

# VIA EPIA CL-Series Mini-ITX Mainboard Operation Guidelines

*Dream Catalyst*

## Contents

- Overview
- Layout
- Specifications
- Processor SKUs
- CLE266 Chipset Overview
- I/O Back Panel Layout
- Layout Diagram & Mounting Holes
- Noise Levels Data
- DVD Playback Tests
- Power Consumption Data
- Compatible Chassis
- Power Specifications
- Linux & Microsoft Driver Support
- Contact

**EPIA CL-Series Overview**

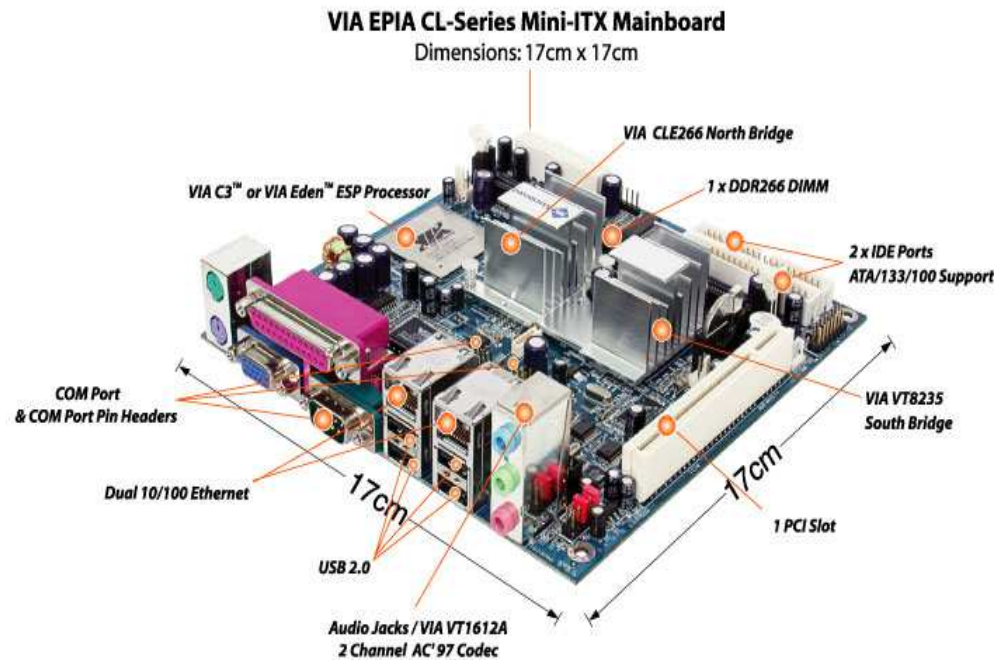
The VIA EPIA CL-Series Mini-ITX Mainboard is an ultra compact x86 dual LAN platform with unprecedented expandability and versatility for today's ever-growing need of networking applications. The VIA EPIA CL features more connectivity options than any other EPIA mainboard opening up a vast range of applications in the home, office, public places, and commercial LANs. Measuring a mere 17 x 17 cm, the VIA EPIA CL-series enables space and power saving systems with minimal moving parts making it ultra reliable for 24/7 operation in a once-on-always-on network environment.

The VIA EPIA CL-series is fully compatible with Microsoft® and Linux operating systems and is available in a variety of configurations, including the fanless VIA Eden™ ESP processor for silent system designs and the highly efficient VIA C3™ processor for more demanding multimedia applications.

The mainboard is based on the VIA CLE266 chipset featuring an embedded hardware MPEG-2 decoder and integrated VIA 2D/3D graphics for rich digital media performance. With the sizable memory bandwidth of DDR266 SDRAM and the high data transfer speeds of ATA-133, the VIA EPIA CL-series delivers the increased performance levels required by today's commercial digital video and audio applications.

The latest in high-bandwidth connectivity is supported with up to six USB 2.0 connections, as well as four COM ports and two 10/100 Fast Ethernet ports for extended broadband connectivity. The VIA EPIA CL-series also offers support for a number of LVDS embedded LCD panels, has one PCI slot for expandability options, The VIA EPIA CL-series is compatible with a full range of Mini-ITX chassis as well as FlexATX and MicroATX enclosures and power supplies.

**VIA EPIA CL-Series Layout**




**VIA EPIA CL-Series Specifications**

<b>Processor</b>	- VIA C3™ / VIA Eden™ ESP processor
<b>Chipset</b>	- VIA CLE266 North Bridge - VIA VT8235 South Bridge
<b>System Memory</b>	- 1 DDR266 DIMM socket - Up to 1GB memory size
<b>Back Panel I/O</b>	- 2 RJ-45 LAN port - 1 PS2 mouse port - 1 PS2 keyboard port - 1 Parallel port - 1 Serial port - 4 USB 2.0 ports - 1 VGA port - 3 Audio jacks: line-out, line-in and mic-in
<b>Onboard I/O Connectors</b>	- 1 USB connector for 2 additional USB 2.0 ports - Front-panel audio connectors (mic-in and line-out) - CD Audio-in connector - 1 Buzzer - SIR connector - CIR connector (Switchable for KB/MS) - Wake-on-LAN - CPU/Sys FAN/Fan 3 - System intrusion connector (Optional) - 1 Connector for LVDS module (Optional) - 3 COM port pin headers
<b>VGA</b>	- Integrated VIA 2D/3D graphics with MPEG-2 decoder, motion compensation and duo-view support
<b>Expansion Slots</b>	- 1 PCI
<b>Onboard IDE</b>	- 2 X UltraDMA 133/100/66 Connector
<b>Onboard Floppy</b>	- 1 x FDD Connector
<b>Onboard LAN</b>	- VIA VT6105 LOM - VT6103 10/100 Fast Ethernet Controller
<b>Onboard Audio</b>	- VIA VT1612A2 channel AC'97 Codec
<b>BIOS</b>	- Award BIOS - 2/4Mbit flash memory
<b>System Monitoring &amp; Management</b>	- CPU voltage monitoring - Wake-on-LAN, Keyboard-Power-on, Timer-Power-on - System power management - AC power failure recovery
<b>Form Factor</b>	- Mini-ITX (4 layer) - 17 cm x 17 cm

