LV-670 series

User's Manual
Edition 1.3

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Packing List

LV670 :

Hardware

LV-670 Motherboard ..... X 1

Cable Kit

40-pin ATA100 IDE Flat Cable ..... X 1
34-pin Floppy Cable ..... X 1
Dual-USB Port Cable ..... X 1
DB9 COM Port Cable ..... X 1
Audio Cable..... X 1
I/O Shield..... X 1

Printed Matter and Software

User's Manual ..... X 1
Driver CD ..... X 1

LV670LVDS :

Hardware

LV-670LVDS Motherboard ..... X 1

Cable Kit

40-pin ATA100 IDE Flat Cable ..... X 1
34-pin Floppy Cable ..... X 1
Dual-USB Port Cable ..... X 1
DB9 COM Port Cable ..... X 1
Audio Cable..... X 1
I/O Shield..... X 1

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Chapter 1. Introduction

1.1 Product Overview

LV-670 series (Include **LV-670** and **LV-670LVDS**) is an all-in-one industrial compact Pentium 4 level motherboard based on Mini-ITX form factor at 170 x 170 mm of dimension. Based on Intel 845GV and ICH4 chipset, **LV-670 series** offers the compact, embedded, value and high performance solution with Intel Pentium 4 CPU, 533 / 400 MHz of FSB, 1 GBytes DDR200/266/333 SDRAM, Intel 845GV GMCH built-in Intel Extreme Graphics, Intel PRO/100+ LAN, Hi-Speed USB 2.0, IEEE 1394, 5.1 channel and S/P DIF 3D audio, TV-out and embedded flash disk interfaces.

Compact Mini-ITX Form Factor @ 170 x 170 mm

LV-670 series is based on the ultra compact mini-ITX form factor at only 170 x 170 mm of dimension, meets the demand of compact and powerful computing platform. With this feature, **LV-670 series** should be the ideal solution for the high-end, Pentium 4 level book-size, slim type and other embedded PC systems.

Powerful Pentium 4 Computing Platform

With Intel Socket 478 Pentium 4 / Celeron CPU at 533/400 MHz FSB and 1GBytes DDR200/266/333 SDRAM of system memory, **LV-670 series** offers the high-end industrial computing platform with low cost Intel integrated solutions.

Value / High Performance Multi-media Solution

The Intel 845GV GMCH chipset built-in Intel Extreme Graphics, 6 channel and S/P DIF AC97 3D audio make **LV-670 series** be the high performance but low cost multi-media AV platform. With this feature, **LV-670 series** should be the ideal solution for VoD (Video on Demand), DVR (Digital Video Recorder), digital video broadcasting (DVB), streaming, surveillance, compression (MPEG), interaction server, POS, Kiosk, ATM, Panel PC, transaction workstation and terminal applications.

Hi-Speed USB 2.0 and IEEE 1394 Interface

Intel ICH4 built-in Hi-Speed USB 2.0 controller and onboard IEEE 1394 chipset let **LV-670 series** offer up to 480 Mbps of Hi-Speed USB 2.0 and 100/200/400 Mbps of IEEE 1394 interfaces.

1.2 Specification

General Specification	
Form Factor	Mini-ITX at 170 x 170 mm (L x W)
CPU	Intel Socket 478 Pentium 4 / Celeron @ 533/400 MHz FSB Support Northwood / Willamette Pentium 4 / Celeron CPU
Memory	1GBytes DDR200/266/333 SDRAM on one 184-pin DIMM socket
Chipset	Intel 82845GV GMCH and 82801DB ICH4
BIOS	Phoenix-Award 2Mb PnP flash BIOS
Green Function	Power saving mode includes doze, standby and suspend modes. ACPI version 1.0 and APM version 1.2 compliant
Watchdog Timer	System reset programmable watchdog timer with 1 ~ 255 sec./min. of timeout value
Real Time Clock	Intel ICH4 built-in RTC with lithium battery
Enhanced IDE	PCI enhanced IDE interface supports dual channels and up to 4 ATAPI devices at UltraATA/100 One 40-pin and one 44-pin IDE port DiskOnModule (DOM) embedded flash disk up to 1GBytes
Expansive Slot	One PCI slot supports up to 2 bus master PCI bus interface via the additional riser card

Multi-I/O Port	
Chipset	Intel 82801DB ICH4 (USB) and Winbond W83627HF-AW LPC Super I/O controller
Serial Port	One internal RS-232 serial port with 16C550 compatible UART and 16 bytes FIFO
USB Port	Four Hi-Speed USB 2.0 ports with 480 Mbps of data transfer rate Two external and two internal USB ports
Parallel Port	One external bi-direction parallel port with SPP/ECP/EPP mode
Floppy Port	One FDD port supports up to two FDD
IrDA Port	One IrDA compliant Infrared interface supports CIR/SIR
K/B & Mouse	External PS/2 keyboard and mouse ports on rear I/O panel

VGA Display Interface	
Chipset	Intel 845GV GMCH built-in Intel Extreme Graphics With 266 MHz VGA core and 256-bit 3D engine
Memory	Intel dynamic video memory up to 64 Mbytes shared with system
Display Type	CRT, LCD monitor and analog display Up to 4 textures / pixel on a single pass and 2048x2048 texture size
Connector	External DB15 female connector on rear I/O panel Internal 40-pin LVDS connector (**LV-670LVDS** only)

