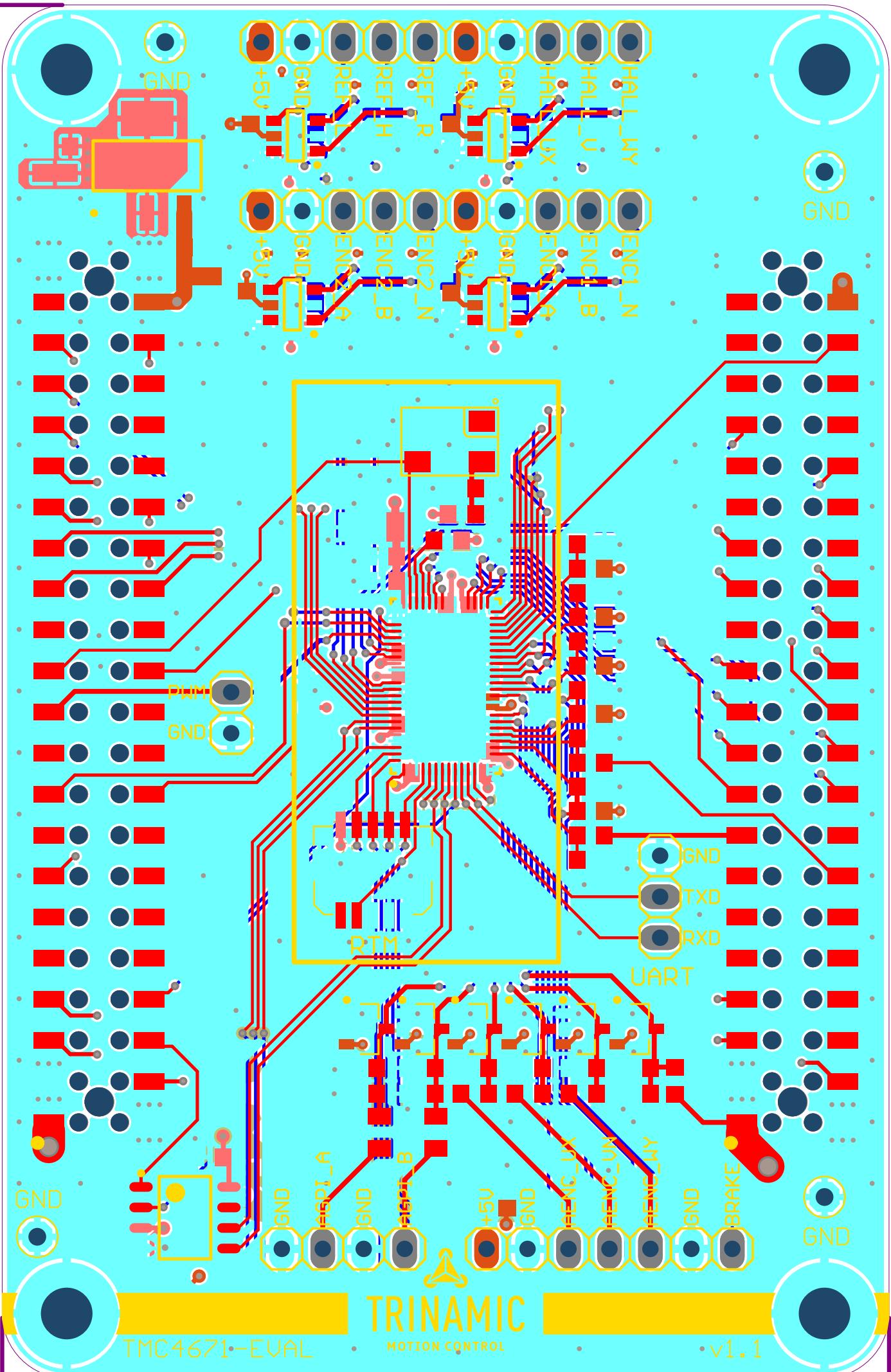
AENC_WX_INN

GND



85, 00

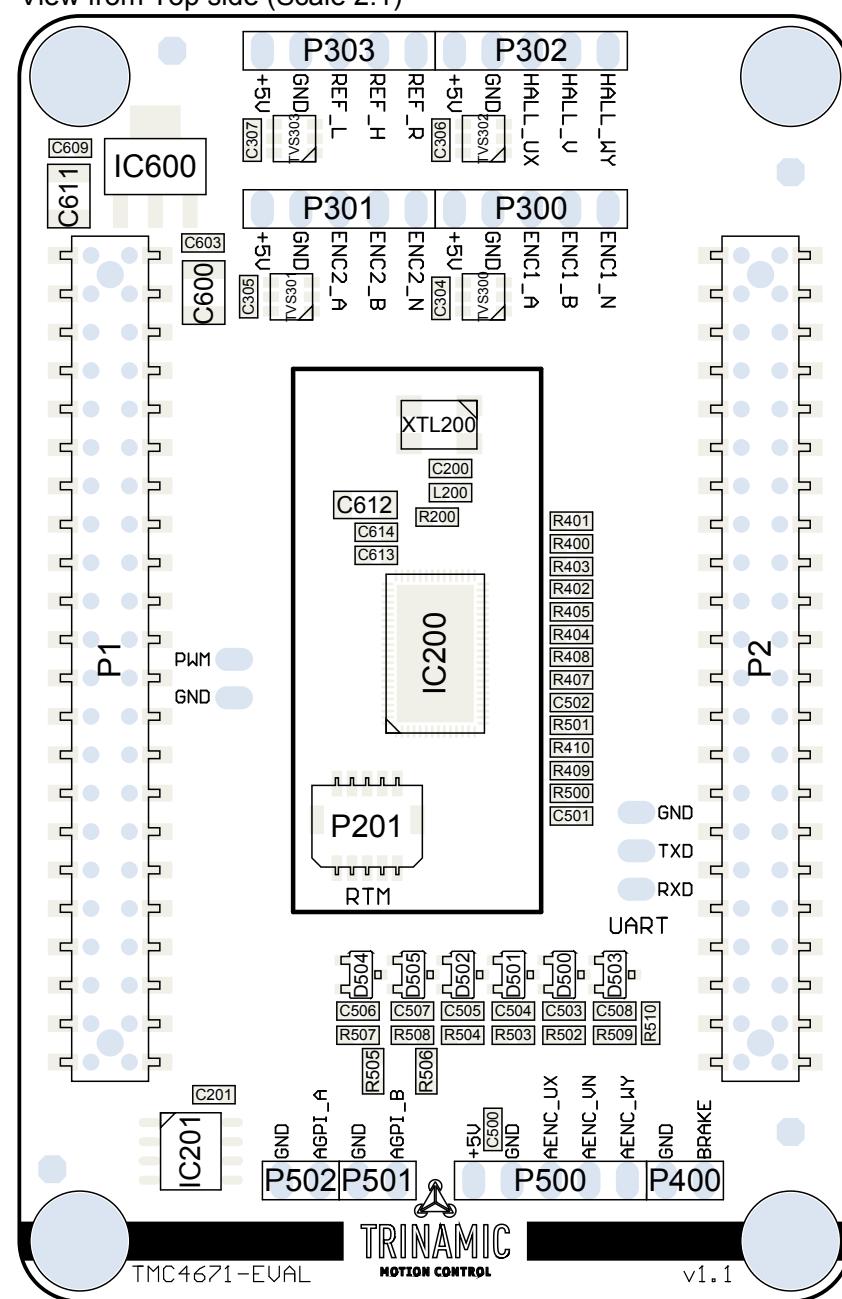
55, 00



A

E

View from Top side (Scale 2:1)



A

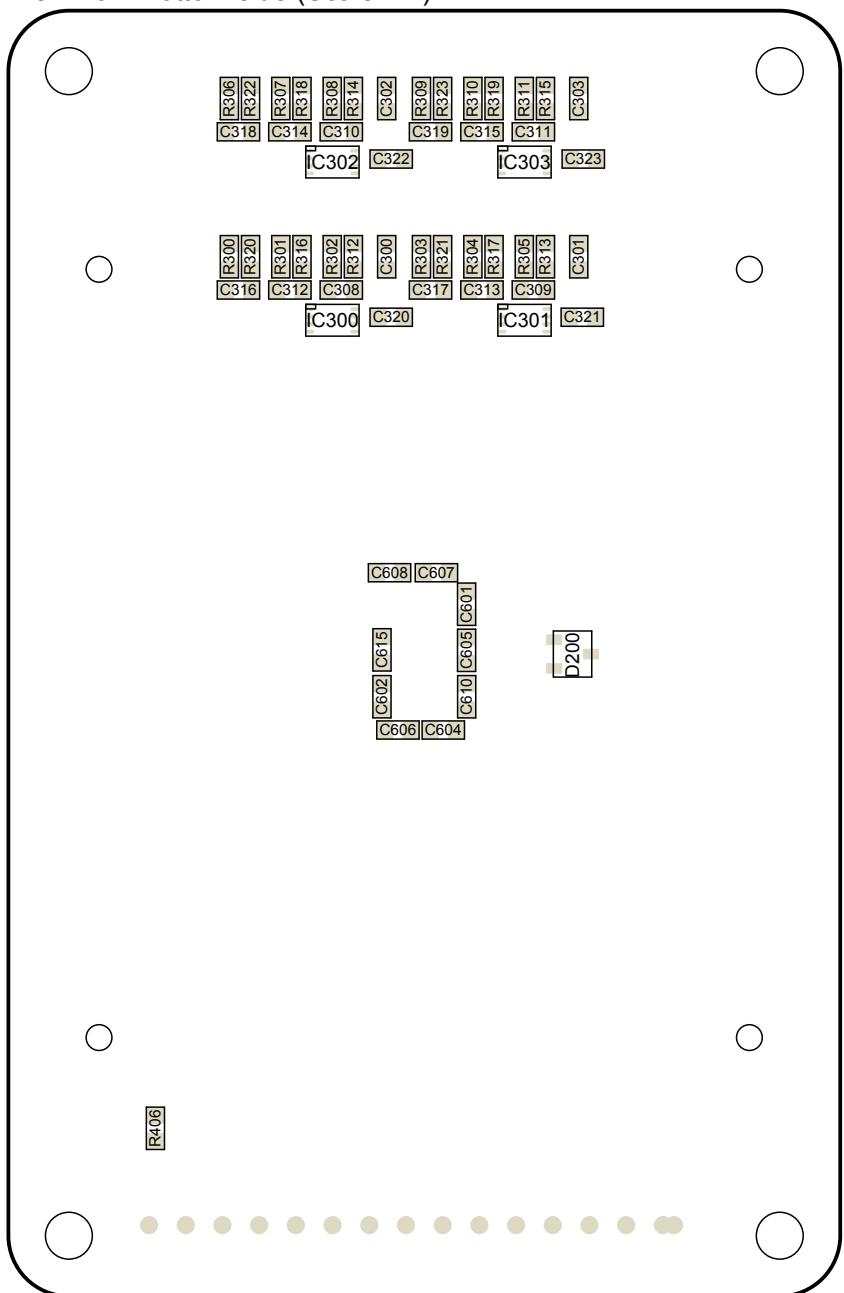
B

C

D

E

View from Bottom side (Scale 2:1)



A

B

C

D

E

A

B

C

