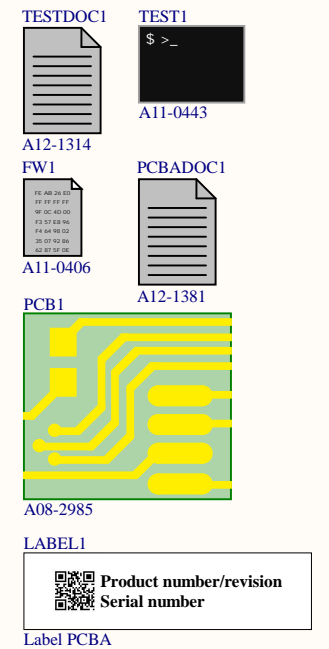
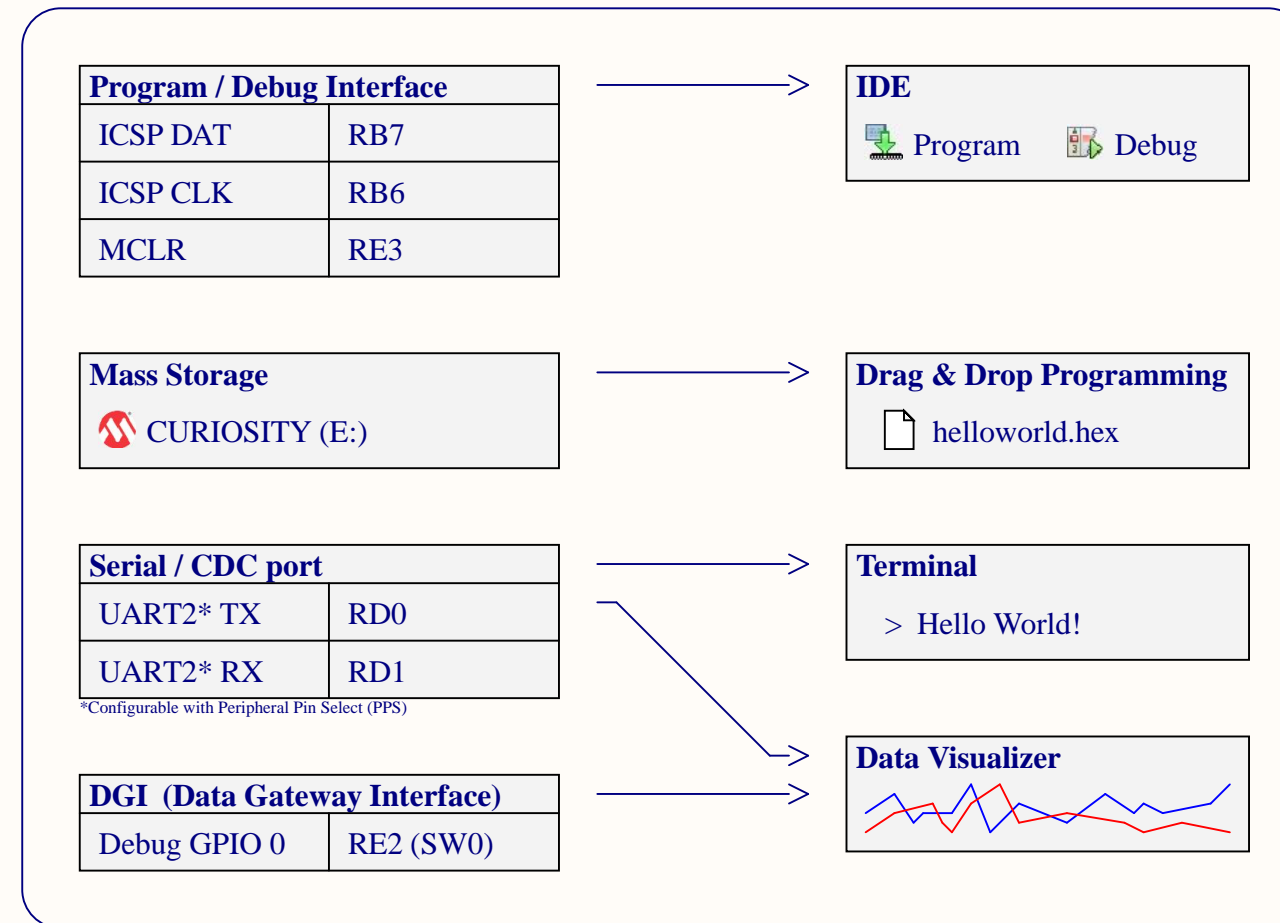
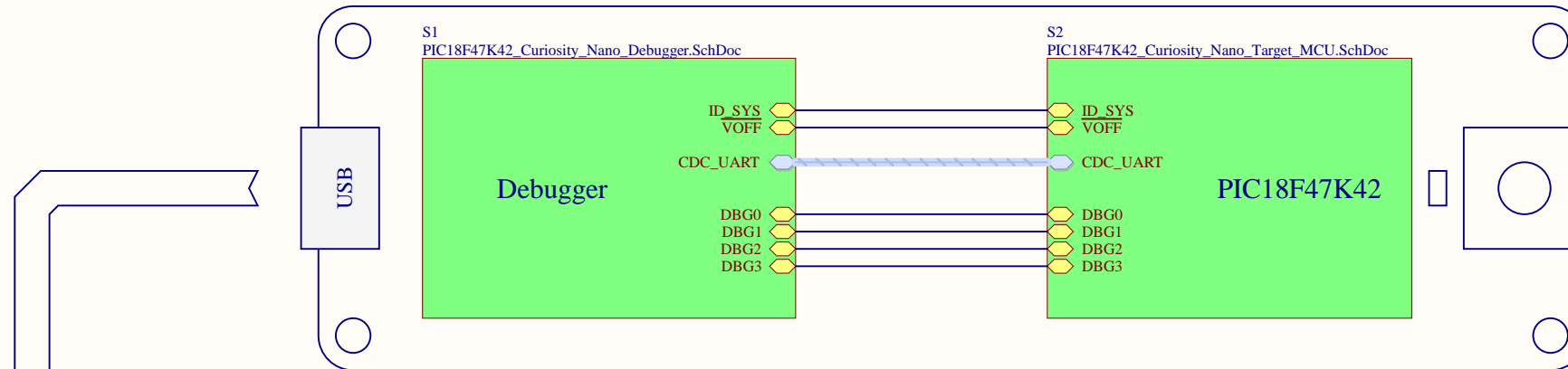


