



MCP2515 Stand-Alone CAN Controller PICtail™ Demo 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in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates.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's products as critical components in life support systems is not authorized except with express written approval by Microchip. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights.

Trademarks

The Microchip name and logo, the Microchip logo, Accuron, dsPIC, KEELOQ, microID, MPLAB, PIC, PICmicro, PICSTART, PRO MATE, PowerSmart, rfPIC, and SmartShunt are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

AmPLab, FilterLab, Migratable Memory, MXDEV, MXLAB, PICMASTER, SEEVAL, SmartSensor and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Analog-for-the-Digital Age, Application Maestro, dsPICDEM, dsPICDEM.net, dsPICworks, ECAN, ECONOMONITOR, FanSense, FlexROM, fuzzyLAB, In-Circuit Serial Programming, ICSP, ICEPIC, Linear Active Thermistor, MPASM, MPLIB, MPLINK, MPSIM, PICKit, PICDEM, PICDEM.net, PICLAB, PICTail, PowerCal, PowerInfo, PowerMate, PowerTool, rLAB, rfPICDEM, Select Mode, Smart Serial, SmartTel, Total Endurance and WiperLock 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.

All other trademarks mentioned herein are property of their respective companies.

© 2005, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

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, nonvolatile 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	1
Chapter 1. Product Overview	5
1.1 Introduction	5
1.2 What is the MCP2515 PICtail™ Demo Board ?	5
1.3 What the MCP2515 PICtail™ Demo Board Kit Includes	5
Chapter 2. Installation and Operation	7
2.1 Introduction	7
2.2 Features	7
2.3 Getting Started	8
2.4 Firmware Description	8
Appendix A. Schematics and Layouts	11
A.1 Introduction	11
Appendix B. Bill of Materials (BOM)	15
Worldwide Sales and Service	16

MCP2515 PICtail™ Demo Board User's Guide

NOTES:

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 “DSXXXXXA”, where “XXXXX” is the document number and “A” is the revision level of the document.

INTRODUCTION

This chapter contains general information that will be useful to know before using the MCP2515 PICtail™ Demo Board. Items discussed in this chapter include:

- Document Layout
- Conventions Used in this Guide
- Recommended Reading
- The Microchip Web Site
- Customer Support
- Document Revision History

DOCUMENT LAYOUT

This document describes how to use the MCP2515 PICtail™ Demo Board. The manual layout is as follows:

- **Chapter 1. “Product Overview”** – Important information about the MCP2515 PICtail™ Demo Board.
- **Chapter 2. “Installation and Operation”** – Includes instructions on how to get started with this evaluation board.
- **Appendix A. “Schematics and Layouts”** – Shows the schematic and layout diagrams for the MCP2515 PICtail™ Demo Board.
- **Appendix B. “Bill of Materials (BOM)”** – Lists the parts used to build the MCP2515 PICtail™ Demo Board.

MCP2515 PICtail™ Demo Board User's Guide

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>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>

RECOMMENDED READING

For more information regarding the Stand-Alone Controller Area Network (CAN) controller, CAN I/O Expander and CAN transceiver devices, refer to the appropriate data sheet. Table 1 shows the device and associated Data Sheet (DS) literature number. These documents can be downloaded from the Microchip web site at: www.microchip.com.

TABLE 1: DEVICES AND DATA SHEET LITERATURE NUMBERS

Device	Literature #	Device	Literature #
MCP2515	DS21801	MCP2502X/5X	DS21664
MCP2551	DS21667		

THE MICROCHIP WEB SITE

Microchip provides online support via our web site at www.microchip.com. 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
- **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

CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support
- Development Systems Information Line

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 (August 2005)

- Initial release of this document.

