epic **NANO-HM551**
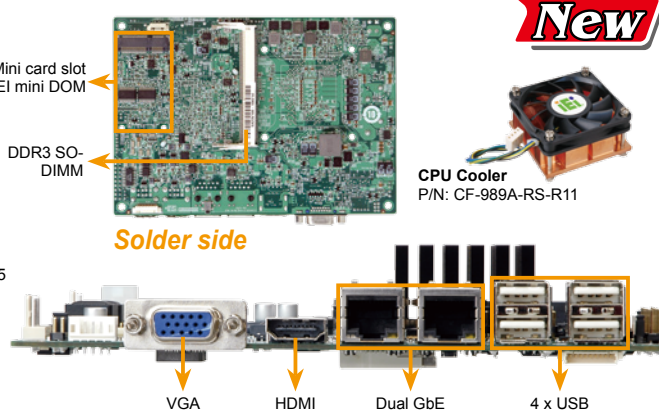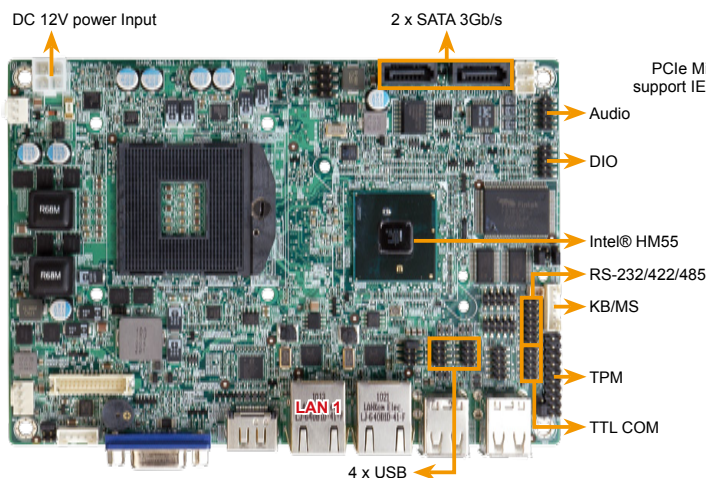
**EPIC SBC supports Socket G1 for Intel® Core™ i7/ i5/ i3/ Celeron® CPU, VGA/HDMI, Dual PCIe GbE, USB 2.0, PCIe Mini, SATA 3Gb/s and Audio, RoHS**
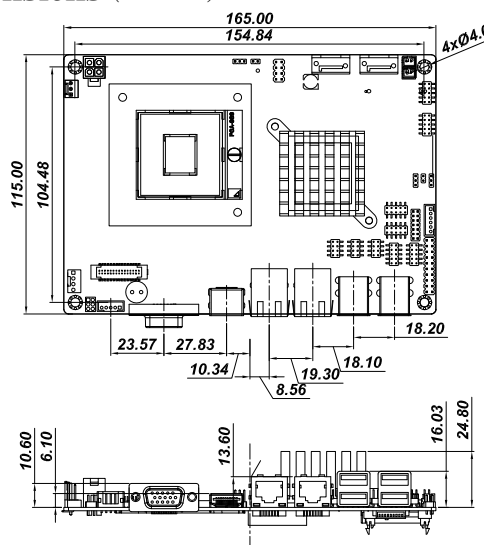


- DC 12V power Input
- 2 x SATA 3Gb/s
- Audio
- DIO
- Intel® HM55
- RS-232/422/485
- KB/MS
- TPM
- TTL COM
- 4 x USB

PCIe Mini card slot support IEI mini DOM

DDR3 SO-DIMM

**Solder side**

**New**

**CPU Cooler** P/N: CF-989A-RS-R11

- VGA
- HDMI
- Dual GbE
- 4 x USB

TPM module

SATA Mini DOM | DDR3 800/1066 | SERIAL ATA SATA 3Gb/s | USB 2.0 | Gigabit Ethernet PCIe GbE | Dual Display | 12V only

