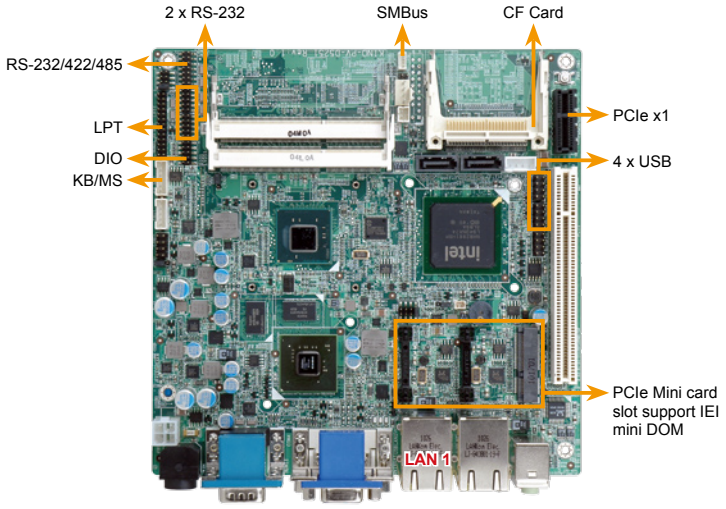
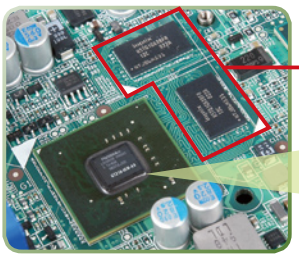
KINO-PVN-D4251 / D5251

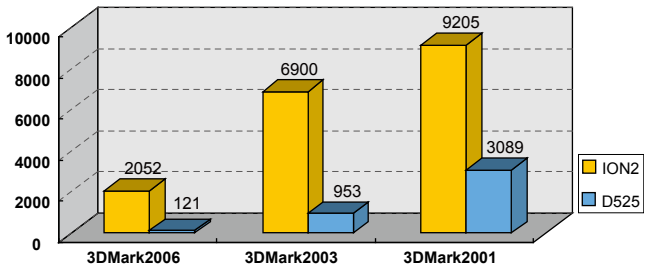
Mini-ITX SBC with Intel® Atom™ D425/D525, VGA/ DVI-DL/ HDMI by Nvidia GT218-ION, Dual GbE, Audio, USB 2.0 and SATA 3Gb/s, RoHS

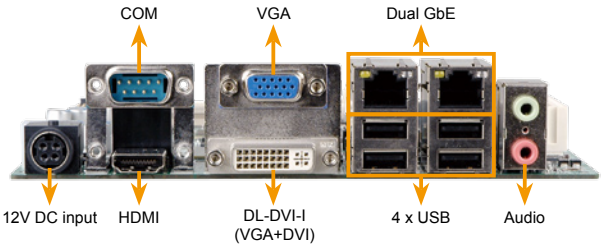




New

Best Graphic engine by Nvidia GT218-ION
- HDMI support up to 1080p
- Dual Link DVI-I support up to 2560x1600





SATA Mini DOM | DDR3 800 | SATA 3Gb/s | USB 2.0 | GbE | One Key Recovery | Nvidia Ion | 12V only

