



VIA Embedded Platform
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Operating Guide

EPIA SP-Series Mini-ITX Mainboard

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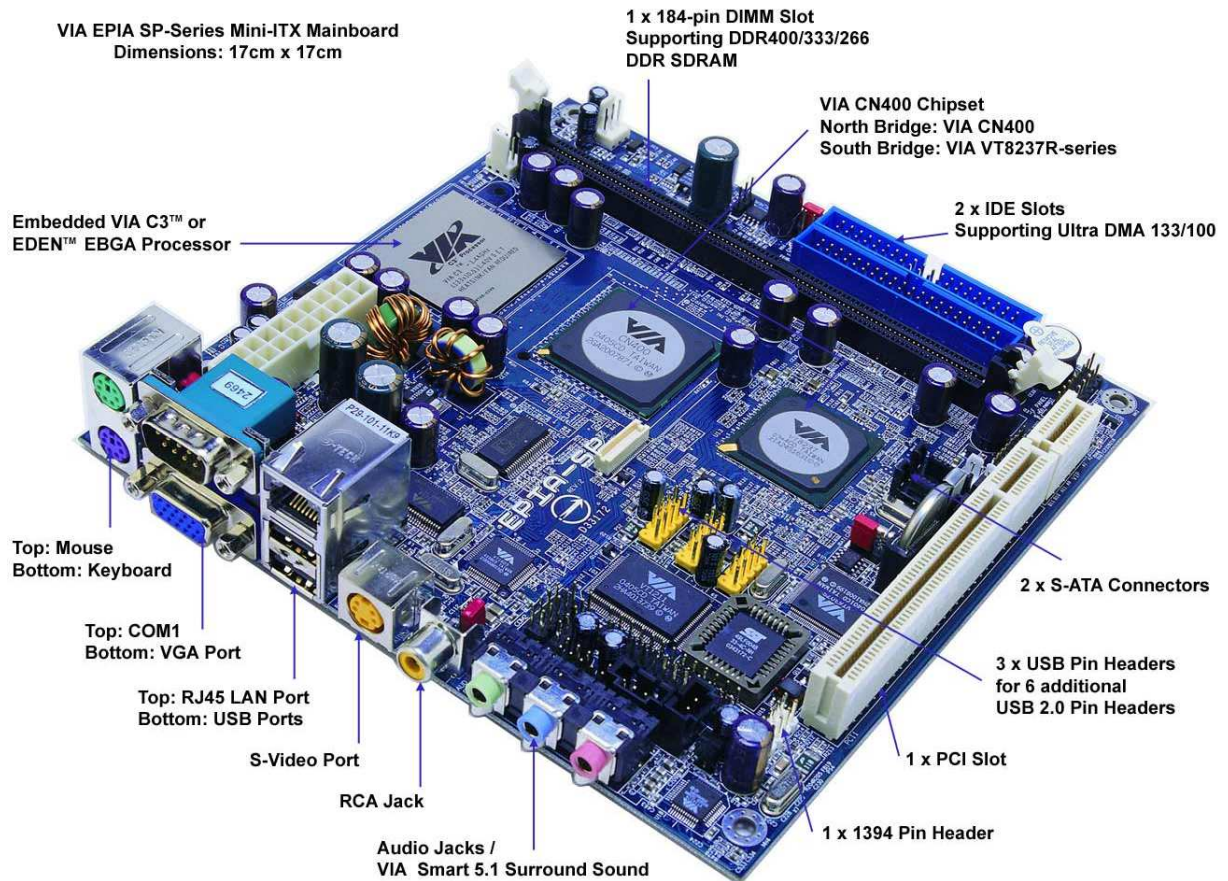
VIA EPIA SP-Series Overview

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 and integrated VIA UniChrome™ Pro 2D/3D graphics for rich digital media performance. With the sizable memory bandwidth of DDR400 SDRAM DIMM, 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 has 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, S-Video, Video interface port and has one 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

