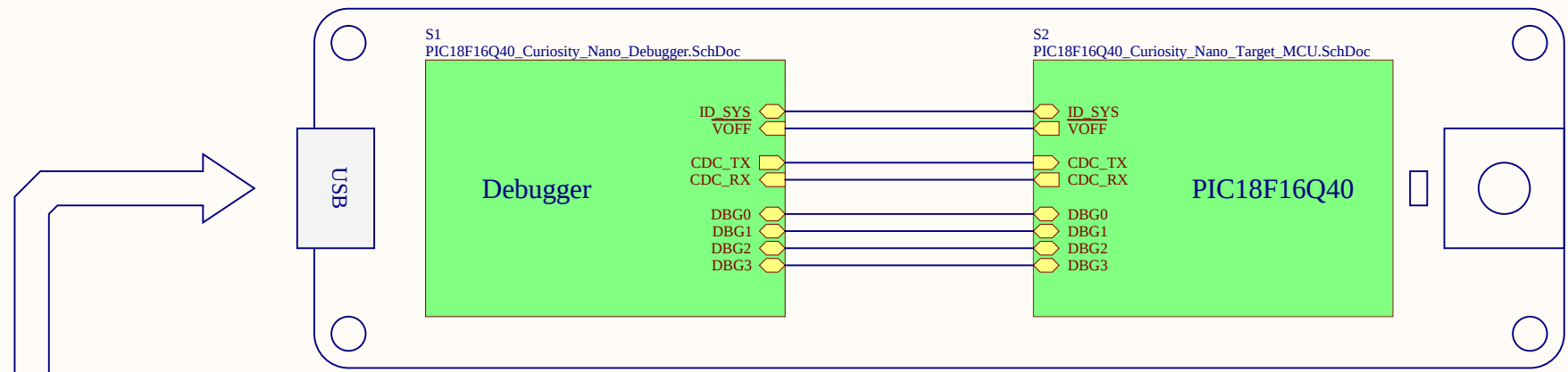
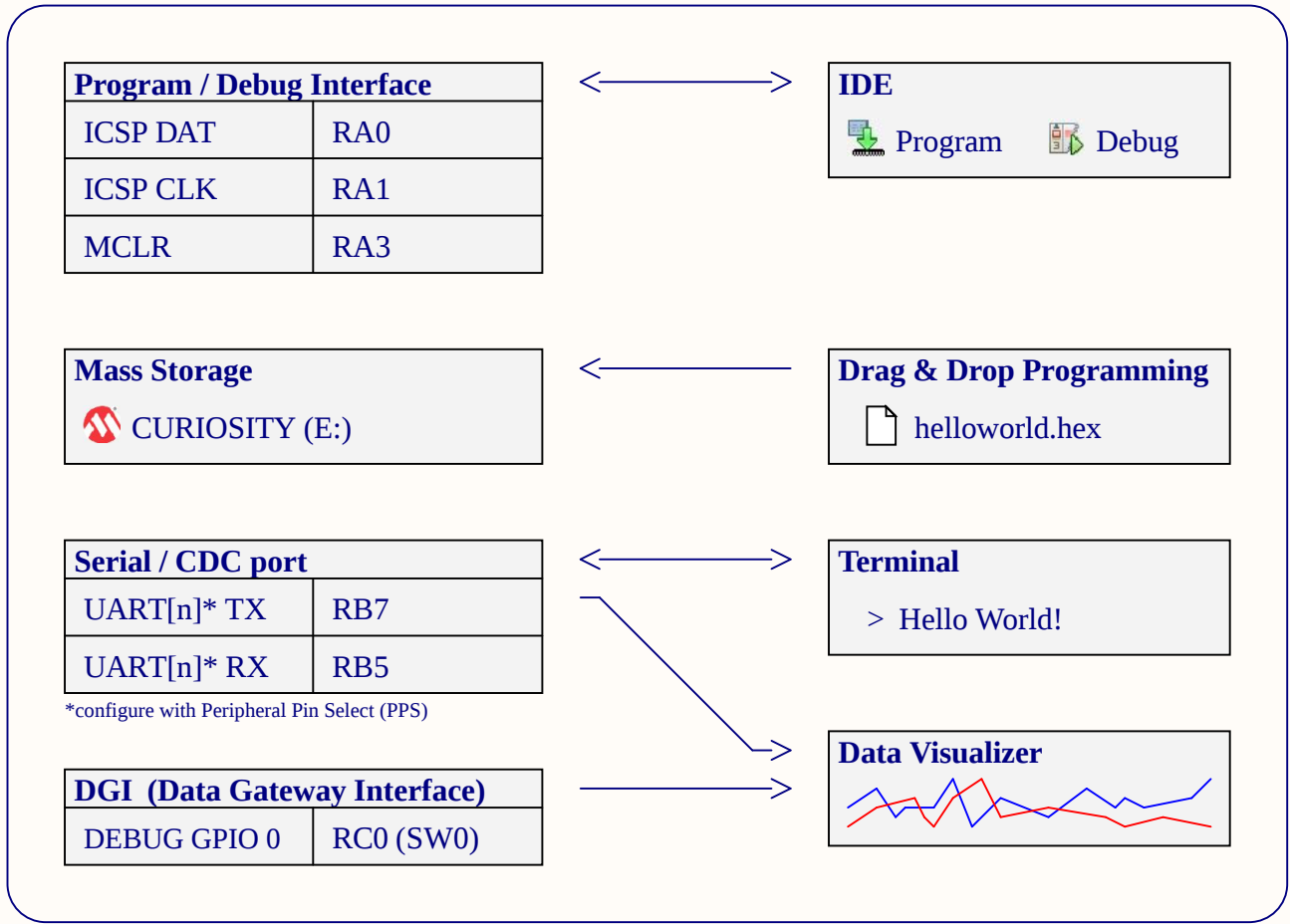


