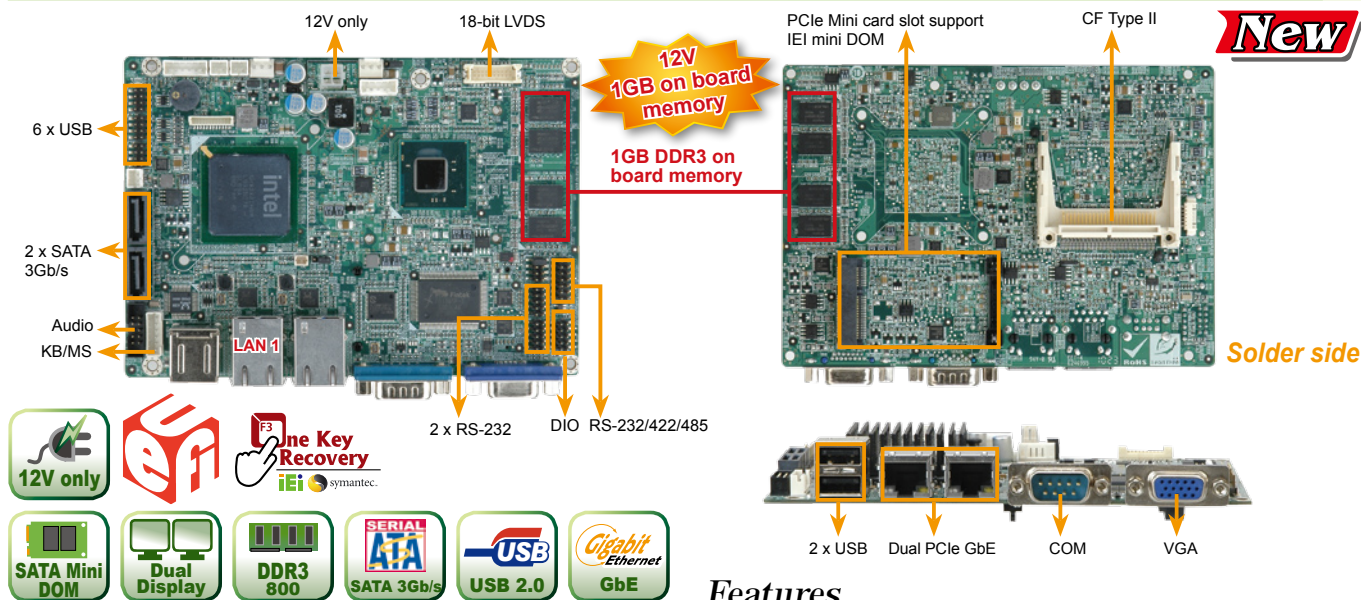


# WAFER-PV-D4251 N4551 D5251

3.5" SBC with Intel® Atom™ D425/N455/D525, DDR3 1GB memory on board, VGA/LVDS, Dual GbE, USB 2.0 and SATA 3Gb/s, Audio, RoHS



