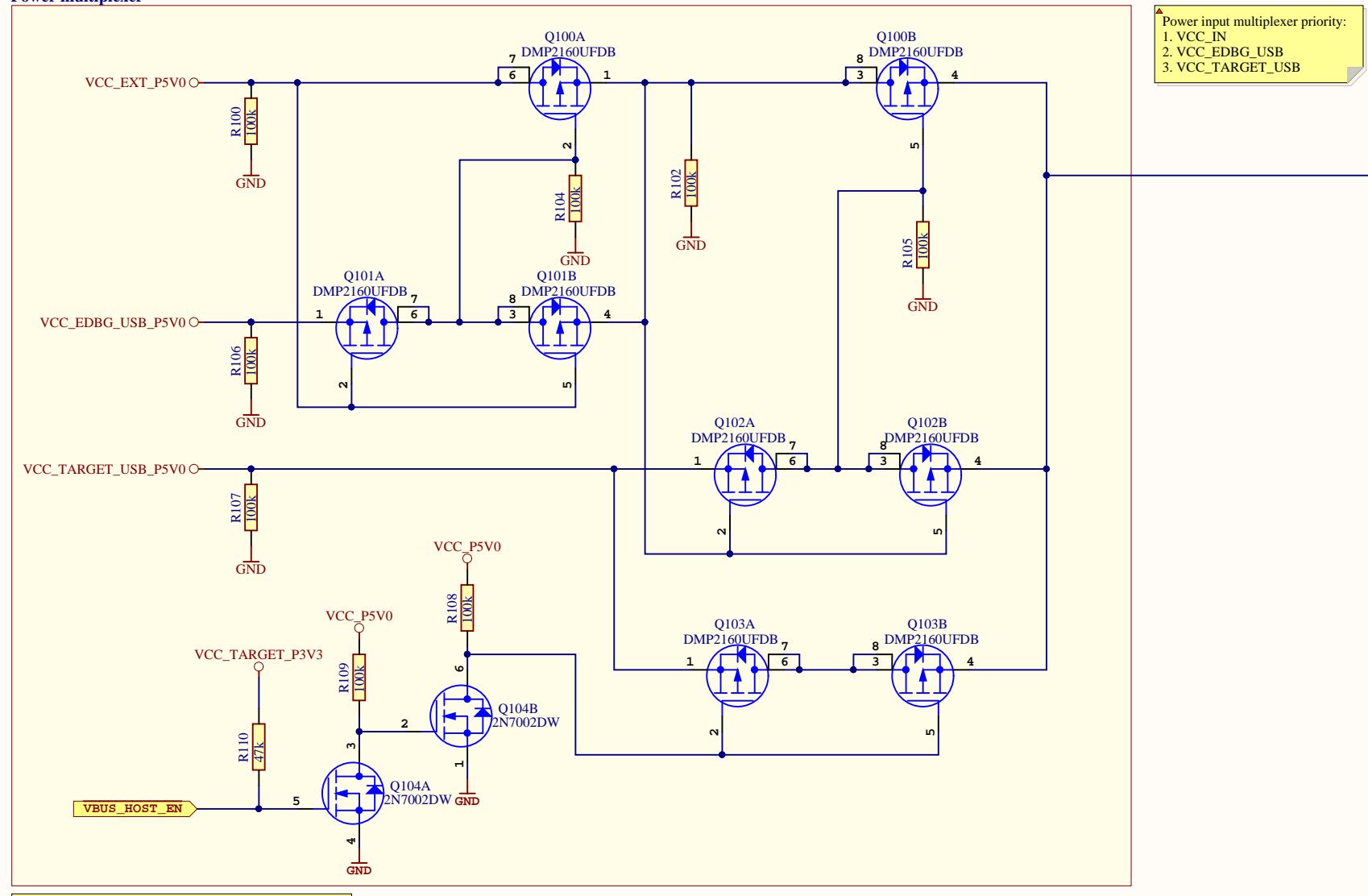
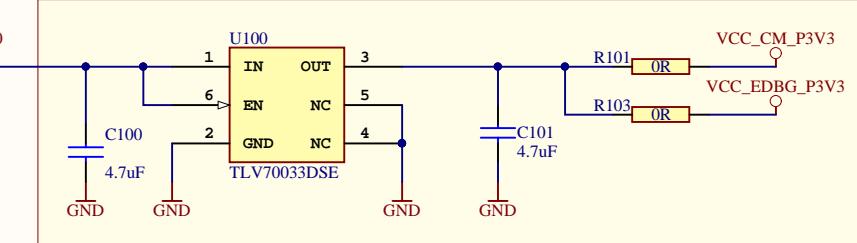


Power multiplexer

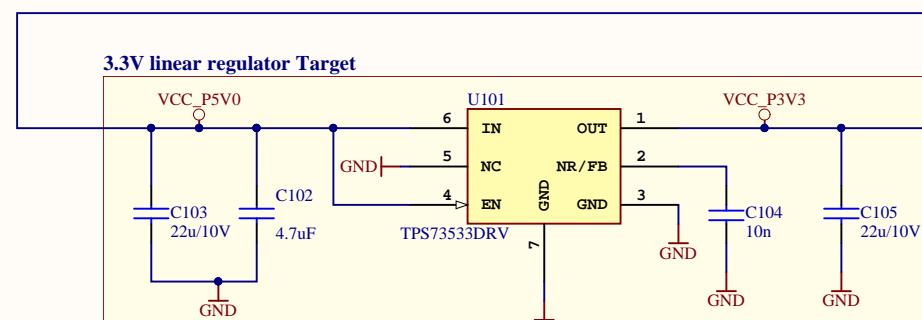
▲ Power input multiplexer priority:
1. VCC_IN
2. VCC_EDBG_USB
3. VCC_TARGET_USB

3.3V linear regulator EDBG and XAM

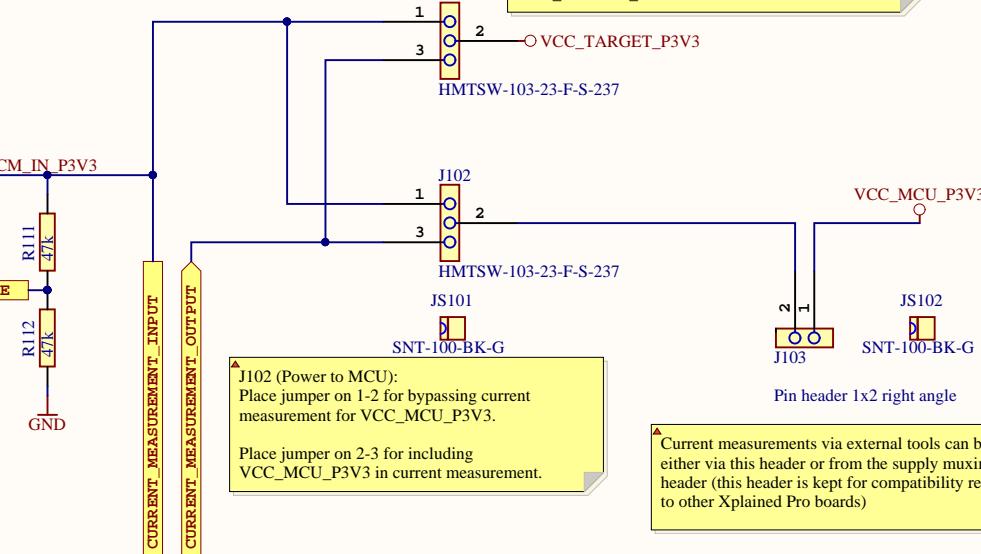
▲ I_{out} max = 200mA
Accuracy 2%
Low noise: 48 uVRms (10 Hz to 100 kHz)
Dropout 150mV at full load
Quiescent current 55 uA (no load)
Current limit max 860 mA
Thermal shutdown
Minimum capacitance required on output is 0.1uF (with less than 200mOhm ESR)

The target peripheral and the MCU can be powered either directly from the regulator or from the current measurement circuitry (XAM). When powered from the current measurement the supply voltage will vary from 3.3 V to 3.2 V due to voltage drop over the current measurement shunt resistor.

J100 (Power to peripherals):
Place jumper on 1-2 for bypassing current measurement for VCC_TARGET_P3V3.
Place jumper on 2-3 for including VCC_TARGET_P3V3 in current measurement.



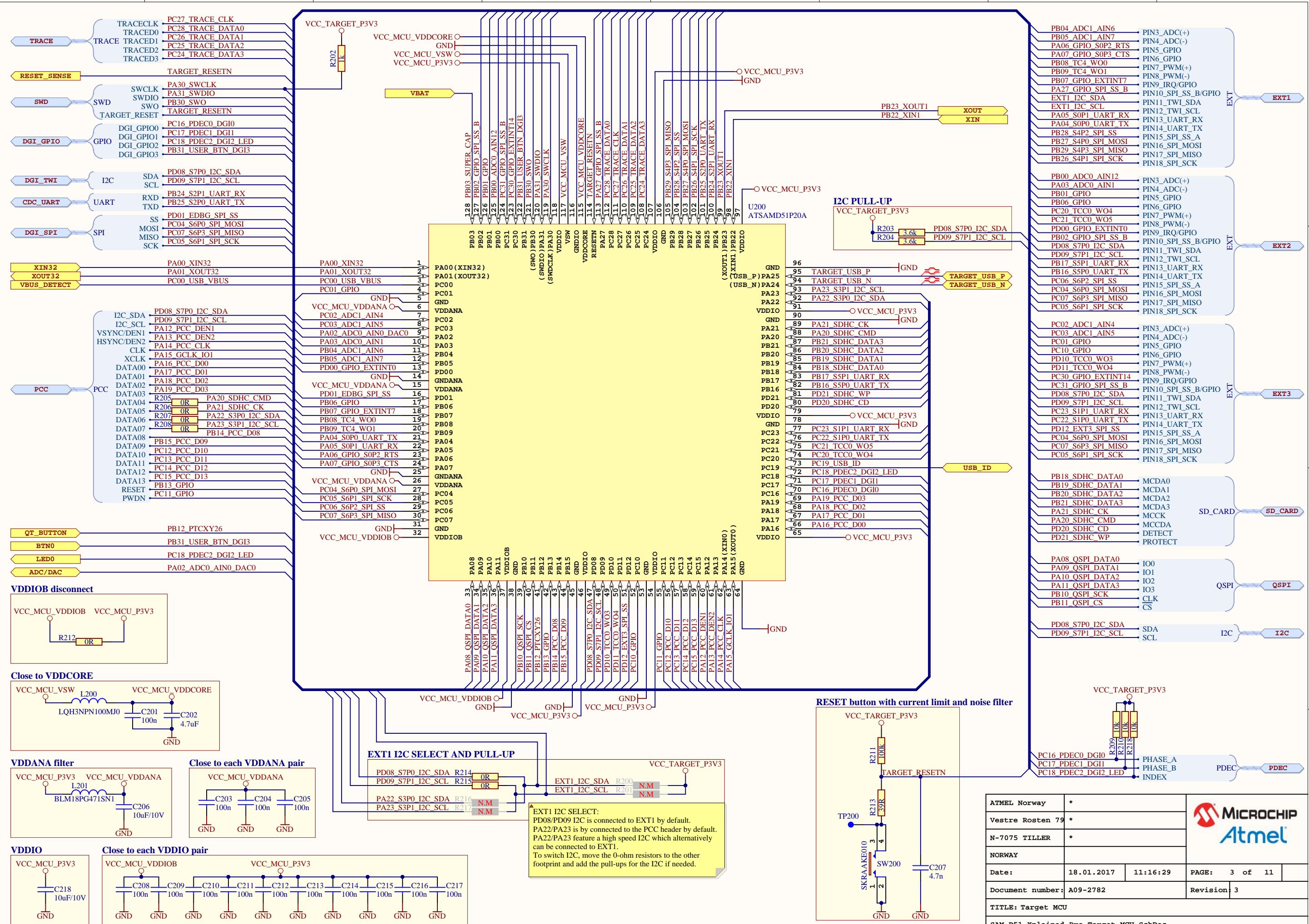
▲ 500mA low noise LDO voltage regulator
Noise: 28uVRms
Accuracy 2%
Dropout 280 mV at full load
Quiescent current 46 uA
Current limit 1170 mA
Thermal shutdown

