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F1 LV Evaluation Platform for Enhanced PIC[®] Microcontrollers User's Guide

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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 web site (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 "XXXXX" 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 F1 LV Evaluation Platform User's Guide. Items discussed in this chapter include:

- · Document Layout
- Conventions Used in this Guide
- Warranty Registration
- Recommended Reading
- The Microchip Web Site
- Development Systems Customer Change Notification Service
- Customer Support
- Document Revision History

DOCUMENT LAYOUT

This document describes how to use the F1 LV Evaluation Platform User's Guide as a development tool to emulate and debug firmware on a target board. The manual layout is as follows:

- Chapter 1. "F1 LV Evaluation Platform Overview"
- Chapter 2. "Getting Started"
- Chapter 3. "Programming the F1 LV Evaluation Platform"
- · Chapter 4. "Demo Code"
- Chapter 5. "Hardware Libraries and Drivers"
- Chapter 6. "Troubleshooting"
- Chapter 7. "Schematics"

CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION CONVENTIONS

Description	Represents	Examples	
Arial font:			
Italic characters	Referenced books	MPLAB [®] IDE User's Guide	
	Emphasized text	is the only 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>File>Save</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></f1></enter>	
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	OxFF, `A'	
Italic Courier New	A variable argument	<i>file.</i> o, 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	<pre>var_name [, var_name]</pre>	
	Represents code supplied by user	<pre>void main (void) { }</pre>	

WARRANTY REGISTRATION

Please complete the enclosed Warranty Registration Card and mail it promptly. Sending in the Warranty Registration Card entitles users 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 F1 LV Evaluation Platform. Other useful documents are listed below. The following Microchip documents are available and recommended as supplemental reference resources.

Readme for F1 LV Evaluation Platform User's Guide

For the latest information on using F1 LV Evaluation Platform User's Guide, read the "Readme for F1 LV Evaluation Platform User's Guide.txt" file (an ASCII text file) in the Readmes subdirectory of the MPLAB[®] IDE installation directory. The Readme file contains update information and known issues that may not be included in this user's guide.

Readme Files

For the latest information on using other tools, read the tool-specific Readme files in the Readmes subdirectory of the MPLAB IDE installation directory. The Readme files contain update information and known issues that may not be included in this user's guide.

THE MICROCHIP WEB SITE

Microchip provides online support via our web site at <u>www.microchip.com/F1LVEval</u>. 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 (FAQs), technical support requests, online discussion groups, Microchip consultant program member listing
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To register, access the Microchip web site 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 and other language tools. These include the HI TECH C[®] C16, MPLAB C18 and MPLAB C30 C compilers; MPASM[™] and MPLAB ASM30 assemblers; MPLINK[™] and MPLAB LINK30 object linkers; and MPLIB[™] and MPLAB LIB30 object librarians.
- In-Circuit Debuggers The latest information on the Microchip in-circuit debugger, MPLAB ICD 2, ICD3, PICkit™ 3.
- 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 simulator, MPLAB IDE Project Manager and general editing and debugging features.
- **Programmers** The latest information on Microchip programmers. These include the MPLAB PM3 device programmers and PICkit[™] 3 development programmers.

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://support.microchip.com

DOCUMENT REVISION HISTORY

Revision A (November 2011)

• Initial Release of this Document.

NOTES:



F1 LV EVALUATION PLATFORM USER'S GUIDE

Chapter 1. F1 LV Evaluation Platform Overview

1.1 INTRODUCTION

Thank you for choosing the F1 LV Evaluation Platform. This kit allows you to begin development using the PIC16LF1947 microcontroller (MCU).

The PIC16LF1947 is the first in a family of enhanced mid-range microcontrollers. These architectural enhancements allow for more memory and faster computation than that of legacy PIC16 microcontrollers.

