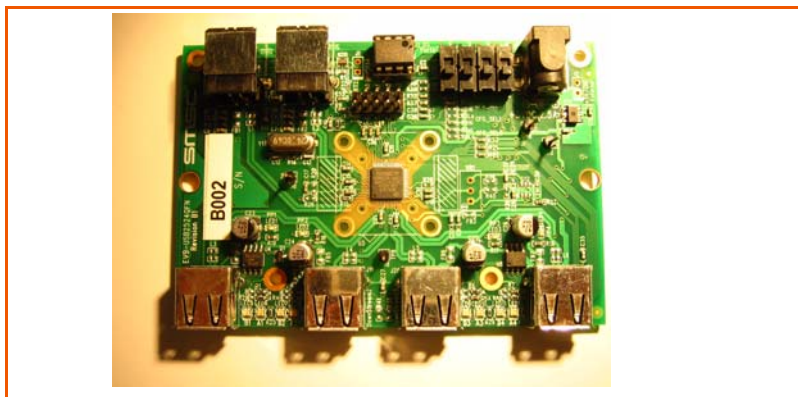


## EVB-USB2524 Evaluation Board Revision B1



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## 1 Overview

The SMSC USB2524 MultiSwitch™ is an USB2.0 compliant switching hub with two up-stream ports and four down-stream ports. The EVB-USB2524 Evaluation Board demonstrates a stand alone application for the switching hub with all the features listed below. Each of the down stream ports can individually be assigned to up-stream port 1 or up-stream port 2. The port assignment can be dynamically changed with user accessible switches individually for each port.

### 1.1 Features

- Operates from a single voltage (+5.0V, regulated) 'wall wart' external power supply
- Low Cost 2-Layer Design
- Self-powered operation
- Multi-TT enabled
- Supports four program selection options: Internal defaults, EEPROM (default), SMBus, Strapping options
- Serial EEPROM for configuration in a socket for easy programming
- Single Onboard +3.3V Regulator
- LED status modes supported: USB, BASIC, and DUAL LED
- Single Crystal Clock Source
- Individual port over-current sensing
- Individual port power control
- High-speed, Full-speed, and Low-speed capable
- Port Assignment interface
- Port OCS/Port Power Control interface
- Optional ESD and EMI footprints are provided

### 1.2 General Description

The EVB-USB2524 is a demonstration and evaluation platform featuring the USB2524 MultiSwitch™ 4-port USB2.0 Switching Hub. It is designed to robustly demonstrate this unique device's features using a low-cost PCB implementation.

The EVB-USB2524 features an on-board EEPROM for VID/PID/DID and configuration strings, such as switching options, LED status options, and non-removable or disabled configuration for each port. The manufacturer, product and serial strings for the hub can be changed in the EEPROM as well.

The EVB-USB2524 can also be configured through changing population of resistors to access internal "strapping options", without using the EEPROM.

The schematic for the EVB-USB2524 indicates which components are required for each configuration option.

