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**EVB-USB5926
Evaluation Kit
User's Guide**

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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 “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 EVB-USB5926 Evaluation Kit User's Guide. Items discussed in this chapter include:

- [Document Layout](#)
- [Conventions Used In This Guide](#)
- [Warranty Registration](#)
- [The Microchip Web Site](#)
- [Development Systems Customer Change Notification Service](#)
- [Customer Support](#)
- [Document Revision History](#)

DOCUMENT LAYOUT

This document describes how to use the EVB-USB5926 Evaluation Kit as a demonstration platform optimized for portable applications. The manual layout is as follows:

- **Chapter 1. “Overview”** – This chapter shows a brief description of the EVB-USB5926 Evaluation Kit.
- **Chapter 2. “Getting Started”** – This chapter provides information about setup and operation of the EVB-USB5926 Evaluation Kit.
- **Chapter 3. “Hardware Configuration”** – This chapter includes information about the hardware configuration of the EVB-USB5926 Evaluation Kit.
- **Appendix A. “Schematics”**– This appendix shows the EVB-USB5926 Evaluation Kit schematics.
- **Appendix B. “Bill of Materials”** – This appendix shows the EVB-USB5926 Evaluation Kit Bill of Materials.
- **Appendix C. “PCB Silk Screens”** – This appendix shows the EVB-USB5926 Evaluation Kit silk screens.

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) { ... }

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- **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 non-production development programmers such as PICSTART[®] Plus and PICKit 2 and 3.

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- Technical Support

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Technical support is available through the website at:

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

DOCUMENT REVISION HISTORY

Revisions	Section/Figure/Entry	Correction
DS50002536D (07-25-22)	Appendix C	Replaced silk screen images
DS50002536C (07-13-22)	Section 2.1 Contents of the Kit	Removed "12V Power Supply"
	2.2.1 Quick Start	Updated Step 1.
	All	Updated style and formatting
DS50002536B (02-08-17)	Section 1.4 References	Updated
	Figure 3-1	Updated figure
	All	Updated style and formatting
DS50002536A (09-23-16)	Initial release	

Chapter 1. Overview

1.1 EVB-USB5926 EVALUATION KIT OVERVIEW

The EVB-USB5926 is a demonstration and evaluation platform that provides the necessary requirements and interface options for evaluating the USB5926, a 6-Port SS/HS USB Smart Hub on a 6-layer RoHS-compliant Printed Circuit Board (PCB). This will allow the user to gain an understanding of the product and accelerate the integration of the USB5926 into the user's design. The EVB-USB5926 is compliant with the USB 3.2 (Gen1) Specification and supports SuperSpeed (SS), High-Speed (HS), Full-Speed (FS), and Low-Speed (LS) USB signaling for complete coverage of all defined USB operation speeds. The evaluation platform supports six downstream ports, two USB Type-C™ USB 3.2 Gen 1 ports, two standard A USB 3.2 Gen 1 ports, and two standard A USB 2.0 ports. The EVB-USB5926 platform also supports battery charging on all six ports (maximum of 13A* at any one time). The EVB-USB5926 is configured for operation through internal default settings and supports custom configurations through SMBus or through the external 16-Mbit SPI Flash device. The EVB-USB5926 demonstrates driver compatibility with Microsoft® Windows® 8.x, Windows 7, Windows XP, Mac OS® X 10.4+, and Linux® hub drivers.

See [Section 1.2 “Features”](#) for more information.

Note: *Requires a 12V, 85W supply.

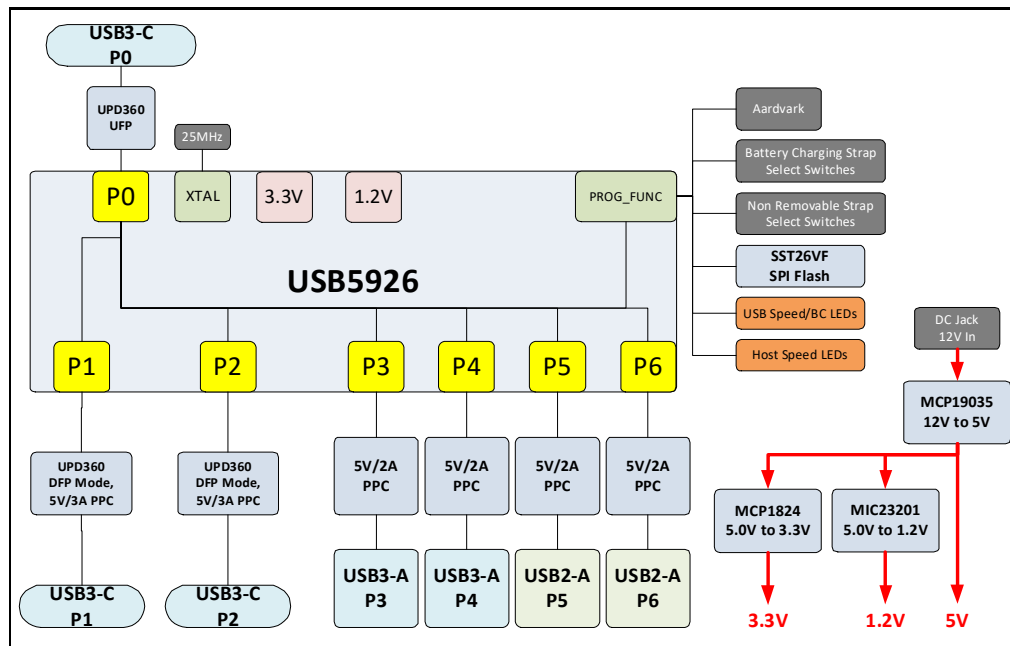
1.2 FEATURES

- Microchip's PortSwap, PHYBoost™, and VariSense™ technologies
- Native USB Type-C Support
- USB5926 in a 100-pin QFN RoHS compliant package
- USB 3.2 Gen 1 compliant (SS, HS, FS, and LS operation)
- USB pins are 5V tolerant.
- Self-powered operation
- USB Type-C USB 2.0/USB 3.2 Gen1 upstream port
- Six Downstream USB ports:
 - Two Type-C USB 2.0/USB 3.2 Gen 1 downstream ports
 - Two Type-A USB 2.0/USB 3.2 Gen 1 downstream ports
 - Two Type-A USB 2.0-Only downstream ports
- All downstream ports support individual port power and overcurrent sense.
- All downstream ports can be enabled for battery charging with the battery charging select switch SW1. (BC1.2 or SE1, 2.1A maximum per port)
- Onboard SPI Flash for external downloadable firmware
- Operates from a single voltage (+12.0V, regulated) external power supply
- Onboard 25 MHz crystal or external clock input
- Single onboard +5.2V, 6 Amp regulator. MCP19035-based switching regulator design provides 5.2V at up to 15A when using a 12V, 85W supply.
- Single onboard +3.3V, 0.5 Amp regulator
- Single onboard +1.2V, 2 Amp regulator

- Port Power LED indicators
- SPI Flash activity blue LED indicator
- Reset red LED indicator
- Green LED indicators for 5V, 3.3V, 1.2V supplies
- Dual color LED USB Suspend indicator (green=run/yellow=suspend)
- USB Type-C upstream green LED charging capability indicators: 3A, 1.5A, Legacy
- SMBus current monitor on each USB Type-C downstream port
- Terminal block connector for use with an external bench supply
- Removable/non-removable downstream ports can be configured with switch SW2.

1.3 BLOCK DIAGRAM

FIGURE 1-1: EVB-USB5926 BLOCK DIAGRAM



1.4 REFERENCES

Concepts and materials available in the following documents may be helpful when reading this document. Visit www.microchip.com for the latest documentation.

