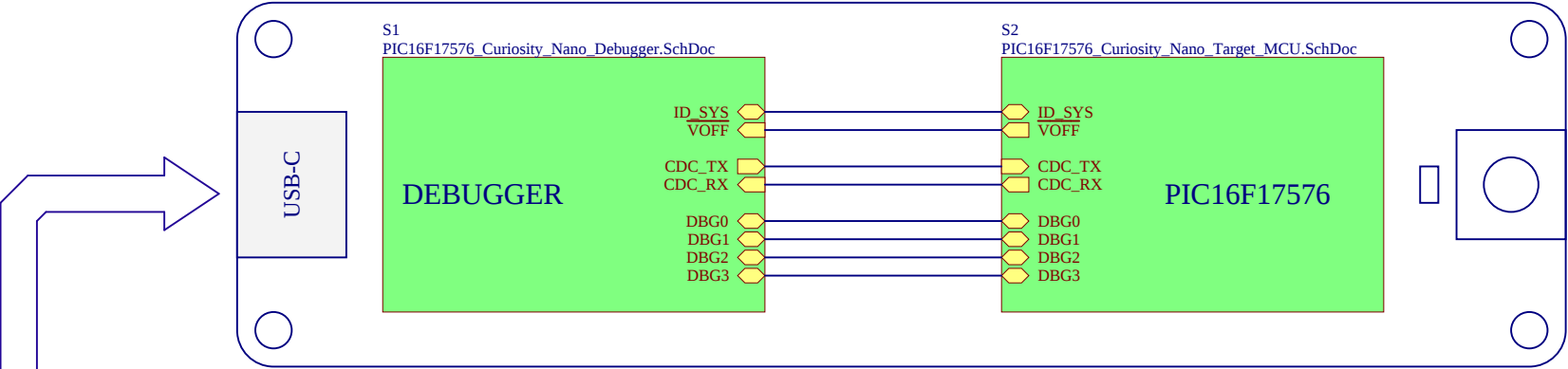
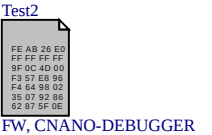
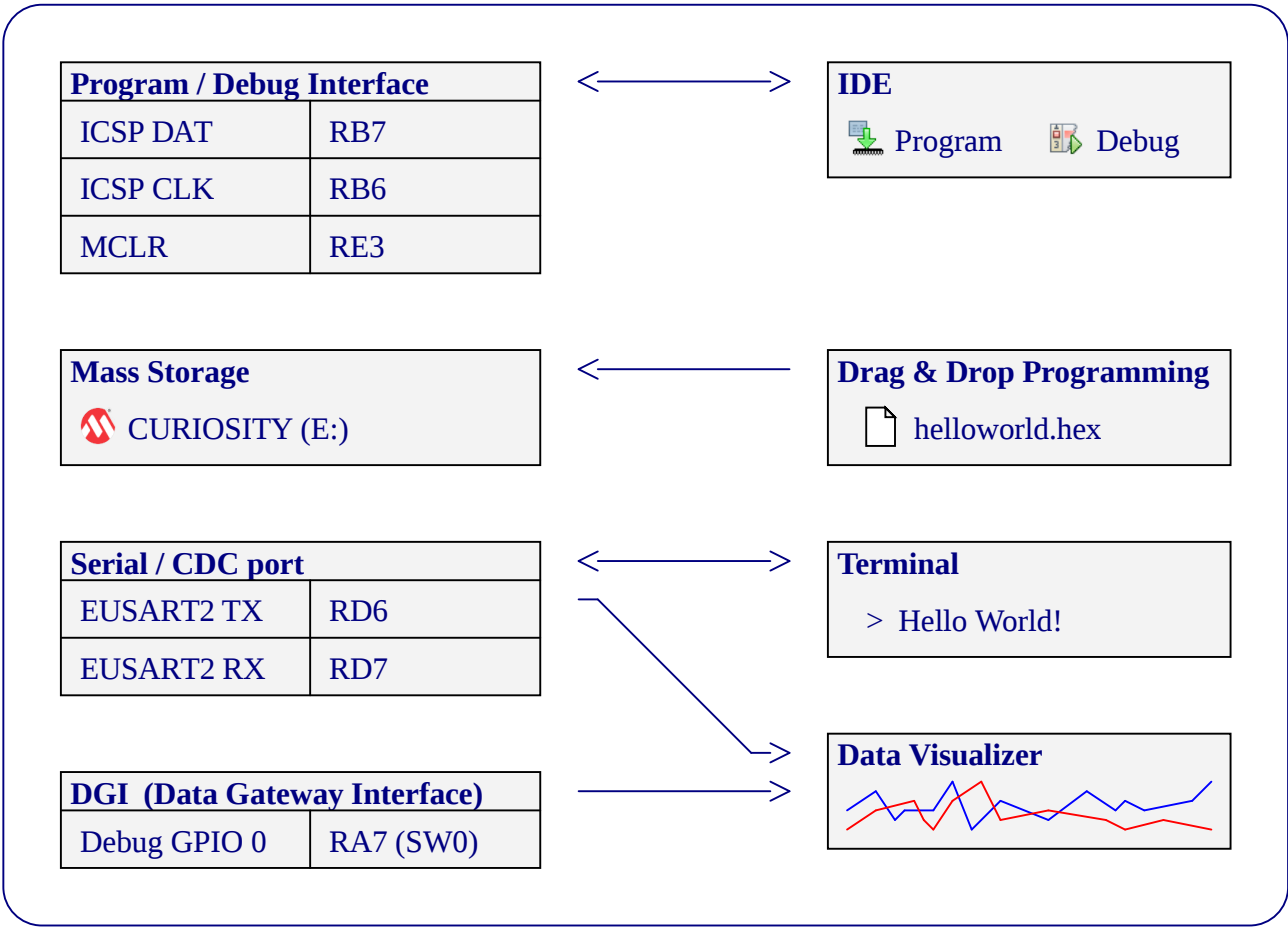