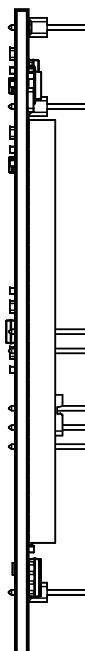
D

E

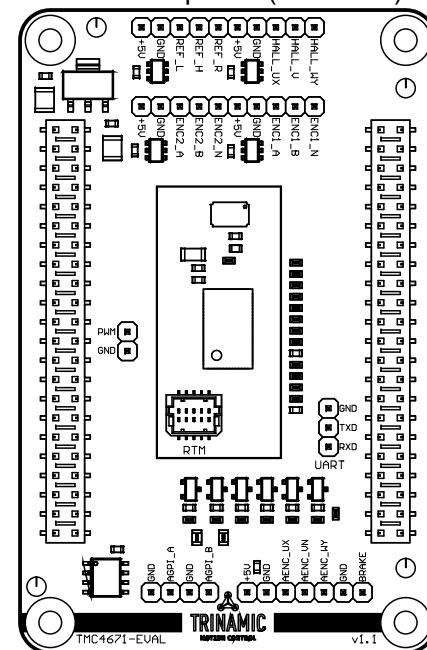
1

1

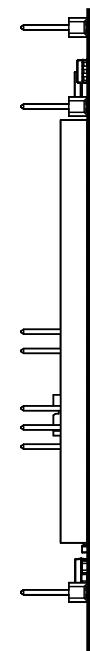
View from Left side (Scale 1:1)



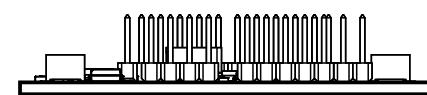
View from Top side (Scale 1:1)



View from Right side (Scale 1:1)



View from Front side (Scale 1:1)



