SIGMATEL
MIXED-SIGNAL SEMICONDUCTORS

PRODUCT BRIEF

STBD2010

USB 2.0 Hi-Speed Flash Drive Controller

FEATURES

- **Complete System Solution for Implementing USB Flash Drives**
  - USB 2.0 High Speed Device Controller Interface
  - Flexible Control of NAND Flash Memory
  - High Integration Minimizes External Components
- **USB 2.0 Mass Storage Class Device Controller**
  - Compatible with USB 2.0 Specification for High Speed Operation
  - Integrated USB 2.0 Transceivers
  - Control, Bulk In, Bulk Out endpoints
  - Compatible with Bus Powered Specification
  - Configurable Vendor ID
  - Unique Device Serial Number
  - Support for Booting from Flash Drive
  - Supports Multiple Drive Partitions
- **Flash Memory Controller Provides High Flexibility and Performance**
  - Supports Single Level Cell (SLC) NAND Flash Technology
  - See Memory Support Section for more details
- **Embedded High Performance Microcontroller Provides Control Functions**
  - Internal Program ROM
  - Internal RAM for Data, Buffering, Scratchpad, and Program ROM Patch
- **Password Protection**
- **Supports External LED**
- **Support for Write Protect Switch**
- **Integrated PLL**
- **Integrated 5.0V-3.3V and 3.3V-1.8V Linear Voltage Regulators Provide Power for Typical Flash Drive Configurations**
- **1.8V Low Power Core Operation.**
- **3.3V I/O with 5.0V Input Tolerance**
- **48-pad QFN Leadless Package (7mm x 7mm) minimizes board space requirements**
- **Supports MAC OS, Linux, WinME, Win2000, Win XP and later Windows Operating Systems**

DESCRIPTION

The SigmaTel STBD2010 is a low cost, low power, USB 2.0 Hi-Speed Flash Drive Controller integrated circuit for enabling high density USB Flash Drive products compatible with the USB Bulk Only Mass Storage Class Specification. The STBD2010 connects directly to the USB Bus and provides all control circuitry necessary for control of a wide variety of NAND Flash memory devices. A complete USB Flash Drive can be implemented simply by adding Flash Memory Devices, a 24 MHz crystal, and a few passive components for bypass and power filtering.

The STBD2010 is comprised of USB 2.0 High Speed compatible device controller including PHY/Transceiver, Flash memory interface logic, a programmable microcontroller, memory for program and buffering, and voltage regulators required for the typical USB Flash Drive product.

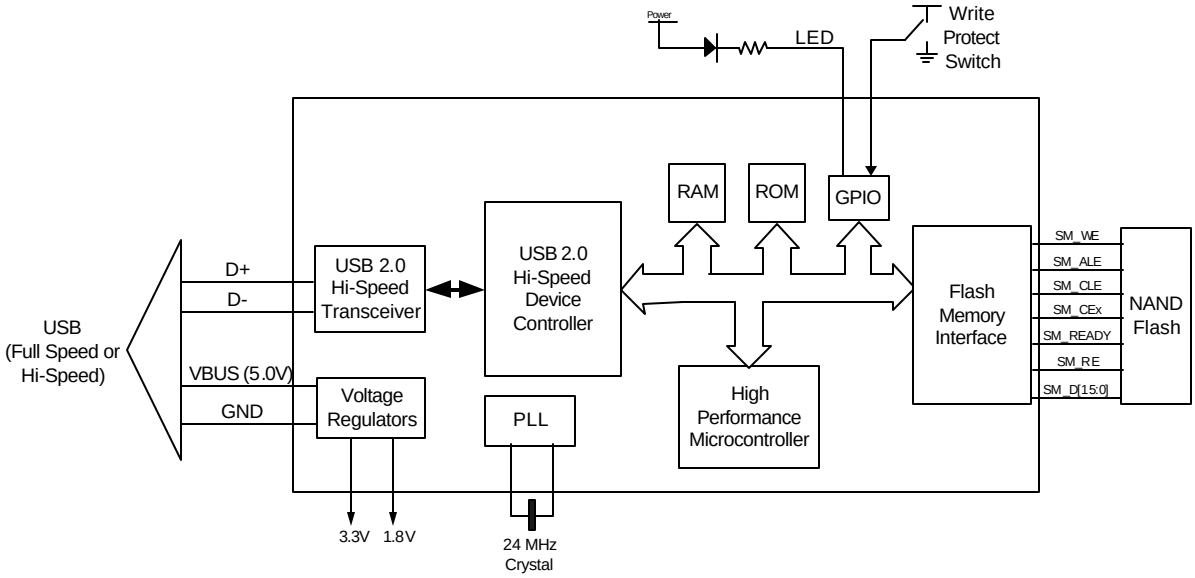
A high performance microcontroller provides control functions for the device. On-chip Program ROM and program/data RAM eliminates external components. RAM is used for data, buffering, and program ROM patch. This implementation provides flexibility and allows rapid development of derivative devices.

