integration with integrity

3308510 User's Manual

3.5" Embedded Engine board with Intel Atom N270 Processor

Version 1.0

Table of Contents

Safety Instructions

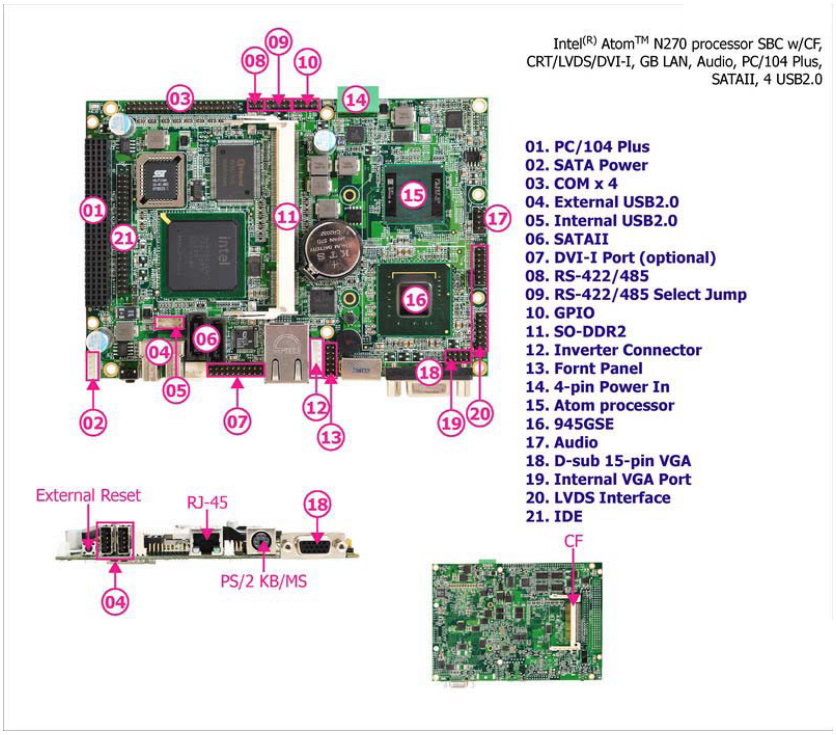
Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This helps to discharge any static electricity on your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components. Fasten the ALLIGATOR clip of the strap to the end of the shielded wire lead from a grounded object. Please wear and connect the strap before handle the 3308510 to ensure harmlessly discharge any static electricity through the strap.
- Please use an anti-static pad when putting down any components or parts or tools outside the computer. You may also use an anti-static bag instead of the pad. Please inquire from your local supplier for additional assistance in finding the necessary anti-static gadgets.

NOTE: *DO NOT TOUCH THE BOARD OR ANY OTHER SENSITIVE COMPONENTS WITHOUT ALL NECESSARY ANTI-STATIC PROTECTIONS.*

Chapter 1

General Description



The 3308510 is an Intel® 945GSE/ICH7-M chipset-based board designed, the board supports Intel® Atom™ N270 processor 1.6GHz. The 3308510 is an ideal all-in-one embedded engine board. Additional features include an enhanced I/O with CF, CRT/DVI-I/LVDS, GB LAN, audio, SATAII, 4 COM, USB2.0, and PC/104 Plus interfaces.

The Intel® 945GSE with 244MB shared main memory supports CRT/Panel displays up to 2048 x 1536 @ 75MHz. It also supports 18-bit single channel/36-bit dual channel LVDS interface.

System memory is also sufficient with the one 200-pin SO-DIMM socket up to 2GB DDR2 SDRAM.

Additional onboard connectors include an advanced USB2.0 port providing faster data transmission. And one RJ-45 connector for 10/100/1000 Based Ethernet uses. To ensure the reliability in an unmanned or standalone system, the watchdog timer (WDT) onboard 3308510 is designed with software that does not need the arithmetical functions of a real-time clock chip. If any program causes unexpected halts to the system, the onboard WDT will automatically reset the CPU or generate an interrupt to resolve such condition.

1.1 Major Features

The 3308510 comes with the following features:

- Intel® Atom™ N270 processor 1.6GHz
- One SO-DIMM up to 2GB DDR2 SDRAM
- Intel® 945GSE/ICH7-M system chipset, W83627EHG super I/O chipset
- Intel® 945GSE graphics, RealTek RTL8111C GB Ethernet, ALC202A audio controller
- 18-bit single channel/36-bit dual channel LVDS Panel interface
- Internal VGA connector, CF, SATAII x 2, COM x 4, USB2.0 x 4, PC/104 Plus
- 8-bit GPIO, Single +12V power in, H/W Monitor function
- Provides +5V/+12V output for SATA device
- Provides DVI-I display interface (optional)

1.2 Specifications

- **System**
  - **CPU:**
    Intel® Atom™ N270 processor 1.6GHz
  - **FSB:**
    533MHz FSB
  - **BIOS:**
    Award PnP Flash BIOS
  - **System Chipset:**
    Intel® 945GSE/ICH7-M
  - **I/O Chipset:**
    Winbond W83627EHG
  - **System Memory:**
    One 200-pin SO-DIMM socket up to 2GB DDR2 SDRAM
  - **Storage:**
    1 x Type II CF socket
  - **Watchdog Timer:**
    Software programmable time-out intervals from 1~255 sec.

