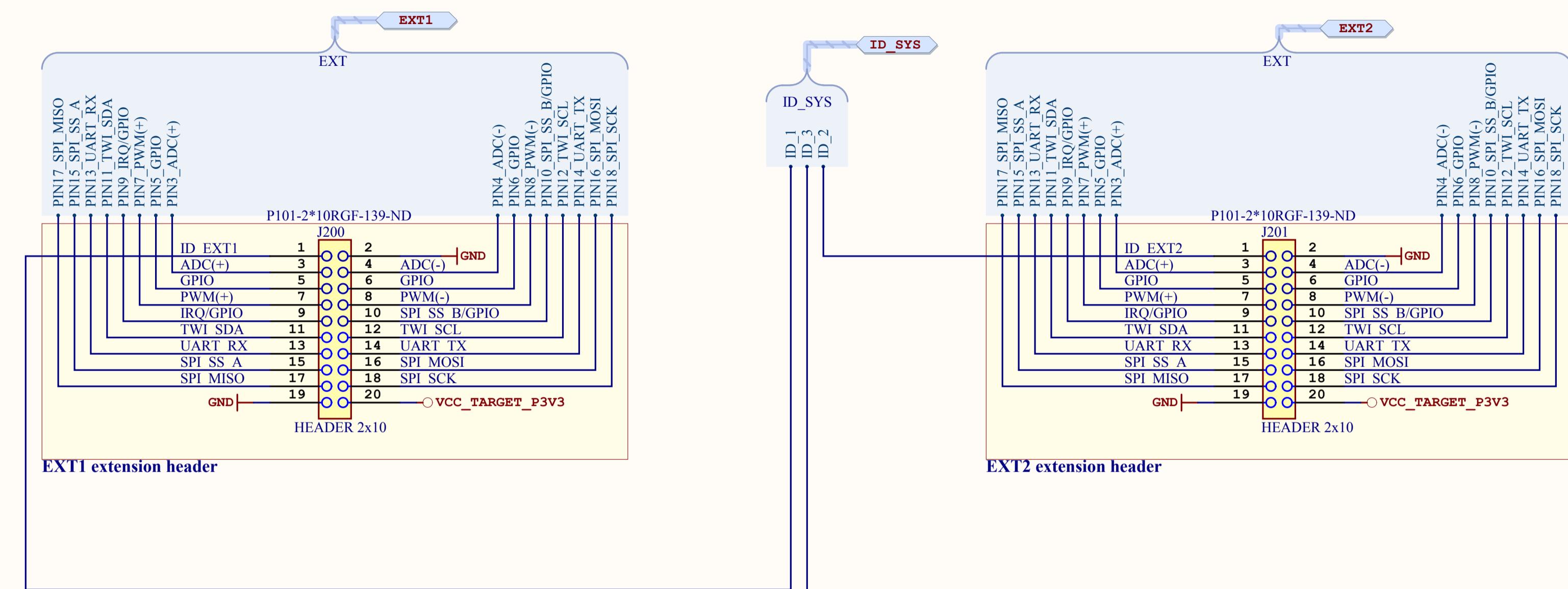
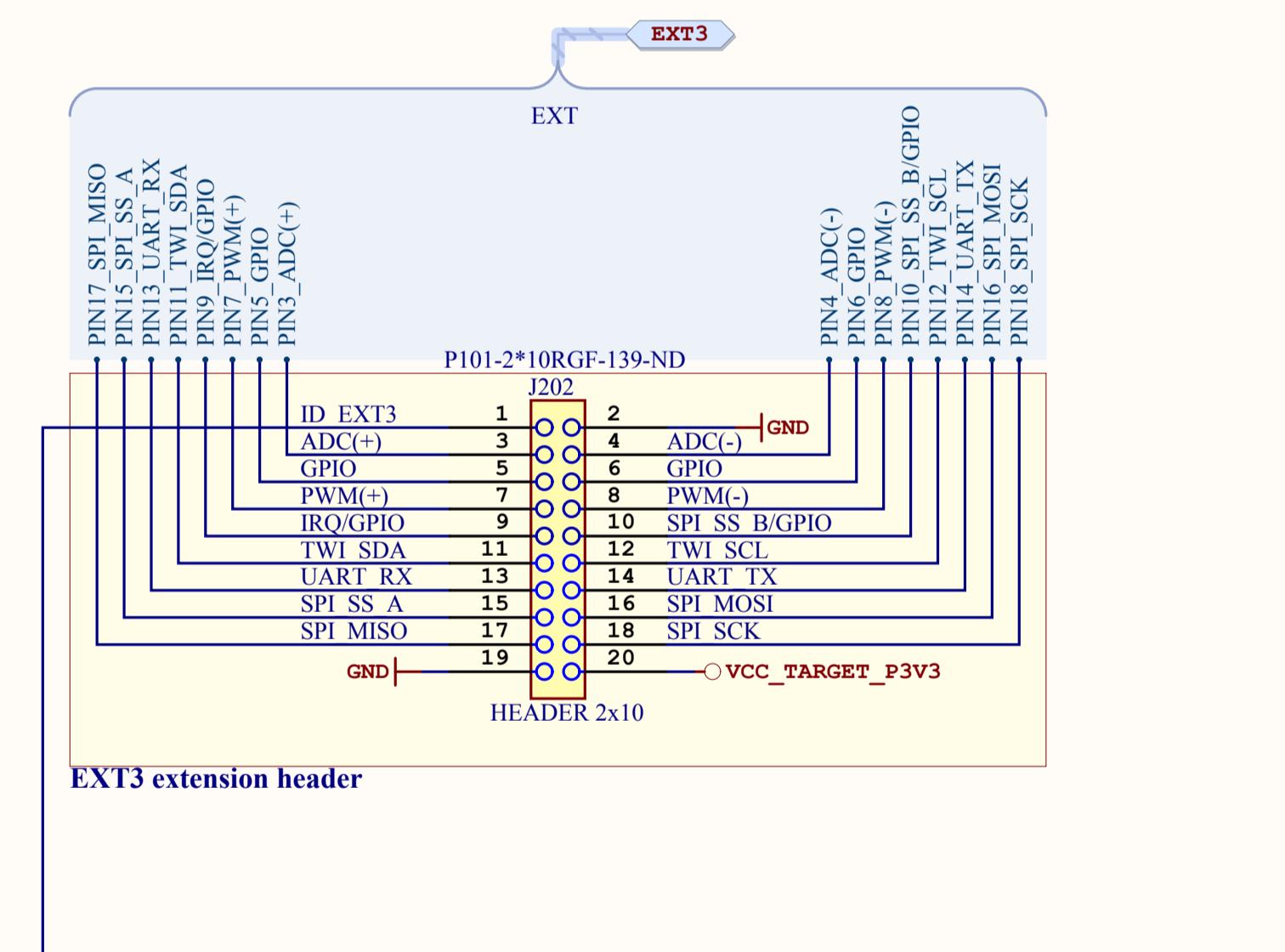


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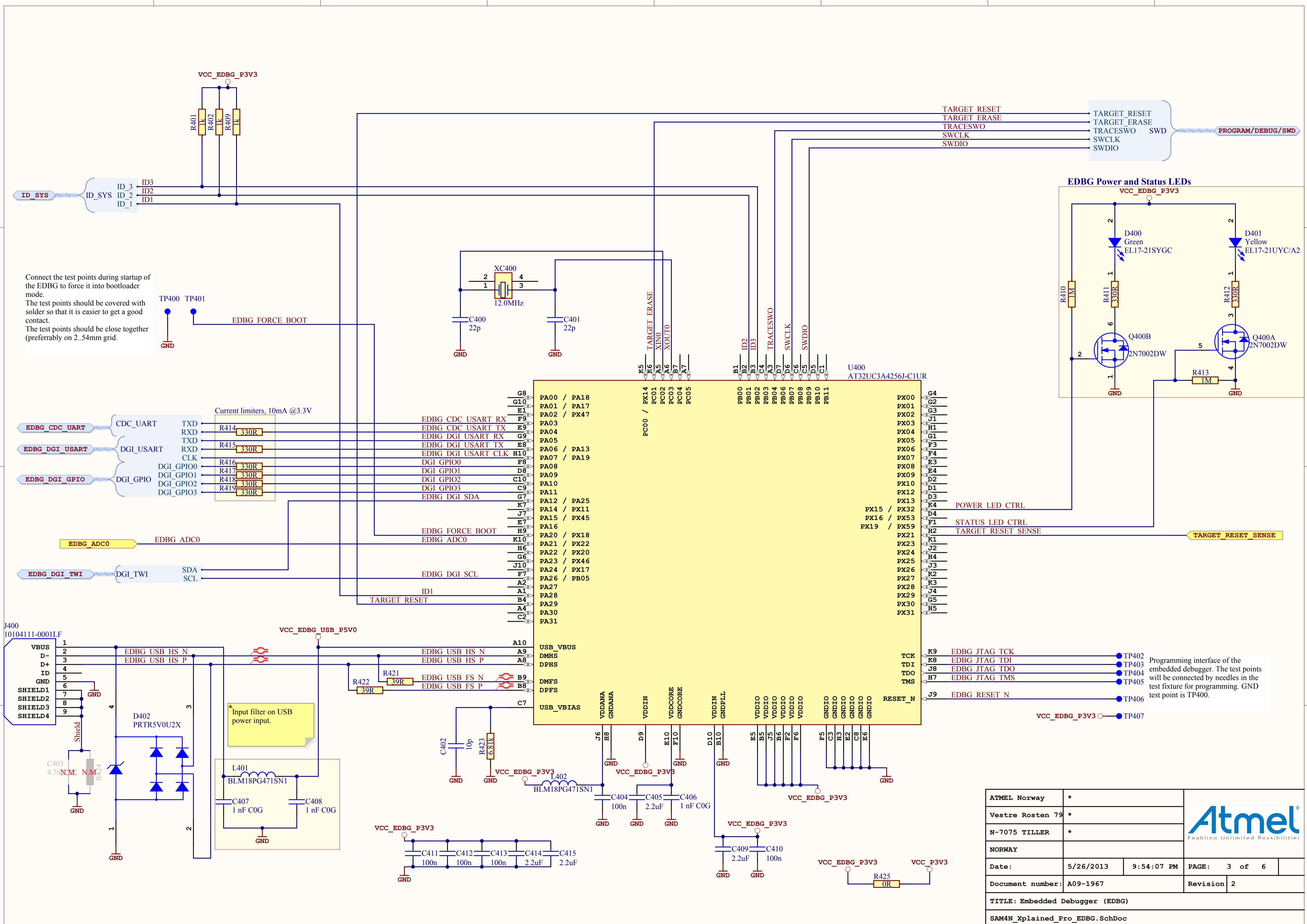


