



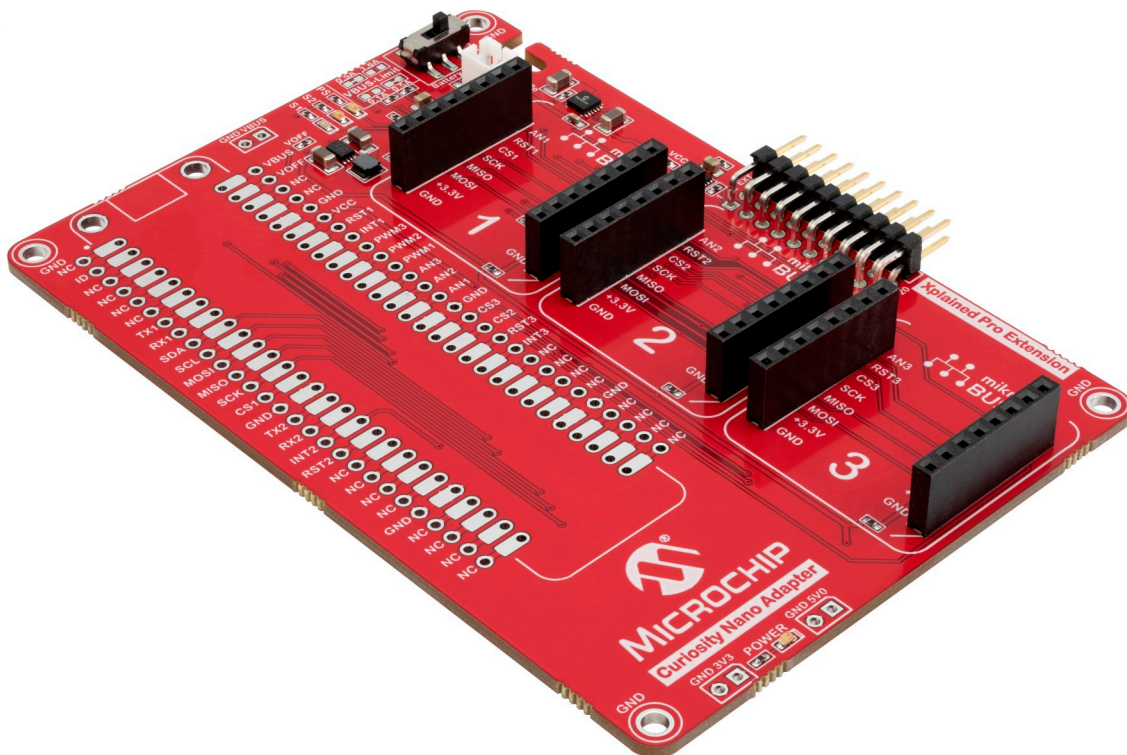
# Curiosity Nano Base for Click boards™

## Curiosity Nano Base for Click boards™ Hardware User Guide

### Preface

The Curiosity Nano Base for Click boards™ evaluation kit is a hardware extension platform to ease the connection between Curiosity Nano kits and extension boards like the mikroBUS™ Click modules and Xplained Pro extension boards.

Curiosity Nano Base for Click boards has an on-board Li-Ion/LiPo charger and management circuit for battery powered operation of the board.



## Table of Contents

---

Preface.....	1
1. Introduction.....	3
1.1. Features.....	3
1.2. Kit Overview.....	3
2. Getting Started.....	4
2.1. Curiosity Nano Quick Start.....	4
2.2. Design Documentation and Relevant Links.....	4
3. Hardware User Guide.....	5
3.1. Curiosity Nano Base for Click boards Pinout.....	5
3.2. Curiosity Nano Base for Click boards Power Supply.....	6
3.3. Curiosity Nano Base for Click boards Battery Charger.....	8
3.4. Curiosity Nano Base for Click boards Mounting.....	9
4. Hardware Revision History.....	11
4.1. Identifying Product ID and Revision.....	11
4.2. Revision 3.....	11
5. Document Revision History.....	12
6. Appendix.....	13
6.1. Assembly Drawing.....	13
6.2. Schematic.....	15
The Microchip Web Site.....	16
Customer Change Notification Service.....	16
Customer Support.....	16
Product Identification System.....	17
Microchip Devices Code Protection Feature.....	17
Legal Notice.....	17
Trademarks.....	17
Quality Management System Certified by DNV.....	18
Worldwide Sales and Service.....	19

## 1. Introduction

### 1.1 Features

- Curiosity Nano Footprint
- One Power LED
- Three mikroBUS Sockets
- One Xplained Pro Extension Header
- Power
  - USB powered from the Curiosity Nano kit
  - Alternative external power input
  - Option to power from, and charge, 4.20V Li-Ion/LiPo batteries
  - Fixed 3.3V PSU for target and mikroBUS sockets
  - Fixed 5.0V Boost converter for 5V mikroBUS sockets

