Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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dsPICDEM™ 1.1 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.

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
ISO/TS 16949:2002

Microchip received ISO/TS-16949:2002 quality system certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona and Mountain View, California in October 2003 . The Company's quality system processes and procedures are for its PICmicro® 8-bit MCUs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, non-volatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

Table of Contents

Preface

INTRODUCTION

This chapter contains general information about this user's guide and customer support that will be useful prior to using the dsPICDEM 1.1 Development Board.

HIGHLIGHTS

Items discussed in this chapter are:

- About this Guide
- Warranty Registration
- Recommended Reading
- Troubleshooting
- Microchip On-Line Support
- Customer Change Notification Service
- Customer Support

ABOUT THIS GUIDE

This document describes how to use the dsPICDEM 1.1 Development Board. The manual layout is as follows:

- **Chapter 1: Introduction** – This chapter introduces the dsPICDEM 1.1 Development Board and provides a brief description of the hardware.
- **Chapter 2: Tutorial** – This chapter goes through a basic step-by-step process for getting your dsPICDEM 1.1 Development Board up and running with the MPLAB® In-Circuit Debugger 2 (ICD 2).
- **Chapter 3: Demonstration Program Operation** – This chapter presents a detailed description of the operational functionality of the sample code, which is preprogrammed into the dsPIC30F device.
- **Chapter 4:** dsPICDEM 1.1 Development Board **Hardware** – This chapter presents the features of the dsPICDEM 1.1 Development Board in more detail.
- **Appendix A: Hardware Schematics** – This Appendix illustrates the dsPICDEM 1.1 Development Board layout and hardware schematic diagrams.
- **Appendix B: LCD Controller Specification** – This section presents the 122 x 32 Graphics LCD Controller Interface Specifications.
- **Index** – This section provides cross-reference listing of terms, features and sections of this document.
- **Worldwide Sales and Service** – A listing of Microchip sales and service locations and telephone numbers worldwide.

Conventions Used in This Guide

This manual uses the following documentation conventions:

TABLE 1: DOCUMENTATION CONVENTIONS

Description	Represents	Examples
Code (Courier font):		
Plain characters	Sample code Filenames and paths	`#define START` `c:\autoexec.bat`
Square brackets [ ]	Optional arguments	`pic30-as [main.s]`
Curly brackets and pipe character: { | }	Choice of mutually exclusive arguments; an OR selection	`errorlevel {0|1}`
Lower case characters in quotes	Type of data	`"filename"`
Ellipses...	Used to imply (but not show) additional text that is not relevant to the example	`list ["list_option..., "list_option"]`
0xnnnn	A hexadecimal number where n is a hexadecimal digit	`0xFFFF, 0x007A`
Italic characters	A variable argument; it can be either a type of data (in lower case characters) or a specific example (in upper case characters)	`char isascii (char, ch);`
Interface (Arial font):		
Underlined, italic text with right arrow	A menu selection from the menu bar	*File > Save*
Bold characters	A window or dialog button to click	**OK**, **Cancel**
Characters in angle brackets < >	A key on the keyboard	<Tab>, <Ctrl-C>
Documents (Arial font):		
Italic characters	Referenced books	*MPLAB IDE User's Guide*

Documentation Updates

All documentation becomes dated, and this user's guide is no exception. Since the *dsPICDEM 1.1 Development Board User's Guide* and other Microchip tools are constantly evolving to meet customer needs, some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our web site to obtain the latest documentation available.

Documentation Numbering Conventions

Documents are numbered with a "DS" number. The number is located on the bottom of each page, in front of the page number. The numbering convention for the DS Number is: DSXXXXXA;

where:

XXXXX = The document number.

A = The revision level of the document.

WARRANTY REGISTRATION

Please complete the enclosed Warranty Registration Card and mail it promptly. Sending in your Warranty Registration Card entitles you to receive new product updates. Interim software releases are available at the Microchip web site.

RECOMMENDED READING

This user's guide describes how to use the dsPICDEM 1.1 Development Board. Other useful documents are listed below:

dsPIC30F Family Reference Manual (DS70046)

Consult this document for detailed information on the dsPIC30F device operation. The manual explains the operation of the dsPIC30F MCU family architecture and peripheral modules but does not cover the specifics of each device. Refer to the appropriate device data sheet, mentioned below, for device-specific information.

dsPIC30F Data Sheet, Motor Control and Power Conversion Family (DS70082)

Consult this document for information regarding the dsPIC30F Motor Control and Power Conversion devices. Reference information found in this data sheet includes:

- Device memory map
- Device pinout and packaging details
- Device electrical specifications
- List of peripherals included on the device

dsPIC30F Data Sheet, General Purpose and Sensor Families (DS70083)

Consult this document for information regarding the dsPIC30F Sensor and General Purpose devices. Reference information found in this data sheet includes:

- Device memory map
- Device pinout and packaging details
- Device electrical specifications
- List of peripherals included on the device

dsPIC30F Programmer's Reference Manual (DS70030)

This manual is a software developer's reference for the dsPIC30F 16-bit MCU family of devices. This manual describes the instruction set in detail and also provides general information to assist the user in developing software for the dsPIC30F MCU family.

dsPIC30F Family Overview, dsPIC High Performance 16-bit Digital Signal Controller (DS70043)

This document provides an overview of the features and functionality of the dsPIC® product family. It helps determine how the dsPIC 16-bit Digital Signal Controller Family fits a specific product application. For detailed information about any of the functionality, refer to the *dsPIC30F Family Reference Manual* (DS70046).

MPLAB ASM30, MPLAB LINK30 and Utilities User's Guide (DS51317)

This document details Microchip Technology's language tools for dsPIC devices based on GNU technology. The language tools discussed are:

- MPLAB ASM30 Assembler
- MPLAB LINK30 Linker
- MPLAB LIB30 Archiver/Librarian
- Other Utilities

MPLAB C30 C Compiler User's Guide (DS51284)

The purpose of this document is to help you use Microchip's MPLAB C30 C compiler for dsPIC devices to develop your application. MPLAB C30 is a GNU-based language tool, based on source code from the Free Software Foundation (FSF). For more information about the FSF, see www.fsf.org.

Other GNU language tools available from Microchip are:

- MPLAB ASM30 Assembler
- MPLAB LINK30 Linker
- MPLAB LIB30 Librarian/Archiver

MPLAB IDE Simulator, Editor User's Guide (DS51025)

Consult this document for more information pertaining to the installation and features of the MPLAB Integrated Development Environment (IDE) Software.

