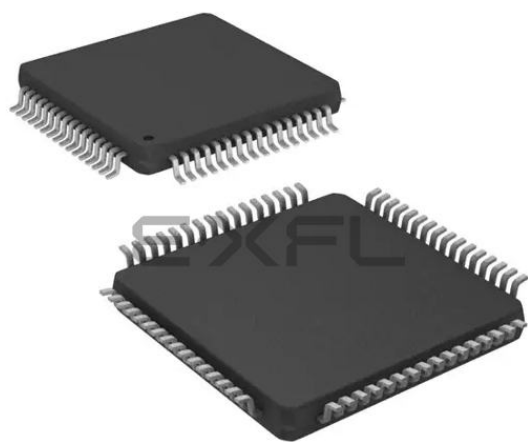




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Details

Product Status	Active
Core Processor	MIPS32® M4K™
Core Size	32-Bit Single-Core
Speed	80MHz
Connectivity	I ² C, IrDA, LINbus, PMP, SPI, UART/USART, USB OTG
Peripherals	Brown-out Detect/Reset, DMA, POR, PWM, WDT
Number of I/O	53
Program Memory Size	256KB (256K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	32K x 8
Voltage - Supply (Vcc/Vdd)	2.3V ~ 3.6V
Data Converters	A/D 16x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	64-TQFP
Supplier Device Package	64-TQFP (10x10)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/pic32mx440f256ht-80v-pt

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CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION 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
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
Courier New font:		
Plain Courier New	Sample source code	<code>#define START</code>
	Filenames	<code>autoexec.bat</code>
	File paths	<code>c:\mcc18\h</code>
	Keywords	<code>_asm, _endasm, static</code>
	Command-line options	<code>-Opa+, -Opa-</code>
	Bit values	<code>0, 1</code>
	Constants (in source code)	<code>0xFF, 'A'</code>
Italic Courier New	A variable argument	<code>file.o</code> , where <code>file</code> can be any valid filename
Square brackets []	Optional arguments	<code>mcc18 [options] file [options]</code>
Curly brackets and pipe character: { }	Choice of mutually exclusive arguments; an OR selection	<code>errorlevel {0 1}</code>
Ellipses...	Replaces repeated text	<code>var_name [, var_name...]</code>
	Represents code supplied by user	<code>void main (void) { ... }</code>

DOCUMENT REVISION HISTORY

Revision A (October 2007)

This is the initial release of the PIC32MX Starter Kit User's Guide.

Revision B (October 2007)

Removed confidential status.

Revision C (November 2008)

Updated the instructions in **Section 3.3.2 “Task 2, Select the Language Toolsuite”**.

Added connector table in **Section Table 4-1: “Starter Board Connector Part Numbers”**.

Revision D (February 2009)

Updated directory names and associated figures.

PIC32MX Starter Kit User's Guide

NOTES:

Chapter 1. Introducing the PIC32MX Starter Kit

1.1 INTRODUCTION

Thank you for purchasing the Microchip Technology PIC32MX Starter Kit. This kit provides a low-cost, modular development system for Microchip's new line of 32-bit microcontrollers.

The starter kit comes pre-loaded with demonstration software for the user to explore the new features of the PIC32MX. It is also expandable through a modular expansion interface, which allows the user to extend its functionality. The PIC32MX Starter Kit also supplies on-board circuitry for full debug and programming capabilities.

1.2 HIGHLIGHTS

This chapter covers the following topics:

- Kit Contents
- PIC32MX Functionality and Features
- Installing the PIC32MX Starter Kit CD
- Using the PIC32MX Starter Kit Out of the Box
- PIC32MX Demonstration Program

The preprogrammed example code on the PIC32MX MCU has been included on the PIC32MX Starter Kit CD-ROM for future reference. All project files have been included, so that the code may be used directly to restore the PIC32MX MCU on the starter kit to its original state (i.e., if the sample device has been reprogrammed with another program), or so you can use the tutorial code as a platform for further experimentation.

1.3 KIT CONTENTS

The PIC32MX Starter Kit contains the following items:

- PIC32MX Starter Kit Board
- USB Mini-B cable
- PIC32 Starter Kit Installation CD-ROM, which includes:
 - *PIC32MX Starter Kit User's Guide* (DS61144)
 - *PIC32MX Family Data Sheet* (DS61143)
 - *PIC32MX Family Reference Manual* (DS61132)
 - *PIC32MX Peripheral Library Manual*
 - Code examples for use with the PIC32MX devices

If you are missing any part of the kit, contact a Microchip sales office for assistance. A list of Microchip offices for sales and service is provided on page 44.

