



# **Operating Guide**

## **EPIA SP-Series Mini-ITX Mainboard**

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## VIA EPIA SP-Series Overview

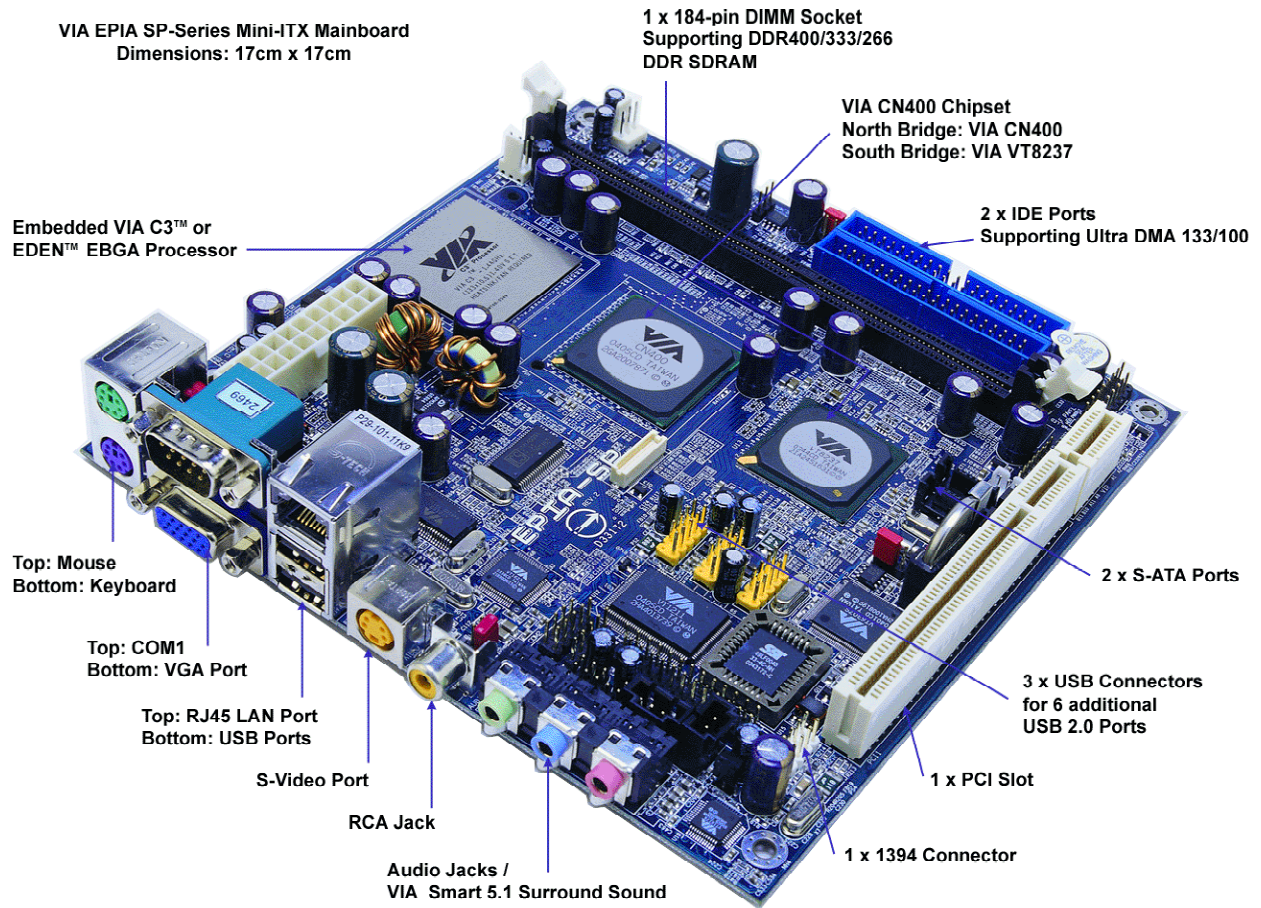
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The VIA EPIA SP-Series Mini-ITX Mainboard is an ultra compact x86 motherboard design with unprecedented expandability and versatility for today's ever-growing need of embedded applications. The mainboard is based on the VIA CN400 chipset featuring an embedded hardware MPEG-2 decoder / MPEG-4 accelerator and integrated VIA UniChrome™ Pro 2D/3D graphics for rich digital media performance. With the sizable memory bandwidth of a 184-pin DDR400 SDRAM DIMM slot, the high data transfer speeds of ATA-133 and Serial ATA and further enhanced by support of 6-Channel AC'97 codec for Smart 5.1 surround sound, the VIA EPIA SP-Series delivers the increased performance levels required of today's embedded digital media applications.