**VIA EPIA CL Processor SKUs**

The VIA EPIA CL-Series is available in two different speed grades. The EPIA CL6000 utilizes VIA's ultra low power Eden processor while the EPIA CL10000 utilizes the robust VIA C3™ processor.

**EPIA  
CL6000**



- **VIA Eden™  
ESP 6000  
Processor**
- **633MHz**
- **Fanless Operation**
- **1.2v Operating  
Voltage**
- **128KB L1 Cache &  
64KB L2 Cache**
- **MMX and 3DNow!**



Suitable for fanless systems  
with low heat and ultra low-  
power requirements

**EPIA CL10000  
CL8000**



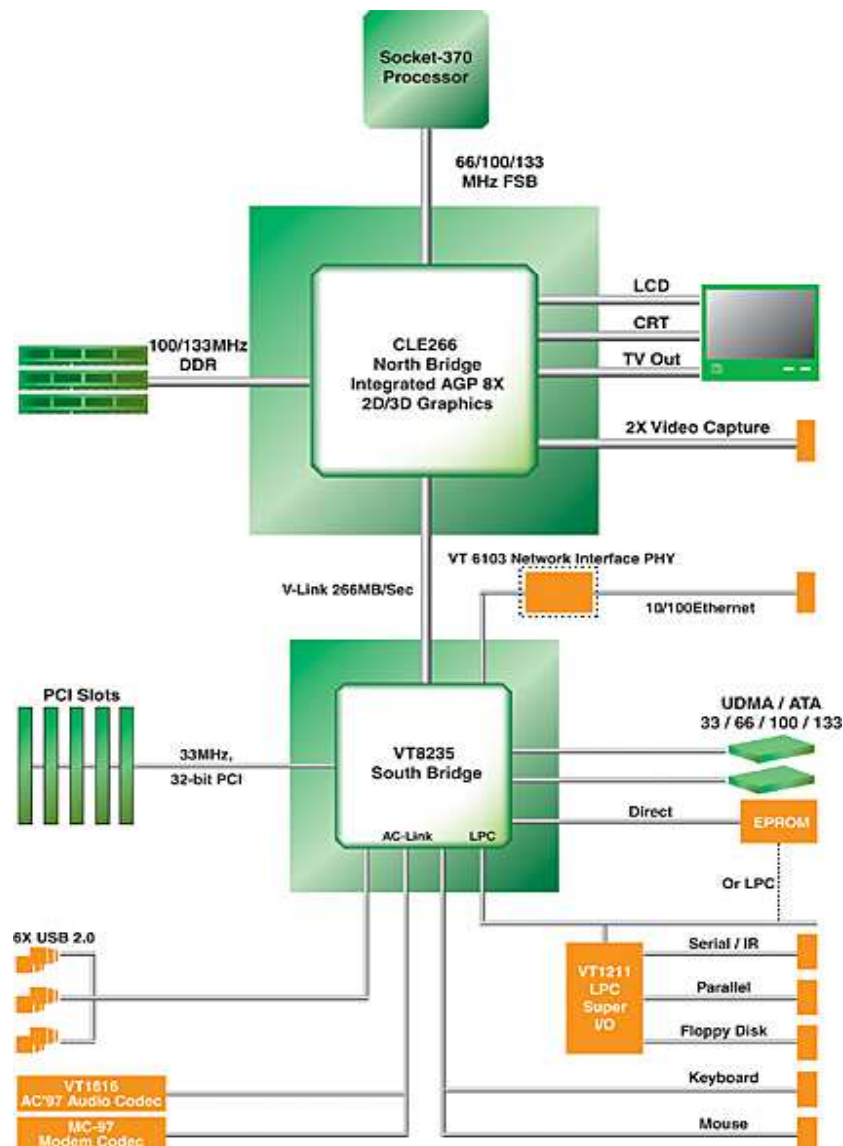
- **VIA C3™  
Processor**
- **1GHz and 800MHz**
- **1.35v Operating  
Voltage**
- **128KB L1 Cache  
& 64KB L2 Cache**
- **MMX and 3DNow!**