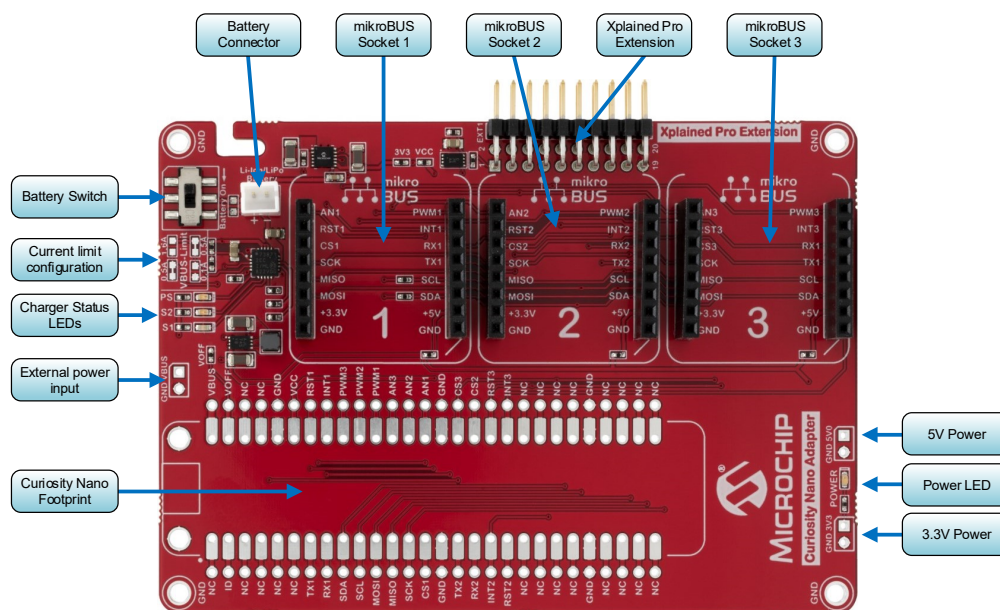
### 1.2 Kit Overview

Curiosity Nano Base for Click boards allows easy connection of Mikro Elektronika mikroBUS™ Click boards and Xplained Pro extensions to Curiosity Nano evaluation kits.

The kit is powered through USB on a mounted Curiosity Nano kit by default. The kit can also be powered from a Li-Ion/LiPo battery or an external source.

Curiosity Nano Base for Click boards is shipped with pin-headers and pin-sockets to connect Curiosity Nano evaluation kits.

**Figure 1-1. Curiosity Nano Base for Click boards Evaluation Kit Overview**



## 2. Getting Started

### 2.1 Curiosity Nano Quick Start

Steps to start exploring the Curiosity Nano platform:

1. Download Atmel Studio/Microchip MPLAB<sup>®</sup> X IDE.
2. Launch [Atmel START](#) or [MPLAB<sup>®</sup> Code Configurator](#).
3. Find the code examples for the Curiosity Nano kit attached to the Curiosity Nano Base for Click boards.

Use the code examples as a base for your own firmware development.

### 2.2 Design Documentation and Relevant Links

The following list contains links to the most relevant documents and software for the Curiosity Nano Base for Click boards.

- [MPLAB<sup>®</sup> X IDE](#) - MPLAB<sup>®</sup> X IDE is a software program that runs on a PC (Windows<sup>®</sup>, Mac OS<sup>®</sup>, Linux<sup>®</sup>) to develop applications for Microchip microcontrollers and digital signal controllers. It is called an Integrated Development Environment (IDE) because it provides a single integrated "environment" to develop code for embedded microcontrollers.
- [Atmel Studio](#) - Free IDE for the development of C/C++ and assembler code for microcontrollers.
- [IAR Embedded Workbench<sup>®</sup> for AVR<sup>®</sup>](#) - This is a commercial C/C++ compiler that is available for 8-bit AVR. There is a 30-day evaluation version as well as a 4 KB code-size-limited kick-start version available from their website.
- [Atmel START](#) - Atmel START is an online tool that helps the user to select and configure software components and tailor your embedded application in a usable and optimized manner.
- [Microchip Sample Store](#) - Microchip sample store where you can order samples of devices.
- [Data Visualizer](#) - Data Visualizer is a program used for processing and visualizing data. The Data Visualizer can receive data from various sources such as the EDBG Data Gateway Interface found on Curiosity Nano and Xplained Pro boards and COM Ports.
- [Xplained Pro Extension Kits](#) - Xplained Pro Extensions for peripheral functions.
- [Curiosity Nano Base for Click boards website](#) - Kit information, latest user guide and design documentation.
- [Curiosity Nano Base for Click boards on Microchip Purchasing & Client Services](#) - Purchase this kit on Microchip Purchasing & Client Services.

