2002/6/26
0.2

USB to CF/ATA/SM/Flash Interface Controller, Mass Storage Class Compliant

1 General Description

SN11030 is a high-performance integrated circuit to bridge USB and CF/ATA/SM/Flash compliance devices. It provides a flexible and cost efficient single chip solution for external storage applications that intend to utilize the convenience of USB. To help the system manufacturers to build high quality, low cost USB storage systems, several special features are implemented. SN11030 can be easily configured to access CF, ATA device, SM, NAND type flash or any combination of the above. This diversity in function relieves the component sourcing task of the system builders. With the ability to support flash memory, the combo system which supports both card reader and thumb drive can be built without any special effort. The embedded translation table help the system makers to design a high performance SM card or NAND type flash accessing device but still keeps the cost low. The proprietary randomization algorithm effectively extends the lifetime of the SM card and flash memory, ensuring the robustness of the system. The real time ECC correction keeps the data integrity while still maintains the high data transfer rate.

The external serial EEPROM provides the possibility to customize the USB identity for each product. The OEM makers could make products for different customers by just putting the vendor/product ID and names in the EEPROM but still keep other things the same. The serial number can help the system manufacturers to track down every single device they made even when the design and the PID/VID are all the same. The USB Mass Storage Class compliance capability of SN11030 makes it a truly “plug-and-play” device without vendor drivers needed under the OS like Windows 2000/ME/XP and Mac OS 9/10. This feature not only makes the system developing faster and easier, but also reduces the cost and increases the reliability. The SN11030 even provides the capability to boot the PC. Therefore, the system manufacturers can use it to build a much faster, high capacity, reliable, and portable system to replace the legacy floppy disk easily.

With so many functions built-in and the high performance, easy to design-in

architecture, SN11030 is an ideal choice for building a portable USB to CF/ATA/SM/Flash storage system.

2 Features

- 12 MHz USB 1.1 full-speed compatible.
- USB 1.1 Mass Storage Class compliant
- USB Mass Storage Class Bulk-Only Transport 1.0 supported
- USB Mass Storage Class SCSI transparent command set supported
- 12 characters of serial number and up to 28 characters of Vendor/Product/Revision string supported with external EEPROM
- Support PIO mode CF/ATA/ATAPI device
- Support 3.3V, 4Mbytes to 128 Mbytes SSFDC(SmartMedia Card), Type I/II CompactFlash card and MicroDrive.
- Support NAND-type flash memory, from 4Mbytes to 128 Mbytes.
- Real-time ECC correction circuit to ensure the data integrity and accelerate the access speed for SmartMedia/NAND-type flash.
- Built-in SRAM to support logical-to-physical address translation for SmartMedia/NAND-type flash to reduce cost and increase performance and reliability
- Supports Hot-Swapping among flash memory, CF card and SM card without un-plug USB.
- Built-in FIFO for upstream and downstream data transfer
- Data transfer rate up to 1.5 MB/s (burst), 1.1 MB/s (read average),
- Pin selectable high-power (500mA) or low-power (100mA)
- 3 LED lightening pins available. One for CF, one for SM, and one for CF + SM (version 2 only)
- PC boot up capability provided (PC BIOS needs to support USB ZIP boot up) (version 2 only)
- No Driver needed under Microsoft Windows ME/2000/XP, Mac OS 9.x/10.x
- Driver support Microsoft Windows 98
- Multiple icon driver support for Microsoft Windows 2000 and Mac OS 9
- Single 3.3V operation
- 80 pin LQFP package.