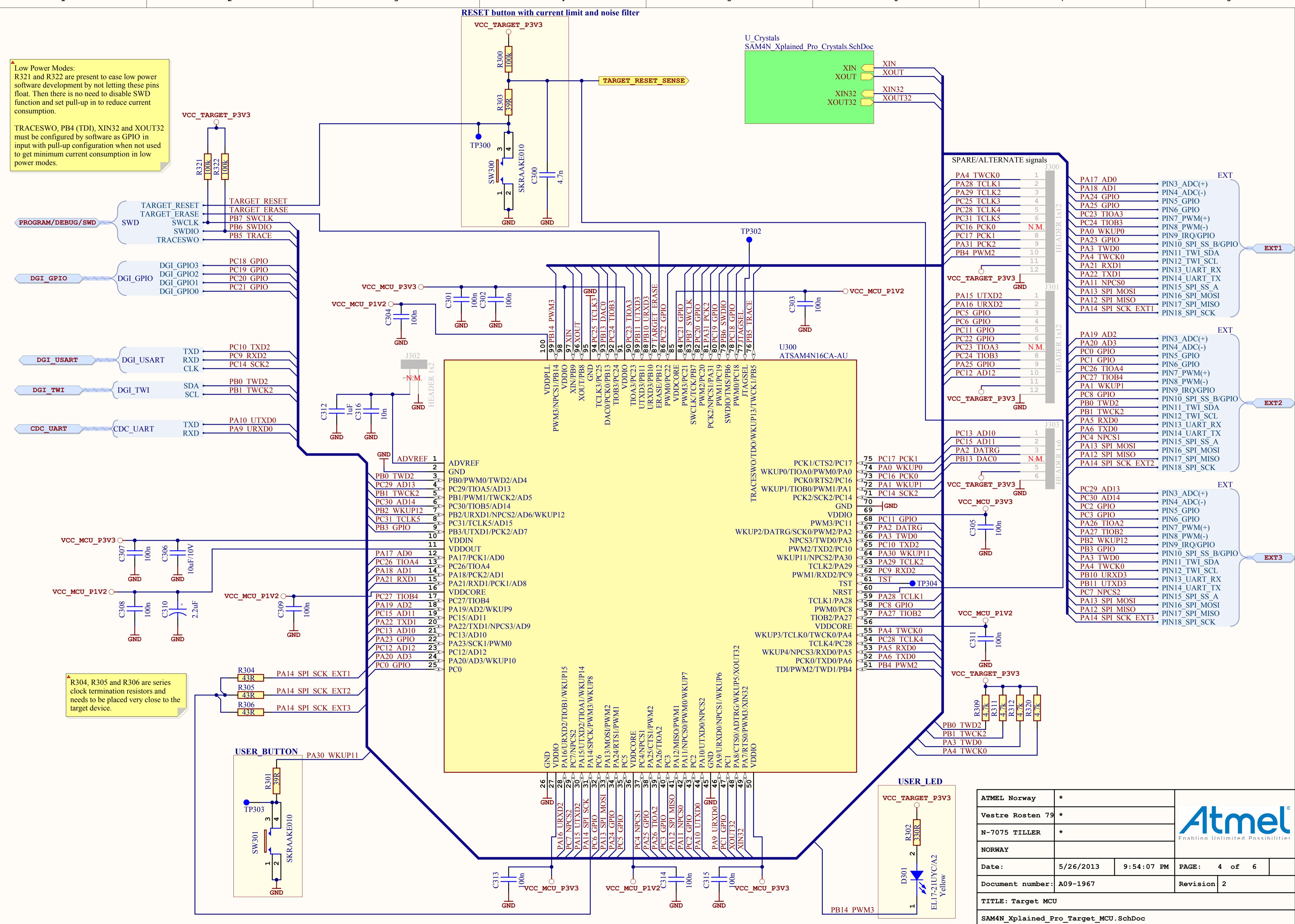
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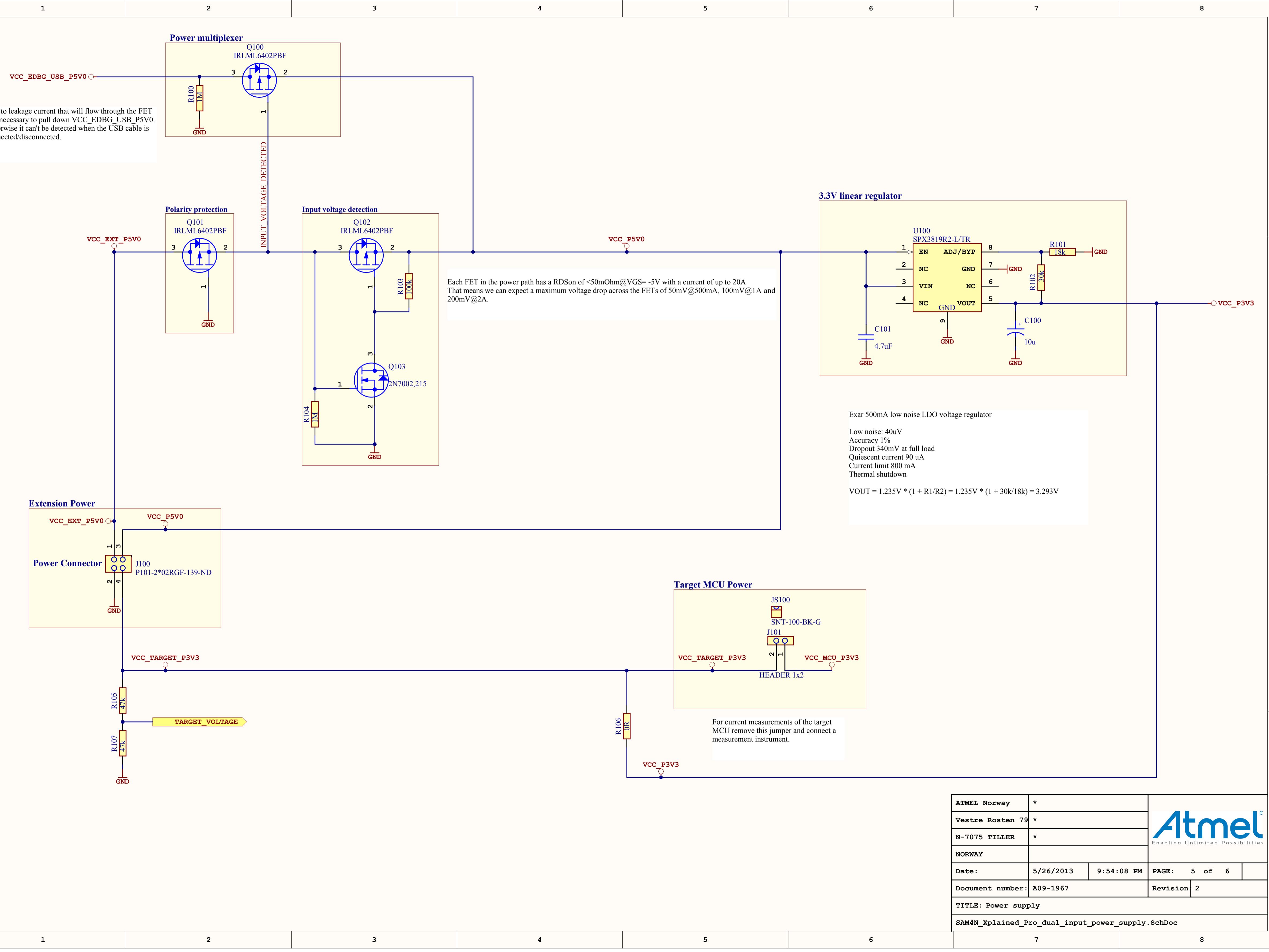


C

ATMEL Norway	*	
Vestre Rosten 79	*	
N-7075 TILLER	*	
NORWAY		
Date:	5/26/2013	9:54:07 PM
Document number:	A09-1967	Revision 2
TITLE: Extension connectors		
SAM4N_Xplained_Pro_Connectors.SchDoc		







