MCP73855 Evaluation Board User's Guide

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MCP73855 EVALUATION BOARD USER'S GUIDE

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MCP73855 EVALUATION BOARD USER'S GUIDE

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.

For the most up-to-date information on development tools, see the MPLAB® IDE on-line help. Select the Help menu, and then Topics to open a list of available on-line help files.

INTRODUCTION

This chapter contains general information that will be useful to know before using the MCP73855 Evaluation Board. Items discussed in this chapter include:

- About This Guide
- Recommended Reading
- The Microchip Web Site
- Customer Support

ABOUT THIS GUIDE

Document Layout

This document describes how to use the MCP73855 Evaluation Board. The manual layout is as follows:

- **Chapter 1: Product Overview** – important information about the MCP73855 Evaluation Board.
- **Chapter 2: MCP73855 Evaluation Board Installation** – for users evaluating the MCP73855, this chapter describes how to use the various features of the hardware.
- **Appendix A: Schematic and Layouts** – shows the schematic and layout diagrams for the MCP73855 Evaluation Board.
- **Appendix B: Bill-of-Materials** – lists the parts used to build the MCP73855 Evaluation Board.

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	*File>Save*
Bold characters	A dialog button	Click **OK**
	A tab	Click the **Power** tab
'b*nnnn*	A binary number where *n* is a digit	'b00100, 'b10
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
Courier font:		
Plain Courier	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`
Italic Courier	A variable argument	*`file`*`.o`, where *`file`* can be any valid filename
`0x`*`nnnn`*	A hexadecimal number where *n* is a hexadecimal digit	`0xFFFF`, `0x007A`
Square brackets [ ]	Optional arguments	`mcc18 [options]` *`file`* `[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 the MCP73855 Evaluation Board. Other useful documents are listed below. The following Microchip documents are available and recommended as supplemental reference resources.

MCP73853/55 Data Sheet (DS21915)

This data sheet provides detailed information regarding the MCP7385X devices.

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 (FAQ), 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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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

In addition, there is a Development Systems Information Line which lists the latest versions of Microchip's development systems software products. This line also provides information on how customers can receive currently available upgrade kits.

The Development Systems Information Line numbers are:

1-800-755-2345 – United States and most of Canada

1-480-792-7302 – Other International Locations

Chapter 1. Product Overview

1.1 INTRODUCTION AND HIGHLIGHTS

This chapter provides an overview of the MCP73855 Evaluation Board and covers the following topics:

- What is the MCP73855 Evaluation Board?
- What the MCP73855 Evaluation Board Kit Includes

1.2 WHAT IS THE MCP73855 EVALUATION BOARD?

The MCP73855 Evaluation Board is an evaluation and demonstration tool for Microchip Technology's MCP73855 USB Compatible Li-Ion/Li-Polymer Charge Management Controller. The design provides for dynamic versatility while being able to handle accurate measurements.

The MCP73855 Evaluation Board allows for the evaluation of the MCP73855 device in a variety of applications.

1.3 WHAT THE MCP73855 EVALUATION BOARD KIT INCLUDES

This MCP73855 Evaluation Board Kit includes:

- The MCP73855 Evaluation Board (102-00040)
- MCP73855 Device (Installed)
- MCP73853/55 Data Sheet (DS21915)
- MCP73855 Evaluation Board User's Guide (DS51522)

NOTES:

Chapter 2. MCP73855 Evaluation Board Installation

2.1 FEATURES

The MCP73855 Evaluation Board has the following features:

- Evaluation of the MCP73855 USB Compatible Li-Ion/Li-Polymer Charge Management Controller in a 3mm x 3mm, 10-Lead DFN Package
- Simple, stand-alone operation or microcontroller-compatible
- Powered from external bench supply, wall cube or USB port
- Surface-mount design
- Fully assembled and tested

2.2 GETTING STARTED

The MCP73855 Evaluation Board is a fully-functional, assembled and tested, surface-mount board used for evaluation of Microchip's MCP73855 USB Compatible Li-Ion/Li-Polymer Charge Management Controller. The following steps provide simple, stand-alone operation. Refer to Figure 2-1 for the setup configuration diagram. The setup configuration diagram depicts evaluation of the installed MCP73855 for single-cell applications.

1. Connect an external bench supply, wall cube or USB port to the surface-mount test points provided. The input voltage source should be in the range of 4.5V to 5.5V. Refer to **Section 2.3.1 "Input Source"** for details on the input source requirements.

Note:	Observe correct polarity of connection. Positive terminal connects to J2, V_{IN}+; negative terminal connects to J3, V_{IN}-.

