



MICROCHIP

**Curiosity High Pin Count (HPC)
Development Board
User's Guide**

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.

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in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates.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.

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[®] MCUs and dsPIC[®] DSCs, KEELOQ[®] 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.

**QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
= ISO/TS 16949 =**

Trademarks

The Microchip name and logo, the Microchip logo, AnyRate, dsPIC, FlashFlex, flexPWR, Heldo, JukeBlox, KeeLoq, KeeLoq logo, Klear, LANCheck, LINK MD, MediaLB, MOST, MOST logo, MPLAB, OptoLyzer, PIC, PICSTART, PIC32 logo, RightTouch, SpyNIC, SST, SST Logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

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.

Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BodyCom, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, Inter-Chip Connectivity, JitterBlocker, KlearNet, KlearNet logo, MiWi, motorBench, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PureSilicon, RightTouch logo, REAL ICE, Ripple Blocker, Serial Quad I/O, 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.

GettIC 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.

© 2016, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 978-1-5224-0824-6

Object of Declaration: Curiosity High Pin Count Development Board

EU Declaration of Conformity

Manufacturer: Microchip Technology Inc.
2355 W. Chandler Blvd.
Chandler, Arizona, 85224-6199
USA

This declaration of conformity is issued by the manufacturer.

The development/evaluation tool is designed to be used for research and development in a laboratory environment. This development/evaluation tool is not a Finished Appliance, nor is it intended for incorporation into Finished Appliances that are made commercially available as single functional units to end users under EU EMC Directive 2004/108/EC and as supported by the European Commission's Guide for the EMC Directive 2004/108/EC (8th February 2010).

This development/evaluation tool complies with EU RoHS2 Directive 2011/65/EU.

This development/evaluation tool, when incorporating wireless and radio-telecom functionality, is in compliance with the essential requirement and other relevant provisions of the R&TTE Directive 1999/5/EC and the FCC rules as stated in the declaration of conformity provided in the module datasheet and the module product page available at www.microchip.com.

For information regarding the exclusive, limited warranties applicable to Microchip products, please see Microchip's standard terms and conditions of sale, which are printed on our sales documentation and available at www.microchip.com.

Signed for and on behalf of Microchip Technology Inc. at Chandler, Arizona, USA


Derek Carlson
VP Development Tools

12-Sep-14
Date

Curiosity High Pin Count Development Board User's Guide

NOTES:



CURIOSITY HIGH PIN COUNT DEVELOPMENT BOARD USER'S GUIDE

Table of Contents

Preface	7
Introduction.....	7
Document Layout	7
Conventions Used in this Guide	8
Recommended Reading.....	9
The Microchip Website.....	9
Development Systems Customer Change Notification Service	9
Customer Support	10
Revision History	10
Chapter 1. Introduction to Curiosity High Pin Count (HPC)	
1.1 Curiosity High Pin Count (HPC) Development Board Kit Contents	11
Chapter 2. Getting Started	
2.1 Programming the Curiosity HPC Development Board	13
2.1.1 Programming Using MPLAB® X	13
2.1.2 Programming using MPLAB® Xpress	17
Chapter 3. Troubleshooting	
3.1 The MCU Will Not Program Using The PKOB	23
Appendix A. Schematic	
A.1 Curiosity HPC Development Board Schematic	25
Appendix B. General Notes	
B.1 microBus™ Clicks	27
B.2 Solder Blob Jumper	27
Worldwide Sales and Service	29

Curiosity High Pin Count Development Board User's Guide

NOTES:



CURIOSITY HIGH PIN COUNT DEVELOPMENT BOARD USER'S GUIDE

Preface

NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our website (www.microchip.com) to obtain the latest documentation available.

Documents are identified with a “DS” number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is “DSXXXXA”, where “XXXX” is the document number and “A” is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® IDE online help. Select the Help menu, and then Topics to open a list of available online help files.

INTRODUCTION

This chapter contains general information that will be useful to know before using the Curiosity HPC Development Board. Items discussed in this chapter include:

- Document Layout
- Conventions Used in this Guide
- Recommended Reading
- The Microchip Website
- Development Systems Customer Change Notification Service
- Customer Support
- Revision History

DOCUMENT LAYOUT

This document describes how to use the Curiosity HPC Development Board as a development tool to emulate and debug firmware on a target board. The document is organized as follows:

- **Chapter 1. “Introduction to Curiosity High Pin Count (HPC)”** – This chapter contains general information regarding the Curiosity HPC Development Board kit contents, layout and power source.
- **Chapter 2. “Getting Started”** – This chapter offers information on how to program the Curiosity HPC Development Board.
- **Chapter 3. “Troubleshooting”** – Consult this chapter for troubleshooting information.
- **Appendix A. “Schematic”** – This appendix lists the Curiosity HPC Development Board schematic.
- **Appendix B. “General Notes”** – Refer to this appendix for general notes on using the Click module sockets and the solder blob jumpers.

Curiosity High Pin Count Development Board User's Guide

CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENT CONVENTIONS

Description	Represents	Examples
Arial font:		
Italic characters	Referenced books	<i>MPLAB IDE User's Guide</i>
	Emphasized text	...is the <i>only</i> compiler...
Initial caps	A window	the Output window
	A dialog	the Settings dialog
	A menu selection	select Enable Programmer
Quotes	A field name in a window or dialog	"Save project before build"
Underlined, italic text with right angle bracket	A menu path	<u><i>File>Save</i></u>
Bold characters	A dialog button	Click OK
	A tab	Click the Power tab
N'Rnnnn	A number in verilog format, where N is the total number of digits, R is the radix and n is a digit.	4'b0010, 2'hF1
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
Courier New font:		
Plain Courier New	Sample source code	#define START
	Filenames	autoexec.bat
	File paths	c:\mcc18\h
	Keywords	_asm, _endasm, static
	Command-line options	-Opa+, -Opa-
	Bit values	0, 1
	Constants	0xFF, 'A'
Italic Courier New	A variable argument	<i>file.o</i> , where <i>file</i> can be any valid filename
Square brackets []	Optional arguments	mcc18 [options] <i>file</i> [options]
Curly brackets and pipe character: { }	Choice of mutually exclusive arguments; an OR selection	errorlevel {0 1}
Ellipses...	Replaces repeated text	var_name [, var_name...]
	Represents code supplied by user	void main (void) { ... }

RECOMMENDED READING

This user's guide describes how to use the Curiosity HPC Development Board. For the latest information on using other tools, refer to the MPLAB® X IDE home page: www.microchip.com/mplabx/. This resource page contains updated documentation, downloads and links to other MPLAB X compatible tools, plug-ins and much more.

THE MICROCHIP WEBSITE

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

- **Product Support** – Data sheets and errata, application notes, sample programs and labs, design resources, user's guides and hardware support documents, latest software releases and archived software
Curiosity Development Board-specific product support can be accessed via our website at www.microchip.com/curiosity.
- **General Technical Support** – Frequently Asked Questions (FAQs), 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

DEVELOPMENT SYSTEMS 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 website at www.microchip.com, click on Customer Change Notification and follow the registration instructions.

The Development Systems product group categories are:

- **Compilers** – The latest information on Microchip C compilers, assemblers, linkers and other language tools. These include all MPLAB C compilers; all MPLAB assemblers (including MPASM™ assembler); all MPLAB linkers (including MPLINK™ object linker); and all MPLAB librarians (including MPLIB™ object librarian).
- **Emulators** – The latest information on Microchip in-circuit emulators. This includes the MPLAB REAL ICE™ and MPLAB ICE 2000 in-circuit emulators.
- **In-Circuit Debuggers** – The latest information on the Microchip in-circuit debuggers. This includes MPLAB ICD 3 in-circuit debuggers and PICKit™ 3 debug express.
- **MPLAB IDE** – The latest information on Microchip MPLAB IDE, the Windows® Integrated Development Environment for development systems tools. This list is focused on the MPLAB IDE, MPLAB IDE Project Manager, MPLAB Editor and MPLAB SIM simulator, as well as general editing and debugging features.
- **Programmers** – The latest information on Microchip programmers. These include production programmers such as MPLAB REAL ICE in-circuit emulator, MPLAB ICD 3 in-circuit debugger and MPLAB PM3 device programmers. Also included are nonproduction development programmers such as PICSTART® Plus and PICKit 2 and 3.