PIC16F17576 Curiosity Nano



On-Board Peripherals

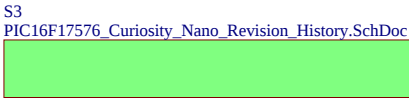
LED0	RE1	Active Low
SW0	RA7	Active Low



"Text in Silkscreen on PCB"

CNANO Template Revision: 2.7

Project Owner: TF		 MICROCHIP			
PCB Layout Contact: TF					
PartNumber: EV14L29A		Project Title PIC16F17576 Curiosity Nano		Variant: <u>Default Assembly</u>	
Sheet Title Top Level					
Size A3	SCH #: 02-01225		Rev: 2	Date: 14.04.2025	 Altium Altium.com
	PCB #: 04-12289		Rev: 1	Sheet 1 of 4	
File: PIC16F17576_Curiosity_Nano_TopLevel.SchDoc					



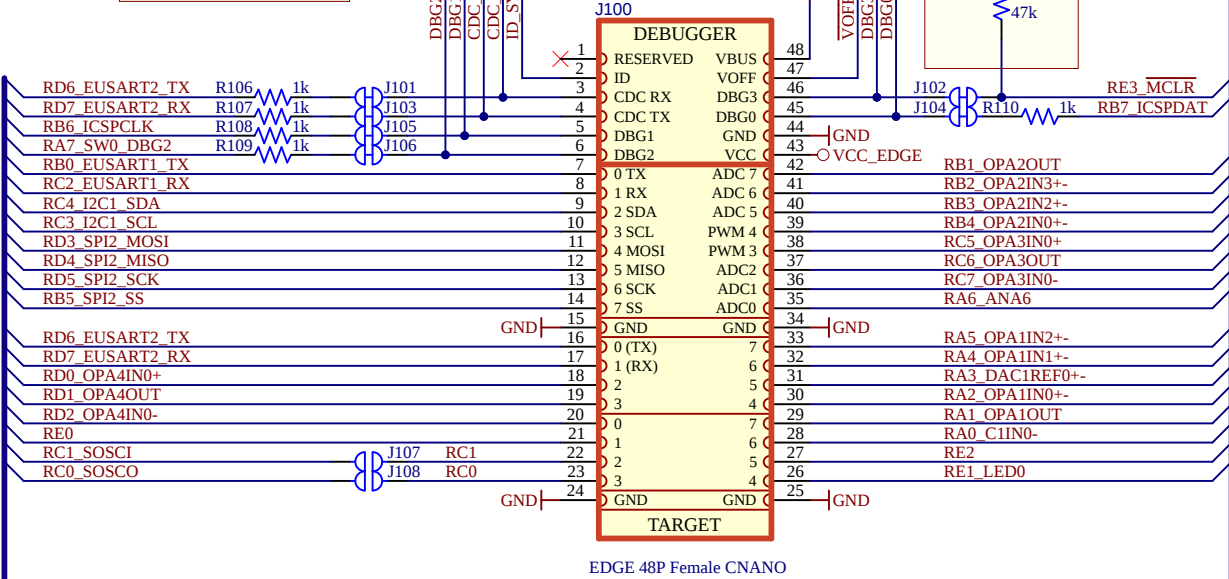
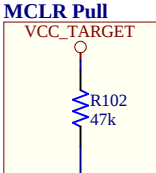
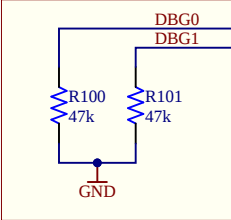
PIC16F17576

PIC16F17576		
Debugger	Name	Pin
CDC TX	USARTn RX	RD7
CDC RX	USARTn TX	RD6
DBG0	ICSPDAT	RB7
DBG1	ICSPCLK	RB6
DBG2	GPIO0	RA7
DBG3	MCLR	RE3
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

PROG/DEBUG Pull



EDGE 48P Female CNANO

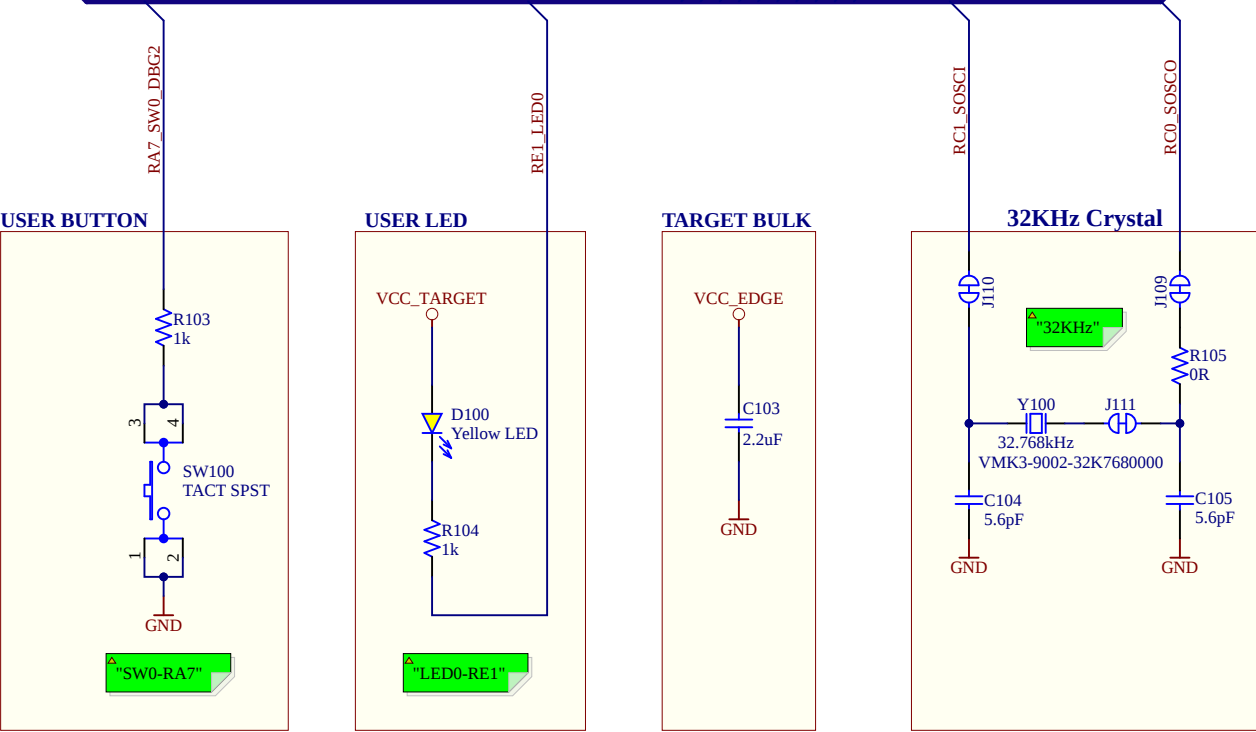
NOTE on UART/CDC:
RX/TX on the header denotes the input/output direction of the signal respective to it's source.

