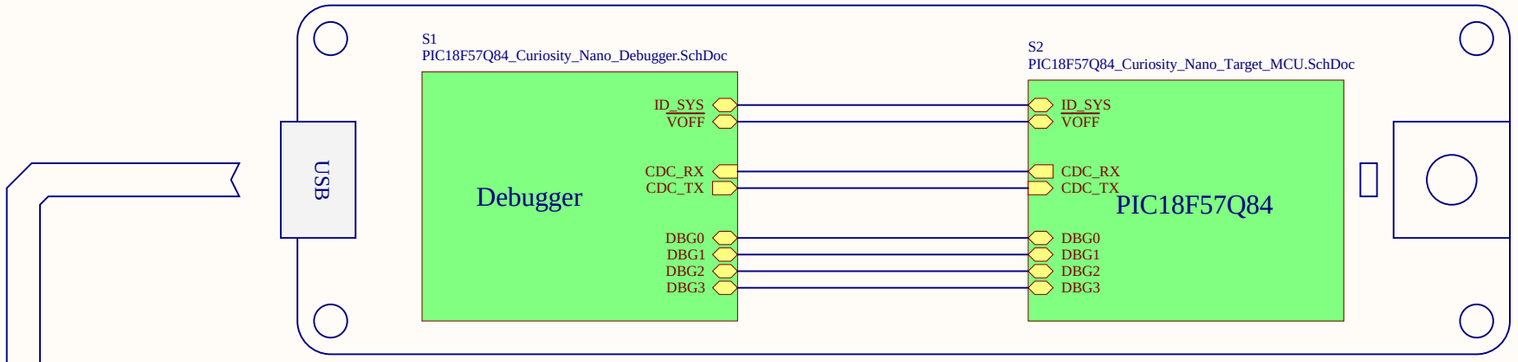
PIC18F57Q84 Curiosity Nano



On-Board Peripherals		
LED0	RF3	Active Low
SW0	RA3	Active Low

Program / Debug Interface	
ICSP DAT	RB7
ICSP CLK	RB6
MCLR	RE3

IDE

Program Debug

Mass Storage

CURIOSITY (E:)

Drag & Drop Programming

helloworld.hex

Serial / CDC port	
UART[1/3/5]* TX	RF0
UART[1/3/5]* RX	RF1

*configure with Peripheral Pin Select (PPS)

Terminal

> Hello World!

Data Visualizer

DGI (Data Gateway Interface)	
DEBUG GPIO 0	RA3 (SW0)

