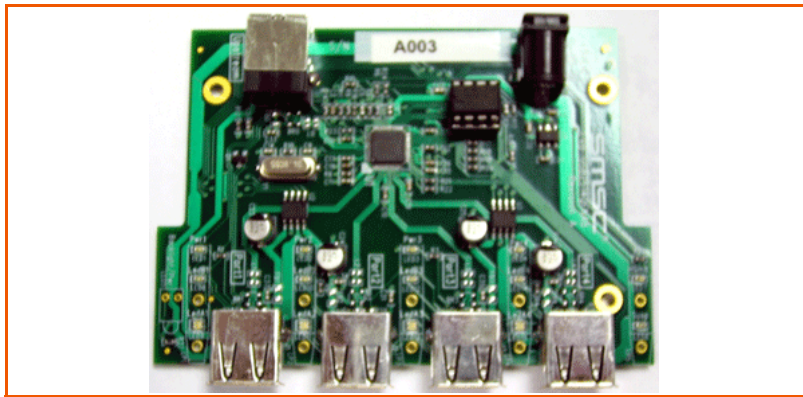


EVB-USB2514Q48 48-Pin QFN Evaluation Board Revision A1



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1 Overview

The SMSC USB2514 MultiTRAK[™] is a Low-Power Full-Featured High-Speed USB2.0 compliant hub with four down-stream ports. The EVB-USB2514Q48 evaluation board demonstrates a stand alone application for the hub with all the features listed below and demonstrates the advanced power saving options and configurable port assignments.

1.1 Features

- Integrated USB2.0 Compatible 4-Port Hub.
- Supports either Single-TT or Multi-TT configurations for Full-Speed and Low-Speed connections (when connected to a High-Speed Host).
- High-Speed (480Mbps/s), Full-Speed (12Mbps/s), and Low-Speed (1.5Mbps/s) compatible.
- Optional pull-up resistors for disabling individual downstream ports
- Operates from a single voltage (+5.0V, regulated) 'wall wart' external power supply with LED indication.
- Onboard 3.3V regulator.
- Low Cost 2-Layer Design
- Self-powered operation
- Individual Port OCS/Port Power Control interface with optional LEDs for port power indication.
- Ports can be disabled/reordered in any order to support multiple product SKU's. Hub will automatically reorder the remaining ports to match the Host controller's numbering scheme.
- Single Crystal Clock Source
- Enhanced configuration options available through a single EEPROM.
- Multiple LED Modes for Standard USB2.0 Specification compliant Green and Amber LED's, Dual-colored LED's for speed and connection status, and Hub High-Speed and Suspend LEDs.
- 1-Up Stream/4-Down Stream ports with optional EMI and ESD protection.

1.2 General Description

The EVB-USB2514Q48 is a demonstration of a full-featured evaluation platform featuring the USB2514 MultiTRAK[™] 4-port, Low-Power High-Speed USB2.0 Hub. It is designed to robustly demonstrate this unique device's features using a low-cost PCB implementation with individual port power control, on board EEPROM, Hub status LEDs, and EMI/ESD protection. The EVB-USB2514 is designed for full-feature, power efficient implementation of a High speed USB Hub with indicators that comply with the USB2.0 specification, or SMSC's dual-color USB speed indicators. Schematics, Layout, and Bill of Materials are included minimizing the customers new product development time.

2 Hardware Configuration

2.1 Hardware Description

The EVB-USB2514Q48 has one on board regulator, which generates 3.3V from 5V power supply. The USB2514 generates its own on chip 1.8V supply. The USB2514 Hub consumes power from the 3.3V supply while the MIC2026 Power distribution switch consumes power from the 5V supply. The MIC2026 Power distribution switch supplies power to each down-stream port.

2.1.1 Port Assignment

Down-stream ports are numbered 1 through 4 with individual port power controllers. The power distribution switches are for power distribution and circuit protection to the downstream ports 1-4. Via the EEPROM configuration, ports can be disabled, reordered, and polarity reversed in any order to support multiple product SKUs and for optimal port routing see USB2514 datasheet for more detail. Upstream and downstream port connector circuits are designed for USB 2.0 compliance with decoupling, filtering, grounding and optional EMI/ESD circuitry.