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 must be mounted close to client device(s).

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

Selected in design after verification
C= 5.6pF/5.6pF



Project Owner:
TF

PCB Layout Contact:
TF

PartNumber:
EV14L29A

Project Title
PIC16F17576 Curiosity Nano

Variant: Default Assembly

Sheet Title
Target MCU

Size A3

SCH #: 02-01225

Rev: 2

Date: 14.04.2025

PCB #: 04-12289

Rev: 1

Sheet 2 of 4

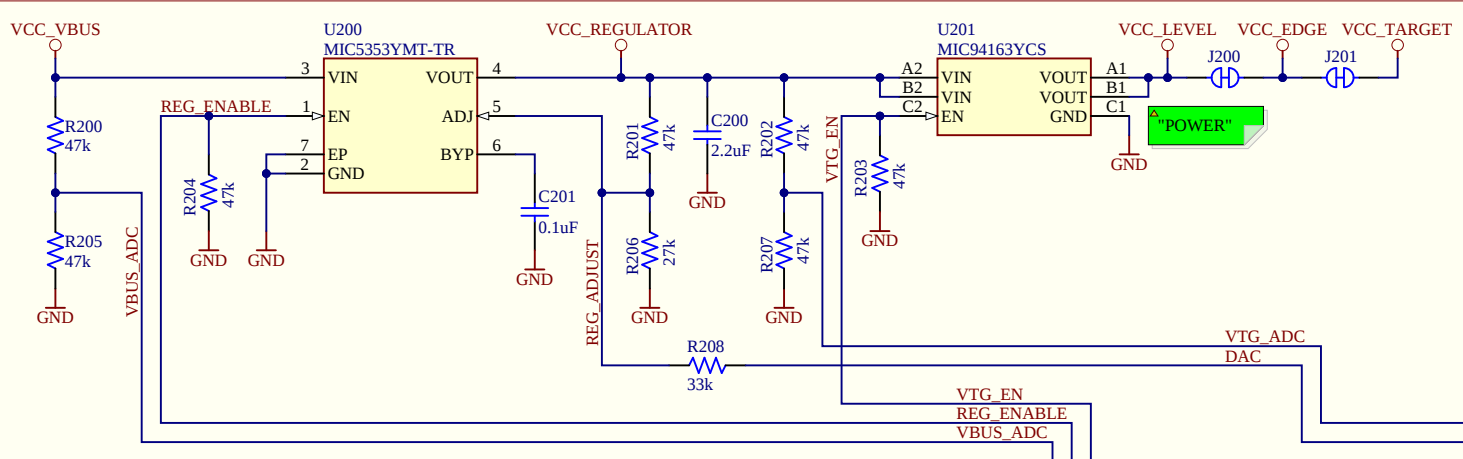
Designed with
Altium

Altium.com

File: PIC16F17576_Curiosity_Nano_Target_MCU.SchDoc

CNANO Template Revision: 2.7

TARGET ADJUSTABLE REGULATOR



J200:
- 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.
J201:
- For current measurements using the on-board power supply, this strap must be cut and an ammeter connected across.

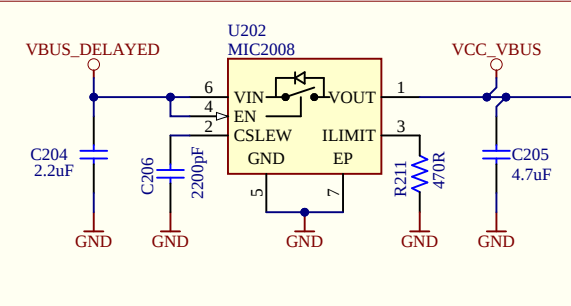
MIC5353:
Vin: 2.6V to 6V
Vout: 1.25V to 5.1V
Imax: 500mA
Dropout (typical): 50mV @ 150mA, 160mV @ 500mA
Accuracy: 2% initial
Thermal shutdown and current limit

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

Interface Signal	ICSPTM 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 volatage 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.

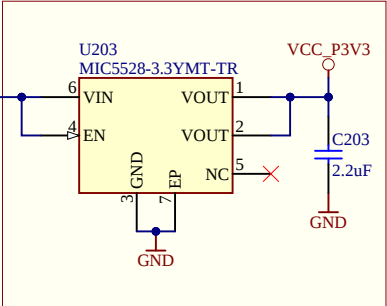
VBUS SLEW RATE- & CURRENT-LIMIT



CURRENT LIMIT:
- With R211 set to 470 ohms, the current through the power switch MIC2008 is limited to 500mA.

