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**EVB-USB5734
Evaluation Board
User's Guide**

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ISBN: 978-1-63277-157-5

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Object of Declaration: EVB-USB5734

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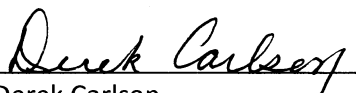
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Date

NOTES:

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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-USB5734. Items discussed in this chapter include:

- [Document Layout](#)
- [Conventions Used in this Guide](#)
- [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-USB5734 Evaluation Board as a development tool for the USB5734 4-port USB 3.0 hub with battery charging features.

- **Chapter 1. “Overview”** – Shows a brief description of the EVB-USB5734 Evaluation Board.
- **Chapter 2. “Board Details & Configuration”** – Includes instructions on how to get started with the EVB-USB5734 Evaluation Board.
- **Chapter 3. “Configuration IO Modes”** – Provides information about the five IO daughter cards provided with the EVB-USB5734 Evaluation Board.
- **Appendix A. “EVB-USB5734 Evaluation Board”** – This appendix shows the EVB-USB5734 Evaluation Board.
- **Appendix B. “EVB-USB5734 Schematics”** – This appendix shows the EVB-USB5734 Evaluation Board schematics.
- **Appendix C. “EVB-USB5734 BOM”** – This appendix includes the EVB-USB5734 Evaluation Board Bill of Materials (BOM).
- **Appendix D. “EVB-USB5734 Silk Screens”** – This appendix includes the EVB-USB5734 Evaluation Board 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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- **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 PIC-kit 2 and 3.

CUSTOMER SUPPORT

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- 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 web site at:

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

DOCUMENT REVISION HISTORY

Revision A (March 2015)

- Initial Release of this Document.

Chapter 1. Overview

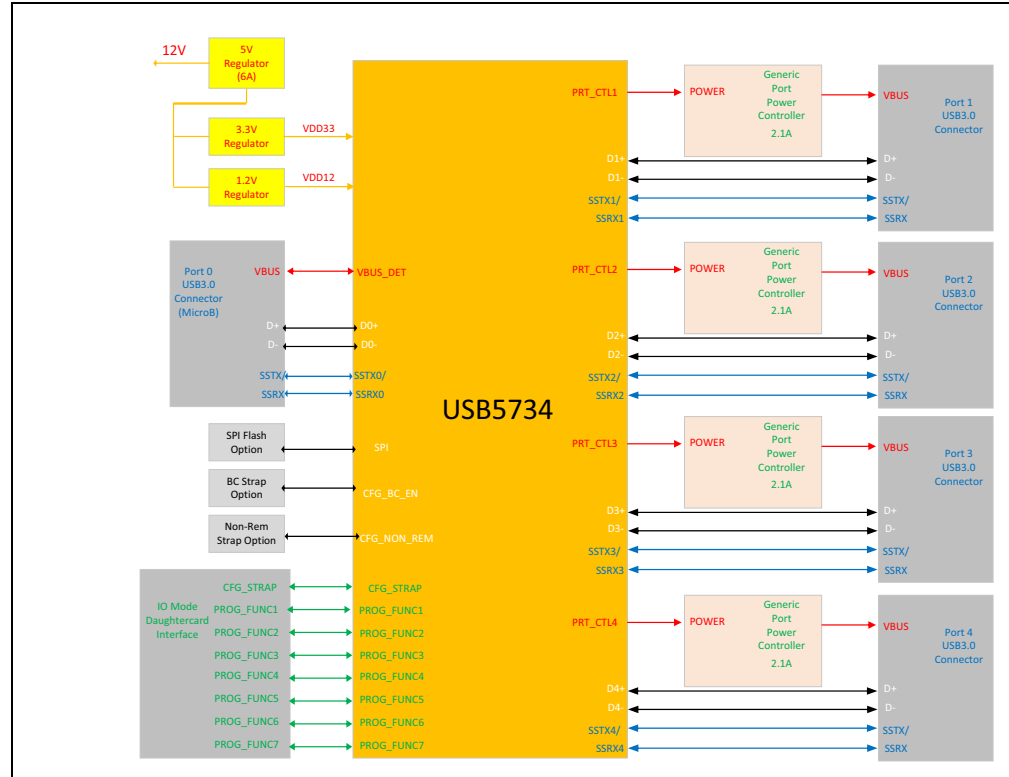
1.1 INTRODUCTION

The EVB-USB5734 Revision B is a demonstration and evaluation platform that provides the necessary requirements and interface options for evaluating the USB5734 Ultra Fast four port battery charging hub on a 4-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 EVB-USB5734 into the user's design. The EVB-USB5734 is compliant with the USB 3.0 USB Specification and supports Super-Speed (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 four downstream ports that are USB 2.0 and USB 3.0 compliant. The EVB-USB5734 platform also supports battery charging on all four downstream ports (maximum of 5A total current at any one time). The EVB-USB5734 is configured for operation through internal default settings and supports custom configurations through SMBus or through the external 64-Mbit SPI Flash device, U8. The EVB-USB5734 demonstrates driver compatibility with Microsoft® Windows® 8x, Windows 7, Windows XP, Mac OS® X 10.4+, and Linux® hub drivers.

The EVB-USB5734 provides the following features:

- USB5734 in a 64-pin QFN RoHS compliant package
- USB 3.0 compliant (SS, HS, FS, and LS operation)
- USB pins are 5 V tolerant
- Four downstream USB 2.0/3.0 ports
- All downstream ports support individual port power and overcurrent sense
- All downstream ports are enabled for battery charging (2.1A max per port)
- Can support up to 5A total current downstream at any one time
- On-board SPI Flash for external downloadable firmware
- Low-cost 4-layer space saving design
- Operates from a single voltage (+12.0 V, regulated) external power supply
- On-board 25 MHz crystal
- Single on-board +5.25 V, 6 Amp regulator
- Single on-board +3.3 V, 0.5 Amp regulator
- Single on-board +1.2 V, 1 Amp regulator
- Port Power and Port Enable LED indicators
- LED indicators for SPI/Strap Configuration
- On-board IO connector for configurable Mode operations

FIGURE 1-1: EVB-USB5734 FUNCTIONAL BLOCK DIAGRAM



1.2 REFERENCES

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

- USB5734 Datasheet
- EVB-USB5734 Schematics

1.3 TERMS AND ABBREVIATIONS

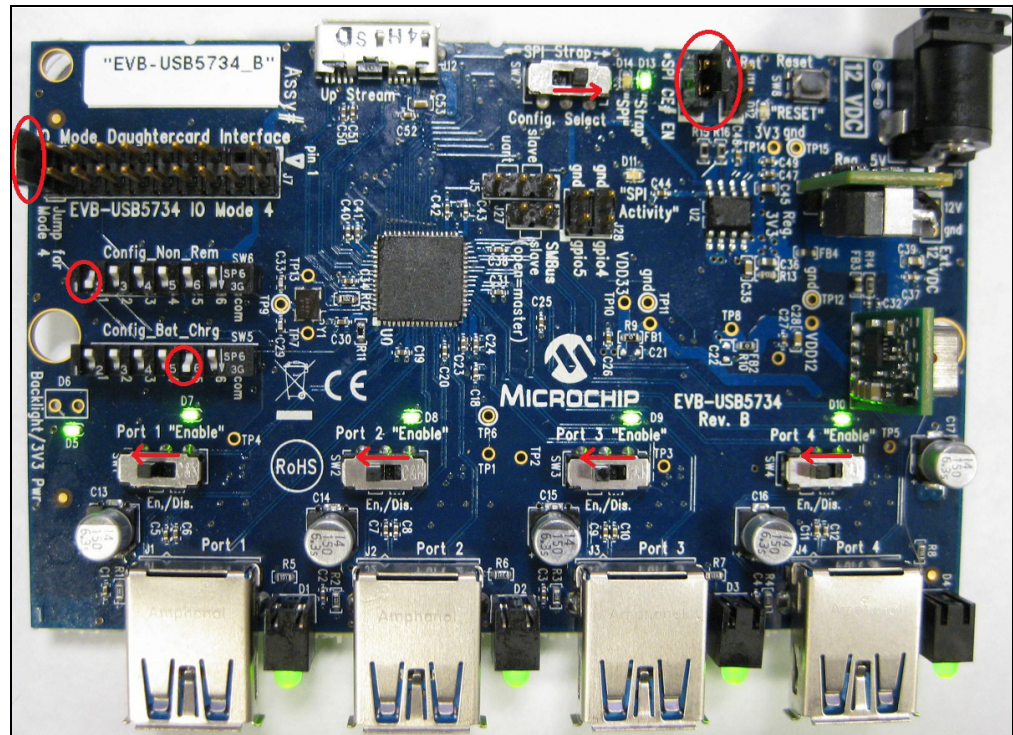
- EVB - Engineering Validation Board
- SPI - Serial Protocol Interface
- CFG - Configuration
- BC - Battery Charge
- Non-Rem - Non Removable
- UART - Universal Asynchronous Receiver/Transmitter
- DUT - Device Under Test
- DFP - Downstream Facing Port

Chapter 2. Board Details & Configuration

The Microchip EVB-USB5734 is designed for flexible configuration solutions. It can be configured via default internal register settings, downloadable external firmware to an on-board SPI Flash, through SMBus, or through the on-board configuration switches. When configured with the default internal register settings, the device operates as a USB 3.0/2.0 hub with four battery charge enabled USB ports and Microchip's standard VID/PID/DID settings.

This chapter describes details on the EVB-USB5734 Power, Clock and Configuration.