TV-out Interface	
Chipset	Intel 845GV GMCH built-in Intel Extreme Graphics with Chrontel CH7011(for LV-670) & CH7017A-T(for LV-670LVDS) TV-out encoder
TV Mode	Support both of NTSC and PAL mode
Connector	External S-video and RCA Jack on rear I/O panel

Ethernet Interface	
Chipset	Intel PRO/100+ LAN interface with Intel ICH4 and 82562ET Phy
Type	10Base-T / 100Base-TX, auto-switching Fast Ethernet Full duplex, IEEE802.3U compliant
Connector	External RJ45 connector with LED on rear I/O panel

Audio Interface	
Chipset	Intel ICH4 with Realtek ALC650 AC97 3D audio codec
Interface	5.1 channel 3D audio with front (R/L), rear (R/L), center and bass S/P DIF digital audio encoding signal input and output Line-in, line-out, CD-in and MIC-in
Connector	External three phone jack for 5.1 channel audio on rear panel External S/P DIF connector on rear panel Internal 10-pin header for line-in/-out, MIC-out, 4-pin header for CD-in

IEEE1394 Interface	
Chipset	Agere FW323 PCI IEEE1394 controller
Interface	IEEE1394 with 100/200/400 Mbps of data transfer bandwidth
Connector	External IEEE1394 connector on rear I/O panel

Power and Environment	
Power Requirement	20-pin ATX power connector Additional +12V on 4-pin connector for Pentium 4 PSU
Dimension	170 (L) x 170 (H) mm, Mini-ITX form factor
Temperature	Operating within 0 ~ 60°C (32 ~ 140°F) Storage within -20 ~ 85°C (-4 ~ 185°F)
EMI	CE/FCC class A certified

Ordering Code	
LV-670	Mini-ITX Socket 478 Pentium 4 Motherboard with Intel Extreme VGA, LAN, TV-out, 5.1-CH/SPDIF Audio, Hi-Speed USB 2.0, IEEE1394 Interface
LV-670LVDS	Same with **LV-670** but support **24-bit dual channel LVDS**

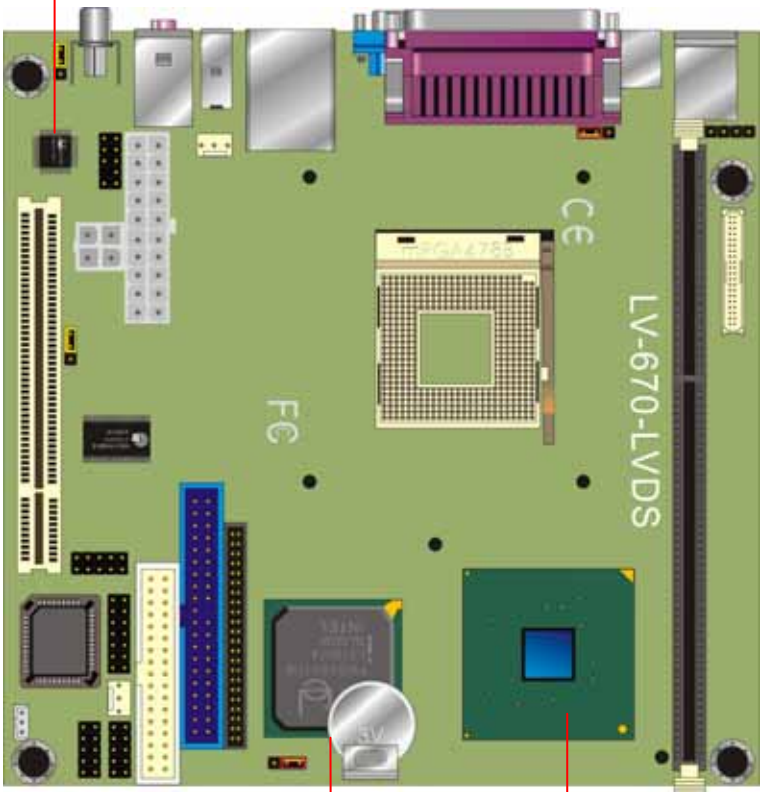
For further product information please visit the website at
http://www.commell.com.tw

1.3 Component Placement

ALC650 AC97 Audio Codec
With 5.1 Channel Audio
S/P DIF, Line-in/out, Mic-in
and CD-in Interface