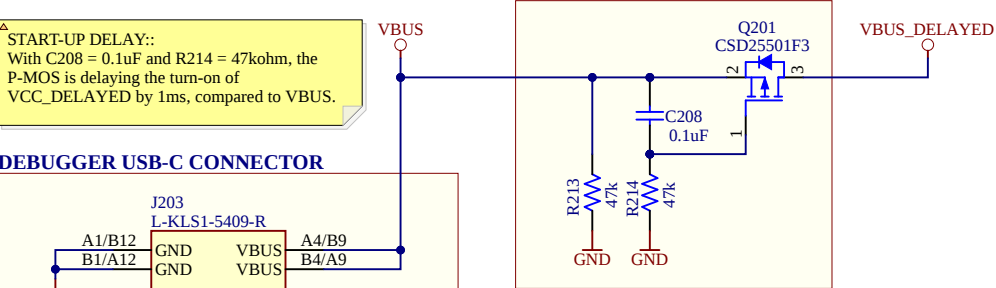
SLEW RATE LIMIT:
- The CSLEW feature is implemented incorrectly. CSLEW should be connected to VIN with a capacitor. The actual slew rate for VCC_VBUS is approximately 50V/ms.

DEBUGGER REGULATOR

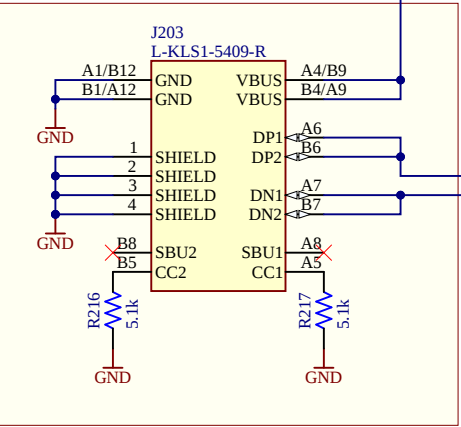


MIC5528:
Vin: 2.5V to 5.5V
Vout: Fixed 3.3V
Imax: 500mA
Dropout: 260mV @ 500mA

VBUS START-UP DELAY

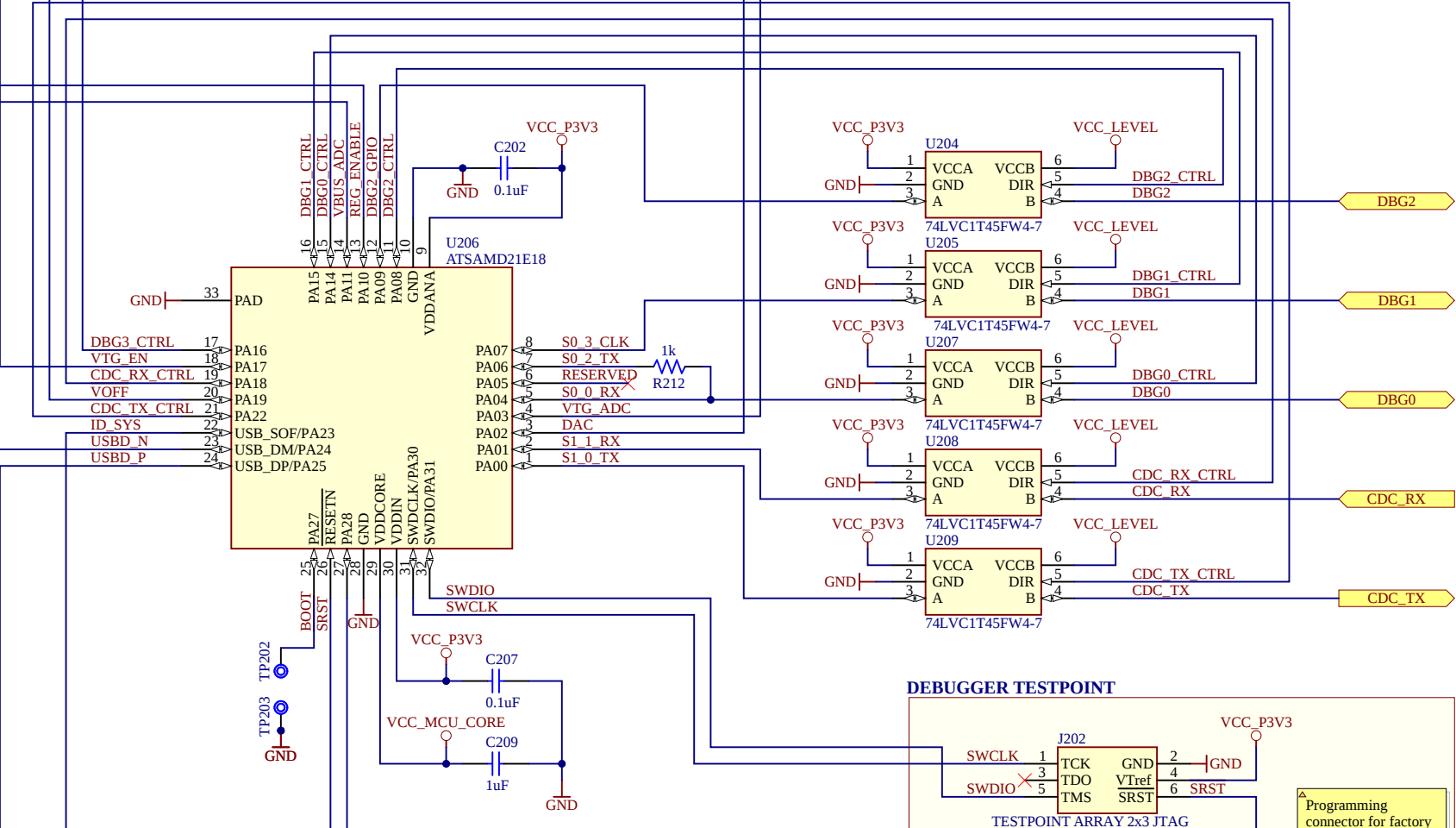


DEBUGGER USB-C CONNECTOR

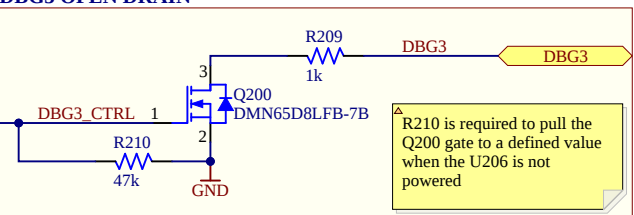


TP200 and TP201 are MTG Holes in the corners of the PCB close to the DEBUGGER section labelled "GND" on the silkscreen.

