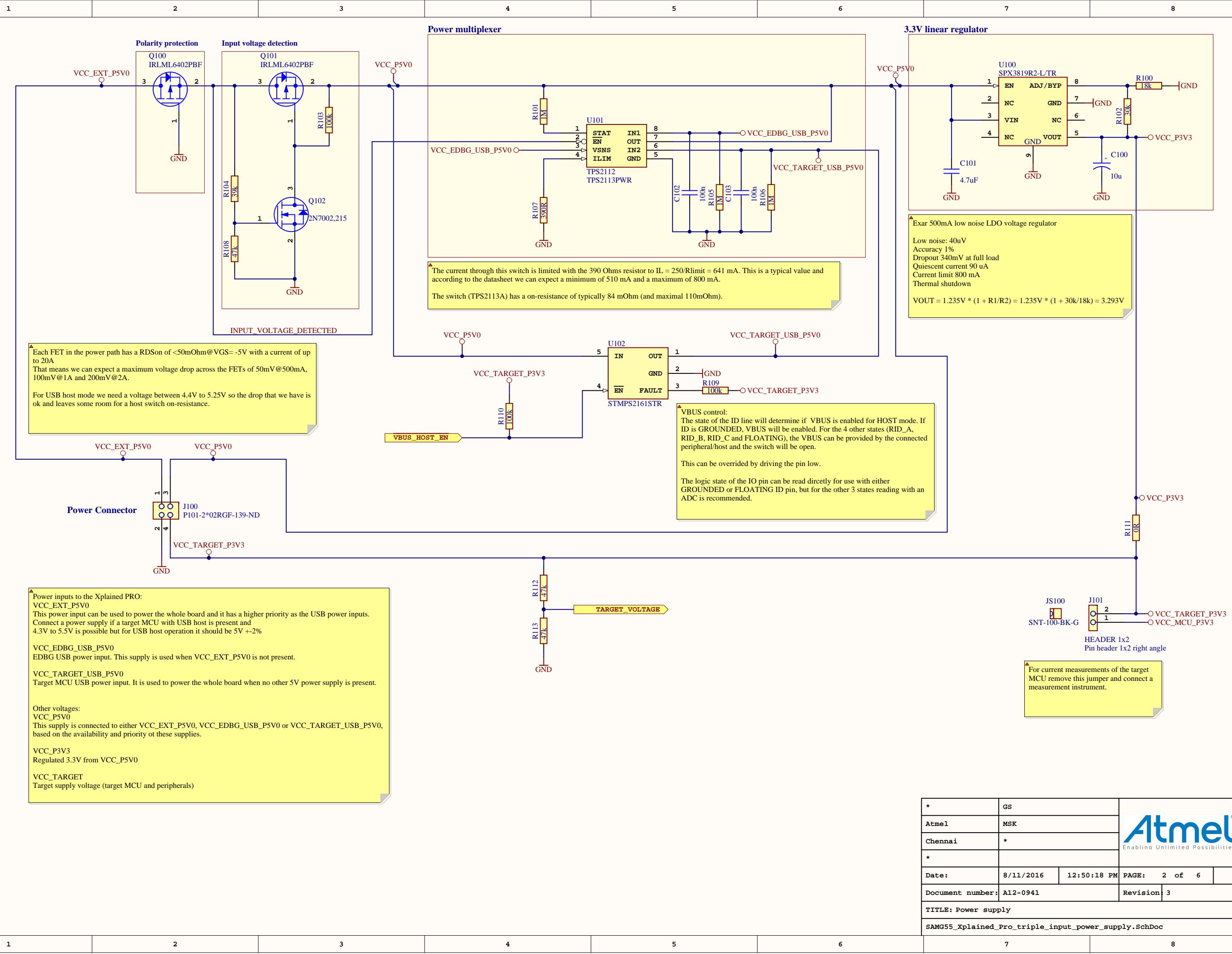
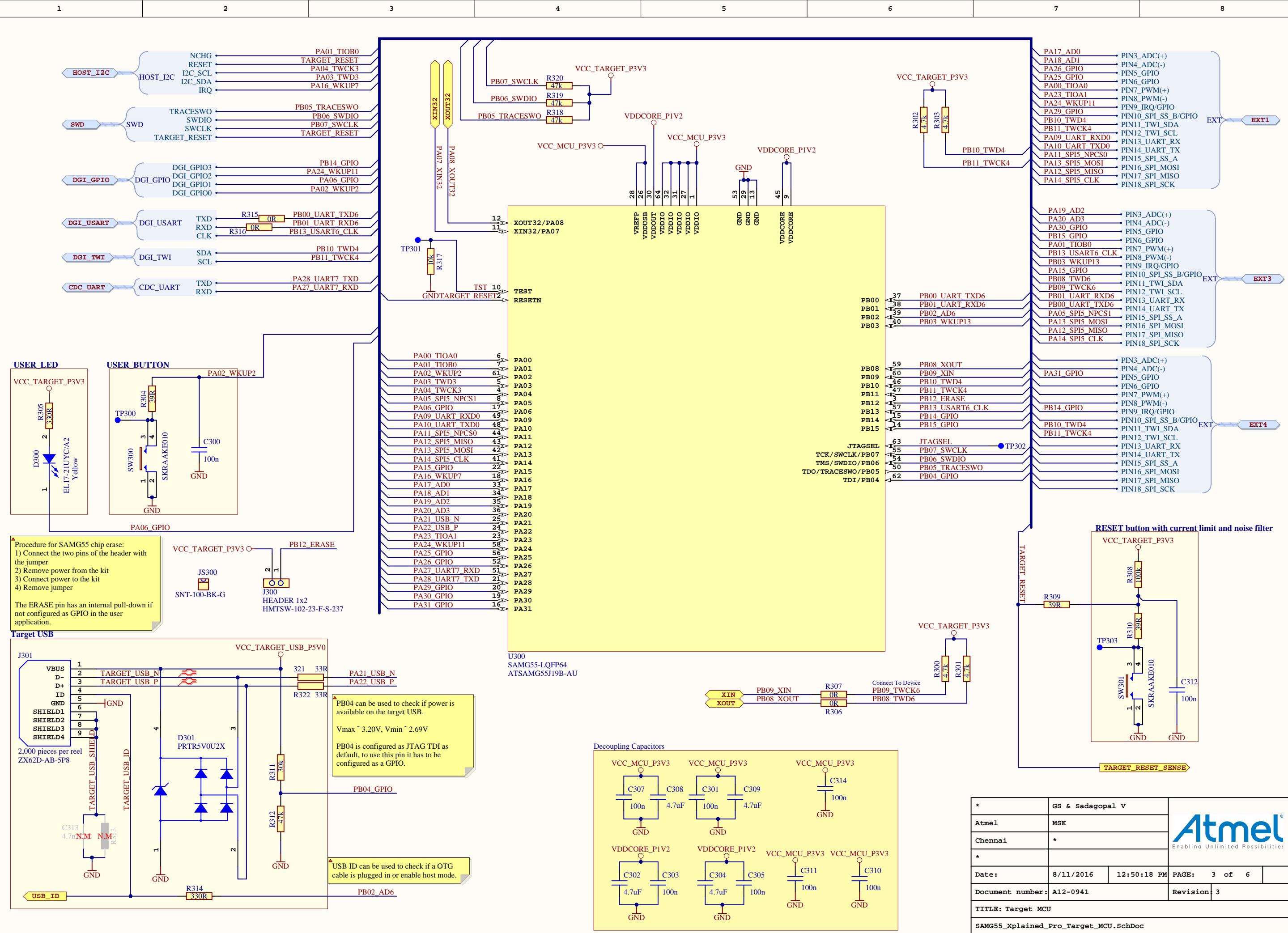


*	GS	<b>Atmel</b> Enabling Unlimited Possibilities
Atmel	MSK	
Chennai	*	
*		
Date:	8/11/2016	12:50:18 PM
Document number:	A12-0941	Revision 3
TITLE: Top Level Schematics		
SAMG55_Xplained_Pro_TopLevel.SchDoc		