- *USB5926 Data Sheet*
- USB-IF, Universal Serial Bus 3.1 Specification
- USB-IF, Battery Charging Specification
- USB-IF, Type-C Cable and Connector Specification

1.5 DEFINITIONS

TABLE 1-1: ACRONYMS AND DEFINITIONS

Acronym	Definition
BC1.2	The latest USB-IF specified USB battery charging standard
CDP	Charging Downstream Port, a BC1.2-compliant port allows simultaneous USB data and USB charging
DCP	Dedicated Charging Port, a BC1.2-compliant port which is only capable of USB charging (no data)
DFP	Downstream Facing Port
EVB	Evaluation Board
OTP	One-Time-Programmable Memory
SDP	Standard Downstream Port, a standard USB port with no high-current battery charging capabilities
SE1	Type of Battery Charging (non-USB compliant) that sets the USB D+/D- to specific DC voltages to communicate charging capability
Type-C	Reversible USB Connector
USB-IF	USB Integrators Forum, a collection of corporate sponsored members responsible for developing USB specifications
Gen1	USB Specification 3.2 Gen1

NOTES:

Chapter 2. Getting Started

2.1 CONTENTS OF THE KIT

The EVB-USB5926 evaluation kit includes the EVB-USB5926 Evaluation Board.

2.2 GETTING STARTED

The Microchip EVB-USB5926 is designed for flexible configuration solutions. It can be configured via default internal register settings, downloadable external firmware to an onboard SPI Flash, through SMBus, or through the onboard configuration switches.

Microchip provides a comprehensive software programming tool, ProTouch2, for configuring USB5926 functions, registers, and OTP memory. When configured with the default internal register settings, the device operates as a USB 3.2 Gen 1/USB 2.0 hub with 6 USB ports and Microchip's standard VID/PID/DID settings. For additional information on the Pro-Touch2 programming tool, refer to Software Libraries within Microchip USB5926 product page at www.microchip.com/USB5926.

2.2.1 Quick Start

To quickly start using the board, perform the following steps:

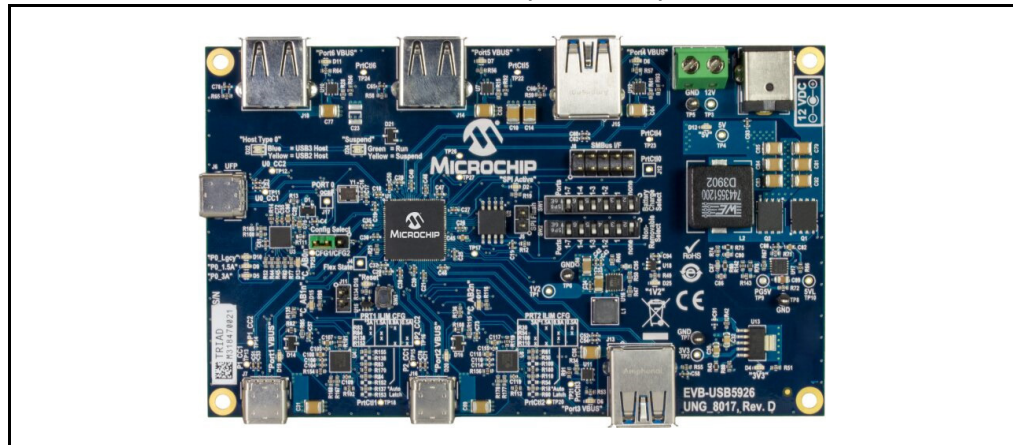
1. Connect a 12V power supply to barrel connector on the EVB-USB5926 (**J10**) or a Bench Power Supply to J9 – 2 position terminal block.
2. Using a USB Type-C Cable or USB Type-A Male to Type-C cable, connect the EVB-USB5926 to a USB host via the upstream “Port 0” USB Type-C Connector (**J6**).
3. You may now connect devices to any of the downstream ports to enumerate and use that device with the USB host.
4. You can perform additional configuration or evaluate specific features by launching the ProTouch2 software on your USB host or by manipulating the included hardware configuration options detailed in the next section.

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Chapter 3. Hardware Configuration

3.1 HARDWARE CONFIGURATION OPTIONS

FIGURE 3-1: EVB-USB5926 REV D (TOP-SIDE)



3.1.1 Configuration

3.1.1.1 EXTERNAL SPI FLASH

Upon power-up, the USB5926 first looks for an external SPI ROM device and a valid signature in the Flash. If one is found, the external ROM is enabled and code execution is initiated from the external SPI ROM device.

To select the SPI device, install a shunt to short **J5**. When code is executing from a SPI ROM device, a blue LED (**D2**) will illuminate.

Note 1: CFG_BC and CFG_Non-Rem options are deselected when a shunt is installed on **J5**. When operating SPI mode, all configuration is handled by the code executing from the SPI ROM device.

2: If the SPI Flash is not properly programmed or has an invalid signature, the USB5926 will revert to internal defaults even if the SPI ROM is selected.

3.1.1.2 SMBUS

If an SPI Flash device is not found, the firmware checks if SMBus is enabled.

To select SMBus configuration, leave **J5** open to disconnect the SPI ROM and select CONFIG2 option from the CFG_STRAP header by shunting pins 1-2 of **J1**. The SMBus signals may be accessed at **J8**, pins 1 and 3.

Remember, if configured for SMBus operation, the USB5926 will wait indefinitely for data from the SMBus interface and will not enumerate to the USB host until the special USB Attach command is sent.

3.1.1.3 INTERNAL DEFAULT CONFIGURATIONS WITH STRAPPING OPTIONS

When the USB5926 does not detect a valid SPI Flash image or SMBus configuration upon power-up, the USB5926 uses internal default register settings. It also sets the Vendor ID, Product ID, Language ID, and Device ID, and additional settings from internal ROM code.

If configuration is not done through SPI or SMBus, additional configuration is available through three functions: CFG_STRAP, CFG_BC_EN, and CFG_NON-REM. The controls are configured by selecting one of six resistor values for each pin. These straps are read by the USB5926 device at power-on to determine the default configuration of the device.

To select the configuration mode, a shunt must be installed to short 2 pins of the **J1** header. See [Table 3-1](#).

TABLE 3-1: CFG_SEL (J1) OPTIONS

Shunt Position	Configuration
Pins 1-2	CFG2 - Speed Indicator Mode + SMBus Slave mode
Pins 2-3	CFG1 - Speed Indicator Mode + I ² C Bridging mode [Default]

To use the battery charging and non-removable port strapping options, leave **J5** open. Select the desired CFG_BC_EN and CFG_NON-REM options by enabling only one position for each of the CFG_BC_EN Select and CFG_NON-REM Select switches (**SW1** and **SW2**). See [Table 3-2](#) and [Table 3-3](#).

TABLE 3-2: BATTERY CHARGING OPTIONS (CFG_BC_EN - SW1)

Switch Position	Configuration
1	No battery charging enabled
2	Port 1 is BC1.2 enabled.
3	Ports 1 and 2 are BC1.2 enabled.
4	Ports 1 to 3 are BC1.2 enabled.
5	Ports 1 to 4 are BC1.2 enabled.
6	All ports are BC1.2 enabled [Default].

TABLE 3-3: NON-REMOVABLE PORT OPTIONS (CFG_NON-REM - SW2)

Switch Position	Configuration
1	All ports are removable [Default].
2	Port 1 is non-removable.
3	Ports 1 and 2 are non-removable.
4	Ports 1 to 3 are non-removable.
5	Ports 1 to 4 are non-removable.
6	All ports are non-removable.