Curiosity High Pin Count Development Board User's Guide

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.

Technical support is available through the website at:

www.microchip.com/support.

REVISION HISTORY

Revision A (July 2016)

Initial release of this document.



CURIOSITY HIGH PIN COUNT DEVELOPMENT BOARD USER'S GUIDE

Chapter 1. Introduction to Curiosity High Pin Count (HPC)

The Curiosity High Pin Count (HPC) Development Board supports Microchip's 28- and 40-pin 8-bit PIC[®] MCUs. Two unique PDIP sockets are surrounded by dual-row expansion headers, which allow for connectivity to all pins on the PIC MCUs. Programming/debugging is accomplished through the PICkit[™] On Board (PKOB), eliminating the need for an external programming/debugging tool. The development board includes a set of four indication LEDs, a potentiometer, and push-button switches. Additionally, the Curiosity HPC Board integrates two MikroElektronika microBUS[™] sockets, which accommodate a variety of plug-in Click[™] Board modules that can be used for application development.

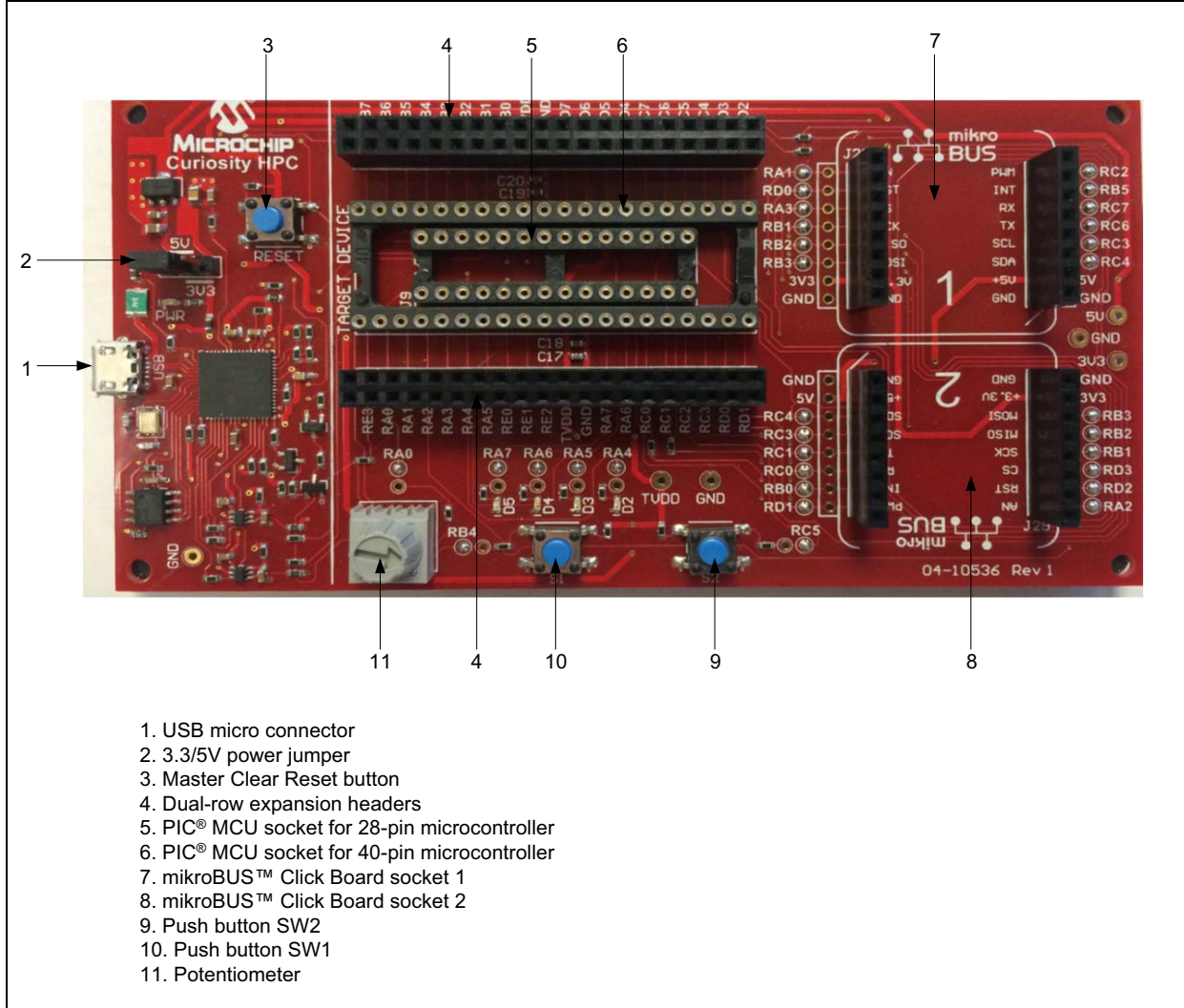
1.1 CURIOSITY HIGH PIN COUNT (HPC) DEVELOPMENT BOARD KIT CONTENTS

The Curiosity High Pin Count (HPC) Development Board kit contains the following:

- Curiosity High Pin Count (HPC) Development Board
- Quick Start Guide
- PIC16F18875 MCU

Curiosity High Pin Count Development Board User's Guide

FIGURE 1-1: HPC DEVELOPMENT BOARD



Chapter 2. Getting Started

The Curiosity HPC Development Board can be used with either MPLAB® X Integrated Development Environment (IDE, version 3.0 or higher) or MPLAB® Xpress IDE; both IDEs are available for free at www.microchip.com.

The Curiosity HPC Development Board contains a PICKit On Board (PKOB) which allows for both low-voltage programming and low-voltage in-circuit debugging for all supported devices. When used with the MPLAB IDE, in-circuit debugging allows the user to run, modify, and troubleshoot their custom software and hardware quickly, without the need for additional debugging tools.