## Specifications

- ◆ CPU
  - Intel® Atom™ D525 dual-core processor 1.8GHz/1MB L2 cache
  - Intel® Atom™ D425 single-core processor 1.8GHz/512KB L2 cache
  - Intel® Atom™ N455 single-core processor 1.66GHz/512KB L2 cache
- ◆ Chipset
  - ICH8M
- ◆ BIOS
  - UEFI BIOS
- ◆ Memory
  - On-board DDR3 800MHz 1GB SDRAM
- ◆ Graphic
  - GMA 3150
  - Graphic core speed 400MHz for D525/ D425
  - Graphic core speed 200MHz for N455
- ◆ Display Interface
  - Analog CRT up to 2048x1536 for D525/ D425, 1400x1050 for N455
  - Support for CRT hot plug
  - Single-channel 18-bit LVDS, resolution support up to WXGA 1366x768 or XGA 1024x768
- ◆ Ethernet
  - Dual GbE by Realtek RTL8111E, LAN1 with ASF2.0 support
- ◆ I/O Interfaces
  - 3 x RS-232                      1 x RS-232/422/485 with Auto Flow control
  - 1 x KB/MS                     2 x SATA 3Gb/s
  - 8 x USB 2.0                    1 x CF Type II
- ◆ Digital I/O
  - 8-bit digital I/O, 4-bit input / 4-bit output
- ◆ Expansion
  - 1 x PCIe Mini card slot (PCIe + USB + SATA signal) support IEI mini DOM
- ◆ Audio
  - Realtek ALC888 HD codec
- ◆ Watchdog Timer
  - Software programmable support 1~255 sec. system reset by Super I/O
- ◆ Power Supply
  - 12V input only                AT/ATX mode select            2x2 pin power connector
- ◆ Super IO
  - Fintek F81865
- ◆ Fan Connector
  - 1 x 3-pin CPU fan            1 x 3-pin system fan
- ◆ Power Consumption
  - 1.7A @ 12V(Intel® Atom™ D525 with 1GB 1066MHz DDR3)
  - 1.52A @ 12V(Intel® Atom™ D425 with 1GB 1066MHz DDR3)
  - 1.33A @ 12V(Intel® Atom™ N455 with 1GB 1066MHz DDR3)
- ◆ 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
- ◆ Operation Humidity: 5% ~ 95%, non-condensing
- ◆ Dimensions: 146 mm x 102 mm
- ◆ Weight: GW: 650g / NW: 170g

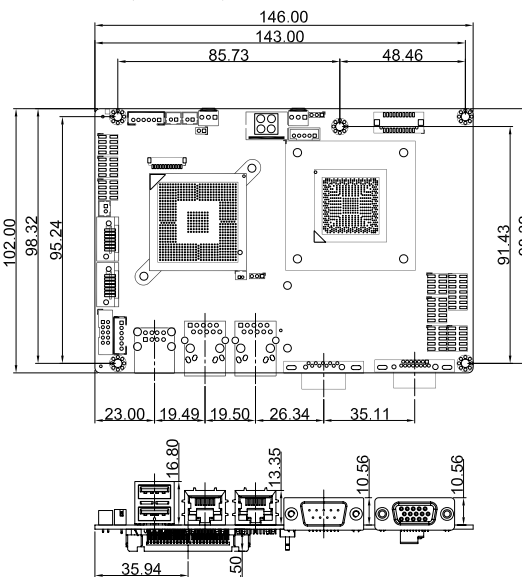
## Packing List

1 x WAFER-PV-D4251/N4551/D5251 single board computer	
1 x SATA with 5V output cable Kit (P/N: 32801-000201-100-RS)	
1 x Power cable (P/N: 32100-087100-RS)	1 x KB/MS cable (P/N: 32000-023800-RS)
1 x Audio cable (P/N: 32000-072100-RS)	1 x Mini jumper pack
1 x QIG	1 x Utility CD

## Features

1. 3.5" form factor with Intel® Atom™ D525 / D425 / N455 processor supports DDR3 memory
2. 12V only single voltage design for AT/ATX power
3. On-board DDR3 800 MHz 1GB SDRAM
4. Support VGA and 18-bit single-channel LVDS with dual-display support
5. Complete I/O with eight USB, two SATA 3Gb/s, one CF II, four COM and audio
6. IEI One Key Recovery solution allows you to create rapid OS backup and recovery

## Dimensions (Unit: mm)

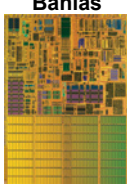
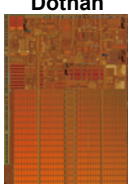










## Ordering Information

Part No.	Description
WAFER-PV-D5251-R10	3.5" SBC with Intel® Atom™ D525 1.8GHz, DDR3 1GB Memory on board, VGA/LVDS, Dual GbE, USB2.0 and SATA 3Gb/s, audio, RoHS
WAFER-PV-D4251-R10	3.5" SBC with Intel® Atom™ D425 1.8GHz, DDR3 1GB Memory on board, VGA/LVDS, Dual GbE, USB2.0 and SATA 3Gb/s, audio, RoHS
WAFER-PV-N4551-R10	3.5" SBC with Intel® Atom™ N455 1.66GHz, DDR3 1GB Memory on board, VGA/LVDS, Dual GbE, USB2.0 and SATA 3Gb/s, audio, RoHS
32000-070301-RS	Dual port USB cable
32000-0628000-RS	SATA cable
32205-000300-100-RS	RS-232/422/485 cable
19FTS00032100-000001-RS	CPU fan