2. Connect a single-cell Li-Ion or Li-Polymer battery pack to the circuit for evaluation.

Note:	Observe correct polarity of connection. Positive terminal connects to J5, V_{BAT}+; negative terminal connects to J6, V_{BAT}-.

3. Turn on the bench supply or plug in the wall cube/USB port.
4. A green LED (D_1) provides status during the charge cycle. Refer to the MCP73853/55 data sheet (DS21915) for details.

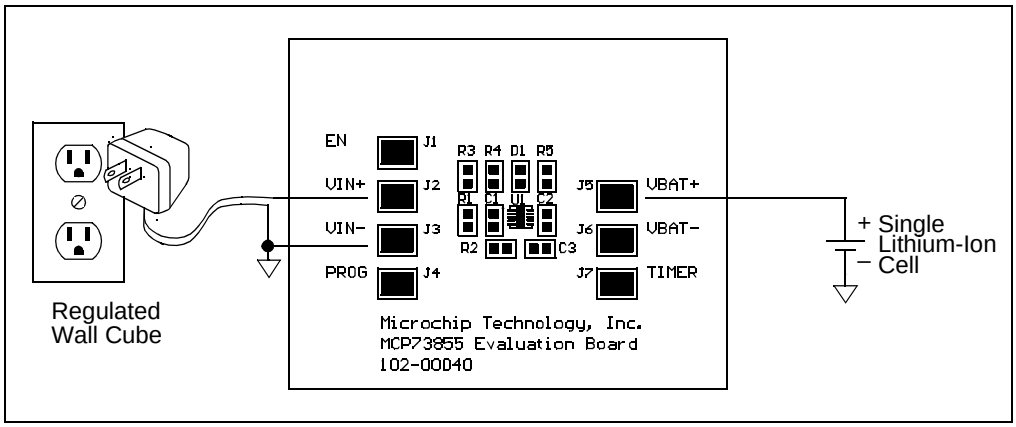


FIGURE 2-1: *Setup Configuration Diagram.*

2.3 DETAILED DESCRIPTION

The MCP73855 Evaluation Board is set-up to evaluate simple, stand-alone, linear charging of single-cell Li-Ion/Li-Polymer battery packs. The reference design provides constant current charging followed by constant voltage charging with automatic charge termination. As provided, the MCP73855 Evaluation Board is set for fast charge constant current levels of 85 mA with J4 (PROG) open and 400 mA with J4 (PROG) connected to J3 (V_{IN}–). The MCP73855 is provided in a 3 mm X 3 mm, 10-lead DFN package and is equipped with shutdown control, status indicator and safety timer. Refer to the MCP73853/55 data sheet (DS21915) for details on individual device features.

2.3.1 Input Source

The MCP73855 Evaluation Board is designed to provide a fast charge current up to 400 mA, typically. The input source should provide a voltage in the range of 4.5V to 5.5V. The input source should be capable of providing a minimum of 2.5W.

Charge currents between 85 mA and 400 mA can be obtained by adjusting the value of the charge programming resistors (R_2) and connecting surface-mount test point J4 (PROG) to J3 (V_{IN}–). Refer to the MCP73853/55 data sheet (DS21915) for details on determining the appropriate programming resistor.

2.3.2 Safety Timer Periods

The MCP73855 Evaluation Board can be used with a variety of battery packs. As provided, the MCP73855 Evaluation Board is set up to perform well with single-cell, 100 mAh to 500 mAh battery packs. Battery packs with alternative capacities and various charge currents can be implemented. The safety timer periods may need to be adjusted in order to ensure a full charge. The safety timer periods can be adjusted by changing the capacitance of C_3. Refer to the MCP73853/55 data sheet (DS21915) for details on determining the appropriate timer capacitance.

2.3.3 Disable Control

The MCP73855 Evaluation Board is designed to provide stand-alone operation. The installed MCP73855 device is enabled whenever the input source is present. To disable charging, a jumper can be placed between J1 (EN) and J3 (V_{IN}–).

2.3.4 Battery Headers

Independent battery connections are provided. The battery pack positive terminal should be connected to J5 (V_{BAT}+). The battery pack's negative terminal should be connected to J6 (V_{BAT} –).

Note:	Improper connection of the battery may result in damage to the battery and the possibility of personal injury. It is also important to avoid shorting the battery terminals together.

2.3.5 Device Support Options

The MCP73855 Evaluation Board supports the MCP73855 device. The MCP73855 Evaluation Board is provided with one reference design utilizing the MCP73855.