**A**

Crystal datasheet:  
Accuracy: +/-20ppm  
max ESR: 60 kOhm  
CLcrystal: 7pF

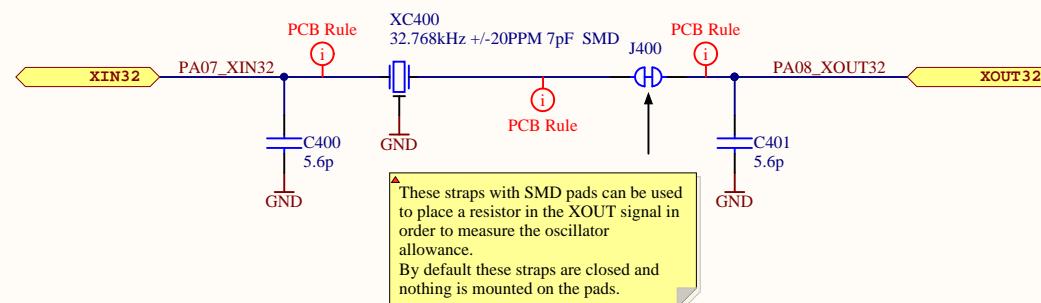
SAMG53 datasheet:  
CLmcu = 0.7 pF (equivalent load)

Cpcb = 0.5pF (estimate)

Calculation of crystal load capacitors:  
Cext = 2x ( CLcrystal - CLmcu - Cpcb )  
Cext = 2x(7.0pF - 0.7pF - 0.5pF) = 11.6pF

The data is similar to SAM4N and actual measurements have shown that 5.6pF gives the best result therefore we select this value here as well.

Verification results:  
Accuracy: TBD  
Startup time: full swing is reached after TBD ms (probe loading TBD)  
Safety factor: TBD



**B**

Crystal datasheet:  
CLcrystal = 20pF  
max ESR = 80 Ohm  
Accuracy = +/-30 ppm

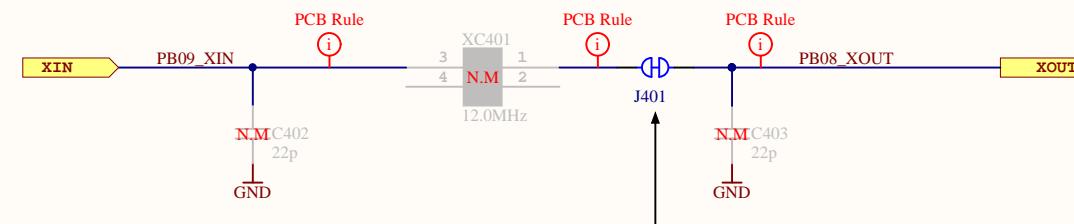
SAMG53 datasheet:  
CLmcu = TBD (equivalent load)

Cpcb = 0.5pF (estimate)

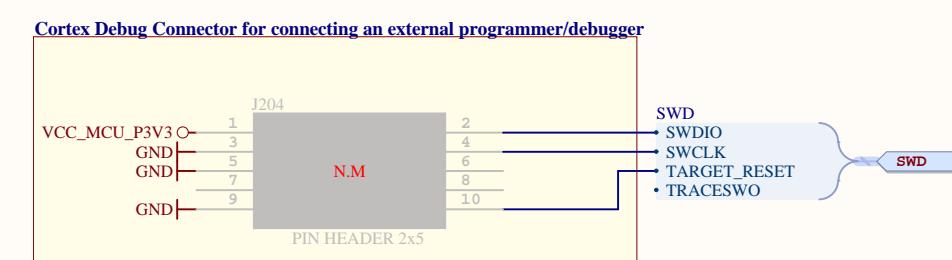
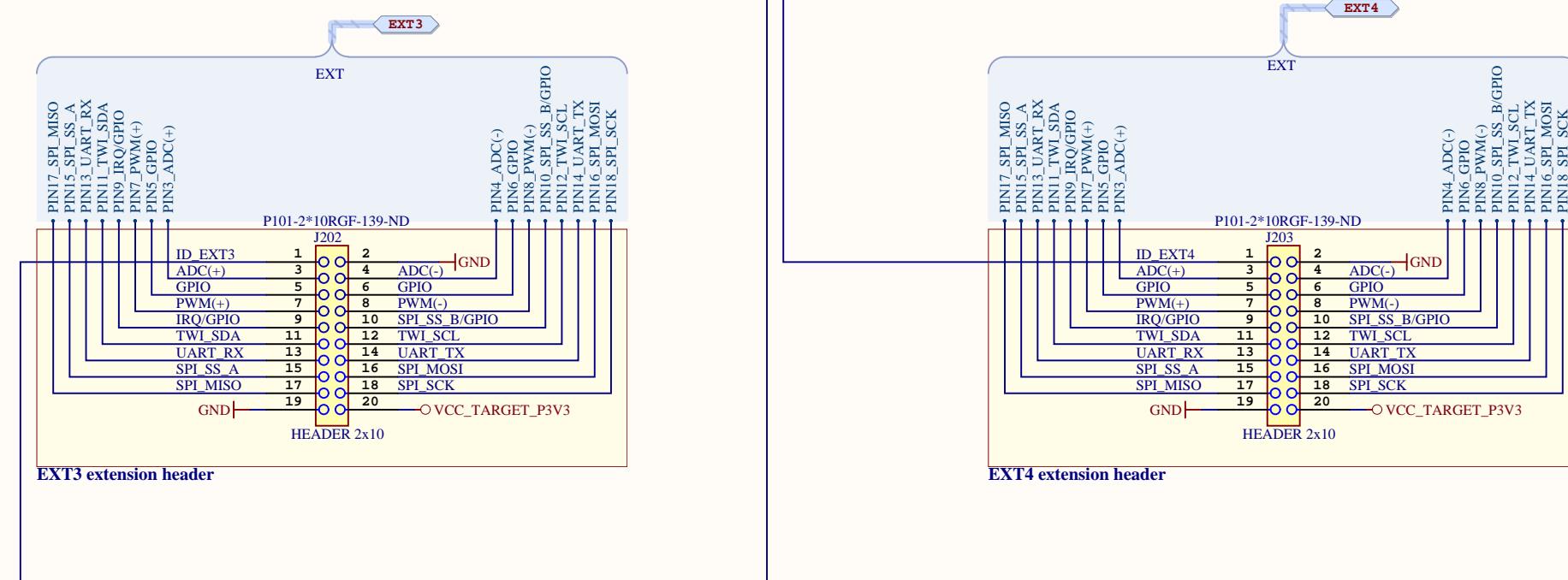
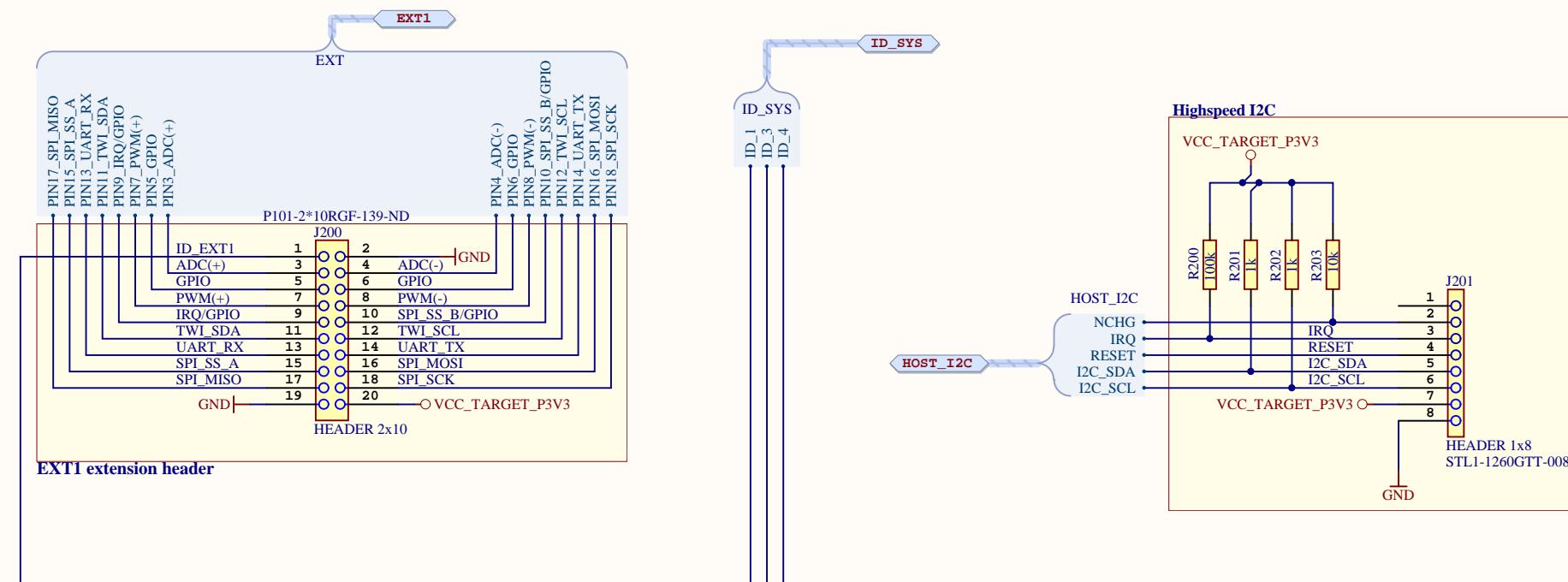
Calculation of crystal load capacitors:  
Cext = 2x ( CLcrystal - CLmcu - Cpcb )