Processor	- VIA C3 / EDEN EBGA Processor
Chipset	- VIA CN400 North Bridge - VIA VT8237R-series South Bridge
System Memory	- 1 DDR400/333/266 DIMM slot - Up to 1GB memory size
VGA	- Integrated VIA UniChrome™ Pro AGP Graphics
Expansion Slot	- 1 PCI
Onboard IDE	- 2 UltraDMA 133/100 slots
Onboard S-ATA	- 2 Serial ATA connectors
Onboard LAN	- VIA VT6103 10/100 Base-T Ethernet PHY
Onboard Audio	- VIA VT1617A 6 channel AC'97 Codec
Onboard TV Out	- VIA VT1623 TV Encoder
Onboard 1394	- VIA VT6307S IEEE 1394 Firewire
Onboard I/O Connectors	- 3 USB pin headers for 6 additional USB 2.0 ports - 1 1394 pin header for a 1394 port - 1 serial header for a second com port - 1 VIP header - 1 Front-Panel Audio header (Mic-in and Line-Out) - 1 CD Audio-in connector - 1 Buzzer - 1 FIR header - 1 CIR header (Switchable for KB/MS connector) - 1 LPT header - 1 Wake-on-LAN connector - 2 FAN connectors (CPU and SYS FAN) - 1 SM Bus header - 1 LVDS/TTL module connector (Manufacturing option) - 1 +12V power connector - 1 ATX Power connector
Back Panel I/O	- 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)
BIOS	- Award BIOS - 4/8Mbit flash memory
System Monitoring & Management	- CPU voltage monitoring - Wake-on-LAN, Keyboard-Power-on, Timer-Power-on - System power management - AC power failure recovery
Operating Temperature	- 0 ~ 50°C
Operating Humidity	- 0% ~ 93% (relative humidity; non-condensing)
Form Factor	- Mini-ITX (6 Layer) - 17 cm x 17 cm

* The specification is subject to change without prior notice.

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



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 fanless systems with low heat and ultra low-power requirements



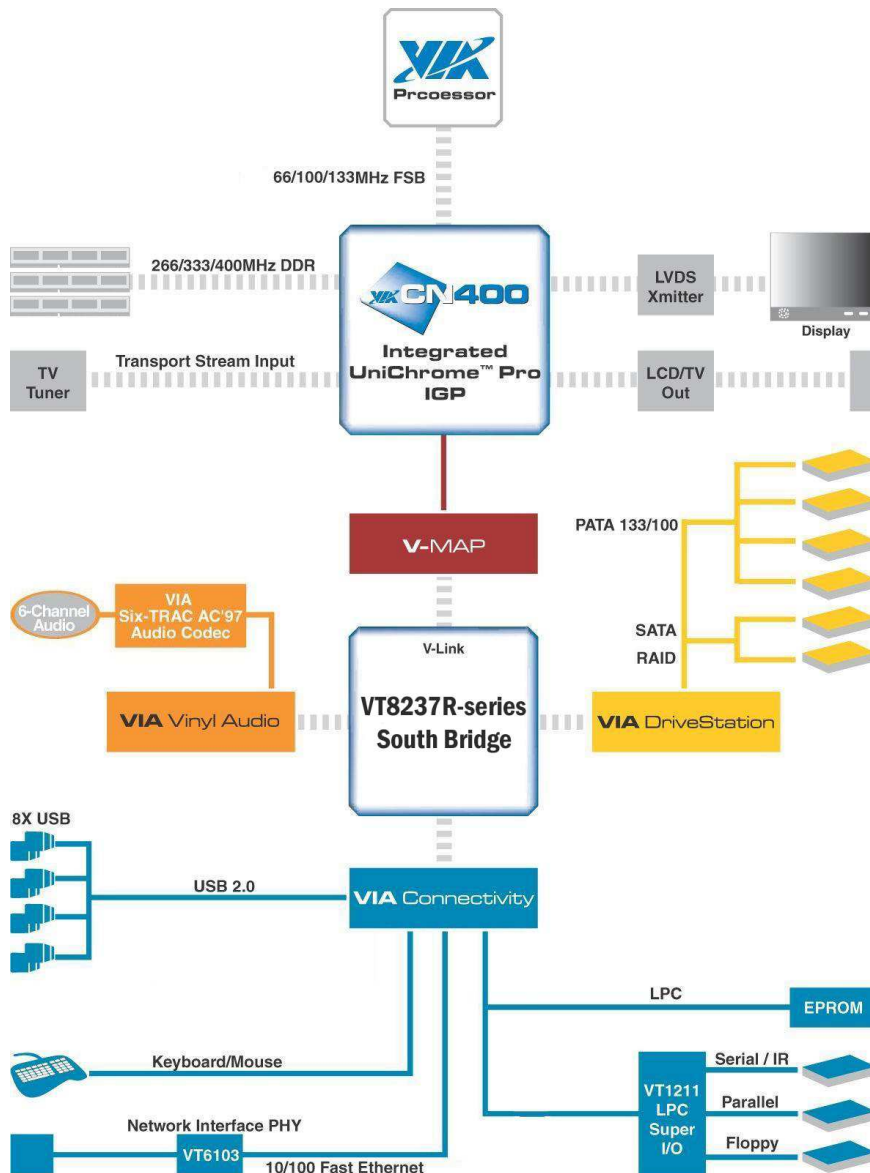
Suitable for compact systems running multimedia applications



