USB375x Evaluation Board User Manual

1 Introduction

This user manual is for the USB3750 Evaluation board. This board can be used to test and evaluate the functionality of the USB3750 and USB3751. The USB375x EVB exposes the upstream and downstream ports, as well as the I^2C communication pins.

There is also SMSC software that can be used with the USB375x EVB and a Total Phase Aardvark adaptor that can be used to communicate with the USB3750. This software can be used to evaluate the functionality of the USB3750, prototype microprocessor software, and test how the USB3750 fits into the entire system. The Total Phase Aardvark adaptor is not included with the USB375x EVB.

2 Hardware

The USB375x EVB is a simple board that demonstrates the capabilities of the USB3750. The board consists of the upstream and downstream ports, a VOUT LED for visual confirmation of the switch functionality, an I^2C header exposing the I^2C pins, and additional circuitry that is used for proper I^2C communication.

2.1 USB Ports

The USB ports are mounted on the edges of the USB375x EVB. The downstream ports use the standard USB Type A receptacle. The label for the port is located below the receptacle. The upstream port can be a standard USB Type B, mini-B or micro-B receptacle.

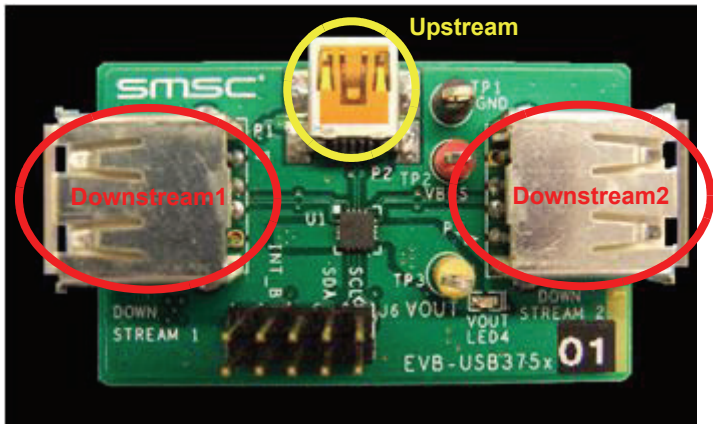

Figure 2.1 Upstream and Downstream Ports

2.2 Test Points and LEDs

The USB375x EVB also breaks out the remaining pins. **TP1** connects to GND, **TP2** connects to the VBUS pin, and **TP3** connects to the VOUT pin. The VOUT pin is also connected to **LED4** to confirm that the OVP switch is enabled or disabled. When the LED turns on, the OVP switch is closed and power can flow from the upstream port to VOUT.

The SCL, SDA and INT_B pins are also exposed on the **J6** header. These pins are compatible with the Aardvark pinout, where pin 1 of the Aardvark connector connects to pin 1 of the header or SCL.

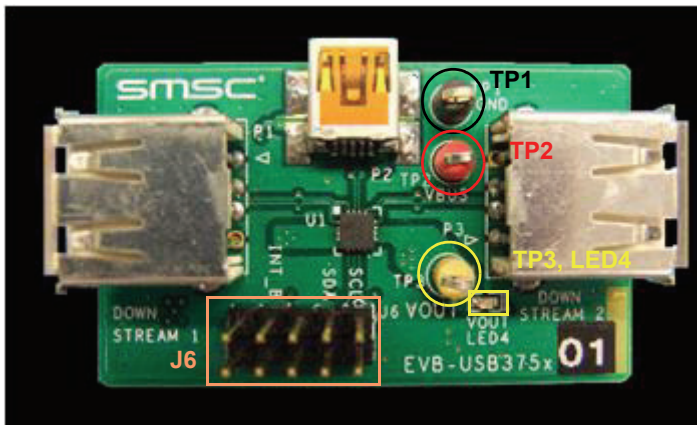

Figure 2.2 Test points, LED and Header

2.3 Vcc I²C Regulator

The USB375x EVB contains circuitry to pull up the I²C pins to a specified Vcc voltage. The Vcc voltage can be adjusted by choosing the proper **R21** resistance. **R10, R11** and **R12** are used to pull the I²C pins up to Vcc. The current value of the I²C pullups are10kΩ, but a smaller value may need to be selected for 1MHz operation. The current Aardvark speed is at a very slow clock speed.