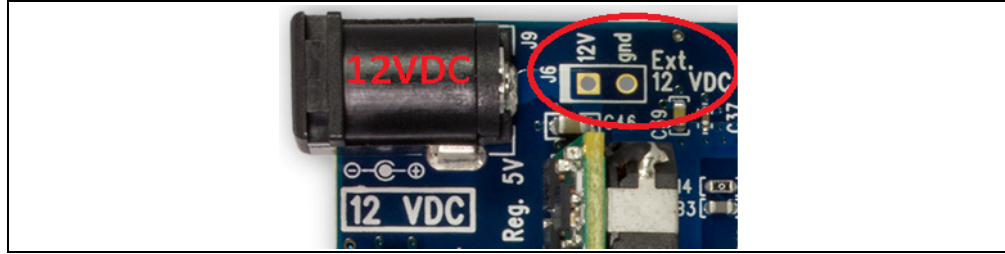
FIGURE 2-1: INITIAL CONFIGURATION



2.1 POWER SOURCE - SELF-POWERED

The EVB-USB5734 only supports self-powered operation, and is powered through one +12.0V regulated external power supply. The power supply plugs into the 2.5mm connector J9 on the board. Alternatively, an external voltage can be injected onto the J6 Ext. 12V header, which is not populated by default. The +12.0V feeds a 6A regulator which outputs +5.25V across the board. This +5.25V output supplies the +3.3V and +1.2V on-board regulators.

FIGURE 2-2: EVB-USB5734 POWER SOURCE



2.2 DOWNSTREAM PORT POWER CONTROL

USB power to the four downstream ports are controlled via port power controllers with auto-discharge function. This provides up to 2.1A of USB battery charging power to each port, limited to a total of 5A at any one time.

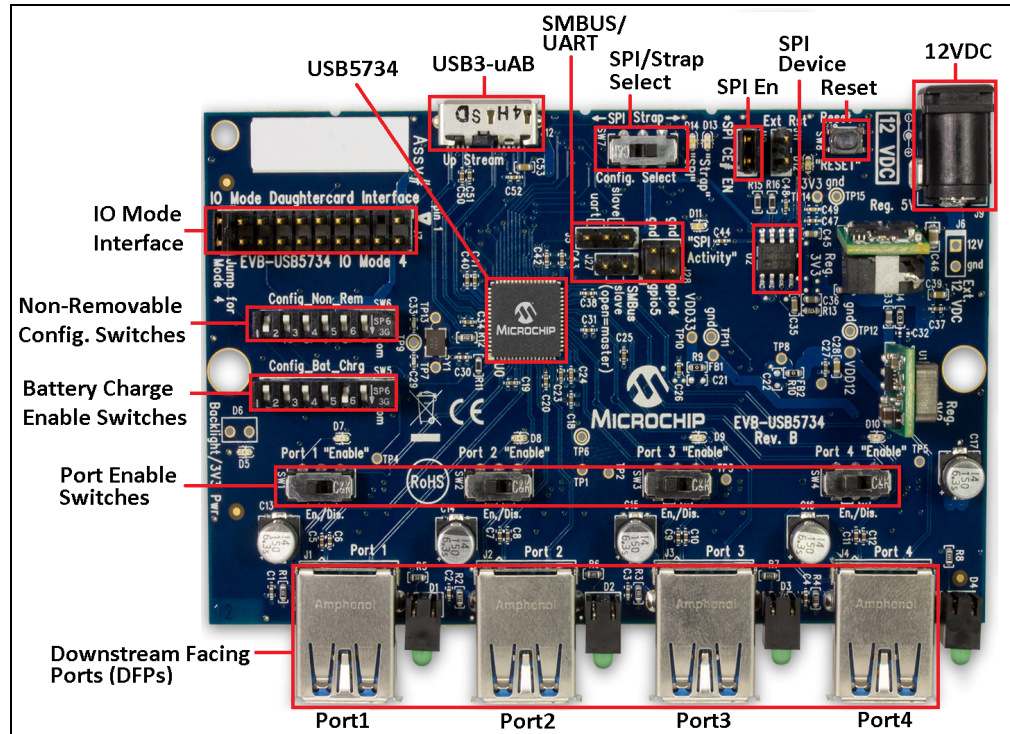
2.3 CLOCK

The EVB-USB5734 utilizes an external 25MHz 30ppm crystal to drive its internal oscillator circuit.

2.4 CONFIGURATION

The following sections describe the various board features and configuration settings. Figure 2-2 below shows a top view of the EVB-USB5734.

FIGURE 2-3: EVB-USB5734 TOP VIEW



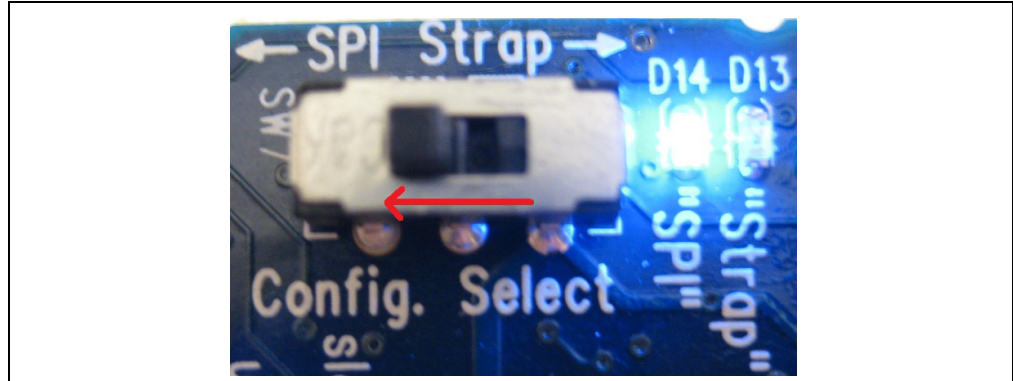
2.4.1 External SPI Flash

Upon power-up, the USB5734 first looks for an external SPI Flash 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 device.

To select the SPI device, set the **Config. Select** switch (SW7) to the **SPI** position. The blue “**SPI**” LED will light. Note that the CFG_BC (Configuration Battery Charge) and CFG_Non-Rem (Configuration Non Removable) options are now de-selected. All configuration in SPI mode is done by the SPI.

Note: If the SPI Flash is not properly programmed or has an invalid signature, the USB5734 will default to internal defaults even if the SPI Flash is selected.

FIGURE 2-4: SPI SELECT



The pull-up resistors (R42 and R58) on the SPI device's Write Protect (WPn) and Hold (HOLDn) pins must be populated in order to use external flash. The pull-up resistor (R61) on the SPI_CE_N pin of the USB5734 must also be populated in order to select 60MHz SPI operation, as opposed to 30MHz operation. Additionally there must be a jumper placed across the J10 **SPI CE# EN** header in order to enable the SPI device. The external flash can be programmed using the Microchip ProTouch2 MPT software tool which can be downloaded from the Microchip website at <http://www.microchip.com/ProTouch>.

Note: Refer to the Protouch MPT User Manual on using this software to program the configuration.

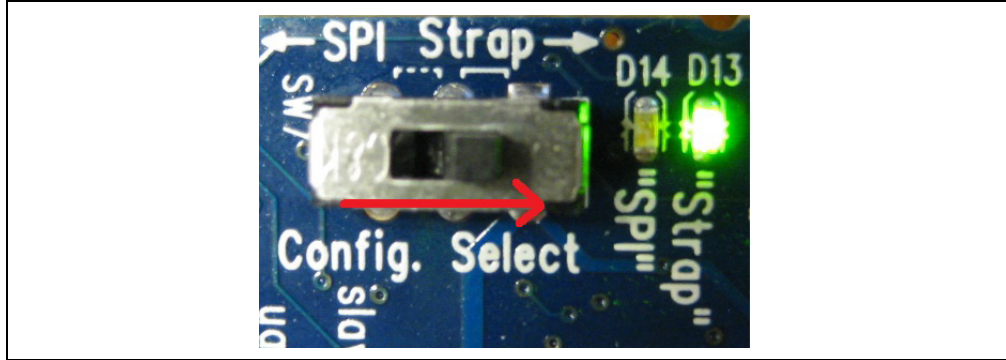
2.4.2 SMBus

If a SPI Flash device is not found, the firmware checks if the SMBus is enabled. To select SMBus configuration, set the **Config. Select** switch to the **Strap** position. The green “**Strap**” LED will light.

The SMBus interface must have correct pull-up resistors applied by external circuitry to function properly. The USB5734 can operate in SMBus Slave or I2C Bridging mode. To operate in SMBus Slave mode, install a jumper across pins 1 and 2 of the J5 and J27 SMBus headers. These jumpers are required in order to enable SMBus communication. To operate in I2C Bridging mode instead, the J5 and J27 SMBus headers must be left open.

Note: If the USB5734 is configured for SMBus Slave operation, the DUT will wait indefinitely for data from the SMBus interface and will not enumerate until instructed by the SMBus interface.

