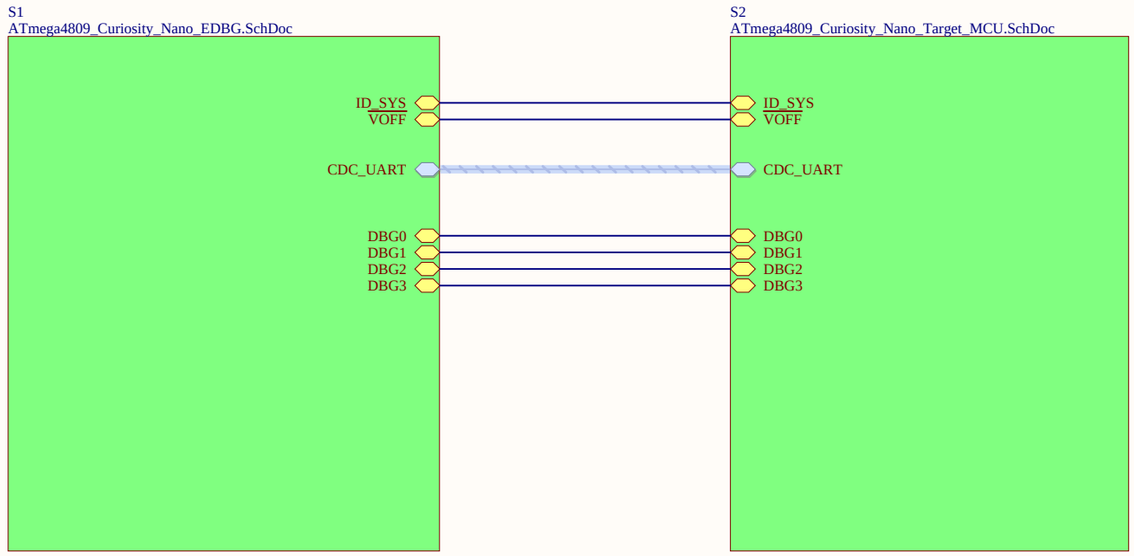
ATmega4809 Curiosity Nano



TESTDOC1
A12-1314

TEST1
$ >_
A11-0401

FW1
A11-0406

PCBADOC1
A12-1297

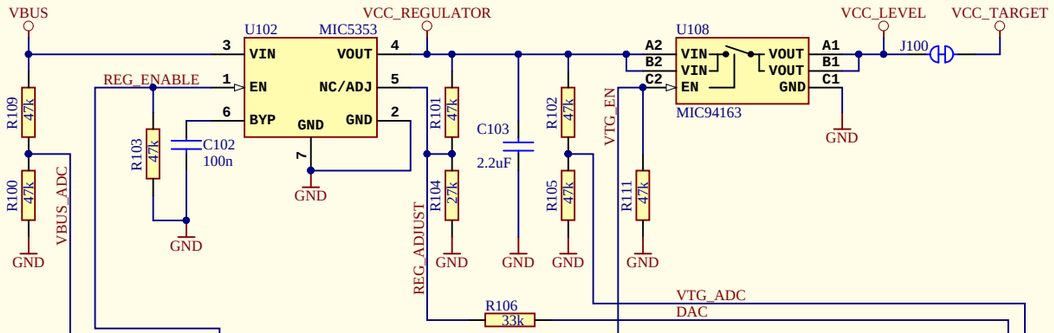
PCB1
A08-2838

LABEL1
Product number/revision
Serial number
Label PCBA

S3
ATmega4809_Curiosity_Nano_Revision_History.SchDoc

Drawn By: Microchip Norway			
Engineer: HN			
Project Title: *ATmega4809 Curiosity Nano*			Designed with Altium — Altium.com
Sheet Title: Top Level			
Size A3	PCB Assembly Number: A09-3094	PCBA Revision: 5	Date: 10.10.2018
	PCB Number: A08-2838	PCB Revision: 5	Page: 1 of 4
File: ATmega4809_Curiosity_Nano_TopLevel.SchDoc			

TARGET ADJUSTABLE REGULATOR



Adjustable output and limitations:
- The nEDBG can adjust the output voltage of the regulator between 1.25V and 5.1V to the target.
- The level shifters have a minimal voltage level of 1.65V and will limit the minimum operating voltage allowed for the target to still allow communication.
- The output switch has a minimal volatege level of 1.70V and will limit the minimum voltage delivered to the target.
- Firmware configuration will limit the voltage range to be within the the target specification.
- Firmware feedback loop will adjust the output voltage accuracy to within 0.5%.

J100:
- Cut-strap used for full separation of target power from the level shifters and on-board regulators.
- For current measurements using the on-board power supply, this strap must be cut and an ammeter connected across.
- For current measurements using an external power supply, this strap could be cut for more accurate measurements. Leakage back through the switch is in the micro ampere range.