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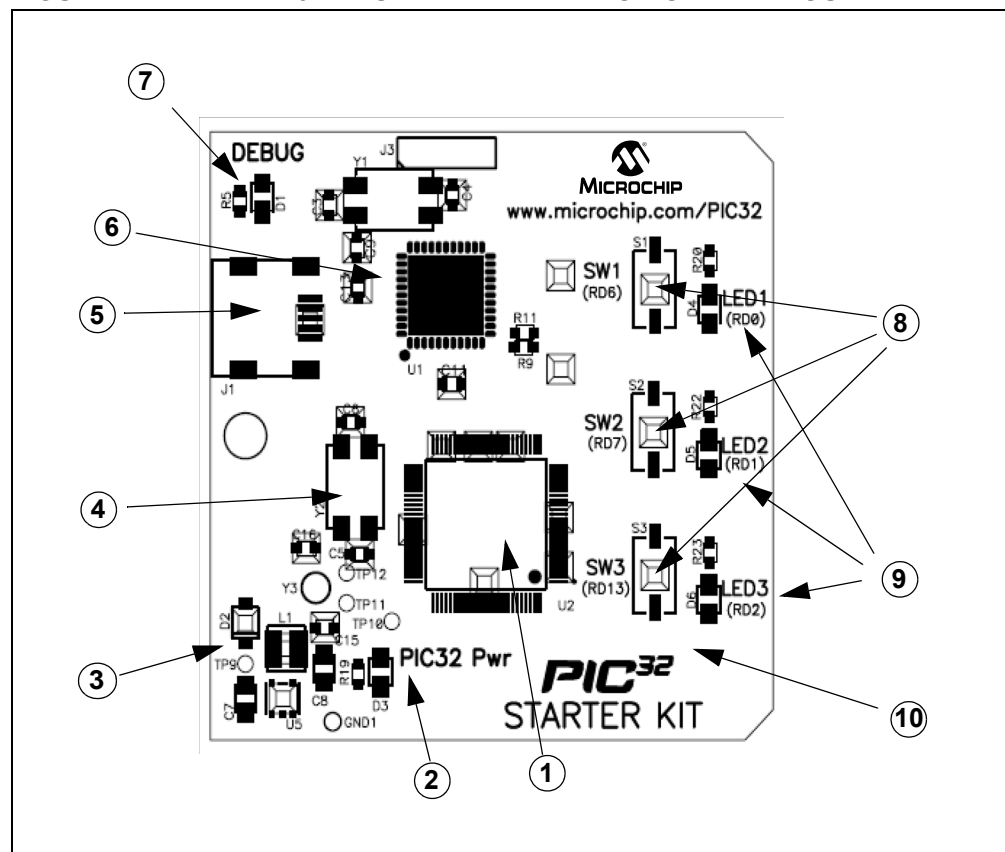
1.4 PIC32MX FUNCTIONALITY AND FEATURES

A representation of the layout of the PIC32MX Starter Kit is shown in Figure 1-1. The board includes these key features, as indicated in the diagram:

1. PIC32MX360F512L 32-bit microcontroller
2. Green power-indicator LED
3. Regulated +3.3V power supply for powering the starter kit board via USB or expansion board
4. On-board crystal for precision microcontroller clocking (8 MHz)
5. USB connectivity for on-board debugger communications
6. PIC18LF4550 USB microcontroller for on-board debugging
7. Orange Debug indicator LED
8. Three push-button switches for user-defined inputs
9. Three user-defined indicator LEDs
10. Connector for connecting various expansion boards (on the underside of board)

For details on these features, refer to **Chapter 4. "PIC32MX Starter Kit Hardware"**.

FIGURE 1-1: PIC32MX STARTER KIT DEMO BOARD LAYOUT

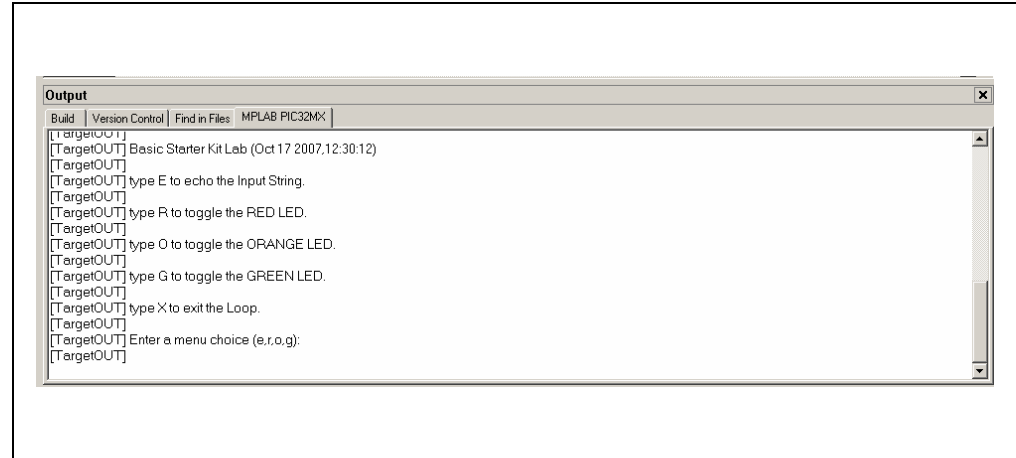


The tutorial program includes the Debug Print Library, which facilitates print functionality. A peripheral library header file for flashing the LEDs is also included. The header file for print functionality is `db_utils.h`.

Depending on the macro definition given in the print header file, the debug print macros will be expanded. The print functionality in the tutorial is routed to the Output window on the **MPLAB PIC32MX** tab in the interface window. In order to achieve this, the macro definition "PIC32_STARTER_KIT" is added to the MPLAB C Compiler for PIC32 options.