FIGURE 2-5: SMBUS SELECT



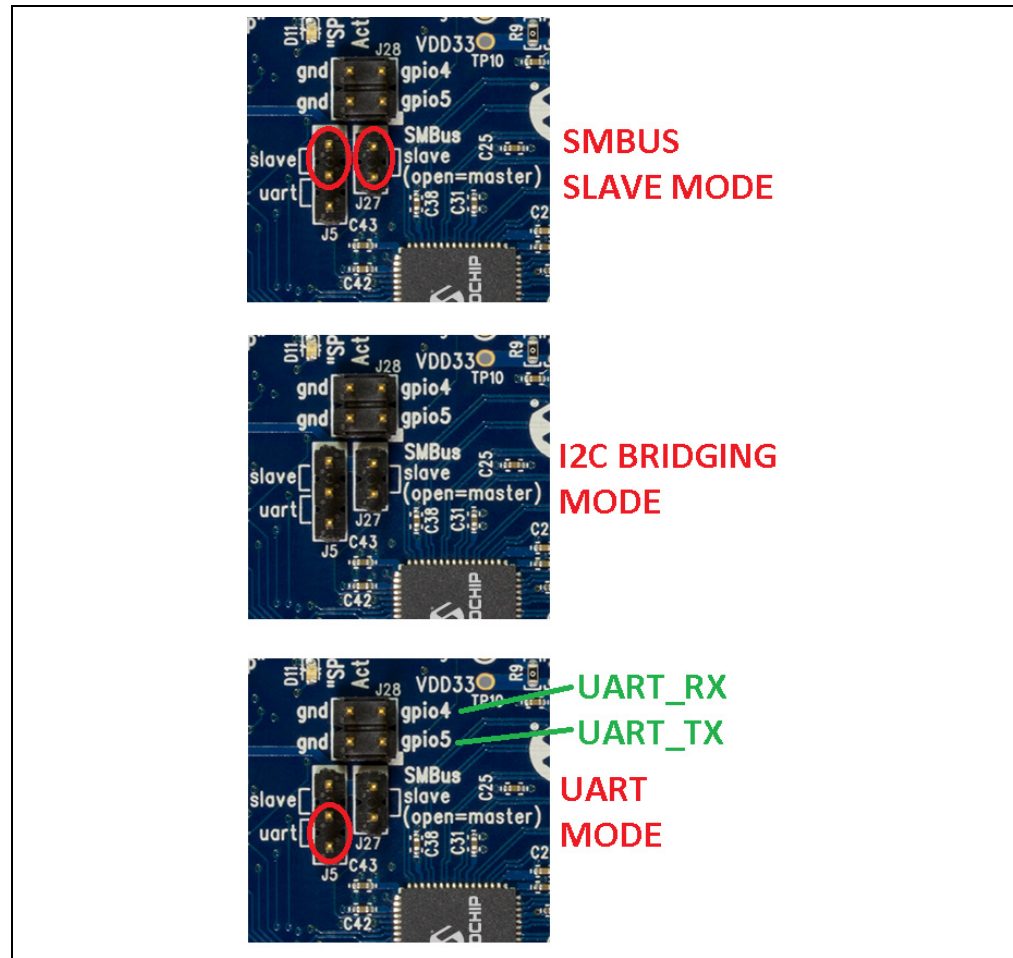
2.4.3 UART

The USB5734 provides a USB to UART bridge function that can be used in a simple two wire TX/RX mode or in a full modem signaling configuration (see Mode 6 section in Chapter 3). For simple two wire mode the J27 header must be left open and the J5 header must have a jumper installed across pins 2 and 3. This jumper is required in order to add a pull-down resistor on the UART_TX signal in order to enable the UART interface. Once in UART mode, the J28 UART header should be used for accessing the UART_RX and UART_TX signals on the USB5734. Note that UART can be enabled in configured IO Modes 1, 2, 3, 4, and 5. When IO Mode 6 is installed into the J7 IO connector (described more in section below), the J5 header does not require a jumper in order to configure the USB5734 for UART mode. The following table details the GPIO4/GPIO5 jumper options available to configure the USB5734 into different modes.

TABLE 2-1: SMBUS / UART SELECT

MODE	GPIO4 (J27)	GPIO5 (J5)	PU/PD STATUS
SMBUS Slave	short pins 1-2	short pins 1-2	GPIO4 = PU GPIO5 = PU
I2C Bridging	open	open	GPIO4 = open GPIO5 = open
UART	open	short pins 2-3	GPIO4 = open GPIO5 = PD

FIGURE 2-6: UART SELECT



2.4.4 Configuration Source - Internal Default

When the USB5734 does not detect a valid SPI Flash image or SMBus configuration upon power-up, the EVB-USB5734 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.

2.4.5 Strapping Option

If configuration is not done through SPI, additional configuration is available through two functions: CFG_BC and CFG_Non-Rem. The controls are configured by selecting ONLY one of six resistor values for each pin. These are read by the USB5734 device and the BC and Non-Rem behavior of the downstream facing ports are determined.

To use the strapping option (which is the default configuration setup), set the **Config. Select** switch (SW7) to the **Strap** position. The green "**Strap**" LED will light. Select the desired CFG_BC and CFG_Non-Rem options by enabling only one position for each of the **Config_Bat_Chrg** Select and **Config_Non_Rem** Select switches (SW5 and SW6). The default setup for SW5 is to slide pin 5 to the **com** side of the switch (towards the downstream facing ports) which configures all four downstream ports to be enabled for battery charging. The default setup for SW6 is to slide pin 1 to the **com** side of the switch (towards the downstream facing ports) which configures all four downstream ports to be removable.

FIGURE 2-7: STRAPPING OPTIONS

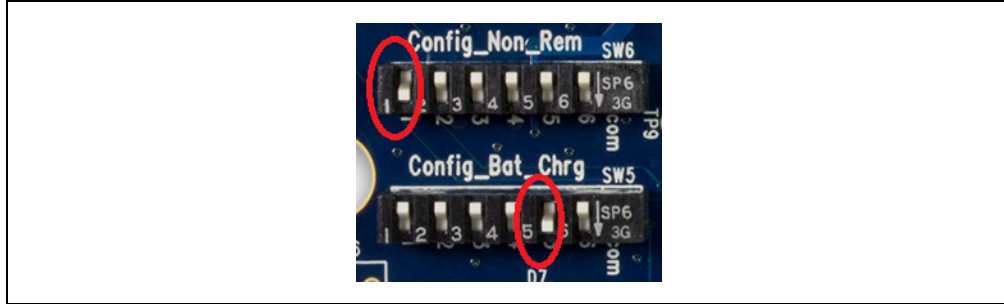


TABLE 2-2: STRAPPING OPTIONS FOR BATTERY CHARGING

SW5 Position	Configuration
1	No Ports BC Enabled
2	Port 1 is BC Enabled
3	Port 1 & 2 are BC Enabled
4	Port 1, 2 & 3 are BC Enabled
5	Port 1, 2, 3 & 4 are BC Enabled [default]
6	Reserved

TABLE 2-3: STRAPPING OPTIONS FOR PORT REMOVABLE

SW6 Position	Configuration
1	All ports are Removable [default]
2	Port 1 is Non-Removable
3	Port 1 & 2 are Non-Removable
4	Port 1, 2 & 3 are Non-Removable
5	Port 1, 2, 3 & 4 are Non-Removable
6	Reserved

2.4.6 Port Power Options: Port Enable and Port Disable Select

Any downstream facing port on the EVB-USB5734 can be disabled if desired. When both DP & DM signals are pulled high to +3.3V, the USB5734 automatically disables the port, reports the corrected number of available ports to the host, and drives the PRT_CTRL line for the disabled port(s) low. By default, all four downstream facing ports are enabled.

To enable a port, use its **Port Enable** switch (SW1 - SW4) to select the **EN.** position. The associated “**Enable**” LED will light green.

To disable a port, slide its **Port Enable** switch (SW1 - SW4) to the **Dis.** position. The “**Enable**” LED will turn off.

The table below describes the port enable/disable strap options available for all four downstream ports on the USB5734.

TABLE 2-4: PORT ENABLE/DISABLE STRAP OPTIONS

Downstream Port	Associated Switch	Switch Position	LED
1	SW1	1-2, 4-5 = Port Enabled (Default)	D7 Green
		2-3, 5-6 = Port Disabled	D7 OFF
2	SW2	1-2, 4-5 = Port Enabled (Default)	D8 Green
		2-3, 5-6 = Port Disabled	D8 OFF

TABLE 2-4: PORT ENABLE/DISABLE STRAP OPTIONS (CONTINUED)

Downstream Port	Associated Switch	Switch Position	LED
3	SW3	1-2, 4-5 = Port Enabled (Default) 2-3, 5-6 = Port Disabled	D9 Green D9 OFF
4	SW4	1-2, 4-5 = Port Enabled (Default) 2-3, 5-6 = Port Disabled	D10 Green D10 OFF

Chapter 3. Configurable IO Modes

The Microchip EVB-USB5734 is designed for flexible configuration solutions. Five IO daughter cards are included in the EVB-USB5734 kit. Each IO daughter card has a 2x10 connector on the bottom side of the board that has pin 3 keyed and has pin 1 clearly marked with a triangle on the silkscreen. In order to use the desired IO daughter card, insert its keyed 2x10 header onto the keyed 2x10 IO connector J7 that is on the EVB-USB5734. The pin one triangle indicator on the EVB-USB5734 should line up with the pin one triangle indicator on the IO daughter card that is inserted. The sections below describe the mode functions of each IO daughter card.

Note: When configuring the USB5734 for IO Modes 1, 2, 3, 5, or 6, the jumper placed across pins 19 and 20 of the J7 IO connector must be removed from the EVB-USB5734. This jumper is only to be placed when configuring the USB5734 into IO Mode 4: Custom GPIO Mode.

3.1 CONFIGURATION IO DAUGHTER CARDS

The USB5734 can be configured for different IO modes depending on the pull-up or pull-down resistor chosen on the CFG_STRAP pin on the DUT. The table below shows the different resistor values required for the different IO mode settings. These resistor settings are populated by default on each IO daughter card.