A

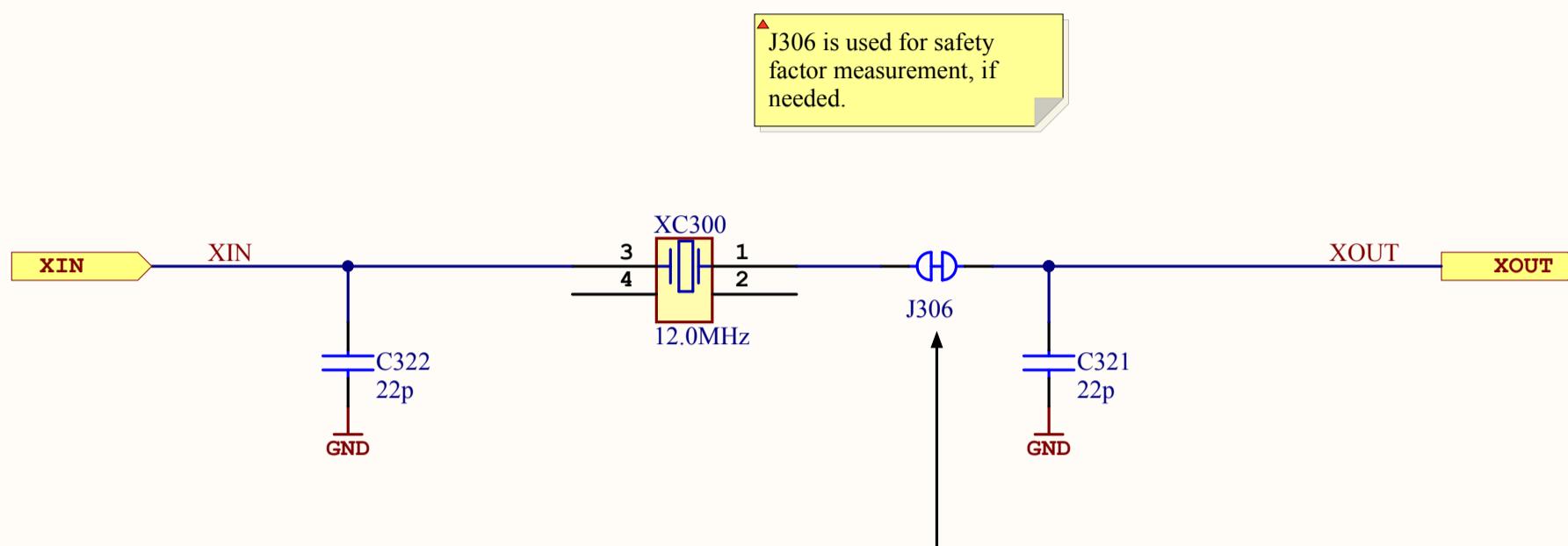
Crystal datasheet:
CLcrystal = 20pF
max ESR = 80 Ohm
Accuracy = +/-30 ppm

SAM4N datasheet:
CLmcu = 9.0pF (equivalent load)
Cpcb = 0.5pF (estimate)

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

Cext = 2x(20pF - 9.0pF - 0.5pF) = 21.0pF
Selected value 22pF

Verification results:
Accuracy: 8 to 16 ppm measured on three boards
Startup time: 1.58 ms to reach full swing (first clock edge after 296 us)
Safety factor: Above 5.1



J306 is used for safety factor measurement, if needed.

These straps with SMD pads can be used to place a resistor in the XOUT signal in order to measure the oscillator allowance.
By default these straps are closed and nothing is mounted on the pads.

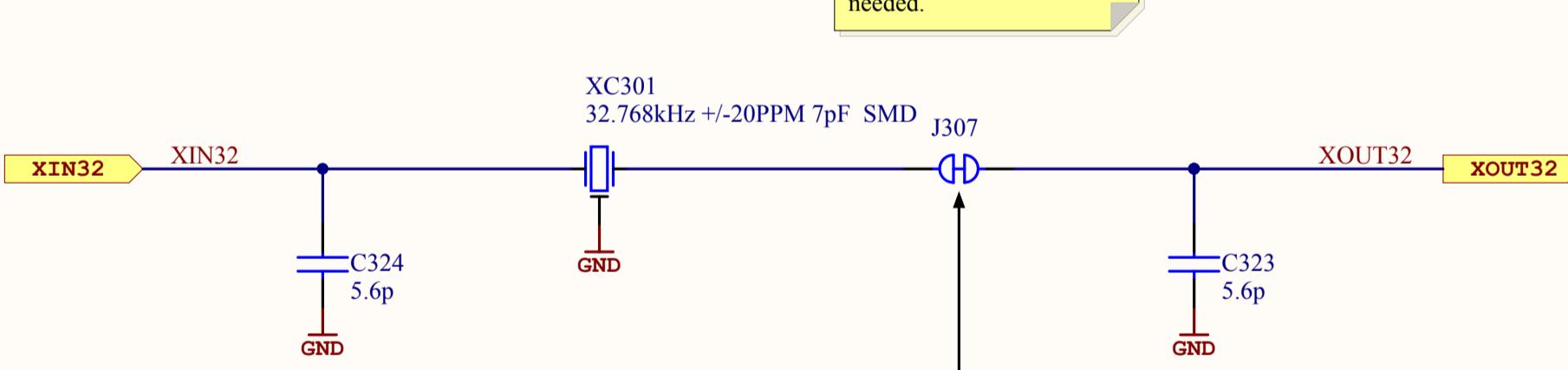
B

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

SAM4N datasheet:
CLmcu = 0.7pF (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

Verification results:
Accuracy: The calculated 12pF shows large error in accuracy around 50ppm. The best accuracy down to 2ppm is achieved with 5.6pF load.
Startup time: full swing is reached after 400ms (probe loading 6-15pF)
Safety factor: Above 5.5

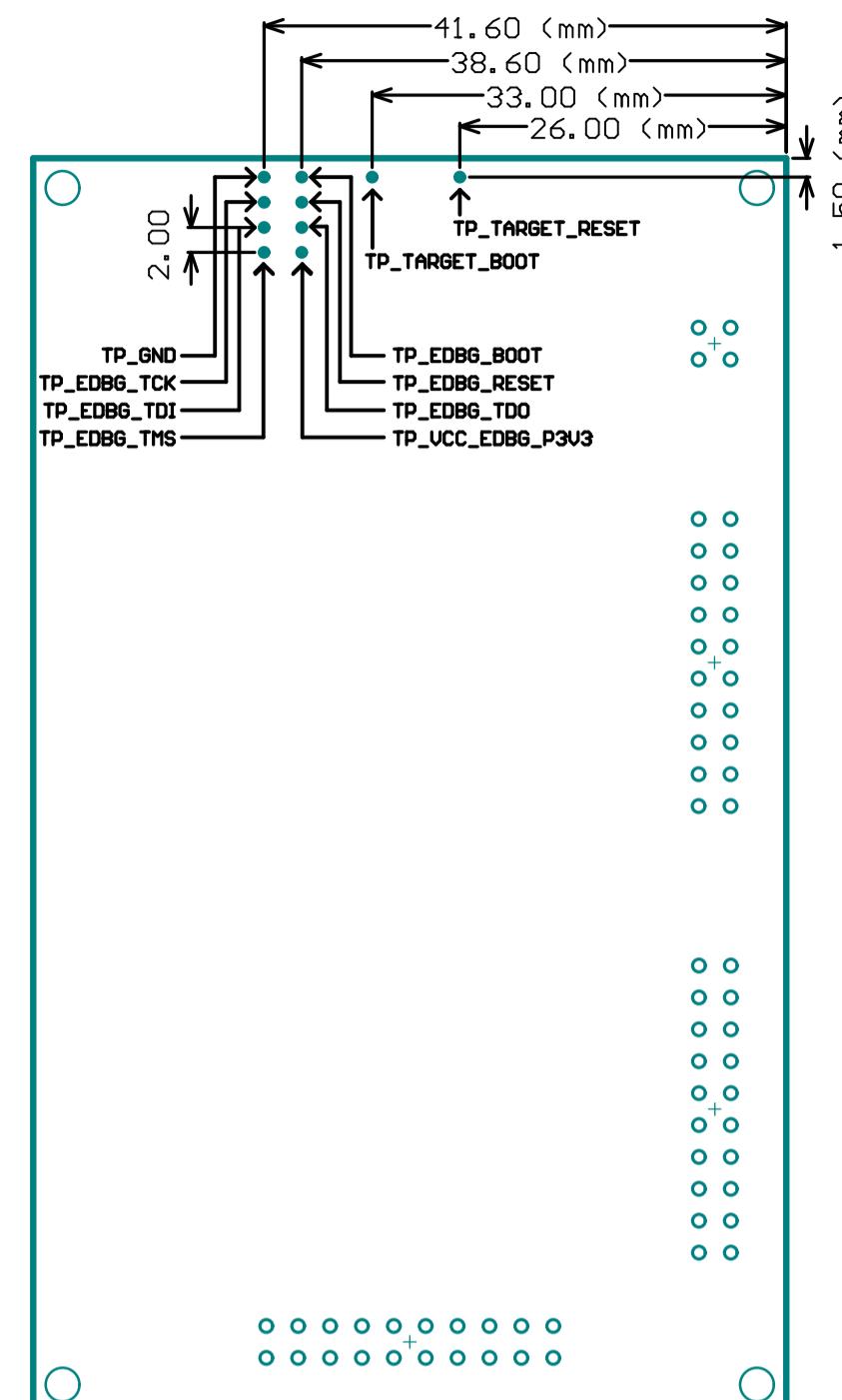


J307 is used for safety factor measurement, if needed.