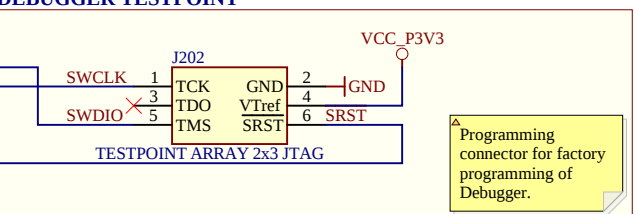
DEBUGGER



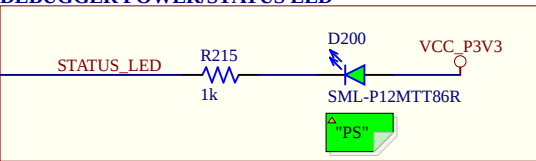
DBG3 OPEN DRAIN



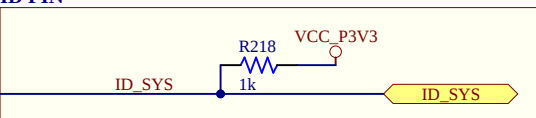
DEBUGGER TESTPOINT



DEBUGGER POWER/STATUS LED



ID PIN



Revision History

PCB Assembly Rev 1:

Design Changes:

Initial Design

PCB:

PCB revision 1

PCB Assembly Rev 2:

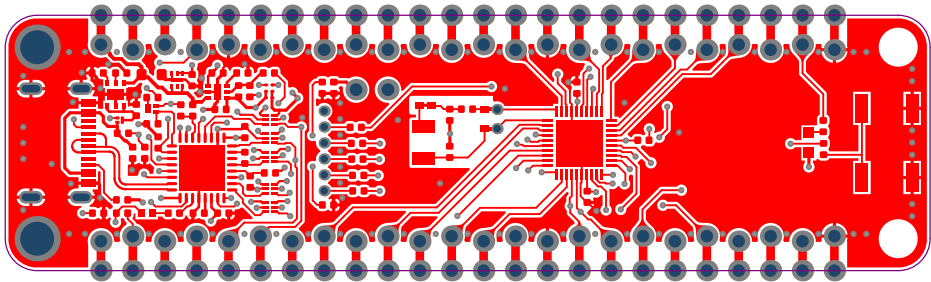
Design Changes:

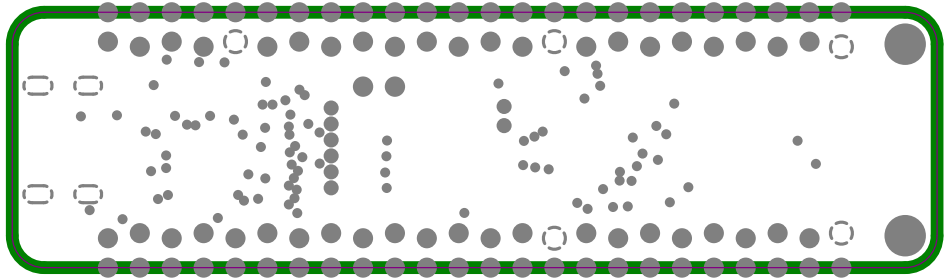
- Changed C104/C105 to 5.6pF to improve accuracy on crystal osillator

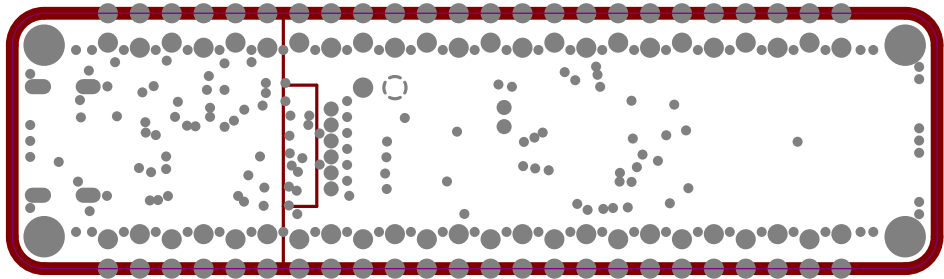
PCB:

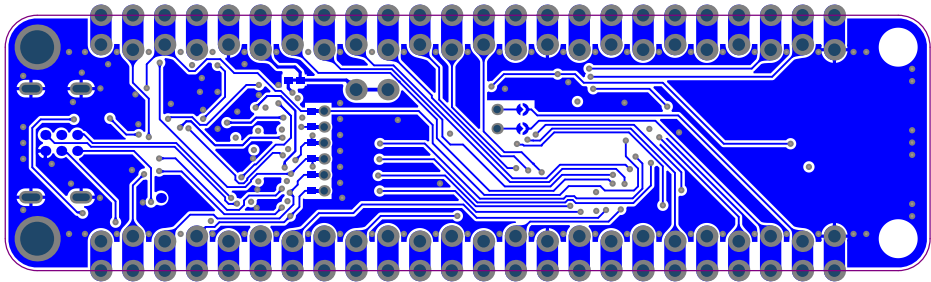
PCB revision 1

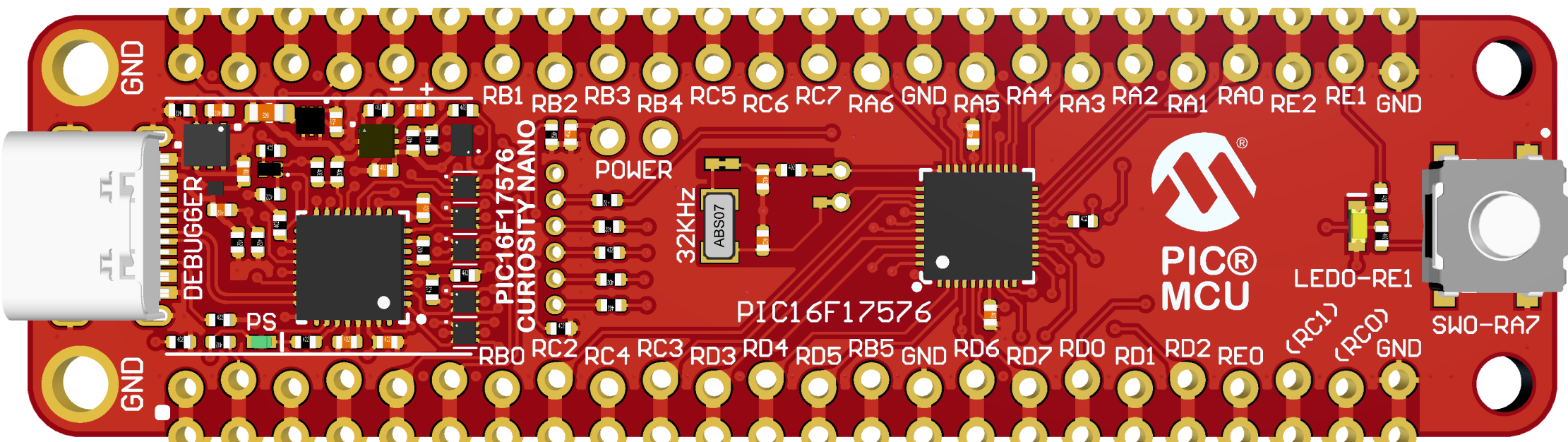
CNANO Template Revision: 2.7











GND RE1 RE2 RA0 RA1 RA2 RA3 RA4 RA5 GND RA6 RC7 RC6 RC5 RB4 RB3 RB2 RB1 UTG GND D0 D3 VOFF USB GND

Microchip © 2024



[ASSY# / REV]
SN: [SERIAL]
[DATE yyyy.mm.dd]