Specifications

- CPU
  Intel® Atom™ D525 dual-core processor (1.8GHz/1MB L2 cache)
  Intel® Atom™ D425 single-core processor (1.8GHz/512KB L2 cache)
- Chipset
  ICH8M
- BIOS
  UEFI BIOS
- Memory
  Two 204-pin 800MHz DDR3 SDRAM SO-DIMMs supported (System max. 4GB) for D525/D425
- Graphic
  On board NVIDIA GT218-ION graphic chip with 512MB DDR3 memory
- Display Interface
  Dual display supported by HDMI+VGA/ HDMI+DVI / VGA+DVI/ VGA+VGA (by DVI to VGA adaptor)
  Analog CRT support by Nvidia GT218-ION with up to 2048x1536 resolution
  Support CRT hot plug
  Dual Link DVI-I support by Nvidia GT218-ION, resolution support up to 2560x1600
  HDMI supported by Nvidia GT218, Resolution up to 1080p
- Ethernet
  Dual PCIe GbE by Realtek RTL8111E,LAN1 with ASF2.0 support
- I/O Interfaces
  1 x LPT 1 x KB/MS 2 x SATA 3Gb/s
  8 x USB 2.0 1 x CF Type II 3 x RS-232
  1 x RS-232/422/485 with Auto Flow control
- SMBus
  1 x 4-pin wafer connector
- Digital I/O
  8-bit digital I/O, 4-bit input / 4-bit output
- Expansion
  1 x PCI slot 1 x PCIe x1 slot
  1 x PCIe Mini card slot (PCIe + USB + SATA signal) support IEI mini DOM
- Audio
  Realtek ALC 888 HD codec
- Watchdog Timer
  Software programmable support 1~255 sec. system reset
- Power Supply
  12V, AT/ATX power mode
  1 x External DIN 4-pin DC jack
  1 x Internal 2x2pin power connector
- Super IO
  Fintek F81865
- Fan Connector
  1 x 4-pin CPU fan connector 1 x 3-pin system fan
- Power Consumption
  12V@3.44A (Intel® Atom™ D525 1.8GHz with DDR3 1333MHz 2GB*2 DIMM)
  12V@3.11A (Intel® Atom™ D425 1.8GHz with DDR3 1333MHz 2GB*2 DIMM)
- Temperature
  Operation: -10°C ~ 60°C
- Humidity
  Operation: 5% ~ 95% non-condensing
- Dimensions
  170mm x 170mm
- Weight
  GW: 900g / NW: 360g

Features

1. Mini ITX form factor with Intel® Atom™ D525/D425 processor
2. 12V single voltage design for AT/ATX power
3. Two expansion DDR3 800MHz SO-DIMM slot supports to 4GB
4. Excellent graphic engine support VGA, dual-link DVI-I, HDMI by Nvidia GT218-ION for dual independent display support
5. Complete I/O with eight USB, two SATA 3Gb/s, one CF II, one LPT, four COM and Audio
6. IEI One Key Recovery solution allows you to create rapid OS backup and recovery

Packing List

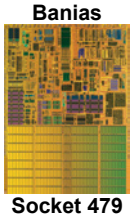
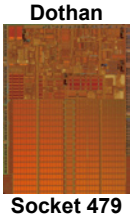
1 x KINO-PVN-D4251/D5251 single board computer	
1 x SATA with 5V/12V output cable Kit (P/N: 32801-000100-100-RS)	
1 x SATA with 5V output cable Kit (P/N: 32801-000201-100-RS)	
1 x RS-232 cable with bracket (P/N: 19800-000300-100-RS)	1 x QIG
1 x I/O shielding (P/N: 45014-0032C0-00-RS)	1 x Mini jumper pack
1 x DVI to VGA Adaptor (P/N: 33Z00-000031-RS)	1 x Utility CD

Ordering Information

Part No.	Description
KINO-PVN-D5251-R10	Mini ITX SBC with Intel® Atom™ D525 1.8GHz/1MB L2 cache, DDR3, VGA/ DVI-I DL/ HDMI by Nvidia GT218, Dual GbE, audio, USB 2.0 and SATA 3Gb/s, RoHS
KINO-PVN-D4251-R10	Mini ITX SBC with Intel® Atom™ D425 1.8GHz/512KB L2 cache, DDR3, VGA/ DVI-I DL/ HDMI by Nvidia GT218, Dual GbE, audio, USB 2.0 and SATA 3Gb/s, RoHS
32000-0023800-RS	PS2 KB/MS cable
32100-192900-RS	One 4-pin(2x2) to one 4-pin(1x4) DC power cable with terminal block
32200-015100-RS	LPT cable
19800-000110-RS	RS-232/422/485 cable with bracket
CB-USB02-RS	Dual port USB cable
PCIER-K101L-R10	PCIe x1 riser card

Embedded Dual Core Atom

New Atom™ Platform

Generation	Pentium M / Celeron M		3 chipsets Atom	2 chipsets Dual Core Atom	
	Banias	Dothan	Atom N270	Atom DDR2	Atom DDR3 (2011 New)
Architecture	 Socket 479	 Socket 479		 D510/ D410/ N450	 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			