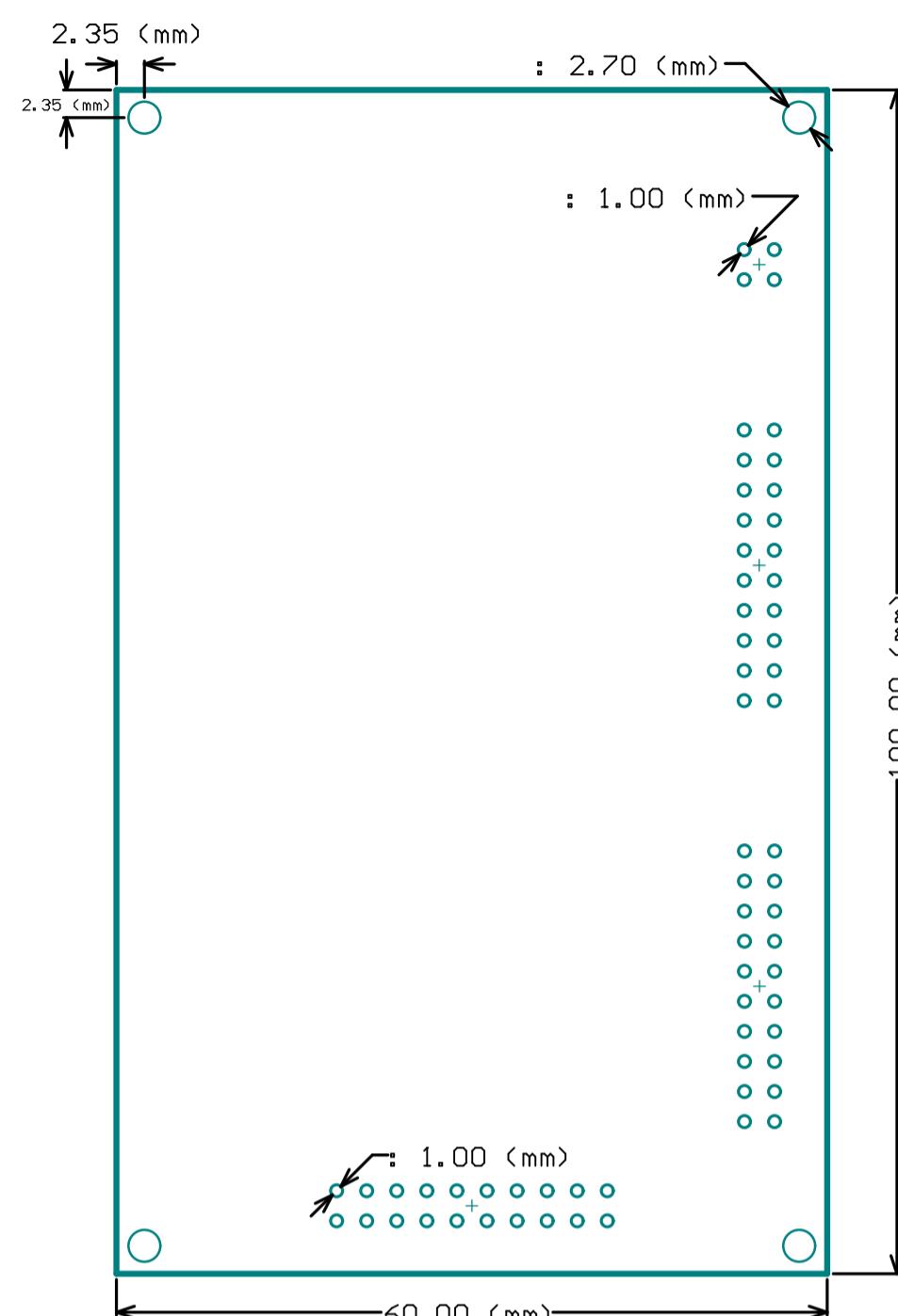
These straps with SMD pads can be used to place a resistor in the XOUT signal in order to measure the oscillator allowance.
By default these straps are closed and nothing is mounted on the pads.

ATMEL Norway	*	
Vestre Rosten 79	*	
N-7075 TILLER	*	
NORWAY		
Date:	5/26/2013	9:54:08 PM
Document number:	A09-1967	Revision 2
TITLE:	Power supply	
SAM4N_Xplained_Pro_Crystals.SchDoc		

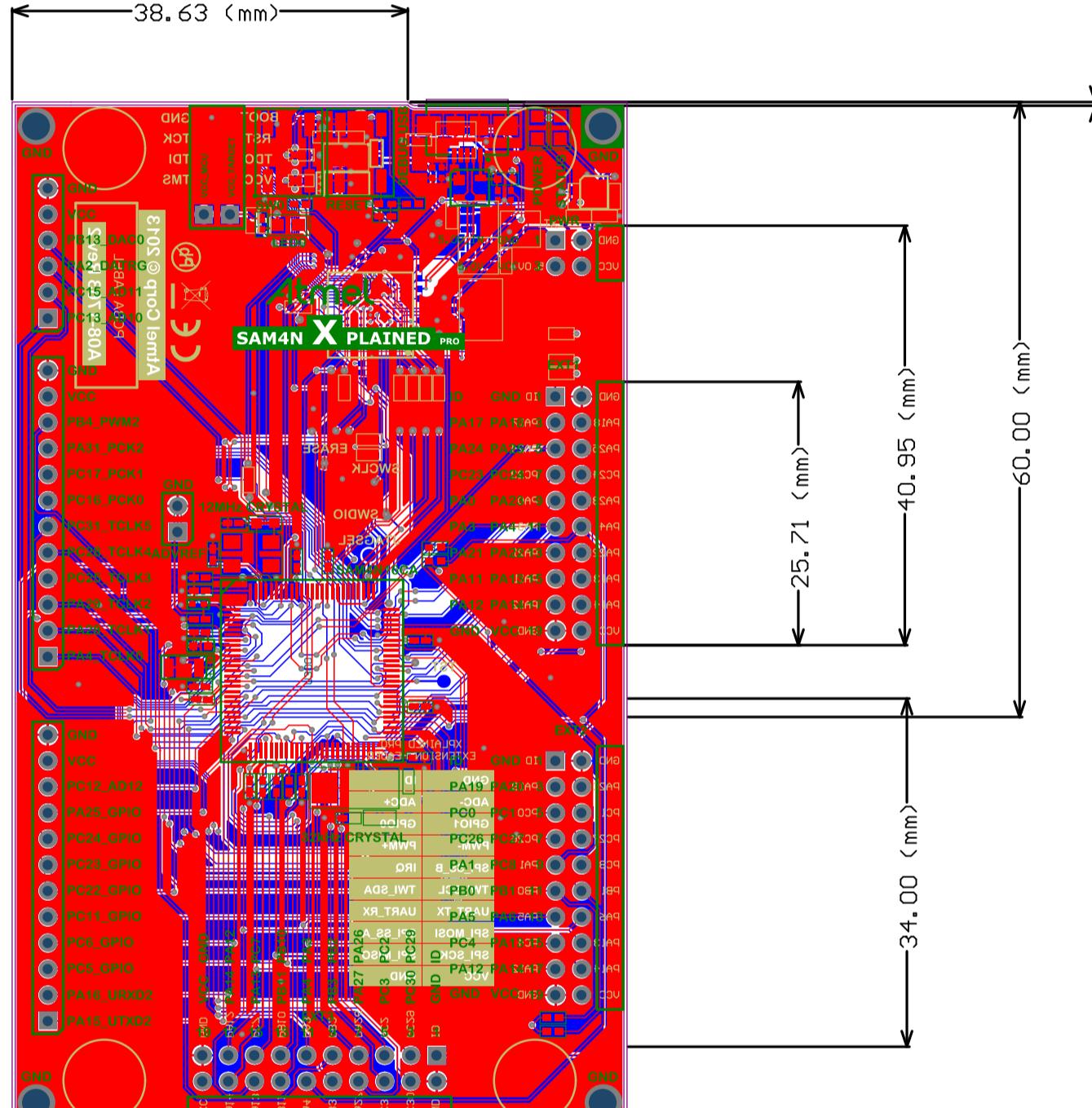
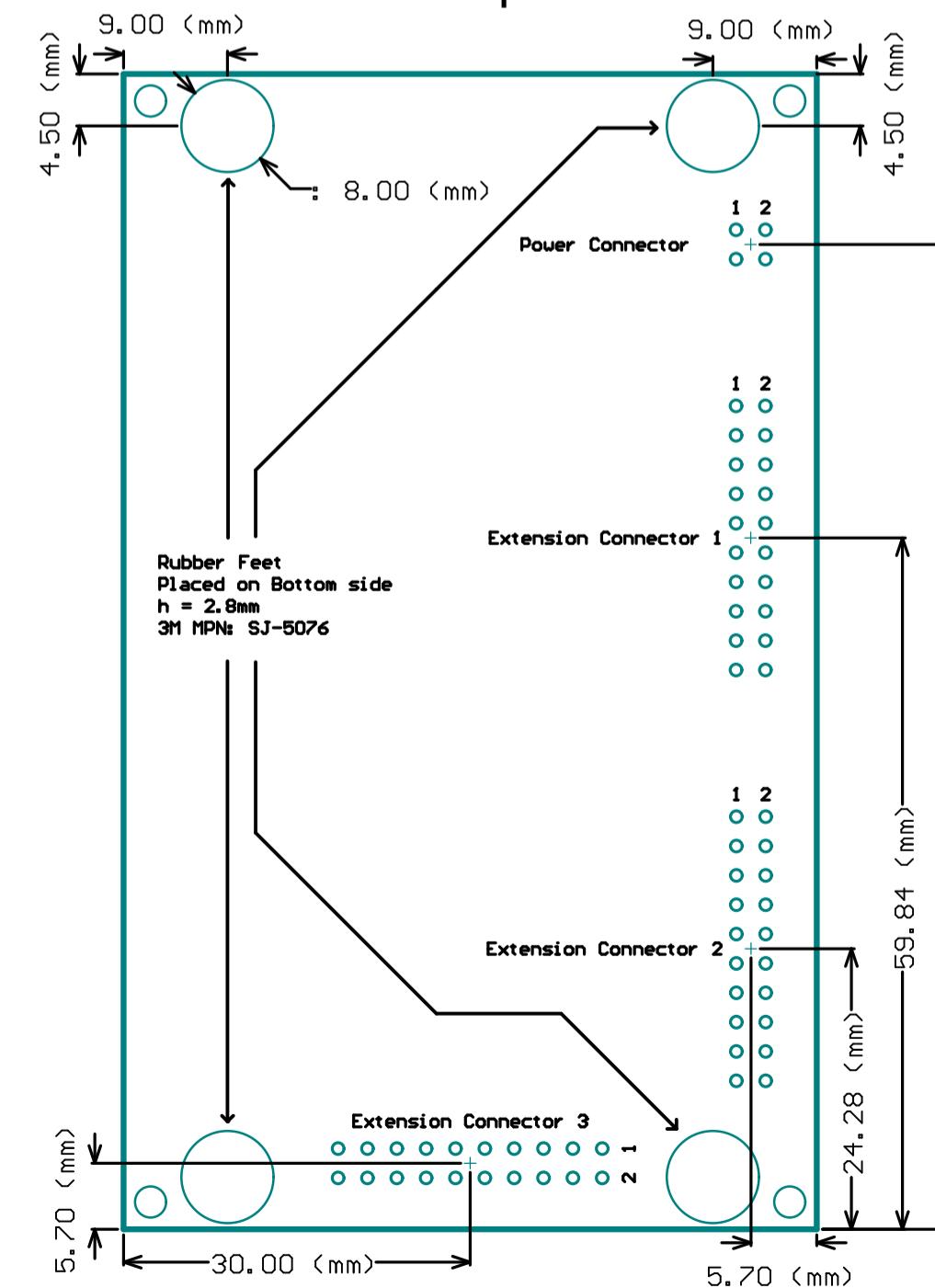
Medium MCU Test Points