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

The VIA EPIA SP-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.

## VIA EPIA SP-Series Layout



## VIA EPIA SP-Series Specifications

<b>Processor</b>	- VIA C3/EDEN EPGA Processor
<b>Chipset</b>	- VIA CN400 North Bridge - VT8237 South Bridge
<b>System Memory</b>	- 1 DDR400/333/266 DDR SDRAM slot - Up to 1GB memory size
<b>VGA</b>	- Integrated VIA UniChrome™ Pro AGP Graphics
<b>Expansion Slot</b>	- 1 PCI
<b>Onboard IDE</b>	- 2 UltraDMA 133/100 connectors
<b>Onboard LAN</b>	- VIA VT6103 10/100 Base-T Ethernet PHY
<b>Onboard Audio</b>	- VIA VT1617A 6 channel AC'97 Codec
<b>Onboard TV Out</b>	- VIA VT1623 TV Encoder
<b>Onboard 1394</b>	- VIA VT6307S IEEE 1394 Firewire
<b>Onboard I/O Connectors</b>	- 3 USB connectors for 6 USB 2.0 ports - 2 Serial ATA ports - 1 1394 connector for 1 1394 port - 1 serial port connector for a second com port - 1 VIP connector - 1 Front-Panel Audio connector (Mic-in and Line-Out) - 1 CD Audio-in connector - 1 FIR connector - 1 CIR connector (Switchable for KB/MS) - 1 LPT port connector - 1 Wake-on-LAN connector - 2 FAN connectors: CPU and SYS FAN - 1 LVDS/TTL module connector (Manufacturing option) - 1 +12V power connector - ATX Power connector
<b>Back Panel I/O</b>	- 1 PS2 Mouse port - 1 PS2 Keyboard port - 1 RJ-45 LAN port - 1 Serial port - 2 USB 2.0 ports - 1 VGA port - 1 RCA port (SPDIF or TV out) - 1 S-Video port - 3 Audio jacks: line-out, line-in and mic-in (Horizontal, Smart 5.1 support)
<b>BIOS</b>	- Award BIOS - 4/8Mbit 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 (6 Layer) - 17 cm x 17 cm

## VIA EPIA SP Processor SKUs

The VIA EPIA SP-Series is available in two different speed grades. The VIA EPIA SP8000E utilizes VIA's ultra low power VIA Eden™ ESP processor while the VIA EPIA SP13000 utilizes the robust VIA C3™ processor.



**EPIA SP8000E**

**VIA Eden™ ESP 8000 processor**  
**800 MHz**  
**Fanless Operation**  
**1.05v Operating Volts**  
**128KB L1 Cache**  
**64KB L2 Cache**  
**MMX and SSE**  
**Padlock and ACE Encryption**



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



**EPIA SP13000**

**VIA C3™ processor**  
**1.3 GHz**  
**1.4v Operating Volts**  
**128KB L1 Cache**  
**64KB L2 Cache**  
**MMX and SSE**  
**Padlock and ACE Encryption**