A

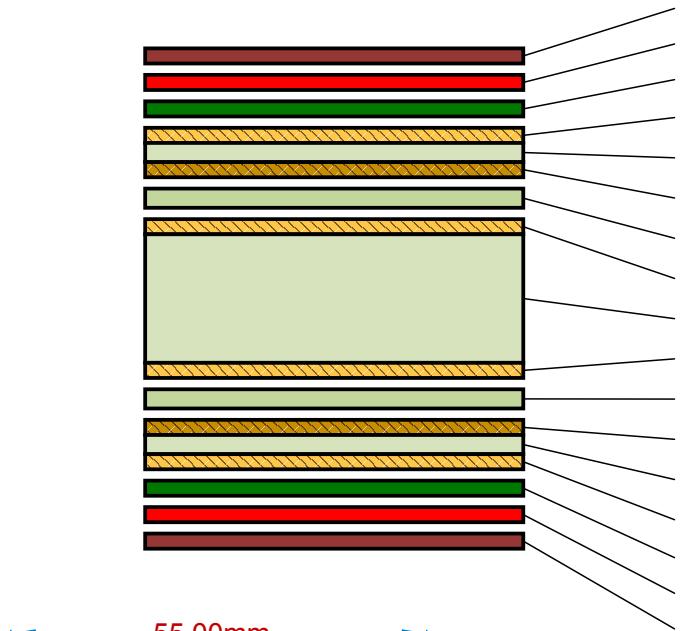
B

C

D

E

Layer Stack Legend



	Material	Layer	Thickness	Dielectric Material	Type	Gerber
1		Top Paste			Paste Mask	GTP
		Top Overlay			Legend	GTO
	Surface Material	Top Solder	0.010mm(0.400mil)	Solder Resist	Solder Mask	GTS
	Copper	Top	0.035mm(1.378mil)	FR-4	Signal	GTL
	Core		0.127mm(5.000mil)		Dielectric	
	Copper	GND1	0.035mm(1.378mil)	GP1	Internal Plane	
	Prepreg		0.127mm(5.000mil)		Dielectric	
	Copper	MID	0.035mm(1.378mil)	G1	Signal	
	Core		0.850mm(33.465mil)		Dielectric	
	Copper	VM	0.035mm(1.378mil)	G2	Signal	
	Prepreg		0.127mm(5.000mil)		Dielectric	
	Copper	GND2	0.035mm(1.378mil)	GP2	Internal Plane	
	Core		0.127mm(5.000mil)		Dielectric	
	Copper	Bottom	0.035mm(1.378mil)	GBL	Signal	
2	Surface Material	Bottom Solder	0.010mm(0.400mil)	Solder Resist	Solder Mask	GBS
		Bottom Overlay			Legend	GBO
		Bottom Paste			Paste Mask	GBP

Total thickness: 1.588mm(62.533mil)

Notes:

1. MATERIAL : FR-4-2 NATURAL EPOXY/FIBERGLASS
2. APPLY SOLDERMASK ON BOTH SIDES
COLOR: WHITE
FABRICATOR SHALL MAKE NECESSARY MODIFICATIONS TO SOLDERMASK PHOTOPLOT FILES FOR OPTIMAL SOLDERMASK COVERAGE BETWEEN FINE PITCH COMPONENT LEADS.
3. FINISH ALL EXPOSED COPPER SURFACES WITH IMMERSION GOLD.
4. HOLE SIZES APPLY AFTER PLATING.
5. APPLY SILKSCREEN TO BOTH SIDES
COLOR: BLACK
FABRICATOR SHALL MAKE NECESSARY MODIFICATIONS TO LEGEND PHOTOPLOT FILES TO ENSURE NO LEGEND INK COVERS ANY COMPONENT PAD OR VIA PAD.
6. MODIFIED PHOTOPLOT FILES ARE TO BE RETURNED BEFORE ORDER DELIVERED.
7. ALL PRINTED CIRCUITBOARD NETS SHALL BE ELECTRICALLY TESTED FOR OPENS AND SHORTS.
8. FABRICATION OF PCB TO COMPLY WITH IPC-A-600 CLASS II . CURRENT REVISION.

