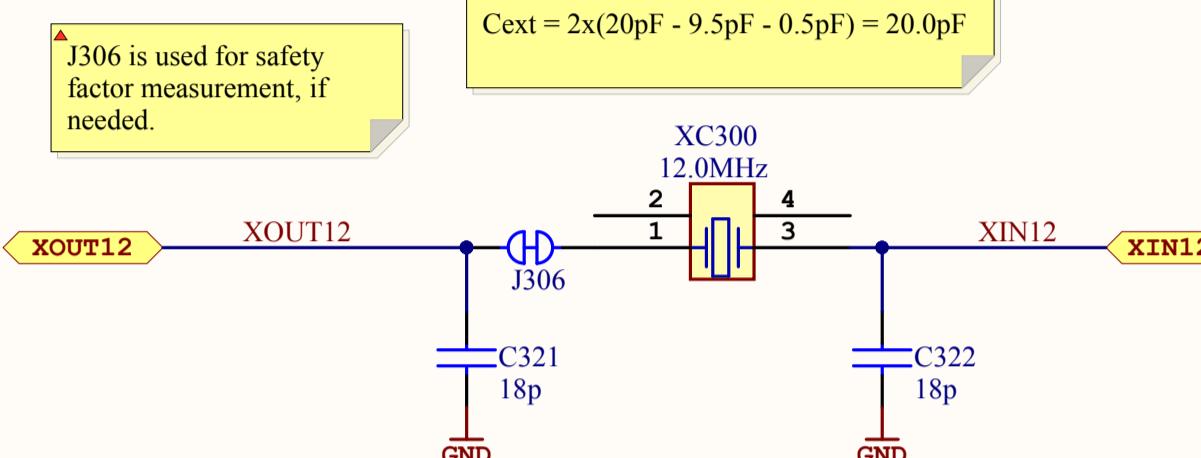
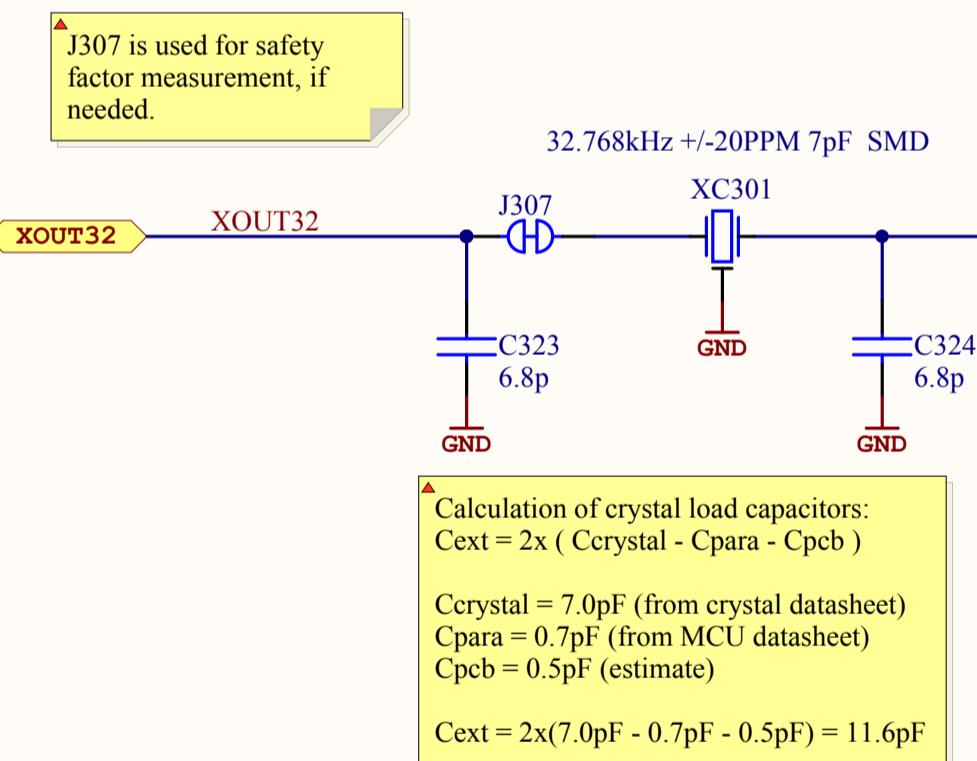


A

▲ Calculation of crystal load capacitors:  
 $C_{ext} = 2x(C_{crystal} - C_{L} - C_{pcb})$   
 Ccrystal = 20pF (from crystal datasheet)  
 $C_L = 9.5pF$  (from MCU datasheet)  
 $C_{pcb} = 0.5pF$  (estimate)  
 $C_{ext} = 2x(20pF - 9.5pF - 0.5pF) = 20.0pF$



B



C

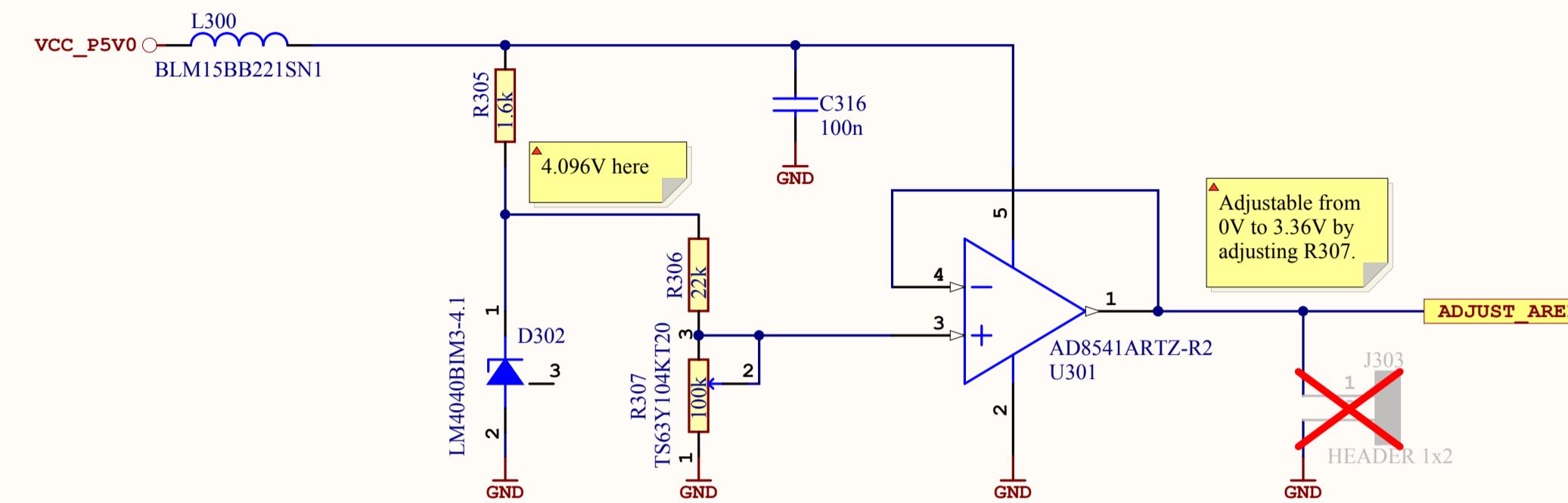
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ATMEL Norway	*		
Vestre Rosten 79	*		
N-7075 TILLER	*		
NORWAY			
Date:	2/28/2013	2:45:55 PM	PAGE: 5 of 8
Document number:	5	Revision	5
TITLE: Crystal Oscillators			
SAM4S_Xplained_Pro_Oscillators.SchDoc			