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

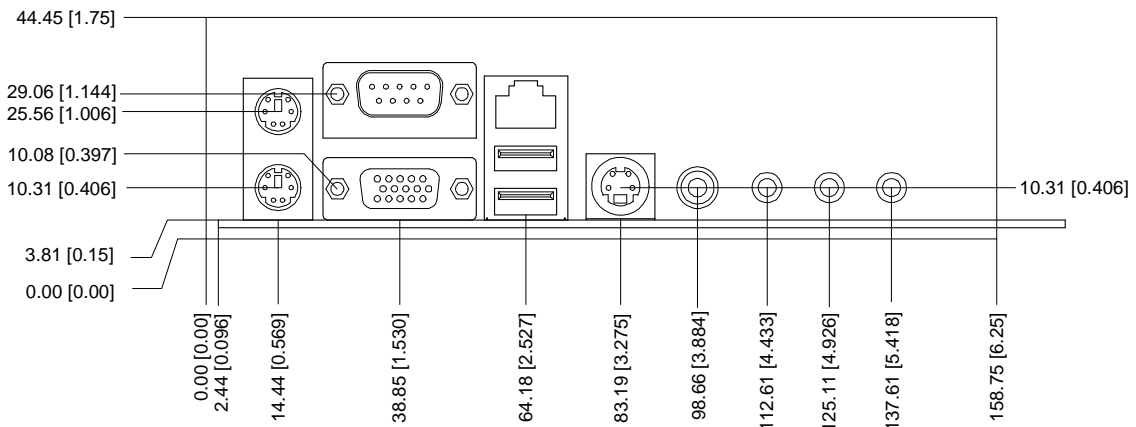
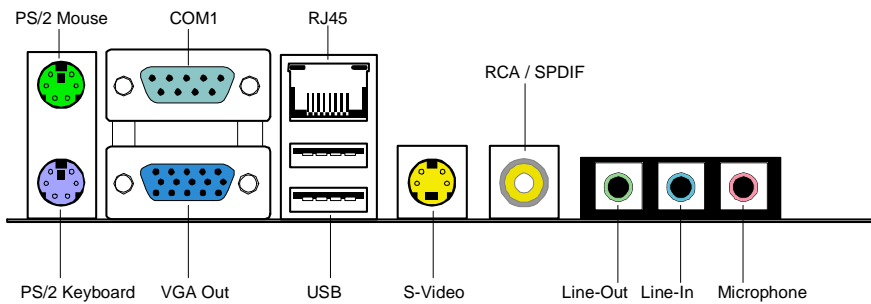
VIA CN400 Chipset Overview

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, 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.