Title: TMC4671-EVAL

Version: 1.1

Date: 4.05.2018 Time: 21:40 21:40

TMC4671_EVAL_V1.0

A
[1]_InterfaceConnectors
[1]_InterfaceConnectors.SchDoc

B
[2]_Communication_Inputs
[2]_Communication_Inputs.SchDoc

C
[3]_Output_Feedback
[3]_Output_Feedback.SchDoc

D
[4]_Output_Feedback_2
[4]_Output_Feedback_2.SchDoc

C
[5]_Analog_input_filters
[5]_Analog_input_filters.SchDoc

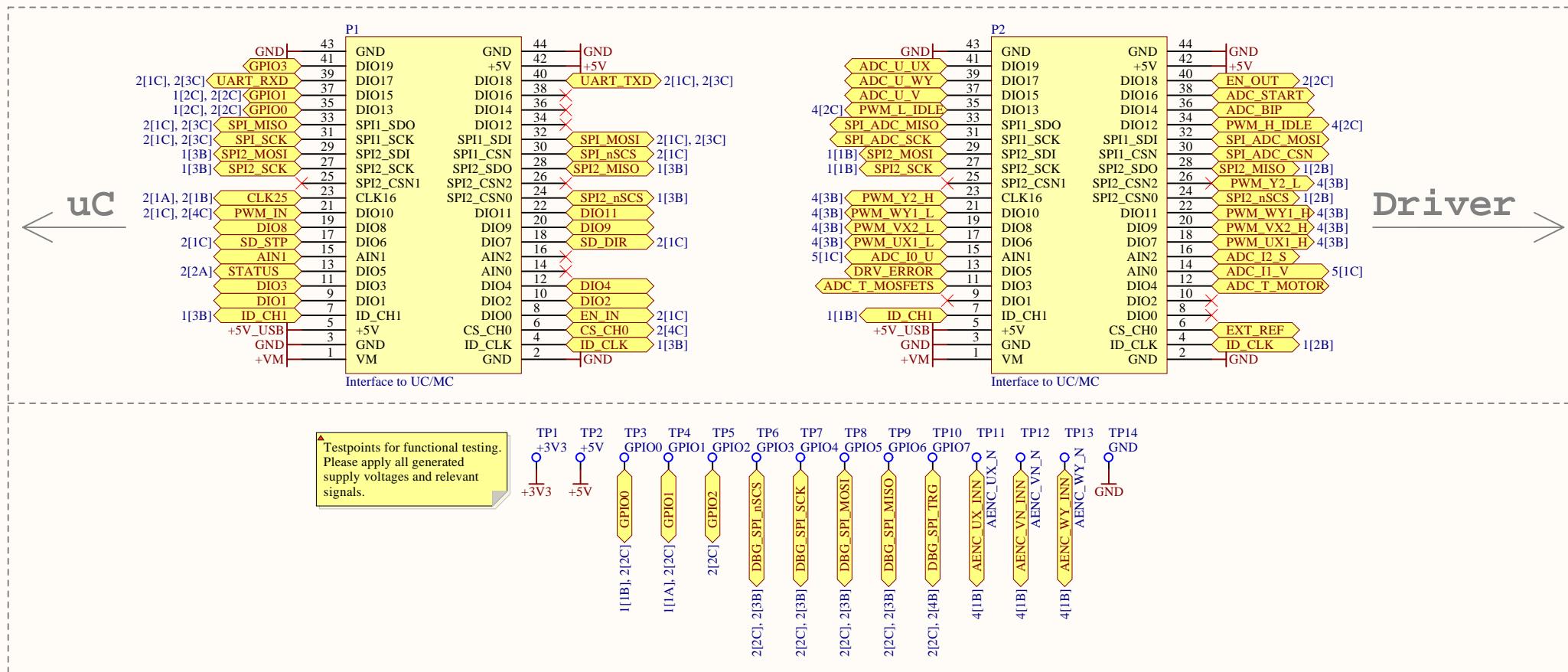
[6]_PSU
[6]_PSU.SchDoc

ChangeLog
ChangeLog.SchDoc

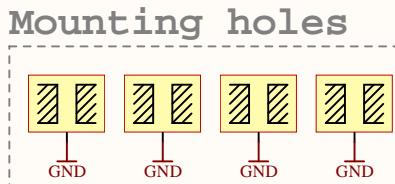
Title: TMC4671_EVAL_V1.0		
Size: A4	Project: TMC4671-EVAL	Version: 1.1
Date: 4.05.2018	Time: 21:40:37	Sheet 0 of 8
File: TMC4671-EVAL_V1_1.SchDoc		



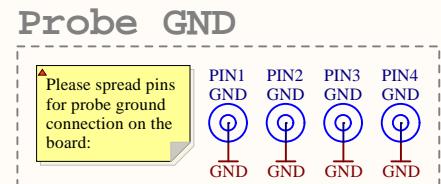
Interface connectors, mounting holes & testpads



SILK1
BACK SIDE GRAPHICS



SILK2
TMC LOGO SMALL

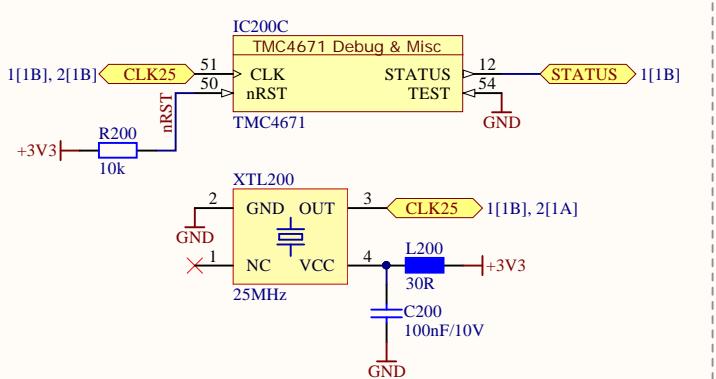


Title: Interface connectors, mounting holes & testpads	
Size: A4	Project: TMC4671-EVAL
	Version: 1.1
Date: 4.05.2018	Time: 21:40:38
File: [1]_InterfaceConnectors.SchDoc	Sheet 1 of 8

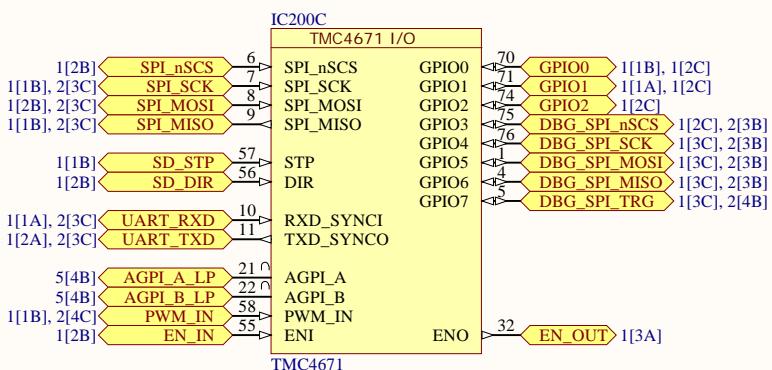
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Communication & Inputs