The PIC16F1 and PIC12F1 family of microcontrollers are a series of 8-bit microcontrollers derived from the popular PIC16 series of 8-bit PIC[®] microcontrollers. The F1 LV derivatives feature an enhanced CPU, support for extended amounts of memory, improved peripherals, and XLP low power. The F1 LV Evaluation Platform allows you to evaluate these features for your application in a simple, low-cost platform.

This chapter introduces the F1 LV Evaluation Platform:

- Platform Contents
- Hardware Features

1.2 PLATFORM CONTENTS

The F1 LV Evaluation Platform contains the following items:

1. F1 LV Evaluation Platform Demo Board – <u>www.microchip.com/F1LVEval</u>

1.3 HARDWARE FEATURES

The F1 LV Evaluation Platform has the following hardware features:

1.3.1 PIC16LF1947

The PIC16LF1947 is a 64-pin full-featured device, including:

- 1. Enhanced PIC16 instruction set
- 2. 16K words of Flash memory
- 3. 1K of RAM
- 4. 256 bytes of EEPROM
- 5. 2 CCPs and 3 enhanced CCPs
- 6. MSSP (I^2C^{TM} , SPI)
- 7. Enhanced USART
- 8. 8- and 16-bit timers
- 9. 32 MHz internal oscillator
- 10. Low-power 32 kHz crystal oscillator
- 11. LCD controller
- 12. LF Operating Range: 1.8-3.6V

1.3.2 MCP9800 I²C[™] Temperature Sensor

The MCP9800 is a low-power, I^2C temperature sensor with selectable 9 to 12 bits of output resolution.

1.3.3 PICkit[™] 3 Programming/Debug Header

The PICkit 3 is a low-cost development tool that allows programming and debugging of the PIC16LF1947 MCU using the PICkit ICSP™ header.

1.3.4 MCP2200 USB to Serial Converter

The MCP2200, with the associated driver, makes the F1 LV Evaluation platform appear as a serial port when connected to a PC. The demo code includes utilities to control the various add-on boards through this serial interface.

1.3.5 Two Push Buttons, One Potentiometer, 7 LEDs

Simple applications need the basic user interface elements. Two push buttons, one potentiometer and 4 green LEDs are available for any application. The remaining three LEDs are used as indicators, a red LED is used to indicate the board is powered, the remaining two LEDs are green and indicate RX/TX communication through the USB Serial Converter.

1.3.6 One Custom LCD

The LCD glass supplied on this board is a Microchip custom display with icons for a battery indicator, 4 large numerical digits, 2 small numerical digits, adjustable decimal point, colon for time keeping, 4 function mode (Fx) indicators, 8 segment bar, a three-segment battery power indicator and 1 custom Microchip symbol. The PIC16LF1947 makes controlling the LCD very simple.

1.3.7 20-pin Add-on Connector

This connector expands the F1 LV Evaluation Board with optional add-on boards. Currently, there are 4 motor control add-ons planned or in production. The PIC16LF1947 has complete control of 3 phases, so other 1, 2, or 3-phase motor topologies are supported.

1.3.8 Current Monitoring Connector

To demonstrate the Extreme Low Power (XLP) features of the PIC16LF1947, a precision ammeter can be connected to the current monitoring connector. This allows your application to be easily optimized for the lowest possible current.

1.3.9 Generous Prototyping Area

Our circuits are not your circuits. A prototyping area has been provided to extend the functionality of this demo board to demonstrate the utility of the PIC16LF1947 in your application.

1.3.10 MCP1640 Synchronous Boost Regulator

The MCP1640 is a compact, high-efficiency, fixed frequency, synchronous step-up DC-DC converter. Through the use of this component, the F1 LV Evaluation board has the option of boosting an AAA 1.8V battery to 3.3V, which is then used to power the board and supporting circuitry.

1.3.11 MCP1703 LDO Regulator

The MCP1703 is a low-dropout voltage regulator with a 250 mA maximum output. Through the use of this component, the user has the option of powering the F1 LV Evaluation board through the USB Serial Converter connector. The USB supplies 5V, and the MCP1703 reduces this to the operating voltage of 3.3V.