- **H/W Status Monitor:**
  Monitoring temperatures, voltages, and cooling fan status
- **Expansion:**
  PC/104 Plus

I/O Interface

- **MIO:**
  3 x RS-232
  1 x RS-232/422/485
  4 x USB2.0 (2 x internal, 2 x external)
  1 x IDE
  2 x SATAII
  1 x PS/2 for KB/MS
- **GPIO:**
  8-bit general purpose input/output by parallel port

Display

- **Chipset:**
  Intel® 945GSE
- **Display Memory:**
  224MB shared memory
- **LVDS:**
  18-bit single channel/36-bit dual channel
- **DVI-I:**
  Chrontel CH7307 (optional)
- **Other Interface:**
  1 x 10-pin internal VGA port
- **Resolution:**
  CRT Mode: 2048 x 1536 @ 75Hz

Audio

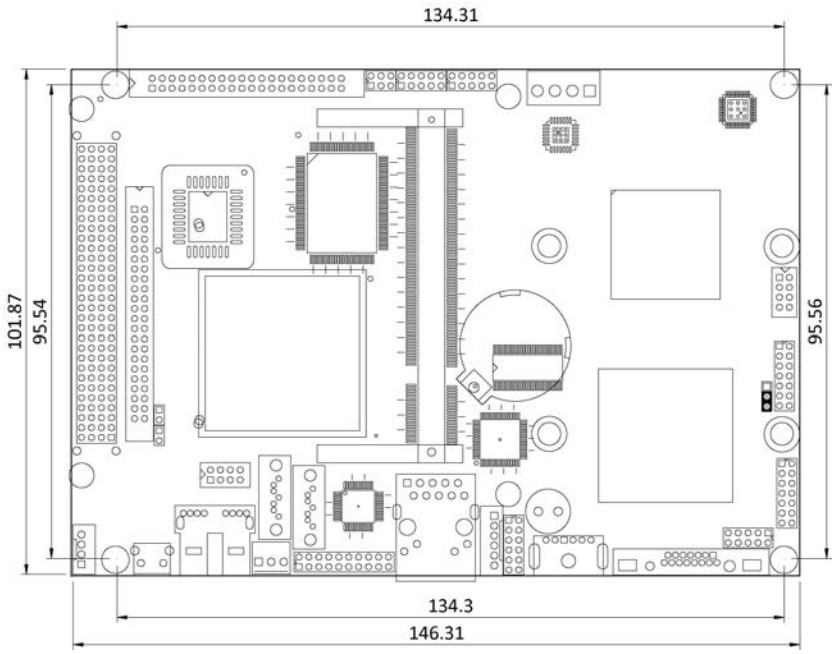
- **Chipset:**
  RealTek ALC202A
- **Audio Interface (w/header):**
  MIC In, Line Out

Ethernet

- **Chipset:**
  RealTek RTL8111C 10/100/1000 Mbps LAN
- **Ethernet Interface:**
  RJ-45 x 1

- **Mechanical & Environmental**
  - **Power In:**
    Single +12V/1.6A power in
    Provides +5V/+12V output for SATA device
  - **Operating Temperature:**
    0~+60 degrees C
  - **Operating Humidity:**
    0~95%, non-condensing
  - **Size (L x W):**
    145 x 102 mm

1.3 Board Dimensions



Chapter 2

Unpacking

2.1 Opening the Delivery Package

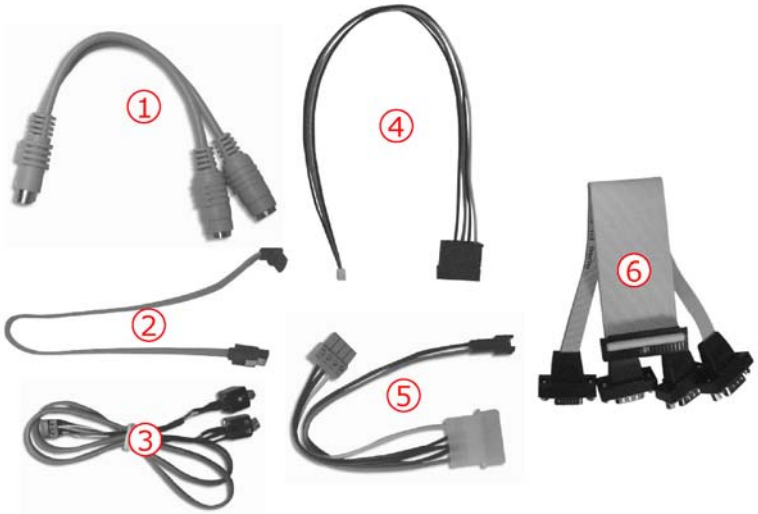
The 3308510 is packed in an anti-static bag. The board has components that are easily damaged by static electricity. Do not remove the anti-static wrapping until proper precautions have been taken. Safety Instructions in front of this manual describe anti-static precautions and procedures.