3 Pin Assignment

Pin#	PAD Name	Type	Drive	Special	Description
1	GND	PWR			Digital ground
2	CFD12_SMD6	DIO	8mA	PD	ATA data bit 12 / SM data bit 6
3	CFD5_SMD2	DIO	8mA	PD	ATA data bit 5 / SM data bit 2
4	CFD13_SMD7	DIO	8mA	PD	ATA data bit 13 / SM data bit 7
5	CFD6_SMD1	DIO	8mA	PD	ATA data bit 6 / SM data bit 1
6	CFD14_SMD0	DIO	8mA	PD	ATA data bit 14 / SM data bit 0
7	SMWP	DO	8mA		SM write protect
8	SMRB	DI			SM ready/busy
9	VDD	PWR			Digital 3.3V
10	GND	PWR			Digital ground
11	CFD7_SMWE	DIO	8mA	PD	ATA data bit 7 / SM write enable
12	CFD15_SMRE	DIO	8mA	PD	ATA data bit 15 / SM read enable
13	CFCS0	DO	8mA		ATAPI chip select 0
14	CFCS1	DO	8mA		ATAPI chip select 1
15	CFDRN	DO	8mA		ATAPI I/O read signal, active low
16	CFDWN	DO	8mA		ATAPI I/O write signal, active low
17	CFDRDY	DI		PU	ATAPI data ready signal, active high
18	CFDA2_SMALE	DO	8mA		ATAPI device address 2 / SM address latch enable
19	LED_CF	DO	8mA		LED for CF
20	GND	PWR			Digital ground
21	VDD	PWR			Digital 3.3V
22	CFDA1_SMCLE	DO	8mA		ATAPI device address 1 / SM command latch enable
23	CFDA0	DO	8mA		ATAPI device address 0
24	CFD0	DIO	8mA	PD	ATA data bit 0
25	CFD1	DIO	8mA	PD	ATA data bit 1
26	CFD8	DIO	8mA	PD	ATA data bit 8
27	CFD2	DIO	8mA	PD	ATA data bit 2