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

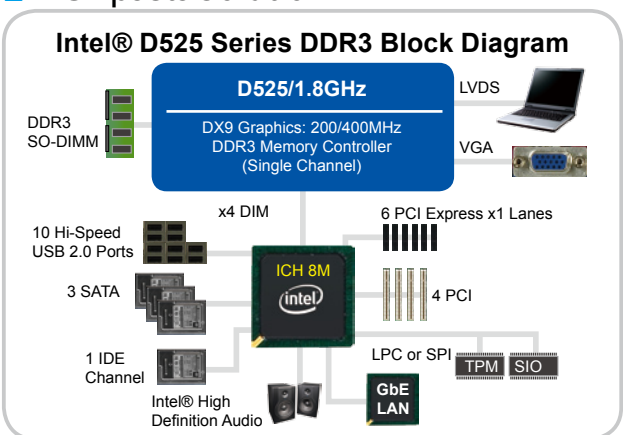
D525/D425/N455: The Intel® Atom™ processor D425 and D525/ N455 series integrates the graphics, display, and DDR3 memory controller with a processor specifically designed for affordable, entry-level basic computing.

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

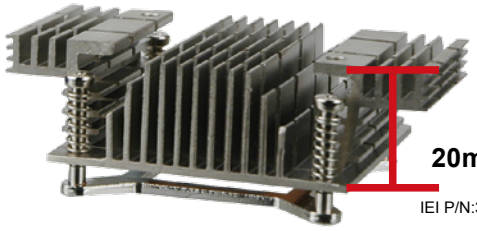


Fanless deign

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

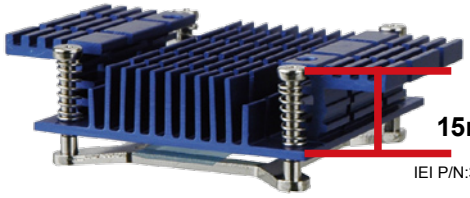
- D525 series with 20mm heatsink
- D425/N455 with 15mm heatsink

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



IEI P/N:34000-000357-RS

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

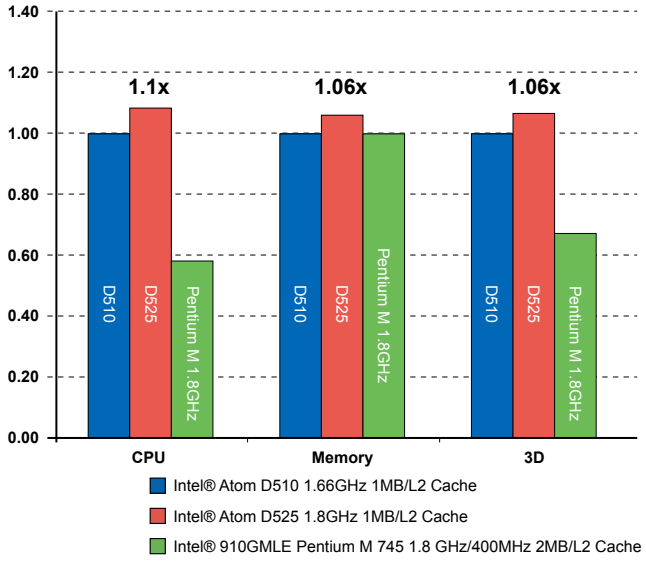


IEI P/N:34000-000356-RS

Dual Core Atom DDR3 solution

Pentium M replacement platform

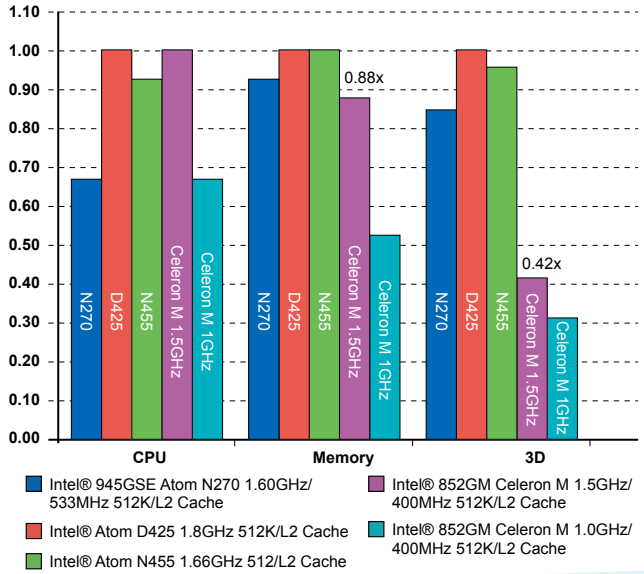
D525: Intel® Dual Core™ Atom™ with DDR3 supported, performance 1.1x better than Intel® D510 (DDR2 Dual Core™ Atom™)