3.1.2 Power Source – Self Powered

The EVB-USB5926 only supports self-powered operation and is powered through one +12.0V regulated 'wall wart' external power supply. The power supply plugs into the 2.5 mm connector J9 on the board. Alternatively, an external voltage can be supplied to the screw terminal TERM_BLOCK_2P (J9) or test point TP3. The +12.0V feeds a 15A regulator which outputs +5.2V across the board. This +5.2V output supplies the +3.3V and +1.2V onboard regulators.

Note: The supplied 12.0V external power supply cannot support simultaneous battery charging on all downstream ports. Use a higher power supply if the required test use case exceeds the power capability of the supply. Failure to heed to this warning could result in damage to the 12.0V external power supply.

3.1.3 Downstream Port Power Control

USB power to the six downstream ports is controlled via port power controllers with auto-discharge function.

The two downstream Type-C ports are capable of up to 3A of USB Type-C battery charging. Downstream Port 1 is configured for 3A charging by default, while downstream Port 2 is configured for 1.5A charging by default.

The four downstream USB Type-A ports are capable of up to 2.1A of USB battery charging.

3.1.4 USB Type-C® Ports

The USB5926 has two USB 3.2 Gen 1 PHYs for each Type-C port. This eliminates the need for an external multiplexer. The USB5926 only needs to be signaled when and in what orientation a USB Type-C attach has been made. It will power-on only the USB 3.2 Gen 1 PHY needed for USB communication. To reduce power, the USB5926 powers down unused USB 3.2 Gen 1 PHYs. In the case where no USB Type-C attach is detected, both USB 3.2 Gen 1 PHYs associated with that port are powered down.

The USB Type-C® ports utilize the Microchip UPD360 Type-C port controller in order to detect USB Type-C attachment and plug orientation. The UPD360 monitors the voltage on the USB Type-C CC wires in order to detect USB Type-C attach events.

The upstream UPD360 device also detects the USB Type-C charging capability of the USB host via LEDs (D5, D9, and D10).

The downstream Port 1 UPD360 is configured for 3A operation by default. The downstream Port 2 UPD360 is configured for 1.5A operation by default. The UPD360 mode of operation can be modified by changing the PWR_CAP[1:0] resistor population options.

3.1.5 LED Indicators on EVB-USB5926

Table 3-4 describes the LED indicators included on the EVB-USB5926.

TABLE 3-4: LED INDICATOR DESCRIPTIONS

REF. DES.	LABEL	DESCRIPTION
D2	"SPI Active"	Indicates that the SPI ROM is being accessed (connects to the Chip Enable pin)
D4	"3V3"	Indicates that the output of the 3.3V regulator is operational
D5	"P0_3A"	Indicates that the upstream port has detected a 3.0A USB-C™ charging capability
D6	"Port3 VBUS"	Illuminates when 5V to downstream Port 3 VBUS is present
D7	"Port5 VBUS"	Illuminates when 5V to downstream Port 5 VBUS is present
D8	"Port4 VBUS"	Illuminates when 5V to downstream Port 4 VBUS is present
D9	"P0_1.5A"	Indicates that the upstream port has detected a 1.5A USB-C charging capability
D10	"P0_Lgcy"	Indicates that the upstream port has detected a Legacy 500 mA/900 mA USB-C charging capability
D11	"Port6 VBUS"	Illuminates when 5V to downstream Port 6 VBUS is present
D12	"5V"	Indicates that the output of the 5.2V regulator is operational
D13	"C_AB0n"	Indicates the upstream Port 0 USB-C plug orientation LED OFF = A side active (or no connection detected) LED ON = B side active
D15	"C_AB1n"	Indicates the downstream Port 1 USB-C plug orientation LED OFF = A side active (or no connection detected) LED ON = B side active
D17	"C_AB2n"	Indicates the downstream Port 2 USB-C plug orientation LED OFF = A side active (or no connection detected) LED ON = B side active
D18	"Reset"	Illuminates when the USB5926 hub is being reset via the RESET_N pin (SW3 button press)
D19	"Port1 VBUS"	Illuminates when 5V to downstream Port 1 VBUS is present
D20	"Port2 VBUS"	Illuminates when 5V to downstream Port 2 VBUS is present
D22	"Host Type 0"	Indicates the connection speed of the upstream port when the hub is not flexed: - Off: No Connection - Blue: USB3 - Yellow: USB2
D24	"Suspend"	Indicates the state of the hub: - Off: Unconfigured - Green: Normal Operation (Running) - Yellow: Suspended
D25	"1V2"	Indicates that the output of the 1.2V regulator is operational

3.1.6 Switches on EVB-USB5926

Table 3-5 describes the switches included in the EVB-USB5926.

TABLE 3-5: SWITCH DESCRIPTIONS

REF. DES.	LABEL	DESCRIPTION
SW1	Battery Charging Select	Six-position SIP SPST switch. Selects one of the 6 battery charging strapping options. [Default = all ports battery charging enabled]
SW2	Non-Removable Select	Six-position SIP SPST switch. Selects one of the 6 non-removable port strapping options. [Default = all ports non-removable]
SW3	External Reset	Momentary Push-button switch to reset hub.

3.1.7 Connector Descriptions for EVB-USB5926

Table 3-6 describes the connectors included in the PCB.

TABLE 3-6: EVB-USB5926 CONNECTOR DESCRIPTIONS

REF. DES.	TYPE	LABEL	DESCRIPTION
J1	1x3 Header	CONFIG Select	Selects the configuration mode. A shunt must be installed between 2 pins. [1-2] – CONFIG2 mode [2-3] – CONFIG1 mode No Shunt – Not Allowed
J4	1-Pin Header	—	Test Point for FLEX_STATE (pin 22) of hub IC
J5	1x2 Header	—	Install a shunt to connect the SPI ROM to the hub
J6	USB 3.2 Type-C Connector	Port 0	Upstream USB connection (to USB host)
J7	USB 3.2 Type-C Connector	Port 1	Downstream Port 1 USB connection
J8	2x5 Header	Aardvark	SMBus connection compatible with Aardvark I2C/SPI Host Device
J9	2-pin Terminal Block	12V	Connection point for using lab bench 12V power supply to power board
J10	BC Barrel Jack	12V	Connection point for DC 12V power supply
J11	1x2 Header	External Reset	Install a shunt to permanently hold hub in the Reset state
J12	1-Pin Header	—	Test Point for GPIO69 (pin 69) of hub IC
J13	USB3 Type-A Connector	PORT3	Downstream Port 3 USB connection
J14	USB3 Type-A Connector	PORT5	Downstream Port 5 USB connection
J15	USB3 Type-A Connector	PORT4	Downstream Port 4 USB connection

TABLE 3-6: EVB-USB5926 CONNECTOR DESCRIPTIONS

REF. DES.	TYPE	LABEL	DESCRIPTION
J16	USB 3.2 Type-C Connector	Port 2	Downstream Port 2 USB connection
J17	1-Pin Header	—	Test Point for OCS_COMP1 of upstream UPD360
J18	USB3 Type-A Connector	PORT7	Downstream Port 7 USB connection

3.1.8 Test Points on EVB-USB5926

Table 3-7 describes the test points included in the EVB-USB5926. A header may be permanently installed on the through-hole test points if needed.