# Embedded Dual Core Atom

## New Atom™ Platform

Generation	Pentium M / Celeron M		3 chipsets Atom	2 chipsets Dual Core Atom	
Architecture	Banias	Dothan	Atom N270	Atom DDR2	Atom DDR3
					
	Socket 479	Socket 479		D510/ D410/ N450	D525/ D425/ N455
TDP	5.5W ~ 27W		2.5W	D510 13W/ D410 10W/ N450 6.5W	
Platform					
	852GM/855GME	915GME	Intel® ICH 7M	Intel® ICH 8M	Intel® ICH 8M

**2011 New**

South Bridge	ICH7M	ICH8M
PCI-Express	4 Lanes, PCI Express 1.1	6 Lanes, PCI Express 1.1
PCI	PCI Rev 2.3 @ 33MHz up to 4 Bus Masters	PCI Rev 2.3 @ 33MHz up to 2 Bus Masters
I/O	8 x USB 2.0, 2 x SATA, 1 x IDE, AC'97, HD Audio	10 x USB 2.0, 3 x SATA II, 1 x IDE, HD Audio
TDP	1.7W	2.4W

## Embedded Intel® Atom™ Family

**New**

Platform	Navy Pier DDR2	Luna Pier DDR2	Luna Pier DDR3	Luna Pier DDR3	Luna Pier DDR3
	Atom N270	Atom D510	Atom D425	Atom D525	Atom N455
Launch Date	2008'Q2	2010'Q3	2010'Q4	2010'Q4	2010'Q4
CPU/Chipset	Atom N270 1.6GHz Intel 945GSE	Atom 1.66GHz Dual Core/D510	Atom 1.8GHz Single Core/D425	Atom 1.8GHz Dual Core/D525	Atom 1.66GHz Single Core/N455
FSB	533MHz	N/A	N/A	N/A	N/A
TDP	6.5W (2.5W Atom + 4W 945GSE)	13W	10W	13W	6.5W
L2 Cache	512KB	1024KB	512KB	1024KB	512KB
Supported Memory	DDR2(400/533MHz) up to 2GB	DDR2 (533/667MHz) up to 4GB	DDR3 (667/800MHz) up to 4GB		DDR3 (667MHz) up to 2GB
Graphic	VGA, HDTV(1080i)	VGA (2048x1536)		VGA (1400x1050)	
Output	Dual 18bit LVDS (36bit), SDVO	Single 18bit LVDS (1366x768)			
Graphics	Gen3.5, 133MHz, GMA950	Gen 3.5, 400MHz, GMA3150		Gen 3.5, 200MHz, GMA3150	
Cores	DirectX9c, OpenGL 1.5				

## D525/D425/N455 Embedded Low Power DDR3 Solution

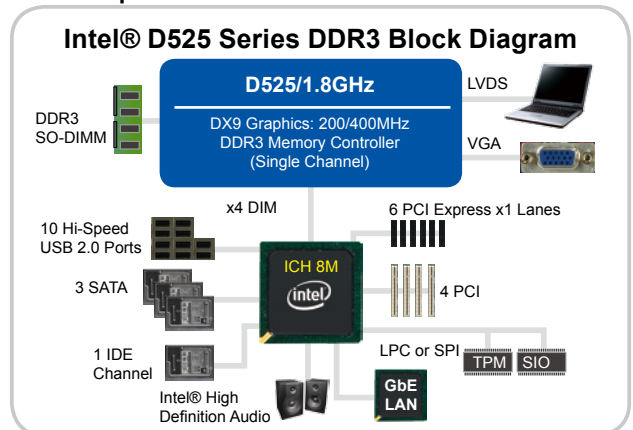
**D525/D425/N455:** The Intel® Atom™ processor D425 and D525/ N455 series integrates the graphics, display, and DDR3 memory controller with a processor specifically designed for affordable, entry-level basic computing.