To obtain any of these documents, contact the nearest Microchip sales location (see back page) or visit the Microchip web site at: www.microchip.com.

THE MICROCHIP WEB SITE

Microchip provides online support on the Microchip World Wide Web (WWW) site. The web site is used by Microchip as a means to make files and information easily available to customers. To view the site, you must have access to the Internet and a web browser, such as, Netscape Navigator® or Microsoft® Internet Explorer.

The Microchip web site is available by using your favorite Internet browser to reach:

http://www.microchip.com

The web site provides a variety of services. Users may download files for the latest development tools, data sheets, application notes, user's guides, articles and sample programs. A variety of information specific to the business of Microchip is also available, including listings of Microchip sales offices, distributors and factory representatives.

Technical Support

- Frequently Asked Questions (FAQ)
- Online Discussion Groups – conferences for products, development systems, technical information and more
- Microchip Consultant Program Member Listing
- Links to other useful web sites related to Microchip products

Engineer's Toolbox

- Design Tips
- Device Errata

Other Available Information

- Latest Microchip Press Releases
- Listing of seminars and events
- Job Postings

DEVELOPMENT SYSTEMS CUSTOMER NOTIFICATION SERVICE

Microchip started the customer notification service to help our customers keep current on Microchip products with the least amount of effort. Once you subscribe, you will receive e-mail notification whenever we change, update, revise or have errata related to a specified product family or development tool of interest.

Go to the Microchip web site at (http://www.microchip.com) and click on Customer Change Notification. Follow the instructions to register.

The Development Systems product group categories are:

- Compilers
- Emulators
- In-Circuit Debuggers
- MPLAB IDE
- Programmers

Here is a description of these categories:

Compilers – The latest information on Microchip C compilers and other language tools. These include the MPLAB C17, MPLAB C18 and MPLAB C30 C compilers; MPASM™ and MPLAB ASM30 assemblers; MPLINK™ and MPLAB LINK30 object linkers; MPLIB™ and MPLAB LIB30 object librarians.

Emulators – The latest information on Microchip in-circuit emulators. This includes the MPLAB ICE 2000 and MPLAB ICE 4000.

In-Circuit Debuggers – The latest information on Microchip in-circuit debuggers. These include the MPLAB ICD and MPLAB ICD 2.

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 SIM and MPLAB SIM30 simulators, MPLAB IDE Project Manager and general editing and debugging features.

Programmers – The latest information on Microchip device programmers. These include the PRO MATE® II device programmer and PICSTART® Plus development programmer.

CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Corporate Applications Engineer (CAE)
- Hotline

Customers should call their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. See the back cover for a list of sales offices and locations.

Corporate Applications Engineers (CAEs) may be contacted at (480) 792-7627.

In addition, there is a Systems Information and Upgrade Line. This line provides system users a list of the latest versions of all of Microchip's development systems software products. Plus, this line provides information on how customers can receive any currently available upgrade kits.

The Hotline Numbers are:

1-800-755-2345 for U.S. and most of Canada.

1-480-792-7302 for the rest of the world.

Chapter 1. Introduction

1.1 INTRODUCTION

The dsPICDEM 1.1 Development Board Kit serves as a development and evaluation tool for the dsPIC30F High Performance Digital Signal Controllers.

1.2 HIGHLIGHTS

This chapter discusses:

- dsPICDEM 1.1 Development Board Kit
- dsPICDEM 1.1 Development Board Features
- Running the dsPICDEM 1.1 Demonstration Program
- Reference Documents

1.3 dsPICDEM 1.1 DEVELOPMENT BOARD KIT

The dsPICDEM 1.1 Development Board Kit contains the following items:

- The dsPICDEM 1.1 Printed Circuit Board (Figure 1-1)
- Preprogrammed dsPIC30F6014 Plug-in Module (Figure 1-2)
- 9V DC Power Supply
- RS-232 Interface Cable
- dsPICDEM 1.1 Development Board Kit CD containing demonstration programs

FIGURE 1-1: dsPICDEM 1.1 DEVELOPMENT BOARD

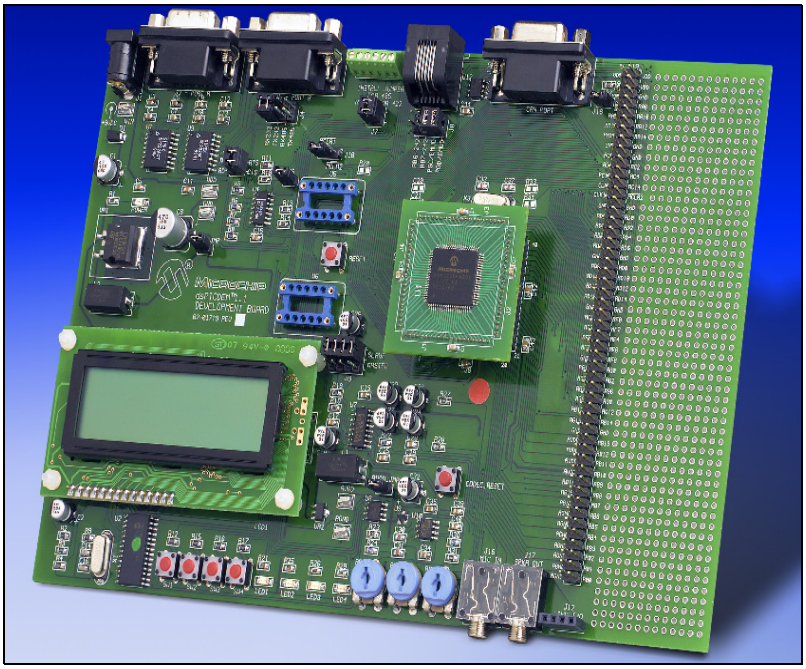
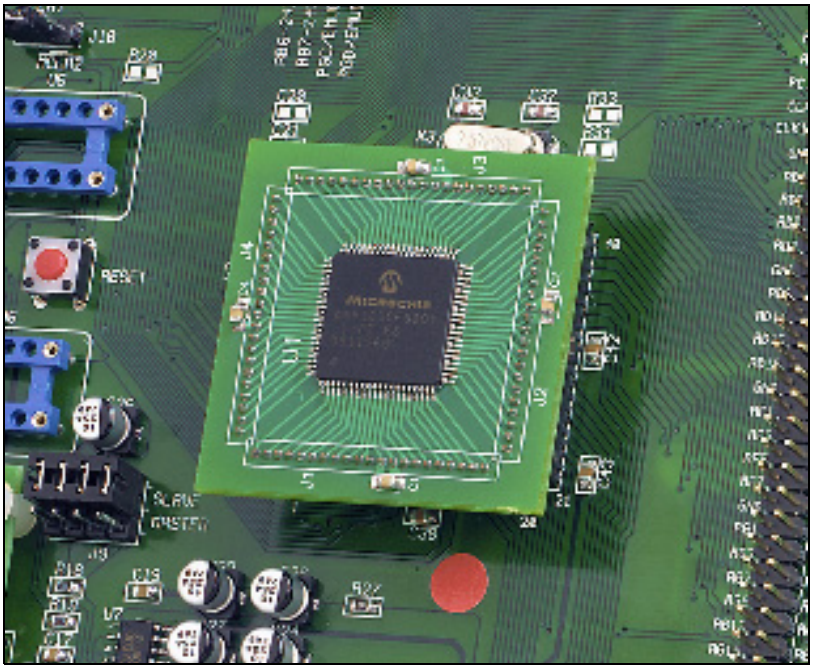


