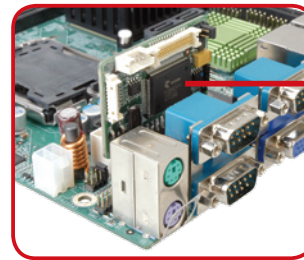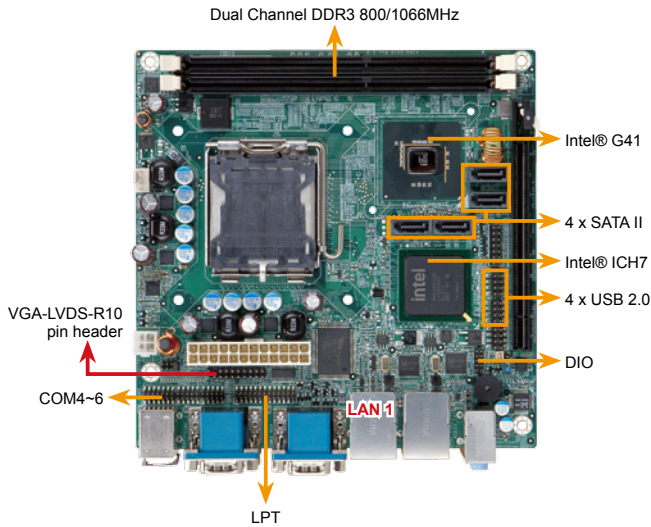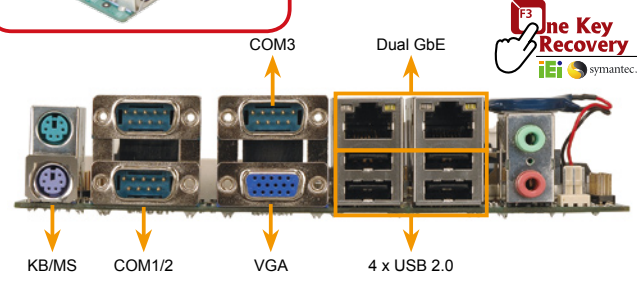# KINO-G410

Mini-ITX SBC supports socket LGA775 Intel® Core™2 Quad CPU with 1333MHz FSB, DDR3, VGA, dual PCIe GbE, six COM, four SATA II, Aduio and RoHS

Dual Channel DDR3 800/1066MHz

- Intel® G41
- 4 x SATA II
- Intel® ICH7
- 4 x USB 2.0
- DIO

VGA-LVDS-R10 pin header

COM4~6

LAN 1

LPT

VGA-LVDS-R10
VGA to 24-bits dua-channel LVDS support
Resolution support:
640x480, 800x600, 1024x768, 1280x1024, 1366x768, 1920x1080

COM3   Dual GbE

One Key Recovery
iEi symantec.

KB/MS   COM1/2   VGA   4 x USB 2.0

FSB 1333   DDR 3 1066   SERIAL ATA SATA II   USB 2.0   Gigabit Ethernet PCIe GbE

Features

1. LGA775 Intel® Core™ 2 Extreme/Quad/Duo and Celeron® processor with up to 1333MHz FSB
2. Intel® GMA X4500 delivers an excellent blend of graphics performance
3. Dual-channel DDR3 800/1066MHz supports up to 8GB
4. LVDS supported by VGA-LVDS-R10 convertor board
5. Complete I/O interface for 6 COM, 8 USB, LPT and 4 SATA II
6. IEI One Key Recovery solution allows you to create rapid OS backup and recovery

Specifications

◆ CPU
LGA775 45nm Intel® Core™2 Quad, Core™2 Duo, Pentium® D, Celeron® at FSB 800/1066/1333MHz processors
◆ System Chipset
Intel® G41 + ICH7
◆ Memory
Two 240-pin 800/1066MHz dual-channel DDR3 SDRAM DIMM supported (System max. 8GB)
◆ BIOS
UEFI BIOS
◆ Ethernet
Dual Realtek RTL8111E PCIe GbE controller, LAN 1 with ASF2.0 support
◆ Graphic Engine
Intel® GMA X4500
◆ Display Interface
VGA Integrated in the Intel® G41 24-bit LVDS by VGA-LVDS-R10
◆ Super I/O
Fintek F81865
◆ Audio
Realtek ALC888 HD Audio Codec
◆ Expansion
1 x PCIe x16 slot