04-12289 Rev1

UK
CA



TARGET

CONNECTIONS

RE3	D3
RA7	D2
RB6	D1
RB7	D0
RD6	RX
RD7	TX

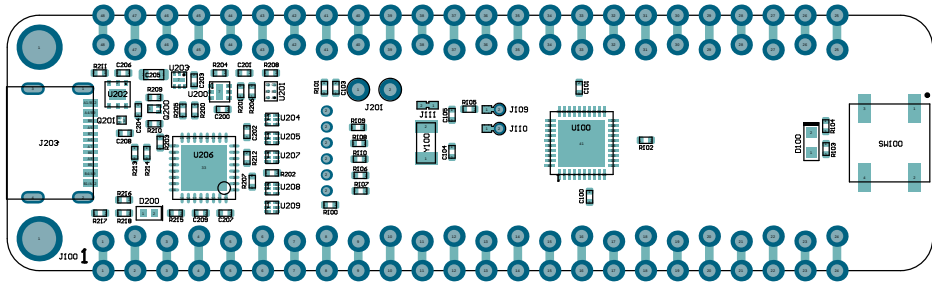
DEBUGGER

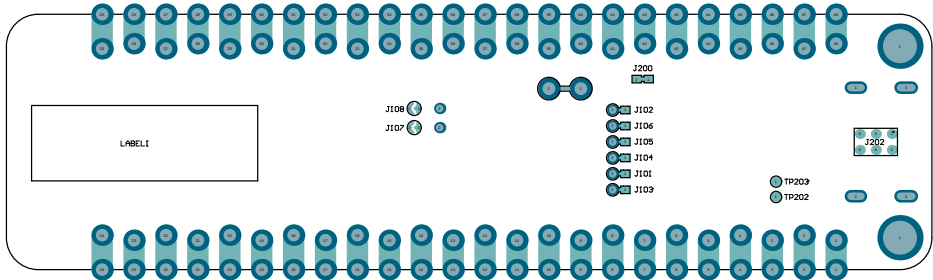


GND (RC0) (RC1) RE0 RD2 RD1 RD0 RD7 RD6 GND RB5 RD5 RD4 RD3 RC3 RC4 RC2 RB0 D2 D1 TX CDC RX ID NC GND

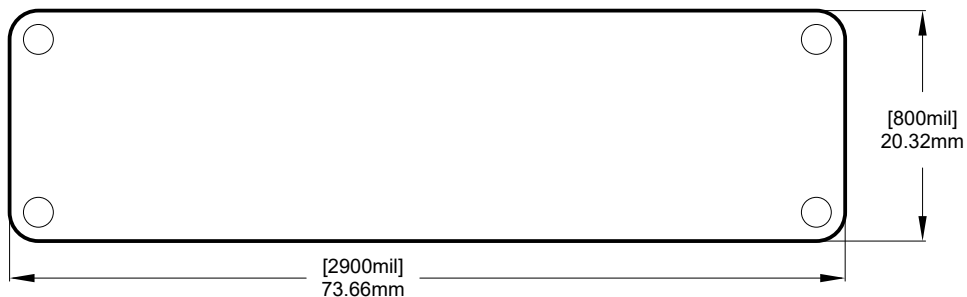
GND

GND

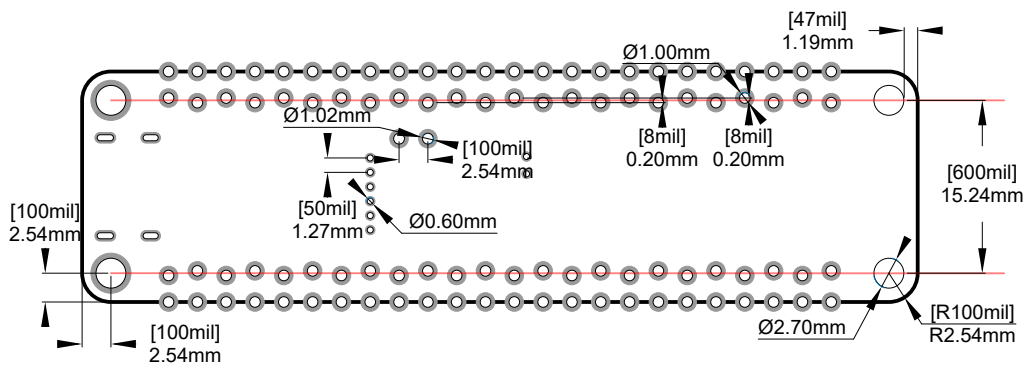




Board Outline

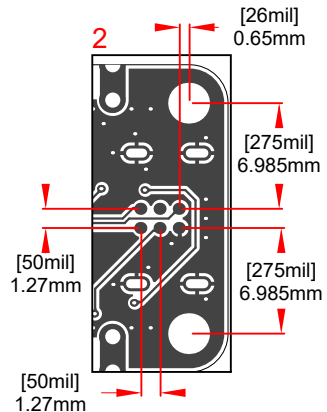
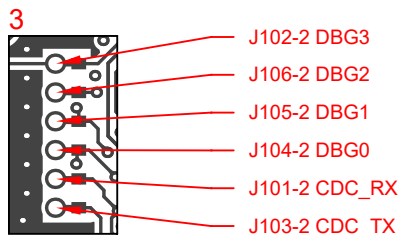
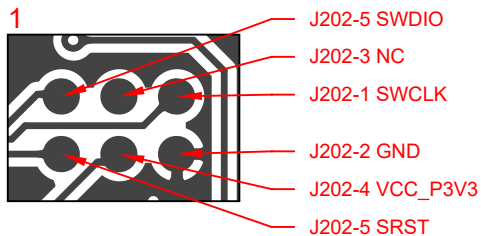
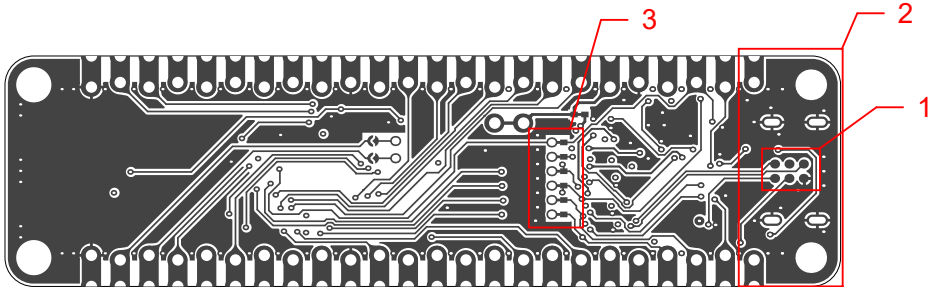
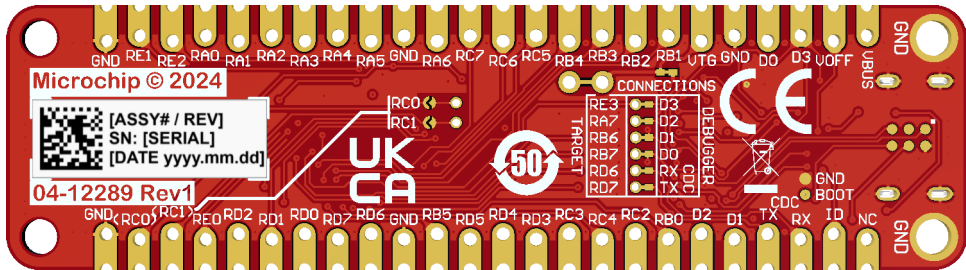


Through-Hole Dimensions



Centerline of staggered through-holes for pin headers.