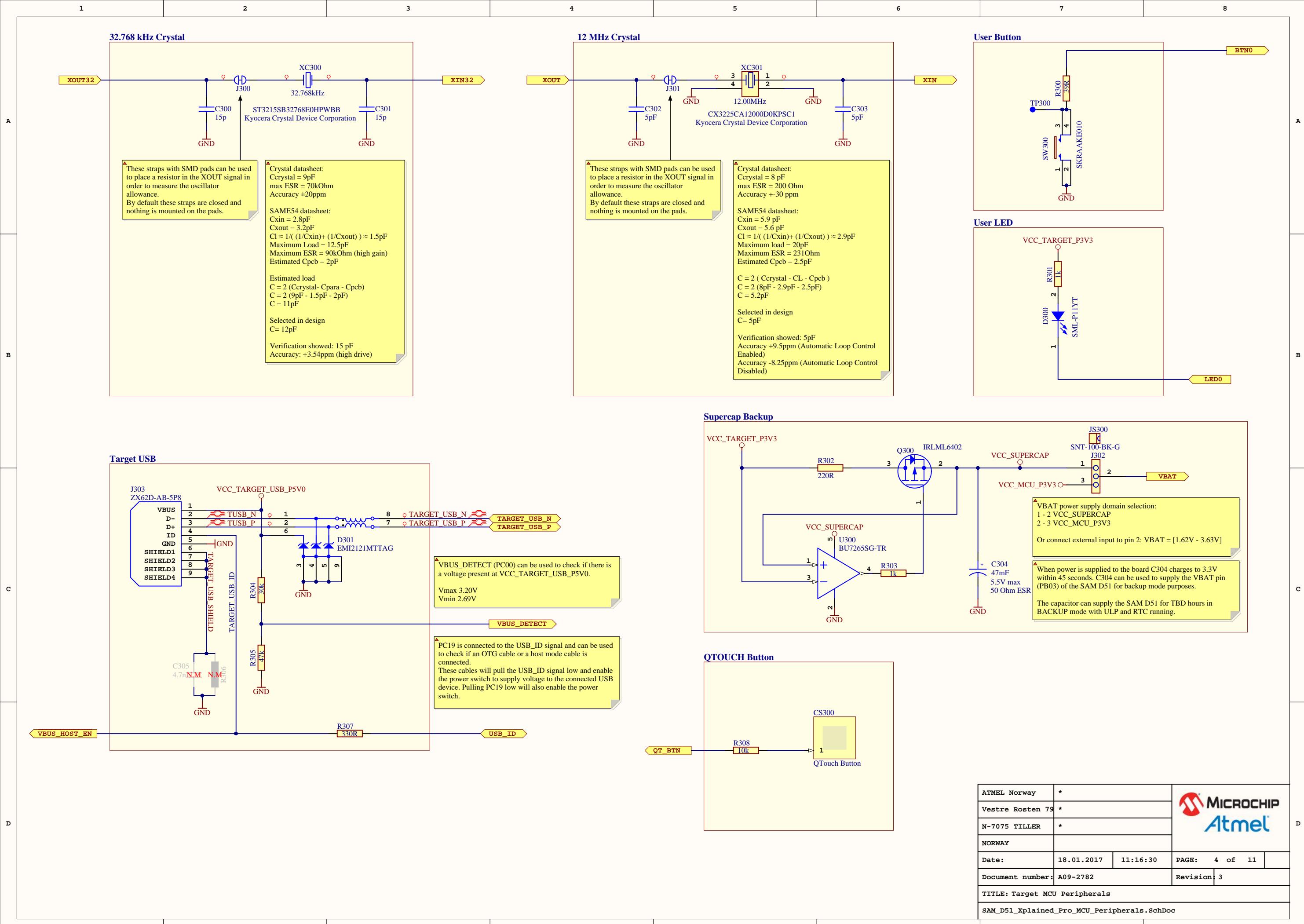


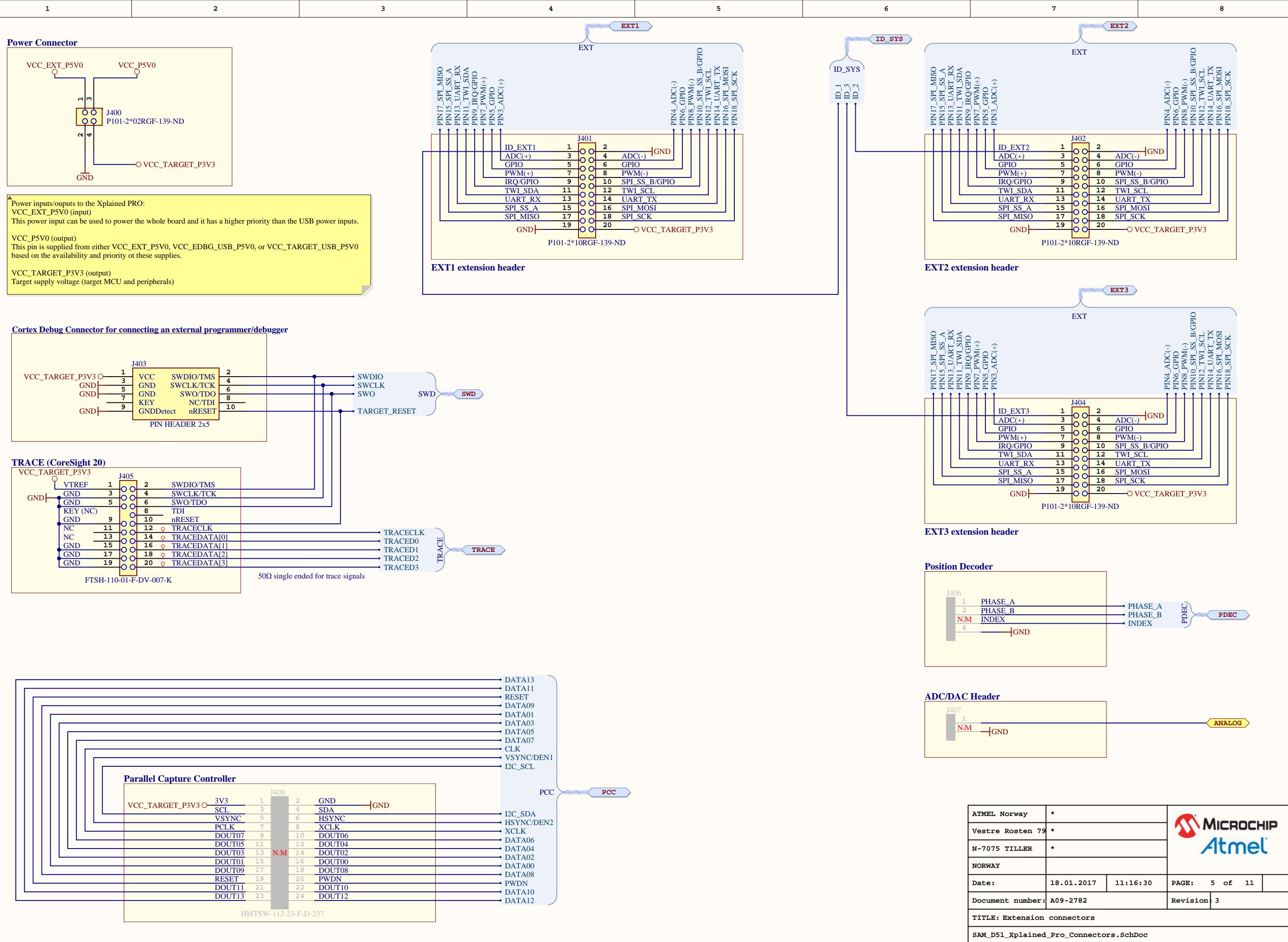
J102 (Power to MCU):
Place jumper on 1-2 for bypassing current measurement for VCC_MCU_P3V3.
Place jumper on 2-3 for including VCC_MCU_P3V3 in current measurement.

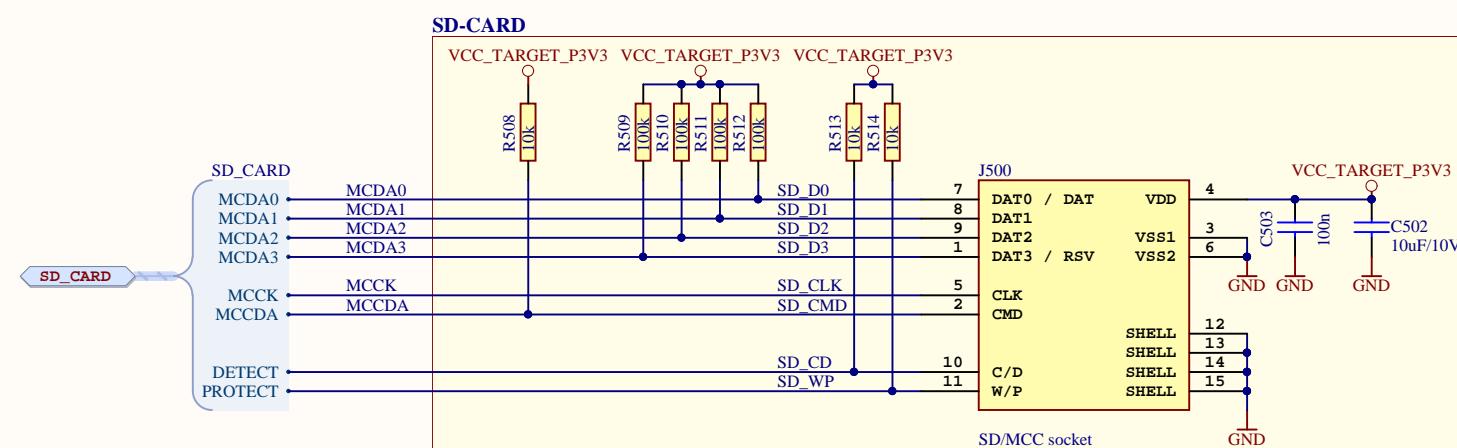
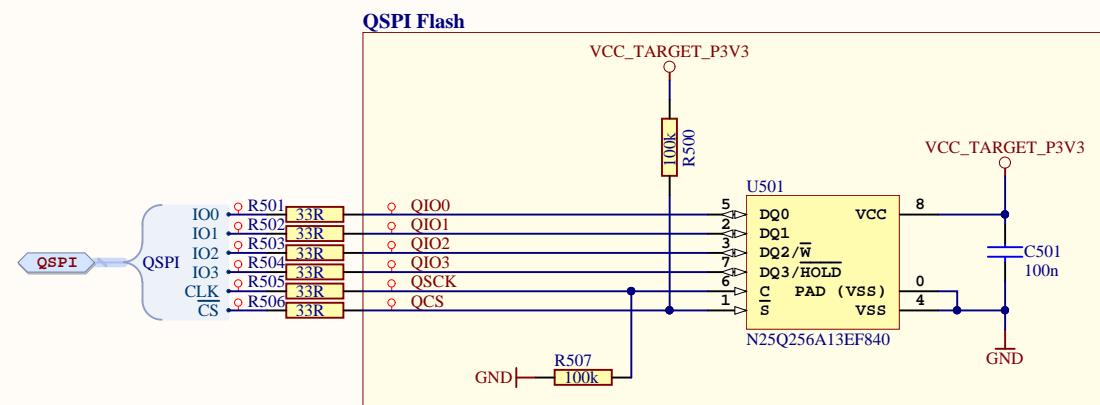
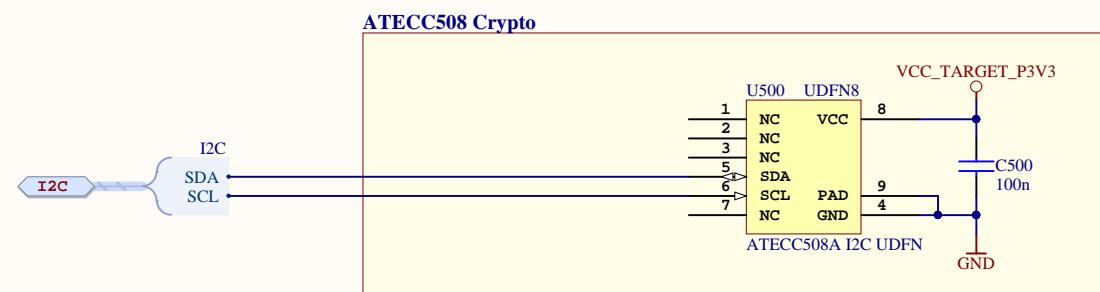
Current measurements via external tools can be done either via this header or from the supply muxing header (this header is kept for compatibility reasons to other Xplained Pro boards)

ATMEL Norway	*	MICROCHIP Atmel
Vestre Rosten 79	*	
N-7075 TILLER	*	
NORWAY		
Date:	18.01.2017 11:16:29	PAGE: 2 of 11
Document number:	A09-2782	Revision 3
TITLE: Power supply		
SAM_D51_Xplained_Pro_triple_input_power_supply_HSW.SchDoc		