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	*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

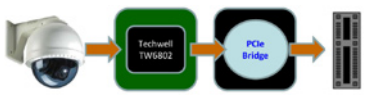
2011 new feature in standard definition compression capture card

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

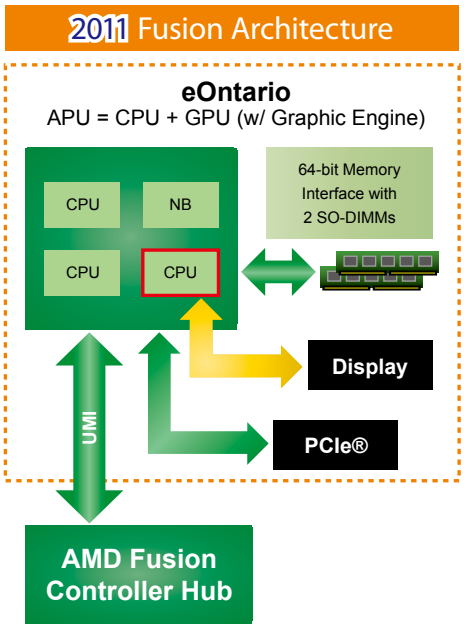
PCIe base capture engine

Best Graphics Enhanced Platform

AMD eOntario Solution

eOntario introduction

2011 new architecture embedded version of "Ontario" low-power APU (Accelerated Processing Unit) with integrated GPU supporting DDR3 memory platform



2011 eOntario embedded solution

Specification comparison table

	2010	2011
Platform	RS780E/T+ SB710	eOntraio + Hudson E1/M1
Graphic Core	Radeon 3200	Radeon 4xxx series
DirectX® Support	DirectX 10	DirectX 11
Video Decode	UVD – VC-1, MPEG2, and H.264/AVC Full HD Decode	UVD3 – VC-1, MPEG2, and H.264/AVC Full HD Decode
Memory Interface	DDR2-800 or DDR3-1066 up to 4GB	DDR3 (1333MHz) up to 32GB
HDMI/DVI	1080p	1080p
LVDS	18 bit/24 bit dual channel	18 bit single channel
PCIe® Graphics	1 PCIe x16 or 2 PCIe x8 Gen 2	1 PCIe x4 Gen 2
PCIe GPP	6 PCIe x1 Gen 2	4 PCIe x1 Gen 2
Display Port	up to 2	up to 2
Max Resolution VGA	2560x1600	2560x1600
TDP	8~18W	5~18W
USB Ports/ Controller	12 x USB 2.0 2 x USB 1.0	14 x USB 2.0 2 x USB 1.1
SATA	6 x SATA II	6 x SATA II
eSATA	Supported	Supported

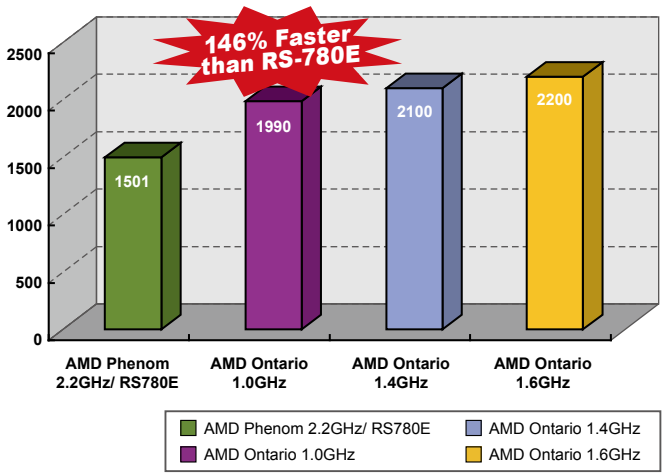
DirectX® 11 – Key Features

1. Tessellation
2. Multi-Threading
3. DirectCompute 11
4. Shader Model 5.0
5. Texture Compression

Best integrated graphics performance

World class integrated ATI graphics core with DirectX® 11 support – delivers extreme graphics performance 146% faster than RS-780E

