New Mini-ITX Mainboard Specification White Paper

Ultra Compact Motherboard Form Factor with a New Level of Integration for the New Generation of Quiet, Small Footprint Connected Information and Entertainment Systems

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1. Introduction

This document defines Mini-ITX, the IT industry's smallest form factor mainboard specification, developed by VIA Technologies, Inc. As part of the company's open industry-wide Total Connectivity initiative, the new VIA Mini-ITX mainboard enables the creation of an exciting new generation of small, ergonomic, innovative and affordable embedded systems through its high level of integration and vastly reduced size of less than 33% the size of the FlexATX mainboard form factor. The new Mini-ITX mainboard comes with an onboard VIA Eden™ Embedded System Platform or a VIA C3™ E-series processor, boasting high levels of integration, ultra low power consumption and cool, quiet operation providing a noiseless and more ergonomic system.

A platform for innovation due to its small size and onboard VIA Eden™ Platform, the Mini-ITX is fully compatible with Microsoft? Windows? XP and a full range of Embedded Windows, Windows CE, and the latest Linux operating systems and applications. Compatibility is further enhanced with its support for all the most popular Internet programs and plug-ins.

The new VIA Eden™ Embedded System Platform is spurring the further development of the emerging new generation of quiet running, low profile small factor designs that are being adopted for a myriad of connected information and entertainment systems – ranging from home entertainment devices such as Set Top Boxes, Game Consoles, Personal Video Recorders and Broadband Gateways to commercial applications such as Thin Clients, LCD Web Based Terminals, POS Terminals, and Network Attached Servers.

These new designs not only leverage the fundamental strengths of the x86 platform – namely, its software resources, its Internet compatibility, its rapid product innovation cycles, its massive economies of scale and its open architecture. They also extend the capabilities of the PC and the Internet by allowing people to connect to information and entertainment in an easier, more convenient, and more affordable way.

Compact, stylish, reliable, fanless, and energy efficient, these new devices are already beginning appearing in homes, workplaces, and public places such as airports and coffee shops, and are set to further proliferate as more compelling digital multimedia applications and services are developed and delivered over the Internet, home and corporate networks through fixed and wired broadband technologies such as cable modems, ADSL, 802.11a, and satellite.

In addition to describing the main features and applications for Mini-ITX form factor motherboards, this document also includes information about the low power, fan less VIA Eden™ Platform to enable developers to fully evaluate the benefits of adopting this innovative new form factor.

2. Mini-ITX Mainboard Overview

2.1 Mini-ITX Mainboard Features and Benefits

The new Mini-ITX mainboard provides motherboard makers, system integrators, and OEMs with the first standardized ultra compact yet highly integrated and scaleable platform that can be utilized best in small, modern, attractive and practical devices.

With a footprint that measures just 17cm X 17cm, the new Mini-ITX motherboard form factor not only enables PC appliance designers to lower costs by reducing the size of the motherboard and the chassis, it also allows them to explore a huge variety of product development options - from compact space-saving sealed designs to fully functional Information Station and Value PC systems.

The versatility and cost-effectiveness of the Mini-ITX form factor is further enhanced by its highly integrated feature set that makes it, essentially, a system on a mainboard. The onboard VIA Eden™ Platform includes a VIA Eden™ ESP processor, AGP graphics and audio support, advanced Ethernet networking, SPDIF 5.1 audio channels and TV Out features that are not available on other small form factor motherboards. The VIA Eden™ Platform boasts an ultra low power consumption allowing the use of passive cooling and enabling quiet, totally fanless systems. This further enhances the benefits of modern form factor designs by making them smaller, quieter and more environmentally friendly.

Table 1 provides a summary of the main features and benefits of the Mini-ITX mainboard form factor:

Table 1 Mini-ITX Mainboard Feature & Benefit Summary

Feature	**Benefit**
Standard Platform for Innovation	✍ Provides a new standard format for OEMs and SIs ✍ Highly scaleable standard platform
Small 17cm x 17cm board size	✍ Enables small footprint system designs ✍ Reduces overall system costs
Rich I/O Integration	✍ Support for complete range of I/O standards, including USB, TV Out, 10/100Mbps Ethernet etc... ✍ Reduces overall system costs
Integrated AGP graphics and audio	✍ High quality multimedia performance ✍ Reduces overall system costs
VIA Eden™ Platform	✍ Lowest power x86 embedded platform ✍ Highest performance x86 embedded processor ✍ Multiple Configuration Options ✍ Proven native x86 Architecture ✍ Rich Levels of Integration
Slimline 50W Power supply	✍ Saves system space ✍ Enables fanless silent PC designs due to its low heat characteristics ✍ Reduces overall system costs ✍ Enhances reliability

2.2 Mini-ITX Product Applications

The new Mini-ITX motherboard form factor has been specifically designed for integration in small footprint chassis, including a growing number of Information PC and Information Station reference systems. It can also be mounted in a standard FlexATX and MicroATX chasses in which modifications have been made to the chassis mounting hole positions.