One Key Recovery — iEi / symantec. | HDMI

## Features

1. EPIC SBC with Socket G1 for Intel® Core™ i7 /i5 /i3 and Celeron® processor
2. VGA /24-bit dual channel LVDS/ HDMI for dual display support
3. DDR3 800/1066HMz SDRAM supported (system max. 4 GB)
4. Support five COM, eight USB 2.0, two SATA, audio
5. IEI One Key Recovery solution allows you to create rapid OS backup and recovery
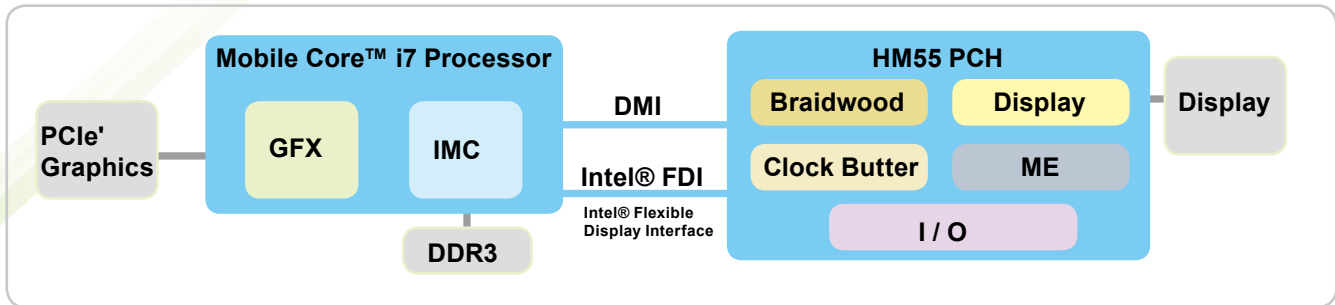
## Dimensions *(Unit: mm)*



## Specifications

- ◆ **CPU**
  Socket G1 for Intel® mobile Core™ i7/ i5/ i3 and Celeron® processor (Socket 988)
- ◆ **PCH**
  Intel® HM55
- ◆ **BIOS**
  UEFI BIOS
- ◆ **Memory**
  One 204-pin 800/1066MHz DDR3 SDRAM SO-DIMM up to 4GB
- ◆ **Graphic**
  Gen 5.75 with 12 Execution Units DirectX* 10, OpenGL* 2.1
- ◆ **Display Interface**
  Analog CRT by VGA connector (2048x1536)
  18/24-bit dual-channel LVDS (1600x1200)
  HDMI supports up to 1080p resolution (1920x1080)
- ◆ **LAN**
  Dual PCIe LAN controller by Realtek RTL8111E, LAN1 with ASF 2.0 support
- ◆ **Super I/O**
  Fintek F81865
- ◆ **I/O Interface**
  8 x USB2.0          1 x 6-pin pin header for KB/MS
  3 x RS-232          1 x RS-232/422/485 (COM3) with Auto Flow control
  1 x TTL COM (COM5)  2 x SATA 3Gb/s with SATA power connector
- ◆ **Audio**
  Realtek ALC888 HD codec
- ◆ **Expansion**
  1 x Mini PCIe card slot (PCIe + USB + SATA signal) support IEI mini DOM
- ◆ **TPM**
  2 x 10-pin header
- ◆ **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**
  12V only, AT/ATX support
- ◆ **Power Consumption**
  12V@3.8A (Intel® Core™ i3 330M 2.13GHz CPU with DDR3 1066MHz 1GB)
- ◆ **Temperature**
  Operation: -10°C ~ 60°C
- ◆ **Humidity**
  Operation: 5% ~ 95%, non-condensing
- ◆ **Dimensions**
  115mm x 165mm
- ◆ **Weight**
  GW:850g / NW:350g

## Packing List

| |
|---|
| 1 x NANO-HM551 single board computer |
| 1 x Power cable (P/N: 32100-087100-RS) |
| 2 x RS-232 cable (P/N: 32200-000049-RS) |
| 1 x SATA with power cable kit (P/N: 32801-000201-100-RS) |

| | |
|---|---|
| 1 x Audio cable (P/N: 32000-072100-RS) | 1 x Mini jumper pack |
| 1 x QIG | 1 x Utility CD |