FIGURE 1-2: dsPIC30F6014 PLUG-IN MODULE



1.4 dsPICDEM 1.1 DEVELOPMENT BOARD FEATURES

The dsPICDEM 1.1 Development Board supports the following features:

Development Board Power

- Separate on-board +5V regulators for V_{DD} and AV_{DD} with direct input from 9V, AC/DC wall adapter
- 9V DC power source input jack for development board
- LED Power-on indicator

MPLAB ICD 2 and MPLAB ICE 4000 Connections

- MPLAB ICD 2 programming connector
- Jumper J8 for selection of processor interfaced to the MPLAB ICD 2 Debugger/Programmer
- Emulation header for connection to MPLAB ICE 4000 Emulator
- Pad location for 80-pin TQFP dsPIC device

Serial Communication Channels

- Two RS-232 communication channels
- 6-pin terminal block and configuration jumper for RS-485 and RS-422 communication on UART1 from the dsPIC device
- Single CAN communication channel

Voice-band Codec

- Si3000 Voice-band Codec chip
- Jumper J9 for selection of Si3000 Codec mode (Master/Slave)
- Socket U6, optional clock oscillator for Si3000 Voice-band Codec
- 4-pin header for the Codec Line In and Line Out
- One 3.5 mm phono jack for the Codec left and right speaker outputs
- One 3.5 mm phono jack for the Codec MIC input
- Codec reset push button switch

Analog

- Three 5 kΩ Potentiometers (RP1-RP3)
- Microchip TC1047A Thermal Sensor (U9)
- MCP41010 Digital Potentiometer
- MCP602 Operational Amplifiers configured as low-pass filters for temperature sensor and digital potentiometer

Device Clocking

- 7.3728 MHz crystal, X3, for dsPIC device
- Socket U5, clock oscillator for dsPIC device (alternate clock source, X3 removed)
- Pad for 32.768 kHz crystal and load caps

Miscellaneous

- Reset push button switch and jumper (J10) for resetting the PIC18F242 LCD controller or the dsPIC device
- Four red LEDs (LED1-LED4)
- Four push button switches (SW1-SW4) for external input stimulus
- 122 x 32 dot addressable LCD
- PIC18F242 LCD controller
- 2 x 50 prototyping header for user hardware expansion (header not installed)
- Prototype area for user hardware

1.5 RUNNING THE dsPICDEM 1.1 DEMONSTRATION PROGRAM

The dsPICDEM 1.1 Development Board is supplied with a pre-loaded demonstration program that exercises principal CPU functions and peripheral options that interact with typical user application programs.

When you apply power to the dsPICDEM 1.1 Development Board, the LCD menu displays these demonstration functions:

- Data Acquisition Display
- Digital Signal Processing (DSP) Operations
- Dual Tone Multi-Frequency (DTMF) Generation

Switches SW2-SW4 select one of these three choices. Each choice offers a submenu, which provides for additional options using switches SW1-SW4.

Refer to **Chapter 3. "Demonstration Program Operation"** for full details on the demonstration code operation.

1.6 REFERENCE DOCUMENTS

The following documentation is available to support the use of the dsPICDEM 1.1 Development Board:

- dsPIC30F Family Reference Manual (DS70046)
- dsPIC30F Data Sheet, Motor Control and Power Conversion Family (DS70082)
- dsPIC30F Data Sheet, General Purpose and Sensor Families (DS70083)
- dsPIC30F Programmer's Reference Manual (DS70030)
- dsPIC30F Family Overview, dsPIC High Performance 16-bit Digital Signal Controller (DS70043)
- MPLAB C30 C Compiler User's Guide (DS51284)
- MPLAB ASM30, MPLAB LINK30 and Utilities User's Guide (DS51317)
- MPLAB ICD 2 In-Circuit Debugger Quick Start Guide (DS51268)
- MPLAB ICE Emulator User's Guide (DS51159)

You can obtain these reference documents from your nearest Microchip sales office (listed in the back of this document) or you can download them from the Microchip web site (www.microchip.com).

Chapter 2. Tutorial

2.1 INTRODUCTION

This chapter is a self-paced tutorial to get you started using the dsPICDEM 1.1 Development Board.

2.2 HIGHLIGHTS

Items discussed in this chapter include:

- Tutorial Overview
- Creating the Project
- Building the Code
- Programming the Chip
- Debugging the Code
- Summary

2.3 TUTORIAL OVERVIEW

The tutorial program in `Tut6014.s` is written in assembly code. This program displays text on the LCD and flashes an LED. The source file is used with a linker script file (`p30f6014.gld`) and an include file (`p30f6014.inc`) to form a complete project. The tutorial is a simple project that uses a single source code file. More complex projects might use multiple assembler and compiler source files as well as library files and precompiled object files. For simplicity, this tutorial uses only one source file.

There are four steps to this tutorial:

1. Create a project in MPLAB IDE.
2. Assemble and link the code.
3. Program the chip with the MPLAB ICD 2.
4. Debug the code with the MPLAB ICD 2.

2.4 CREATING THE PROJECT

The first step is to create a project and a workspace in MPLAB IDE. Usually, you will have one project in one workspace.

Note:	These instructions presume the use of MPLAB 6.31 or newer.

A project contains the files needed to build an application (source code, linker script files, etc.) along with their associations to various build tools and build options.

A workspace contains one or more projects and information on the selected device, debug tool and/or programmer, open windows and their location, and other IDE configuration settings.

