



**MA8621**

**USB 2.0 High Speed 3-Port Hub**

**with SD Reader Controller**

**Product Datasheet**

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## 1. Description

The MA8621 is a high performance solution for USB 2.0 High Speed 3-port hub with SD card controller which is fully compliant with Universal Serial Bus Specification 2.0. The controller inherits advanced serial interface technology to consume the least power when 3 DS (downstream) ports function simultaneously.

The MA8621 is an innovation that integrates function to combine USB 2.0 Hub and SD card reader. The reader complies with SD, SDHC, SDXC and MMC card specification. With single IC, MA8621 provides system solution targeting the multi-media set top box for multiple USB ports and reader application.

MA8621 adapt Single Transaction Translator (STT) and Ganged power management to achieve cost effective purpose. Users can also implement multiple Hub configuration options through external EEPROM.

MA8621 provides QFN-40 package.

## 2. Features

### 2.1 USB 2.0 Hub

- Compliant with USB Specification Revision 2.0
  - Upstream Port supports high-speed (480MHz) and full-speed (12MHz) traffic
  - Configurable 3/2 downstream ports support high-speed, full-speed, and low-speed
  - Backward compatible to USB Specification Revision 1.1
- 12Mhz Oscillator clock input
- Integrated upstream 1.5K $\Omega$  pull-up downstream 15K $\Omega$  pull-down resistors
- Single Transaction Translator (Single TT)
- Ganged Power Control and Global Over Current detection for downstream ports
- Leading small power consumption USB2.0 Hub
- Integrated Fast 8051 microprocessor
- On chip 5V to 3.3V/1.2V regulator
- Automatic re-enumeration for switching between self-powered and bus-powered modes
- External EEPROM interface for customized information storage
  - Customized VID, PID
  - Number of downstream port
  - Product ID
  - Serial number

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**(USB 2.0 High Speed 3-Port Hub with SD Reader Controller)**

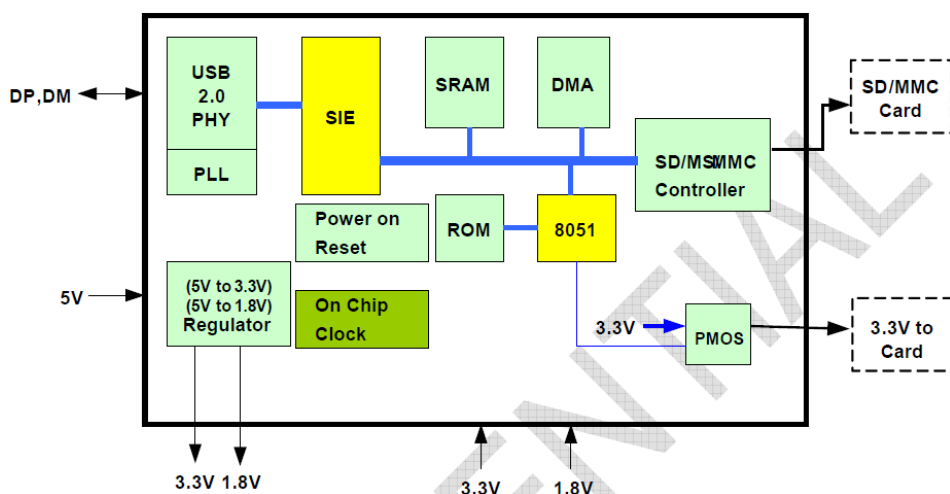
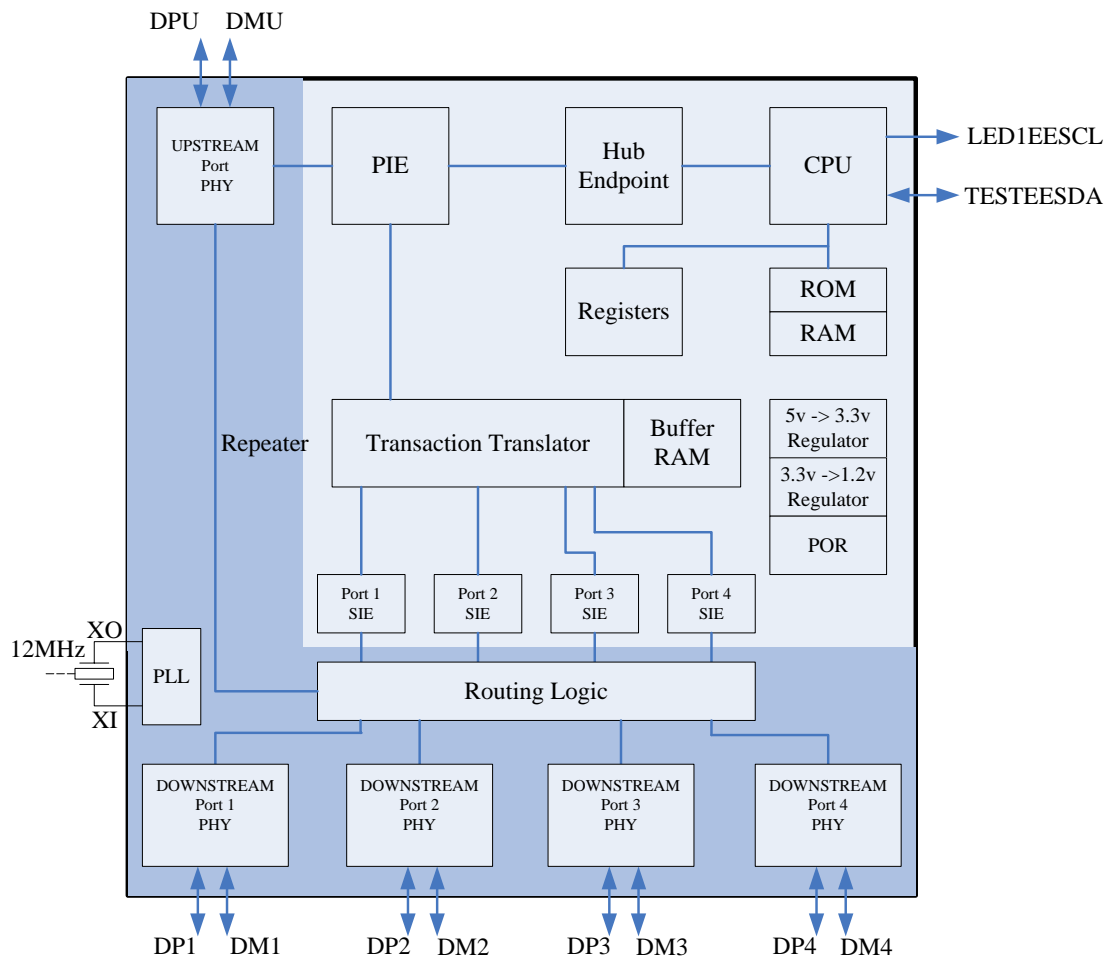
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- Two LED port indicator mode
  - 3 Downstream port LED (enable green) and one Active/Suspend LED(Red)
  - One joint Downstream port LED for 3 ports (enable green) and one Active/Suspend LED(Red)