TABLE 3-7: EVB-USB5926 TEST POINT DESCRIPTIONS

REF. DES.	TYPE	DESCRIPTION
TP1	Test Loop (Yellow)	1.2V regulator probe point
TP2	Test Loop (Orange)	3.3V regulator probe point
TP3	Test Loop (Red)	12V input probe point
TP4	Test Loop (Red)	5V regulator probe point
TP5	Test Loop (Black)	Ground probe point
TP6	Test Loop (Black)	Ground probe point
TP7	Test Loop (Black)	Ground probe point
TP8	Test Loop (Black)	Ground probe point
TP9	Test Loop (Blue)	5.2V Switcher probe point for PWRGD pin (pin 6)
TP10	Test Loop (Red)	5.2V Switcher probe point for +VCC pin (pin 5)
TP11	Test Pad	Port 0 CC1 signal probe point
TP12	Test Pad	Port 0 CC2 signal probe point
TP13	Test Pad	Port 1 CC1 signal probe point
TP14	Test Pad	Port 1 CC2 signal probe point
TP15	Test Pad	Port 2 CC1 signal probe point
TP16	Test Pad	Port 2 CC2 signal probe point
TP17	Test Pad	USB5926 pin 55 signal probe point
TP18	Test Pad	PRTCTL1 (from hub) signal probe point
TP20	Test Pad	PRTCTL2 (from hub) signal probe point
TP21	Test Pad	PRTCTL3 (from hub) signal probe point
TP22	Test Pad	PRTCTL5 (from hub) signal probe point
TP23	Test Pad	PRTCTL4 (from hub) signal probe point
TP24	Test Pad	PRTCTL6 (from hub) signal probe point
TP25	Test Pad	Upstream UPD360 (U3) pin A1/B1 probe point

Hardware Configuration

TABLE 3-7: EVB-USB5926 TEST POINT DESCRIPTIONS (CONTINUED)

REF. DES.	TYPE	DESCRIPTION
TP26	Test Pad	USB5926 pin 80 signal probe point
TP27	Test Pad	USB5926 pin 79 signal probe point

NOTES:



Appendix A. Schematics

A.1 INTRODUCTION

This appendix shows the EVB-USB5926 Schematics.