# PIC18F47K42 Curiosity Nano



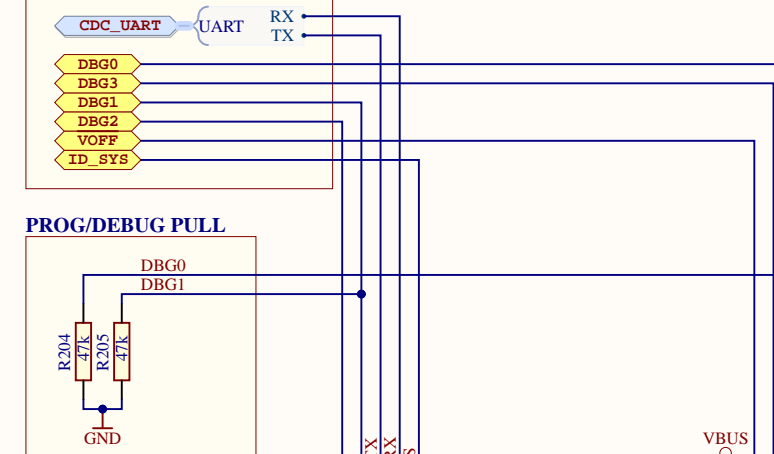
S3  
PIC18F47K42\_Curiosity\_Nano\_Revision\_History.SchDoc

|  |                                 |                  |                  |
|--|---------------------------------|------------------|------------------|
| Drawn By:<br>Microchip Norway                      |                                 |                  |                  |
| Engineer:<br>TF, HN                                |                                 |                  |                  |
| Project Title<br><b>PIC18F47K42 Curiosity Nano</b> | Designed with<br><br>Altium.com |                  |                  |
| Sheet Title<br><b>Top Level</b>                    |                                 |                  |                  |
| Size A3  | PCB Assembly Number: A09-3244   | PCBA Revision: 2 | Date: 23.10.2020 |
|  | PCB Number: A08-2985            | PCB Revision: 2  |                  |
| File: PIC18F47K42_Curiosity_Nano_TopLevel.SchDoc   |                                 |                  | Page: 1 of 4     |