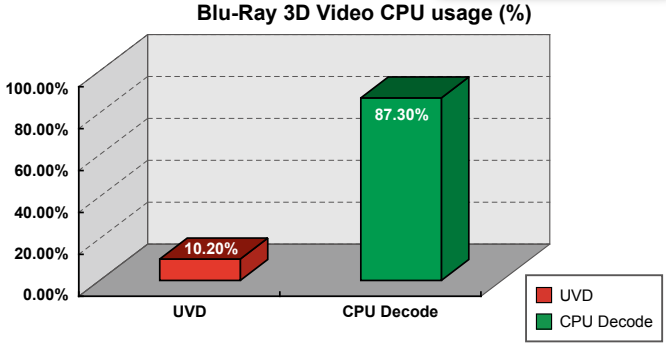
3DMark 2006 Performance



HD video enhancement

eOntario architecture also provides HW accelerated decode of H.264, VC-1 and MPEG-2 content and updated Unified Video Decoder 3 (UVD) core reducing latency for enhanced Blu-ray playpack quality. System loading keeps 10% usage with UVD enabled.

Blu-Ray 3D Video CPU usage (%)



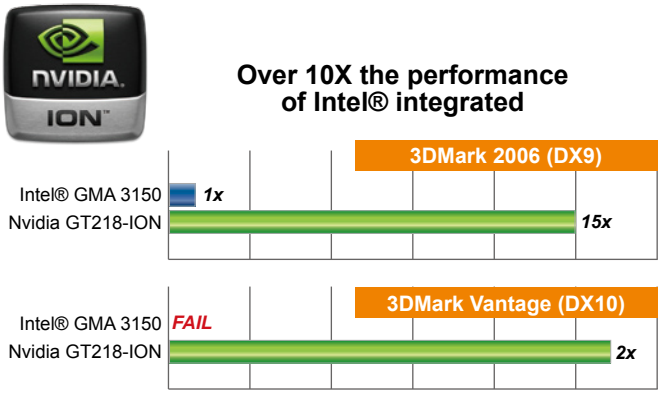
eOntario embedded processor list

Package Type		Model	OPN	Clock Speed	DDR3 Speed	TDP	L1/Core	L2/Core
FT1 (BGA-413)	40nm	T56N	GET56NGBB22GTE	1.6GHz	DDR3-1066	18W	64KB	512K x 2
	40nm	T48N	GET48NGBB22GTE	1.4GHz	DDR3-1066	18W	64KB	512K x 2
	40nm	T40N	GET40NFPB22GTE	1.0GHz	LVDDR3-1066	9W	64KB	512K x 2
	40nm	T52R	GET52RGBB12GTE	1.5GHz	DDR3-1066	18W	64KB	512K
	40nm	T44R	GET44RFPB12GTE	1.2GHz	LVDDR3-1066	9W	64KB	512K
	40nm	T48L	GET48LGBB22GTE	1.4GHz	DDR3-1066	18W	64KB	512K
	40nm	T24L	GET24LFPB12GTE	800MHz	DDR3-1066	5W	64KB	512K

NVIDIA GT218-ION Solution

Over 10X performance than Intel® GMA3150 solution

The NVIDIA Geforce GT218-ION is the most advanced GPU from NVIDIA. The GT218-ION GPU supports PCI Express 2.0 with a single lane of PCI-E 2.0 traffic. A new video engine, VP4, performs over 10 times better than the Intel® integrated GMA3150 engine on a dual core Atom platform. The system can play HD movies with low CPU loading.



Features and technologies

The GT218-ION GPU supports the following features and technologies:

- 3D Technology
- DirectX 10.1 and Shader Model 4
- Open GL3.0
- NVIDIA CUDA technology

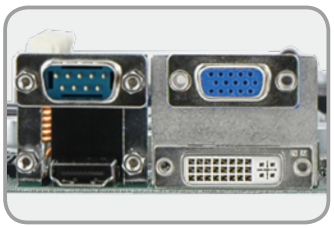
NVIDIA CUDA technology

NVIDIA CUDA software technology takes advantage of the increased performance of the GT218 GPU.