## Ordering Information

| Part No. | Description |
|---|---|
| NANO-HM551-R10 | EPIC SBC supports Socket G1 for Intel® Core™ i7 CPU, VGA/ HDMI, Dual PCIe GbE, USB 2.0, Mini PCIe, SATA 3Gb/s and Audio, RoHS |
| 32000-070301-RS | Dual port USB cable |
| 32100-043403-RS | ATX power cable |
| CF-989A-RS-R11 | CPU cooler for mobile socket-G (PGA988) up to 55W processor, Copper, 60x60x27.6mm ,RoHS |
| CF-989B-RS | CPU cooler for mobile socket-G (PGA988) 50W processor, Aluminum, 60x60x27.6mm, RoHS |
| 32000-023800-RS | KB/MS cable |
| TPM-IN01-R11 | 20-Pin Infineon TPM module, software management tool, firmware V3.17 |

# Intel® HM55/QM57 Chipset

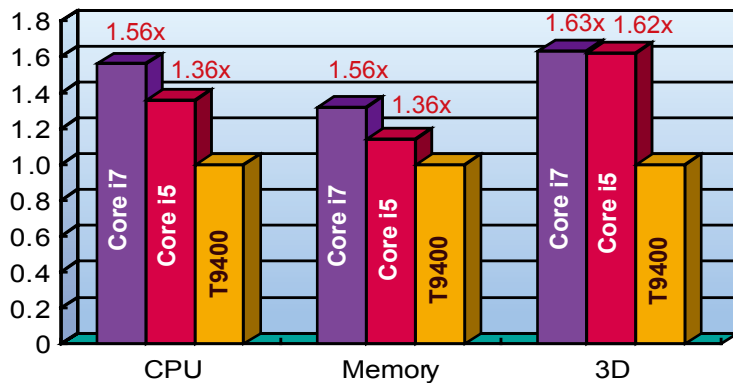## Best Graphic Performance Solution for Mobile Core™ i7/ i5/ i3/ Celeron® Platform

| | Mobile Core™ i7 Processor | | HM55 PCH | |
|---|---|---|---|---|
| PCIe' Graphics | GFX / IMC | DMI / Intel® FDI | Braidwood / Clock Butter / Display / ME / I/O | Display |

Intel® Flexible Display Interface

DDR3

## Mobile Core™ i7 Embedded CPU List for QM57/ HM55

Yellow means long term support

| Package Type | Brand Name | Code Name | CPU No. | Clock Speed | L2 Cache | TDP | iAMT6.0 | Integrated Graphic |
|---|---|---|---|---|---|---|---|---|
| Socket G1 988-pin PGA | Core™ i7 Extreme Edition | Arrandale | i7-940XM | 2.13G | 8M | 55W | | |
| | | | i7-920XM | 2.0G | 8M | 55W | | |
| | Core™ i7 | | i7-840QM | 1.86G | 8M | 45W | | |
| | | | i7-820QM | 1.73G | 8M | 45W | | |
| | | | i7-740QM | 1.73G | 6M | 45W | | |
| | | | i7-720QM | 1.6G | 6M | 45W | | |
| | | | i7-620M | 2.66G | 4M | 35W | V (For QM57 only) | V |
| | Core™ i5 | | i5-540M | 2.53G | 3M | 35W | | V |
| | | | i5-520M | 2.4G | 3M | 35W | V (For QM57 only) | V |
| | | | i5-450M | 2.4G | 3M | 35W | | V |
| | | | i5-430M | 2.26G | 3M | 35W | | V |
| | Core™ i3 | | i3-370M | 2.4G | 3M | 35W | | V |
| | | | i3-350M | 2.26G | 3M | 35W | | V |
| | | | i3-330M | 2.13G | 3M | 35W | | V |
| | Celeron® | | P4500 | 1.86G | 2M | 35W | | V |

## CPU Performance Comparison

1.56x, 1.36x, 1.56x, 1.36x, 1.63x, 1.62x

CPU — Memory — 3D

Core i7 / Core i5 / T9400

- i7-620M 2.66G
- i5-520M 2.4G
- T9400 2.53G

Intel® Core™ i7 processor is 1.56 and 1.6 time faster on CPU and graphic performance compared with the T9400 CPU plus GM45 chipset.