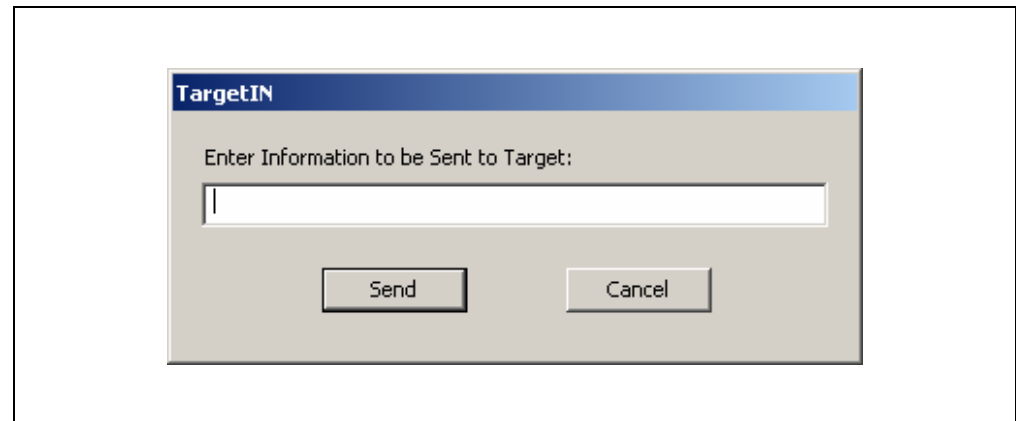
As the program runs, the Output window (Figure 2-14) tracks the progress.

FIGURE 2-14: OUTPUT WINDOW



After printing the menu, the application displays a prompt that requests your input, see Figure 2-15.

FIGURE 2-15: TARGET IN WINDOW

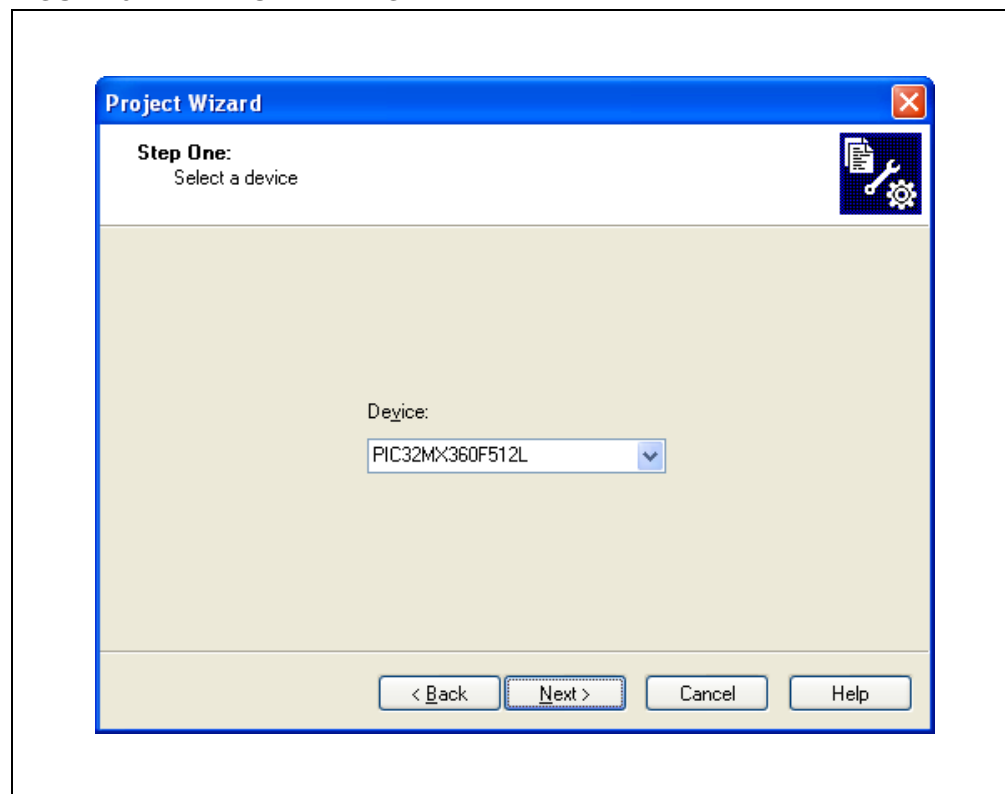


Type your choice into the Enter Information to be Sent to Target box, and click **Send**. The program responds according to the menu entry. Watch the LEDs on the starter kit board. If your entry is incorrect, the LEDs will toggle once.