The Flash Memory Interface provides the logic necessary to control up to four Flash Memory Devices. In conjunction with the Microcontroller, the Flash Memory Interface allows the STBD2010 to interface to a wide range of Flash Memory devices providing the Flash Drive manufacturer with unparalleled flexibility in purchasing Flash memory devices. The STBD2010 supports Single Level Cell (SLC) binary NAND Flash from multiple flash manufacturers.

GPIO pins support the control of functions external to the device. Dedicated pins are implemented for an LED indicator and for a Write Protect Switch. An integrated PLL generates all on-chip clocks from a single 24 MHz crystal. Integrated voltage regulators use the 5.0V USB power to generate 1.8V and 3.3V power required by the STBD2010 and other devices on the typical Flash Drive.

The STBD2010 requires no additional software for use with MAC OS, Windows ME, Windows 2000, Windows XP and later versions of the Windows operating system. A driver is available for Windows 98 SE.

BLOCK DIAGRAM



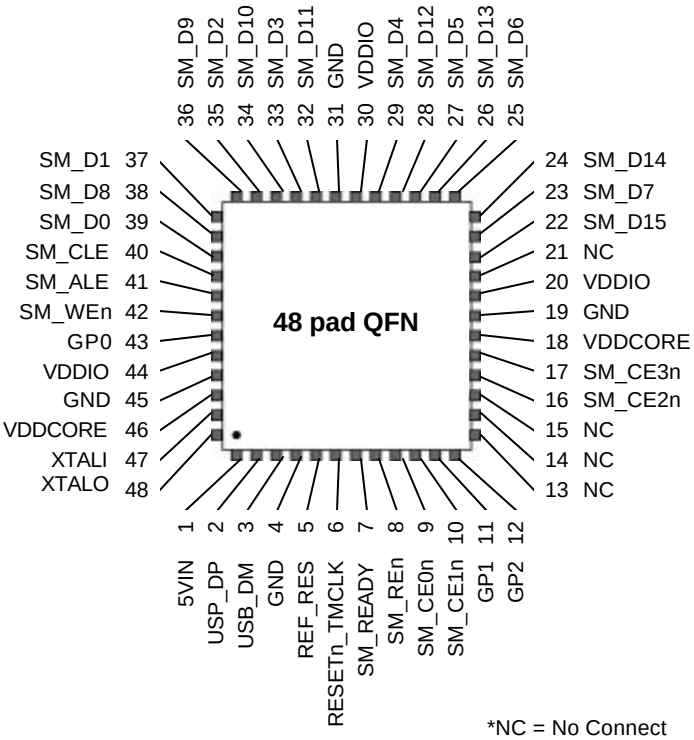
SOFTWARE DETAILS

- **USB Mass Storage Class Implementation**
  - No drivers needed for WinME, Win2000, WinXP, MAC OS 9.0 and later, Linux version 2.4.0 and later
  - Driver for Winows 98 SE included
- **Utilities for data security, USB Boot**

MEMORY SUPPORT

- **Supports 1-4 NAND Flash Devices**
- **Supports Binary SLC Flash Devices from Toshiba, Samsung, and SanDisk**
- **Supports Small Block and Large Block Flash Devices**
- **Support 8-bit and 16-bit Flash Devices**
- **Supports Monolithic Flash Devices up to 2-Gbits**
- **Supports Multi-die Flash Devices Up to 8-Gbits**
- **Autoconfiguration of Memory Type**
- **Hardware Reed-Solomon Error Correction for improved data reliability**
- **For more Flash compatibility information, see the Flash Compatibility Chart**

PIN DIAGRAM



*NC = No Connect

ADDITIONAL PRODUCT SUPPORT

- **Data Sheet**
- **Manufacturable reference design**
- **Manufacturer utilities**

For additional product and company information, please visit www.sigmatel.com.

ORDERING INFORMATION

Part Number	Package	Temp Range	Supply Range
STBD2010N	48-Pad QFN	0° C to +70° C	Vdd = 3.1 - 3.6V