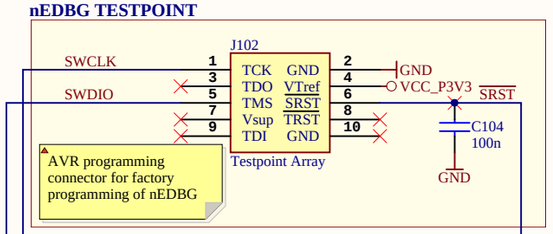
MIC5353:
Vin: 2.6V to 6V
Vout: 1.25V to 5.1V
Imax: 500mA
Dropout (typical): 50mV@150mA, 160mV @ 500mA
Accuracy: 2% initial
Thermal shutdown and current limit

Maximum output voltage is limited by the input voltage and the dropout voltage in the regulator. (Vmax = Vin - dropout)

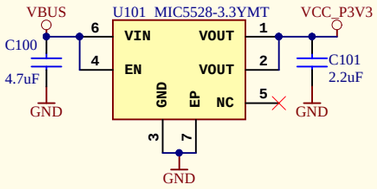
Interface / Signal	ICSP TARGET	UPDI TARGET
CDC TX	UART RX	UART RX
CDC RX	UART TX	UART TX
DBG0	DAT	UPDI
DBG1	CLK	GPIO
DBG2	GPIO	GPIO
DBG3	$\overline{\text{MCLR}}$	$\overline{\text{RESET}}$
VCC	-	-