TESTDOC1
A12-1314

TEST1
A11-0467

FW1
A11-0406

PCBADOC1
A12-1415

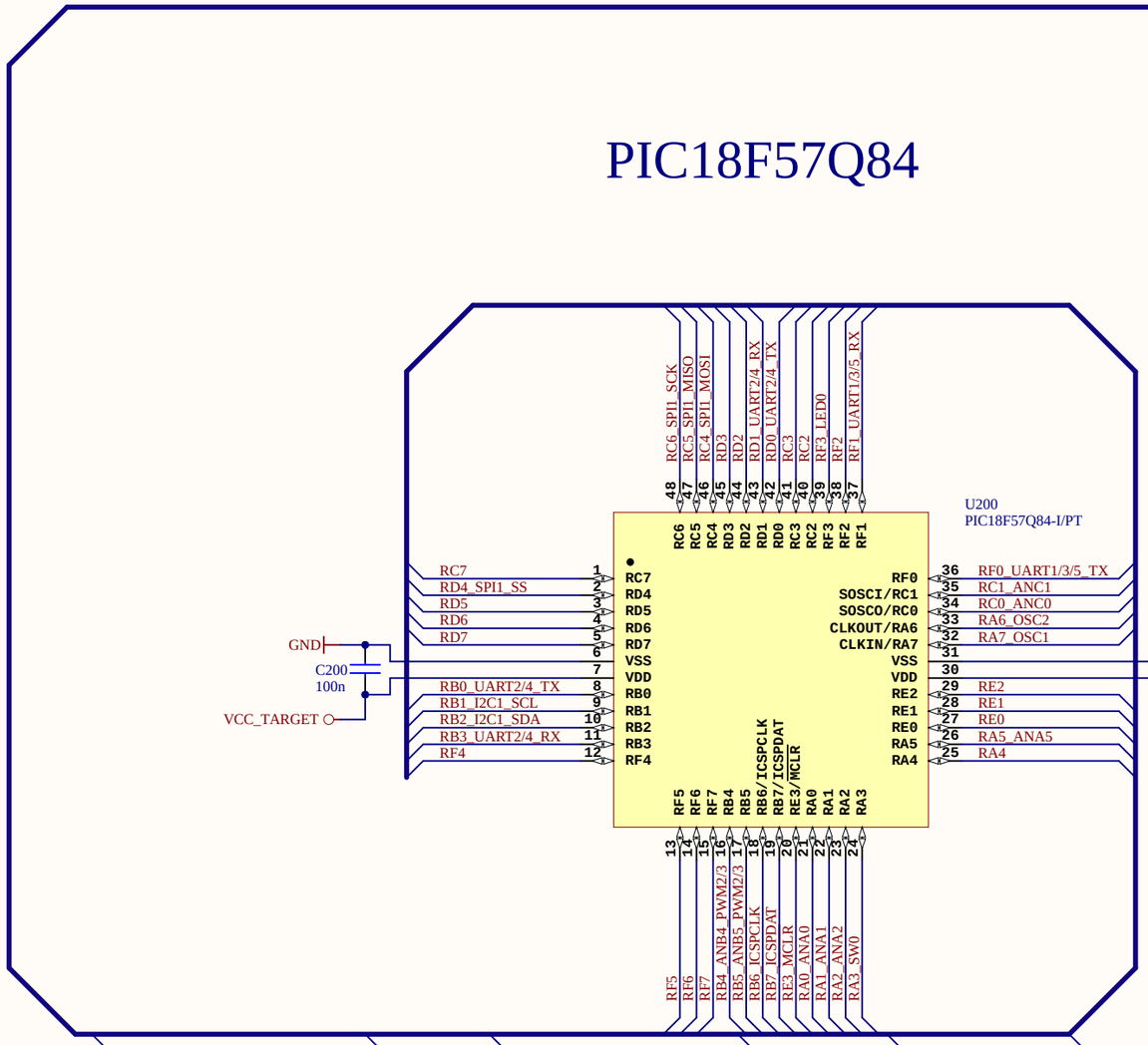
PCB1
A08-3039
PIC18F57Q84 Curiosity Nano PCB Documentation

LABEL1
Product number/revision
Serial number
Label PCBA

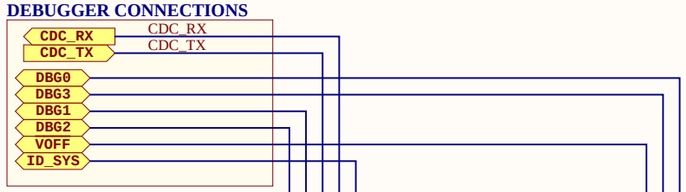
S3
PIC18F57Q84_Curiosity_Nano_Revision_History.SchDoc

Drawn By: ML, PB			
Engineer: SR, PB			
Project Title: *PIC18F57Q84 Curiosity Nano*			Designed with Altium — Altium.com
Sheet Title: Top Level			
Size A3	PCB Assembly Number: A09-3321	PCBA Revision: 4	Date: 12/14/2020
	PCB Number: A08-3039	PCB Revision: 3	Page: 1 of 4
File: PIC18F57Q84_Curiosity_Nano_TopLevel.SchDoc			

PIC18F57Q84

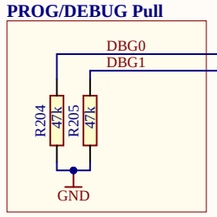


DEBUGGER CONNECTIONS

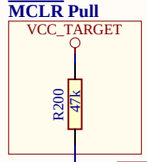


PIC18F57Q84		
Debugger	*Name*	*Pin*
CDC TX	UART RX	RF1
CDC RX	UART TX	RF0
DBG0	ICSPDAT	RB7
DBG1	ICSPCLK	RB6
DBG2	GPIO0	RA3
DBG3	$\overline{\text{MCLR}}$	RE3
VTG	1.8V - 5.5V	

PROG/DEBUG Pull



$\overline{\text{MCLR}}$ Pull



CNANO56-pin edge connector

NOTE on UART/CDC:

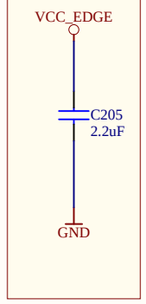
RX/TX on the header denotes the input/output direction of the signal respective to it's source.