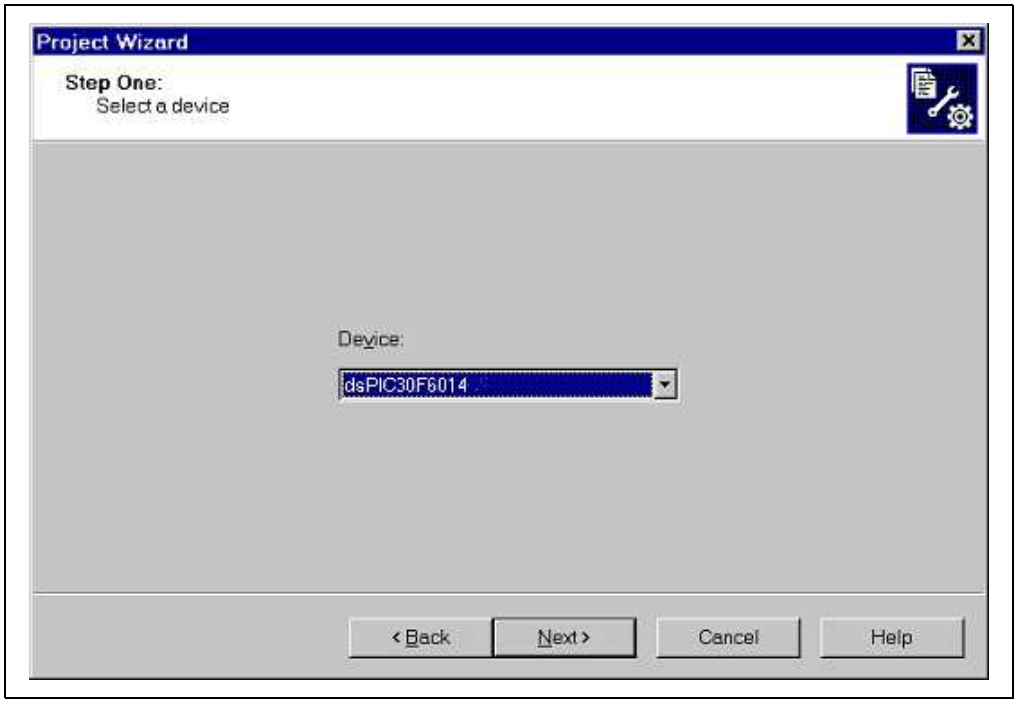
MPLAB IDE contains a Project Wizard to help create new projects. Before starting, create a folder for the project files for this tutorial (`C:\Tutorial` is assumed in the instructions that follow). From the `dsPICDEM 1_1 Development Board code\Tutorial Code` folder on the dsPICDEM 1.1 Development Kit CD, copy the `Tut6014.s` file into the `C:\Tutorial` folder.

Note: All files copied from the CD are read only. If the file needs to be edited, the attributes will need to be changed.

2.4.1 Select a Device

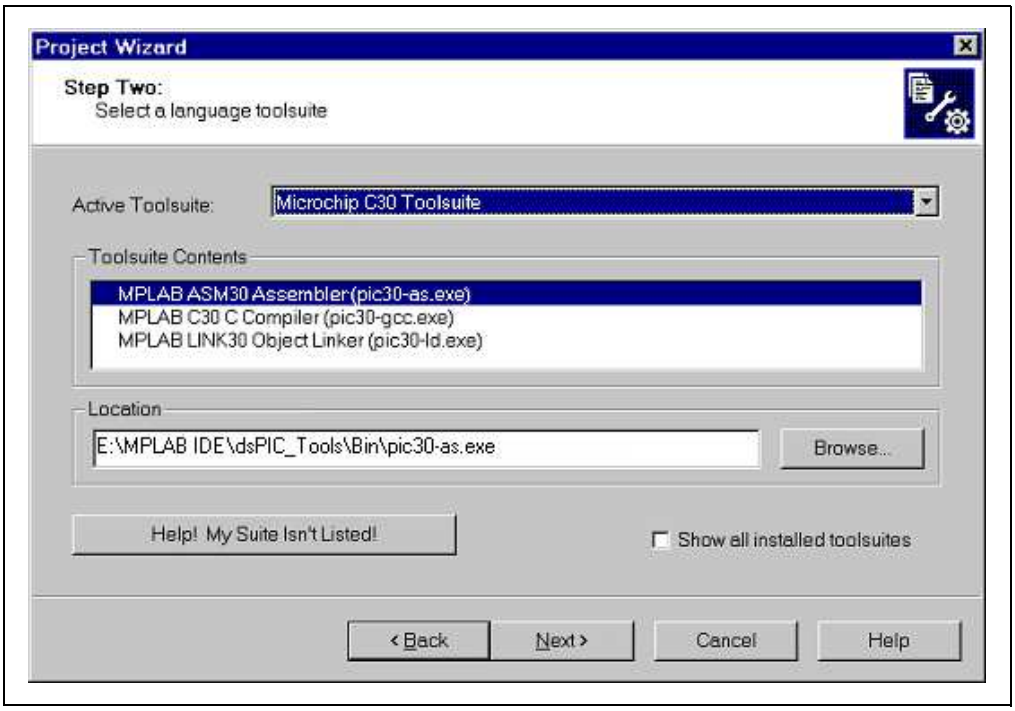
1. Start MPLAB IDE.
2. Close any workspace that might be open (*File>Close Workspace*).
3. From the *Project* menu, select *Project Wizard*.
4. From the Welcome screen, click **Next>** to display the Project Wizard Step One dialog (see Figure 2-1).

FIGURE 2-1: PROJECT WIZARD, STEP 1, SELECT A DEVICE



5. From the **Device:** pull-down list, select `dsPIC30F6014` and click **Next>**. The Project Wizard Step Two dialog displays (see Figure 2-2).