3.3.1 Task 1, Select a Device

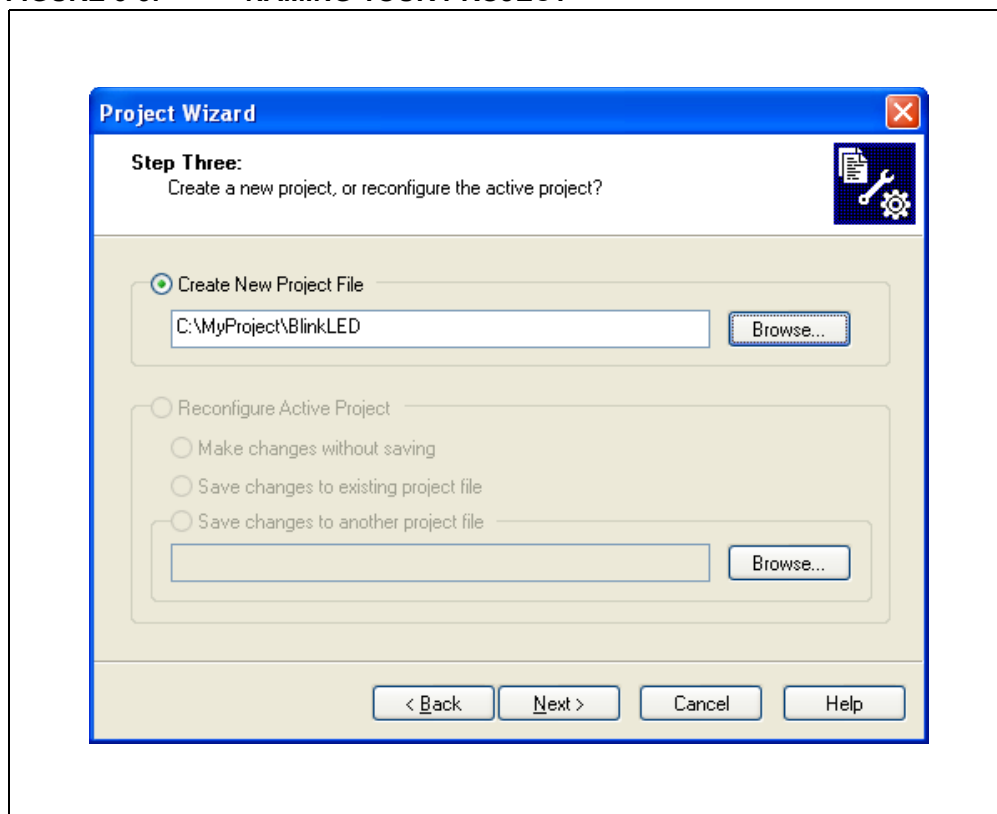
1. Start MPLAB IDE.
2. Click File>Close Workspace on the menu bar, to close any workspace that is open.
3. Click Project>Project Wizard... to start the wizard.
4. In the Welcome window, click **Next**. The Project Wizard Step One: window is displayed, as shown in Figure 3-1.

FIGURE 3-1: SELECTING THE DEVICE



5. From the "Device" drop-down list, select "PIC32MX360F512L".
6. Click **Next**. The Project Wizard Step Two: dialog box opens, as shown in Figure 3-2.

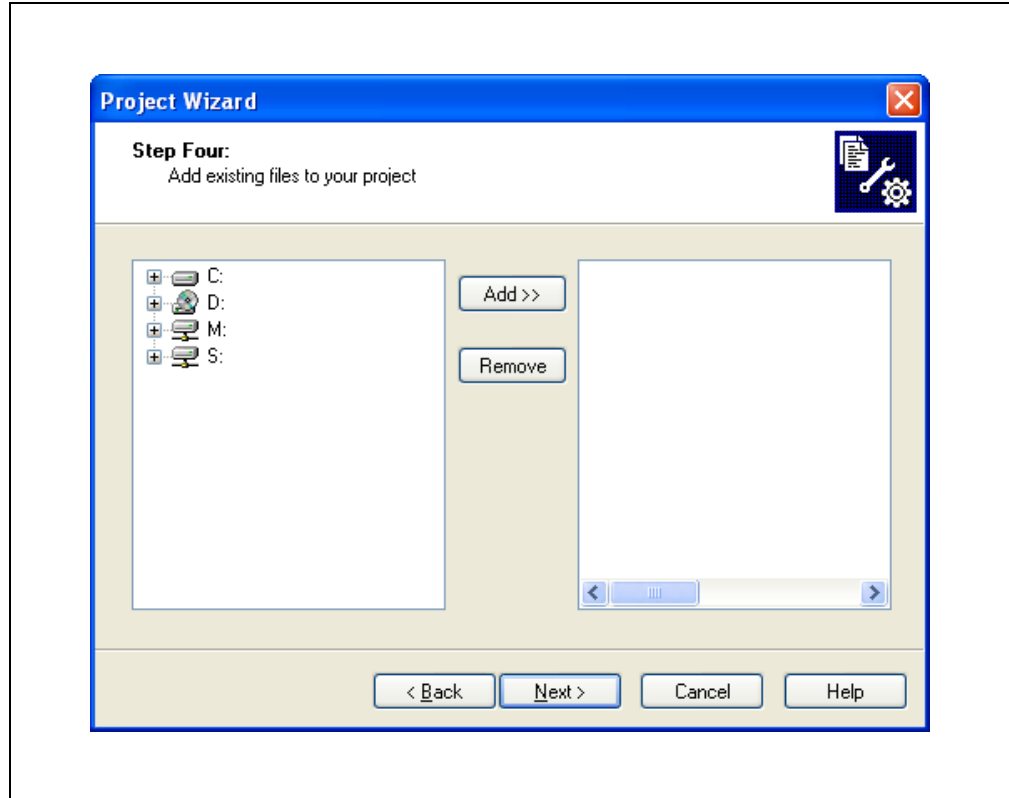
FIGURE 3-3: NAMING YOUR PROJECT



3.3.3 Task 3, Name Your Project

1. In the "Create New Project File" field, type **C:\MyProject\BlinkLED**.
2. Click **Next** and **Ok** to continue. The Project Wizard Step Four: dialog opens, as shown in Figure 3-4.

FIGURE 3-4: ADDING FILES TO THE PROJECT



3.3.4 Task 4, Add Files to Your Project

This window can be skipped, since no '.c' files have been created.