Figure 1 Information PC

The Information PC reference design is a small, quiet and inexpensive entry-level computing platform spanning price points from US$199 to US$399. It is optimised for mainstream Internet applications and services as well as common productivity, education, storage and entertainment applications. The Information PC is fully compatible with standard x86 hardware and software, thus offering the advantage of flexibility, connectivity, upgradeability and, with the VIA Eden™ Platform, quiet operation.

Figure 2 Information Station

The Information Station reference design provides a small, silent and affordable platform for devices that convert a television into an interactive multimedia box capable of surfing the web, playing DVDs and running common productivity applications.

2.3 Mini-ITX Board Dimensions

Table 2 below compares the dimensions of the Mini-ITX with those of other ATX form factors. As can be seen, the Mini-ITX is the smallest available form factor on the market measuring more than 33% smaller than the FlexATX form factor.

Table 2 Mini-ITX & ATX Mainboard Dimensions Comparison Chart

Form Factor	Maximum Allowable Width	Maximum Allowable Depth	% Smaller
Mini-ITX	**170mm**	**170mm**	
iTX	215mm	191mm	more than 29%
FlexATX	229mm	191mm	**more than 33%**
Mini ATX	284mm	208mm	more than 51%
MicroATX	244mm	244mm	more than 51%
ATX, full-size	305mm	244mm	more than 61%

2.4 Mini-ITX Chassis Mounting

The Mini-ITX form factor was designed specifically for small footprint appliances such as the Information PC or Set Top Box currently being promoted by VIA Technologies, Inc. Mounting Mini-ITX motherboards in a standard FlexATX or MicroATX chassis is also possible with modifications to the chassis hole mounting positions.

2.5 Mini-ITX Power Specifications

The Mini-ITX compliant power supply is designed with several space, energy and noise reduction features in mind. The typical physical dimensions (see table below) are very compact compared to other standard power supplies such as ATX. The options of AC 100 – 240V and 50 – 60Hz auto switching are fully supported.

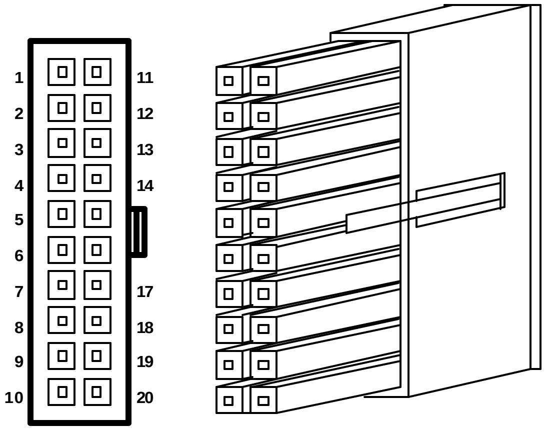
Table 3 Power Supply Size Comparisons

Power Supply	**Length**	**Width**	**Height**	**Total Area % smaller**
iTX, Mini-ITX	**174 mm**	**73mm**	**55 mm**	
ATX	140 mm	150 mm	86 mm	150%

2.6 Mini-ITX Power Supply Connector

The Mini-ITX power specification uses an industry standard 20-pin main connector to the power supply as shown in Figure 3.

Figure 3 20-pin Mini-ITX Power Supply Connector



1	+3V	**11**	+3V
2	+3V	**12**	NC
3	Gnd	**13**	Gnd
4	+5V	**14**	PWR_ON-
5	Gnd	**15**	Gnd
6	+5V	**16**	Gnd
7	Gnd	**17**	Gnd
8	PWR_GD	**18**	NC
9	5V_SB	**19**	+5V
10	+12V	20	+5V

Note: NC = no connection

Table 4 Mini-ITX Switching Power Supply DC Output

Output Voltage	**Load Range**		**Peak 3 Sec.**	**Voltage Tolerance**	**Ripple & Noise (p-p)**	**Over Voltage Protection**
	Min.	**Max.**				
5V_SB	0.1A	1.5A	2.0A	±5%	150mV	6.5V
+3V	0.1A	1.0A	1.5A	±5%	100mV	3.8V
+5V	0.1A	6.0A	7.0A	±5%	100mV	6.5V
+12V	0.1A	0.5A	0.8A	±8%	200mV	15.6V
Total Power: Max 47W, Peak 60W						

The onboard VIA Eden™ Platform leverages its highly efficient architectural design to deliver power consumption to below one watt when running in optimized low voltage mode.

3. VIA Eden™ Embedded System Platform Overview

The VIA Eden™ Platform is a low power, high performance, and highly integrated x86 platform that provides the most flexible, compatible, and cost-effective solution for building the emerging new generation of connected digital information & entertainment devices. It combines a proven ultra low power sixth generation processor core with a choice of a highly integrated North Bridge and South Bridge chips, as well as a broad spectrum of expansion options for enhanced communications, connectivity, and multimedia functions.