FIGURE 2-2: PROJECT WIZARD, STEP 2, SELECT LANGUAGE TOOLSUITE



2.4.2 Select Language Toolsuite

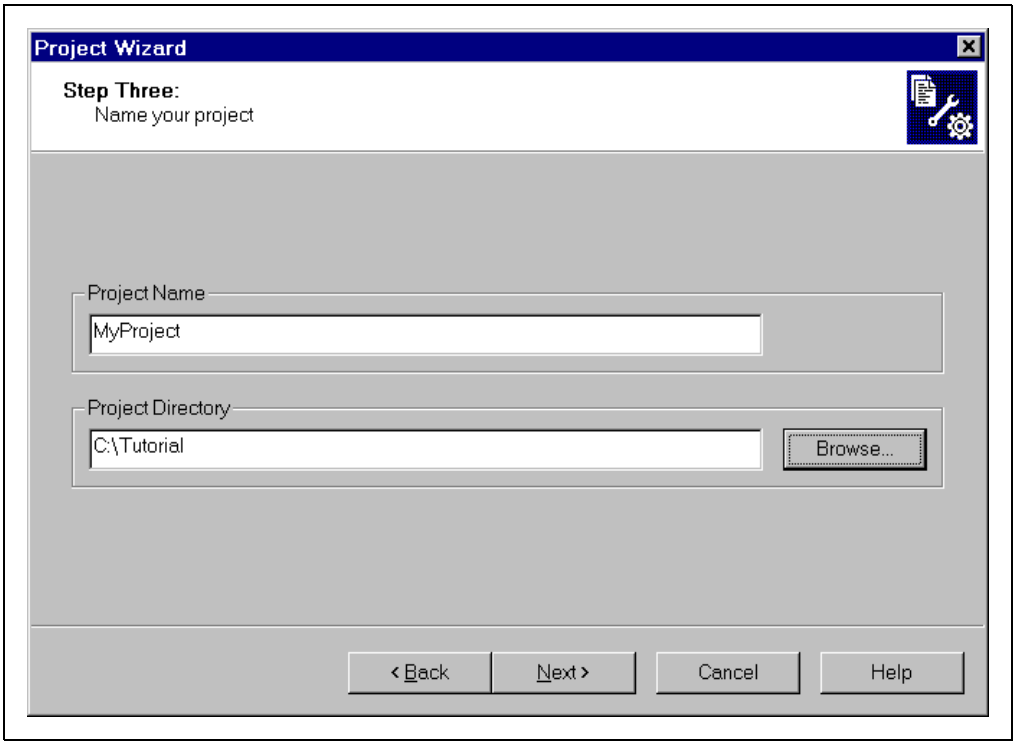
1. From the **Active Toolsuite:** pull-down menu, select **Microchip C30 Toolsuite**. This toolsuite includes the assembler and linker that will be used (the C Compiler is not used).
2. In the **Toolsuite Contents** block, select **MPLAB ASM30 Assembler (pic30-as.exe)**.
3. In the **Location** block, click **Browse...** and navigate to:

   `E:\MPLAB IDE\dsPIC_Tools\Bin\pic30-as.exe`
4. With **MPLAB LINK 30 Object Linker (pic30-ld.exe)** selected in **Toolsuite Contents**, click **Browse...** and navigate to:

   `E:\MPLAB IDE\dsPIC_Tools\Bin\pic30-ld.exe`
5. Click **Next>** to continue. The Project Wizard Step Three dialog displays (see Figure 2-3).

Note: The tool locations for your environment may be different from those shown in this tutorial.

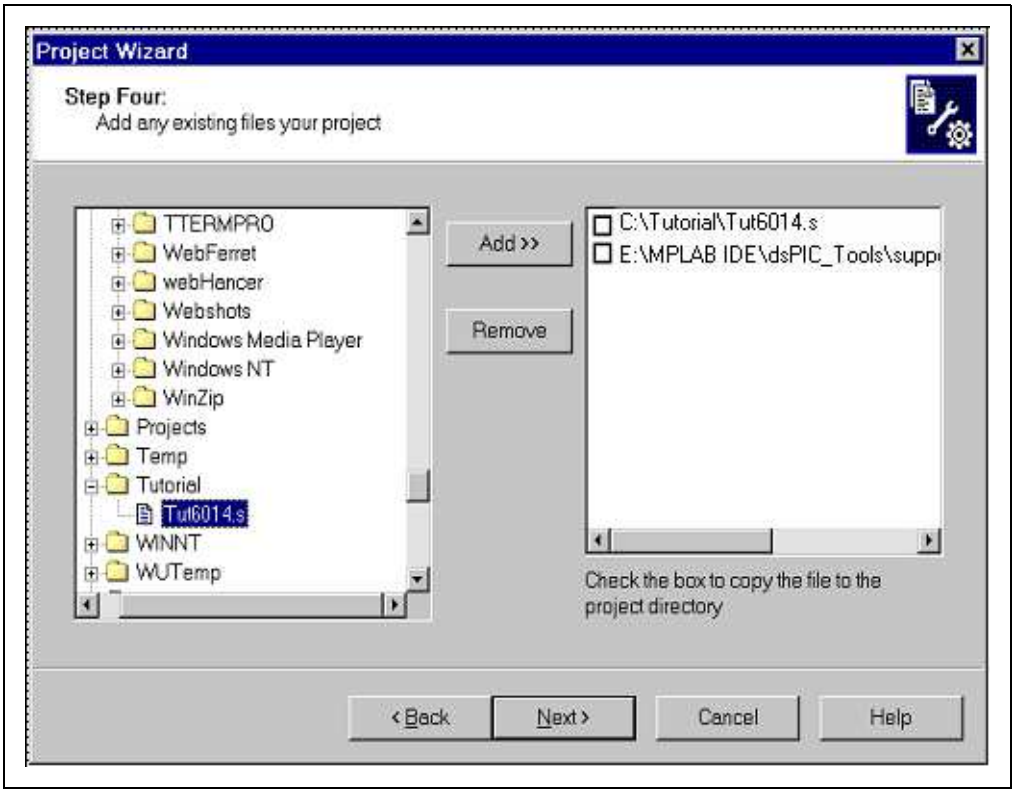
FIGURE 2-3: PROJECT WIZARD, STEP 3, NAME YOUR PROJECT



2.4.3 Name Your Project

1. In the **Project Name** text box, type **MyProject**.
2. Click **Browse...** and navigate to `C:\Tutorial` to place your project in the Tutorial folder.
3. Click **Next>** to continue. The Project Wizard Step Four dialog displays (see Figure 2-4).

FIGURE 2-4: PROJECT WIZARD, STEP 4, ADD FILES TO PROJECT

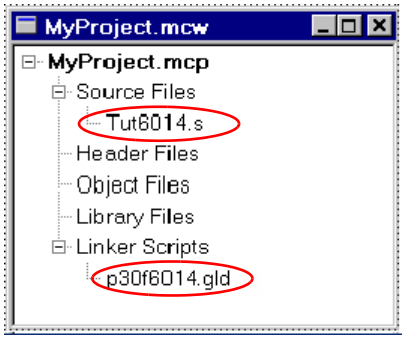


2.4.4 Add Files to Project

1. Locate the `C:\Tutorial` folder and select the `Tut6014.s` file.
2. Click **Add>>** to include the file in the project.
3. Expand the `E:\MPLAB IDE\dsPIC_Tools\support\gld` folder and select the `p30f6014.gld` file.
4. Click **Add>>** to include the file in the project. There should now be two files in the project.
5. Click **Next>** to continue.
6. When the summary screen displays, click **Finish**.