MIC5528:
Vin: 2.5V to 5.5V
Vout: Fixed 3.3V
Imax: 500mA
Dropout: 260mV @ 500mA

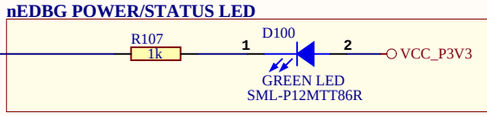
nEDBG TESTPOINT



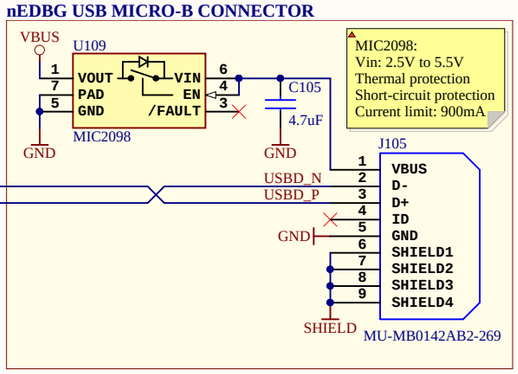
nEDBG REGULATOR



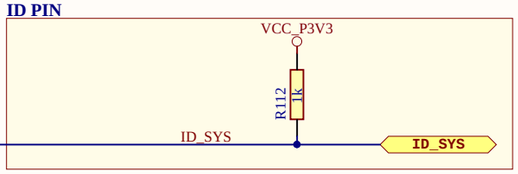
nEDBG POWER/STATUS LED

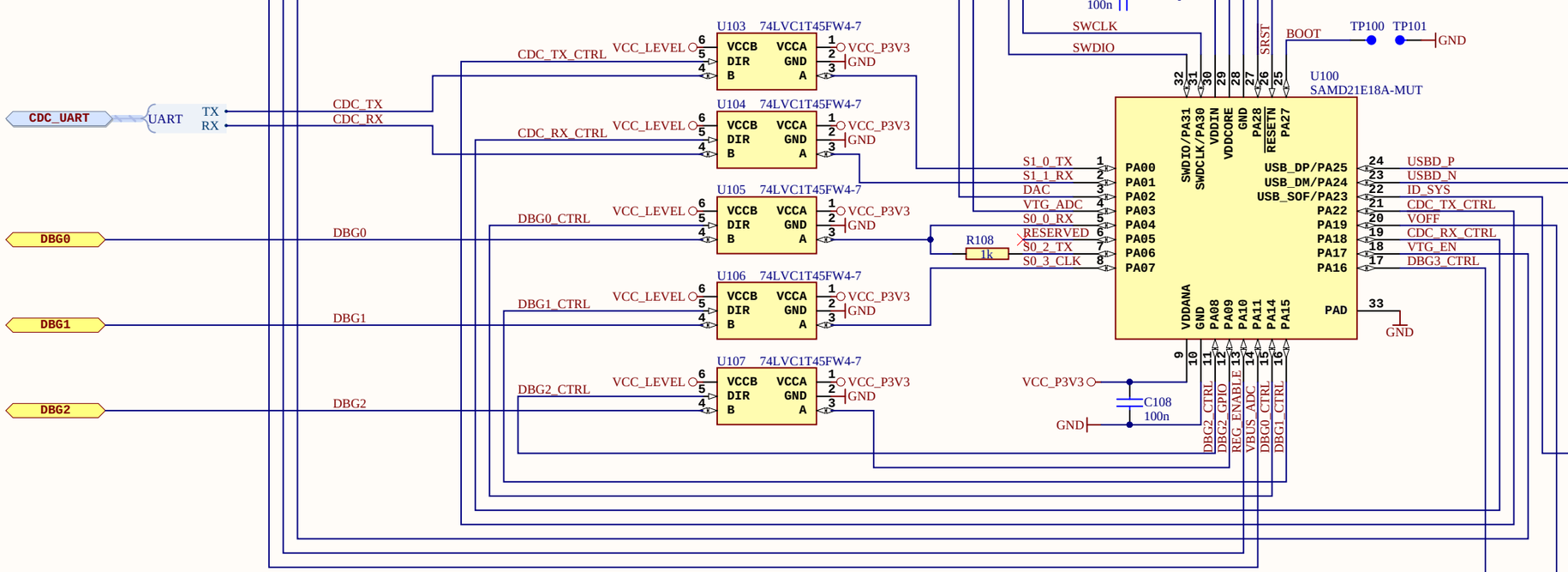


nEDBG USB MICRO-B CONNECTOR

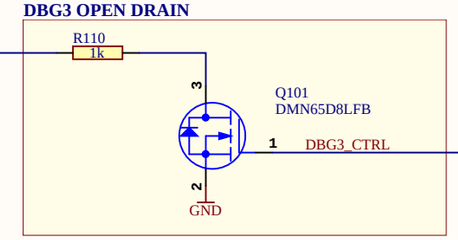


ID PIN





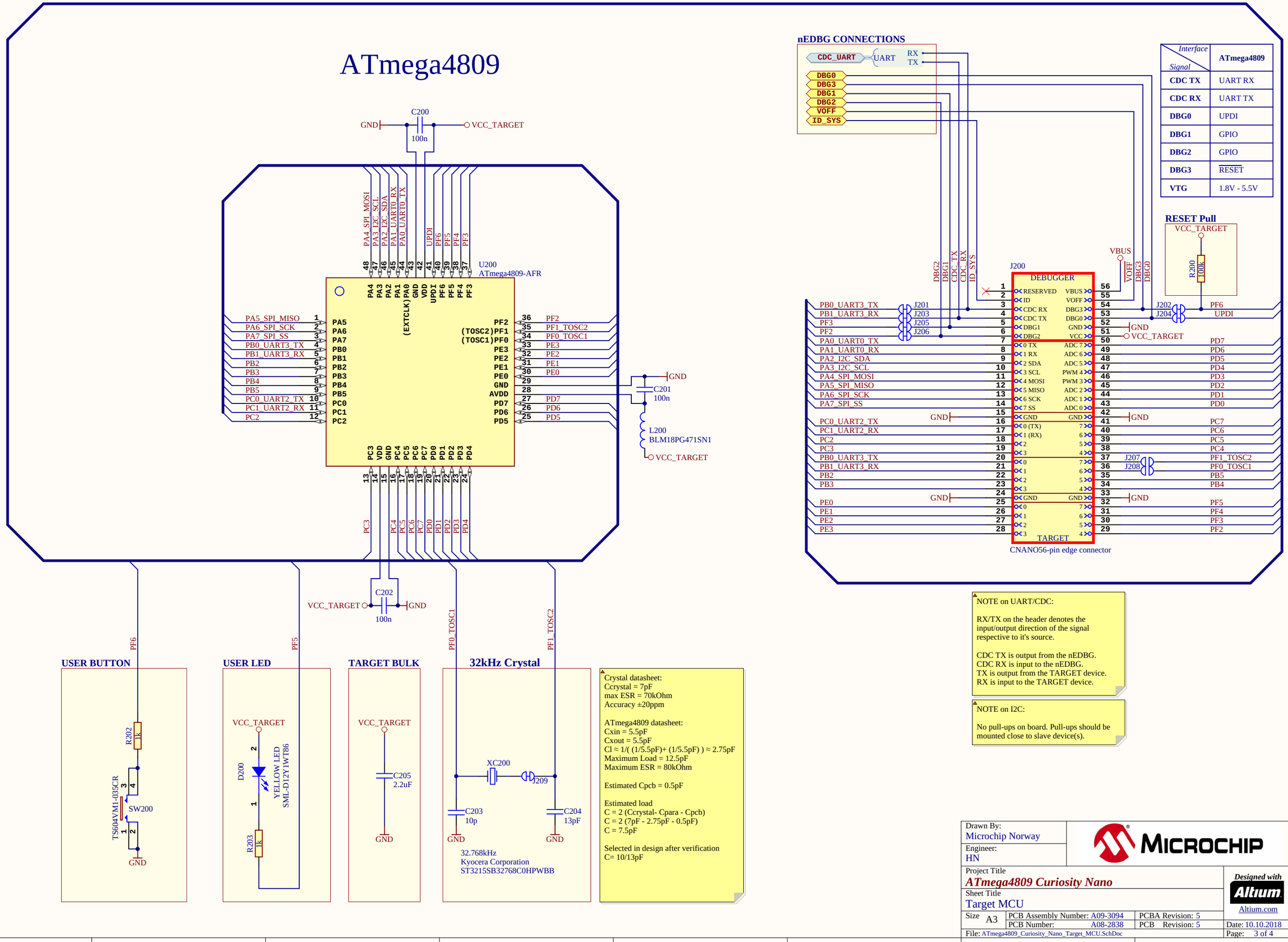
DBG3 OPEN DRAIN



Drawn By:	Microchip Norway
Engineer:	HN
Project Title	*ATmega4809 Curiosity Nano*
Sheet Title	Debugger
Size	A3
PCB Assembly Number:	A09-3094
PCB Number:	A08-2863
PCBA Revision:	5
PCB Revision:	5
File:	ATmega4809_Curiosity_Nano_EDBG.SchDoc
Date:	10.10.2018
Page:	2 of 4

