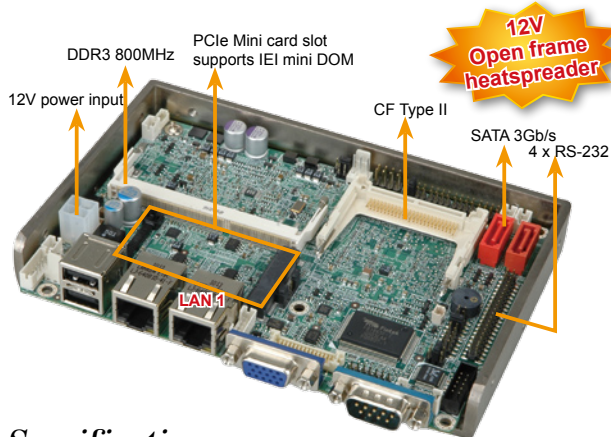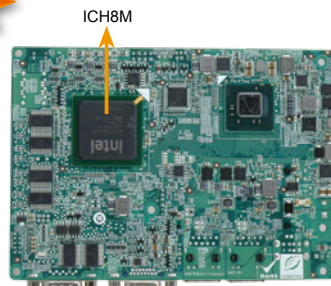# WAFER-PV- D4252 N4552 D5252
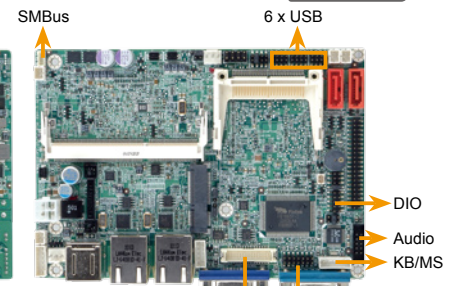
3.5" SBC with Intel® Atom™ D425/N455/D525, DDR3, VGA/LVDS, Dual GbE, USB 2.0 and SATA 3Gb/s, Audio, RoHS

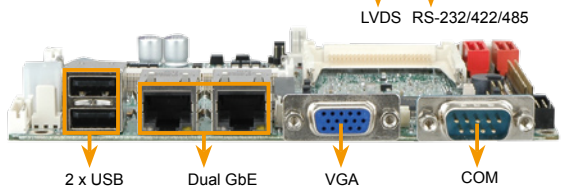12V Open frame heatspreader

New

Labels (left board): 12V power input · DDR3 800MHz · PCIe Mini card slot supports IEI mini DOM · CF Type II · SATA 3Gb/s · 4 x RS-232 · LAN 1

Labels (middle board): ICH8M · SMBus · 6 x USB · Solder side

Labels (right board): DIO · Audio · KB/MS · LVDS · RS-232/422/485 · 2 x USB · Dual GbE · VGA · COM

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**
Intel® ICH8M
◆ **BIOS**
UEFI BIOS
◆ **Memory**
One 204-pin 800MHz DDR3 SDRAM SO-DIMM supported (System max. 4GB for D525/ D425)
One 204-pin 800MHz DDR3 SDRAM SO-DIMM supported (System max. 2GB for N455)
◆ **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
◆ **Ethernet**
Dual GbE by Realtek RTL8111E,LAN1 with ASF2.0 support
◆ **I/O Interfaces**
5 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 only, AT/ATX support
◆ **Super IO**
Fintek F81865F
◆ **FAN Connector**
1 x 3-pin CPU fan
1 x 3-pin system fan
◆ **SMBus**
1 x 4-pin wafer connetor
◆ **Power Consumption**
12V@1.79A (Intel® Atom™ D525 1.8GHz with DDR3 1GB)
◆ **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
◆ **Weight**
GW: 600g / NW: 250g

Icons: 12V only · Dual Display · DDR3 800 · SERIAL ATA SATA 3Gb/s · USB 2.0 · Gigabit Ethernet GbE · One Key Recovery (iEi symantec.) · SATA Mini DOM

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. Open frame heatsink thermal design for fanelss solution
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, six COM and audio
6. IEI One Key Recovery solution allows you to create rapid OS backup and recovery