Suitable for compact  
systems that run  
multimedia applications

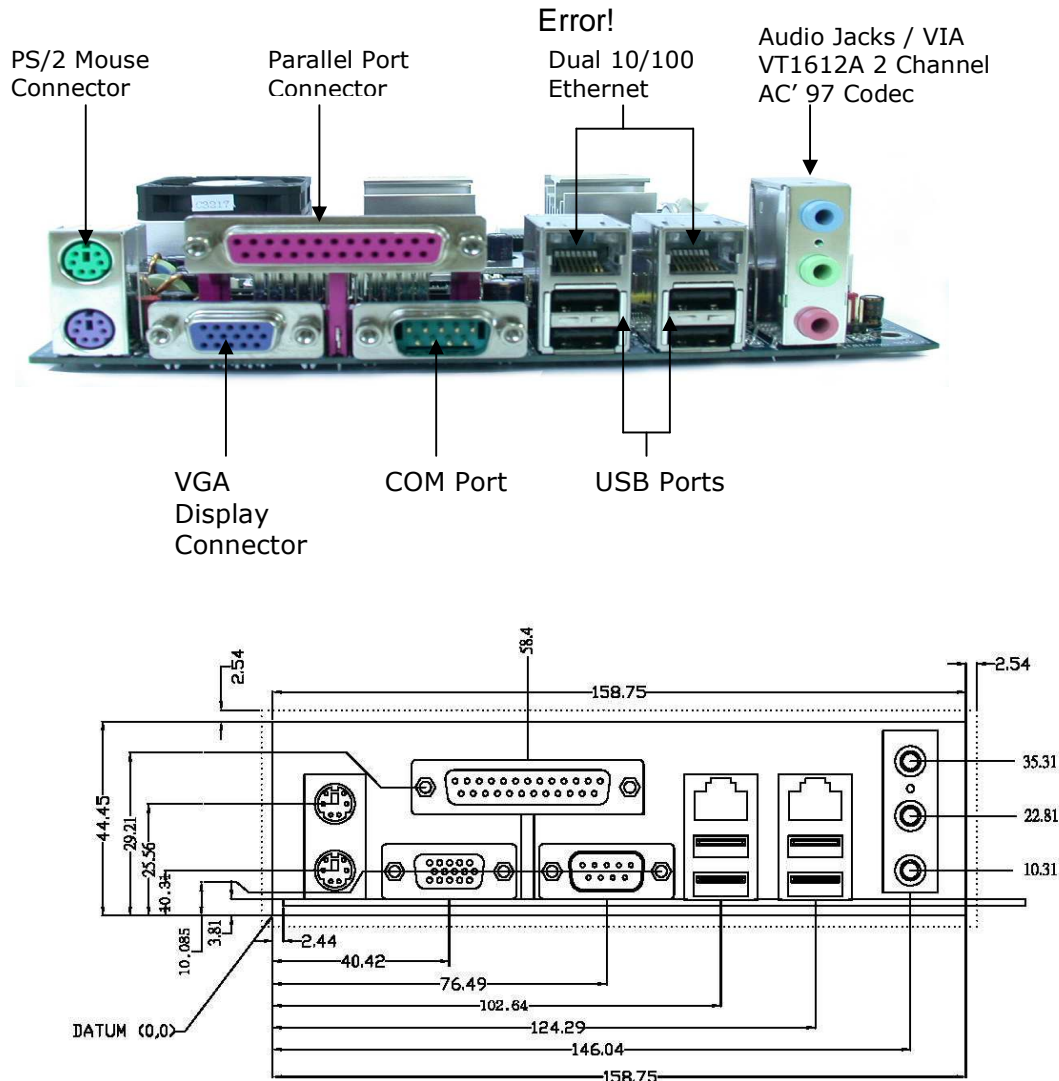
**VIA CLE266 Chipset Overview**

The VIA Apollo CLE266 Chipset is designed to enable high quality digital video streaming and DVD playback in a new generation of fanless, small form factor PCs and IA devices. The [CLE266](#) features the embedded VIA 2D/3D MPEG-2 decoder, DDR266 support, motion compensation and duo-view support to ensure a rich overall entertainment experience. Outstanding connectivity features include USB 2.0, IEEE 1394, TV Out, 10/100 LAN and ATA/133.