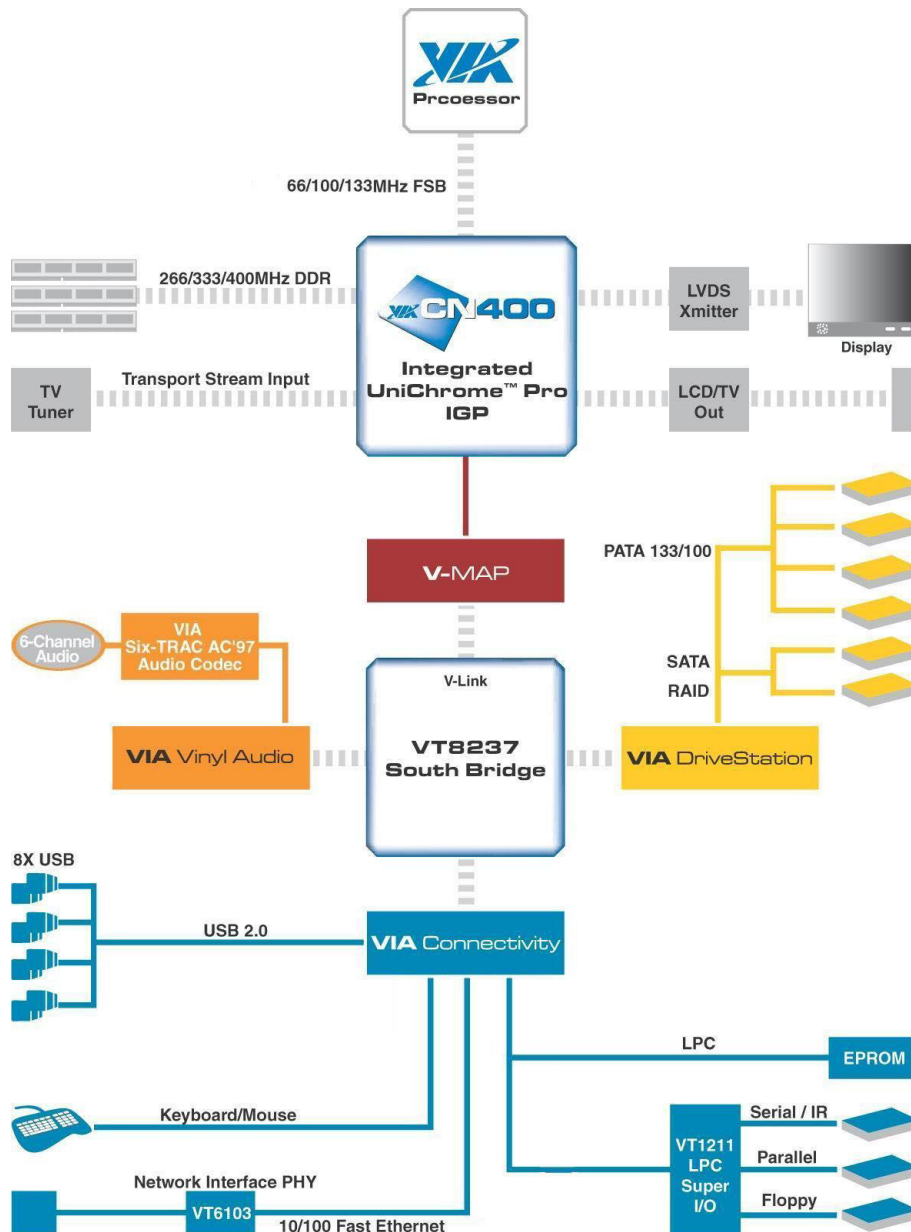
Suitable for compact systems running multimedia applications



PadLock ACE US government approved Advanced Encryption Standard (AES), performing cryptographic functions for securing e-mails, personal files, online transactions, and networks.

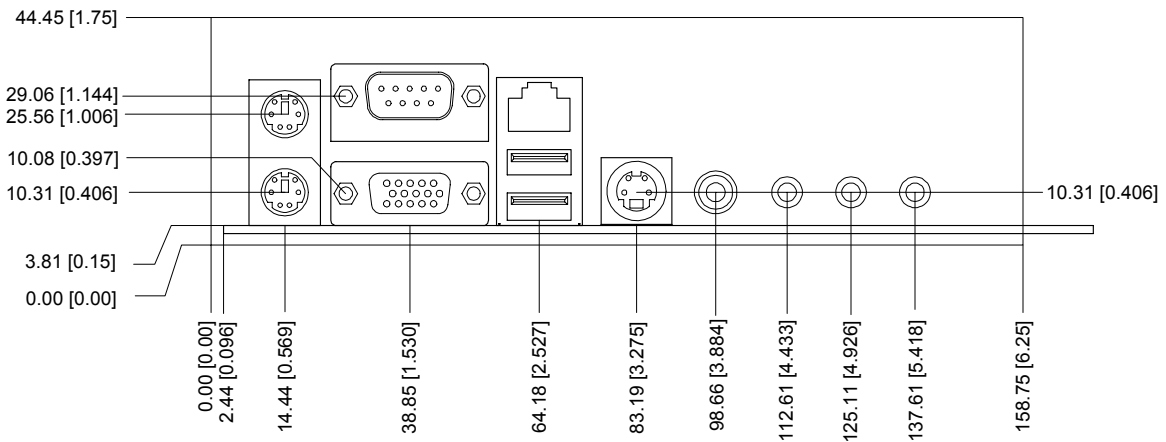
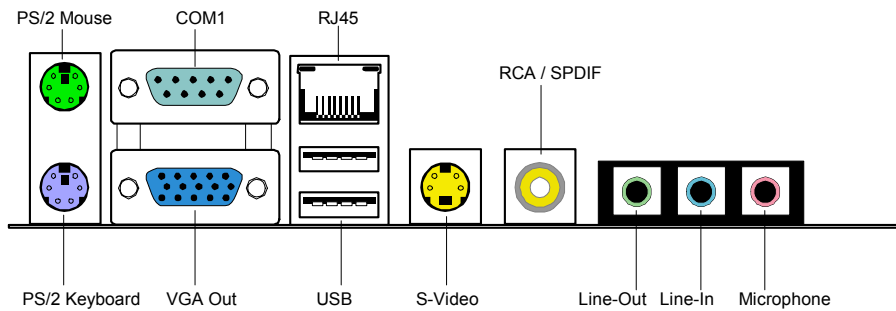
## VIA CN400 Chipset Overview