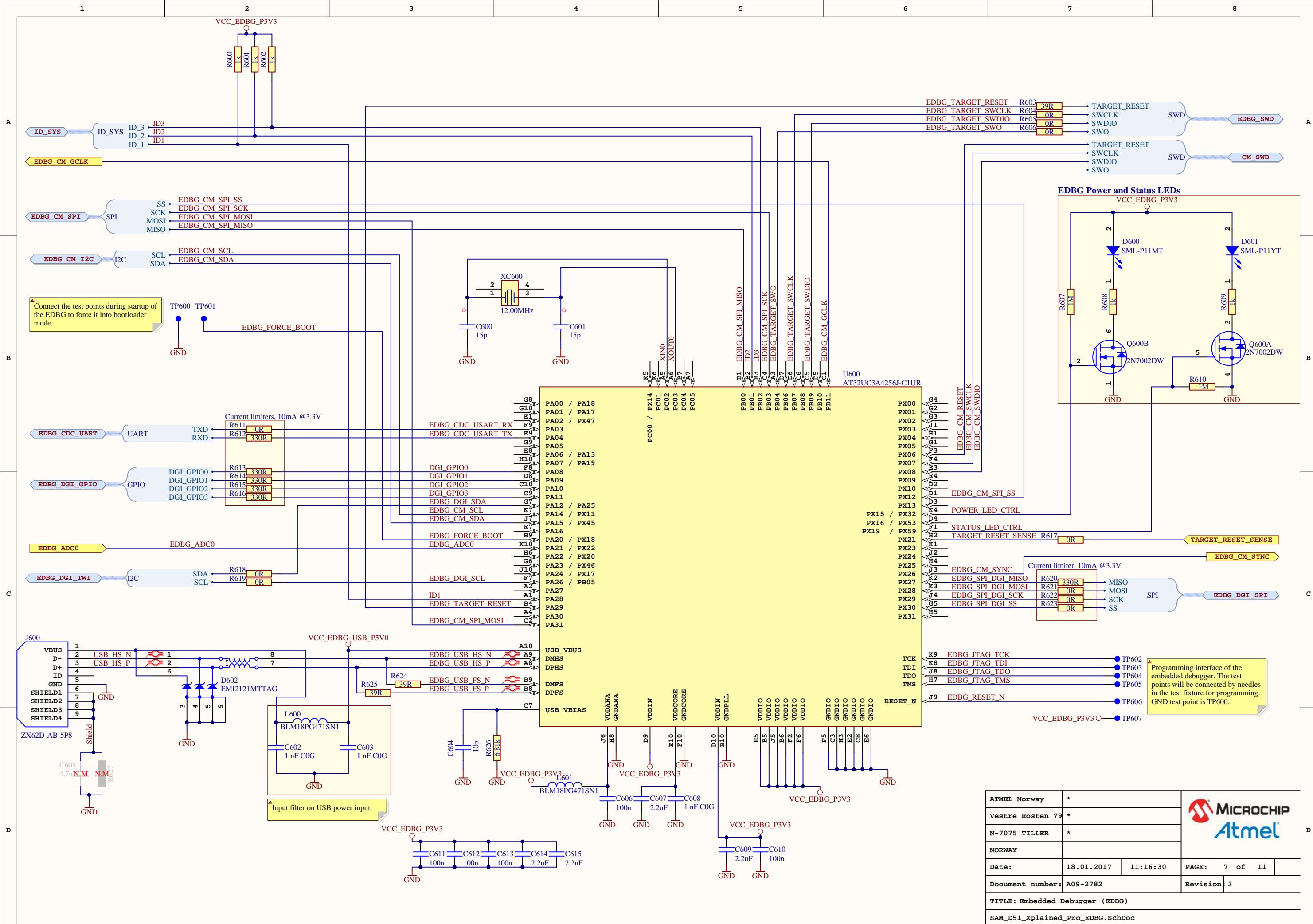


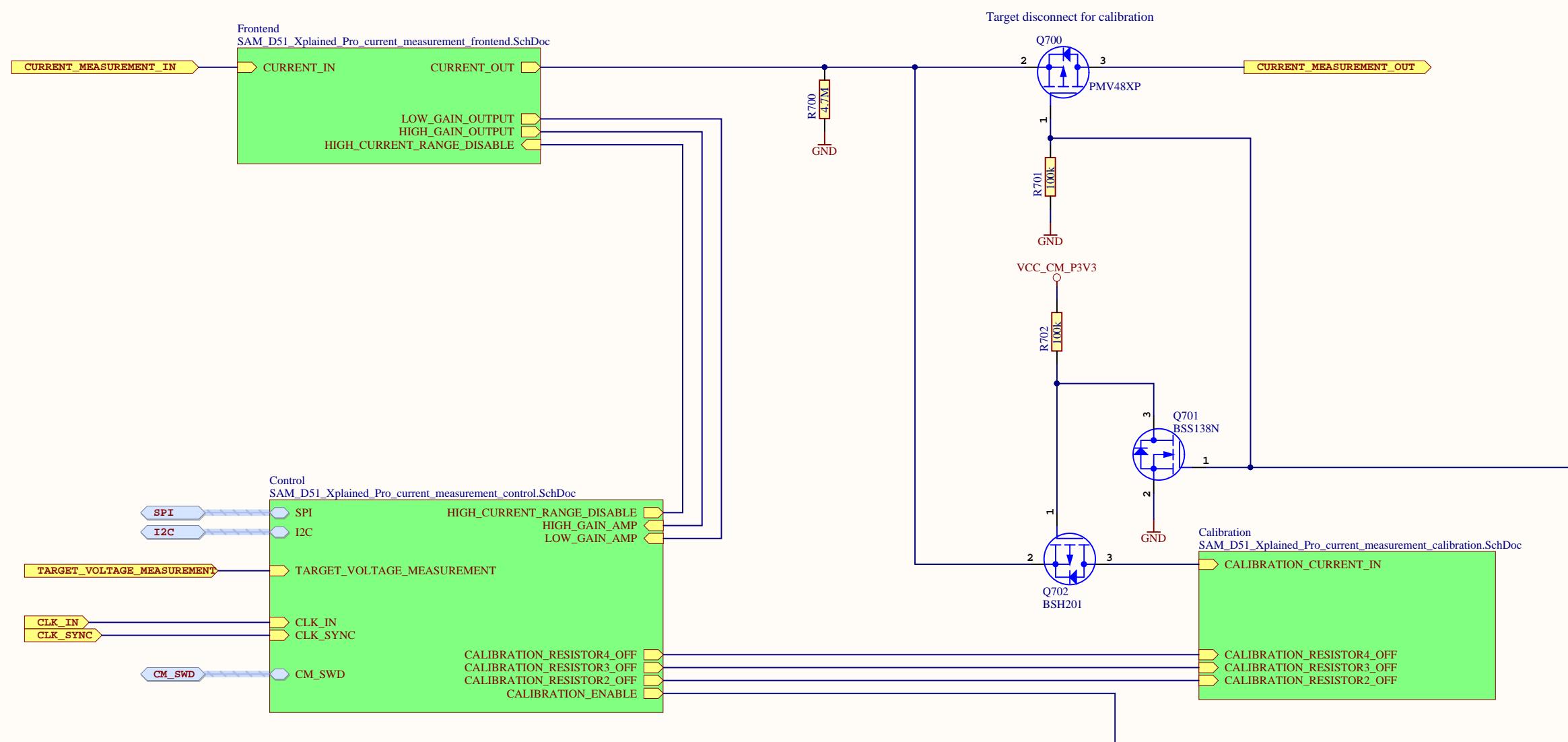




▲ C/D is connected to GND when a card is placed into the socket.
W/P is connected to GND when the write protect slider is in protect position.

ATMEL Norway	*		
Vestre Rosten 79	*		
N-7075 TILLER	*		
NORWAY			
Date:	18.01.2017	11:16:30	PAGE: 6 of 11
Document number:	A09-2782		Revision: 3
TITLE: Memory			
SAM_D51_Xplained_Pro_Memory.SchDoc			





ATMEL Norway	*		
Vestre Rosten 79	*		
N-7075 TILLER	*		
NORWAY			
Date:	18.01.2017	11:16:30	PAGE: 8 of 11
Document number:	A09-2782	Revision 3	
TITLE: Current measurement			
SAM_D51_Xplained_Pro_current_measurement.SchDoc			

