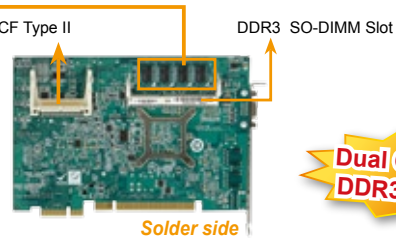
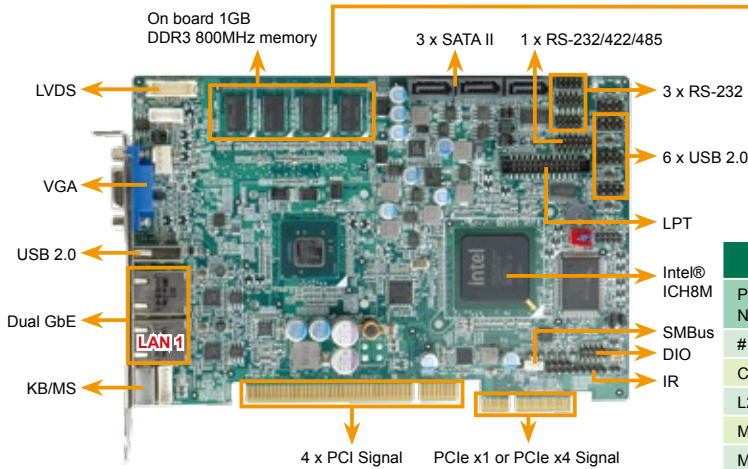


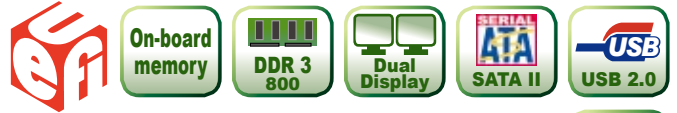
PIC0e-PV-D4251 N4551 D5251

Half-size PCIe CPU Card with Intel® Atom™ D425/N455/D525, DDR3, 1 GB Memory on board, VGA/LVDS, Dual PCIe GbE, USB 2.0, SATA II, Audio and RoHS



Intel® Atom™ Comparison Table for PIC0e-PV SKUs

Processor Name	Intel® Atom™ D525	Intel® Atom™ N455	Intel® Atom™ D425	Intel® Atom™ D510
# of Cores	2	1	1	2
Clock Speed	1.80 GHz	1.66 GHz	1.80 GHz	1.66 GHz
L2 Cache	1 MB	512 KB	512 KB	1 MB
Max TDP	13 W	6.5 W	10 W	13 W
Memory	DDR3 800MHz	DDR3 800MHz	DDR3 800MHz	DDR2 667/800



Specifications

- ◆ CPU
 - Intel® Atom™ Dual Core D525 Processor (1.80GHz with 1MB L2 cache)
 - Intel® Atom™ Single Core N455 Processor (1.66GHz with 512K L2 cache)
 - Intel® Atom™ Single Core D425 Processor (1.80GHz with 512K L2 cache)
- ◆ System Chipset
 - ICH8M
- ◆ BIOS
 - UEFI BIOS
- ◆ Memory
 - One 204-pin 800MHz DDR3 SDRAM SO-DIMM supported (System max. 2GB)
 - On-board 1 GB DDR3 800 MHz memory
- ◆ Graphic Engine
 - GMA 3150
 - Gen3.5 DX9, 400MHz for D525/D425
 - Gen3.5 DX9, 200MHz for N455
- ◆ Ethernet
 - Dual PCIe GbE by Realtek RT8111E, LAN1 with ASF2.0 support
- ◆ Display Interface
 - Analog CRT up to 2048x1536 for D525/D425, 1400x1050 for N455
 - Support CRT hot plug
 - Single Channel 18-bit LVDS support resolution up to XGA (1024x768) & WXGA (1366x768)
- ◆ I/O Interfaces
 - 3 x RS-232 1 x RS-232/422/485 with Auto Flow control
 - 1 x LPT 1 x PS/2 for KB/MS
 - 1 x CF Type II 1 x 6-pin wafer header for KB/MS
 - 3 x SATA II 7 x USB 2.0 (6 by header, 1 on rear side)
- ◆ Digital I/O
 - 8-bit digital I/O, 4-bit input / 4-bit output
- ◆ Super IO
 - Fintek F81865
- ◆ Infrared Interface
 - 1 x 5-pin header
- ◆ TPM (Optional)
 - On board INFINEON SLB9635TT1.2
- ◆ SMBus
 - 1 x 4-pin wafer connector
- ◆ FAN Connector
 - 1 x 4-pin fan connector
- ◆ Expansion
 - 4 x PCI
 - 4 x PCIe x1 or 1 x PCIe x4
- ◆ Audio
 - Support 7.1 channel HD audio by IEI AC-KIT883HD kit
- ◆ Watchdog Timer
 - Software programmable support 1~255 sec. system reset
- ◆ Power Consumption
 - 12V@0.54A, 5V@3.38A (Intel® Atom™ Dual Core D525 1.80GHz with 1GB DDR3 800MHz Memory on board)
 - 12V@0.43A, 5V@3.28A (Intel® Atom™ Single Core D425 1.80GHz with 1GB DDR3 800MHz Memory on board)
 - 12V@0.32A, 5V@3.13A (Intel® Atom™ Single Core N455 1.66GHz with 1GB DDR3 800MHz Memory on board)
- ◆ Power Supply
 - 5V/12V, AT/ATX support
- ◆ Temperature
 - 20°C ~ 60°C with free air, -20°C ~ 70°C with force air for D525 processor
 - 20°C ~ 65°C with free air, -20°C ~ 70°C with force air for D425 processor
 - 20°C ~ 70°C with free air, -20°C ~ 75°C with force air for N455 processor
- ◆ Humidity
 - Operation: 5% ~ 95%, non-condensing
- ◆ Dimensions
 - 185 mm x 122 mm
- ◆ Weight
 - GW: 1000g / NW: 250g