2.2 Inspection

After unpacking the board, place it on a raised surface and carefully inspect the board for any damage that might have occurred during shipment. Ground the board and exercise extreme care to prevent damage to the board from static electricity.

Integrated circuits will sometimes come out of their sockets during shipment. Examine all integrated circuits, particularly the BIOS, processor, memory modules, ROM-Disk, and keyboard controller chip to ensure that they are firmly seated. The 3308510 delivery package contains the following items:

- **3308510 Board x 1**
- **Utility CD Disk x 1**
- **Cables Package x 1**
- **Jumper Bag x 1**
- **User's Manual**



Cables Package		
NO.	**Description**	**QTY.**
1	1-to-2 Mini DIN cable	1
2	SATA device cable	1
3	SPK 8-pin(2.0-pitch) phone jack x 2	1
4	30cm SATA power cable	1
5	4-pin to 4-pin terminal block power cable	1
6	COM DB9*4-40P (2.0-pitch)	1

It is recommended that you keep all the parts of the delivery package intact and store them in a safe/dry place for any unforeseen event requiring the return shipment of the product. In case you discover any missing and/or damaged items from the list of items, please contact your dealer immediately.

Option Accessories	
NO.	**Description**
1	1-to-2 USB cable with bracket
2	IDE device cable

Chapter 3

Hardware Installation

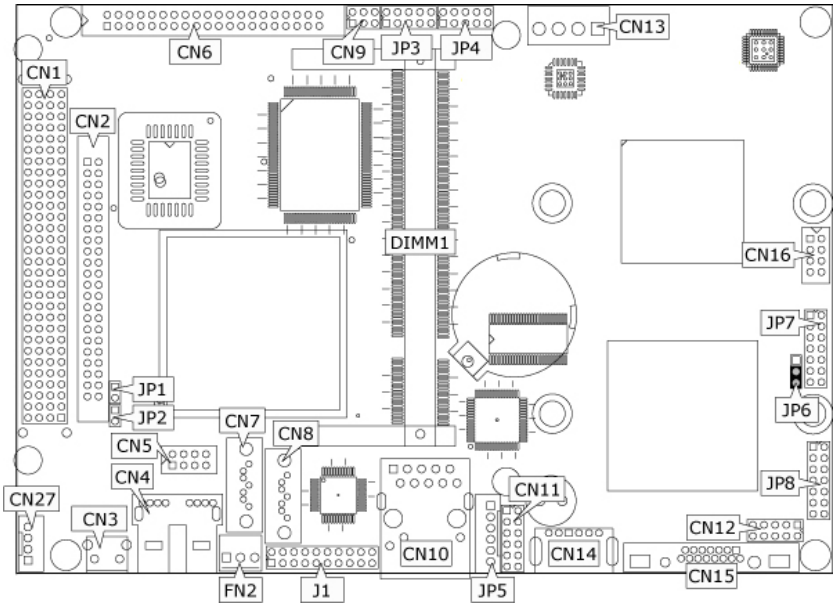
This chapter provides the information on how to install the hardware using the 3308510. This chapter also contains information related to jumper settings of switch, and watchdog timer selection etc.

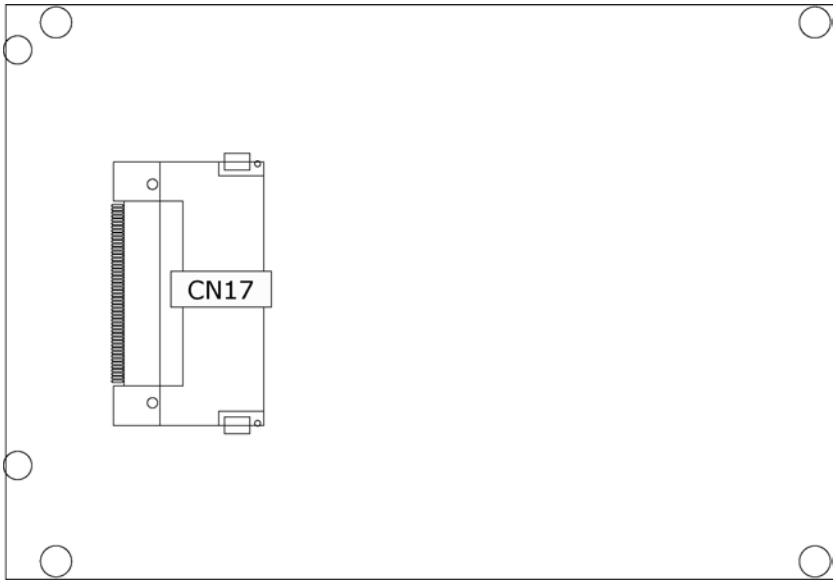
3.1 Before Installation

After confirming your package contents, you are now ready to install your hardware. The following are important reminders and steps to take before you begin with your installation process.