1.3.12 User Selectable Power Sources

The F1 LV Evaluation board operates at 3.3V and comes with a flexable range of powering options.

- J5 (EXT SUPP) The user can power the board from a external power supply connected to the +/- headers.
- J6 (EXP PWR) The user can power the board from any Add-on board through the expansion connector.
- J7 (AAA BATT) The user can power the board by inserting a single AAA battery into B1 battery clamp.
- J8 (USB PWR) The user can power the board by connecting a USB cable to J2 USB SERIAL CONV header.

NOTES:



F1 LV EVALUATION PLATFORM USER'S GUIDE

Chapter 2. Getting Started

2.1 INTRODUCTION

This chapter gives instructions to get your F1 LV Evaluation Platform powered up and running the default demonstration. The following sections include:

- Powering the F1 LV Evaluation Platform
- Default Firmware
- Programming the F1 LV Evaluation Platform with the PICkit[™] 3
- Measuring the current consumption





2.2 POWERING THE F1 LV EVALUATION PLATFORM

The PIC16LF1947 supplied with your F1 LV Evaluation Platform requires a supply voltage of 1.8V-3.6V. Voltages above 3.6V will degrade or damage the device. There are five ways to supply the necessary power.

1. Use PICkit 3

Select Power Supply Source via cross jumper configuration

- 2. External Power Source, J5
- 3. Use the Add-on Expansion Header, J6
- 4. Use an AAA Battery, J7, or
- 5. Use USB Cable, J8.

2.3 POWERING WITH PICkit[™] 3

To power with the PICkit 3, perform the following steps:

- 1. Make sure a jumper or an ammeter is connected across J4.
- 2. Configure the PICkit 3 to supply a voltage between 1.8 and 3.6V. For proper LCD contrast, the supply should be 3.3V.
- 3. Attach the PICkit 3 to the PICkit ICSP[™] connector at the end of the board.
- 4. Activate the PICkit 3 power output.

Note: When powering from the PICkit 3, all power supply jumpers (J5 - J8) should be removed.

FIGURE 2-2: POWERING FROM PICkit[™] 3



2.4 POWERING FROM EXTERNAL POWER SUPPLY

To power from an external power supply, perform the following steps:

- 1. Make sure a jumper or an ammeter is connected across J4.
- 2. Connect VREF+ to EXT SUPP (+), connect VREF- to EXT SUPP(-).
- 3. Verify the supply voltage to be between 1.8 and 3.6V. For proper LCD contrast, the supply should be 3.3V.
- 4. Populate EXT PWR jumper, J5.
- 5. Turn on the power supply.

FIGURE 2-3: POWERING WITH EXTERNAL POWER SUPPLY



2.5 POWERING WITH THE ADD-ON EXPANSION HEADER J3

The add-on expansion hardware will supply the F1 LV Evaluation board with 3.3V DC through use of a linear regulator. This allows the 5-12V motor power supply to power the PIC16LF1947. J3, pin 6, is the source for the 3.3V power. To use this power perform the following steps.

- 1. Make sure a jumper or an ammeter is connected across J4.
- 2. Verify that any attached PICkit 3 is not supplying power.
- 3. Populate the EXP PWR jumper, J6.
- 4. Attach the add-on expansion board.
- 5. Connect power to the add-on expansion board.

FIGURE 2-4: EXPANSION SLOT POWER



2.6 POWERING WITH A AAA BATTERY

To power with a single AAA battery, the MCP1640 Boost Regulator is used to take the supplied 1.8V and convert it to 3.3V.

- 1. Make sure the jumper or an ammeter is connected across J4.
- 2. Insert AAA battery into B1 battery clip.
- 3. Populate AAA BATT jumper, J7.