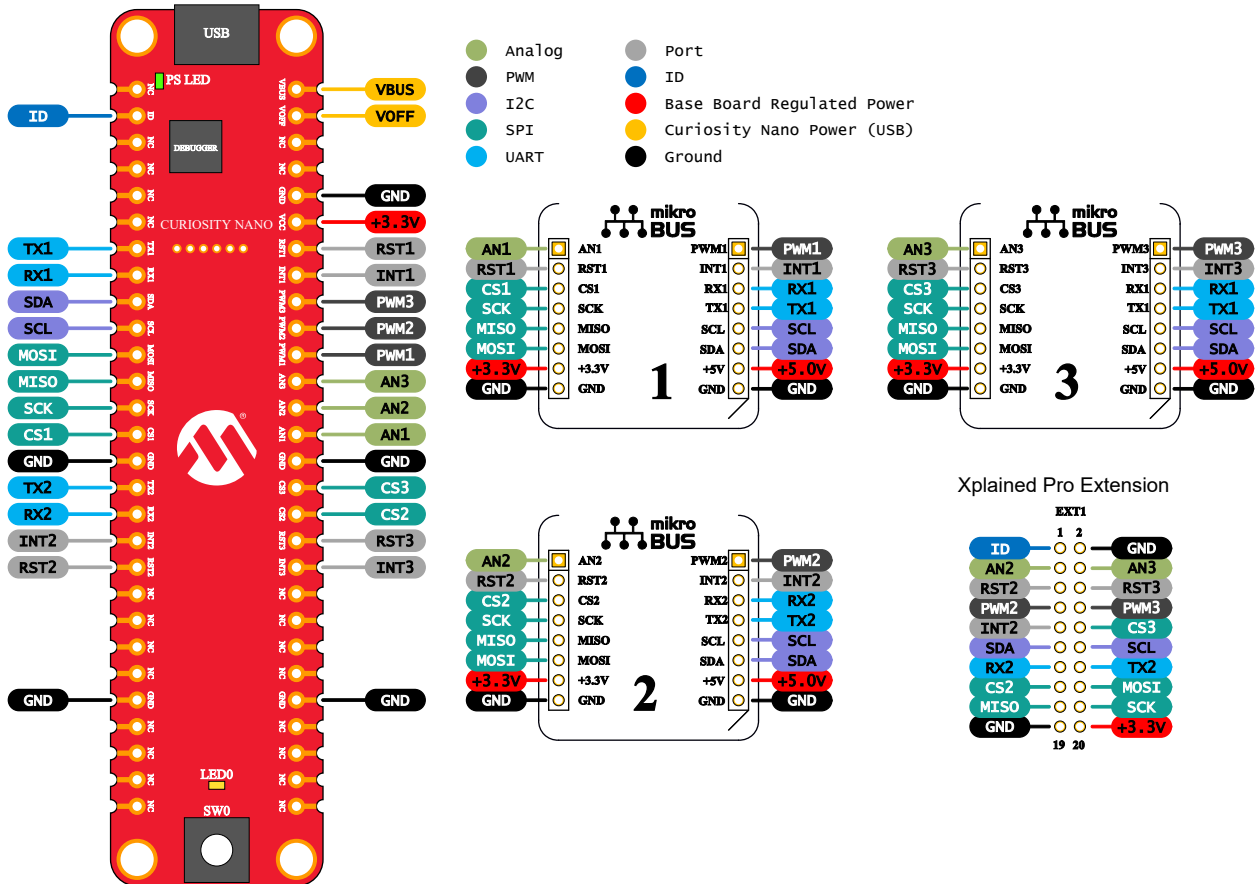
## 3. Hardware User Guide

### 3.1 Curiosity Nano Base for Click boards Pinout

The figure below shows how a Curiosity Nano microcontroller board connects to each of the mikroBUS sockets and Xplained Pro extension.

Check the appendix of the user guide for your microcontroller board to easily figure out how the microcontroller I/Os are routed on the Curiosity Nano Base for Click boards.

**Figure 3-1. Curiosity Nano Base for Click boards Pin-out**



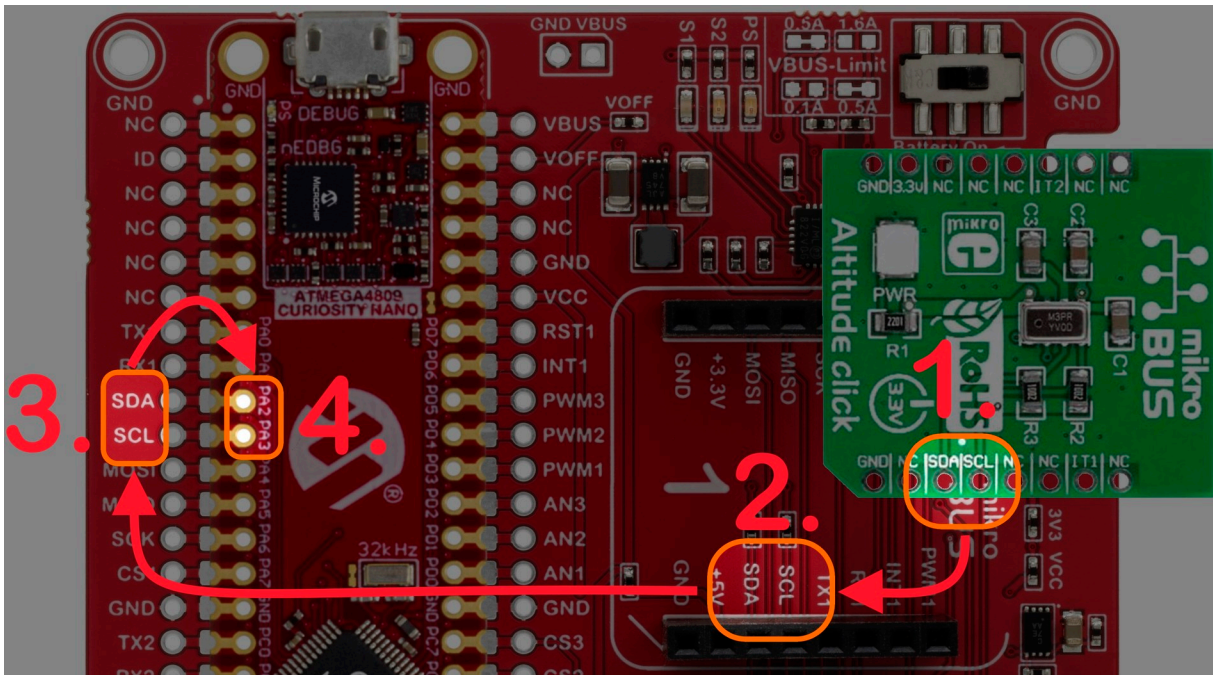
**Info:**

SPI and I<sup>2</sup>C are shared between all connected hardware. The SPI bus has three unique chip select signals routed to each mikroBUS socket.