## **2.2 USB 2.0 SD Card Reader**

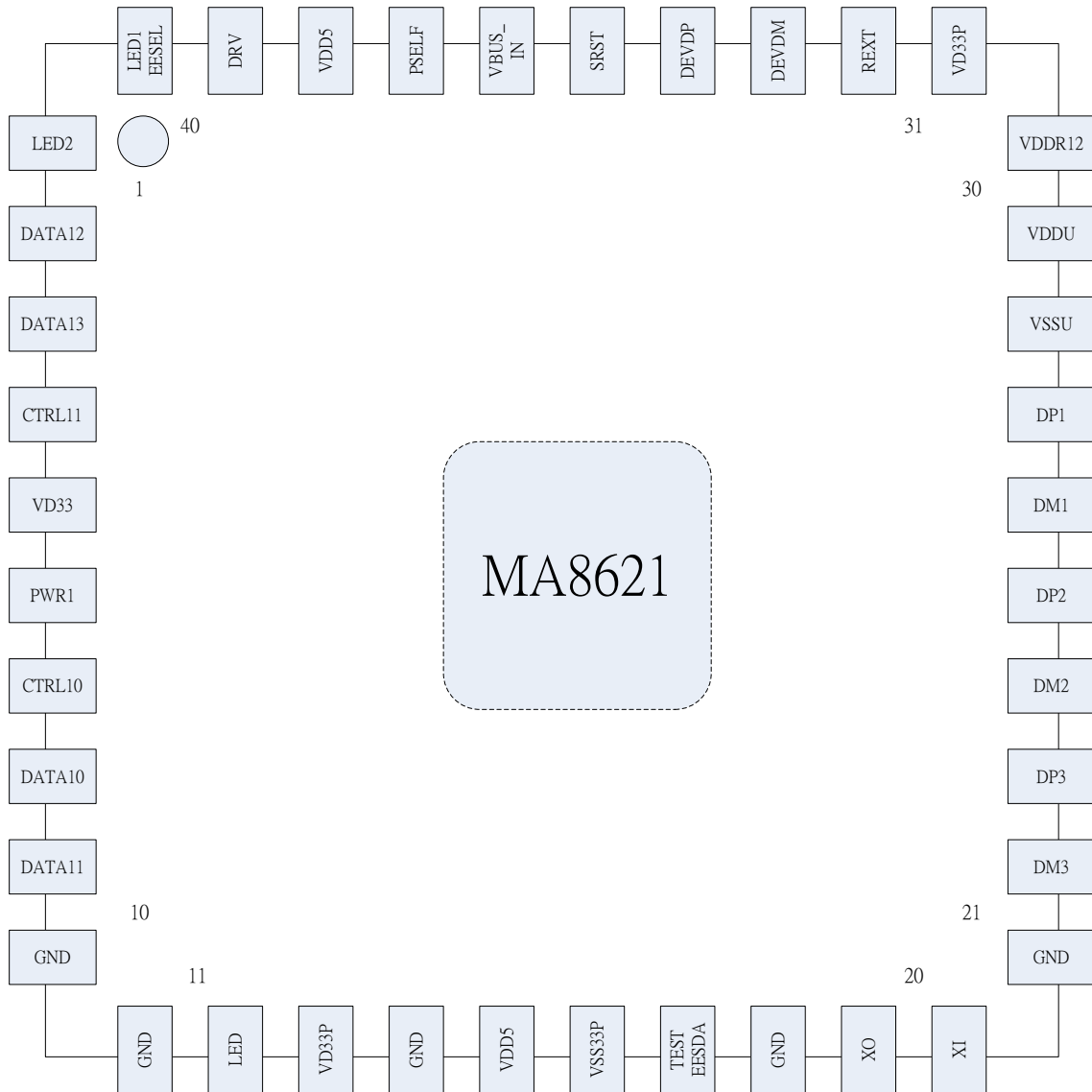
- USB Device Class Definition for Mass Storage , Bulk-Transport v1.0
- Single LUN support for SD/MMC card
  - Support MMC 4.0/4.1/4.2 (4 bit & 8bit), RS-MMC, MMC-Mobile
  - Support SD 1.1/2.0/SDHC, Micro SD 1.1/2.0/SDHC, Mimi SD card
  - Support SD/MMC High Speed Mode
- Integrated Fast 8051 microprocessor
- On chip 5V to 3.3V/1.2V regulator
- Type of package
  - 40QFN

### 3. Block Diagram



## 4. Pin Assignment

### 4.1 QFN40 Pin Out Diagram



#### 4.2 QFN40 Pin Description

Pin #	Pin Name	I/O	Description
1	LED2/ GLEDEN	B	DSP 2 and DSP 4 LED control/Group LED Indicator Enable
2	DATA12	B	SD/MMC data pin
3	DATA13	B	SD/MMC data pin
4	CTRL11	O	SD/MMC command response pin
5	VD33	P	Logical Power 3.3V Input
6	PWR1	P	Output 3.3V Power Source for SD/MMC Card
7	CTRL10	O	SD/MMC clock output
8	DATA10	B	SD/MMC data pin
9	DATA11	B	SD/MMC data pin
10	GND	P	Ground
11	VSS	P	Ground
12	LED	O	LED for reader status indicator
13	VD33P	P	PHY 3.3V Power Input
14	GND	P	Ground
15	VDD5	P	5V Bus Power Input to Internal Regulator
16	GND	P	Ground
17	TEST / EESDA	B	Test mode enable, (pull up) / EEPROM data pin. For normal usage this EESDA pin should left as No-Connection or connect to EEPROM SDA pin. Active low.
18	VSS	P	Ground
19	XO	P	12MHz Crystal Oscillator output
20	XI	P	12MHz Crystal Oscillator input
21	GND	P	Ground
22	DM3	B	USB D- pin for the 3 <sup>rd</sup> Downstream Port
23	DP3	B	USB D+ pin for the 3 <sup>rd</sup> Downstream Port
24	DM2	B	USB D- pin for the 2 <sup>nd</sup> Downstream Port
25	DP2	B	USB D+ pin for the 2 <sup>nd</sup> Downstream Port
26	DM1	B	USB D- pin for the 1 <sup>st</sup> Downstream Port
27	DP1	B	USB D+ pin for the 1 <sup>st</sup> Downstream Port
28	VSSU	P	Ground
29	VDDU	P	1.2V input
30	VDDR12	P	1.2V output from 3.3V to 1.2V LDO
31	VDDR33	P	3.3V output from 5V LDO
32	REXT	I	USB PHY bias reference
33	DMU	B	USB D- pin for the Upstream Port