MCP2515 PICtail™ Demo Board User's Guide

NOTES:

Chapter 1. Product Overview

1.1 INTRODUCTION

This chapter provides an overview of the MCP2515 PICtail™ Demo Board and covers the following topics:

- What is the MCP2515 PICtail™ Demo Board?
- What the MCP2515 PICtail™ Demo Board kit includes

1.2 WHAT IS THE MCP2515 PICtail™ DEMO BOARD?

The MCP2515 PICtail™ Demo Board allows the system designer to quickly evaluate the operation of the MCP2515 Stand-Alone CAN Controller. The board demonstrates the MCP2515 in a CAN bus environment.

In addition, the kit includes an MCP25020 CAN I/O Expander node which demonstrates the device on a CAN bus.

1.3 WHAT THE MCP2515 PICtail™ DEMO BOARD KIT INCLUDES

This MCP2515 PICtail™ Demo Board Kit includes:

- One MCP2515 PICtail™ Demo Board with two CAN nodes
 - One node includes a PIC16F676, a MCP2515 CAN controller and a MCP2551 transceiver.
 - The other node includes a MCP25020 CAN I/O expander and an MCP2551 transceiver.
 - The CAN nodes can be physically separated by snapping them apart at the perforation.
- One power/bus cable for connecting the two PCB sections together
- MCP2515 Data Sheet (DS21801) (electronic version on CD)
- MCP2502X/5X Data Sheet (DS21664) (electronic version on CD)
- MCP2551 Data Sheet (DS21667) (electronic version on CD)
- MCP2515 PICtail™ Demo Board User's Guide (DS21572) (electronic version on CD)

MCP2515 PICtail™ Demo Board User's Guide

NOTES:

Chapter 2. Installation and Operation

2.1 INTRODUCTION

This chapter discusses the setup and operation of the MCP2515 PICtail™ Demo Board.

The MCP2515 PICtail™ Demo Board is designed to demonstrate the MCP2515 and MCP25020 as simple, low-cost CAN nodes. Both nodes monitor an input push button and send CAN messages with the button condition at regular intervals. The CAN message is received by the other node, where a LED is set to mirror the button state.

2.2 FEATURES

The MCP2515 PICtail™ Demo Board has the following features:

- Two (2) CAN nodes consisting of:
 - **Node A:** MCP2515, PIC16F676 and a MCP2551 CAN transceiver.
 - **Node B:** MCP25020 CAN I/O Expander and MCP2551 CAN transceiver.
- Each node also has one push button and one LED connected to the I/O.
 - The push button state from each node is sent to the other node via a CAN message.
- Two headers on Node A, used for programming the PICmicro® Microcontroller Unit (MCU) using the programming features of the PICKit™ 1 Flash Starter Kit or PICKit™ 2 Microcontroller Programmer. Neither header is populated. Refer to **Appendix A. "Schematics and Layouts"**.

MCP2515 PICtail™ Demo Board User's Guide

2.3 GETTING STARTED

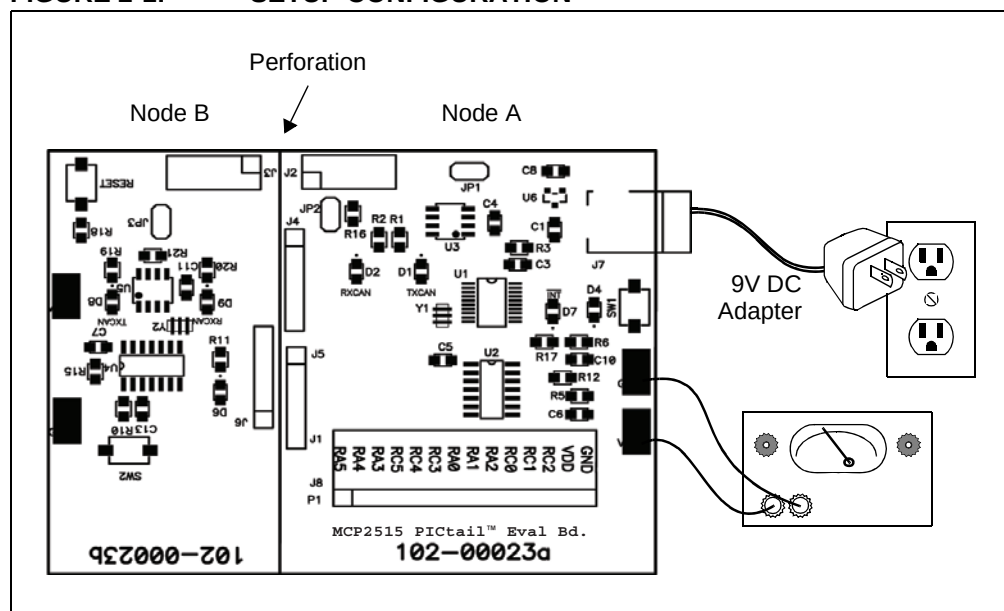
The MCP2515 PICtail™ Demo Board is a fully-functional, assembled and tested board for evaluation of the MCP2515 Stand-Alone CAN controller in a simple CAN environment. In addition, the MCP25020 CAN I/O Expander can be observed in operation. The following describes the basic setup and operation (see Figure 2-1):