TABLE 3-1: CONFIG STRAP RESISTOR SETTINGS

MODE	Configuration	SIGNAL	CFG_STRAP Resistor	PU/PD STATUS
1	Suspend Mode	C1_CONFIG	200kΩ	PD to GND
2	Flex Mode	C2_CONFIG	200kΩ	PU to 3V3
3	USB Speed LEDs Mode	C3_CONFIG	10kΩ	PD to GND
4	GPIO Mode (default)	CFG_STRAP	10kΩ	PU to 3V3
5	Battery Charging Mode	C5_CONFIG	10Ω	PD to GND
6	UART Mode	C6_CONFIG	10Ω	PU to 3V3

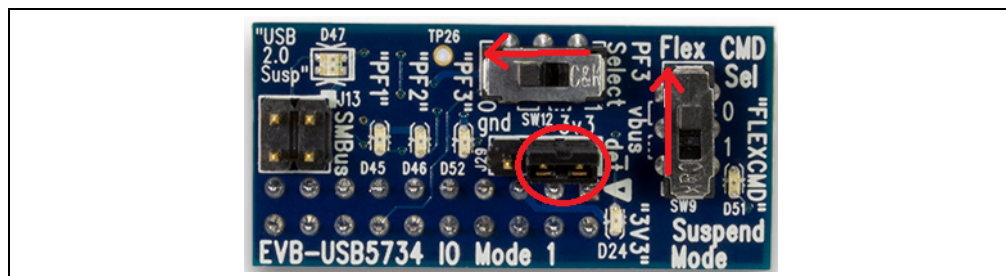
3.1.1 Mode 1: Suspend Mode

The Mode 1 IO daughter card configures the USB5734 into Suspend Indicator Mode. Once inserted onto the EVB-USB5734, the “**3V3**” Power LED should turn on green. The default setup is for pins 1 and 2 of the **VBus Select** header J29 to be shunted together. This jumper allows VBus Detect on the IO daughter card to be tied to 3.3V by default. If an external VBus is to be supplied, then remove the jumper and pins 2 and 3 can be accessed for injecting an external VBus. An **SMBus** header J13 is provided as well for accessing the SMDAT and SMCLK signals of the USB5734 while in Suspend Mode. Additionally, the GPIO4/GPIO5 header J28 can be used in this mode to access the digital RX and TX UART signals. When accessing these signals, the J27 header must be left open and the J5 header must have a shunt placed across pins 2 and 3.

LED indicators “PF1” and “PF2” are provided for when accessing the PROG_FUNC1 and PROG_FUNC2 signals on the USB5734. When these function pins are driven high, their associated LED will turn on green. When these function pins are driven low, their associated LED will be OFF. The “PF3” LED is provided to indicate the state of the **PF3 Select** switch (SW12) as described below. A “**USB 2.0 Susp**” LED is also provided to indicate when USB 2.0 on the USB5734 is in suspend or active mode. When in suspend mode, this LED will turn on yellow. When in active mode, this LED will turn on green.

There are two slide switches provided on this daughter card. The **PF3 Select** switch (SW12) allows the user to manually select whether PROG_FUNC3 will be driven high or low. The default position is to slide this switch into the **0** or Low position. With this switch in the low position, as mentioned above, the associated “PF3” LED will be OFF. When the **PF3 Select** switch is switched into the **1** or High position, the associated “PF3” LED will turn on green. The second slide switch is the **Flex_CMD Select** switch (SW9). This switch allows the user to manually set the USB5734 into Flex mode. The default setup is to slide the **Flex_CMD Select** switch into the **0** or Low position which will turn the “FLEXCMD” LED OFF. When the **Flex_CMD Select** switch is in the **1** or High position, the “FLEXCMD” LED will turn on orange and the “USB 2.0 Susp” LED will turn on yellow to indicate that the USB5734 is in Flex mode.

FIGURE 3-1: IO MODE 1 DAUGHTER CARD



3.1.2 Mode 2: Flex Mode

The Mode 2 IO daughter card configures the USB5734 into Flex Mode. Once inserted onto the EVB-USB5734, the “3V3” Power LED should turn on green. The default setup is for pins 1 and 2 of the **VBus Select** header J30 to be shunted together. This jumper allows VBus Detect on the IO daughter card to be tied to 3.3V by default. If an external VBus is to be supplied, then remove the jumper and pins 2 and 3 can be accessed for injecting an external VBus. An **SMBus** header J16 is provided as well for accessing the SMDAT and SMCLK signals of the USB5734 while in Flex Mode. Additionally, the GPIO4/GPIO5 header J28 can be used in this mode to access the digital RX and TX UART signals. When accessing these signals, the J27 header must be left open and the J5 header must have a shunt placed across pins 2 and 3.

LEDs “Port0” and “Port1” are indicators for the USB Host bus speed. During Flex mode either Port 0 or Port 1 can be the USB host, and only the corresponding USB host LED will turn on. The LED color will indicate the USB host bus speed: yellow indicates USB 2.0 and blue indicates USB 3.0.

There is one slide switch provided on this daughter card. The **Flex_CMD Select** switch (SW11) allows the user to manually set the USB5734 into Flex mode. The default setup is to slide the **Flex_CMD Select** switch into the **0** or Low position which will turn the “FLEXCMD” and “Flexed” LEDs OFF. When the **Flex_CMD Select** switch is in the **1** or High position, the “FLEXCMD” and “Flexed” LEDs will turn on orange to indicate that the USB5734 is in Flex mode.

FIGURE 3-2: IO MODE 2 DAUGHTER CARD

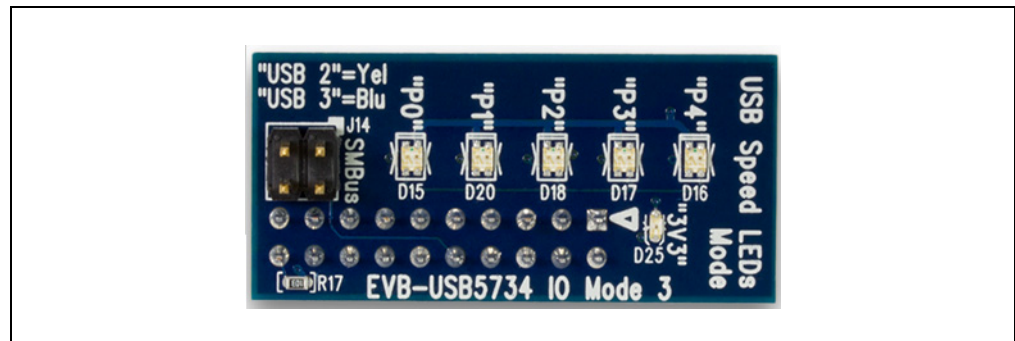


3.1.3 Mode 3: USB Speed LEDs Mode

The Mode 3 IO daughter card configures the USB5734 IO signals to indicate USB Speed status. Once inserted onto the EVB-USB5734, the “3V3” Power LED should turn on green. An **SMBus** header J14 is provided for accessing the SMDAT and SMCLK signals of the USB5734 while in USB Speed LEDs Mode. Additionally, the GPIO4/GPIO5 header J28 can be used in this mode to access the digital RX and TX UART signals. When accessing these signals, the J27 header must be left open and the J5 header must have a shunt placed across pins 2 and 3.

There are five speed LEDs on this daughter card that are labeled “P0” to “P4” which correspond to downstream Port 0 to Port 4. When a USB device is connected to a USB downstream port, the LED color will indicate the bus speed for the corresponding USB port: yellow indicates USB 2.0 and blue indicates USB 3.0. If there is no downstream device connected, the corresponding LED will be turned OFF.

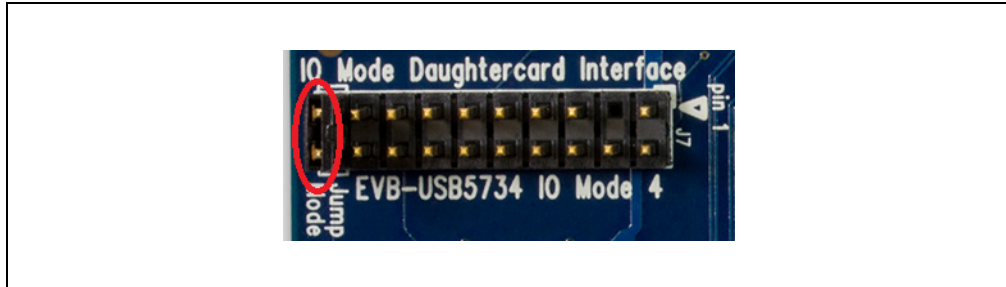
FIGURE 3-3: IO MODE 3 DAUGHTER CARD



3.1.4 Mode 4: GPIO Mode

Mode 4 is the default IO configuration for the EVB-USB5734. There is no daughter card for Mode 4 operation. For the USB5734 to be set into GPIO Mode, a jumper needs to be placed across pins 19 and 20 on the 2x10 IO connector J7. When in GPIO mode, the programmable function pins of the USB5734 are set to TBD status. This mode is used for implementations that use the external SPI ROM and allows for custom configurations. The GPIO4/GPIO5 header J28 can be used in this mode to access the digital RX and TX UART signals. When accessing these signals, the J27 header must be left open and the J5 header must have a shunt placed across pins 2 and 3.