2.1 PROGRAMMING THE CURIOSITY HPC DEVELOPMENT BOARD

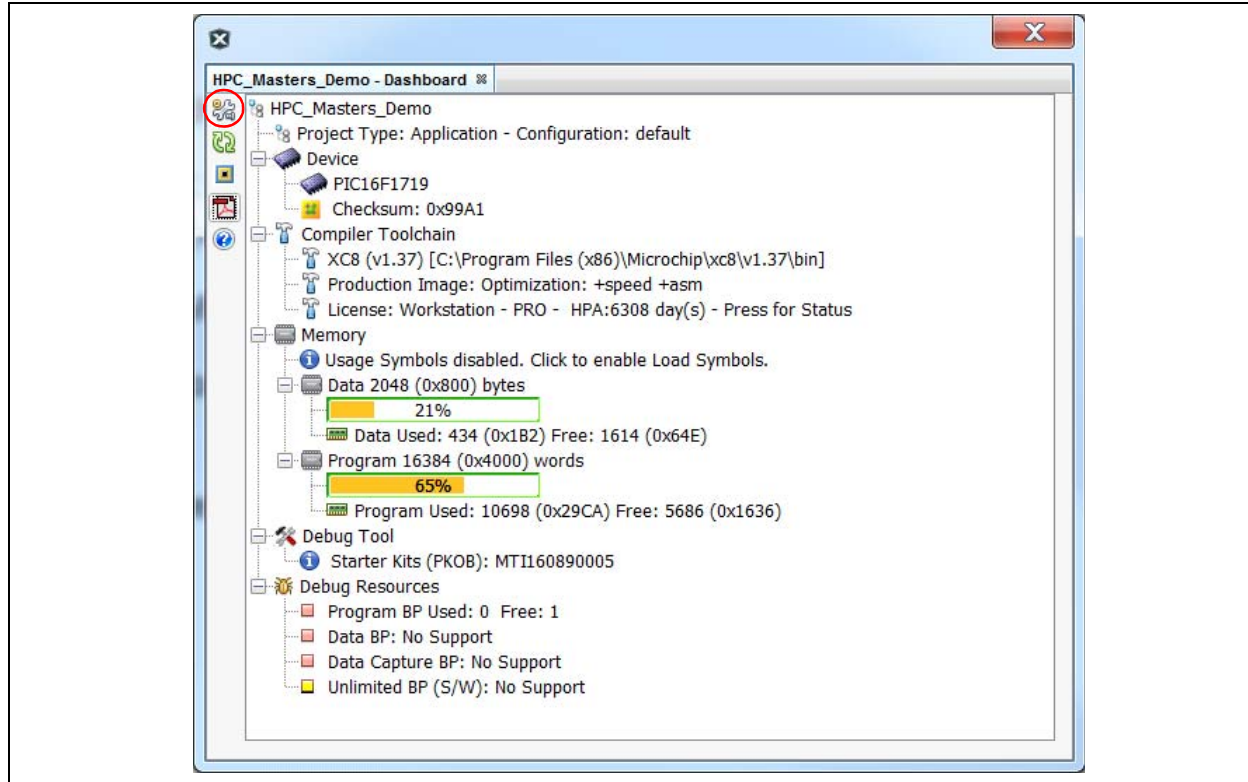
Programming the Curiosity HPC Development Board can be accomplished through one of the two following ways: either through MPLAB X (version 3.30 or higher), or through MPLAB Xpress.

<p>Note: The Curiosity HPC Board must be programmed using Low-Voltage Programming (LVP). The LVP bit of the Configuration Word(s) must be set (LVP = ON or '1').</p>

2.1.1 Programming Using MPLAB® X

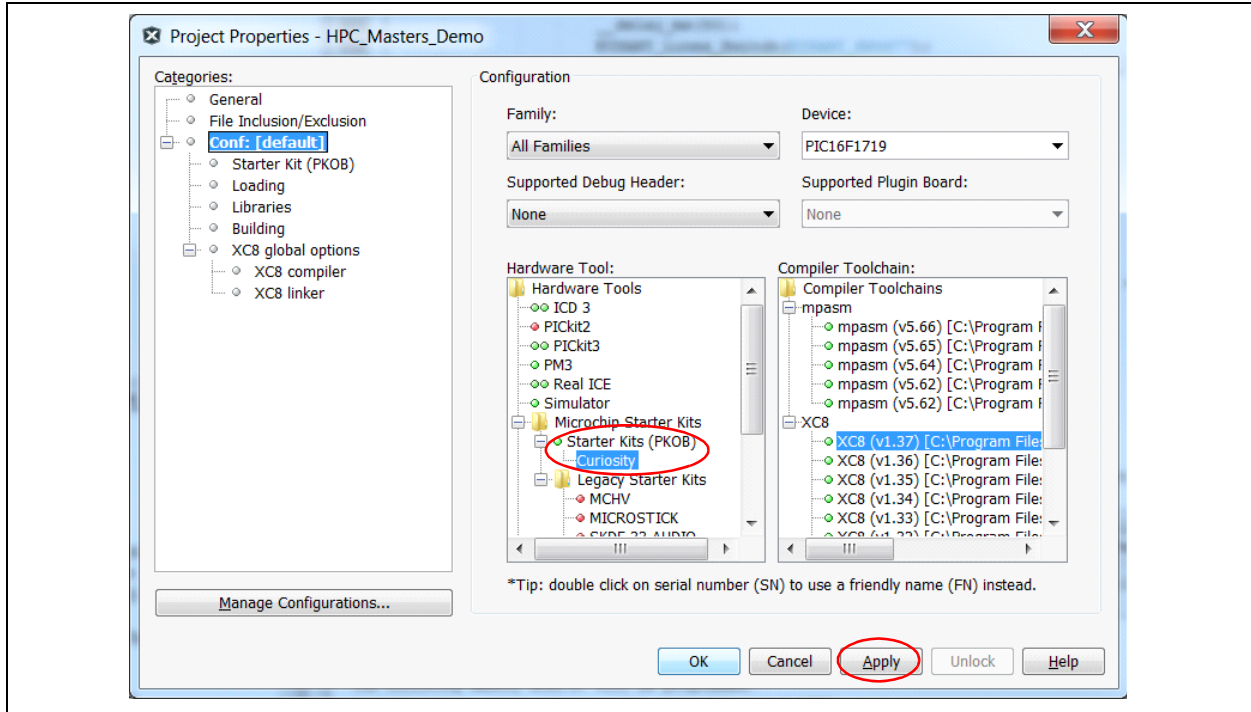
1. Connect the Curiosity HPC Board to the computer using the on-board micro-USB connector.
2. Open MPLAB X and either create a new project or open an existing one.
3. Click on the **Project Properties** icon located in the project's Dashboard window (as seen in [Figure 2-1](#)). Alternatively, the Project Properties window can be opened by clicking on *File > Project Properties*, or by right-clicking on the project name in the Projects window and clicking **Properties**.

FIGURE 2-1: PROJECT PROPERTIES BUTTON



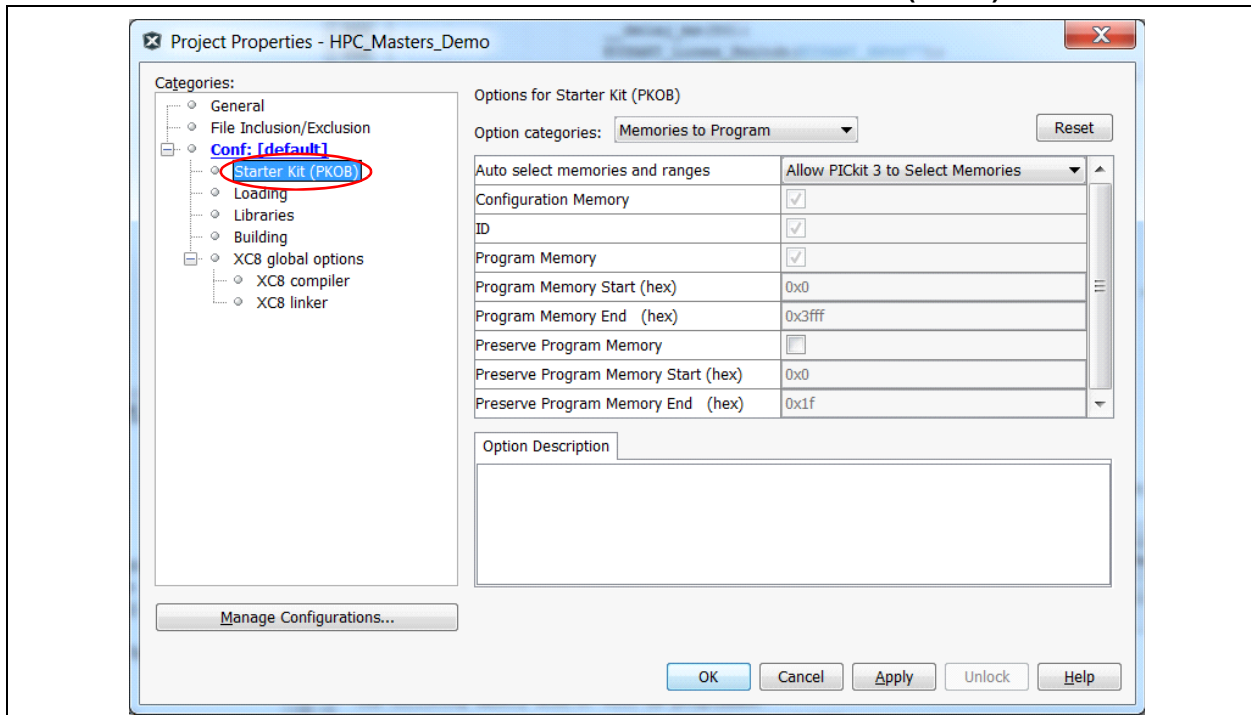
4. The Project Properties window will open. This window allows for the selection of the programming tool, compiler, and PIC MCU. MPLAB X refers to the Curiosity HPC Board as 'Starter Kits (PKOB)', with 'Curiosity' listed below in the Hardware Tool selection window. Click on **Curiosity** to select the Curiosity HPC Board, then click the **Apply** button (as seen in [Figure 2-2](#)).