Dimensions *(Unit: mm)*

Dimension values: 7.00 · 18.50 · 60.00 · 60.00 · 18.50 · 14.02 · 9-6#32 · 157.00 · 149.00 · 75.88 · 58.29 · 21.00 · 14.00 · 7.00 · 14.84 · 35.00 · 35.00 · 99.68 · 84.78 · 73.66 · 77.02 · 26.40 · 16.80 · 13.80 · 10.56 · 10.56
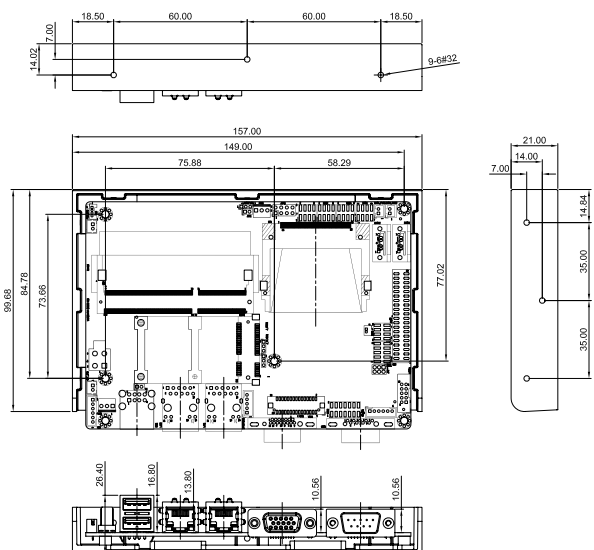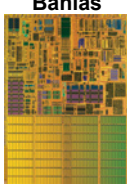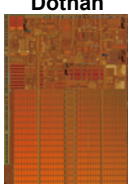
Packing List

1 x WAFER-PV-D4252/N4552/D5252 single board computer
1 x KB/MS cable (P/N: 32000-023800-RS)
1 x Audio cable (P/N: 32000-072100-RS)
1 x SATA with 5V output cable Kit (P/N:32801-000201-100-RS)
1 x Quad RS-232 cable (P/N: 32200-025401-RS)
1 x Power cable (P/N: 32100-087100-RS)

1 x Enclosure heatsink	1 x Mini jumper pack
1 x QIG	1 x Utility CD

Ordering Information

Part No.	Description
WAFER-PV-D5252-R10	3.5" SBC with Intel® Atom™ D525 1.8GHz, DDR3,VGA/LVDS, Dual GbE, USB2.0 and SATA 3Gb/s, audio, RoHS
WAFER-PV-D4252-R10	3.5" SBC with Intel® Atom™ D425 1.8GHz, DDR3,VGA/LVDS, Dual GbE, USB2.0 and SATA 3Gb/s, audio, RoHS
WAFER-PV-N4552-R10	3.5" SBC with Intel® Atom™ N455 1.66GHz, DDR3,VGA/LVDS, Dual GbE, USB2.0 and SATA 3Gb/s, audio, RoHS
32000-070301-RS	Dual port USB cable
32205-000300-100-RS	RS-232/RS-422/485 cable

Embedded Dual Core Atom

New Atom™ Platform

Generation	Pentium M / Celeron M		3 chipsets Atom	2 chipsets Dual Core Atom	
Architecture	**Banias** Socket 479	**Dothan** Socket 479	**Atom N270**	**Atom DDR2** D510/ D410/ N450	**2011 New** **Atom DDR3** D525/ D425/ N455
TDP	5.5W ~ 27W		2.5W	D510 13W/ D410 10W/ N450 6.5W	D525 13W/ D425 10W/ N455 6.5W
Platform	852GM/855GME	915GME		**Intel® ICH 7M**	**Intel® ICH 8M** / **Intel® ICH 8M**

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		

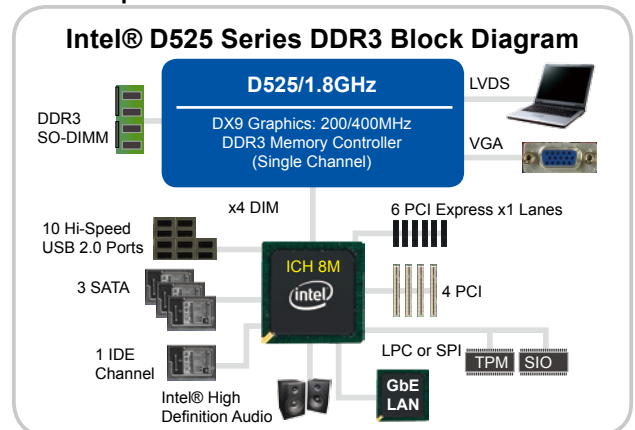## D525/D425/N455 Embedded Low Power DDR3 Solution

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

Intel® D525 Series DDR3 Block Diagram

DDR3 SO-DIMM

D525/1.8GHz
DX9 Graphics: 200/400MHz
DDR3 Memory Controller
(Single Channel)