PIC18F16Q40 Curiosity Nano



On-Board Peripherals		
LED0	RC1	Active Low
SW0	RC0	Active Low



TESTDOC1
A12-1314

TEST1
\$ >_
A11-0487

FW1
A11-0406

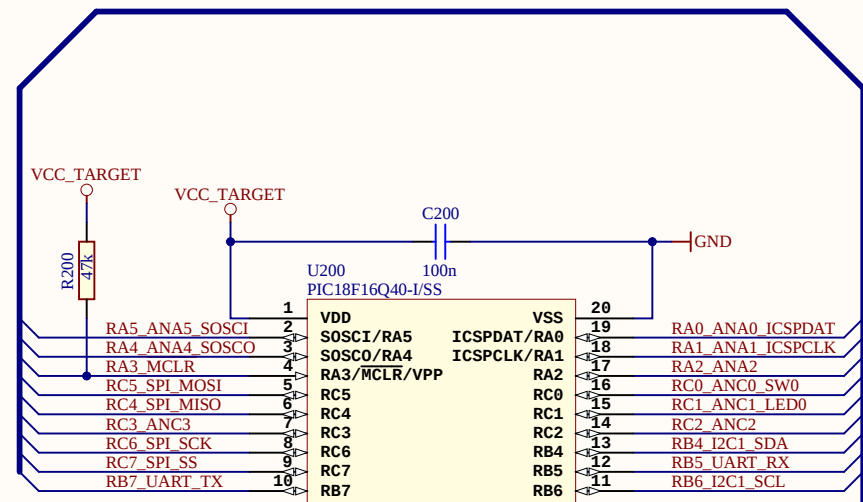
PCBADOC1
A12-1448

PCB1
A08-3084

LABEL1
Label PCBA

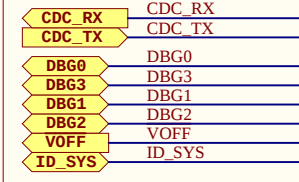
Product number/revision
Serial number

PIC18F16Q40

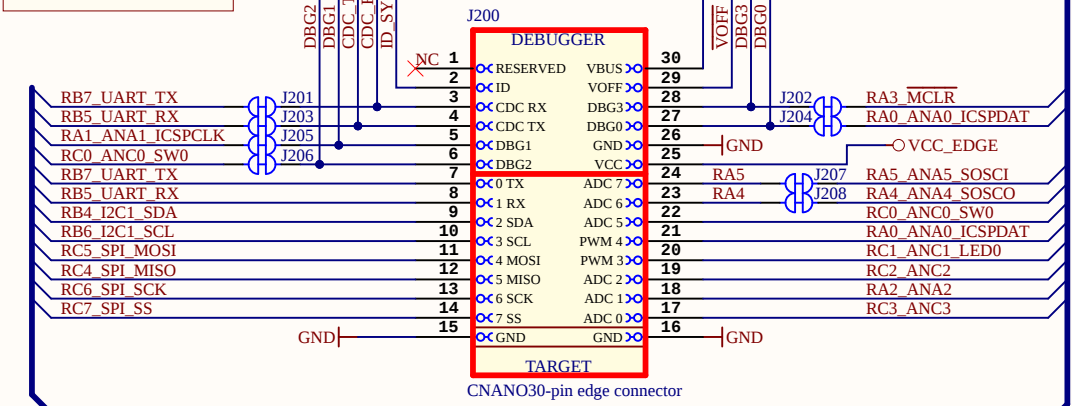
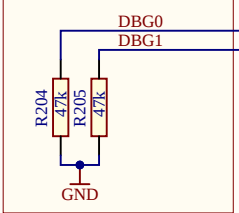