UART1 (TX1 and RX1) is shared between mikroBUS socket 1 and 3, while UART2 (TX2 and RX2) is shared between mikroBUS socket 2 and the Xplained Pro extension header.

The Xplained Pro extension header is shared with mikroBUS socket 2 and 3. Make sure to check for any conflicting signals if several add-on boards are in use at the same time.

Figure 3-2. Pin Map Example



The figure above shows how to identify which microcontroller pins on a ATmega4809 Curiosity Nano are connected to mikroBUS socket 1.

1. Identify which pins you want on the click module
2. Find the pin name inside the mikroBUS socket on the Curiosity Nano Base for Click boards
3. Locate the same pin names next to the Curiosity Nano footprint
4. Read the pin names on the ATmega4809 Curiosity Nano board

SDA is connected to pin PA2 and SCL is connected to pin PA3 of the ATmega4809.

### 3.1.1 Xplained Pro Extensions

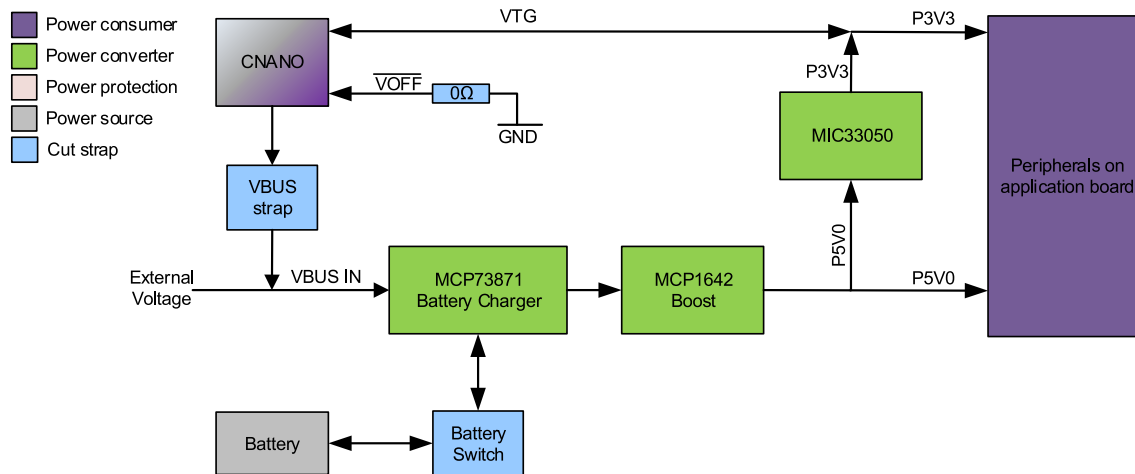
Xplained Pro Extensions are small extension boards with extra peripheral functions like the mikroBUS Click modules. The extension boards, originally intended for the Xplained Pro series of evaluation kits, are mostly not device specific and can be used with any microcontroller.

**Note:** The QTx Xplained Pro Extension kits are not ensured compatibility due to the device specific requirement of the Peripheral Touch Controller (PTC) and pinout.

## 3.2 Curiosity Nano Base for Click boards Power Supply

The Curiosity Nano Base for Click boards is powered from the USB port on a connected Curiosity Nano microcontroller board. The USB voltage is used to supply the MCP73871 battery charger, to generate 3.3V and 5.0V for the mikroBUS sockets, and to supply the Xplained Pro extension header and the microcontroller on the Curiosity Nano microcontroller board. The power LED at the bottom edge of the board is lit whenever there is a voltage on the 3.3V net.

**Figure 3-3. Curiosity Nano Base for Click boards Power Supply**



**Info:** The  $\overline{\text{VOFF}}$  pin connected to the Curiosity Nano microcontroller board is pulled low on Curiosity Nano Base for Click boards. When  $\overline{\text{VOFF}}$  is low, the power supply on the Curiosity Nano microcontroller board is disabled and 3.3V is supplied from Curiosity Nano Base for Click boards to the microcontroller.

There are several ways to modify how the different parts of the board are powered. 5.0V can be removed from any of the mikroBUS sockets by removing *R16*, *R17*, and *R18*.

To power the board from an external power supply, cut *J11* and supply an external voltage from 4.5V to 6V through *J16*.

To use the variable voltage power supply on a Curiosity Nano microcontroller board remove *R11* and *R15*. The base board will no longer be powered through the MCP73871 or from an external voltage connected to *J16*.

**Table 3-1. Default Component Values**

Designator	Default	Comment
J11	Closed	USB Voltage from Curiosity Nano
J16	Not Mounted	1x2 2.54mm pitch pin header, MCP73871 input voltage and GND
J14	Not Mounted	1x2 2.54mm pitch pin header, 5.0V output (MCP1642B)
J15	Not Mounted	1x2 2.54mm pitch pin header, 3.3V output (MIC33050)
R11	Mounted, 0Ω	MIC33050 output connection to VTG_P3V3 net
R12	Mounted, 0Ω	Curiosity Nano VCC connection to VTG_P3V3 net
R15	Mounted, 0Ω	Curiosity Nano $\overline{\text{VOFF}}$ pin connection to GND
R16	Mounted, 0Ω	5.0V connection to mikroBUS socket 1
R17	Mounted, 0Ω	5.0V connection to mikroBUS socket 2
R18	Mounted, 0Ω	5.0V connection to mikroBUS socket 3

### 3.3 Curiosity Nano Base for Click boards Battery Charger

The board has a MCP73871-2CC battery charger for 4.20V Li-Ion/LiPo batteries with 2-pin JST B2B-PH connectors.

