

# **SYS76989VGGA**

Industrial Computer Board

# Chapter 1

## Overview

Thank you for choosing the SYS76989VGGA, the excellent industrial computer boards from Grantech.

Based on the innovative **Intel® QM77/ HM76** chipsets for optimal system efficiency, the Board accommodates the **Intel® Core™ i7 / i5 / i3 or Celeron®** processor in rPGA-989 (Socket G2) and supports 2 DDR3 1067/1333/1600 DIMM slots to provide the maximum of 16GB memory capacity.

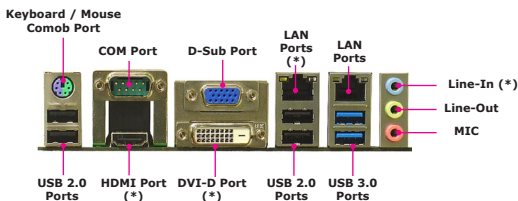
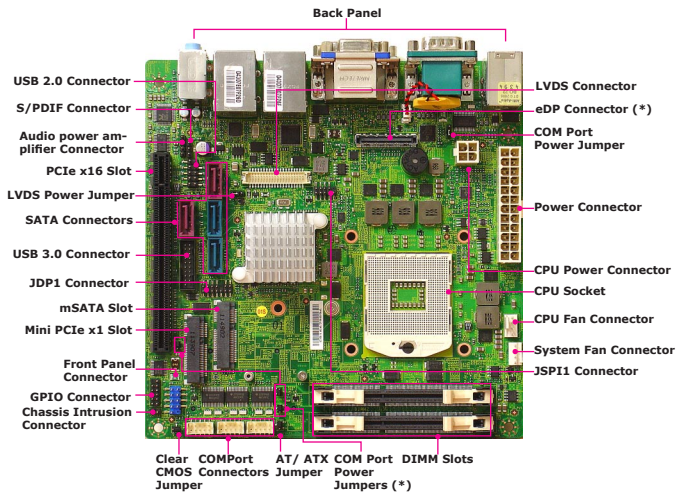
The board are durable under extreme environments and suitable to be applied in every industrial field, such as digital signage, kiosk, gaming, industrial control automation and POS.

## MAINBOARD SPECIFICATIONS

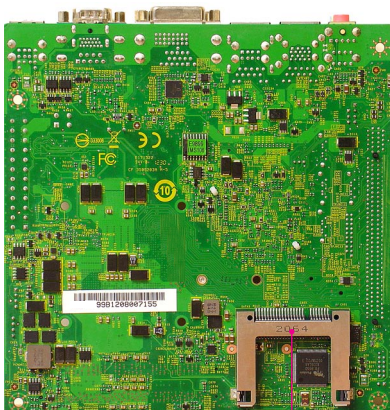
<b>CPU</b>	<ul style="list-style-type: none"><li>■ Intel® Core™i7 / i5 / i3 or Celeron® processor in rPGA-989 (Socket G2)</li></ul>
<b>Chipset</b>	<ul style="list-style-type: none"><li>■ SKU1: Intel® QM77 Chipset</li><li>■ SKU2: Intel® HM76 Chipset</li></ul>
<b>Memory</b>	<ul style="list-style-type: none"><li>■ 2 unbuffered non-ECC DDR3 1067/1333/1600 DIMM slots</li><li>■ Supports the maximum of 16GB</li></ul>
<b>LAN</b>	<ul style="list-style-type: none"><li>■ Intel® 82579LM Gigabit Fast Ethernet controller</li><li>■ Intel® 82583V Gigabit Fast Ethernet controller (QM77 only)</li></ul>
<b>Audio</b>	<ul style="list-style-type: none"><li>■ Realtek® ALC887 VD2-CG Codec</li></ul>
<b>RAID</b>	<ul style="list-style-type: none"><li>■ Supports RAID 0/ 1/ 5/ 10 (QM77)</li></ul>
<b>Graphics</b>	<ul style="list-style-type: none"><li>■ Graphics integrated in Intel® processor<ul style="list-style-type: none"><li>- 2 independent displays supported by SNB</li><li>- 3 independent displays supported by IVB (QM77)</li></ul></li></ul>
<b>Back Panel I/O</b>	<ul style="list-style-type: none"><li>■ Back Panel I/O<ul style="list-style-type: none"><li>- 1 PS/2 mouse and keyboard combo port</li><li>- 1 serial port</li><li>- 1 HDMI port (QM77 only)</li><li>- 1 VGA port</li><li>- 1 DVI-D ports (QM77 only)</li><li>- 2 USB 3.0 ports</li><li>- 4 USB 2.0 ports</li><li>- 2 Gigabit LAN jacks (QM77) / 1 Gigabit LAN jack (HM76)</li><li>- 3 flexible audio ports (QM77) / 2 flexible audio ports (HM76)</li></ul></li></ul>