◆ TPM (optional)
On board Infineon SLB9635TT1.2
◆ I/O Interface
5 x RS-232   8 x USB 2.0
1 x LPT   4 x SATA II
2 x PS/2 KB/MS
1 x RS-232/422/485 with Auto Flow control
◆ Watchdog Timer
Software programmable support 1~255 sec. system reset
◆ Digital I/O
8-bit digital I/O, 4-bit input / 4-bit output
◆ FAN Connector
1 x 4-pin CPU fan connector
1 x 3-pin system fan connector
◆ Power Supply
ATX power supply
◆ Power Consumption
5V@6.41A, Vcore_12V@2.52A, 3.3V@0.27A
(2.8GHz Intel® Core™2 Duo E7400 with 1GBx2 DDR3 1066MHz)
◆ Operating Temperature: -10°C ~ 60°C
◆ Operating Humidity: 5% ~95%, non-condensing
◆ Dimensions: 170mm x 170mm
◆ Weight: GW:1100g / NW: 700g

Packing List

1 x KINO-G410 single board computer	2 x SATA cable (P/N: 32000-062800-RS)
1 x I/O shielding (P/N: 45014-0014C0-00-RS)	1 x Mini jumper pack
1 x Utility CD	1 x QIG

Ordering Information

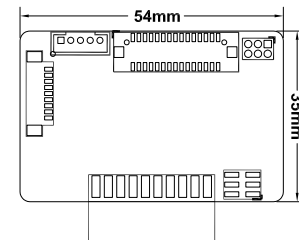| Part No.	Description
KINO-G410-R10	Mini-ITX SBC supports socket LGA775 Intel® Core™ 2 Quad CPU with 1333MHz FSB, DDR3, VGA, Dual PCIe GbE, 6 COM, 4 SATA II and Audio, RoHS
KINO-G410T-R10	Mini-ITX SBC supports socket LGA775 Intel® Core™ 2 Quad CPU with 1333MHz FSB, DDR3, VGA, Dual PCIe GbE, 6 COM, 4 SATA II and Audio, TPM, RoHS
CB-USB02-RS	Dual ports USB cable with Bracket
32102-000100-200-RS	SATA power cable
CF-775A-RS	CPU cooler for 130W
CF-520-RS-R11	CPU cooler for 115W
CF-775B-RS	1U CPU cooler for 90W
32200-015100-RS	LPT cable
32205-000300-100-RS	RS-232/422/485 cable
19800-000112-RS	Dual RS-232 with bracket cable
VGA-LVDS-R10	VGA to 24-bit dual channel LVDS convertor module

VGA-LVDS-R10

VGA to 24-bits dual-channel LVDS converter board

◆ Compatible with IEI mini ITX SBC KINO-G410 only
◆ LVDS supported by scaling chip Novatek 68667UFG
◆ Support resolution support:
640x480, 800x600, 1024x768, 1280x1024, 1366x768, 1920x1080

Dimensions (Unit : mm)