The key components of the VIA Eden™ Embedded System Platform include the following:

?? Lowest power and highest performance embedded sixth generation x86 processor core featuring:

- Lowest voltage
- World's smallest x86 processor die
- Native x86 execution
- Integrated 192KB internal L1/L2 cache
- MMX? & 3DNow! support
- Leading edge 0.13 and 0.15 micron processes

?? Market-leading x86 North Bridge technology featuring:

- Advanced memory controller with high-speed PC133 SDRAM support
- Integrated low power AGP2X/4X graphics with high performance 3D acceleration, and full 2D/video acceleration including motion compensation and up to 32MB Frame Buffer
- CRT/TFT/DSTN Flat Panel/DVI Panel Monitor Support

?? Proven x86 South Bridge technology with highly integrated multimedia, communications, and connectivity features, including:

  - ✍ AC 97 audio
  - ✍ USB 1.1
  - ✍ Super I/O
  - ✍ ATA-33/66/100 support
  - ✍ 10/100 Mbps Ethernet
  - ✍ MC 97 Fax/Modem

?? Flexible communications, connectivity, and multimedia Companion technology options, including:

  - ✍ Ethernet MAC & PHY
  - ✍ TV-Out
  - ✍ 1394
  - ✍ USB 2.0
  - ✍ Audio CODEC

3.1 VIA Eden™ Embedded System Platform Solution Family

The VIA Eden™ Platform family consists of the VIA Eden™ VE1000 Series and the VIA Eden™ VE2000 Series, providing a choice of three ultra low power, high performance processor cores coupled with the highly integrated VIA Apollo PLE133 or VIA ProSavage? PN133T North Bridge and the VT8231 or VT868B South Bridge, as listed in the table below:

Table 5 VIA Eden™ ESP Solution Family

VIA Eden™ Platform Series	**VIA Eden™ Platform Processor Core**	**VIA Eden™ Platform North Bridge**	**VIA Eden™ Platform South Bridge**
VIA Eden™ VE1000 Series			
VIA Eden™ VE1400	ESP4000	PLE133	VT8231/VT686B
VIA Eden™ VE1500	ESP5000	PLE133	VT8231/VT686B
VIA Eden™ VE1600	ESP6000	PLE133	VT8231/VT686B
VIA Eden™ VE2000 Series			
VIA Eden™ VE2400	ESP4000	PN133T	VT8231/VT686B
VIA Eden™ VE2500	ESP5000	PN133T	VT8231/VT686B
VIA Eden™ VE2600	ESP6000	PN133T	VT8231/VT686B

The VIA Eden™ Platform family also includes multiple Companion chip expansion options for integrating additional communications, connectivity, and multimedia functionality in order to meet the requirements of each particular design application in a most cost effective form. These options are listed in the table below, and represent the richest blend of expansion options from a single vendor.

Table 6 VIA Eden™ ESP Companion Chip Options

Application	VIA Eden™ ESP Companion Chip
Networking	VT6103 (PHY)/ VT6105 (2 in 1)
TV Out	VT1621/VT7002
Audio CODEC	VT1611A/ VT1612A
IEEE 1394	VT6306
USB 2.0	VT6202

The VIA Eden™ VE1000 Series and VE2000 Series product lines have been developed to meet the specific power consumption, performance, functionality, and cost requirements of their target market segments. All these features in an ultra compact form factor enable a wide range of device designs for the VIA Eden™ Platform with applications in the leisure, business and education markets.

The table of projected device designs below highlights the applications for which the VIA Eden™ Platform is the optimal solution, meeting all operational requirements with a highly competitive cost-performance ratio.

Table 7 VIA Eden™ ESP Projected Device Designs

VIA Eden™ Platform Series	Home Digital Information Devices	Commercial Digital Information Devices	Mobile Digital Information Devices
VE1000 Series	Information PC Set Top Box Web Terminal Broadband Gateway Storage	Thin Client Web Terminal POS Terminal NAS Router	
VE2000 Series	Information PC Set Top Box Game Console Mobile Devices	Thin Client LCD Web Terminal LCE POS Terminal	Web Pad Tablet PC E-book

3.1.1 VIA Eden™ Platform VE1000 Series

Combining a choice of VIA Eden™ ESP processor cores with the highly-integrated VIA Apollo PLE133 North Bridge, featuring a high-speed PC133 SDRAM controller and built-in AGP2X graphics with high performance 3D acceleration and full 2D and video acceleration, the VIA Eden™ ESP VE1000 Series provides a powerful and cost effective platform solution for building a wide range of desktop and set top connected digital information devices for home, commercial, and mobile environments. Ranging from LCD POS Terminals to Thin Clients and Web Terminals, these devices deliver powerful computing and multimedia performance for popular applications including digital music and DVD playback.