<b>Onboard Connectors/Pin-headers</b>	<ul style="list-style-type: none"> <li>■ Onboard Connectors/Pinheaders           <ul style="list-style-type: none"> <li>- 1 USB 3.0 pinheader (2 ports)</li> <li>- 1 USB 2.0 pinheader (2 ports)</li> <li>- 2 SATA 6Gb/s ports</li> <li>- 2 SATA 3Gb/s ports</li> <li>- 3 serial port connectors</li> <li>- 4 serial port power jumpers (QM77)</li> <li>1 serial port power jumpers (HM76)</li> <li>- 1 front panel pinheader</li> <li>- 1 chassis intrusion connector</li> <li>- 1 GPIO connector</li> <li>- 1 LVDS connector</li> <li>- 1 LVDS power jumper</li> <li>- 1 amplifier pinheader</li> <li>- 1 eDP port (QM77)</li> <li>- 1 S/PDIF out pinheader</li> </ul> </li> </ul>
<b>Slot</b>	<ul style="list-style-type: none"> <li>■ 1 PCIe x 16 slot</li> <li>■ 1 mini PCIe x 1 slot</li> <li>■ 1 mSATA 3Gb/s port</li> <li>■ 1 CFAST slot (QM77)</li> </ul>
<b>Form Factor</b>	<ul style="list-style-type: none"> <li>■ Mini-ITX: 17.0cm x 17.0cm</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>■ Operating Temperature: 0°C to 60°C</li> <li>■ Storage Temperature: -20°C to 80°C</li> <li>■ Humidity: 0% ~ 95% RH, Non-Condensing</li> </ul>

## MAINBOARD LAYOUT



(\*) For QM77 only.



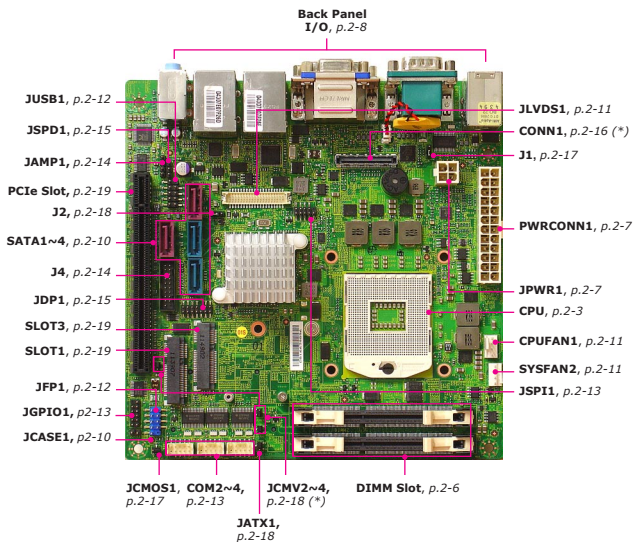
**CFAST Slot (\*)**

## Chapter 2

# Hardware Setup

This chapter provides you with the information on mainboard hardware configurations. Incorrect setting of jumpers and connectors may damage your mainboard. Please pay special attention not to connect these headers in wrong direction. **DO NOT** adjust any jumper while the mainboard is powered on.

## QUICK COMPONENTS GUIDE



(\*) For QM77 only.



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## **CPU (CENTRAL PROCESSING UNIT)**

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When you are installing the CPU, make sure that you install the cooler to prevent overheating. If you do not have the CPU cooler, consult your dealer before turning on the computer.

### **Important**

#### ***Overheating***

*Overheating can seriously damage the CPU and mainboard. Always make sure the cooling fans work properly to protect the CPU from overheating. Be sure to apply an even layer of thermal paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.*

#### ***Replacing the CPU***

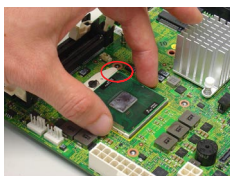
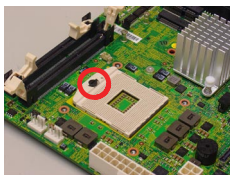
*When replacing the CPU, always turn off the system's power supply and unplug the power supply's power cord to ensure the safety of the CPU.*

## CPU Installation

Locate the CPU socket on the mainboard. On the upper end of the CPU socket is a socket actuator in the form of a slotted screw head.