Features

1. PCIe CPU card supports four PCIe x1 or one PCIe x4 and four PCI expansions
2. Intel® Atom™ D525/ D425/ N455 processor
3. 1GB of DDR3 800MHz SDRAM on board and one expansion SO-DIMM slot support
4. Support VGA and 18-bit single channel LVDS with dual display support
5. I/O include three RS-232, one RS-232/422/485, seven USB 2.0 and three SATA II
6. IEI One Key Recovery solution allows you to create rapid OS backup and recovery

Packing List

1 x PIC0e-PV-D4251/N4551/D5251 single board computer	
1 x Dual RS-232 cable (P/N:19800-000112-RS)	
3 x SATA cable (P/N:32000-0628000-RS)	
1 x KB/MS Y cable (P/N: 32000-133200-RS)	
1 x USB cable (P/N: CB-USB02-RS)	1 x Utility CD
1 x Mini jumper pack	1 x QIG

Ordering Information

Part No.	Description
PIC0e-PV-D5251-R10	Half-size PCIe CPU Card with Intel® Atom™ Dual Core D525 1.80GHz/1MB L2, 1GB Memory on board, VGA/LVDS, Dual PCIe GbE, USB 2.0, SATA II and audio, RoHS
PIC0e-PV-D5251T-R10	Half-size PCIe CPU Card with Intel® Atom™ Dual Core D525 1.80GHz/1MB L2, 1GB Memory on board, VGA/LVDS, Dual PCIe GbE, USB 2.0, SATA II and audio, TPM, RoHS
PIC0e-PV-N4551-R10	Half-size PCIe CPU Card with Intel® Atom™ Single Core N455 1.66GHz/512K L2, 1GB Memory on board, VGA/LVDS, Dual PCIe GbE, USB 2.0, SATA II and audio, RoHS
PIC0e-PV-N4551T-R10	Half-size PCIe CPU Card with Intel® Atom™ Single Core N455 1.66GHz/512K L2, 1GB Memory on board, VGA/LVDS, Dual PCIe GbE, USB 2.0, SATA II and audio, TPM, RoHS
PIC0e-PV-D4251-R10	Half-size PCIe CPU Card with Intel® Atom™ Single Core D425 1.80GHz/512K L2, 1GB Memory on board, VGA/LVDS, Dual PCIe GbE, USB 2.0, SATA II and audio, RoHS
PIC0e-PV-D4251T-R10	Half-size PCIe CPU Card with Intel® Atom™ Single Core D425 1.80GHz/512K L2, 1GB Memory on board, VGA/LVDS, Dual PCIe GbE, USB 2.0, SATA II and audio, TPM, RoHS
AC-KIT883HD-R10	7.1 channel HD Audio kit with Realtek ALC883 support dual audio streams
19800-00075-RS	KB/MS cable with bracket
32102-000100-200-RS	SATA power cable
32200-015100-RS	LPT cable
19FTS00032100-000001-RS	CPU fan

