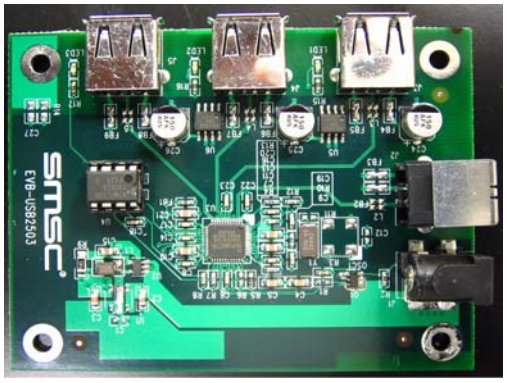
EVB-USB2503 Evaluation Board



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1 Overview

1.1 Features

- Operates from a single voltage (+5.0V, regulated) wall wart external power supply or bus-powered from upstream VBUS
- Onboard +3.3V Regulator (Option A linear, Option B switching regulator)
- Self-powered or bus-powered operation dynamically switched
- Serial EEPROM for configuration information mounted in a socket
- Optional pull-up resistors for disabling individual downstream ports
- Green LED indicators
- Individual port over-current sense and power switching
- Multi-TT enabled
- High-speed/Full-speed capable
- 100mS down stream port power on time
- PCB - 2.6” X 3.5”, 4-layers

1.2 General Description

The primary purpose of this board is to demonstrate a full-featured HUB configuration for the SMSC USB2503 3-port HUB. This does not represent a minimal cost design. A view of the silk screen is shown in figure 1. The EEPROM allows for modifications to the base configuration - for example one or more down stream ports can be disabled or configured as non-removable for compound device application. The DID, PID or DID information can be changed for the HUB.

2 Hardware Functionality

2.1 Dynamic Power Switching

The EVB-USB2503 supports dynamic switching of power. This feature allows a hub to operate as self-powered when external power is available or bus-powered when external power is not available. The USB2503 will reconfigure when it detects pin SELF_PWR changing. For more details on dynamic power switching feature please refer to the data sheet for the USB2503.

2.1.1 Regulator Options

The EVB-USB2503 supports two different 3.3V regulator solutions A and B. Option A uses a standard LDO regulator. For true USB-IF certifiable bus power operation the total power budget exceeds the maximum allowed. However, option B uses a switching regulator with approximately 90% efficiency. This regulator also has a low suspend current feature. The power budget is shown in the table below for different operating conditions. The hub controller current is the maximum current when all three down stream ports are operating.

NOTE:

For reference revision A3 of the schematic in included and is recommended for new designs. The EVB-USB2503 is shipping as revision A2 and does not incorporate the changes from A2 to A3.

2.1.2 Power Budget

Table 1 Power Budget

	HUB CONTROLLER	DOWNSTREAM PORTS	TOTAL
SELF POWERED			
Linear Regulator, Option A	250 mA	1500 mA	1750 mA
Switching regulator, Option B	170 mA	1500 mA	1670 mA
Bus Powered			
Linear regulator, Option A	250 mA	300 mA	550 mA (Note this exceeds USB-IF specification for bus-powered devices, which is 500 mA maximum)
Switching regulator, Option B	170 mA	300 mA	470 mA
Suspend			
Linear regulator, Option A	1.2 mA	1.5 mA	2.7 mA
Switched regulator, Option B	0.9 mA	1.5 mA	2.4 mA