1. Either connect a power supply (5 V) using the VDD and GND test points, or plug a 9V power supply or power adapter into the plug.
2. Observe that RXCAN, TXCAN, and $\overline{\text{INT}}$ LEDs flash at regular intervals.
3. Node A (MCP2515) samples its input (push button) and sends to Node B instructing it to drive its LED to the input corresponding level of the switch.
4. Node A also requests Node B's I/O status (push button) at the same interval and drives its LED as required.

2.3.1 PICKIT™ 1 Flash Starter Kit and PICKIT™ 2 Microcontroller Programmer Connections

The MCP2515 PICtail™ Demo Board has two headers (not populated), which allows the PICKIT™ 1 Flash Starter Kit or PICKIT™ 2 Microcontroller Programmer to be used to reprogram the PICmicro® MCU. Refer to the PICKIT™ 2 Microcontroller Programmer User's Guide (DS51553) for more information on programming PICmicro MCUs.

FIGURE 2-1: SETUP CONFIGURATION



2.4 FIRMWARE DESCRIPTION

See Figure 2-2 and Figure 2-3 for a simple firmware flow diagram for Node A (Node B does not contain any firmware).

1. The firmware first configures the PIC16F676 and the MCP2515.
2. The firmware then checks a global flag bit to determine if a message needs to be sent (a message containing the input button value is transmitted once every 224 ms).
 - 2a. Node A sends a message to Node B requesting I/O status (i.e., push button status).
3. The firmware checks a global receive flag bit to determine if a message has been received by the MCP2515. If yes, the data is read and the LED is set accordingly.
4. The firmware loops back to #2.