When a battery is connected together with an external power source, the MCP73871 will charge the battery at a maximum current of 500mA. When external power is removed, the MCP73871 will source power from the battery to power the board. The battery charge current can be customized by replacing resistor *R7*, the charge current follows the formula  $I = 1000V / R7$ .



Only use Li-Ion/LiPo batteries with a nominal voltage of 4.20V, and batteries that can handle a charge current of 500mA or more.



**Info:** The battery can be connected/disconnected with the slider switch at the upper right corner of the board.

Input current to the MCP73871 is limited to 500mA with the default board settings. With a battery connected, the MCP73871 will power the board with whatever current it requires and use the remaining current to charge the battery.

The input current limit can be changed by adjusting the configuration of *J9*, *J10*, *J12*, and *J13* according to the table below.

**Table 3-2. MCP73871 Input Current Limit Settings**

J9	J10	J12	J13	MCP73871 Current Limit [mA]
Open	Closed	Closed	Open	80 to 100
Open	Closed	Open	Closed	80 to 100
Closed	Open	Closed	Open	1500 to 1800
Closed	Open	Open	Closed	400 to 500 (default)



All combinations not listed in the table are invalid and will cause a short-circuit between the input voltage and ground.

If the battery is attached to the back of the board in the designated area, a thermistor can be mounted in footprint *TH1* to enable the thermal protection feature in the MCP73871. Remove *R21* when the thermistor is attached. As an example, using a 10kΩ NTC with  $\beta$  parameter of 3590 will allow charging between approximately 4°C and 43°C.

Three status signals from the MCP73871 are connected to LEDs located at the upper edge of the board. The table below shows the different LED combinations.

**Table 3-3. MCP73871 Status LEDs**

S1	S2	PS	Status
Off	Off	Off	Shutdown/no power



.....continued

S1	S2	PS	Status
Off	Off	On	Shutdown/no battery connected
On	Off	On	Battery charging
Off	On	On	Battery charge complete
On	Off	Off	Low battery output
On	On	On	Temperature/timer fault

**Table 3-4. Default Component Values**

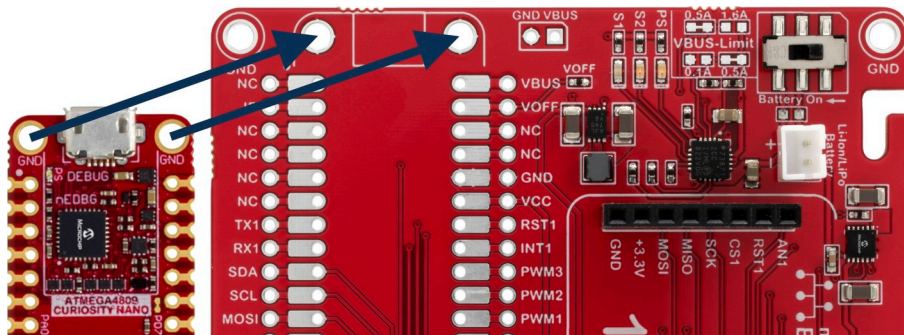
Designator	Default	Comment
J9	Closed	MCP73871 current limit setting
J10	Open	
J12	Open	
J13	Closed	
R20	Not Mounted	Battery switch bypass, solder 0 ohm to permanently connect the battery to the MCP73871
R7	Mounted, 2kΩ	Sets the battery charge current
R21	Mounted, 10kΩ	Battery thermal protection feature of the MCP73871
TH1	Not Mounted	

### 3.4 Curiosity Nano Base for Click boards Mounting

Connecting a Curiosity Nano microcontroller kit to Curiosity Nano Base for Click boards can be done in several ways. The most practical way is to solder sockets to the base board, and headers to the Curiosity Nano microcontroller kit. It is also possible to skip the header and socket, and solder the Curiosity Nano microcontroller kit directly to the base board.

Align the USB connector on the Curiosity Nano kit with the upper edge of the base board as shown in the image below to connect the board correctly.

**Figure 3-4. How to Mount Curiosity Nano Kit**



The images below shows examples of ATmega4809 Curiosity Nano and PIC16F18446 Curiosity Nano mounted through pin-headers and pin-sockets.

Figure 3-5. ATmega4809 Curiosity Nano kit mounted on Curiosity Nano Base for Click boards