54mm

35mm

Ordering Information

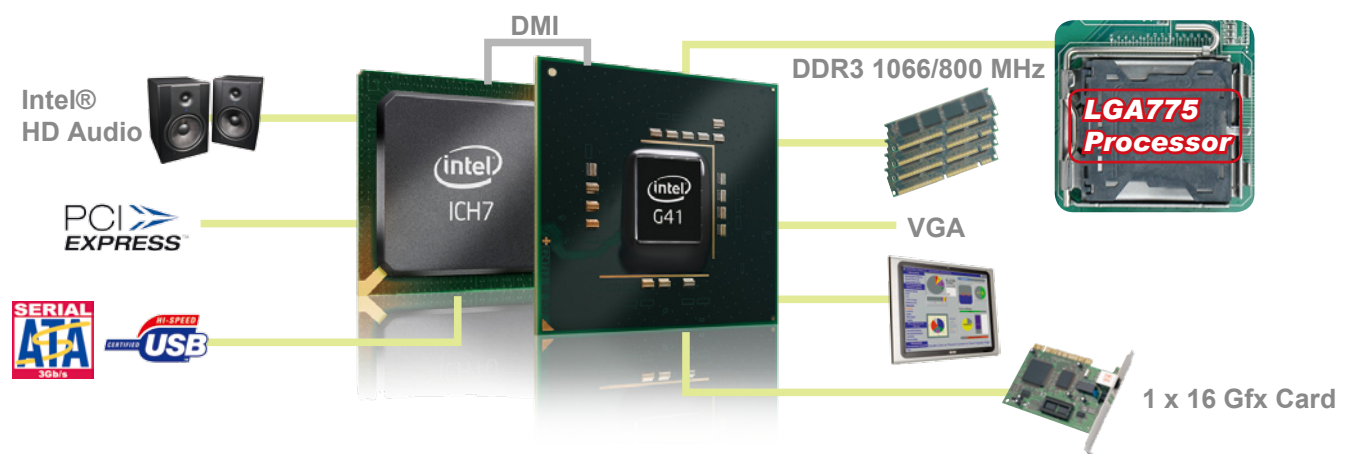| Part No.	Description
VGA-LVDS-R10	VGA to 24-bit dual-channel LVDS converter module
32600-004900-RS	30-pin LVDS connecting cable for evaluation only

Packing List

1 x VGA to LVDS converter module	1 x QIG
1 x Mini jumper Pack	

Intel® G41 Chipset
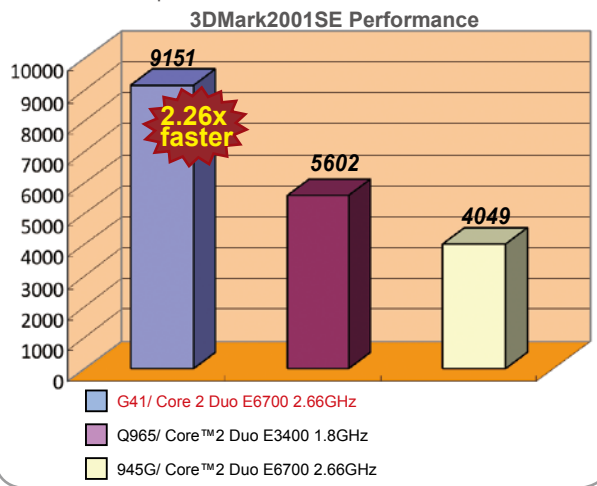
The Best Choice of Peformance Chipset for LGA775 Platform

- DMI
- Intel® HD Audio
- PCI EXPRESS™
- SERIAL ATA 3Gb/s
- HI-SPEED USB CERTIFIED
- Intel ICH7
- Intel G41
- DDR3 1066/800 MHz
- LGA775 Processor
- VGA
- 1 x 16 Gfx Card

LGA775 Processor Supported by Intel® G41

Brand Name	CPU Code	CPU No.	Process	Clock speed	FSB MHz	L2 cache	TDP
Core 2 Quad	Yorkfield	Q9400	45nm	2.66G	1333	6M	95W
Core 2 Duo	Wolf dale	E8400	45nm	3.0G	1066	6M	65W
		E7400	45nm	2.8G		3M	65W
Pentium D Dual Core	Wolfdale	E6500	45nm	2.93G	1066	2M	65W
		E5300	45nm	2.6G	800	2M	65W
Core 2 Duo	Conroe	E6400	65nm	2.13G	1066	2M	65W
		E4300	65nm	1.8G	800	2M	65W
Pentium D Dual Core	Conroe	E2160	65nm	1.8G	800	1M	65W
Celeron Dual Core	Conroe	E3400	45nm	2.4G	800	512K	65W
		E1500	65nm	2.2G		512K	65W
Celeron	Conroe L	440	65nm	2.0G	800	512K	35W

Performance Comparison

Intel® G41 chipset features not only complete CPU support list but also an excellent graphic performance compared with Q965/945G chipset

3DMark2001SE Performance

- 9151 — 2.26x faster
- 5602
- 4049

- ■ G41/ Core 2 Duo E6700 2.66GHz
- ■ Q965/ Core™2 Duo E3400 1.8GHz
- ■ 945G/ Core™2 Duo E6700 2.66GHz