A

A

B

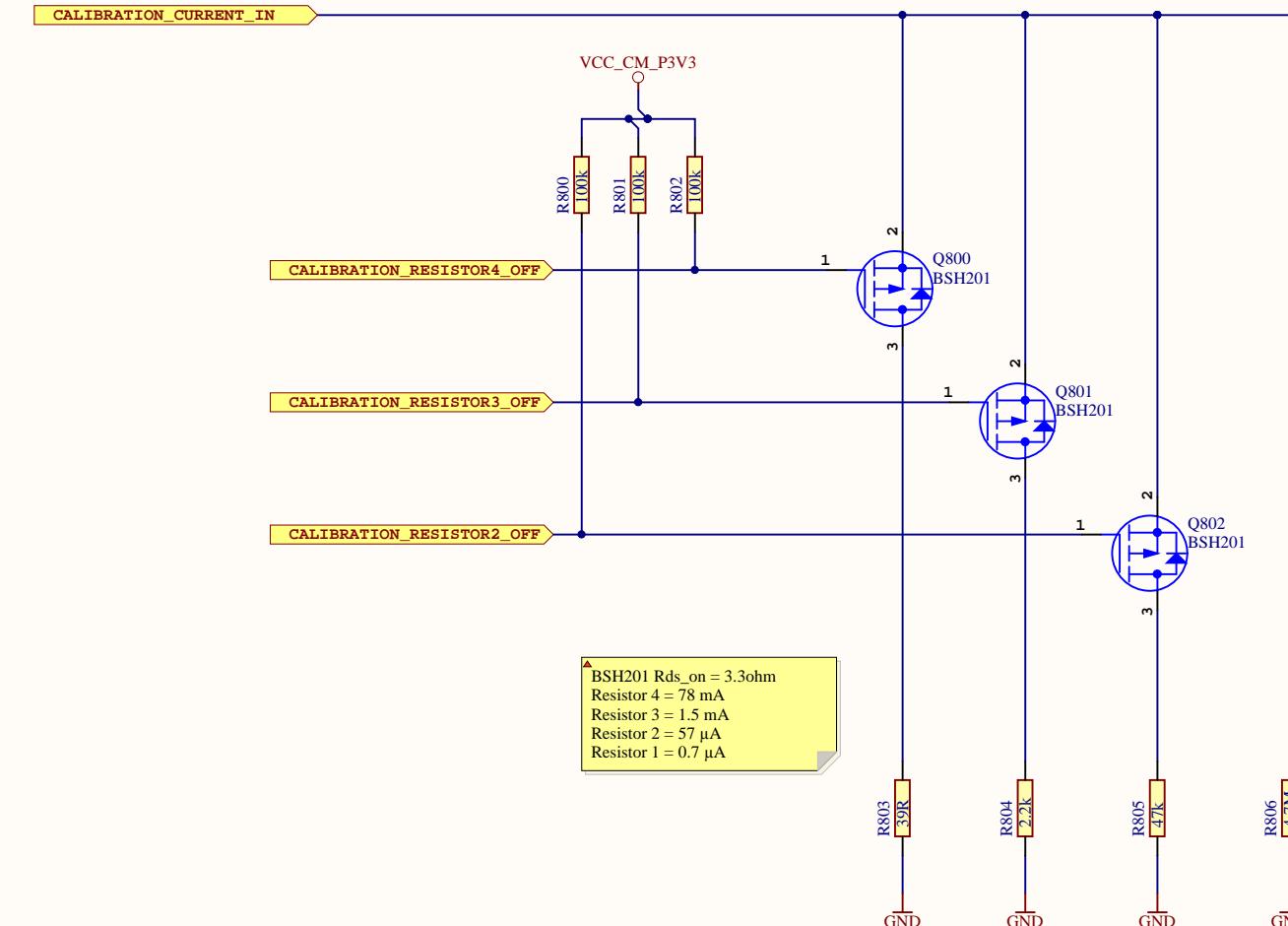
B

C

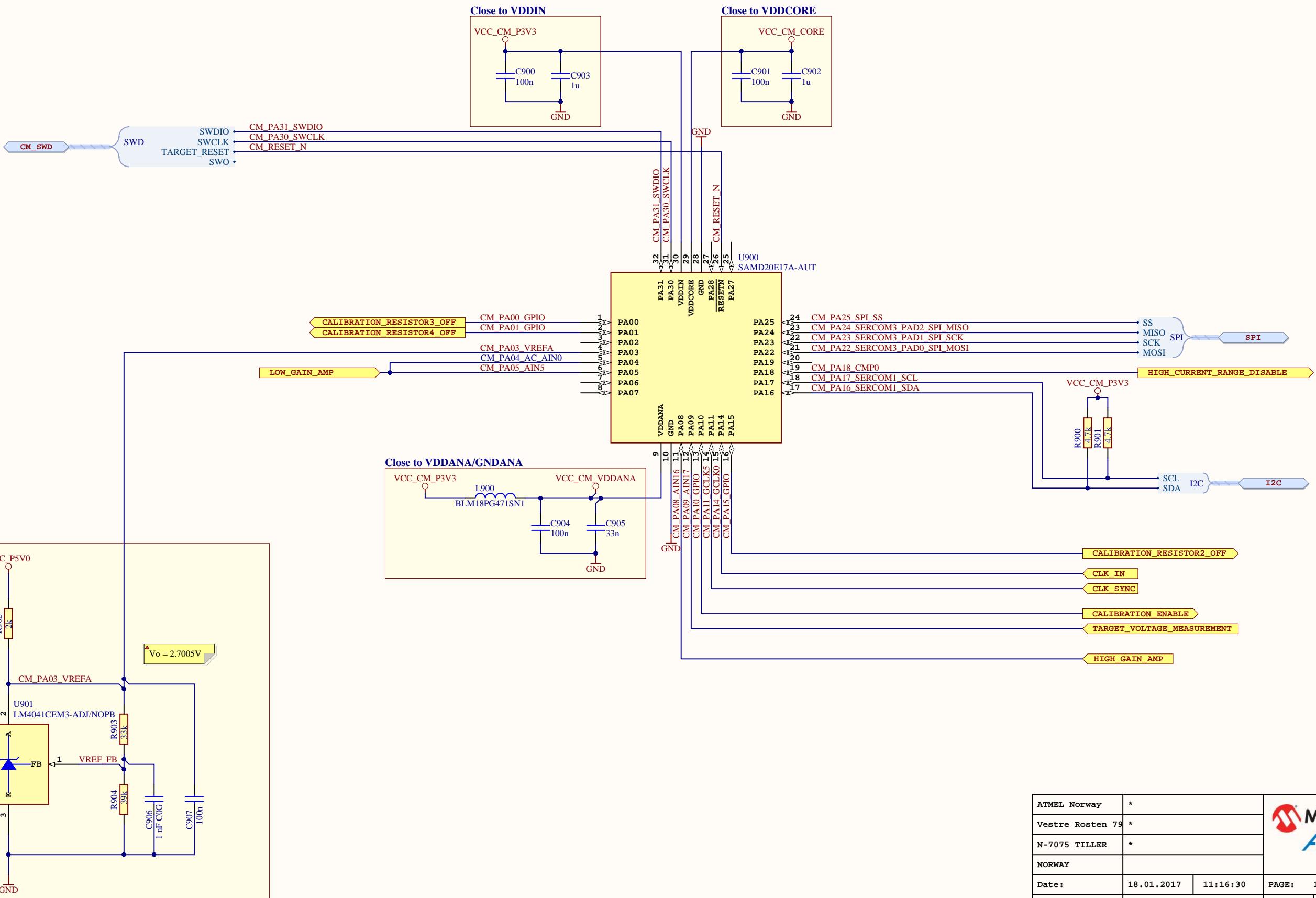
C

D

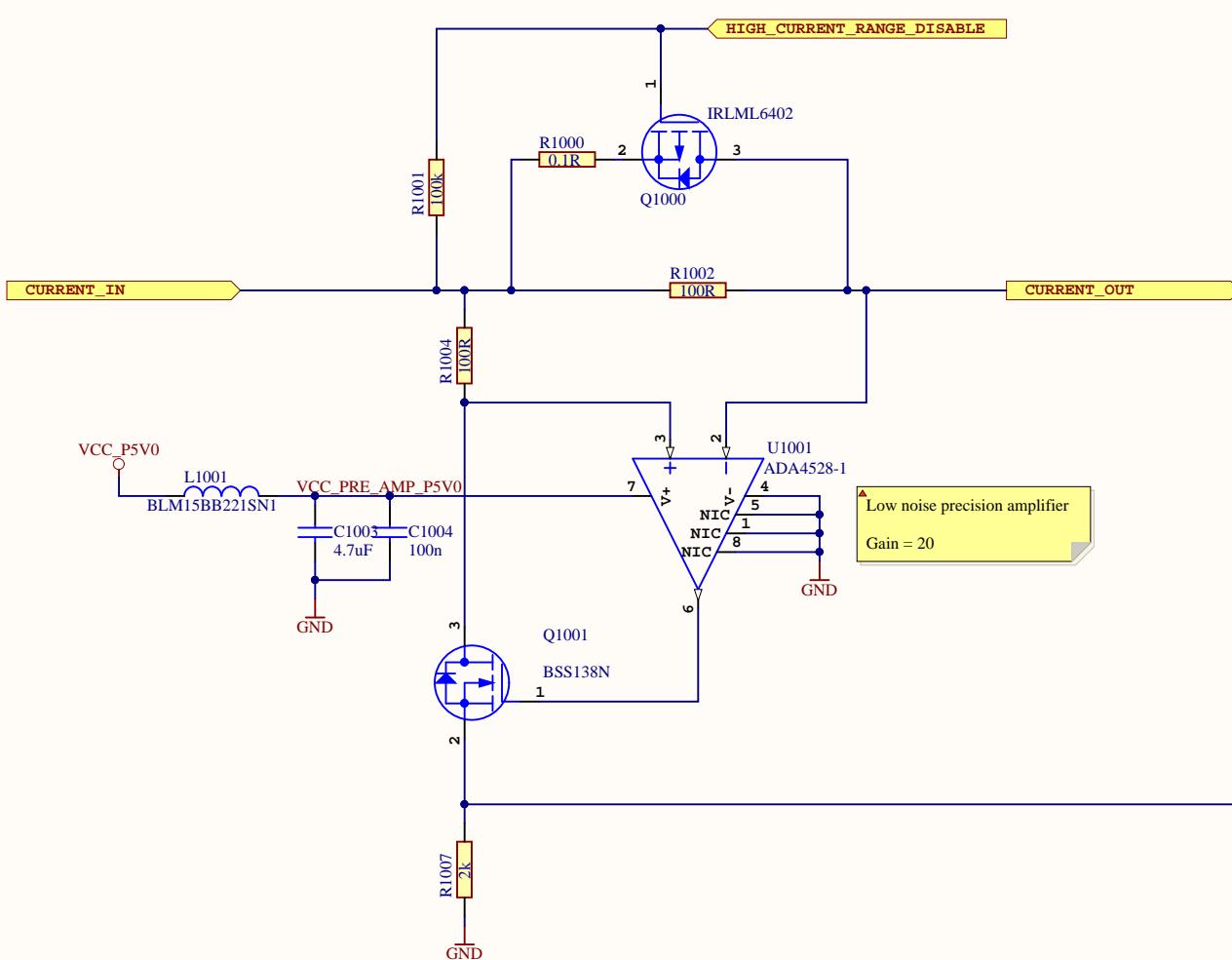
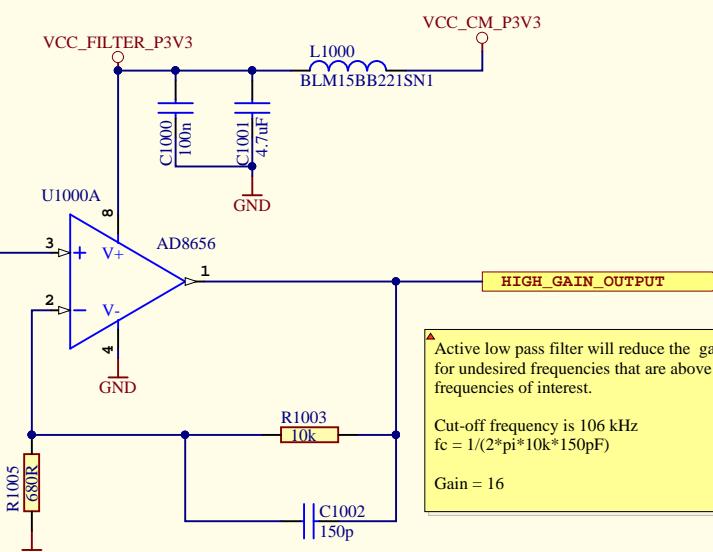
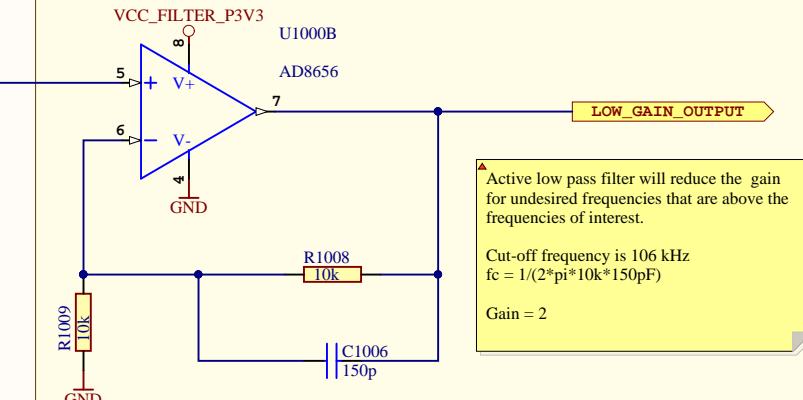
D



ATMEL Norway	*	
Vestre Rosten 79	*	
N-7075 TILLER	*	
NORWAY		
Date:	18.01.2017	11:16:30
Document number:	A09-2782	Revision 3
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SAM_D51_Xplained_Pro_current_measurement_calibration.SchDoc		

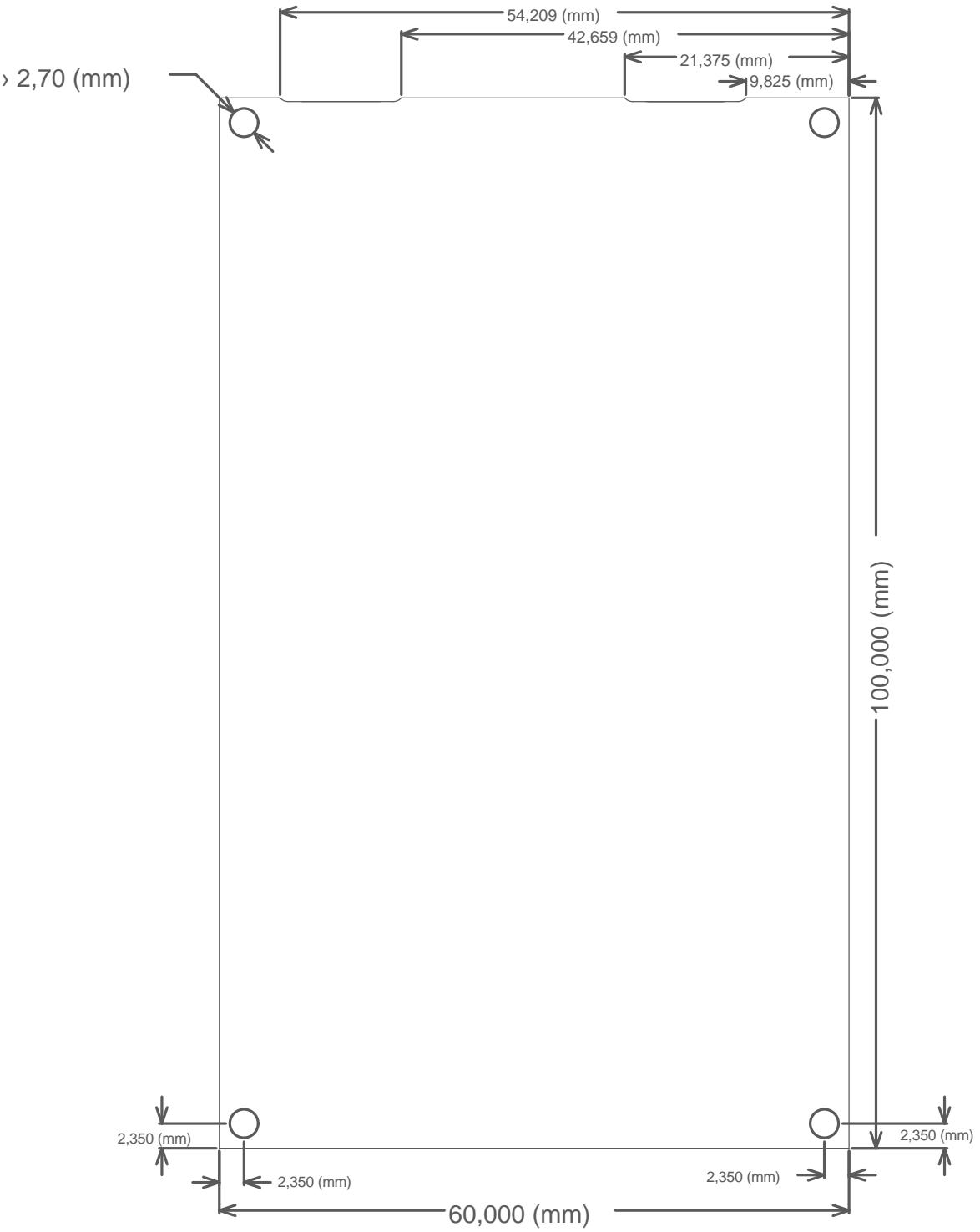


ATMEL Norway	*		
Vestre Rosten 79	*		
N-7075 TILLER	*		
NORWAY			
Date:	18.01.2017	11:16:30	PAGE: 10 of 11
Document number:	A09-2782	Revision	3
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SAM_D51_Xplained_Pro_current_measurement_control.SchDoc			