Medium MCU Mechanical Dimensions



Medium MCU Component Placement



GND

GND

VCC

PB13_DAC0

PA2_DATRG

PC15_AD11

PC13_AD10

GND

VCC

PB4_PWM2

PA31_PCK2

PC17_PCK1

PC16_PCK0

GND

12MHz CRYSTAL

PC31_TCLK5

C321 J306

PC28_TCLK4ADVREF

XC300

PC25_TCLK3

C301

PA29_TCLK2

C304

PA28_TCLK1

C312

PA4_TCLK0

C316

C307

C306

C310

C308

C309

GND

VCC

PC12_AD12

C313

R306

R305

R304

C314

PA25_GPIO

XC301

+

PC24_GPIO

C323 J307

PC23_GPIO

PC22_GPIO

PC11_GPIO

PC6_GPIO

PC5_GPIO

PA16_URXD2

PA15_UTXD2

VCC

GND

PA14 PA12

PA13 PC7

PB11 PB10

PA4 PA3

PB3 PB2

PA27 PA26

PC3 PC2

PC30 PC29

GND

ID

PA19 PA20

PC0 PC1

PC26 PC27

PA1 PC8

PB0 PB1

PA5 PA6

PC4 PA13

PA12 PA14

GND

VCC

J400

DEBUG USB

J401

D402

L401

C40B

D401

POWER

STATUS

D401

GND

5.0V_IN

GND

5.0V_UCC

3

D400

D401

GND

PWR

+

J100

Atmel®

SAM4N X PLAINED PRO

EXT1

ID

GND

1

PA17 PA18

3

PA24 PA25

5

PC23 PC24

7

PA0 PA23

9

PA3 PA4

11

R312 PA21 PA22

13

PA11 PA13

15

PA12 PA14

17

GND VCC

19

EXT2

ID

GND

1

PA19 PA20

3

PC0 PC1

5

PC26 PC27

7

PA1 PC8

9

PB0 PB1

11

PA5 PA6

13

PC4 PA13

15

PA12 PA14

17

GND

VCC

19

R309

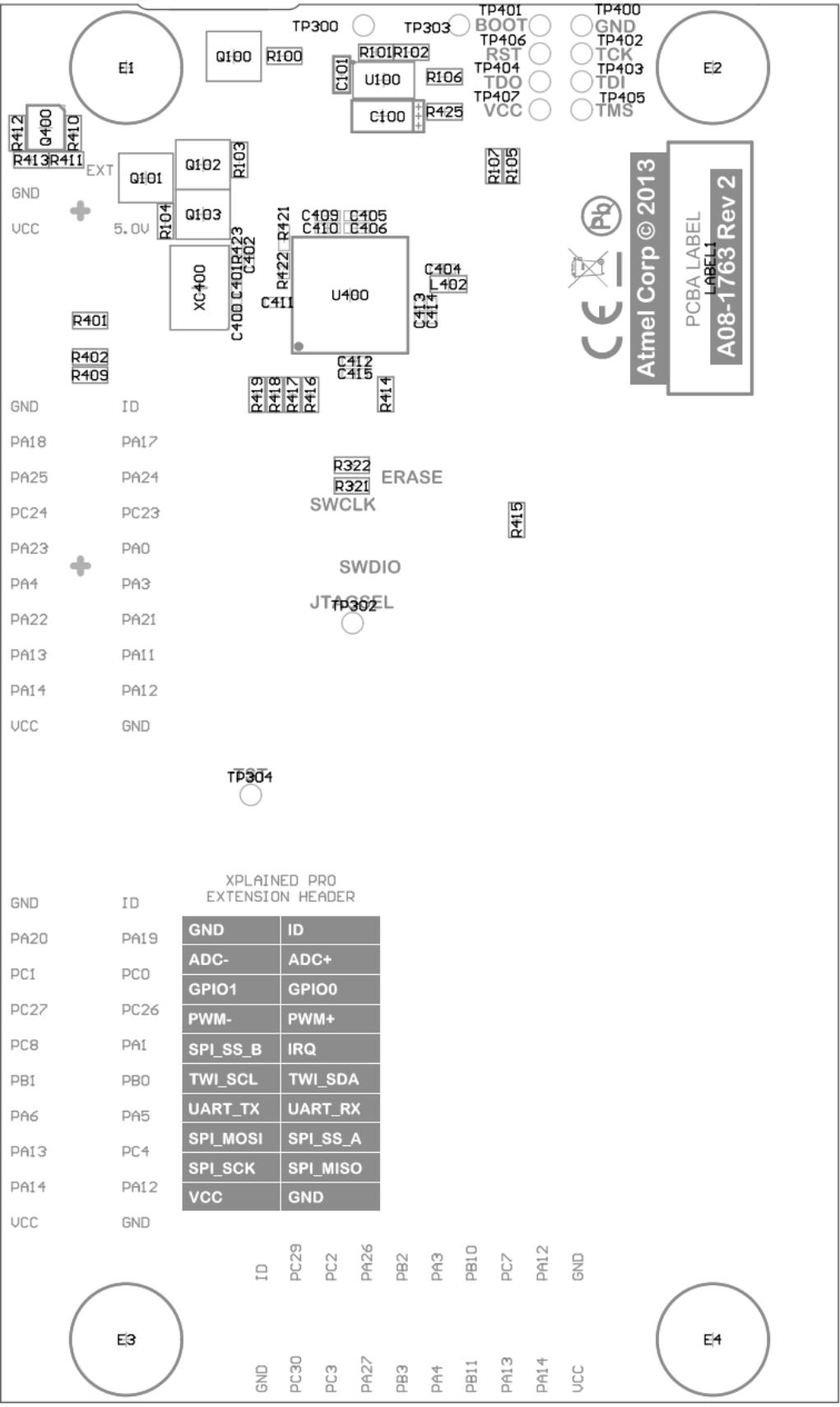
R311

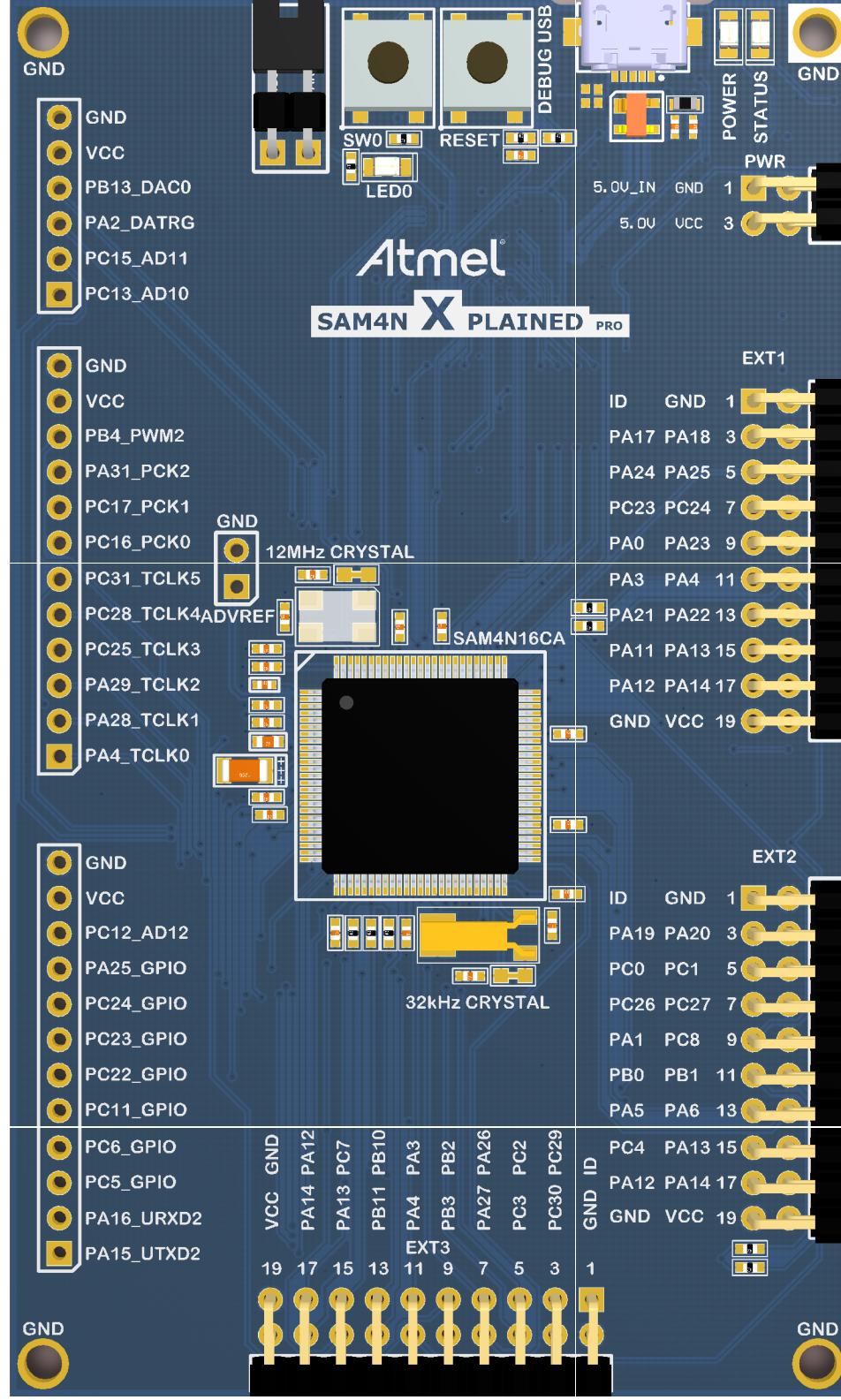
GND

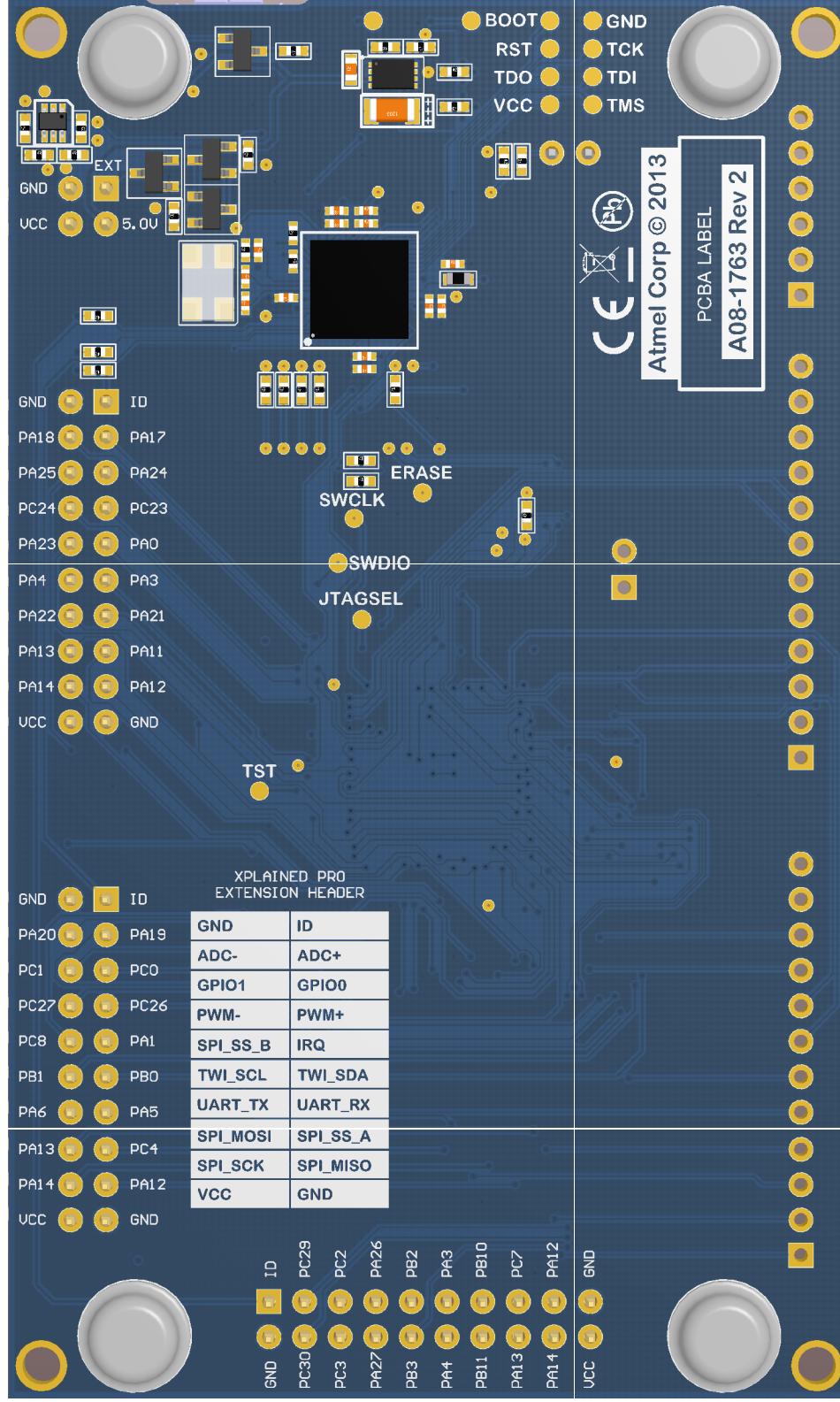
+

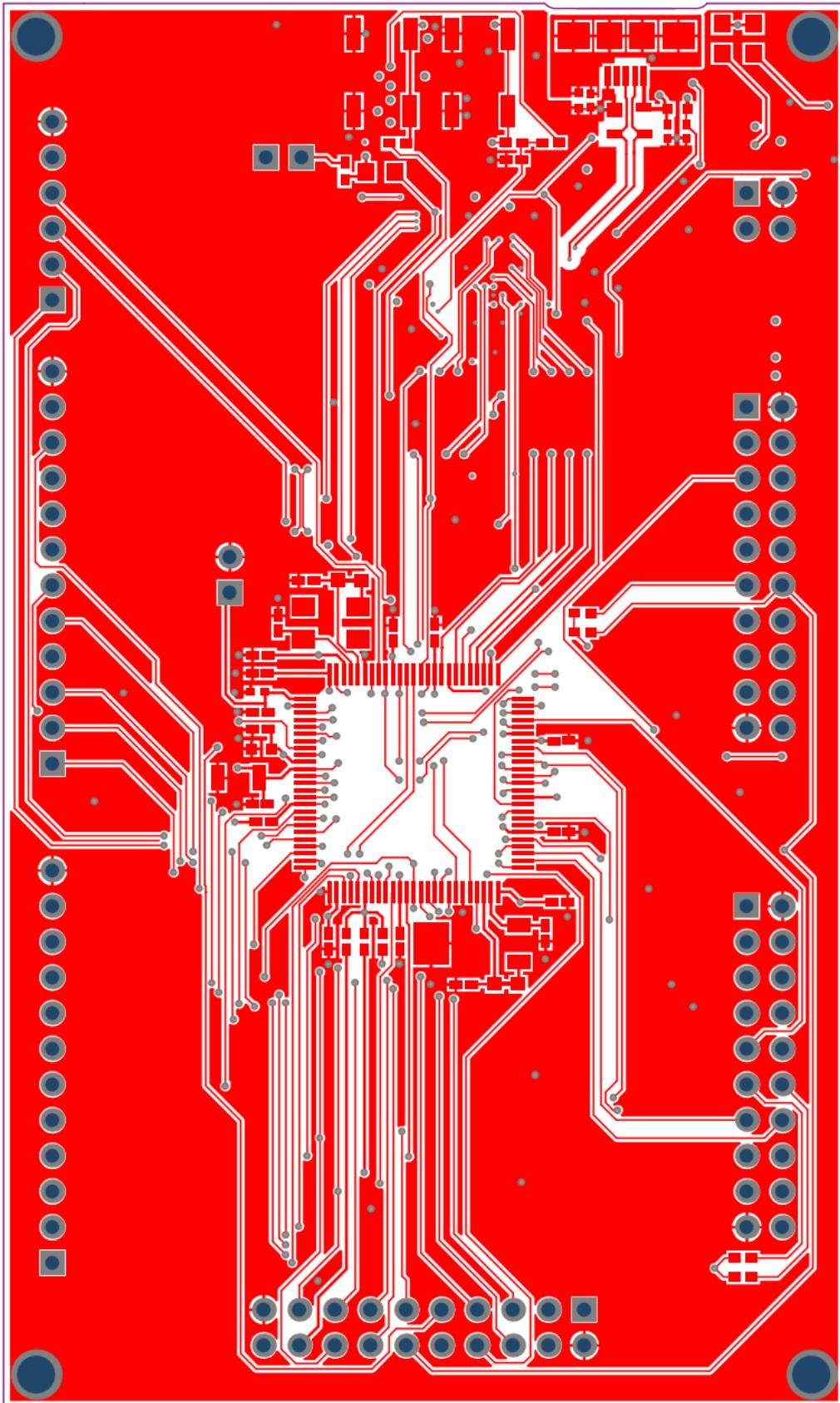
J202

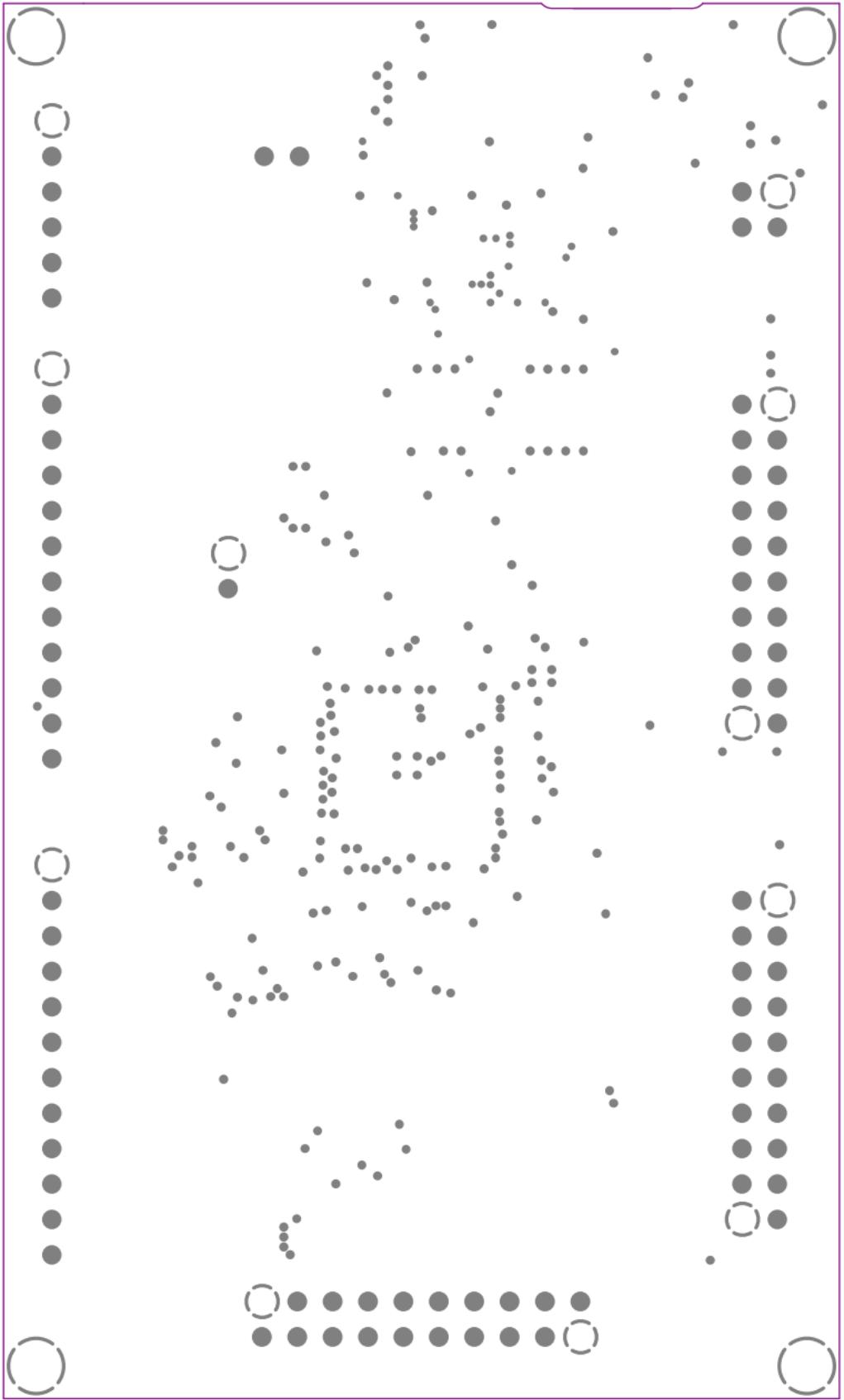
GND

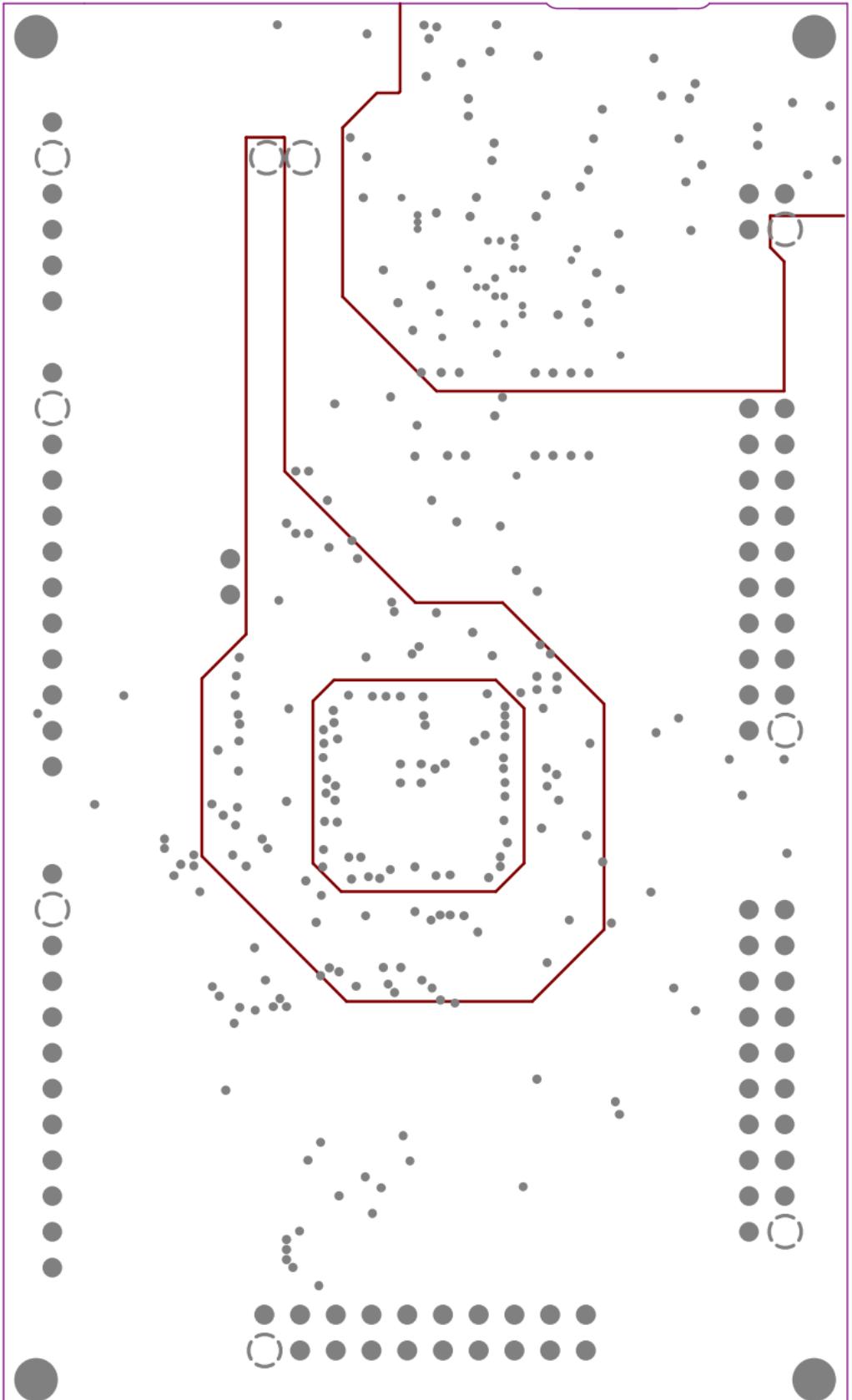


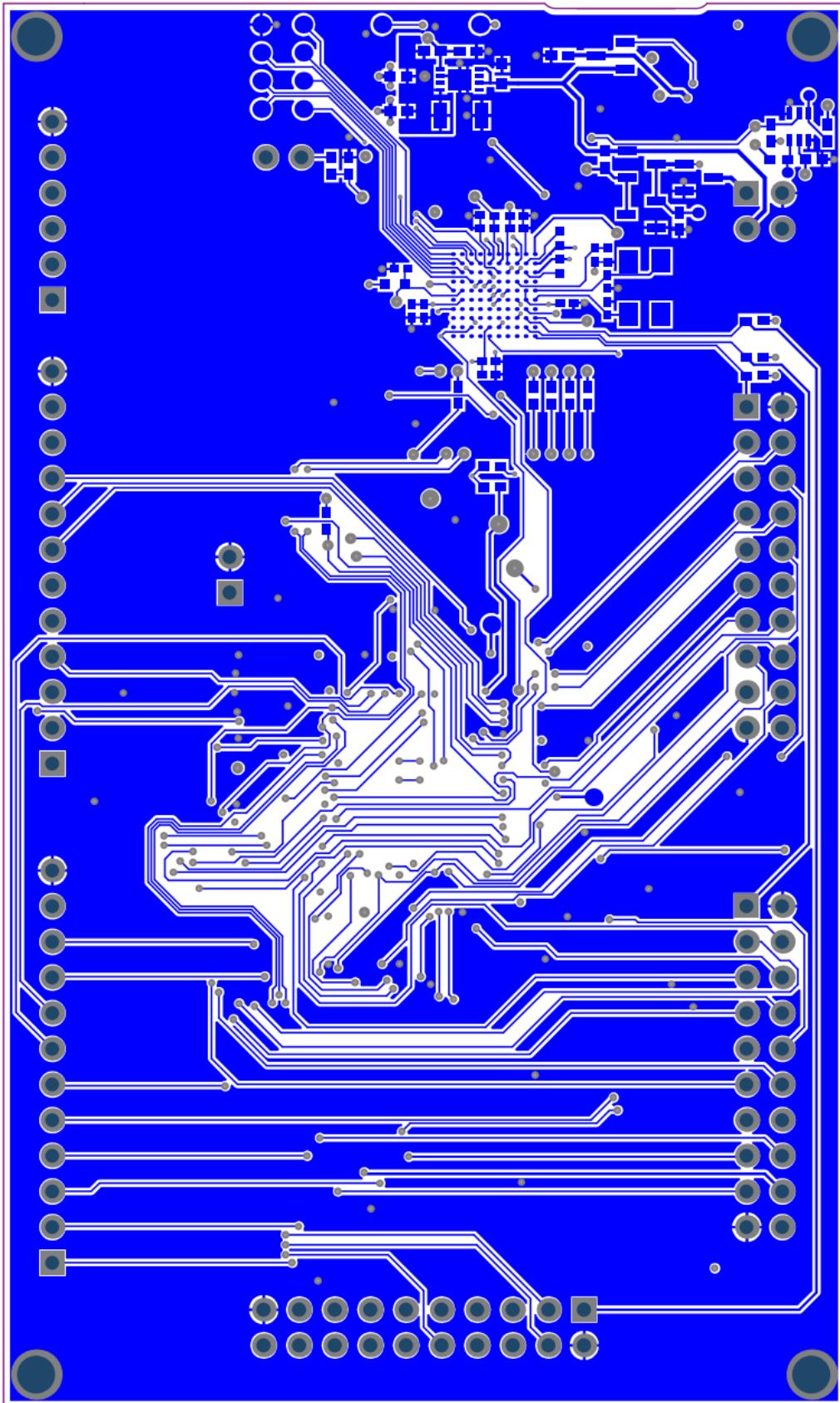












Component list

Top Level Schematics

Source Data From:
Project:
Variant:

SAM4N_Xplained_Pro.PnjPCB
SAM4N_Xplained_Pro.PnjPCB
Default assembly



Fitted	Designator	Quantity	Value	Manufacturer	MPN	Description
