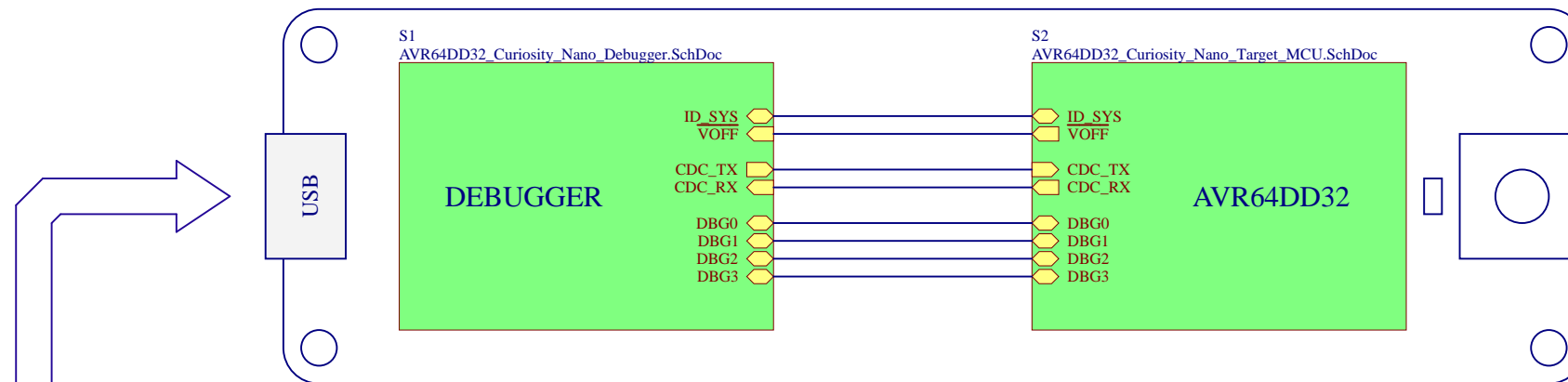
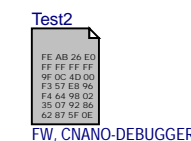
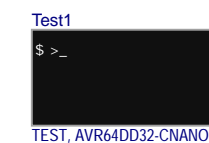
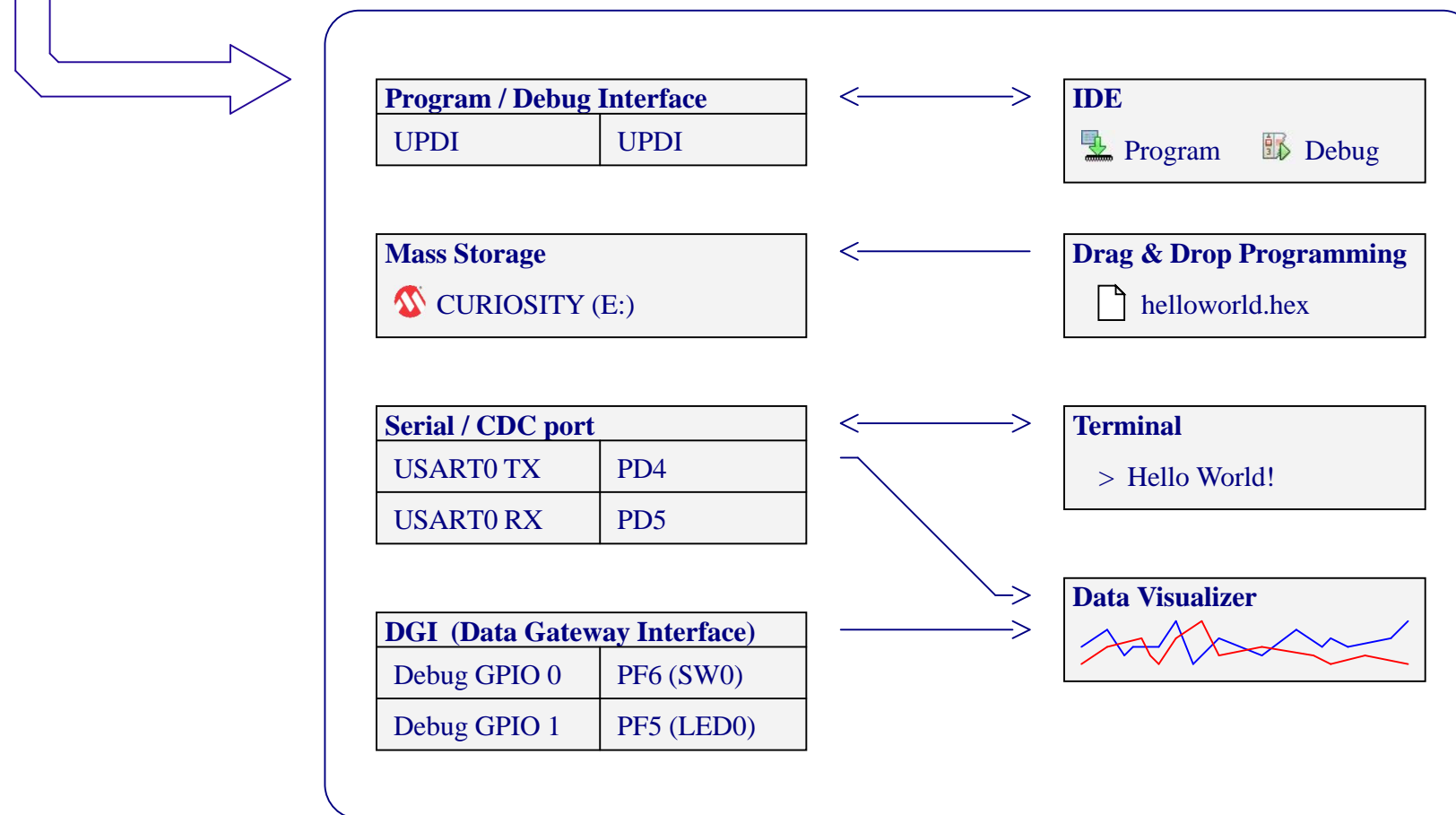