FIGURE A-1: EVB-USB5926 SCHEMATIC

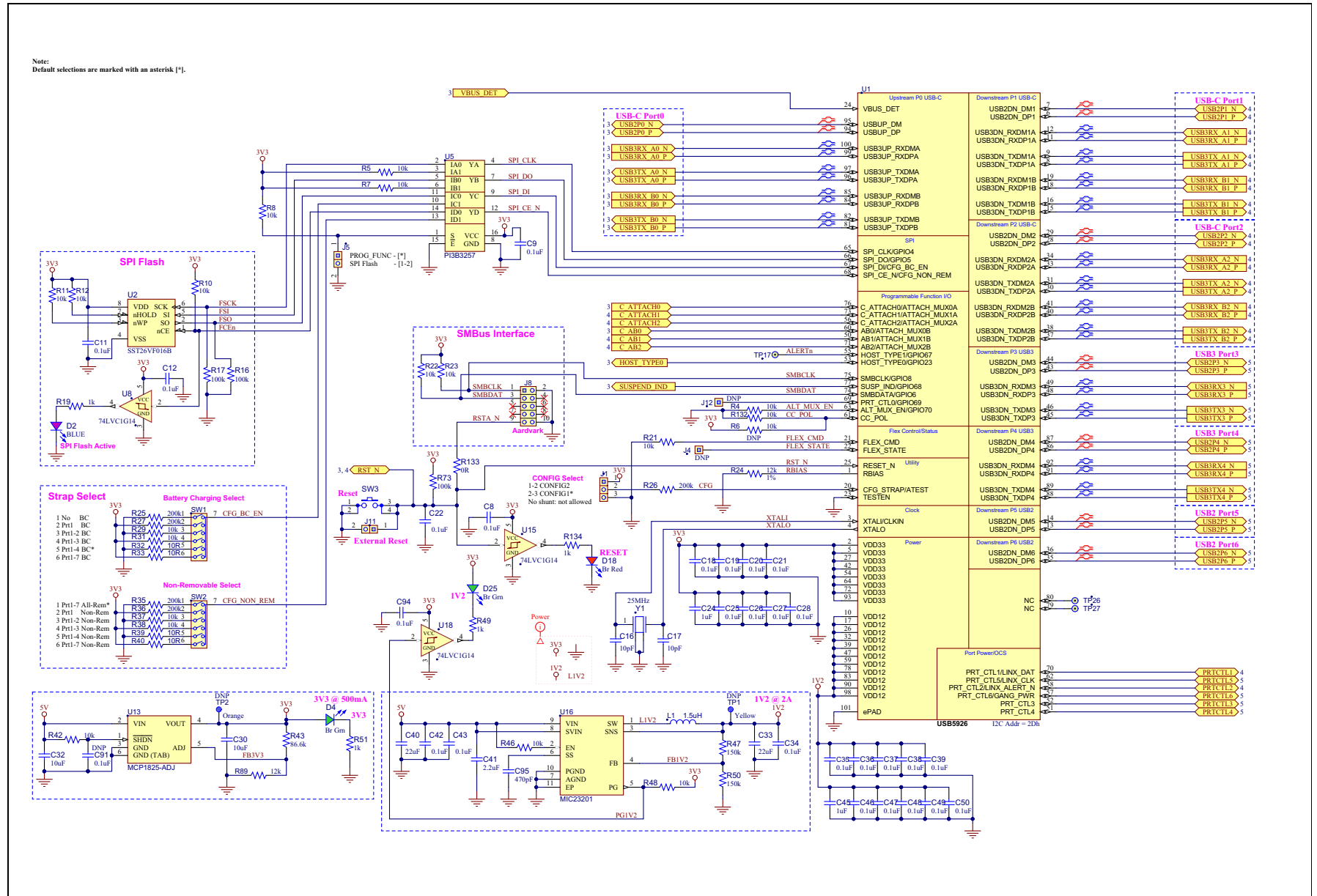


FIGURE A-2: EVB-USB5926 SCHEMATIC

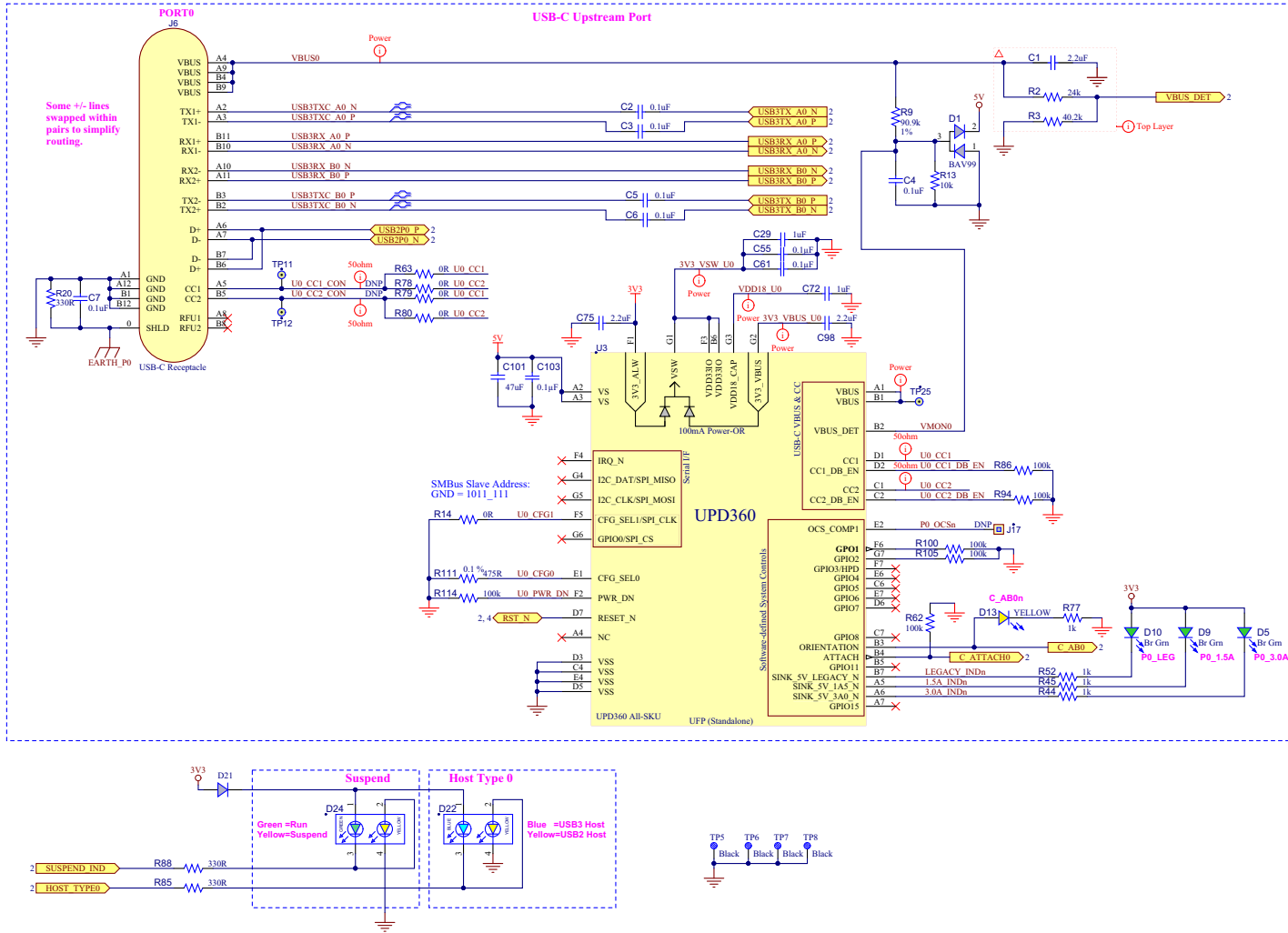


FIGURE A-3: EVB-USB5926 SCHEMATIC

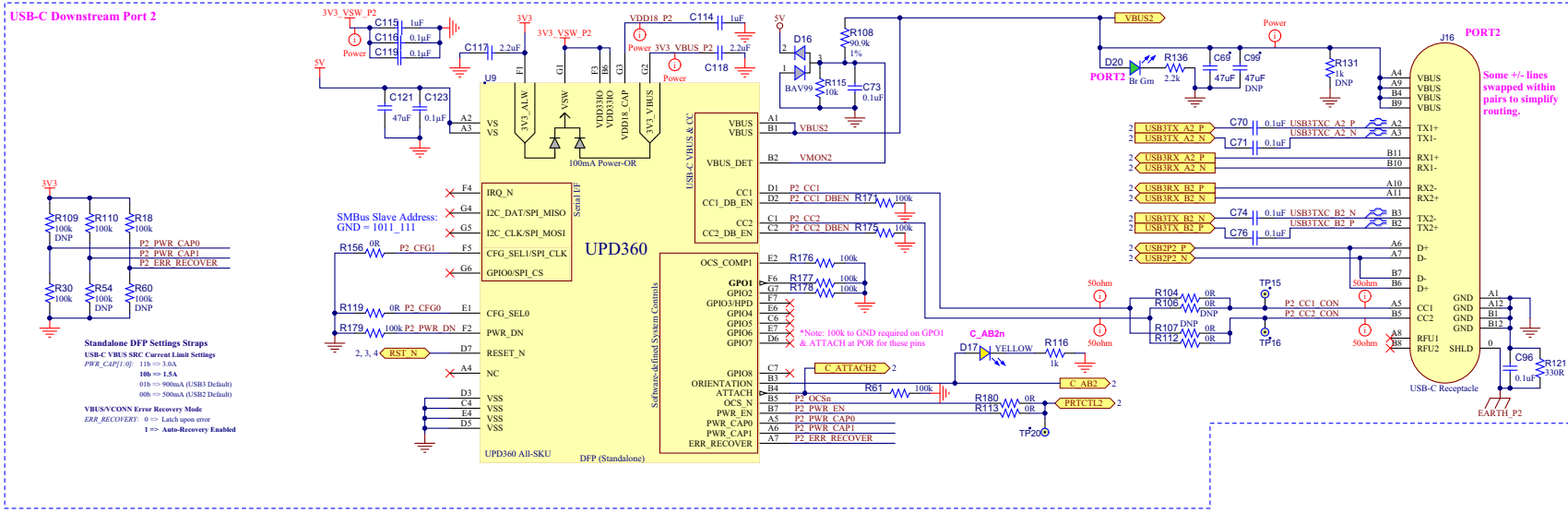
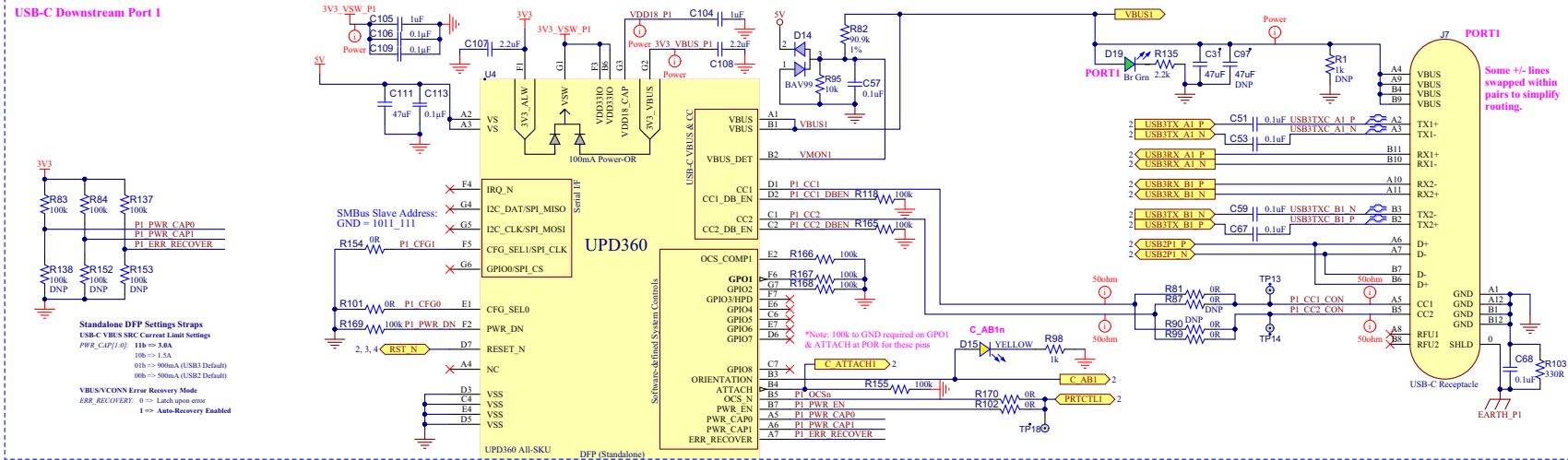
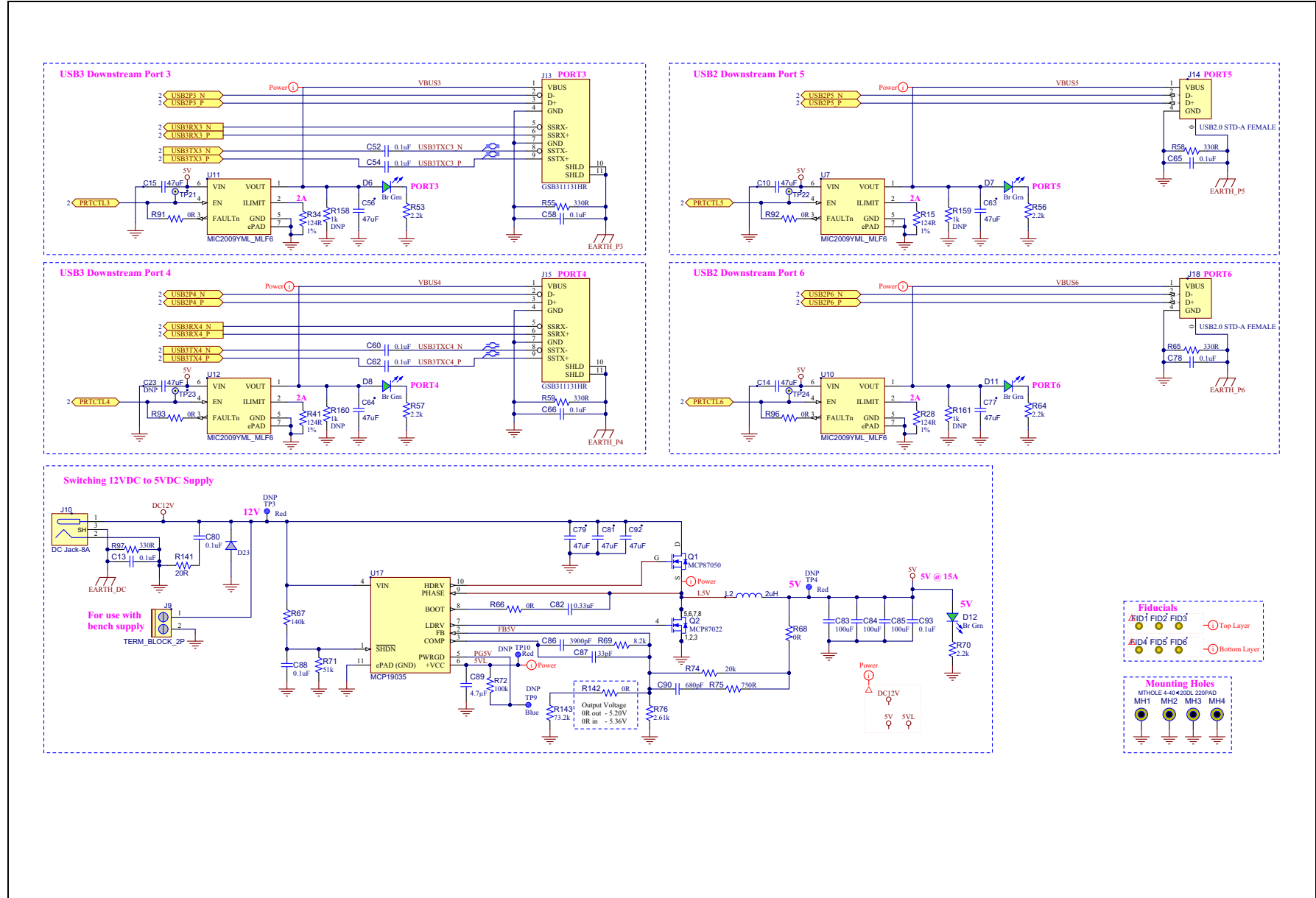