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% (de31036)
Fitted	C300	1	4.7n			Ceramic capacitor, SMD 0402, X7R, 25V, +/-10% (de35267)
Fitted	C301, C302, C303, C304, C305, C307, C308, C309, C311, C313, C314, C315	12	100n	Kemet	C0402C104K4RAC TU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C306	1	10uF/10V	AVX	0603ZD106MA12A	Ceramic capacitor, SMD 0603, X5R, 10V, 10uF +/- 20%
Fitted	C310	1	2.2uF	Kemet	T494A225K010AT	Capacitor Tantalum 10V 2.2uF 10% ESR = 6 ohm
Fitted	C312	1	1uF	AVX	0402ZD105KAT2A	Ceramic capacitor, SMD 0402, X5R, 10V, +/-10 %
Fitted	C316	1	10n			Ceramic capacitor, SMD 0402, X7R, 25V, +/-10%
Fitted	C321, C322	2	22p			Ceramic capacitor, SMD 0402, NPO, 50V, +/-5%
Fitted	C323, C324	2	5.6p			Ceramic capacitor, SMD 0402, NPO, 50V, +/-5%
Fitted	C400, C401	2	22p			Ceramic capacitor, SMD 0402, NPO, 50V, +/-5%
Fitted	C402	1	10p			Ceramic capacitor, SMD 0402, NPO, 50V, +/-5%
Fitted	C404, C410, C411, C412, C413	5	100n	Kemet	C0402C104K4RAC TU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C405, C409, C414, C415	4	2.2uF	Kemet	C0402C225M0PAC	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-20%
Fitted	C406, C407, C408	3	1nF COG	Murata	GRM155C1H102JA01D	Ceramic capacitor, SMD 0402, C0G, 50V, +/-5%
Fitted	D301, D401	2	EL17-21UYC/A2	Everlight	17-21UYC/S30-A3/TR8	LED, Yellow, Wave length=591nm, SMD 0805, +/-70°
Fitted	D400	1	EL17-21SYGC	Everlight	EL17-21SYGC	LED, Green, Wave length=575nm, SMD 0805, +/-70°
Fitted	D402	1	PRT85V0U2X	Philips	PRT85V0U2X	Double rail-to-rail USB ESD protection diode
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	ESCATEC	Xplained PRO MCU board Jupiter Test Fixture	Xplained PRO MCU board Jupiter Test Fixture
Fitted	FW1	1	EDBG secured firmw are	ATMEL		EDBG secured firmw are