1. Click **Next** to continue.
2. Click **Finish** on the summary screen.
3. A project and workspace have been created in the MPLAB IDE.
`BlinkLED.mcw` is the workspace file and `BlinkLED.mcp` is the project file.
4. Click File>New from the menu bar to create a new file. A new file is displayed.
5. Click File>Save As... and save this file as 'BlinkLED.c' in the same folder (in this case, the `C:\MyProject` folder).
6. Now copy the source code provided in Example 3-1 to the `BlinkLED.c` file. The source code file is located in the PIC32 Starter Kit directory:
`[install directory]\PIC32 Starter Kits\Blink_Leds.`

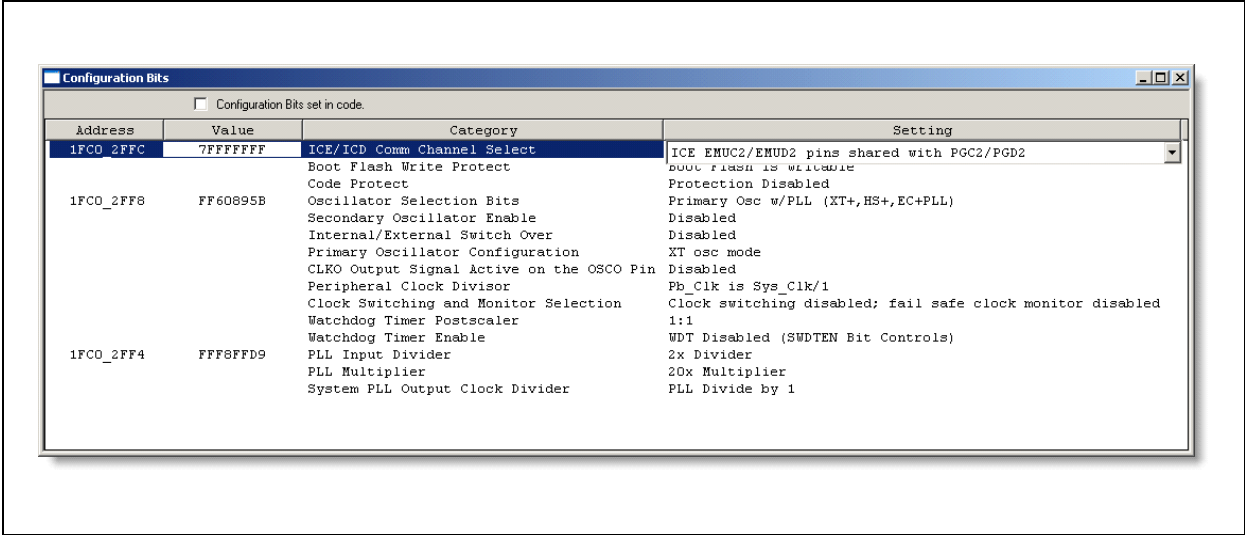
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3.3.5 Task 5, Confirm the Configuration Settings

Click [Configure>Configuration Bits](#) to confirm that the configuration settings are correct. Typical configuration settings for the starter kit are shown in Figure 3-6.

Note: The “Configuration Bits set in code” check box must be unchecked if the config bits are set via this window and not in the code.
The configuration settings can also be embedded in the source file.
See the *MPLAB C Compiler for PIC32 User's Guide* (DS51686) for information.

FIGURE 3-6: CONFIGURATION BIT SETTINGS



CAUTION

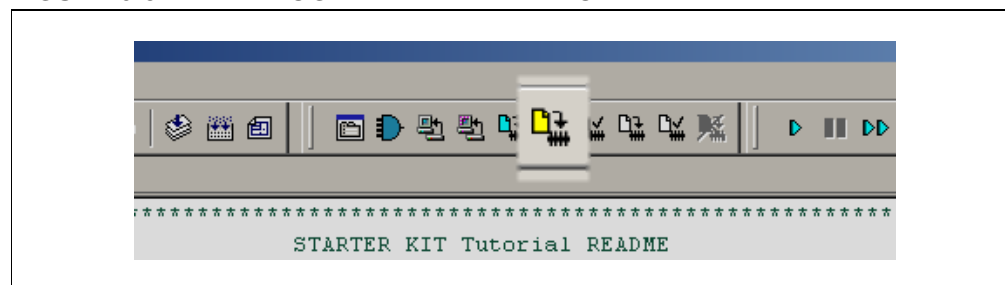
Setting the PIC32 Starter Kit configuration bits to cause the PIC32MX to operate faster than the maximum 80MHz system clock speed may cause the PIC32MX to stop communicating with the PIC18F4550 Starter Kit debugger. Should this occur, run the `sk_erase.exe` utility to re-flash the PIC32MX with a default configuration. This utility is located on the PIC32 Starter Kit CD or in the PIC32MX Starter Kit directory:

[install directory]\PIC32 Starter Kits\tools

3.3.7 Task 7, Program the Device

1. Click the Program All Memories icon on the Program Device Tool Bar, as shown in Figure 3-8.

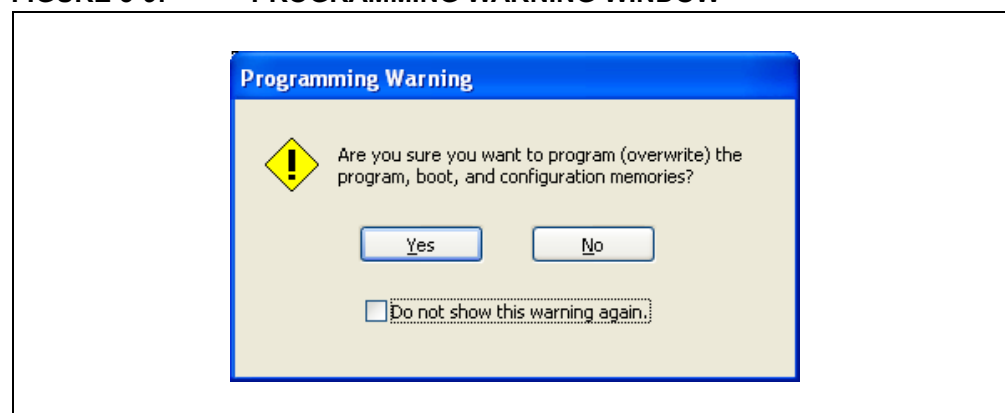
FIGURE 3-8: PROGRAM DEVICE WINDOW



A Programming Warning window (Figure 3-9) opens to warn you about overwriting the memory.