Test Point Placement [Bottom View]



PCB Stackup

Material	Layer	Thickness	Dielectric Material	Type	Gerber
	Top Overlay			Legend	GTO
Surface Material	Top Solder	0.010mm	Solder Resist	Solder Mask	GTS
Copper	Top Layer	0.035mm		Signal	GTL
Prepreg		0.117mm	PP-016	Dielectric	
Copper	Gnd Plane	0.035mm		Internal Plane	GP1
Core		1.200mm	FR-4	Dielectric	
Copper	Pwr Plane	0.035mm		Internal Plane	GP2
Prepreg		0.117mm	PP-016	Dielectric	
Copper	Bottom Layer	0.035mm		Signal	GBL
Surface Material	Bottom Solder	0.010mm	Solder Resist	Solder Mask	GBS
	Bottom Overlay			Legend	GBO
Total thickness: 1.594mm					

Component list

PIC16F17576 Curiosity Nano

PCBA Number:

02-01225

PCBA Revision:

2

Variant:

Default Assembly



Print Date: 14.04.2025 11:12:48

Fitted	Designator	Quantity	Value	Manufacturer 1	Manufacturer Part Number 1	Description_
Fitted	C100, C101, C201, C202, C207, C208	6	0.1uF	KEMET	C0402C104K4RAC7867	CAP CER 0.1uF 16V 10% X7R SMD 0402
Fitted	C103, C200, C203, C204	4	2.2uF	Murata	GRM155R61A225KE95D	CAP CER 2.2uF 10V 10% X5R SMD 0402
Fitted	C104, C105	2	5.6pF	Vishay	VJ0402A5R6DXA CW1BC	CAP CER 5.6pF 50V 0.5pF NP0 SMD 0402
Fitted	C205	1	4.7uF	KEMET	C0603C475K8PAC7867	CAP CER 4.7uF 10V 10% X5R SMD 0603
Fitted	C206	1	2200pF	KEMET	C0402C222J3GACTU	CAP CER 2200pF 25V 5% C0G SMD 0402
Fitted	C209	1	1uF	KEMET	C0402C105K9PACTU	CAP CER 1uF 6.3V 10% X5R SMD 0402
Fitted	D100	1	Yellow LED	Rohm Semiconductor	SML-D12Y1WT86	LED YELLOW DIFFUSED 1608 SMD
Fitted	D200	1	LED SINGLE SML-P12MTT86R YELLOW-GREEN	Rohm Semiconductor	SML-P12MTT86R	DIO LED YELLOW-GREEN 2.2V 20mA 25mcd Clear SMD 0402
Fitted	J203	1	USB2.0 Type-C FEMALE	KLS Electronic	L-KLS1-5409-R	CON USB2.0 Type-C Female SMD R/A
Fitted	LABEL1	1	PCBA LABEL 18X6mm	ACT Logimark AS	505462	LABEL PCBA 18x6mm Datasheet Assy# / Rev / Serial / Date
Fitted	Q200	1	DMN65D8LFB-7B	Diodes Incorporated	DMN65D8LFB-7	TRANS FET N-CH DMN65D8LFB-7B 260mA 60V 430mW X1_DFN1006-3
Fitted	Q201	1	CSD25501F3	Texas Instruments	CSD25501F3	TRANS FET P-CH CSD25501F3 -20V -3.6A 0.076R LGA
Fitted	R100, R101, R102, R200, R201, R202, R203, R204, R205, R207, R210, R213, R214	13	47k	Yageo	RC0402FR-0747KL	RES TKF 47k 1% 1/16W SMD 0402
Fitted	R103, R104, R106, R107, R108, R109, R110, R209, R212, R215, R218	11	1k	Panasonic	ERJ-2RKF1001X	RES TKF 1k 1% 1/10W SMD 0402
Fitted	R105	1	0R	Vishay	CRCW04020000Z0EDHP	RES TKF 0R 1/5W SMD 0402 AEC-Q200
Fitted	R206	1	27k	Yageo	RC0402FR-0727KL	RES TKF 27k 1% 1/16W SMD 0402
Fitted	R208	1	33k	Yageo	AC0402FR-0733KL	RES TKF 33k 1% 1/16W SMD 0402
Fitted	R211	1	470R	Yageo	RC0402FR-07470RL	RES TKF 470R 1% 1/16W MF 0402
Fitted	R216, R217	2	5.1k	Panasonic Electronic Components	ERJ-2RKF5101X	RES TKF 5.1k 1% 1/10W SMD 0402
Fitted	SW100	1	TACT SPST	Dailyw ell Electronics Co.,Ltd.	TS604VM1-035CR-R	SWITCH TACT SPST 12 50mA TS604VM1-035CR-R SMD
Fitted	Test1	1				TEST, PIC16F17576-CNANO
Fitted	Test2	1	Debugger Firmw are			FW, CNANO-DEBUGGER
Fitted	U100	1	PIC16F17576-I/MP	Microchip Technology	PIC16F17576-I/MP	MCHP MCU 8-BIT 32MHz 28KB 2KB PIC16F17576-I/MP QFN-40
Fitted	U200	1	MIC5353YMT-TR	Microchip Technology	MIC5353YMT-TR	MCHP ANALOG LDO ADJ 500mA MIC5353YMT-TR MLF-6
Fitted	U201	1	MIC94163YCS	Microchip Technology	MIC94163YCS-TR	IC LOAD SWITCH HI SIDE 3A 6WLCSP
Fitted	U202	1	MIC2008	Microchip Technology	MIC2008YML-TR	MCHP ANALOG POWER SWITCH 5.5V 2.1A MIC2008YML-TR VDFN-6
Fitted	U203	1	MIC5528 3V3	Microchip Technology	MIC5528-3.3YMT-TR	MCHP ANALOG LDO 3.3V MIC5528-3.3YMT-TR 6-TDFN
Fitted	U204, U205, U207, U208, U209	5	74LVC1T45FW4-7	Diodes Incorporated	74LVC1T45FW4-7	IC VOLTAGE TRANSLATOR BI-DIR 1 CIRCUIT 74LVC1T45FW4-7 X2_DFN1010-6
Fitted	U206	1	ATSAMD21E18	Microchip Technology	ATSAMD21E18A-MUT	MCHP MCU 32-BIT 48MHz 256Kb 32Kb ATSAMD21E18A-MUT QFN-32
Fitted	Y100	1	32.768kHz	Microchip Technology	VMK3-9002-32K7680000	MCHP CRYSTAL 32.768kHz 7pF VMK3-9002-32K7680000 SMD L3.2W1.5H0.9

66

Approved

Notes