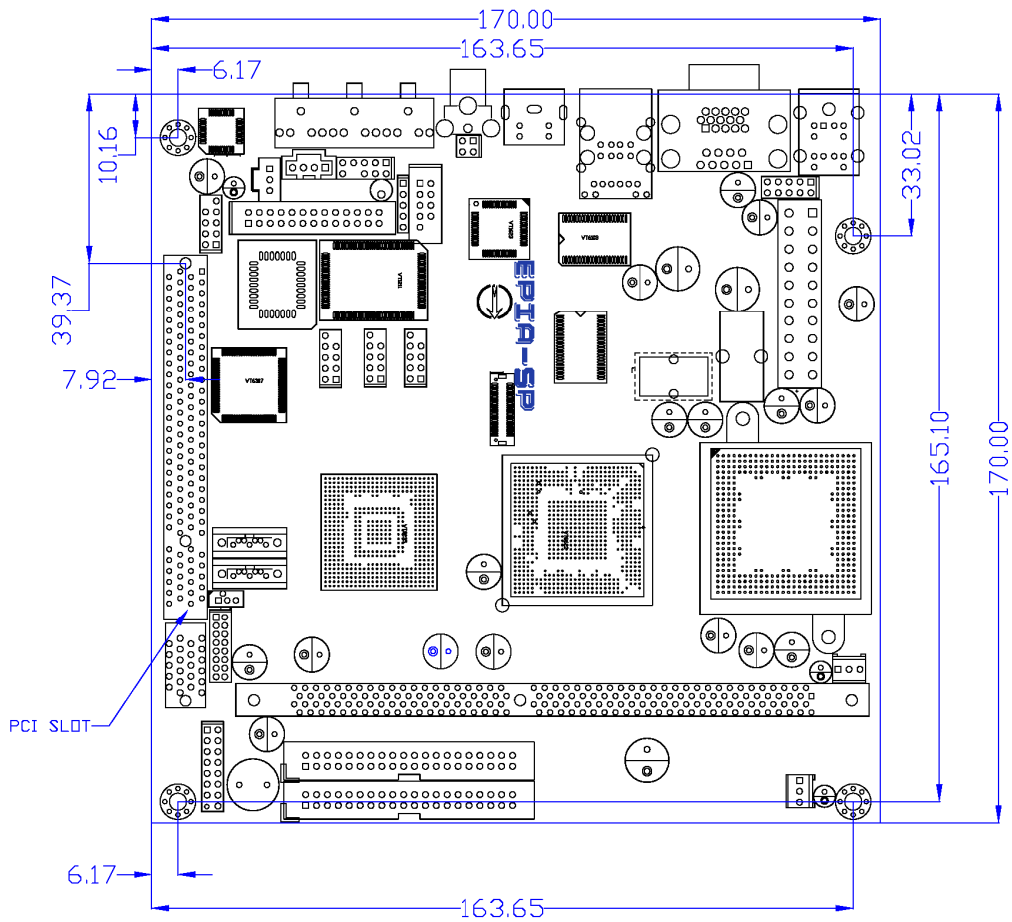


VIA EPIA SP-Series I/O Back Panel Layout

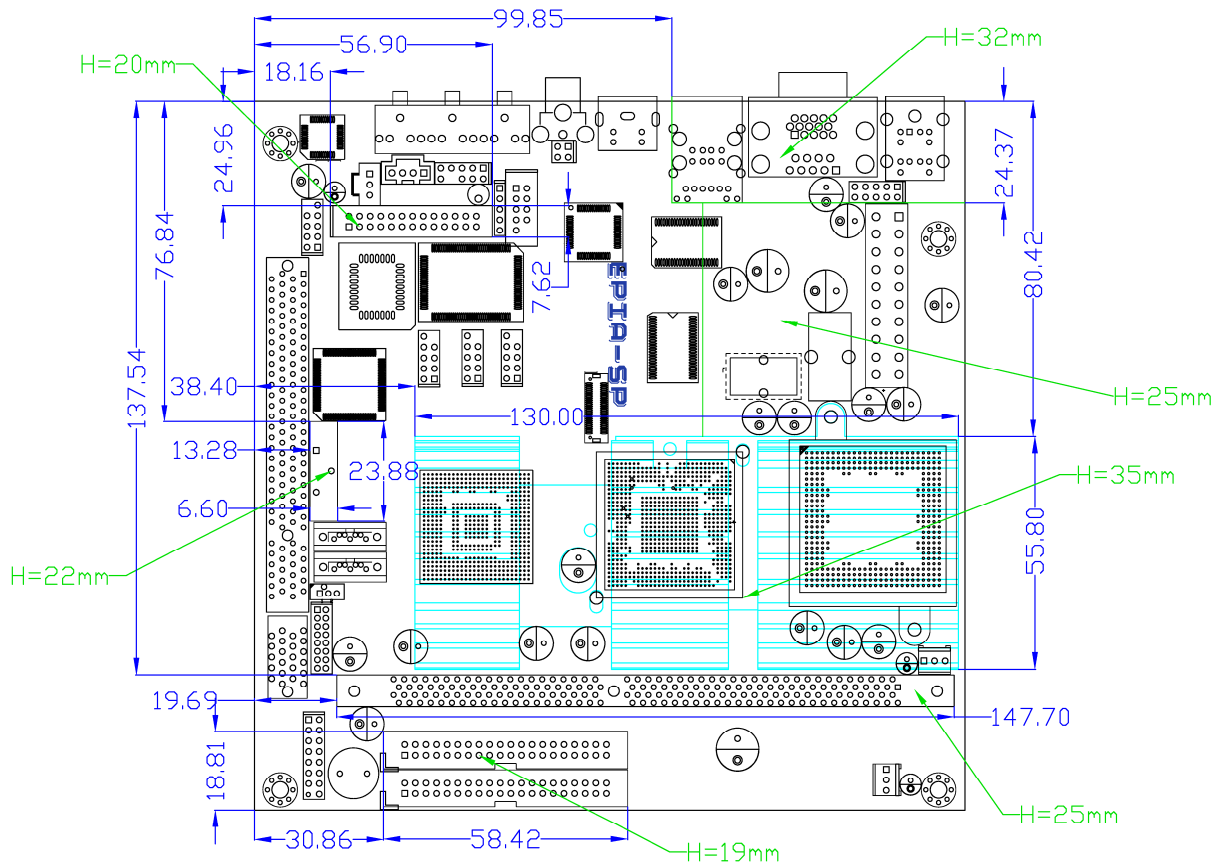
The EPIA SP's ultra compact 17cm x 17cm, integrated design supports all the standard legacy x86 connectivity options as well as USB 2.0, VGA port, RJ45 LAN port, serial port and VIA 6 channel AC'97 audio.



VIA EPIA SP-Series Layout Diagram & Mounting Holes



VIA EPIA SP-Series Layout Diagram & Height Distribution



Noise Level Data

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
Main Board Power Consumption			31.204

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
Main Board Power Consumption			33.495

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
Main Board Power Consumption			18.588

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
Main Board Power Consumption			27.567

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
Main Board Power Consumption			17.076

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
Main Board Power Consumption			18.659

C. Idle

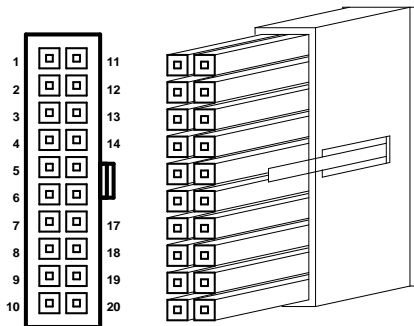
	Voltage	Measured Amp.	Watts
Main Board +3.3V	3.302	2.576	8.505
Main Board +5V	5.068	0.424	2.150
Main Board 5VSB	5.092	0.066	0.336
Main Board +12V	12.127	0.127	1.544
Main Board Power Consumption			12.535

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
Main Board Power Consumption			16.041

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.



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

VIA EPIA SP-Series Microsoft and Linux Driver Support

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.

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.

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 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.

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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

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