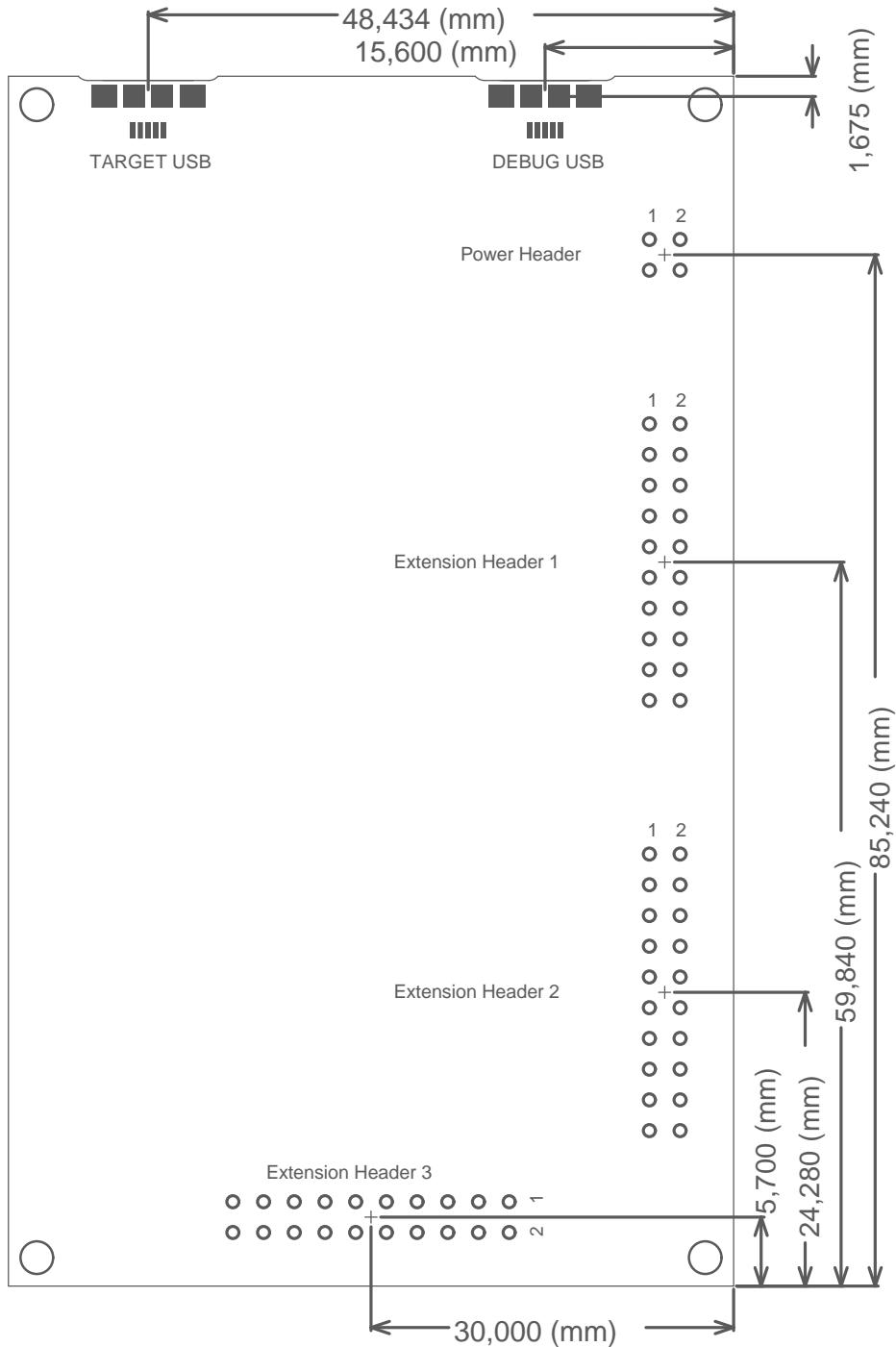
**Active low pass filter with gain****Active low pass filter with gain**

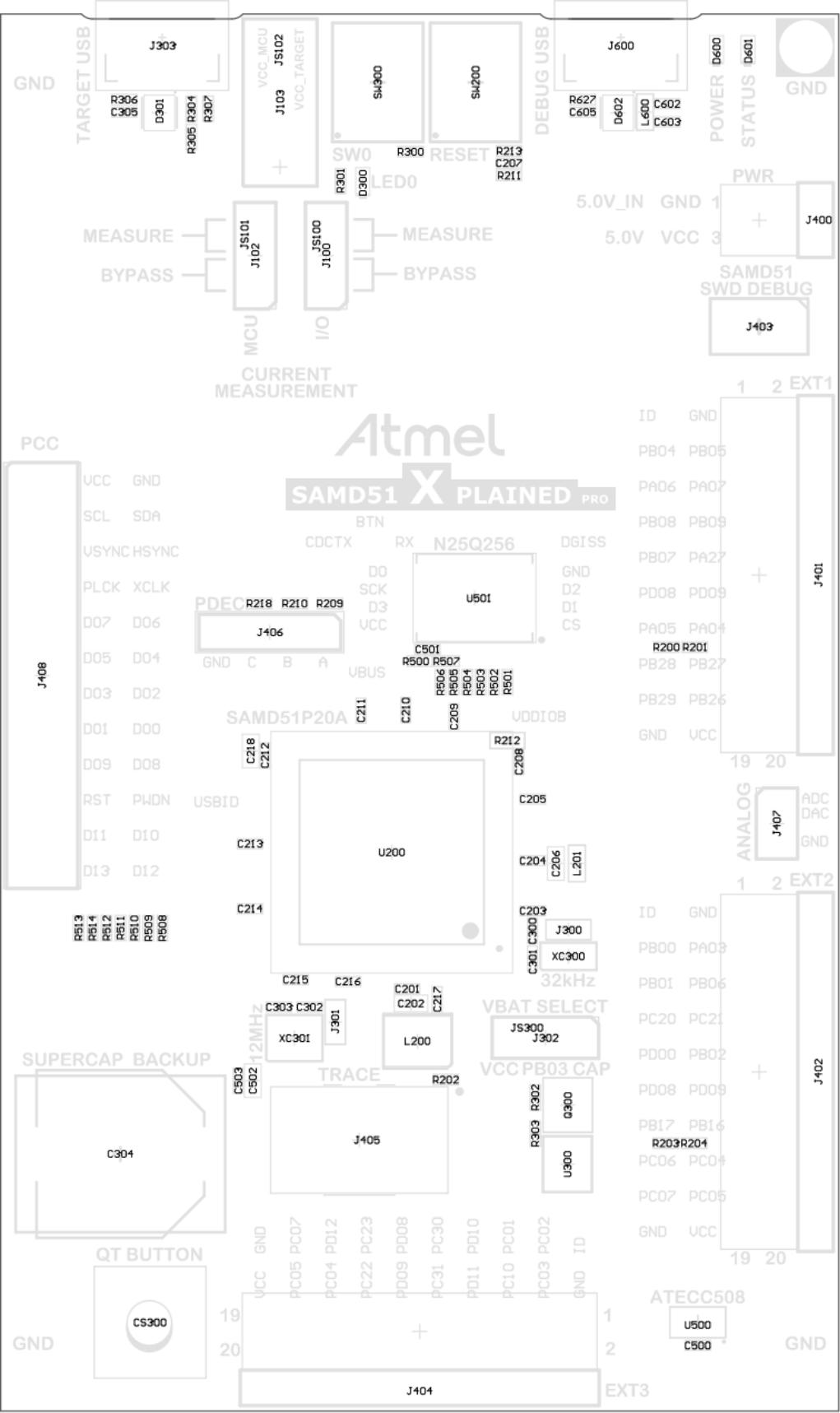
ATMEL Norway	*	
Vestre Rosten 79	*	
N-7075 TILLER	*	
NORWAY		
Date:	18.01.2017	11:16:30
Document number:	A09-2782	Revision 3
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SAM_D51_Xplained_Pro_current_measurement_frontend.SchDoc		

