



MICROCHIP

**PIC16F19197 LCD
Plug-in Module (PIM)
User's Guide**

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ISBN: 978-1-5224-2595-3

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 PIC16F19197 LCD PIM. 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 PIC16F19197 LCD PIM as a development tool to emulate and debug firmware on a target board, as well as how to program devices. The document is organized as follows:

- [“Overview”](#) – This section gives a general description of using the PIC16F19197 LCD PIM
- [“Pin Mapping”](#) – This section describes general PIM pin mapping exceptions.
- [“Running the Demo”](#) – This section gives a description of how to run the demo.
- [“Equipment Required”](#)– This section describes the items needed to run the demo.
- [“Instructions”](#)– This section describes general instructions on how to set-up the demo.
- [“Modes”](#)– This section describes the modes available.
- [“Optional”](#) – This section describes other set-up options.
- [“Schematic”](#) – PIC16F1919X LCD PIM.

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
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 PIC16F19197 LCD PIM. Other useful documents are listed below. The following Microchip documents are available and recommended as supplemental reference resources.

Release Notes for MPLAB ICD 3 In-Circuit Debugger

For the latest information on using PIC16F19197 LCD PIM, read the "Readme for PIC16F19197 LCD PIM .htm" file (an HTML file) in the Readmes subdirectory of the MPLAB IDE installation directory. The release notes (Readme) contains update information and known issues that may not be included in this user's guide.

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 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
- **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

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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.

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 website at:

<http://www.microchip.com/support>.

REVISION HISTORY

Revision A (01/2018)

This is the initial release of this document.



PIC16F19197 LCD PIM USER'S GUIDE

Using the PIC16F19197 LCD PIM

OVERVIEW

The PIC16F19197 Plug-in Module (PIM) is designed to demonstrate the capabilities of the PIC16F19197 device family using the LCD Explorer XLP Development Board (DM240314). Most of the pins of the device are mapped directly to the PIM connector (100 pin ICE). The exceptions are those pins that provide the connections to the secondary oscillator and pins on the PIM that do not correspond to pins on the device.

PIN MAPPING

There are several PIM ICE pins that do not have a one-to-one connection to the PIC16F19197. Table 1 below shows these exceptions. There are two pins (RC0 and RC1) on the PIC16F19197 that do not connect to the PIM ICE connector, instead they are connected to the secondary oscillator on the PIM.

TABLE 1: PIM PIN MAPPING EXCEPTIONS (NO DIRECT CONNECTION TO PIC16F19197)

PIM Pin Function	PIM Pin	PIM Pin Function	PIM Pin	PIM Pin Function	PIM Pin
VCC	2	VCC	30	OSCI	63
LCDBIAS0	5	GND	31	OSCO	64
RC4	9	GND	36	RD8	68
VLCAP1	11	VCC	37	RC13	73
VLCAP2	12	RB12/PMPA11	41	RC14	74
RE8/INT1	18	GND	45	GDN	75
RE9/INT2	19	RF3/U1TX	51	VCAP	85
RB3/AN3	22	RF2/U1RX	52	RF0	87
RB2/SS1/AN2	23	RF8/SDO1	53	RF1	88
RB1/AN1	24	RF7/SDI1	54	RG1	89
RB0/AN0	25	RF6/SCK1	55	RG0	90

RUNNING THE DEMO

This demo has six operating modes: Power-on Self-Test (POST), Scrolling Text, Potentiometer (POT) Voltage Reference, Battery Voltage, the Temperature in Degrees Celsius, and Temperature in Degrees Fahrenheit. The PIM and LCD Explorer can be powered from two AAA batteries or from the standard Microchip 9V wall mounted power supply.

EQUIPMENT REQUIRED

- PIC16F19197 LCD PIM (MA160019)
- LCD Explorer Development Board (DM240314)
- 9V Wall Mount Power Supply (optional - AC002014)
- Two AAA Batteries (optional)
- Coin Cell CR2032 Battery (optional)

Using the PIC16F19197 LCD PIM

INSTRUCTIONS

1. Plug the PIM into the LCD Explorer board, taking note of PIN 1 orientation.
2. Either put two AAA batteries in the battery holders (B1 and B2 noting orientation) or plug in the 9V wall mount power supply into J5.
3. Turn the board on with SW2, located near B2.

MODES

Mode 1: POST – turns on all the LCD segments for two seconds to verify the functionality of the LCD and PIM. Once that is complete, the demo goes directly into Mode 2.

Mode 2: Scrolling Text – displays a message that lists features of the PIC16(L)F19197 family. Pressing S6 near the LCD will change to the next mode.

Mode 3: POT Voltage Ref– displays the scrolling message “POT R20 Voltage”. Then, the display shows the voltage dropped across POT R20, located near the USB jack. Adjust R20 to see the change in voltage. Pressing S6 near the LCD will change to the next mode.

Mode 4: Battery Voltage– if the batteries are installed, then the battery voltage is displayed. As the batteries get depleted the voltage will decrease. Pressing S6 near the LCD will change to the next mode.

Mode 5: Temp in Celsius – the current temperature in degrees Celsius will be displayed. The temperature sensor, located near R20, can be cooled or heated to show a change in temperature. Pressing S6 near the LCD will change to the next mode.