The VIA CN400 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 CN400 features the embedded VIA UniChrome™ Pro 2D/3D MPEG-2 decoder/MPEG-4 accelerator, DDR400 support, motion compensation and duo-view support to ensure a rich overall entertainment experience. Outstanding connectivity features include USB 2.0, Serial ATA, 10/100 LAN and ATA133/100.



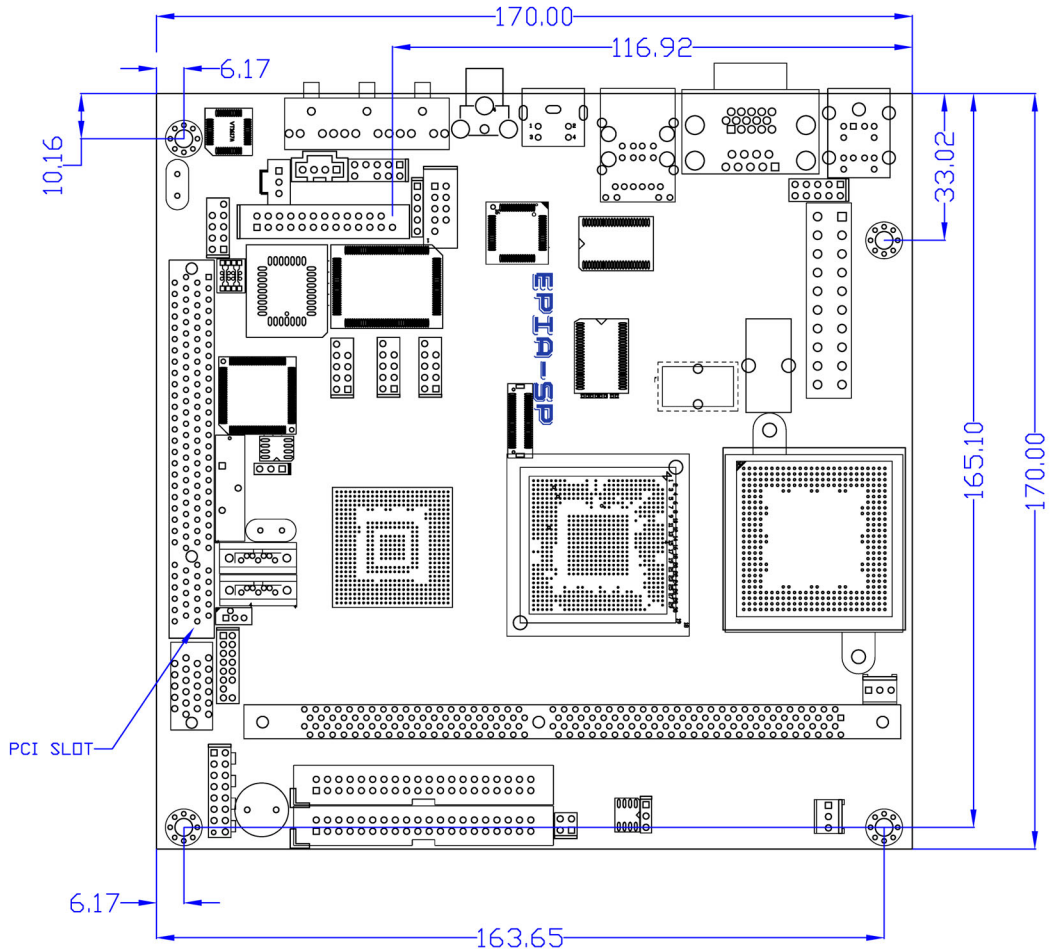
## VIA EPIA SP-Series I/O Back Panel Layout

The EPIA SP's ultra compact 17cm x 17cm, integrated design supports all the standard legacy x86 connectivity options as well as USB 2.0, VGA port, RJ45 LAN port, serial port and VIA 6 channel AC'97 audio.