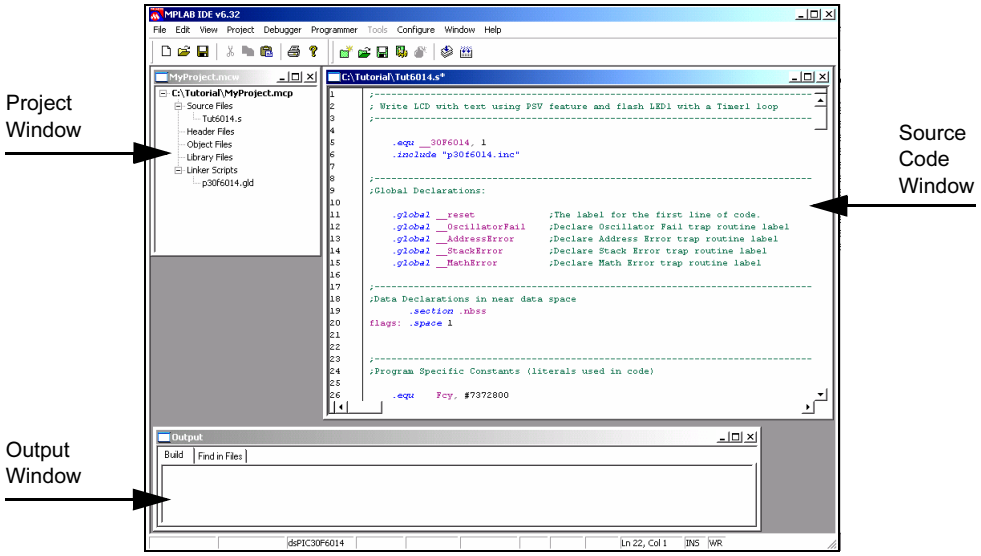
After the project wizard completes, the MPLAB IDE project window shows the `Tut6014.s` file in the **Source Files** folder and the `p30f6014.gld` file in the **Linker Scripts** folder (see Figure 2-5).

FIGURE 2-5: MPLAB IDE PROJECT WINDOW



A project and workspace has now been created in MPLAB IDE. `MyProject.mcw` is the workspace file and `MyProject.mcp` is the project file. Double-click the `Tut6014.s` file in the project window to open the file. MPLAB IDE should now look similar to Figure 2-6.

FIGURE 2-6: MPLAB IDE WORKSPACE WINDOWS



2.5 BUILDING THE CODE

In this project, building the code consists of assembling the `Tut6014.s` file to create an object file, `Tut6014.o`, and then linking the object file to create the `Tut6014.hex` and `Tut6014.cof` output files. The `.hex` file contains the data necessary to program the device and the `.cof` file contains additional information that lets you debug at the source code level.

Before building, there are settings required to tell MPLAB IDE where to find the include files and to reserve space for the extra debug code when the MPLAB ICD 2 is used.

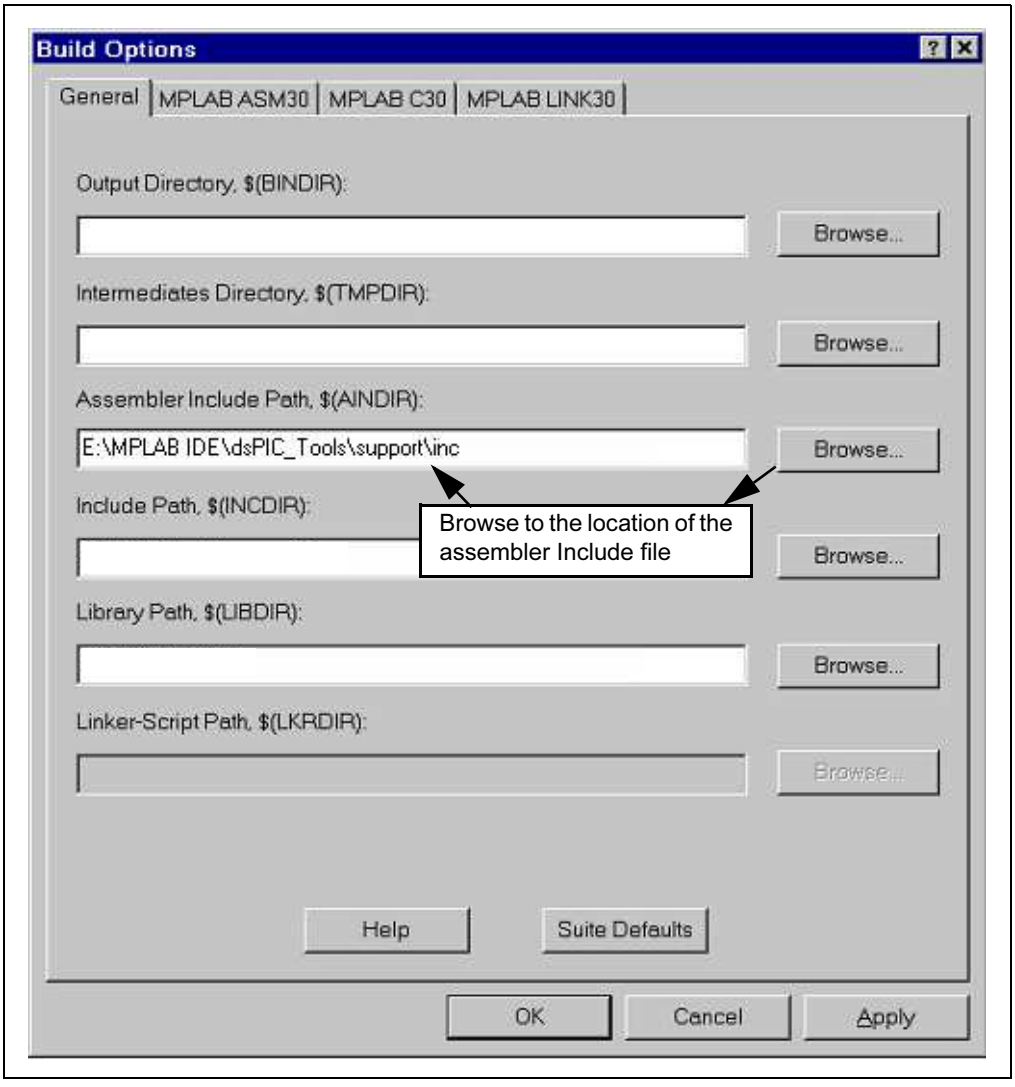
The following line is near the top of the `Tut6014.s` file:

```
.include "p30f6014.inc"
```

This line causes a standard include file to be used. Microchip provides these files with all the Special Function Register (SFR) labels already defined for convenience.

