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GL641USB

USB ATA/ATAPI/ COMPACT FLASH CARD CONTROLLER

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1. Features

- High performance and low cost solution for USB ATA / ATAPI / Compact Flash controller
- USB Specification Compliance
  - Conforms to USB 12Mbps Specification, Version 1.1
  - Conforms to USB Storage Class Specification, Version 1.0 (bulk only protocol)
  - Supports 1 device address and 4 endpoints (include endpoint 0)
- Operating System Supported
  - Windows 2000 & Windows ME
    - Supported by Microsoft default driver
  - Windows 98 & Windows 98 SE
    - Supported by Genesys Logic USB Storage driver
  - Mac OS 9.X & Mac OS X
    - Supported by Apple default driver or Genesys Logic USB Storage driver
- On-chip 3.3v output for USB D+ pulled up
- Integrated USB transceiver
- External EEPROM interface for customizing VID & PID of USB device
- Support ATA hard disk / ATAPI CD-ROM, CD-RW, MO / Compact Flash card in one chip
- Data transfer rate up to 1.1Mbytes/sec when read/write the USB storage device
- Improved output drivers with slew-rate control to reduce EMI
- 12 MHz external clock
- Internal power-on reset (POR)
- Internal power-fail detector
- Supports suspend/normal mode power management
- Available in cost saving 48-pins LQFP
- Suspend power consumption of bus powered CF card reader is less than 500µA (USB specification)

2. Functional Overview

The GL641USB is a USB storage class controller that supports ATA/ATAPI/Compact Flash device. It is compliant to USB 12Mbps protocol and data transfer rate is up to 1.1Mbytes/Sec. It is also compliant to USB Storage Class Bulk Only protocol. There are 4 endpoints in GL641USB controller. Endpoint 0 is a Control endpoint for this controller. It is used to initialize this USB device. Endpoint 1 is a Bulk IN endpoint. It is used to read data from the storage device. Endpoint 2 is a Bulk OUT endpoint. It is used to issue SCSI packet command to the storage device and write data to the storage device. Endpoint 3 is an Interrupt IN endpoint and not used by USB Storage Class Bulk Only protocol currently.