AVR64DD32 Curiosity Nano



On-Board Peripherals		
LED0	PF5	Active Low
SW0	PF6	Active Low



S3
AVR64DD32_Curiosity_Nano_Revision_History.SchDoc

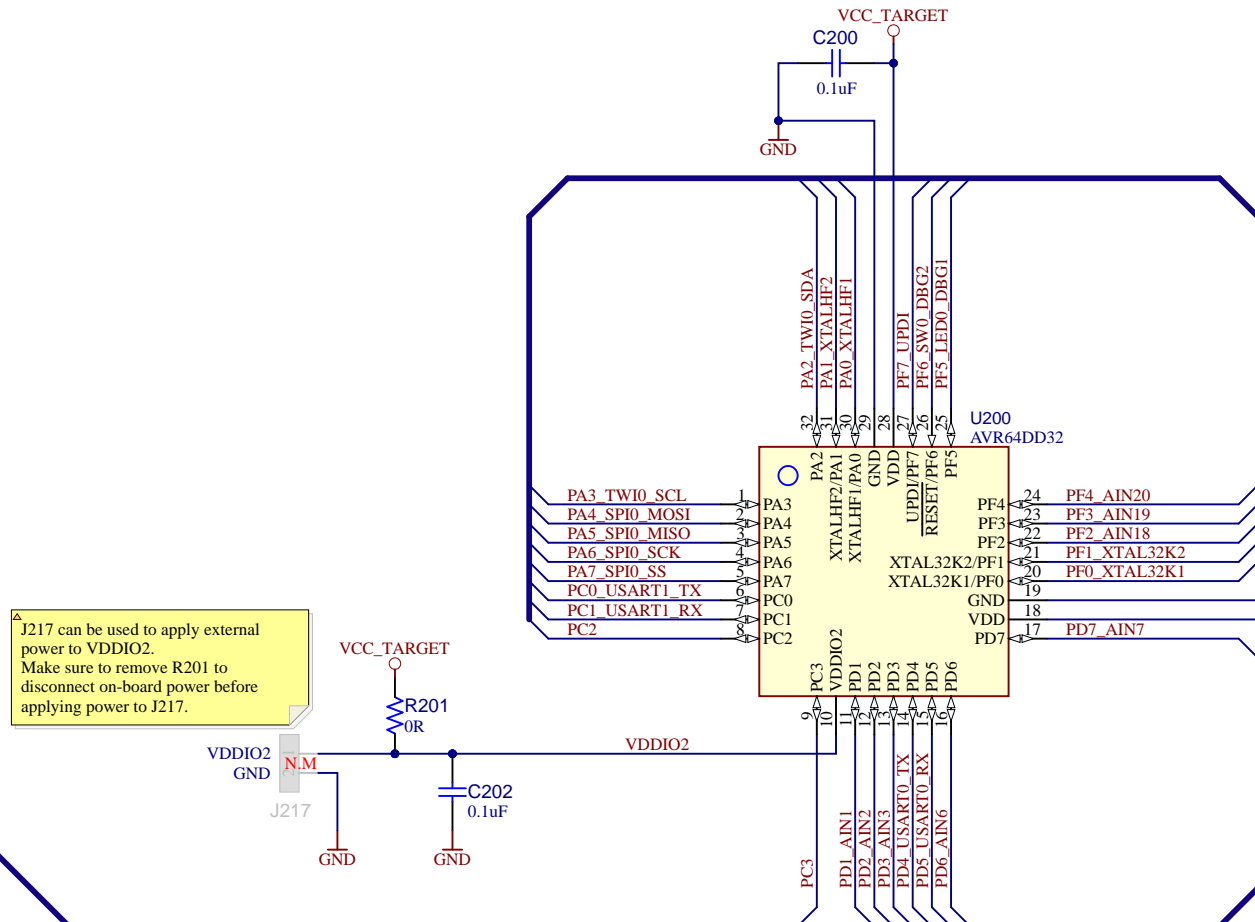
Project Owner: P. Breedveld			
PCB Layout Contact: P. Breedveld			
PartNumber: EV72Y42A	Project Title AVR64DD32 Curiosity Nano	Variant: Default Assembly	
Sheet Title Top Level			
Size A3	SCH #: 02-00195	Rev: 2	Date: 2022-06-02
	PCB #: 04-11312	Rev: 2	Sheet 1 of 4
File: AVR64DD32_Curiosity_Nano_TopLevel.SchDoc			
			 Designed with Altium.com

AVR64DD32

AVR64DD32		
Debugger	Name	Pin
CDC TX	USART0 RX	PD5
CDC RX	USART0 TX	PD4
DBG0	UPDI	PF7
DBG1	GPIO1	PF5
DBG2	GPIO0	PF6
DBG3	RESET	PF6
VTG	1.8V - 5.5V	

