USB2229/USB2230

5th Generation Hi-Speed USB Flash Media and IrDA Controller with Integrated Card Power FETs

PRODUCT FEATURES

IrDA Controller

- IrDA v1.1 FIR and SIR Compliant Controller, with 9.6K, 19.2K, 38.4K, 57.6K, 115.2K, 0.576Mbps, 1.152Mpbs and 4Mbps data rate support.

Flash Media Controller

- Complete System Solution for interfacing SmartMedia™ (SM) or xD Picture Card™ (xD)[1], Memory Stick™ (MS), High Speed Memory Stick (HSMS), Memory Stick PRO (MSPRO), MS Duo™, Secure Digital (SD), High Speed SD, Mini-Secure Digital (Mini-SD), TransFlash (SD), MultiMediaCard™ (MMC), Reduced Size MultiMediaCard (RS-MMC), NAND Flash, Compact Flash™ (CF) and CF Ultra™ I & II, and CF form-factor ATA hard drives to Hi-Speed USB
  - Supports USB Bulk Only Mass Storage Compliant Bootable BIOS
- Support for simultaneous operation of all above devices. (only one at a time of each of the following groups supported: CF or ATA drive, SM or XD or NAND, SD or MMC)
- On-Chip 4-Bit High Speed Memory Stick and MS PRO Hardware Circuitry
- On-Chip firmware reads and writes High Speed Memory Stick and MS PRO
- 1-bit ECC correction performed in hardware for maximum efficiency
- Hardware support for SD Security Command Extensions
- On-chip power FETs with short circuit protection for supplying flash media card power
- USB Bus Power Certified
- 3.3 Volt I/O with 5V input tolerance on VBUS/GPIO3
- Complete USB Specification 2.0 Compatibility for Bus Powered Operation
  - Includes Hi-Speed USB Transceiver
  - A Bi-directional Control and two Bi-directional Bulk Endpoints are provided.
- 8051 8 bit microprocessor
  - Provides low speed control functions
  - 30 Mhz execution speed at 1 clock per instruction cycle average

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1.xD Picture Card not applicable to USB2229

- 12K Bytes of internal SRAM for general purpose scratchpad
- 768 Bytes of internal SRAM for general purpose scratchpad or program execution while re-flashing external ROM
- Two, Double Buffered Bulk Endpoints
- Two, Bi-directional 512 Byte Buffers for Bulk Endpoints
- 64 Byte RX Control Endpoint Buffer
- 64 Byte TX Control Endpoint Buffer
- Internal or External Program Memory Interface
  - 76K Byte Internal Code Space or Optional 128K Byte External Code Space using Flash, SRAM or EPROM memory.
- On Board 24Mhz Crystal Driver Circuit
- Can be clocked by 48MHz external source
- On-Chip 1.8V Regulator for Low Power Core Operation
- Internal PLL for 480Mhz Hi-Speed USB Sampling, Configurable MCU clock
- Supports firmware upgrade via USB bus if "boot block" Flash program memory is used
- 12 GPIOs for special function use: LED indicators, button inputs, power control to memory devices, etc.
  - Inputs capable of generating interrupts with either edge sensitivity
- Attribute bit controlled features:
  - Activity LED polarity/operation/blink rate
  - Full or Partial Card compliance checking
  - Bus or Self Powered
  - LUN configuration and assignment
  - Write Protect Polarity
  - SmartDetach™ - Detach from USB when no Card Inserted for Notebook apps
  - Cover Switch operation for xD compliance
  - Inquiry Command operation
  - SD Write Protect operation
  - Older CF card support
  - Force USB 1.1 reporting
  - Internal or External Power FET operation
- Compatible with Microsoft WinXP, WinME, Win2K SP3, Apple OS10, Softconnex, and Linux Multi-LUN Mass Storage Class Drivers
- Win2K, Win98/98SE and Apple OS8.6 and OS9 Multi-LUN Mass Storage Class Drivers available from SMSC
- 128 Pin TQFP Package (1.0mm height, 14mmx14mm footprint); green, lead-free package also available

> ## ORDER NUMBER(S):
>
> **USB2229/USB2230-NE-XX FOR 128 PIN, TQFP PACKAGE; USB2229/USB2230-NU-XX FOR 128 PIN, TQFP PACKAGE (GREEN, LEAD-FREE) PACKAGE**

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

SMSC®

General Description

The USB2229/USB2230 is a Hi-Speed USB IrDA and Bulk Only Mass Storage Class Peripheral Controller. The Bulk Only Mass Storage Class Peripheral Controller supports CompactFlash (CF) in True IDE Mode only, SmartMedia (SM), Memory Stick (MS) including both serial and parallel interface and Secure Digital/MultiMediaCard (SD/MMC) flash memory devices. It provides a single chip solution for the most popular flash memory cards in the market. In addition, the IrDA controller consists of the SMSC IrCC block, which includes a Synchronous Communications Engine (SCE).