Intel® Desktop Chipset Specification Comparison Table

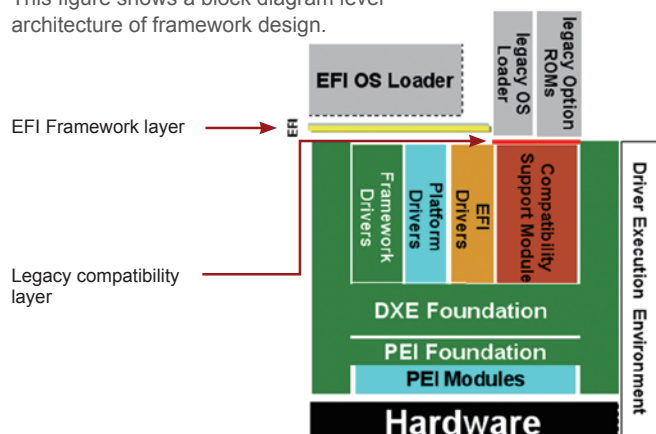| Northbridge	Intel® G41	Intel® G45	Intel® Q45	Intel® Q35	Intel® Q965	Intel® 945G
CPU FSB	1333MHz 45nm/65nm	1333MHz 45nm/65nm	1333MHz 45nm/65nm	1333MHz 45nm/65nm	1066MHz 65nm	1066MHz 65nm
Graphic	GMAX4500 Direct*X10	GMAX4500HD Direct*X10	GMAX4500 Direct*X10	GMA3100 Direct*X 9.0c	GMA3000 Direct*X 9.0c	GMA 950 Direct*X 9.0c
Full H/W decode acceleration MPEG2/4, VC1 & AVC	N/A	Yes	N/A	N/A	N/A	N/A
Memory	DDR3-1066 8GB	DDR3-1066 16GB	DDR3-1066 16GB	DDR2-800 8GB	DDR2-800 8GB	DDR2-667 4GB
PCIe x16	Gen1	Gen2	Gen2	Gen1	Gen1	Gen1
Southbridge	ICH7 / ICH7R	ICH10	ICH10DO	ICH9DO	ICH8DO	ICH7/ICH7R
PCI	6	4	4	4	6	6
PCIe x1 Lanes	6 (ICH7R) 4 (ICH7)	6	6	6	6	6 (ICH7R) 4 (ICH7)
USB 2.0	8	12	12	12	10	8
SATA II	4	6	6	6	6	4
Intel AMT	N/A	N/A	Yes	Yes	Yes	N/A

UEFI Introduction

- **UEFI (Unified Extensible Firmware Interface) BIOS is next-generation BIOS firmware based on UEFI specifications and the Intel® Platform Innovation Framework for EFI.**

- **UEFI BIOS can be expanded by using a variety of drivers, development tools, support utilities and pre-boot application (PBA) solutions.**

UEFI Architecture

This figure shows a block diagram level architecture of framework design.

EFI Framework layer →

Legacy compatibility layer →

Legacy BIOS V.S. UEFI

	Legacy BIOS	**UEFI**
Language	Assembly	C (99%)
Resource	Interrupt Hardcode Memory Access Hardcode I/O Access	Driver \ Protocols
Processor	x86 16-bits	CPU Protected Mode (Flat Mode)
Target	Binary Code	Removable Binary Drivers
Expand	Hook Interrupt	Load Driver
OS Bridge	ACPI (SMI, INT Service)	RunTime Driver Service AED (ACPI EFI Protocol Driver) (ACPI, SMI)
3rd Party ISV & IHV	Bad for Support	Easy for Support and for Multi Platforms

The architecture represents a structured implementation composed primarily of the following:

- Foundation code that binds the pieces together
- Modular elements of code that perform the functional job of enumerating and initializing the platform

UEFI Benefits

Expansibility –

ODM/OEM and customers can add their own PBA easily. PBA can be integrated in BIOS flash or placed in external mass storage devices.

Migration ability –

Drivers, PBA can be migrated easily from one platform to another because they're designed highly modularize on a unified framework.