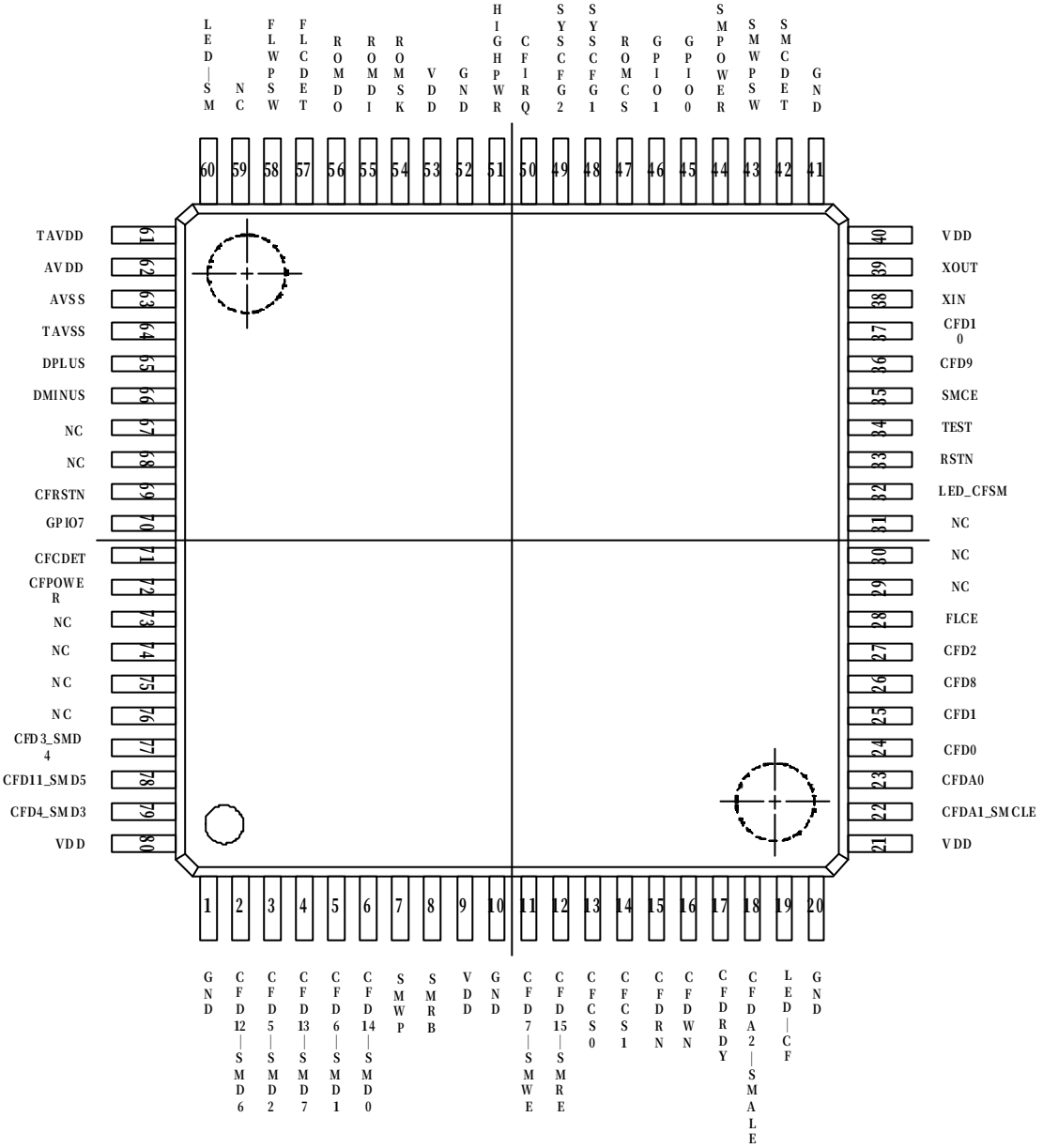
28	FLCE	DO	8mA		Flash chip enable
29	NC				Not Connected
30	NC				Not Connected
31	NC				Not Connected
32	LED_CFSM	DO	8mA	PD	LED for CF + SM
33	RSTN	DI		PU	Chip reset
34	TEST	DI		PD	Test pin
35	SMCE	DO	8mA		SM chip enable
36	CFD9	DIO	8mA	PD	ATA data bit 9
37	CFD10	DIO	8mA	PD	ATA data bit 10
38	XIN	I	-	-	Crystal input or oscillator input
39	XOUT	O	-	-	Crystal output or no connection
40	VDD	PWR			Digital 3.3V
41	GND	PWR			Digital ground
42	SMCDET	DI		PU	SM card detect
43	SMWPSW	DI		PU	SM write protect switch
44	SMPOWER	DO	8mA	OC	SM/Flash power control
45	GPIO0	DIO	8mA		General Purpose Input/Output 0
46	GPIO1	DIO	8mA		General Purpose Input/Output 1
47	ROMCS	DIO	4mA		Chip select for external EEPROM
48	SYSCFG1	DI			System configuration 1
49	SYSCFG2	DI			System configuration 2
50	CFIRQ	DI			ATA interrupt request
51	HIGHPWR	DI			High power/Low power configuration
52	GND	PWR			Digital ground
53	VDD	PWR			Digital 3.3V
54	ROMSK	DIO	4mA		Clock for external serial EEPROM
55	ROMDI	DIO	4mA		Serial data to external EEPROM
56	ROMDO	DIO	4mA		Serial data from external EEPROM
57	FLCDET	DI			Flash card detect
58	FLWPSW	DI		PU	Flash write protect switch
59	NC				Not Connected