FIGURE 2-5: POWERING FROM BATTERY



2.7 POWERING WITH A USB CABLE

To power with the USB cable, perform the following steps:

- 1. Make sure a jumper or an ammeter is connected across J4.
- 2. The USB cable will supply 5V DC to the F1 LV Evaluation board. The MCP1703 converts the 5V to 3.3V supply voltage for the PIC16LF1947.
- 3. Populate the USB PWR jumper, J8.



2.8 DEFAULT FIRMWARE

The default firmware supplied with your F1 LV Evaluation Board Demo performs the following functions:

- 1. Blink LEDs
- 2. Measure the ambient temperature
- 3. Run an attached add-on board motor (the firmware will auto-detect the add-on motor type, or indicate if no add-on board is attached.)
- 4. Display time/temperature/pot position/motor RPM on the LCD
- 5. User interface with a button and pot

For the latest firmware go to www.microchip.com/F1LVEval

2.8.1 Blinking LEDs

LED RA4 is used to indicate timing of the demonstration main loop. The LED toggles at each cycle through the demonstration program main loop. LEDs RA6, RA7 and RC5 are add-on board dependent, their function will change depending on the add-on board attached.

2.8.2 Measuring the Ambient Temperature

The MCP9800 is polled when in Temperature Measurement mode. The measured temperature is filtered, scaled to either Centigrade or Fahrenheit and displayed on the LCD.

2.8.3 Add-on Motor Expansion

A main task of the demo code is to allow the user to connect any of the expansion add-on motor boards and have the PIC16LF1947 determine the motor type and adjust the drive accordingly. The code provided with the F1 LV Evaluation board works with the following add-on boards:

- BLDC	(DM164130-2)
--------	--------------

- BDC (DM164130-6)
- Unipolar Stepper (DM164130-7)
- Bipolar Stepper (DM164130-8)

2.8.4 LCD Display

The time, temperature, pot position and motor speed are displayed on the LCD. The LCD is a display with multipurpose icons. The display uses 4 commons and 28 segment drives. The Timer1 oscillator is used to clock the display peripheral and allow the LCD to display data even in Sleep. Normally, the Timer1 counter would be used to drive the display, but this timer is required for the BLDC software. This requires configuring the LCD peripheral for a Type B waveform for this demo. The Type B waveform requires coordinating LCD updates when the peripheral is ready. The BLDC Interrupt requirements preclude using the built-in LCD interrupt for update coordination, therefore, the LCD interrupt is polled as part of the main loop. Type A waveforms can update the display without the extra coordination complexity. The different waveform types are described in section 21.9 of the PIC16LF1947 data sheet (DS41414). Because the LCD is clocked from the 32.768 kHz crystal, the LCDIF operates at a multiple of the crystal frequency, providing a very accurate time base for the real-time clock.

2.8.5 User Interface

Due to the extreme simplicity of this board, only a single button and a single pot are available for user input. A MCLR button is also present for the demonstration, this will function as a master clear switch. These two elements allow the user to cycle through the display elements, change the motor speed and change the time.

Pressing and releasing the button cycles through the following display modes:

- 1. Add-on Motor Indicator
- 2. Setable AM/PM Clock
- 3. 24-hr clock with seconds
- 4. Temperature (C)
- 5. Temperature (F)
- 6. POT ADC Value
- 7. Motor RPM (BLDC and stepper motors only)

By holding down the RD2 button during the Setable Clock mode, the minutes will begin to increment. The minutes will increment from 0-9; when the minutes increment past 9, the minutes will begin to increase by factors of 10. When incrementing reaches an hour, the hours will begin to increment and the minutes will stay at 00. The AM/PM indicator will automatically change accordingly. To set the clock, first set the hours and release the button. Then, set the tens of minutes and release the button. Finally, set the seconds. To synchronize the seconds, increment the minutes one final time at the instant the time reference advances to the next minute.

Turning the pot will change the motor speed.

When an expansion board is present, the F1 LV Evaluation code will automatically detect the add-on type and modify the motor drive accordingly.