FIGURE 3-4: IO MODE 4 (NO DAUGHTER CARD)



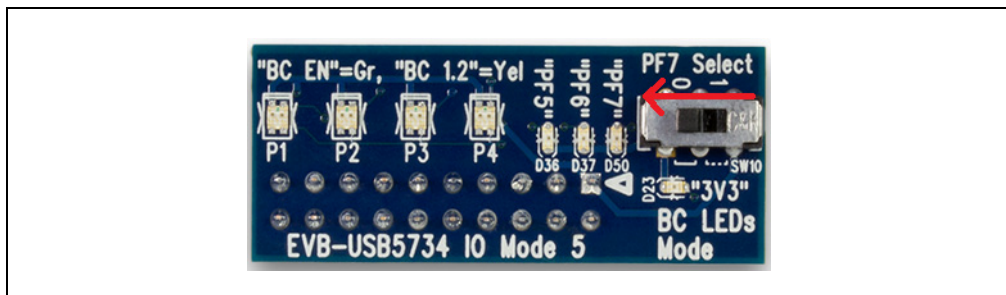
3.1.5 Mode 5: Battery Charging LEDs Mode

The Mode 5 IO daughter card configures the USB5734 IO signals to indicate Battery status, with three IO signals configured as GPIO signals. Once inserted onto the EVB-USB5734, the “3V3” Power LED should turn on green. The GPIO4/GPIO5 header J28 can be used in this mode to access the digital RX and TX UART signals. When accessing these signals, the J27 header must be left open and the J5 header must have a shunt placed across pins 2 and 3.

There are seven LEDs on this daughter card. The first four LEDs labeled P1 to P4 indicate the battery charge status of Ports 1 through 4. The LEDs “P1” - “P4” will turn on green to indicate that battery charging is enabled on the corresponding USB port. If a battery charging device is connected to a BC enabled port and BC1.2 negotiation is successful, the corresponding LED will turn yellow. There are also three GPIO LEDs on this daughter card that are labeled “PF5” - “PF7”. LEDs “PF5” and “PF6” are indicators for when GPIO8 and GPIO10 are set as outputs using the USB to GPIO bridge function. When these pins are driven high, the associated “PFx” LED(s) will turn on green. When these pins are driven low, the associated “PFx” LED(s) will be OFF. The “PF7” LED is provided to indicate the state of the PF7 Select switch (SW10) as described below.

There is one slide switch on this daughter card. The PF7 Select switch (SW10) allows the user to manually select whether the PROG_FUNC7 pin should be driven high or low. The USB to GPIO bridge function is used to configure GPIO11 and sample the state of SW10. The default setup is to slide this switch into the 0 or Low position which will turn the “PF7” LED off. When the PF7 Select switch is in the 1 or High position, the “PF7” LED will turn on green.

FIGURE 3-5: IO MODE 5 DAUGHTER CARD



3.1.6 Mode 6: UART Mode

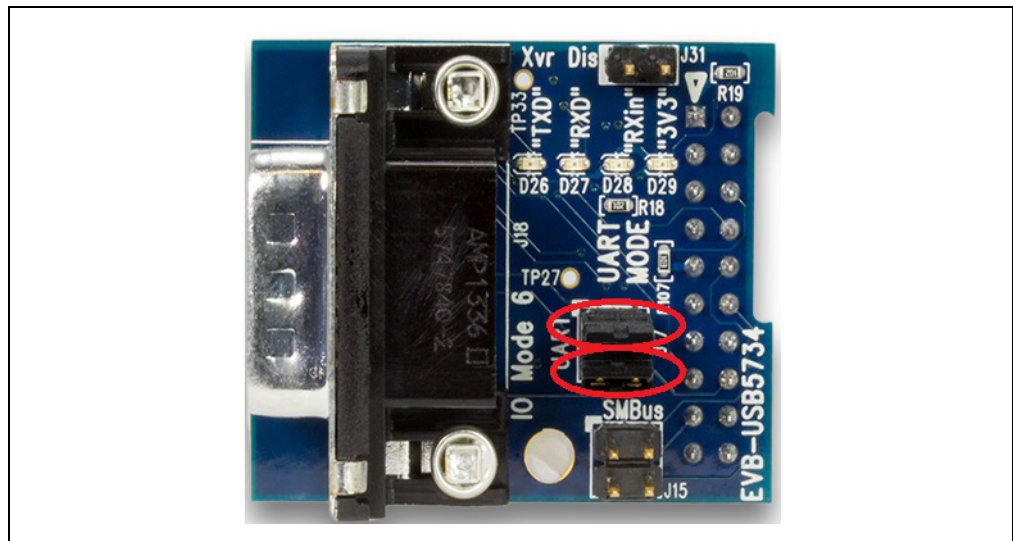
The Mode 6 IO daughter card configures the USB5734 into UART Mode. To insert this daughter card onto the EVB-USB5734, mate its 2x10 connector on the bottom side with the 2x10 IO connector on the EVB-USB5734, as done with the other IO cards. This daughter card has an additional standoff that inserts between the daughter card and the main EVB which provides extra support to the IO card.

Once inserted onto the EVB-USB5734, the “3V3” Power LED should turn on green. An **SMBus** header J15 is provided for accessing the SMDAT and SMCLK signals of the USB5734 while in UART Mode. There is a DTE serial connector on board (J18) which connects to a MAX3243 IC for RS232 communication. A 2x2 **UART** header J17 is provided so that the user can have the capability of using a straight cable or a simple null-modem cable. The default setup is to jumper pins 1-2 and 3-4 for a straight cable configuration. If a simple null-modem cable is used, then pins 1-3 and 2-4 should be placed together on the J17 header. The “TXD” and “RXD” LEDs on this daughter card will turn on green to indicate activity on these signals.

There are two supported UART operations when using this IO card. The default operation is for normal flow control in which the user communicates through the DTE connector with the MAX3243 transceiver in circuit. In this configuration, the **Xvr Disable** header J31 header should be left open. The second option available is to have no flow control with the MAX3242 transceiver removed from the circuit. In this configuration, the **Xvr Disable** header J31 should have a jumper across pins 1-2 in order to disable the MAX3242. The UART signals can then be accessed via the **UART** header J28 on the EVB-USB5734. Also for this operation, there must be a jumper placed across pins 2 and 3 of the J5 header on the EVB-USB5734 and the J27 header must be left open.

Note: Use of this IO daughter card prevents the use of the on-board SPI and SMBus Slave.

FIGURE 3-6: IO MODE 6 DAUGHTER CARD

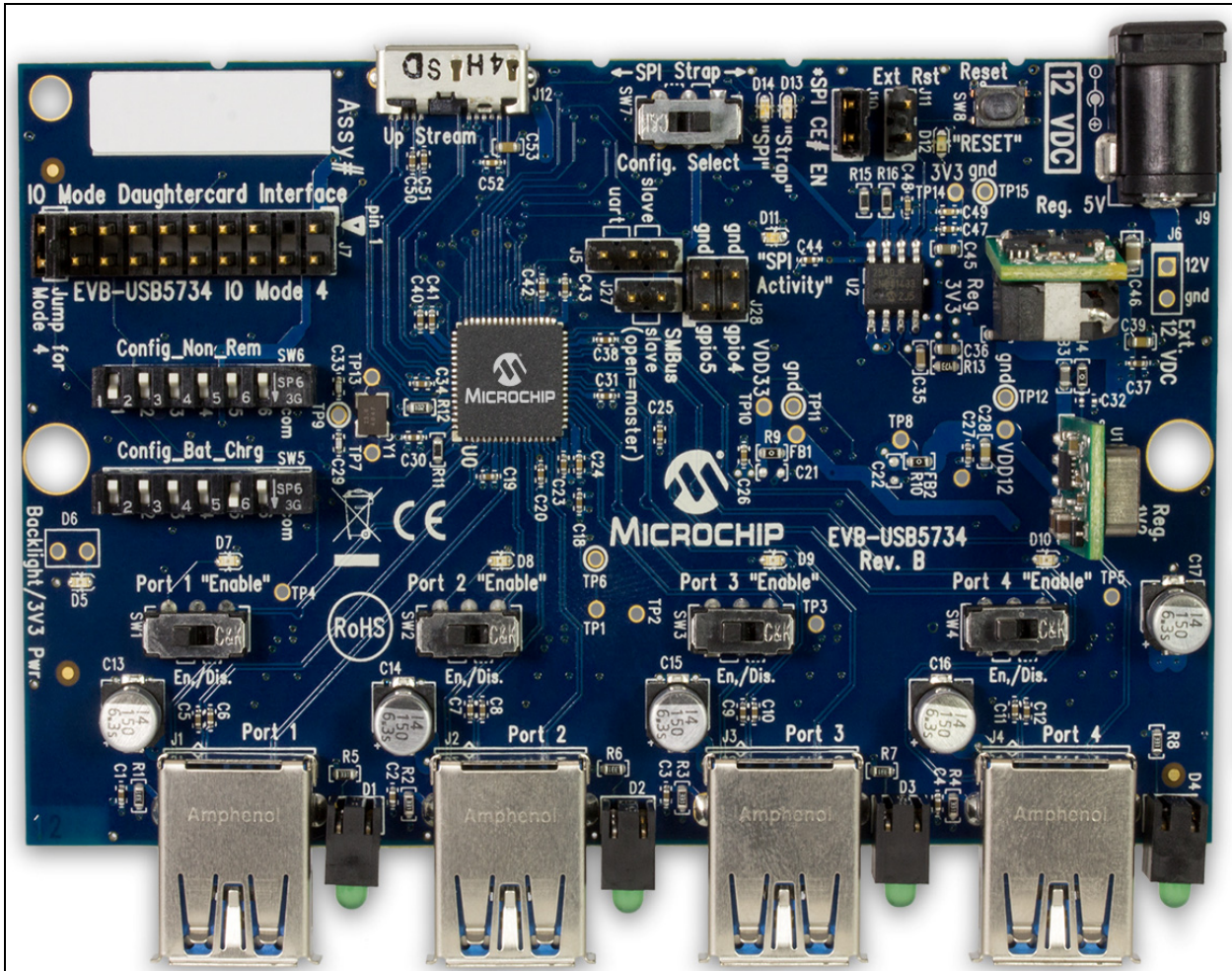


Appendix A. EVB-USB5734 Evaluation Board

A.1 INTRODUCTION

This appendix shows the EVB-USB5734 Evaluation Board.