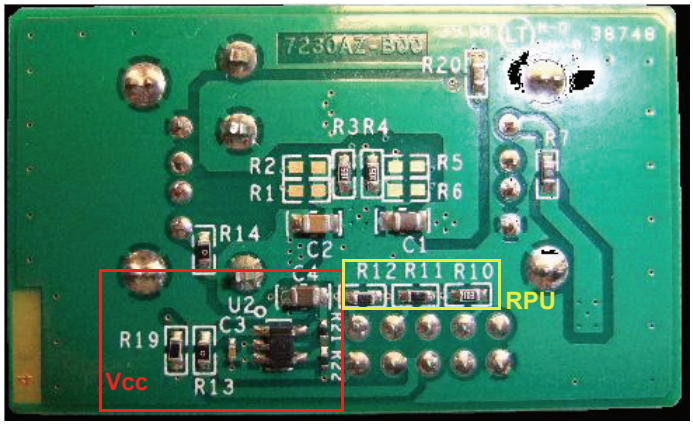

Figure 2.3 Vcc Regulator and I²C Pull-up Resistors

3 Software

The USB375x EVB comes with a CD that contains evaluation software that can be used with the Total Phase Aardvark adaptor. To install the software, run **Setup.exe**, found on the CD. This will install the USB3750 Evaluation Software, the LabVIEW Run-time engine (to run the executable), and the Total Phase drivers to communicate with the Aardvark. Once the software has been installed, locate and run the **USB3750 Eval.exe** program on the computer.

The tab on the right is labeled **Charger Detect**; This tab shows how the USB3750 can be used to detect the connection of the upstream port. In this section the code is simply polling the status register, and updating the display accordingly.

Figure 3.1 Charger Detect with No Connection and SDP Connection

The middle tab is labeled **Switch Control**; this tab is a graphical way to change which downstream port is connected to the upstream port. Simply click on the port to route it upstream, and click on the middle of the board to route none of the dowstream ports.