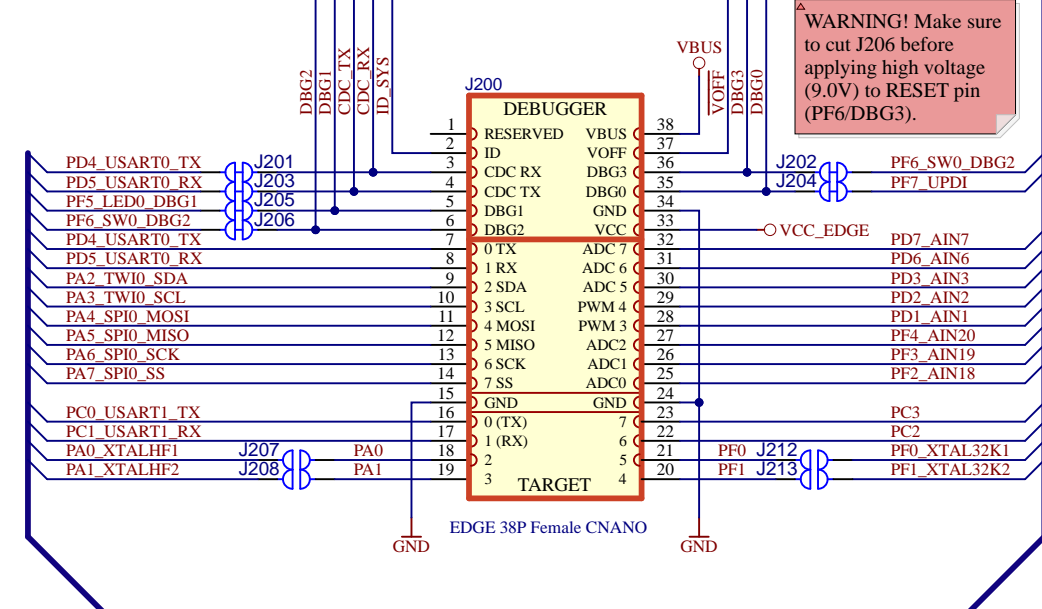
DEBUGGER CONNECTIONS

CDC RX	CDC RX
CDC TX	CDC TX
DBG0	DBG0
DBG3	DBG3
DBG1	DBG1
DBG2	DBG2
VOFF	VOFF
ID_SYS	ID_SYS



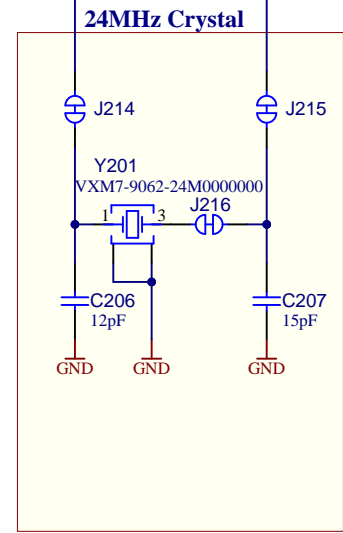
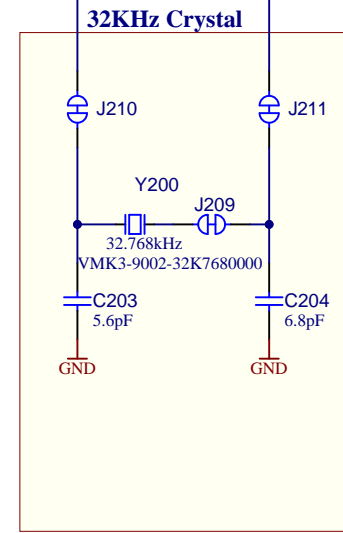
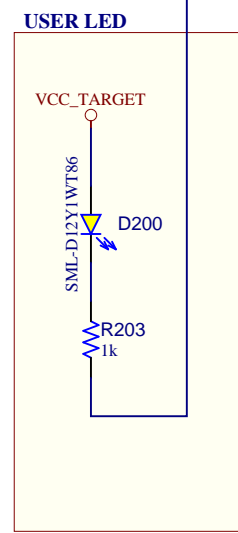
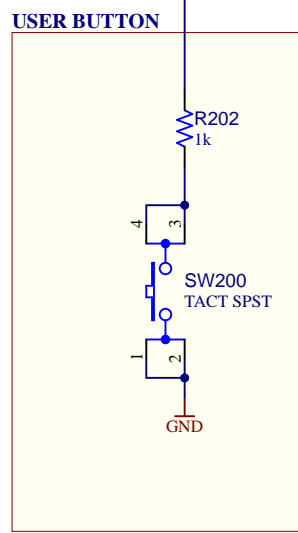
J217 can be used to apply external power to VDDIO2. Make sure to remove R201 to disconnect on-board power before applying power to J217.

WARNING! Make sure to cut J206 before applying high voltage (9.0V) to RESET pin (PF6/DBG3).

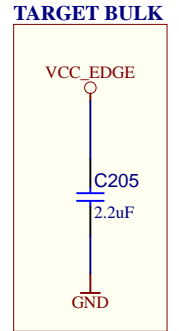


NOTE on I2C/TWI:
No pull-ups on board. Pull-ups should be mounted close to client device(s).

NOTE on UART/CDC:
RX/TX on the header denotes the input/output direction of the signal respective to its source.
CDC TX is output from the DEBUGGER. CDC RX is input to the DEBUGGER. TX is output from the TARGET device. RX is input to the TARGET device.



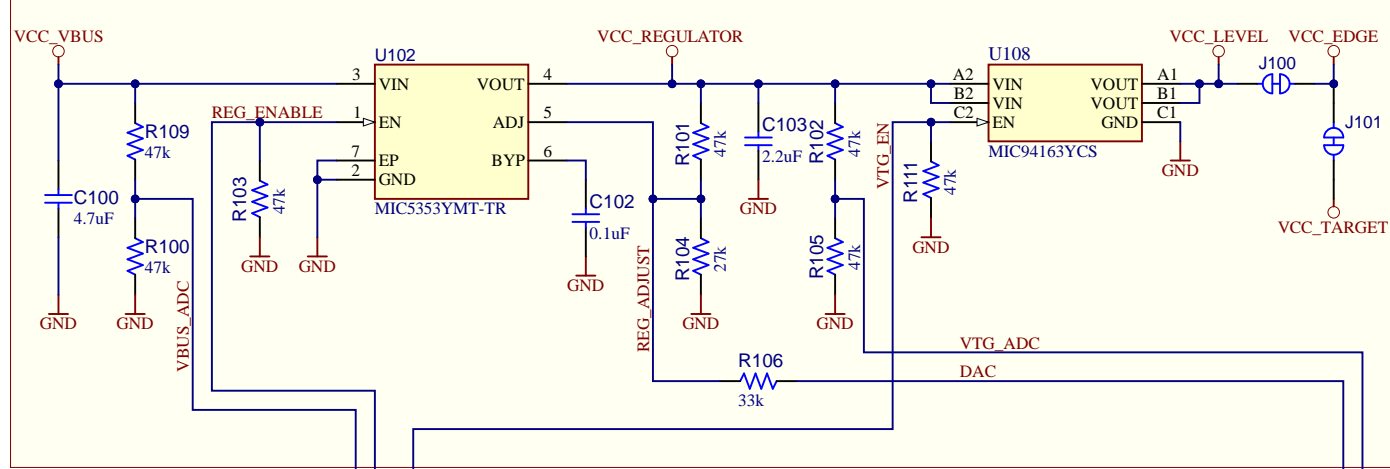
Crystal datasheet:
Crystal = 7pF
max ESR = 70kOhm
Accuracy ±20ppm
AVR64DD32 datasheet:
Cxtal1/Cxtal2 = 5.0pF (typical value)
 $C1 \approx 1 / ((1/5.0pF) + (1/5.0pF)) \approx 2.5pF$
Maximum Load = 12.5pF
Maximum ESR = 50kOhm
Estimated Cpcb = 1pF
Estimated load
C = 2 (Crystal - Cpara - Cpcb)
C = 2 (7pF - 2.5pF - 1pF)
C = 7.0pF
Selected in design after verification
C = 5.6pF/6.8pF