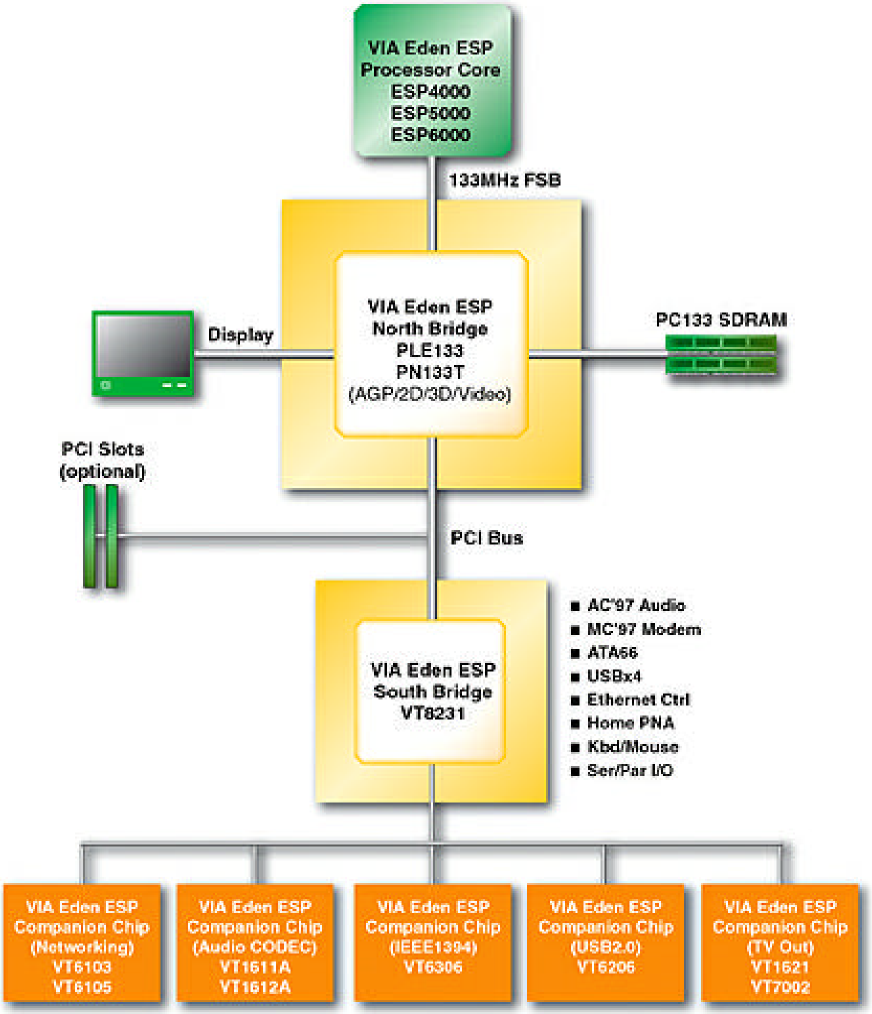
3.1.2 VIA Eden™ Platform VE2000 Series

Combining a choice of VIA Eden™ ESP processor cores with the highly-integrated VIA ProSavage PN133T North Bridge, featuring a high-speed PC133 SDRAM controller and built-in AGP4X graphics with high performance 2D/3D acceleration and full DVD Motion Compensation, the VIA Eden™ ESP VE2000 Series provides a powerful and cost effective platform solution for building a wide range of desktop and mobile Connected Digital Information Devices for the commercial and consumer marketplaces. Ranging from Set Top Boxes to PVRs and Web Pads, these devices deliver powerful computing and multimedia performance for a full range of productivity or entertainment applications.

3.2 VIA Eden™ Platform Architecture

The VIA Eden™ Embedded System Platform is based on the following architecture.

Figure 4 VIA Eden™ ESP Architecture


VIA Eden ESP
Processor Core
ESP4000
ESP5000
ESP6000
133MHz FSB
Display
VIA Eden ESP
North Bridge
PLE133
PN133T
(AGP/2D/3D/Video)
PC133 SDRAM
PCI Slots
(optional)
PCI Bus
VIA Eden ESP
South Bridge
VT8231
AC'97 Audio
MC'97 Modem
ATA66
USBx4
Ethernet Ctrl
Home PNA
Kbd/Mouse
Ser/Par I/O
VIA Eden ESP Companion Chip (Networking) VT6103 VT6105
VIA Eden ESP Companion Chip (Audio CODEC) VT1611A VT1612A
VIA Eden ESP Companion Chip (IEEE1394) VT6306
VIA Eden ESP Companion Chip (USB2.0) VT6206
VIA Eden ESP Companion Chip (TV Out) VT1621 VT7002

3.3 VIA Eden™ Embedded System Platform Benefits

With its exceptionally low power consumption, robust performance, and highly flexible and feature rich architecture, the VIA Eden™ Platform provides the most comprehensive solution for building a full spectrum of home, commercial, and mobile Connected Digital Information & Entertainment Devices from a single vendor. It delivers the following major benefits to OEMs and System Integrators:

Table 8 VIA Eden™ ESP Benefits

Feature	**Benefits**
Lowest power x86 embedded platform	Enables flexible system designs, including low profile, small form factors and silent fanless devices Saves energy and ensures longer battery life in mobile designs
Highest performance x86 embedded processor	Runs a complete range of productivity, multimedia, and Internet applications, including digital audio, digital video, and digital imaging
Multiple Configuration Options	Enables customized systems with appropriate power, performance, and features for the target market segment
Proven native x86 Architecture	Leverages industry's existing hardware design and manufacturing infrastructure, thereby minimizing product development and production costs and speeding up time to market Utilizes existing software development tools and ensures complete compatibility with full range of software and Internet applications and plug-ins
Rich Levels of Integration	Maximizes system reliability and longevity Lowers costs by reducing number of discrete components Enables lower profile designs and smaller form factors

3.4 VIA Eden™ Platform Power Consumption

Built using the industry's most advanced 0.13 and 0.15 micron manufacturing processes, the VIA Eden™ ESP processor core provides the industry's lowest power and highest performance pure x86 embedded processing engine. Based on the industry standard x86 architecture, the VIA Eden™ Embedded System Platform is fully compatible with Microsoft? Windows? XP and a full range of Embedded Windows, Windows CE, and the latest Linux operating systems and applications. Compatibility is further enhanced with its support for all the most popular Internet programs and plug-ins.