### Features

- **DDR3 support up to 4GB by UEFI BIOS**
  - » Power saving more than 30% compared to DDR2
  - » Higher bandwidth performance, up to 2133 MT/s standardized
- **UEFI BIOS**
  - » Boot time under 10 seconds for fast boot
  - » Support HDD capacities more than 2.2 TB
  - » Support Dual ranks x16 DDR3 Memory up to 2GB per DIMM, system up to 4GB
- **New graphics performance**
  - » The GPU contains the 3rd generation graphics core GMA3150 support DX9\*, MPEG2 Hardware Acceleration
  - » VGA resolution up to 2046x1536 MHz
  - » Single 18bit LVDS resolution up to 1366x768MHz



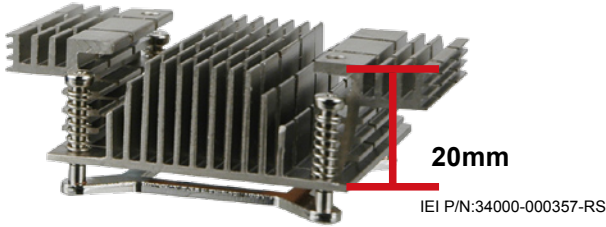
### 2 Chipsets Solution



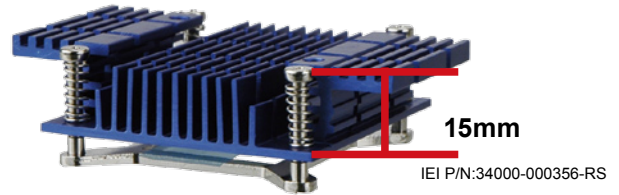
## Fanless design

IEI provides two fanless heatsink choices for the D525/D425/N455 SBCs

- D525 series with 20mm heatsink
  - D425/N455 with 15mm heatsink
- A. 20mm height heatsink with bracket preinstalled for D525 series products



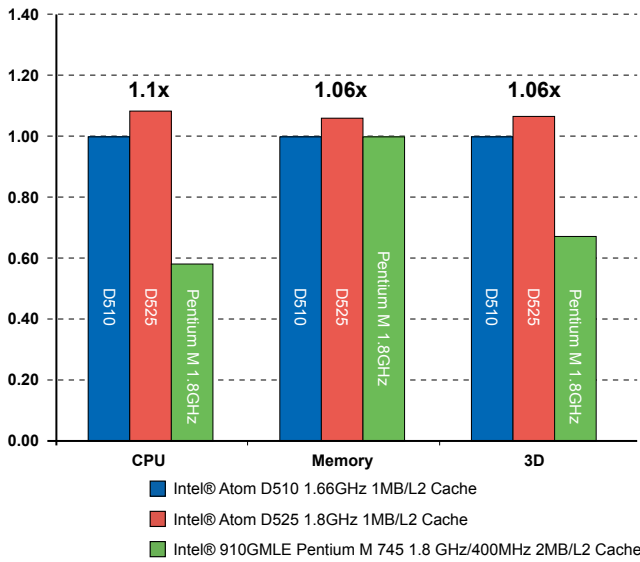
- B. 15mm height heatsink with bracket preinstalled for D425/N455 series products



## Dual Core Atom DDR3 solution

Pentium M replacement platform

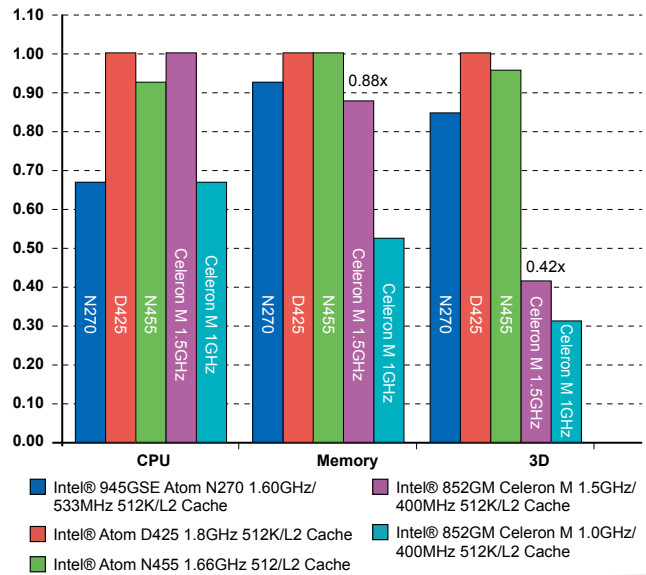
**D525:** Intel® Dual Core™ Atom™ with DDR3 supported, performance 1.1x better than Intel® D510 (DDR2 Dual Core™ Atom™)



## Single Core Atom DDR3 solution

Celeron M replacement platform

D425/N455 integrated Intel® Graphic GMA3150 graphics core, graphics performance 50% better than Celeron® M with 852GM



# IEI Capture Card Solutions

IEI provides complete video/audio capture card solutions to fulfill the demands of various applications.