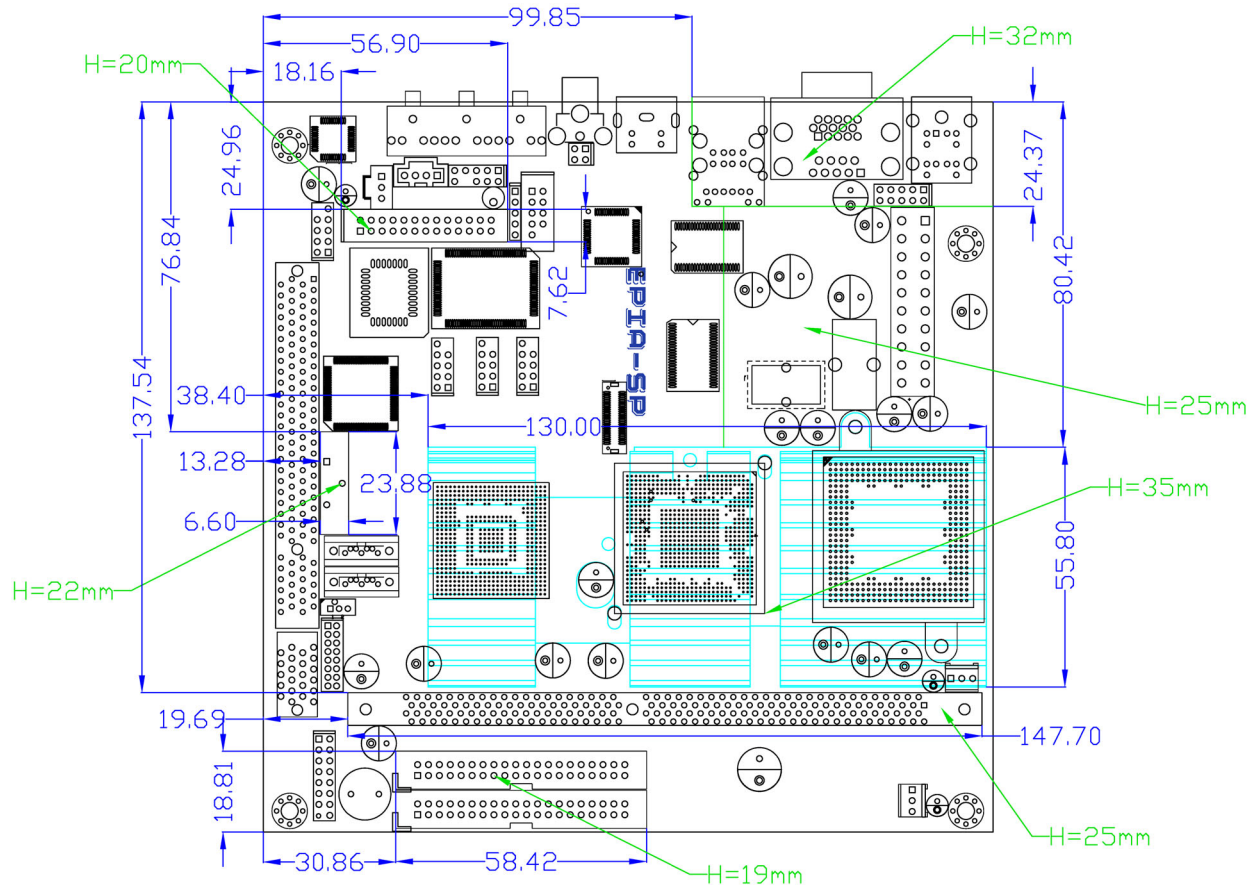




## VIA EPIA SP-Series Layout Diagram & Mounting Holes



## VIA EPIA SP-Series Layout Diagram & Height Distribution



## Noise Level Data

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VIA and the EPIA series have been at the forefront of the quiet computing initiative. The VIA EPIA SP-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 VIA EPIA SP8000E to 25dBA for the VIA EPIA SP13000, 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 thin clients, flat panel small form factor desktop replacement systems, LCD PCs and a host of other space and power saving systems.

