

MCP2200 Breakout Module User's Guide

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MCP2200 BREAKOUT MODULE USER'S GUIDE

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Derek Carlson
VP Development Tools

07-Dec-11
Date

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 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 MCP2200 Breakout Module. 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 MCP2200 Breakout Module board. The manual layout is as follows:

- **Chapter 1. "Product Overview"** – Important information about the MCP2200 Breakout Module
- **Chapter 2. "Installation and Operation"** – Covers the initial set-up of this board, required tools and board operation
- **Appendix A. "Schematic and Layouts"** – Shows the schematic and board layouts for the MCP2200 Breakout Module
- **Appendix B. "Bill of Materials (BOM)"** – Lists the parts used to populate the MCP2200 Breakout Module

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
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	*`file`*`.o`, where *`file`* can be any valid filename
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) { ... }`

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RECOMMENDED READING

This user's guide describes how to use the MCP2200 Breakout Module. Another useful document is listed below. The following Microchip document is available and recommended as a supplemental reference resource.

- **MCP2200 Data Sheet - *"USB 2.0 to UART Protocol Converter with GPIO"* (DS22228)**

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
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- Field Application Engineer (FAE)
- Technical Support

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Technical support is available through the web site at:
http://www.microchip.com/support.

DOCUMENT REVISION HISTORY

Revision A (May 2012)

- Initial Release of this Document.

NOTES:

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Chapter 1. Product Overview

1.1 INTRODUCTION

This chapter provides an overview of the MCP2200 Breakout Module and covers the following topics:

- What Is the MCP2200 Breakout Module?
- What the MCP2200 Breakout Module Kit Contains

1.2 WHAT IS THE MCP2200 BREAKOUT MODULE?

The MCP2200 Breakout Module is a development and evaluation platform for the USB-to-UART (Universal Serial Bus-to-Universal Asynchronous Receiver/Transmitter) serial converter MCP2200 device. The module is comprised of a single Dual In-Line Package (DIP) form-factor board.

The MCP2200 Breakout Module has the following features:

- UART Tx and Rx signals
- UART RTS and CTS signals
- 8 General Purpose (GP) lines - configurable for GPIO or dedicated function operation
- User selectable power supply of 3.3V or 5V (up to 500 mA) by using a jumper
- DIP form-factor (0.6 inches overall row spacing between pins)
- PICkit™ Serial Analyzer header – used for UART communication only

A Windows®-based PC software was created to help with the evaluation/demonstration of the MCP2200 device as a USB-to-UART protocol converter. It allows I/O control and custom device configuration. The software is downloadable from the board web page on www.microchip.com.

1.3 WHAT THE MCP2200 BREAKOUT MODULE KIT CONTAINS

The MCP2200 Breakout Module kit includes:

- MCP2200 Breakout Module (ADM00393)
- Mini-USB cable
- Important Information Sheet

NOTES:

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Chapter 2. Installation and Operation

2.1 INTRODUCTION

The MCP2200 Breakout Module is designed to demonstrate the device as an USB-to-UART protocol converter solution.

The module is comprised of a single board and has the following features:

- Small plug-in board with DIP form factor (0.6 inches overall row spacing between pins)
- Mini-USB connector
- Access to the UART signals (Tx, Rx, RTS and CTS) and all GP signals
- PICkit™ Serial Analyzer compatible header
- 3.3 or 5V jumper selectable V_{DD}; the breakout board can be used to supply up to 100 mA to the rest of the system. The board already provides a signal trace between the V_{DD} and the 3.3V rail. For systems requiring a 5V V_{DD} power supply, the V_{DD} header must be mounted on the board. A jumper will close the middle pin and the 5V pin.

2.2 BOARD SETUP

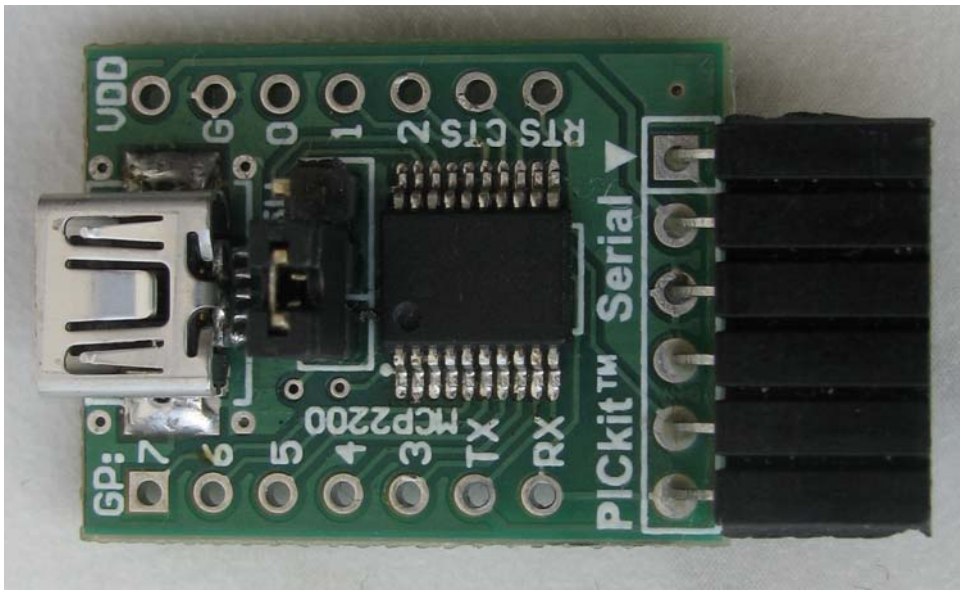
Follow these steps to set up the MCP2200 Breakout Module:

1. Download the support material (PC applications and DLL libraries) that can be found on the board's web page, on the Microchip web site.
2. Attach the MCP2200 Breakout Module to the system that requires the USB-to-UART conversion, using a DIP adapter or the PICkit™ Serial Analyzer header.
3. Plug the MCP2200 Breakout Module to a PC via a USB cable.
4. In the dialog window that appears, browse for `MCP2200.inf` to install the driver.

The board is now set up for operation.Optional steps include the following:

5. Install the downloaded PC software.
6. Start the demo application developed for the board, or a hyperterminal-like application, in order to get access to the virtual COM port created by the PC for the MCP2200 device.

FIGURE 2-1: BREAKOUT BOARD LAYOUT



2.3 BOARD OPERATION

The MCP2200 device is detected by a Windows®-based PC host as a composite device. The accompanying software can be used to exercise the board's features and also provides a reference point for users that want to design their own applications based on the MCP2200 device.

2.3.1 MCP2200 Breakout Module Operation

The MCP2200 Breakout Module can be used with a UART-based system. The breakout board eases the USB support addition.

The board has the following features:

- UART signals (Tx, Rx, RTS and CTS)
- 8 GP signals that can be configured for:
  - GPIO functionality (digital input or output pins)
  - Dedicated function pins (signaling import system states, such as USB Configured, USB Suspend)
- Jumper selectable power supply: 3.3 or 5V (up to 500 mA)
- PICkit™ Serial Analyzer header - the board can be directly plugged into systems that have this type of header. The MCP2200 Breakout Module provides the UART-to-USB access.
- DIP form-factor (0.6 inches overall row spacing between pins)

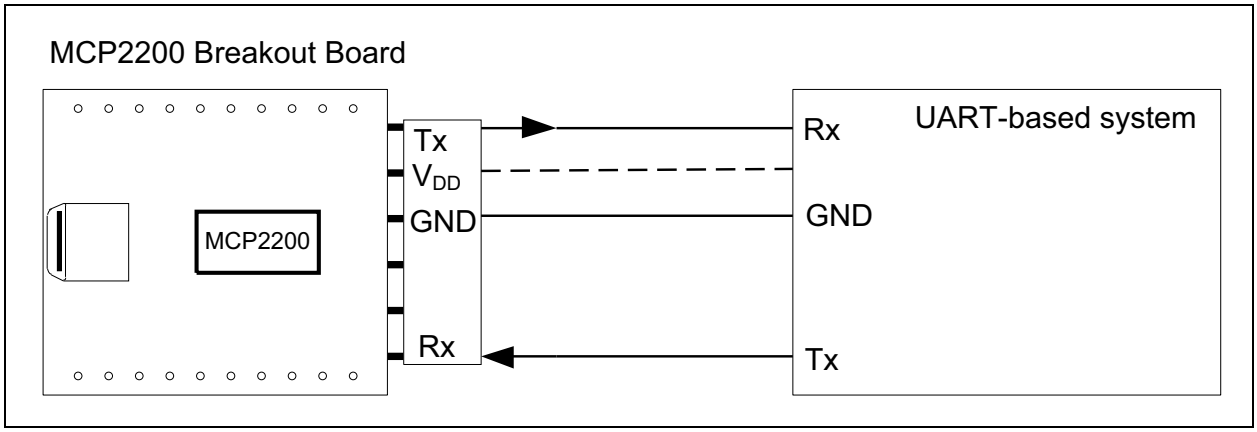
By using the provided software and libraries, the user can create personalized PC applications, using the breakout board as an USB-to-UART protocol converter.

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2.4 MCP2200 TYPICAL USAGE SCENARIOS

MCP2200 can be used in systems where a UART bus is available. The MCP2200 enables the USB connection to a UART-based system.