Fitted	J100	1	P101-2*02RGF-139-ND		P101-2*02RGF-139-ND	Pin header, 2x2, Right Angle, 2.54mm, THT, Pin In Paste
Fitted	J101	1	Pin header 1x2 right angle	Pro-data International Corp	2213R-2G	1x2 pin header, right angle, 2.54 mm pitch, through-hole
Fitted	J200, J201, J202	3	P101-2*10RGF-139-ND		P101-2*10RGF-139-ND	Pin header, 2x10, Right Angle, 2.54mm, THM, Pin In Paste
Fitted	J400	1	10104111-0001LF	FCI	10104111-0001LF	Micro USB AB Connector
Fitted	JS100	1	SNT-100-BK-G	SAMTEC	SNT-100-BK-G	Jumpers cap for 2.54mm pinheader
Fitted	L401, L402	2	BLM18PG471SN1	Murata	BLM18PG471SN1	SMD RF inductor 0603, Z=470Ohm (@100MHz), Max R(DC)=0.65Ohm, Max current=1A
Fitted	LABEL1	1	Label PCB A	ACT Logimark AS	505462	POBA identification label PP Top White Gloss
Fitted	PCB1	1	SAM4N Xplained Pro PCB	ATMEL		SAM4N Xplained Pro PCB, 4 layer, size 60mm x 100mm
Fitted	PCBADOC1	1	A09-1967 PCBA Files	ATMEL		SAM4N Xplained Pro PCBA documentation
Fitted	O100, Q101, Q102	3	IRML6402PBF	International Rectifier	IRML6402PBF	P-ch. MOSFET, -30V, -3.7A continuous RDS(ON)=0.050ohm@VGS=-4.5V, RDS(ON)=0.080ohm@VGS=-2.5V
Fitted	Q103	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	Q400	1	2N7002DW	Fairchild	2N7002DW	Dual N-Channel MOSFET, 60V, 115mA cont,RDS(ON) < 7.5 Ohm @50mA@5V, SOT-363
Fitted	R100, R104, R410, R413	4	1M	KOA	RK73H1ETTP1004F	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R101	1	18k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R102	1	30k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R103, R300, R321, R322	4	100k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R105, R107	2	47k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R106, R425	2	0R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R301, R303	