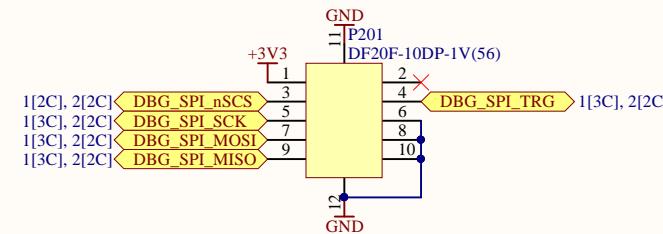
A Clock & Misc



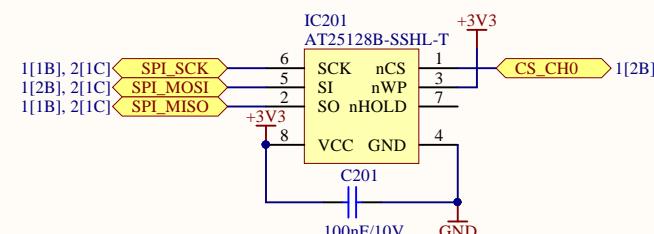
B TMC4671 I/O



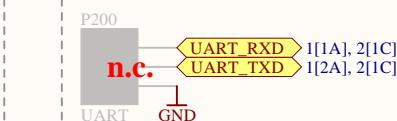
C TMC Realtime Monitoring Interface



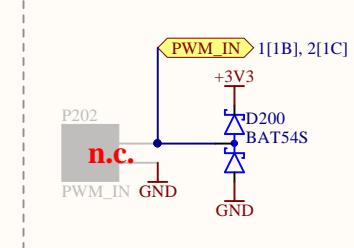
D Module identification EEPROM



E UART / Sync I/O

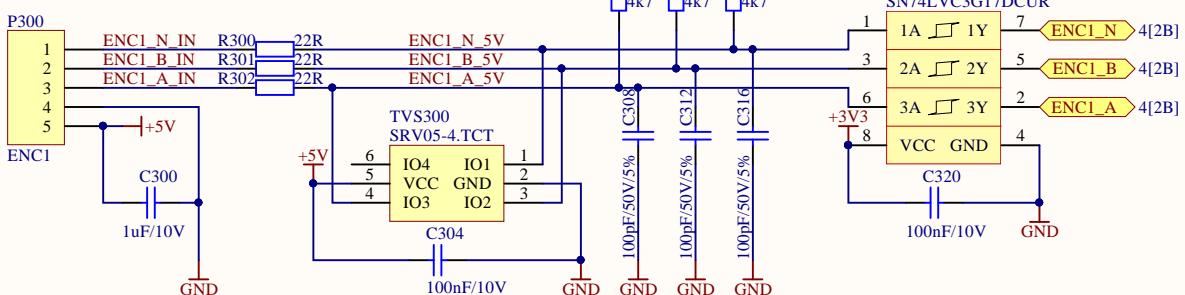


F PWM Input

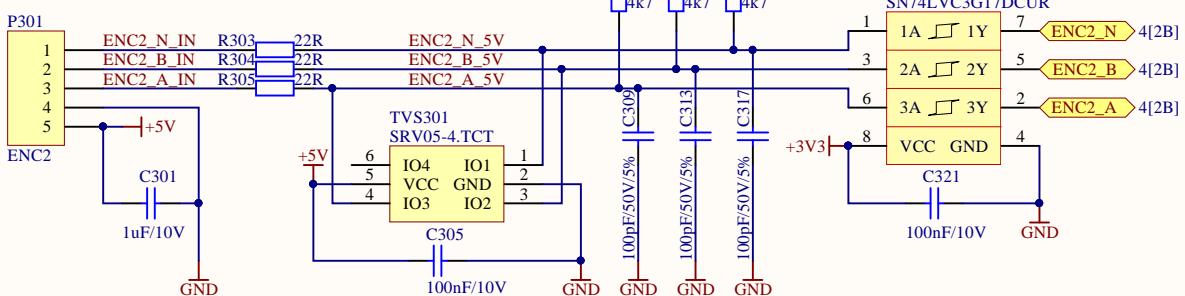


Output & Feedback