Chipset on Back Side

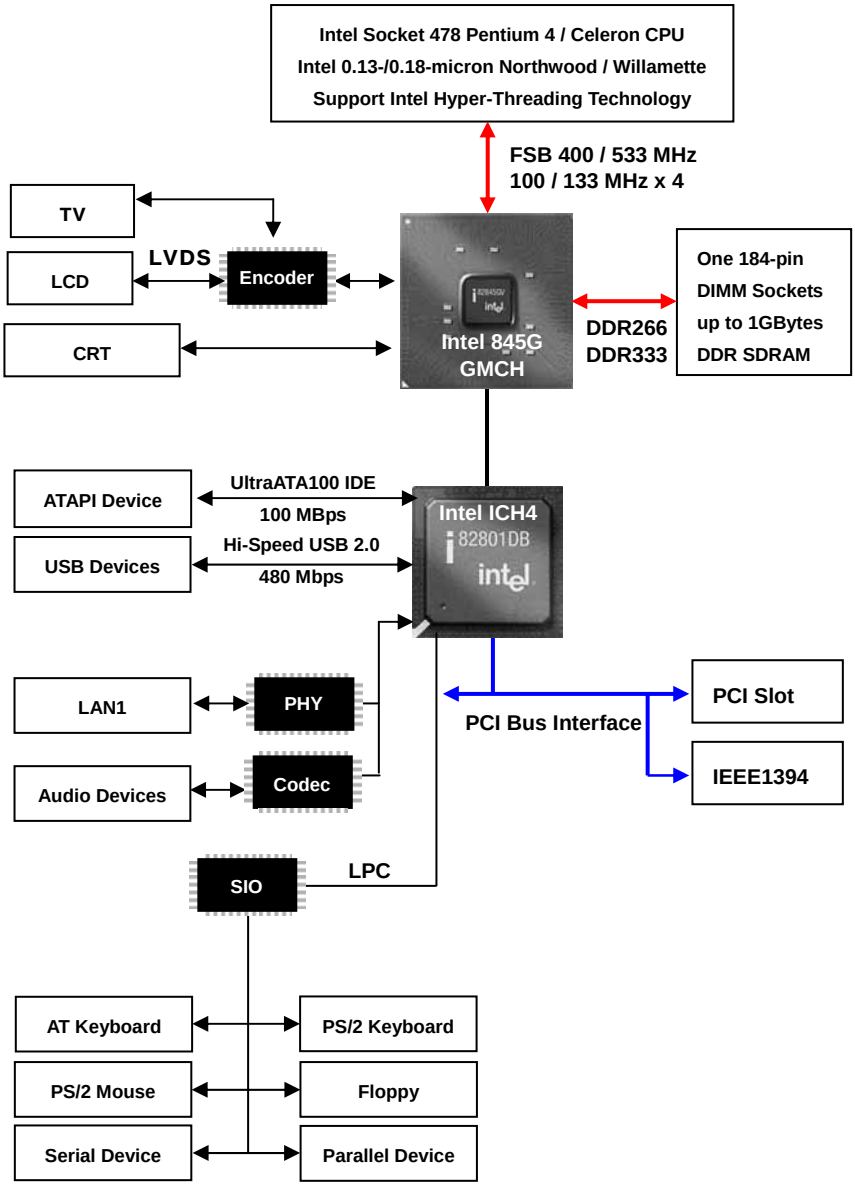
- Intel 82562ET LAN Phy
- Agere FW323 IEEE1394 Controller