Project Owner: P. Breedveld			
PCB Layout Contact: P. Breedveld			
PartNumber: EV72Y42A	Project Title: AVR64DD32 Curiosity Nano	Variant: Default Assembly	
Sheet Title: Target MCU			
Size: A3	SCH #: 02-00195	Rev: 2	Date: 2022-06-02
	PCB #: 04-11312	Rev: 2	Sheet 2 of 4
File: AVR64DD32_Curiosity_Nano_Target_MCU.SchDoc			

Designed with Altium.com

TARGET ADJUSTABLE REGULATOR



J100:
 - Cut-strap used for full separation of target power from the level shifters and on-board regulators.
 - 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.
J101:
 - For current measurements using the on-board power supply, this strap must be cut and an ammeter connected across.

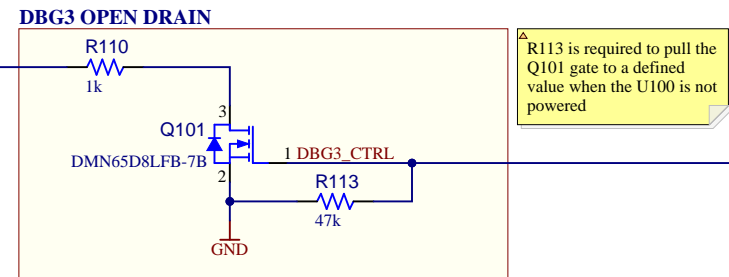
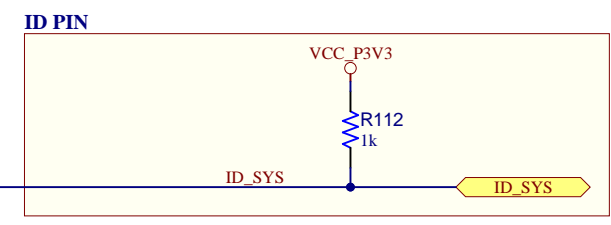
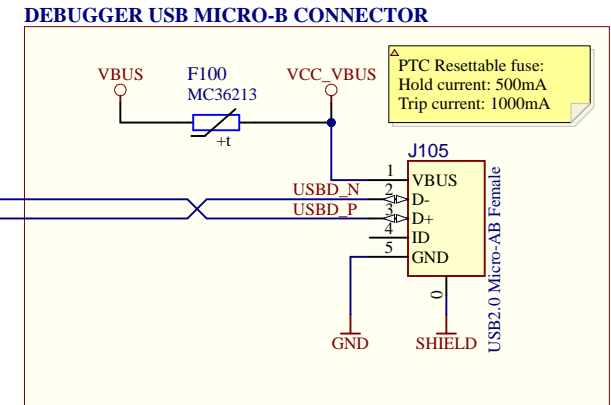
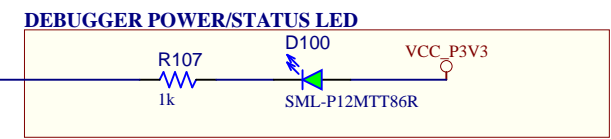
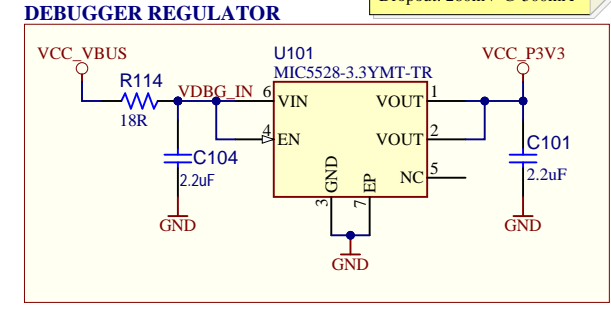
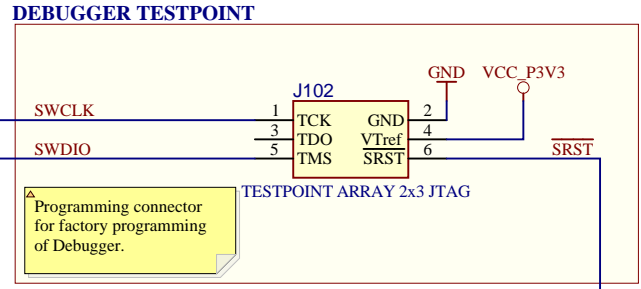
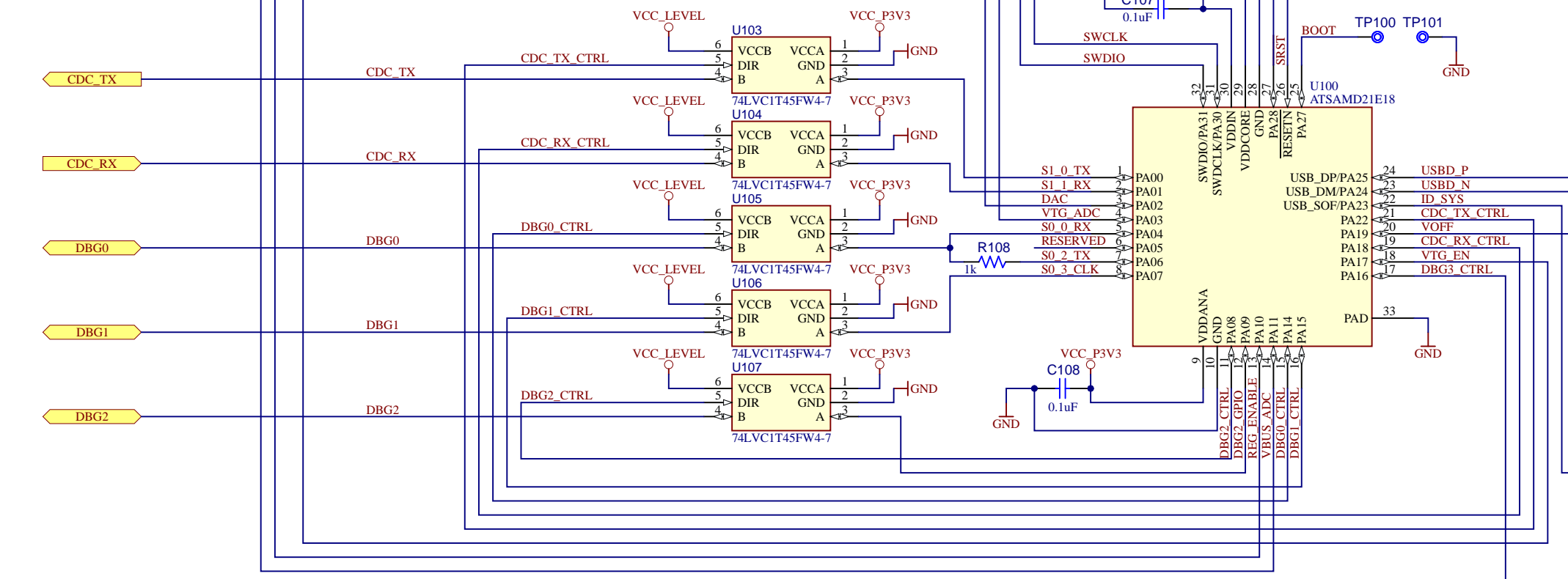
MIC5353:
 Vin: 2.6V to 6V
 Vout: 1.25V to 5.1V
 Imax: 500mA
 Dropout (typical): 50mV@150mA, 160mV @ 500mA
 Accuracy: 2% initial
 Thermal shutdown and current limit
 Maximum output voltage is limited by the input voltage and the dropout voltage in the regulator.
 ($V_{max} = V_{in} - \text{dropout}$)