To build the code, select *Build Options>Project* from the *Project>* menu. The Build Options dialog displays, as shown in Figure 2-7.

FIGURE 2-7: BUILD OPTIONS



2.5.1 Identify Assembler Include Path

1. Select the General tab.
2. At the **Assembler Include Path, $(AINDIR)** box, click **Browse...** and navigate to:

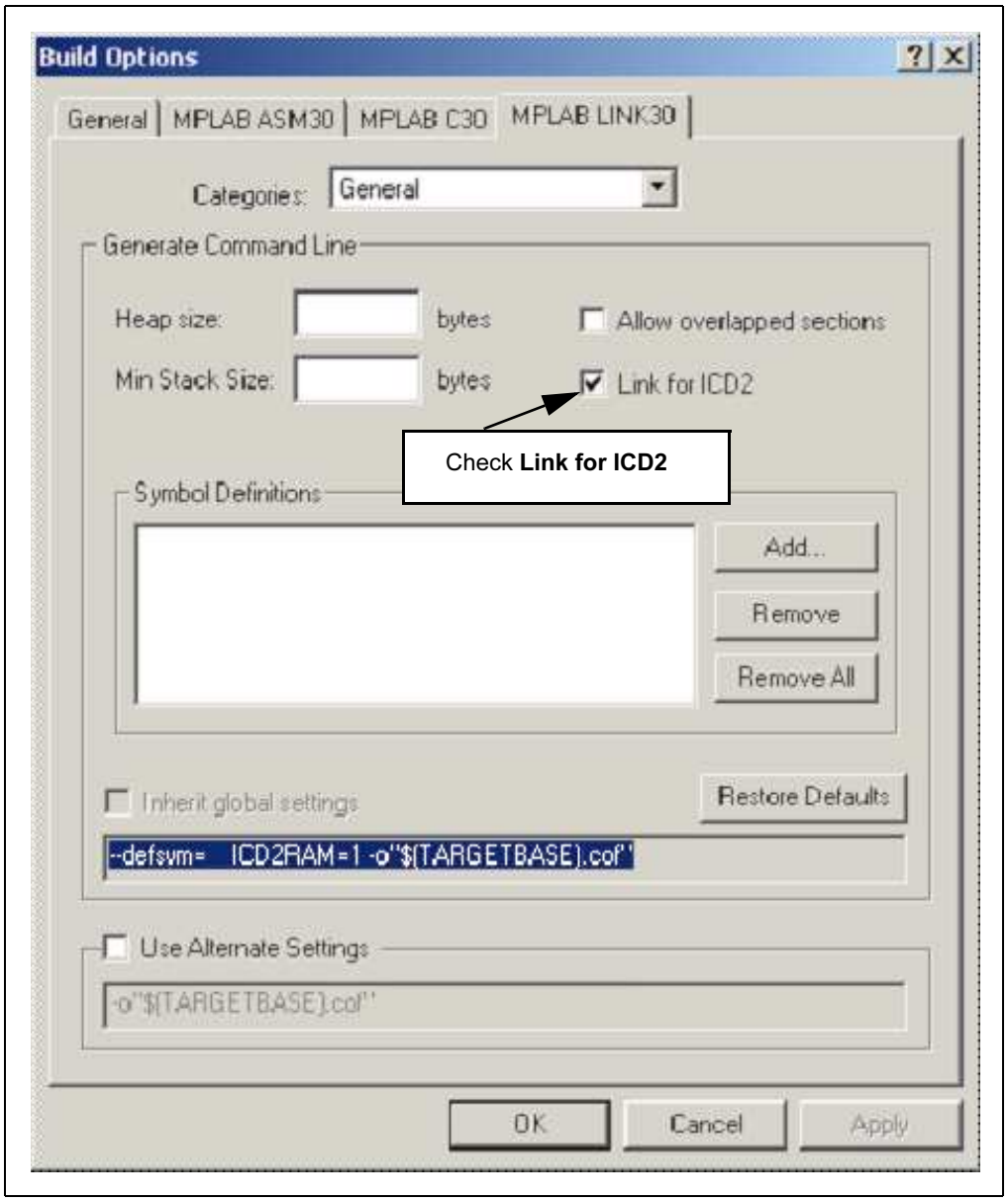
   `E:\MPLAB IDE\dsPIC_Tools\support\inc`

   This path tells MPLAB IDE where to find the Include files.

2.5.2 Link for ICD 2

1. Select the MPLAB LINK30 tab to view the linker settings (see Figure 2-8).
2. Check **Link for ICD 2**.
3. Click **OK**. The text box closes while the linker reserves space for the debug code used by the MPLAB ICD 2.
4. Click **OK** again to save these changes. The project is now ready to build.

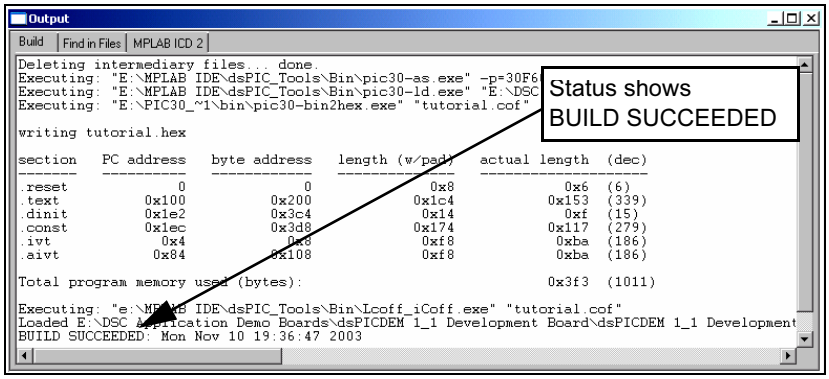
FIGURE 2-8: MPLAB LINK30 BUILD OPTIONS



2.5.3 Build the Project

1. Select *Make>Project* menu to display the Build Output window (Figure 2-9).
2. Observe the progress of the build.
3. When BUILD SUCCEEDED displays you are ready to program the device.