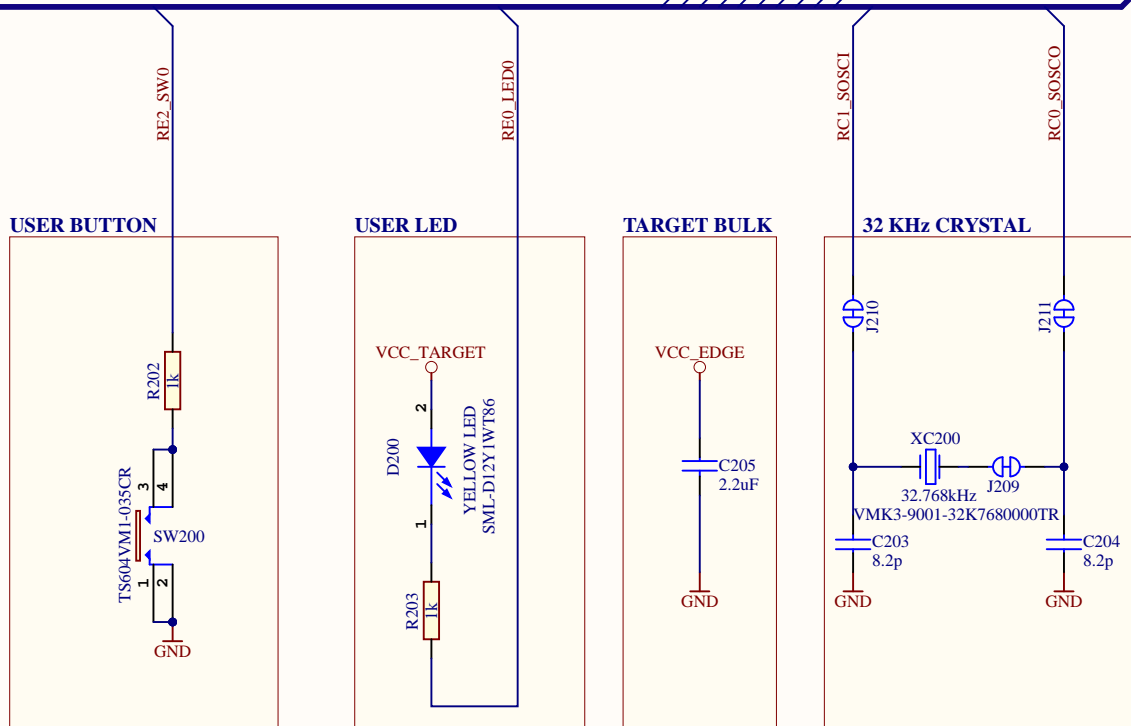
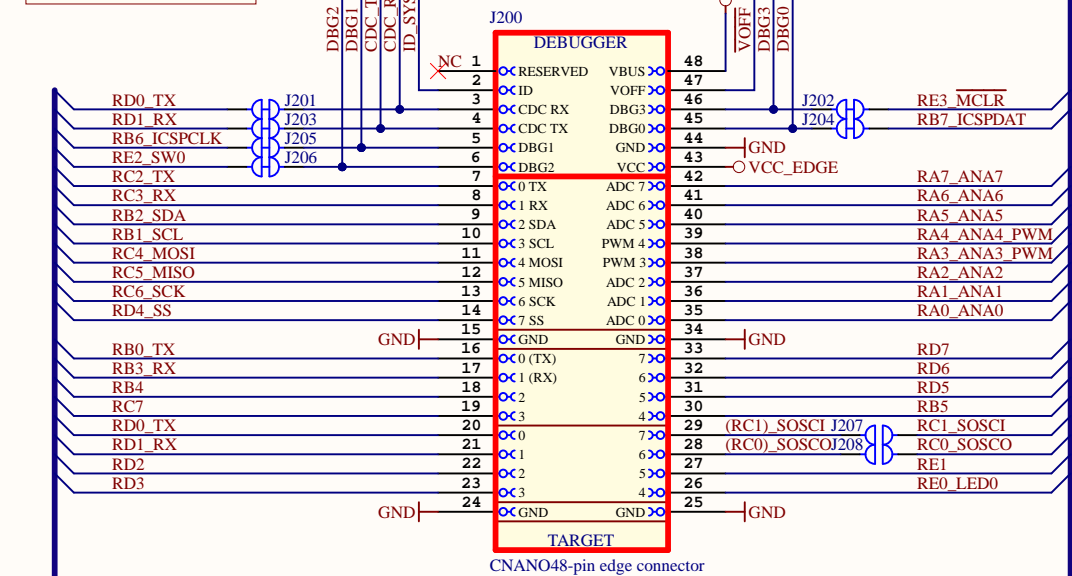
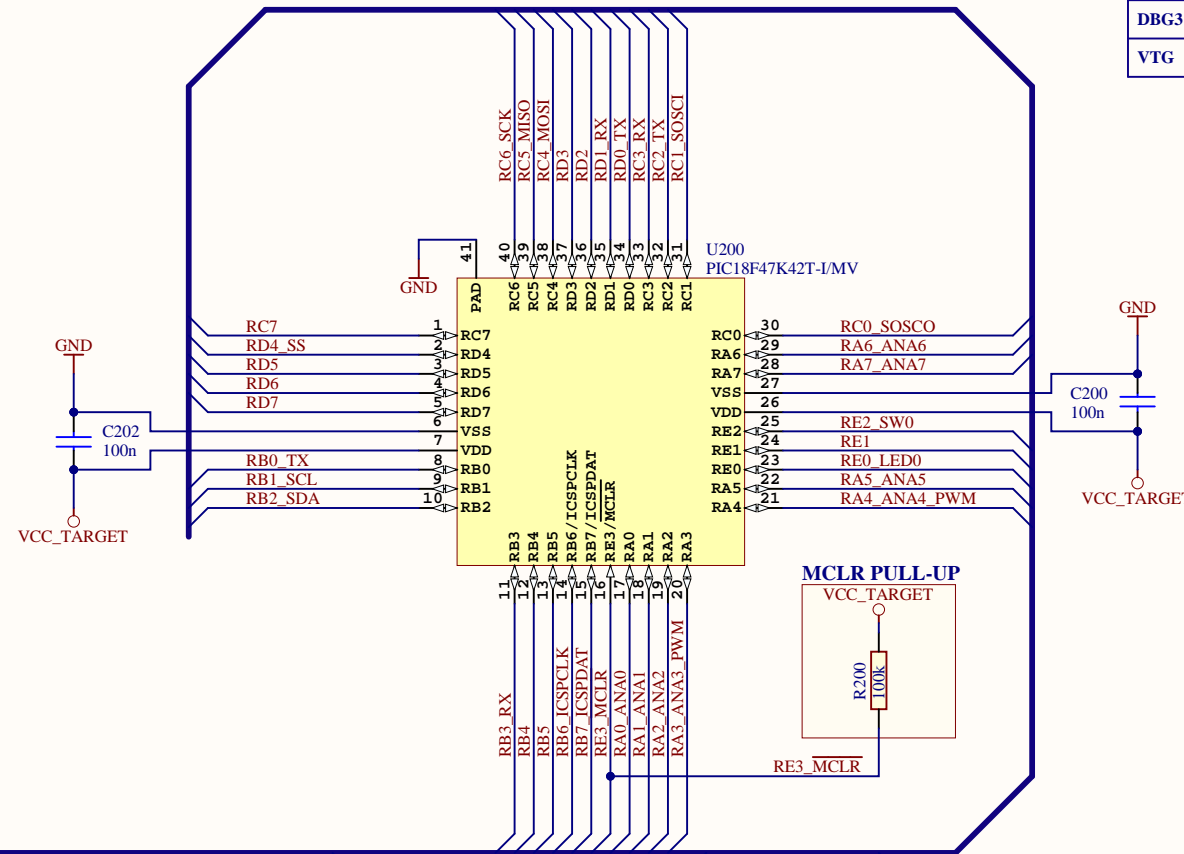
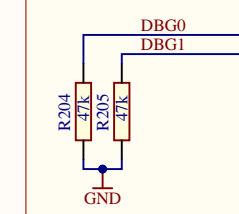
# PIC18F47K42