PIC18F16Q40		
Debugger	Name	Pin
CDC TX	UART[n] RX	RB5
CDC RX	UART[n] TX	RB7
DBG0	ICSPDAT	RA0
DBG1	ICSPCLK	RA1
DBG2	GPIO0	RC0
DBG3	MCLR	RA3
VTG	1.8V - 5.5V	

DEBUGGER CONNECTIONS



PROG/DEBUG Pull



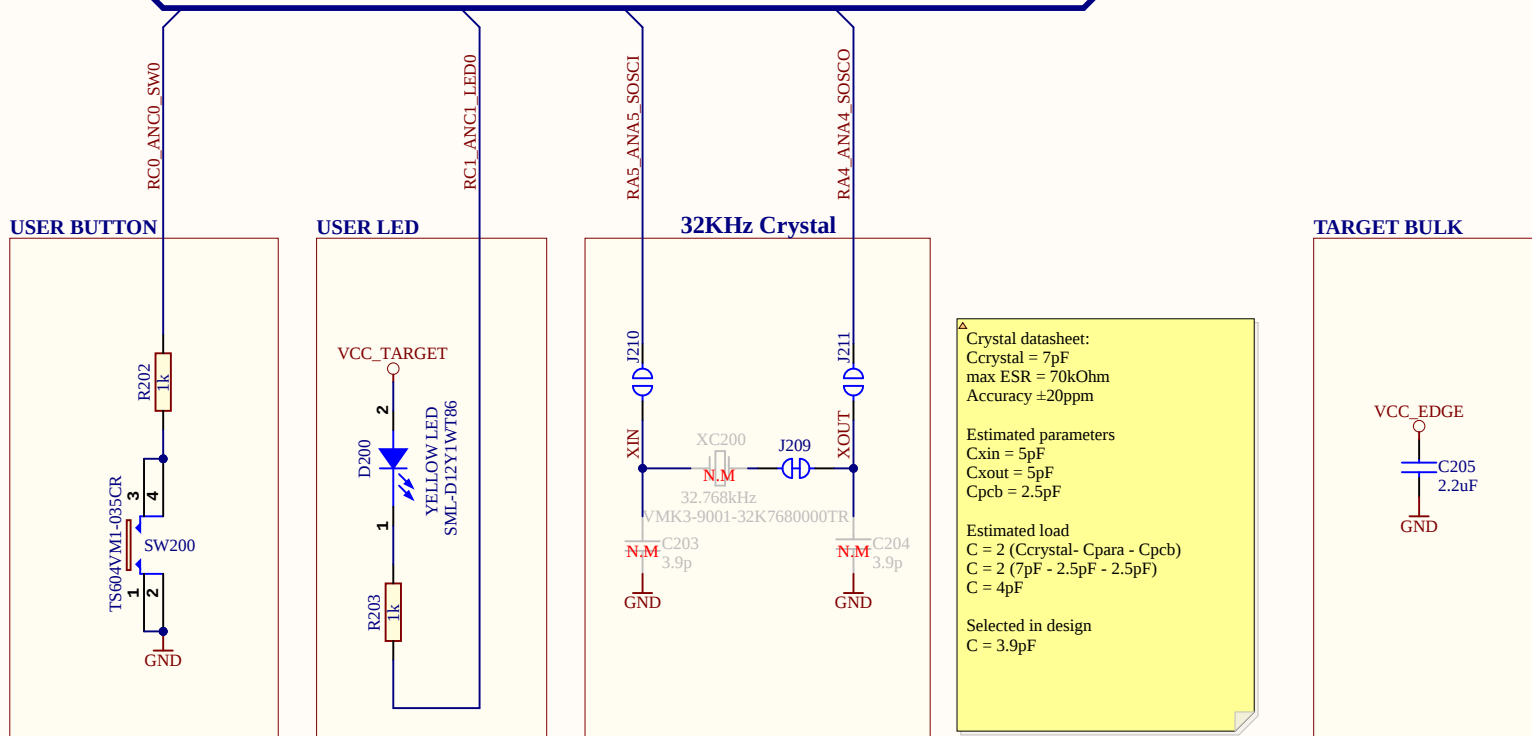
NOTE on UART/CDC:

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

CDC TX is output from the DEBUGGER.
CDC RX is input to the DEBUGGER.
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

Estimated parameters
Cxin = 5pF
Cxout = 5pF
Cpcb = 2.5pF

Estimated load
C = 2 (Ccrystal - Cpara - Cpcb)
C = 2 (7pF - 2.5pF - 2.5pF)
C = 4pF

Selected in design
C = 3.9pF

Drawn By:
ML

Engineer:
PB

MICROCHIP

Project Title
PIC18F16Q40 Curiosity Nano

Sheet Title
Target MCU

Size A3

PCB Assembly Number: A09-3373

PCB Number: A08-3084

File: PIC18F16Q40_Curiosity_Nano_Target_MCU.SchDoc

PCBA Revision: 2

Revision: 2

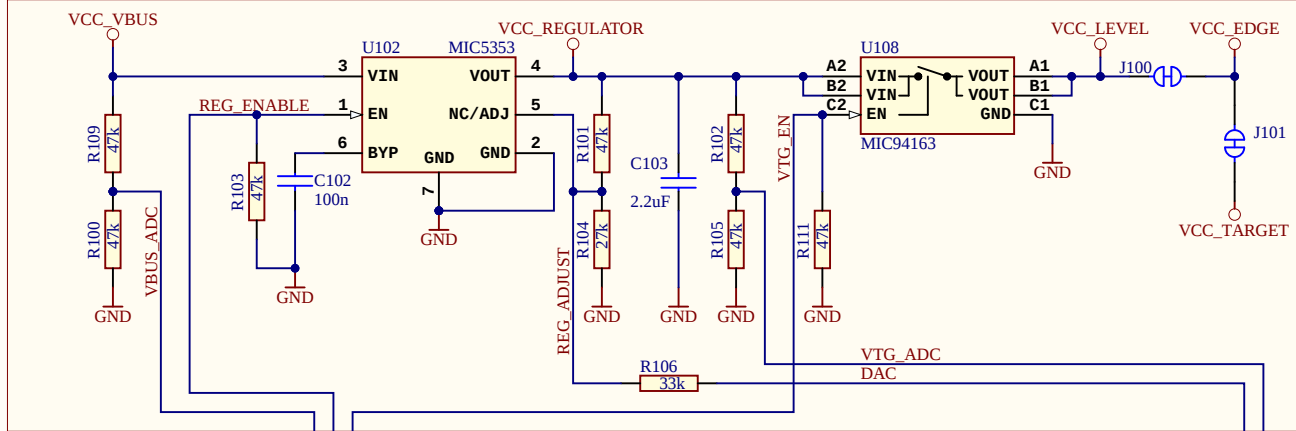
Designed with
Altium

Altium.com

Date: 8/13/2020

Page: 2 of 4

TARGET ADJUSTABLE REGULATOR



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.

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:
This is footprint for a 1x2 100mil pitch pin-header that can be used for easy current measurement to the target microcontroller and the LED / Button. To use the footprint:
- Cut the track between the holes, and mount a pin-header

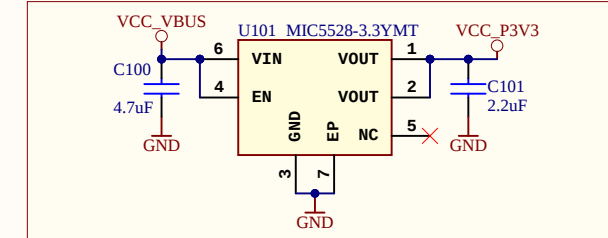
MIC5353:
Vin: 2.6V to 6V
Vout: 1.25V to 5.1V
Imax: 500mA
Dropout (typical): 50mV@150mA, 160mV @ 500mA
Accuracy: 2% initial
Thermal shutdown and current limit

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

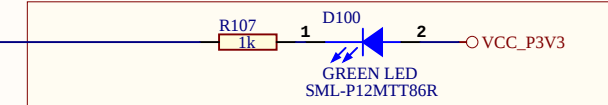
Interface	ICSP TARGET	UPDI TARGET	SWD TARGET
CDC TX	UART RX	UART RX	UART RX
CDC RX	UART TX	UART TX	UART TX
DBG0	DAT	UPDI	SWDAT
DBG1	CLK	GPIO	SWCLK
DBG2	GPIO	GPIO	SWO/GPIO
DBG3	MCLR	RESET	RESET
VCC	-	-	-