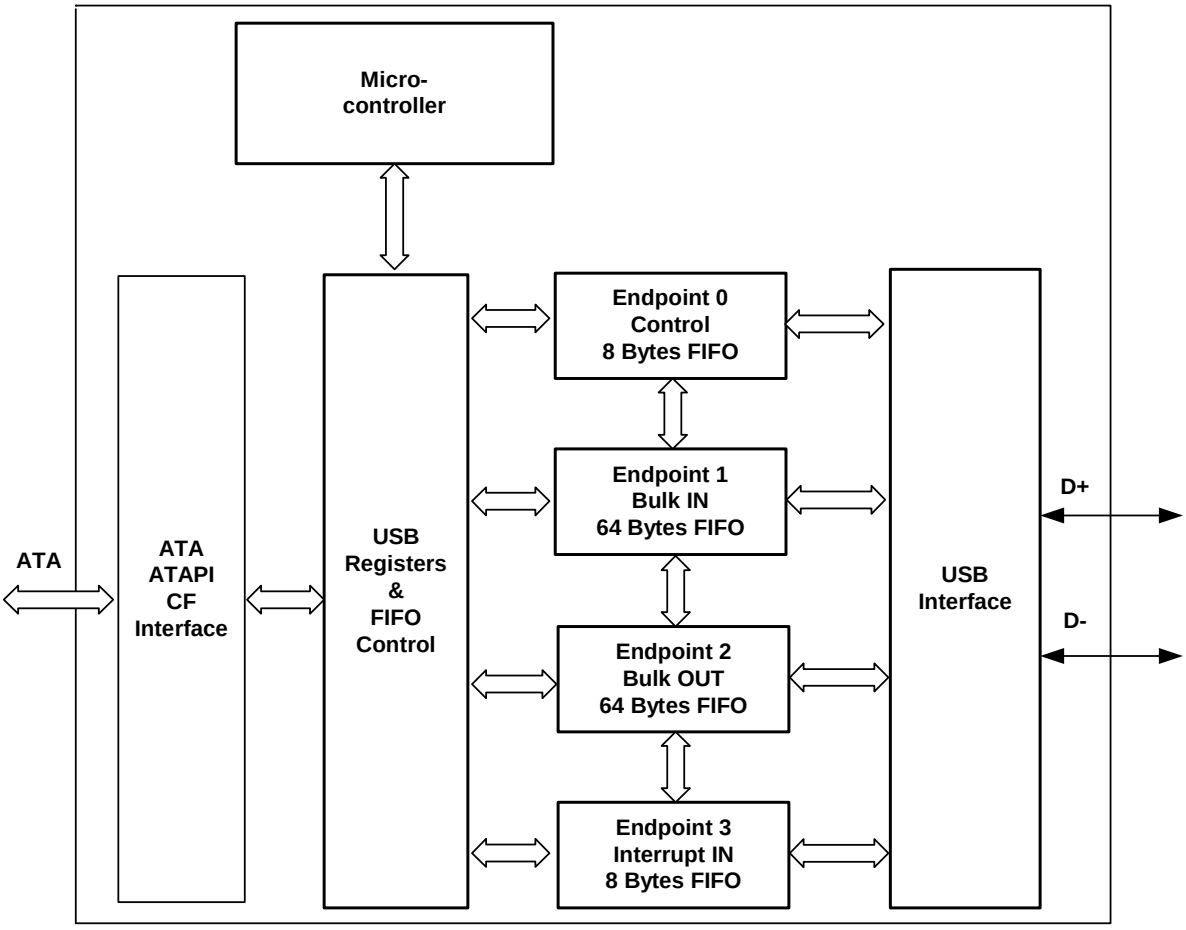


Figure 2-1 Block Diagram of GL641USB

3. PIN Definitions and Descriptions

Pin No.	Name	I/O	Description
1	PVDD	PWR	Power supplier for storage device interface
2	D8	I/O	Storage device data bus bit 8*
3	D9	I/O	Storage device data bus bit 9*
4	D10	I/O	Storage device data bus bit 10*
5	D11	I/O	Storage device data bus bit 11*
6	PGND	PWR	Ground for storage device interface
7	D12	I/O	Storage device data bus bit 12*
8	D13	I/O	Storage device data bus bit 13*
9	D14	I/O	Storage device data bus bit 14*
10	D15	I/O	Storage device data bus bit 15*
11	DIOR#	O	Storage device read strobe signal*
12	DIOW#	O	Storage device write strobe signal*
13	INTRQ	I	Storage device interrupt request signal*
14	DVDD	PWR	5V power supplier for internal logic
15	DGND	PWR	Ground for internal logic
16	Crystal out	CLK	Crystal clock output
17	Crystal in	CLK	Crystal clock input
18	GPIO1	I/O	General purpose I/O 1
19	GPIO2	I/O	General purpose I/O 2
20	V3.3	USB	3.3v power supplier for USB bus
21	D+	USB	D+ signal for USB
22	D-	USB	D- signal for USB
23	AVDD	PWR	5V power supplier for USB interface
24	AGND	PWR	Ground for USB interface
25	GPIO3	I/O	General purpose I/O 3
26	GPIO4	I/O	General purpose I/O 4
27	TSTMODE	I	Used at test mode only
28	EXTRST#	I	Used at test mode only
29	GPIO8	I/O	General purpose I/O 8
30	GPIO7	I/O	General purpose I/O 7
31	GPIO6	I/O	General purpose I/O 6
32	GPIO5	I/O	General purpose I/O 5
33	DGND	PWR	Ground for internal logic
34	DVDD	PWR	5V power supplier for internal logic
35	CS3FX#	O	Storage device register bank 3 selector*
36	CS1FX#	O	Storage device register bank 1 selector*
37	A0	O	Storage device address bus bit 0*
38	A1	O	Storage device address bus bit 1*
39	A2	O	Storage device address bus bit 2*
40	D0	I/O	Storage device data bus bit 0*
41	D1	I/O	Storage device data bus bit 1*
42	D2	I/O	Storage device data bus bit 2*
43	D3	I/O	Storage device data bus bit 3*
44	PGND	PWR	Ground for storage device interface
45	D4	I/O	Storage device data bus bit 4*
46	D5	I/O	Storage device data bus bit 5*
47	D6	I/O	Storage device data bus bit 6*
48	D7	I/O	Storage device data bus bit 7*

Table 3-1 GL641USB Pin Definitions and Descriptions

* Output voltage of this pin is equivalent to voltage supplied by PVDD.
Input voltage of this pin can be from 0v to 5v, and it threshold is 1v ~ 2v.
Therefore, these pins can support 3v/5v interface according to voltage of PVDD.