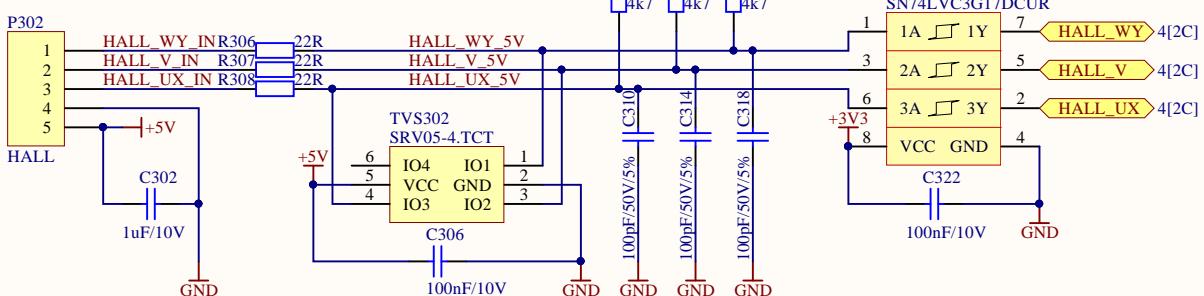
ABN Encoder 1



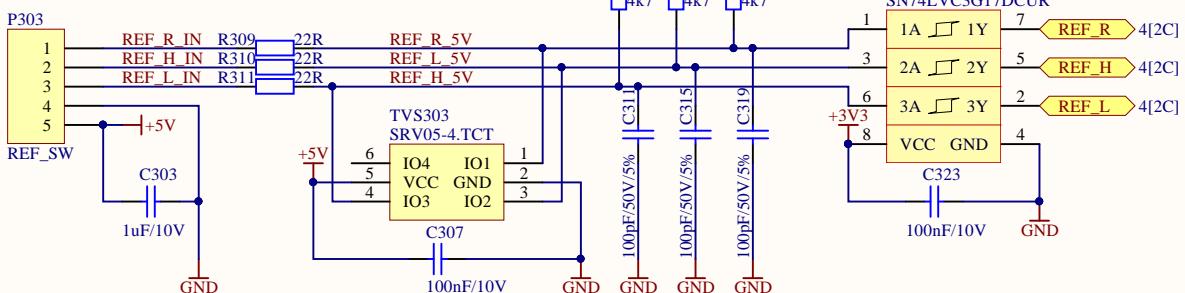
ABN Encoder 2



Hall sensor input

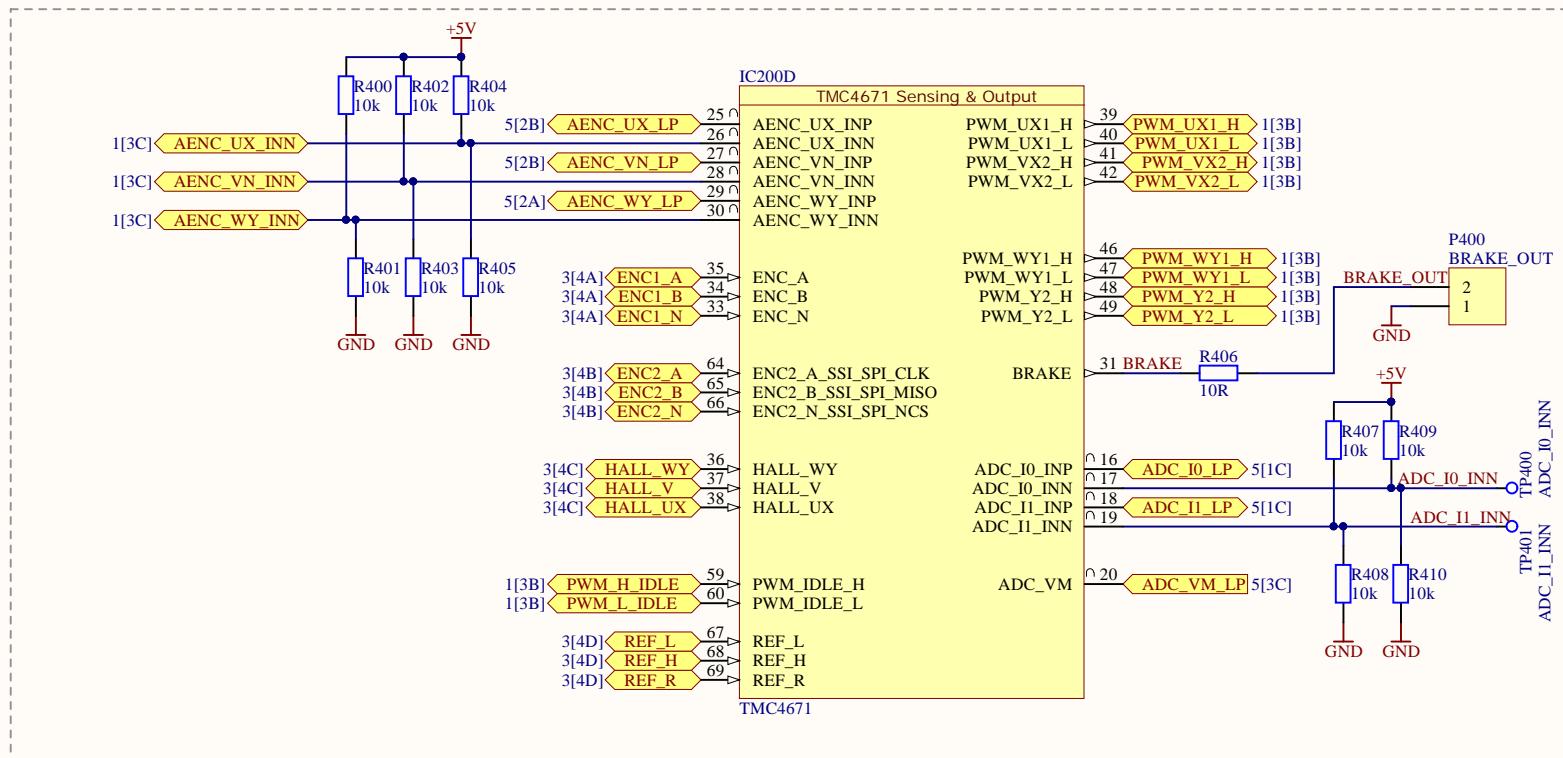


Reference switches



Output & Feedback 2

TMC4671 Sensing & Output

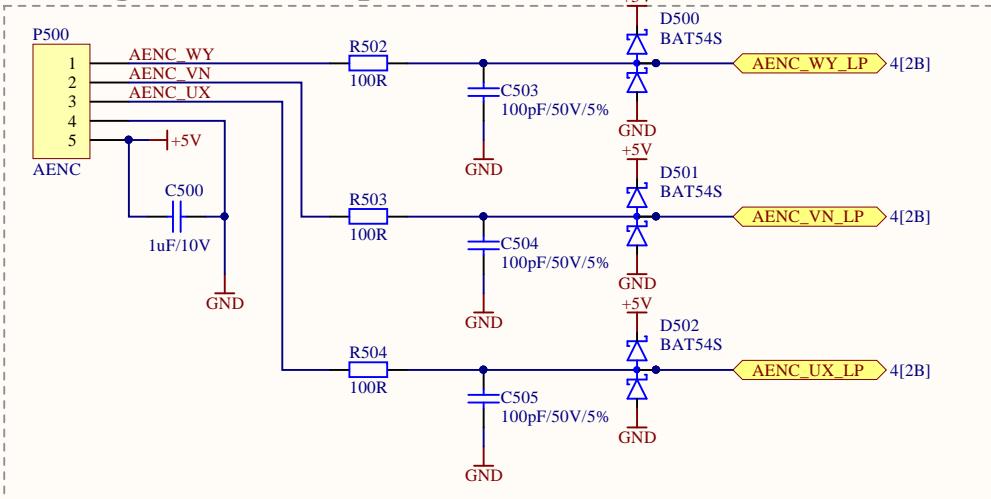


Title: Output & Feedback 2		
Size: A4	Project: TMC4671-EVAL	Version: 1.1
Date: 4.05.2018	Time: 21:40:41	Sheet 4 of 8
File: [4]_Output_Feedback_2.SchDoc		