FIGURE 2-2: SELECTING THE CURIOSITY HPC DEVELOPMENT BOARD



- In the upper left-hand corner of the Project Properties window, click on **Starter Kits (PKOB)**. The window will now show the configuration options for the PKOB programmer, as shown in [Figure 2-3](#).

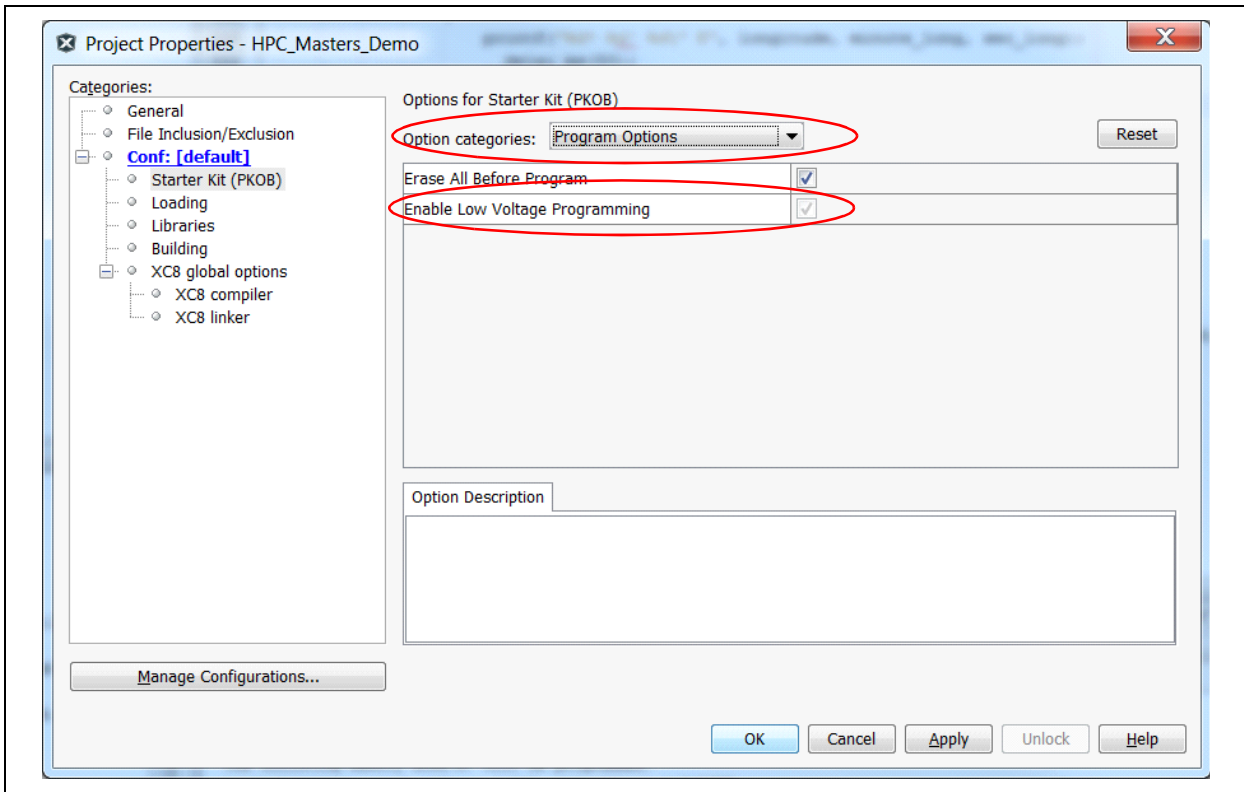
FIGURE 2-3: PROGRAM OPTIONS FOR THE PICKIT™ ON BOARD (PKOB)



Curiosity High Pin Count Development Board User's Guide

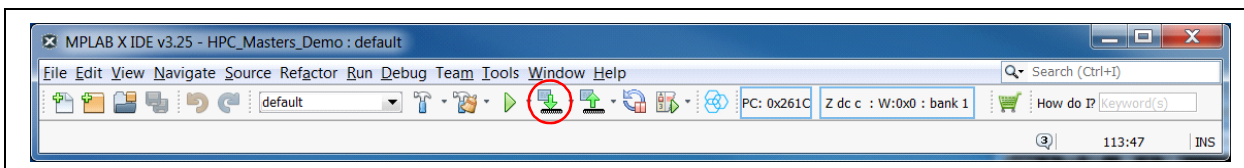
6. In the Option categories drop-down menu, select **Program Options**; ensure that the Enable Low Voltage Programming checkbox is checked (Figure 2-4). This option should go default to checked, which ensures low-voltage programming. Click the **OK** button. The Curiosity HPC Board is now ready to be programmed.

FIGURE 2-4: ENSURE LOW-VOLTAGE PROGRAMMING IS ENABLED



7. Once the project is ready to be programmed, simply click on the **Make and Program Device** button, and MPLAB will build and compile the code and program the PIC device, as displayed in Figure 2-5.