Chapter 3. Programming the F1 LV Evaluation Platform

3.1 INTRODUCTION

The F1 LV Evaluation Platform makes extensive use of the on-board peripherals of the PIC16LF1947. This chapter provides guidance concerning the tools used for programming the F1 LV Evaluation Board and a map of the board function to I/O pin and pin function.

3.2 PROGRAMMING/DEVELOPMENT TOOL SUPPORT

The following development tools support the F1 LV Evaluation Platform:

- 1. PICkit™ 3
- 2. ICD 3
- 3. REAL ICE™ in-circuit emulator (with adapter AC164110)

The PICkit[™] or ICD 3 tools can also power the F1 LV Evaluation Platform, therefore, no additional hardware is required to get started. The ICSP pins of the PIC16LF1947 are dedicated to the PICkit ICSP connector, eliminating interactions between the Evaluation Platform and the programmer/debugger.

If you are developing with the REAL ICE emulator ICD, you will need the AC164110 adaptor, or the high-speed trace adaptor. These adaptors provide the inline 6-pin connector required by the PICkit ICSP programming capability interface. You will also need a power supply, please see **Chapter 2. "Getting Started"** for more on powering the F1 LV Evaluation Platform.

3.3 HARDWARE RESOURCES

TABLE 3-1: HARDWARE RESOURCES

Pin Number	PORT ID	I/0	Use	Name	Description
1	RE1	0		RE1	J3 – Pin 10
2	RE0	0		RE0	J3 – Pin 12
3	RG0	0		P3A	Low Side Drive C; J3 – Pin 9
4	RG1	I	LCD	SEG43	S1/S2/S3/S4
5	RG2	I	LCD	SEG44	T1/T2/T3/T4
6	RG3	0		R3	J3 – Pin 8
7	RG5	I		MCLR/Vpp	MCLR
8	RG4	0		RG4	J3 – Pin 2
9				Vss	Supply Return
10	NC			NC	Pin tied to VDD
11	RF7	I	AN5	C12IN3-	BEMF A; J3 – Pin 15
12	RF6	I	AN1	C1IN+	BEMF Reference; J3 – Pin 16
13	RF5	I	AN10	C12IN1-	BEMF C; J3 – Pin 19
14	RF4	I	AN9	C2IN+	Current Sense Reference; J3 – Pin 18
15	RF3	I	AN8	C12IN2-	BEMF B; J3 – Pin 17
16	RF2	0		RF2	C1OUT
17	RF1	I	LCD	SEG19	S5/S6/S7/S8
18	RF0	I	AN16	C12IN0-	Current Sense; J3 – Pin 20
19				Avdd	Power Supply
20				Avss	Supply Return
21	RA3	I	AN3	RA3	Battery Voltage
22	RA2	I	LCD	SEG34	6A/6D/6E/6F
23	RA1	I	LCD	SEG18	5B/5C/5G/P5
24	RA0	I	LCD	SEG33	5A/5D/5E/5F
25				Vss	Supply Return
26				Vdd	Power Supply
27	RA5	I	AN4	RA5	Speed Control Input (New Layout)
28	RA4	0		RA4	LED [D4]
29	RC1	I		RC1	T1OSCI
30	RC0	0		RC0	T1OSCO
31	RC6	0		TX1	Serial Transmit
32	RC7	I		RX1	Serial Receive
33	RC2	0		P1A	Low Side Drive B; J3 – Pin 1
34	RC3	I		SCK1	I ² C™ Clock
35	RC4	I		SDA1	l ² C Data
36	RC5	0		RC5	Phase C LED, LED [D3]
37	RB7	0		RGD	ICSP™ Data (TestPoint 1)
38				VDD	Power Supply
39	RA7	0		RA7	Phase B LED; LED [D2]
40	RA6	0		RA6	Phase A LED; LED [D1]
41				Vss	Supply Return
42	RB6	0		PGC	ICSP Clock (TestPoint 1)
43	RB5	I	LCD	SEG29	F2/6B/6C/6G