| PIC18F47K42 |             |     |
|-------------|-------------|-----|
| Debugger    | Name        | Pin |
| CDC TX      | UART2 RX    | RD1 |
| CDC RX      | UART2 TX    | RD0 |
| DBG0        | ICSPDAT     | RB7 |
| DBG1        | ICSPCLK     | RB6 |
| DBG2        | GPI00       | RE2 |
| DBG3        | MCLR        | RE3 |
| VTG         | 2.3V - 5.5V |     |

## DEBUGGER CONNECTIONS



## PROG/DEBUG PULL

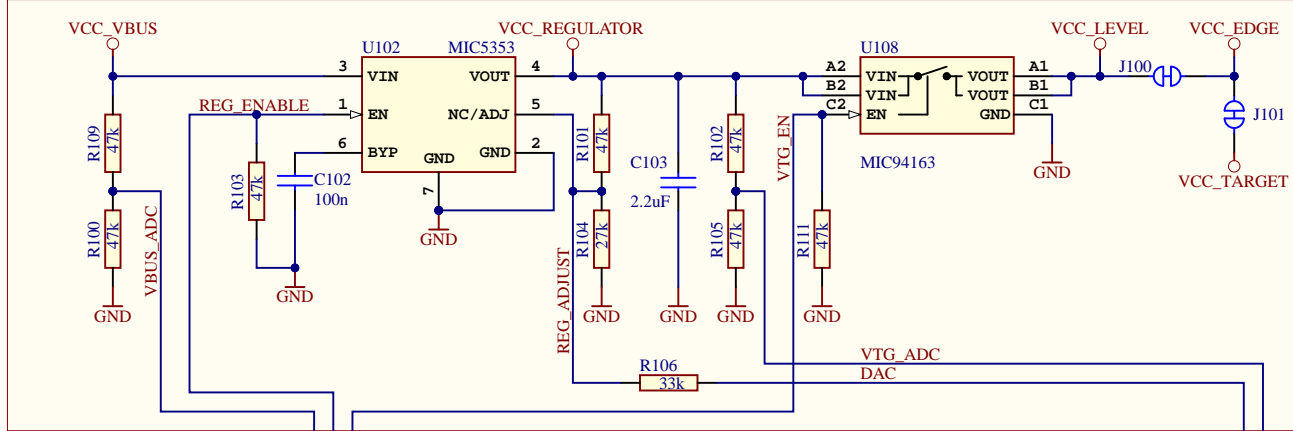


**NOTE on UART/CDC:**  
 RX/TX on the header denotes the input/output direction of the signal respective to its source.  
 CDC TX is output from the on-board debugger.  
 CDC RX is input to the on-board debugger.  
 TX is output from the TARGET device.  
 RX is input to the TARGET device.