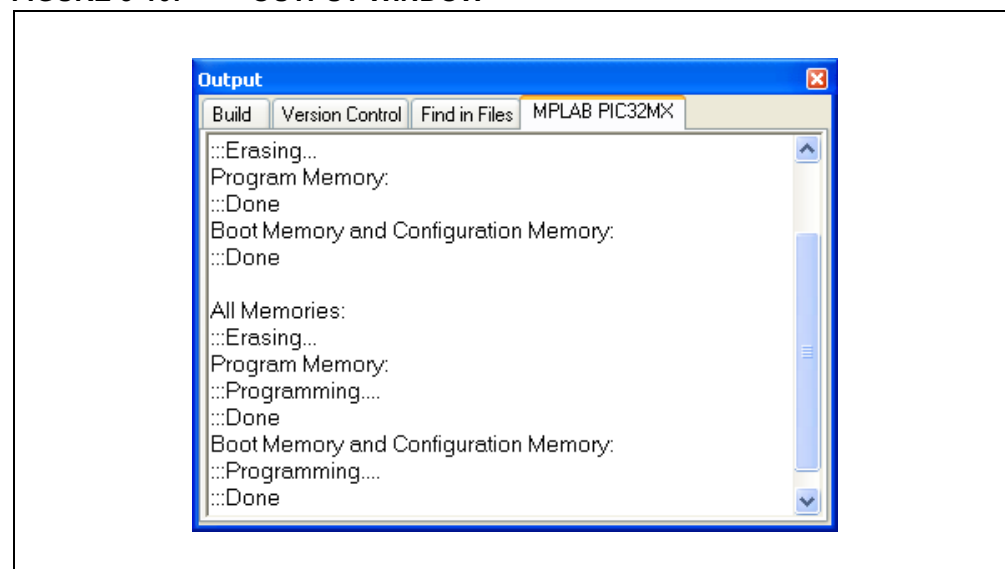
2. Click **Yes**.

FIGURE 3-9: PROGRAMMING WARNING WINDOW



The Output window (Figure 3-10) tracks the progress of the output. “Done” signals that the programming of the device is complete.

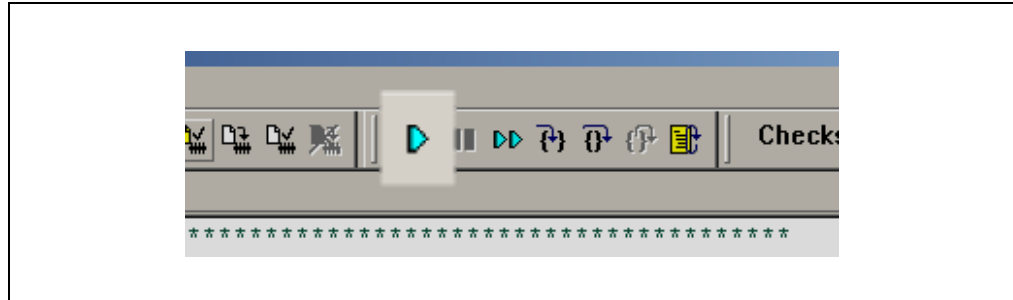
FIGURE 3-10: OUTPUT WINDOW



3.3.8 Task 8, Run the Program

Click *Debugger>Run* from the menu bar of the MPLAB IDE or click the Run icon (the turquoise triangle) on the Debug Tool Bar, as indicated in Figure 3-11, to run the new program.