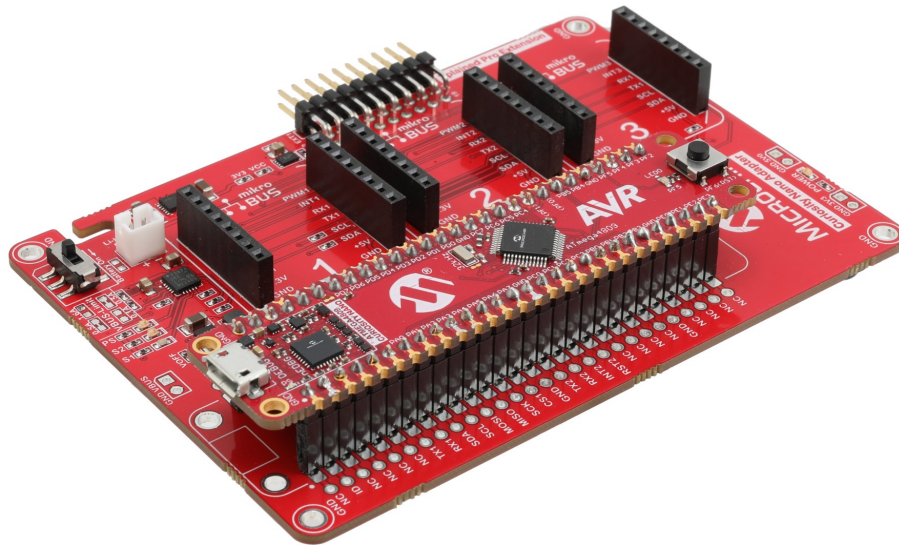
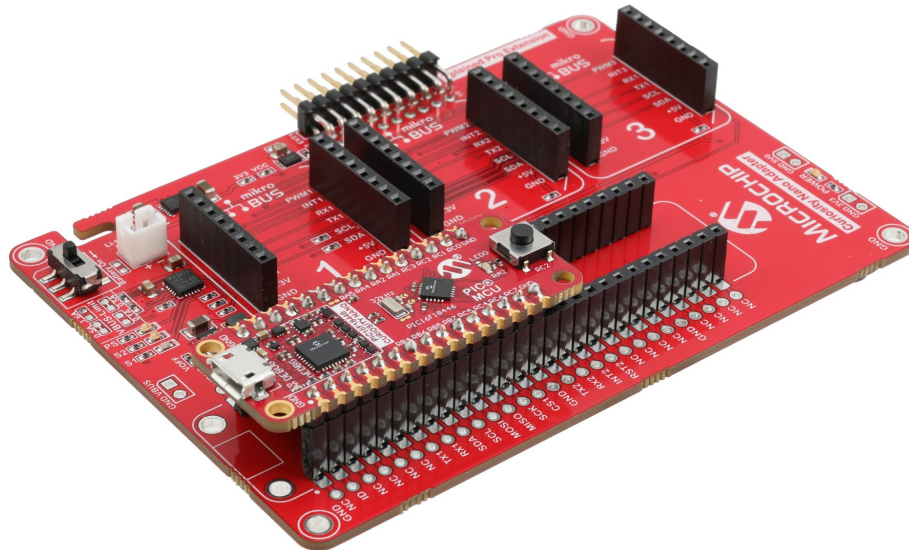


Figure 3-6. PIC16F18446 Curiosity Nano kit mounted on Curiosity Nano Base for Click boards



## 4. Hardware Revision History

This user guide provides the latest available revision of the kit. This chapter contains information about known issues, a revision history of older revisions, and how older revisions differ from the latest revision.

### 4.1 Identifying Product ID and Revision

The revision and product identifier of the Curiosity Nano Base for Click boards can be found in two ways; either through Atmel Studio/Microchip MPLAB<sup>®</sup> X IDE or by looking at the sticker on the bottom side of the PCB.

By connecting a Curiosity Nano Base for Click boards to a computer with Atmel Studio/Microchip MPLAB<sup>®</sup> X IDE running, an information window will pop up. The first six digits of the serial number, which is listed under kit details, contain the product identifier and revision.

The same information can be found on the sticker on the bottom side of the PCB. Most kits will print the identifier and revision in plain text as A09-nnnn\rr, where “nnnn” is the identifier and “rr” is the revision. The boards with limited space have a sticker with only a QR-code, containing the product identifier, revision and the serial number.

The serial number string has the following format:

```
"nnnnrrssssssss"  
n = product identifier  
r = revision  
s = serial number
```

The product identifier for Curiosity Nano Base for Click boards is A09-3206.

### 4.2 Revision 3

Revision 3 is the initially released revision.