**Atmel**  
Enabling Unlimited Possibilities

A

A



B

B

C

C

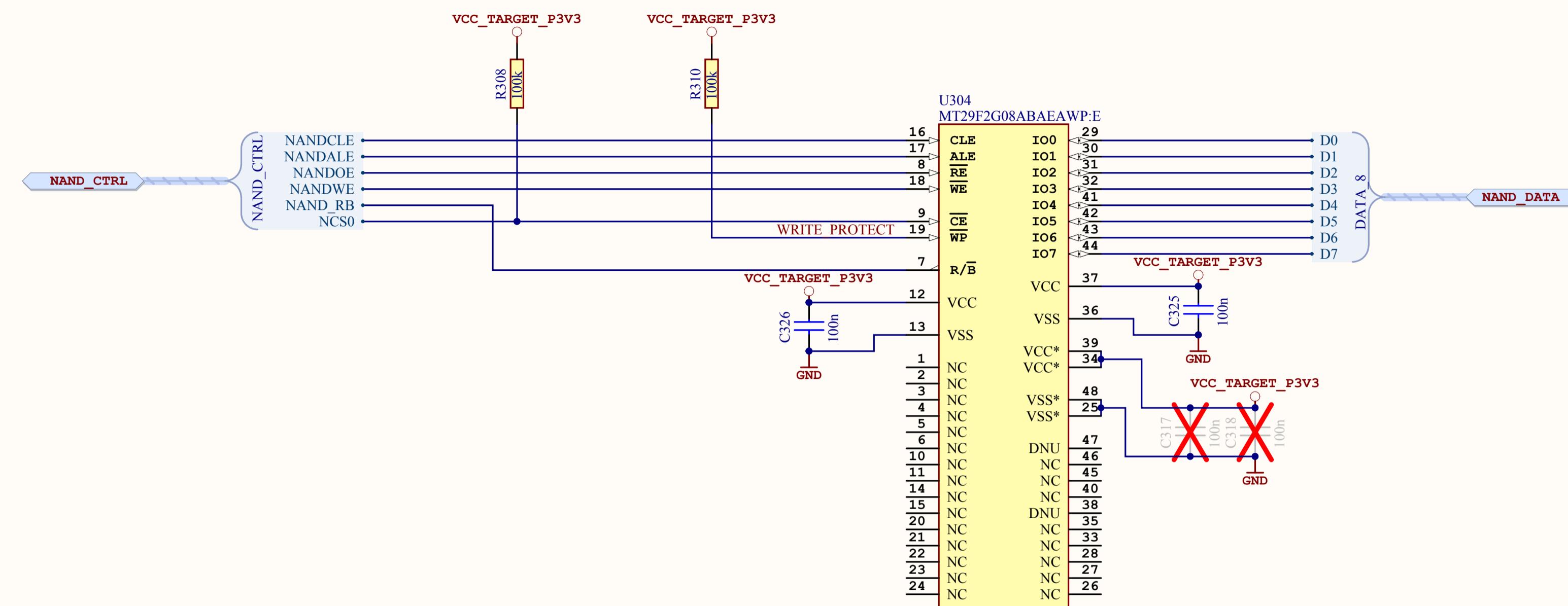
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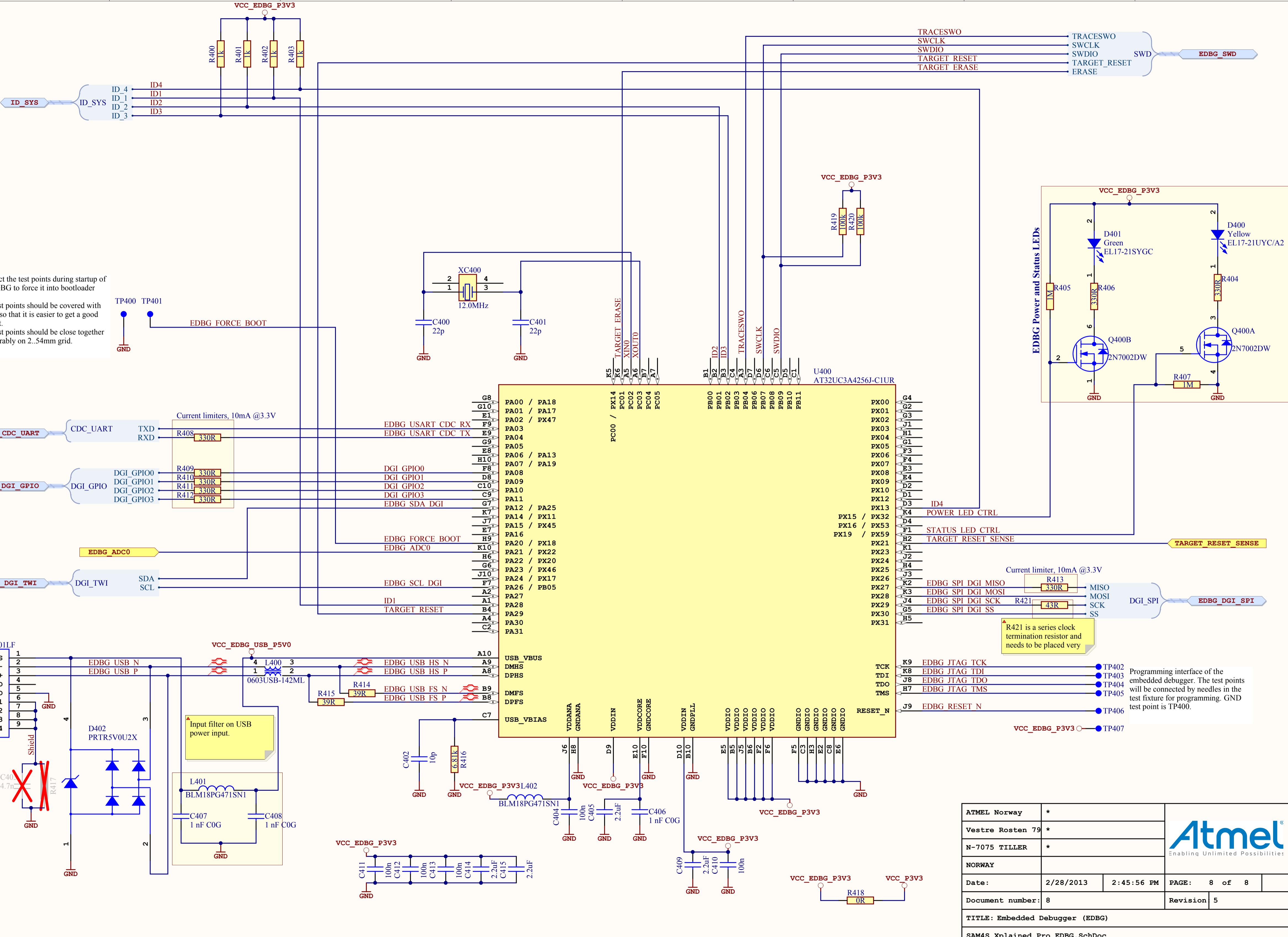
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ATMEL Norway	*		
Vestre Rosten 79	*		
N-7075 TILLER	*		
NORWAY			
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Document number:	6		Revision 5
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SAM4S_Xplained_Pro_Analog_REF.SchDoc			

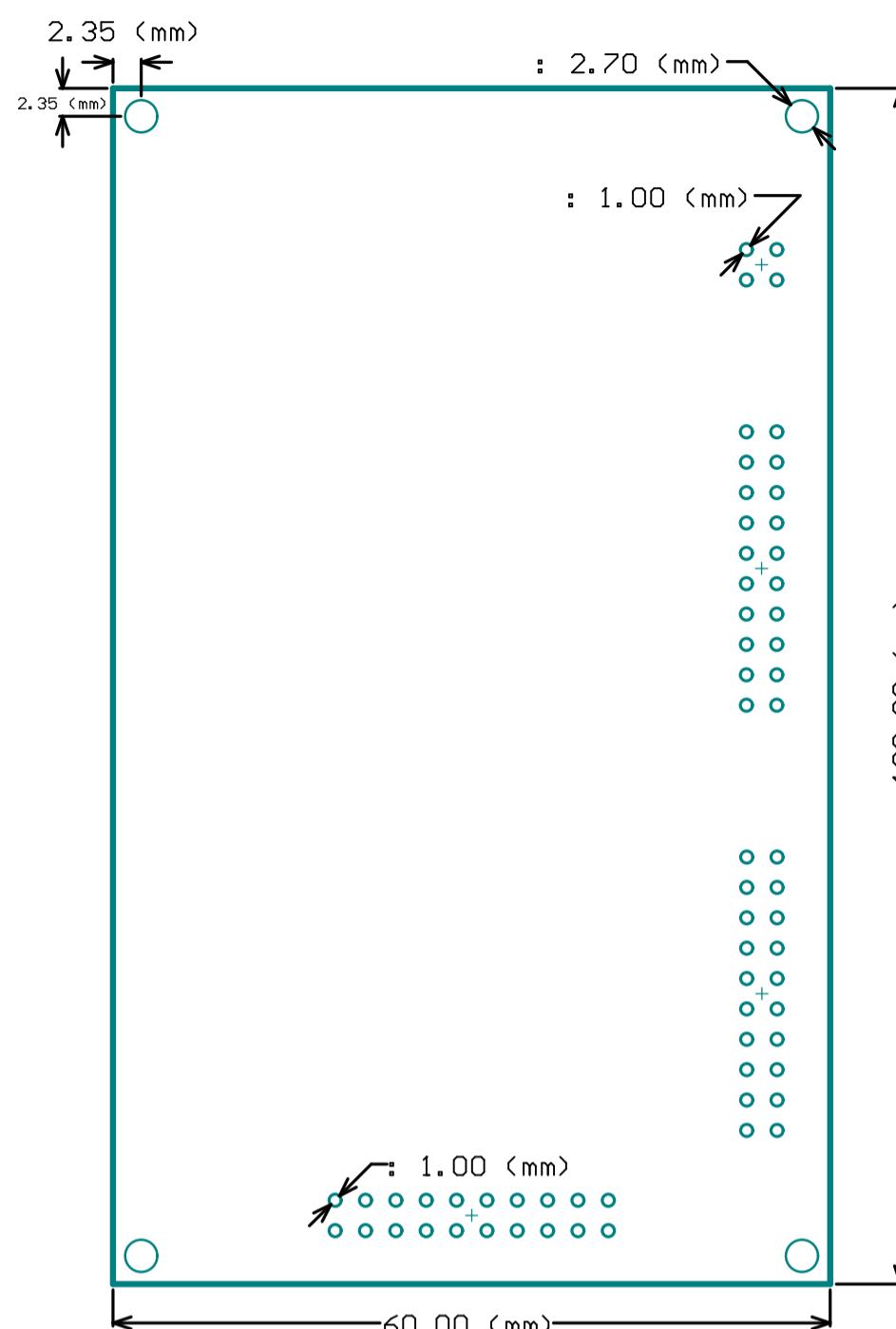
**Atmel**  
Enabling Unlimited Possibilities