1. Make sure that all jumper settings match their default settings and CMOS setup correctly. Refer to the sections on this chapter for the default settings of each jumper. (JP2 open)
2. Go through the connections of all external devices and make sure that they are installed properly and configured correctly within the CMOS setup. Refer to the sections on this chapter for the detailed information on the connectors.
3. Keep the manual and diskette in good condition for future reference and use.

3.2 Board Layout





3.3 Jumper List

Jumper	Default Setting	Setting	Page
JP1	CF Use Master/Slave Select: *Slave*	Open	23
JP2	Clear CMOS: *Normal Operation*	Open	16
JP3	COM 4 Use RS-232 or RS-422/485 Select: *RS-232*	Open	14
JP6	Panel Voltage Select: *+3.3V*	Short 2-3	10

3.4 Connector List

Connector	Definition	Page
CN1	PC/104 Plus Connector	21
CN2	IDE Connector	12
CN3	External Reset Button	18
CN4/CN5	External/Internal USB2.0 Port	16
CN6	COM 1~COM 4 Connector (2x20 header)	14
CN7/CN8	Serial ATA Connector	13
CN9	RS-422/485 Connector	14
CN10	RJ-45 Connector	15
CN11	System Front Panel Control	18
CN12	10-pin Internal VGA Connector (5x2 header)	10
CN13	4-pin Power Connector	17
CN14	PS/2 6-pin Mini DIN	17
CN15	15-pin CRT Connector	10
CN16	MIC In/Line Out Connector	23
CN17	CompactFlash Connector	23
CN27	SATA Power Connector	13
DIMM1	SO-DDRII Socket	10
FN2	Fan Power Connector	17
J1	DVI-I Connector	10
JP4	8-bit GPIO	25
JP5	Inverter Power Connector	10
JP7/JP8	LVDS Panel Connector	10

3.5 Configuring the CPU

The 3308510 embedded with Intel® Atom™ N270 processor 1.6GHz. User don’t need to adjust the frequently and check speed of CPU.

3.6 System Memory

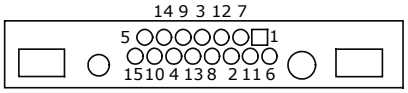
The 3308510 provides one 240-pin SO-DIMM socket at locations *DIMM1*. It supports DDR2 up to 1GB SDRAM.

3.7 VGA Controller

The 3308510 provides four connection methods of a VGA device. *CN15* is a 15-pin CRT connector, and *CN12* offers an internal 10-pin CRT connector. *JP7/JP8* are the LVDS interface connectors onboard reserved for flat panel installation. 3308510 also provides DVI-I at location *J1*.

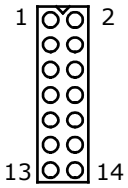
- **CN15: 15-pin CRT Connector**

PIN	Description	PIN	Description
1	Red	2	Green
3	Blue	4	N/C
5	GND	6	GND
7	GND	8	GND
9	N/C	10	GND
11	N/C	12	SDA
13	HSYNC	14	VSYNC
15	SDC		



- **JP7/JP8: LVDS Interface Connector**

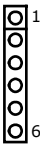
PIN	Description	PIN	Description
1	V_{LCD}	2	V_{LCD}
3	GND	4	GND
5	A0-/B0-	6	A0+/B0+
7	A1-/B1-	8	A1+/B1+
9	A2-/B2-	10	A2+/B2+
11	CLK1-/CLK2-	12	CLK1+/CLK2+
13	N/C	14	N/C



NOTE: *LVDS cable should be produced very carefully. A0- & A0+ have to be fabricated in twister pair (A1- & A1+, A2- & A2+ and so on) otherwise the signal won't be stable. Please set the proper voltage of your panel using JP5 before proceeding on installing it.*

- **JP5: Inverter Power In Connector**

PIN	Description
1	+12V
2	+12V
3	VCC
4	BK_EN
5	ENVDD
6	GND



NOTE: *If use JP7 only, it just supports 18-bit single channel LVDS panel; If you want to use 36-bit dual channel LVDS panel, please use JP7 and JP8 combined.*

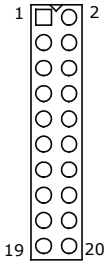
The 3308510 has an onboard jumper that selects the working voltage of the flat panel connected to the system. Jumper *JP6* offers two voltage settings for the user.