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

Interface Signal	ICSP TARGET	UPDI TARGET	SWD TARGET
CDC TX	UART RX	UART RX	UART RX
CDC RX	UART TX	UART TX	UART TX
DBG0	DAT	UPDI	SWDAT
DBG1	CLK	GPIO	SWCLK
DBG2	GPIO	GPIO	SWO/GPIO
DBG3	MCLR	RESET	RESET
VCC	-	-	-

Adjustable output and limitations:
 - The DEBUGGER can adjust the output voltage of the regulator between 1.25V and 5.1V to the target.
 - The voltage output is limited by the input (USB), which can vary between 4.40V to 5.25V
 - 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 MIC94163 has a minimal voltage 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 target specification.

DEBUGGER



Project Owner:
P. Breedveld

PCB Layout Contact:
P. Breedveld

PartNumber: EV72Y42A
Project Title: AVR64DD32 Curiosity Nano
Variant: Default Assembly

Sheet Title: Debugger

Size: A3
SCH #: 02-00195
Rev: 2
Date: 2022-06-02

File: AVR64DD32_Curiosity_Nano_Debugger.SchDoc

Sheet 3 of 4

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Revision History

PCB Assembly Rev 1:

Design Changes:

Initial Design

PCB:

PCB revision 1


PCB Assembly Rev 2:

Design Changes:

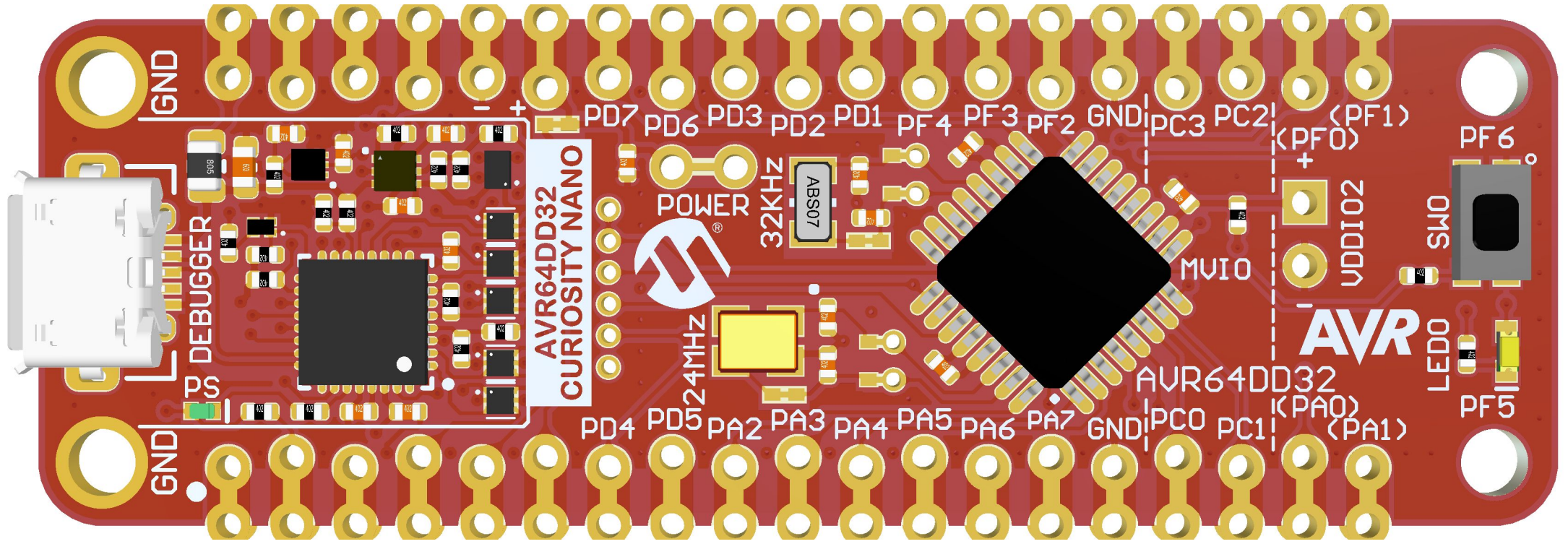
Replaced 32.768 kHz crystal (CI = 9pF -> CI = 7pF) and tuning capacitors
Replaced 24 MHz crystal (CI = 18pF -> 12pF) and tuning capacitors
Added RC filter to U101