3.4.1 Lowest Power Pure x86 Embedded Processor Core

With the world's smallest x86 processor die size and a highly efficient design, the VIA Eden™ ESP processor core delivers industry-leading thermal characteristics that not only minimize power consumption but also make it ideal for fanless designs as well as smaller, lower profile form factors.

As shown in the table below, with an operating voltage ranging from only 1.05 to 1.2 volts, the thermal design power requirements of the VIA Eden™ ESP processor core are as low as three watts – up to half that of competing products.

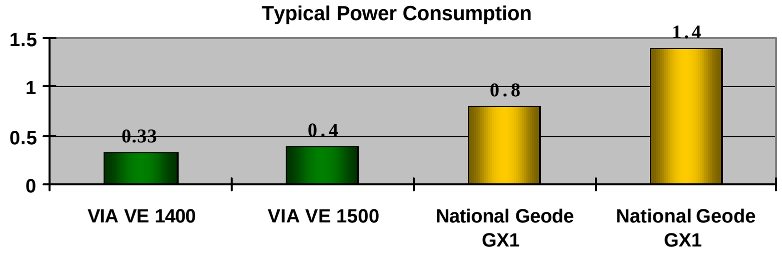
Table 9 VIA Eden™ ESP Operating Voltage Comparison

	VIA Eden™ VE1400	**NS GX2**	**Transmeta TM5800**	**Intel ULP + MX440**
Voltage	**1.05/1.2/1.2V**	1.2V	1.3V	1.1V
Thermal Design Power	**3/5/5 Watts**	N/A	6.0W	5.73W

3.5 VIA Eden™ Platform Processor Core Power Consumption

The typical power consumption of the VIA Eden™ ESP processor core is also extremely low, leading to significant savings in energy costs and longer battery life in mobile devices. As illustrated in the chart below, the power consumption of the National Geode GX1 is over four times higher than that of the VIA Eden™ VE1400 - despite the fact that the Geode runs at a lower clock speed.

Figure 5 VIA Eden™ ESP Processor Core Power Consumption



**Typical power defined as the average power consumption while browsing the Internet or performing data entry.*

***VIA Eden™ VE1400/VE1500 Platform: On Chip 2D/3D AGP VGA, 8MB Shared Memory, 1024x768x16 bit resolution; 128MB PC133 SDRAM; 13.5GB; UDMA66 HDD; Windows 98 SE.*

****NS Geode GX1 Cyrix Media GX MMX-S 233MHz 64MB*1 PC-133 SDRAM CS5530A-UCE , Award pos561/pos563 BIOS v1.10 HDD: Quantum 40G AT Fireball + AS Windows 98 SE.*

3.6 VIA Eden™ Platform System Power Consumption

The VIA Eden™ Platform is designed for optimal heat dissipation and power consumption, enabling quiet-running fanless device designs and savings on energy costs and battery life. The VIA Eden™ Platform has the lowest power profile of any comparable system platform that includes 3D graphics, as a result of its power efficient components including the VIA Eden™ ESP processor core. Integration reduces power consumption by minimizing the transistor count compared to discrete chips. The thermal properties of the VIA Eden™ Platform enable flexible, small form factors and enhance reliability, especially for “always on” devices.

3.7 VIA Eden™ Platform North Bridge Options

The VIA Eden™ ESP offers a choice of two highly-integrated North Bridge options with proven reliability, compatibility, and performance.

3.7.1 VIA Apollo PLE133

With rich built-in AGP2X graphics, and an advanced memory controller supporting PC133 SDRAM, the VIA Apollo PLE133 chipset is a highly integrated and cost effective solution designed for the specific needs of the new generation of digital information and entertainment applications.

The 133MHz Front Side Bus ensures ample memory bandwidth for the most demanding productivity and Internet applications, lending considerable flexibility and scalability to system builders in the development of cost-effective platforms without sacrificing features and performance.

3.7.2 VIA Apollo PN133T

The high performance, feature rich S3 Graphics Savage4™ AGP4X graphics core integrated into the VIA ProSavage PN133T provides strong 2D/3D acceleration and support for DVD playback and LCD panel support, ideally suited for the new trend in home digital video and imaging entertainment appliances.

Designed specifically for the thin, light and ultra small mobile market and for the emerging information station market, the VIA ProSavage PN133T demonstrates low power characteristics, a high level of integration and second generation motion compensation, with the 133MHz Front Side Bus supporting all common software and Internet applications.

3.8 VIA Eden™ Platform South Bridge Options

The VIA Eden™ Platform offers a choice of two highly-integrated South Bridge options with proven reliability, compatibility, and performance.