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

|  |                               |                  |
|--|-------------------------------|------------------|
| Drawn By:<br>Microchip Norway                      |                               |                  |
| Engineer:<br>TF, HN                                |                               |                  |
| Project Title<br><b>PIC18F47K42 Curiosity Nano</b> |                               |                  |
| Sheet Title<br><b>Target MCU</b>                   |                               |                  |
| Size A3  | PCB Assembly Number: A09-3244 | PCBA Revision: 2 |
|  | PCB Number: A08-2985          | PCB Revision: 2  |
| File: PIC18F47K42_Curiosity_Nano_Target_MCU.SchDoc |                               | Date: 23.10.2020 |
|  |                               | 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.

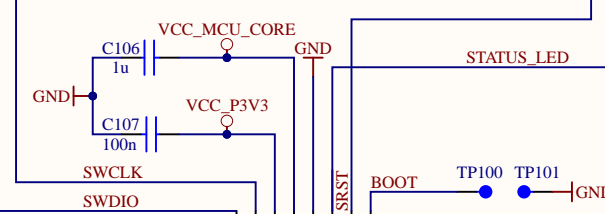
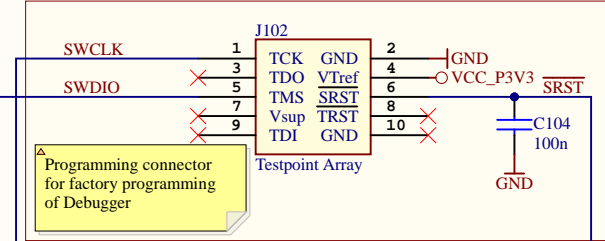
**J101:**  
This is footprint for a 1x2 100mil pitch pin-header that can be used for easy current measurement to the target microcontroller and the LED / Button. To use the footprint:  
- Cut the track between the holes, and mount a pin-header

**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)

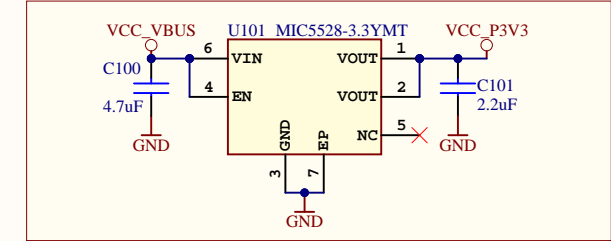
| Interface | ICSP TARGET | UPDI TARGET |
|-----------|-------------|-------------|
| CDC TX    | UART RX     | UART RX     |
| CDC RX    | UART TX     | UART TX     |
| DBG0      | DAT         | UPDI        |
| DBG1      | CLK         | GPIO        |
| DBG2      | GPIO        | GPIO        |
| DBG3      | MCLR        | RESET       |
| VCC       | -           | -           |

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

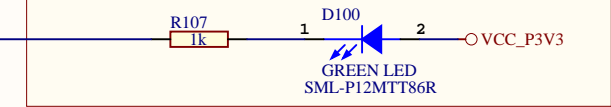
### DEBUGGER TESTPOINTS



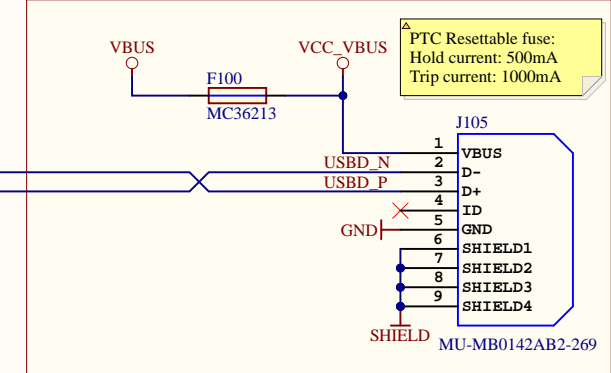
### DEBUGGER REGULATOR



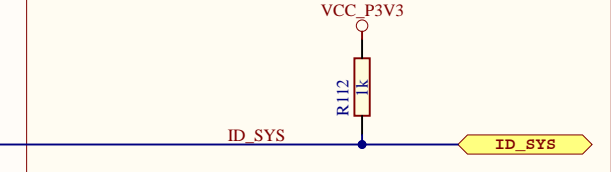
### DEBUGGER POWER/STATUS LED



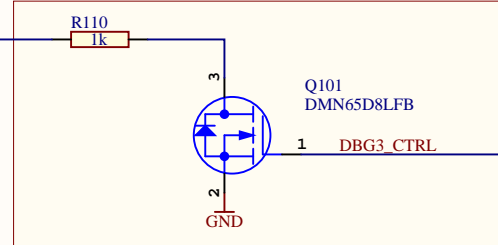
### DEBUGGER USB MICRO-B CONNECTOR



### ID PIN



### DBG3 OPEN DRAIN



|  |                               |                  |
|--|-------------------------------|------------------|
| Drawn By:<br>Microchip Norway                      |                               | <b>MICROCHIP</b> |
| Engineer:<br>TF, HN                                |                               |                  |
| Project Title<br><b>PIC18F47K42 Curiosity Nano</b> |                               |                  |
| Sheet Title<br><b>Debugger</b>                     |                               |                  |
| Size A3  | PCB Assembly Number: A09-3244 | PCBA Revision: 2 |
|  | PCB Number: A08-2985          | PCB Revision: 2  |
| File: PIC18F47K42_Curiosity_Nano_Debugger.SchDoc   |                               | Date: 23.10.2020 |
|  |                               | Page: 3 of 4     |