2.1.2 HUB Configuration

The EVB-USB2514Q48 has been configured to support register settings loaded via the EEPROM as determined by the state of CFG_SEL2, CFG_SEL1, CFG_SEL0 pins immediately after reset. The internal 1.8V regulator supplies power to the oscillator and PLL, which is turned off during suspend to minimize suspend current.

Table 1 EVB-USB2514 EEPROM Configuration

EEPROM CONFIGURATION SETTINGS	
ID	
Device	USB2514-48 pin
VID	0424
PID	2514
DID	00A2
LandId	0409
CONFIG DATA BYTE 1	
Self/Bus	Self Power
High-Speed Disable	High/Full Speed
Multiple-TT	Multiple TT
EOP Disable	EOP disabled
Current	Individual
Downstream Port Power Enabling	Individual
CONFIG DATA BYTE 2	
Dynamic	No
Over-Current	8ms
Compound	No
CONFIG DATA BYTE 3	
Port Re-Mapping	Standard
LED	Speed Indication
String Description	Strings Enabled
NON-REMOVABLE DEVICE	
Port 1	Removable
Port 2	Removable
Port 3	Removable
Port 4	Removable

Table 1 EVB-USB2514 EEPROM Configuration

EEPROM CONFIGURATION SETTINGS	
SELF POWER	
Max Power	01
Max Hub Controller Current	01
Port 1	Available
Port 2	Available
Port 3	Available
Port 4	Available
BUS POWER	
Max Power	32
Max Hub Controller Current	32
Port 1	Available
Port 2	Available
Port 3	Available
Port 4	Available
STRING DESCRIPTOR FIELDS	
Mfg. Length	04
Product Length	23
Serial # Length	30
Mfg. String	SMSC
Product String	Nocona::HUB:USB:2.0:HUB
Serial String	4:PORT:USB:2.0:HUB:MTT:NORMAL:
ELECTRICAL DRIVE STRENGTH	
Port 1	Normal
Port 2	Normal
Port 3	Normal
Port 4	Normal
PORT REMAP	
Port 1	N/A (dependent upon Config Byte 3 register)
Port 2	N/A (dependent upon Config Byte 3 register)
Port 3	N/A (dependent upon Config Byte 3 register)
Port 4	N/A (dependent upon Config Byte 3 register)
Power On Time (Hex)	32

2.1.3 LED Configuration

LEDs are implemented to provide maximum feedback to the status and speed of the hub. LED6 indicates whether the Hub is suspended. LED7 indicates enumeration at High Speed.

Via the EEPROM, the LED mode of the HUB has been preprogrammed to support "Speed Indication Mode". The Green and Red LEDs connected to LEDA [4:1] indicate connection status as well as port speed by using dual color LEDs. The dual-color LEDs provide two separate colors (commonly Green and Red). If each of these separate colors are pulsed on and off at a rapid rate, a user will see a third color (in this example, Orange). By this four different "color" states are possible (Green, Red, Orange, and Off).

Note:LED8, LED10, LED12, and LED14 are none functional for this version of EEPROM settings.