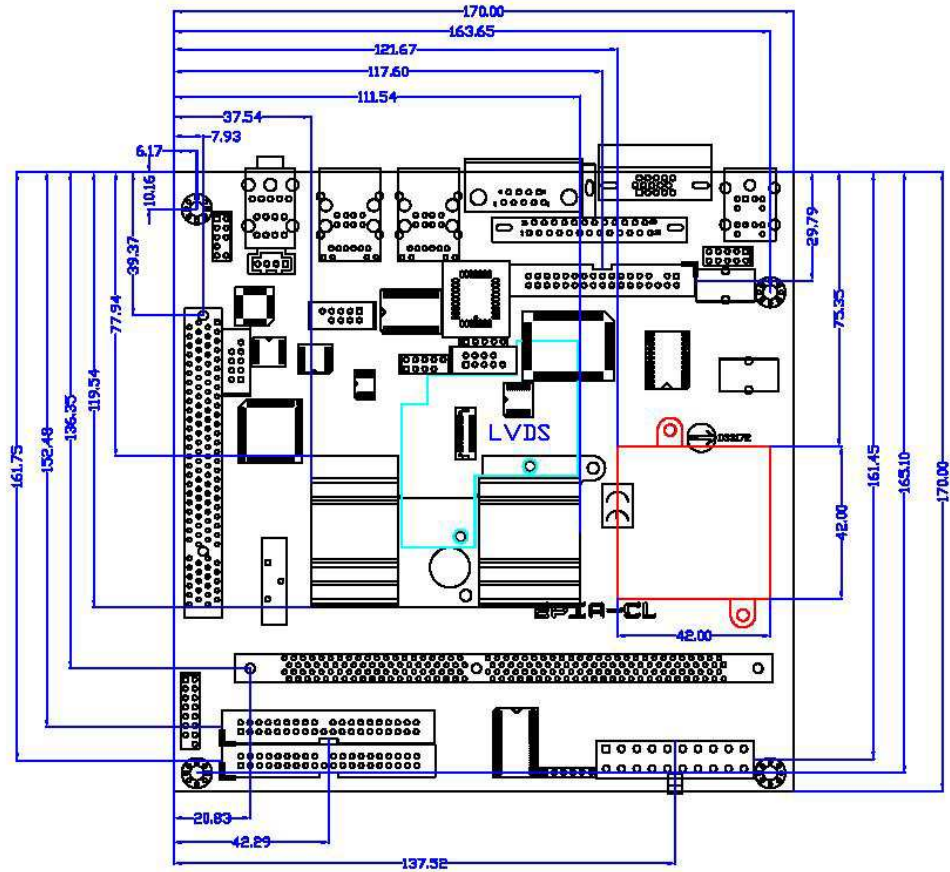


### VIA EPIA CL-Series I/O Back Panel Layout

The EPIA CL's ultra compact 17cm by 17cm integrated design supports all the standard legacy x86 connectivity options that include dual Ethernet LAN, USB 2.0. Video connectivity options are supported through a VGA port, The COM port provides connectivity to legacy devices such as bar code scanners.



**VIA EPIA CL-Series Layout Diagram & Mounting Holes**





**Noise Level Data**

VIA and the EPIA series have been at the forefront of the quiet computing initiative. The VIA EPIA CL-series has been designed to be totally non-obtrusive with noise levels equivalent to a person whispering. With noise levels ranging from the totally silent EPIA CL6000 to 25dBA for the EPIA CL10000, a new wave of system design innovation and exciting opportunities are being created in an almost limitless number of emerging new market segments - ranging from fanless networking devices, video conferencing to a host of commercial networking applications such as Kiosk and POS.

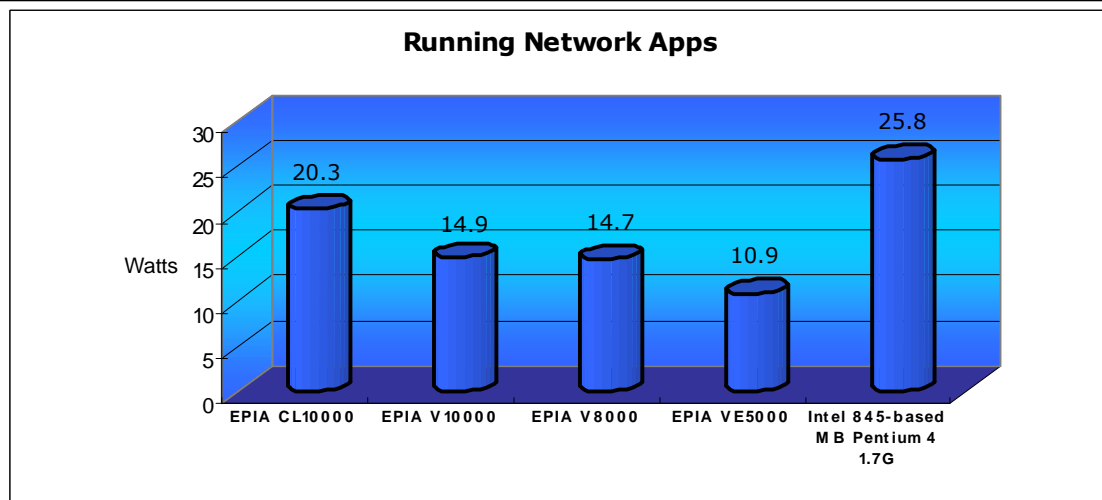
Common Sounds	dBA Level
Threshold of hearing	0 dBA
<b>EPIA CL6000</b>	<b>0 dBA</b>
Normal breathing	10 dBA
Whispering at 1 meter	20 dBA
<b>EPIA CL10000</b>	<b>25 dBA</b>
Conventional PC	35 – 50 dBA
Rainfall	50 dBA
Normal speech	60 dBA

The dBA scale is logarithmic, i.e. 10 dBA represents a doubling in volume. dBA values are measured at a distance of one meter.

