HS8836A

USB 2.0

HUB Controller

Datasheet

1.0 Description

- Compliant to USB specification Revision 2.0
  - Support 4/3/2 downstream ports by I/O pin configuration
  - Upstream port supports both high-speed (HS) and full-speed (FS) traffic
  - Downstream ports support HS, FS, and low-speed (LS) traffic

- On-chip 8-bit micro-processor
  - RISC-like architecture
  - USB optimized instruction set

- Single Transaction Translator (STT)
  - Single TT shares the same TT control logics for all downstream port devices. This is the most cost effective solution for TT. Multiple TT provides individual TT control logics for each downstream port. This is a performance better choice for USB 2.0 hub

- Integrate USB 2.0 transceiver
- Each downstream port supports two-color status indicator, with automatic and manual modes compliant to USB specification Revision 2.0

- Embed serial resister for USB signals
- Support both individual and gang modes of power management and over-current detection for downstream ports
- Conform to bus power requirements
- Automatic switching between self-powered and bus-powered modes
- Support compound-device (non-removable in downstream ports) by I/O pin configuration
- Configurable non-removable device support

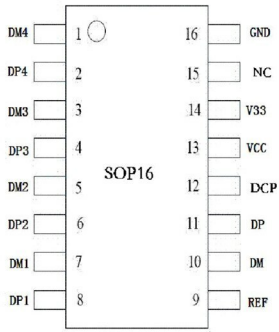
- Embeds 5V to 3.3V regulator

- Improve output drivers with slew-rate control for EMI reduction
- Internal power-fail detection for ESD recovery

- Applications:
  - Stand-alone USB hub
  - PC motherboard USB hub, Docking of notebook
  - LCD monitor hub
  - Any compound device to support USB HUB function

2.1 Pinouts

Packages SOP-16



2.2 Pin List

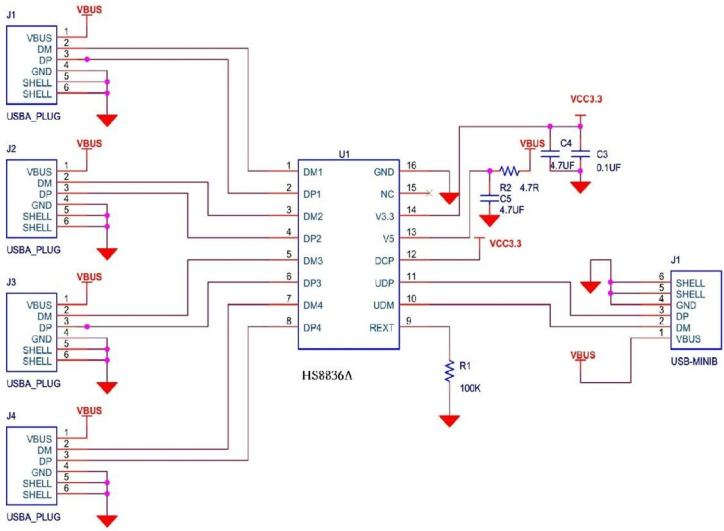
Notation:

Type	**O**	Output
	I	Input
	B	Bi-directional
	P	Power / Ground

Table 2.2 - Pin Descriptions

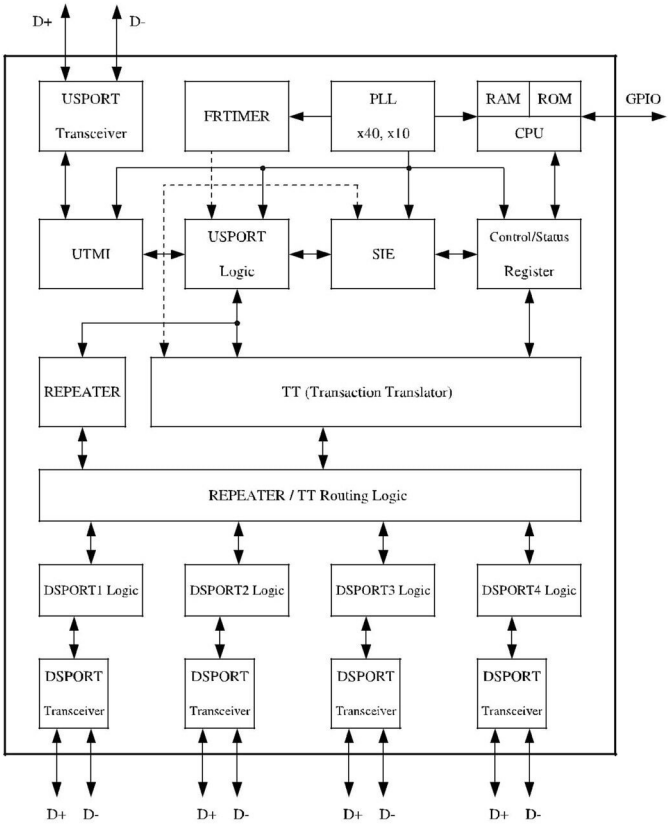
USB Interface			
Pin Name	**GL850G 48Pin#**	**I/O Type**	**Description**
DM,DP	10,11	I/B	USB signals for USPORT
DM1,DP1	7,8	O/B	USB signals for DSPORT1
DM2,DP2	5,6	O/B	USB signals for DSPORT2
DM3,DP3	3,4	O/B	USB signals for DSPORT3
DM4,DP4	1,2	O/B	USB signals for DSPORT4
REF	9	B	10K Ω resister must be connected between REF and analog ground (AGND).
V33	14	P	3.3V digital power input for digital circuits
VCC	13	P	5V-to-3.3V regulator Vin
V33	12	P	5V-to-3.3V regulator Vout