# Revision History

## PCB Assembly Rev 1:



Design Changes:  
Initial Design

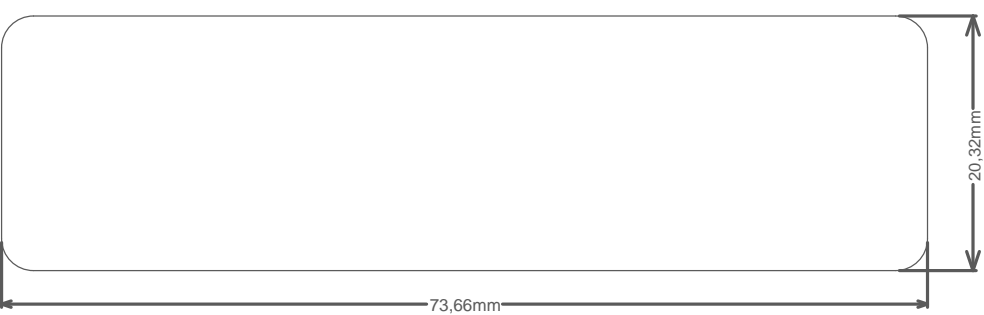
PCB:  
PCB revision 1

## PCB Assembly Rev 2:

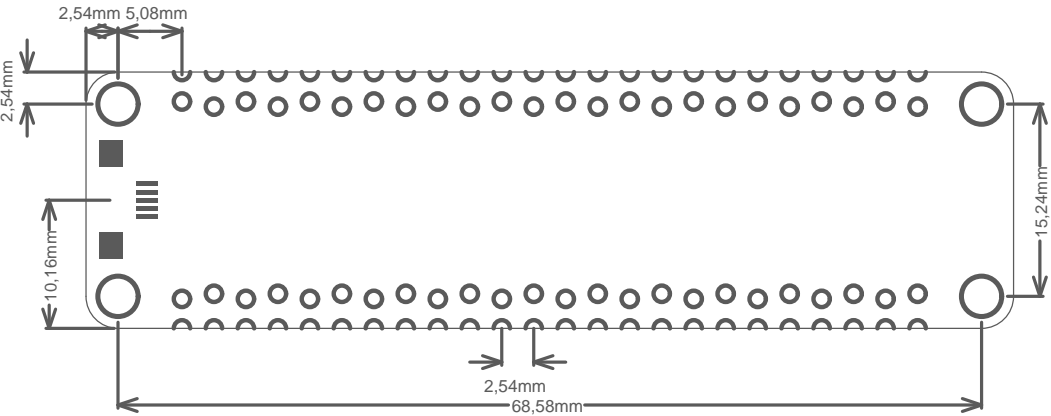
Design Changes:  
Added solderstrap jumper with holes between edge connector power (VCC) and VCC\_TARGET.

PCB:  
PCB Revision 2  
Updated J200 (edge pin header connector) with staggered footprint, and adjusted traks, polygons, teardrops, and text accordingly.

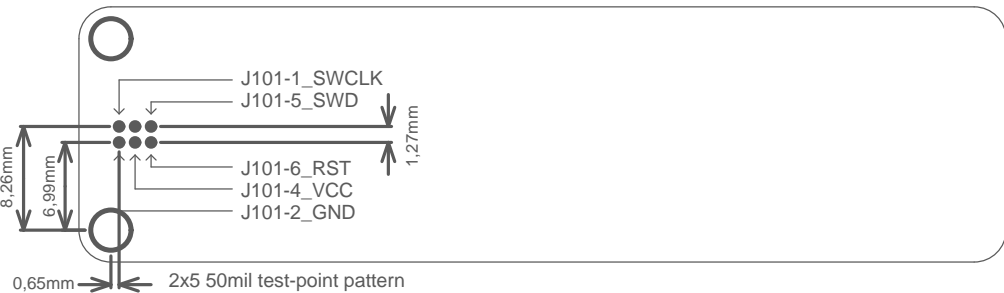
|  |   |                  |                  |
|--|---|------------------|------------------|
| Drawn By:<br>Microchip Norway                            |    |                  |                  |
| Engineer:<br>TF, HN                                      |   |                  |                  |
| Project Title<br><b>PIC18F47K42 Curiosity Nano</b>       | <br>Designed with<br><b>Altium</b><br>Altium.com |                  |                  |
| Sheet Title<br><b>Revision History</b>                   |   |                  |                  |
| Size A3  | PCB Assembly Number: A09-3244   | PCBA Revision: 2 | Date: 23.10.2020 |
|  | PCB Number: A08-2985  | PCB Revision: 2  |                  |
| File: PIC18F47K42_Curiosity_Nano_Revision_History.SchDoc |   |                  | Page: 4 of 4     |