Cext = 2x(20pF - TBD - 0.5pF) = TBD  
Selected value TBD

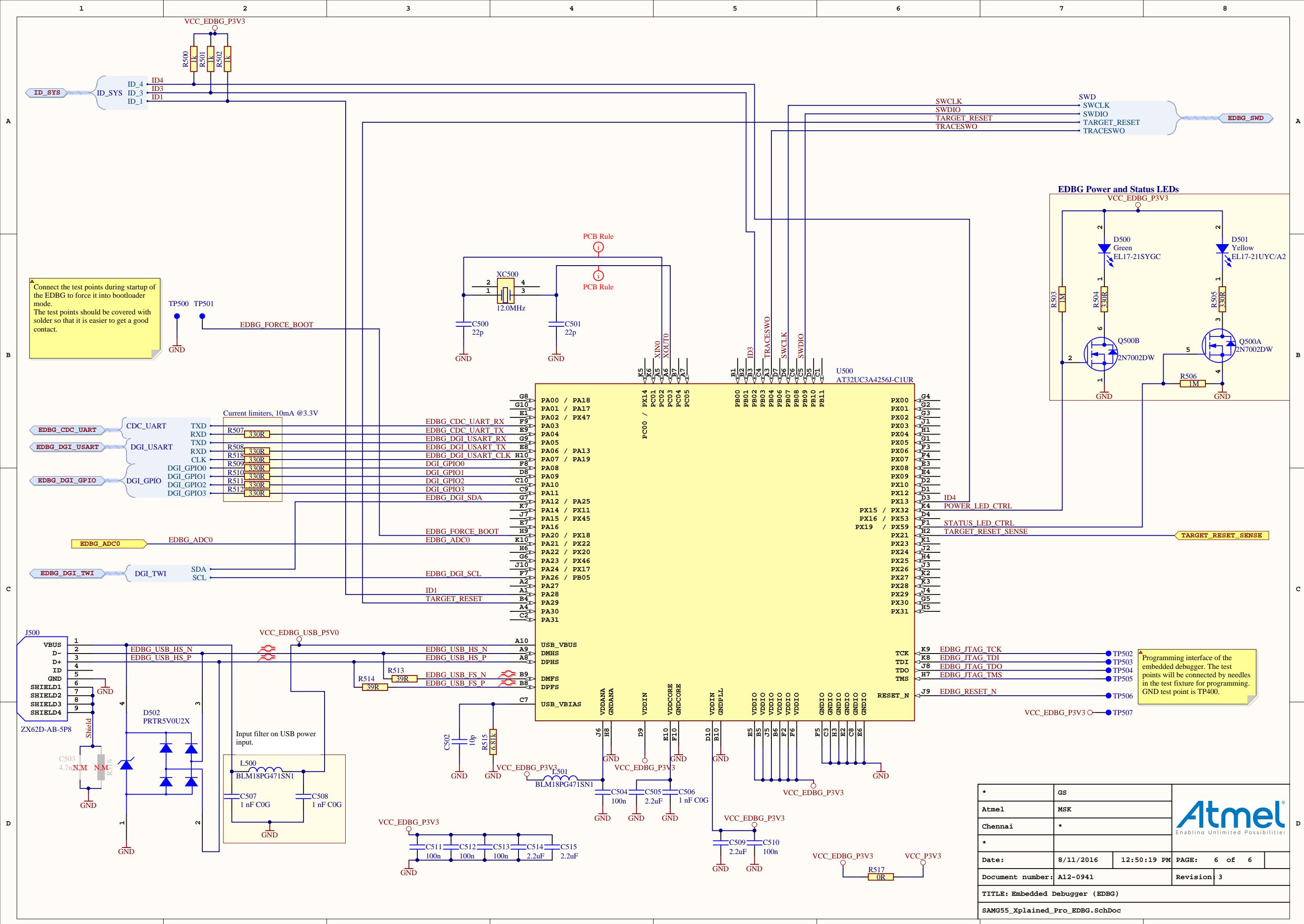
Verification results:  
Accuracy: TBD  
Startup time: TBD ms to reach full swing (first clock edge after TBD us)  
Safety factor: TBD