FIGURE A-1: EVB-USB5734 EVALUATION BOARD





Appendix B. EVB-USB5734 Schematics

B.1 INTRODUCTION

This appendix shows the EVB-USB5734 Evaluation Board schematics.

FIGURE B-1: EVB-USB5734 EVALUATION BOARD SCHEMATIC 1

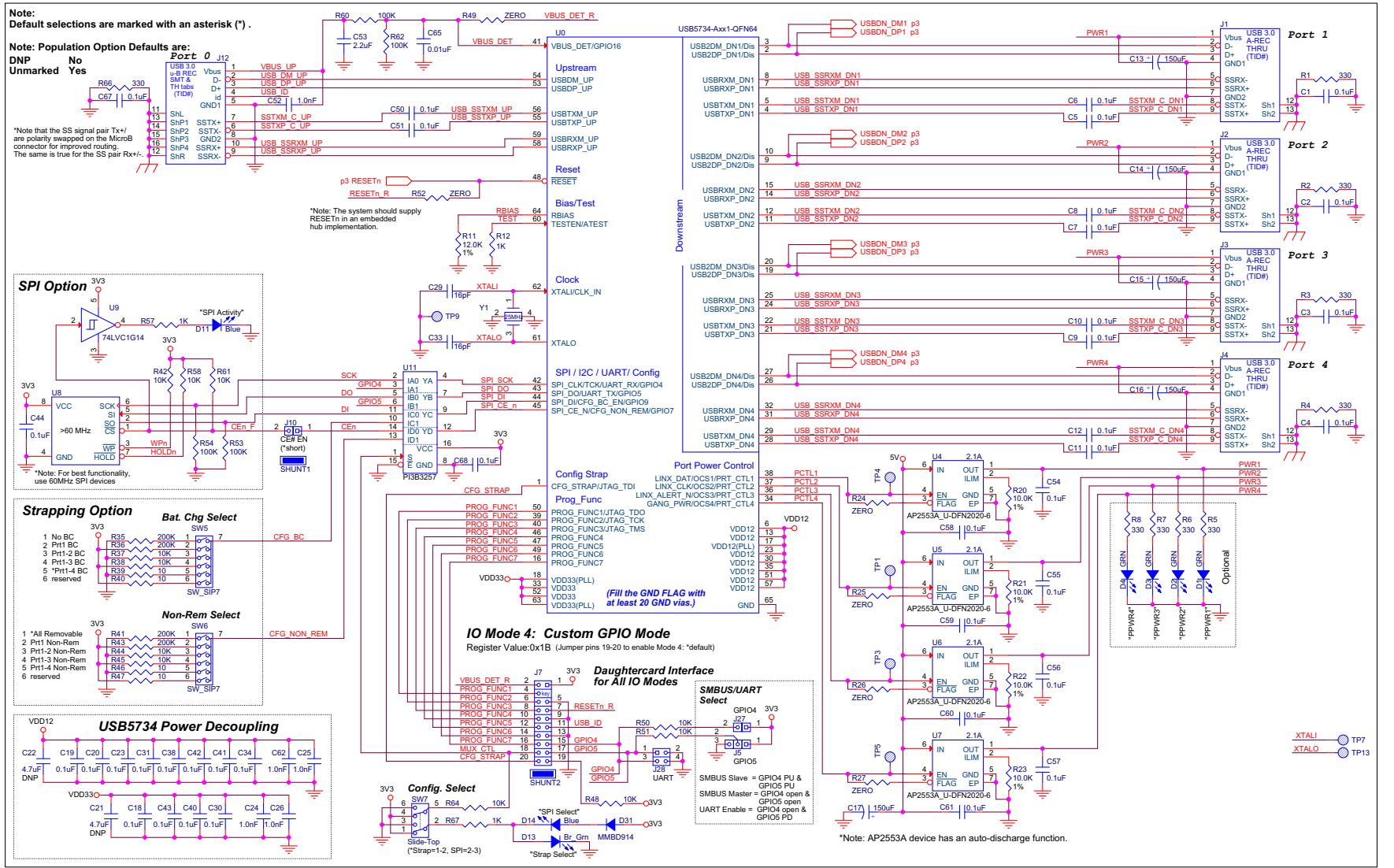
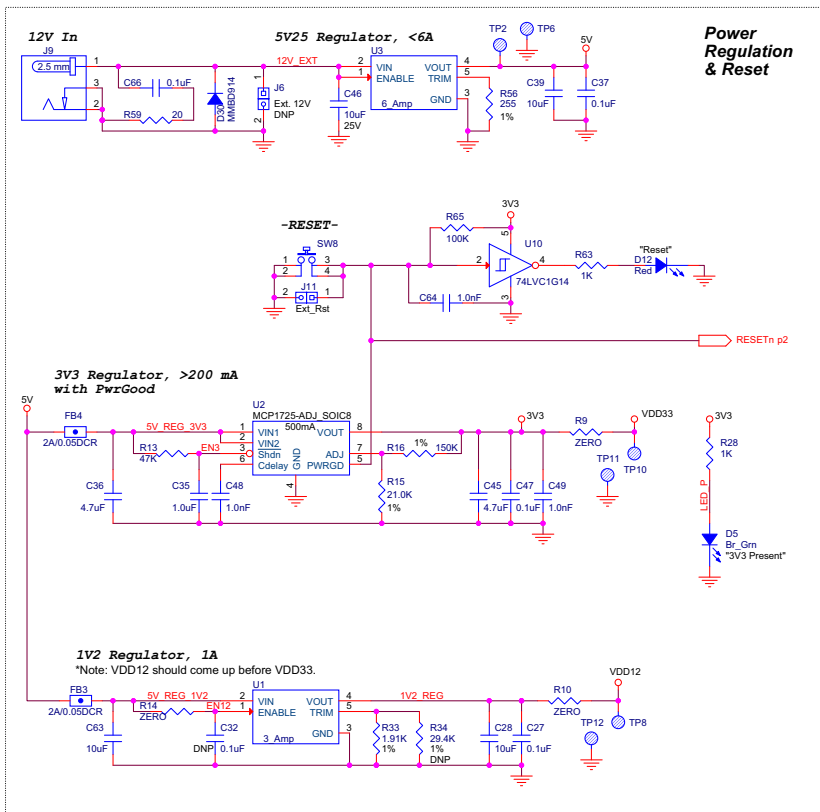


FIGURE B-2: EVB-USB5734 EVALUATION BOARD SCHEMATIC 2



Port Disable Strap Option

*Note: Pull up both DP and DM on a port to disable it.
 (*1-2, Port Enabled, 2-3, Port Disabled)