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

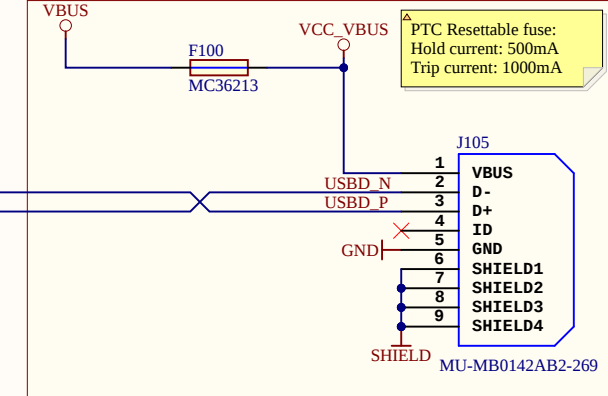
DEBUGGER REGULATOR



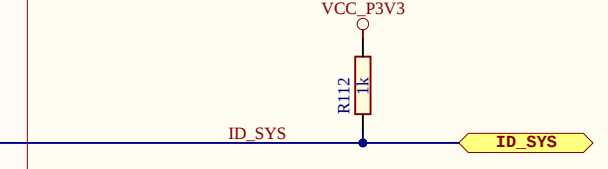
DEBUGGER POWER/STATUS LED



DEBUGGER USB MICRO-B CONNECTOR

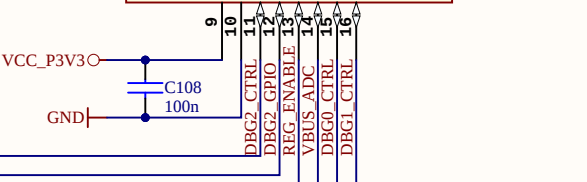
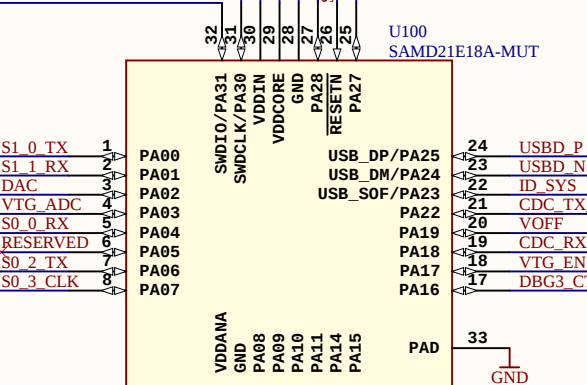
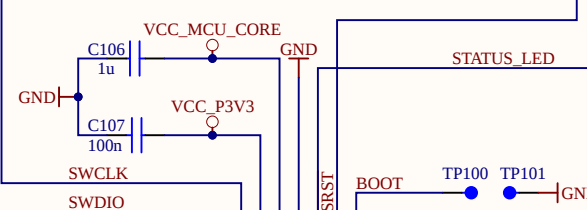
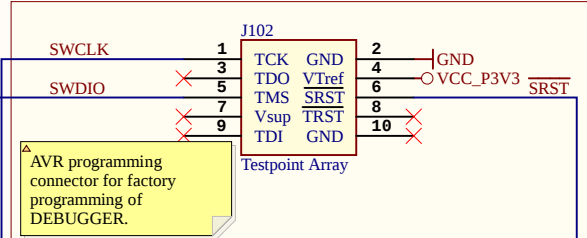


ID PIN

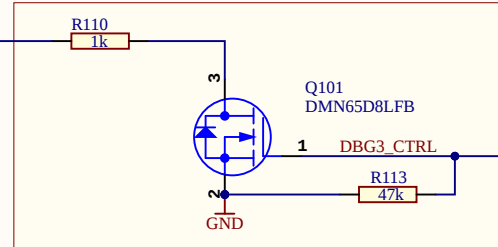


DEBUGGER

DEBUGGER TESTPOINT



DBG3 OPEN DRAIN



R113:
Pull down to prevent
DBG3_CTRL from
floating when debugger is
not powered.