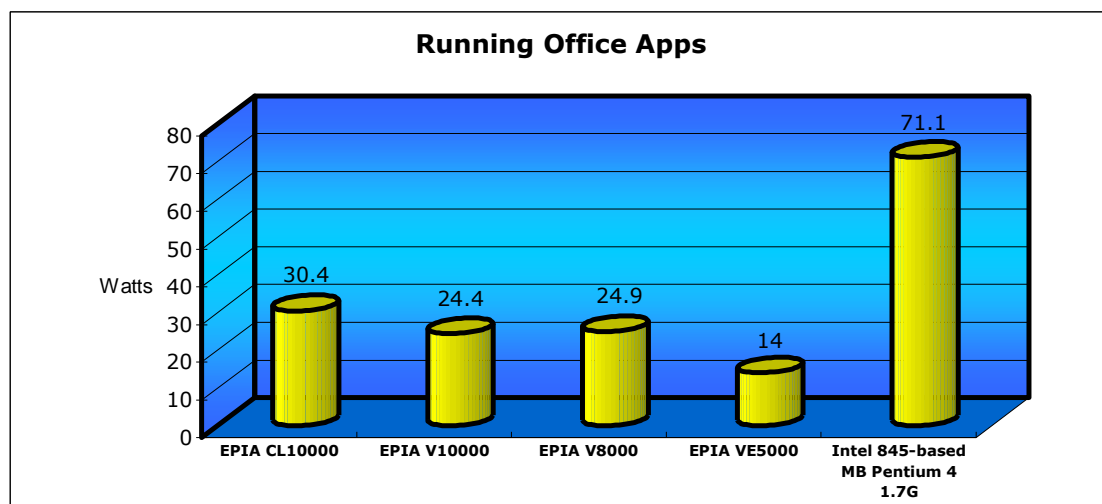
**Power Consumption Tests**

As the DVD playback performance is comparable in the table above, we will also look at comparing the different power consumption results of the VIA EPIA CL series of Mini-ITX mainboards when running network applications and other PC functions with a typical "one size fits all" platform that is being promoted by others in the PC industry. We have also included the low power VIA EPIA-Series V-Series of Mini-ITX mainboards as a frame of reference. Where the VIA EPIA CL series of mainboards is aimed at networking in the home, office, and commercial networks, the VIA EPIA V-Series mainboards are aimed at the thin-client, small footprint desktop and education PC markets.

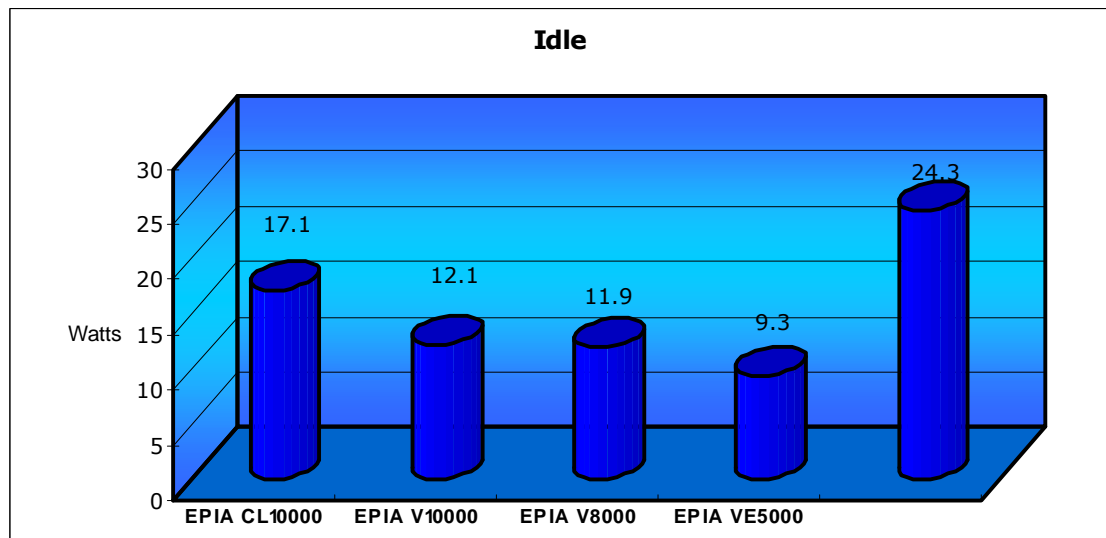
The "one size fits all" system that we are using as a reference platform is an Intel 845-based Pentium 4 platform and we are comparing the power consumption to that of the VIA EPIA CL mainboard series. The tests conducted include: the power consumption levels when running networking applications, running office applications, in idle state, playing MP3s and playing DVDs. All tests were conducted using the Microsoft Windows® 2000 operating system and include the wattage consumed by the total platforms.



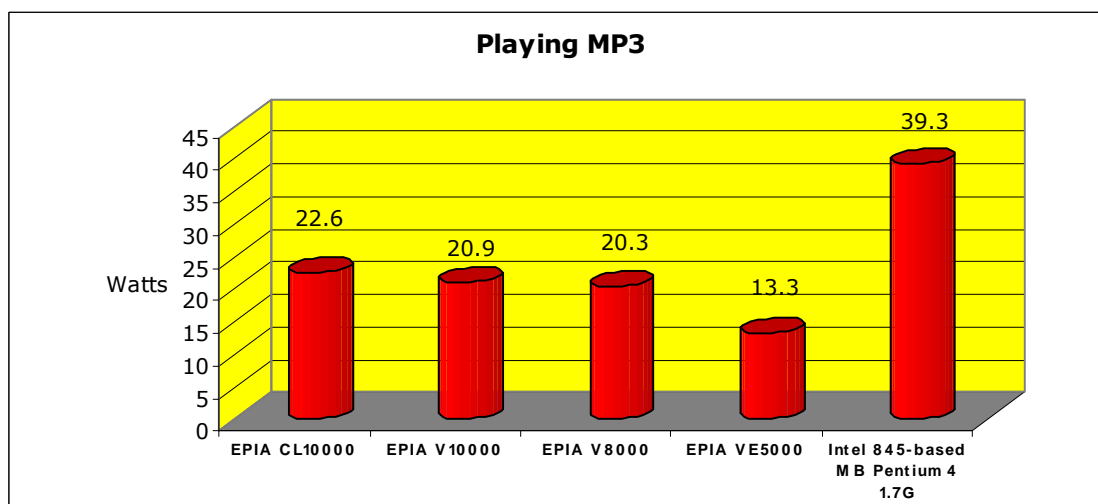
The power consumption comparison for network applications was run while transferring large data files over a standard 10 Base T network. Here again the power consumption of the Intel reference platform is considerably more than that of the VIA EPIA series of Mini-ITX mainboards.