PCB:

PCB revision 2

Project Owner: P. Breedveld			
PCB Layout Contact: P. Breedveld			
PartNumber: EV72Y42A	Project Title AVR64DD32 Curiosity Nano	Variant: Default Assembly	
Sheet Title Revision History			
Size A3	SCH #: 02-00195 PCB #: 04-11312	Rev: 2 Rev: 2	Date: 2022-06-02 Sheet 4 of 4
File: AVR64DD32_Curiosity_Nano_Revision_History.SchDoc			





GND

GND

PS DEBUGGER

AVR64DD32
CURIOSITY NANO



POWER

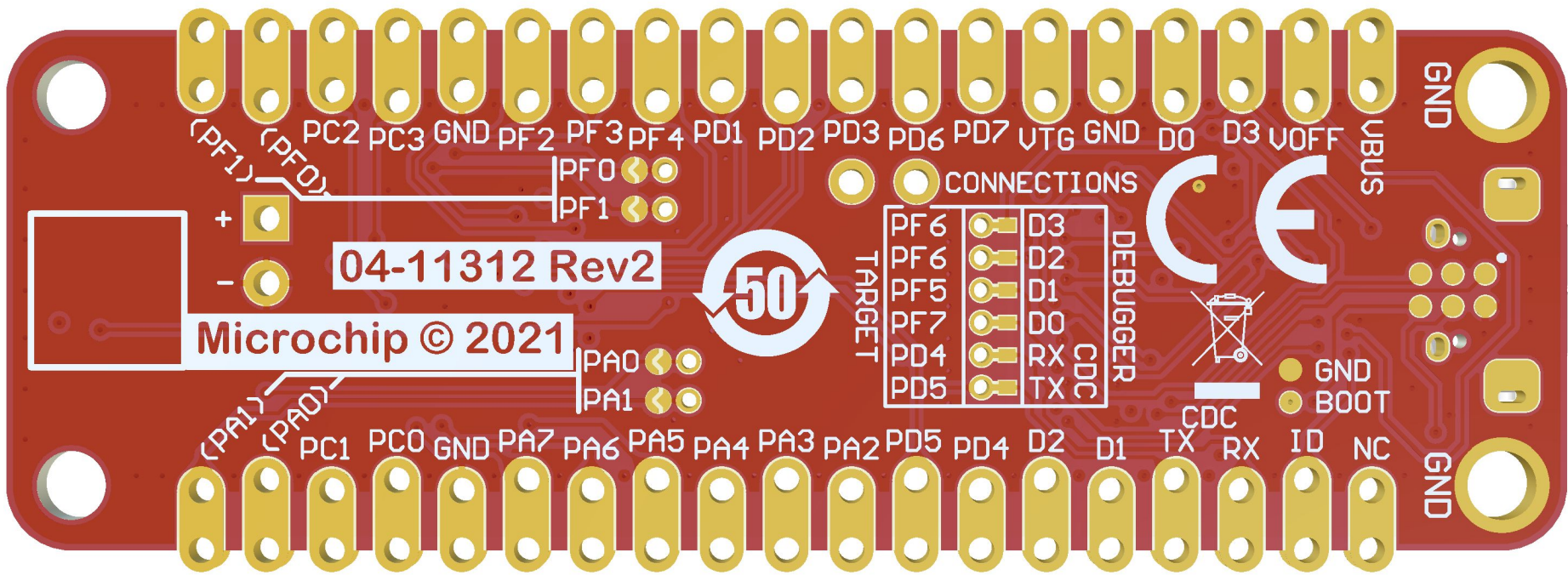
ZHX2C
ABS07

32MHZ

PD7 PD6 PD3 PD2 PD1 PF4 PF3 PF2 GND PC3 PC2
(PF1) (PF0) +
UDDI02
MUIO
AVR64DD32
GND PC0 PC1 (PA0) (PA1)
PD4 PD5 PA2 PA3 PA4 PA5 PA6 PA7