2	39R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R302, R411, R412, R414, R415, R416, R417, R418, R419	9	330R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R304, R305, R306	3	43R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R309, R311, R312, R320	4	4.7k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R401, R402, R409	3	1k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R421, R422	2	39R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R423	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 A08-0091 but less force is needed
Fitted	TEST1	1	SAM4N Xplained Pro test	ATMEL		Fixture test for SAM4N Xplained Pro
Fitted	TESTDOC1	1	SAM4N Xplained Pro Test Instructions	ATMEL		SAM4N Xplained Pro Test Instructions
Fitted	U100	1	SPX3819R2-L/TR	Exar	SPX3819R2-L/TR	500mA LDO, ADJ, low noise, 8-DFN package
Fitted	U300	1	ATSAM4N16CA-AU	ATMEL	ATSAM4N16CA-AU	ARM Cortex-M4 MCU with 1MB flash, 80KB SRAM
Fitted	U400	1	AT32UC3A4256J-CTUR	ATMEL	AT32UC3A4256J-CTUR	AVR 32-bit RISC MCU
Fitted	XC300, XC400	2	12.0MHz	Fox Electronics	FQ5032B 12.0MHz SMD crystal 7388-12	Fox FQ5032B 12.0MHz SMD crystal 7388-12
Fitted	XC301	1	32.768kHz +/-20PPM 7pF SMD	Micro Crystal	MS1V-T1K 32.768kHz 7pF +/-20PPM TA	32k768 crystal, +/-20ppm, CL=7pF, max ESR 60kOhm, SMD
Not Fitted	C403	0	4.7n			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	J302	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	J303	0	HMTSW-106-23-F-S-237	SAMTEC	HMTSW-106-23-F-S-237	1x6 pin header, 2.54mm pitch, Pin-in-Paste THM
Not Fitted	R424	0	1M	KOA	RK73H1ETTP1004F	Thick film resistor, SMD 0402, 1/16W, 1%

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Approved	Notes
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