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.

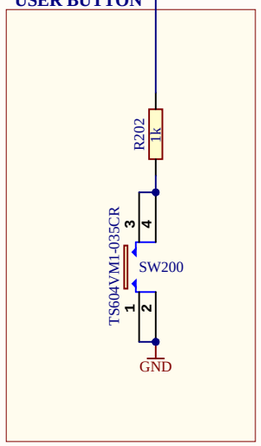
NOTE on I2C:

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

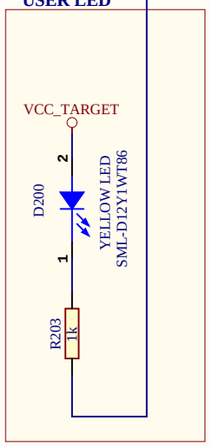
TARGET BULK



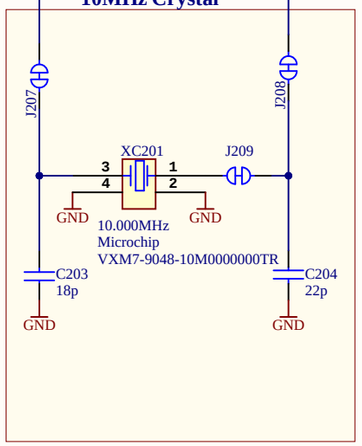
USER BUTTON



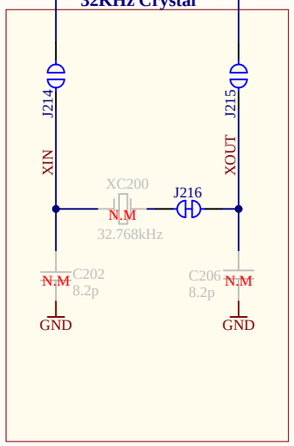
USER LED



10MHz Crystal



32KHz Crystal



10MHz Crystal

Crystal datasheet:
Ccrystal = 12pF
max ESR = 150
Accuracy ±25ppm

Selected in design after verification
C203 = 18pF
C204 = 22pF

Empirical verification of 5 units showed values within +-5 ppm clock accuracy.

Crystal safety factor tested by cutting J209 and replacing it with a 750 ohm resistor. The oscillator starts up fine.

Safety Factor = (ESR + R) / ESR
SF = (150 + 750) / 150 = 6

SF >= 5; Excellent

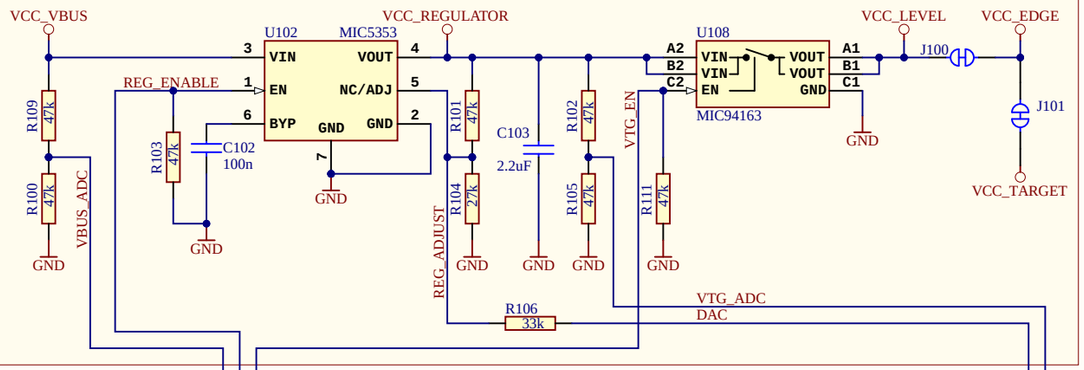
Drawn By:	ML, PB
Engineer:	SR, PB
Project Title	*PIC18F57Q84 Curiosity Nano*
Sheet Title	Target MCU
Size	A3
PCB Assembly Number:	A09-3321
PCBA Revision:	4
PCB Number:	A08-3039
PCB Revision:	3
Date:	12/14/2020
File:	PIC18F57Q84_Curiosity_Nano_Target_MCU.SchDoc
Page:	2 of 4

MICROCHIP

Designed with Altium
Altium.com

DEBUGGER

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 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 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.