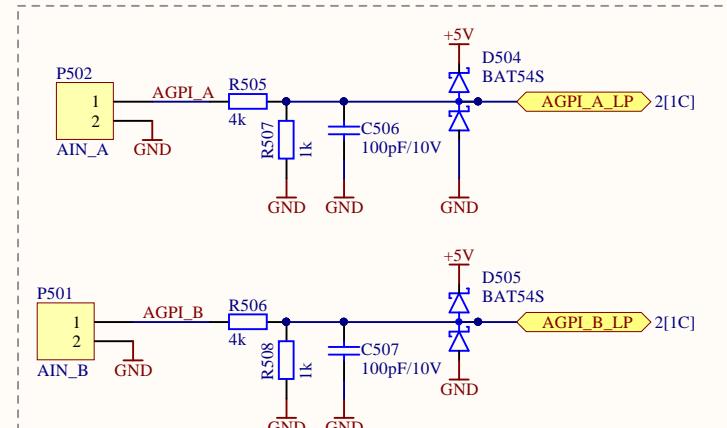


Analog inputs & filters

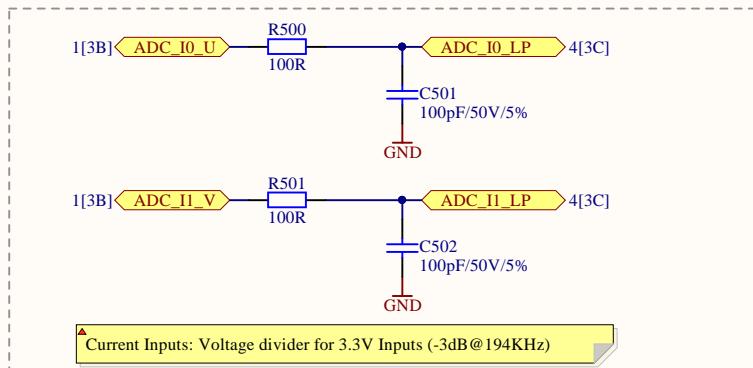
Analog encoder input + filters



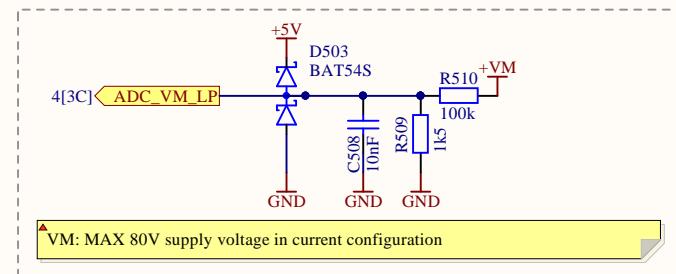
Analog inputs A & B with filters



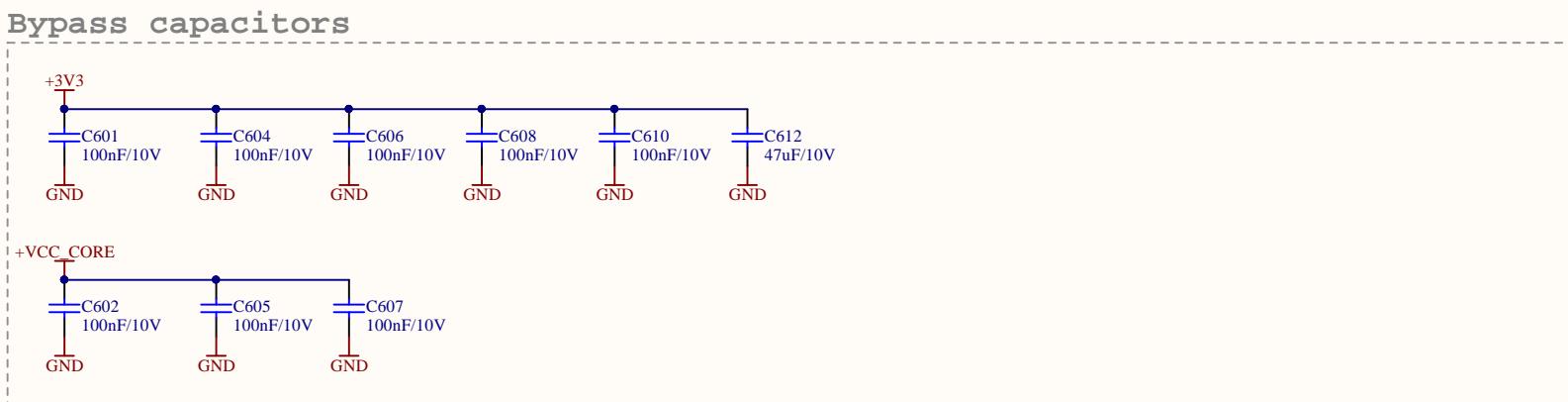
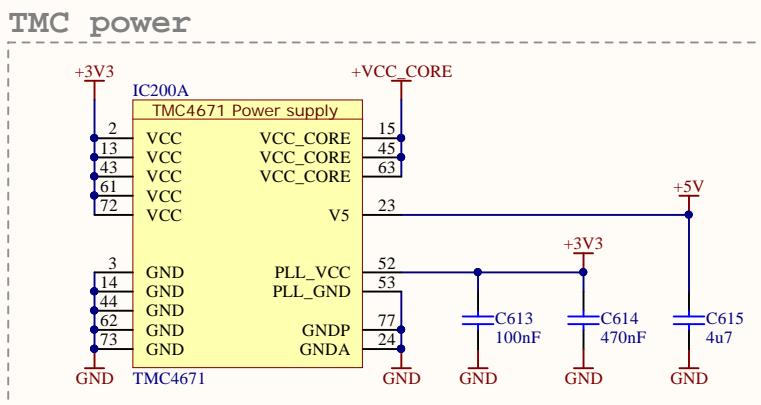
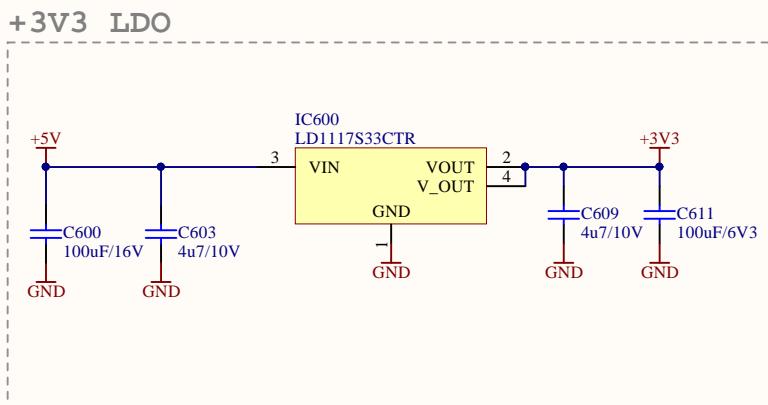
ADC Filter



VM ADC Filter



PSU



Title: **PSU**
Size: **A4** Project: **TMC4671-EVAL** Version: **1.1**
Date: **4.05.2018** Time: **21:40:42** Sheet **6** of **8**
File: **[6].PSU.SchDoc**



ChangeLog

V1.0 - Initial design

25.09.2017

- Fixed XTL200 FOX924B pinout bug (swapped pins 3 & 4).

V1.1 - Bug fixes

04.12.2017

- Fixed twisted AENC_UX and AENC_WY nets.
- Changed P200 pin order on PCB to [+5V, GND, AENC_UX, AENC_VN, AENC_WY].
- Minor clean-ups.

22.12.2017

- Reduced TMC4671 footprint pad widths by 0.7mil.
- Increased TMC4671 pad clearances from 6mil to match pad spacing 8.5mil.

Title:	ChangeLog
Size:	A4
Project:	TMC4671-EVAL
Version:	1.1
Date:	4.05.2018
Time:	21:40:43
Sheet:	7 of 8
File:	ChangeLog.SchDoc