The latest HDC solutions are capable of compressing and decompressing full HD video (1920x1080) in real-time using the H.264 codec.

The IEI IVC series provides standard-definition (SD) video resolution with standard or MP3 audio capture capability for better sound quality.

### H.264 Hardware Compression Solution

Supports high definition video resolution up to 1920 x 1080

**HDMI Interface DVI Interface SDI Interface**  
 HDC-304E HDC-401 HDC-502E  
 HDC-302E HDC-401E HDC-501ER  
 HDC-301E HDC-402E  
 HDC-301



### Software Compression Solution

Supports standard definition video resolution up to 720 x 480 NTSC/ 720 x 576 PAL

**PCIe type PCI type PCI type**  
 IVCE-C604 IVCE-T604 IVC-T604  
 IVCE-C608 IVCE-T608 IVC-T608  
 IVCE-268G IVC-168G IVC-268G



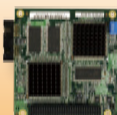
### Long Distance High Quality Extension Solution

**SDI Interface**  
 HD-SDI-BOX



### H.263/ MPEG4 Hardware Compression Solution

**PCI type**  
 IVC-8371P  
 PM-1059



## 2011 new feature in standard definition compression capture card

1. Single card with 8 channels capture up to 128 channels.
2. Direct PCIe bus with better bandwidth flow.
3. Better power consumption.
5. Real time video/audio output for real time monitoring.
5. MP3 quality audio capture

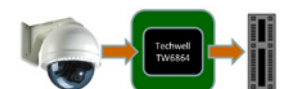
### Direct PCIe Solution

#### 2010 PCIe Bridge Solution



PCI base capture engine

#### 2011 Direct PCIe Solution



PCIe base capture engine



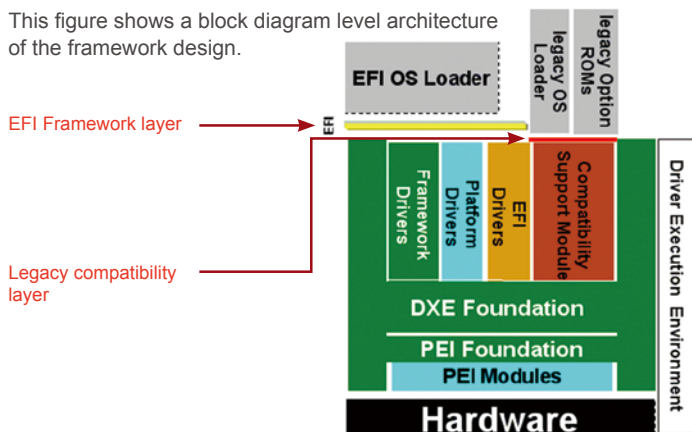
# UEFI Introduction



- **UEFI** (Unified Extensible Firmware Interface) 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.



### 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	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 iSMN 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)

# 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 is shipped with every IEI SBC, embedded system and all-in-one panel PC product.

## 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



Recovery system



Normal

### System Backup



Normal



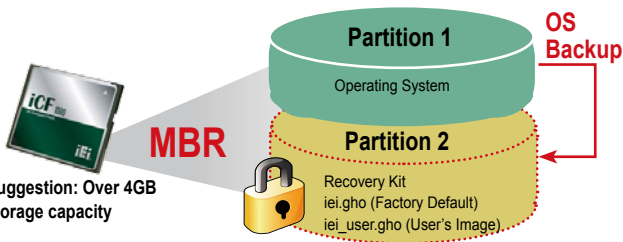
Backup system



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.