- **JP6: Panel Voltage Select**

Options	Settings
+3.3V (default)	Short 2-3
+5V	Short 1-2

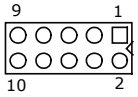
- **J1: DVI-I Connector**

PIN	Description	PIN	Description
1	TDC0-	2	+5V
3	TDC0+	4	GND
5	GND	6	HPDET
7	TDC1-	8	SDC
9	TDC1+	10	SDA
11	GND	12	GND
13	TDC2-	14	TLC-
15	TDC2+	16	TLC+
17	GND	18	GND
19	N/C	20	N/C



- **CN12: 10-pin Internal VGA Connector**

PIN	Description	PIN	Description
1	Red	2	GND
3	Green	4	GND
5	Blue	6	GND
7	HSYNC	8	SDA
9	VSYNC	10	SDC

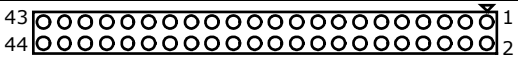


3.8 IDE Drive Connector

CN2 is a 2.0-pitch 44-pin connector daisy-chain driver connector serves the PCI E-IDE drive provisions onboard the 3308510. A maximum of two ATA/33/66/100 IDE drives can be connected to the 3308510 via *CN2*.

- **CN2: IDE Connector**

PIN	Description	PIN	Description
1	Reset	2	GND
3	PDD7	4	PDD8
5	PDD6	6	PDD9
7	PDD5	8	PDD10
9	PDD4	10	PDD11
11	PDD3	12	PDD12
13	PDD2	14	PDD13
15	PDD1	16	PDD14
17	PDD0	18	PDD15
19	GND	20	N/C
21	PDREQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	PIORDY	28	PR1PD1-
29	RPDACK-	30	GND
31	Interrupt	32	N/C
33	RPDA1-	34	PATA66
35	RPDA0-	36	RPDA2-
37	RPCS1-	38	RPCS3-
39	HDD Active	40	GND
41	VCC	42	VCC
43	GND	44	N/C

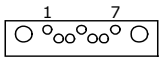


3.9 Serial ATA Connector

You can connect the Serial ATA device that provides you high speeds transfer rates (150MB/sec.). If you wish to use RAID function, please note that these two serial ATA connectors just support RAID0 and only compatible with WIN XP.

- **CN7/CN8: Serial ATA Connector**

PIN	Description
1	GND
2	SATATXP
3	SATATXN
4	GND
5	SATARXN
6	SATARXP
7	GND



- **CN27: SATA Power Connector**

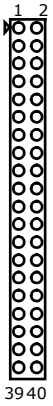
PIN	Description
1	+5V
2	GND
3	GND
4	+12V

3.10 Serial Port Connectors

The 3308510 offers NS16C550 compatible UARTs with Read/ Receive 16-byte FIFO serial ports.

- **CN6: COM 1 ~ COM 4 Connector (2x20 Header)**

PIN	Description	PIN	Description
1	DCD1	2	DSR1
3	RXD1	4	RTS1
5	TXD1	6	CTS1
7	DTR1	8	RI1
9	GND	10	Don't Use
11	DCD2	12	DSR2
13	RXD2	14	RTS2
15	TXD2	16	CTS2
17	DTR2	18	RI2
19	GND	20	Don't Use
21	DCD3	22	DSR3
23	RXD3	24	RTS3
25	TXD3	26	CTS3
27	DTR3	28	RI3
29	GND	30	Don't Use
31	DCD4	32	DSR4
33	RXD4	34	RTS4
35	TXD4	36	CTS4
37	DTR4	38	RI4
39	GND	40	Don't Use



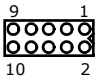
- **CN9: RS-422/485 Connector (3x2 Header, COM 4)**

PIN	Description	PIN	Description
1	TX-	2	TX+
3	RX+	4	RX-
5	GND	6	N/C

NOTE: *The terminal resistance of RX & TX is set at 180 Ω.*

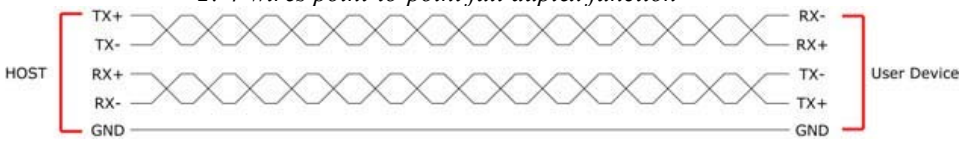
- **JP3: COM 4 use RS-232 or RS-422/485 Select**

Options	Settings
RS-232 (default)	Open
RS-485 by Auto (*1)	Short 1-2, 3-4, 5-7, 8-10
RS-485 by –RTS (*-1)	Short 1-2, 3-4, 7-9, 8-10
RS-422/485 Full Duplex (*2)	Short 1-2, 3-4, 6-8

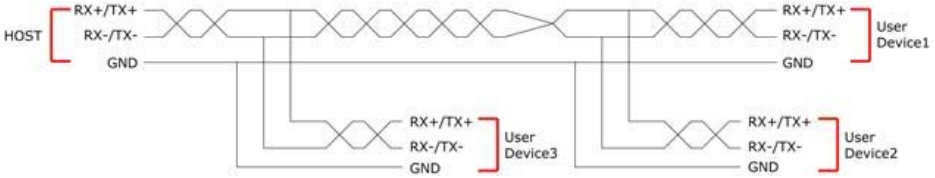


NOTE: **1: 2-wires RS-485 function*

**2: 4-wires point-to-point full duplex function*



4-wires point-to-point full duplex RS-422/485



Typical RS-485 2-wires Mutildrop Network

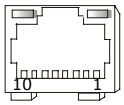
3.11 Ethernet Connector

The 3308510 provides one RJ-45 connector for 10/100/1000 Based LAN. Please refer to the following for its pin information.