BOM

Project: TMC4671-EVAL

Version: 1.1

Date: 4.05.2018

#	Quantity	MPN	Comment	Designator	Footprint	Description	Note	MF
1	18	MC0603B104K100CT	100nF/10V	C200, C201, C304, C305, C306, C307, C320, C321, C322, C323, C601, C602, C604, C605, C606, C607, C608, C610	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 0.1 µF, 10 V, ± 10%, X7R, MC Series		Multicomp
2	5	MC0603X105K100CT	1uF/10V	C300, C301, C302, C303, C500	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 1 µF, 10 V, ± 10%, X5R, MC Series		MULTICOMP
3	17	MC0603N101J500CT	100pF/50V/5%	C308, C309, C310, C311, C312, C313, C314, C315, C316, C317, C318, C319, C501, C502, C503, C504, C505	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 100 pF, 50 V, ± 5%, COG / NP0, MC Series		MULTICOMP
4	2	MCMT18N101F100CT	100pF/10V	C506, C507	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 100 pF, 10 V, ± 1%, COG / NP0, MCMT Series		MULTICOMP
5	1	MCSH18B103K100CT	10nF	C508	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 0.01 µF, 10 V, ± 10%, X7R, MCSH Series		MULTICOMP
6	1	EMK325ABJ107M/T	100uF/16V	C600	C1210	SMD Multilayer Ceramic Capacitor, 1210 [3225 Metric], 100 µF, 16 V, ± 20%, X5R, M Series		TAIYO YUDEN
7	2	MC0603X475K100CT	4u7/10V	C603, C609	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 4.7 µF, 10 V, ± 10%, X5R, MC Series		MULTICOMP
8	1	GRM31CR60J107ME39L	1000uF/6V3	C611	C1210	SMD Multilayer Ceramic Capacitor, 1210 [3225 Metric], 100 µF, 6.3 V, ± 20%, X5R, GRM Series		MURATA
9	1	GRM31CR61A476ME15L	47uF/10V	C612	C1206	SMD Multilayer Ceramic Capacitor, 1206 [3216 Metric], 47 µF, 10 V, ± 20%, X5R, GRM Series		MURATA
10	1	MC0603B104K100CT	100nF	C613	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 0.1 µF, 10 V, ± 10%, X7R, MC Series		Multicomp
11	1	MC0603X474K160CT	470nF	C614	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 0.47 µF, 16 V, ± 10%, X5R, MC Series		Multicomp
12	1	MC0603X475K100CT	4u7	C615	C0603	SMD Multilayer Ceramic Capacitor, 0603 [1608 Metric], 4.7 µF, 10 V, ± 10%, X5R, MC Series		MULTICOMP
13	7	BAT54S	BAT54S	D200, D500, D501, D502, D503, D504, D505	SOT95P237X130-3N	Small Signal Schottky Diode, Dual Series, 30 V, 200 mA, 1 V, 600 mA, 125 °C		TAIWAN SEMICONDUCTOR
14	1	TMC4671	TMC4671	IC200	QFN40P1050x650x90_H5-77N			TRINAMIC
15	1	AT25128B-SH-L-T	AT25128B-SH-L-T	IC201	SOP127P600X175-8N	EEPROM, SPI, 128 Kbit, 16K x 8bit, 20 MHz, SOIC, 8 Pins		MICROCHIP
16	4	SN74LVC3G17DCUR	SN74LVC3G17DCUR	IC300, IC301, IC302, IC303	TSSOP50P310X90-8L	Triple Schmitt-Trigger Buffer, 74LVC3G17, 1.65 V to 5.5 V, VSSOP-8		TEXAS INSTRUMENTS
17	1	LD1117S33CTR	LD1117S33CTR	IO600	SOT230P700X180-4N	Fixed LDO Voltage Regulator, 4.75V to 15V, 1.1V Dropout, 3.3Vout, 950mAout, SOT-223-4		STMICROELECTRONICS
18	1	MFB-160808-0030PQ	30R	L200	L0603	Ferrite Bead, 30 ohm, 0603 [1608 Metric], MFB Series, 3 A, 0.04 ohm, ± 25%		MECMARCOM
19	2	HLE-122-02-L-DV	Interface to UCMC	P1, P2	Interface_Connector	Board-To-Board Connector, 2.54 mm, 44 Contacts, Receptacle, HLE Series, Surface Mount, 2 Rows		SAMTEC
20	1	DF20F-10DP-1V(56)	DF20F-10DP-1V(56)	P201	CON_TMC Debug SPI	Wire-To-Board Connector, 1 mm, 10 Contacts, Header, DF20 Series, Surface Mount, 2 Rows		Hirose Electric Co Ltd
21	1	ENC1	ENC1	P300	TH_HDR_1X5	Header, 5-Pin		
22	1	ENC2	ENC2	P301	TH_HDR_1X5	Header, 5-Pin		
23	1	HALL	HALL	P302	TH_HDR_1X5	Header, 5-Pin		
24	1	REF_SW	REF_SW	P303	TH_HDR_1X5	Header, 5-Pin		
25	1	BRAKE_OUT	BRAKE_OUT	P400	TH_HDR_1X2	Header, 2-Pin		
26	1	AENC	AENC	P500	TH_HDR_1X5	Header, 5-Pin		
27	1	AIN_B	AIN_B	P501	TH_HDR_1X2	Header, 2-Pin		
28	1	AIN_A	AIN_A	P502	TH_HDR_1X2	Header, 2-Pin		
29	11	MC0063W0603110K	10k	R200, R400, R401, R402, R403, R404, R405, R407, R408, R409, R410	R0603	SMD Chip Resistor, Thick Film, 10 kohm, 50 V, 0603 [1608 Metric], 63 mW, ± 1%, MC Series		MULTICOMP
30	12	MCWR06X22R0FTL	22R	R300, R301, R302, R303, R304, R305, R306, R307, R308, R309, R310, R311	R0603	SMD Chip Resistor, Thick Film, 22 kohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
31	12	WR06X4701FTL	4k7	R312, R313, R314, R315, R316, R317, R318, R319, R320, R321, R322, R323	R0603	SMD Chip Resistor, 4.7 kohm, 75 V, 0603 [1608 Metric], 100 mW, ± 1%, WR06 Series		WALSIN
32	1	MC0063W0603110K	10R	R406	R0603	SMD Chip Resistor, Thick Film, 10 ohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
33	5	MCWR06X1000FTL	100R	R500, R501, R502, R503, R504	R0603	SMD Chip Resistor, Thick Film, 100 ohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
34	2	CRCW08054K00FKTA	4k	R505, R506	R0805	SMD Chip Resistor, Thick Film, 4 kohm, 150 V, 0805 [2012 Metric], 125 mW, ± 1%, CRCW Series		VISHAY
35	2	MC0063W0603111K	1k	R507, R508	R0603	SMD Chip Resistor, Thick Film, 1 kohm, 50 V, 0603 [1608 Metric], 100 mW, ± 0.5%, RE Series		MULTICOMP
36	1	MCWR06X1501FTL	1k5	R509	R0603	SMD Chip Resistor, Thick Film, 1.5 kohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
37	1	MCWR06X1003FTL	100k	R510	R0603	SMD Chip Resistor, Thick Film, 100 kohm, 50 V, 0603 [1608 Metric], 100 mW, ± 1%, MCWR Series		MULTICOMP
38	4	SRV05-4.TCT	SRV05-4.TCT	TVS300, TVS301, TVS302, TVS303	SOT95P280X145-6N	ESD Protection Device, TVS, 17.5 V, SOT-23, 6 Pins, 5 V, 300 W		SEMTECH
39	1	FOX924B-25.000	25MHz	XTL200	FOX924B-25.000	TCXO, 25 MHz, 2.5 ppm, SMD, 5mm x 3.2mm, HCMOS, 3.3 V, FOX924 Series		FOX ELECTRONICS
Approved		Notes					129	