1 Industrial Computing Solutions

2 Embedded Computing Solutions

3 Industrial Data Collector and Controller

4 Video Capture Solutions

5 I/O Communication Solutions

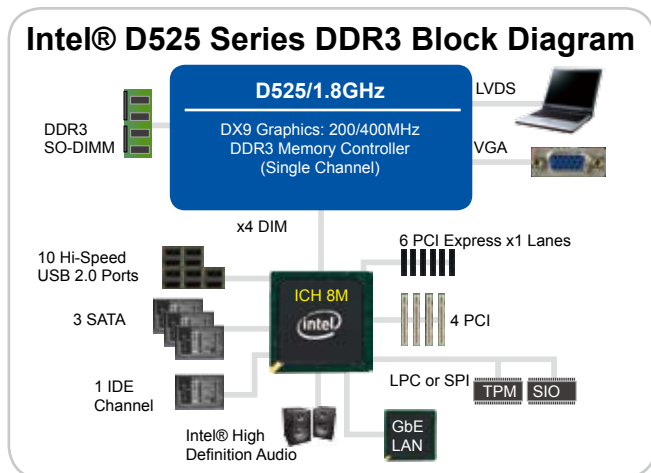
6 Panel Solutions

7 ORing Network Communication

8 Power Supply Peripherals

Intel® D525/D425/N455 Family

DDR3 Support for Low Power Embedded Platform



Next Generation Atom Platforms Feature

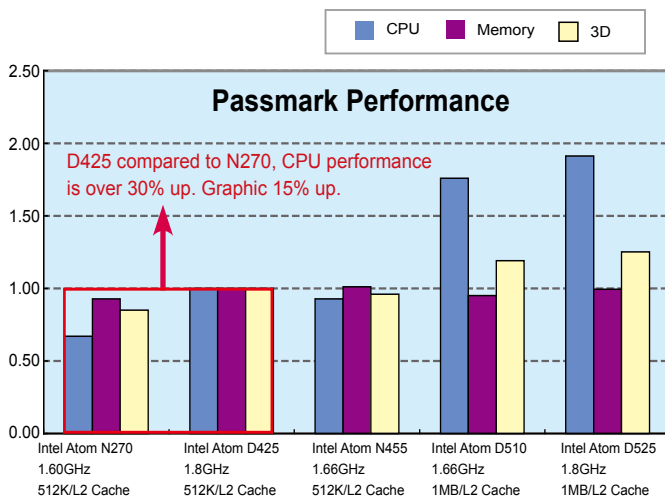
The GPU contains a refresh of the 3rd generation graphics core

- Direct X* 9 compliant Pixel Shader* v2.0
- 2 display ports: LVDS and RGB
- Single LVDS channel supporting resolution up to 1366 * 768, 18bpp
- Analog RGB display output resolution up to 2048 x 1536@ 60 Hz (D525 /D425), 1440 x1050 (N455)
- Intel® Clear Video Technology
- MPEG2 Hardware Acceleration

Embedded higher performance with DDR3 Sku

- Intel® Atom™ D525 1.80GHz (Dual Core)
- Intel® Atom™ D425 1.80GHz (Single Core)
- Intel® Atom™ N455 1.66GHz (Single core)

Intel® Dual Core Atom™ Performance Chart

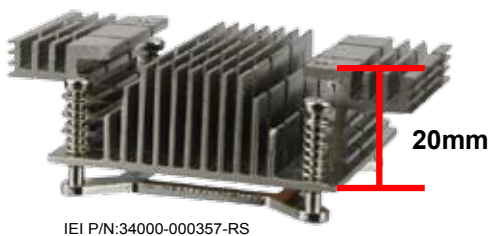


Embedded Intel® Atom™ Solution Specification Comparison Table

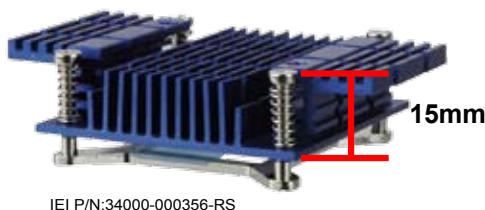
Platform	Atom D425	Atom D525	Atom N455
CPU/Chipset	Atom 1.8GHz Single Core/D425	Atom 1.8GHz Dual Core/D525	Atom 1.66GHz Single Core/N455
L2 Cache	512KB	1024KB	512KB
Supported Memory	DDR3 (800MHz) up to 4GB	DDR3 (800MHz) up to 4GB	DDR3 (667MHz) up to 2GB
Graphic Output	VGA (2048x1536) Single-channel 18-bit LVDS	VGA (2048x1536) Single-channel 18-bit LVDS	VGA (1400x1050) Single-channel 18-bit LVDS
Graphics Cores	Gen 3.5, 400MHz DirectX9c, OpenGL 1.5 GMA 3150	Gen 3.5, 400MHz DirectX9c, OpenGL 1.5 GMA 3150	Gen 3.5, 200MHz DirectX9c, OpenGL 1.5 GMA 3150
South Bridge	ICH8M	ICH8M	ICH8M
PCI-Express	6 Lanes (1x4+ 2x1), PCI Express 1.1		
PCI	PCI Rev 2.3 @ 33MHz up to 2 bus masters		
I/O	10 x USB 2.0, 3 x SATA II, 1 x IDE, HD Audio		