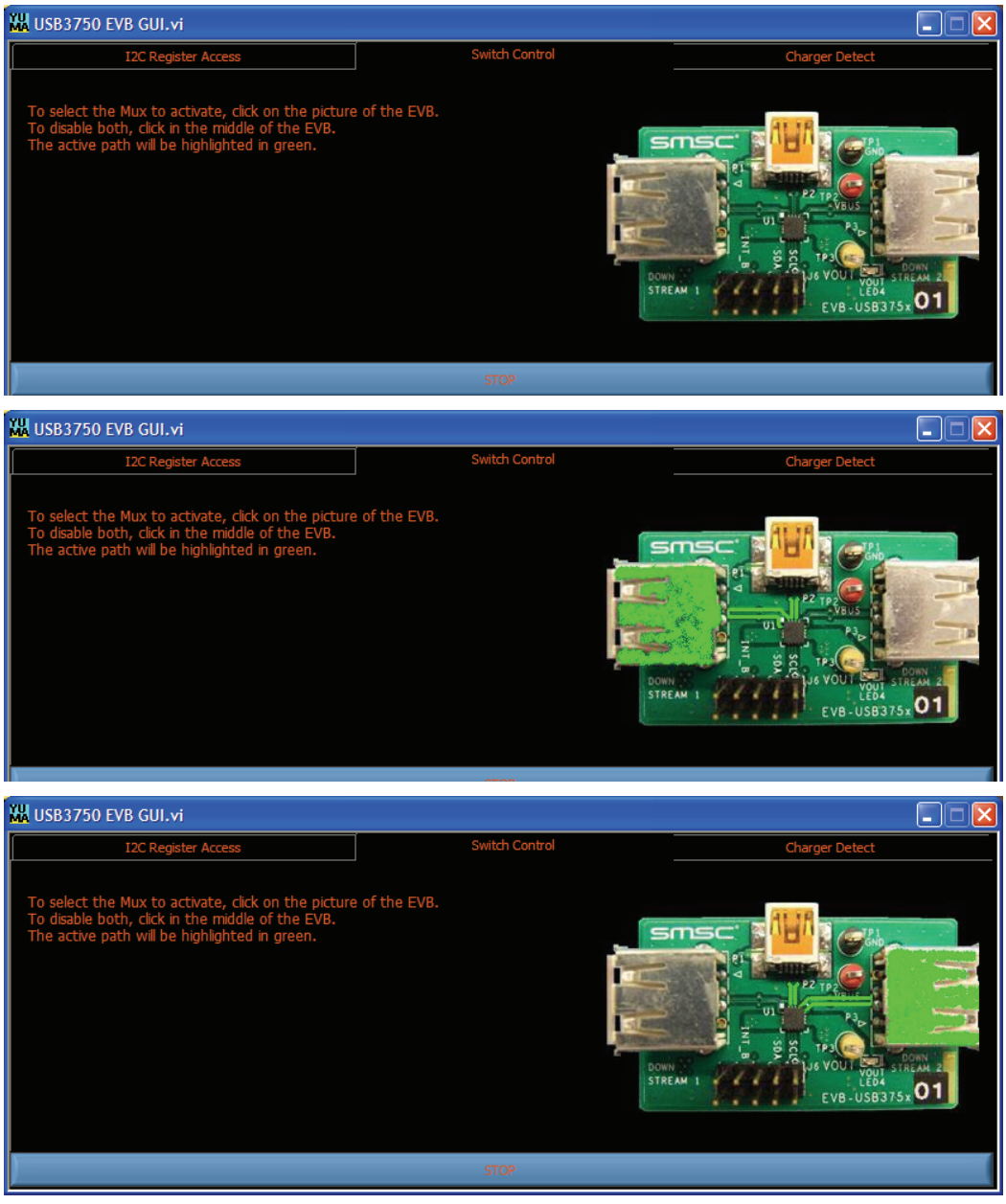

Figure 3.2 Switch Control Options

The left tab contains a general I^2C register read/write screen. The boxes and strings display the bits descriptions found in the USB3750 datasheet. The register menu and digital display can be used to select the proper register to manipulate. The click on the value or bit box above to change the value of the register. Once the desired value and register are selected, press the **Write** button to change the value on the part. Click on the **Read** button and the Value and Bit boxes will update the current value

on the part. Refer to the USB3750 datasheet for a detailed description of each register and operation of the device.