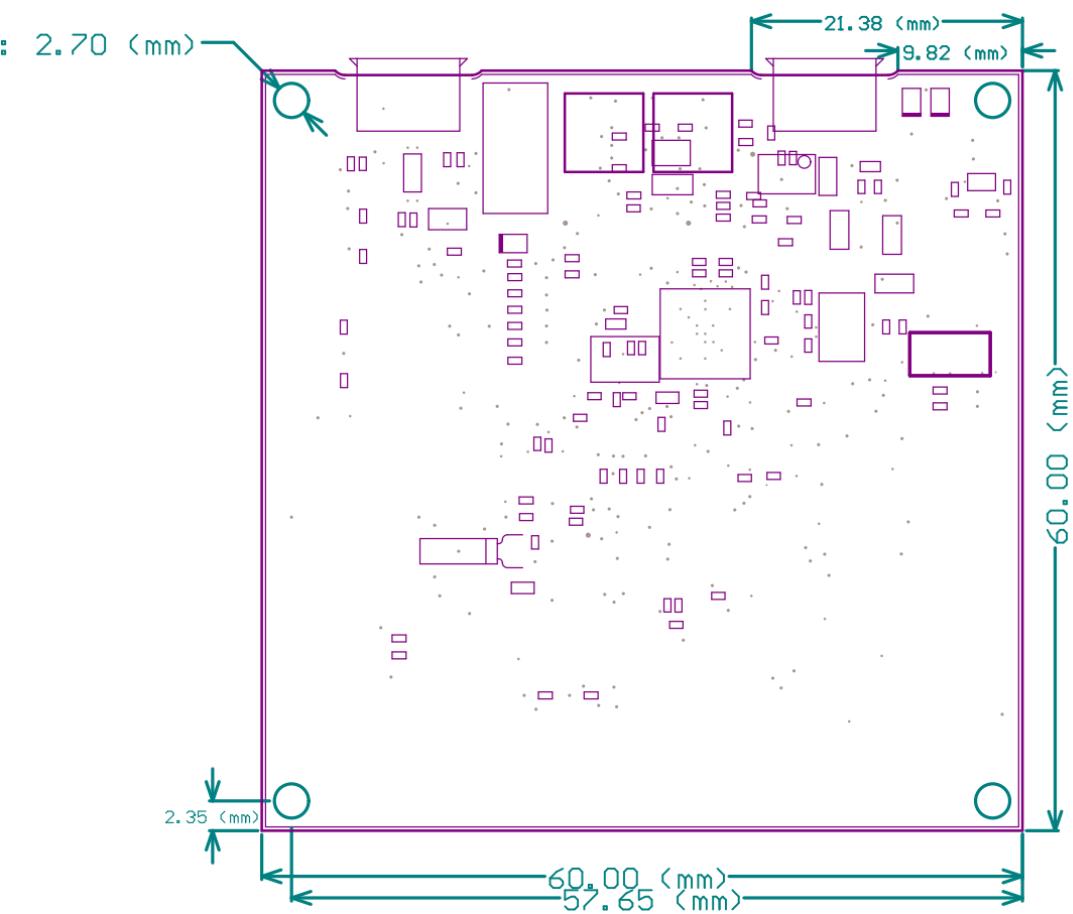
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Atmel	MSK	
Chennai	*	
*		
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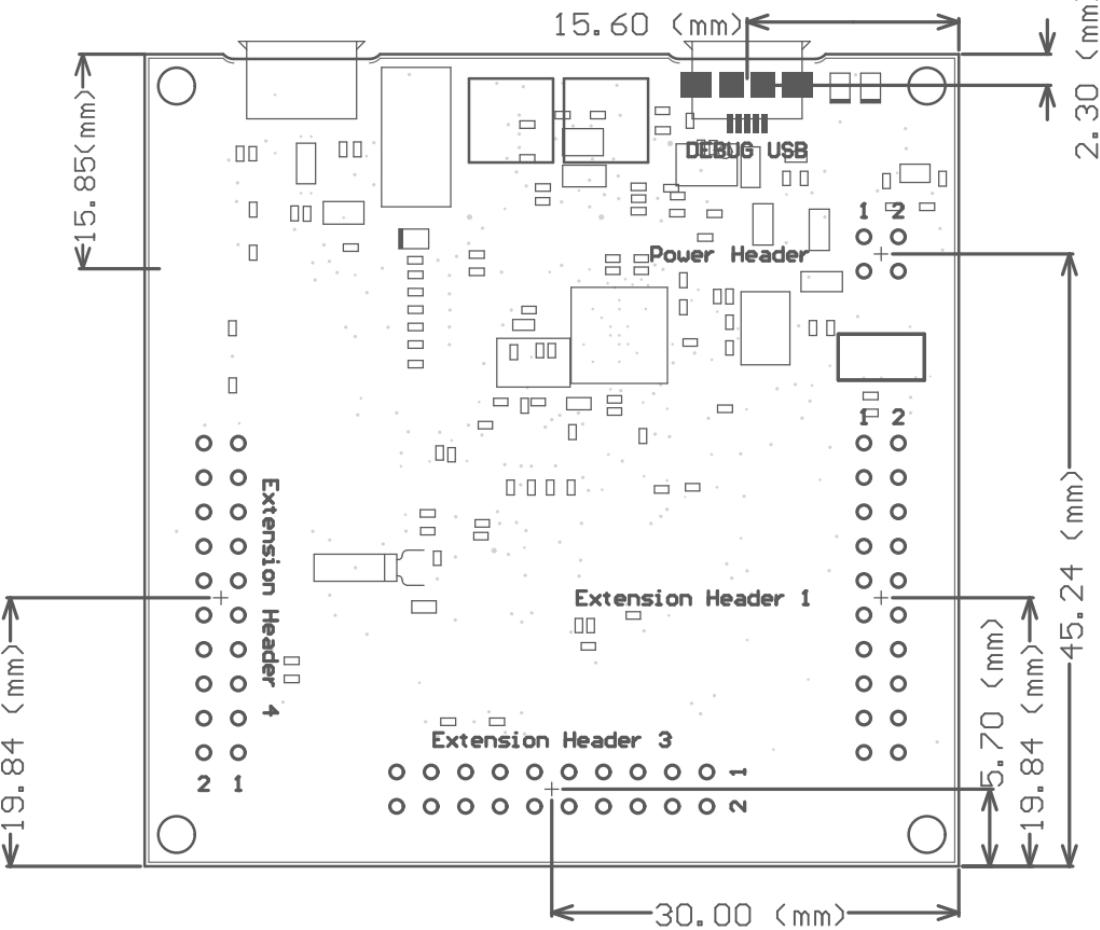
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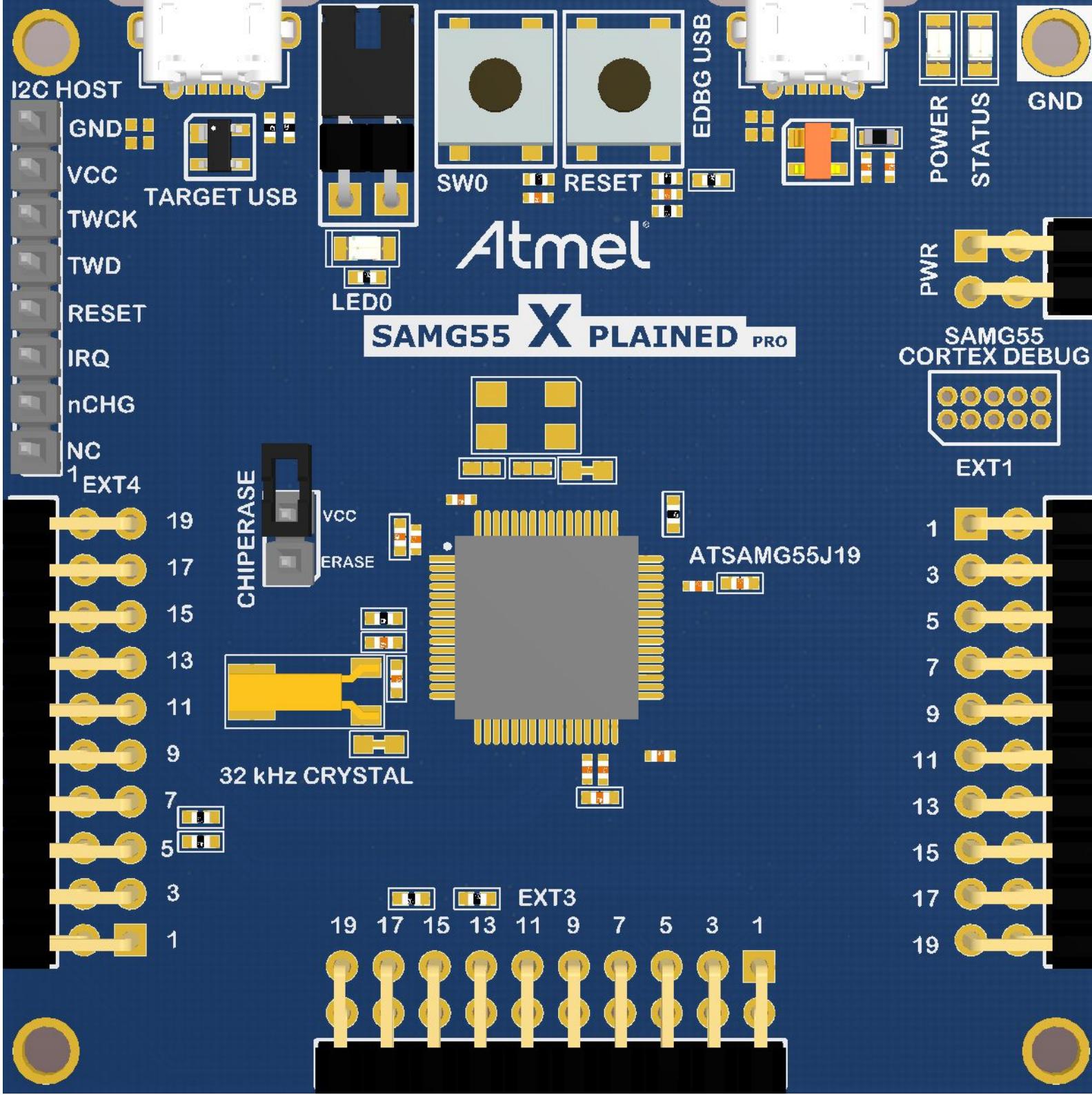


