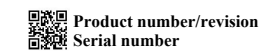
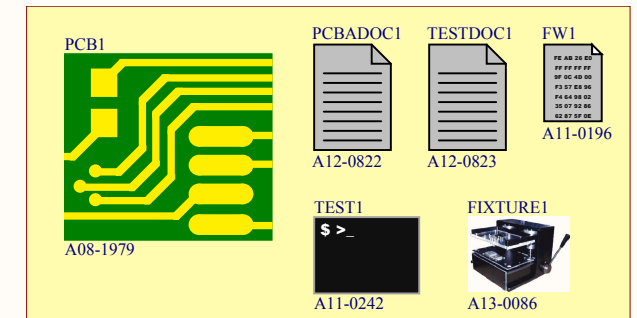


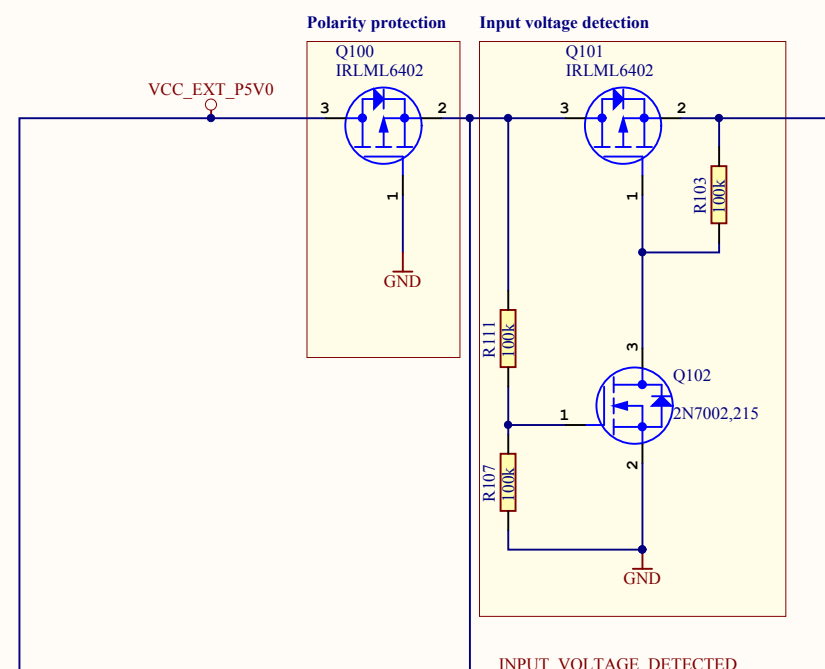
LABEL1



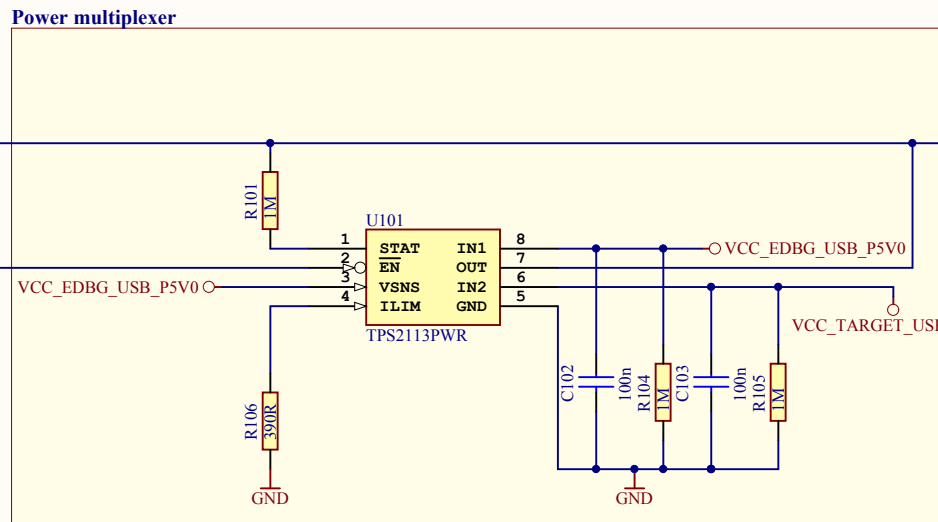
Label PCBA



ATMEL Norway	*			
Vestre Rosten 79	*			
N-7075 TILLER	*			
NORWAY				
Date:	28.09.2015	11:16:33	PAGE: 1 of 5	
Document number:	A09-2178		Revision	3
TITLE: Top Level Schematics				
SAMD11_Xplained_Pro_TopLevel.SchDoc				

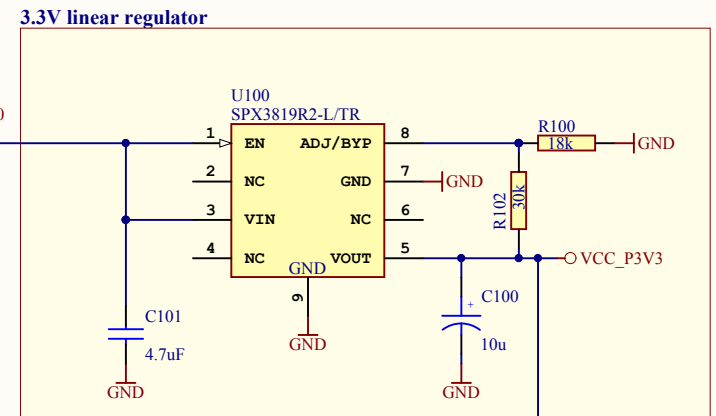


Each FET in the power path has a R_{DSon} of $<50m\Omega$ at $V_{GS} = -5V$ with a current of up to 20A. That means we can expect a maximum voltage drop across the FETs of 50mV@500mA, 100mV@1A and 200mV@2A.



The current through this switch is limited with the 390 Ohms resistor to $I_L = 250/R_{limit} = 641$ mA. This is a typical value and according to the datasheet we can expect a minimum of 510 mA and a maximum of 800 mA.