3.8.1 VIA VT8231

The VIA VT8231 possesses a comprehensive networking and communication feature set including integrated VIA Ethernet MAC, ATA 33/66/100, support for 4 USB ports, AC'97 audio, MC'97 modem and integrated Super I/O.

3.8.2 VIA VT82C686B

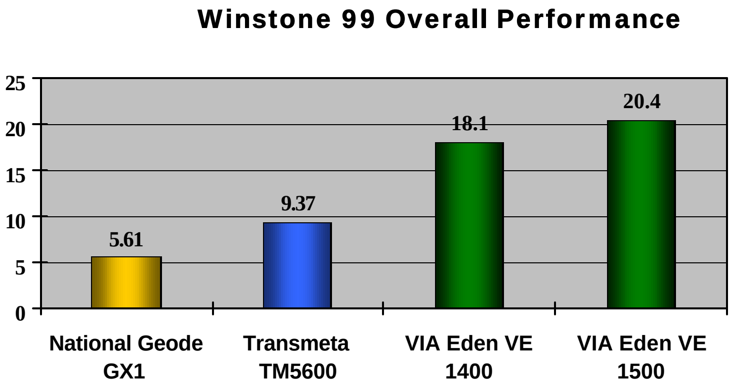
The VIA VT82686B includes ATA 33/66/100, support for 4 USB ports, AC'97 audio, MC'97 modem and integrated Super I/O.

3.9 VIA Eden™ Platform Performance

Featuring a true sixth generation x86 architecture with a native x86 instruction set, the VIA Eden™ processor core is available in multiple frequency ranges and comes with 192KB full speed integrated L1/L2 cache to provide the highest levels of performance for even the most demanding productivity and Internet applications.

As shown in the table below, the VIA Eden™ VE1400 scores over three times higher than the National Geode GX1 processor under Winstone 99, and the VIA Eden™ VE1500 achieves double the score of the Transmeta 5600[PE1]. Winstone 99 was selected as the benchmark due to the speed limitations of the NS GX1.

Figure 6 VIA Eden™ ESP Performance



** VIA Eden™ 1400/1500 Platform: On Chip 2D/3D AGP VGA, 8MB Shared Memory, 1024x768x16 bit resolution; 128MB PC133 SDRAM; 13.5GB; UDMA66 HDD; Windows 98 SE.*

*** Transmeta benchmarks tested on Sony Vaio Picture Book*

**** NS Geode GX1 Cyrix Media GX MMX-S 233MHz 64MB*1 PC-133 SDRAM CS5530A-UCE Award pos561/pos563 BIOS v1.10 HDD: Quantum 40G AT Fireball+AS Windows 98 SE*

With the industry's most advanced embedded processor multimedia instructions, including 3DNow!? and MMX? , the VIA Eden™ processor core also delivers best of class performance for gaming and digital audio, imaging, and video applications. This makes it an ideal solution for home connected digital information & entertainment devices with advanced multimedia capabilities such as video streaming, audio streaming, and DVD playback.