The IrCC SCE supports FIR and SIR IrDA. The IrCC offers flexible signal routing and programmable output control through the Raw mode interface, General Purpose Data pins and Output Multiplexer. Chip-level address decoding is required to access the IrCC register set.

The device consists of a USB 2.0 PHY and SIE, buffers, Fast 8051 microprocessor with expanded scratchpad, and program SRAM, and IrDA, CF, MS, SM and SD controllers. The SD controller supports both SD and MMC devices.

Provisions for external Flash Memory up to 128K bytes for program storage is provided (note: when Bank switching is enabled the upper 64K will map into the 8051 ROM space, otherwise, only the first 64K bytes is used).

12K bytes of scratchpad SRAM and 768Bytes of program SRAM are also provided.

Twelve GPIO pins are provided for indicators, external serial EEPROM for OEM ID and system configuration information, and other special functions.

Internal power FETs are provided to directly supply power to the xD/SM, MMC/SD and MS/MSPro cards.

The internal ROM program is capable of implementing any combination of single or multi-LUN CF/SD/MMC/SM/MS reader functions with individual card power control and activity indication. SMSC also provides licenses** for Win98 and Win2K drivers and setup utilities. Note: Please check with SMSC for precise features and capabilities for the current ROM code release.

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Block Diagram
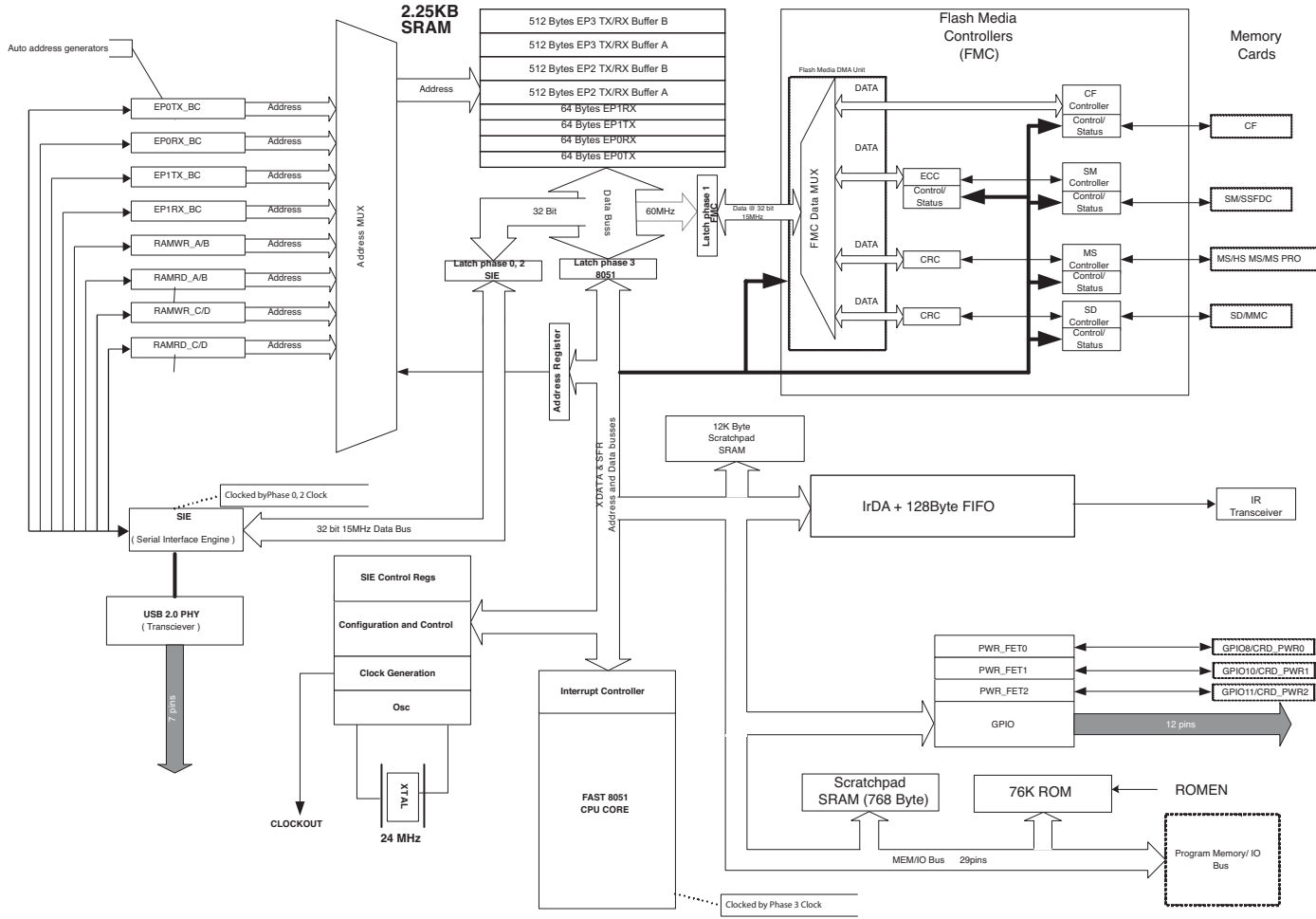
Figure 1 USB2229/USB2230 Block Diagram

| 2.25KB SRAM | Flash Media Controllers (FMC) | Memory Cards |

512 Bytes EP3 TX/RX Buffer B
512 Bytes EP3 TX/RX Buffer A
512 Bytes EP2 TX/RX Buffer B
512 Bytes EP2 TX/RX Buffer A
64 Bytes EP1RX
64 Bytes EP1TX
64 Bytes EP0RX
64 Bytes EP0TX