IEI UEFI BIOS Features

1. Familiarity –

Providing advanced UEFI functionality with a familiar BIOS setup interface.

2. Compatibility –

Designed to extend BIOS compatibility into UEFI solutions. Supporting legacy Option Rom binaries and operating systems requiring a legacy BIOS runtime interface.

IEI Products with UEFI BIOS

1.QM57/HM55 chipset family.

KINO-QM57A, KINO-HM551, NOVA-HM551, NANO-QM57A, NANO-HM551

2.G41 chipset family

IMBA-G410, IMBA-G412ISA, KINO-G410

3. D525/D425/ N455 family

UEFI BIOS has a better compatibility with the dual ranks x16 DRAM memory module for D425/D525/N455 series

3. Functionality –

(1) Compliant with iSMM H/W monitor utility
(2) Dynamic LOGO
(3) Fast boot
(4) ICP Standard Feature – AT/ATX, WDT, DIO
(5) BIOS setup with touch device support
(6) HDD/Storage support over 2.2TB with 64-bit operation system

4. Extensibility –

Allowing to add and execute pre-boot applications (PBA) in a protected hidden partition
(1) HDD Security
(2) Shell environment
(3) Pre-boot messenger (Third Party)
(4) Pre-boot Network Browser (Third Party)
(5) Pre-boot Antivirus (Third Party)

IEI One Key Recovery Solution
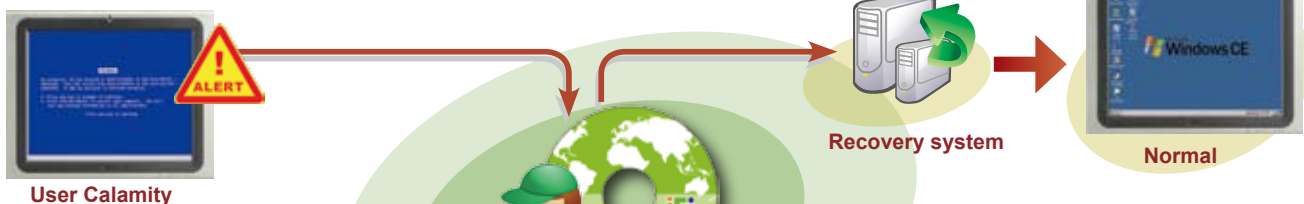
One Key Recovery

IEI unique one key recovery solution includes exclusive technology to recover and backup your operating system by just one click without any complicated settings. IEI freely bundled recovery CD is shipped with every IEI SBC, embedded system and all-in-one panel PC products.
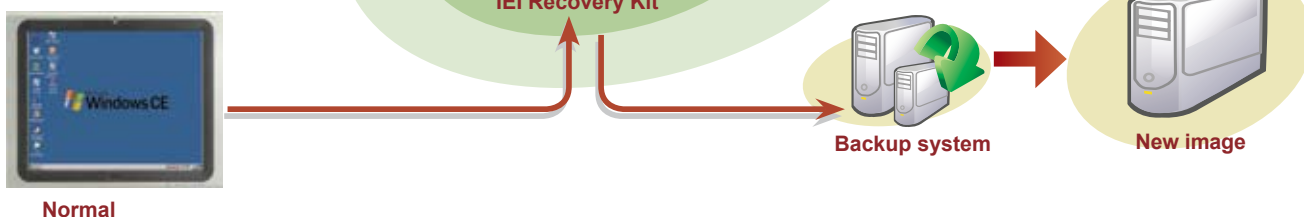
Recovery Tool for IEI Products Only

The IEI recovery CD includes a system recovery software developed by IEI with the Windows PE 2.0. The recovery CD helps to create full system backup and restore from system failures. Users don't need to spend additional cost for other system backup and recovery tools.
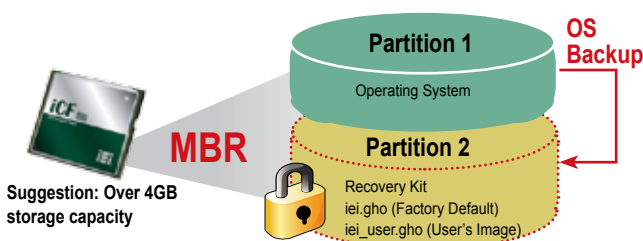
System Recovery

User Calamity → Recovery system → Normal

System Backup

Normal → Backup system → New image

IEI Recovery Kit

Recovery Partition

Hidden partition is a logical section of a disk which is not accessible to the operating system. You can use a partition tool such as SPFDISK to create a hidden partition first. It may be used to protect confidential data or store backup of the system.