FIGURE 2-2: FIRMWARE FLOW DIAGRAM

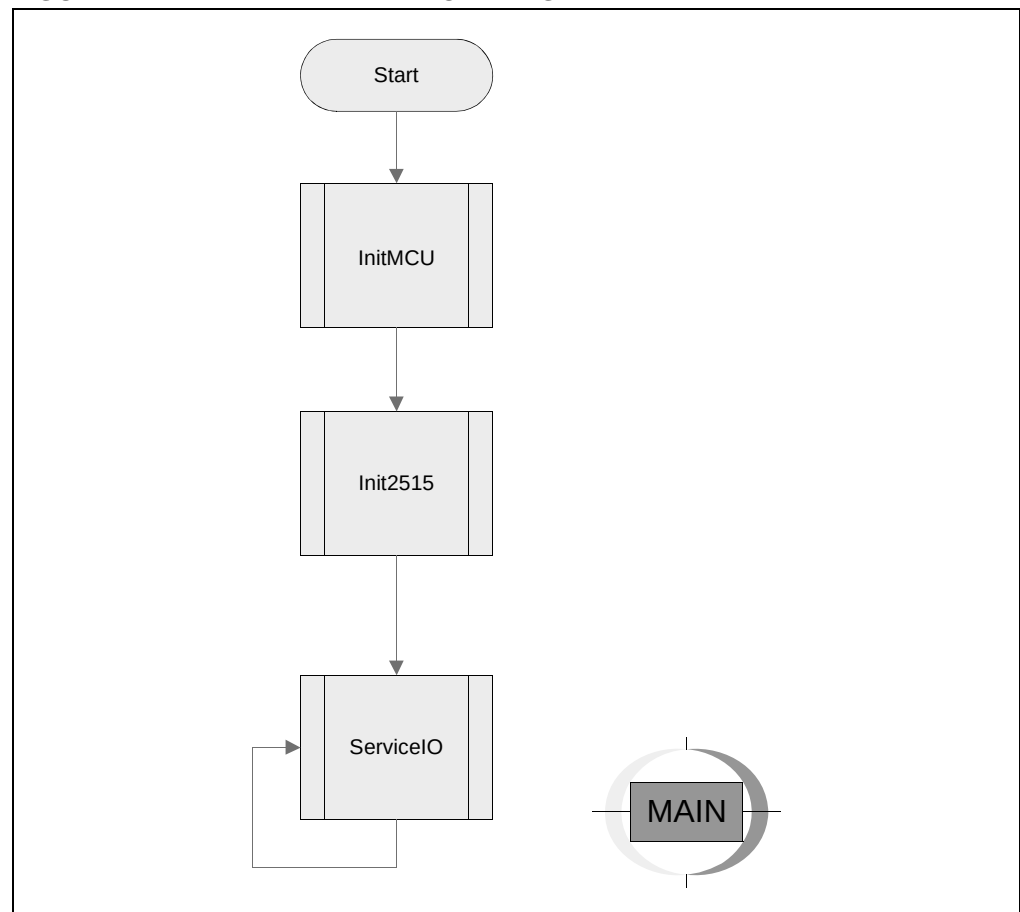
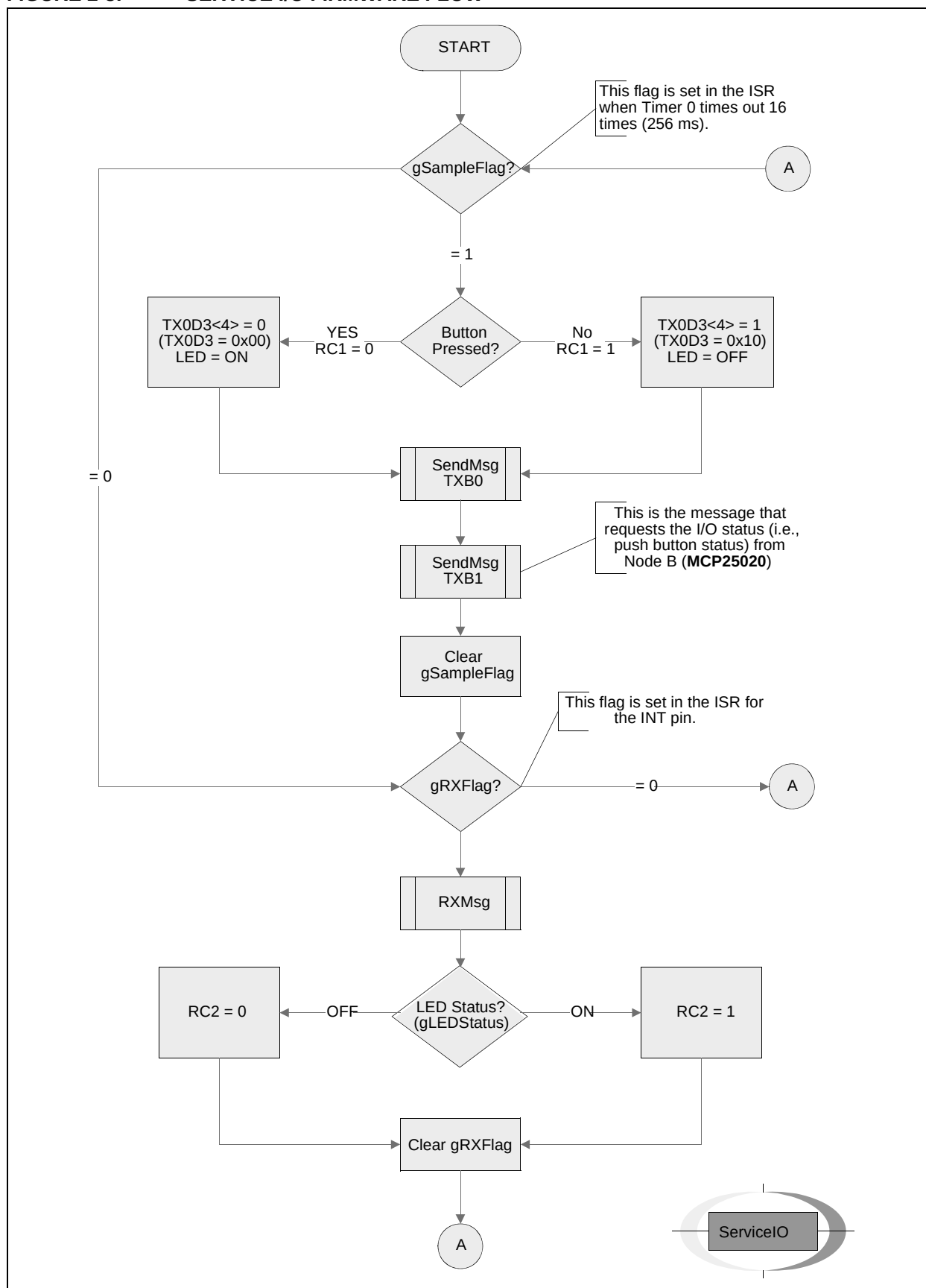