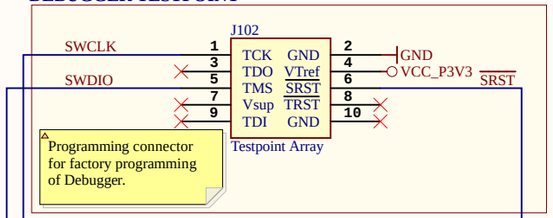
MIC5353:
Vin: 2.6V to 6V
Vout: 1.25V to 5.1V
Imax: 500mA
Dropout (typical): 50mV@150mA, 160mV @ 500mA
Accuracy: 2% initial
Thermal shutdown and current limit

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

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	$\overline{MCLR}$	$\overline{RESET}$	$\overline{RESET}$
VCC	-	-	-

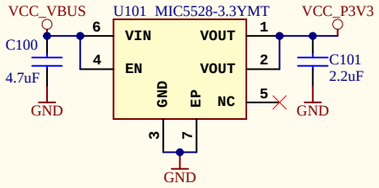
MIC5528:
Vin: 2.5V to 5.5V
Vout: Fixed 3.3V
Imax: 500mA
Dropout: 260mV @ 500mA

DEBUGGER TESTPOINT

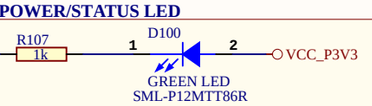


Programming connector for factory programming of Debugger.