Revision History

PCB Assembly Rev 1:

Design Changes:

Initial Design

PCB:

PCB revision 1

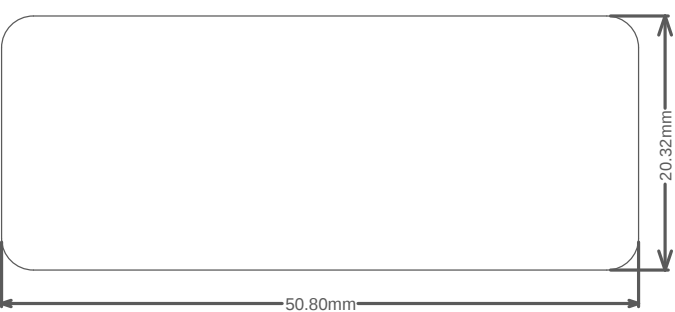
PCB Assembly Rev 2:

Design Changes:

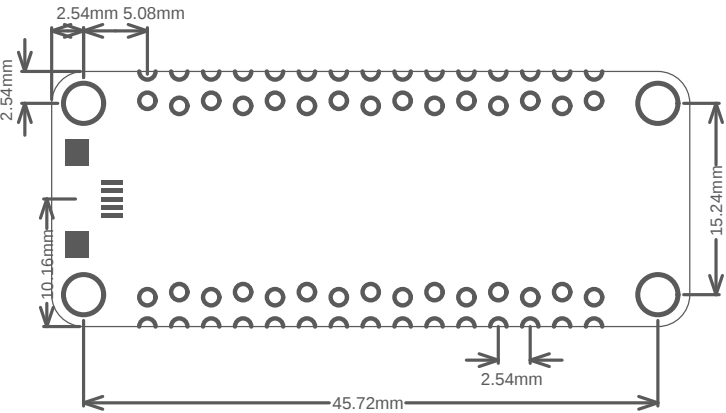
Changed to SSOP20 package

PCB:

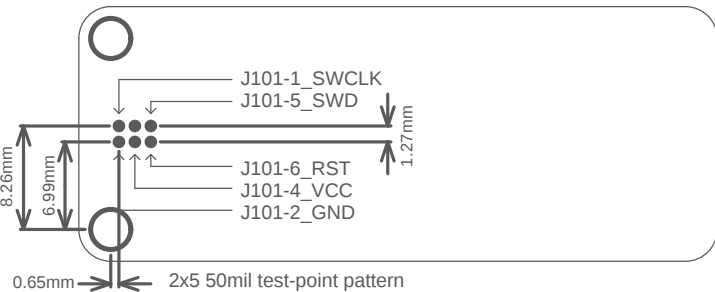
PCB revision 2

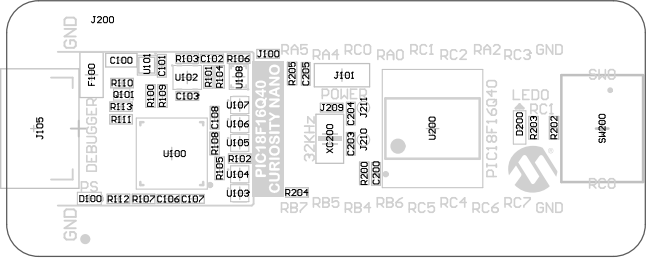


Connector Placement



Test Point Placement





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LABEL1

A08-3084 Rev2



RA3	J202	D3
RC0	J206	D2
RA1	J205	D1
RA0	J204	D0
RB7	J201	RX CDC
RB5	J203	TX CDC

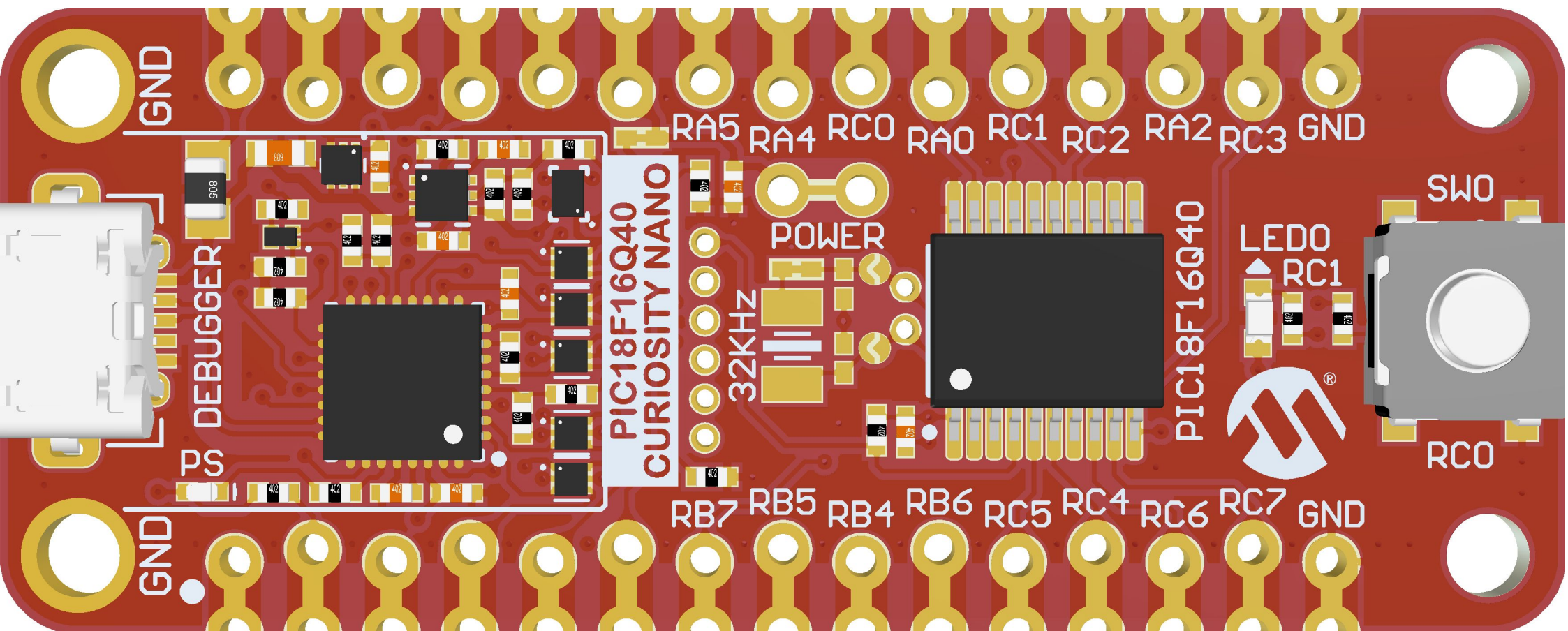
DEBUGGER



TP101 GND
TP100 BOOT

CDC TX RX ID NC

J102



GND

PS DEBUGGER

GND

PIC18F16Q40
CURIOSITY NANO

RA5 RA4 RC0 RA0 RC1 RC2 RA2 RC3 GND

RB7 RB5 RB4 RB6 RC5 RC4 RC6 RC7 GND

32KHz

POWER

PIC18F16Q40

LED0 RC1

SW0

RC0

Microchip © 2020

A08-3084 Rev2

GND RC3 RA2 RC2 RC1 RA0 RC0 RA4 RA5 V_{TT} GND D0 D3 V_{OFF} V_{BUS}

RA4
RA5

TARGET

RA3	D3
RC0	D2
RA1	D1
RA0	D0
RB7	RX
RB5	TX

DEBUGGER

CDC

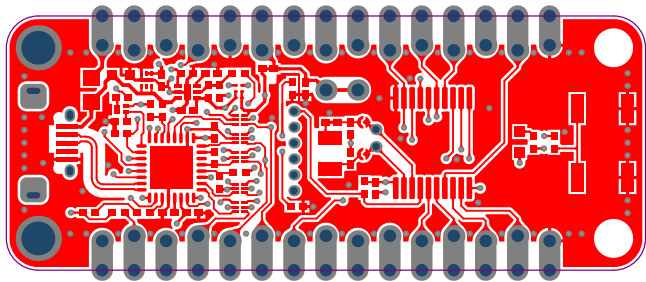
CDC

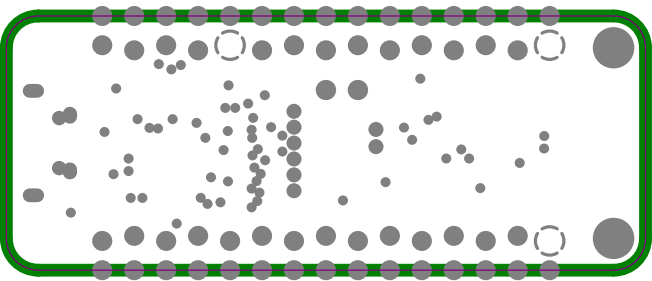
GND
BOOT

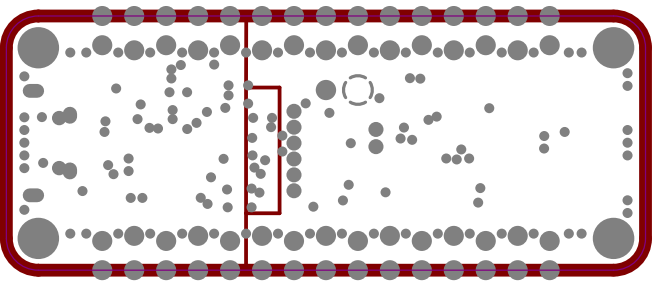
GND RC7 RC6 RC4 RC5 RB6 RB4 RB5 RB7 D2 D1 TX RX ID NC