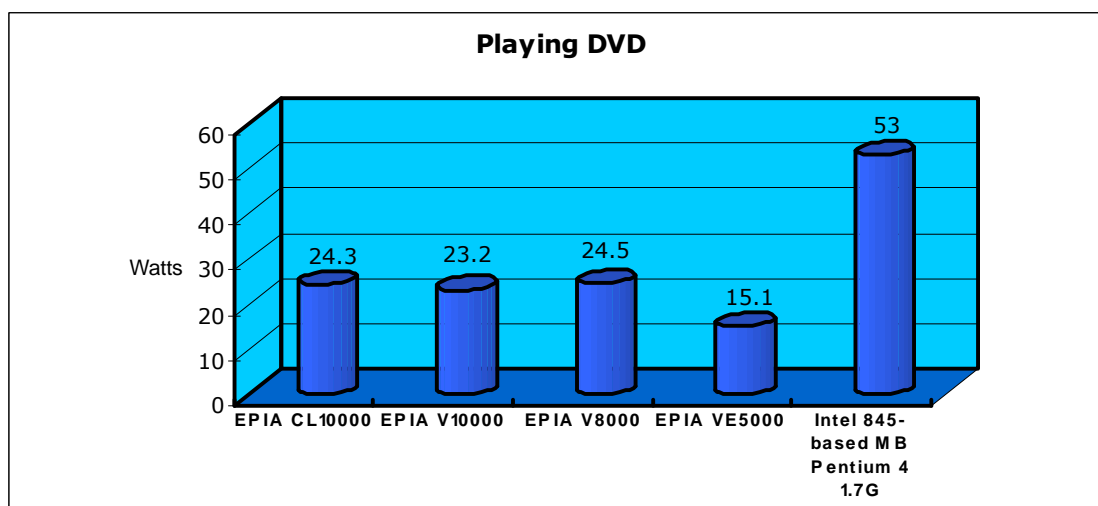
The comparison above uses CC Winstone 2001 to compare power consumption while carrying out standard office tasks like word processing, manipulating spreadsheets and web browsing. In this comparison, the VIA EPIA CL10000 mainboard uses more than 50% less power than the reference platform.



In this comparison, the power consumed while standing idle is compared and the VIA EPIA CL-Series mainboards draw around 70% of the power that the reference platform draws.



Power consumption of the VIA EPIA CL10000 is around 70% that of the reference platform



The power consumption of the VIA EPIA CL10000 is more than half of that of the reference platform.

The following table is a comprehensive breakdown of the EPIA platform's voltage, Amp and Wattage values while running common system applications

<b>EPIA CL10000</b>			
<b>Running Network Applications</b>			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.368V	2.924A	9.848W
+5V	5.083V	1.323A	6.725W
5VSB	5.046V	0.190A	0.959W
+12V	11.894V	0.239A	2.843W
<b>Total Watts: 20.375W</b>			
<b>Playing DVD</b>			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.368V	3.276A	11.034W
+5V	5.083V	1.864A	9.475W
5VSB	5.046V	0.193A	0.974W
+12V	11.894V	0.238A	2.831W
<b>Total Watts: 24.314W</b>			
<b>Playing MP3</b>			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.368V	3.001A	10.107W
+5V	5.083V	1.722A	8.753W
5VSB	5.046V	0.199A	1.004W
+12V	11.894V	0.237A	2.819W
<b>Total Watts: 22.683W</b>			
<b>Idle</b>			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.368V	2.776A	9.350W
+5V	5.083V	0.776A	3.944W
5VSB	5.046V	0.194A	0.979W
+12V	11.894V	0.240A	2.855W
<b>Total Watts: 17.128W</b>			
<b>Running Office Applications</b>			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.368V	3.046A	10.259W
+5V	5.083V	3.215A	13.342W
5VSB	5.046V	0.195A	0.984W
+12V	11.894V	0.237A	2.819W
<b>Total Watts: 30.404W</b>			

EPIA CL6000			
Running Network Applications			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	2.99A	10.0763W
+5V	4.92V	1.08A	5.3676W
5VSB	5.02V	0.14A	0.7028W
+12V	12.40V	0.163A	2.0212W
<b>Total Watts: 18.1679W</b>			
Playing DVD			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	3.36A	11.3232W
+5V	4.92V	1.69A	8.3317W
5VSB	5.02V	0.14A	0.7028W
+12V	12.40V	0.164A	2.0336W
<b>Total Watts: 22.3913W</b>			
Playing MP3			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	3.06A	10.3122W
+5V	4.92V	1.50A	7.395W
5VSB	5.02V	0.14A	0.7028W
+12V	12.40V	0.164A	2.0336W
<b>Total Watts: 20.4436W</b>			
Idle			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	2.79A	9.4023W
+5V	4.92V	0.83A	4.0919W
5VSB	5.02V	0.14A	0.7028W
+12V	12.40V	0.162A	2.0088W
<b>Total Watts: 16.2058W</b>			
Running Office Applications			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	3.10A	10.447W
+5V	4.92V	1.77A	8.7261W
5VSB	5.02V	0.14A	0.7028W
+12V	12.40V	0.164A	2.0336W
<b>Total Watts: 21.9095W</b>			

