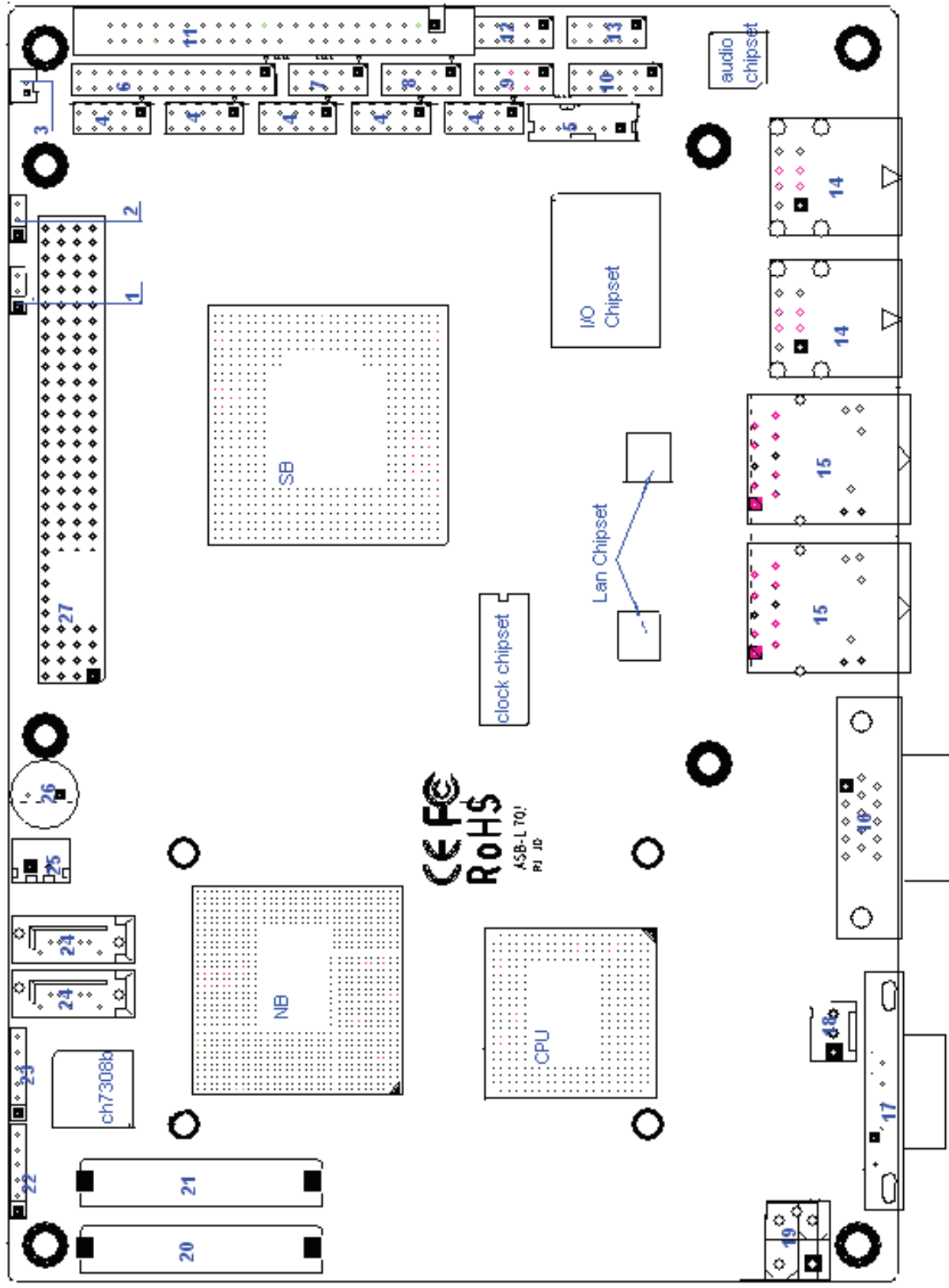


Figure 2.2: Mainboard Dimensions



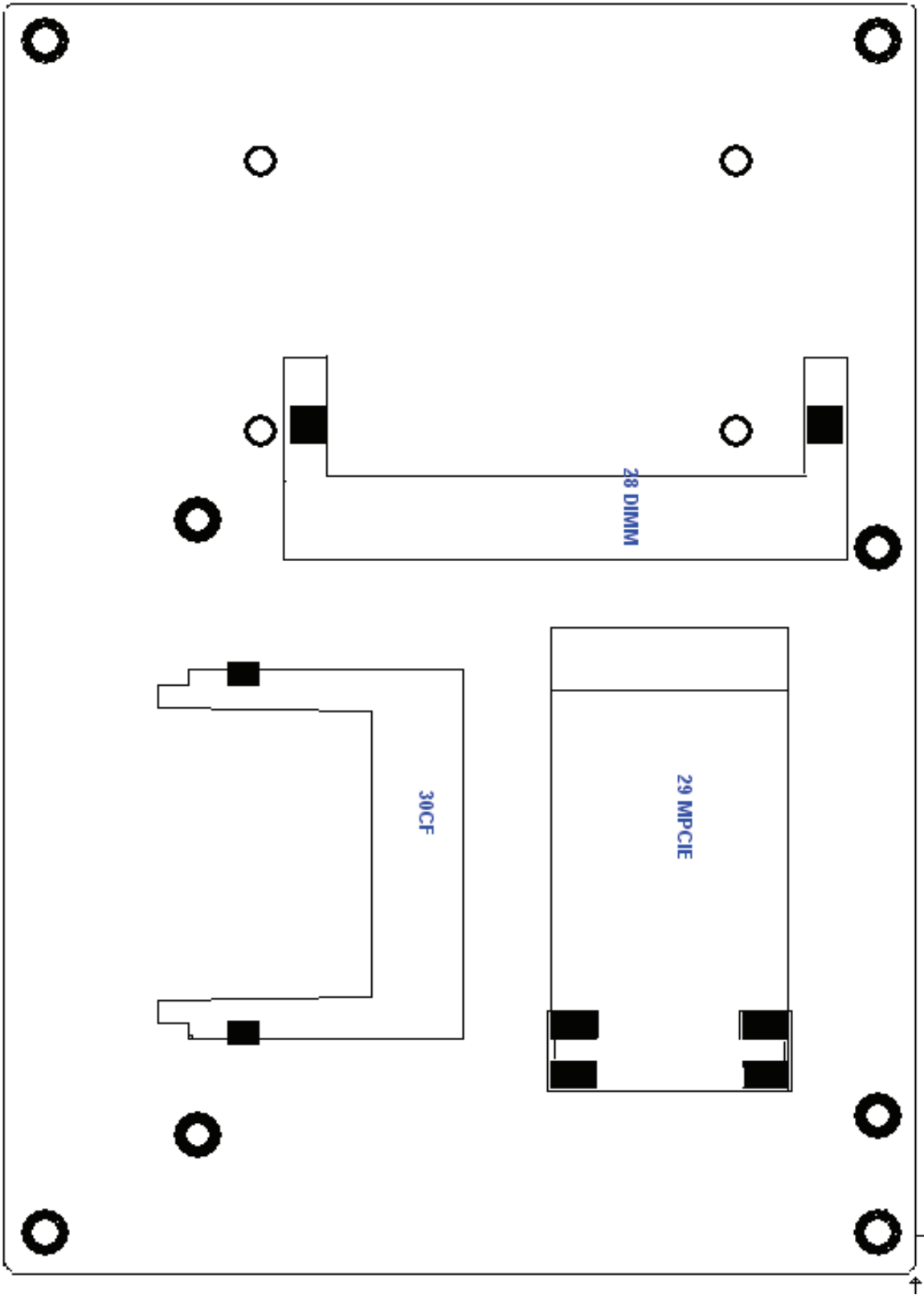


Figure 2.3: Connector and Jumper Locations

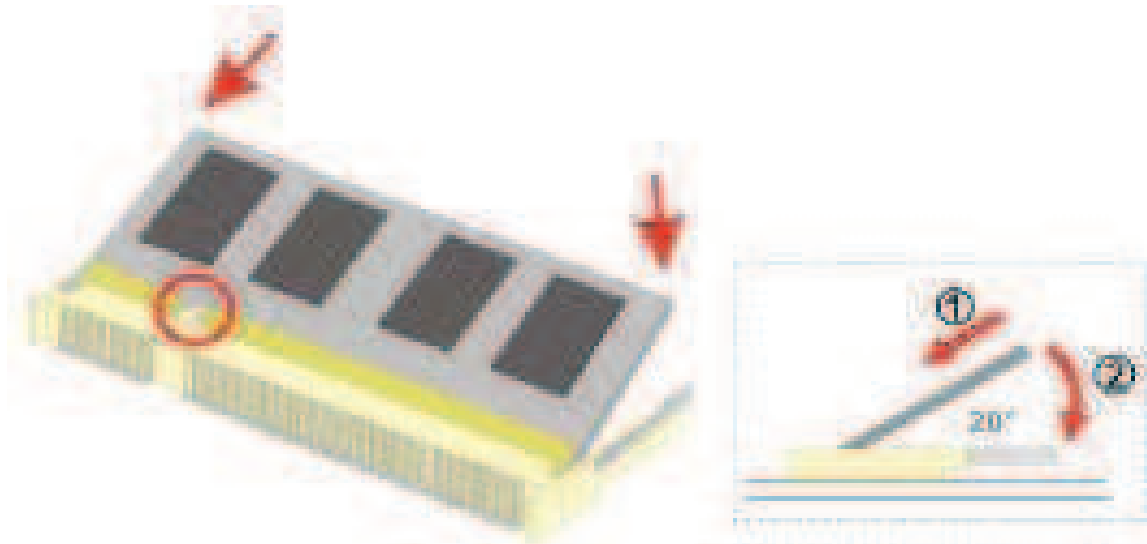
<b>Mainboard Specifications</b>	
<b>Board Size</b>	165 x 115mm
<b>CPU Support</b>	Intel Atom N270 1.6 GHz with 533MHz FSB
<b>Chipset</b>	Intel 945GSE + Intel ICH7M
<b>Memory Support</b>	1x200pin 533/400MHz DDR2 SO-DIMM support, up to 2GB SDRAM
<b>Graphics</b>	Intel Graphics Media Accelerator 950VGA integrated in Intel 945GSE 18-bit dual-channel LVDS integrated in Intel 945GSE 18/24 bit dual-channel LVDS support by Chrontel CH7308B 1 x DB15 Female connector for external
<b>Super I/O</b>	Winbond W83627UHG
<b>BIOS</b>	Award BIOS
<b>Storage</b>	2 x SATA Connector 1 x Compact Flash II Slot 1 x 44-pin IDE Connector