FIGURE 2-2: MCP2200 TYPICAL USAGE DIAGRAM



NOTES:

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Appendix A. Schematic and Layouts

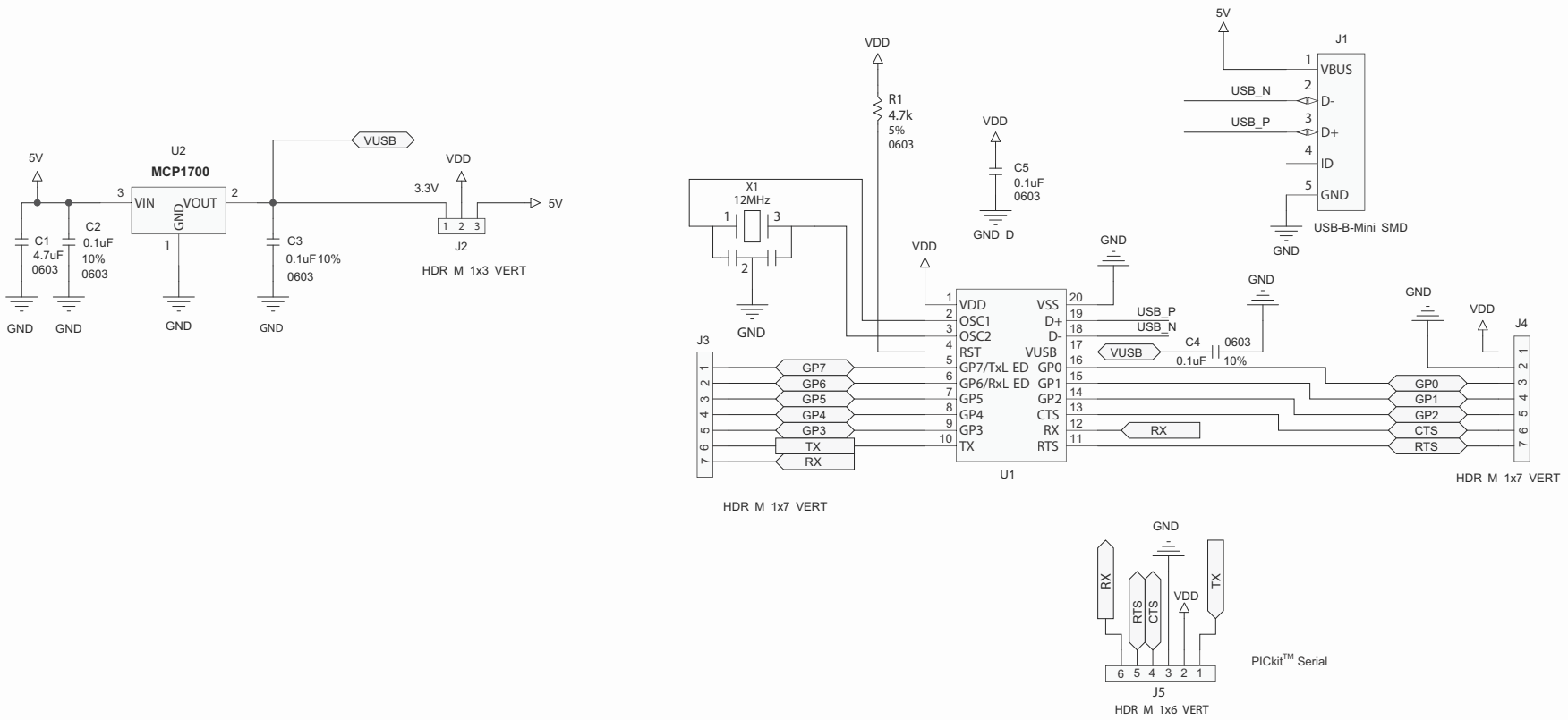
A.1 INTRODUCTION

This appendix contains the following schematics and layouts for the MCP2200 Breakout Module:

- Board – Schematic
- Board – Top Silk
- Board – Top Silk and Pads
- Board – Top Copper
- Board – Bottom Silk
- Board – Bottom Silk and Pads
- Board – Bottom Copper