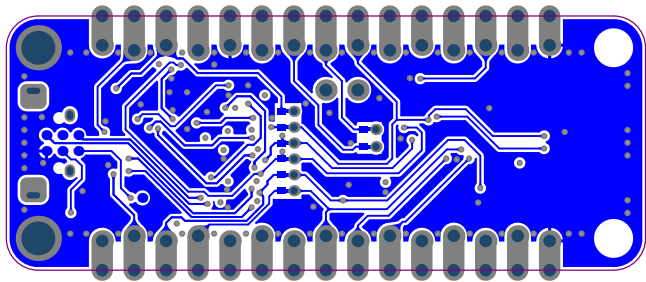
GND

GND









Component list

Bill of Materials Fitted for Variant [Default Assembly] of Project [PIC18F16Q40_Curiosity_Nano.PrjPcb] (No PCB Document Selected)

Source Data From: PIC18F16Q40_Curiosity_Nano.PrjPcb
Project: PIC18F16Q40_Curiosity_Nano.PrjPcb
Variant: Default Assembly



Report Date: 8/13/2020 3:43 PM
Print Date: 8/13/2020 3:42:32 PM

Fitted	Designator	Quantity	Value	Manufacturer	MPN	Description
Fitted	C100	1	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, C107, C108, C200	4	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	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	F100	1	MC36213	Multicomp	MC36213	Resetable PTC fuse, Ih = 0.5A, It = 1.0A, 0805 package
Fitted	FW1	1	nEDBG firmw are			nEDBG firmw are
Fitted	J105	1	MU-MB0142AB2-269	Allen Creations Corp.	MU-MB0142AB2-269	USB micro AB, Surface mount signals and DIP shield
Fitted	LABEL1	1	Label PCBA	ACT Logimark AS	505462	PCBA identification label PP Top White Gloss
Fitted	PCB1	1	PIC18F16Q40 Curiosity Nano PCB Documentation			PIC18F16Q40 Curiosity Nano PCB Documentation
Fitted	PCBADOCL	1	PIC18F16Q40 Curiosity Nano PCBA Documentation			PIC18F16Q40 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, R113, R200, R204, R205	11	47k	KOA	RK73H1ETTP4702F	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R104	1	27k	Yageo	RC0402FR-0727KL	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R106	1	33k	ASJ Holdings	CR10-3302-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	R107, R108, R110, R112, R202, R203	6	1k	ASJ Holdings	CR10-1001-FK	Thick film resistor, SMD 0402, 1/16W, 1%
Fitted	SW200	1	TS604VM1-035CR	Dailywell Electronics Co.LTD	TS604VM1-035CR-R	SWITCH, SMD, 260gf, 6.4mm X 6.2mm
Fitted	TEST1	1	PIC18F16Q40 Curiosity Nano Test			Fixture Test for PIC18F16Q40 Curiosity Nano
Fitted	TESTDOC1	1	Curiosity Nano Test Instructions			Generic Test Instructions for Curiosity Nano
Fitted	U100	1	SAMD21E18A-MUT	Microchip	ATSAMD21E18A-MUT	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 Transceiver, 1.65-5.5 Translation and 3-State Outputs
Fitted	U108	1	MIC94163	Microchip	MIC94163YCS-TR	Loadswitch, Rds(on) = 14.5mohm, 1.0mm x 1.5mm WLCSP, reverse blocking
Fitted	U200	1	PIC18F16Q40-VSS	Microchip	PIC18F16Q40T-VSS	MCU 64MHz PIC18F16Q40-VSS SSOP20
Not Fitted	C203, C204	0	3.9p	Yageo	CC0402CRNP09BN3R9	Ceramic capacitor, SMD 0402, NP0, 50V, +/-0.25pF
Not Fitted	XC200	0	32.768kHz	Microchip	VMK3-9001-32K7680000TR	Crystal, 32.768kHz, CL=9.0pF, ESR=70kOhm, SMD LxW=3.2 x 1.5mm, 20ppm
		50				
Approved			Notes			