Display

The GT218-ION GPU provides support for various display connectors including HDMI, Display Port, DVI and VGA. While there can be only two active displays at a given time, key display features are listed below:

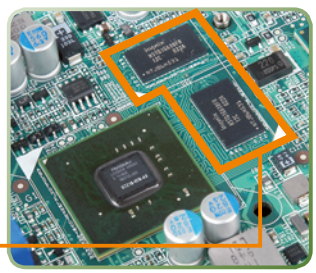
» HDMI version: 1.3a
» DVI-I and DVI-D support up to 2560 x 1600
» VGA resolution support up 2048 x 1536 at 85Hz refresh rate
» Two pipelines for dual independent display



Display output
Dual Link DVI/HDMI/VGA

Memory performance

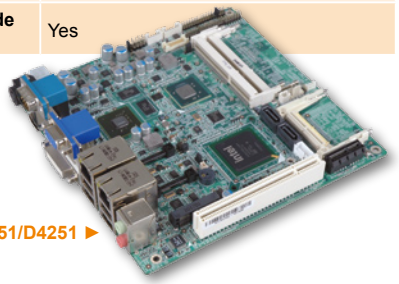
The GT218-ION GPU has a flexible memory interface supporting DDR2/DDR3 memory devices up to a 512 MB maximum frame buffer size.



IEI KINO-PVN-D5251/ D4251 solution

The IEI KINO-PVN-D5251/D4251 is designed with NVIDIA Geforce GT218-ION, the most advanced GPU from NVIDIA. The GT218-ION GPU supports PCI Express 2.0 with a single lane of PCI-E 2.0 traffic. A new video engine, VP4, delivers over 10 times performance better than the Intel® integrated GMA3150 engine on a dual core Atom platform. The system can play HD movies with low CPU loading.

System	CPU	Atom D525/D425
	Memory	DDR3
GPU	Part number	NVIDIA GT218-ION
	Host Platform	PCI Express 2.0 x1
	Frame buffer	Up to 512 MB DDR3 memory
	Display (Any 2)	DVI DL
		HDMI
		VGA
	DirectX	10.1
Features	HW video decode acceleration	Yes



Video

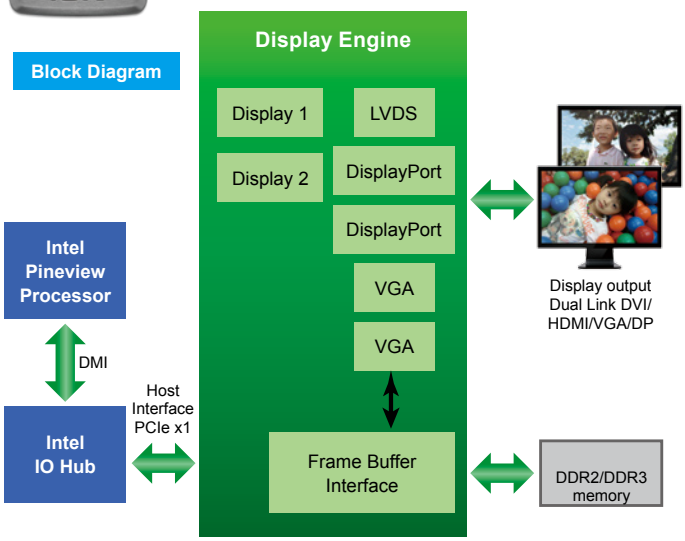
The GT218-ION GPU is integrated with a new VP4 video engine, which is backwards compatible with the VP3 video engine.

VP4 supports the following video formats:

» Blu-ray
» MPEG2, MPEG4 Part 2 Advanced Simple Profile
» H.264/VC1
» DivX version 3.11 and later

Nvidia GT218-ION Graphic Chip

Block Diagram

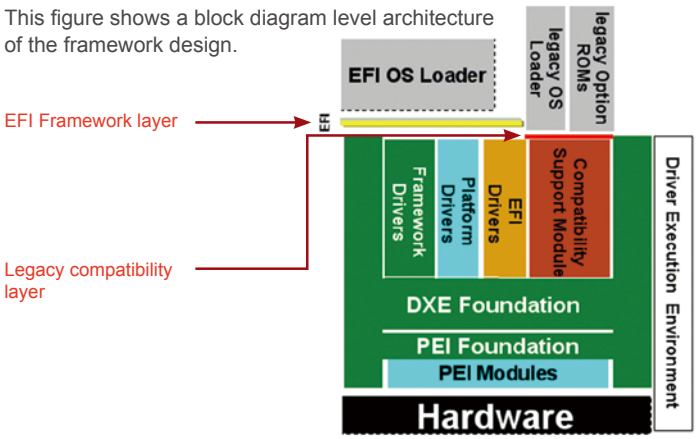


UEFI Introduction

- **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.