Intel 845 chipset-based mainboard - Pentium 4 1.7G			
Running Network Applications			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	2.55A	8.5935W
+5V	5.06V	0.77A	3.8962W
5VSB	5.04V	0.058A	0.2923W
+12V	11.96V	0.18A	2.1528W
CPU12V	11.99V	0.91A	10.9109W
Total Watts: <b>25.8457W</b>			
Playing DVD			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	2.82A	9.5034W
+5V	5.06V	0.77A	3.8962W
5VSB	5.04V	0.058A	0.2923W
+12V	11.96V	0.179A	2.1408W
CPU12V	11.99V	3.10A	37.169W
Total Watts: <b>53.0017W</b>			
Playing MP3			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	2.62A	8.8294W
+5V	5.06V	0.77A	3.8962W
5VSB	5.04V	0.058A	0.2923W
+12V	11.96V	0.179A	2.1408W
CPU12V	11.99V	2.015A	24.1599W
Total Watts: <b>39.3186W</b>			
Idle			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	2.53A	8.5261W
+5V	5.06V	0.76A	3.8456W
5VSB	5.04V	0.058A	0.2923W
+12V	11.96V	0.18A	2.1528W
CPU12V	11.99V	0.796A	10.9109W
Total Watts: <b>24.3608W</b>			
Running Office Applications			
Test Voltage	Real Voltage	Tested Amp.	Watts
+3.3V	3.37V	2.61A	8.7957W
+5V	5.06V	0.77A	3.8962W
5VSB	5.04V	0.058A	0.2923W
+12V	11.96V	0.178A	2.1289W
CPU12V	11.99V	4.67A	55.9933W
Total Watts: <b>71.1064W</b>			

**Compatible Chassis**

- Ultra small footprint cases designed specifically for the Mini-ITX platform.
- Users don't want loud, hot, beige tin boxes in their offices or homes:
- Size and Appearance playing and increasingly important role in consumer's choices
- Consumer Electronics Design Values
- Small footprints, low power, low noise
- Devices that can take pride of place in the office space
- Compact designs enabled by low power VIA processors
- Low power VIA C3™ Processor
- Fanless VIA Eden™ ESP Processor



**EPIA CL Compatible Chassis**

A growing number of chassis are available from leading case manufacturers in a variety of different mini-box and slimline styles. The tables below provide a list of the key features of a selection of ultra small footprint chassis in slimline and mini-box configurations designed for the VIA EPIA Mini-ITX platform and their respective vendors.

**Slimline Chassis: Morex, ATCSTek, Chyang Fun**









	Morex Cupid 2699	Morex Cupid 2677	Morex Cupid 2688V	Morex Cupid 3677	Morex Cupid 3688	ATCSTek Slimline	ATCS-TEK Slim	Chyang Fun CF "668" E-Note
<b>Drive Bays</b>								
CDROM	5.25" Slim	5.25" Slim	5.25" Slim	5.25" Std.	5.25" Slim	5.25" Slim	5.25" Slim	5.25" Std.
Hard Drive	3.5"	3.5"	3.5"	3.5"	2.5"	3.5"	3.5"	3.5"
Floppy	No	No	Yes	No	No	No	No	No
<b>Accessories</b>								
1 to 1 riser	Optional	Yes	Yes	Optional	Optional	Optional	Optional	Yes
Front USB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Front 1394	Yes	Yes	No	No	No	Yes	Yes	Yes
Front Audio	Yes	Yes	No	No	No	Yes	Yes	Yes
<b>Power Supply</b>	12V AC adaptor	150W	Not included	12V AC adaptor	12V AC adaptor	Internal	150W	150W
<b>Photos</b>								
<b>Contact</b>	<a href="mailto:sales@idot.com">sales@idot.com</a>					Tel: 886 2 2270 1895	Tel: 886 2 32340220	Tel: 886 3 3631521

**Morex chassis contact:** [info@morexintl.com](mailto:info@morexintl.com)

**ATCSTek:** [information@atcstek.com](mailto:information@atcstek.com)

**Chyang Fun:** [sales@chyangfun.com](mailto:sales@chyangfun.com)









**Slimline Chassis: Skyhawk, Casetronic**

	Skyhawk IPX8201 "Serenity"	Skyhawk IPRO-1200	Skyhawk IPRO-1201	Skyhawk IPRO-1202	Skyhawk IPRO-1203	Casetronic Travla 134	Casetronic Travla 136	Casetronic Travla 137
<b>Drive Bays</b>								
CDROM	5.25" Slim	5.25" Slim	5.25" Slim	5.25" Slim	5.25" Std.	5.25" Slim	5.25" Std.	5.25" Std.
Hard Drive	3.5"	3.5"	3.5"	3.5"	3.5"	2.5"	25"	25"
Floppy	Yes	Yes	Yes	Yes	Yes	No	No	No
<b>Accessories</b>								
1 to 1 riser	Yes	No	No	No	No	No	No	Yes
Front USB	Yes	Yes	Yes	Yes	Yes	No	No	No
Front 1394	Yes	No	No	No	No	No	No	No
Front Audio	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
<b>Power Supply</b>	150W	200W	200W	200W	200W	12V AC adaptor	12V AC adaptor	12V AC adaptor
<b>Photos</b>								