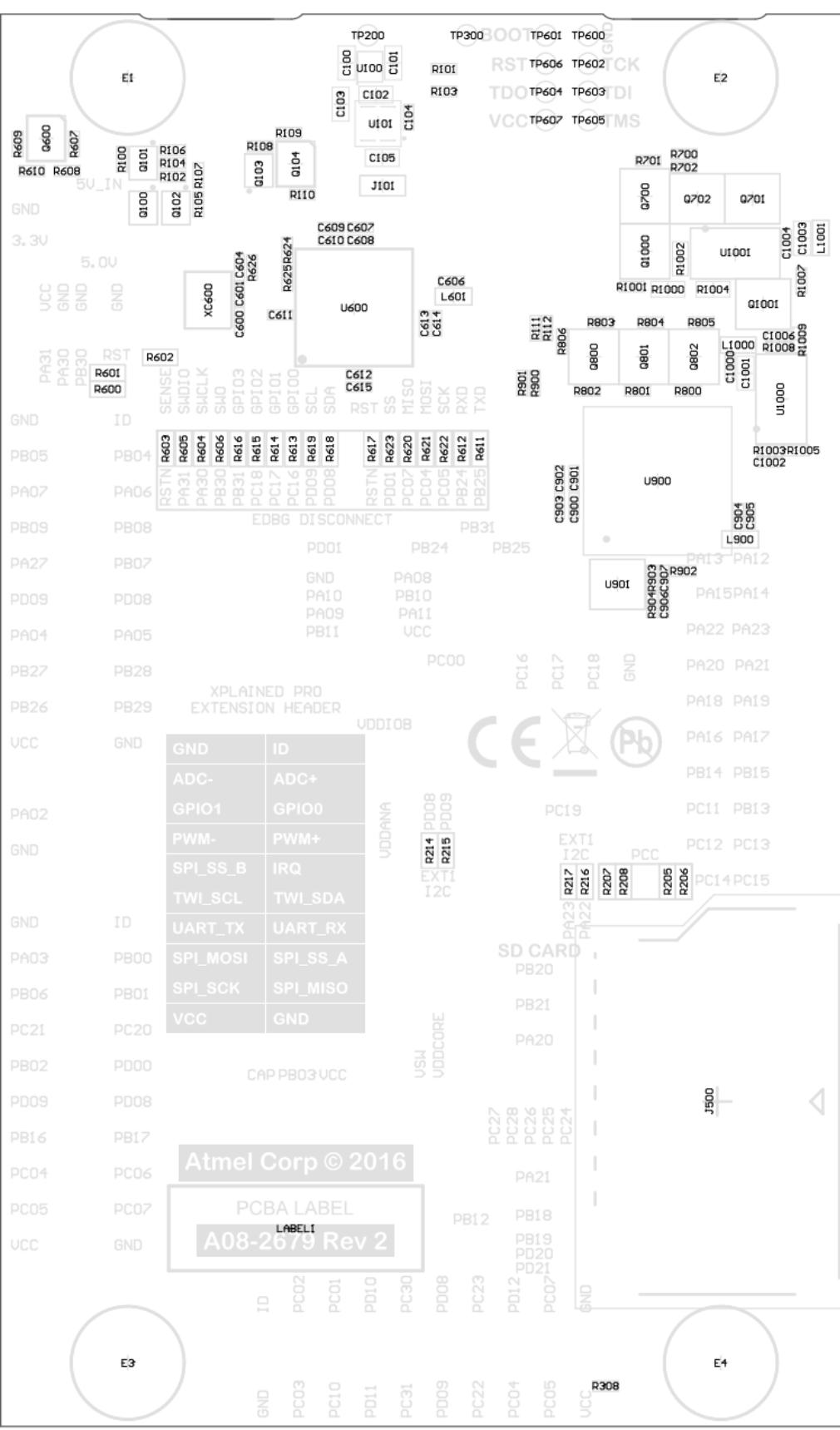
Mechanical Dimensions

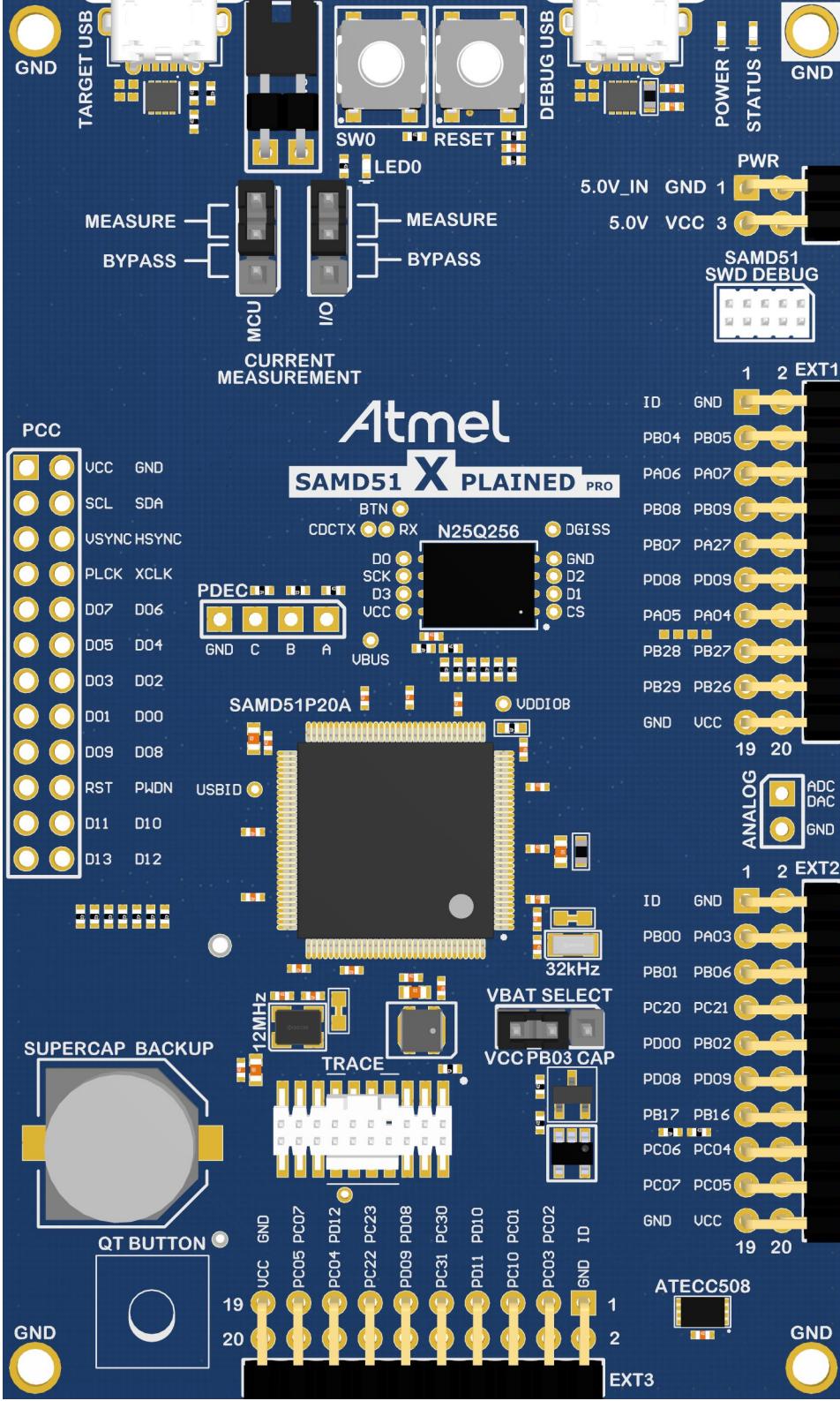


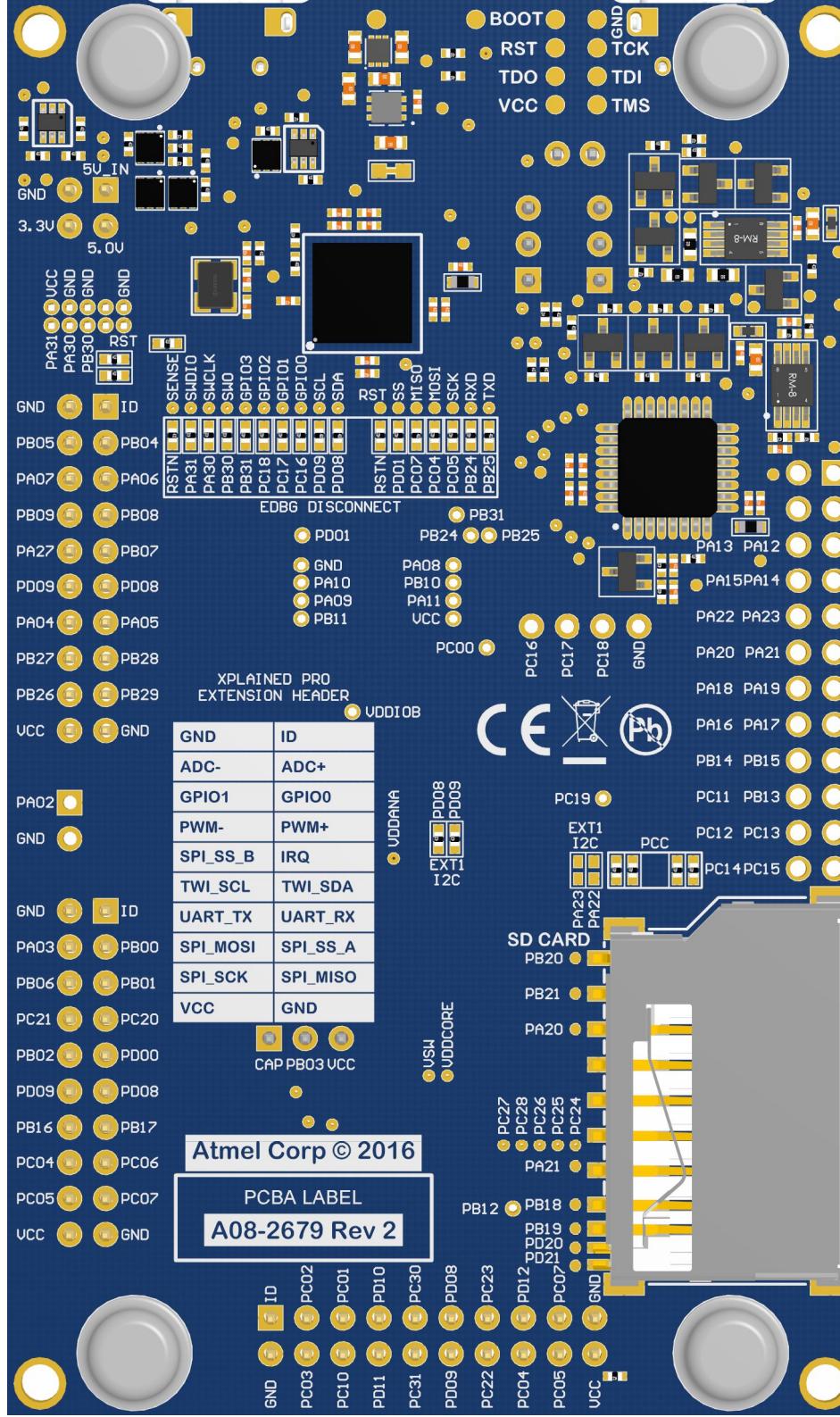
Connector Placement

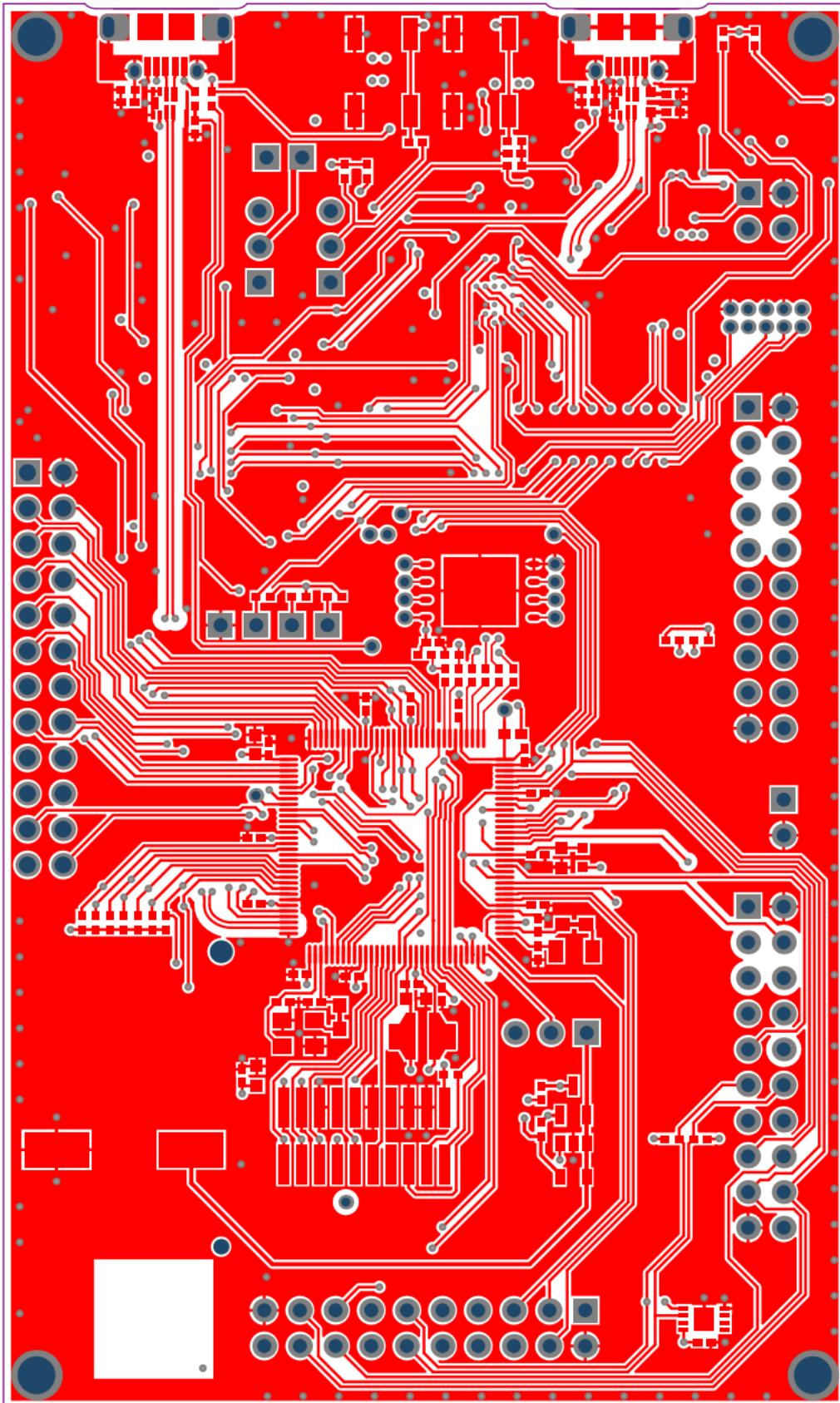


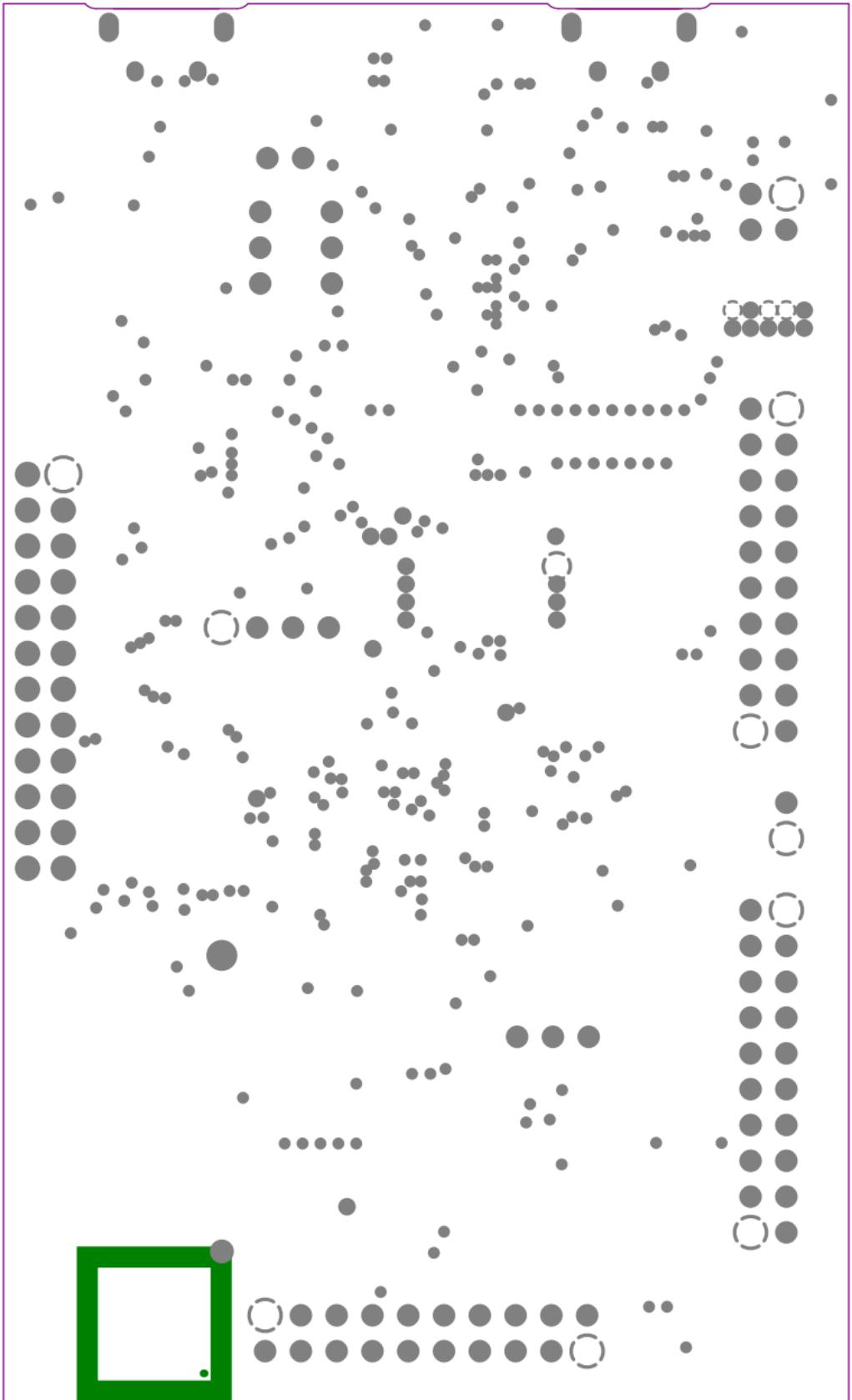


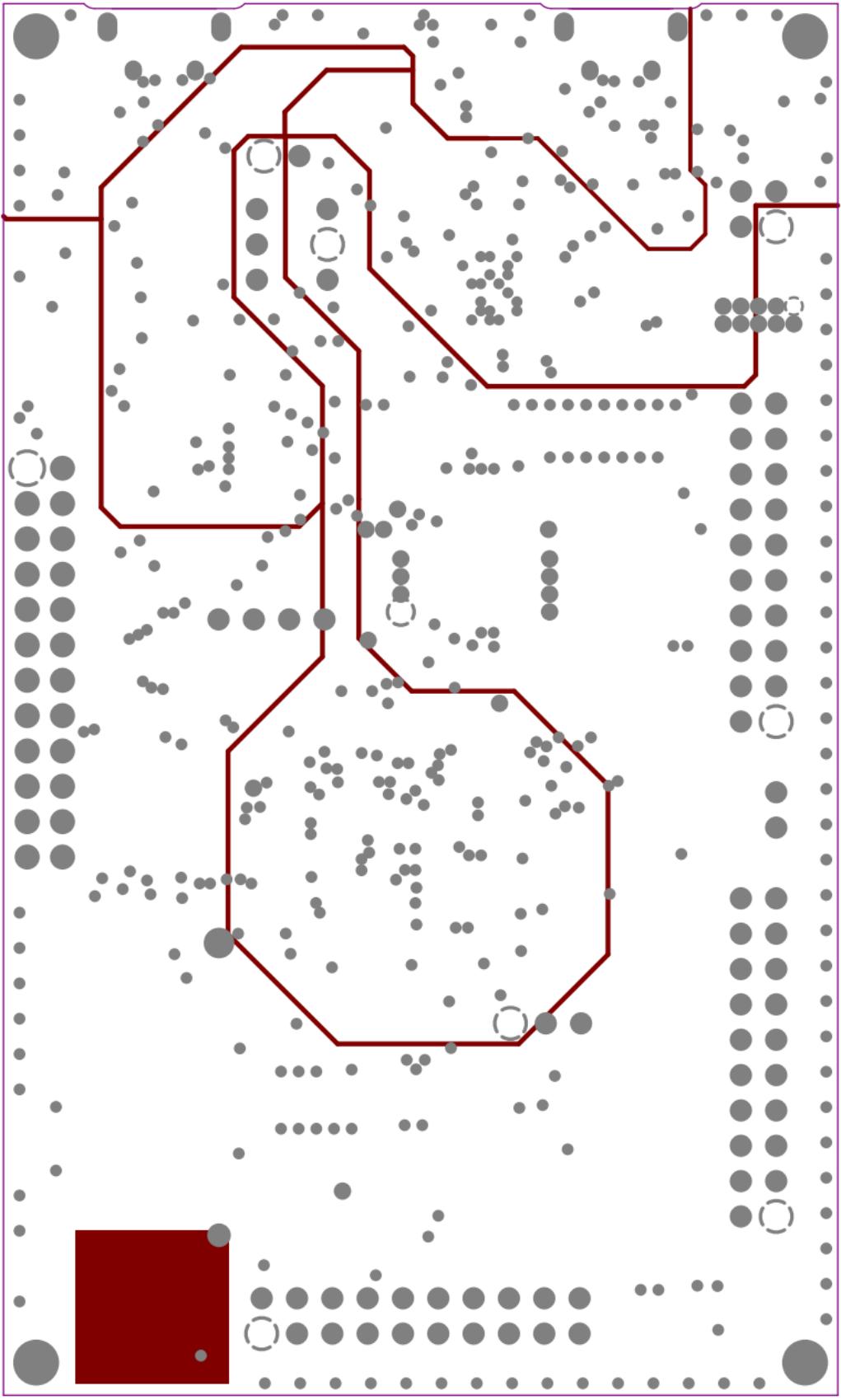