LVDS

VGA

x4 DIM

6 PCI Express x1 Lanes

10 Hi-Speed USB 2.0 Ports

3 SATA

1 IDE Channel

ICH 8M

4 PCI

LPC or SPI

TPM SIO

GbE LAN

Intel® High Definition Audio
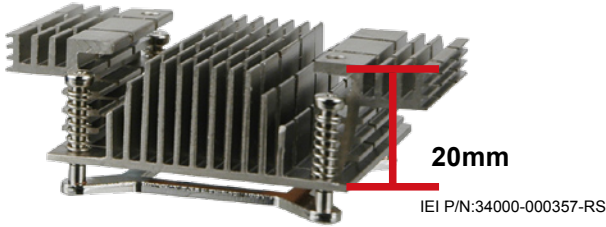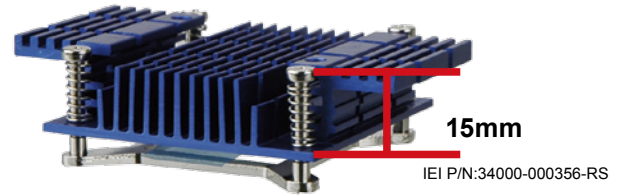
■ Fanless deign

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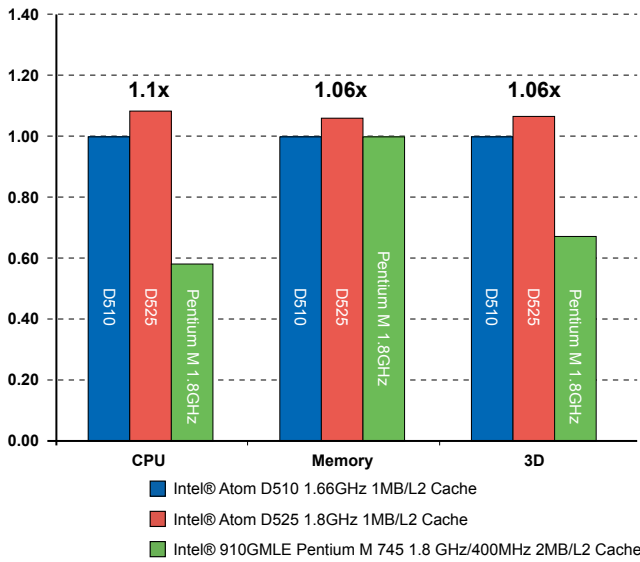
B. 15mm height heatsink with bracket preinstalled
   for D425/N455 series products

20mm

IEI P/N:34000-000357-RS

15mm

IEI P/N:34000-000356-RS
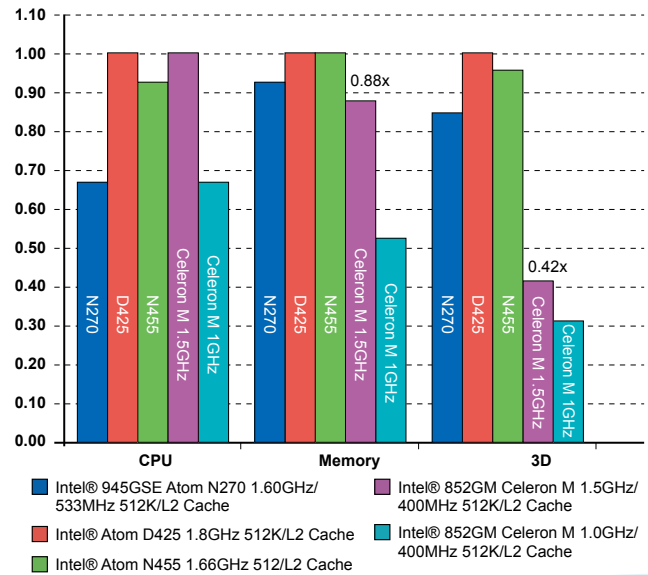
■ Dual Core Atom DDR3 solution

Pentium M replacement platform

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

■ Intel® Atom D510 1.66GHz 1MB/L2 Cache
■ Intel® Atom D525 1.8GHz 1MB/L2 Cache
■ Intel® 910GMLE Pentium M 745 1.8 GHz/400MHz 2MB/L2 Cache