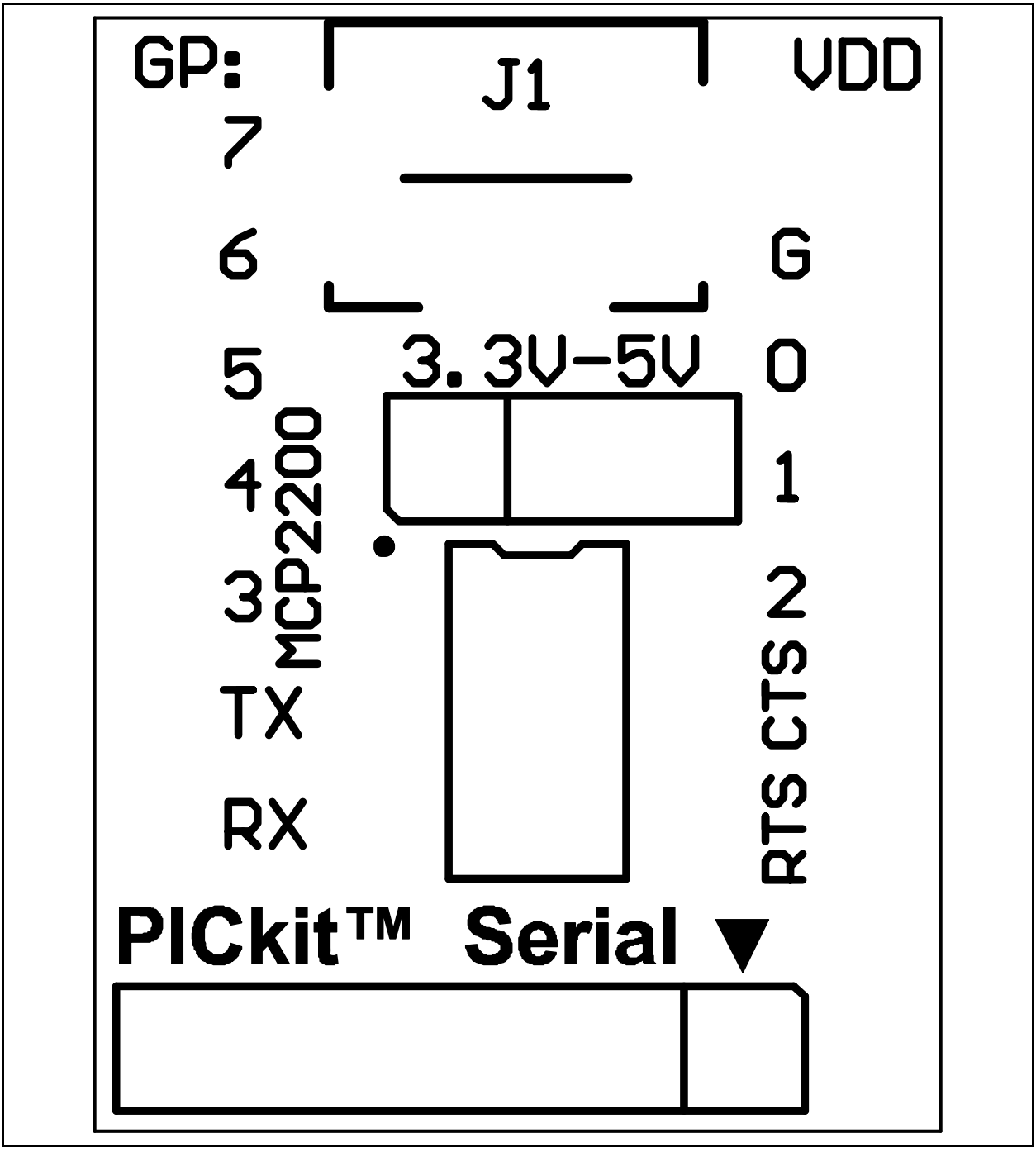
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A.2 BOARD – SCHEMATIC