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

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.

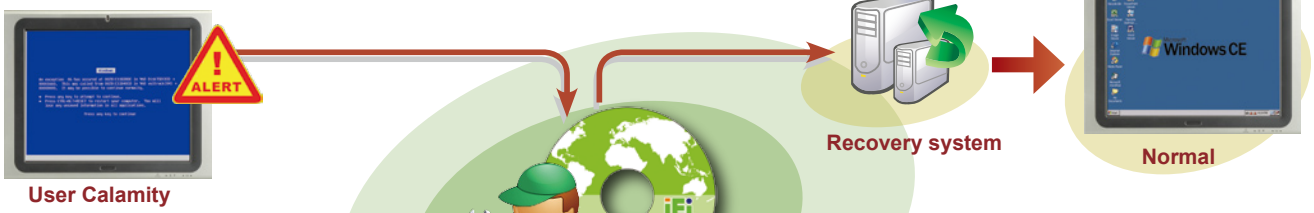
F3 One Key Recovery

iEi symantec

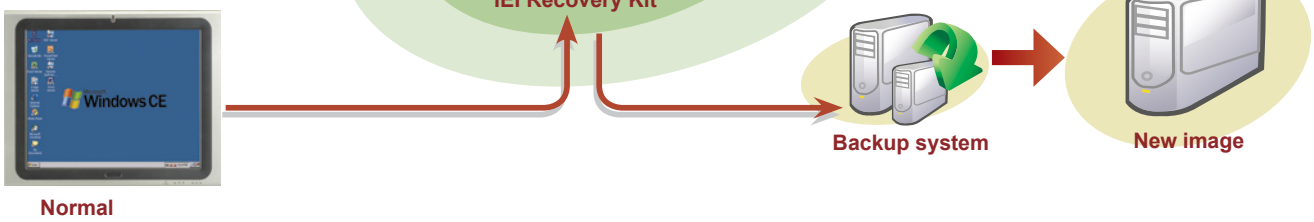
Recovery Tool for IEI Products Only

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

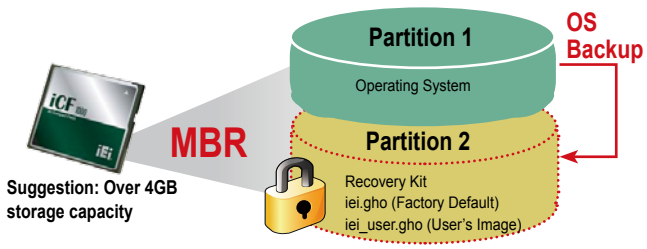


System Backup



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.



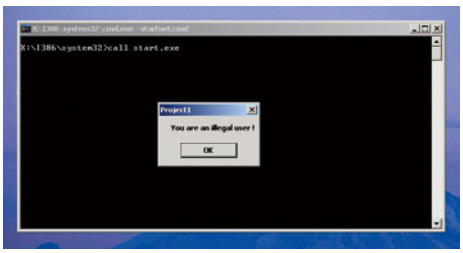
IEI Recovery Solution Advantages:

- 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

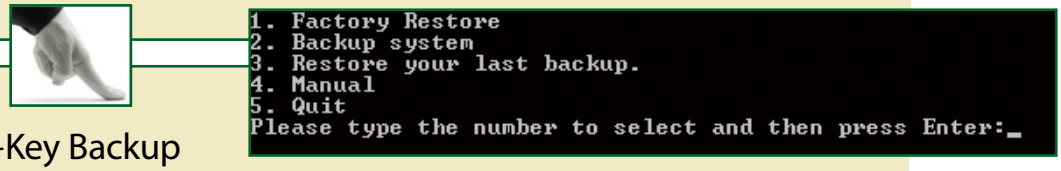
Rapid Imaging/ Migration Through One Touch Hot Key

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.