Designed with Altium
Altium.com

ATmega4809



NOTE on UART/CDC:

RX/TX on the header denotes the input/output direction of the signal respective to it's source.

CDC TX is output from the nEDBG.
CDC RX is input to the nEDBG.
TX is output from the TARGET device.
RX is input to the TARGET device.

NOTE on I2C:

No pull-ups on board. Pull-ups should be mounted close to slave device(s).

Crystal datasheet:
Ccrystal = 7pF
max ESR = 70kOhm
Accuracy ±20ppm

ATmega4809 datasheet:
Cxin = 5.5pF
Cxout = 5.5pF
Cl ≈ 1/((1/5.5pF)+ (1/5.5pF)) ≈ 2.75pF
Maximum Load = 12.5pF
Maximum ESR = 80kOhm

Estimated Cpcb = 0.5pF

Estimated load
C = 2 (Ccrystal- Cpara - Cpcb)
C = 2 (7pF - 2.75pF - 0.5pF)
C = 7.5pF

Selected in design after verification
C= 10/13pF

Drawn By:	Microchip Norway
Engineer:	HN
Project Title	*ATmega4809 Curiosity Nano*
Sheet Title	Target MCU
Size	A3
PCB Assembly Number:	A09-3094
PCBA Revision:	5
PCB Number:	A08-2838
PCB Revision:	5
File:	ATmega4809_Curiosity_Nano_Target_MCU.SchDoc
Date:	10.10.2018
Page:	3 of 4

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Altium.com

Revision History

PCB Assembly Rev 1:

Design Changes:

Initial Design

PCB:

PCB revision 1

PCB Assembly Rev 2:

Design Changes:

Removed bypass switch

PCB:

PCB Revision 2, changed layout

PCB Assembly Rev 3:

Design Changes:

Added reverse blocking switch (U108)
Added ID_SYS pin
Added VOFF pin
Change 10uf to 4.7uF (U100)

PCB:

PCB Revision 3
Increased board size for ID and VOFF pin
Rerouted for target voltage blocking switch

PCB Assembly Rev 4:

Design Changes:

Added USB VBUS protection (U109)
Added VBUS pin

PCB:

PCB Revision 4
Increased board size for VBUS pin
Reroute the debugger section for the VBUS pin

PCB Assembly Rev 5:

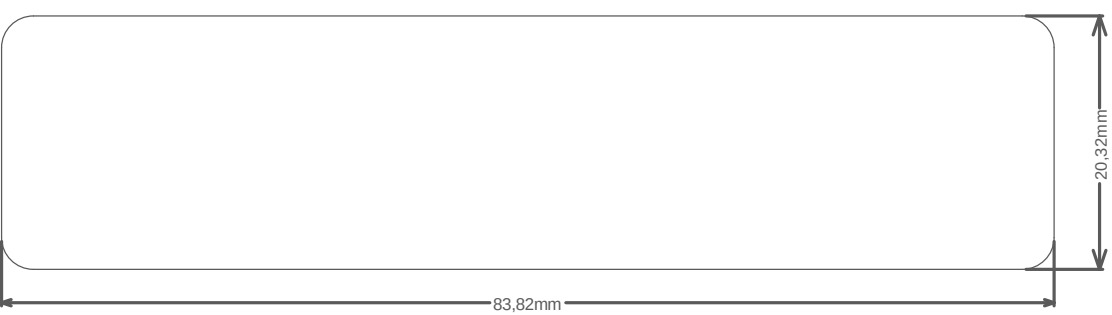
Design Changes:

Added input cap on U109

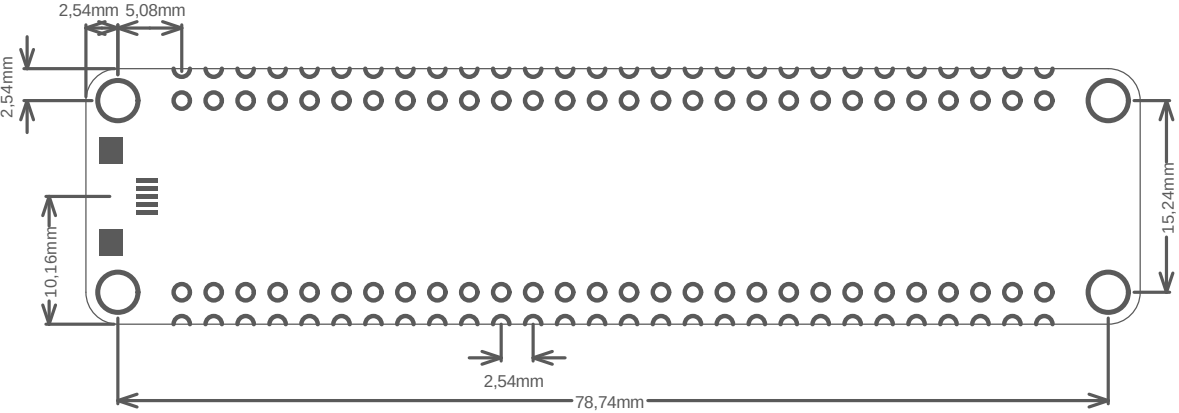
PCB:

PCB Revision 5
Added input cap on U109

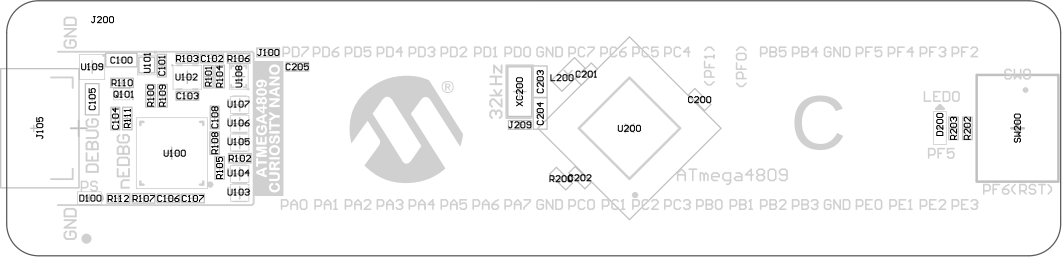
Drawn By: Microchip Norway		MICROCHIP	
Engineer: HN			
Project Title: *ATmega4809 Curiosity Nano*			Designed with Altium Altium.com
Sheet Title: Revision History			
Size A3	PCB Assembly Number: A09-3094	PCBA Revision: 5	
	PCB Number: A08-2863	PCB Revision: 5	Date: 10.10.2018
File: ATmega4809_Curiosity_Nano_Revision_History.SchDoc			Page: 4 of 4