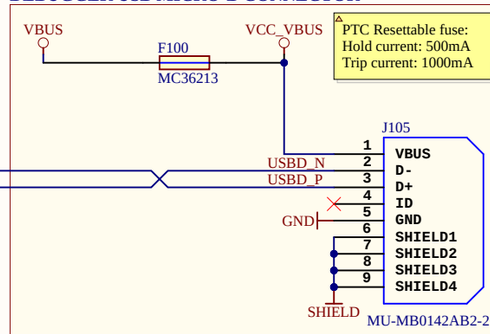
DEBUGGER REGULATOR



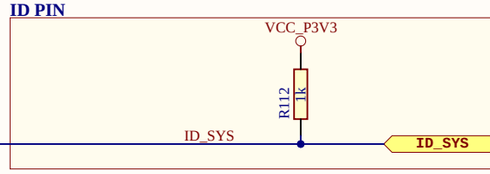
DEBUGGER POWER/STATUS LED

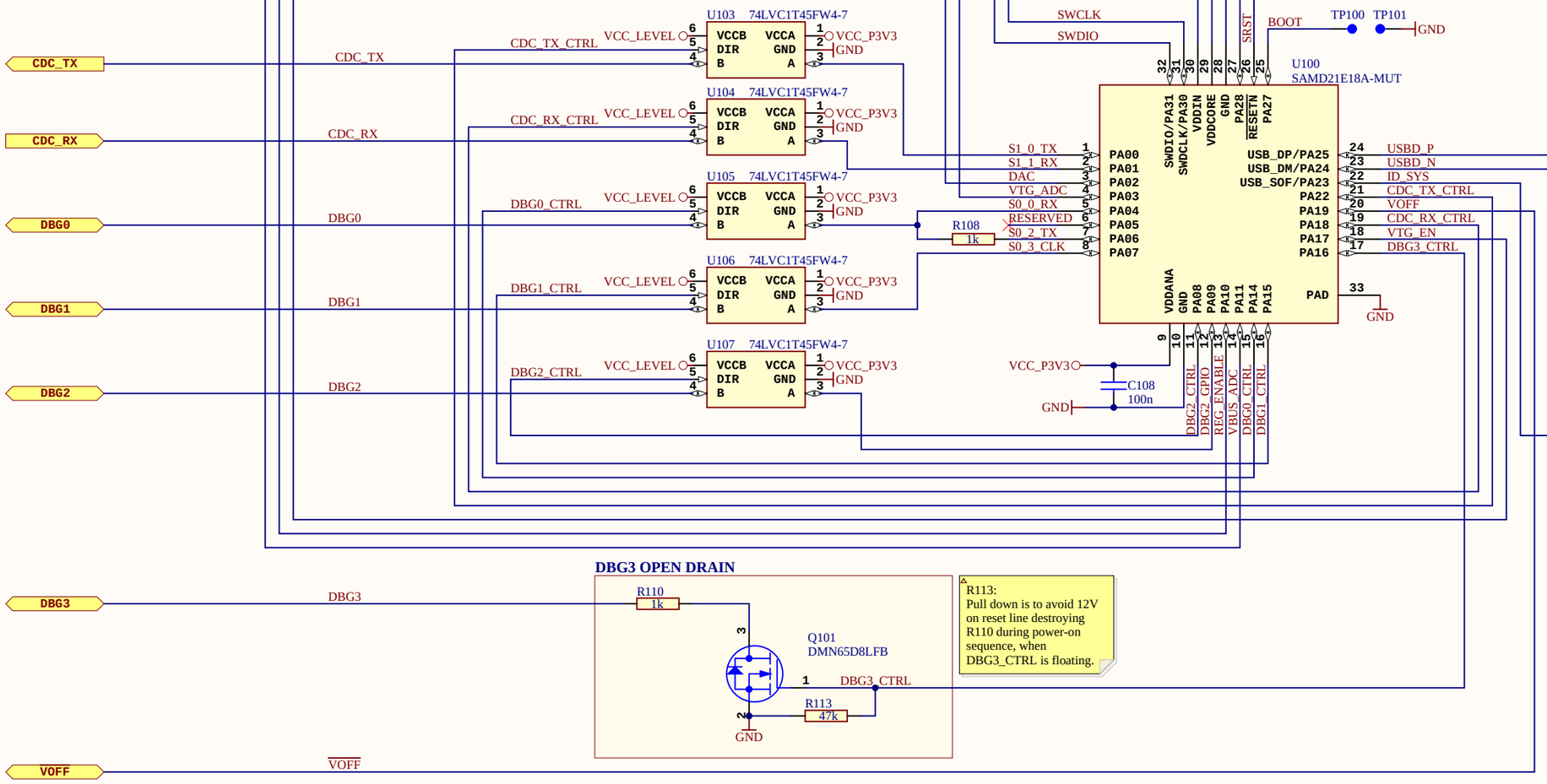


DEBUGGER USB MICRO-B CONNECTOR



ID PIN





DBG3 OPEN DRAIN

R113:
Pull down is to avoid 12V on reset line destroying R110 during power-on sequence, when DBG3_CTRL is floating.

Drawn By: ML, PB	MICROCHIP
Engineer: SR, PB	
Project Title: *PIC18F57Q84 Curiosity Nano*	Designed with Altium — Altium.com
Sheet Title: Debugger	
Size: A3	PCB Assembly Number: A09-3321 — PCBA Revision: 4
	PCB Number: A08-3039 — PCB Revision: 3
File: PIC18F57Q84_Curiosity_Nano_Debugger.SchDoc	Date: 12/14/2020 — Page: 3 of 4

Revision History

PCB Assembly Rev 1:

Design Changes:

Initial Design

PCB:

PCB revision 1

PCB Assembly Rev 2:

Design Changes:

New MCU Pinout

PCB:

PCB revision 2

PCB Assembly Rev 3:

Design Changes:

Added 10MHz crystal
Edge pinout changed to account for 10MHz crystal

PCB:

PCB revision 3

PCB Assembly Rev 4:

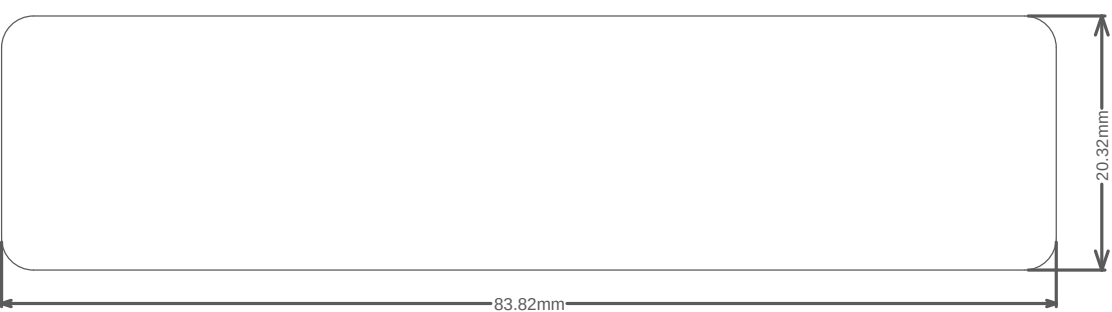
Design Changes:

Replaced C203 and C204:
C203: 10pF -> 18pF
C204: 13pF -> 22pF

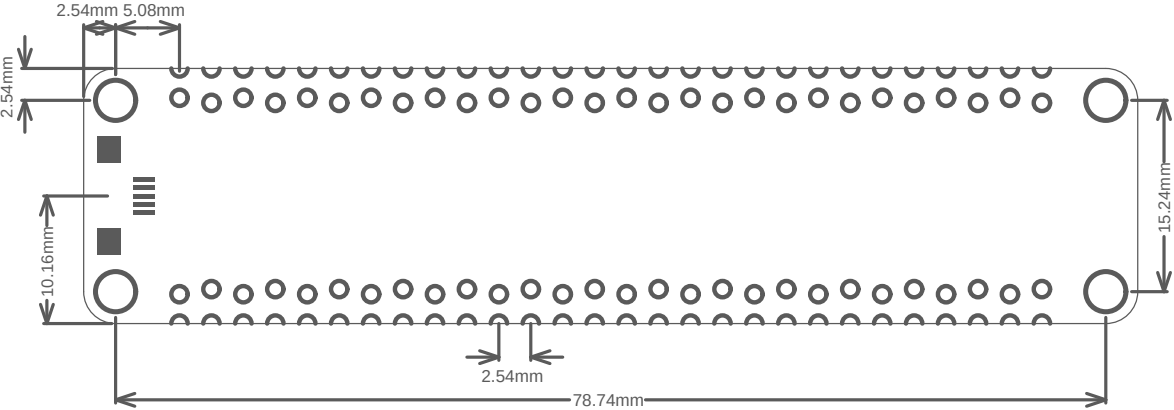
PCB:

PCB revision 3

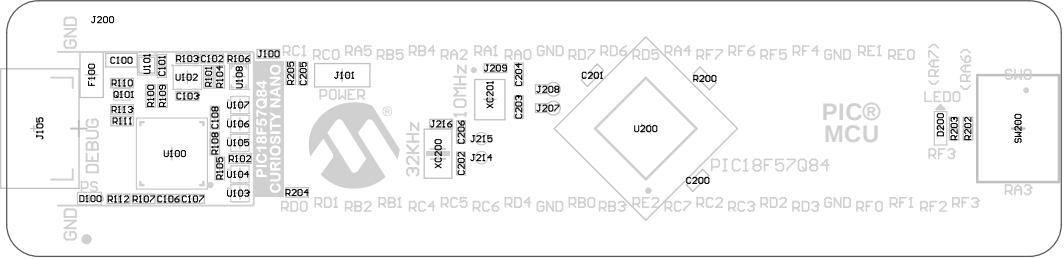
Drawn By: ML, PB		MICROCHIP	
Engineer: SR, PB			
Project Title: *PIC18F57Q84 Curiosity Nano*			Designed with Altium — Altium.com
Sheet Title: Revision History			
Size: A3	PCB Assembly Number: A09-3321	PCBA Revision: 4	
	PCB Number: A08-3039	PCB Revision: 3	Date: 12/14/2020
File: PIC18F57Q84_Curiosity_Nano_Revision_History.SchDoc			Page: 4 of 4