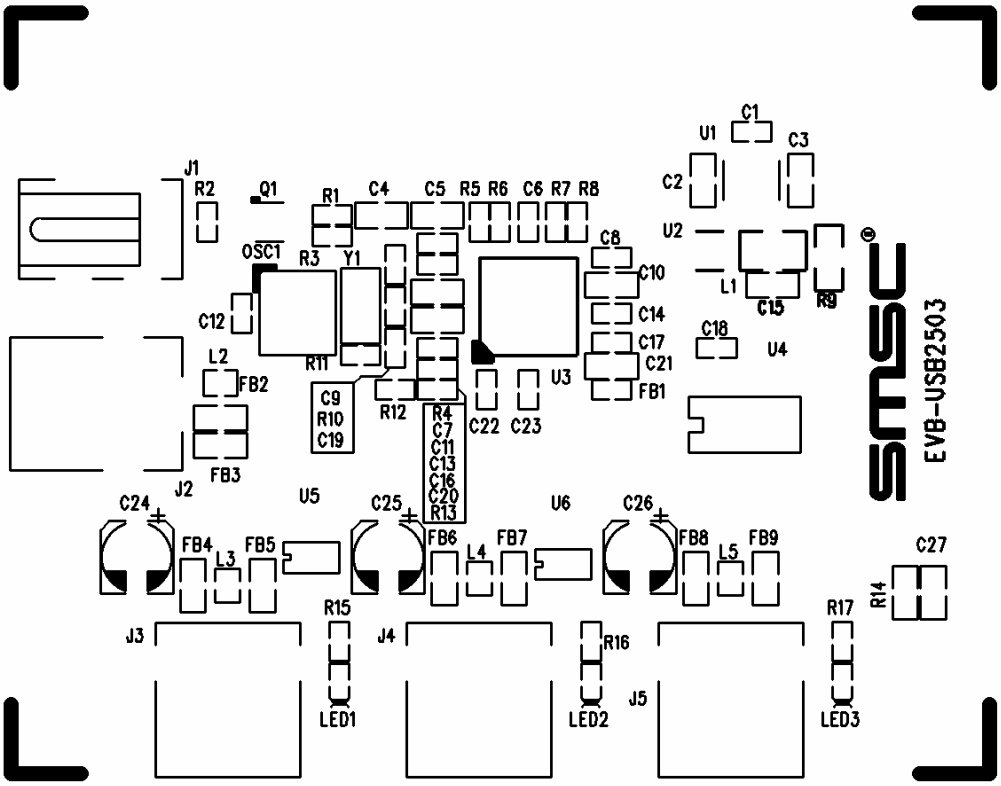

Figure 2.1 Silk screen of EVB-USB2503 PCB.

2.1.3 EEPROM Configuration

The windows utility E2PROMAPP is included in the package to allow modifications of the base configuration EEPROM. The bin file evb-usb2503_02.bin contains the base configuration. A screen shot from the application is shown in figure 2. After changes has been selected click the button "Create EEPROM File". Note that if the output file name is the same as the input file name it will be overwritten with the new values. The output file name can be changed before creating a new bin file. The bin file format is compatible with most EEPROM programmers.

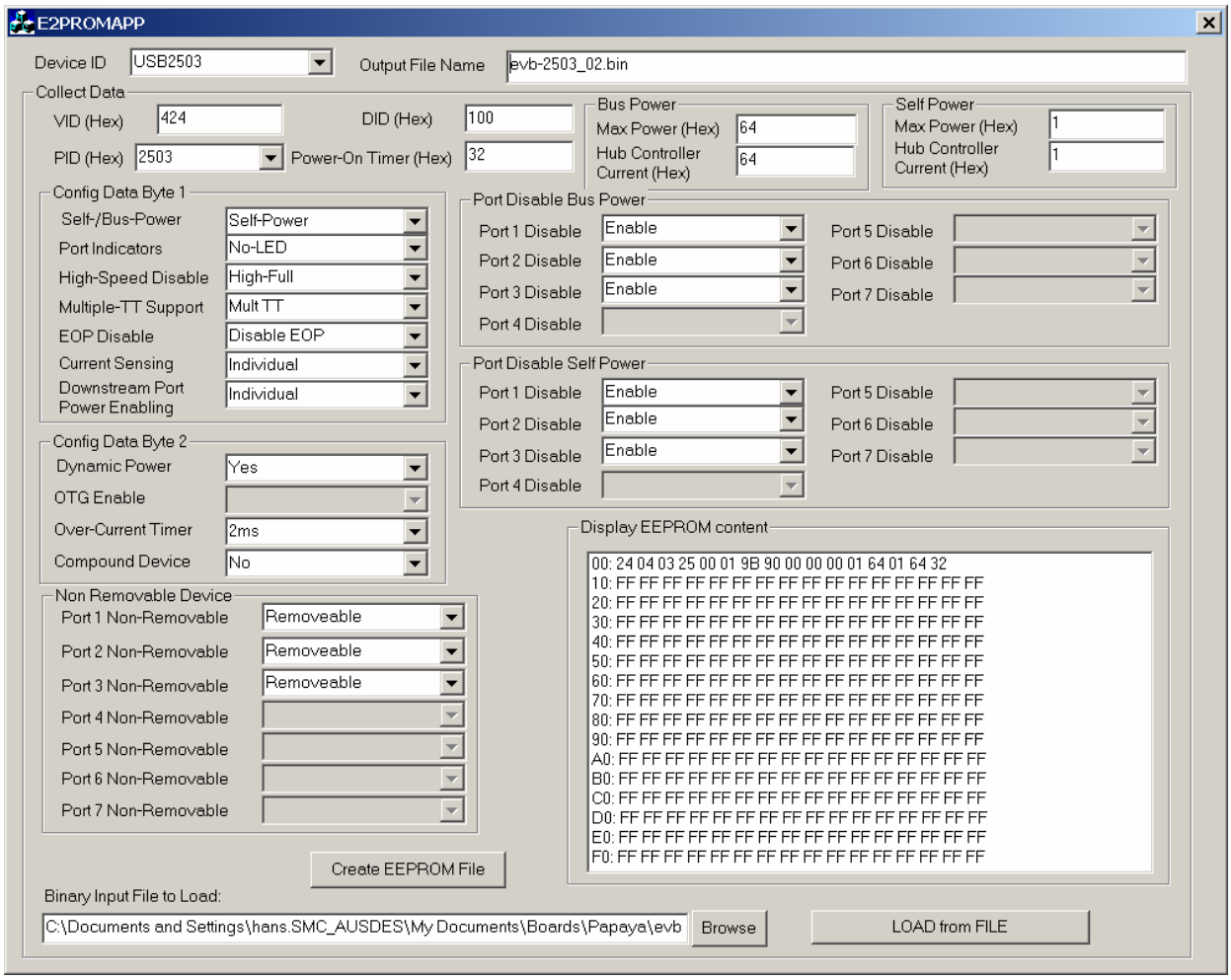

Figure 2.2 E2PROMAPP EEPROM Configuration Utility.