When installs OS, this driver namely can automatically install. User does not need to renewal.

- **CN10: RJ-45 Connector**

PIN	Description	PIN	Description
1	MDI0+	2	MDI0-
3	MDI1+	4	MDI1-
5	N/C	6	330Ω pull 3.3V
7	MDI2+	8	MDI-2
9	MDI3+	10	MDI3-

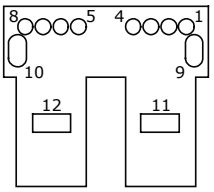


3.12 USB Port

The 3308510 provides one 8-pin connector, at location *CN5*, and *CN4* is external USB2.0 ports, there are total four USB2.0 ports in 3308510.

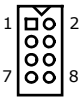
- **CN4: External USB2.0 Connector**

PIN	Description	PIN	Description
1	VCC	2	VCC
3	USBD0-	4	USBD1-
5	USBD0+	6	USBD1+
7	GND	8	GND
9	GND	10	GND
11	GND	12	GND



- **CN5: Internal USB2.0 Connector**

PIN	Description	PIN	Description
1	VCC	2	VCC
3	USBD2-	4	USBD3-
5	USBD2+	6	USBD3+
7	GND	8	GND



3.13 CMOS Data Clear

The 3308510 has a Clear CMOS jumper on *JP2.*

- **JP2: Clear CMOS**

Options	Settings
Normal Operation (default)	Open
Clear CMOS	Short

IMPORTANT: *Before you turn on the power of your system, please set JP2 to open for normal operation.*

3.14 Power and Fan Connectors

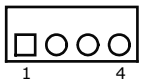
3308510 provides one 4-pin power in at *CN13*. Connector *FN2* onboard 3308510 is a 3-pin +12V fan power output connector.

- **FN2: Fan Power In Connector**

PIN	Description
1	GND
2	+12V
3	Fan In

- **CN13: 4pin Power In Connector**

PIN	Description
1	DC In
2	GND
3	GND
4	DC In

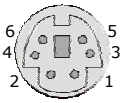


3.15 Keyboard/Mouse Connectors

The *CN14* is a PS/2 6-pin Mini DIN connector for 3308510.

- **CN14: PS/2 6-pin Mini DIN Keyboard/Mouse Connector**

PIN	Description
1	Keyboard Data
2	Mouse Data
3	GND
4	+5V
5	Keyboard Clock
6	Mouse Clock

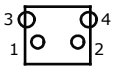


3.16 System Front Panel Control

The 3308510 has front panel control at location *CN11* that indicates the power-on status.

- **CN3: External Reset Button**

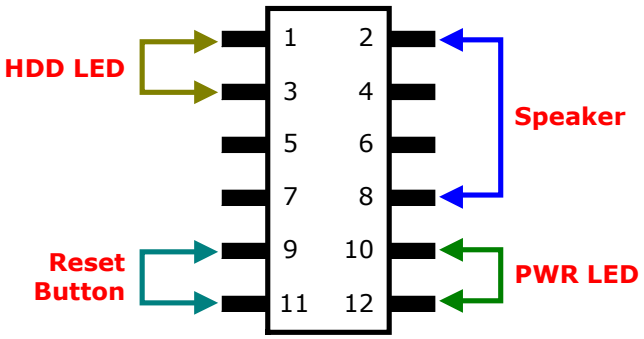
PIN	Description
1	GND
2	Reset Switch
3	GND
4	GND



- **CN11: System Front Panel Control**

PIN	Description	PIN	Description
1	330Ω pull VCC	2	Speaker
3	HDD LED	4	N/C
5	No Use	6	GND
7	GND	8	330Ω pull VCC
9	Reset Switch	10	330Ω pull 3.3V
11	GND	12	GND

Connector CN11 Orientation



3.17 Watchdog Timer

Once the Enable cycle is active a Refresh cycle is requested before the time-out period. This restarts counting of the WDT period. When the time counting goes over the period preset of WDT, it will assume that the program operation is abnormal. A reset system signal will restart when such error happens.