IEI Thermal Solution for Intel® Atom™ D525/D425/N455 Series Products

A. 20mm height heatsink with bracket preinstalled for D525 series products



B. 15mm height heatsink with bracket preinstalled for D425/N455 series products



C. IEI also provides an optional CPU fan which can be easily installed on the preinstalled CPU heatsink by two push pins. The installation diagram is shown below.



CPU fan specification	
IEI Part Number	19FTS00032100-000001-RS
Dimensions (mm)	40x40x10
Fan Speed(RPM)	4200
Noise (dBA)	21
Life Expectance(hrs)	70000
Weight (g)	17

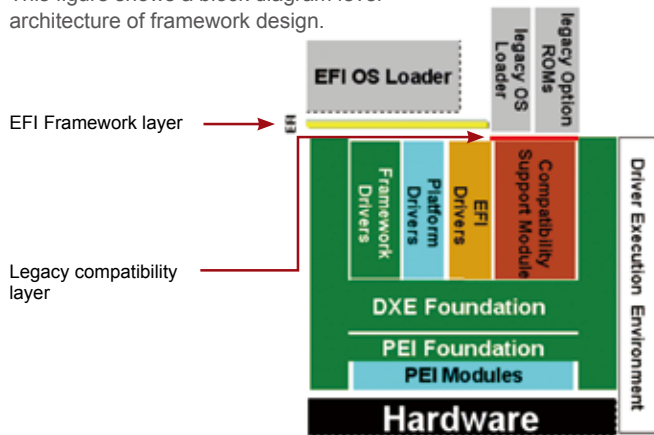
UEFI Introduction



- **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.



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

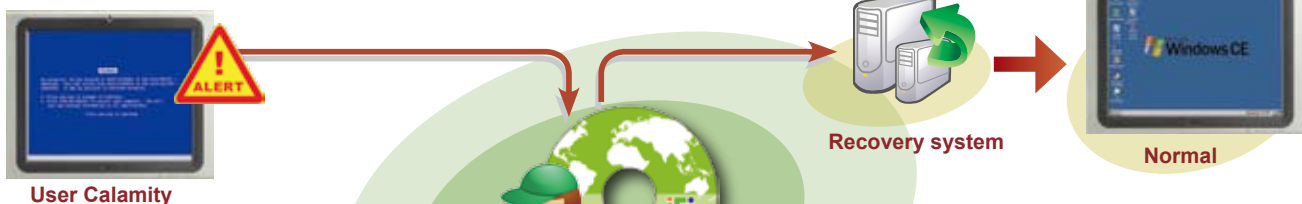
IEI unique one key recovery solution includes exclusive technology to recover and backup your operating system by just one click without any complicated settings. IEI freely bundled recovery CD is shipped with every IEI SBC, embedded system and all-in-one panel PC products.



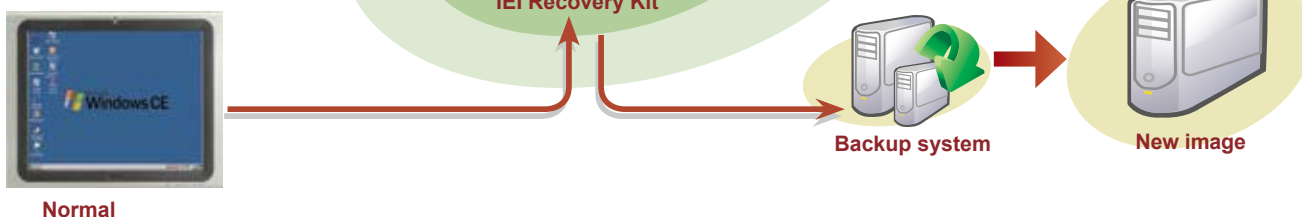
Recovery Tool for IEI Products Only

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

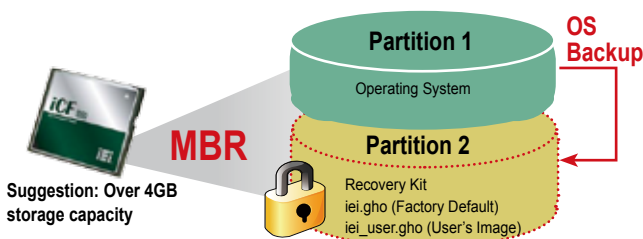


System Backup



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.