Table 2.1 Dual LED Configuration color coding

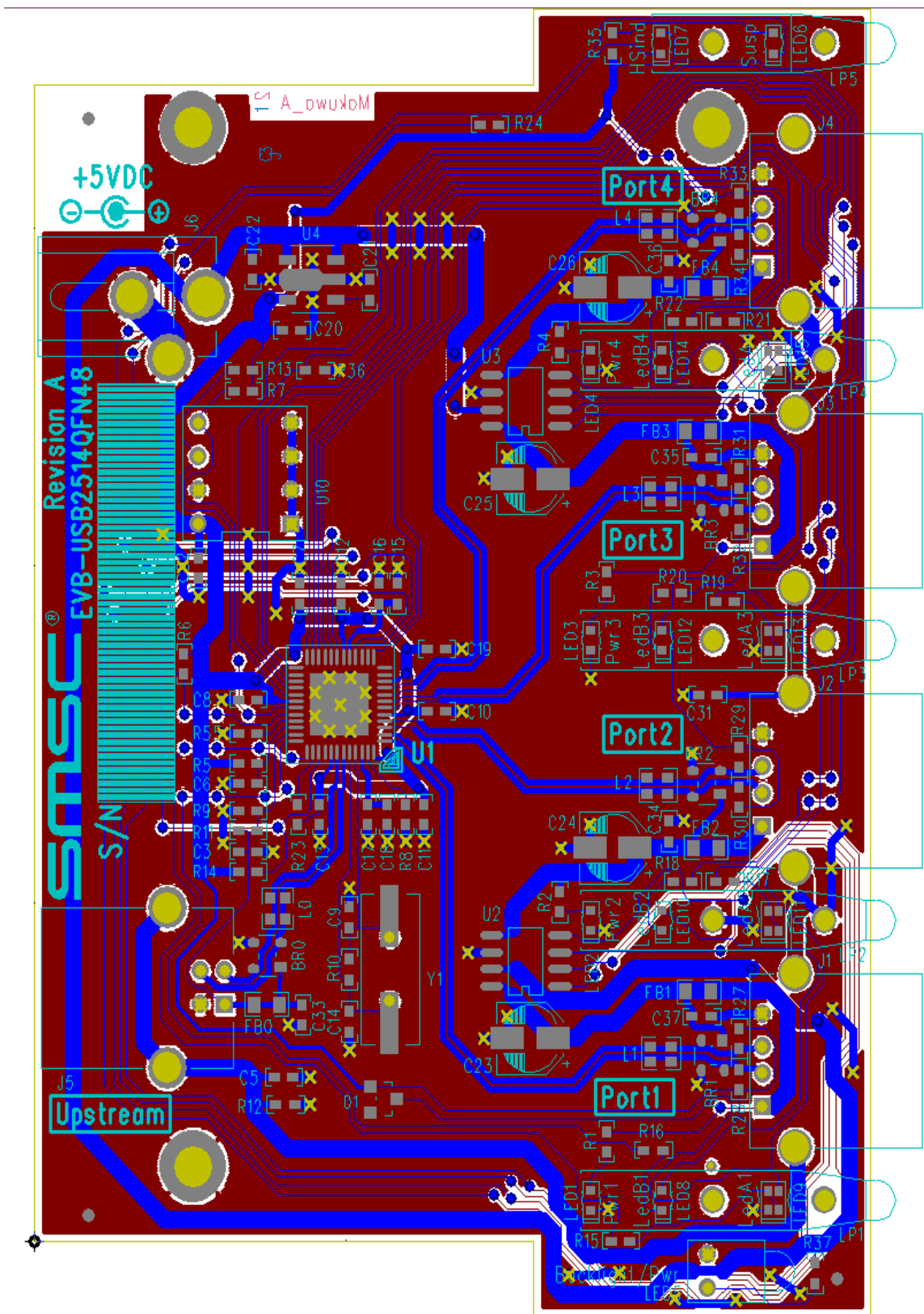
Green	Red	Port Status
OFF	OFF	Un-assigned/OFF
OFF	ON	Port is assigned and operating at Full Speed
ON	OFF	Port is assigned and operating at Low Speed
ON	ON	Port is assigned and operating at High Speed

2.1.4 Connector Description

The EVB-USB2514 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 USB2514. Table 2 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 2.

Table 2 Port Description

CONNECTOR	TYPE	DESCRIPTION
J5	USB B	Upstream Port 1
J1	USB A	Downstream Port 1
J2	USB A	Downstream Port 2
J3	USB A	Downstream Port 3
J4	USB A	Downstream Port 4
J6	Power Jack 2.0mm	+5V Power Supply

Figure 2.1 EVB-USB2514 48-Pin PCB


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