Intel 82801DB ICH4
With Hi-Speed USB 2.0
UltraATA100 IDE
Intel PRO/100+ LAN Mac

Intel 845GV GMCH
With 533 / 400 MHz Host Bus
200 / 266 /333 MHz Memory
Bus

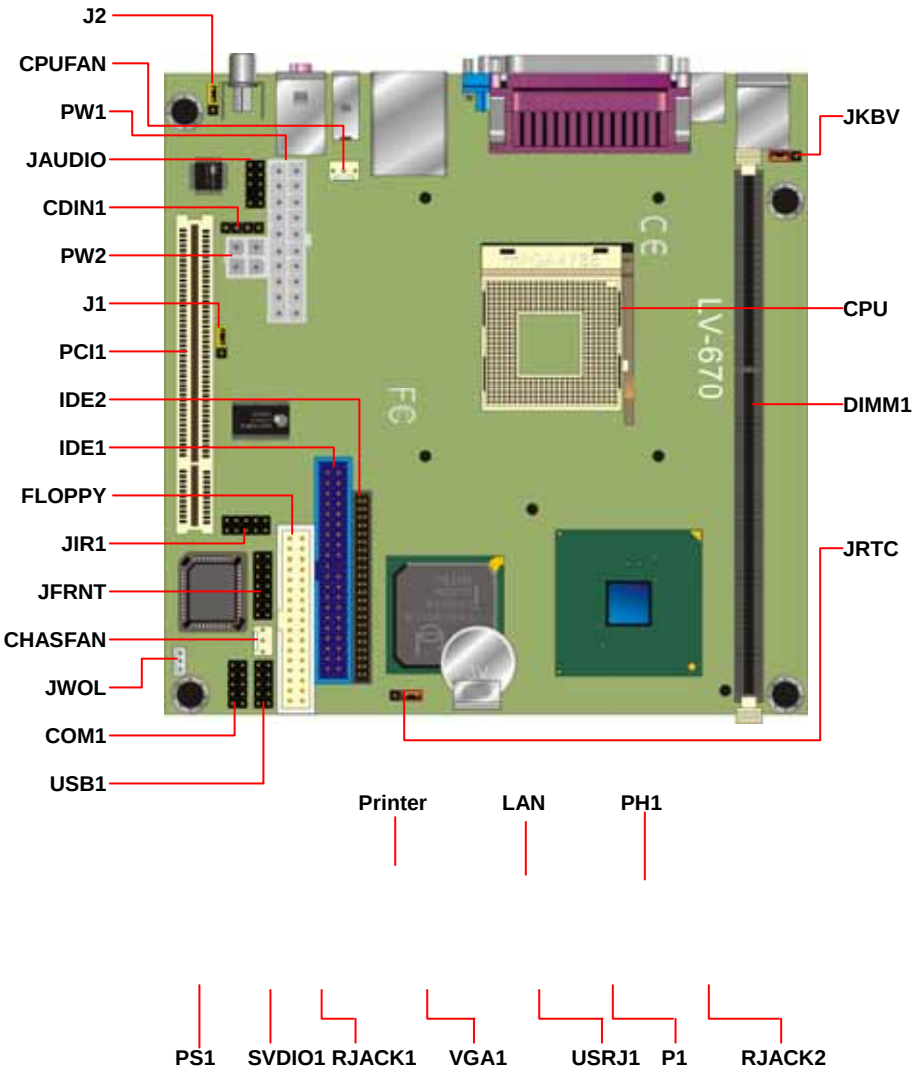
1.4 Block Diagram

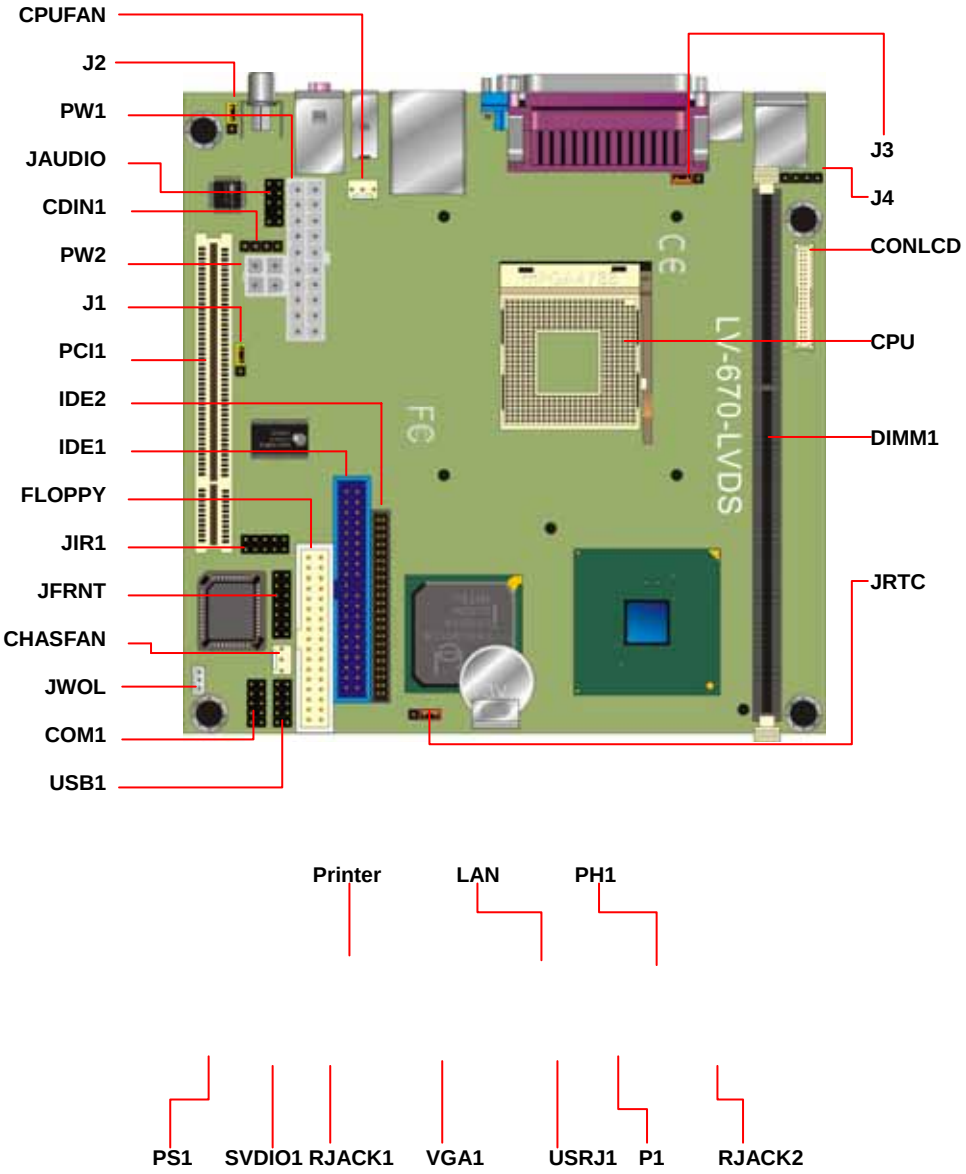


Chapter 2. Hardware Setup

This chapter contains the information for installation of hardware. The install procedure includes jumper settings, CPU and memory installation, fan, I/O and panel connections.