**Skyhawk chassis contact:** [sales@idot.com](mailto:sales@idot.com)

**Casetronic chassis contact:** [vincent@casetronics.com](mailto:vincent@casetronics.com)

**Cube Chassis: Skyhawk, Morex, Bacata, ATCSTek**

	Skyhawk Eagle Box 6261-20	Skyhawk Eagle Box 6271-20	Morex Venus 668	Bacata Bleur nJeur B1 Box	Bacata Bleur Jeur AS Box	Chyang Fan CF-7989	Casetronic Travla 138	ATCSTek Cube
<b>Drive Bays</b>								
CDROM	5.25" Slim	5.25" Slim	5.25" Slim	5.25" Slim	3.5" Slim	5.25" Std.	5.25" Slim	5.25" Std.
Hard Drive	3.5"	3.5"	2.5"	3.5"	3.5"	3.5"	25"	3.5"
Floppy	Yes	Yes	Yes	No	No	No	No	No
<b>Accessories</b>								
1 to 1 riser	Yes	Yes	No	No	No	No	Yes	Yes
Front USB	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Front 1394	No	Yes	Yes	No	No	Yes	Yes	Yes
Front Audio	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
<b>Power Supply</b>	180W	200W	200W	120W	125W	150W	12V AC adaptor	Internal
<b>Photos</b>								
<b>Contact</b>	Tel: 886 2 29858063	Tel: 886 2 32340220	Tel: 886 2 24513000	Tel: 33 61 146 090	Tel: 33 61 146 090	Tel: 886 2 2270 1895	Tel +1 510 6565475	Tel: 886 3 3631521

**Skyhawk chassis contact:** [sales@idot.com](mailto:sales@idot.com)

**Morex chassis contact:** [info@morexintl.com](mailto:info@morexintl.com)

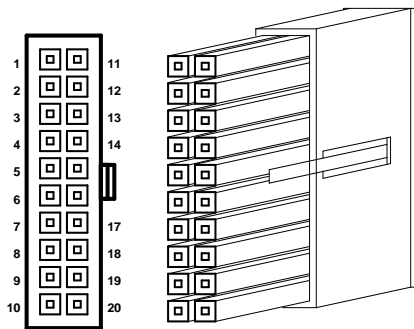
**Bacata chassis contact:** [bacata@bacata.net](mailto:bacata@bacata.net)

**Casetronic chassis contact:** [vincent@casetronics.com](mailto:vincent@casetronics.com)

**ATCSTek:** [information@atcstek.com](mailto:information@atcstek.com)

## Power Specifications

The EPIA CL utilizes an industry standard 20-pin ATX main connector to the power supply. Due to the EPIA CL platform's ultra low power requirements a 90 – 120 Watt ATX power supply is ample for even the heaviest of multimedia system applications.



1	+3V	11	+3V
2	+3V	12	-12V
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

## EPIA CL-Series Linux & Microsoft Driver Support

### Linux Driver Support

The EPIA CL-Series mainboards have a very high degree of support under Linux.

Support and drivers are provided through various methods including:

- Drivers provided by VIA
- Using a driver built into a distribution package
- Installing VIA's pre-compiled driver binary
- Compiling VIA's driver source code
- Installing a third party driver (such as the ALSA driver from the Advanced Linux Sound Architecture project for integrated audio)

Full instructions for the most popular distribution packages are updated monthly and are available for free download from the [Linux Arena](http://www.viaarena.com) on [www.viaarena.com](http://www.viaarena.com). The [Linux Application notes](#) on VIA Arena also contains further useful information to optimize system performance, such as increasing IDE performance beyond the capabilities of an in-built driver, measuring hard disk performance, enabling hardware monitoring features and other practical guides such as installing CD re-writers, enabling the USB 2.0 controller, and much more.

---

For OEM clients and system integrators developing a product for long term production, other code and other resources may also be made available. You can submit a request either through the [Developers portal](#) on VIA Arena, or through your VPSD support contact. Alternatively, VIA in some circumstances will also work towards providing a driver to suite your specific needs.

The [Linux Arena](#) is updated at least once per month. Other information, notes and links to specific areas of interest can also be found on the [EPIA Mainboards driver page](#). Many OEMs and system integrators also find it valuable to discuss their development with other Linux users in the dedicated [Linux Category](#) of the [VIA Arena Forums](#), which is monitored by VIA staff.

### **Microsoft Driver Support**

EPIA CL offers full support for the complete range of Microsoft operating systems.

A Windows XP Embedded support package for EPIA CL mainboards is available on the [WinXP Embedded Applications Notes](#) page, to facilitate evaluation and development. OEMs and System Integrators should, however, customize their own binary images according to their actual product specifications and application requirements. Sample component implementation for the CLE266 and Northbridge as well as integrated audio on the VT8235 Southbridge is also provided to assist in development. Updates to this support page are made on a monthly basis and further sample components will be released. Components of the VIA EPIA CL mainboard are also supported in Service Pack 1 (SP1).

### **Contact**

For more information on the EPIA CL-Series Mini ITX Mainboard contact your sales representative or visit our website at [www.viamainboard.com](http://www.viamainboard.com)

#### **USA**

440 Mission Court, Suite 220  
Fremont, CA 94539  
Tel: (510) 683 3300  
Fax: (510) 687 4654  
Email: [vpsd\\_sales@viatech.com](mailto:vpsd_sales@viatech.com)

#### **Germany**

Mottmann Strasse 12  
53842 Troisdorf-Oberlar  
Tel: 2241 397780  
Fax: 2241 3977819  
Email: [sales@via-tech.de](mailto:sales@via-tech.de)

#### **Taiwan**

8F, 533, Chung Cheng Road  
Hsin Tien, Taipei  
Tel: (02) 2218 5452  
Fax: (02) 2218 5453  
Email: [mkt@via.com.tw](mailto:mkt@via.com.tw)

#### **China**

6F, DAscom Tower  
9 Shangdi East Road  
Haidian District  
Beijing, 100085  
Tel: 10 6296 3088  
Fax: 10 6297 2929  
Email: [vpsdbj@viatech.com.cn](mailto:vpsdbj@viatech.com.cn)