To install the CPU, follow the steps shown below:

1. Loosen the socket actuator with the parallel screw driver.
2. Locate the golden cut edge on where the CPU should be installed.
3. Align the correct CPU orientation and insert the CPU into the socket. Note that the CPU will only fit in the socket when the CPU orientation is correct. Do not use force to insert the CPU into the socket, because it will damage the golden pins of the CPU.
4. Fasten the CPU screw with the parallel screw driver to steady the CPU.



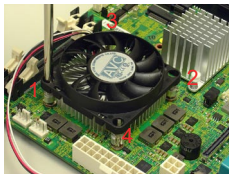
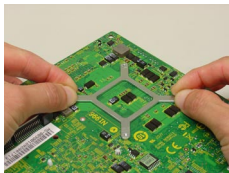
### ***Important***

Mainboard photos shown in this section are for demonstration only and may differ from the actual look of your mainboard.

## CPU Cooler Installation

When the CPU installation is completed, please install the CPU cooler to prevent the CPU from overheating.

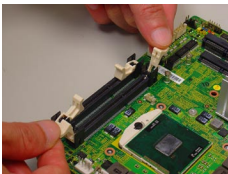
1. Remove the sticker film from the CPU cooler backplate.
2. Paste the backplate to be in line with the holes on the reverse side of the mainboard.
3. Place the CPU cooler onto the mainboard.
4. Screw it from corner to opposite corner not left to right or top to bottom.
5. Plug in the fan power cable.



## Memory

These DIMM slots are used for installing memory modules.

1. Unlock the DIMM slot by pushing the mounting clip to the side. Vertically insert the memory module into the DIMM slot. The memory module has an off-center notch on the bottom that will only allow it to fit one way into the DIMM slot.
2. Push the memory module deep into the DIMM slot. The plastic clip at side of the DIMM slot will automatically close when the memory module is properly seated and an audible click should be heard.
3. Manually check if the memory module has been locked in place by the DIMM slot's side clip.



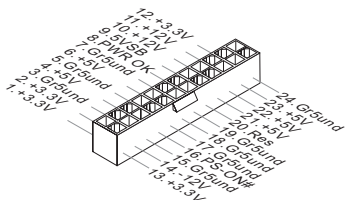
### **Important**

- *You can barely see the golden finger if the DIMM is properly inserted in the DIMM slot.*
- *To enable successful system boot-up, always insert the DIMM into the **DIMM1** first. Power Supply*

## ATX 24-pin Power Connector: PWRCONN1

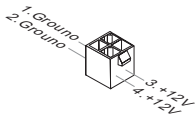
This connector allows you to connect an ATX 24-pin power supply. To connect the ATX 24-pin power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.

You may use the 20-pin ATX power supply as you like. If you'd like to use the 20-pin ATX power supply, please plug your power supply along with pin 1 & pin 13.



## ATX 4-pin Power Connector: JPWR1

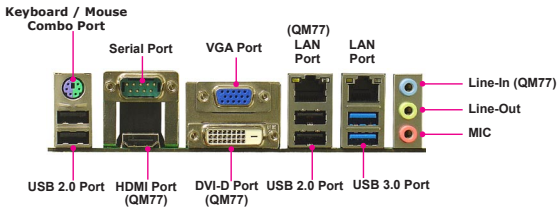
This connector is used to provide the power output to the CPU.



### **Important**

*Make sure that all the connectors are connected to proper ATX power supplies to ensure stable operation of the mainboard.*

## BACK PANEL I/O



### ▶ Keyboard / Mouse Combo Port

The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

### ▶ Serial Port

The serial port is a 16550A high speed communications port that sends/receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

### ▶ HDMI Port (QM77)

The High-Definition Multimedia Interface (HDMI) is an all-digital audio/video interface capable of transmitting uncompressed streams. HDMI supports all TV format, including standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable.

### ▶ VGA Port

The DB15-pin female connector is provided for monitor.

### ▶ DVI-D Port (QM77)

The DVI-D (Digital Visual Interface-Digital) connector allows you to connect an LCD monitor. It provides a high-speed digital interconnection between the computer and its display device. To connect an LCD monitor, simply plug your monitor cable into the DVI connector, and make sure that the other end of the cable is properly connected to your monitor (refer to your monitor manual for more information.)

### ▶ USB 2.0 Port

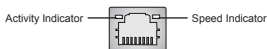
The USB (Universal Serial Bus) port is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices.

### ▶ USB 3.0 Port

USB 3.0 port is backward-compatible with USB 2.0 devices. Supports data transfer rate up to 5 Gbit/s (SuperSpeed).

### ▶ LAN Port

The standard RJ-45 LAN jack is for connection to the Local Area Network (LAN). You can connect a network cable to it.