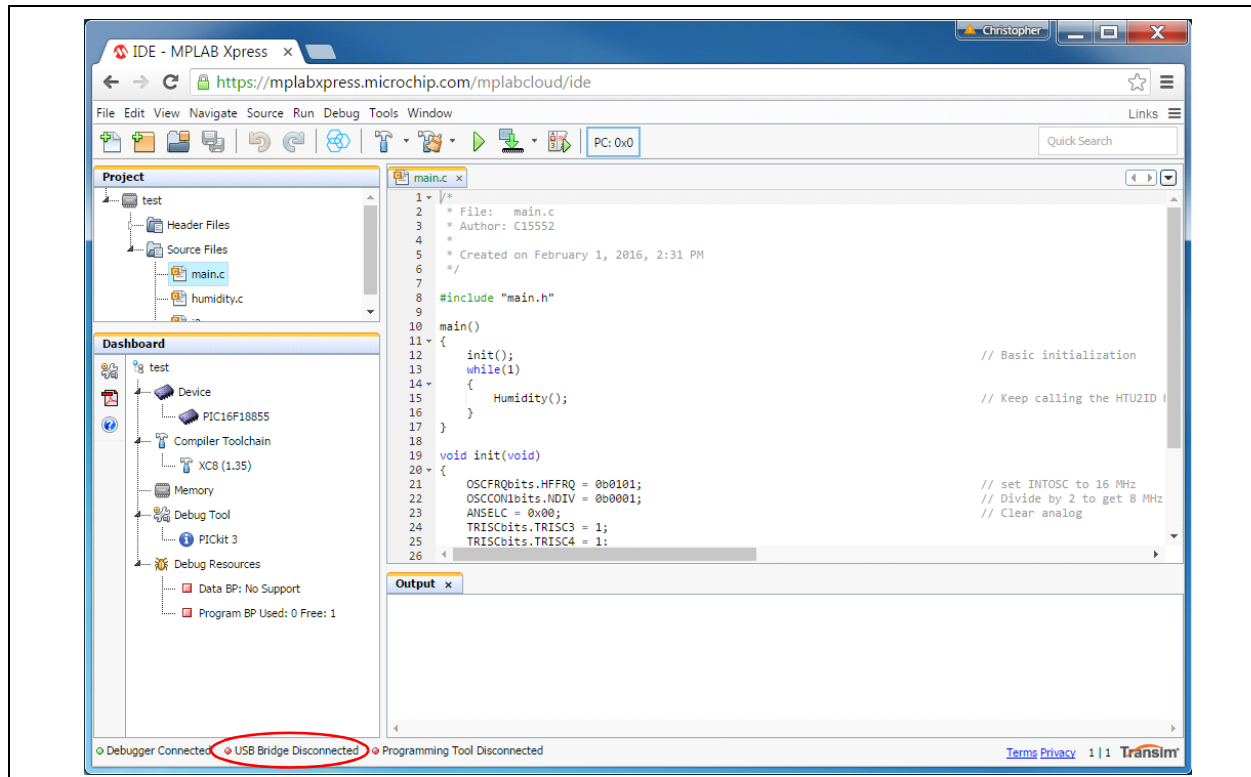
FIGURE 2-5: DEVICE PROGRAMMING



2.1.2 Programming using MPLAB® Xpress

1. Connect the Curiosity HPC Board to the computer using the on-board micro-USB connector.
2. Type the link to the MPLAB Xpress IDE (www.mplabxpress.microchip.com) into a browser window.
3. Create a new project or open an existing project.
4. At the very bottom of the MPLAB Xpress window, click on the label **USB Bridge Disconnected** (Figure 2-6); a new Manage USB Bridge window will open.

FIGURE 2-6: CONNECTING THE USB BRIDGE



Curiosity High Pin Count Development Board User's Guide

- The new window configures the USB connection between the computer and the Curiosity HPC Board (Figure 2-7). Step 1 indicates that the latest Java Runtime Environment must be installed, allowing the user to download and install the latest version. Step 2 opens the bridge tool; click on the **Download USB Bridge Tool** button to download the bridge tool. A new window, MPLAB Xpress USB Bridge will appear, and may ask for the unique token found in Step 3 in the Manage USB Bridge window. Copy and paste the token into the USB Bridge tool. Once connected, the Bridge tool will show the connection and the words “Everything is looking good.” will appear (Figure 2-8). It is important to note that the Bridge Tool window must remain open while working on the project. Click the **OK** button in the Manage USB Bridge window.

FIGURE 2-7: MANAGE USB BRIDGE WINDOW

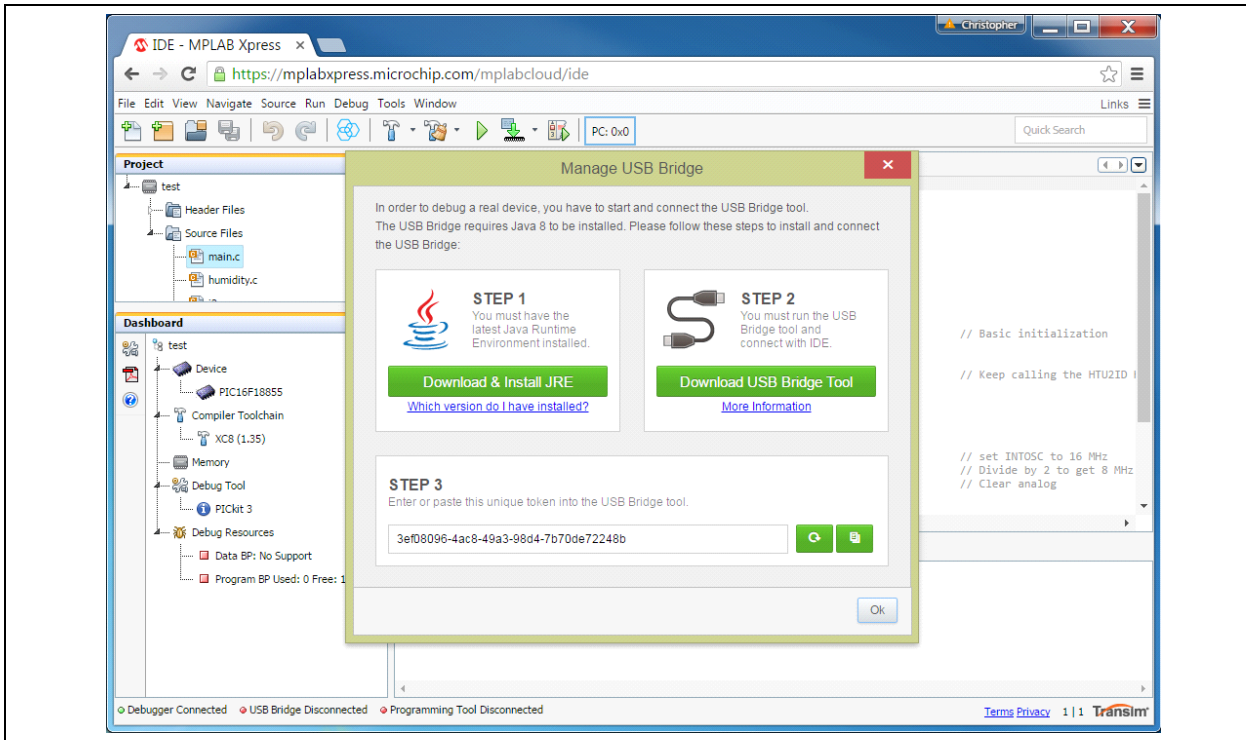
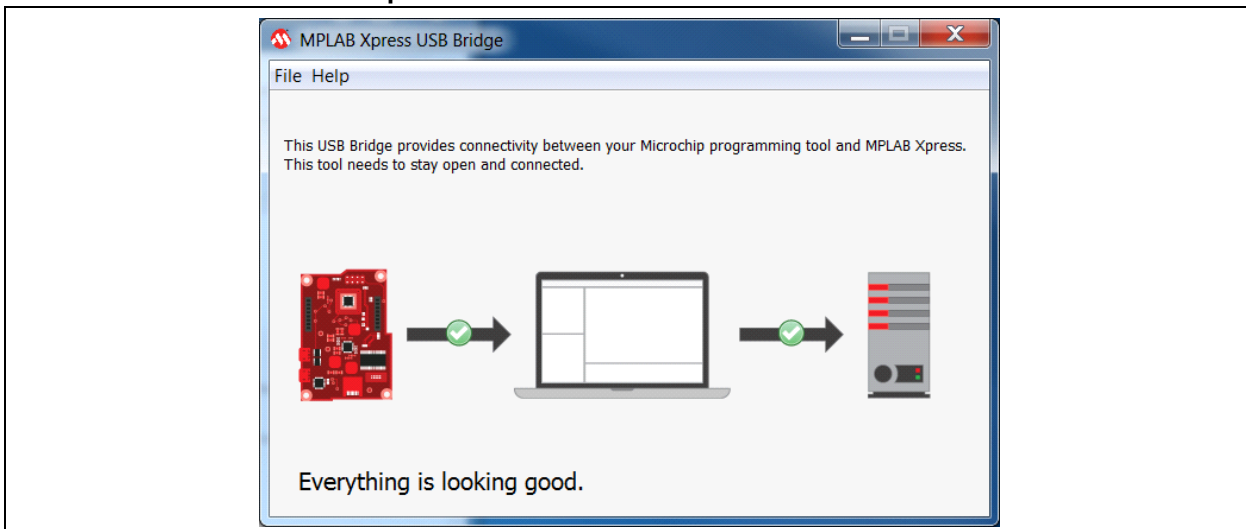
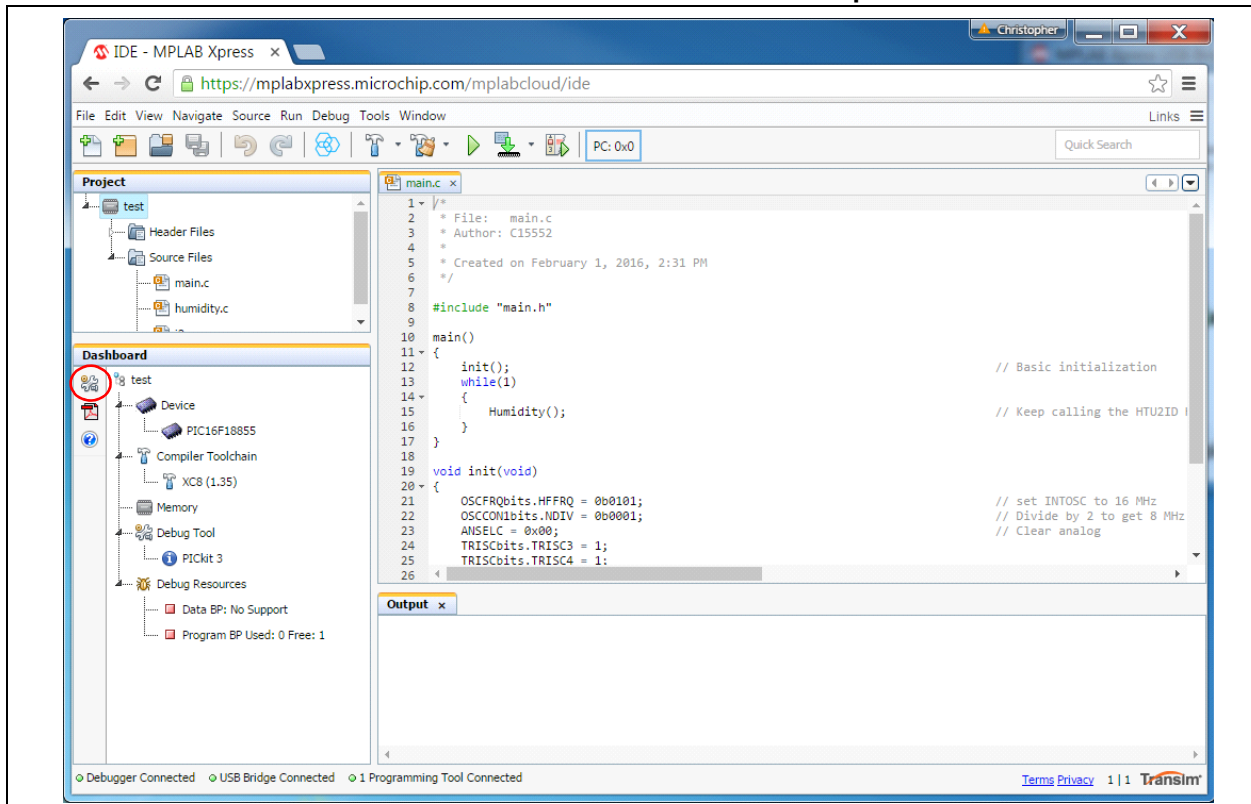