Note: Intel® Core™ i7 Quad Core CPU does not support internal graphic, please use add-on graphic card for graphic support.

## Valued Mobile Core™ i7 Choice

### Specification differences between QM57 and HM55

| Ibex Peak-M Feature | QM57 | HM55 |
|---|---|---|
| PCI-Express | 8 ports | 6 ports |
| SATA | 6 ports | 4 ports |
| TDP | 3.2~3.5W | 3.2~3.5W |
| Intel Active Management Technology (Intel AMT) | 6.0 (integrated KVM) | No |
| USB 2.0 Ports | 14 ports | 12 ports |

### HM55 total solution coming soon!!

**KINO-HM551**

Mini-ITX SBC, 12V, 6COM, HDMI/LVDS/VGA/DVI Dual GbE, PCIe x16, Dual PCIe Mini

**NOVA-HM551**

5.25" SBC,12V, 6COM, Dual HDMI/LVDS/VGA, Dual GbE, PCIe x16, PCI-104, Dual PCIe Mini

**NANO-HM551**

EPCI SBC, 12V, 5COM, HDMI/LVDS/VGA Dual GbE

# UEFI Introduction

- **UEFI** (**U**nified **E**xtensible **F**irmware **I**nterface) BIOS is a 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 the framework design.

EFI Framework layer

Legacy compatibility layer
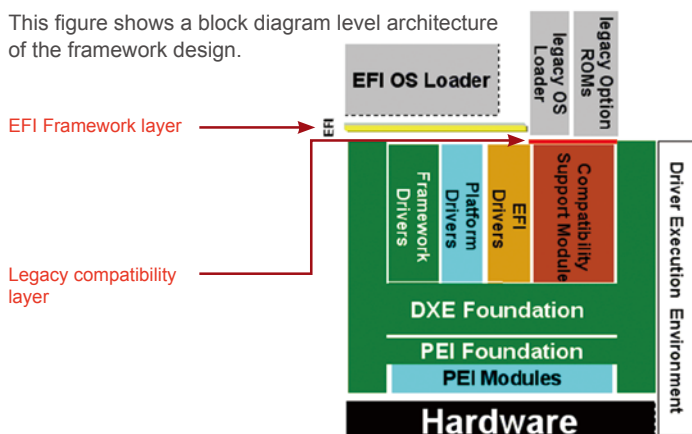
### Legacy BIOS V.S. UEFI

|  | **Legacy BIOS** | **UEFI** |
|---|---|---|
| **Language** | Assembly | C (99%) |
| **Resource** | Interrupt<br>Hardcode Memory Access<br>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<br>(SMI, INT Service) | RunTime Driver Service<br>AED (ACPI EFI Protocol Driver)<br>(ACPI, SMI) |
| **3rd Party ISV & IHV** | Not Fully Supported | Easily Supports 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 of the highly modularized design on a unified framework.

## IEI Products with UEFI BIOS

### 1. C206/Q67/B65, QM67/HM65, QM57/HM55 chipsets
SPCIE-C2060, PCIE-Q670, IMBA-C2060, IMBA-Q670, IMB-C2060, IMB-Q670, KINO-QM670, 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 better compatibility with the dual ranks x16 DRAM memory module of the D425/D525/N455 series

## 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.

### 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
The option 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)

www.ieiworld.com

# IEI One Key Recovery Solution

**IEI's unique One Key Recovery solution includes exclusive technology to recover and backup your operating system by just one click without any complicated settings. One Key Recovery software comes is shipped with every IEI SBC, embedded system and all-in-one panel PC product.**

F3 One Key Recovery

iEi / symantec

## Recovery Tool for IEI Products Only

The IEI recovery CD includes system recovery software developed by IEI using Windows PE 2.0. The recovery CD helps create full system backup and restore from system failures. Users don't need to buy additional system backup and recovery tools.