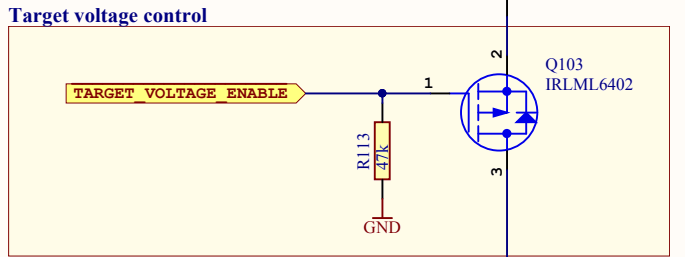
The switch (TPS2113A) has an on-resistance of typically 84 mOhm (and maximal 110mOhm).



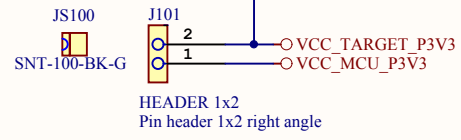
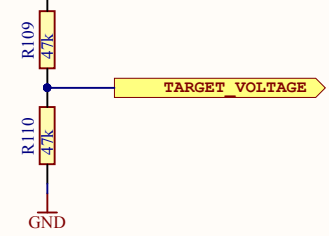
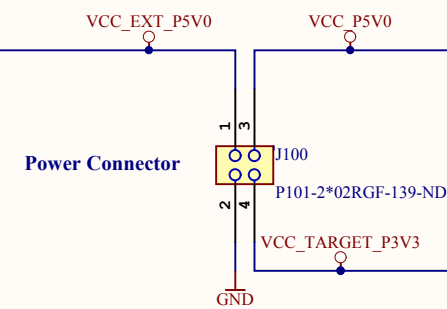
Exar 500mA low noise LDO voltage regulator

Low noise: 40uV
Accuracy 1%
Dropout 340mV at full load
Quiescent current 90 uA
Current limit 800 mA
Thermal shutdown

$V_{OUT} = 1.235V * (1 + R1/R2) = 1.235V * (1 + 30k/18k) = 3.293V$



For current measurements of the target MCU remove this jumper and connect a measurement instrument.



Power inputs to the Xplained PRO:
VCC_EXT_P5V0
 This power input can be used to power the whole board and it has a higher priority as the USB power inputs.

VCC_EDBG_USB_P5V0
 EDBG USB power input. This supply is used when VCC_EXT_P5V0 is not present.

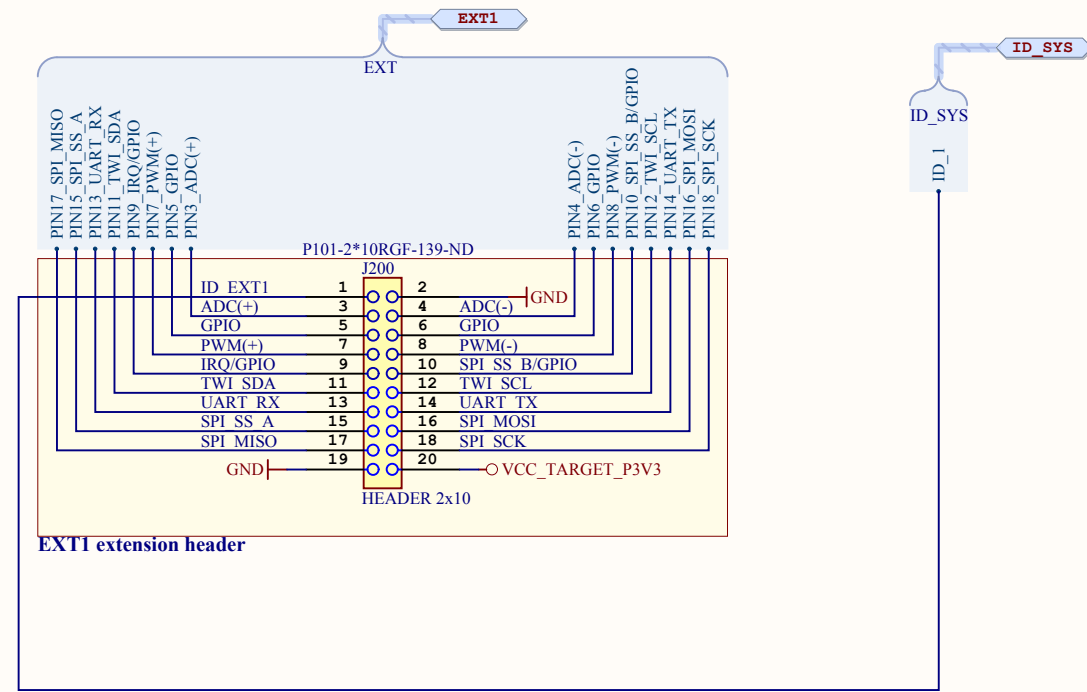
VCC_TARGET_USB_P5V0
 Target MCU USB power input. It is used to power the whole board when no other 5V power supply is present.

Other voltages:
VCC_P5V0
 This supply is connected to either VCC_EXT_P5V0, VCC_EDBG_USB_P5V0 or VCC_TARGET_USB_P5V0, based on the availability and priority of these supplies.