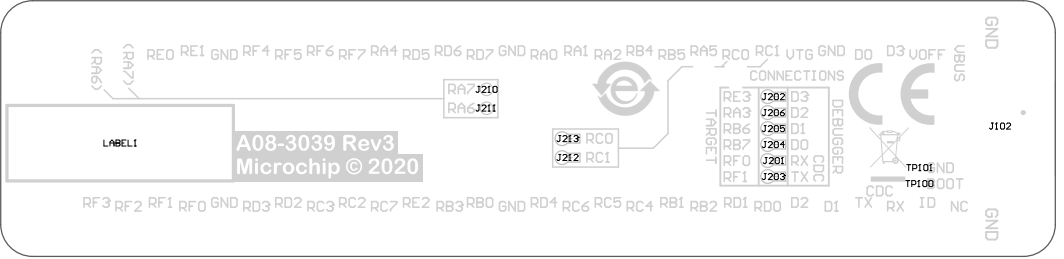

20.32mm
83.82mm

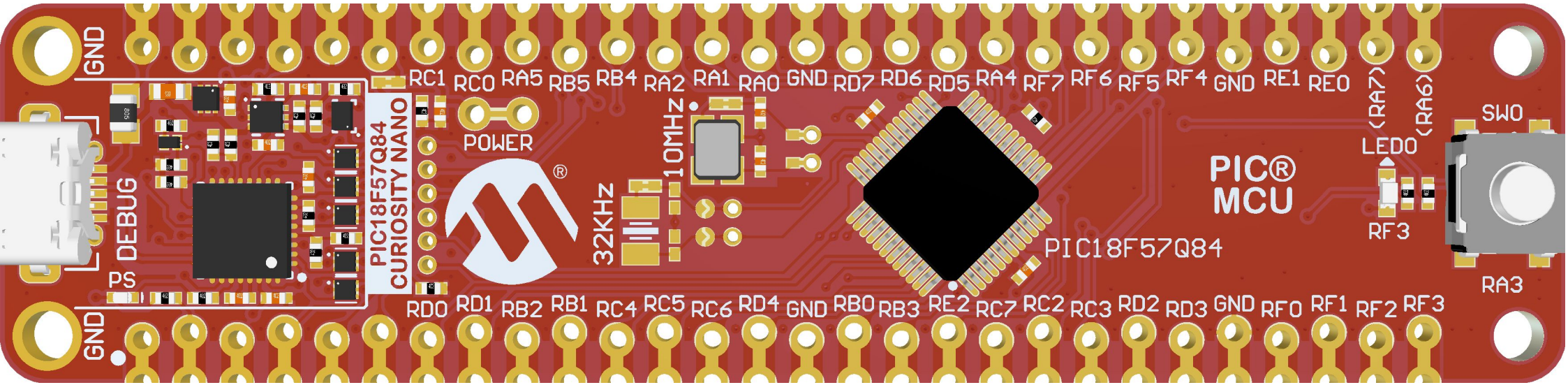
Connector Placement

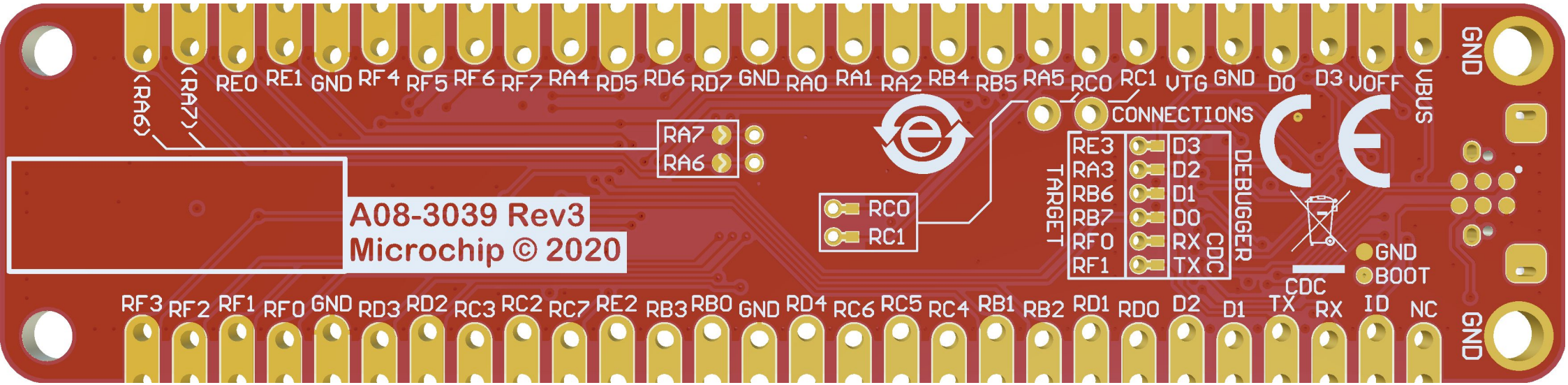


Test Point Placement


J200
GND
J105
DEBUG
F100
C100
U101
RI10
GI01
RI00
RI09
C101
U102
C103
RI13
RI11
RI03
C102
RI06
RI01
RI04
U103
U104
U105
U106
U107
U108
U100
RI05
RI08
C108
D100
RI12
RI07
C106
C107
J100
R205
C205
R204
PIC18F57Q84
CURIOSITY NANO
J101
POWER
32KHz
X200
J216
C206
C202
J215
J214
OMHz
X201
J209
C204
C203
J208
J207
C201
R200
U200
C200
PIC18F57Q84
PIC®
MCU
D200
R203
R202
SW200
LED0
(RA7)
(RA6)
RF3
RA3
RC1 RC0 RA5 RB5 RB4 RA2 RA1 RA0 GND RD7 RD6 RD5 RA4 RF7 RF6 RF5 RF4 GND RE1 RE0
RD0 RD1 RB2 RB1 RC4 RC5 RC6 RD4 GND RB0 RB3 RE2 RC7 RC2 RC3 RD2 RD3 GND RF0 RF1 RF2 RF3


(RA6)
(RA7)
RE0 RE1 GND RF4 RF5 RF6 RF7 RA4 RD5 RD6 RD7 GND RA0 RA1 RA2 RB4 RB5 RA5 RC0 RC1 VTG GND DO D3 VOFF VBUS
GND
CONNECTIONS
RA7 J210
RA6 J211
LABEL1