<b>Network</b>	2 x Gigabit Ethernet Port by RJ45 with LED indicators - Ethernet controller : 2 x PCIe by one bus Realtek 8111D
<b>USB</b>	4 x USB 2.0 stack port for external 2 x USB 2.0 header for internal
<b>Serial</b>	1 x RS232 port, DB9 connector for external (COM1), pin 9 w/5V/12V/Ring select 1 x RS232/422/485 (Full-duplex) select header for internal (COM2), default RS232 4 x RS232 header for internal (COM3 – COM6)
<b>Digital I/O</b>	8-bit digital I/O by header 4-bit digital Input 4-bit digital Output
<b>Battery</b>	Support CR2477 battery by 2-pin header
<b>Audio</b>	Support Audio via Realtek ALC662 HD audio decoder Support Line-in, Line-out, MIC by 2x5-pin header
<b>Printer</b>	1x LPT port by 2x13-pin header
<b>Keyboard /Mouse</b>	1x PS2 keyboard/mouse by 1x6 -pin wafer connector

<b>Expansion Bus</b>	1x PC 104+ connector (PCI master 4, jumper for +3.3V & 5V select) 1x PCIe (PCI-e 1x +SMBUS+USB2.0) mini card
<b>Power Management</b>	DC12V input 1 x 2x2-pin power input connector
<b>Front I/O</b>	by 2x5-pin header Power on/off switch Reset switch Power LED status HDD LED status Buzzer
<b>Watchdog Timer</b>	Software programmable 1 – 255 second by Super I/O
<b>External I/O port</b>	1 x COM Port (COM1) 4 x USB 2.0 Ports (stack) 2 x RJ45 GbE Port (10/100/1000Mbps) 1 x VGA Port
<b>Temperature</b>	Operating: 0 – 60 degree C Storage: -20 – 80 degree C
<b>Humidity</b>	5% - 95%, non-condensing, operating
<b>Power Consumption</b>	12V @1.4 5A (Intel N270 processor with 1GB DDR2 DRAM)
<b>EMI/EMS</b>	CE/FCC class A

## 2.2 Installations

### 2.2.1 SO-DIMM Installation

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to picture.