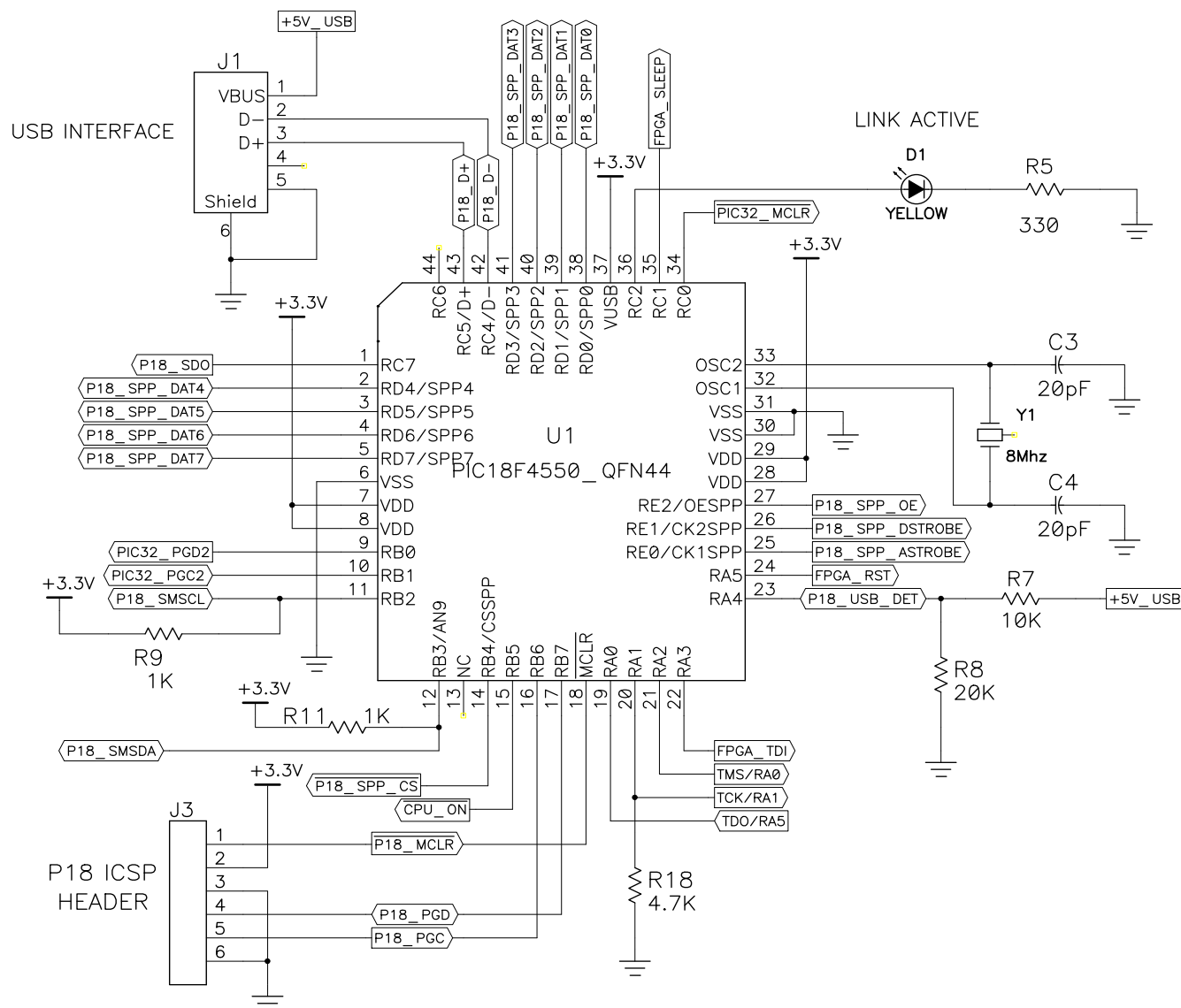
FIGURE 3-11: RUN THE PROGRAM



The starter kit LEDs blink to indicate that the program is running successfully.

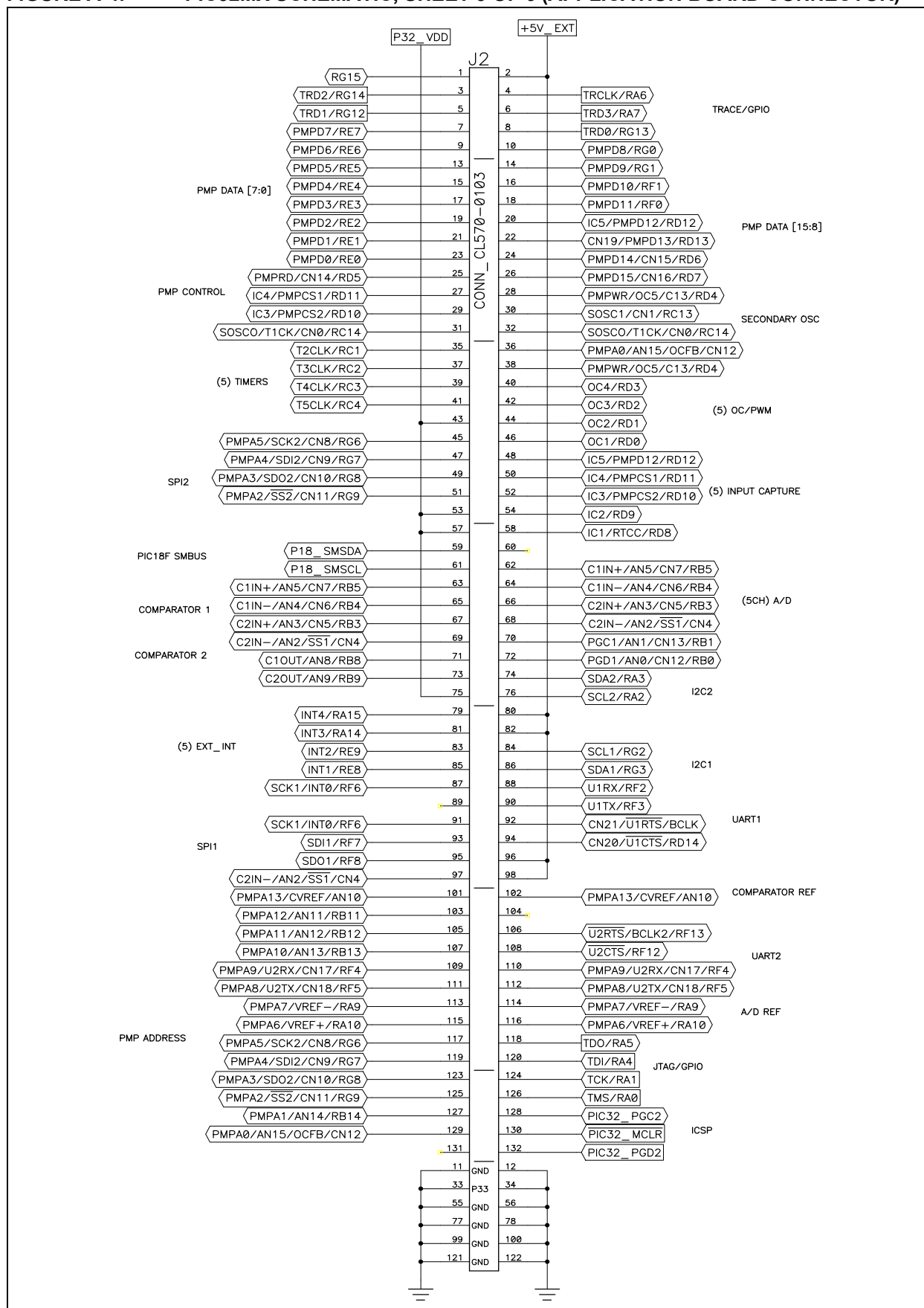
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NOTES:

[illegible]

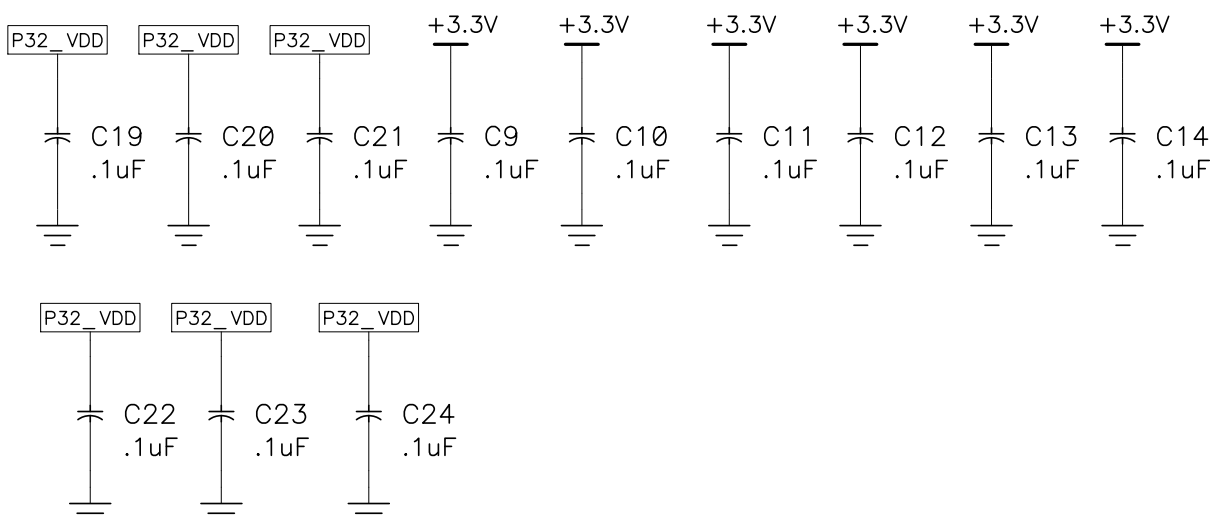
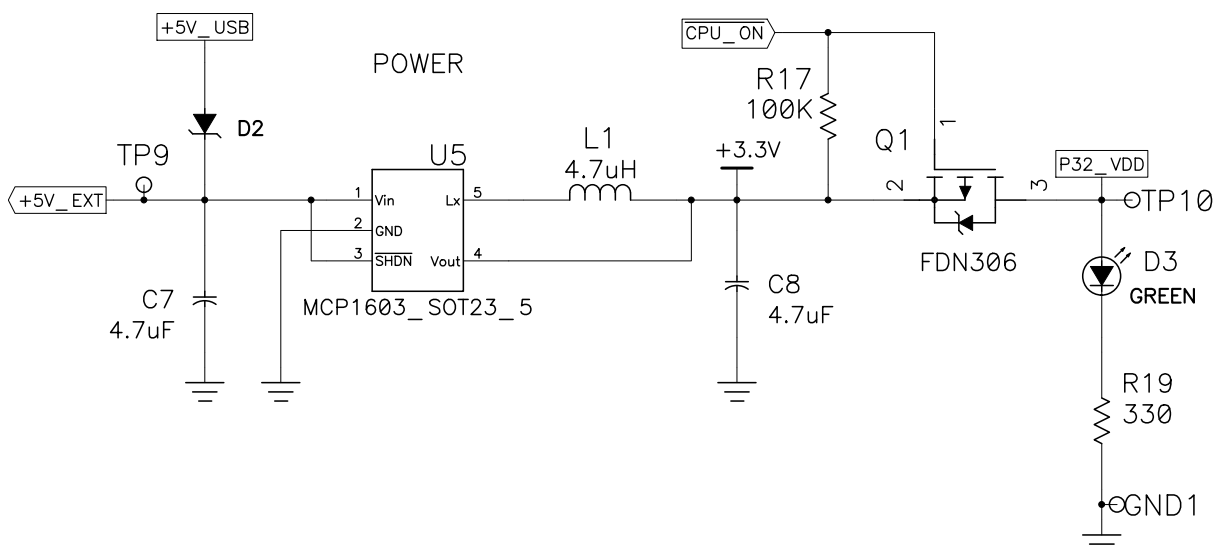
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FIGURE A-4: PIC32MX SCHEMATIC, SHEET 3 OF 6 (APPLICATION BOARD CONNECTOR)



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FIGURE A-6: PIC32MX SCHEMATIC, SHEET 6 OF 6 (POWER SUPPLY)



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