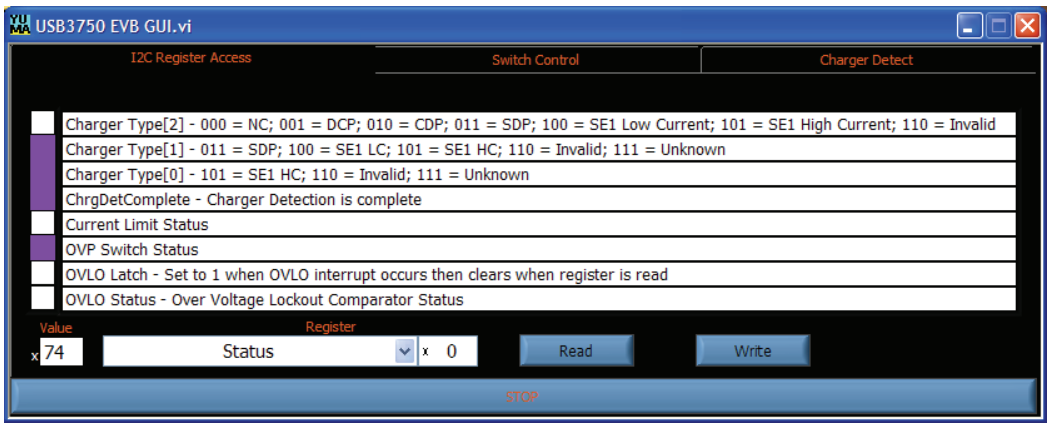

Figure 3.3 I²C Register Access

4 USB375x EVB Schematic

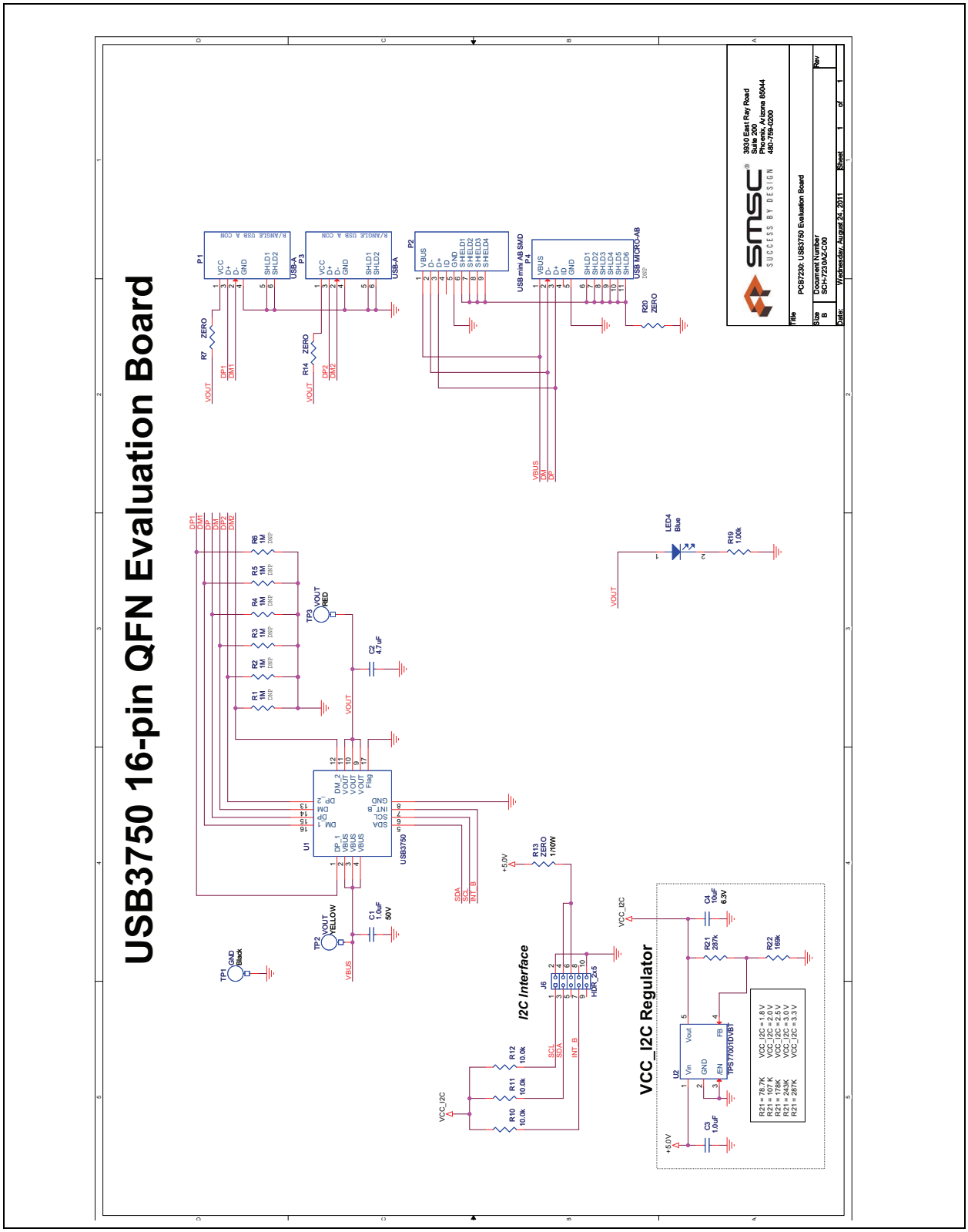

Figure 4.1 USB375x EVB Schematic

5 USB375x EVB Bill of Materials

Item #	Quantity	Part Reference	Description	Digikey_Number	Manuf	Manuf_PN	RoHS	DNP
1	1	C1	CAPACITOR CERAMIC 1.0UF 50V Y5V 0805	445-1364-1-ND	TDK	C2012Y5V1H105Z	Yes	
2	2	C2 C4	CAPACITOR CERAMIC 10UF 6.3VDC 20% X5R 08	PCC2225CT-ND	PANASONIC	ECJ-2FB0J106M	Yes	
3	1	C3	CAPACITOR CERAMIC 1.0UF 6.3V 20% X5R 040	490-1319-1-ND	MURATA ERIE	GRM155R60J105ME19D	Yes	
5	1	J6	HEADER, 2 X 5, 0.1 INCH, VERTICAL	SAM1030-05-ND	SAMTEC	TSW-105-07-L-D	Yes	
6	1	LED4	LED GREEN SMT	404-1005-1-ND	STANLEY	BG1111C-TR	Yes	
7	2	P1 P3	RECEPTACLE, USB, STYLE B, RIGHT ANGLE	609-1045-ND	FCI	87520-0010BLF	Yes	
8	0	P2	CONNECTOR RECEPT USB MINI AB 5POS RT ANG	WM17122CT-ND	MOLEX	56579-0576	Yes	P2