**Figure 2.2: Installation of Memory Module**

#### **Step 1:**

**Locate the SO-DIMM socket.** Place the NANO-945GSE2 on an anti-static pad with the solder side facing up.

#### **Step 2:**

**Align the SO-DIMM with the socket.** The SO-DIMM must be oriented in such away that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

#### **Step 3:**

**Insert the SO-DIMM.** Push the SO-DIMM chip into the socket at an angle. (See **Figure 2.3**)

#### **Step 4:**

**Open the SO-DIMM socket arms.** Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down

## 2.3 Onboard Jumpers and Port Pin outs

**1. JVCCIO (2.0MM 1X3) PC104+ port voltage selection jumper:** select voltage for PC104+ device

JVCCIO	PC104+ VCCIO Voltage
<b>CLOSE 1-2</b>	<b>+3.3V (default)</b>
CLOSE 2-3	+5V

**2. JCLR\_CMOS (2.0MM 1X3) CMOS clear jumper:** CMOS clear operation will permanently reset old BIOS settings to factory defaults.

JCLR_CMOS	CMOS
<b>CLOSE 1-2</b>	<b>NORMAL (default)</b>
CLOSE 2-3	CLEAR CMOS



Procedures of CMOS clear:

1. Turn off the system and unplug the power cord from the power outlet;
2. To clear the CMOS settings, use the jumper cap to close pins 2 and 3 for about 3 seconds then reinstall the jumper clip back to pins 1 and 2.
3. Power on the system again;
4. When entering the POST screen, press the <DEL> key to enter CMOS Setup Utility to load optimal defaults;
5. After the above operations, save changes and exit BIOS Setup.

**3. BAT (1.25.0MM 1X2) Battery port:** a 3.3V battery is embedded to provide power for CMOS.

PIN#	Signal Name
PIN1	VBAT
PIN2	Ground

**4.COM2-COM6 (2.0MM 2X5) COM2~COM6 port:** up to 5 standard RS232 ports are provided. They can be used directly via COM adapter cable connection.

Signal Name	Pin#	Pin#	Signal Name
DCD	1	2	RXD
TXD	3	4	DTR
Ground	5	6	DSR
RTS	7	8	CTS
RI	9	10	NC



Note: COM2 port is controlled by pins No.8~10 of JCOM. For details, please refer to description of JCOM.

**5.KB/MS (2.0MM 1X6) PS/2 keyboard/mouse port:** the port can be connected to PS/2 keyboard or mouse via a dedicated adapter cable for direct use.

Pin#	Signal Name
1	KBDATA
2	MSDATA
3	Ground
4	+5V
5	KBCLK
6	MSCLK

**6. LPT (2.0MM 2X13) Parallel port:** a standard 26 pin parallel port is provided to connect parallel peripherals as required.

Signal Name	Pin#	Pin#	Signal Name
PSTB#	1	2	PD0
PD1	3	4	DP2
DP3	5	6	DP4
DP5	7	8	DP6
DP7	9	10	ACK#



BUSY	11	12	PE
SLCT	13	14	AFD#
ERR#	15	16	INIT#
SLIN#	17	18	Ground
Ground	19	20	Ground
Ground	21	22	Ground
Ground	23	24	Ground
Ground	25	26	Ground

**7. GPIO (2.0MM 2X5) General-purpose input/output port:** it provides a group of self-programming interfaces to customers for flexible use.

Signal Name	Pin#	Pin#	Signal Name
GPIO20	1	2	GPIO60
GPIO21	3	4	GPIO61
GPIO22	5	6	GPIO62
GPIO23	7	8	GPIO63
Ground	9	10	+5V

**8. COM22 (2.0MM 2X5):** it provides selectable RS422/485 serial signal output.

Signal Name	Pin#	Pin#	Signal Name
A	1	2	Terminal Resistance
B	3	4	Terminal Resistance
Z	5	6	NC
Y	7	8	NC
Ground	9	10	NC

**9. USB4 (2.0MM 2X5) Front USB connector:** it provides two USB ports via a dedicated USB adapter cable.

Signal Name	Pin#	Pin#	Signal Name
+5V	1	2	+5V
USB_P6_DN	3	4	USB_P7_DN
USB_P6_DP	5	6	USB_P7_DP
Ground	7	8	Ground

NC	9	10	Ground
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Note:

Before connection, make sure that pin out of the USB adapter is in accordance with that of the said tables. Any inconformity may cause system down and even hardware damages.