4. General Purpose I/O Ports

The GL641USB interface with peripherals is conducted via up to 8 GPIO signals. Host driver can control all of these I/O pins directly. The GL641USB provides 3 vendor specific control transfer functions to host driver. One of these functions is used to set I/O pins direction. One is used to read data from I/O pins. And the other one is used to write data to I/O pins.

GPIO1 is used as a power on strapping to distinguish the application is used for Compact Flash card or other ATA/ATAPI device. If this pin is pulled up when USB bus reset, GL641USB will treat the connected device is a Compact Flash card. Otherwise, GL641USB will assume the connected device is an ATA/ATAPI device.

GPIO2 is used as power control signal for bus powered device, especially for Compact Flash card reader. Hence USB bus powered device must consume less than 500uA when suspend mode, power of the Compact Flash card should be turned off when system suspend.

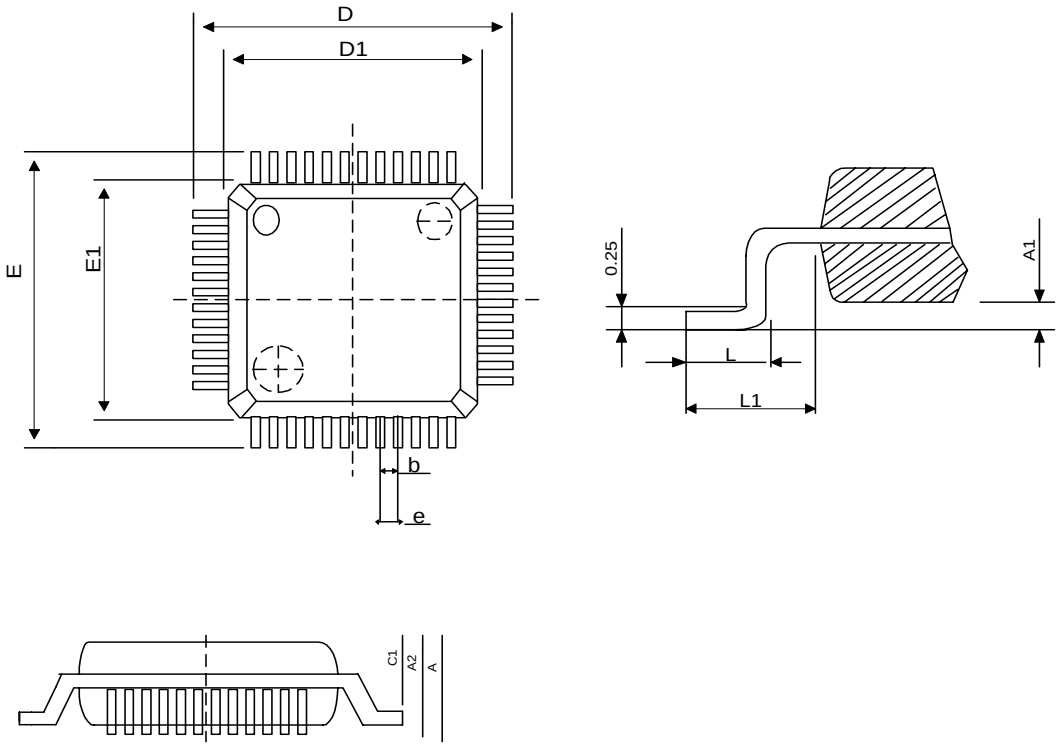
GPIO3 is connected to external reset pin of ATA/ATAPI/Compact Flash card. The GL641USB can only work at True IDE mode when Compact Flash card is connected.

GPIO4~GPIO7 are used as serial EEPROM interface. System maker can write their own vendor ID and product ID into the serial EEPROM by a test program provided by Genesys Logic.

GPIO8 is used for Compact Flash card reader. This pin is pulled up by a resistor on board and connected to ground when Compact Flash card is inserted. This is used as a card detection signal.

5. Package Diagram

48-LQFP



SYVBOIS	MIN	MAX
A		1.6
A1	0.05	0.15
A2	1.35	1.45
C1	0.09	0.16
D	9.00BSC	
D1	7.00BSC	
E	9.00BSC	
E1	7.00BSC	
e	0.5BSC	
b	0.17	0.27
L	0.45	0.75
L1	1 REF	