VCC_P3V3
 Regulated 3.3V from VCC_P5V0

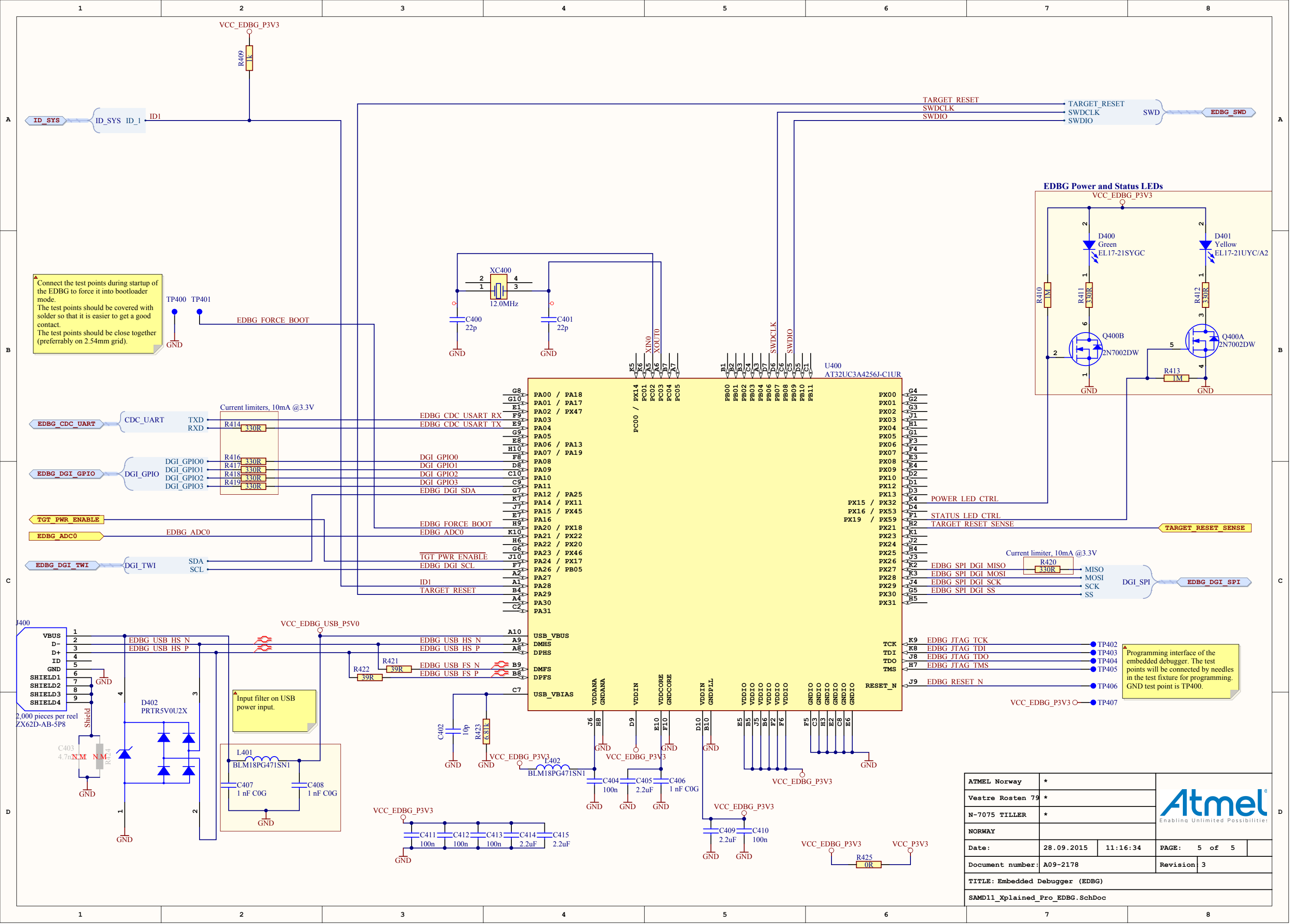
VCC_TARGET
 Target supply voltage (target MCU and peripherals)

ATMEL Norway	*			
Vestre Rosten 79	*			
N-7075 TILLER	*			
NORWAY				
Date:	28.09.2015	11:16:34	PAGE: 2 of 5	
Document number:	A09-2178		Revision:	3
TITLE: Power supply				
SAMD11_Xplained_Pro_triple_input_power_supply.SchDoc				



EXT1 extension header


ATMEL Norway	*	 Enabling Unlimited Possibilities	
Vestre Rosten 79	*		
N-7075 TILLER	*		
NORWAY			
Date:	28.09.2015	11:16:34	PAGE: 4 of 5
Document number:	A09-2178		Revision 3
TITLE: Extension connectors			
SAMD11_Xplained_Pro_Connectors.SchDoc			



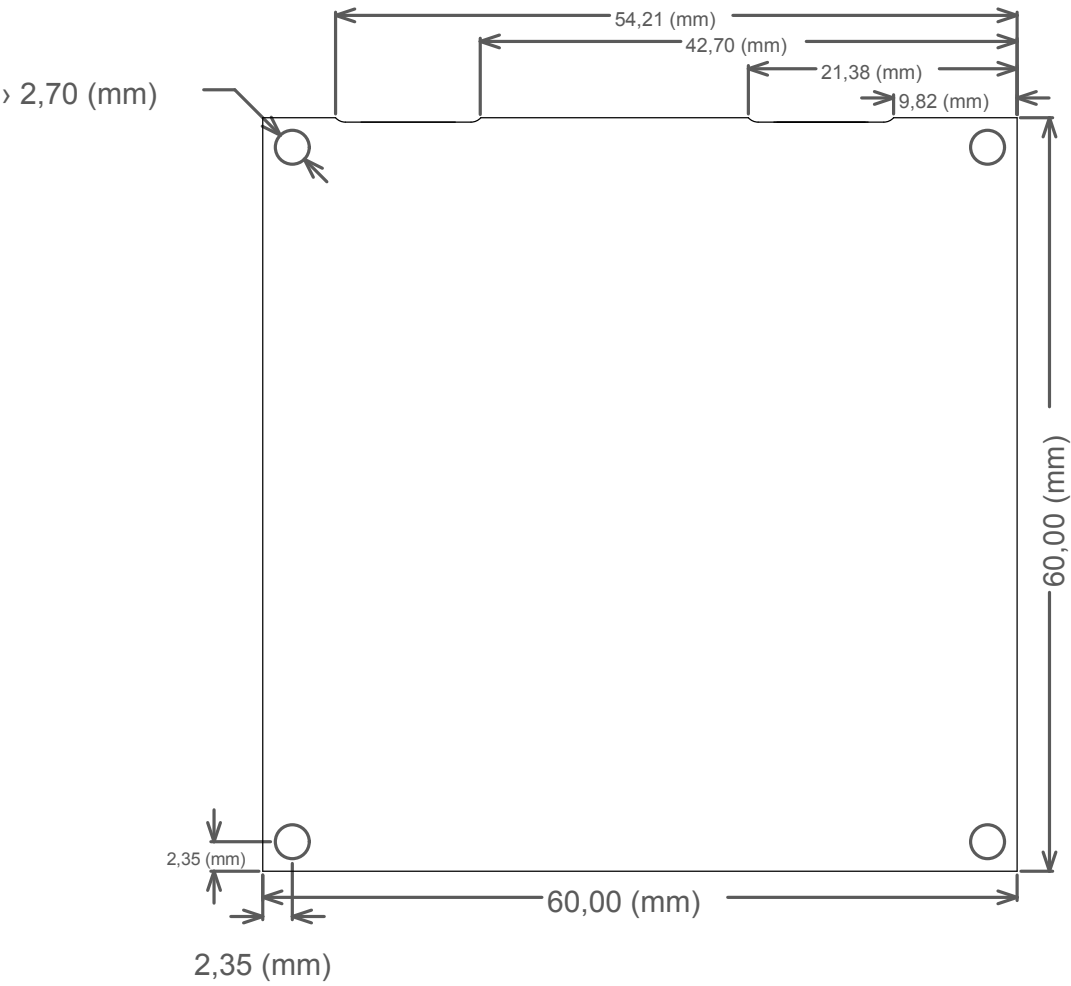
Connect the test points during startup of the EDBG to force it into bootloader mode. The test points should be covered with solder so that it is easier to get a good contact. The test points should be close together (preferably on 2.54mm grid).