**10. JCOM (2.0MM 2X6) COM1/2 setup jumper:** pin 1~6 are used to select signal out of pin 9 of COM1 port; pin 7~12 are used to select output type for COM2 port (RS232 or RS422/485).

JCOM	Function
<b>CLOSE 1-2</b>	<b>COM1 Pin9=RI (default)</b>
CLOSE 3-4	COM1 Pin9=+5V
CLOSE 5-6	COM1 Pin9=+12V
<b>CLOSE 7-9</b>	<b>COM2 FOR RS232 FROM COM2</b>
<b>CLOSE 8-10</b>	<b>(default)</b>
CLOSE 9-11	COM2 FOR RS485/RS422 FROM
CLOSE 10-12	COM22



Note:

1. As determined by its hardware design, the board features full-duplex RS485 communication. Like RS422, a four-wire connection is necessary.
2. Since COM2 and COM22 use the same address, they cannot work at the same time.

**11. IDE (2.0MM 2X22) IDE connector:** the motherboard provides a 44-pin IDE connector for connection of 2.5' IDE hard disk drivers and supports up to 2 IDE devices.

Signal Name	Pin#	Pin#	Signal Name
RESET	1	2	Ground
IDE_PDD7	3	4	IDE_PDD8
IDE_PDD6	5	6	IDE_PDD9
IDE_PDD5	7	8	IDE_PDD10
IDE_PDD4	9	10	IDE_PDD11
IDE_PDD3	11	12	IDE_PDD12
IDE_PDD2	13	14	IDE_PDD13
IDE_PDD1	15	16	IDE_PDD14
IDE_PDD0	17	18	IDE_PDD15
Ground	19	20	NC
DREQ	21	22	Ground
IOW#	23	24	Ground

IOR#	25	26	Ground
IOCHRDY	27	28	Ground
DACK#	29	30	Ground
IRQ14	31	32	NC
Address 1	33	34	IDE_PDIAG
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground
+5V	41	42	+5V
Ground	43	44	NC



Note:

If two IDE devices are connected, CF card connection cannot be realized.

## 12. F\_PANEL (2.0MM 2X5) Front panel connector

Signal Name	Pin#	Pin#	Signal Name
HD LED+	1	2	POWER LED+
HD LED-	3	4	POWER LED-
Ground	5	6	PWRBTN
RESET	7	8	Ground
BUZZER+	9	10	BUZZER-

PIN1&3: They are used to connect hard disk activity LED. The LED blinks when the hard disk is reading or writing data.

PIN2&4: They are used to connect power LED. When the system is powered on or under S0/S1 state, the LED is normally on; when the system is under S4/S5 state, the LED is off.

PIN5&6: They are used to connect power switch button. The two pins are disconnected under normal condition. You may short them temporarily to realize system startup & shutdown or awaken the system from sleep state.

PIN7&8: They are used to connect reset button. The two pins are disconnected under normal condition. You may short them temporarily to realize system reset.

PIN9&10: They are used to connect an external buzzer.



Note:

When connecting LEDs and buzzer, pay special attention to the signal polarity.

Make sure that the connector pins have a one-to-one correspondence with chassis wiring, or it may cause boot up failure.

**13. F\_AUDIO (2.0MM 2X5) Front Audio:** An onboard REALTEL ALC662 CODEC is used to provide high-quality audio I/O ports; Line Out can be connected to a headphone or amplifier; Line In is used for the connection of external audio source via a Line in cable; Mic is the port for microphone input audio.

Signal Name	Pin#	Pin#	Signal Name
FRONT-OUT-L	1	2	LINEIN_R
AUD_AGND	3	4	AUD_AGND
FRONT-OUT-R	5	6	LINEIN_L
AUD_AGND	7	8	AUD_AGND
FRONT-MIC1	9	10	AUD_AGND



**Note:**

The board only supports mono microphone input.

**14. USB1/2 Rear USB connector:** it provides up to 4 USB2.0 ports.

**15. LAN1/2 Rear LAN connectors:** 2 standard 1000M RJ-45 Ethernet ports are provided. LINK LED (green) and ACTIVE LED (yellow) respectively located at the left-hand and right-hand side of the Ethernet port indicate the activity and transmission state of LAN.

**16. VGA (Video Graphic Array):** GMA950 GPU is integrated to provide high-quality video output.

**17. COM Rear serial port:** standard DB9 serial port is provided to make a direct connection to serial devices.

**18. FAN (2.54MM 1X3) Fan connector:** cooling fans can be connected directly for use. You may set the rotation condition of cooling fan in PC Health Status menu of BIOS Setup.