Common Sounds	dBa Level
Threshold of hearing	0 dBA
VIA EPIA SP8000E	0 dBA
Normal breathing	10 dBA
Whispering at 1 meter	20 dBA
VIA EPIA SP13000	25 dBA
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

Power consumption tests were carried out comparing the VIA EPIA SP13000 (running the 1.3GHz VIA C3™ processor) and the VIA EPIA SP8000E (running the 800MHz VIA Eden™ ESP processor). The following tables are a comprehensive breakdown of the EPIA platform's voltage, amp and wattage values while running common system applications.

### VIA EPIA SP 13000

#### A. Playing DVD – Power DVD 4.0

	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.256	3.152	10.263
Main Board +5V	5.074	3.515	17.835
Main Board 5VSB	5.076	0.092	0.467
Main Board +12V	11.995	0.220	2.639
<b>Main Board Power Consumption</b>			<b>31.204</b>

#### B. 3DMark 2001

	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.205	4.455	14.278
Main Board +5V	5.052	3.636	18.369
Main Board 5VSB	5.083	0.012	0.061
Main Board +12V	12.100	0.065	0.787
<b>Main Board Power Consumption</b>			<b>33.495</b>

#### C. Idle

	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.295	3.176	10.465
Main Board +5V	5.101	1.147	5.851
Main Board 5VSB	5.081	0.030	0.152
Main Board +12V	12.045	0.176	2.120
<b>Main Board Power Consumption</b>			<b>18.588</b>

#### D. Run C.C. Winstone 2001

	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.265	2.970	9.697
Main Board +5V	5.056	3.091	15.628
Main Board 5VSB	5.077	0.069	0.350
Main Board +12V	12.049	0.157	1.892
<b>Main Board Power Consumption</b>			<b>27.567</b>

## VIA EPIA SP 8000E

### A. Playing DVD – Power DVD 4.0

	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.295	2.970	9.785
Main Board +5V	5.034	1.091	5.492
Main Board 5VSB	5.092	0.061	0.312
Main Board +12V	12.128	0.123	1.487
<b>Main Board Power Consumption</b>			<b>17.076</b>

### B. 3DMark 2001

	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.352	3.212	10.767
Main Board +5V	5.026	1.212	6.092
Main Board 5VSB	5.092	0.061	0.312
Main Board +12V	12.128	0.123	1.487
<b>Main Board Power Consumption</b>			<b>18.659</b>

### C. Idle

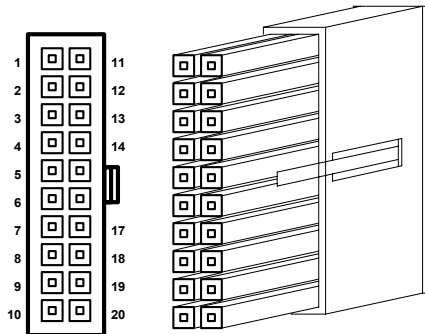
	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.302	2.576	8.505
Main Board +5V	5.068	0.424	2.150
Main Board 5VSB	5.092	0.066	0.336
Main Board +12V	12.127	0.127	1.544
<b>Main Board Power Consumption</b>			<b>12.535</b>

### D. Run C.C. Winstone 2001

	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.321	2.545	8.453
Main Board +5V	5.028	1.152	5.790
Main Board 5VSB	5.092	0.061	0.311
Main Board +12V	12.128	0.123	1.487
<b>Main Board Power Consumption</b>			<b>16.041</b>

## Power Specifications

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



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

Note: NC = no connection

## VIA EPIA SP-Series Microsoft and Linux Driver Support

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### Microsoft Driver Support

VIA EPIA SP-Series offer full support for the complete range of Microsoft operating systems.

For standard operating systems, Windows 98/Me/2000/XP latest drivers downloads can be found in the VEPD website at [www.viaembedded.com](http://www.viaembedded.com).

For embedded operating systems, Windows CE.NET and XP Embedded related driver supports can be found in the VIA Arena website at [www.viaarena.com](http://www.viaarena.com).

### Linux Driver Support

VIA EPIA SP 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
  - Visiting VIA Arena website at [www.viaarena.com](http://www.viaarena.com) for latest updates on a monthly basis
- Installing a third party driver (such as the ALSA driver from the Advanced Linux Sound Architecture project for integrated audio)

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

## Contact

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

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