■ 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

■ Intel® 945GSE Atom N270 1.60GHz/ 533MHz 512K/L2 Cache
■ Intel® Atom D425 1.8GHz 512K/L2 Cache
■ Intel® Atom N455 1.66GHz 512/L2 Cache
■ Intel® 852GM Celeron M 1.5GHz/ 400MHz 512K/L2 Cache
■ Intel® 852GM Celeron M 1.0GHz/ 400MHz 512K/L2 Cache

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	PCIe 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
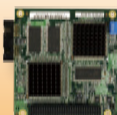
■ 2011 new feature in standard definition compression capture card

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

Windows 7

Direct PCIe Solution

2010 PCIe Bridge Solution

PCI base capture engine

2011 Direct PCIe Solution
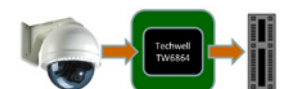
PCIe base capture engine

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.
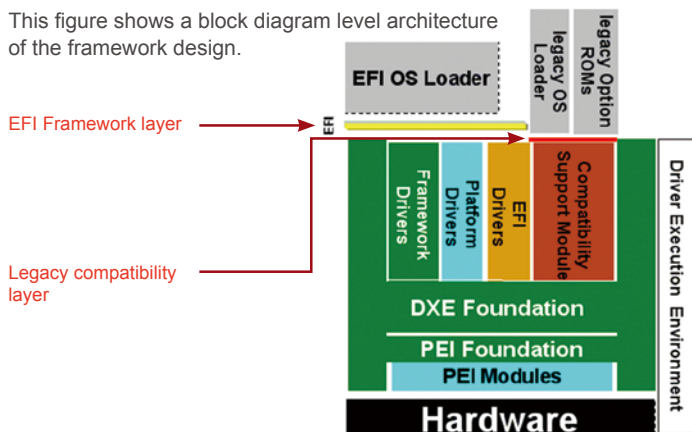
EFI Framework layer

Legacy compatibility layer

EFI OS Loader
legacy OS Loader
legacy Option ROMs
Framework Drivers
Platform Drivers
EFI Drivers
Compatibility Support Module
Driver Execution Environment
DXE Foundation
PEI Foundation
PEI Modules
Hardware

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 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)

IEI One Key Recovery Solution

F3

One Key Recovery

IEI symantec.

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

ALERT

IEI Recovery Kit

Recovery system

Normal

Windows CE

System Backup
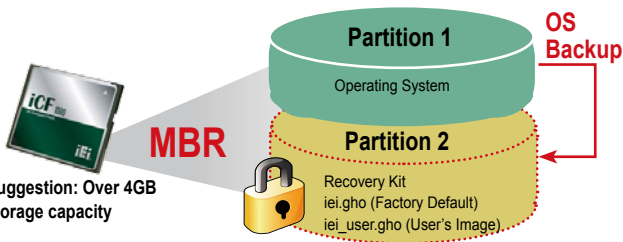
Normal

Windows CE

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.

X:\I386\system32>call start.exe

Project1
You are an illegal user !
OK
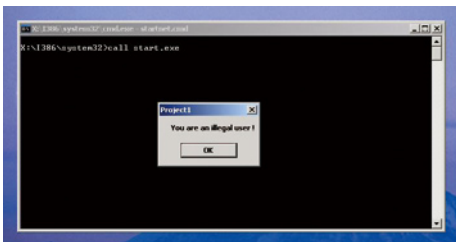
Support OS List	
Windows® XP	Windows® Vista
Windows® 7	Windows® CE 5.0
Windows® CE 6.0	Windows® XP Embedded

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

Press F3 to boot into recovery mode...
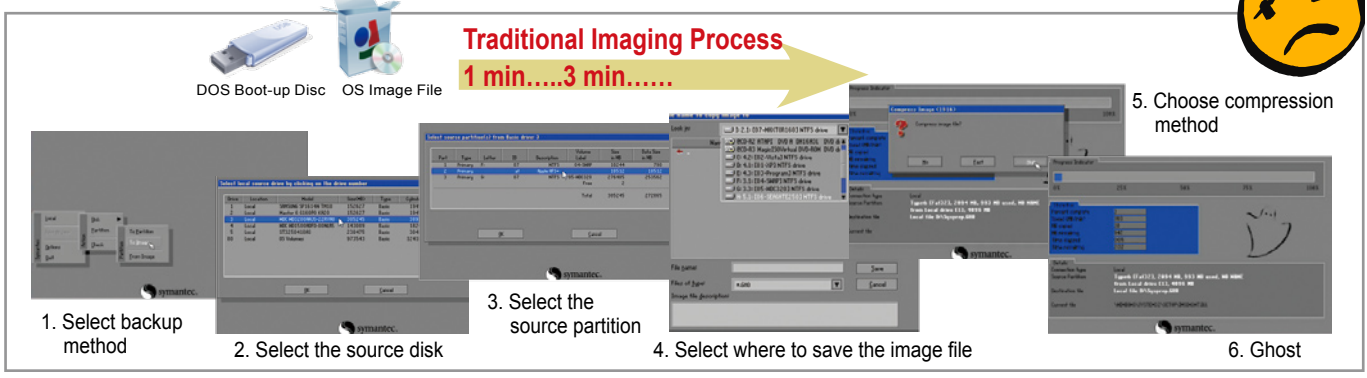
One Key Backup / Restore