Pin#	Signal Name
1	Ground
2	+12V
3	Rotation detection



Note: Output power of cooling fan must not be above 5W.

## 19. AT12V (5.0MM 1X2) 12V System power input connector

Pin#	Signal Name
1	+12V
2	Ground



Note:

Make sure that the voltage of power supply is DC(12±5%)V before power on, or it may cause boot up failure and even system damage.

## 20. LVDS1 for dual 18 bit 18-bit LVDS output connector: Fully supported by

INTEL945GSE chipset, the interface features single and dual channel 18-bit output with maximum resolution support up to 1600\*1200. The format of connected display screen is SPWG. Model name of the interface connector is Hirose DF13-40DP-1.25V.

Signal Name	Pin#	Pin#	Signal Name
+5V	1	2	+5V
Ground	3	4	Ground
+3.3V	5	6	+3.3V
LADATAN0	7	8	LBDATAN0
LADATAP0	9	10	LBDATAP0
Ground	11	12	Ground
LADATAN1	13	14	LBDATAN1
LADATAP1	15	16	LBDATAP1
Ground	17	18	Ground
LADATAN2	19	20	LBDATAN2
LADATAP2	21	22	LBDATAP2
Ground	23	24	Ground
LACLKN	25	26	LBCLKN
LACLKP	27	28	LBCLKP
Ground	29	30	Ground
LDDC_CLK	31	32	LDDC_DATA
Ground	33	34	Ground

NC	35	36	NC
NC	37	38	NC
NC	39	40	NC

## 21. LVDS1 for dual 24 bit 24-bit LVDS output connector: Fully supported by CHRONTEL

CH70308BE chipset, the interface features single and dual channel 18-bit and 24-bit output with maximum resolution support up to 1600\*1200. The format of connected display screen is OPENLDI. Model name of the interface connector is Hirose DF13-40DP-1.25V.

Signal Name	Pin#	Pin#	Signal Name
+5V	1	2	+5V
Ground	3	4	Ground
+3.3V	5	6	+3.3V
A0M	7	8	A4M
A0P	9	10	A4P
Ground	11	12	Ground
A1M	13	14	A5M
A1P	15	16	A5P
Ground	17	18	Ground
A2M	19	20	A6M
A2P	21	22	A6P
Ground	23	24	Ground
CLK1M	25	26	CLK2M
CLK1P	27	28	CLK2P
Ground	29	30	Ground
SC_DDC	31	32	SD_DDC
Ground	33	34	Ground
A3M	35	36	A7M
A3P	37	A3M	A7P
NC	39	40	NC

## 22. BKL2 (2.0MM 1X6) Backlight control connector for LVDS2

Pin#	Signal Name
1	+12V
2	+5V

3	Ground
4	Ground
5	ENABKL
6	NC

### 23. BKL1 (2.0MM 1X6) Backlight control connector for LVDS1

Pin#	Signal Name
1	+12V
2	+5V
3	Ground
4	Ground
5	LBKLT_EN
6	LBKLT_CTRL



Note: Remember that BLK1 supports LVDS1 and BLK2 supports LVDS2 during wiring. The two must not be confused.

**24. SATA1/2 SATA Connectors:** two SATA connectors are provided, with transfer speed up to 3.0Gb/s.

**25. CN1 (2.5MM 1X2):** an onboard 5V output connector is reserved to provide power for IDE/SATA devices.

Pin#	Signal Name
1	+5V
2	Ground



Note:  
Output current of the connector must not be above 1A.

**26. BZ Buzzer:** onboard buzzer

**27. PC104+ PC104+ connector:** it conforms to standard PC104+ specification.

**28. DIMM Memory socket:** the socket is located at the backside of the board and supports 200PIN 1.8V DDRII400/533 memory module up to 2G. If a DDRII667/800 memory module is installed, the system will reduce the DRAM frequency to 533MHz.

**29. MPCIE Mini PCIE slot:** it supports MINI PCIE devices with USB2.0, SMBUS and PCIE signal.

**30. CF CF Card Slot:** it is located at the backside of the board and serves as an insert interface for Type I and Type II Compact Flash card. The operating voltage of CF card can be set as 3.3V or 5V. The default setting of the product is 3.3V.