Input filter on USB power input.

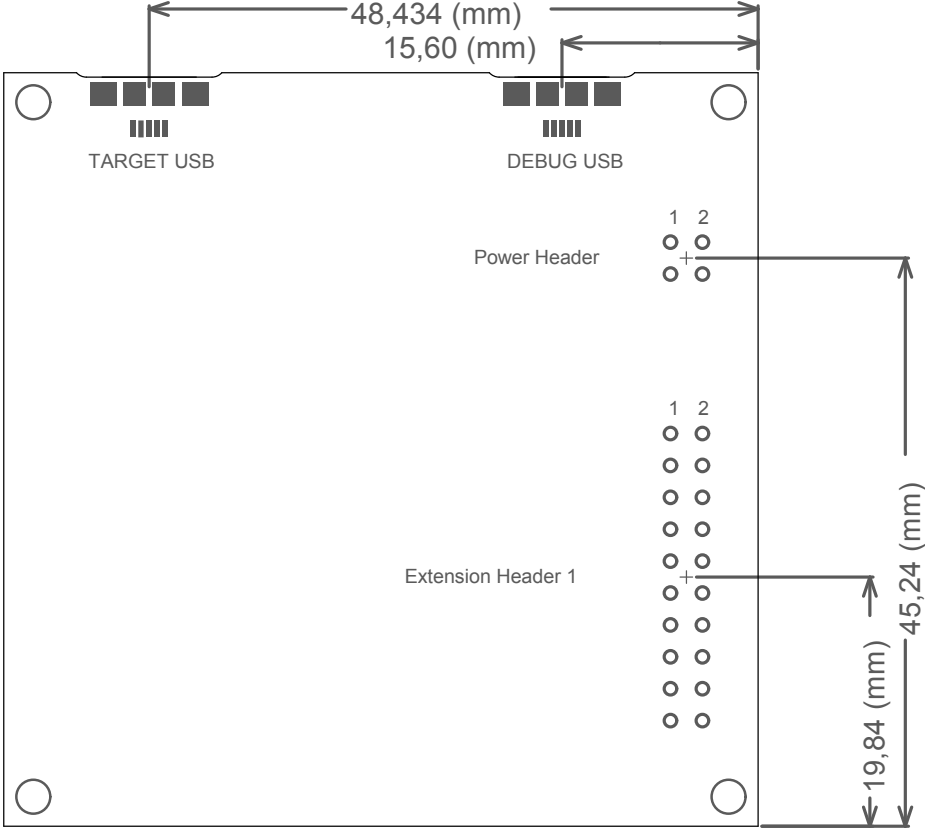
Programming interface of the embedded debugger. The test points will be connected by needles in the test fixture for programming. GND test point is TP400.

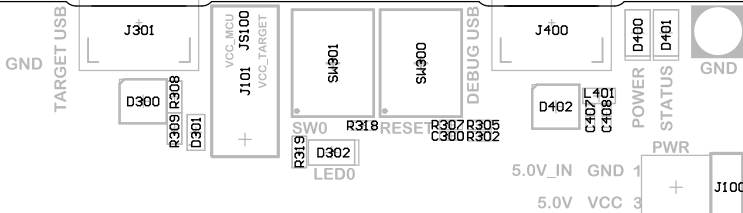
ATMEL Norway	*			 Enabling Unlimited Possibilities
Vestre Rosten 79	*			
N-7075 TILLER	*			
NORWAY				
Date:	28.09.2015	11:16:34	PAGE:	5 of 5
Document number:	A09-2178		Revision:	3
TITLE: Embedded Debugger (EDBG)				
SAM11_Xplained_Pro_EDBG.SchDoc				