FIGURE 2-8: MPLAB® Xpress USB BRIDGE WINDOW



6. Click on the **Project Properties** icon located in the project's Dashboard window (Figure 2-9). Alternatively, the Project Properties window can be opened by clicking on *File > Project Properties*, or by right-clicking on the project name in the Projects window and clicking **Project Properties**.

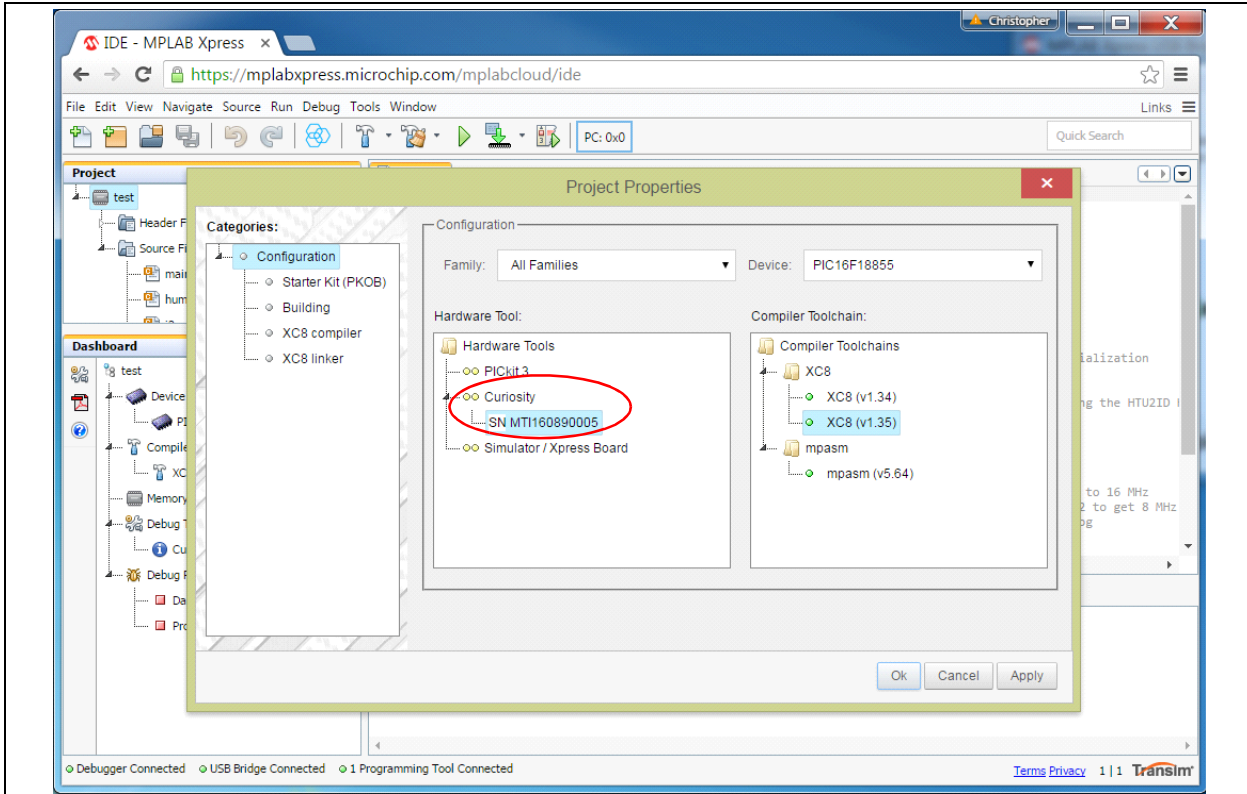
FIGURE 2-9: SELECTING THE CURIOSITY HPC IN MPLAB® Xpress



7. The Project Properties window will open; this window allows for the selection of the programming tool, compiler, and PIC MCU. MPLAB Xpress refers to the Curiosity HPC Board as 'Curiosity', with the Curiosity HPC serial number listed below in the Hardware Tool selection window. Click on the **serial number** to select the Curiosity HPC Board then click the **Apply** button (Figure 2-10).