FIGURE A-4: EVB-USB5926 SCHEMATIC



NOTES:



Appendix B. Bill of Materials

B.1 INTRODUCTION

This appendix shows the EVB-USB5926 Evaluation Bill of Materials.

TABLE B-1: BILL OF MATERIALS

Item	Qty	Reference Designator(s)	Description	Manufacturer	Manufacturer Part Number
1	8	C1, C41, C75, C98, C107, C108, C117, C118	CAP CER 2.2 μ F 10V 10% X7R SMD 0603	Murata	GRM188R71A225KE15D
2	57	C2, C3, C4, C5, C6, C7, C8, C9, C11, C12, C13, C18, C19, C20, C21, C22, C25, C26, C27, C28, C34, C35, C36, C37, C38, C39, C42, C43, C46, C47, C48, C49, C50, C51, C52, C53, C54, C57, C58, C59, C60, C62, C65, C66, C67, C68, C70, C71, C73, C74, C76, C78, C80, C88, C93, C94, C96	CAP CER 0.1 μ F 16V 10% X7R SMD 0402	Murata	GRM155R71C104KA88D
3	12	C10, C14, C15, C31, C56, C63, C64, C69, C77, C79, C81, C92	Capacitor, 47 μ F, 16V, 10%, X5R, 1210	Murata	GRM32ER61C476KE15K
4	2	C16, C17	CAP CER 10 pF 50V 5% NP0 SMD 0402	Murata	GRM1555C1H100JZ01D
5	2	C24, C45	CAP CER 1 μ F 6.3V 10% X5R SMD 0603	Panasonic	ECJ-1VB0J105K
6	6	C29, C72, C104, C105, C114, C115	CAP CER 1 μ F 10V 10% X5R SMD 0402	Murata Electronics Nort	GRM155R61A105KE15D
7	2	C30, C32	CAP CER 10 μ F 16V 10% X5R SMD 0805	Murata	GRM21BR61C106KE15L
8	2	C33, C40	CAP CER 22 μ F 10V 10% X7R SMD 1206	Samsung Electro-Mecha	CL31B226KPHNNNE
9	9	C55, C61, C103, C106, C109, C113, C116, C119, C123	CAP CER 0.1 μ F 35V X5R 0402	TDK Corporation	C1005X5R1V104M050BB
10	1	C82	CAP CER 0.33 μ F 16V 10% X7R SMD 0603	Murata	GRM188R71C334KA01D
11	3	C83, C84, C85	CAP CER 100 μ F 10V 20% X5R SMD 1210	Taiyo Yuden	LMK325BJ107MM-T
12	1	C86	CAP CER 3900 pF 50V 5% C0G SMD 0603	TDK	C1608C0G1H392J080AA
13	1	C87	CAP CER 33 pF 50V 5% NP0 SMD 0603	Cal-Chip	GMC10CG330J50NTLF
14	1	C89	CAP CER 4.7 μ F 50V 0805	Samsung Electro-Mecha	CL21A475KBQNNNE
15	1	C90	CAP CER 680 pF 50V 5% NP0 SMD 0603	Panasonic	ECJ-1VC1H681J
16	1	C95	CAP CER 470 pF 25V 5% NP0 SMD 0603	AVX	06033A471JAT2A
17	3	C101, C111, C121	CAP CER 47 μ F 6.3V 20% X5R SMD 0805	Taiyo Yuden	JMK212BJ476MG-T
18	3	D1, D14, D16	DIO RECTARR BAV99 1.25V 200 mA 70V SOT-23-3	Fairchild	BAV99
19	1	D2	DIO LED BLUE 2.8V 20 mA 15 mod Clear SMD 0603	Lite-On	LTST-C193TBKT-5A
20	12	D4, D5, D6, D7, D8, D9, D10, D11, D12, D19, D20, D25	LED, Bright Green, 0603	Lite-On	LTST-C191KGKT
21	3	D13, D15, D17	DIO LED YELLOW 2.2V 25 mA 3.4 mod Diffuse SMD 0603	Stanley Electric Co	AY1111C-TR
22	1	D18	LED, Bright Red, 0603	Lite-On	LTST-C191KRKT
23	2	D21, D23	DIODE SWITCHING 75V 0.2A SOT-23	Diodes Inc.	MMBD914-7-F
24	1	D22	DIO LED BLUE, YELLOW 2.9V, 2.0V 5 mA 0605	Lite-On	LTST-C195TBKSKT-5A
25	1	D24	DIO LED DUAL, GREEN/YELLOW 2.0V, 2.0V 5 mA 0605	Lite-On	LTST-C195KGJSKT
26	1	J1	CONN HEADER 3POS 100" SGL GOLD	Samtec	TSW-103-07-G-S
27	2	J5, J11	CONN HEADER 2POS 100" SGL GOLD	Samtec	TSW-102-07-G-S
28	3	J6, J7, J16	USB TYPE-C [®] Conn Receptacle Top mount TH/SMT	Advanced Connector IN	NBR25-AKXX22