A

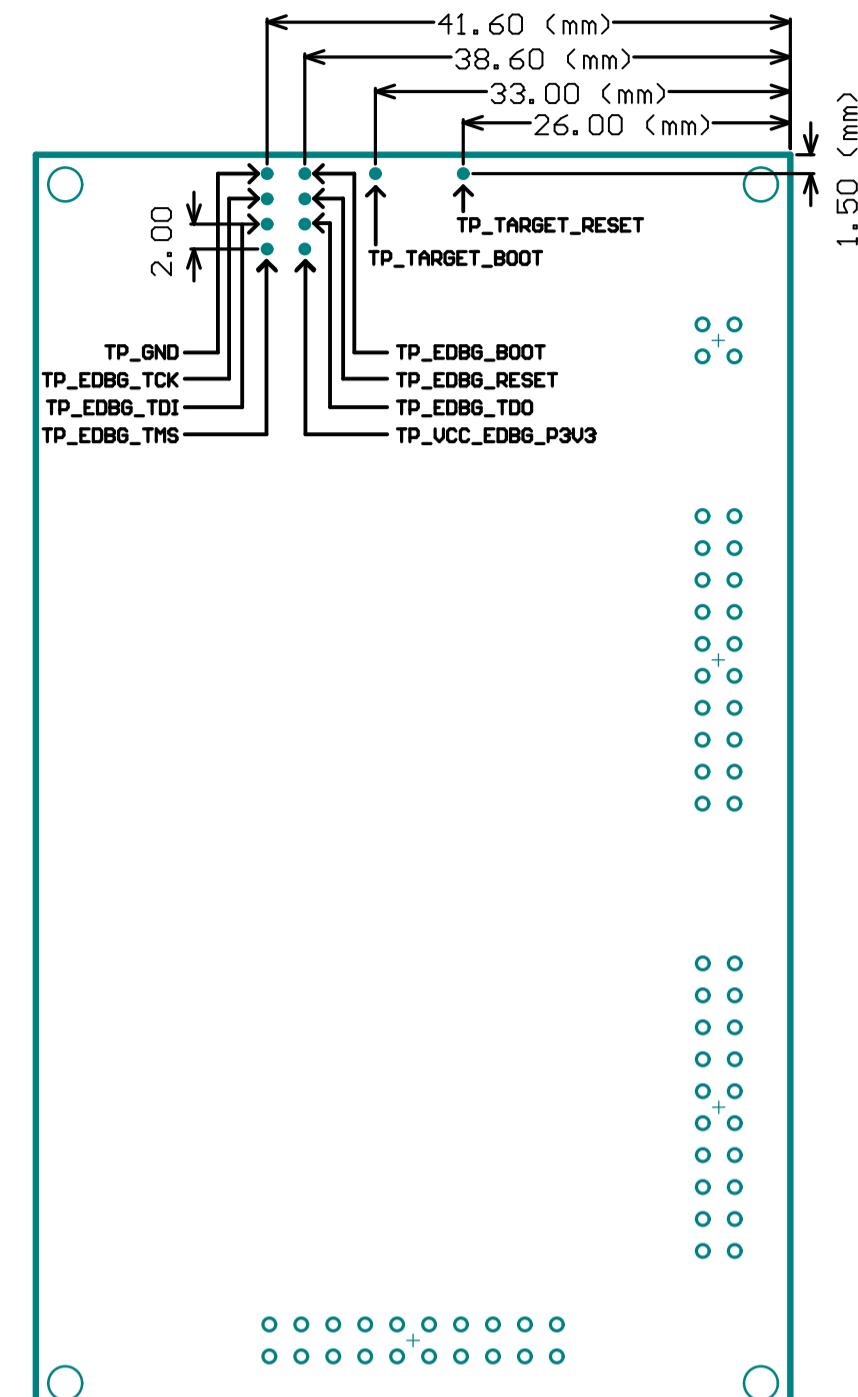




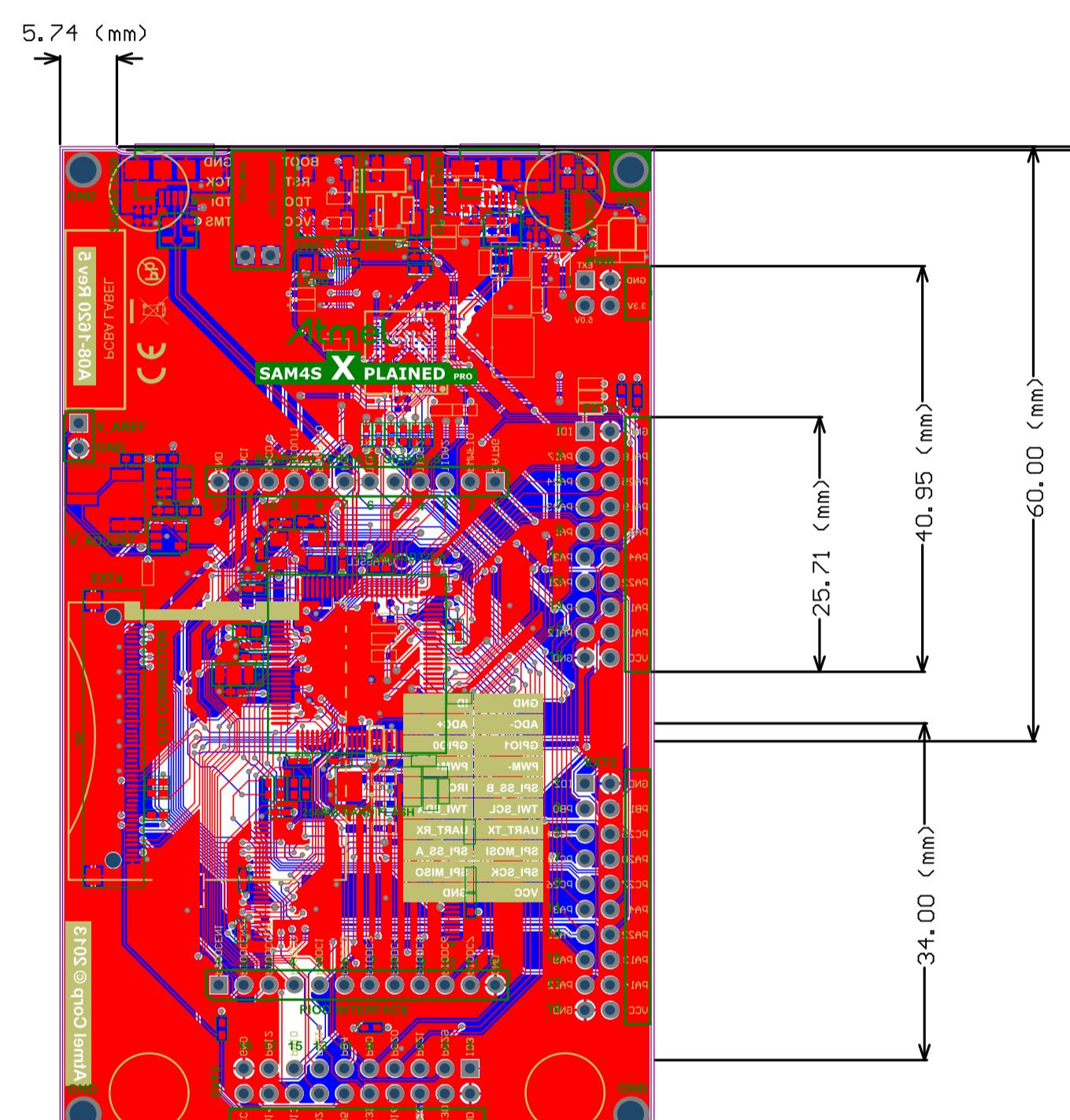
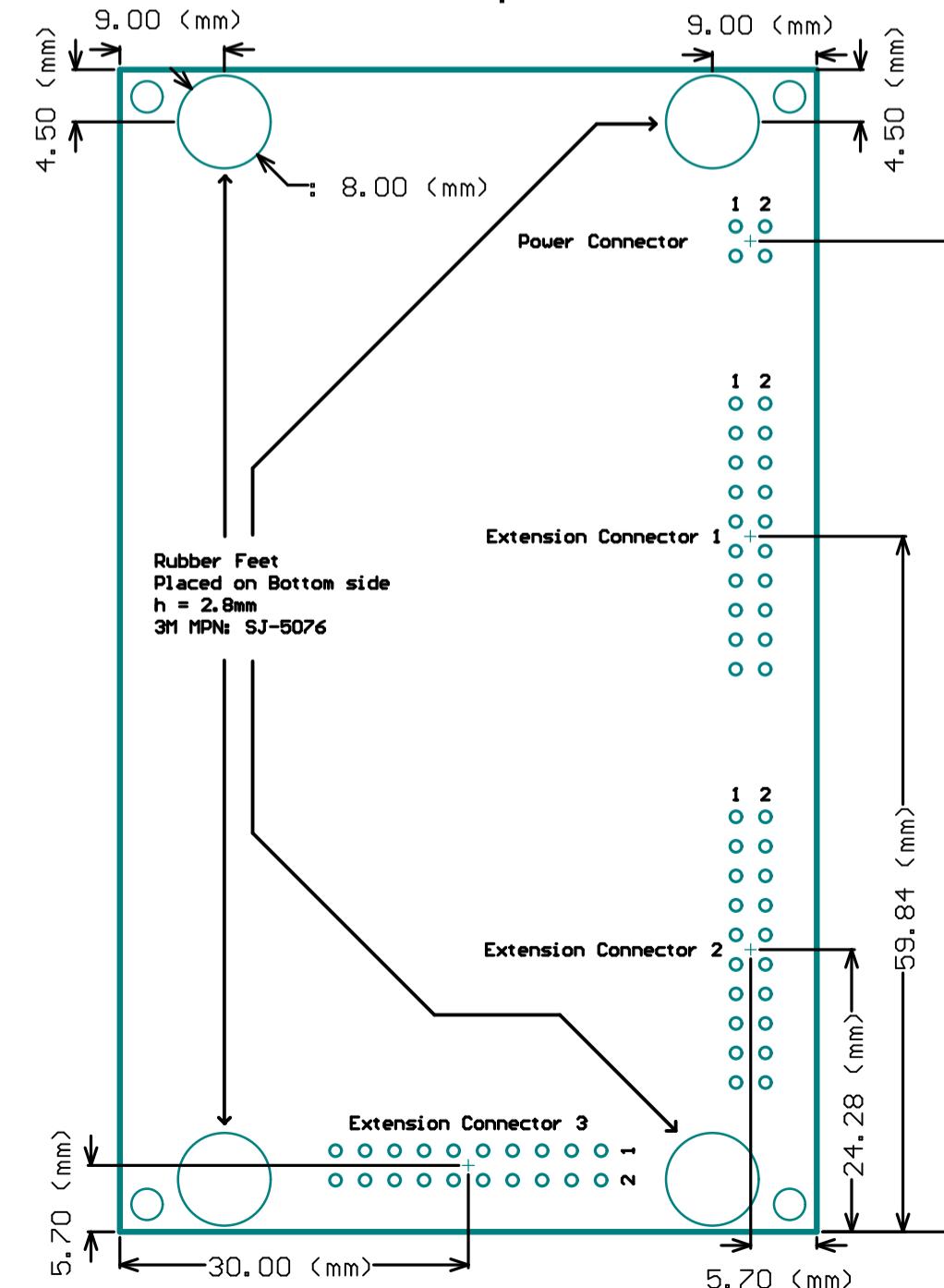
### Medium MCU Mechanical Dimensions



### Medium MCU Test Points



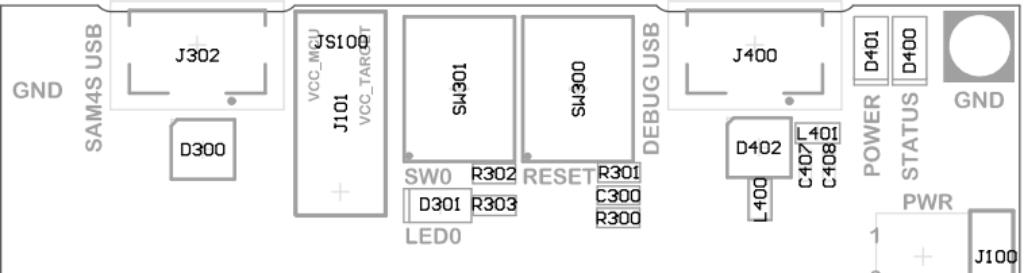
### Medium MCU Component Placement



**Atmel**

ATMEL NORWAY  
Vestre Rosten 79  
N-7075 Trondheim

ENGINEER:	TITLE:
PCB DESIGNER:	
DATE:	PART NO.:
2/28/2013	DWG NO.:
FILE NAME: SAM4S_Xplained_ProjDwg	SCALE:



# Atmel

## SAM4S X PLAINED PRO

V\_AREF

GND

R306 R305

D302 C316 L300

R307

V\_ADJUST

U301

EXT4

LCD CONNECTOR  
J203

R200  
R202  
R201

SPARE/ALTERNATE SIGNALS

R413  
R409  
R408  
R410  
R412  
R411

C301 C303

XC300 ATSAM4SD32CA

J306

C302

C304

C322

C301

C304

C306

C307

C308

C310

C309

U300

1 2 3 4 5 6 7 8 9 10 11 12

EXT1

1 3 5 7 9 11 13 15 17 19

1 3 5 7 9 11 13 15 17 19

+ R320 R312

J200

256MB NAND FLASH

C313

C314

C315

C324

C322

J307

C323

U304

1 2 3 4 5 6 7 8 9 10 11 12

1 3 5 7 9 11 13 15 17 19

R308 C326 R310

EXT2

1 3 5 7 9 11 13 15 17 19

+ J201

PIO3 INTERFACE

R309

19 17 15 13 11 9 7 5 3 1

EXT3

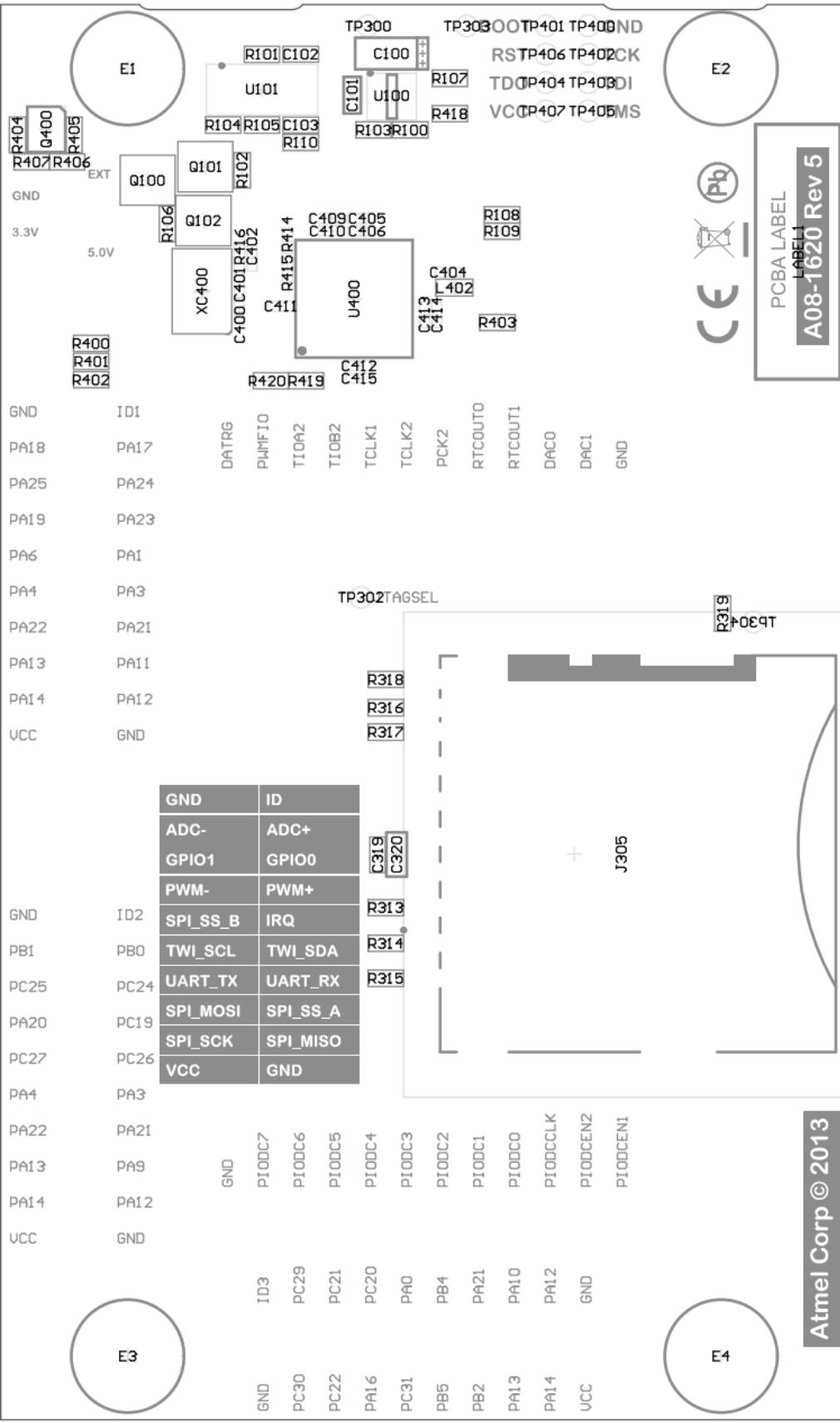
R311

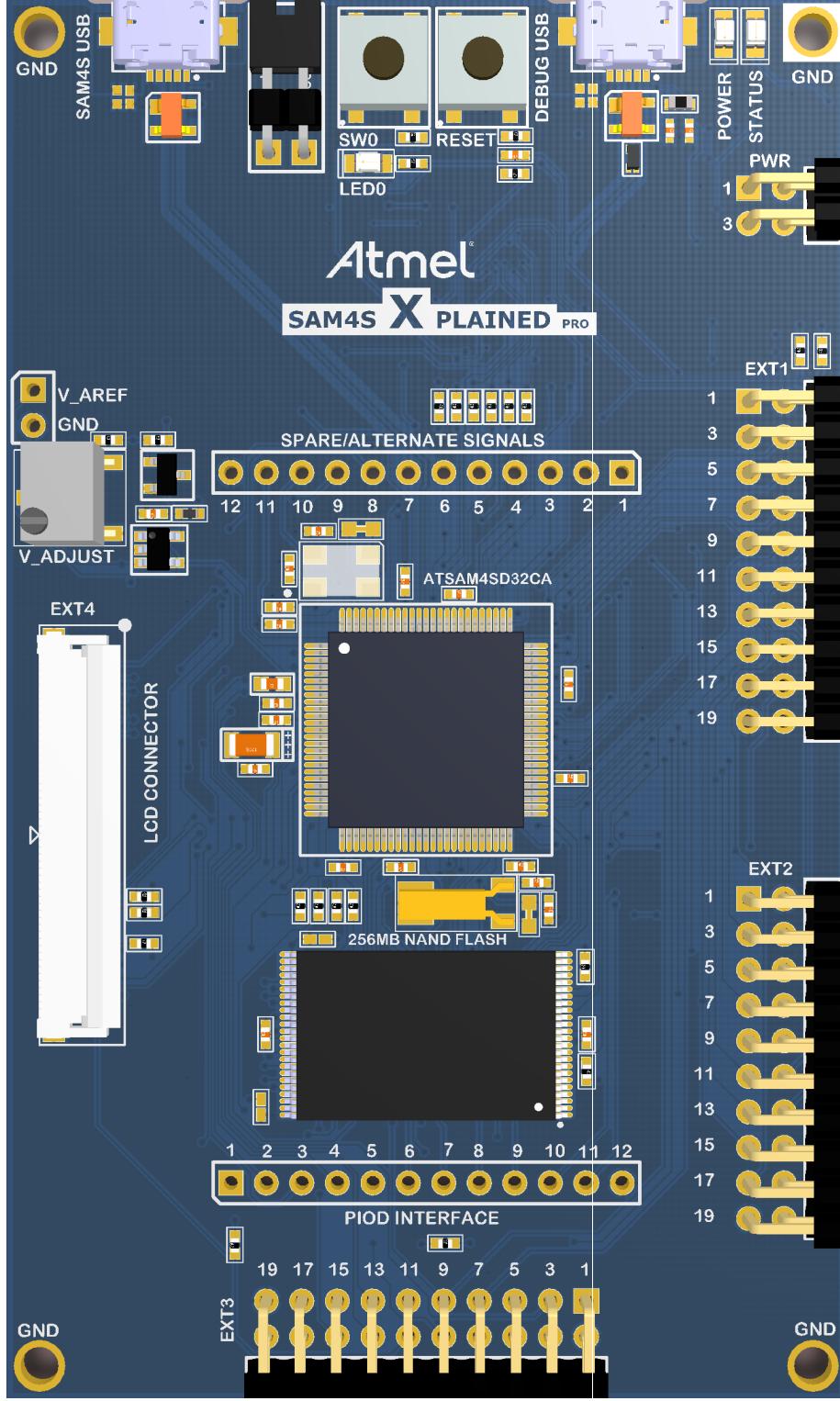
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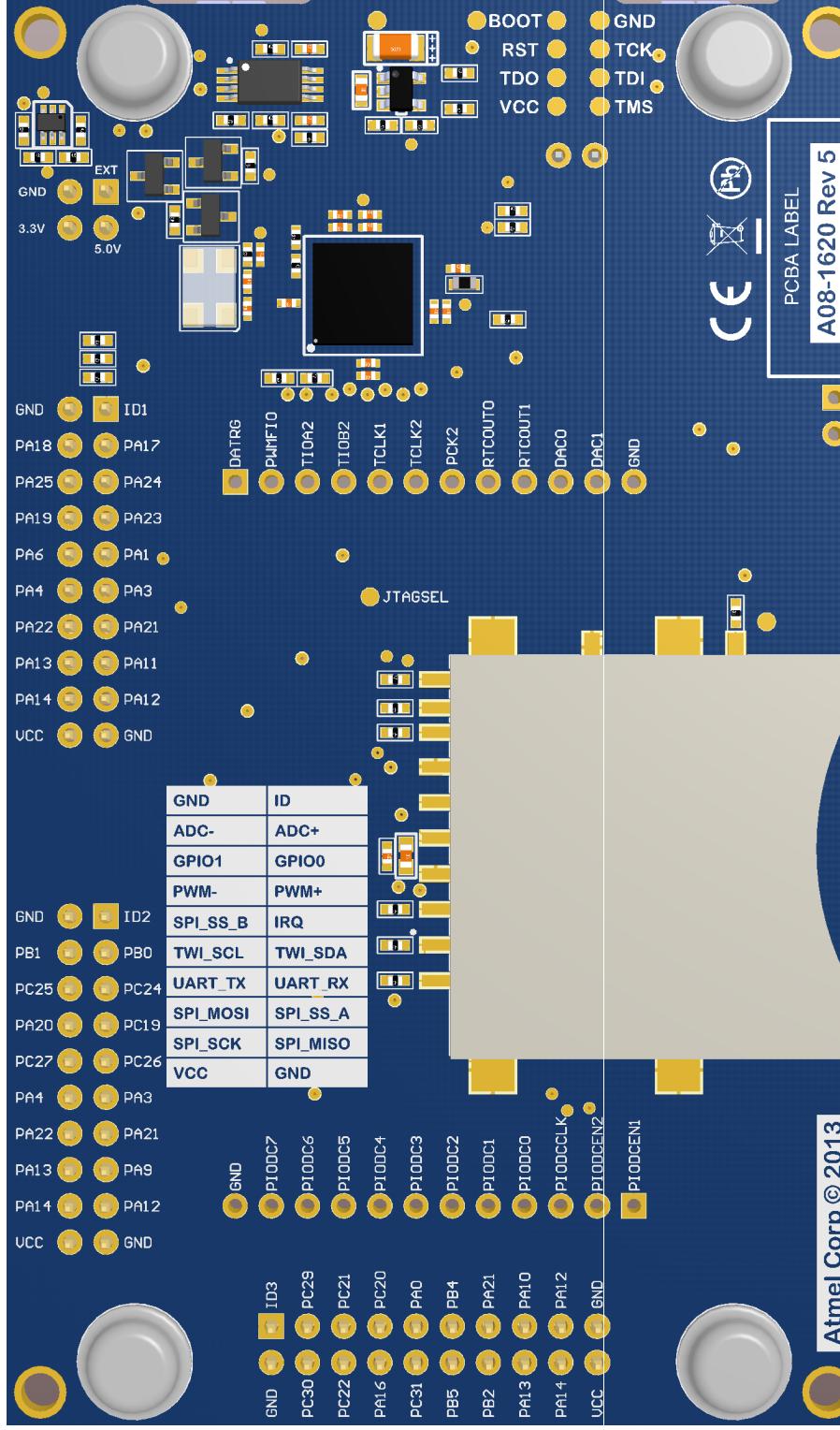
GND