FIGURE 2-3: SERVICE I/O FIRMWARE FLOW



Appendix A. Schematics and Layouts

A.1 INTRODUCTION

This appendix contains the schematic and PCB layout for the MCP2515 PICtail™ Demo Board. Diagrams included:

- Board Schematic – Sheet 1 of 2
- Board Schematic – Sheet 2 of 2
- Board – Top Layer (with silk-screen)
- Board – Bottom Layer

MCP2515 PICtail™ Demo Board User's Guide

FIGURE A-3: BOARD – TOP LAYER (WITH SILK-SCREEN)

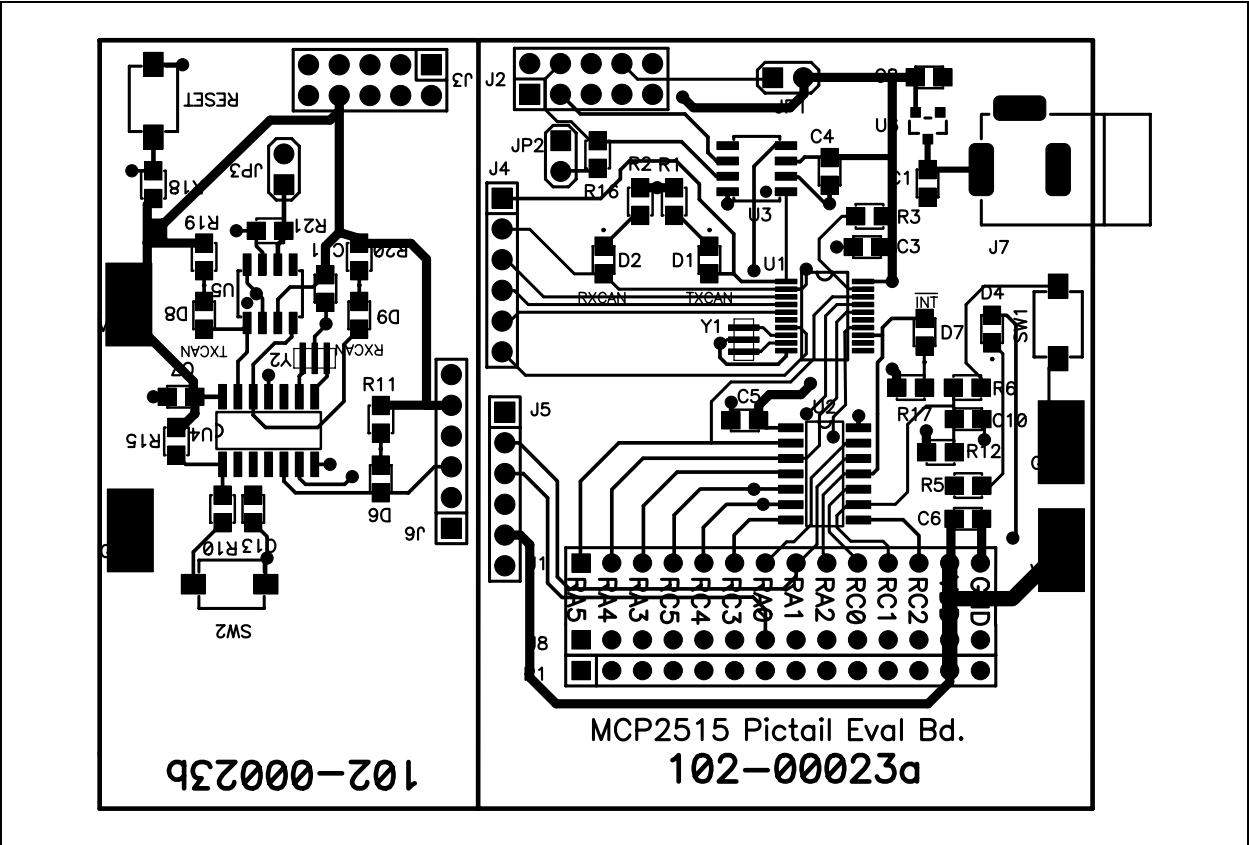
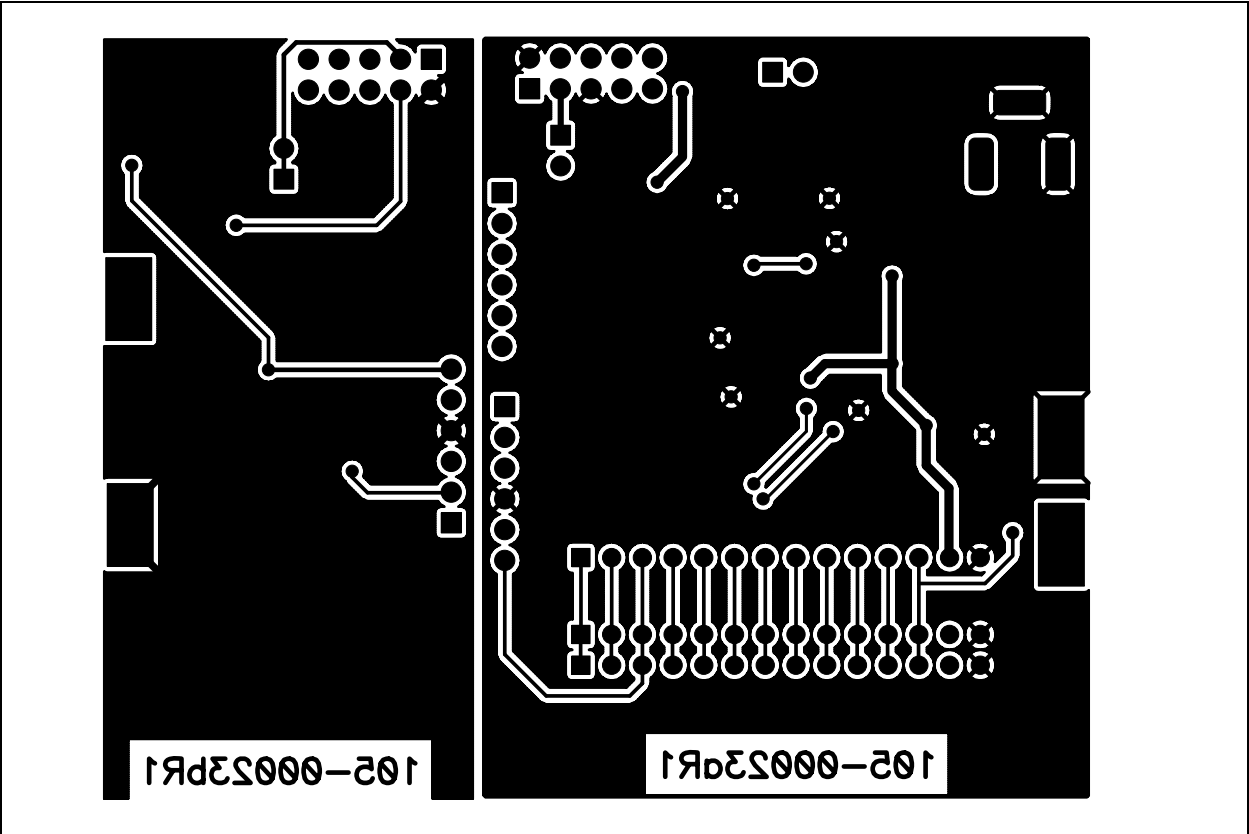