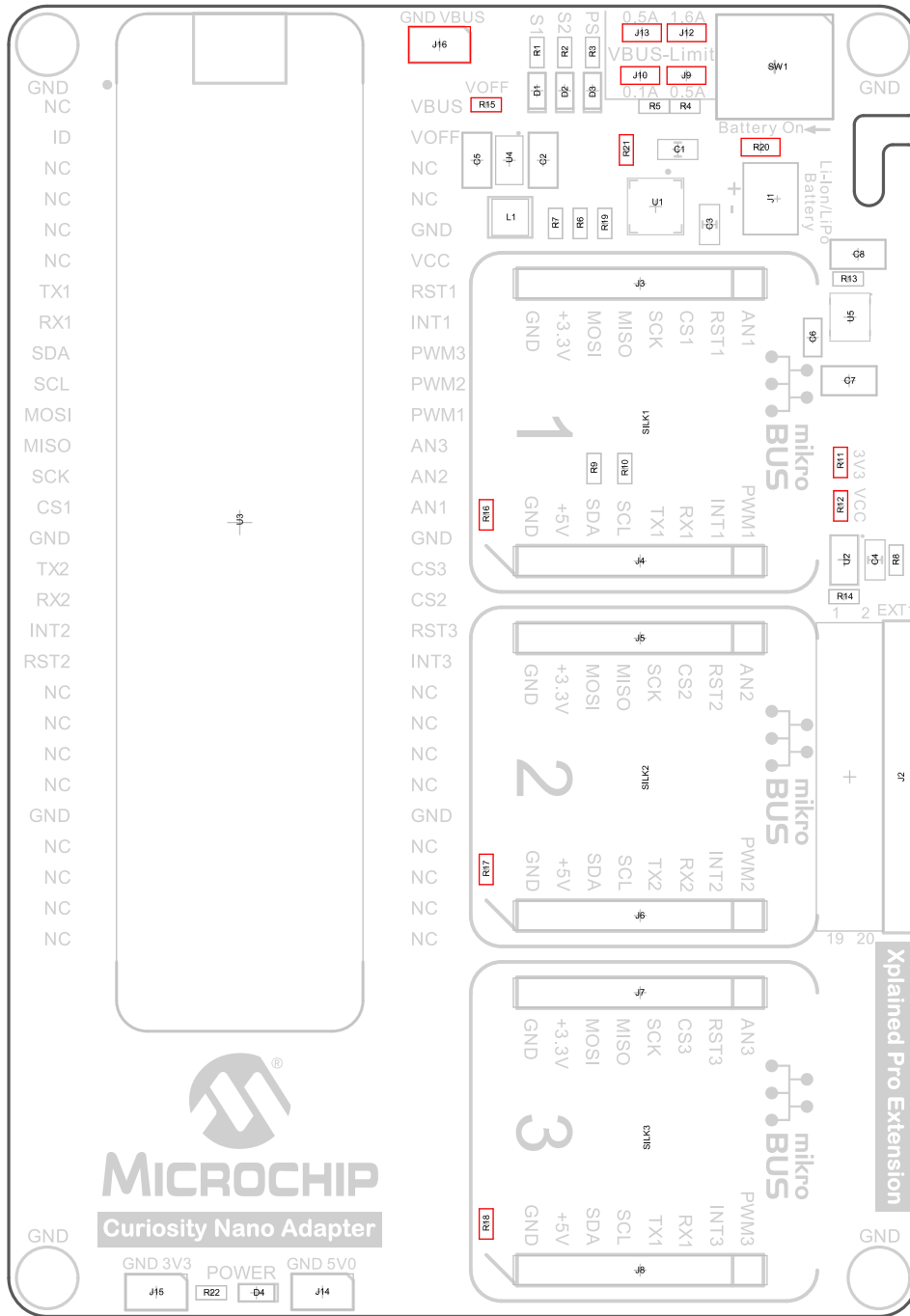
**5. Document Revision History**

Doc. rev.	Date	Comment
B	3/2019	Kit name changed from Curiosity Nano Adapter to Curiosity Nano Base for Click boards™.
A	1/2019	Initial document release.

### 6. Appendix

#### 6.1 Assembly Drawing

Figure 6-1. Curiosity Nano Base for Click boards Assembly Drawing Top







## The Microchip Web Site

---

Microchip provides online support via our web site at <http://www.microchip.com/>. This web site is used as a means to make files and information easily available to customers. Accessible by using your favorite Internet browser, the web site contains the following information:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQ), technical support requests, online discussion groups, Microchip consultant program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

## Customer Change Notification Service

---

Microchip's customer notification service helps keep customers current on Microchip products. Subscribers will receive e-mail notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, access the Microchip web site at <http://www.microchip.com/>. Under "Support", click on "Customer Change Notification" and follow the registration instructions.

## Customer Support

---

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or Field Application Engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

Technical support is available through the web site at: <http://www.microchip.com/support>



## Product Identification System

---

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

## Microchip Devices Code Protection Feature

---

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

## Legal Notice

---

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

## Trademarks

---

The Microchip name and logo, the Microchip logo, AnyRate, AVR, AVR logo, AVR Freaks, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, Helder, JukeBlox, KeeLoq, Kleer, LANCheck, LINK MD, maXStylus, maXTouch, MediaLB, megaAVR, MOST, MOST logo, MPLAB, OptoLyzer, PIC, picoPower, PICSTART, PIC32 logo, Prochip Designer, QTouch, SAM-BA, SpyNIC, SST, SST Logo, SuperFlash, tinyAVR, UNI/O, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

# Curiosity Nano Base for Click board...

---

ClockWorks, The Embedded Control Solutions Company, EtherSynch, Hyper Speed Control, HyperLight Load, IntelliMOS, mTouch, Precision Edge, and Quiet-Wire are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, INICnet, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, memBrain, Mindi, MiWi, motorBench, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICKit, PICTail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQL, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2019, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 978-1-5224-4201-1

AMBA, Arm, Arm7, Arm7TDMI, Arm9, Arm11, Artisan, big.LITTLE, Cordio, CoreLink, CoreSight, Cortex, DesignStart, DynamIQ, Jazelle, Keil, Mali, Mbed, Mbed Enabled, NEON, POP, RealView, SecurCore, Socrates, Thumb, TrustZone, ULINK, ULINK2, ULINK-ME, ULINK-PLUS, ULINKpro,  $\mu$ Vision, Versatile are trademarks or registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere.

## Quality Management System Certified by DNV

---

### ISO/TS 16949

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC<sup>®</sup> MCUs and dsPIC<sup>®</sup> DSCs, KEELOQ<sup>®</sup> code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