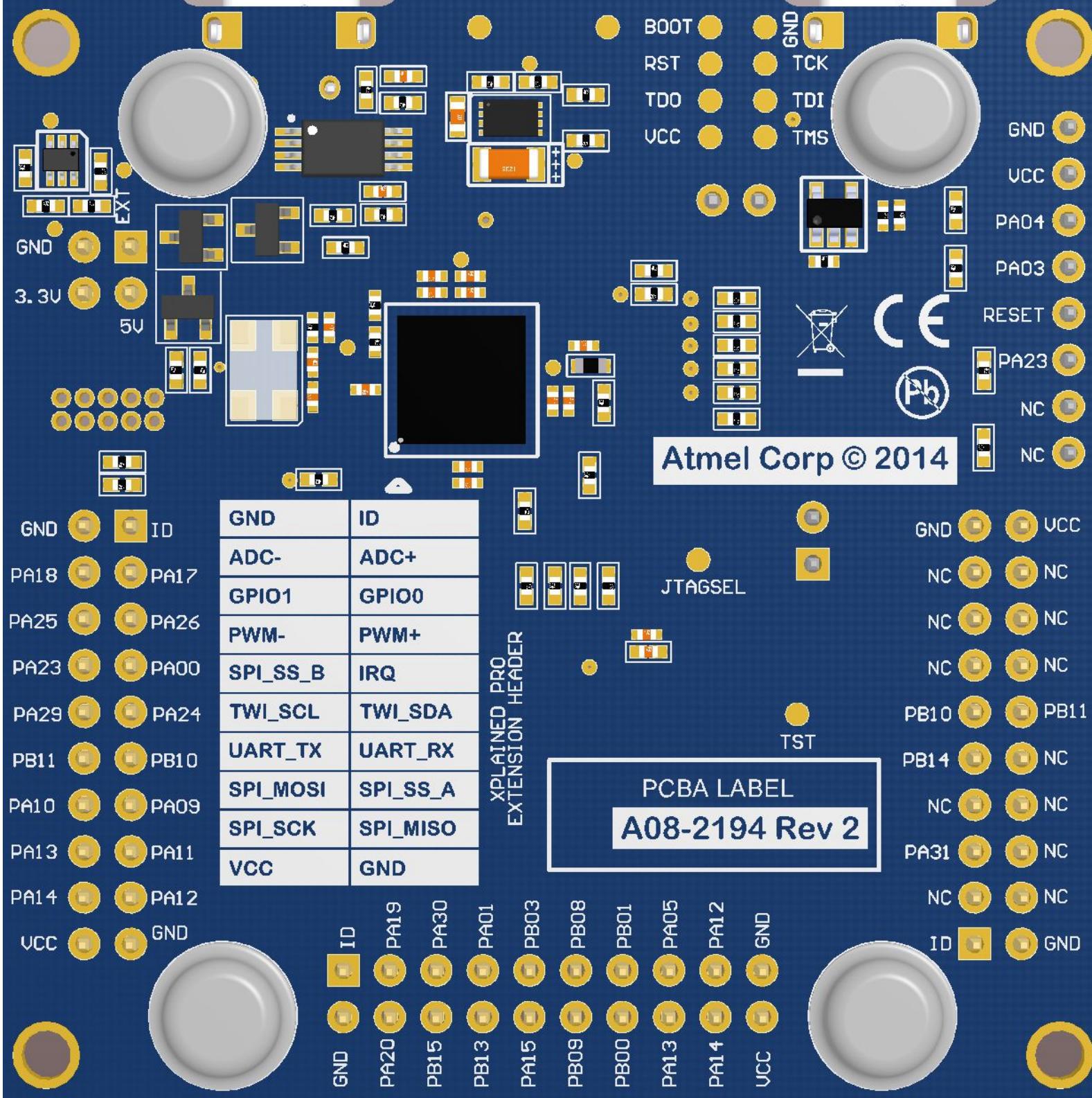
# Mechanical Dimensions

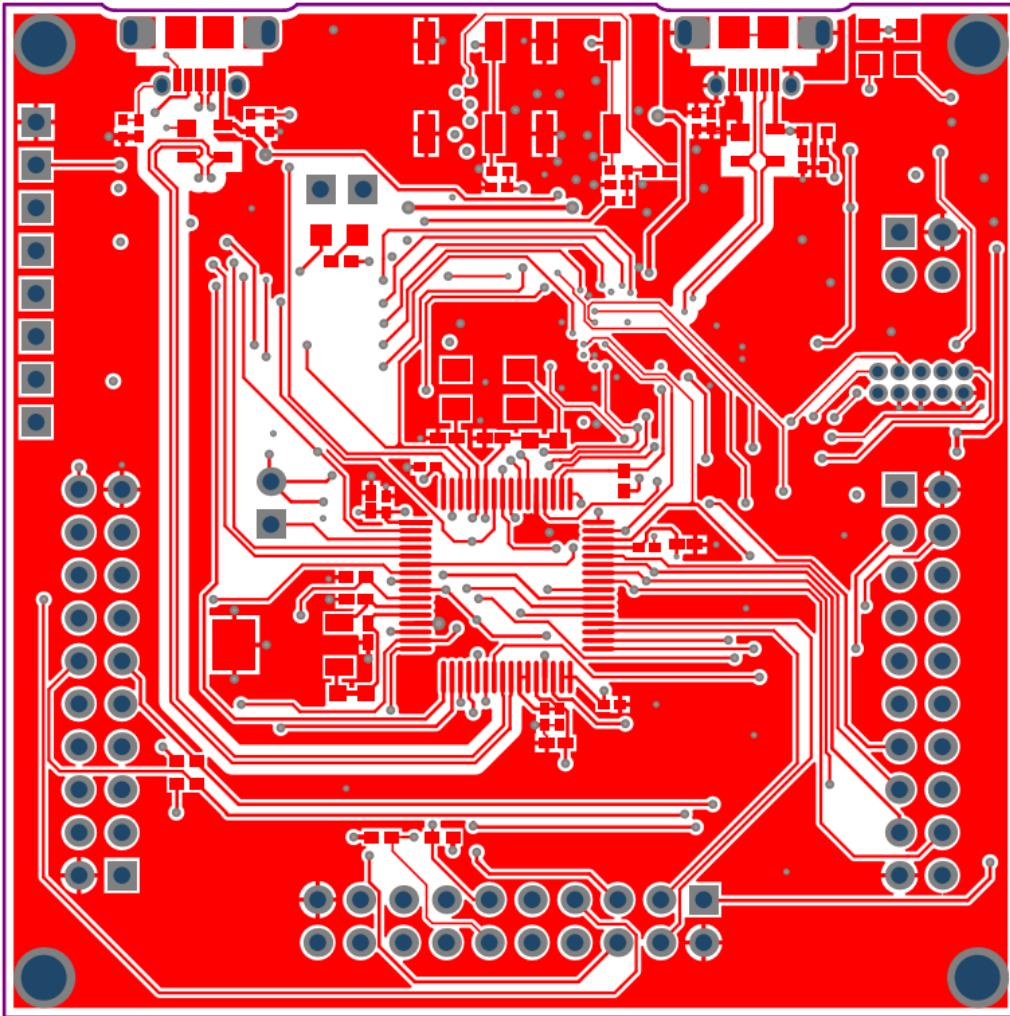


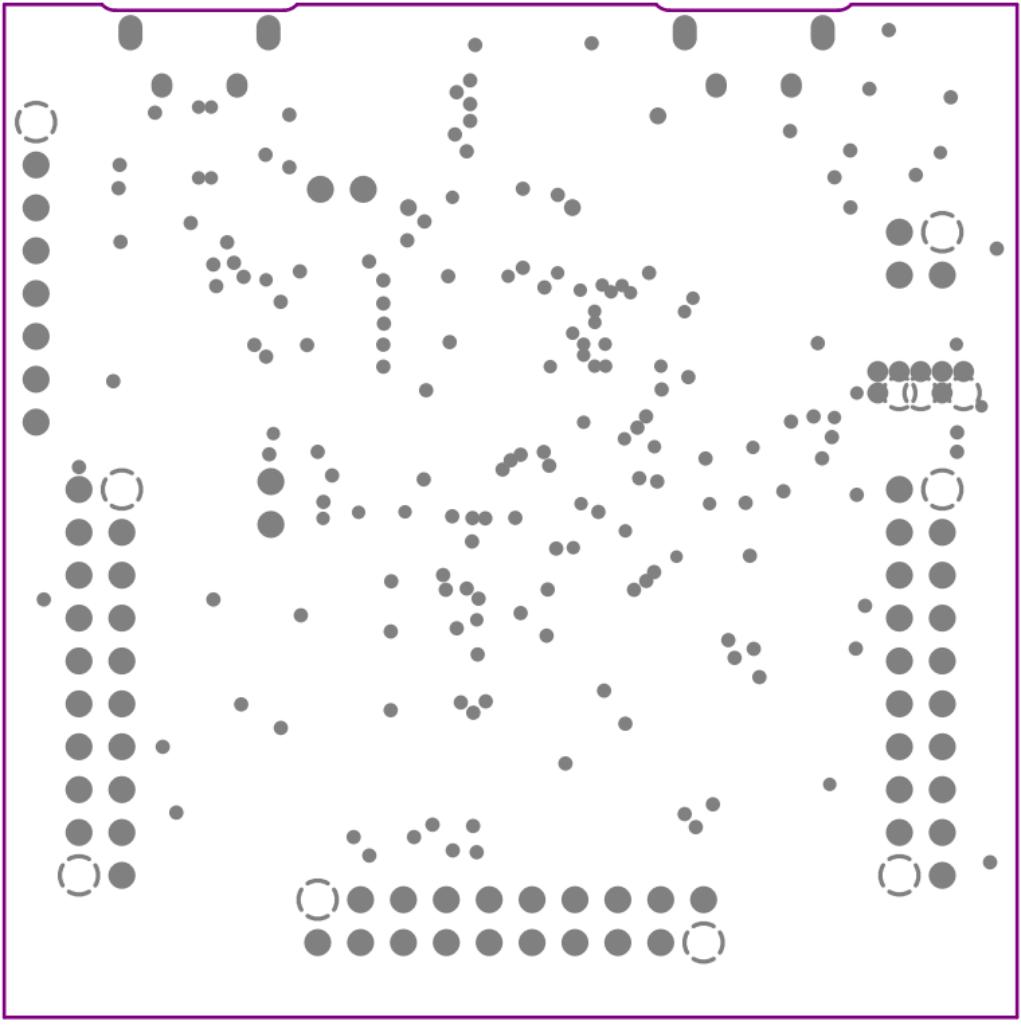