FIGURE A-4: BOARD – BOTTOM LAYER



Appendix B. Bill of Materials (BOM)

TABLE B-1: BILL OF MATERIALS (BOM)

Qty	Reference	Description	Manufacturer	Part Number
5	C3, C4, C5, C7, C11	CAP .1 μ F 16V CERAMIC X7R 0805	Panasonic® - ECG	ECJ-2VB1C104K
1	C6	CAP 1.0 μ F 10V CERAMIC X7R 0805	Kemet®	C0805C105K8RACTU
2	C10, C13	CAP 10000PF 50V CERAMIC X7R 0805	Kemet	C0805C103K5RACTU
6	D1, D2, D4, D6, D7, D8, D9	LED RED CLEAR 0805 SMD	Lite-On Trading USA Inc	LTST-C170CKT
8	GND, GND1, TP1, TP2, TP3, TP4, TP4, VDD, VDD1	PC TEST POINT COMPACT SMT	Keystone Electronics®	5016
2	J2, J3	CONN HEADER 10POS .100 VERT TIN	Molex®/Waldom® Electronics Corp	10-88-1101
1	J4	CONN HEADER 6POS .100 VERT TIN	Molex/Waldom Electronics Corp	22-28-4061
2	J5, J6	CONNHEADER6POS.100VERTTIN Header Not Installed	Molex/Waldom Electronics Corp	22-28-4062
2	JP1, JP2	CONN HEADER 2POS .100 VERT TIN	Molex/Waldom Electronics Corp	22-28-4021
1	JP3	CONNHEADER2POS.100VERTTIN Jumper Not Installed	Molex/Waldom Electronics Corp	22-28-4022
1	P1	CONNHEADER14POS.100R/ATIN Header Not Installed	Molex/Waldom Electronics Corp	22-28-8140
7	R1, R2, R5, R11, R17, R19, R20	RES 475 OHM 1/10W 1% 0805 SMD	Panasonic - ECG	ERJ-6ENF4750V
1	R3	RES 10.0K OHM 1/8W 1% 0805 SMD	Yageo America	9C08052A1002FKHFT
2	R6, R10	RES 510 OHM 1/8W 5% 0805 SMD	Panasonic - ECG	ERJ-6GEYJ511V
3	R12, R15, R18	RES 4.99K OHM 1/10W 1% 0805 SMD	Panasonic - ECG	ERJ-6ENF4991V
2	R16, R21	RES 121 OHM 1/10W 1% 0805 SMD	Panasonic - ECG	ERJ-6ENF1210V
3	SW1, SW2, SW5	SWITCH LT TOUCH 6X3.5 100GF SMD	Panasonic - ECG	EVQ-PJS04K
1	U1	Stand-alone Controller Area Network (CAN) controller	Microchip Technology Inc.	MCP2515-I/ST
1	U2	PIC® 14-Pin Flash-based 8-Bit CMOS Microcontroller	Microchip Technology Inc.	PIC16F676-I/SN
2	U3, U5	High-Speed CAN Transceiver	Microchip Technology Inc.	MCP2551-I/SL
1	U4	CAN I/O Expander for a Controller Area Network (CAN) system,	Microchip Technology Inc.	MCP25020-I/SL
1	Y1, Y2	Resonator 16.0 MHZ Ceramic	Murata® Electronics North America	CSTCE16M0V53-R0