FIGURE 2-9: BUILD OUTPUT WINDOW



2.6 PROGRAMMING THE CHIP

The MPLAB ICD 2 In-Circuit Debugger can be used to program and debug the dsPIC30F6014 device in-circuit on the dsPICDEM 1.1 Development Board.

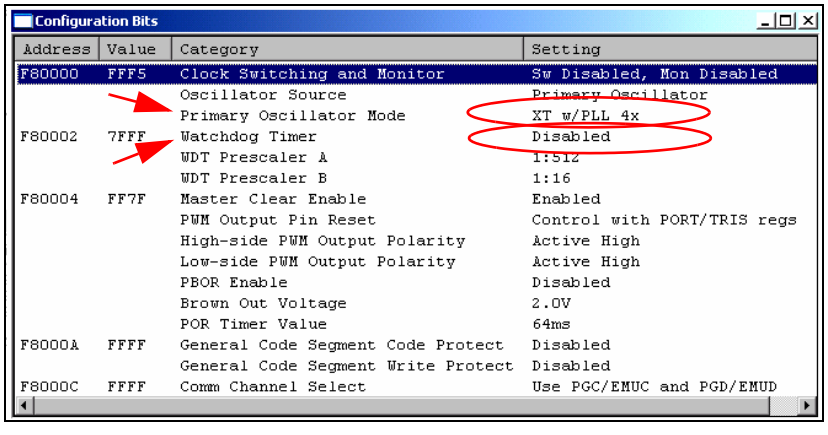
Note: Before proceeding, make sure that the USB driver for the MPLAB ICD 2 has been installed on your PC (see the *MPLAB ICD 2 User's Guide*, DS51331) for more details regarding the installation of MPLAB ICD 2.

Use the following procedures to program the dsPIC30F6014 device.

2.6.1 Set Up the Device Configuration

1. Use the *Configure>Configuration Bits* menu to display the configuration settings.
2. Set up the configuration bits as shown in Figure 2-10.

FIGURE 2-10: CONFIGURATION SETTINGS



The highlighted configuration settings may need to change to the these values:

Primary Oscillator Mode: XT w/PLL 4x
Watchdog Timer: Disabled

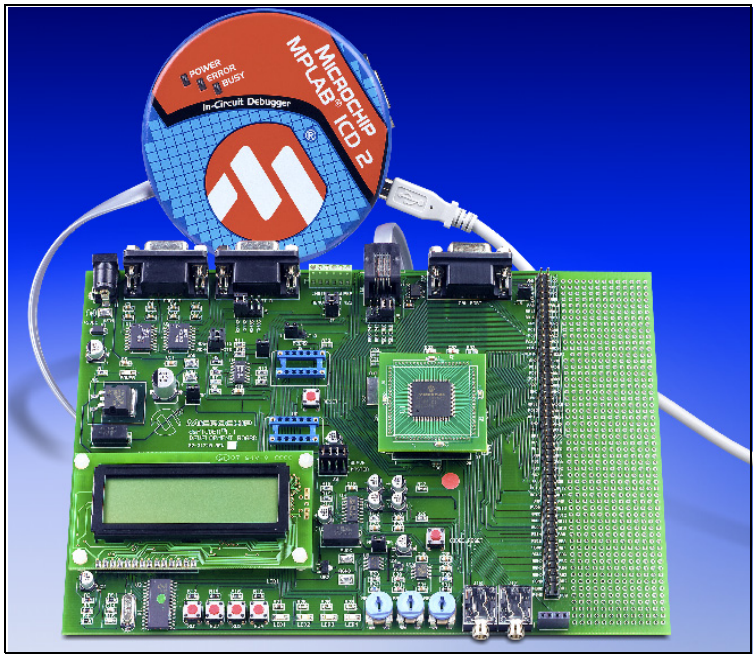
2.6.2 Connect the MPLAB ICD 2 In-Circuit Debugger

1. Before setting up the hardware, check that the following jumpers are in place:

AVDD_JMP:	On
J8:	PGD/EMUD, PGC/EMUC
J10:	MCLR1
VDD_JMP:	On

2. Connect the MPLAB ICD 2 to the PC with the USB cable (see Figure 2-11).
3. Connect the MPLAB ICD 2 to the dsPICDEM 1.1 Development Board with the short RJ-11 (telephone) cable.
4. Apply power to the board.

FIGURE 2-11: dsPICDEM 1.1 DEVELOPMENT BOARD CONNECTED TO MPLAB ICD 2 IN-CIRCUIT DEBUGGER

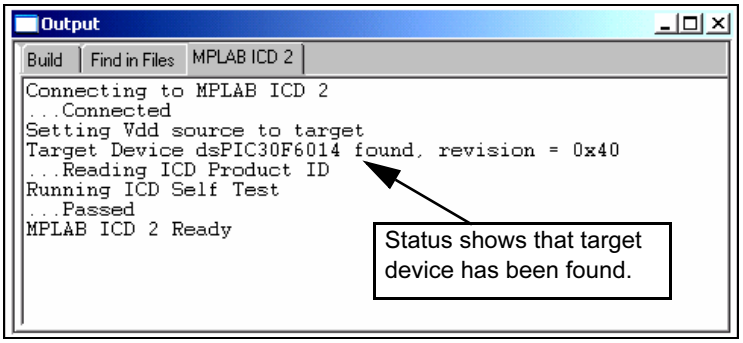


2.6.3 Enable MPLAB ICD 2 Connection

1. From the *Debugger* menu, click *Select Tool>MPLAB ICD 2* to designate the MPLAB ICD 2 as the debug tool in MPLAB IDE.
2. From the *Debugger* menu, select *Connect* to connect the debugger to the device. The MPLAB ICD 2 should report that it found the dsPIC30F6014 device, as shown in Figure 2-12.

Note: MPLAB IDE may need to download new firmware if this is the first time the MPLAB ICD 2 is being used with a dsPIC30F device. Allow it to do so. If any errors are shown, double-click the error message to get more information.

FIGURE 2-12: ENABLING MPLAB ICD 2



3. From the *Debugger* menu, click *Settings* to display the MPLAB ICD Debugger settings.
4. Select **Allow ICD 2 to select memories and ranges,** as shown in Figure 2-13**.** This setting will speed up operations by programming only a small part of the total program memory.

FIGURE 2-13: SETTING PROGRAM MEMORY SIZE