2. 1 Connector Location




CPUFAN
J2
PW1
JAUDIO
CDIN1
PW2
J1
PCI1
IDE2
IDE1
FLOPPY
JIR1
JFRNT
CHASFAN
JWOL
COM1
USB1
J3
J4
CONLCD
CPU
DIMM1
JRTC
LV-670-LVDS
Printer
LAN
PH1
PS1
SVDIO1
RJACK1
VGA1
USRJ1
P1
RJACK2

2.1.1 Jumper Reference

LV-670

Jumper	Function
JRTC	COMS Operate / Clear Setting
JKBV	Keyboard +5V / +5VSB Voltage Setting
J1	IEEE1394 Enable/Disable Setting
J2	S/P DIF Input / Output Setting

LV-670LVDS

Jumper	Function
JRTC	COMS Operate / Clear Setting
J1	IEEE1394 Enable/Disable Setting
J2	S/P DIF Input / Output Setting
J3	Panel Voltage Setting

Jumper Setting Quick Reference

Jumper	1-2	2-3
JRTC	Clean CMOS	Normal Operation
JKBV	KB with +5V	KB with +5VSB
J1	IEEE1394 Enable	IEEE1394 Disable
J2	S/P DIF Output	S/P DIF Input
J3	+5V	+3.3V

Default setting

2.1.2 Connector Reference

Internal Onboard Connector

Connector	Function	Remark
CPU	MicroPGA478 478 CPU Socket	Standard
DIMM1	184-pin DIMM Socket	Standard
IDE1	40-pin Primary IDE Port	Standard
IDE2	44-pin Secondary IDE Port	Standard
FDC1	34-pin FDD Port	Standard
JCOM1	10-pin COM1 RS-232 Serial Port	Standard
USB1	10-pin 3rd / 4th Hi-Speed USB 2.0 Port	Standard
JIR1	10-pin CIR / SIR IrDA Port	Standard
PW1	20-pin ATX Power Connector	Standard
PW2	4-pin Additional +12V Power Connector	Standard
JFRNT	14-pin Switch and Indicator Connector	Standard
CPUFAN	3-pin +12V CPU Fan Connector	Standard
CHASFAN	3-pin +12V System Fan Connector	Standard
JAUDIO	10-pin Audio Port	Standard
CDIN	4-pin CD-in Interface	Standard
WOL1	3-pin Wake-On-LAN Interface	Standard
CONLCD	40-pin LVDS connector	**670LVDS** only
J4	5-pin LCD Inverter Power Connector	**670LVDS** only

External Connector on Bracket

Connector	Function	Remark
PS1	PS2 Keyboard / Mouse 6-pin Connector	Standard
Printer	Parallel Port DB25 Female Connector	Standard
SVDIO1	S-Video TV-out Connector	Standard
RJACK1	AV TV-out RCA Jack	Standard
VGA1	VGA DB15 Female Connector	Standard
LAN	LAN RJ45 Connector with LED	Standard
USRJ1	Dual USB Connector	Standard
P1	IEEE1394 Connector	Standard
PH1	Audio RCA Connector	Standard
RJACK2	S/P DIF Digital Audio Connector	Standard

2.2 CPU and DRAM Setting

The board is based on Intel Socket 478 architecture with Intel 845G chipset, supports Intel Socket 478 Pentium 4 / Celeron CPU at 533/400 MHz FSB.

System memory of this board supports up to 1GBytes DDR200/266/333 SDRAM on two 184-pin DIMM sockets. Please notices that Intel 845G GMCH **DOESN'T** support ECC and register DIMM.

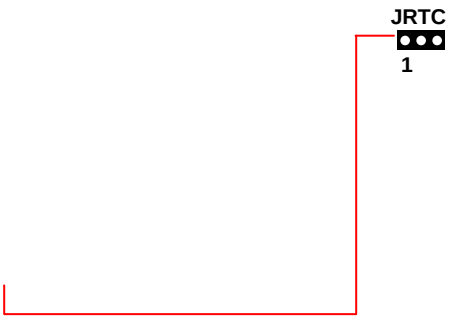
2.3 CMOS Setting

The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

Jumper: **JRTC**
Type: onboard 3-pin header

JRTC	Mode
1-2	Clear CMOS
2-3	Normal Operation

Default setting



2.4 Watchdog Timer Setting

The watchdog timer makes the system auto-reset while it stop to work for a period. The integrated watchdog timer can be setup as system reset mode by program.