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://support.microchip.com>
Web Address:
www.microchip.com

Atlanta

Alpharetta, GA
Tel: 770-640-0034
Fax: 770-640-0307

Boston

Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago

Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas

Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit

Farmington Hills, MI
Tel: 248-538-2250
Fax: 248-538-2260

Kokomo

Kokomo, IN
Tel: 765-864-8360
Fax: 765-864-8387

Los Angeles

Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608

San Jose

Mountain View, CA
Tel: 650-215-1444
Fax: 650-961-0286

Toronto

Mississauga, Ontario,
Canada
Tel: 905-673-0699
Fax: 905-673-6509

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing
Tel: 86-10-8528-2100
Fax: 86-10-8528-2104

China - Chengdu
Tel: 86-28-8676-6200
Fax: 86-28-8676-6599

China - Fuzhou
Tel: 86-591-8750-3506
Fax: 86-591-8750-3521

China - Hong Kong SAR

Tel: 852-2401-1200
Fax: 852-2401-3431

China - Qingdao
Tel: 86-532-502-7355
Fax: 86-532-502-7205

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: 86-755-8203-2660
Fax: 86-755-8203-1760

China - Shunde
Tel: 86-757-2839-5507
Fax: 86-757-2839-5571

China - Wuhan
Tel: 86-27-5980-5300
Fax: 86-27-5980-5118

China - Xian
Tel: 86-29-8833-7250
Fax: 86-29-8833-7256

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-2229-0061
Fax: 91-80-2229-0062

India - New Delhi
Tel: 91-11-5160-8631
Fax: 91-11-5160-8632

India - Pune
Tel: 91-20-2566-1512
Fax: 91-20-2566-1513

Japan - Yokohama
Tel: 81-45-471- 6166
Fax: 81-45-471-6122

Korea - Seoul
Tel: 82-2-554-7200
Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Penang
Tel: 604-646-8870
Fax: 604-646-5086

Philippines - Manila
Tel: 011-632-634-9065
Fax: 011-632-634-9069

Singapore
Tel: 65-6334-8870
Fax: 65-6334-8850

Taiwan - Hsinchu
Tel: 886-3-572-9526
Fax: 886-3-572-6459

Taiwan - Kaohsiung
Tel: 886-7-536-4818
Fax: 886-7-536-4803

Taiwan - Taipei
Tel: 886-2-2500-6610
Fax: 886-2-2508-0102

Thailand - Bangkok
Tel: 66-2-694-1351
Fax: 66-2-694-1350

EUROPE

Austria - Weis
Tel: 43-7242-2244-399
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 - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Spain - Madrid
Tel: 34-91-352-30-52
Fax: 34-91-352-11-47

UK - Wokingham
Tel: 44-118-921-5869
Fax: 44-118-921-5820

07/01/05

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru

www.lifeelectronics.ru