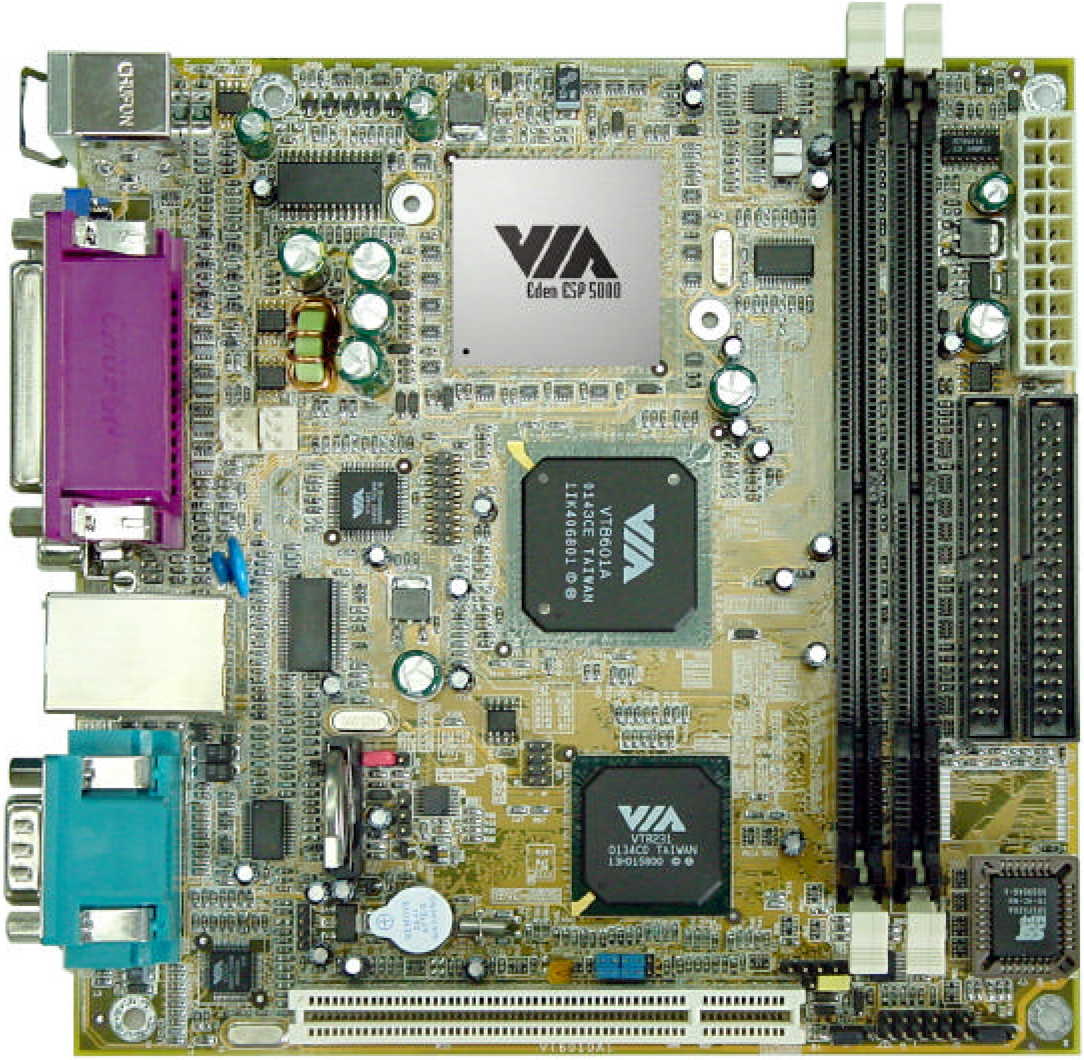
4. VIA Mini-ITX Mainboard

4.1 VIA Mini-ITX Mainboard Overview

The VIA Mini-ITX mainboard design provides developers with a standard platform for designing and building truly cost effective, ultra compact, scalable mainboards incorporating a myriad of features not previously possible using such a small form factor.

Featuring the VIA Eden™ Platform, the Mini-ITX mainboard comes with two DIMMs, two EIDE connectors, one PCI slot supporting up to 2 PCI devices, onboard TV Out and 10/100Mbps Ethernet to provide a highly flexible and cost effective platform that can be scaled to meet a range of product requirements and feature sets.

Figure 7 VIA Mini- ITX Reference Board


Eden ESP 5000
VT8601A
VT8231

4.2 VIA Mini-ITX Mainboard Specification Overview

Table 5 summarizes the main features implemented on the VIA Mini-ITX mainboard.

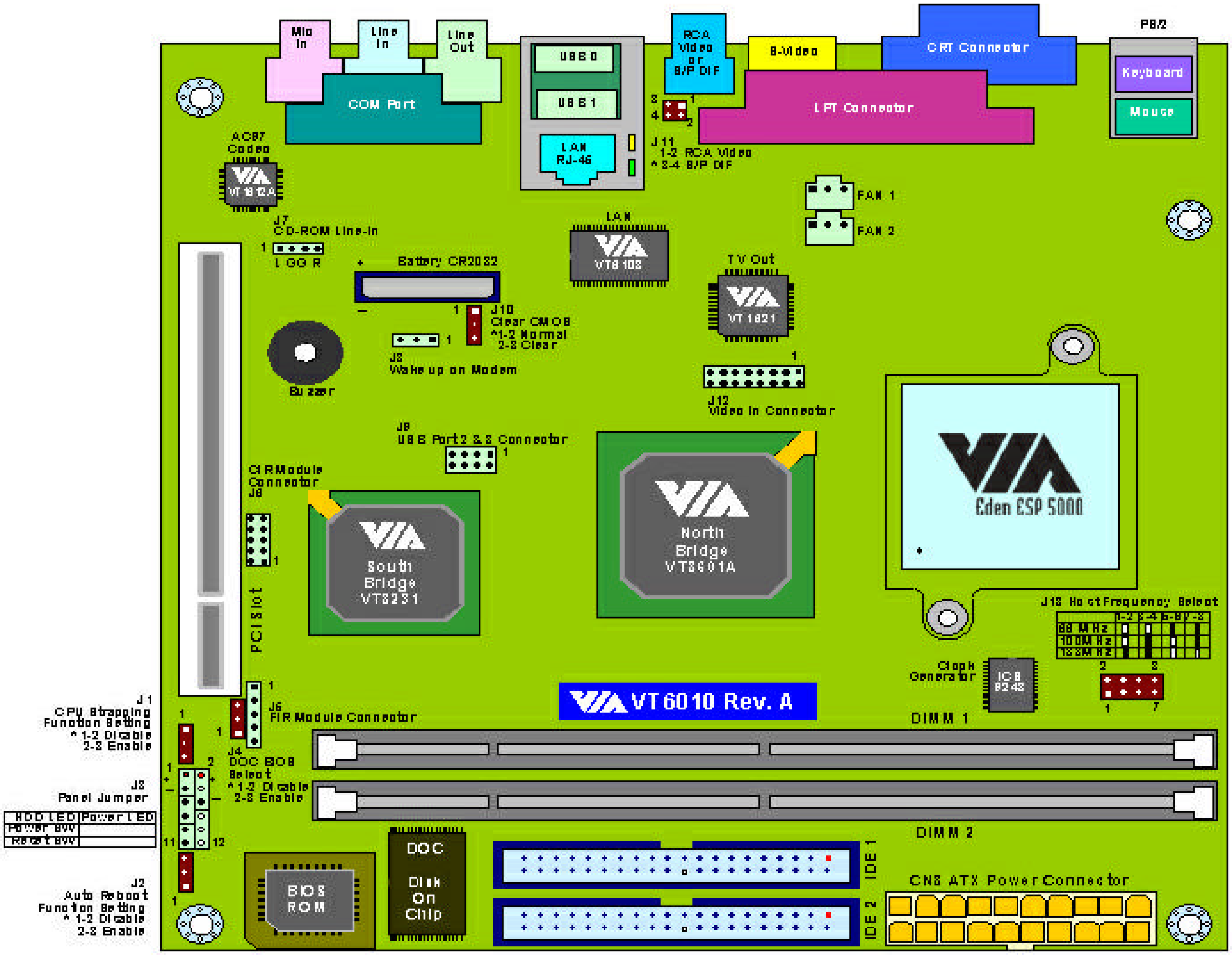
Table 10 Mini-ITX Mainboard Specifications