Timeout Value Range

- 1 to 255
- Second or Minute

Program Sample

Watchdog timer setup as system reset with 5 second of timeout

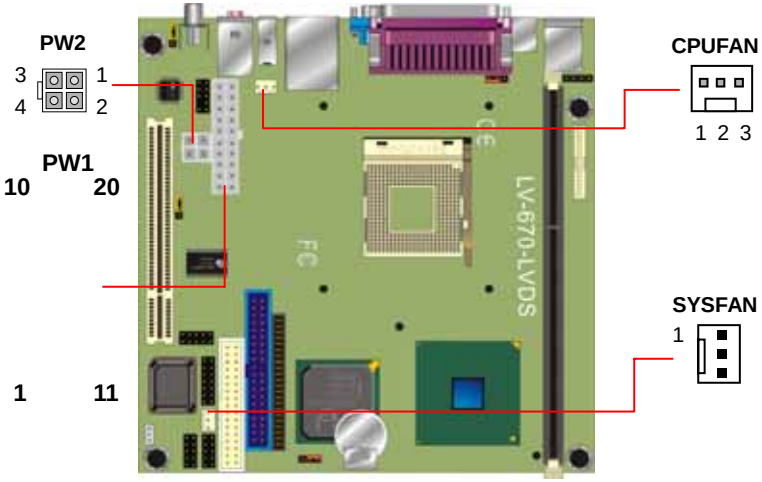
2E, 87	
2E, 87	
2E, 07	
2F, 08	Logical Device 8
2E, 30	Activate
2F, 01	
2E, F5	Set as Second*
2F, 00	
2E, F6	Set as 5
2F, 05	

* Minute: bit 3 = 0; Second: bit 3 = 1

2.5 Embedded Solid State Disk

The **LV-670 series** supports the IDE-based, bootable and driver free DiskOnModule (DOM) embedded flash disk. The onboard 40-pin IDE1 and 44-pin IDE2 box header supports normal DOM (DiskOnModule) or M-systems DiskOnChip IDE Pro flash disk with or without the additional Vcc power cable.

2.6 Power and Fan Connector



Connector: **PW2**
Type: 4-pin standard Pentium 4 additional +12V power connector

Pin	Description	Pin	Description
1	Ground	2	Ground
3	+12V	4	+12V

Connector: **PW1**
Type: 20-pin ATX power connector

PIN assignment			
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

Connector: **CPUFAN**, **SYSFAN**
Type: 3-pin fan wafer connector

Pin	Description	Pin	Description	Pin	Description
1	Ground	2	+12V	3	Fan Control

2.7 VGA Interface

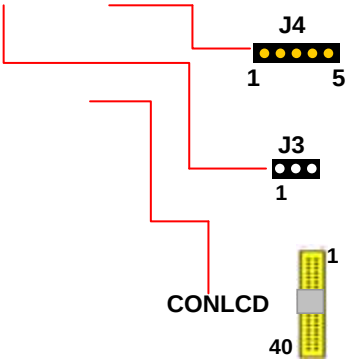
2.7.1 Analog VGA Interface

The board is integrated with Intel 845G GMCH chipset built-in Intel Extreme Graphics with 266 MHz VGA core, 256-bit 3D engine and Intel Dynamic Video Memory up to 64MBytes shared with system memory. The CRT / analog VGA interface includes one external DB15 female connector on bracket on board.

VGA

2.7.2 Digital VGA Interface (LV-670LVDS only)

The board's digital video interface provides LVDS flat panel. The built-in 40-bit dual channel LVDS interface offers the economical solution for LVDS-based LCD display.



Connector: J4
Type: 5-pin LVDS Power Header
Header

Pin	Description
1	ENABKL
2	GND
3	GND
4	GND
5	+12V

Connector: J3
Type: 3-pin Power select

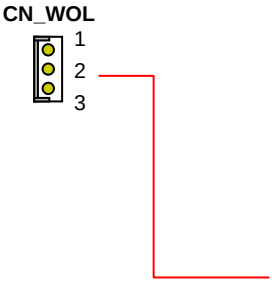
Pin	Description
1	VCC
2	GND
3	VCC3

Connector: CONLCD
Type: onboard 40-pin connector for LVDS connector

Pin	Signal	Pin	Signal
2	LCDVCC	1	LCDVCC
4	GND	3	GND
6	ATX0-	5	BTX0-
8	ATX0+	7	BTX0+
10	GND	9	GND
12	ATX1-	11	BTX1-
14	ATX1+	13	BTX1+
16	GND	15	GND
18	ATX2-	17	BTX2-
20	ATX2+	19	BTX2+
22	GND	21	GND
24	ATXC-	23	BTX3-
26	ATXC+	25	BTX3+
28	GND	27	GND
30	ATX3-	29	BTXC-
32	ATX3+	31	BTXC+
34	GND	33	GND
36	PANELCLK	35	PANELCLK
38	PANELDATA	37	PANELDATA
40	HPD	39	HPD

2.8 Ethernet Interface

The **LV-670 series** is integrated with Intel PRO/100+ Fast Ethernet interface at the type of 10Base-T/100Base-TX auto-switching Fast Ethernet with full duplex and IEEE 802.3U compliant. The **LV-670 series** LAN interface is controlled by the Intel 82801DB ICH4 and 82562ET PHY, and connect with the external RJ45 connector on rear I/O panel.