MBR

Suggestion: Over 4GB storage capacity

Partition 1 — Operating System

OS Backup

Partition 2 — Recovery Kit, iei.gho (Factory Default), iei_user.gho (User's Image)

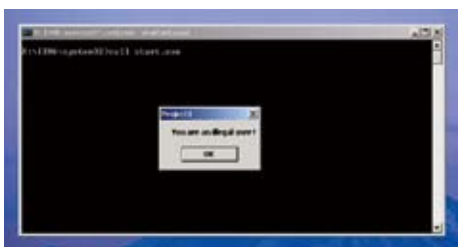**IEI Recovery Solution Advantages:**
- No need to make recovery discs by yourself nor follow the trivial imaging procedures
- Simple steps to backup or restore the system. No IT personnel are required.
- Backup/Restore system easily through unique multi-menu
- One key to make recovery disc
- One key to restore system

IEI Products Only

SYMC GSS OneKey Recovery

☑ **IEI Certified Sticker**

The IEI recovery CD is only for IEI products. A message will show to warn "you are an illegal user" if using the CD for non-IEI products. This protection is detected through the BIOS of the IEI boards.

Support OS List	
Windows® XP	Windows® Vista
Windows® 7	Windows® CE 5.0
Windows® CE 6.0	Windows® XP Embedded

Linux OS
  1. Red Hat RHEL- 5.4
  2. Fedora Core 7, 8, 10, 11, 12
  3. Ubuntu 6.10, 7.10 , 8.10
  4. Debien 4.0, 5.0
  5. SuSe 11.2

iEi®

Rapid Imaging/ Migration through One Touch Hot Key

Neither specialized IT staff nor consultants are required in order to implement the system imaging and data migration. Just press the F3 key to get access to the recovery menu. The one key operation simplifies the imaging or migration process to help IT staff up and running quickly.

EASY WAY

F3 Auto-run

Press F3 to boot into recovery mode...

One Key Backup / Restore

● One-Key Recovery
- Factory restore: restore your system to default setting (iei.gho)
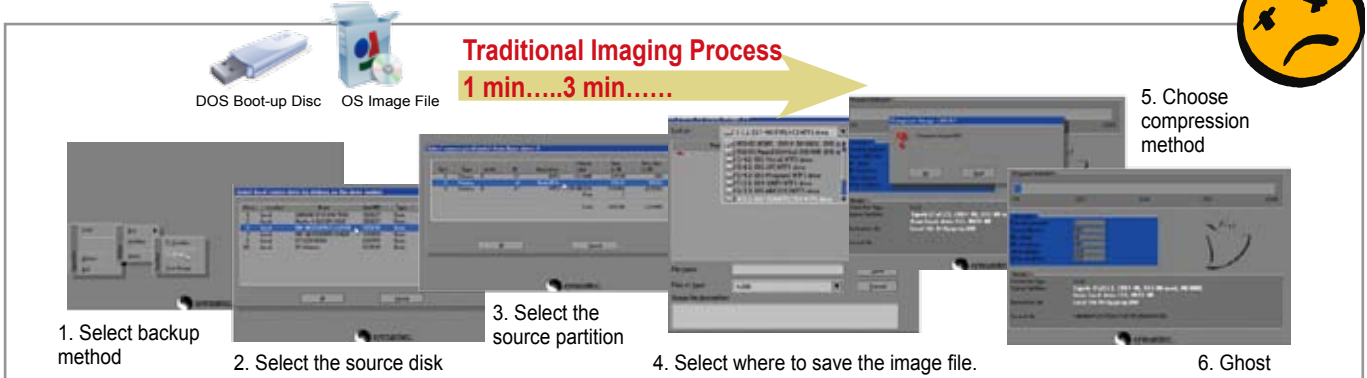- Restore your last backup: recover the last system configuration (iei_user.gho)

```
1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:_
```

● One-Key Backup
Backup your operating system to the secure hidden partition. You can create your own ghost image as "iei_user.gho" including your application programs set-ups.