# Connector Placement



# Test Point Placement

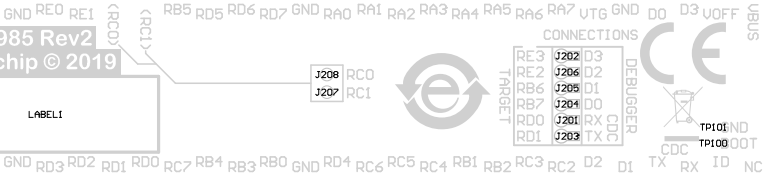


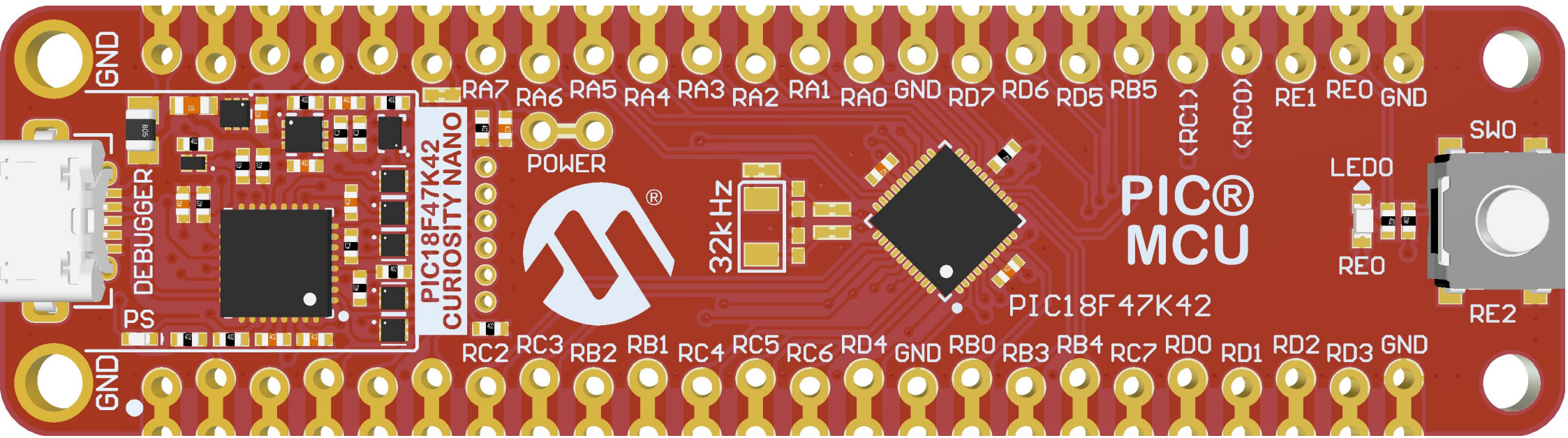




A08-2985 Rev2  
Microchip © 2019

LABEL1





GND

RA7 RA6 RA5 RA4 RA3 RA2 RA1 RA0 GND RD7 RD6 RD5 RB5 <RC1> <RC0> RE1 RE0 GND

PS DEBUGGER

PIC18F47K42  
CURIOSITY NANO



POWER

32kHz

PIC®  
MCU

PIC18F47K42

LED0  
RE0

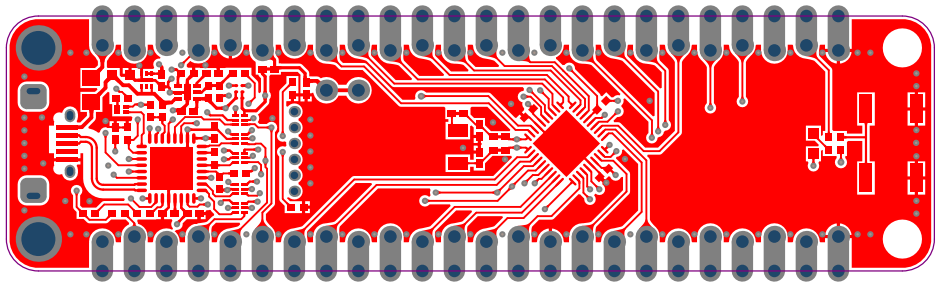
SW0

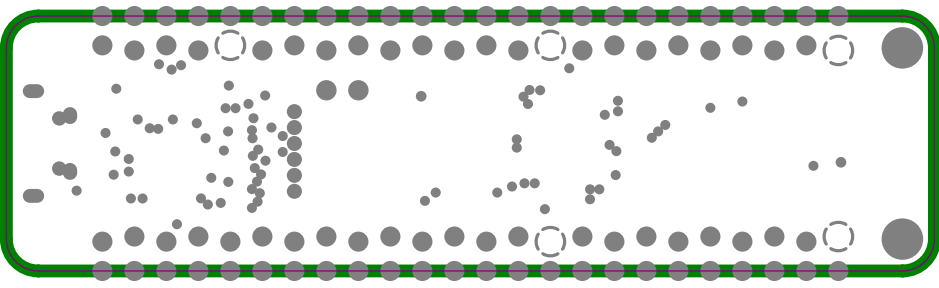
RE2

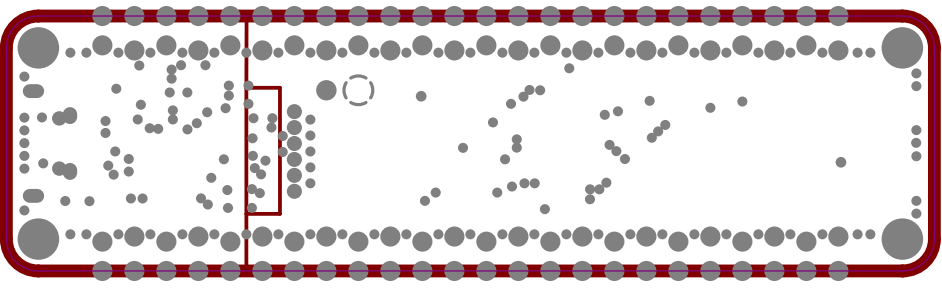
GND

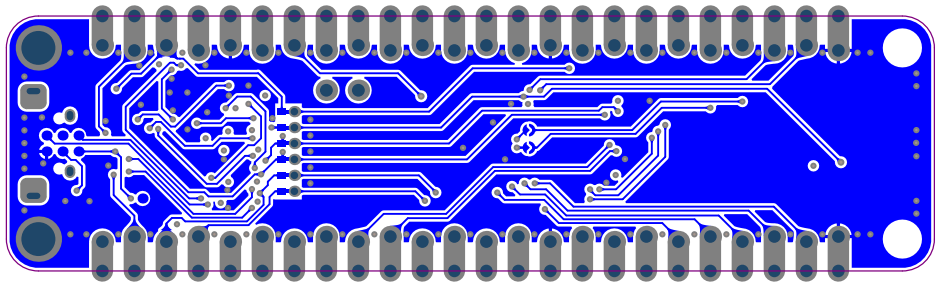
RC2 RC3 RB2 RB1 RC4 RC5 RC6 RD4 GND RB0 RB3 RB4 RC7 RD0 RD1 RD2 RD3 GND











# Component list

Bill of Materials Fitted for Variant [Default Assembly] of Project [PIC18F47K42\_Curiosity\_Nano.PrjPcb] (No PCB Document Selected)

Source Data From: PIC18F47K42\_Curiosity\_Nano.PrjPcb  
 Project: PIC18F47K42\_Curiosity\_Nano.PrjPcb  
 Variant: Default Assembly



Report Date: 23.10.2020 11:28  
 Print Date: 23.10.2020 11:28:13

| 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, C104, C107, C108, C200, C202                   | 6        | 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, C204   | 2        | 8.2p   | Yageo                         | CC0402CRNPO9B8R2      | 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 | 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        | MJ-MB0142AB2-269                             | Allen Creations Corp.         | MJ-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        | PIC18F47K42 Curiosity Nano PCB Documentation |                               |                       | PIC18F47K42 Curiosity Nano PCB Documentation                                 |