Small MCU Mechanical Dimensions



Small MCU Connector Placement





Atmel

SAMD11 X PLAINED PRO

SAMD11
CORTEX DEBUG



EXT1



SAMD11D14A



R314
R313

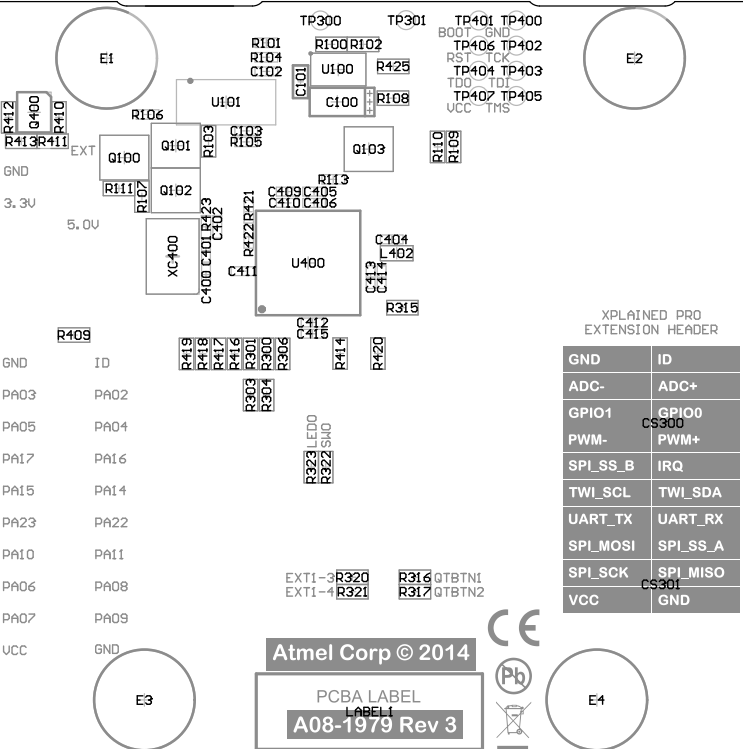
R312
R311

ID	GND	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
PA02	PA03																			
PA04	PA05																			
PA16	PA17																			
PA14	PA15																			
PA22	PA23																			
PA11	PA10																			
PA08	PA06																			
PA09	PA07																			
GND	VCC																			

J200

GND

GND



XPLAINED PRO
 EXTENSION HEADER

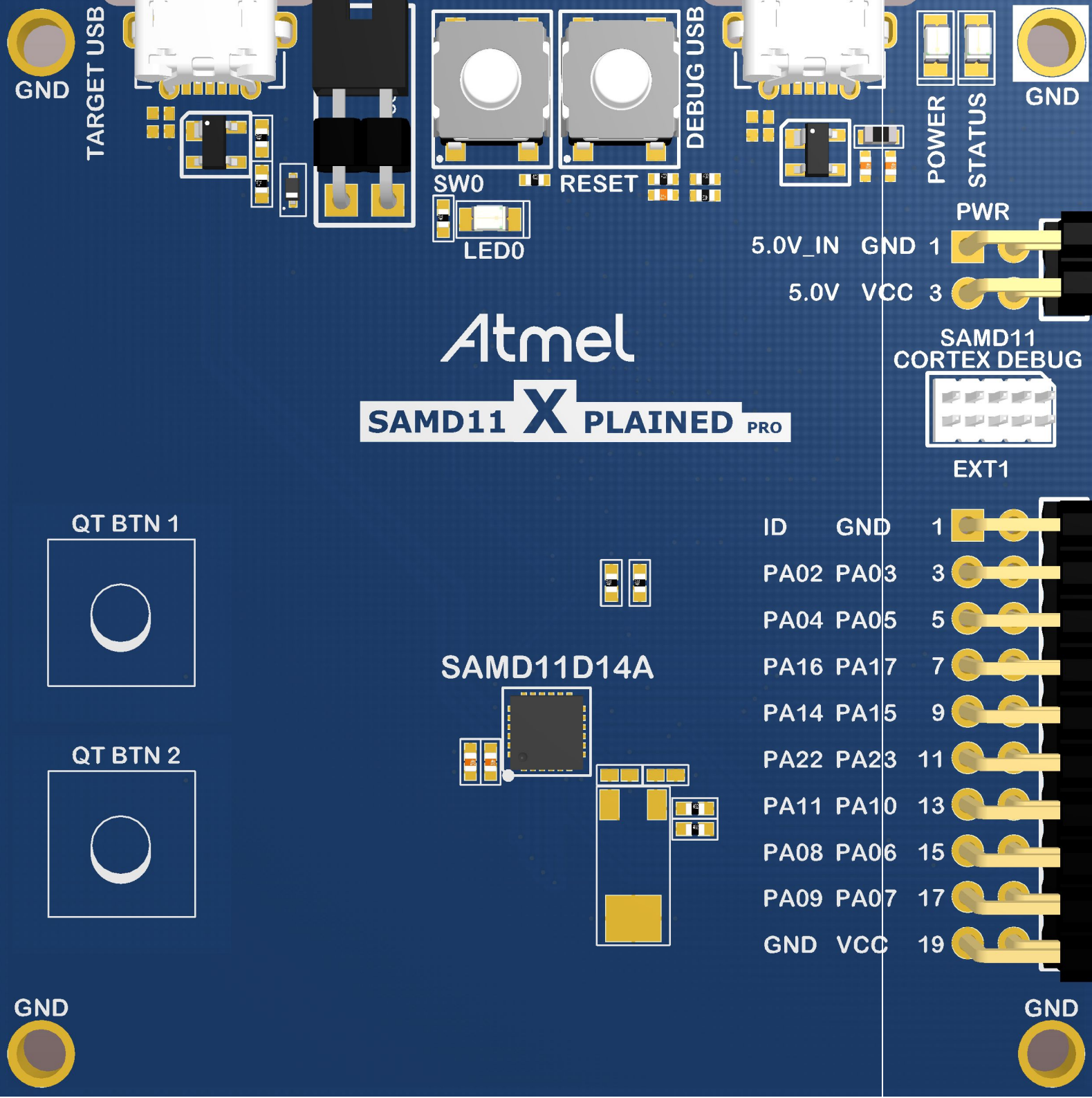
GND	ID
ADC-	ADC+
GPIO1	GPIO0
PWM-	PWM+
SPI_SS_B	IRQ
TWI_SCL	TWI_SDA
UART_TX	UART_RX
SPI_MOSI	SPI_SS_A
SPI_SCK	SPI_MISO
VCC	GND

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PCBA LABEL
 LABEL1

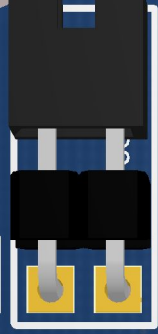
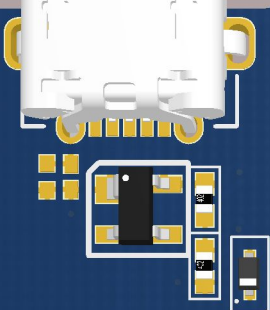
A08-1979 Rev 3