EASY WAY

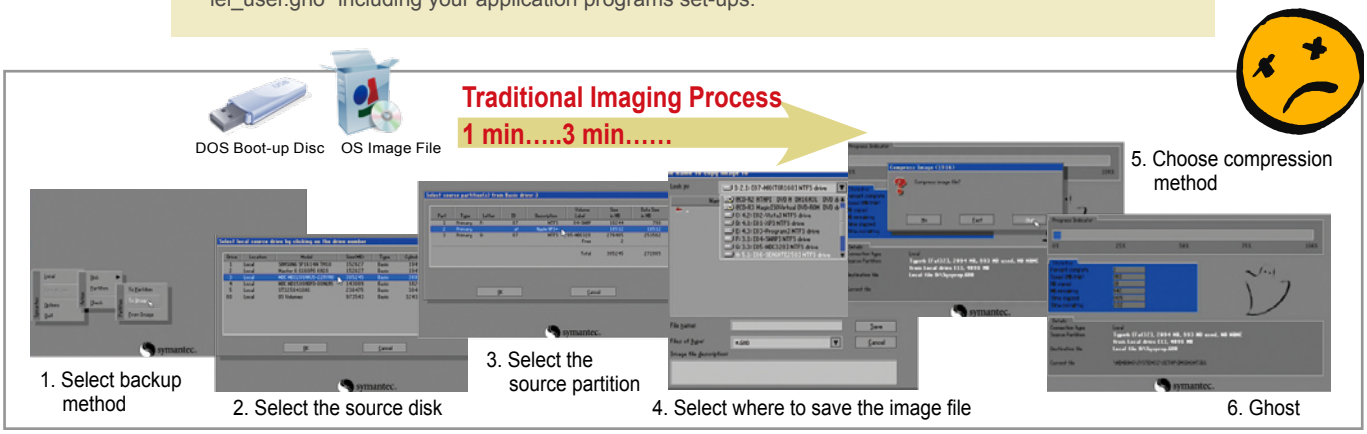
One-Key Recovery

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



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.

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

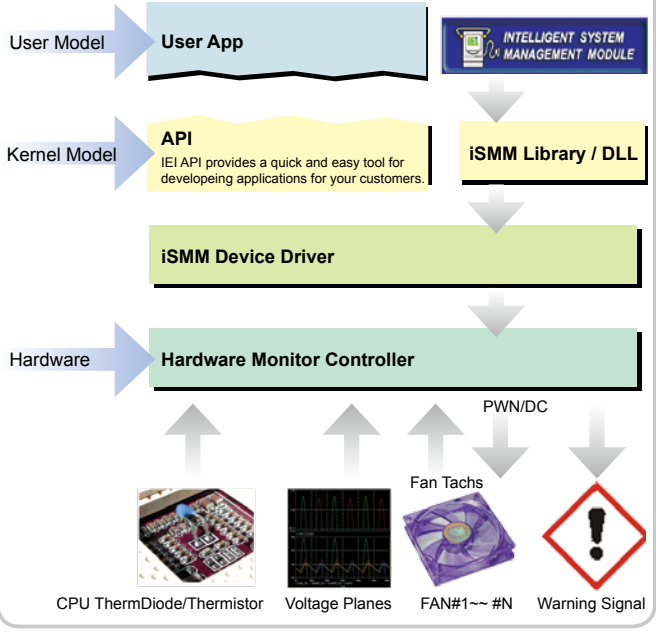
a. Windows XP
b. Windows Vista
c. Windows 7

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



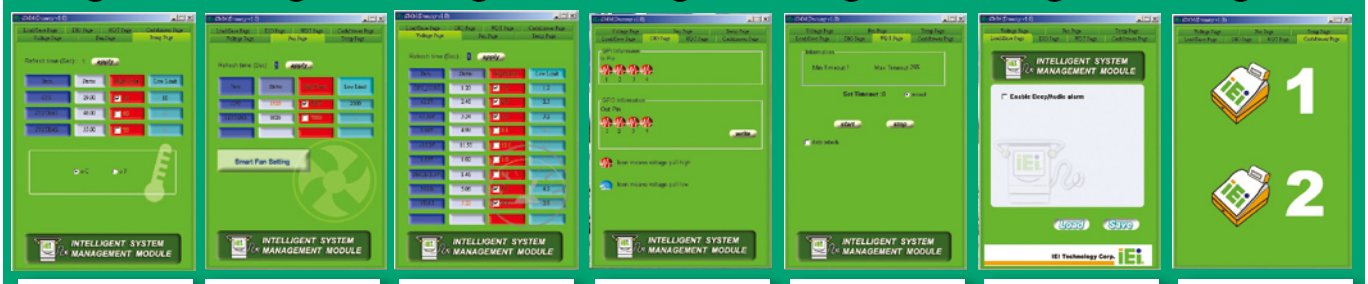
IEI Exclusive Diagnosis Software

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