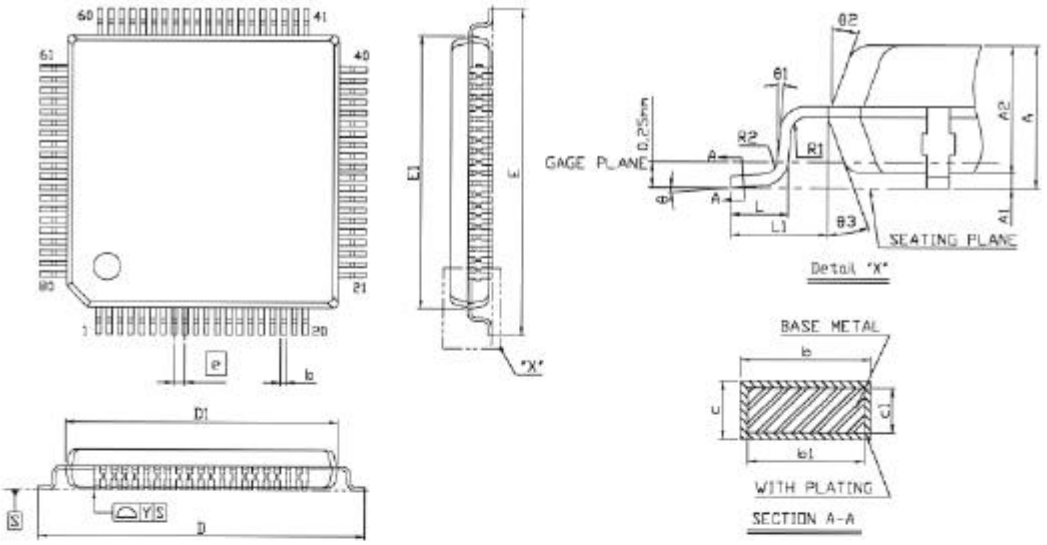
60	LED_SM	DO	8mA		LED for SM
61	TAVDD	PWR			USB transceiver 3.3V
62	AVDD	PWR			PLL analog 3.3V
63	AVSS	PWR			PLL analog ground
64	TAVSS	PWR			USB transceiver ground
65	DPLUS	AIO	-	-	USB D+ signal
66	DMINUS	AIO	-	-	USB D- signal
67	NC				Not Connected
68	NC				Not Connected
69	CFRSTN	DO	8mA		ATA reset, active low
70	GPIO7	DIO	8mA		GPIO7 for SM data bus OE
71	CFCDET	DI	8mA	PU	CF card detect
72	CFPOWER	DO	8mA	OC	CF power control
73	NC				Not Connected
74	NC				Not Connected
75	NC				Not Connected
76	NC				Not Connected
77	CFD3_SMD4	DIO	8mA	PD	ATA data bit 3 / SM data bit 4
78	CFD11_SMD5	DIO	8mA	PD	ATA data bit 11 / SM data bit 5
79	CFD4_SMD3	DIO	8mA	PD	ATA data bit 4 / SM data bit 3
80	VDD	P	-	-	Digital 3.3V

- **P: power pin; AI: analog input pin, AIO: analog input/output pin; DI: digital input pin; DO: digital output pin; DIO: digital input/output pin.**
- **TTL: TTL compatible input pin; PD: pull down; PU: pull up.**
- **All pads are Schmitt triggered and with slew rate control**

4 Package diagram

LQPF 80 Package





SYMBOL	DIMENSION (MM)			DIMENSION (MIL)		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A			1.60			63
A1	0.05		0.15	2		6
A2	1.35	1.40	1.45	53	55	57
b	0.13	0.18	0.23	5	7	9
b1	0.13	0.16	0.19	5	6	7
c	0.09		0.20	4		8
c1	0.09		0.16	4		6
D	12.00 BSC			472 BSC		
D1	10.00 BSC			394 BSC		
E	12.00 BSC			472 BSC		
E1	10.00 BSC			394 BSC		
e	0.40 BSC			16 BSC		
L	0.45	0.60	0.75	18	24	30
L1	1.00 REF			39 REF		
R1	0.08			3		
R2	0.08		0.20	3		8
Y			0.075			3
θ	0°	3.5°	7°	0°	3.5°	7°
θ1	0°			0°		
θ2	11°	12°	13°	11°	12°	13°
θ3	11°	12°	13°	11°	12°	13°

NOTES:
1.REFER TO JEDEC MS-026/BCE
2.DIMENSION D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION.
ALLOWABLE PROTRUSION IS 0.25mm PER SIDE D1 AND E1 ARE
MAXIMUM PLASTIC BODY SIZE DIMENSION INCLUDING MOLD MISMATCH.
3.DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE
DAMBAR PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED
THE MAXIMUM b DIMENSION BY MORE THAN 0.08mm.
4.ALL DIMENSIONS IN MILLIMETERS.

5 Version Control

Draft	Apr-29-2002	
0.1	June-17-2002	
0.2	June-25-2002	add new pin outs & features for version 002