DOS Boot-up Disc   OS Image File

Traditional Imaging Process
1 min…..3 min……

5. Choose compression method

1. Select backup method

2. Select the source disk

3. Select the source partition

4. Select where to save the image file.

6. Ghost

Benefits

2 Use the recovery tool to restore your OS at the local site

1 When the system is infected by virus or has a blue screen.

Alert

! ALERT

Remote Maintenance Reduces the Cost of IT Infrastructure

All migration tasks can be performed remotely from a central management console. It will save a lot of cost from reducing physical visits.

One Key Restore + Remote KVM

3

OK

F3 One Key Recovery
iEi symantec.

Intel® Q57/QM57 iAMT 6.0

Remote Troubleshooting

IEI Intelligent System Management Module

iSMM

IEI iSMM is a system health supervision API which utilizes sensor chips on IEI motherboards to track system and CPU temperatures, voltages, cooling fan speed., WDT and Digital I/O set up status. By quickly capturing and reporting system health data, users can prevent disasters such as system instability or damage.

Features

- External and on-chip voltages data feedback
- CPU and system temperature data feedback
- Cooling fan speed data feedback
- Cooling fan speed controlled by PWM/ On-Off/ Automatic Mode
- Warning signals by beeper and sound effect
- WDT Test
- Programmable Digital I/O
- System health configurations save and load

Available Models

iSMM support below super I/O:

- a. Winbond W83627
- b. ITE IT8712
- c. ITE IT8718
- d. Fintek F81216D
- e. Fintek F81865
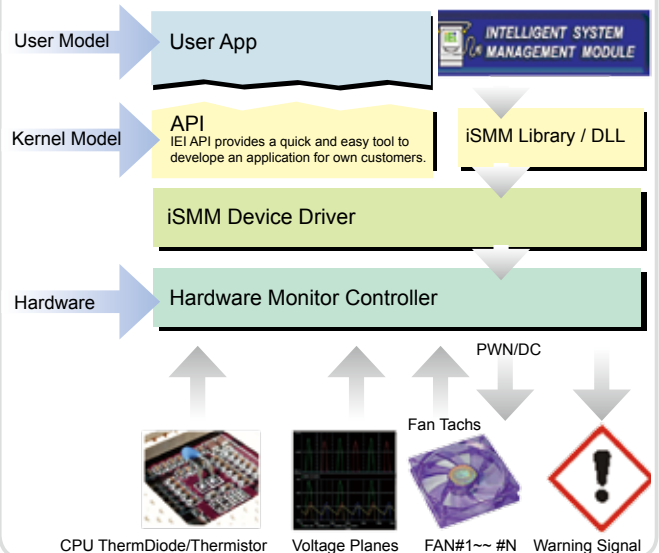
Available Operation System

- a. Windows XP
- b. Windows Vista
- c. Windows 7

Note: Please disable UAC function before install iSMM software under Windows Vista and Windows 7.

Advantages

Know that your system is running within safe limits !!
Prevent disasters such as sysem unstablity or damage.

Architecture

User Model	User App → INTELLIGENT SYSTEM MANAGEMENT MODULE
Kernel Model	API — IEI API provides a quick and easy tool to develope an application for own customers. → iSMM Library / DLL
	iSMM Device Driver
Hardware	Hardware Monitor Controller

PWN/DC

Fan Tachs

CPU ThermDiode/Thermistor   Voltage Planes   FAN#1~~ #N   Warning Signal

---

IEI Exclusive Diagnosis Software

Full Graphic Interface, Real-time, 6 in 1 Modules !!

INTELLIGENT SYSTEM MANAGEMENT MODULE

IEI Solutions Compliance Only

Functions

Temp.	Fan	Voltage.	DIO	WDT	Save/Load	Cash drawer
CPU + System temperature monitoring	Dynamic fan speed controlling	Real time voltage alarm	Easy Digital I/O configuriation	Trouble free watch dog timer testing	Flexibility user profile recover	Cash drawer status monitoring