Auto address generators

EP0TX_BC · Address
EP0RX_BC · Address
EP1TX_BC · Address
EP1RX_BC · Address
RAMWR_A/B · Address
RAMRD_A/B · Address
RAMWR_C/D · Address
RAMRD_C/D · Address

Address MUX

Address

Flash Media DMA Unit

DATA

CF Controller Control/ Status — CF

ECC Control/ Status

SM Controller Control/ Status — SM/SSFDC

DATA

CRC

MS Controller Control/ Status — MS/HS MS/MS PRO

DATA

CRC

SD Controller Control/ Status — SD/MMC

FMC Data MUX

32 Bit

Data Buss

60MHz

Latch phase 1 FMC

Data @ 32 bit 15MHz

Latch phase 0, 2 SIE

Latch phase 3 8051

Address Register

X DATA & SFR Address and Data busses

12K Byte Scratchpad SRAM

SIE (Serial Interface Engine)

Clocked by Phase 0, 2 Clock

32 bit 15MHz Data Bus

IrDA + 128Byte FIFO — IR Transceiver

USB 2.0 PHY (Transciever)

7 pins

SIE Control Regs
Configuration and Control
Clock Generation
Osc

CLOCKOUT

XTAL
24 MHz

Interrupt Controller

FAST 8051 CPU CORE

Clocked by Phase 3 Clock

PWR_FET0 — GPIO8/CRD_PWR0
PWR_FET1 — GPIO10/CRD_PWR1
PWR_FET2 — GPIO11/CRD_PWR2
GPIO — 12 pins

Scratchpad SRAM (768 Byte)

76K ROM — ROMEN

MEM/IO Bus 29pins

Program Memory/ IO Bus
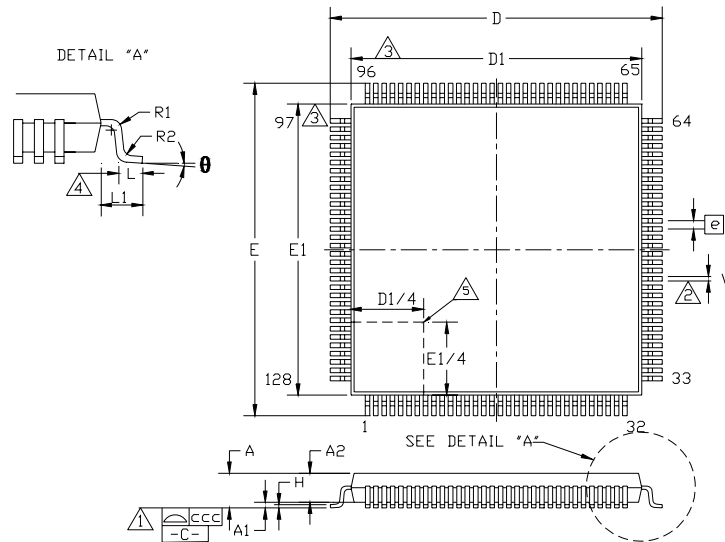
Package Outline

Figure 2 USB2229/USB2230 128-Pin TQFP Package Outline

Table 1 USB2229/USB2230 128-Pin TQFP Package Parameters

	MIN	NOMINAL	MAX	REMARKS
A	~	~	1.20	Overall Package Height
A1	0.05	~	0.15	Standoff
A2	0.95	~	1.05	Body Thickness
D	15.80	~	16.20	X Span
D1	13.80	~	14.20	X body Size
E	15.80	~	16.20	Y Span
E1	13.80	~	14.20	Y body Size
H	0.09	~	0.20	Lead Frame Thickness
L	0.45	0.60	0.75	Lead Foot Length
L1	~	1.00	~	Lead Length
e	0.40 Basic			Lead Pitch
q	0º	~	7º	Lead Foot Angle
W	0.13	0.18	0.23	Lead Width
R1	0.08	~	~	Lead Shoulder Radius
R2	0.08	~	0.20	Lead Foot Radius
ccc	~	~	0.08	Coplanarity

Notes:

1. Controlling Unit: millimeter.
2. Tolerance on the true position of the leads is ± 0.035 mm maximum.
   Package body dimensions D1 and E1 do not include the mold protrusion.
3. Maximum mold protrusion is 0.25 mm.
4. Dimension for foot length L measured at the gauge plane 0.25 mm above the seating plane.
5. Details of pin 1 identifier are optional but must be located within the zone indicated.

PRODUCT PREVIEW

Mouser Electronics

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