Programming the F1 LV Evaluation Platform

TABLE 3-1:	HARDWARE RESOURCES (CONTINUED)				
44	RB4	Ι	LCD	SEG11	F1/F3/F4/P6
45	RB3	I	LCD	SEG10	4B/4C/4G/P4
46	RB2	I	LCD	SEG9	4A/4D/4E/4F
47	RB1	I	LCD	SEG8	3B/3C/3G/P3
48	RB0	I	LCD	SEG30	3A/3D/3E/3F
49	RD7	I	LCD	SEG7	2B/2C/2G/P2
50	RD6	0		P1B	High Side Drive A; J3 – Pin 3
51	RD5	0		RD5	J3 – Pin 4
52	RD4	0		P3B	High Side Drive C; J3 – Pin 11
53	RD3	I	LCD	SEG3	2A/2D/2E/2F
54	RD2	I		RD2	Push Button
55	RD1	I	LCD	SEG1	1B/1C/1G/1P
56				Vss	Supply Return
57				Vdd	Power Supply
58	RD0	I	LCD	SEG0	1A/1D/1E/1F
59	RE7	0		P2A	Low Side Drive B; J3 – Pin 5
60	RE6	I	LCD	COM3	COM4
61	RE5	I	LCD	COM2	COM3
62	RE4	Ι	LCD	COM1	COM2
63	RE3	Ι	LCD	COM0	COM1
64	RE2	0		P2B	High Side Drive B; J3 – Pin 7

NOTES:



F1 LV EVALUATION PLATFORM USER'S GUIDE

Chapter 4. Demo Code

4.1 INTRODUCTION

The F1 LV Evaluation Platform demo is located at <u>www.microchip.com/F1LVEval</u>. The F1 LV Evaluation demonstration program uses a single Combined Demo. The Combined Demo source code is organized into sectional code for ease of portability:

This chapter provides an overview to the functions provided by these demos.

4.2 SERVICE DRIVERS

Multiple services drivers are utilized during this demo for operation. For user ease, these drivers have been separated for easy portability.

- The I²C driver is used by the MCP9800 driver to read the current temperature from the on-board MCP9800 I²C temperature sensor.
- Using the LCD and RTCC drivers, the LCD is used for display of the clock, temperature, motor status and motor type.
- The UNI/O[®] driver is used to read from each add-on board which motor type is being attached, and which firmware should be used.

4.3 COMBINED DEMO

The combined demo combines all the software from all the previous demos to show the power of the PIC16LF1947. In this demo, the user can attach any of the (4) add-on motor boards for use. The F1 LV Evaluation Board will auto-detect the type of motor add-on used and automatically configure accordingly for use. All drivers are reused from the previous demos. The RTCC is driven from the LCD peripheral.

The combined demo is preprogrammed in the F1 LV Evaluation Platform.

4.4 MOTOR CONTROL GUI APPLICATION

The F1 LV Evaluation Platform is developed to connect through the MCP2200 to the user's computer emulating a serial port. The GUI is capable of detecting which F1 LV add-on board is being used. Through the application, the user is capable of exploring the many options made with these motor types.

The GUI is capable of detecting and displaying which firmware version is being used through the F1 LV Evaluation Platform, and also which add-on board is connected. The features of the GUI in use with the F1 LV Evaluation Platform with its add-on boards is discussed in the Add-on User's Guide.

4.5 BLDC DEMO

The BLDC demo controls a sensorless, brushless DC motor connected to the PIC16F1 BLDC Expansion board (DM164130-2). Motors of the same type, but other than the motor supplied, can also be driven by making appropriate modifications to the motor control parameters.

Refer to application note AN1305, "Sensorless 3-Phase Brushless Motor Control with the PIC16FXXX", for detailed information regarding BLDC motor control.