



USB5537

7/4-Port SS/HS USB Hub Controller

PRODUCT FEATURES

Data Brief

General Description

The SMSC USB5537 hub is a 7-port, low-power, configurable Hub Controller fully compliant with the *USB 3.0 Specification*. The USB5537 supports 5 Gbps SuperSpeed (SS), 480 Mbps Hi-Speed (HS), 12 Mbps Full-Speed (FS) and 1.5 Mbps Low-Speed (LS) USB signalling for complete coverage of all defined USB operating speeds.

The USB5537 supports the legacy USB speeds through its USB 2.0 hub controller. The new SuperSpeed hub controller operates in parallel with the USB 2.0 controller, so the 5 Gbps SuperSpeed data transfers are not affected by the slower USB 2.0 traffic.

The USB5537 is configured for operation through internal default settings, where custom configurations are supported through an on-chip OTP ROM or an external SPI ROM.

All LED and port control signal pins are under firmware control in order to allow for maximum operational flexibility; those pins can also be configured as GPIOs.

Features

- USB 3.0 compliant 5 Gbps, 480 Mbps, 12 Mbps and 1.5 Mbps operation, USB pins are 5 V tolerant
 - Integrated termination and pull-up/pull-down resistors
- Four downstream USB 3.0 ports (which also support USB 2.0) and 3 additional USB 2.0 ports for non-removable devices
- Optimized for low-power operation and low thermal dissipation
- Configuration via OTP ROM or SPI ROM
- On-chip 8051 μ C manages GPIOs, VBUS, and other hub signals
- 8 K RAM, 32 K ROM
- Power Management capability on the GPIO/LED pins
- LED Modes
 - Speed mode, SS vs. non SS
 - Slightly enhanced SS, HS, FS, LS indication
 - LEDs blink relative to data activity on that port
- One Time programmable (OTP) ROM: 8 kbit
 - Includes on-chip charge pump
 - Values written via JTAG

- Single 25 MHz XTAL or clock input for all on-chip PLL and clocking requirements
- Battery charging operation
 - Emulate China Charger when "headless"
 - Legacy charging when "headless" (Blackberry, Apple, Motorola)
 - USB-IF Battery Charging 1.1/1.2 support as a DCP when "headless"
 - USB-IF Battery Charging 1.1/1.2 support as a CDP when connected to USB Host
 - European Union Charger Support
 - Supports PMBus and I²C on a single interface for all ports as well as individual interfaces for each port
- Supports JTAG boundary scan
- PHYBoost (USB 2.0)
 - Selectable drive strength for improved signal integrity
- VariSense (USB 2.0)
 - controls the receiver sensitivity enabling four programmable levels of USB signal receive sensitivity
- IETF RFC 4122 compliant 128-bit UUID

Software Features

- Compatible with Microsoft Windows 7, Vista, XP, Mac OS X 10.4+, and Linux Hub Drivers (USB 2.0)
- TRUESpeed LEDs (configuration dependent)
 - Multi color LED scheme vividly shows port capability and operating speed
 - Embedded 8051 Micro controller for Hub configuration
- Standard hub I/O (port power, over-current sense, LEDs) are GPIOs controlled by a μ C instead of hard coded functions to allow for flexibility for OEM differentiation

Applications

- Mobile PC docking
- LCD monitors and TVs
- Portable expansion hubs
- PC motherboards
- Set-top boxes, DVD players, DVR/PVR

Order Number(s):

| ORDER NUMBERS | PACKAGE TYPE | PACKAGE SIZE | REEL SIZE |
|-----------------|--|--------------|-----------|
| USB5537-AKZE | 72-Pin QFN Lead-Free, RoHS Compliant Package | 10x10 mm | - |
| USB5537-AKZE-TR | | | 3000 |

**This product meets the halogen maximum concentration values per IEC61249-2-21
For RoHS compliance and environmental information, please visit www.smsc.com/rohs**