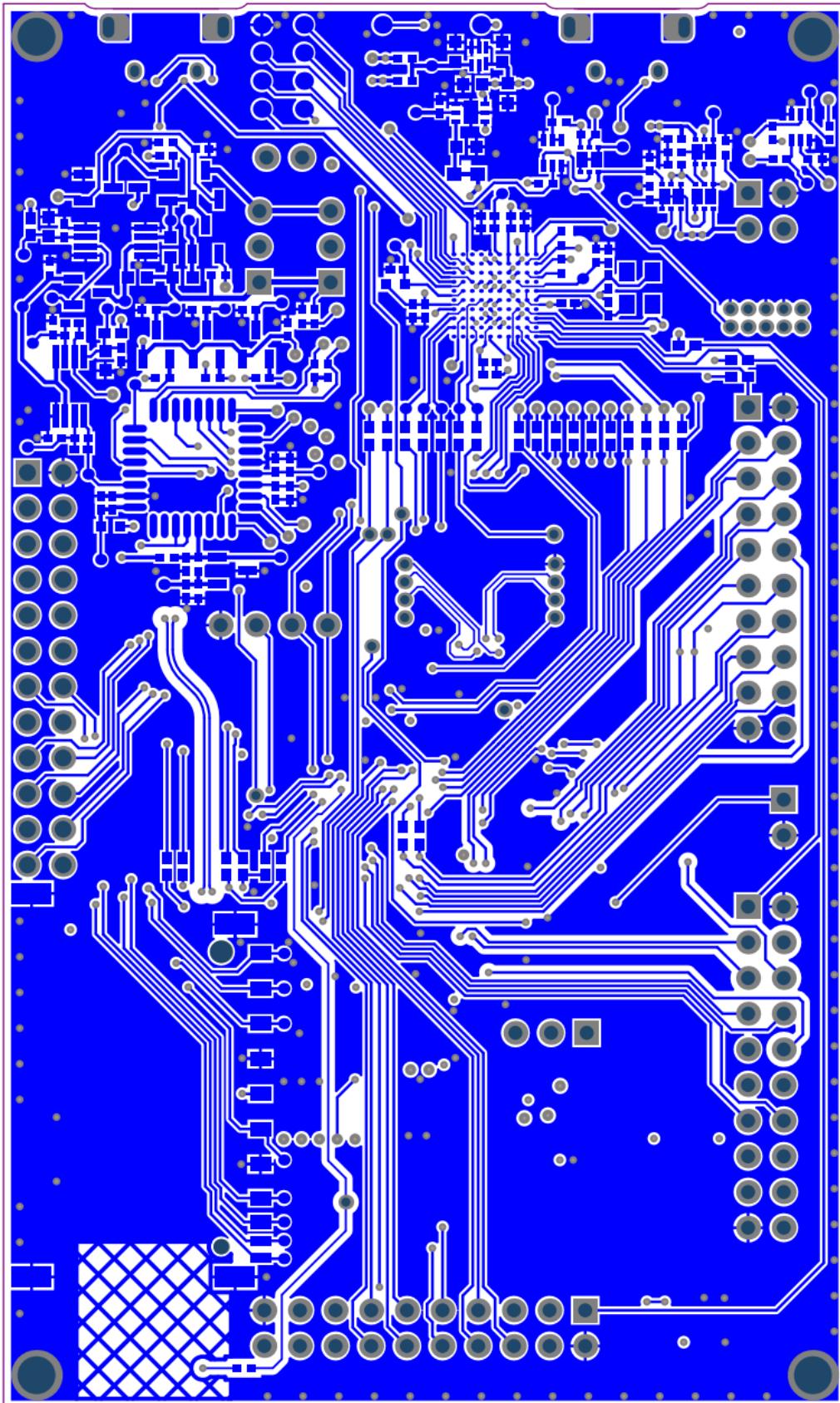












Component list

Bill of Materials Fitted For Variant [Default_assembly] of Project [SAM_D51_Xplained_Pro.PrjPCB] (No PCB Document Selected)



MICROCHIP

Source Data From:

SAM_D51_Xplained_Pro.PrjPCB

Project:

SAM_D51_Xplained_Pro.PrjPCB

Variant:

Default_assembly

Report Date: 18.01.2017 11:17:37
Print Date: 18.01.2017 11:12:54

Fitted	Designator	Quantity	Value	Manufacturer	MPN	Description
Fitted	C100, C101, C102, C202, C1001, C103	6	4.7uF	WALSIN Technology Corporation	0603X475K100CT	Ceramic capacitor, SMD 0603, X5R, 10V, 10% (d31036)
Fitted	C1002, C1006	2	150p	YAGEO CORP	CO0402KRX7R9BB151	Ceramic capacitor, SMD 0402, X7R, 50V, +/-10%
Fitted	C103, C105	2	22u/10V	Murata	GRM188R61A226ME15D	Ceramic capacitor, SMD 0603, X5R, 10V, +/-20%
Fitted	C104	1	10n	YAGEO CORP	CO0402KRX7R8BB103	Ceramic capacitor, SMD 0402, X7R, 25V, +/-10%
Fitted	C201, C203, C204, C205, C208, C209, C210, C211, C212, C213, C214, C215, C216, C217, C500, C501, C503, C606, C610, C611, C612, C613, C900, C901, C904, C907, C1000, C1004	28	100n	Kemet	CO402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C206, C218, C502	3	10uF/10V	AVX	0603D2106MAT2A	Ceramic capacitor, SMD 0603, X5R, 10V, 10uF A± 20%
Fitted	C207	1	4.7n	PHYCOMP	2238 587 15632	Ceramic capacitor, SMD 0402, X7R, 25V, +/-10% (de35287)
Fitted	C300, C301, C600, C601	4	15p	AVX	04025A150JA72A	Ceramic capacitor, SMD 0402, NPO, 50V, +/-5%
Fitted	C302, C303	2	50F	Murata	GRM155GC1H9R0CA01D	Ceramic capacitor, SMD 0402, NPO, +/-0.250F
Fitted	C304	1	47mF	Kemet	FOC0474ZFC-TB24	Electric Double-Layer (Supercapacitor), 5.5V, 47mF, SMD 10.5mm diameter, 50l ² ESR
Fitted	C602, C603, C608, C906	4	1nF/C0G	Murata	GRM155C1H102JA01D	Ceramic capacitor, SMD 0402, COG, 50V, +/-5%
Fitted	C904	1	10p	AVX	04025A100JA72A	Ceramic capacitor, SMD 0402, NPO, 50V, +/-5%
Fitted	C607, C609, C614, C615	4	2.2uF	Kemet	CO402C225MBPAC	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-20%
Fitted	C902, C903	2	1u	Kemet	CO402C105K9PAC	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-10% (de26942)
Fitted	C905	1	33n	Murata	GRM155R7E33KA88D	Ceramic capacitor, SMD 0402, X7R, 25V, +/-10%
Fitted	D300, D601	2	SML-P11YT	ROHM	SML-P11YT-T86	LED, SMD 0402, Yellow, Wave length=586nm, 7.6mcd @ (1mA, 1.9Vt)
Fitted	D301, D602	2	EMB121MTTAG	ON Semiconductor	EMB121, SZEM121 Single Pair Common Mode Filter with ESD Protection	
Fitted	D600	1	SML-P11MT	ROHM	SML-P11MT-T86	LED, SMD 0402, Green, Wave length=569nm, 2.1mcd @ (1mA, 1.9Vt)
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	ESCAPEC	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, J102, J302	3	HMTSW-103-23-F-S-237	SAMTEC	HMTSW-103-23-F-S-237	
Fitted	J103	1	Pin header 1x2 right angle	Pro-data International Corp	2213R-2G	1x3 pin header, 2.54mm pitch, Pin-in-Paste THM, 1mm hole
Fitted	J303, J600	2	ZX62D-AB-5PB	HIROSE	ZX62D-AB-5PB(30)	1x2 pin header, right angle, 2.54 mm pitch, through-hole
Fitted	J400	1	P101-202RGF-139-ND	Pro-data International Corp	P101-202RGF-139-ND	Micro USB AB Connector, Standard SMT + DIP
Fitted	J401, J402, J404	3	P101-210RGF-139-ND	Pro-data International Corp	P101-210RGF-139-ND	Rn header, 2x2, Right Angle, 2.54mm, THT, Pin In Paste
Fitted	J403	1	RINHEADER 2x5	Garry	176-2010-07-XS0-0730	Rn header, 2x10, Right Angle, 2.54mm, THM, Pin In Paste
Fitted	J405	1	FTSH-110-01-F-DV-007-K	SAMTEC	FTSH-110-01-F-DV-007-K	2x5 pin header, 1.27mm pitch, THM
Fitted	J500	1	SDMMC socket	Amphenol	101007064	SAMTEC FTSH series 50-mm header, shrouded, pin 7 removed, SMD SDMMC socket, 2.85mm, push-pull, SMD
Fitted	JS100, JS101, JS102, JS300	4	SNT-100-BK-G	SAMTEC	SNT-100-BK-G	Jump cap for 2.54mm pinheader
Fitted	L1000, L1001	2	BLM15BB221SN1	Murata	BLM15BB221SN1	SMD RF inductor 0402, Z=2200ohm (@ 800MHz), Max R(d)=0.800hm, Max current=200mA
Fitted	L200	1	LQHNPNN100M0	Murata	LQHNPNN100M0	10uH power inductor, Isat = 560mA, Itemp = 710mA, Rdc = 0.360ohm
Fitted	L201, L600, L601, L900	4	BLM18PG471SN1	Murata	BLM18PG471SN1	SMD RF inductor 0603, Z=470ohm (@ 100MHz), Max R(d)=0.650hm, Max current=1A
Fitted	LABEL1	1	Label PCBa (ES)	ACT Logimark AS	505462	PCBA Label for board with ES device
Fitted	PCB1	1	SAMD61 Xplained Pro PCB documentation			SAMD51 Xplained Pro PCB documentation
Fitted	PCBADOC1	1	SAMD61 Xplained Pro PCBa documentation			SAMD51 Xplained Pro PCBa documentation
Fitted	Q100, Q101, Q102, Q103	4	DMP2160UFDB	Diodes Incorporated	DMP2160UFDB-7	MOSFET 20V 3.8A DUAL P-CHAN, Rds 70 mOhms, Vgs 12V, Vds -20
Fitted	Q104, Q600	2	2N7002DW	Fairchild	2N7002DW	Dual N-Channel MOSFET, 60V, 115mA cont,RDS(ON) < 7.5 Ohm @50mA @5V, SOT-363
Fitted	Q300, Q1000	2	IRLML6402	International Rectifier	IRLML6402PBF	P-ch. MOSFET, -30V, -3.7A continuous,RDS(ON)=0.05Ohm@VGS=-4.5V, RDS(ON)=0.09Ohm@VGS=-2.5V
Fitted	Q700	1	FMV48XP	NXP	FMV48XP215	P-Channel Digital FET, -30V, -3.5A continuous, -14A Peak, RDS(ON)=48mOhm@VGS=-4.5V, RDS(ON)=71mOhm@VGS=-2.5V, VGS(th)<1.25V
Fitted	Q701, Q1001	2	BSS138N	Infineon	BSS138N	Low leakage N-Channel MOSFET, 60V, 0.23A continuous, 0.92A Peak, RDS(ON) = 3.50mOhm@VGS=4.5V, VGS(th)<1.4V
Fitted	Q702, Q800, Q801, Q802	4	BSH201	NXP	BSH201,215	P-Channel Digital FET, -60V, -0.3A continuous, -1.2A Peak, RDS(ON)=2.5@VGS=10V, RDS(ON)=5 ohm @VGS=2.5V, VGS(th)<1.9
Fitted	R100, R102, R104, R105, R106, R107, R108, R109, R211, R500, R507, R509, R510, R511, R512, R701, R702, R800, R801, R802, R1001	21	100k	ASJ	CR10-1003-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R1000	1	0.1R	vishay	WSL0603R1000FEA	WSL0603R1000FEA, metal strain resistor, 0.1 Ohm, +/-1%, 0603 SMD, 1/10 W, TEMPCO +7 ppm/°C
Fitted	R1002, R1004	2	100R	Panasonic	ERA3YEB101V	ERA-3YEB101V, metal film, 100R A±0.1%, resistor in 0603 at 100mW, TEMPCO A±25ppm/°C, Max V=75V
Fitted	R1005	1	680R	ASJ	CR10-6800-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R101, R103	2	0R	(n/a)	RMC0402270R00	RES 0.0 OHM 1/16W 0402 SMD
Fitted	R110, R111, R112, R305, R805	5	47k	KOA	RK73H1ETP4702F	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R202, R301, R303, R608, R609	5	1k	ASJ	CR10-1001-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R203, R204	2	3.6k	(n/a)	RMC0402270R00	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R205, R206, R207, R208, R212, R214, R215, R604, R605, R606, R611, R617, R618, R619, R621, R622, R623	17	0R	(n/a)	RMC0402270R00	RES 0.0 OHM 1/16W 0402 SMD
Fitted	R209, R210, R218, R308, R508, R513, R514, R1003, R1008, R1009	10	10k	vishay	CROW040210K0FKED	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R213, R300, R624, R625, R803	5	39R	ASJ	CR10-39R0-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R302	1	220R	ASJ	CR10-220R-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R304	1	30k	ASJ	CR10-3002-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R307	1	330R	ASJ	CR10-3300-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R501, R502, R503, R504, R505, R506	6	33R	ASJ	CR10-33R0-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R600, R601, R602	3	1k	ASJ	CR10-1001-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R603	1	39R	ASJ	CR10-39R0-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R607, R610	2	1M	ASJ	CR10-1004-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R612, R613, R614, R615, R616, R620	6	330R	ASJ	CR10-3300-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R626	1	6.81k	vishay	CROW04026K81FKED	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R700, R806	2	4.7M	YAGEO CORP	RC0402FR-074M7	Thick film SMD 0402 1/16W 1%
Fitted	R804	1	2.2k	ASJ	CR10-2201-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R900, R901	2	4.7k	PHY COMP	2322.706_74702L	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R902, R1007	2	2k	(n/a)	CR10-3300-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R903	1	33k	ASJ	CR10-3302-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R904	1	39k	ASJ	CR10-3902-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	SW200, SW300	2	SKRAAKED010	ALPS	SKRAAKED010	6.6x6.2 mm SMD tact switch, same as A08-0091 but less force is needed
Fitted	TEST1	1	SAMD61 Xplained Pro eggTest			SAMD51 Xplained Pro eggTest
Fitted	TEST1DOC1	1	SAMD61 Xplained Pro Test Instructions			SAMD51 Xplained Pro Test Instructions
Fitted	U100	1	TLV70033DSE	Texas Instruments	TLV70033DSE	LDO, 200 mA, Iq<1 uA, Vdo=250mV, Vout=3.3V, VIN=2 V to 5.5V, SON-6 package
Fitted	U1000	1	AD8656	Analog Devices	AD8656ARMZ	AD8656, dual low noise precision OpAmp, rail-to-rail low offset 250uV, GBP=28 MHz, 8MSOP
Fitted	U1001	1	ADA4528-1	Analog Devices	ADA4528-1ARMZ	Precision OpAmp, Zero-Drift 0.015uV/K, ultra low noise 5.6nV/sqr(Hz), Vo=20uV, GBW=4MHz, single supply 2.2V to 5.5V or dual supply +1V to +2.75V, rail to rail, unity gain stable
Fitted	U101	1	TPS7353DRV	Texas Instruments	TPS7353DRV	Low noise LDO, 500 mA, Vout=3.3V, 2% accuracy, IQ=6uA, noise=28uVRms, VIN= 2.7V to 6.5V, Vdo=280mV, stable with low ESR capacitor
Fitted	U200	1	ATSAMD61P20A	ATMEL	ATSAMD61P20A-ANTES	Atmel 32-bit RISC M0U
Fitted	U300	1	BUT265SG-TR	ROHM	BUT265SG-TR	Single, Low Voltage (1.8-5.5V), Low Power (0.35uA), low cost
Fitted	U500	1	ATEC0508A_I2C_UDFN	ATMEL	ATEC0508A_MA1HD-A-T	ATEC0508A with an I2C Interface and a 8 Pin UDFN Package with Paddle
Fitted	U501	1	N250256A13EF840	Micron	N250256A13EF840	256 Mbit (32Mb) QSPI Flash, 3.3V, 10MHz, V-PDN5-B (8x6mm)
Fitted	U600	1	AT32UC3A4256J-C1UR	ATMEL	AT32UC3A4256J-C1UR	AVR 32-bit RISC MCU, 3.3V, 10MHz, V-PDN5-B (8x6mm)
Fitted	U800	1	SAMD20E17A-AUT	ATMEL	ATSAMD20E17A-AUT	Atmel 32bit RISC MCU 32 pin
Fitted	U801	1	LM4041CBM-B-ADJNOPB	Texas Instruments	LM4041CBM-B-ADJNOPB	Adjustable shunt voltage regulator, 1.24 to 10V out
Fitted	XC300	1	32.768kHz	Kyocera Crystal Device Corporation	ST3215SB32768EDHPWB	Kyocera ST3215SB32768EDHPWB, 32.768kHz, 9pF, SMD tuning fork crystal
Fitted	XC301, XC600	2	12.00MHz	Kyocera Crystal Device Corporation	CX3225CA1200000KPC1, CX3225CA1200000KPC1	Kyocera CX3225CA, 12MHz, 8pF, AEC-Q200, SMD crystal, Kyocera CX3225CA1200000KPC1, 12MHz, 12pF, SMD crystal
Not Fitted	C305, C605	0	4.7n	PHY COMP	2238 587 15632	Ceramic capacitor, SMD 0402, X7R, 25V, +/-10%
Not Fitted	J406	0	HMTSW-104-23-F-S-237	SAMTEC	HMTSW-104-23-F-S-237	1x4 pin header, 2.54mm pitch, Pin-in-Paste TH-M
Not Fitted	J407	0	HMTSW-102-23-F-S-237	SAMTEC	HMTSW-102-23-F-S-237	1x2 pin header, 2.54mm pitch, Pin-in-Paste TH-M
Not Fitted	J408	0	HMTSW-112-23-F-D-237	SAMTEC	HMTSW-112-23-F-D-237	2x12 pin header, 2.54mm pitch, Pin-in-Paste TH-M
Not Fitted	R200, R201	0	1.8k	(n/a)	RMC0402270R00	Thick film resistor, SMD 0402, 1/16W, 1%
Not Fitted	R216, R217	0	0R	(n/a)	RMC0402270R00	RES 0.0 OHM 1/16W 0402 SMD
Not Fitted	R306, R627	0	1M	ASJ	CR10-1004-FK	Thick film resistor, SMD 0402, 1/16W, 1%