2.3.6 Microcontroller option

Connection points provide easily accessible locations for interface to a host microcontroller. The host microcontroller can be used to disable the charger, monitor charge status or terminate a charge.

2.3.7 Output voltage options

The MCP73855 Evaluation Board is provided with a Constant-voltage mode output voltage of 4.2V. Evaluation with a Constant-voltage mode output voltage of 4.1V can be achieved by moving resistor R_4 to R_3, or by shorting the R_3 pads.

NOTES:

Appendix A. Schematic and Layouts

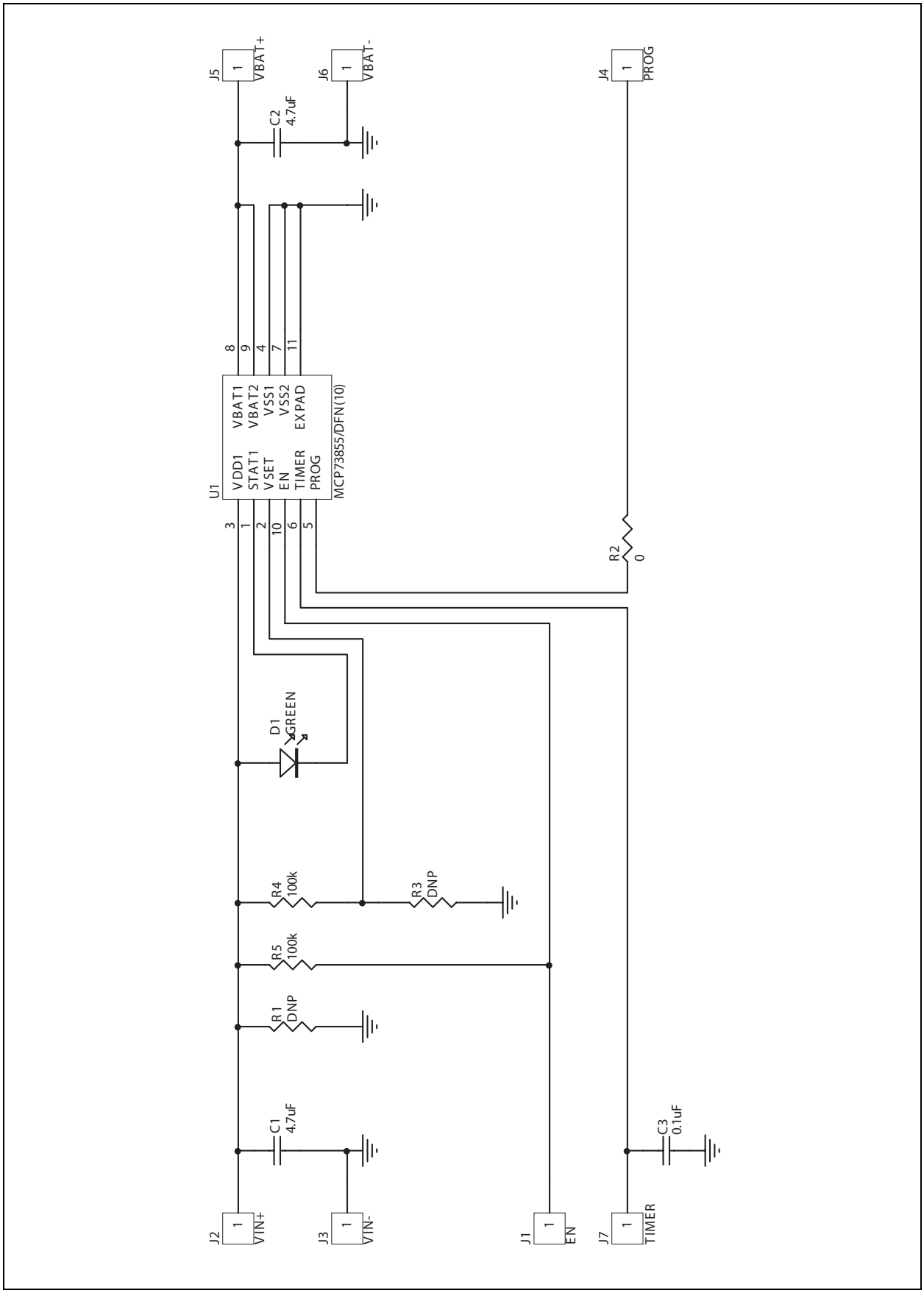
A.1 INTRODUCTION

This appendix contains the following schematics and layout diagrams for the MCP73855 Evaluation Board.

