



# Ultra Fast USB 2.0 Multi-Slot Flash Media Controller

## PRODUCT FEATURES

Data Brief

### General Description

The SMSC USB2250/50i/51/51i is a USB 2.0 compliant, Hi-Speed mass storage class peripheral controller intended for reading and writing to more than 24 popular flash media formats from the CompactFlash<sup>®</sup> (CF), SmartMedia<sup>™</sup> (SM), xD-Picture Card<sup>™</sup> (xD)<sup>1</sup>, Memory Stick<sup>®</sup> (MS), Secure Digital (SD), and MultiMediaCard<sup>™</sup> (MMC) families.

The SMSC USB2250/50i/51/51i is a fully integrated, single chip solution capable of ultra high performance operation. Average sustained transfer rates exceeding 35 MB/s are possible if the media and host can support those rates.

### General Features

- 128-pin VTQFP (14x14 mm) lead-free RoHS compliant package
- Targeted for applications in which single or "combo" media sockets are used
- Supports multiple simultaneous card insertions
- Flexible assignment of number of LUNs and how card types are associated with the LUNs
- Hardware-controlled data flow architecture for all self-mapped media
- Pipelined hardware support for access to non-self-mapped media
- Order number with "i" denotes the version that supports the industrial temperature range of -40°C to 85°C

### Hardware Features

- Single chip flash media controller with non-multiplexed interface for independent card sockets
- Flash Media Specification Revision Compliance
  - CompactFlash 4.1
  - Secure Digital 2.0
  - MultiMediaCard 4.2
- SDIO and MMC Streaming Mode support
  - Memory Stick 1.43
  - Memory Stick Pro Format 1.02
  - Memory Stick Duo Format 1.10
  - Memory Stick Pro-HG Duo Format 1.01
  - xD-Picture Card 1.2
  - SmartMedia 1.3
- Extended configuration options
  - xD player mode operation
  - Socket switch polarities, etc.
- Media Activity LED

- GPIO configuration and polarity
  - Up to 11 GPIOs (based on configuration) for special function use
  - Four GPIO's with up to 200 mA drive
- 16 additional GPIO's are available if CF is not used
- On board 24 MHz crystal driver circuit
- Optional external 24 MHz clock input
- 4 Independent internal card power FETs
  - 200 mA each
  - "Fold-back" short circuit protection
- 8051 8-bit microprocessor
  - 60 MHz - single cycle execution
  - 64 KB ROM | 14 KB RAM
- Internal regulator for 1.8 V core operation
- Optimized pinout improves signal routing which eases implementation for improved signal integrity

### OEM Selectable Features

- Vendor, product, and language IDs
- Manufacturer ID and product strings (28 character)
- Serial number string (12h digit max)
- Customizable vendor specific data by optional use of external serial EEPROM
- Bus- or self-powered selection
- LED blink interval or duration
- Internal power FET configuration

### Software Features

- Optimized for low latency interrupt handling
- Reduced memory footprint
- Device Firmware Upgrade (DFU) support of external EEPROM or External Flash
  - Assembly line support
  - End user field upgrade support
  - DFU Package consists of driver, firmware, sample DFU application and source code, DFU driver API
- Optional custom firmware with up to 128 KB external ROM

### Applications

- Flash Media Card Reader/Writer
- Printers
- Desktop and Mobile PCs
- Consumer A/V
- Media Players/Viewers
- Vista ReadyBoost<sup>™</sup>

1.) xD-Picture Card not applicable to USB2251.

**ORDER NUMBER(S):**

Part Number	CompactFlash <sup>®</sup> Memory Stick <sup>®</sup> Secure Digital MultiMediaCard <sup>™</sup> SmartMedia <sup>™</sup>	xD-Picture Card <sup>™</sup>	Operational temperature
USB2250-NU-XX	✓	✓	0°C to 70°C
USB2250i-NU-XX	✓	✓	-40°C to 85°C
USB2251-NU-XX	✓		0°C to 70°C
USB2251i-NU-XX	✓		-40°C to 85°C

128-Pin VTQFP Lead-Free RoHS Compliant Package

**“XX” in the order number indicates the internal ROM firmware revision level.**  
**Please contact your SMSC sales representative for more information.**



80 ARKAY DRIVE, HAUPPAUGE, NY 11788 (631) 435-6000, FAX (631) 273-3123

Copyright © 2009 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.smisc.com>. SMSC is a registered trademark of Standard Microsystems Corporation ("SMSC"). Product names and company names are the trademarks of their respective holders.

SMSC makes the following part-numbered device available for purchase only by customers who are xD-Picture Card licensees: USB2250/USB2250i.