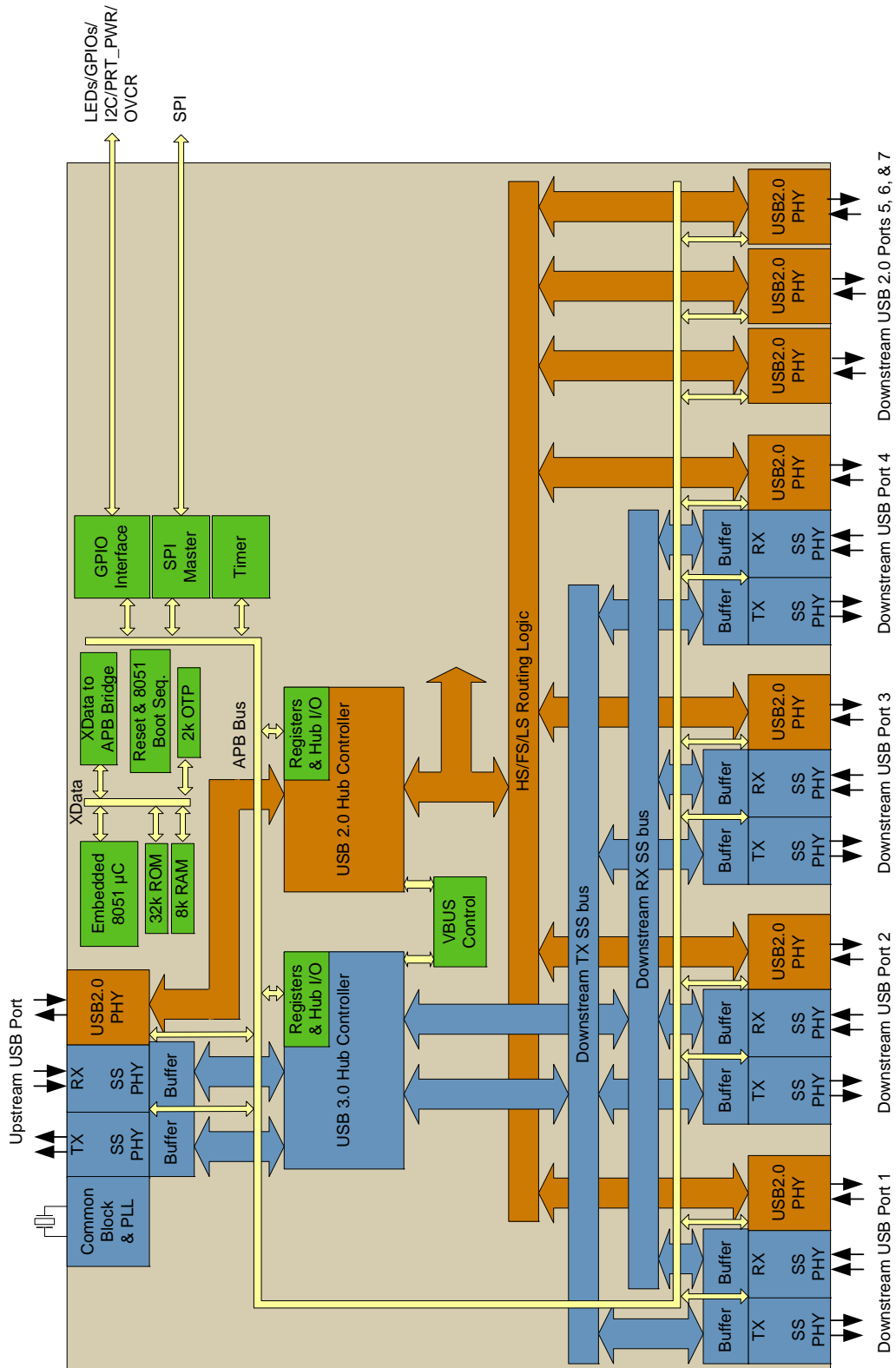
80 ARKAY DRIVE, HAUPPAUGE, NY 11788 (631) 435-6000 or 1 (800) 443-SEMI

Copyright © 2011 SMSC or its subsidiaries. All rights reserved.