The following sample programs show how to enable, disable and refresh the watchdog timer:

```
.286

      .MODEL SMALL
      .DATA                          ;this is data area

x1              db '-----------------------------------------------------',0ah,0dh,'$'
copyright       db '|Copyright by GAI technology write by Richard |',0ah,0dh,'$'
x2              db '-----------------------------------------------------',0ah,0dh,'$'

port    equ       04Eh       ;W83697H Chipset port
datao   equ       04Fh       ;data port

      .CODE

print   macro     buff
        mov       dx,offset buff;
        mov       ah,09h
        int       21h
        endm

begin   proc      near
        mov       ax,@data
        mov       ds,ax
      STI
                  ; W83697H
        mov       dx,port    ; Unlock registor
        mov       al,087H    ;
        out       dx,al
        jmp       $+2
        out       dx,al
        mov       dx,port    ;
        mov       al,07H     ;
        out       dx,al
        jmp       $+2
        mov       dx,datao   ; set device 8
        mov       al,08H     ;
        out       dx,al
        jmp       $+2

        mov       dx,port    ; Watchdog IO function
        mov       al,030H    ; registor
        out       dx,al
        jmp       $+2

        mov       dx,datao   ; set 01h toactivate
        mov       al,01H     ;
        out       dx,al
```

```
                jmp     $+2

                mov     dx,port     ; set CRF3
                mov     al,0f3H     ;
                out     dx,al
                jmp     $+2

                mov     dx,datao    ; set CRF3 to secend
                mov     al,00H      ;
                out     dx,al
                jmp     $+2

                mov     dx,port     ; set CRF4 time
                mov     al,0f4H     ;
                out     dx,al
                jmp     $+2

                mov     dx,datao    ; set CRF4 time to 5 s'
                mov     al,05H      ;
                out     dx,al

                print   x1
                print   copyright
                print   x2
                mov     ah,4ch      ;go back to dos
                int     21h
                .stack
begin           endp
                end begin
```

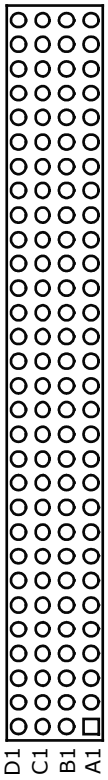
User can also use AL, 00H's defined time for reset purposes, e.g.00H for Disable, 01H = 1sec, 02H=2sec….FFH=255sec.

3.18 PC/104 Plus Connector

The 3308510 provides one PC/104 Plus connector, at location *CN1*.

- **CN1: PC/104 Plus Connector**

PIN	Description	PIN	Description
A1	N/C	B1	N/C
A2	N/C	B2	AD2
A3	AD5	B3	GND
A4	CBE0#	B4	AD7
A5	GND	B5	AD9
A6	AD11	B6	N/C
A7	AD14	B7	AD13
A8	+3.3V	B8	CBE1#
A9	SERR#	B9	GND
A10	GND	B10	PERR#
A11	STOP#	B11	+3.3V
A12	+3.3V	B12	TRDY-
A13	FRAME#	B13	GND
A14	GND	B14	AD16
A15	AD18	B15	+3.3V
A16	AD21	B16	AD20
A17	+3.3V	B17	AD23
A18	IDSEL0	B18	GND
A19	AD24	B19	CBE3#
A20	GND	B20	AD26
A21	AD29	B21	VCC
A22	VCC	B22	AD30
A23	REQ0#	B23	GND
A24	GND	B24	REQB
A25	GNTA	B25	N/C
A26	VCC	B26	PCICLK8
A27	PCICLKB	B27	VCC
A28	GND	B28	INTR_D#
A29	+12V	B29	INTR_A#
A30	-12V	B30	REQC



...MORE ON NEXT PAGE...

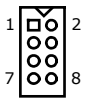
PIN	Description	PIN	Description
C1	VCC	D1	AD0
C2	AD1	D2	VCC
C3	AD4	D3	AD3
C4	GND	D4	AD6
C5	AD8	D5	GND
C6	AD10	D6	PULL VCC
C7	GND	D7	AD12
C8	AD15	D8	+3.3V
C9	N/C	D9	PAR
C10	+3.3V	D10	PULL VCC
C11	PULL VCC	D11	GND
C12	GND	D12	DEVSEL#
C13	IRDY#	D13	+3.3V
C14	+3.3V	D14	CBE2#
C15	AD17	D15	GND
C16	GND	D16	AD19
C17	AD22	D17	+3.3V
C18	IDSEL1	D18	IDSEL2
C19	N/C	D19	IDSEL3
C20	AD25	D20	GND
C21	AD28	D21	AD27
C22	GND	D22	AD31
C23	REQA	D23	N/C
C24	VCC	D24	GNT0#
C25	GNTB	D25	GND
C26	GND	D26	PCICLKA
C27	PCICLKC	D27	GND
C28	VCC	D28	PCIRST#
C29	INTR_B#	D29	INTR_C#
C30	INTR_C#	D30	N/C

3.19 Audio Connectors

The 3308510 has an onboard RealTek ALC202A audio connector. The following tables list the pin assignments of the Line In/Audio Out connector.

- **CN16: MIC In/Line Out Connector**

PIN	Description	PIN	Description
1	AOUTL	2	AOUTR
3	GND	4	GND
5	MIC IN L	6	MIC IN R
7	GND	8	GND



3.20 CompactFlash™ Connector

The 3308510 also offers a Type I/II CompactFlash™ connector is IDE interface located at the solder side of the board. The designated *CN17* connector, once soldered with an adapter, can hold CompactFlash™ cards of various sizes. Please turn off the power before inserting the CF card.