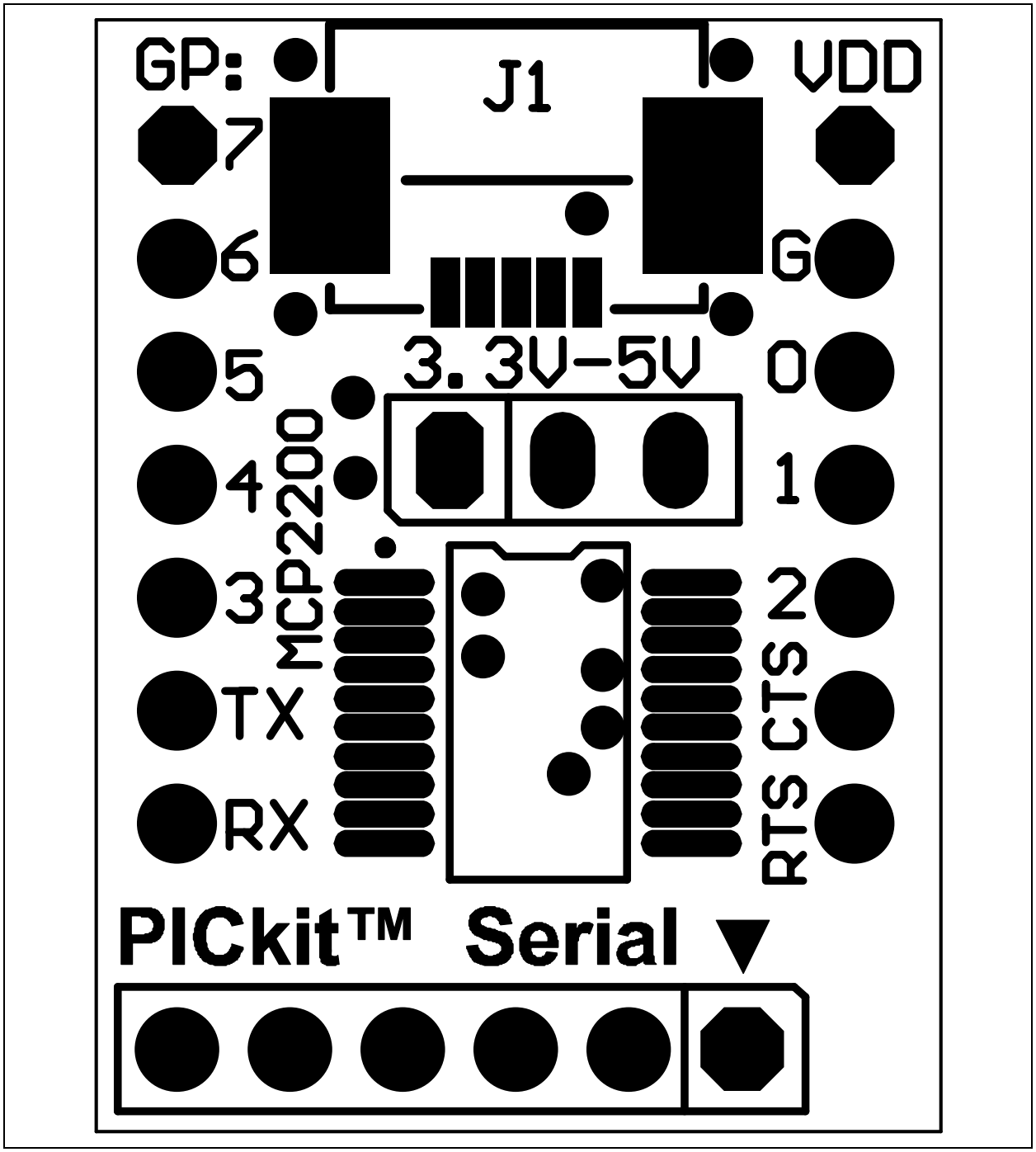


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A.3 BOARD – TOP SILK

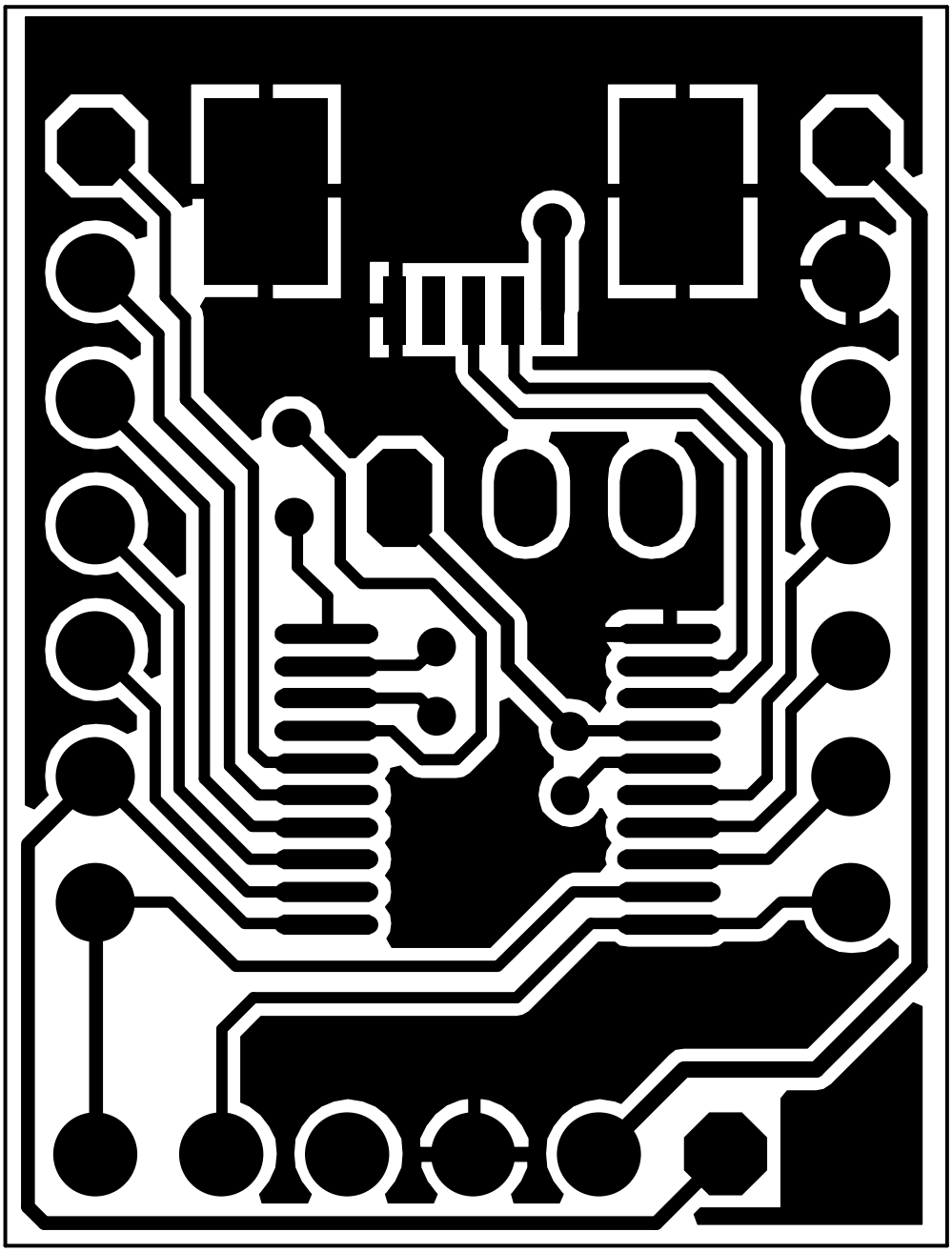


A.4 BOARD – TOP SILK AND PADS

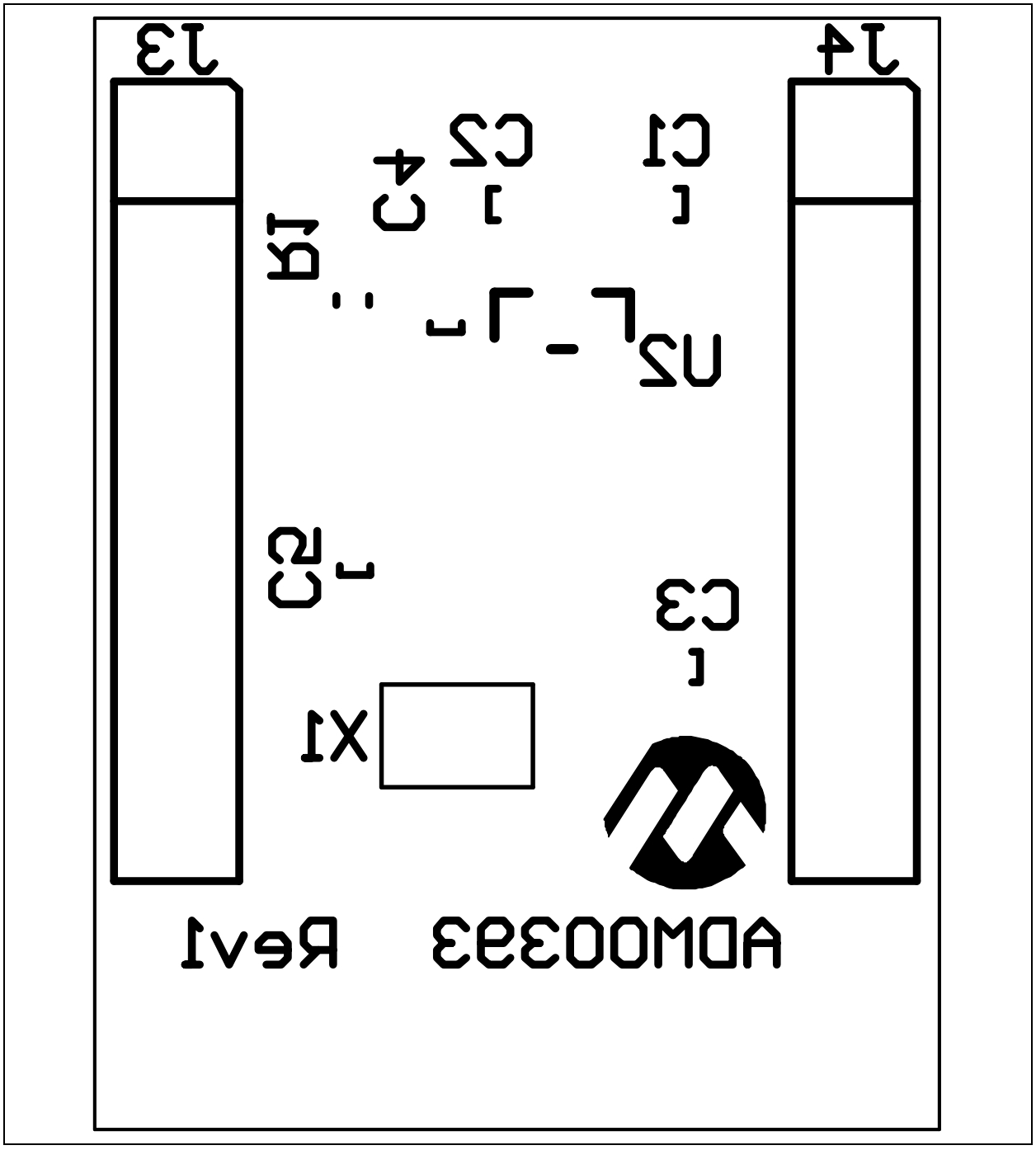


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A.5 BOARD – TOP COPPER

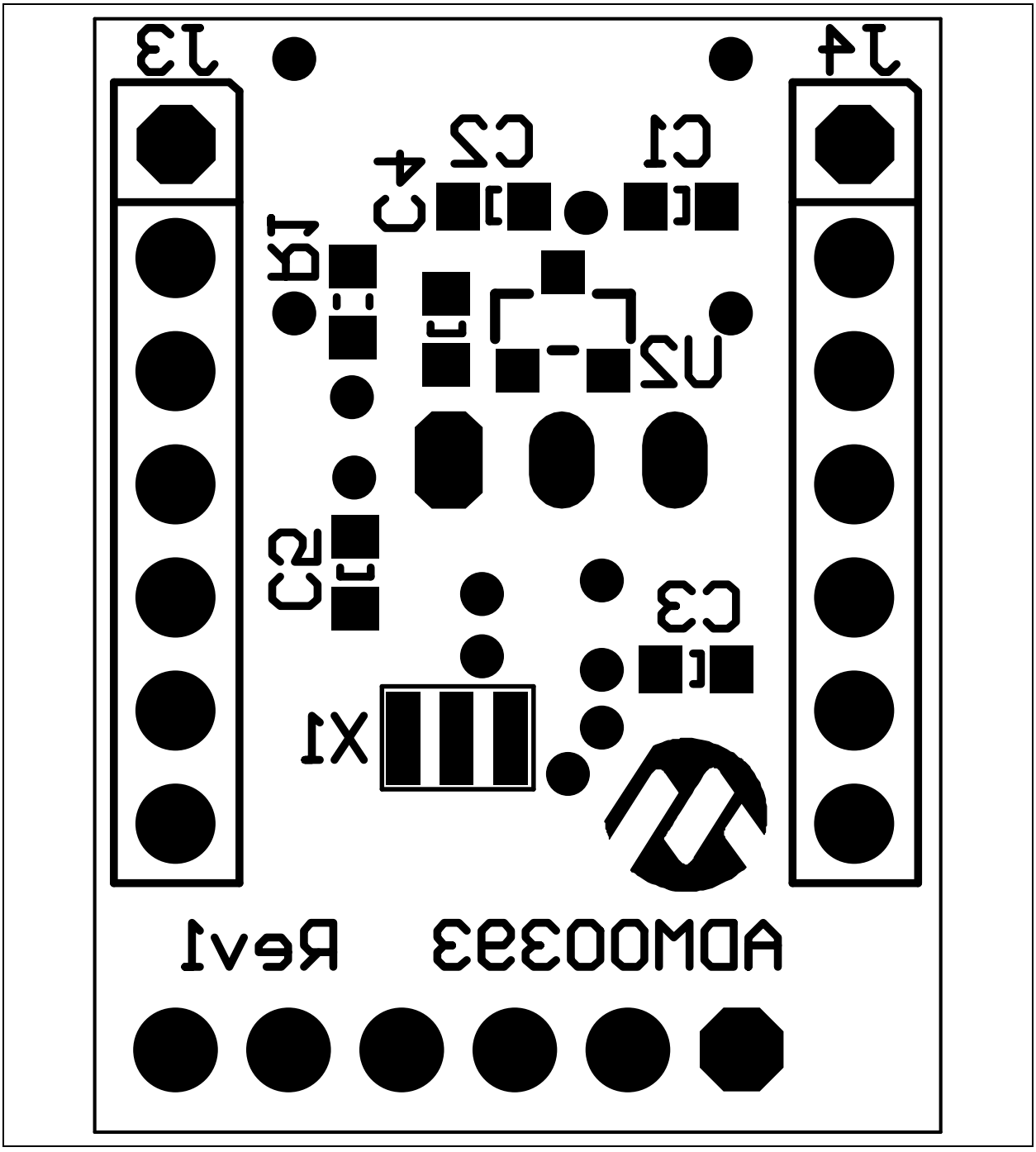


A.6 BOARD – BOTTOM SILK

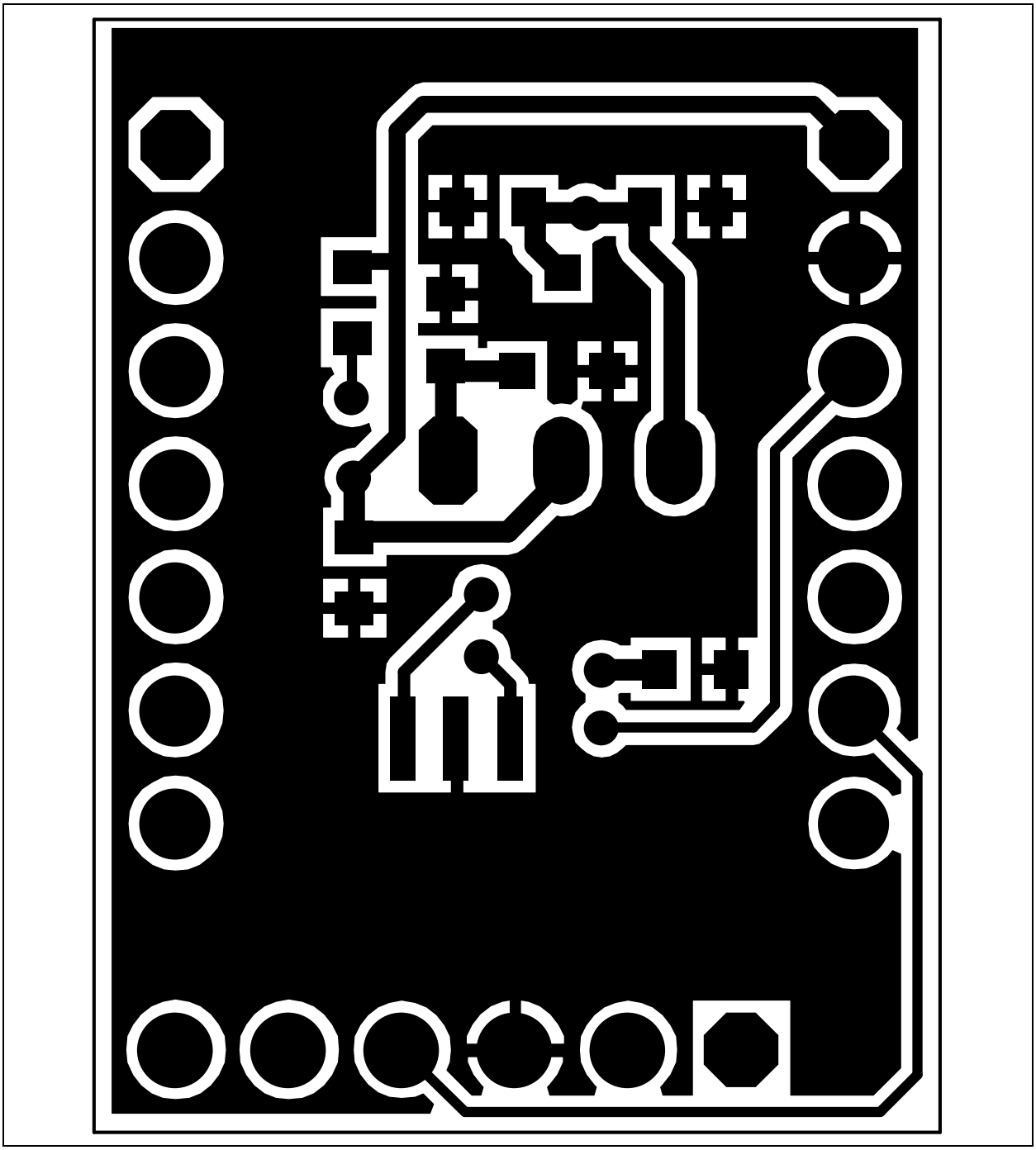


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A.7 BOARD – BOTTOM SILK AND PADS