A08-3039 Rev3
Microchip © 2020
J213 RC0
J212 RC1
TARGET
RE3 J202 D3
RA3 J206 D2
RB6 J205 D1
RB7 J204 D0
RF0 J201 RX CDC
RF1 J203 TX
DEBUGGER
J102
TP101 GND
TP100 BOOT
CDC TX RX ID NC
GND
RF3 RF2 RF1 RF0 GND RD3 RD2 RC3 RC2 RC7 RE2 RB3 RB0 GND RD4 RC6 RC5 RC4 RB1 RB2 RD1 RD0 D2 D1


GND
DEBUG
PS
PIC18F57Q84
CURIOSITY NANO
RC1 RC0 RA5 RB5 RB4 RA2 RA1 RA0 GND RD7 RD6 RD5 RA4 RF7 RF6 RF5 RF4 GND RE1 RE0
POWER
32KHz
10MHz
PIC®
MCU
PIC18F57Q84
LED0
RF3
SW0
RA3
RD0 RD1 RB2 RB1 RC4 RC5 RC6 RD4 GND RB0 RB3 RE2 RC7 RC2 RC3 RD2 RD3 GND RF0 RF1 RF2 RF3


(RA6)
(RA7)
RE0 RE1 GND RF4 RF5 RF6 RF7 RA4 RD5 RD6 RD7 GND RA0 RA1 RA2 RB4 RB5 RA5 RC0 RC1 VTG GND D0 D3 VOFF VBUS
GND
CONNECTIONS
RA7
RA6
RC0
RC1
TARGET
RE3
RA3
RB6
RB7
RF0
RF1
D3
D2
D1
D0
RX
TX
CDC
DEBUGGER
A08-3039 Rev3
Microchip © 2020
GND
BOOT
CDC
RF3 RF2 RF1 RF0 GND RD3 RD2 RC3 RC2 RC7 RE2 RB3 RB0 GND RD4 RC6 RC5 RC4 RB1 RB2 RD1 RD0 D2 D1 TX RX ID NC
GND