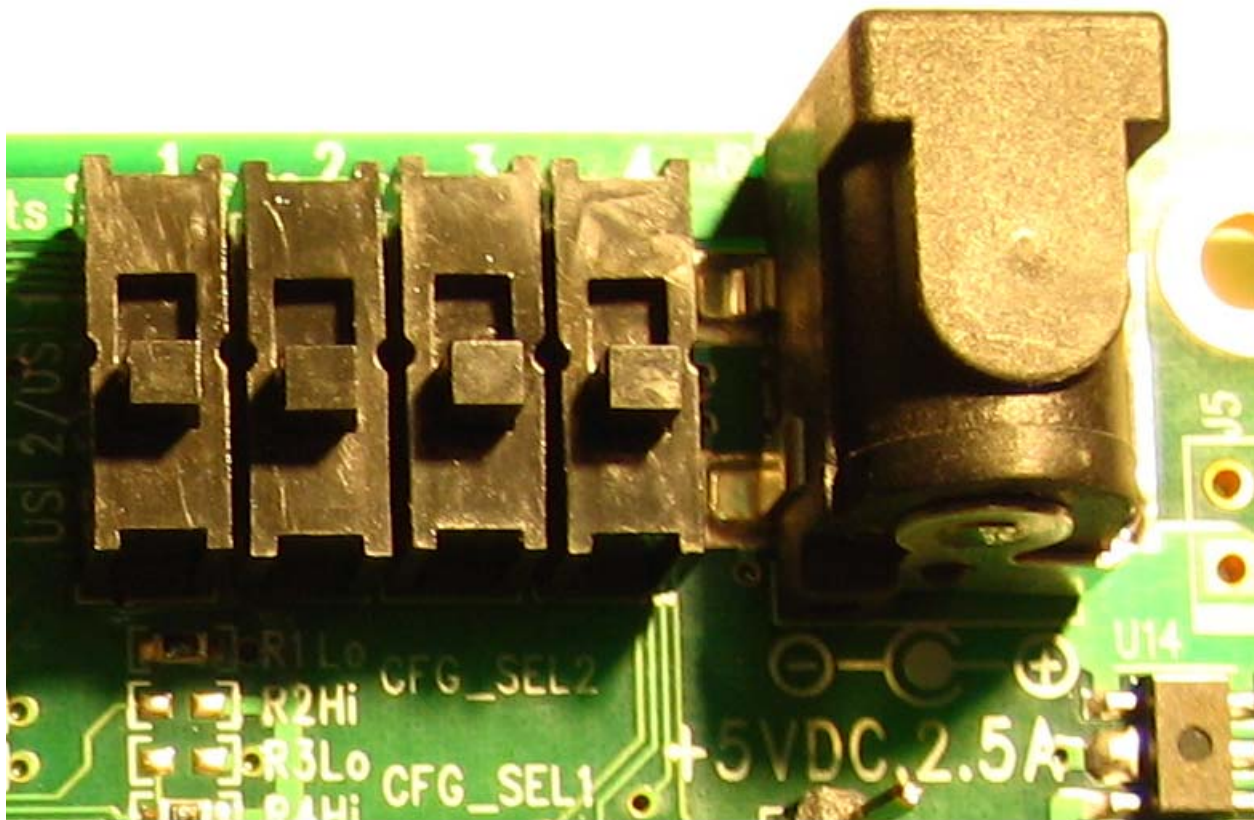
## 2 Getting Started

### 2.1 Port Assignment

The EVB-USB2524 port assignments are selected by four level switches SW1 to SW4 located in the upper right-hand corner. When only one up-stream port, “US 1” or “US 2” is connected to an operational host, all down-stream ports will be assigned to that host. In this case the switches do not have any effect. When both up-stream ports are connected to operational hosts “US 2” is selected with switch in the bottom position and “US 1” with the switch in the top position. Figure 2.1 shows the switches in detail.

Down-stream ports are numbered 1 through 4. The switches are labeled accordingly with the left-most switch controlling down-stream port 1 and the right-most switch close to the supply connector controlling down-stream port 4.

Figure 2.1



## 3 Hardware Configuration

The EVB-USB2524 has two sets of resistor jumpers. The first set selects the USB2524 configuration; internal defaults, SMBus slave or EEPROM configuration. The second set enables dual LED mode.