TABLE B-1: BILL OF MATERIALS

Item	Qty	Reference Designator(s)	Description	Manufacturer	Manufacturer Part Number
29	1	J8	HDR 10POS.100" DUAL GOLD	Samtec Inc.	TSW-105-07-G-D
30	1	J9	Terminal Block 5.0 MM PCB MOUNT 2P	TE Connectivity	282836-2
31	1	J10	CONN PWR JACK 2.5X6.5 MM, 8A	CUI Inc	PJ-063BH
32	2	J13, J15	CON USB 3.0 STD-A RCPT TH R/A	Amphenol Commercial	GSB311131HR
33	2	J14, J18	CON USB 2.0 STD-A FEMALE TH R/A	TE Connectivity AMP Co	292303-1
34	1	L1	Power Inductor 1.5 µH 30% 3A, 24 mOhms	Murata Electronics	LQH5BPN1R5NT0L
35	1	L2	Power Inductor 2 µH 20% 23A, 2.6 mOhms	Würth Electronics	7443551200
36	1	Q1	MCHP ANALOG MOSFET N-CH 25V 100A 0.006R MCP87050-U/MF PDFN-8	Microchip Technology	MCP87050T-U/MF
37	1	Q2	MCHP ANALOG MOSFET N-CH 25V 100A 0.0026R MCP87022T-U/MF PDFN-8	Microchip Technology	MCP87022T-U/MF
38	1	R2	RES TKF 24k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF2402V
39	1	R3	RES TKF 40.2k 1% 1/16W SMD 0603	Panasonic Electronic Co	ERJ-3EKF4022V
40	22	R4, R5, R7, R8, R10, R11, R12, R15, R21, R22, R23, R28, R29, R31, R34, R37, R38, R41, R42, R46, R48, R132	RES TKF 10k 1% 1/10W SMD 0603	Vishay Dale	CRCW060310K0FKEA
41	3	R9, R82, R108	RES TFK 35.7K OHM 1% 1/10W SMD 0603	Vishay Dale	CRCW060335K7FKEA
42	3	R13, R95, R115	RES TKF 5.1k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF5101V
43	11	R14, R78, R79, R87, R90, R101, R106, R107, R119, R154, R156	RES TKF 0R 1/10W SMD 0603	NIC Components	NRC06Z0TRF
44	7	R16, R17, R72, R73, R114, R169, R179	RES TF 100k 1% 1/8W SMD 0603	Vishay	MCT06030C1003FP500
45	6	R18, R30, R83, R84, R110, R137	RES TKF 100k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF1003V
46	10	R19, R44, R45, R49, R51, R52, R77, R98, R116, R134	RES TKF 1k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF1001V
47	10	R20, R55, R58, R59, R65, R85, R88, R97, R103, R121	RES TKF 330R 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF3300V
48	2	R24, R89	RES TKF 12k 1% 1/10W SMD 0603	Yageo	RC0603FR-0712KL
49	5	R25, R26, R27, R35, R36	RES TKF 200k 1% 1/10W SMD 0603	Vishay	CRCW0603200KFKEA
50	4	R32, R33, R39, R40	RES TKF 10R 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF10R0V
51	1	R43	RES TKF 86.6K 1% 1/10W SMD 0603	Panasonic Electronic Com	ERJ-3EKF8662V
52	2	R47, R50	RES TKF 150k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF1503V
53	7	R53, R56, R57, R64, R70, R135, R136	RES TKF 2.2k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF2201V
54	17	R61, R62, R86, R94, R100, R105, R118, R155, R165, R166, R167, R168, R171, R175, R176, R177, R178	RES TKF 100k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF1003V
55	12	R66, R68, R91, R92, R93, R96, R102, R113, R133, R142, R170, R180	RES TKF 0R 1/10W SMD 0603	NIC Components	NRC06Z0TRF
56	1	R67	RES TKF 140k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF1403V
57	1	R69	RES TKF 8.2k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF8201V
58	1	R71	RES TKF 51k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF5102V

TABLE B-1: BILL OF MATERIALS

Item	Qty	Reference Designator(s)	Description	Manufacturer	Manufacturer Part Number
59	1	R74	RES TKF 20k 1% 1/10W SMD 0603	Yageo	9C06031A2002FKHFT
60	1	R75	RES TKF 750R 1% 1/10W SMD 0603	Vishay	CRCW0603750RFKEA
61	1	R76	RES TKF 2.61k 1% 1/16W SMD 0603	MULTICOMP	MC 0.063W 0603 1% 2K61
62	1	R111	RES TKF 475R 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF4750V
63	1	R141	RES TKF 20R 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF20R0V
64	1	R143	RES TKF 73.2k 1% 1/10W SMD 0603	Panasonic	ERJ-3EKF7322V
65	2	SW1, SW2	Switch SIP SPST 6POS Vertical, Unshielded, 20V	C&K Components	SPA06B
66	1	SW3	SWITCH TACTILE SPST-NO 0.05A 16V	C&K Components	CKN10502CT-ND
67	4	TP5, TP6, TP7, TP8	TEST POINT PC MINI .040"D BLACK	Keystone Electronics	5001
68	1	TP9	TEST POINT PC MINIATURE T/H BLUE	Keystone Electronics	5117
69	1	U1	IC, USB5926, 7 Port USB 3.2 Gen1 Hub, QFN100	Microchip Technology	USB5926
70	1	U2	Flash Serial, SPI, 2.7-3.6V, x1/x2/x4, SOIC8	Microchip Technology	SST26VF016B-104I/SM
71	1	U3, U4, U9	USB-C Port Power Controller with PD, 5V, 3A, BGA44	Microchip Technology	UPD360/A_BGA44
72	1	U5	Quad, 2:1 Mux/Demux FET BusSwitch	Pericom	PI3B3257QE
73	4	U7, U10, U11, U12	IC PD SW CURR LIMIT 6DFN	Diodes Inc.	AP2553AFDC-7
74	3	U8, U15, U18	IC BUFF 74LVC1G14SE-7 SNGL SOT-553	Diodes Incorporated	74LVC1G14SE-7
75	1	U13	IC, LDO ADJ, 2.3 to 6Vin, 0.8V to 5V out, 0.5A	Microchip Technology	MCP1825T-ADJE/DC
76	1	U16	IC, 2.7V to 5.5V input, 2A, Synchronous 2 MHz Buck Regulator with adjustable output, power good signal	Microchip Technology	MIC23201YML
77	1	U17	IC, 4.5V to 30V input, 20A, 600 kHz Buck Controller, power good signal	Microchip Technology	MCP19035BAABE/MF
78	1	Y1	Crystal 25 MHz 4 pins 3225	ABRACON	ABM8G-25.000MHZ-B4Y-T



Appendix C. PCB Silk Screens

C.1 INTRODUCTION

This appendix shows the Top and Bottom Silk Screen Images.