3.0 Circuit diagram



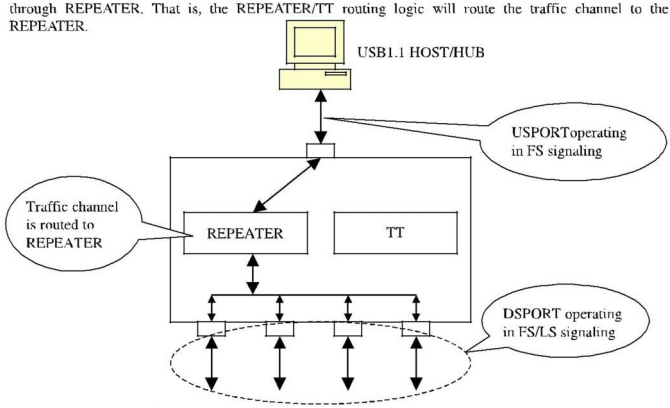
NOTE:

4.0 BLOCK DIAGRAM



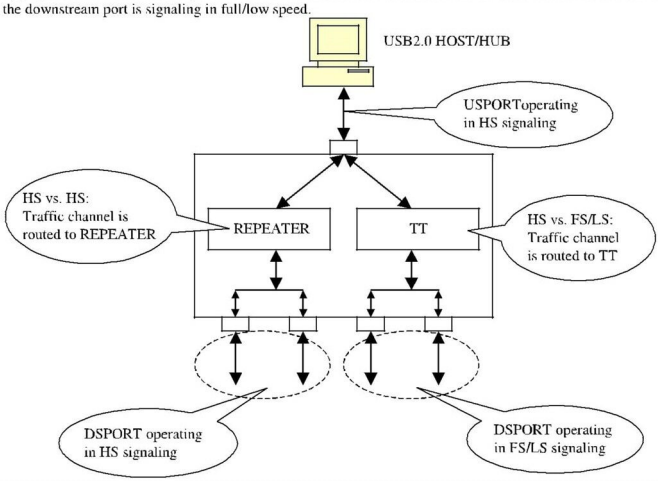
5.1 Connected to 1.1 Host/Hub

If an USB 2.0 hub is connected to the downstream port of an USB 1.1 host/hub, it will operate in USB 1.1 mode. For an USB 1.1 hub, both upstream direction traffic and downstream direction traffic are passing through REPEATER. That is, the REPEATER/TT routing logic will route the traffic channel to the REPEATER.



5.2 Connected to USB 2.0 Host/Hub

If an USB 2.0 hub is connected to an USB 2.0 host/hub, it will operate in USB 2.0 mode. The upstream port signaling is in high speed with bandwidth of 480 Mbps under this environment. The traffic channel will then be routed to the REPEATER when the device connected to the downstream port is signaling also in high speed. On the other hand, the traffic channel will then be routed to TT when the device connected to the downstream port is signaling in full/low speed.



6.0 ELECTRICAL CHARACTERISTICS

6.1 Maximum Ratings

Table 6.1 – Maximum Ratings

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	5V Power Supply	-0.5	+5.5	V
V_{DD}	3.3V Power Supply	-0.5	+3.6	V
V_{IN}	Input Voltage for digital I/O pins	-0.5	+3.6	V
V_{INOD}	Open-drain input pins(Ovcur1~4#,Pself,Reset)	-0.5	+5.5	V
V_{INUSB}	Input Voltage for USB signal (DP, DM) pins	-0.5	+3.6	V
T_S	Storage Temperature under bias	-55	+100	℃
F_{OSC}	Frequency	12 MHz		

6.2 Operating Ranges

Table 6.2 – Operating Ranges

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{CC}	5V Power Supply	4.0	5.0	5.25	V
V_{DD}	3.3V Power Supply	3.1	3.3	3.5	V
V_{IND}	Input Voltage for digital I/O pins	-0.5		3.6	V
V_{INOD}	Open-drain input pins(Ovcur1~4#,Pself,Reset)	-0.5		5.0	V
V_{INUSB}	Input Voltage for USB signal (DP, DM) pins	0.5		3.6	V
T_A	Ambient Temperature	0		70	℃

6.3 DC Characteristics

Table 6.3 – DC Characteristics Except USB Signals

Symbol	Parameter	Min.	Typ.	Max.	Unit
P_D	Power Dissipation	50	-	120	mA
V_{33}	5V to 3.3V regulator output with 200mA load	2.9	3.3	3.52	V
V_{IL}	LOW level input voltage	-	-	0.8	V
V_{IH}	HIGH level input voltage	2.0	-	-	V

SO16 (Narrow) MECHANICAL DATA

DIM	mm			inch		
	MIN	TYP	MAX	MIN	TYP	MAX
A			1.75			0.068
a1	0.1		0.2	0.004		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10			0.393
E	5.8		6.2			0.244
e		1.27				
e3		8.89				
F	3.8		4.0			0.157
G	5.8		5.3			0.208
L	0.5		1.27			0.005
M			0.62			0.024
S	8° (max.)