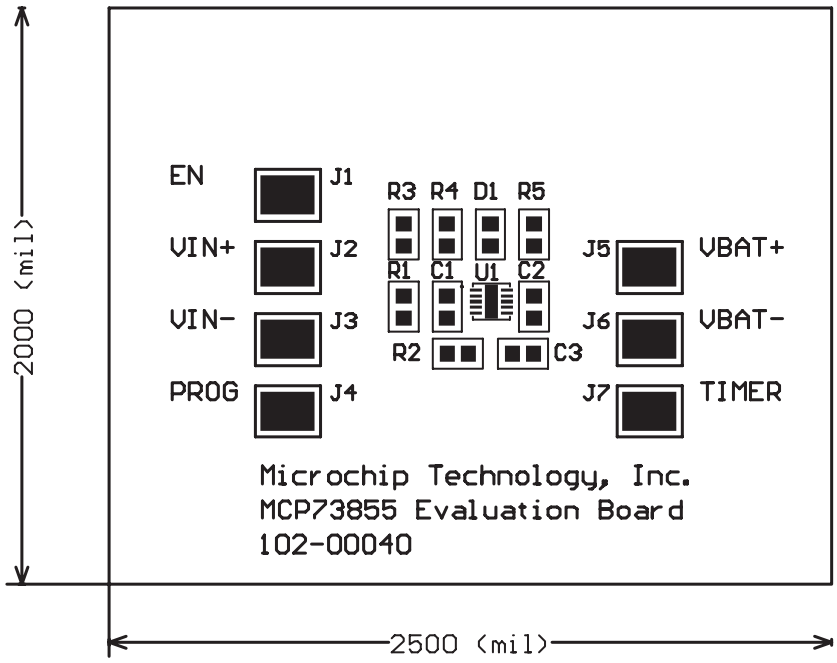
Diagrams included in this appendix:

- Board Schematic
- Board - Assembly Drawing
- Board - Top Layer
- Board - Bottom Layer