		Left LED	Right LED
		Active LED	100M/1000M Speed LED
LED Color		Yellow	Green/Orange
10M Cable Plug-in	No Transmission	OFF	OFF
	Transmission	Yellow (Blinking)	OFF
100M Cable Plug-in	No Transmission	OFF	Green (Lighting)
	Transmission	Yellow (Blinking)	Green (Lighting)
1000M Cable Plug-in	No Transmission	OFF	Orange (Lighting)
	Transmission	Yellow (Blinking)	Orange (Lighting)
In S3/S4/S5 Standby State		OFF	OFF

### ▶ Audio Ports

These audio connectors are used for audio devices. It is easy to differentiate between audio effects according to the color of audio jacks.

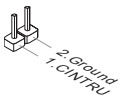
- Line-In (Blue) (QM77) - Line In, is used for external CD player, tapeplayer or other audio devices.
- Line-Out (Green) - Line Out, is a connector for speakers or headphones.
- Mic (Pink) - Mic, is a connector for microphones.

## CONNECTOR

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### Chassis Intrusion Connector: JCASE1

This connector is provided to connect the chassis intrusion switch cable. If the chassis is opened, the chassis intrusion mechanism will be activated. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.



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### Serial ATA Connector: SATA1 ~ SATA4

This connector is a high-speed Serial ATA interface port. Each connector can connect to one Serial ATA device.



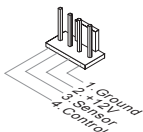
### **Important**

*Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during transmission.*



## Fan Power Connector: CPUFAN1 / SYSFAN2

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always note that the red wire is the positive and should be connected to the +12V; the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

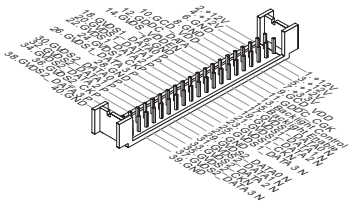


### Important

- Please refer to the recommended CPU fans at processor's official website or consult the vendors for proper CPU cooling fan.
- Fan cooler set with 3- or 4-pin power connector are both available for CPUFAN1.

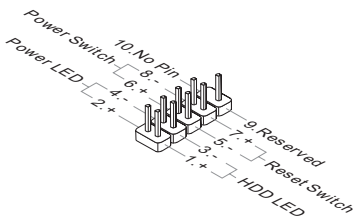
## LVDS Flat Panel Connector: JLVDS1

The LVDS (Low Voltage Differential Signal) connector provides a digital interface typically used with flat panels. After connecting an LVDS interfaced flat panel to the JLVDS1, be sure to check the panel datasheet and set the J2 jumper for proper power voltage.



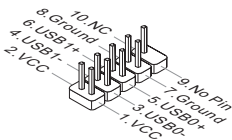
## Front Panel Connector: JFP1

These connectors are for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.



## Front USB Connector: JUSB1

This connector, compliant with Intel I/O Connectivity Design Guide, is ideal for connecting high-speed USB interface peripherals such as USB HDD, digital cameras, MP3 players, printers, modems and the like.

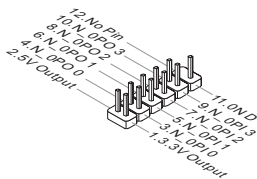


### **Important**

*Note that the pins of VCC and GND must be connected correctly to avoid possible damage.*

## GPIO Connector: JGPIO1

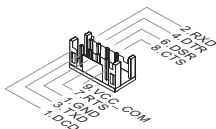
This connector is provided for the General-Purpose Input/Output (GPIO) peripheral module.



## Serial Port Connector: COM2~4 (RS-232)

This connector is a 16550A high speed communications port that sends/ receives 16 bytes FIFOs. You can attach a serial device to it through an optional serial port bracket.

RS-232



RS-232

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	VCC_COM	Power Source

## Debug Connector: JSPI1

This connector is provided for engineer debug only.



## Audio Amplifier Connector: JAMP1

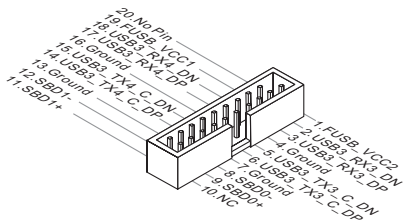
The JAMP1 is used to connect audio amplifiers to enhance audio performance.



PIN	SIGNAL
1	AMP_L-
2	AMP_L+
3	AMP_R-
4	AMP_R+

## USB 3.0 Connector: J4

USB 3.0 port is backward-compatible with USB 2.0 devices. Supports data transfer rate up to 5 Gbit/s (SuperSpeed).