# Connector Placement

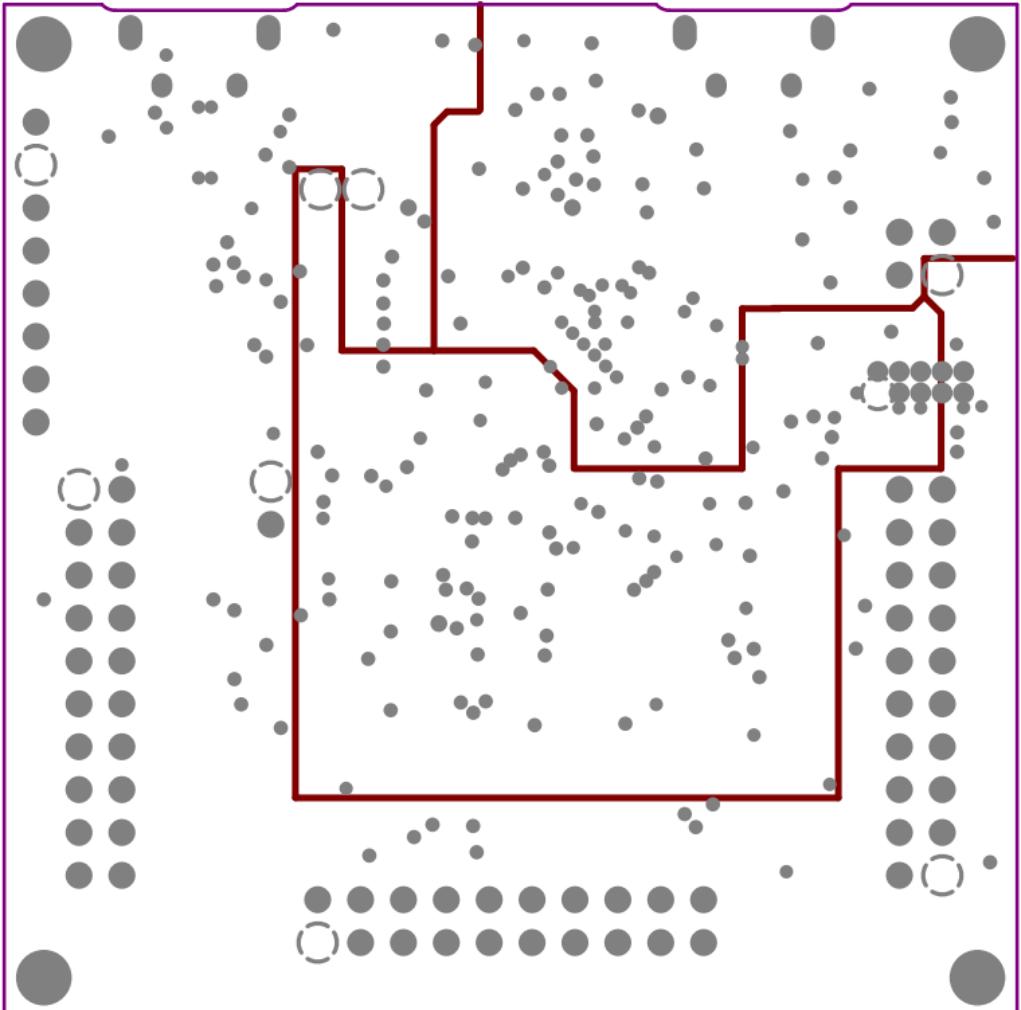


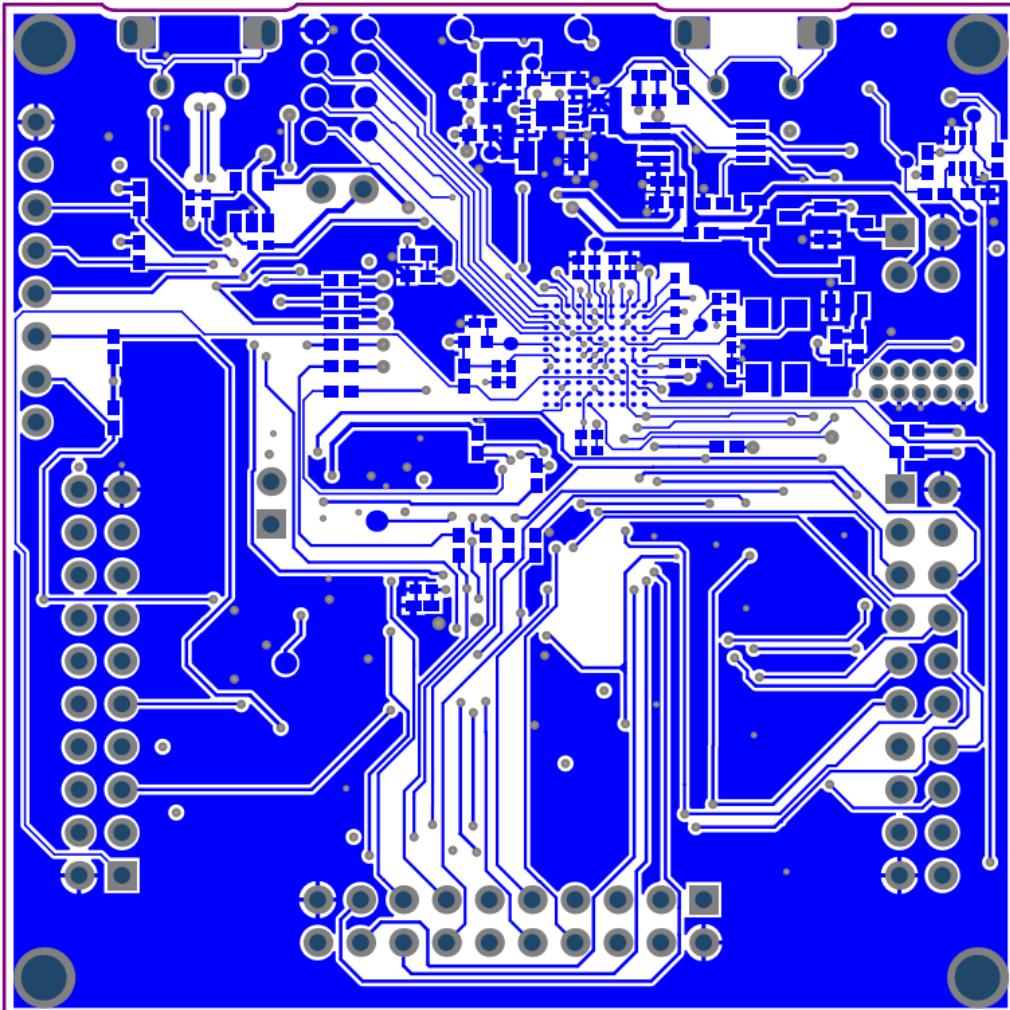


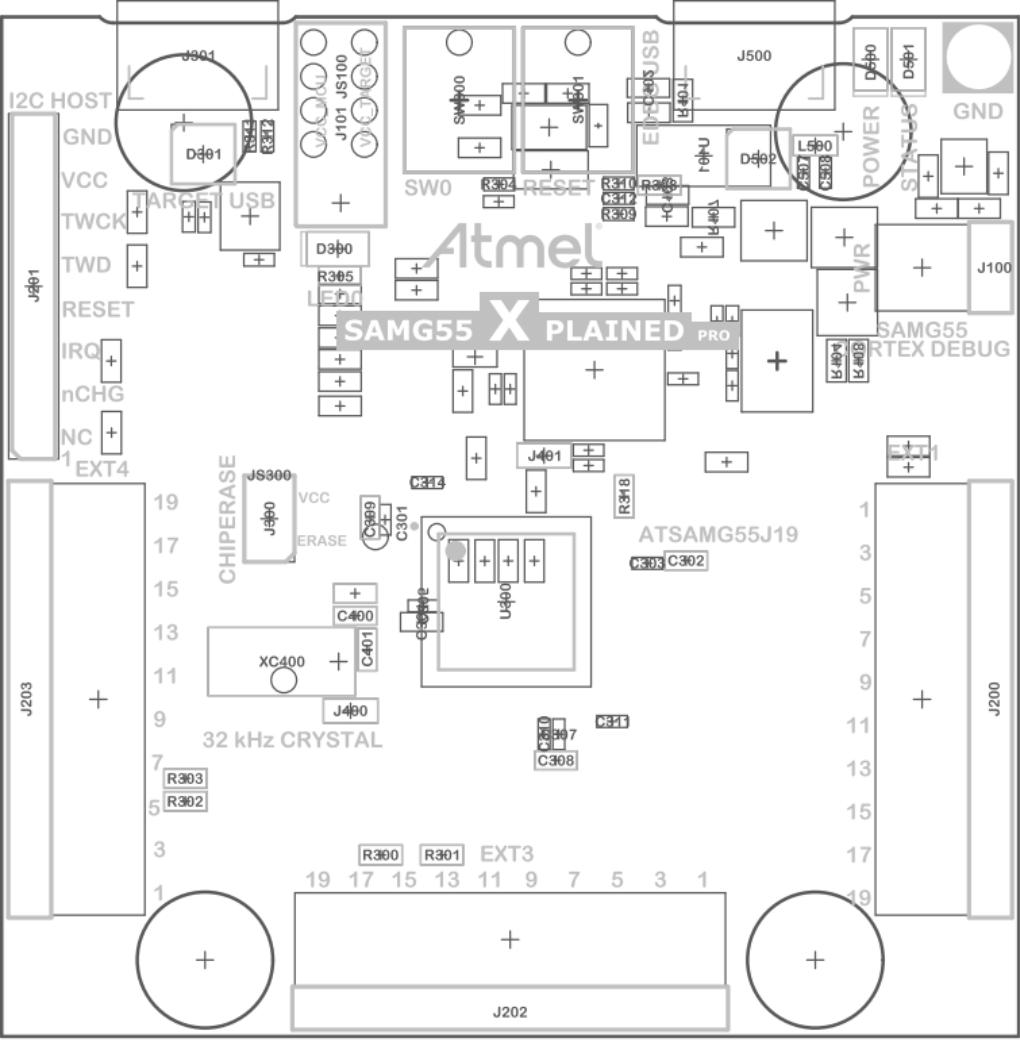