### System Recovery

**User Calamity** → **ALERT** → **IEI Recovery Kit** → **Recovery system** → **Normal** (Windows CE)

### System Backup

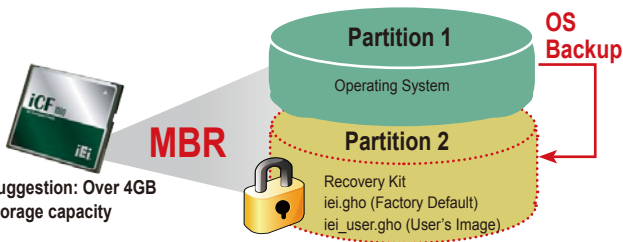**Normal** (Windows CE) → **IEI Recovery Kit** → **Backup system** → **New image**

### Recovery Partition

A 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.

**iCF**

**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 or follow trivial imaging procedures
- Simple steps to backup or restore the system. No IT personnel 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 warns, "you are an illegal user" when using the CD on non-IEI products. This protection is detected through the BIOS of the IEI boards.
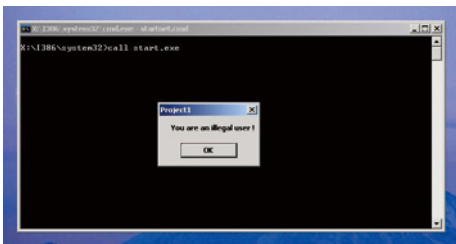
| Support OS List | |
| --- | --- |
| Windows® XP | Windows® Vista |
| Windows® 7 | Windows® CE 5.0 |
| Windows® CE 6.0 | Windows® XP Embedded |

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

# 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 get the system up and running quickly.

**EASY WAY**

**F3** Auto-run

Press F3 to boot into recovery mode...

**One Key Backup / Restore**
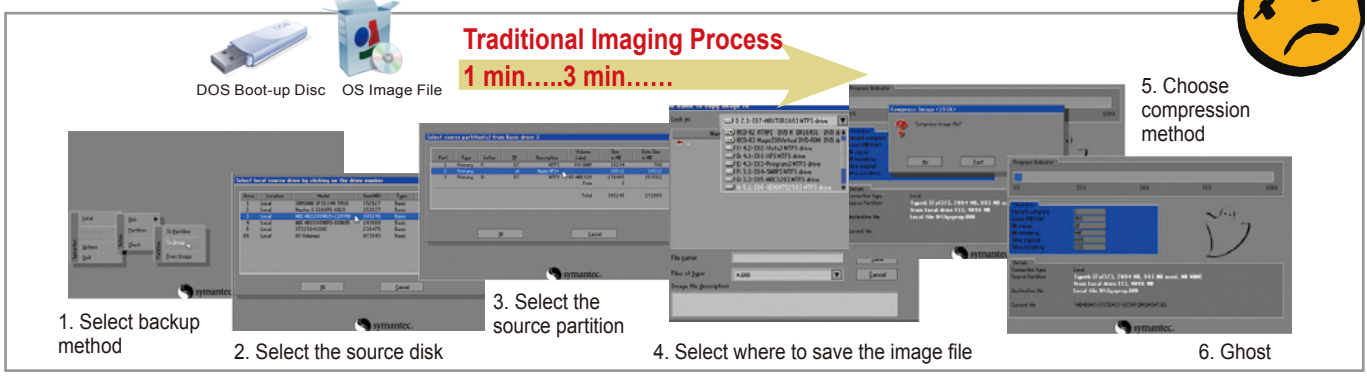
## ■ One-Key Recovery

- 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

**Remote Maintenance Reduces the Cost of IT Infrastructure**

All migration tasks can be performed remotely from a central management console. This reduces the need for physical visits which saves time and money.