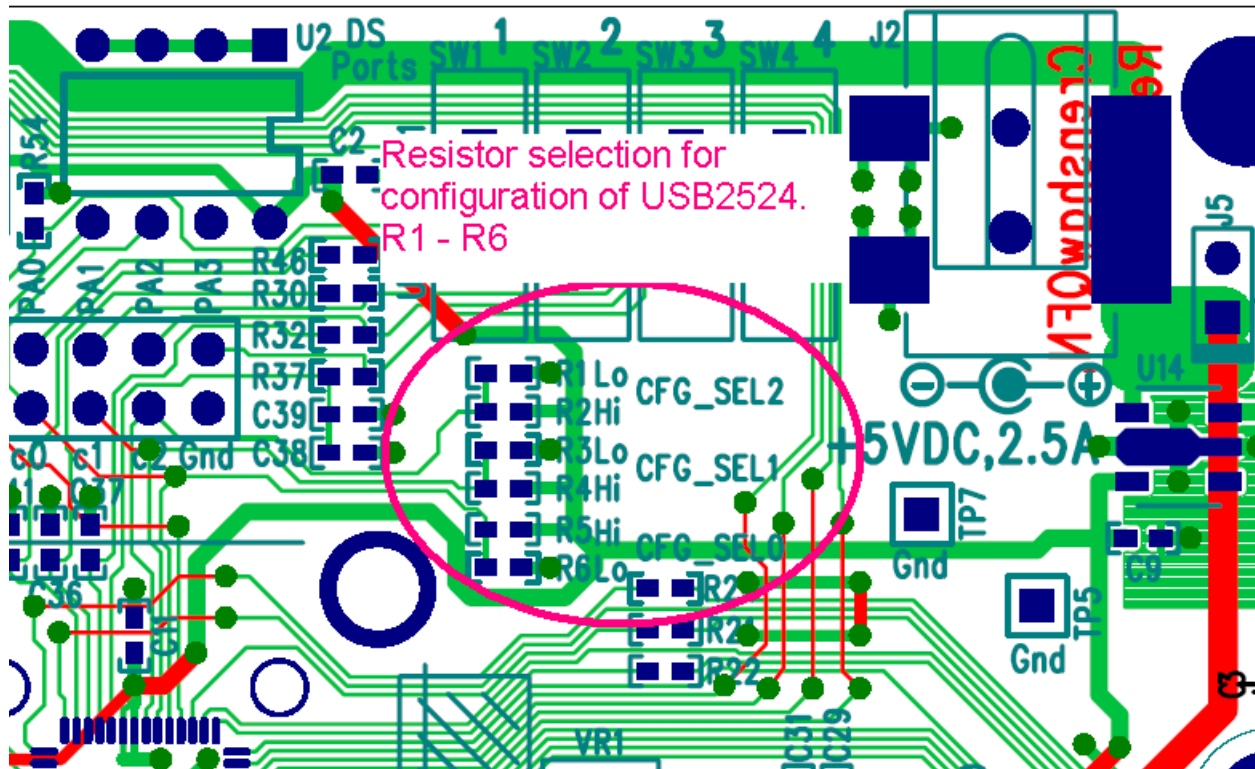
### 3.1 USB2524 Configuration Selection

The USB2524 has three configuration pins CFG\_SEL[2:0], that determines the operating mode of the USB2524. The selection of a configuration is done with six resistor combinations shown in Table 3.1. Only three resistors are installed to either pull up or pull down each configuration pin. Figure 3.1 shows a section of the PCB for the EVB-USB2524 where the resistors are located.

**Table 3.1 Resistor selection for USB2524 configuration**

CFG_SEL2	CFG_SEL1	CFG_SEL0	Configuration
R1	R3	R6	Internal Default Configuration <ul style="list-style-type: none"> <li>■ 3-wire port configuration</li> <li>■ Strap options enabled</li> <li>■ USB LED mode</li> </ul>
R1	R3	R5	SMBus Slave Configuration
R1	R4	R6	Internal Default Configuration <ul style="list-style-type: none"> <li>■ 4-wire port configuration</li> <li>■ Strap options enabled</li> <li>■ USB LED mode</li> </ul>
R1	R4	R5	EERPOM Configuration <b>Note:</b> This is default if no jumpers are populated on J1
R2	R3	R6	Internal Default Configuration <ul style="list-style-type: none"> <li>■ 4-wire (edge) port configuration</li> <li>■ Strap options enabled</li> <li>■ Single mode LED</li> </ul>
R2	R3	R5	Internal Default Configuration <ul style="list-style-type: none"> <li>■ 4-wire (edge) port configuration</li> <li>■ Dual mode LED</li> </ul>
R2	R4	R6	Reserved
R2	R4	R5	Reserved

Figure 3.1 Location of resistors for configuration of USB2524.



## 3.2 LED Configuration

The USB2524 supports three different modes for LED indicators: USB, Basic and DUAL LED. The EVB-USB2524 is configured for Basic LED operation, which means that eight LEDs are used to signal port assignment. Each downstream port has one green and one red LED. When the port is assigned to up-stream port 1 the green LED is lit. When the port is assigned to up-stream port 2 the red LED is lit.

### 3.2.1 Resistors for Dual LED operation

The USB2524 also supports Dual LED mode. This mode indicates up-stream port assignment and speed of device plugged into the down-stream port.

To enable dual LED operation resistors R38 and R41 must be installed. Both resistors should be 0 ohms. The USB2524 must also be reconfigured either by changing the configuration pin selection (see table 3.1) or by changing the contents of the EEPROM.

In the Dual LED configuration port speed is signalled along with port assignment. With two dual color (green/red) LEDs one each for upstream port 1 and upstream port 2 assignment. The interpretation of the color coding for the LEDs are defined in table 3.2.

**Table 3.2 Dual LED Configuration color coding**

<b>Green</b>	<b>Red</b>	<b>Port Status</b>
OFF	OFF	Un-assigned/OFF
OFF	ON	Port is assigned and operating at LS/FS speed
ON	OFF	Port is assigned and operating at High speed
ON	ON	Port is assigned to unattached upstream port <b>Note:</b> The USB2524 sends a continuous 1kHz pulse train in this state.

## 4 Connector Description

The EVB-USB2524 has a standard set of USB style connectors, two of type B for upstream ports and four of type A for downstream ports. Power is supplied via a 2.0 mm power jack. There are three pin strip header blocks for external hardware to access the USB2524. Table 4.1 lists all the connectors. For more details on the pinout of the connectors please see the schematic. The locations of connectors and components are shown in figure 4.1.

**Table 4.1**

Connector	Type	
J3	USB B	Upstream Port 1
J4	USB B	Upstream Port 2
J18	USB A	Downstream Port 1
J19	USB A	Downstream Port 2
J20	USB A	Downstream Port 3
J21	USB A	Downstream Port 4
J2	Power Jack 2.0mm	+5V Power Supply
J5	Pin Strip 1 x 2	+5V Power Supply
J6	Pin Strip 2 x 5	SMBus/Configuration Control

Figure 4.1 EVB-USB2524 PCB layout