Item	**Description**
Processor	VIA ESP processor Latest 0.15 and 0.13 Micron technology 128K L1 and 64K L2 cache
Core Logic	VIA Apollo PLE133: North Bridge (VT8601A/8606) South Bridge (VT8231)
Main Memory	Two 168-pin DIMM memory sockets PC100/133 SDRAM support
Graphics	Integrated AGP2X with 2D/3D Graphics Acceleration Motion Compensation for DVD playback VIP port for video overlay function
Storage (ATA)	Two ATA 33/66/100 IDE connectors 8/16/32MB DOM or standard 2.5”/3.5” HDD CD-ROM or DVD drive
Storage (Flash)	DOC Flash memory (8MB ~ 32MB) on board
Audio System	VIA VT1612A 3 Audio Jacks - Line-Out, Line-In and Microphone-In Sound Blaster, Sound Blaster Pro Compatible Digital I/O compatible with consumer mode S/PDIF
Ethernet (LAN)	VIA VT6103 10/100Mbps Ethernet MAC integrated 10/100Mbps Ethernet PHY VT6103 on board
TV Out	VIA VT1621 Integrated Macro Vision 7.01 High quality scaling and filtering S-Video or Composite video output Support NTSC/PAL TV
I/O Ports	3 Audio Jacks – Line-out, Mic-in and Line-in Four USB ports (two USB ports located at rear side) One EPP/ECP parallel port One 16C550 compatible serial port Two External PS/2 Compatible Keyboard /Mouse ports Two TV output ports (S-Video or optional RCA TV out) One S/PDIF out (optional and multiplex with RCA TV out) One RJ45 port One PCI slot (Note: support for two PCI devices)
Other Optional Modules	SIR/FIR sensor CIR sensor and controller Cable for 2nd PCI device

4.3 Mini-ITX Mainboard Layout

Figure 5 outlines the basic placement of components on the Mini-ITX mainboard layout.

Figure 8 Mini-ITX Mainboard PCB Layout


Mic In
Line In
Line Out
COM Port
USB 0
USB 1
LAN RJ-45
RCA Video or S/P DIF
S-Video
CRT Connector
PS/2
Keyboard
Mouse
LPT Connector
J11 1-2 RCA Video *3-4 S/P DIF
AC97 Codec
VT1612A
J7 CD-ROM Line-In
L G G R
LAN
VT6103
FAN 1
FAN 2
TV Out
VT1621
Battery CR2032
J10 Clear CMOS *1-2 Normal 2-3 Clear
J3 Wake up on Modem
Buzzer
J12 Video In Connector
J9 USB Port2 & 3 Connector
CIR Module Connector J8
South Bridge VT8231
North Bridge VT8601A
Eden ESP 5000
PCI Slot
VT6010 Rev. A
J13 Host Frequency Select
1-2 3-4 5-6 7-8
66 MHz
100MHz
133MHz
Clock Generator
ICS 9248
DIMM 1
DIMM 2
J6 FIR Module Connector
J4 DOC BIOS Select *1-2 Disable 2-3 Enable
J1 CPU Strapping Function Setting *1-2 Disable 2-3 Enable
J5 Panel Jumper
HDD LED
Power LED
Power SW
Reset SW
J2 Auto Reboot Function Setting *1-2 Disable 2-3 Enable
BIOS ROM
DOC Disk On Chip
IDE 1
IDE 2
CN3 ATX Power Connector

4.4 VIA Mini-ITX Mainboard Power Requirements

The VIA Mini-ITX Mainboard supports both ITX and ATX compliant power supplies.

5. Contacts

For more information on the Mini-ITX mainboard specification, the VIA Mini-ITX mainboard or the VIA Eden™ Embedded Systems Platform, please contact Tim Handley or Timothy J. Brown at the following e-mail addresses:

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