GND

TARGET USB



SW0

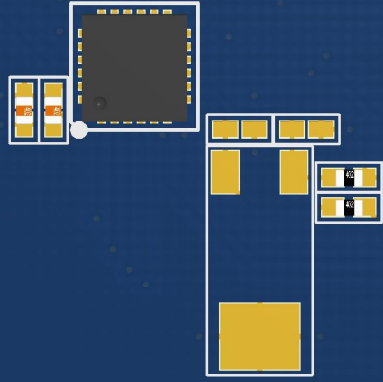
RESET

LED0

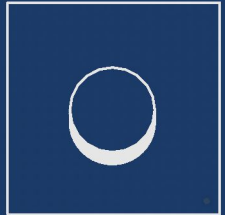
Atmel

SAMD11 X PLAINED PRO

SAMD11D14A



QT BTN 1



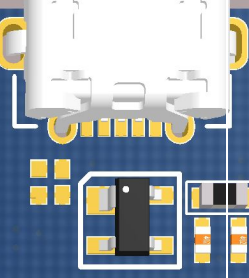
QT BTN 2



GND



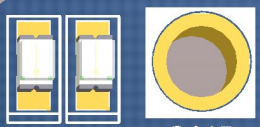
DEBUG USB



POWER

STATUS

GND



PWR

5.0V_IN GND 1

5.0V VCC 3

SAMD11 CORTEX DEBUG



EXT1

ID GND 1

PA02 PA03 3

PA04 PA05 5

PA16 PA17 7

PA14 PA15 9

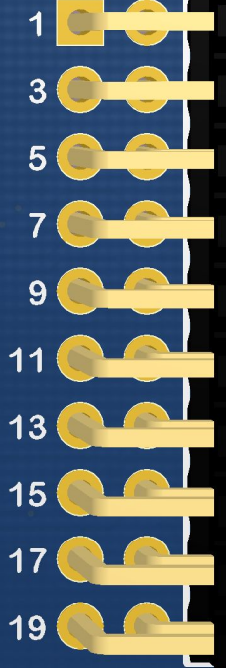
PA22 PA23 11

PA11 PA10 13

PA08 PA06 15

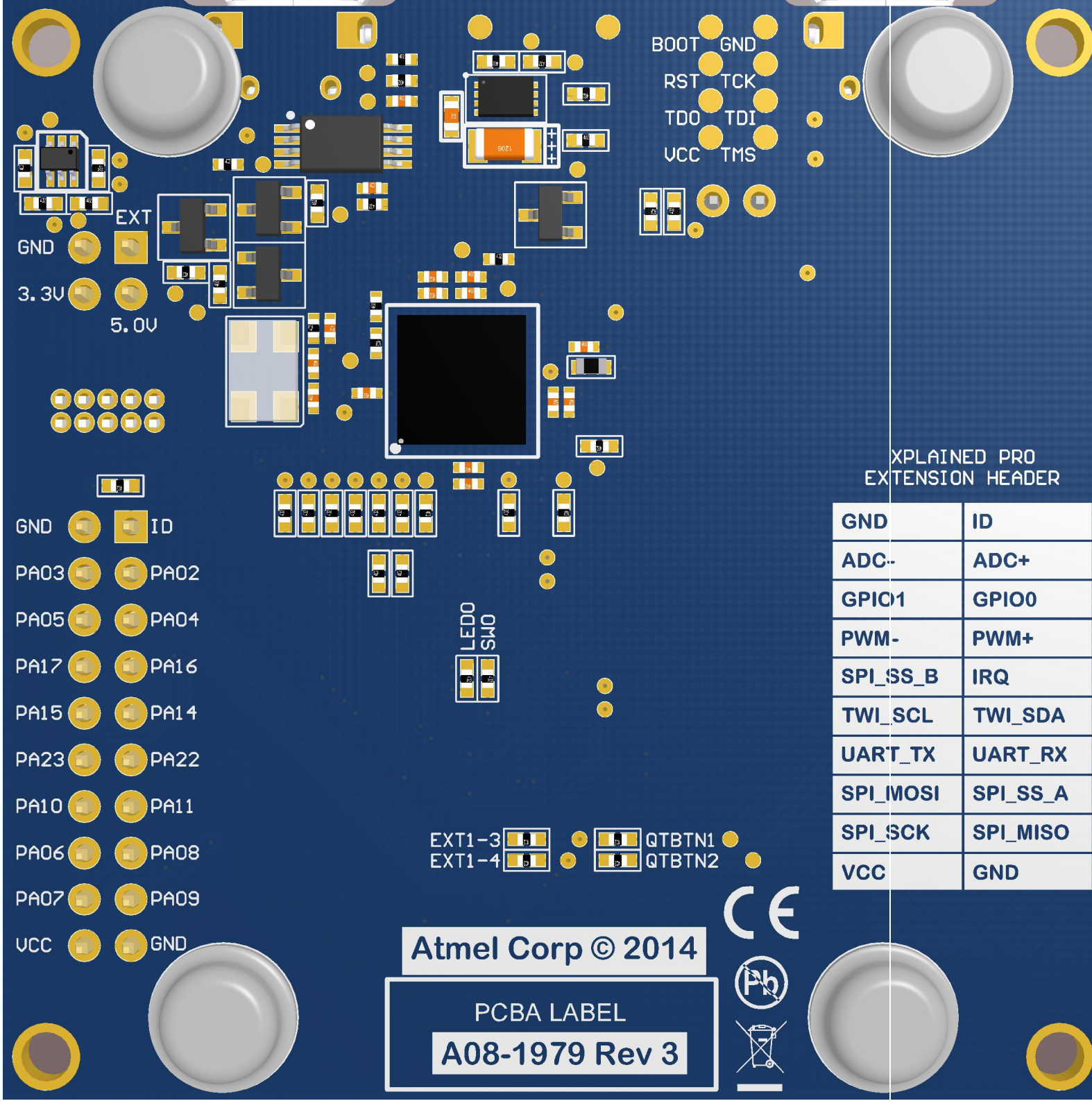
PA09 PA07 17

GND VCC 19



GND





BOOT GND
 RST TCK
 TDO TDI
 VCC TMS

EXT
 GND