LED0
SWD

PF6
PF5



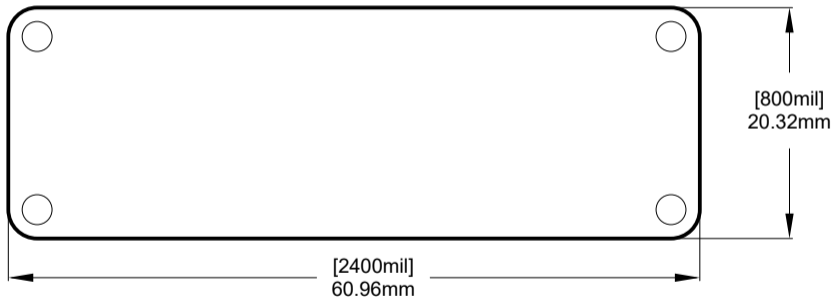
04-11312 Rev2
Microchip © 2021

CONNECTIONS	
PF6	D3
PF6	D2
PF5	D1
PF7	D0
PD4	RX
PD5	TX

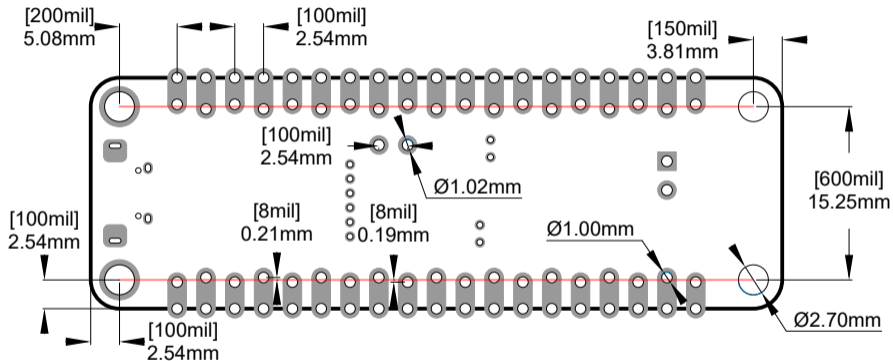
DEBUGGER

GND
BOOT

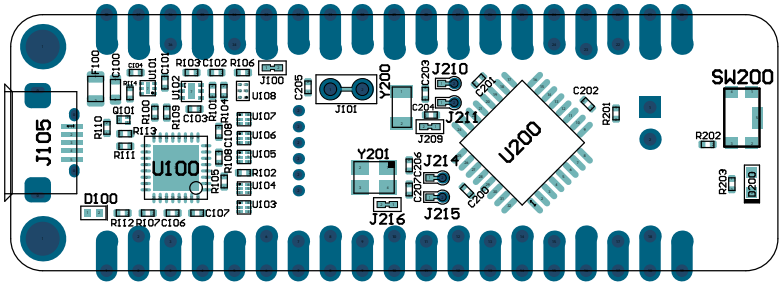
Board Outline



Through-Hole Dimensions



■ Centerline of staggered through-holes for pin headers.



J105

D100

F100

R112 R107 C106

R110

C100

R111

R113

Q101

R100

BE4

U101

C101

U102

R103

C102

R106

J100

U108

R109

U101

C103

R101

R104

U107

U106

U105

U104

U103

R105

R108

C108

R104

C205

J101

Y200

C203

J210

C204

J209

C201

C202

R201

SW200

R202

U200

R203

D200

Y201

J214

C206

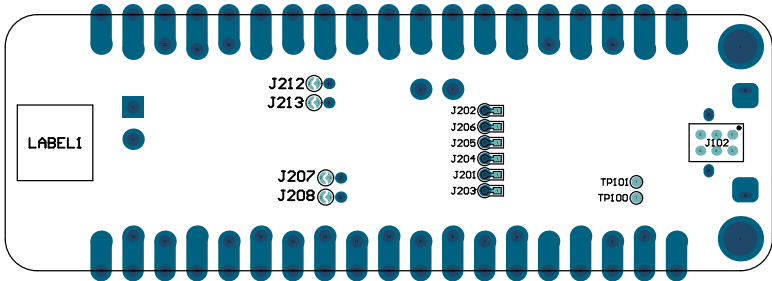
J215

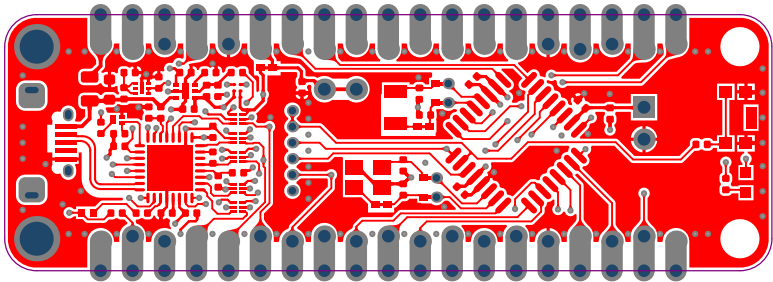
C207

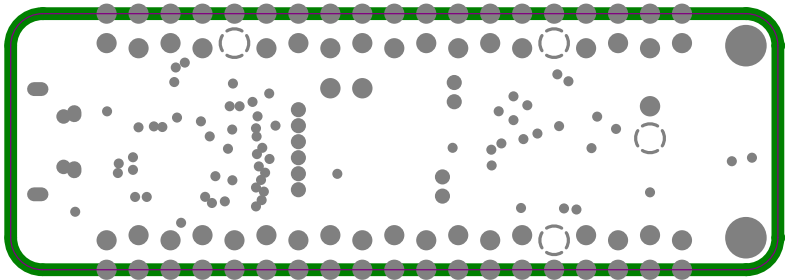
C200

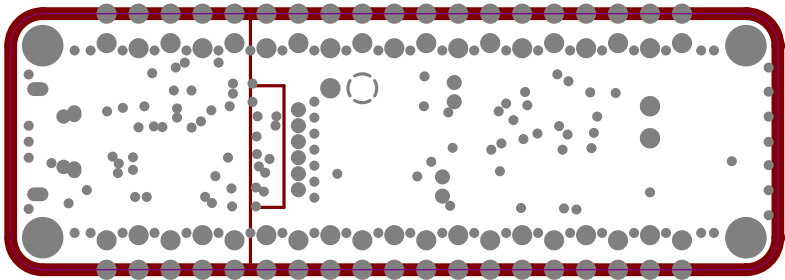
J216

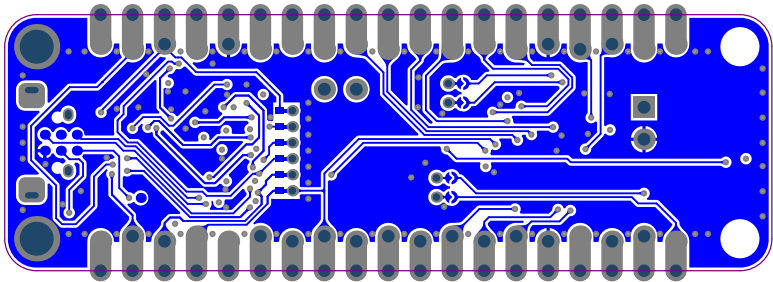
D200











PCB Stackup

Material	Layer	Thickness	Dielectric Material	Type	Gerber
	Top Overlay			Legend	GTO
Surface Material	Top Solder	0.01mm	Solder Resist	Solder Mask	GTS
Copper	Top Layer	0.04mm		Signal	GTL
Prepreg		0.11mm	PP-006	Dielectric	
CF-004	Gnd Plane	0.04mm		Internal Plane	GP1
Core		1.23mm	FR-4	Dielectric	
CF-004	Pwr Plane	0.04mm		Internal Plane	GP2
Prepreg		0.11mm	PP-006	Dielectric	
Copper	Bottom Layer	0.04mm		Signal	GBL
Surface Material	Bottom Solder	0.01mm	Solder Resist	Solder Mask	GBS
	Bottom Overlay			Legend	GBO

Total thickness: 1.61mm

Component list

Bill of Materials Fitted for Variant [Default Assembly] of Project [AVR64DD32_Curiosity_Nano.PrjPcb] (No PCB Document Selected)