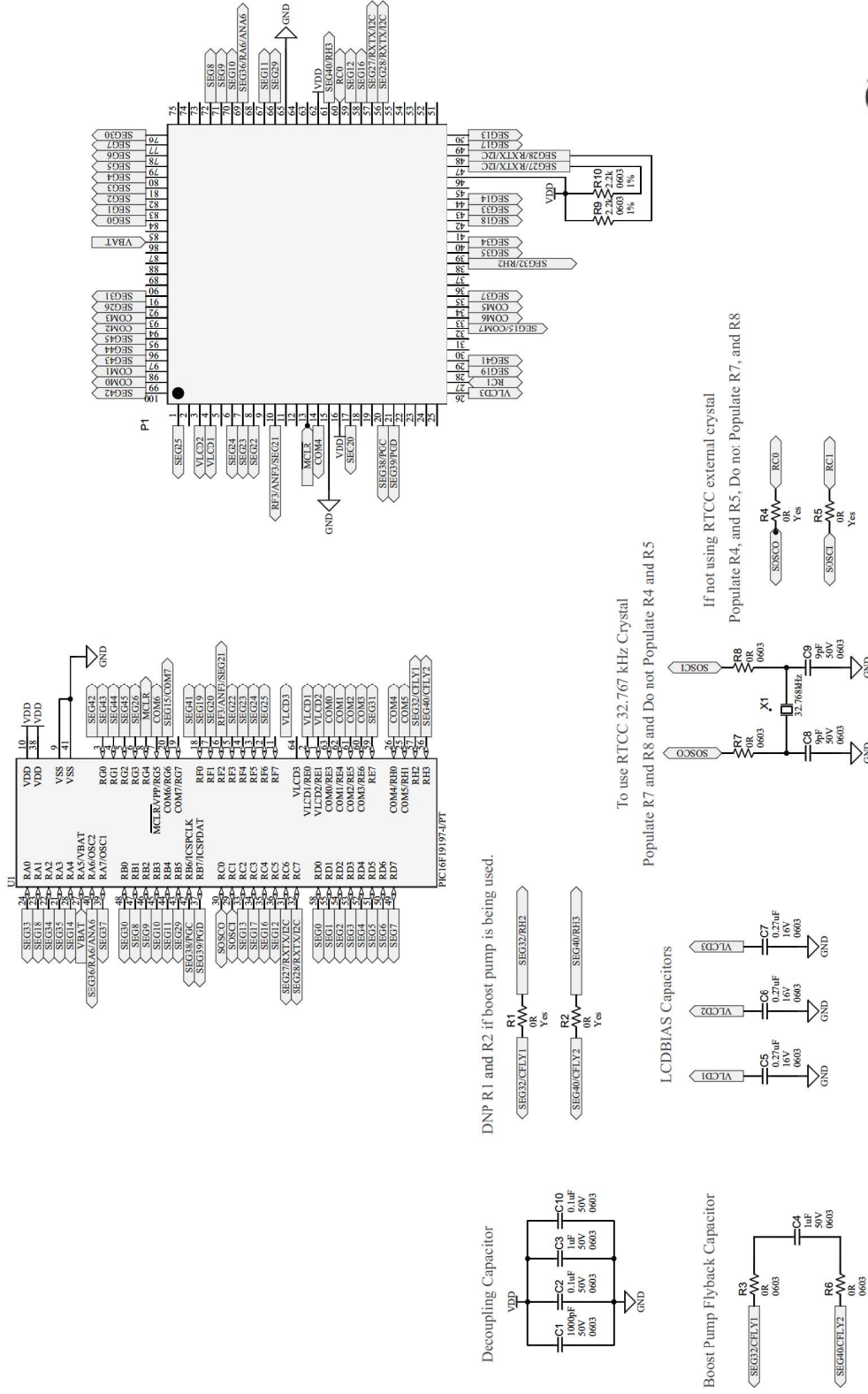
Mode 6: Temp in Fahrenheit – the current temperature in degrees Fahrenheit will be displayed. The temperature sensor, located near R20, can be cooled or heated to show a change in temperature. Pressing S6 near the LCD will return to Mode 1.

OPTIONAL

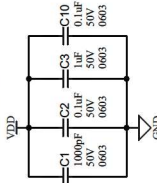
- The PIM can be reprogrammed using the onboard PICKit 3 header or ICD 3 jack.
- A coin cell battery (CR2032) can be installed into the BT1 on the back side of the LCD Explorer board. This battery is tied into VBAT pin on the PIM. This will assist in the development of Real-Time Clock Calendar (RTCC) applications.

SCHEMATIC

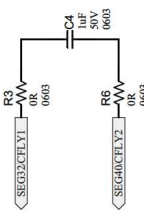
Using the PIC16F19197 LCD PIM



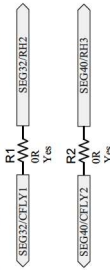
Decoupling Capacitor



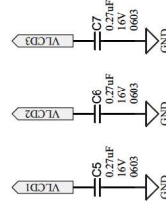
Boost Pump Flyback Capacitor



DNP R1 and R2 if boost pump is being used.

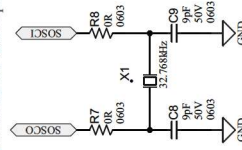


LCDBIAS Capacitors



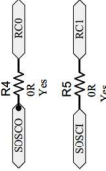
To use RTCC 32.767 kHz Crystal

Populate R7 and R8 and Do not Populate R4 and R5



If not using RTCC external crystal

Populate R4, and R5, Do not Populate R7, and R8



Remove R3 and R6 if Boost Pump is not used and SEG32/RH3 and SEG40/RH3 are.



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