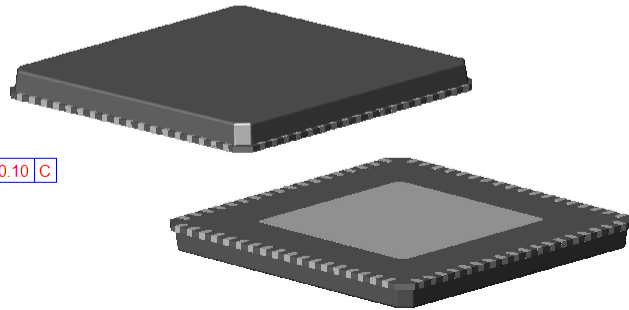
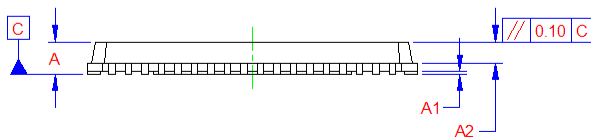
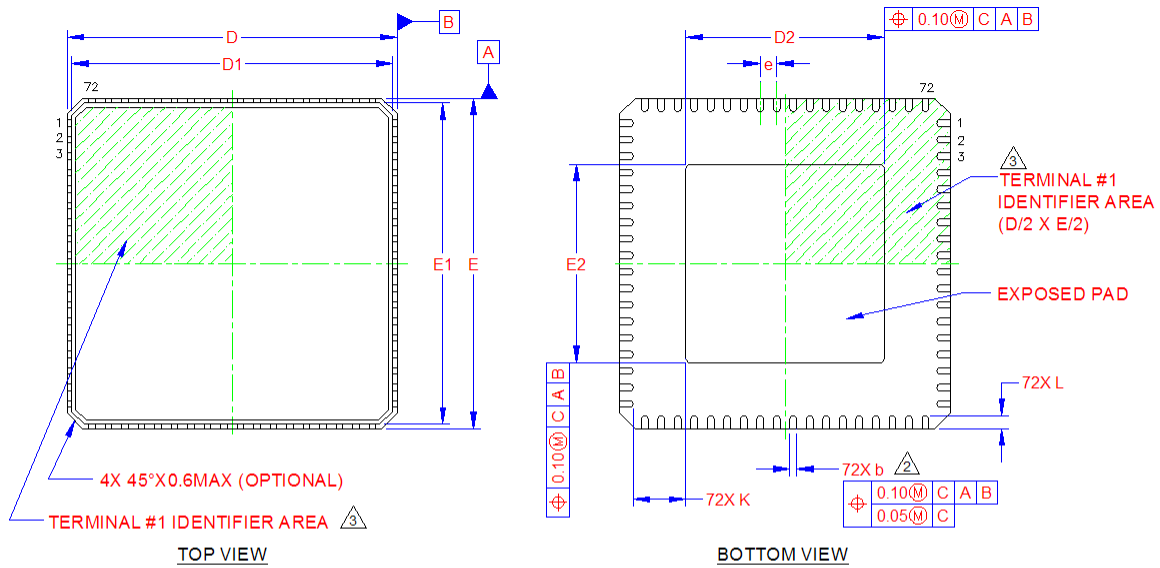
Circuit diagrams and other information relating to SMSC products are included as a means of illustrating typical applications. Consequently, complete information sufficient for construction purposes is not necessarily given. Although the information has been checked and is believed to be accurate, no responsibility is assumed for inaccuracies. SMSC reserves the right to make changes to specifications and product descriptions at any time without notice. Contact your local SMSC sales office to obtain the latest specifications before placing your product order. The provision of this information does not convey to the purchaser of the described semiconductor devices any licenses under any patent rights or other intellectual property rights of SMSC or others. All sales are expressly conditional on your agreement to the terms and conditions of the most recently dated version of SMSC's standard Terms of Sale Agreement dated before the date of your order (the "Terms of Sale Agreement"). The product may contain design defects or errors known as anomalies which may cause the product's functions to deviate from published specifications. Anomaly sheets are available upon request. SMSC products are not designed, intended, authorized or warranted for use in any life support or other application where product failure could cause or contribute to personal injury or severe property damage. Any and all such uses without prior written approval of an Officer of SMSC and further testing and/or modification will be fully at the risk of the customer. Copies of this document or other SMSC literature, as well as the Terms of Sale Agreement, may be obtained by visiting SMSC's website at <http://www.smsc.com>. SMSC is a registered trademark of Standard Microsystems Corporation ("SMSC"). Product names and company names are the trademarks of their respective holders.

SMSC DISCLAIMS AND EXCLUDES ANY AND ALL WARRANTIES, INCLUDING WITHOUT LIMITATION ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND AGAINST INFRINGEMENT AND THE LIKE, AND ANY AND ALL WARRANTIES ARISING FROM ANY COURSE OF DEALING OR USAGE OF TRADE. IN NO EVENT SHALL SMSC BE LIABLE FOR ANY DIRECT, INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES; OR FOR LOST DATA, PROFITS, SAVINGS OR REVENUES OF ANY KIND; REGARDLESS OF THE FORM OF ACTION, WHETHER BASED ON CONTRACT; TORT; NEGLIGENCE OF SMSC OR OTHERS; STRICT LIABILITY; BREACH OF WARRANTY; OR OTHERWISE; WHETHER OR NOT ANY REMEDY OF BUYER IS HELD TO HAVE FAILED OF ITS ESSENTIAL PURPOSE, AND WHETHER OR NOT SMSC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Block Diagram



Package Outline



The USB5537 72-Pin QFN Package Outline (10x10 mm Body, 0.5 Pitch, 3.1 ePad)

| | MIN | NOMINAL | MAX | NOTE | REMARKS |
|-------|----------|---------|-------|------|----------------------------|
| A | 0.80 | 0.85 | 1.00 | - | Overall Package Height |
| A1 | 0 | 0.02 | 0.05 | - | Standoff |
| A2 | - | 0.65 | 0.80 | - | Mold Cap Thickness |
| D/E | 9.90 | 10.00 | 10.10 | - | X/Y Overall Body Size |
| D1/E1 | 9.65 | 9.75 | 9.85 | - | X/Y Mold Cap Size |
| D2/E2 | 5.90 | 6.00 | 6.10 | - | X/Y Exposed Pad Size |
| L | 0.30 | 0.40 | 0.50 | - | Terminal Length |
| b | 0.18 | 0.25 | 0.30 | 2 | Terminal Width |
| K | 1.50 | - | - | - | Terminal to ePad Clearance |
| e | 0.50 BSC | | | - | Terminal Pitch |

Notes:

- All dimensions are in millimeters.
- Applies to plated terminals and is measured between 0.15 and 0.30 mm from the terminal tip
- Details of terminal #1 identifier are optional but must be located within the area indicated. The terminal #1 identifier may be either a mold or marked feature.