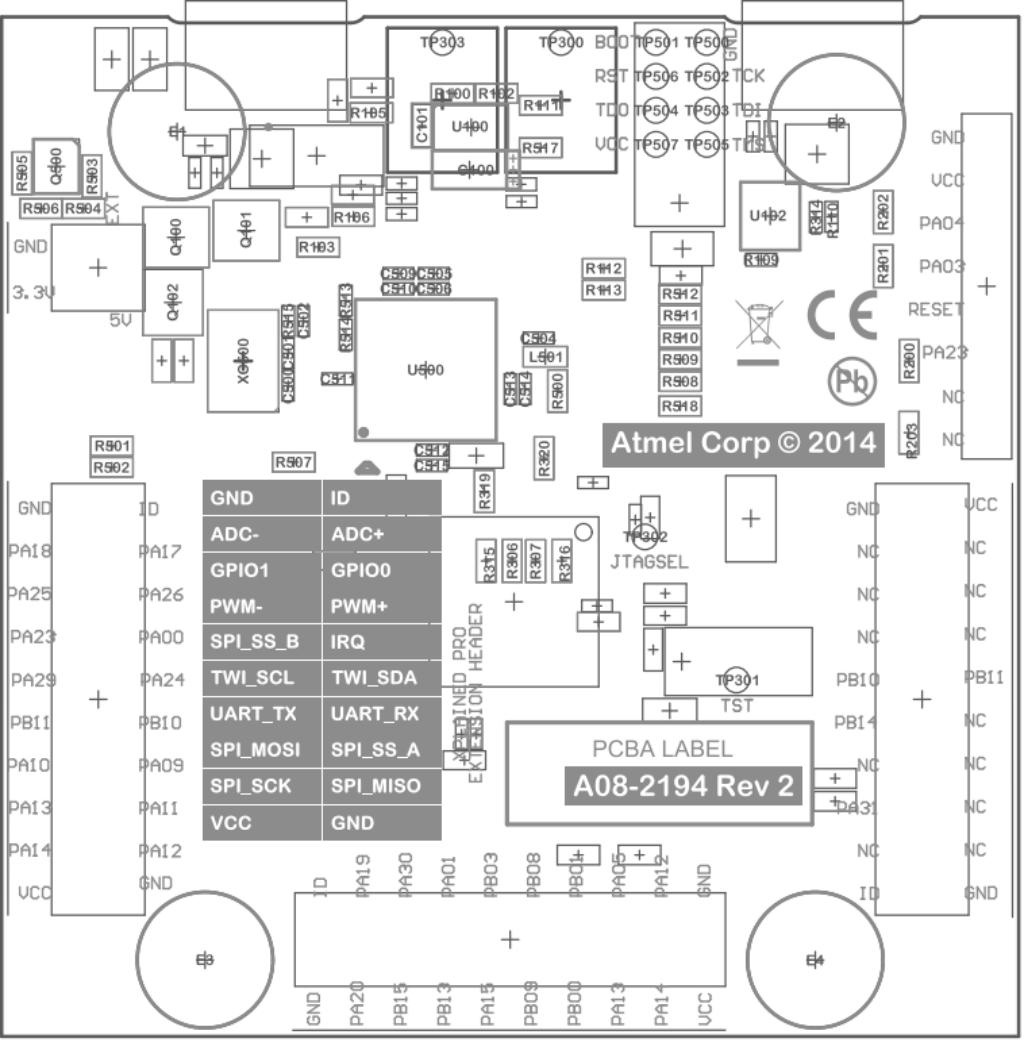








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## Component list

### Top Level Schematics

Source Data From:

SAMG55\_Xplained\_Pro.PrjPCB

Project:

SAMG55\_Xplained\_Pro.PrjPCB

Variant:

Default\_assembly

Report Date: 8/11/2016 12:50:33 PM

Print Date: 8/11/2016 12:39:55 PM



Fitted	Designator	Quantity	Value	Manufacturer	MPN	Description
Fitted	321, R322	2	33R	ASJ	CR10-33R-PK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	C100	1	10u	vishay	TR3A106K016C1700	SMD tantalum capacitor, ESR= 1.7, 3216-18 (BA) 1206,
Fitted	C101	1	4.7uF	tdk	C1608X5R1A475K	Ceramic capacitor, SMD 0603, X5R, 10V, 10% (d631036)
Fitted	C102, C103	2	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C300, C301, C303, C305, C307, C310, C311, C312, C314, C504, C510, C511, C512, C513	14	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C302, C304, C308, C309	4	4.7uF	tdk	C1005X5R0J475K	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-10%
Fitted	C400, C401	2	5.6p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C500, C501	2	22p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C502	1	10p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C505, C509, C514, C515	4	2.2uF	Kemet	C0402C225M9PAC	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-20%
Fitted	C506, C507, C508	3	1nF COG	Murata	GRM155S1H102JA01D	Ceramic capacitor, SMD 0402, COG, 50V, +/-5%
Fitted	D300, D501	2	EL17-21UVCA/2	Everlight	17-21UVCS530-A3/TR8	LED, Yellow, Wave length=591nm, SMD 0805, z70°
Fitted	D301, D502	2	FRTR5V0U2X	Philips	FRTR5V0U2X	Double rail-to-rail USB ESD protection diode
Fitted	D600	1	EL17-21SYGC	Everlight	EL17-21SYGC	LED, Green, Wave length=575nm, SMD 0805, z70°
Fitted	E1, E2, E3, E4	4	SJ-5076	3M	SJ-5076	2.8mm adhesive feet, diam. 8.0mm
Fitted	FIXTURE1	1	Xplained PRO MCU board Jupiter Test Fixture	ESCAPE TEC	Xplained PRO MCU board Jupiter Test Fixture	Xplained PRO MCU board Jupiter Test Fixture
Fitted	FW1	1	EDBG secured firmware	ATMEL		EDBG secured firmware
Fitted	J100	1	P101-2102RGF-139-ND		P101-2102RGF-139-ND	Pin header, 2x2, Right Angle, 2.54mm, TH, Pin In Paste
Fitted	J101	1	Rn header 1x2 right angle	Pro-data International Corp	2213R-2G	1x2 pin header, right angle, 2.54 mm pitch, through-hole
Fitted	J200, J202, J203	3	P101-2102RGF-139-ND		P101-2102RGF-139-ND	Pin header, 2x10, Right Angle, 2.54mm, TH, Pin In Paste
Fitted	J201	1	STL1-1260GTT-008	Garry	STL1-1260GTT-008	1x8 Pin Header, 2.54mm pitch, THM
Fitted	J300	1	HMTSW-102-23-F-S-237	SAMTEC	HMTSW-102-23-F-S-237	1x2 pin header, 2.54mm pitch, Pin-in-Paste THM
Fitted	J301, J500	2	ZX62D-AB-SP8			Micro USB AB Connector, Standard SMT + DIP
Fitted	J500, JS300	2	SNT-100-BK-G	SAMTEC	SNT-100-BK-G	Jumper cap for 2.54mm pinheader
Fitted	L500, L501	2	BLM18PG471SN1	Murata	BLM18PG471SN1	SMD RF inductor 0603, Z=470Ohm (@100MHz), Max R(d)=0.65Ohm, Max current=1A
Fitted	LABEL1	1	Label PCB	ACT Logmark AS	505462	PCBA identification label PP Top White Gloss
Fitted	POB1	1	SAMG55 PCB Documentation			SAMG55 PCB Documentation
Fitted	POBADC1	1	A09-2393 PCBA documentation			SAM G55 Xplained Pro PCBA documentation
Fitted	Q100, Q101	2	IRML6402PBF	International Rectifier	IRML6402PBF	P-ch. MOSFET, -30V, -3.7A continuous, RDS(ON)=0.050hm@VGS=-4.5V, RDS(ON)=0.08Ohm@VGS=-2.5V
Fitted	Q102	1	2N7002.215	NXP	2N7002.215	N-Channel MOSFET, 60V, 0.300A continuous, 1.2A Peak, RDS(ON) = 3.8ohm @ VGS=4.5V, VGS(th)<2.5V
Fitted	Q500	1	2N7002DW	Fairchild	2N7002DW	Dual N-Channel MOSFET, 60V, 115mA cont,RDS(ON) < 7.5 Ohm @50mA @5V, SOT-363
Fitted	R100	1	18k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R101, R105, R106, R503, R506	5	1M			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R102	1	30k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R103, R200, R308	3	100k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R104	1	39k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R107	1	390R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R108, R112, R113, R316, R319, R320	6	47k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R109, R110	2	100k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R111, R306, R307, R315, R316, R517	6	0R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R201, R202, R500, R501, R502	5	1k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R203, R317	2	10k	vishay	CRCW040210K0FKED	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R300, R301, R302, R303	4	4.7k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R304, R309, R310, R513, R514	5	39R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R305, R504, R505, R507, R508, R509, R510, R511, R512, R518	10	330R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R311	1	30k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R312	1	47k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R314	1	330R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R515	1	6.81k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	SW300, SW301	2	SKRAAKE010	ALPS	SKRAAKE010	6.2x6.2 mm SMD tact switch, same A08-0091 but less force is needed
Fitted	TEST1	1	SAMG55 Test software			SAMG55 Test software
Fitted	TESTDOC1	1	SAMG53 Xplained Pro test Instructions	ATMEL		SAMG53 Xplained Pro test Instructions
Fitted	U00	1	SPX1819P-LTR	Exar	SPX1819P-LTR	500mA LDO, ADJ, low noise, 8-DFN package
Fitted	U01	1	TPS2113PWR	Texas Instruments	TPS2113PWR	Autoswitching 2:1 Pow er Mux
Fitted	U02	1	STMP52161S1R			Single channel power switch, 1A, reverse block, active low enabled.
Fitted	U800	1	ATSAM55J19B-AU	ATMEL	ATSAM55J19B-AU	ATSAM55J19B-AU LOFP 64 pack
Fitted	U500	1	AT32UC3A4256J-C1UR	ATMEL	AT32UC3A4256J-C1UR	AVR 32-bit RISC MCU
Fitted	XC400	1	.32.768kHz +/-20ppm 7pF	Micro Crystal	MS1V-T1K 32.768kHz 7pF +/-20ppm TA	32K768 crystal, +/-20ppm, CL=7pF, max ESR 600Ohm, SMD
Fitted	XC500	1	12.0MHz	Fox Electronics	FQ5032B-12-C-C-200-1	Fox FQ5032B 12.0MHz SMD crystal 738B-12
Not Fitted	C313, C503	0	4.7n			Ceramic capacitor, SMD 0402, NP0, 50V, +/-10%
Not Fitted	C402, C403	0	22p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Not Fitted	J204	0	PIN HEADER 2x5	Garry	STL21-0730 G TT-10U	2x5 pin header, 1.27mm pitch, THM
Not Fitted	R313, R516	0	1M	KOA	RK73H1ETTP1004F	Thick film resistor, SMD 0402, 1/16W, 1%
Not Fitted	XC401	0	12.0MHz	Fox Electronics	FQ5032B-12-C-C-200-1	Fox FQ5032B 12.0MHz SMD crystal 738B-12
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Approved

Notes