A.8 BOARD – BOTTOM COPPER



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Appendix B. Bill of Materials (BOM)

TABLE B-1: BILL OF MATERIALS

Qty.	Designator	Description	Manufacturer	Part Number
1	C1	Cap. Ceramic 4.7uF 6.3V 10% X5R 0603	TDK Corporation	C1608X5R0J475K
3	C2, C3, C4	Cap. Ceramic 1UF 10% 16V X7R 0603	AVX Corporation	0603YC104KAT2A
1	C5	Cap. Ceramic 0.1uF 16V 10% X7R 0603	TDK Corporation	C1608X7R1C104K
1	J1	Conn. Rcpt. USB Mini B R/A SMD	Hirose Electric Co., Ltd.	UX60SC-MB-5ST(80)
1	J2	Conn. Hdr. Male .100 1x3 POS Vert.	TE Connectivity	HDR M 1x3 Vertical
2	J3, J4	**DO NOT POPULATE** Conn. Hdr. Male .100 1x7 POS Vert.	TE Connectivity	HDR M 1x7 Vertical
1	J5	**DO NOT POPULATE** Conn. Hdr. Male .100 1x6 POS Vert.	TE Connectivity	HDR M 1x6 Vertical
1	JP1	Conn. Jumper with Handle 2 POS .100" 30 GOLD	TE Connectivity	881545-2
1	PCB	MCP2200 Breakout Module Printed Circuit Board	—	104-00393
1	R1	Res. 4.7k Ohm 1/10W 5% 0603 SMD	Panasonic® - ECG	ERJ-3GEYJ472V
1	U1	IC USB-to-UART SSOP-20	Microchip Technology Inc.	**MCP2200-I/SS**
1	U2	IC Reg. LDO 3.3V 250 mA SOT-23-3	Microchip Technology Inc.	**MCP1700T-3302E/TT**
1	X1	Ceramic Resonator 12.0 MHz SMD	Murata Electronics®	CSTCE12M0G55-R0

Note 1: The components listed in this Bill of Materials are representative of the PCB assembly. The released BOM used in manufacturing uses all RoHS-compliant components.

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