 3.3V
 5.0V

GND ID
 PA03 PA02
 PA05 PA04
 PA17 PA16
 PA15 PA14
 PA23 PA22
 PA10 PA11
 PA06 PA08
 PA07 PA09
 UCC GND

EXT1-3 QTBTN1
 EXT1-4 QTBTN2

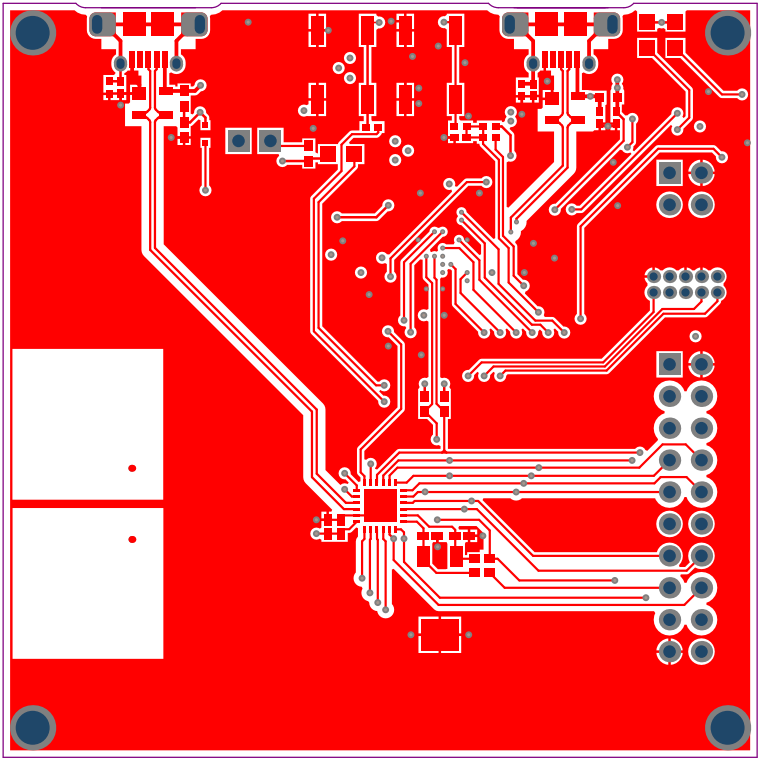
Atmel Corp © 2014

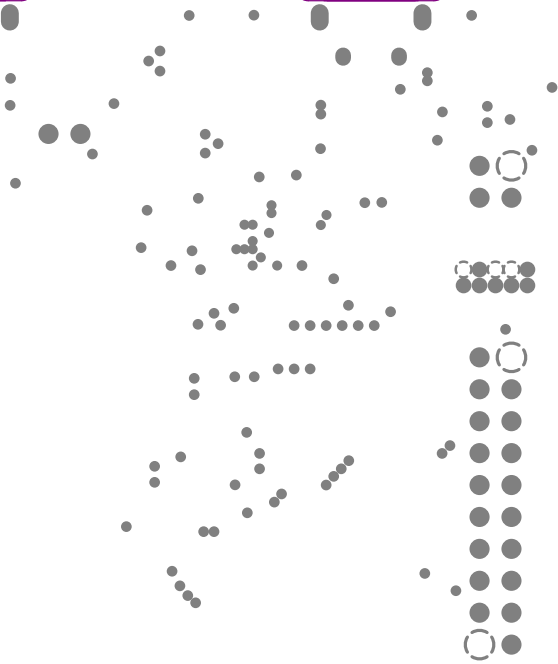
PCBA LABEL
 A08-1979 Rev 3

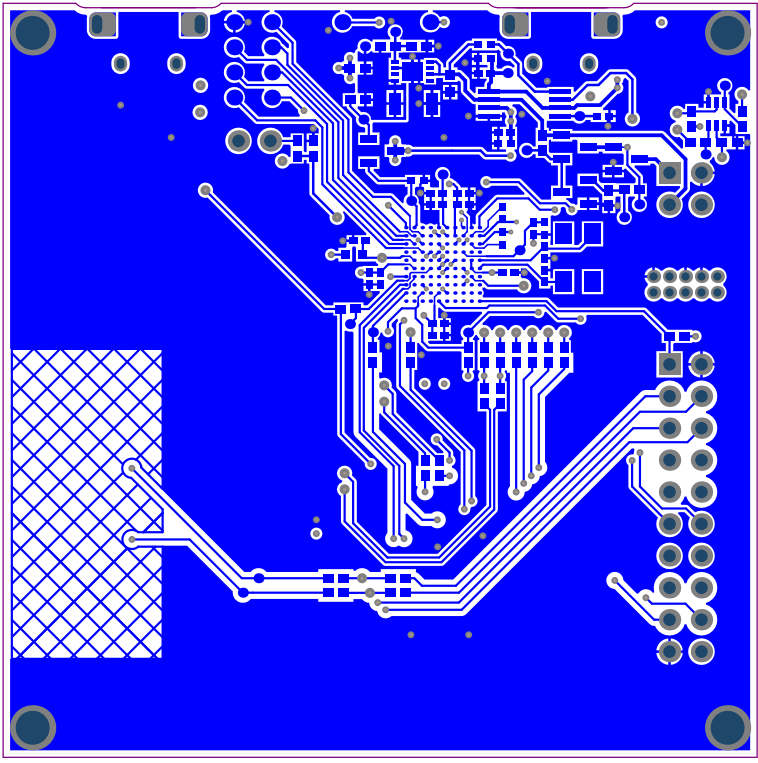
EXPLAINED PRO
EXTENSION HEADER

GND	ID
ADC-	ADC+
GPIO1	GPIO0
PWM-	PWM+
SPI_SS_B	IRQ
TWI_SCL	TWI_SDA
UART_TX	UART_RX
SPI_MOSI	SPI_SS_A
SPI_SCK	SPI_MISO
VCC	GND









Component list

Top Level Schematics

Source Data From: SAMD11_Xplained_Pro.PrjPCB
 Project: SAMD11_Xplained_Pro.PrjPCB
 Variant: Default_assembly