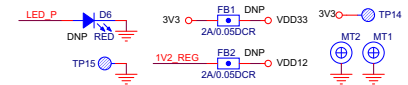
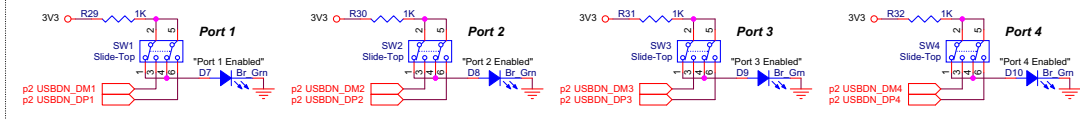
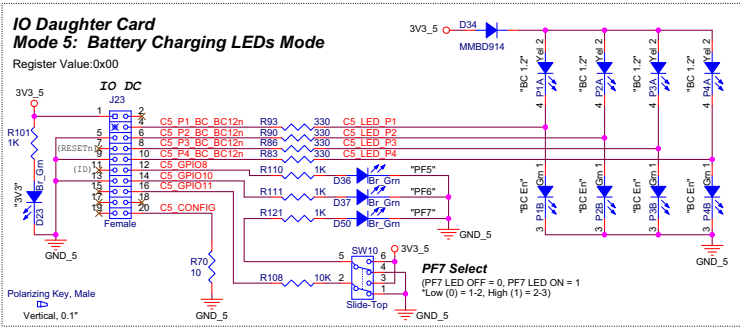
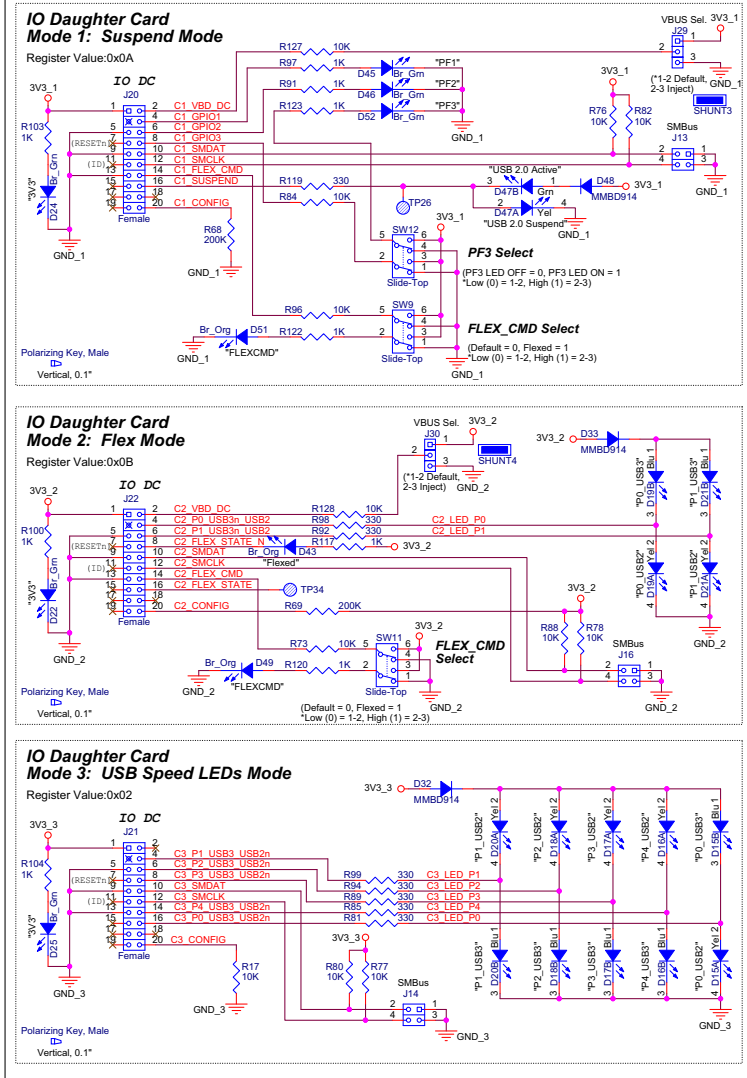
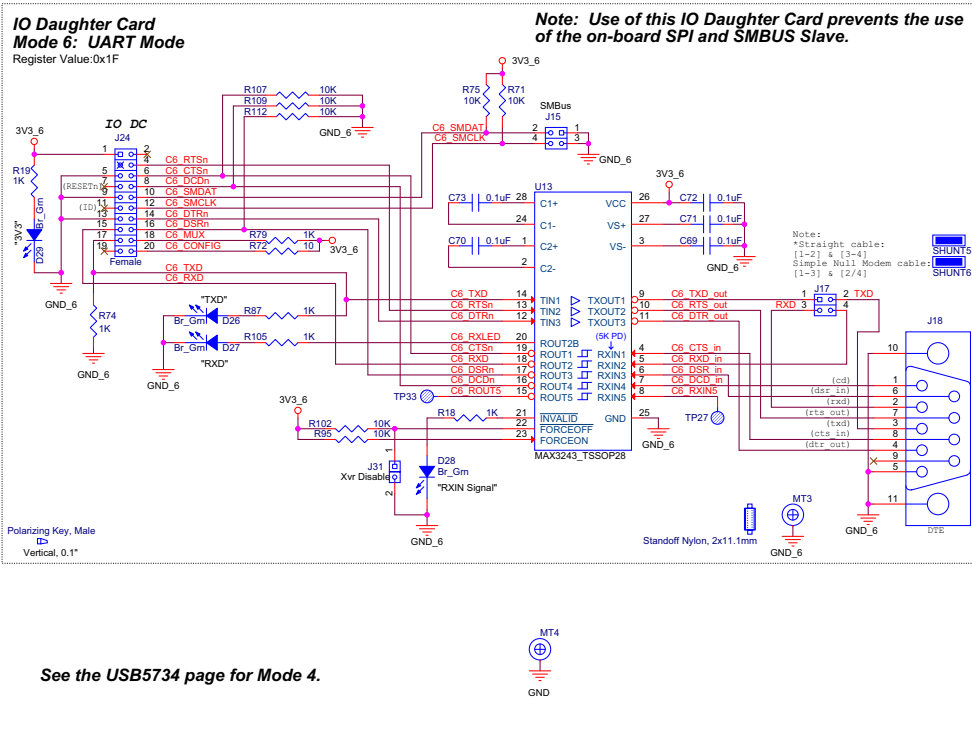


FIGURE B-1: EVB-USB5734 EVALUATION BOARD SCHEMATIC 3



Note: Use of this IO Daughter Card prevents the use of the on-board SPI and SMBUS Slave.





Appendix C. EVB-USB5734 BOM

C.1 INTRODUCTION

This appendix shows the EVB-USB5734 Evaluation Bill of Materials

TABLE C-1: EVB-USB5734 EVALUATION BOARD BILL OF MATERIALS

Item	Qty	Reference Designator(s)	Description	Manufacturer	Manufacturer Part Number
1	41	C1,C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,C12,C18,C19,C20,C23,C27,C30,C31,C34,C37,C38,C40,C41,C42,C43,C44,C47,C50,C51,C54,C55,C56,C57,C58,C59,C60,C61,C66,C67,C68	Capacitor, 0.1uF, 10%, 25V, X5R, 0402	Murata	GRM155R61E104KA87D
2	5	C13,C14,C15,C16,C17	Capacitor, Low ESR, 150uF, 6.3VDC, 20%, Aluminum, Radial-SMT, 5mm x 5.7mm	Lelon	VZS151M0JTR-0506
3	8	C24,C25,C26,C48,C49,C52,C62,C64	Capacitor, 1000pF, 50V, 10%, X7R, 0402	Murata	GRM155R71H102KA01D
4	2	C28,C39	Capacitor, 10uF, 6.3VDC, 20%, X5R, 0603	Murata	GRM188R60J106ME47D
5	2	C29,C33	Capacitor, 16pF, 50V, 2%, NPO, 0402	Murata	GRM1555C1H160GA01D
6	1	C35	Capacitor, 1.0uF, 16VDC, 10%, X5R, 0603	Murata	GRM188R61C105KA93D
7	2	C36,C45	Capacitor, 4.7uF, 6.3VDC, 20%, X5R, 0603	Murata	GRM188R60J475KE19D
8	2	C46,C63	Capacitor, 10uF, 25 VDC, 10%, 0805	Murata	GRM21BR61E106KA73L
9	1	C53	Capacitor, 2.2uF, 6.3VDC, 10%, X5R, 0603	Murata	GRM185R60J225KE26D
10	1	C65	Capacitor, 0.01uF, 25V, 10%, X7R, 0402	Murata	GRM155R71E103KA01D
11	5	C69,C70,C71,C72,C73	Capacitor, 0.1uF, 50V, 10%, X5R, 0402	Taiyo Yuden	UMK105BJ104KV-F
12	6	D30,D31,D32,D33,D34,D48	Diode, MMBD914LT, Fast Switching, 100VDC, 200mA, SOT-23	On Semiconductors	MMBD914LT1
13	4	D1,D2,D3,D4	LED, Green, 3mm, Diffused, 0.2" CL-vert, TH, Right Angle	Lumex	SSF-LXH103GD
14	20	D5,D7,D8,D9,D10,D13,D22,D23,D24,D25,D26,D27,D28,D29,D36,D37,D45,D46,D50,D52	LED, Bright Green, 0603	Liteon	LTST-C191KGKT
15	2	D11,D14	LED, Blue, 0603	Stanley Electric	DB1111C-TR
16	1	D12	LED, Red, 0603	Stanley Electric	BR1111C-TR
17	7	D15,D16,D17,D18,D19,D20,D21	LED, Dual, Yellow/Blue, SMT-0605	Lite-On	LTST-C195TBKSKT-5A
18	3	D43,D49,D51	LED, Bright Orange, 160mcd, 20mA, 0603	Kingbright	APT1608SECK
19	5	P1,P2,P3,P4,D47	LED, Dual, Yellow/Green, SMT-0605	Lite-On	LTST-C195KGJSKT
20	2	FB3,FB4	Ferrite Bead, 220 Ohm, 2A, 0.05DCR, 0603	Murata	BLM18EG221SN1D
21	21	R1,R2,R3,R4,R5,R6,R7,R8,R66,R81,R83,R85,R86,R89,R90,R92,R93,R94,R98,R99,R119	Resistor, 330, 5%, 1/16W, 0603	Panasonic	ERJ-3GEYJ331V
22	9	R9,R10,R14,R24,R25,R26,R27,R49,R52	Resistor, ZERO, 0.1W, 0603	Panasonic	ERJ-3GEY0R00V
23	1	R11	Resistor, 12.0K, 1%, 1/16W, 0603	Panasonic	ERJ-3EKF1202V
24	28	R12,R18,R19,R28,R29,R30,R31,R32,R57,R63,R67,R74,R79,R87,R91,R97,R100,R101,R103,R104,R105,R110,R111,R117,R120,R121,R122,R123	Resistor, 1K, 5%, 1/16W, 0603	Panasonic	ERJ-3GEYJ102V