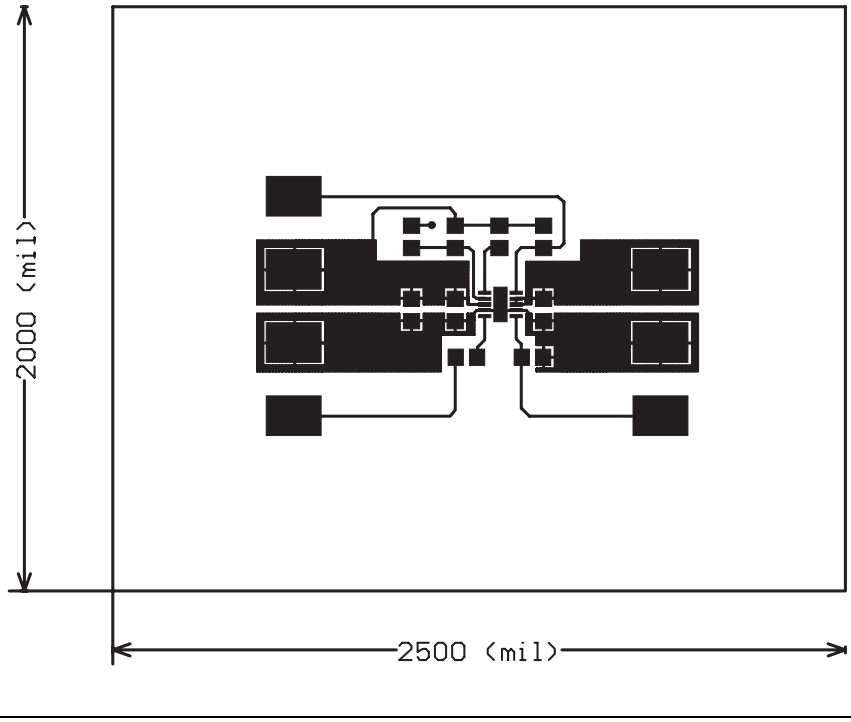
A.2 BOARD SCHEMATIC



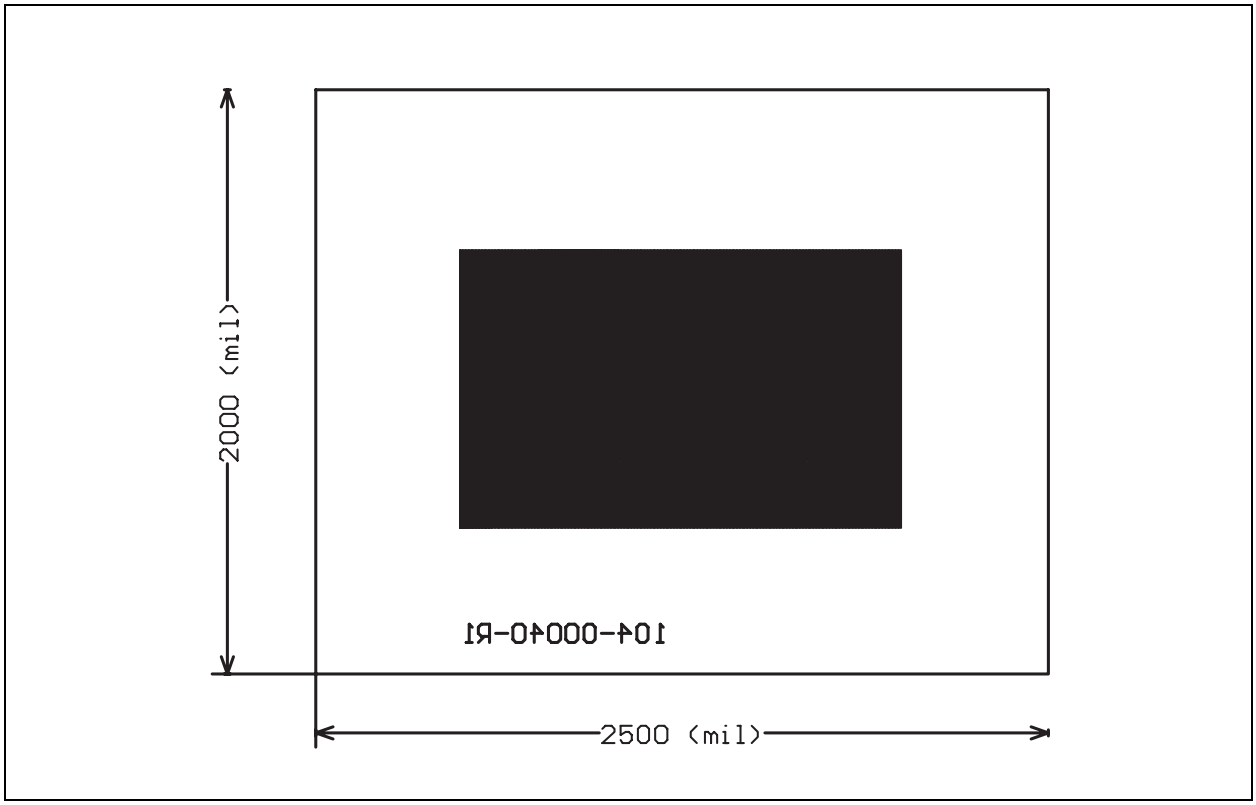
A.3 BOARD - ASSEMBLY DRAWING



A.4 BOARD - TOP LAYER



A.5 BOARD - BOTTOM LAYER



Appendix B. Bill-Of-Materials (BOM)

TABLE B-1: BILL-OF-MATERIALS (BOM)

Qty	Reference Designator	Description	Manufacturer	Part Number
2	C1, C2	4.7 uF, X5R Ceramic, 16V, 0805	Panasonic®	ECJ-2FB1C475K
1	C3	0.1 uF, X7R Ceramic, 16V, 0805	Panasonic	ECJ-2VB1C104K
1	D1	Green LED, 0805	Lumex®	SML-LXT0805GW
7	J1 - J7	Surface Mount Test Point, 5016	Keystone Electrionics®	5016
0	R1, R3	Do Not Populate, 0805	—	—
1	R2	0 ohm Jumper, 0805	Panasonic	ERJ-6GEY0R00V
2	R4, R5	100 kΩ, 1/10W, Chip Resistor, 0805	Panasonic	ERJ-6ENF1003V
1	U1	USB Compatible Charge Controller, 3X3DFN10	Microchip Technology Inc.	MCP73855-I/MF

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Fax: 765-864-8387

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Fax: 949-462-9608

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Fax: 650-961-0286

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Fax: 905-673-6509

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Fax: 61-2-9868-6755

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Fax: 86-10-8528-2104

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Fax: 86-28-8676-6599

China - Fuzhou
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Fax: 852-2401-3431

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Fax: 86-24-2334-2393

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Fax: 86-755-8203-1760

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82-2-558-5934

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Fax: 43-7242-2244-393

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Fax: 45-4485-2829

France - Massy
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Fax: 33-1-69-30-90-79

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