■ 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

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

ALERT

One Key Restore + Remote KVM

3

OK

F3 One Key Recovery
iEi symantec.

Intel® C206/Q67/QM67
AMT 7.0

Remote Troubleshooting
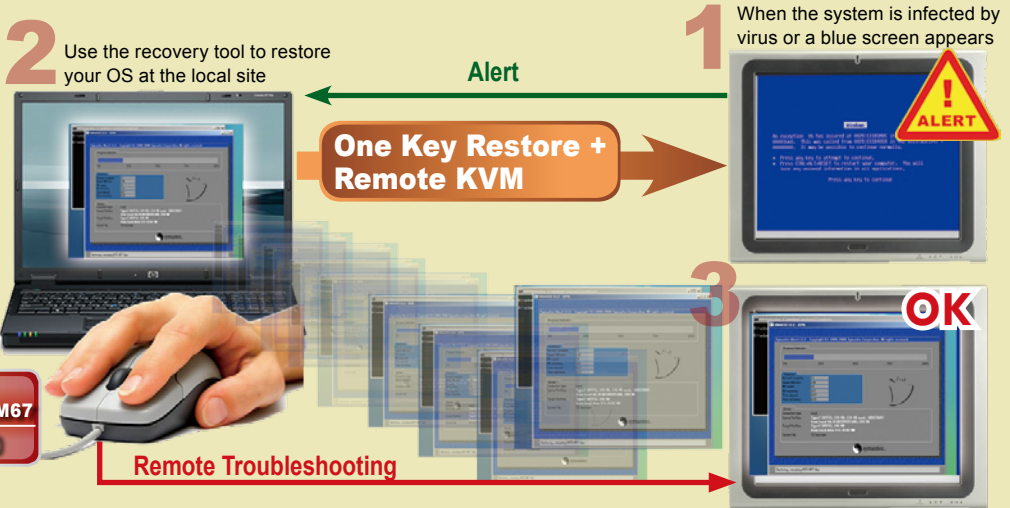
www.ieiworld.com

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
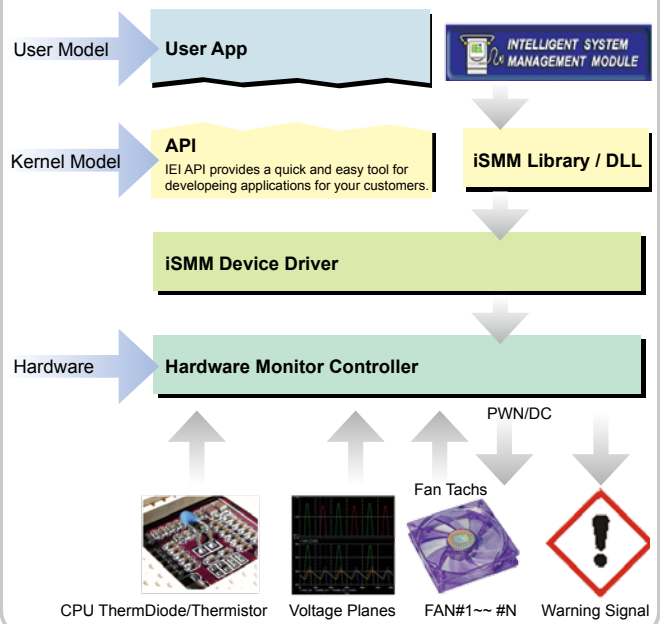7. SMSC SCH311x

■ 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.
CPU + System temperature monitoring

Fan
Dynamic fan speed controlling

Voltage.
Real time voltage alarm

DIO
Easy Digital I/O configuriation

WDT
Trouble free watch dog timer testing

Save/Load
Flexibility user profile recover

Cash drawer
Cash drawer status monitoring