## Worldwide Sales and Service

AMERICAS	ASIA/PACIFIC	ASIA/PACIFIC	EUROPE
<p><b>Corporate Office</b> 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support: <a href="http://www.microchip.com/support">http://www.microchip.com/support</a> Web Address: <a href="http://www.microchip.com">www.microchip.com</a></p> <p><b>Atlanta</b> Duluth, GA Tel: 678-957-9614 Fax: 678-957-1455</p> <p><b>Austin, TX</b> Tel: 512-257-3370</p> <p><b>Boston</b> Westborough, MA Tel: 774-760-0087 Fax: 774-760-0088</p> <p><b>Chicago</b> Itasca, IL Tel: 630-285-0071 Fax: 630-285-0075</p> <p><b>Dallas</b> Addison, TX Tel: 972-818-7423 Fax: 972-818-2924</p> <p><b>Detroit</b> Novi, MI Tel: 248-848-4000</p> <p><b>Houston, TX</b> Tel: 281-894-5983</p> <p><b>Indianapolis</b> Noblesville, IN Tel: 317-773-8323 Fax: 317-773-5453 Tel: 317-536-2380</p> <p><b>Los Angeles</b> Mission Viejo, CA Tel: 949-462-9523 Fax: 949-462-9608 Tel: 951-273-7800</p> <p><b>Raleigh, NC</b> Tel: 919-844-7510</p> <p><b>New York, NY</b> Tel: 631-435-6000</p> <p><b>San Jose, CA</b> Tel: 408-735-9110 Tel: 408-436-4270</p> <p><b>Canada - Toronto</b> Tel: 905-695-1980 Fax: 905-695-2078</p>	<p><b>Australia - Sydney</b> Tel: 61-2-9868-6733</p> <p><b>China - Beijing</b> Tel: 86-10-8569-7000</p> <p><b>China - Chengdu</b> Tel: 86-28-8665-5511</p> <p><b>China - Chongqing</b> Tel: 86-23-8980-9588</p> <p><b>China - Dongguan</b> Tel: 86-769-8702-9880</p> <p><b>China - Guangzhou</b> Tel: 86-20-8755-8029</p> <p><b>China - Hangzhou</b> Tel: 86-571-8792-8115</p> <p><b>China - Hong Kong SAR</b> Tel: 852-2943-5100</p> <p><b>China - Nanjing</b> Tel: 86-25-8473-2460</p> <p><b>China - Qingdao</b> Tel: 86-532-8502-7355</p> <p><b>China - Shanghai</b> Tel: 86-21-3326-8000</p> <p><b>China - Shenyang</b> Tel: 86-24-2334-2829</p> <p><b>China - Shenzhen</b> Tel: 86-755-8864-2200</p> <p><b>China - Suzhou</b> Tel: 86-186-6233-1526</p> <p><b>China - Wuhan</b> Tel: 86-27-5980-5300</p> <p><b>China - Xian</b> Tel: 86-29-8833-7252</p> <p><b>China - Xiamen</b> Tel: 86-592-2388138</p> <p><b>China - Zhuhai</b> Tel: 86-756-3210040</p>	<p><b>India - Bangalore</b> Tel: 91-80-3090-4444</p> <p><b>India - New Delhi</b> Tel: 91-11-4160-8631</p> <p><b>India - Pune</b> Tel: 91-20-4121-0141</p> <p><b>Japan - Osaka</b> Tel: 81-6-6152-7160</p> <p><b>Japan - Tokyo</b> Tel: 81-3-6880-3770</p> <p><b>Korea - Daegu</b> Tel: 82-53-744-4301</p> <p><b>Korea - Seoul</b> Tel: 82-2-554-7200</p> <p><b>Malaysia - Kuala Lumpur</b> Tel: 60-3-7651-7906</p> <p><b>Malaysia - Penang</b> Tel: 60-4-227-8870</p> <p><b>Philippines - Manila</b> Tel: 63-2-634-9065</p> <p><b>Singapore</b> Tel: 65-6334-8870</p> <p><b>Taiwan - Hsin Chu</b> Tel: 886-3-577-8366</p> <p><b>Taiwan - Kaohsiung</b> Tel: 886-7-213-7830</p> <p><b>Taiwan - Taipei</b> Tel: 886-2-2508-8600</p> <p><b>Thailand - Bangkok</b> Tel: 66-2-694-1351</p> <p><b>Vietnam - Ho Chi Minh</b> Tel: 84-28-5448-2100</p>	<p><b>Austria - Wels</b> Tel: 43-7242-2244-39 Fax: 43-7242-2244-393</p> <p><b>Denmark - Copenhagen</b> Tel: 45-4450-2828 Fax: 45-4485-2829</p> <p><b>Finland - Espoo</b> Tel: 358-9-4520-820</p> <p><b>France - Paris</b> Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79</p> <p><b>Germany - Garching</b> Tel: 49-8931-9700</p> <p><b>Germany - Haan</b> Tel: 49-2129-3766400</p> <p><b>Germany - Heilbronn</b> Tel: 49-7131-67-3636</p> <p><b>Germany - Karlsruhe</b> Tel: 49-721-625370</p> <p><b>Germany - Munich</b> Tel: 49-89-627-144-0 Fax: 49-89-627-144-44</p> <p><b>Germany - Rosenheim</b> Tel: 49-8031-354-560</p> <p><b>Israel - Ra'anana</b> Tel: 972-9-744-7705</p> <p><b>Italy - Milan</b> Tel: 39-0331-742611 Fax: 39-0331-466781</p> <p><b>Italy - Padova</b> Tel: 39-049-7625286</p> <p><b>Netherlands - Drunen</b> Tel: 31-416-690399 Fax: 31-416-690340</p> <p><b>Norway - Trondheim</b> Tel: 47-72884388</p> <p><b>Poland - Warsaw</b> Tel: 48-22-3325737</p> <p><b>Romania - Bucharest</b> Tel: 40-21-407-87-50</p> <p><b>Spain - Madrid</b> Tel: 34-91-708-08-90 Fax: 34-91-708-08-91</p> <p><b>Sweden - Gothenberg</b> Tel: 46-31-704-60-40</p> <p><b>Sweden - Stockholm</b> Tel: 46-8-5090-4654</p> <p><b>UK - Wokingham</b> Tel: 44-118-921-5800 Fax: 44-118-921-5820</p>

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Microchip:](#)

[DM182028](#)