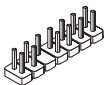
### **Important**

- Note that the pins of VCC and GND must be connected correctly to avoid possible damage.
- If you want to use a USB 3.0 device, you must use the USB 3.0 cable to connect to the USB 3.0 port.

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## Debug Connector: JDP1

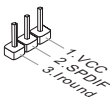
This connector is provided for engineer debug only.



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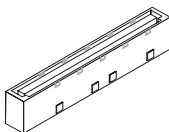
## S/PDIF-Out Connector: JSPD1

This connector is used to connect S/PDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission.



## eDP Connector: CONN1

The embedded Display Port abbreviated as eDP specification is a VESA standard. eDP connector consolidates internal and external connection methods to reduce device complexity, supports cross industry applications, and provides performance scalability. The eDP interface supports link-speeds of 1.62 Gbps and 2.7 Gbps on 1, 2 or 4 data lanes.



PIN	DESCRIPTION	PIN	DESCRIPTION
1	LCD power (Voltage select by J2)	23	Complement Signal Link Lane0
2	LCD power (Voltage select by J2)	24	True Signal Link Lane0
3	LCD power (Voltage select by J2)	25	Ground
4	LCD power (Voltage select by J2)	26	True Signal Auxiliary channel
5	LCD power (Voltage select by J2)	27	Complement Signal Auxiliary channel
6	Ground	28	Ground
7	Ground	29	Auxiliary 3.3V power
8	Ground	30	NC
9	Ground	31	+12V power
10	eDP hot plug detect	32	Ground
11	NC	33	Ground
12	NC	34	+5V power
13	Ground	35	Backlight control Clk
14	Complement Signal Link Lane3	36	Backlight control Data
15	True Signal Link Lane3	37	Backlight control enable
16	Ground	38	+12V power
17	Complement Signal Link Lane2	39	+3.3V power
18	True Signal Link Lane2	40	Ground
19	Ground	41	SMBUS CLK
20	Complement Signal Link Lane1	42	SMBUS DATA
21	True Signal Link Lane1	43	NC
22	Ground	44	NC

## JUMPER

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### Clear CMOS Jumper: JCMOS1

There is a CMOS RAM onboard that has a power supply from an external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set the jumper to clear data.



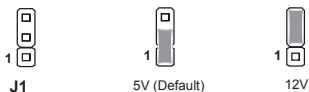
### **Important**

*You can clear CMOS by shorting 1-2 pin while the system is off. Then return to 2-3 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.*

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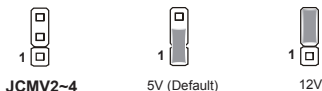
### COM1 Power Select Jumper: J1

This jumper specifies the operation voltage of the rear COM port.



## COM2~4 Power Select Jumper: JCMV2~4 (QM77)

This jumper specifies the operation voltage of the onboard COM2~4.

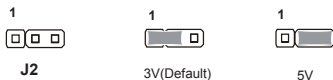


### **Important**

Avoid adjusting the jumper when the system is on; it will damage the mainboard.

## LVDS Voltage Select Jumper: J2

This jumper specifies the operation voltage of LVDS.

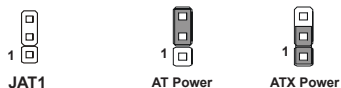


### **Important**

Avoid adjusting the jumper when the system is on; it will damage the mainboard.

## AT/ATX Select Jumper: JATX1

This jumper allows users to select between AT and ATX power.





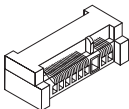
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## SLOT

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### Mini PCI (Peripheral Component Interconnect) Express Slot

The mini PCI Express slot supports the mini PCI Express interface expansion card such as wireless LAN, TV tuner, and Robson NAND Flash.

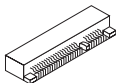


Mini PCI-E Slot

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### mSATA Slot

The slot supports mSATA SSD card that is smaller, lighter and faster than traditional storage device.

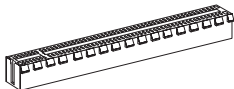


mSATA Slot

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### PCIe Slot

The PCIe slot supports the PCIe interface expansion card.



PCIe x16 Slot

RS-232/422/485 Serial Port Connector: JCOM1



Pin No.	RS232	RS485	RS422
Pin 1	DCD	TXD-	TXD-
Pin 2	RXD	NC	RXD+
Pin 3	TXD	TXD+	TXD+
Pin 4	DTR	NC	RXD-
Pin 5	GND	GND	GND
Pin 6	DSR	NC	NC
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	RI	NC	NC

**Bios Setting:Advanced/Super IO Configuration/Serial Port 1/Mode Select:RS232/RS485/RS422**