20,32mm
83,82mm

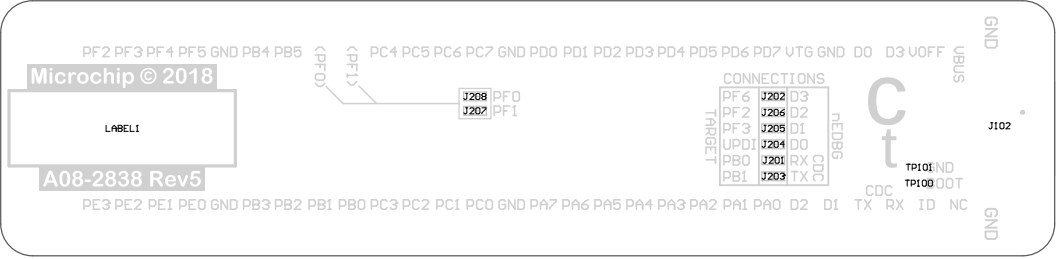
Connector Placement

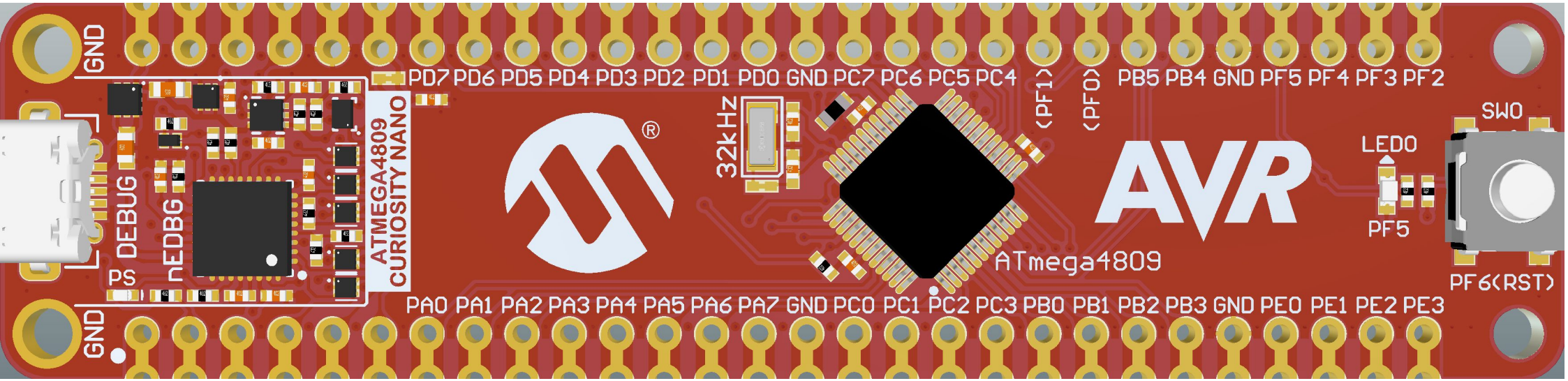


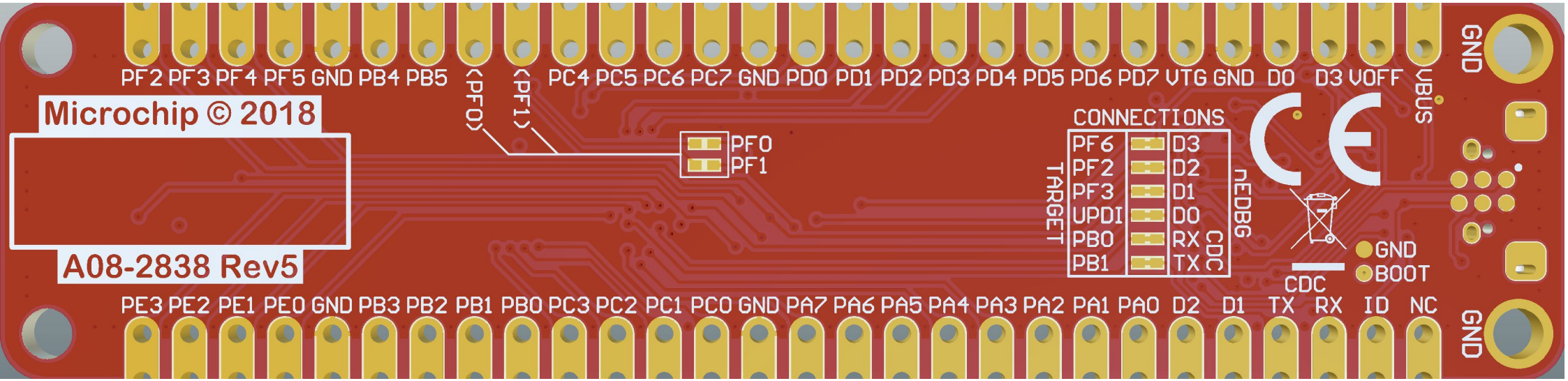
Test Point Placement

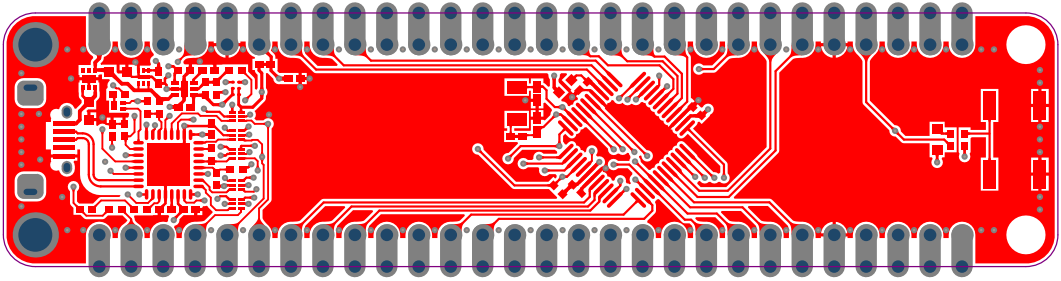


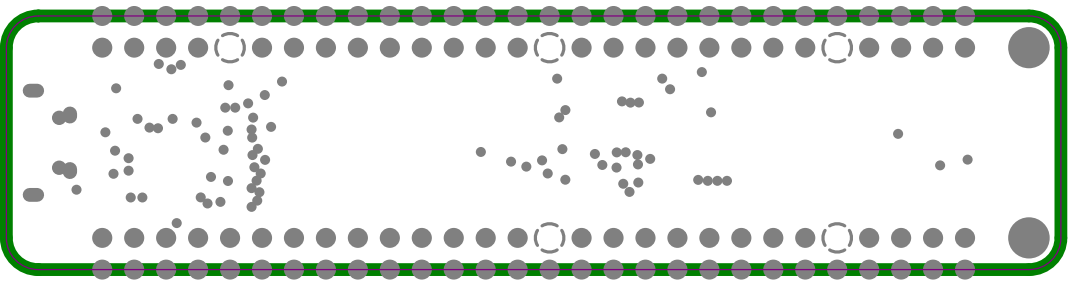
J200
GND
J100
PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0 GND PC7 PC6 PC5 PC4
(PF1)
(PF0)
PB5 PB4 GND PF5 PF4 PF3 PF2
U109
C100
U101
C101
R103
C102
R106
C205
U102
R101
R104
U108
R110
Q101
C105
R100
R109
C103
U107
U106
U105
R102
U104
U103
C104
R111
C108
R108
R105
U100
J105
DEBUG
nEDBG
PS
ATMEGA4809
CURIOSITY NANO
D100
R112
R107
C106
C107
GND
32kHz
XC200
C203
C204
J209
L200
C201
C200
U200
R200
C202
ATmega4809
LED0
D200
R203
R202
PF5
SW0
SW200
PF6(RST)
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7 GND PC0 PC1 PC2 PC3 PB0 PB1 PB2 PB3 GND PE0 PE1 PE2 PE3