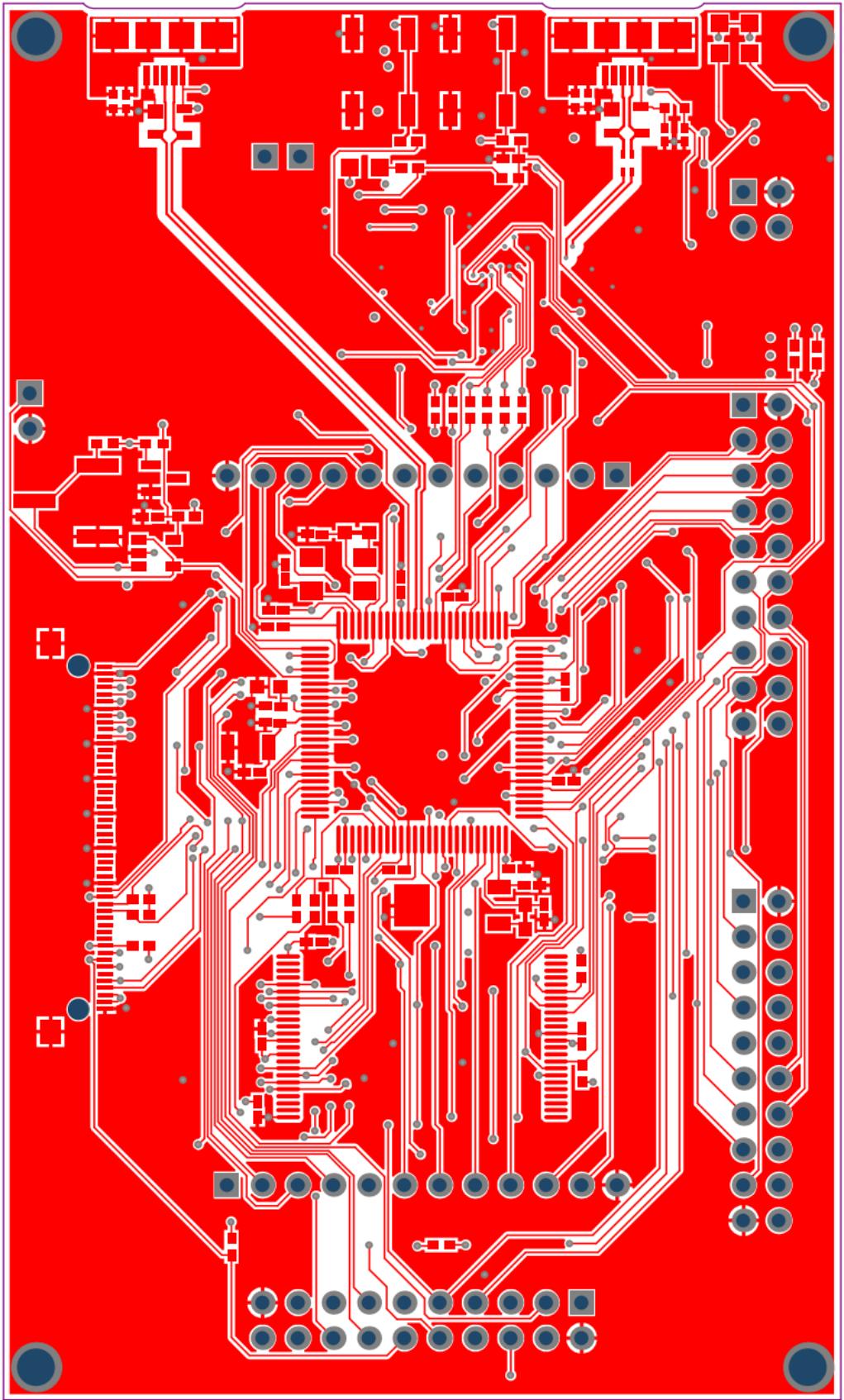
J202

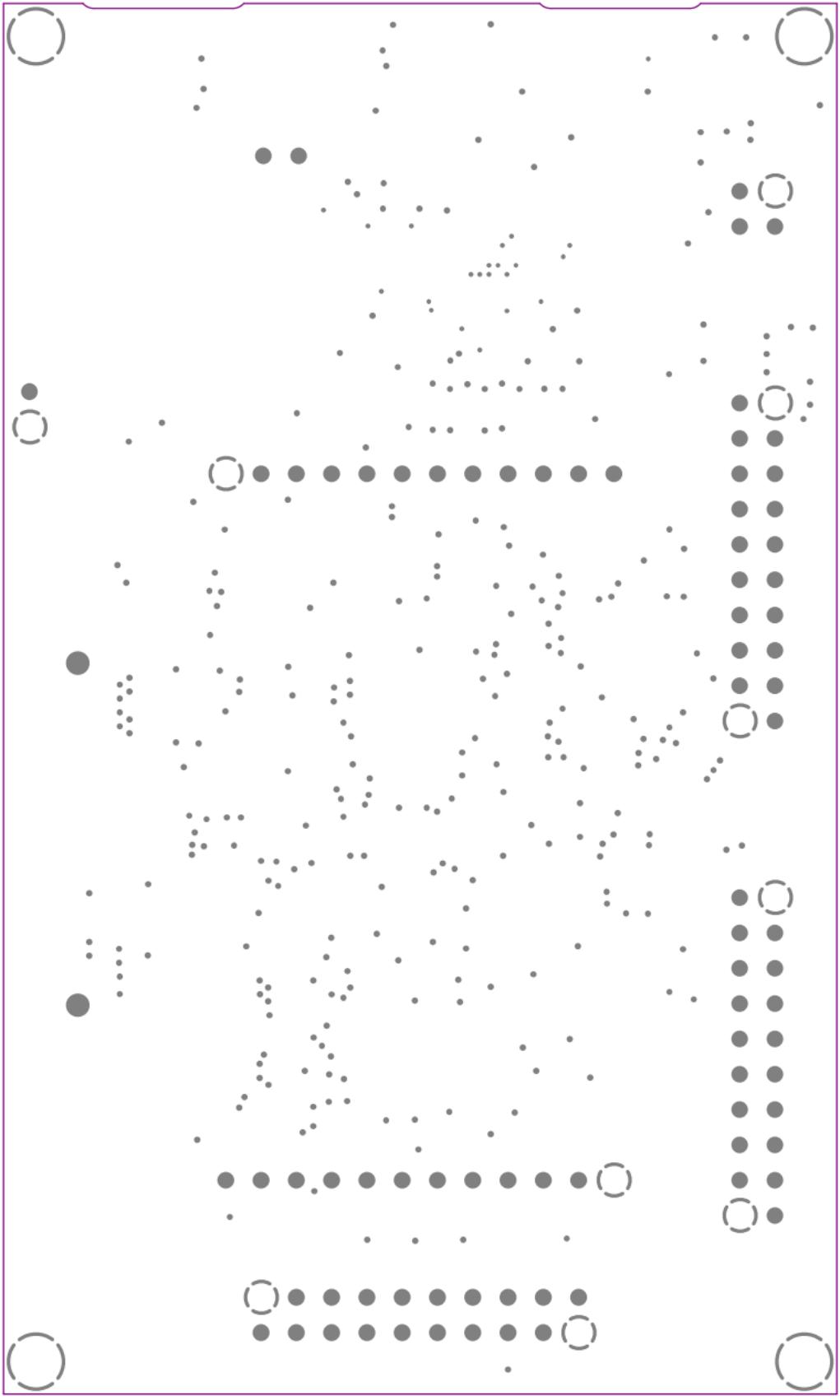
GND

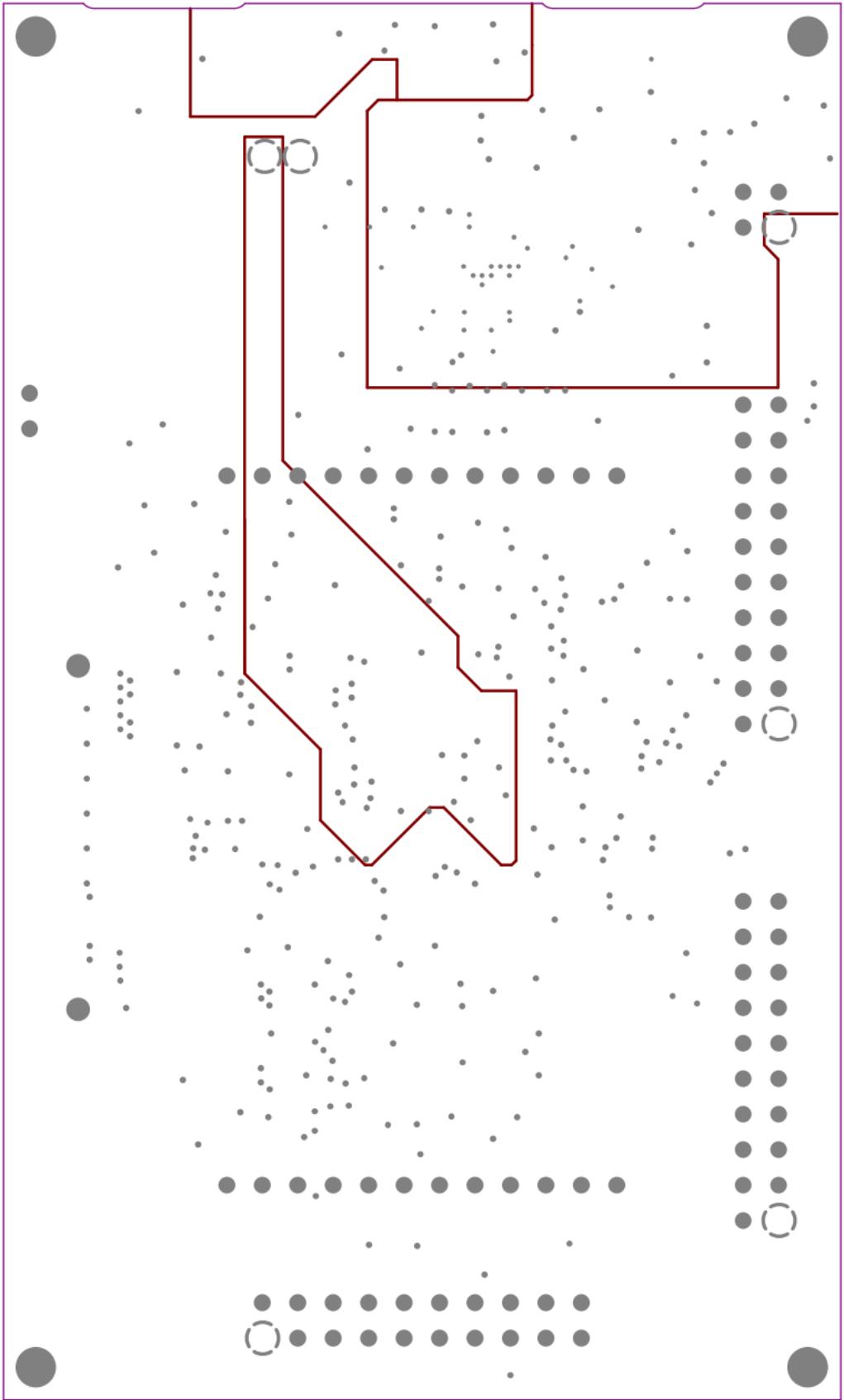


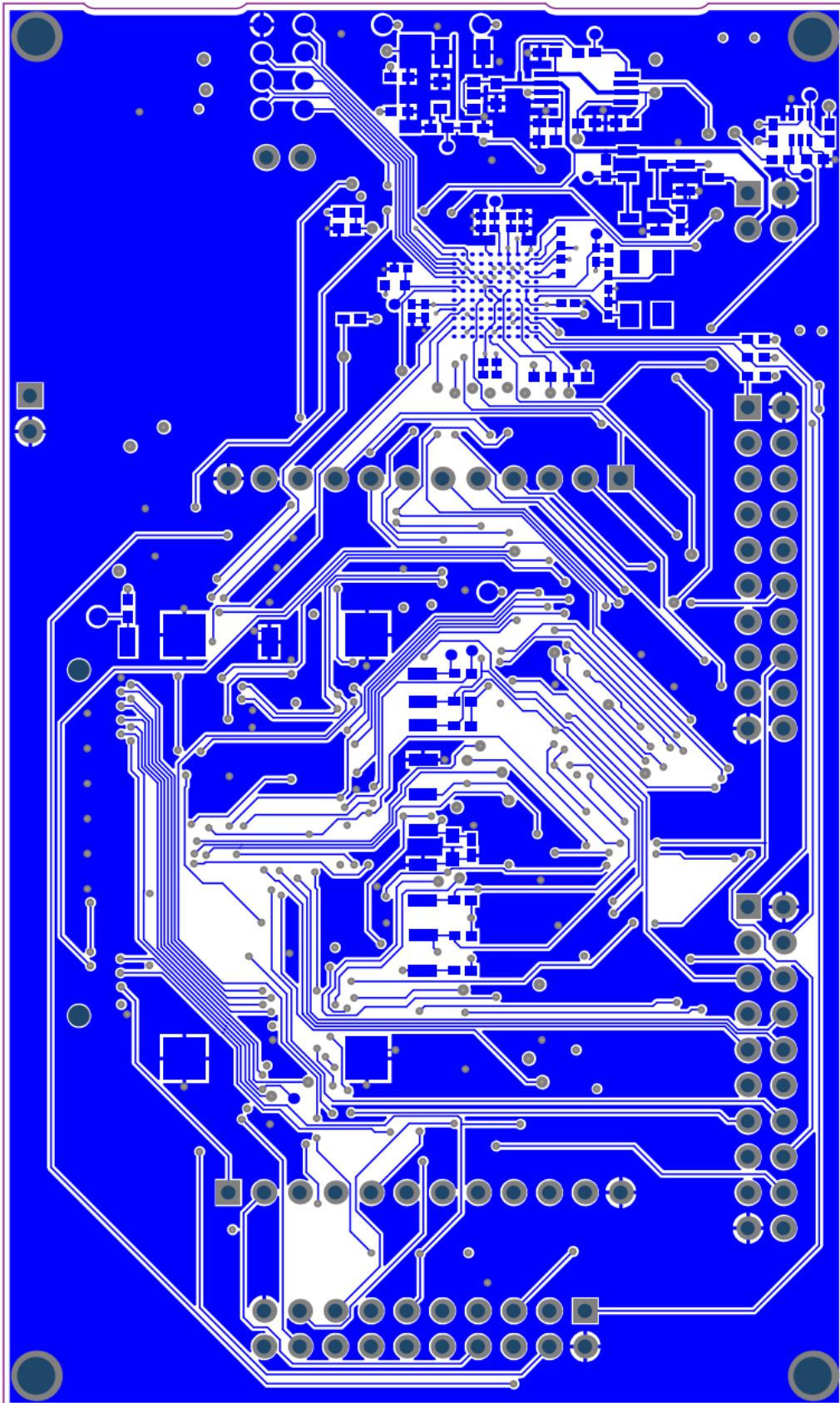












## Component list

### Top Level Schematics

Source Data From:

SAM4S\_Xplained\_Pro.PnjPCB

Project:

SAM4S\_Xplained\_Pro.PnjPCB

Variant:

Default Assembly

Report Date: 2/28/2013  
Print Date: 2/28/2013

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2:46:17 PM



Fitted	Designator	Quantity	Value	Manufacturer	MPN	Description
Fitted	C100	1	10u	vishay	TR2A106K016C1700	SMD tantalum capacitor, ESR = 1.7, 3216-18 (BA) 1206.
Fitted	C101	1	4.7uF	tdk	C1608X5R1A475K	Ceramic capacitor, SMD 0603, X5R, 10V, +/-10% (de31036)
Fitted	C102, C103, C091, C302, C303, C304, C305, C307, C308, C309, C311, C313, C314, C315, C316, C319, C325, C326, C404, C410, C411, C412, C413	23	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C300	1	4.7n			Ceramic capacitor, SMD 0402, X7R, 25V, +/-10% (de35287)
Fitted	C306, C320	2	10u			Ceramic capacitor, SMD 0603,
Fitted	C310	1	2.2uF	Kemet	T494A225K010AT	Capacitor Tantalum 10V 2.2uF 10% ESR = 6 ohm
Fitted	C321, C322	2	18p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C323, C324	2	6.8p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C400, C401	2	22p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C402	1	10p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C405, C409, C414, C415	4	2.2uF	Kemet	C0402C225MBPAC	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-20%
Fitted	C406, C407, C408	3	1 nF COG	Murata	GRM1555C1H102A01D	Ceramic capacitor, SMD 0402, COG, 50V, +/-5%
Fitted	D300, D402	2	PFRT5VOLUX	Philips	PFRT5VOLUX	Double rail-to-rail USB ESD protection diode
Fitted	D301, D400	2	EL17-21UY/C1A2	Everlight	17-21UY/C1S530-A3/TFB	LED, Yellow, Wave length:591nm, SMD 0805, ±70°
Fitted	D302	1	LM4040BM-4.1	National Instruments	LM4040BM-4.1	Voltage reference 4.096V, SOT-23
Fitted	D401	1	EL17-21SYGC	Everlight	EL17-21SYGC	LED, Green, Wave length:575nm, SMD 0805, ±70°
Fitted	DOC1	1	A09-1803_PQBA_Files	ATMEL		SAMS Xplained PRO PCB documentation
Fitted	E1, E2, E3, E4	4	SJ-9076	3M	SJ-5076	2.8mm adhesive feet,diam:8.0mm
Fitted	FXTURE1	1	Xplained PRO MCU board	ESCATEC	Xplained PRO MCU board Jupiter Test Fixture	Xplained PRO MCU board Jupiter Test Fixture
Fitted	FW1	1	EDBG secured firmware			EDBG secured firmware
Fitted	J100	1	P101-2102RGF-139-ND		P101-2102RGF-139-ND	Pin header, 2x2, Right Angle, 2.54mm, THt, Pin In Paste
Fitted	J101	1	PIN header 2x2 right angle	Pro-data International Corp	2213R-2G	1x2 pin header, right angle, 2.54 mm pitch, through-hole
Fitted	J200, J201, J202	3	P101-2101RGF-139-ND	Pro-data International Corp	P101-2101RGF-139-ND	Pin header, 2x10, Right Angle, 2.54mm, THt, Pin In Paste
Fitted	J203	1	XF2M-5015-1A	Omrон Components	XF2M-5015-1A	50pin FFC connector, 0.5mm pitch, Top/Bottom contacts
Fitted	J302, J400	2	10104111-0001LF		10104111-0001LF	Micro USB AB Connector
Fitted	J305	1	KYOCERA - 14 5738 009	Kyocera-elco	KYOCERA - 14 5738 009 220 859+	SD/MMC socket, 2.7mm push-push, SMD
Fitted	JS100	1	SNT-100-BK-G	SAMTEC	SNT-100-BK-G	Jumper cap for 2.54mm pinheader
Fitted	L300	1	BLM165B8221SN1	Murata	BLM165B8221SN1	SMD RF inductor 0402, Z=220nH (@100MHz), Max R(d)=0.80Ohm, Max current=200mA
Fitted	L400	1	0603USB-142ML	Colicraft	0603USB-142ML	USB common-mode filter in 0603
Fitted	L401, L402	2	BLM16P0471SN1	Murata	BLM16P0471SN1	SMD RF inductor 0603, Z=700nH (@100MHz), Max R(d)=0.65Ohm, Max current=1A
Fitted	LABEL1	1	Label PCB4	ACT Logimark AS	505462	PCBA identification label PP Top White Gloss
Fitted	PCB1	1	NCAB			SAMS Xplained PRO PCB, 4 layer, size 60mm x 100mm
Fitted	Q100, Q101	2	IRML6402PBF	International Rectifier	IRML6402PBF	P-ch, MOSFET, -30V, -3.7A continuous,RDS(ON)=0.05Ohm@VGs=-4.5V, RDS(ON)=0.08Ohm@VGs=-2.5V
Fitted	Q102	1	2N7002Z15	NXP	2N7002Z15	N-Channel MOSFET, 60V, 0.300A continuous, 1.2A Peak, RDS(ON) = 3.80mΩ@VGs=4.5V, VGS(th)=2.5V
Fitted	Q400	1	2N7002DW	Fairchild	2N7002DW	Dual N-Channel MOSFET, 60V, 115mA cont,RDS(ON) < 7.5 Ohm @50mA @5V, SOT-363
Fitted	R100	1	30k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R101, R102, R104, R110, R405, R407	6	1M			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R103	1	18k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R105	1	390R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R106, R200, R201, R202, R300, R308, R310, R314, R315, R316, R317, R419, R420	13	100k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R107, R418	2	0R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R108, R409	2	47k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R203, R204, R205, R421	4	43R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R301, R302, R316, R414, R415	5	36R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R402, R404, R405, R406, R409, R410, R411, R412, R413	9	330R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R305	1	1.6k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R306	1	22k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R307	1	TS63Y104KT20	vishay	TS63Y104KT20	100k trimmer, SMD, 13 turn
Fitted	R309, R311, R312, R320	4	4.7k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R313, R319	2	10k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R400, R401, R402, R403	4	1k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R416	1	6.81k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	SW300, SW301	2	SKRAAKED10	ALPS	SKRAAKED10	6.2x6.2 mm SMD tact switch, same as A09-0001 but less force is needed
Fitted	TEST1	1	SAM4S_Xplained_Pro test	ATMEL		Fixture test for SAMS Xplained PRO
Fitted	U100	1	SPX3819MS-LTR	Exar	SPX3819MS-LTR	500mA LDO, low noise, SOT23-5 package
Fitted	U101	1	TPS2113PWR	Texas Instruments	TPS2113PWR	Autoset latching 2.1 Power Mux
Fitted	U300	1	ATSAM4S032CA-AU	ATMEL	ATSAM4S032CA-AU	ARM Cortex-M4 MCU with 2MB flash, 160KB SRAM
Fitted	U301	1	AD9541ARTZ-R2	Analog Devices	AD9541ARTZ-R2	Single, Low Voltage, Rail-to-rail output, Op-Amp, SOT23-5
Fitted	U304	1	MT29F2G08ABA5AWPE	Microsemi	MT29F2G08ABA5AWPE	2Gb, x 8 NAND flash, 3.3V 48-TSOPI
Fitted	U400	1	AT32UC3A4256J-CTUR	ATMEL	AT32UC3A4256J-CTUR	AVR 32-bit RISC MCUs
Fitted	XC300, XC400	2	12.0MHz	Fox Electronics	FQ0302B-12-C-C-200-1	Fox FQ0302B-12.0MHz SMD crystal 736B-12
Fitted	XC301	1	32.768kHz +/-20ppm 7pF	Micro Crystal	MS1V-T1K 32.768kHz 7pF +/-20ppm	32k768 crystal, +/-20ppm, CL=7pF, max ESR 60kOhm, SMD
Not Fitted	C312, C403	0	4.7n			Ceramic capacitor, SMD 0402, X7R, 25V, +/-10%
Not Fitted	C317, C318	0	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 25V, +/-10%
Not Fitted	J300, J301	0	HMTSW-112-23-F-S-237	SAMTEC	HMTSW-112-23-F-S-237	1x12 pin header, 2.54mm pitch, Pin-in-Paste THM
Not Fitted	J303	0	HMTSW-102-23-F-S-237	SAMTEC	HMTSW-102-23-F-S-237	1x2 pin header, 2.54mm pitch, Pin-in-Paste THM
Not Fitted	R304, R417	0	1M	KOA	RK73HETTP1004F	Thick film resistor, SMD 0402, 1/16W, 1%