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

**Alert**

**One Key Restore + Remote KVM**

**1** When the system is infected by virus or a blue screen appears

**ALERT !**

**3** **OK**
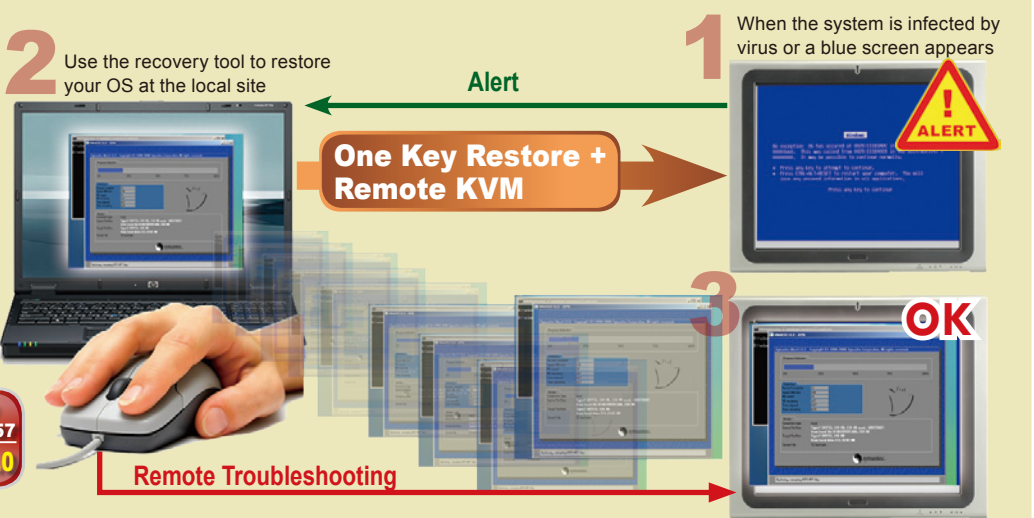
**F3** One Key Recovery
iEi symantec.

Intel® Q57/QM57 iAMT 6.0

**Remote Troubleshooting**

# IEI Intelligent System Management Module

## What is the 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.

*iSMM*

## ■ 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:

1. Winbond W83627
2. Winbond W83697
3. ITE IT8712
4. ITE IT8718
5. Fintek F81216D
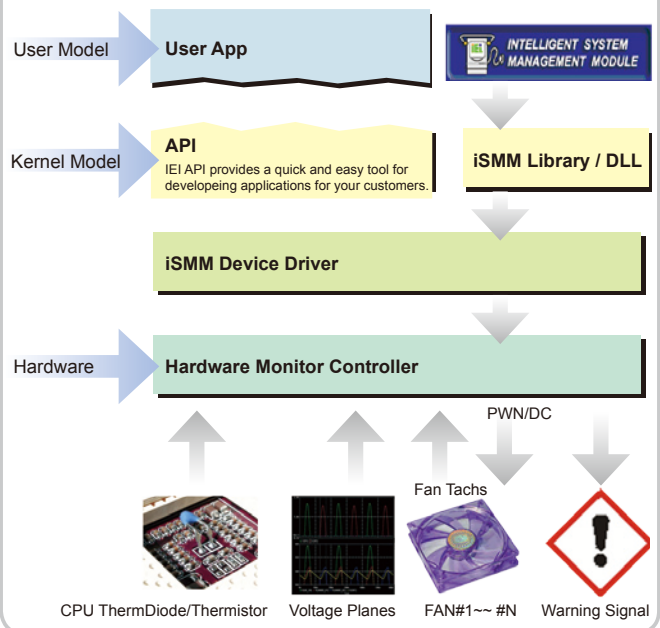6. Fintek F8186
7. SMSC SCH311x

## ■ Available operation system

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

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

## Advantages

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

### Architecture

| | | |
|---|---|---|
| User Model | **User App** | INTELLIGENT SYSTEM MANAGEMENT MODULE |
| Kernel Model | **API** IEI API provides a quick and easy tool for developeing applications for your 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 |