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34	DPU	B	USB D- pin for the Upstream Port
35	SRST	I	System reset pin (pull up)
36	VBUS_IN	I	USB Vbus facing port. Used to monitor the power state of Vbus. When Vbus_in = 1, the chip starts function.
37	PSELF	B	Bus power monitor. Distinguish the power source is Self-powered or Bus-powered. (High level indicates Self-Powered; Low level indicates Bus-Powered; default with in-chip pull- low resistor)
38	VDD5	P	5V input for LDO
39	DRV	B	LED control / Charging Hub Enable
40	LED1/ EESCL	B	DSP 1 and DSP 3 LED control / EEPROM clock

**I/O Type Definition**

O : Output

I : Input

B : Bi-directional

P : Power



## 5. Electrical Characteristics

### 5.1 Absolute Maximum Ratings

Parameter	Value
Supply Voltage	-0.5V to +6.0V
Operating Temperature Range	0°C to +70°C

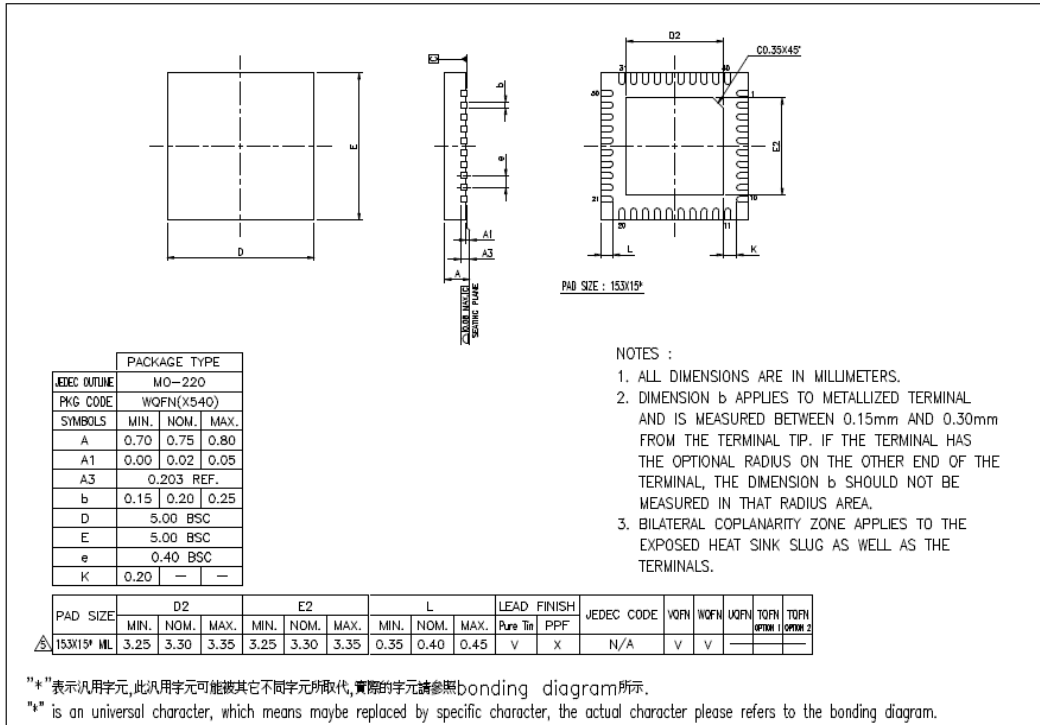
### 5.2 DC Characteristics and Operating Conditions

Symbol.	Parameter	Rating			Unit
		Min.	Typ.	Max.	
<b>V<sub>bus</sub></b>	5V Power Supply Voltage	<b>4.5</b>		<b>5.5</b>	V
<b>V<sub>IH</sub></b>	High level input voltage	<b>2.0</b>			V
<b>V<sub>IL</sub></b>	Low level input voltage			<b>0.8</b>	V
<b>V<sub>OH</sub></b>	High level output voltage	<b>3.0</b>			V
<b>V<sub>OL</sub></b>	Low level output voltage			<b>0.4</b>	V
<b>I<sub>OH</sub></b>	High level output current	<b>6</b>			mA
<b>I<sub>OL</sub></b>	Low level output current ( <b>V<sub>OL</sub> = 0.4V</b> )	<b>6</b>			mA

(USB 2.0 High Speed 3-Port Hub with SD Reader Controller)

## 6. Package Information

### 6.1 QFN40 Outline



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