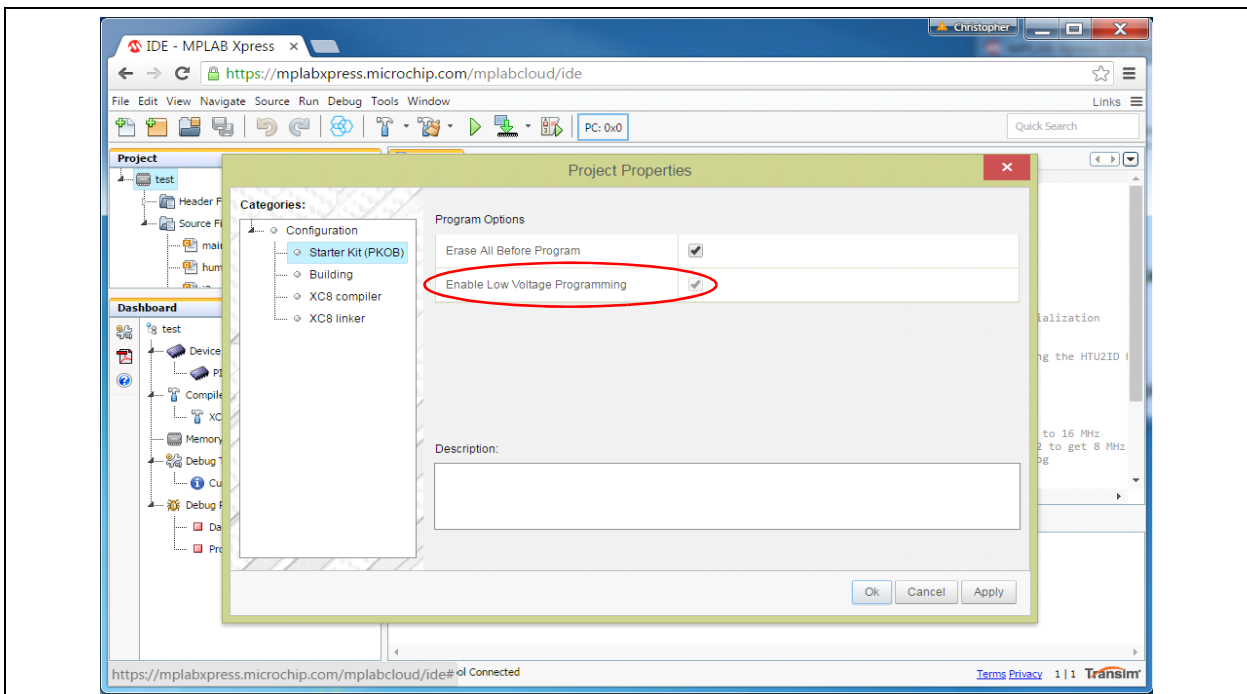
Curiosity High Pin Count Development Board User's Guide

FIGURE 2-10: SELECTING THE CURIOSITY HPC IN MPLAB® Xpress



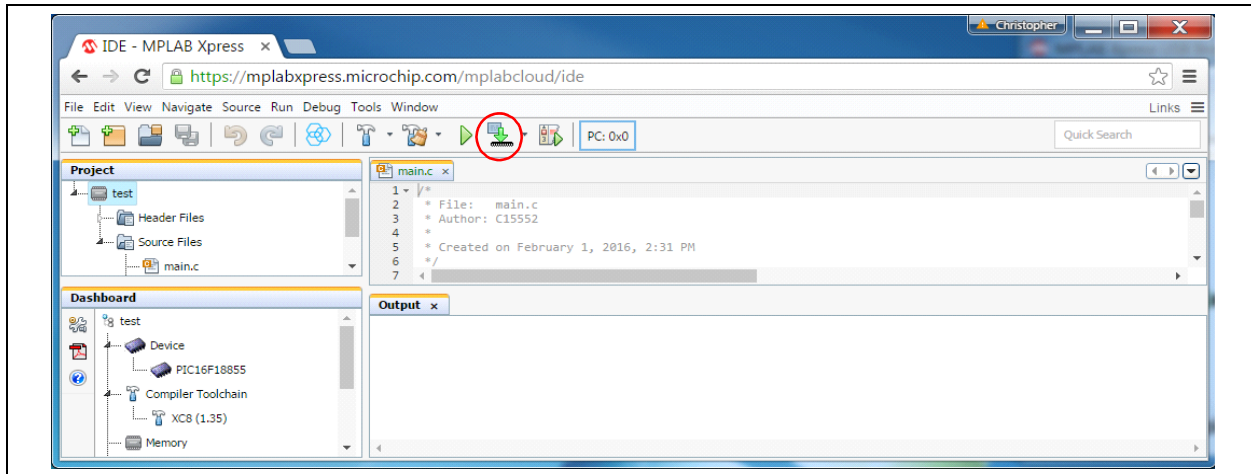
8. In the upper left-hand corner of the Project Properties window, click on **Starter Kit (PKOB)**. The window will now show the program options for the PKOB. Ensure that the Enable Low-Voltage Programming checkbox is checked (Figure 2-11) and press the **OK** button. The Curiosity HPC Board is now ready to be programmed.

FIGURE 2-11: ENSURING LOW-VOLTAGE PROGRAMMING IS ENABLED



9. Once the project is ready to be programmed, simply click on the **Make and Program Device** button and MPLAB Xpress will build and compile the code, and program the PIC device (Figure 2-12).

FIGURE 2-12: PIC® DEVICE PROGRAMMING



Curiosity High Pin Count Development Board User's Guide

NOTES:

Chapter 3. Troubleshooting

This chapter discusses common operational issues and methods to resolve them.

3.1 THE MCU WILL NOT PROGRAM USING THE PKOB

The Curiosity HPC Development Board's PICKit On Board (PKOB) uses low-voltage programming. Both MPLAB X and MPLAB Xpress set the Low-Voltage Programming (LVP) bit to a '1', allowing low-voltage programming.

1. When using custom firmware, the LVP bit must be set to '1' in the Configuration Word. MPLAB X will not allow programming using the PKOB unless the bit is properly configured.
2. When using a PIC microcontroller (one not included with the Curiosity Development Board) that has already been programmed using high-voltage programming and the LVP bit is cleared (LVP = OFF or '0'), the device will not be recognized and cannot be programmed using the PKOB. Reprogramming the device can be achieved by one of the following two methods:
 - a) Connect a PICKit™ 3 Programmer to the PIC device dual-row expansion headers, ensuring the appropriate ICSP™, GND, and VDD connections are made. Configure MPLAB to use the PICKit 3 as the programmer, and ensure the LVP bit is set to '1' in the Configuration Word. Reprogram the device.
 - b) Use an unprogrammed (blank) device and ensure the LVP bit is set to '1' in the Configuration Word.

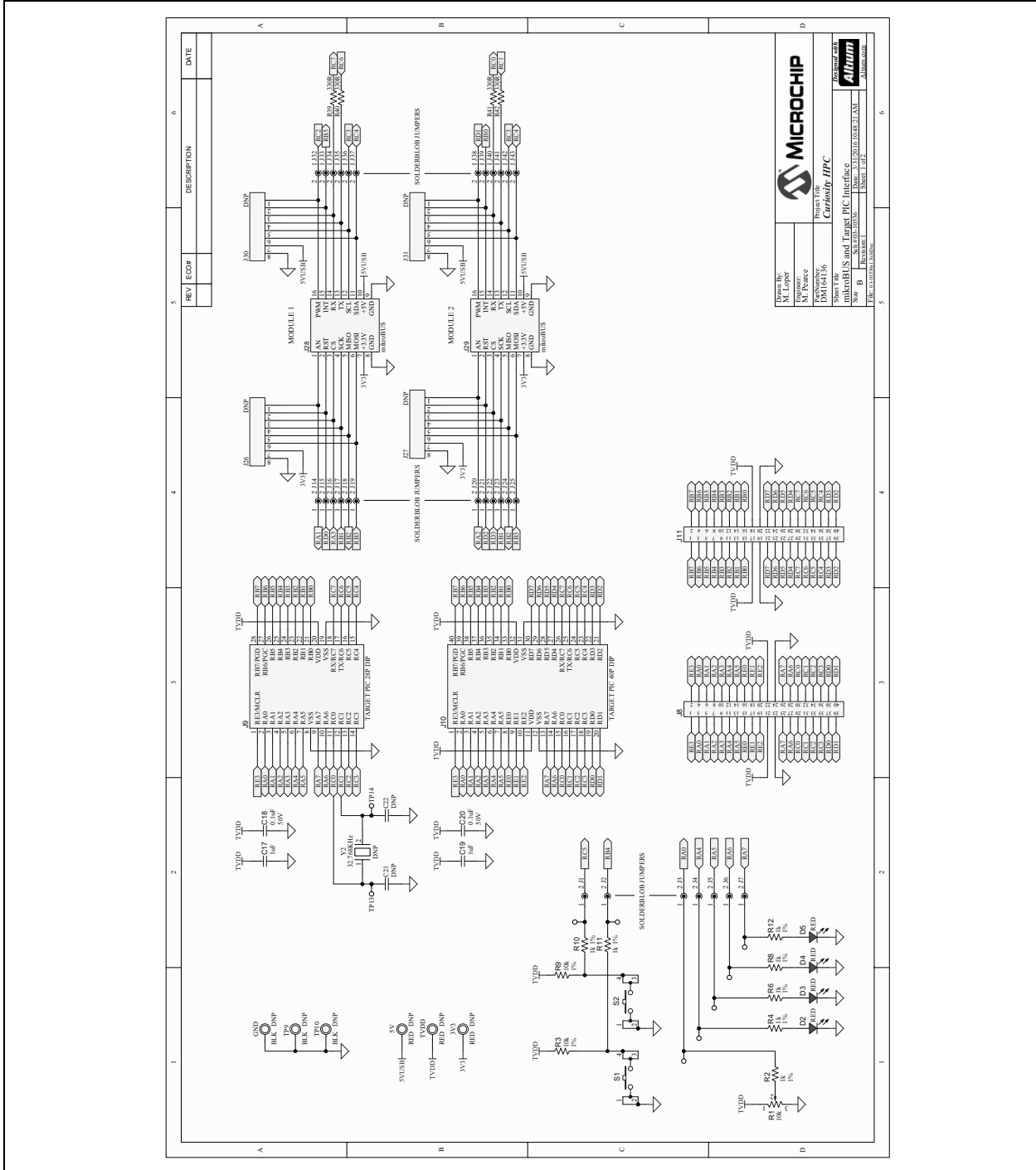
Curiosity High Pin Count Development Board User's Guide