IEI Recovery Solution Advantages:

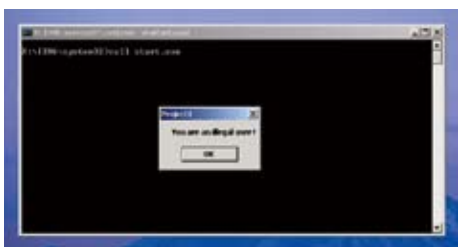
- No need to make recovery discs by yourself nor follow the trivial imaging procedures
- Simple steps to backup or restore the system. No IT personnel are required.
- Backup/Restore system easily through unique multi-menu
- One key to make recovery disc
- One key to restore system

IEI Products Only



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	

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



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)

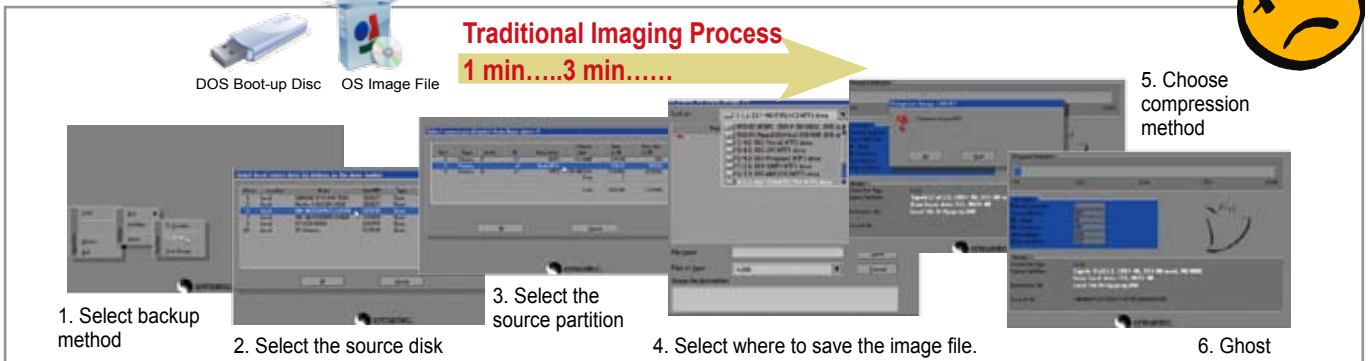


```

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.



Benefits

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.

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

Alert

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

One Key Restore + Remote KVM

3 **OK**

Remote Troubleshooting



IEI Intelligent System Management Module

What is the IEI Intelligent System Management Module (iSMM) ?

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:

- Winbond W83627
- ITE IT8712
- ITE IT8718
- Fintek F81216D
- Fintek F81865

Available Operation System

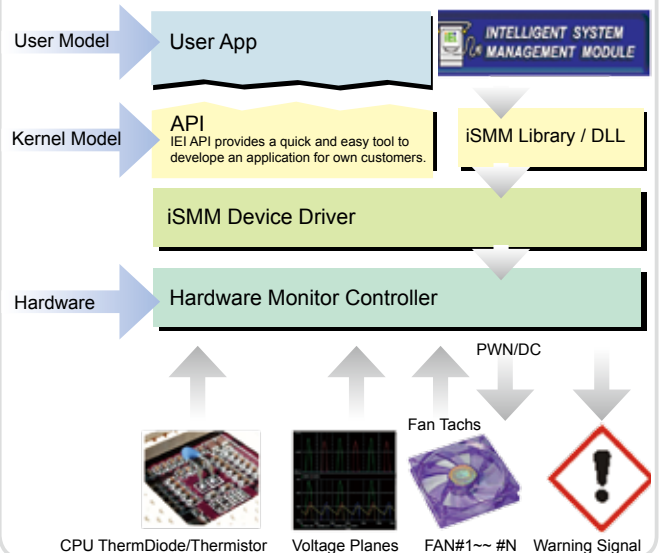
- Windows XP
- Windows Vista
- Windows 7

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 system instability or damage.**

Architecture



IEI Exclusive Diagnosis Software

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



IEI Solutions
Compliance Only

Functions

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