Source Data From: AVR64DD32_Curiosity_Nano.PrjPcb
 Project: AVR64DD32_Curiosity_Nano.PrjPcb
 Variant: Default Assembly



Report Date: 2022-06-02 08:56
 Print Date: 2022-06-02 8:56:08

Fitted	Designator	Quantity	Value	Manufacturer 1	Manufacturer Part Number 1	Description_
Fitted	C100	1	4.7uF	KEMET	C0603C475K8PACTU	CAP CER 4.7uF 10V 10% X5R SMD 0603
Fitted	C101, C103, C104, C205	4	2.2uF	Hottech	C1005A225K6R3NT, C1005A225K100NT	CAP CER 2.2uF 6.3V 10% X5R SMD 0402, CAP CER 2.2uF 10V 10% X5R SMD 0402
Fitted	C102, C107, C108, C200, C201, C202	6	0.1uF	KEMET	C0402C104K4RACAUTO	CAP CER 0.1uF 16V 10% X7R SMD 0402
Fitted	C106	1	1uF	KEMET	C0402C105K9PACTU	CAP CER 1uF 6.3V 10% X5R SMD 0402
Fitted	C203	1	5.6pF	Vishay	VJ0402A5R6DXACW1BC	CAP CER 5.6pF 50V 0.5pF NPO SMD 0402
Fitted	C204	1	6.8pF	Murata	GRM1555C1H6R8BA01D	CAP CER 6.8pF 50V 0.1pF NPO SMD 0402
Fitted	C206	1	12pF	Samsung Electro-Mechanics	CL05C120JB5NNNC	CAP CER 12pF 50V 5% COG SMD 0402
Fitted	C207	1	15pF	Murata	GRM1555C1H150JZ01D	CAP CER 15pF 50V 5% NPO SMD 0402
Fitted	D100	1	LED SINGLE SML-P12MTT86R YELLOW-GREEN	Rohm Semiconductor	SML-P12MTT86R	DIO LED YELLOW-GREEN 2.2V 20mA 25mcd Clear SMD 0402
Fitted	D200	1	Yellow LED	Rohm Semiconductor	SML-D12Y1WT86	LED YELLOW DIFFUSED 1608 SMD
Fitted	F100	1		MULTICOMP	MC36213	PPTC Resettable Fuse, SMD, MC36 Series, 500 mA, 1 A, 6 VDC, -40 °C
Fitted	J105	1	USB2.0 Micro-AB Female	Allen Creations Corp	MJ-MB0142AB2-269	CON USB2.0 Micro-AB Female SMD R/A
Fitted	LABEL.1	1	PCBA LABEL 6X6mm	ACT Logimark AS	505462	LABEL PCBA 6x6mm Datamatrix
Fitted	Q101	1	DMN65D8LFB-7B	Diodes Incorporated	DMN65D8LFB-7B	TRANS FET N-CH DMN65D8LFB-7B 260mA 60V 430mW X1_DFN1006-3
Fitted	R100, R101, R102, R103, R105, R109, R111, R113	8	47k	Hottech	R0402L4702FT	RES TKF 47k 1% 1/16W SMD 0402
Fitted	R104	1	27k	Hottech	R0402L2702FT	RES TKF 27k 1% 1/16W SMD 0402
Fitted	R106	1	33k	Yageo	AC0402FR-0733KL	RES TKF 33k 1% 1/16W SMD 0402
Fitted	R107, R108, R110, R112, R202, R203	6	1k	Panasonic	ERJ-2RKF1001X	RES TKF 1k 1% 1/10W SMD 0402
Fitted	R114	1	18R	Yageo	RC0402FR-0718RL	RES TKF 18R 1% 1/16W SMD 0402
Fitted	R201	1	0R	Yageo	RC0402JR-070RL	RES TKF 0R 1/16W SMD 0402
Fitted	SW200	1	TACT SPST	KLS Electronic	L-KLS7-TS0304A-2-300-T	SWITCH TACT SPST 12V 50mA L-KLS7-TS0304A-2-300-T SMD
Fitted	Test1	1	Test Procedure Automated			TEST, AVR64DD32-CNANO
Fitted	Test2	1	Debugger Firmware			FW, CNANO-DEBUGGER
Fitted	U100	1	ATSAMD21E18	Microchip Technology	ATSAMD21E18A-MUT	MCHP MCU 32-BIT 48MHz 256Kb 32Kb ATSAMD21E18A-MUT QFN-32
Fitted	U101	1	MIC5528 3V3	Microchip Technology	MIC5528-3.3YMT-TR	MCHP ANALOG LDO 3.3V MIC5528-3.3YMT-TR 6-TDFN
Fitted	U102	1	MIC5353YMT-TR	Microchip Technology	MIC5353YMT-TR	MCHP ANALOG LDO ADJ 500mA MIC5353YMT-TR MLF-6
Fitted	U103, U104, U105, U106, U107	5	74LVC1T45FW4-7	Diodes Incorporated	74LVC1T45FW4-7	IC VOLTAGE TRANSLATOR BI-DIR 1 CIRCUIT 74LVC1T45FW4-7 X2-DFN1010-6
Fitted	U108	1	MIC94163YCS	Microchip Technology	MIC94163YCS-TR	IC LOAD SWITCH HI SIDE 3A 6WLCSP
Fitted	U200	1	AVR64DD32	Microchip Technology	AVR64DD32-IPT	MCHP MCU 8-bit 24MHz 64Kb 8Kb AVR64DD32-IPT TQFP-32
Fitted	Y200	1	32.768kHz	Microchip	VMK3-9002-32K7680000	MCHP CRYSTAL 32.768kHz 7pF VMK3-9002-32K7680000 SMD L3.2W1.5H0.9
Fitted	Y201	1	24MHz	Microchip	VXM7-9062-24M0000000	MCHP CRYSTAL 24MHz 12pF VXM7-9062-24M0000000 SMD L3.2W2.5H0.8
Not Fitted	J217	0	HDR-2.54 Male 1x2	Würth Elektronik	61300211121	CON HDR-2.54 Male 1x2 Gold 5.84MH TH VERT
		55				
Approved			Notes			