NOTES:

Appendix A. Schematic

A.1 CURIOSITY HPC DEVELOPMENT BOARD SCHEMATIC

FIGURE A-1: CURIOSITY HPC DEVELOPMENT BOARD SCHEMATIC (1 OF 2)





Appendix B. General Notes

B.1 microBUS™ CLICKS

Module 1 is the main click socket, which is compatible with both 28-pin and 40-pin PIC devices. Module 2 is the secondary socket, and is fully compatible with a 40-pin PIC device. When using a 28-pin PIC device, Module 2 may be used with some Click modules, as long as the application does not use the SPI Chip Select (\overline{CS}) line, the Reset (RST) line, or the PWM line dedicated to Module 2.

B.2 SOLDER BLOB JUMPER

Solder blob jumpers can be found on each Click module, push-button switch, LED, or potentiometer connection. This allows the user to utilize those pin connections for other applications.

Curiosity High Pin Count Development Board User's Guide

NOTES:



MICROCHIP

Worldwide Sales and Service

AMERICAS

Corporate Office

2355 West Chandler Blvd.
Chandler, AZ 85224-6199

Tel: 480-792-7200

Fax: 480-792-7277

Technical Support:

[http://www.microchip.com/
support](http://www.microchip.com/support)

Web Address:

www.microchip.com

Atlanta

Duluth, GA

Tel: 678-957-9614

Fax: 678-957-1455

Austin, TX

Tel: 512-257-3370

Boston

Westborough, MA

Tel: 774-760-0087

Fax: 774-760-0088

Chicago

Itasca, IL

Tel: 630-285-0071

Fax: 630-285-0075

Cleveland

Independence, OH

Tel: 216-447-0464

Fax: 216-447-0643

Dallas

Addison, TX

Tel: 972-818-7423

Fax: 972-818-2924

Detroit

Novi, MI

Tel: 248-848-4000

Houston, TX

Tel: 281-894-5983

Indianapolis

Noblesville, IN

Tel: 317-773-8323

Fax: 317-773-5453

Los Angeles

Mission Viejo, CA

Tel: 949-462-9523

Fax: 949-462-9608

New York, NY

Tel: 631-435-6000

San Jose, CA

Tel: 408-735-9110

Canada - Toronto

Tel: 905-695-1980

Fax: 905-695-2078

ASIA/PACIFIC

Asia Pacific Office

Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon

Hong Kong

Tel: 852-2943-5100

Fax: 852-2401-3431

Australia - Sydney

Tel: 61-2-9868-6733

Fax: 61-2-9868-6755

China - Beijing

Tel: 86-10-8569-7000

Fax: 86-10-8528-2104

China - Chengdu

Tel: 86-28-8665-5511

Fax: 86-28-8665-7889

China - Chongqing

Tel: 86-23-8980-9588

Fax: 86-23-8980-9500

China - Dongguan

Tel: 86-769-8702-9880

China - Guangzhou

Tel: 86-20-8755-8029

China - Hangzhou

Tel: 86-571-8792-8115

Fax: 86-571-8792-8116

China - Hong Kong SAR

Tel: 852-2943-5100

Fax: 852-2401-3431

China - Nanjing

Tel: 86-25-8473-2460

Fax: 86-25-8473-2470

China - Qingdao

Tel: 86-532-8502-7355

Fax: 86-532-8502-7205

China - Shanghai

Tel: 86-21-5407-5533

Fax: 86-21-5407-5066

China - Shenyang

Tel: 86-24-2334-2829

Fax: 86-24-2334-2393

China - Shenzhen

Tel: 86-755-8864-2200

Fax: 86-755-8203-1760

China - Wuhan

Tel: 86-27-5980-5300

Fax: 86-27-5980-5118

China - Xian

Tel: 86-29-8833-7252

Fax: 86-29-8833-7256

ASIA/PACIFIC

China - Xiamen

Tel: 86-592-2388138

Fax: 86-592-2388130

China - Zhuhai

Tel: 86-756-3210040

Fax: 86-756-3210049

India - Bangalore

Tel: 91-80-3090-4444

Fax: 91-80-3090-4123

India - New Delhi

Tel: 91-11-4160-8631

Fax: 91-11-4160-8632

India - Pune

Tel: 91-20-3019-1500

Japan - Osaka

Tel: 81-6-6152-7160

Fax: 81-6-6152-9310

Japan - Tokyo

Tel: 81-3-6880-3770

Fax: 81-3-6880-3771

Korea - Daegu

Tel: 82-53-744-4301

Fax: 82-53-744-4302

Korea - Seoul

Tel: 82-2-554-7200

Fax: 82-2-558-5932 or

82-2-558-5934

Malaysia - Kuala Lumpur

Tel: 60-3-6201-9857

Fax: 60-3-6201-9859

Malaysia - Penang

Tel: 60-4-227-8870

Fax: 60-4-227-4068

Philippines - Manila

Tel: 63-2-634-9065

Fax: 63-2-634-9069

Singapore

Tel: 65-6334-8870

Fax: 65-6334-8850

Taiwan - Hsin Chu

Tel: 886-3-5778-366

Fax: 886-3-5770-955

Taiwan - Kaohsiung

Tel: 886-7-213-7828

Taiwan - Taipei

Tel: 886-2-2508-8600

Fax: 886-2-2508-0102

Thailand - Bangkok

Tel: 66-2-694-1351

Fax: 66-2-694-1350

EUROPE

Austria - Wels

Tel: 43-7242-2244-39

Fax: 43-7242-2244-393

Denmark - Copenhagen

Tel: 45-4450-2828

Fax: 45-4485-2829

France - Paris

Tel: 33-1-69-53-63-20

Fax: 33-1-69-30-90-79

Germany - Dusseldorf

Tel: 49-2129-3766400

Germany - Karlsruhe

Tel: 49-721-625370

Germany - Munich

Tel: 49-89-627-144-0

Fax: 49-89-627-144-44

Italy - Milan

Tel: 39-0331-742611

Fax: 39-0331-466781

Italy - Venice

Tel: 39-049-7625286

Netherlands - Drunen

Tel: 31-416-690399

Fax: 31-416-690340

Poland - Warsaw

Tel: 48-22-3325737

Spain - Madrid

Tel: 34-91-708-08-90

Fax: 34-91-708-08-91

Sweden - Stockholm

Tel: 46-8-5090-4654

UK - Wokingham

Tel: 44-118-921-5800

Fax: 44-118-921-5820

06/23/16

Mouser Electronics

Authorized Distributor

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

[Microchip:](#)

[DM164136](#)