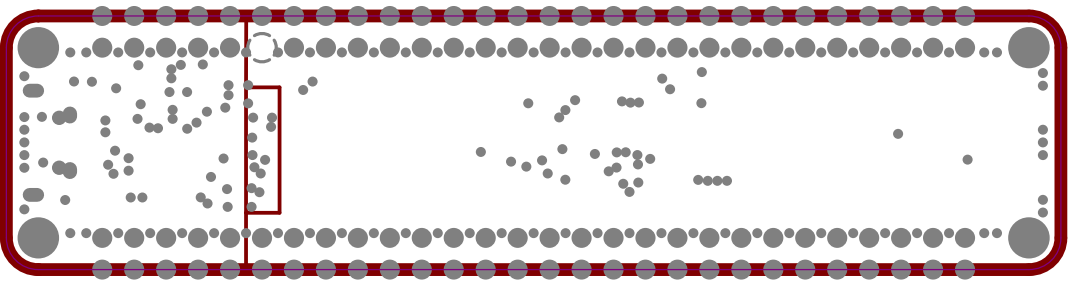

PF2 PF3 PF4 PF5 GND PB4 PB5
<PF0>
<PF1>
PC4 PC5 PC6 PC7 GND PD0 PD1 PD2 PD3 PD4 PD5 PD6 PD7 VTG GND D0 D3 VOFF VBUS
GND
Microchip © 2018
J208 PF0
J207 PF1
CONNECTIONS
PF6 J202 D3
PF2 J206 D2
PF3 J205 D1
UPDI J204 D0
PB0 J201 RX CDC
PB1 J203 TX CDC
TARGET
nEDBG
LABEL1
J102
TPI0I GND
TPI0O BOOT
CDC
A08-2838 Rev5
PE3 PE2 PE1 PE0 GND PB3 PB2 PB1 PB0 PC3 PC2 PC1 PC0 GND PA7 PA6 PA5 PA4 PA3 PA2 PA1 PA0 D2 D1 TX RX ID NC
GND

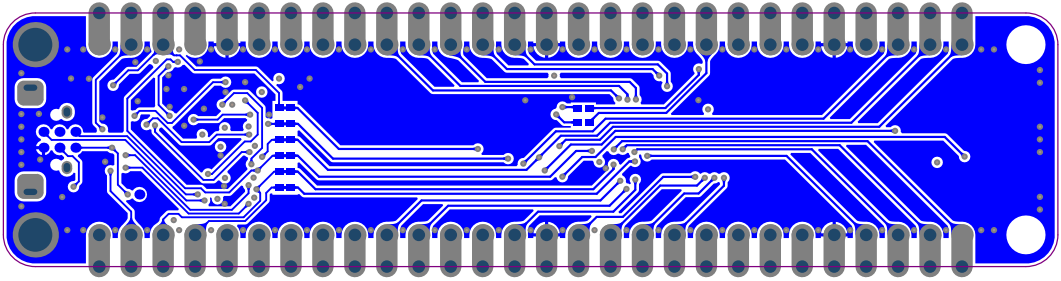

GND
PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0 GND PC7 PC6 PC5 PC4 (PF1) (PF0) PB5 PB4 GND PF5 PF4 PF3 PF2
SW0
LED0
PF5
PF6(RST)
32kHz
ATmega4809
AVR
DEBUG
nEDBG
PS
ATMEGA4809
CURIOSITY NANO
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7 GND PC0 PC1 PC2 PC3 PB0 PB1 PB2 PB3 GND PE0 PE1 PE2 PE3
GND


PF2 PF3 PF4 PF5 GND PB4 PB5 PF0 PF1 PC4 PC5 PC6 PC7 GND PD0 PD1 PD2 PD3 PD4 PD5 PD6 PD7 VTG GND D0 D3 VOFF VBUS GND
Microchip © 2018
A08-2838 Rev5
PF0
PF1
CONNECTIONS
TARGET
PF6 D3
PF2 D2
PF3 D1
UPDI D0
PB0 RX
PB1 TX
nEDBG
CDC
CDC
GND
BOOT
PE3 PE2 PE1 PE0 GND PB3 PB2 PB1 PB0 PC3 PC2 PC1 PC0 GND PA7 PA6 PA5 PA4 PA3 PA2 PA1 PA0 D2 D1 TX RX ID NC GND









Component list

Bill of Materials Fitted For Variant [Default Assembly] of Project [ATmega4809_Curiosity_Nano.PrjPcb] (No PCB Document Selected)