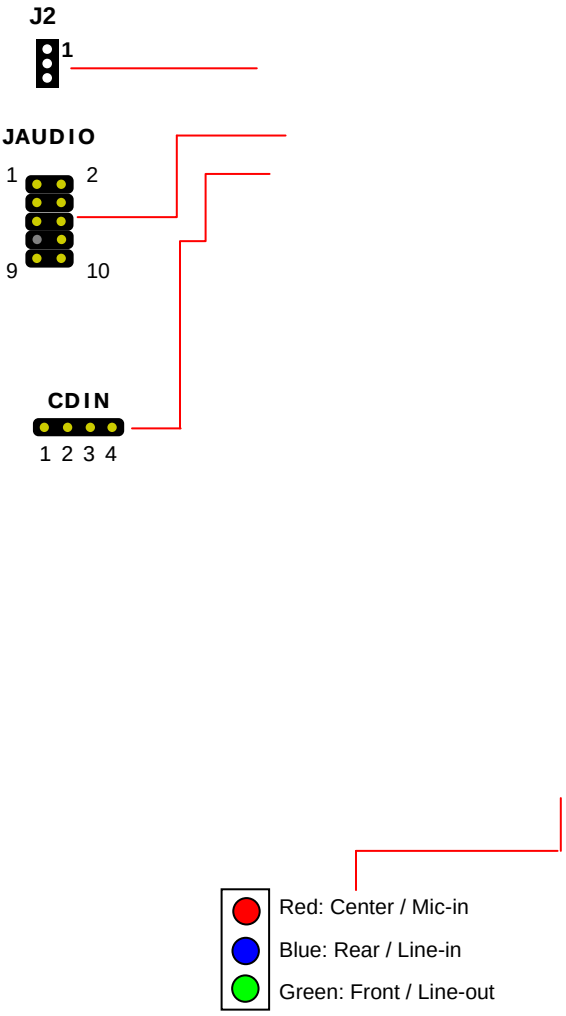


Connector: **CN_WOL**
Type: onboard 3-pin (1 x 3) wafer connector

Pin	1	2	3
Description	WOL-Ctrl	Ground	+5V Standby

2.9 Audio Interface

The **LV-670 series** offers the AC97 3D audio with 5.1-channel and S/P DIF interface based on Intel ICH4 and Realtek ALC650 codec.



Connector: JAUDIO

Type: 10-pin (2 x 5) 2.54-pitch header

Pin	Description	Pin	Description
1	Line – Right	2	Ground
3	Line – Left	4	MIC
5	MIC	6	Ground
7	N/C	8	Line Out – Left
9	Line Out – Right	10	Ground

Jumper: J2

Type: onboard 3-pin header

J2	**Mode**
1-2	S/P DIF Output
2-3	S/P DIF Input

Default setting

Connector: CDIN

Type: 4-pin header

Pin	Description
1	CD – Left
2	Ground
3	Ground
4	CD – Right

2.10 Switch and Indicator

Connector: **JFRNT**
Type: onboard 14-pin (2 x 7) 2.54-pitch header

Function	Signal	PIN		Signal	Function
IDE LED	Vcc (+)	1	2	(+) Vcc	Power LED
	Active	3	4	N/C	
Reset	Reset	5	6	GND	
	GND	7	8	Vcc	Speaker
N/C		9	10	N/C	
Power Button	PWRBT	11	12	N/C	
	GND	13	14	SPKIN	

Notes (This page left blank intentionally)

Chapter 3. BIOS Setup

The single board computer uses the Award BIOS for the system configuration. The Award BIOS in the single board computer is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

The BIOS setup program of the single board computer let the customers modify the basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retains the information when the power is turned off. If the battery runs out of the power, then the settings of BIOS will come back to the default setting.

The BIOS section of the manual is subject to change without notice and is provided here for reference purpose only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

To activate CMOS Setup program, press ÖDEL × key immediately after you turn on the system. The following message “Press DEL to enter SETUP” should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, the Main Menu will be displayed as **Figure 3-1**. You can use arrow keys to select your function, press ÖEnter × key to accept the selection and enter the sub-menu.

Figure 3-1. CMOS Setup Utility Main Screen

Phoenix – Award BIOS CMOS Setup Utility

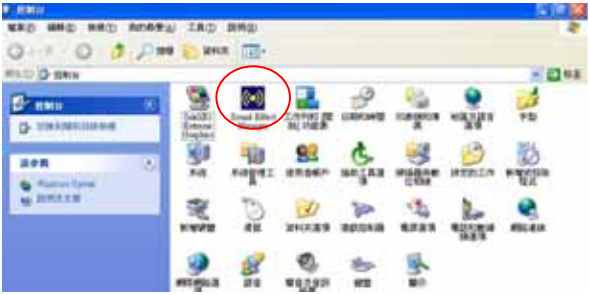
>Standard CMOS Features	>Frequency/Voltage Control
>Advanced BIOS Features	Load Fail-Safe Defaults
>Advanced Chipset Features	Load Optimized Defaults
>Integrated Peripherals	Set Supervisor Password
>Power Management Setup	Set User Password
>PnP / PCI Configurations	Save & Exit Setup
>PC Health Status	Exit Without Saving
Esc : Quit	n p o m : Select Item
F10 : Save & Exit Setup	

Notes (This page left blank intentionally)

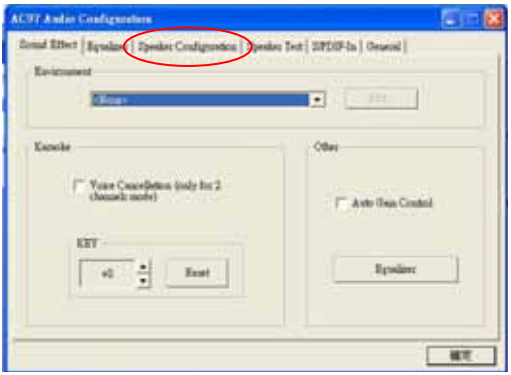
Chapter 4 Audio Channel Configuration

In order to enable 5.1 channel, please follow the setup steps below:

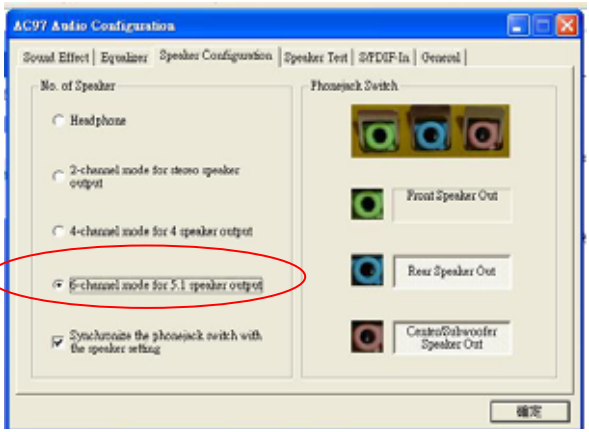
1. lunch the **Control Panel**



2. lunch the **Sound Effect Manager**



3.select **Speaker Configuration** and choose **6 channel mode for 5.1 speaker output**



Notes (This page left blank intentionally)

Chapter 5. Display Settings

Before you using your display device:

1. Check your software

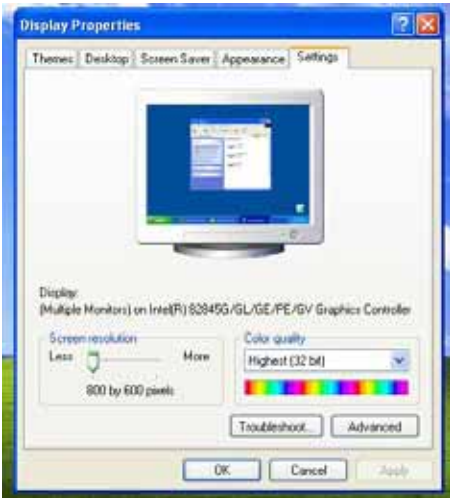
Before you can use the display device properly, please install the VGA drivers.

2. Check your hardware

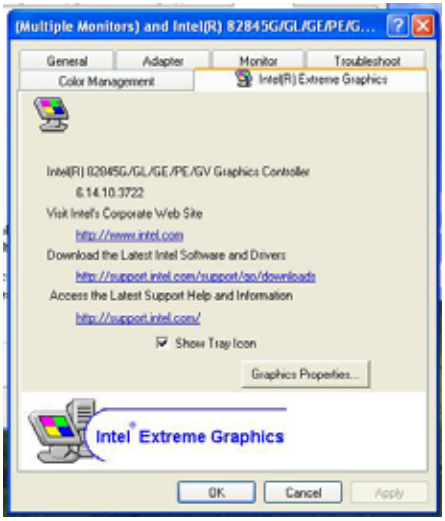
Please setup the display device properly before you boot up the system.

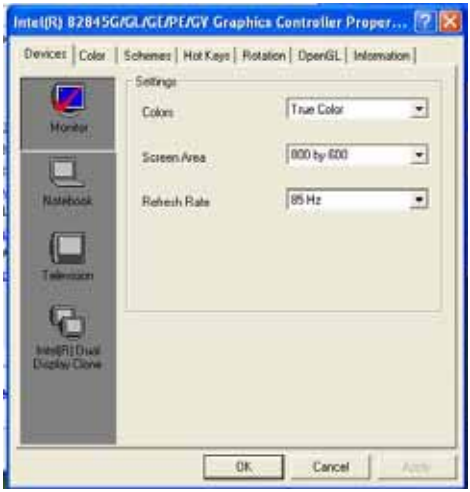
For configure your Display device, please follow the instructions below:

1. lunch the display properties.



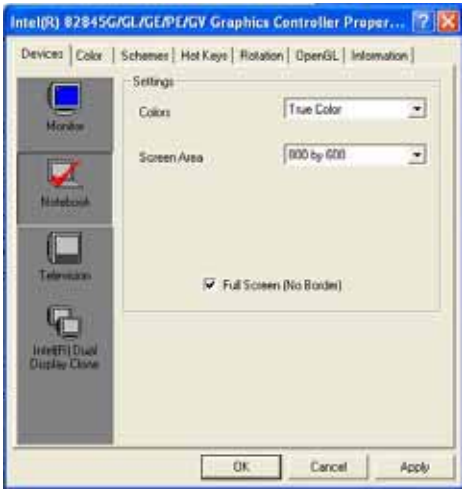
2. Select settings option and click Advanced Button
3. Select Intel(R) Extreme Graphics and click Graphics properties





4. There will be a different device list depends on your connecting devices

For Monitor:
You can configure the Colors, Screen area (resolution) and Refresh Rate.



For Notebook:
If you connect a LCD panel though LVDS interface, you can configure the Colors and Screen Area (resolution) here.