Report Date: 28.09.2015 11:16:51
 Print Date: 28.09.2015 11:12:38

Fitted	Designator	Quantity	Value	Manufacturer	MPN	Description
Fitted	C100	1	10u	vishay	TR3A106K016C1700	SMD tantalum capacitor, ESR = 1.7, 3216-18 (EA) 1206.
Fitted	C101	1	4.7uF	tdk	C1608X5R1A475K	Ceramic capacitor, SMD 0603, X5R, 10V, 10% (de31036)
Fitted	C102, C103	2	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C300	1	4.7n			Ceramic capacitor, SMD 0402, X7R, 25V, +/-10% (de35287)
Fitted	C301	1	4.7uF	tdk	C1005X5R0J475K	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-10%
Fitted	C302	1	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C400, C401	2	22p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C402	1	10p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C404, C410, C411, C412, C413	5	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C405, C409, C414, C415	4	2.2uF	Kemet	C0402C225M9PAC	Ceramic capacitor, SMD 0402, X5R, 8.3V, +/-20%
Fitted	C406, C407, C408	3	1 nF COG	Murata	GRM1555C1H102JA01D	Ceramic capacitor, SMD 0402, COG, 50V, +/-5%
Fitted	D300, D402	2	FRTR5V0L2X	Philips	FRTR5V0L2X	Double rail-to-rail USB ESD protection diode
Fitted	D301	1	BA154XV211G	ON Semiconductor	BA154XV211G	Schottky diode, If:200mA, Vf:0.35V, Vrrm:30V, SOD-523
Fitted	D302, D401	2	EL17-21UYG/A2	Everlight	17-21UYC/S530-A3/TR8	LED, Yellow, Wave length=591nm, SMD 0805, 170°
Fitted	D400	1	EL17-21SYGC	Everlight	EL17-21SYGC	LED, Green, Wave length=575nm, SMD 0805, 170°
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	ESCA TEC	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, TH, Pin In Paste
Fitted	J101	1	Pin header 1x2 right angle	Pro-data International Corp	2213R-2G	1x2 pin header, right angle, 2.54mm pitch, through-hole
Fitted	J200	1	P101-2*10RGF-139-ND		P101-2*10RGF-139-ND	Pin header, 2x10, Right Angle, 2.54mm, THM, Pin In Paste
Fitted	J300	1	PIN HEADER 2x5	Garry	STL21-0730 G TT-10U	2x5 pin header, 1.27mm pitch, THM
Fitted	J301, J400	2	ZX62D-AB-5P8			Micro USB AB Connector, Standard SMT + DIP
Fitted	JS100	1	SNF-100-BK-G	SAMTEC	SNF-100-BK-G	Jumper cap for 2.54mm pinheader
Fitted	L401, L402	2	BLM18PG471SN1	Murata	BLM18PG471SN1	SMD RF inductor 0803, Z=4700Ohm (@100MHz), Max R(dc)=0.65Ohm, Max current=1A
Fitted	LABEL1	1	Label PCB A	ACT Logmark AS	505462	PCBA identification label/PF Top White Gloss
Fitted	PCB1	1	SAMD11 Xplained Pro PCB documentation			SAMD11 Xplained Pro PCB documentation
Fitted	PCBADOC1	1	A09-2176 PCB A Files			SAMD11 Xplained Pro PCB A documentation
Fitted	Q100, Q101, Q103	3	IRLML6402	International Rectifier	IRLML6402PBF	P-ch. MOSFET, -30V, -3.7A continuous, RDS(ON)=0.05Ohm@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) = 3.80Ohm@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	18k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R101, R104, R105	3	1M			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R102, R308	2	30k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R103, R107, R111	3	100k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R106	1	390R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R108, R300, R301, R303, R304, R311, R312, R315, R320, R321, R322, R323, R425	13	0R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R109, R110, R309	3	47k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R113	1	47k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R302, R307, R318, R421, R422	5	39R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R305	1	100k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R306	1	39R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R313, R314	2	4.7k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R316, R317	2	10k	vishay	CRCW040210K0FKED	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R319, R411, R412, R414, R416, R417, R418, R419, R420	9	330R			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R409	1	1k			Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R410, R413	2	1M	KOA	RK73H1ETTP1004F	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	SKRAAKE010	ALPS	SKRAAKE010	6.2x6.2mm SMD tact sw tch, same as A08-0091 but less force is needed
Fitted	TEST1	1	SAMD11 Xplained Pro test			Fixture test for SAMD11 Xplained Pro
Fitted	TESTDOC1	1	SAMD11 Xplained Pro Test Instructions			SAMD11 Xplained Pro Test Instructions
Fitted	U100	1	SPX3819R2-L/TR	Exar	SPX3819R2-L/TR	500mA LDO, ADJ, low noise, 8-DFN package
Fitted	U101	1	TFS2113PWR	Texas Instruments	TFS2113PWR	Autoswitching 2:1 Power Mux
Fitted	U300	1	ATSAMD11D14A-MJT	ATMEL	ATSAMD11D14A-MJT	Atmel 32-bit RISC MCU
Fitted	U400	1	AT32UC3A4256J-C1UR	ATMEL	AT32UC3A4256J-C1UR	AVR 32-bit RISC MCU
Fitted	XC400	1	12.0MHz	Fox Electronics	F05032B-12-C-C-C-200-1	Fox F05032B 12.0MHz SMD crystal 738B-12
Not Fitted	C303, C403	0	4.7n			Ceramic capacitor, SMD 0402, X7R, 25V, +/-10%
Not Fitted	C304, C305	0	8.2p			Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Not Fitted	R310, R424	0	1M	KOA	RK73H1ETTP1004F	Thick film resistor, SMD 0402, 1/16W, 1%
Not Fitted	XC300	0	32.768kHz +/-20PPM 7pF SMD	Micro Crystal	MS1V-11K 32.768kHz 7pF +/-20PPM TA	32K768 crystal, +/-20ppm, CL=7pF, max ESR 60kOhm, SMD

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Approved

Notes