#### IEI Recovery Solution Advantages:

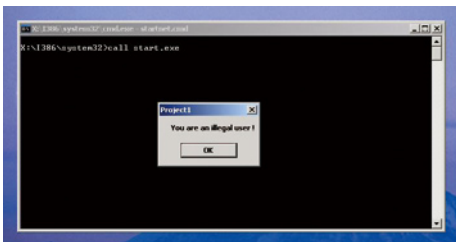
- No need to make recovery discs or follow trivial imaging procedures
- Simple steps to backup or restore the system. No IT personnel required.
- Backup/Restore system easily through unique multi-menu
- One key to make recovery disc
- One key to restore system

### IEI Products Only



#### 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.



## 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)



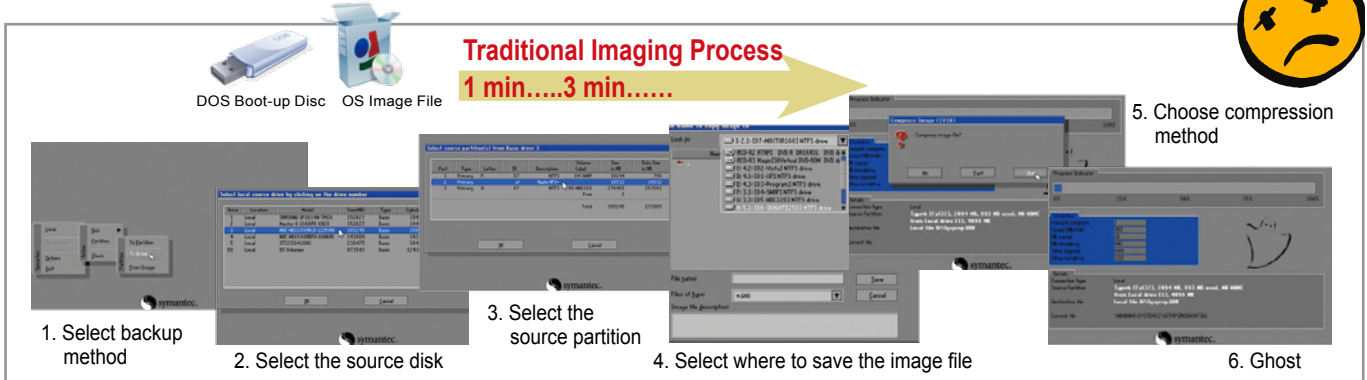
```

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. 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

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



One Key Restore + Remote KVM



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 F81865
7. SMC SCH311x

### ■ Available operation system

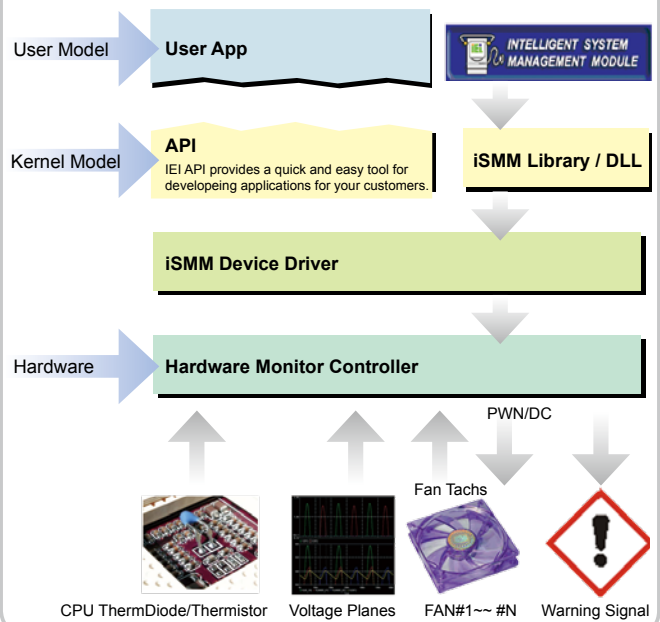
- a. Windows XP
- b. Windows Vista
- c. Windows 7

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 system instability or damage.

### Architecture



## IEI Exclusive Diagnosis Software

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

INTELLIGENT SYSTEM  
MANAGEMENT MODULE

IEI Solutions  
Compliance Only

### Functions