Source Data From: ATmega4809_Curiosity_Nano.PrjPcb

Project: ATmega4809_Curiosity_Nano.PrjPcb

Variant: Default Assembly

Report Date: 10.10.2018 13:17:03

Print Date: 10.10.2018 13:15:21

Fitted	Designator	Quantity	Value	Manufacturer	MPN	Description
Fitted	C100, C105	2	4.7uF	WALSIN Technology Corporation	0603X475K100CT	Ceramic capacitor, SMD 0603, X5R, 10V, 10% (de31036)
Fitted	C101	1	2.2uF	Kemet	C0402C225M9PAC	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-20%
Fitted	C102, C104, C107, C108, C200, C201, C202	7	100n	Kemet	C0402C104K4RACTU	Ceramic capacitor, SMD 0402, X7R, 16V, +/-10%
Fitted	C103, C205	2	2.2uF	tdk	C1005X5R1A225K	CAP CER 2.2UF 10V 10% X5R 0402
Fitted	C106	1	1u	Kemet	C0402C105K9PAC	Ceramic capacitor, SMD 0402, X5R, 6.3V, +/-10% (de26942)
Fitted	C203	1	10p	AVX	04025A100JAT2A	Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	C204	1	13pF	Murata	GRM1555C1H130JA01D	Ceramic capacitor, SMD 0402, NP0, 50V, +/-5%
Fitted	D100	1	GREEN LED	ROHM	SML-P12MTT86R	LED, SMD 0402, Green, Wave length=569nm, 2.1mcd @ (1mA, 1.9Vf)rohm
Fitted	D200	1	YELLOW LED	ROHM	SML-D12Y1WT86	LED, SMD 0603, Yellow , Wave length=590nm, 100mcd @ (20mA, 2.2Vf) rohm
Fitted	FW1	1	nEDBG firmware			nEDBG firmware
Fitted	J105	1	MU-MB0142AB2-269	Allen Creations Corp.	MU-MB0142AB2-269	USB micro AB, Surface mount signals and DIP shield
Fitted	L200	1	BLM18PG471SN1	Murata	BLM18PG471SN1	SMD RF inductor 0603. Z=470Ohm (@100MHz), Max R(dc)=0.65Ohm, Max current=1A
Fitted	LABEL1	1	Label PCBA	ACT Logimark AS	505462	PCBA identification label PP Top White Gloss
Fitted	PCB1	1	ATmega4809 Curiosity Nano PCB documentation			ATmega4809 Curiosity Nano PCB documentation
Fitted	PCBADOC1	1	A09-3094 PCBA files			ATmega4809 Curiosity Nano PCBA documentation
Fitted	Q101	1	DMN65D8LFB	Diodes Incorporated	DMN65D8LFB-7	N-channel MOSFET, DFN1006-3 (SOT883), 60V, 330mA, 4Ohm
Fitted	R100, R101, R102, R103, R105, R109, R111	7	47k	KOA	RK73H1ETTP4702F	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R104	1	27k	YAGEO CORP	RC0402FR-0727KL	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R106	1	33k	ASJ	CR10-3302-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R107, R108, R110, R112, R202, R203	6	1k	ASJ	CR10-1001-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R200	1	100k	ASJ	CR10-1003-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	SW200	1	TS604VM1-035CR	Dailyw ell Electronics Co.LTD	TS604VM1-035CR-R	SWITCH, SMD, 260gf, 6.4mm X 6.2mm
Fitted	TEST1	1	ATmega4809 Curiosity Nano test			Fixture test for ATmega4809 Curiosity Nano
Fitted	TESTDOC1	1	Curiosity Nano Test Instructions			Generic Test Instructions for Curiosity Nano
Fitted	U100	1	SAMD21E18A-MUT	Microchip	ATSAMD21E18A-MUT	Atmel 32-bit RISC MCU 32pin
Fitted	U101	1	MIC5528-3.3YMT	Microchip	MIC5528-3.3YMT-T5	LDO 3.3V 0.5A 6TDFN
Fitted	U102	1	MIC5353	Microchip	MIC5353YMT-TR	500mA Ultra Low Dropout LDO regulator, 2% accuracy, 1.6x1.6mm MLF
Fitted	U103, U104, U105, U106, U107	5	74LVC1T45FW4-7	Diodes Incorporated	74LVC1T45FW4-7	Single-Bit Dual-Supply Transceive, 1.65-5.5 Translation and 3-State Outputs
Fitted	U108	1	MIC94163	Microchip Technology Inc	MIC94163YCS-TR	Loadsw itch, Rds(on) = 14.5mohm, 1.0mm x 1.5mm WLCSP, reverse blocking
Fitted	U109	1	MIC2098	Microchip	MIC2098-1YMT	900mA current limiting pow er distribution sw itch, active high
Fitted	U200	1	ATmega4809-AFR	Microchip	ATmega4809-AFR	Atmel 8-bit RISC MCU, 48K Flash, 48pin TQFP, 7x7mm, 0.5m pitch package
Fitted	XC200	1	32.768kHz	Kyocera Corporation	ST3215SB32768C0HPWBB	Kyocera ST3215SB32768C0HPWBB, 32.768kHz, 7pF, SMD tuning fork crystal
		55				

Approved

Notes