By purchasing or ordering any of such devices, Buyer represents, warrants, and agrees that Buyer is a duly licensed Licensee under an xD-Picture Card<sup>™</sup> License Agreement with Fuji Photo Film Co., Ltd., Olympus Optical Co., Ltd., and Toshiba Corporation; and that Buyer will maintain in effect such xD-Picture Card license and will give SMSC reasonable advance notice of any termination or expiration of such xD-Picture Card license, but in no event less than five days advance notice. SMSC may discontinue making such devices available for purchase by Buyer and/or discontinue further deliveries of such devices if such xD-Picture Card license shall expire, terminate, or cease to be in force, or if Buyer is or becomes in default of such xD-Picture Card license.

**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.**

# Chapter 1 Block Diagram

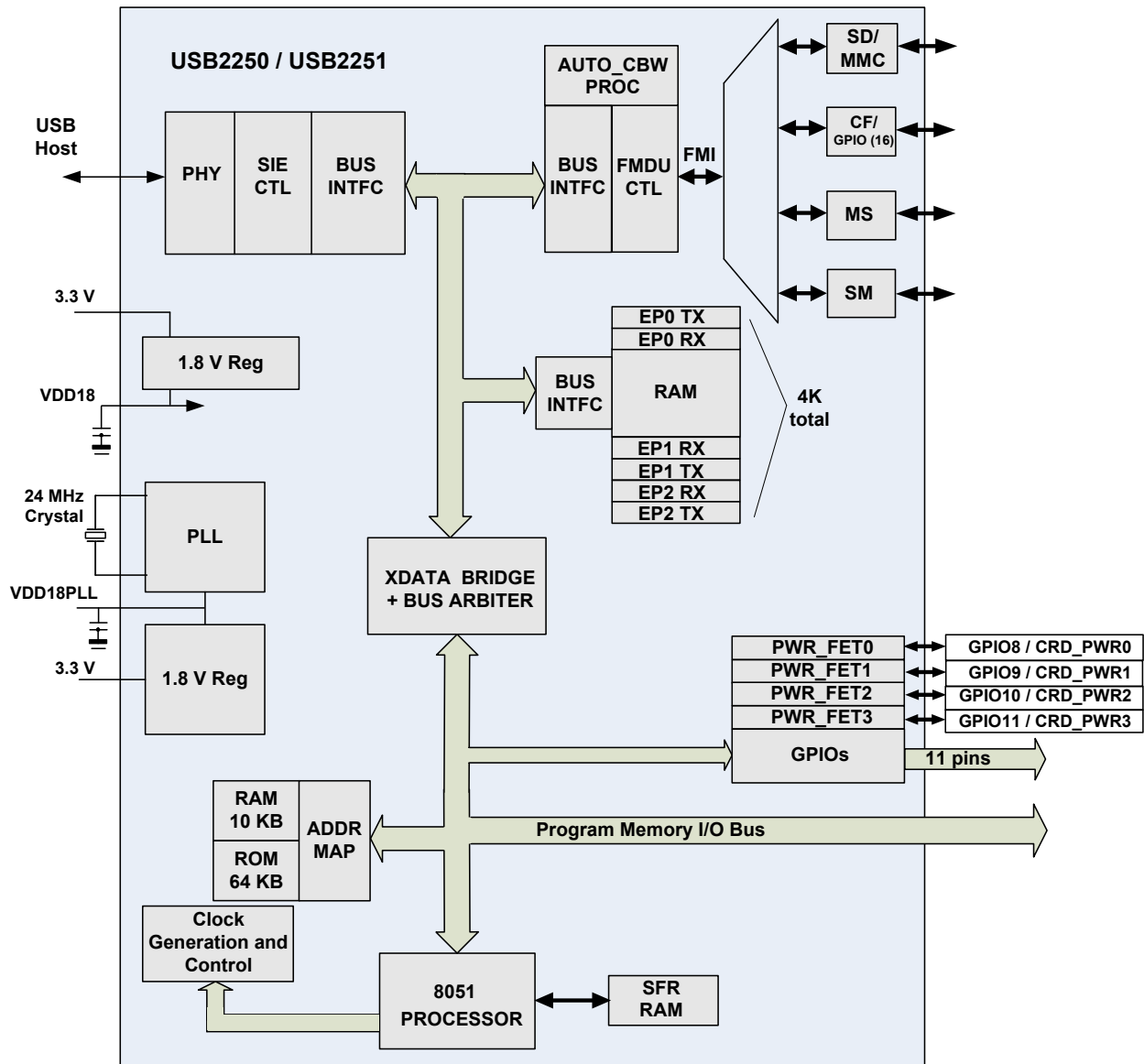


Figure 2 USB2250/50i/51/51i Block Diagram