| Fitted | PCBADOC1   | 1        | A09-3259 PCBA Files                          |                               |                       | PIC18F47K42 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, R204, R205 | 9        | 47k  | KOA                           | RK73H1ETT4702F        | 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                               | Dailywell Electronics Co.LTD  | TS604VM1-035CR-R      | SWITCH, SMD, 260gf, 6.4mm X 6.2mm  |
| Fitted | TEST1  | 1        | PIC18F47K42 Curiosity Nano Test              |                               |                       | Fixture Test for PIC18F47K42 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-T5                            | 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 Technology Inc      | MIC94163YCS-TR        | Loadswitch, Rds(on) = 14.5mohm, 1.0mm x 1.5mm WLCSP, reverse blocking        |
| Fitted | U200   | 1        | PIC18F47K42T-VMV                             | Microchip Technology Inc      | PIC18F47K42T-VMV      | PIC18F47K42 Microcontroller 40 pin UQFN 5mm x 5mm x 0.5mm                    |
| Fitted | XC200  | 1        | 32.768kHz                                    | Microchip                     | VMK3-9001-32K768000TR | Crystal, 32.768kHz, CL=9.0pF, ESR=70kOhm, SMD LxW=3.2 x 1.5mm, 20ppm         |

|          |    |       |
|----------|----|-------|
| Approved | 54 | Notes |
|          |    |       |