FIGURE C-1: EVB-USB5926 TOP SILK SCREEN IMAGE

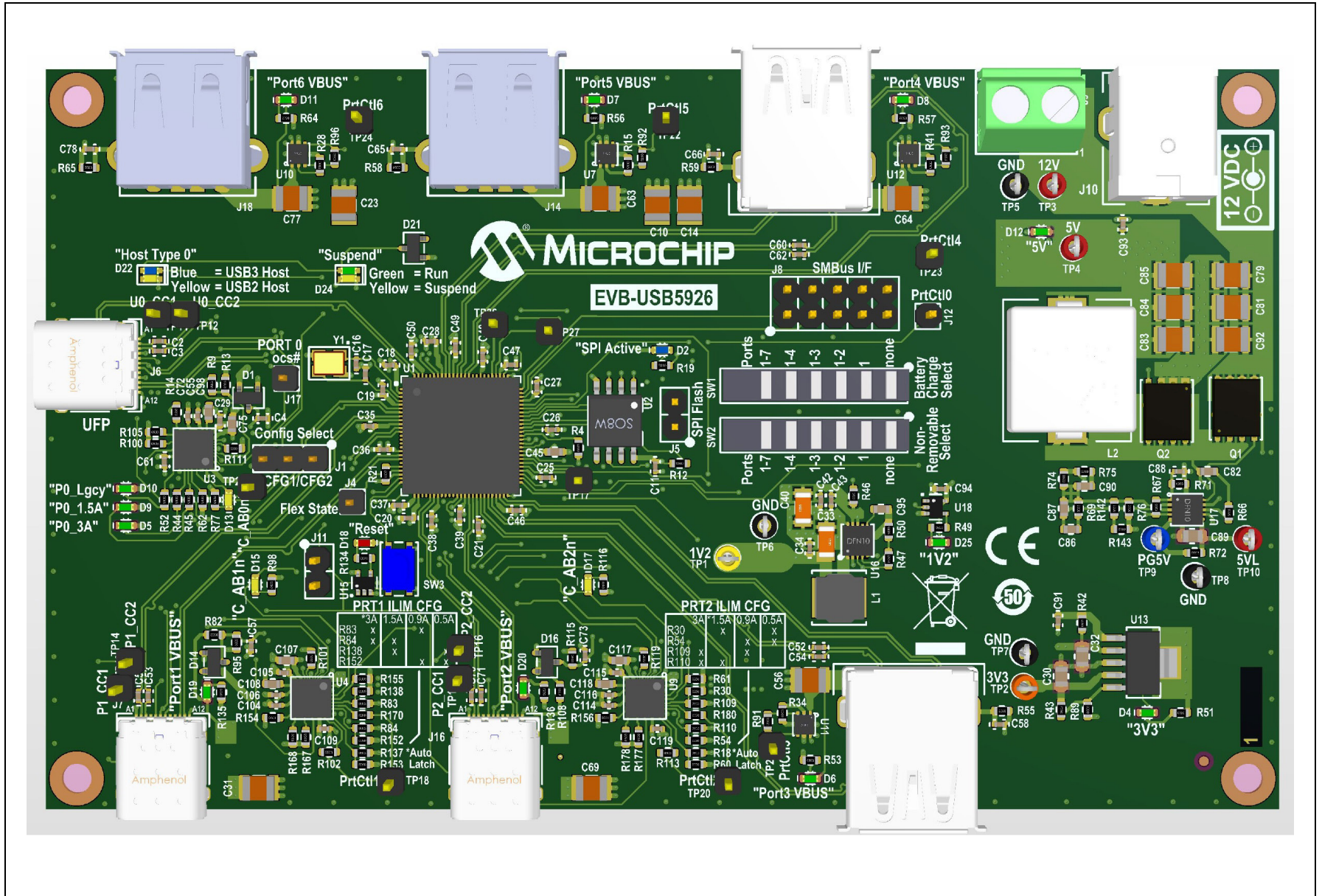
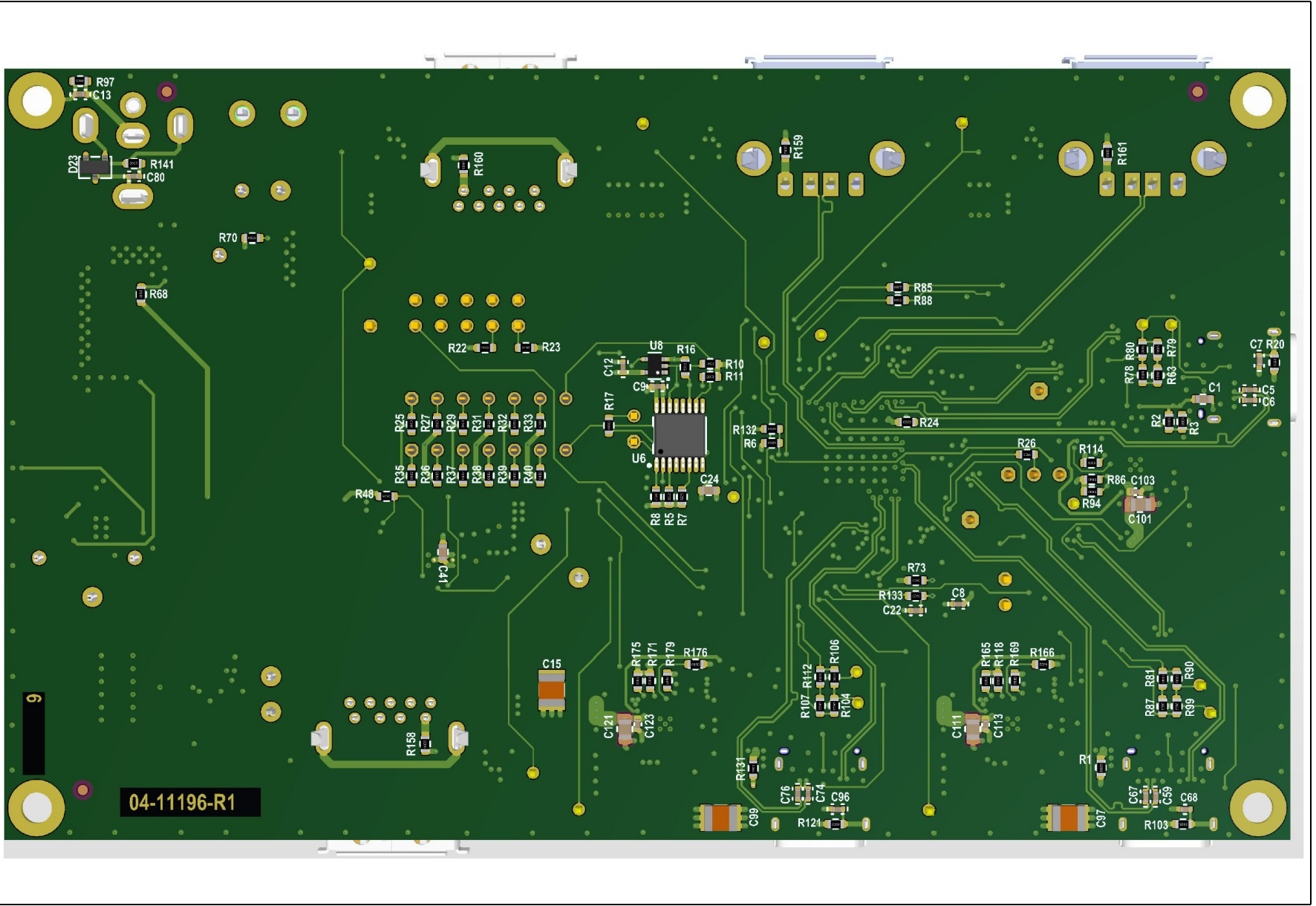


FIGURE C-2: EVB-USB5926 BOTTOM SILK SCREEN IMAGE





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Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
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Korea - Daegu
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Korea - Seoul
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Romania - Bucharest
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Spain - Madrid
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Fax: 34-91-708-08-91

Sweden - Gothenberg
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Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820