Inserting a CompactFlash™ card into the adapter is not a difficult task. The socket and card are both keyed and there is only one direction for the card to be completely inserted. Refer to the diagram on the following page for the traditional way of inserting the card.

- **JP1: CF Use Master/Slave Select**

Options	Setting
Master	Short
Slave (default)	Open

- **CN17: CompactFlash™ Connector**

PIN	Description	PIN	Description
1	GND	2	DATA3
3	DATA4	4	DATA5
5	DATA6	6	DATA7
7	SDCS1#	8	GND
9	GND	10	GND
11	GND	12	GND
13	VCC	14	GND
15	GND	16	GND
17	GND	18	SDA2
19	SDA1	20	SDA0
21	DATA0	22	DATA1
23	DATA2	24	470Ω pull GND
25	N/C	26	N/C
27	DATA11	28	DATA12
29	DATA13	30	DATA14
31	DATA15	32	SDCS3#
33	N/C	34	UOR
35	IOW	36	EWE0
37	IRQ	38	VCC
39	CS	40	N/C
41	RESET	42	IORDY
43	DACK	44	REQ
45	IDE LED	46	PDIAG
47	DATA8	48	DATA9
49	DATA10	50	GND

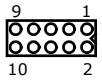
NOTE: *When use CF card, IDE device function will be disabled.*

3.21 8-bit GPIO Function

The 3308510 offers one 8-bit input/output port by parallel port.

- **JP4: 8-bit GPIO**

PIN	Description	PIN	Description
1	VCC	2	GND
3	GD0	4	GD4
5	GD1	6	GD5
7	GD2	8	GD6
9	GD3	10	GD7




```
.286

        .MODEL SMALL
        .DATA                           ;this is data area
port    equ     0378h                   ;print port can be change to 278h

        .CODE

print   macro   buff
        mov     dx, offset buff;
        mov     ah,09h
        int     21h
        endm

delay :
        push    cx
        mov     cx,0155h
@@:
        jmp     $+2
        push    cx
        mov     cx,0ffffh

wait1:  loop    wait1
        pop     cx
        loop    @b
        pop     cx
        ret


begin   proc    near
        mov     ax,@data
        mov     ds,ax
        STI

        Mov     dx, port
        Mov     al, 80h                 out     dx, al

;;--------------------
;;ROR
        mov     cx, 08h
@@:
        ror     al, 1
```

```
        call        delay
        out         dx, al
        loop        @b
        pop         cx
;;ROL
        push        cx
        mov         cx, 08h
@@:
        rol         al, 1
        out         dx, al
        call delay
        loop        @b
        pop         cx
;;--------------------
;;--------------------
;;ROR
        mov         cx, 08h
@@:
        ror         al, 1
        call delay
        out         dx, al
        loop        @b
        pop         cx
;;ROL
        push        cx
        mov         cx, 08h
@@:
        rol         al, 1
        out         dx, al
        call delay
        loop        @b
        pop         cx
;;--------------------
;;--------------------
;;ROR
        mov         cx, 08h
@@:
        ror         al, 1
        call delay
        out         dx, al
        loop        @b
        pop         cx
;;ROL
        push        cx
        mov         cx, 08h
@@:
        rol         al, 1
        out         dx, al
        call delay
        loop        @b
        pop         cx
;;--------------------
;;--------------------
;;ROR
        mov         cx, 08h
@@:
        ror         al, 1
        call delay
```

```
        out         dx, al
        loop        @b
        pop         cx
;;ROL
        push        cx
        mov         cx, 08h
@@:
        rol         al, 1
        out         dx, al
        call delay
        loop        @b
        pop         cx
;;--------------------
;;--------------------
;;ROR
        mov         cx, 08h
@@:
        ror         al, 1
        call delay
        out         dx, al
        loop        @b
        pop         cx
;;ROL
        push        cx
        mov         cx, 08h
@@:
        rol         al, 1
        out         dx, al
        call delay
        loop        @b
        pop         cx
;;--------------------
;;--------------------
;;ROR
        mov         cx, 08h
@@:
        ror         al, 1
        call delay
        out         dx, al
        loop    @b
        pop         cx
;;ROL
        push        cx
        mov         cx, 08h
@@:
        rol         al, 1
        out         dx, al
        call delay
        loop        @b
        pop         cx
;;--------------------
;;--------------------
;;ROR
        mov         cx, 08h
@@:
        ror         al, 1
        call delay
        out         dx, al
```

```
        loop    @b
        pop     cx
;;ROL
        push    cx
        mov     cx, 08h
@@:
        rol     al, 1
        out     dx, al
        call delay
        loop    @b
        pop     cx
;;--------------------

;flash LED 3 time
        mov     cx, 01h
@@:
        mov     al, 0ffh
        out     dx, al
        call delay
        mov     al,0h
        out     dx, al
        call delay
        loop    @b
ee:

        mov     ah, 4ch             ;go back to dos
        int     21h
        .stack
        begin   endp
        end begin
```

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