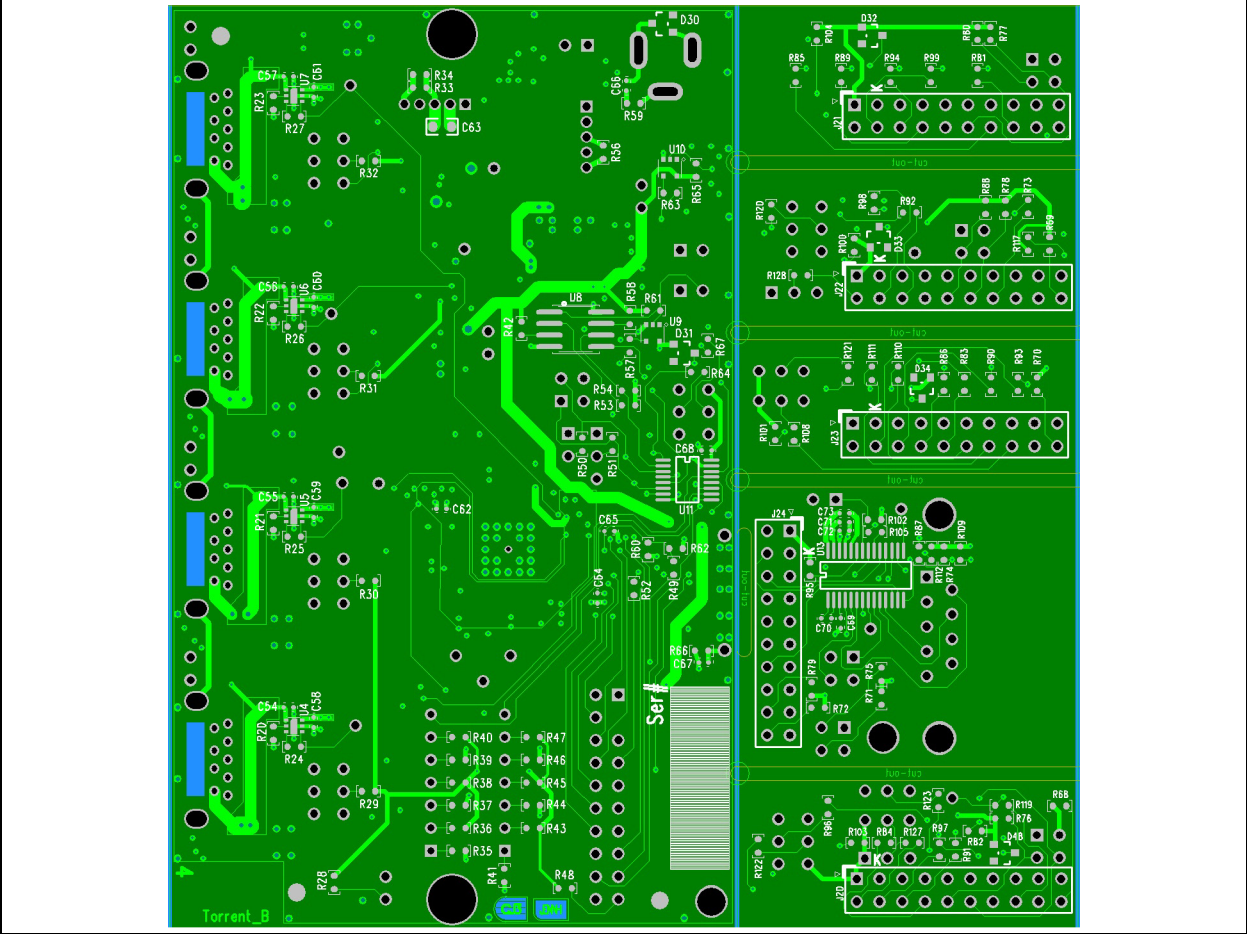
TABLE C-1: EVB-USB5734 EVALUATION BOARD BILL OF MATERIALS (CONTINUED)

Item	Qty	Reference Designator(s)	Description	Manufacturer	Manufacturer Part Number
25	1	R13	Resistor, 47K, 5%, 1/16W, 0603	Yageo America	9C06031A4702JLHFT
26	1	R15	Resistor, 21.0K, 1%, 1/10W, 0603	Panasonic	ERJ-3EKF2102V
27	1	R16	Resistor, 150K, 1%, 1/16W, 0603	Panasonic	ERJ-3EKF1503V
28	31	R17,R37,R38,R42,R44,R45,R48,R50,R51,R58,R61,R64,R71,R73,R75,R76,R77,R78,R80,R82,R84,R88,R95,R96,R102,R107,R108,R109,R112,R127,R128	Resistor, 10K, 5%, 1/16W, 0603	Panasonic	ERJ-3GEYJ103V
29	4	R20,R21,R22,R23	Resistor, 10.0K, 1%, 1/16W, 0603	Rohm	MCR03EZHF1002
30	1	R33	Resistor, 1.91K, 1%, 1/10W, 0603	Stackpole Electronics	RMCF0603FT1K91
31	6	R35,R36,R41,R43,R68,R69	Resistor, 200K, 5%, 1/10W, 0603	Vishay/Dale	CRCW0603200KJNEB
32	6	R39,R40,R46,R47,R70,R72	Resistor, 10, 5%,1/16W, 0603	Yageo America	9C06031A10R0JLHFT
33	5	R53,R54,R60,R62,R65	Resistor, 100K, 5%, 1/16W, 0603	Panasonic	ERJ-3GEYJ104V
34	1	R56	Resistor, 255, 1%, 1/10W, 0603	Panasonic	ERJ-3EKF2550V
35	1	R59	Resistor, 20, 5%, 1/10W, 0603	Panasonic	ERJ-3GEYJ200V
36	4	J10,J11,J27,J31	Header, 1 x 2, 0.1 Inch, Vertical		
37	3	J5,J29,J30	Header, 1 x 3, 0.1 Inch, Vertical		
38	6	J13,J14,J15,J16,J17,J28	Header, 2 x 2, 0.1 Inch, Vertical	FCI	67996-272HLF
39	1	J7	Header, 2 x 10, Key position 3, 0.1 Inch, Vertical		
40	5	J20,J21,J22,J23,J24	Header, 2 x 10, Female, Key position 3, 0.1 Inch, Vertical	Harwin	M20-7831046 (Key 3)
41	4	J1,J2,J3,J4	Receptacle, USB 3.0, Style A, Right Angle, with TID#, Through-hole	Amphenol	GSB311131HR
42	1	J12	Receptacle, USB 3.0, Style MicroB, Right Angle, SMT, with TID#, TH Tabs	Hirose Electric Co Ltd	ZX360D-B-10P
43	1	J9	Connector, Power Jack, 2.5 mm x 5.5 mm, 12 V, 4 A, Right Angle, TH	Cui Stack	PJ-002BH
44	1	J18	Connector, DB-9M, Right Angle	AMP	747840-2
45	9	SW1,SW2,SW3,SW4,SW7,SW9,SW10,SW11,SW12	Switch, DPDT, Slide, Sub-Mini, Top Actuator, TH	C&K	JS202011CQN
46	2	SW5,SW6	Switch Array, SPST, 6 Position, SIP-7	CK	SPA06B
47	1	SW8	Switch, Momentary, SPST, 50mA, J-lead, NO, MicroMini	C&K Components	PTS810 SJM 250 SMTR LFS
48	1	U0	IC, USB5734 USB 3.0 Hub, 4 port, QFN64	Microchip	USB5734_Axx1-QFN64
49	1	U1	IC, DC-DC Converter Module, 0.591-6 Vout, ~12 Vin, 0.591-6 VDC out, 3A, 5 pin SIP, 0.41" Wide	Murata	OKR-T/3-W12-C
50	1	U3	IC, DC-DC Converter Module, 0.591-6 Vout, ~12 Vin, 0.591-6 VDC out, 6A, 5 pin SIP, 0.41" Wide	Murata	OKR-T/6-W12-C

TABLE C-1: EVB-USB5734 EVALUATION BOARD BILL OF MATERIALS (CONTINUED)

Item	Qty	Reference Designator(s)	Description	Manufacturer	Manufacturer Part Number
51	1	U2	IC, MCP1725-ADJE/SN, LDO Regulator, Adj., 500 mA, SOIC8	Microchip	MCP1725(T)-ADJE/SN
52	4	U4,U5,U6,U7	IC, AP2553AFDC-7, Power Distribution Switch, U-DFN2020-6	Diodes Inc.	AP2553AFDC-7
53	1	U8	IC, Flash, SPI, SST25VF064C, 64Mb (8M x 8), 2.7V-3.3V, 75MHz (Dual Read), SO8	Microchip	SST25VF064C-80-4I-S3AE
54	2	U9,U10	IC, 74LVC1G14, Inverter, Shottky, DCK	TI	SN74LVC1G14DCKR
55	1	U11	IC, PI3B3257, Quad 2:1 Mux, 3.3V, QSOP-16	Pericom	PI3B3257QE
56	1	U13	IC, RS/232 Xcvr, '3243, 3-5.5V, TSSOP28	Intersil	ICL3243EIVZ
57	1	Y1	Crystal, 25.000MHz, 30ppm, 10pF, SMT 3.2MM X 2.5MM	Abracon	ABM8G-25.000MHZ-B4Y-T
58	6	SHUNT1,SHUNT2,SHUNT3,SHUNT4,SHUNT5, SHUNT6	Shunt, Insulated, 0.1 Inch	TE Connectivity	881545-2
59	5		Polarizing Key, Male, 0.1 Inch, Vertical	Molex	0015040292
60	1		PCB Nylon Standoff, 2mm x 11.1mm	Eagle Plastic Devices	561-DMSP437
61	4	-none	Foot, Silicone Rubber, Adhesive, Clear, Cylindrical, .500"x.250"	Bumper Specialties	RBS-6
62	1	LBL-SERNO	Label, Serial Number, Laminated, 250 x 800	Brother	1/4" x 0.8"
63	1	LBL-ASSY1	Label, Assembly Number, Laminated, 250 x 800, "EVB-USB5734_B"	Brother	1/4" x 0.8"
64	1	PCB Fab	PCB, Torrent (EVB-USB5734), Rev. B		Torrent_B

FIGURE D-2: EVB-USB5734 BOTTOM SILK SCREEN



NOTES:



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China - Zhuhai
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Fax: 91-80-3090-4123

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India - Pune
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Japan - Osaka
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Japan - Tokyo
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Fax: 81-3-6880-3771

Korea - Daegu
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Fax: 82-53-744-4302

Korea - Seoul
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Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Kuala Lumpur
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Fax: 60-3-6201-9859

Malaysia - Penang
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Philippines - Manila
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Fax: 63-2-634-9069

Singapore
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Fax: 886-3-5770-955

Taiwan - Kaohsiung
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Taiwan - Taipei
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