9	1	P4	CONNECTOR RECEPT MICRO USB TYPE AB SMT	A97799CT-ND	TYCO ELECTRONICS	19841584-1	Yes	
10	3	R1 R2 R3 R4 R5 R6	RESISTOR 1MEG OHM 1/10W 5% 0603	311-1.0MGRCT-ND	YAGEO	RC0603JR-071ML	Yes	R1 R2 R3 R4 R5 R6
11	10	R7 R8 R9 R13 R14 R15 R16 R17 R18 R20	RESISTOR ZERO OHM 1/10W 5% 0603	311-0.0GRCT-ND	YAGEO	RC0603JR-070RL	Yes	
12	3	R10 R11 R12	RESISTOR 10.0K OHM 1/10W 1% 0603	311-10.0KHRCT-ND	YAGEO	RC0603FR-0710KL	Yes	
13	2	R21 R22	RESISTOR 78.7K OHM 1/16W 1% 0402 SMD	541-78.7KLCT-ND	VISHAY-DALE	CRCW040278K7FKED	Yes	
14	1	R23	RESISTOR 470 OHM 1% 1/10W 0603	311-470GRCT-ND	YAGEO	RC0603JR-07470RL	Yes	
15	1	TP1	TEST POINT LOOP COMPACT BLACK	5006K-ND	KEYSTONE	5006	Yes	
16	1	TP2	TEST POINT	5015KCT-ND	KEYSTONE	5015	Yes	
17	1	TP3	TEST POINT LOOP COMPACT YELLOW	5009K-ND	KEYSTONE	5009	Yes	
18	1	U1	USB3750		SMSC	USB3750	Yes	
19	1	U2	IC ADJ 50MA LDO REG SOT-23-5	296-2762-1-ND	TEXAS INSTRUMENTS	TPS77001DBVT	Yes	

Figure 5.1 USB375x EVB Bill of Materials