



Operating Guide

EPIA-M850 Mainboard

Table of Contents

Table of Contents	i
VIA EPIA-M850 overview	1
VIA EPIA-M850 layout.....	2
VIA EPIA-M850 specifications.....	3
VIA EPIA-M850 processor SKUs.....	4
VIA VX900 chipset overview.....	5
VIA EPIA-M850 mounting hole and board dimensions.....	6
VIA EPIA-M850 height distribution	7
VIA EPIA-M850 side profile.....	8
Power consumption.....	9
VIA EPIA-M850 1.6 GHz.....	9
A. 100% CPU usage	9
B. Burn-in 3DMark06, 1280 x 1024 (bench mode)	9
C. Power DVD 8.0 (H.264 1080i, 10MB movie)	9
D. Power DVD 8.0 (MPEG2 1080p, 40MB movie).....	9
E. Power DVD 8.0 (WMV9 1920 x 1080, 40MB movie)	10
F. Idle.....	10
VIA EPIA-M850 1.2 GHz.....	11
A. 100% CPU usage	11
B. Burn-in 3DMark06, 1280 x 1024 (bench mode)	11
C. Power DVD 8.0 (H.264 1080i, 10MB movie)	11
D. Power DVD 8.0 (MPEG2 1080p, 40MB movie).....	11
E. Power DVD 8.0 (WMV9 1920 x 1080, 40MB movie)	12
F. Idle.....	12
Power Specifications.....	13
VIA EPIA-M850 Microsoft and Linux driver support.....	14
Microsoft Driver Support	14
Linux Driver Support	14
Contact information.....	15

VIA EPIA-M850 overview

The VIA EPIA-M850 Mini-ITX Mainboard is a compact native x86 mainboard optimized for advanced level system in embedded and multimedia applications. The mainboard is based on the VIA VX900 Unified Digital Media IGP chipset featuring the VIA C-9 HC with 2D/3D graphics and video accelerators for rich digital media performance.

The VIA EPIA-M850 includes a powerful, secure, and efficient VIA Nano™ processor. The VIA Nano processor includes the VIA Padlock Security Engine, VIA CoolStream™ Architecture, VIA StepAhead™ Technology Suite, and VIA TwinTurbo™ technology.

The VIA EPIA-M850 includes two 1066/800 MHz DDR3 DIMM slots that support a combined total of 8 GB. The VIA EPIA-M850 provides support for high fidelity audio with its included VIA VT1708S High Definition Audio codec. In addition it supports two SATA 3Gb/s storage devices.

The VIA EPIA-M850 is compatible with a full range of Mini-ITX chassis as well as FlexATX and MicroATX enclosures and power supplies. The VIA EPIA-M850 is fully compatible with Microsoft® and Linux operating systems.

VIA EPIA-M850 layout

EPIA-M850
Mini-ITX Embedded Board

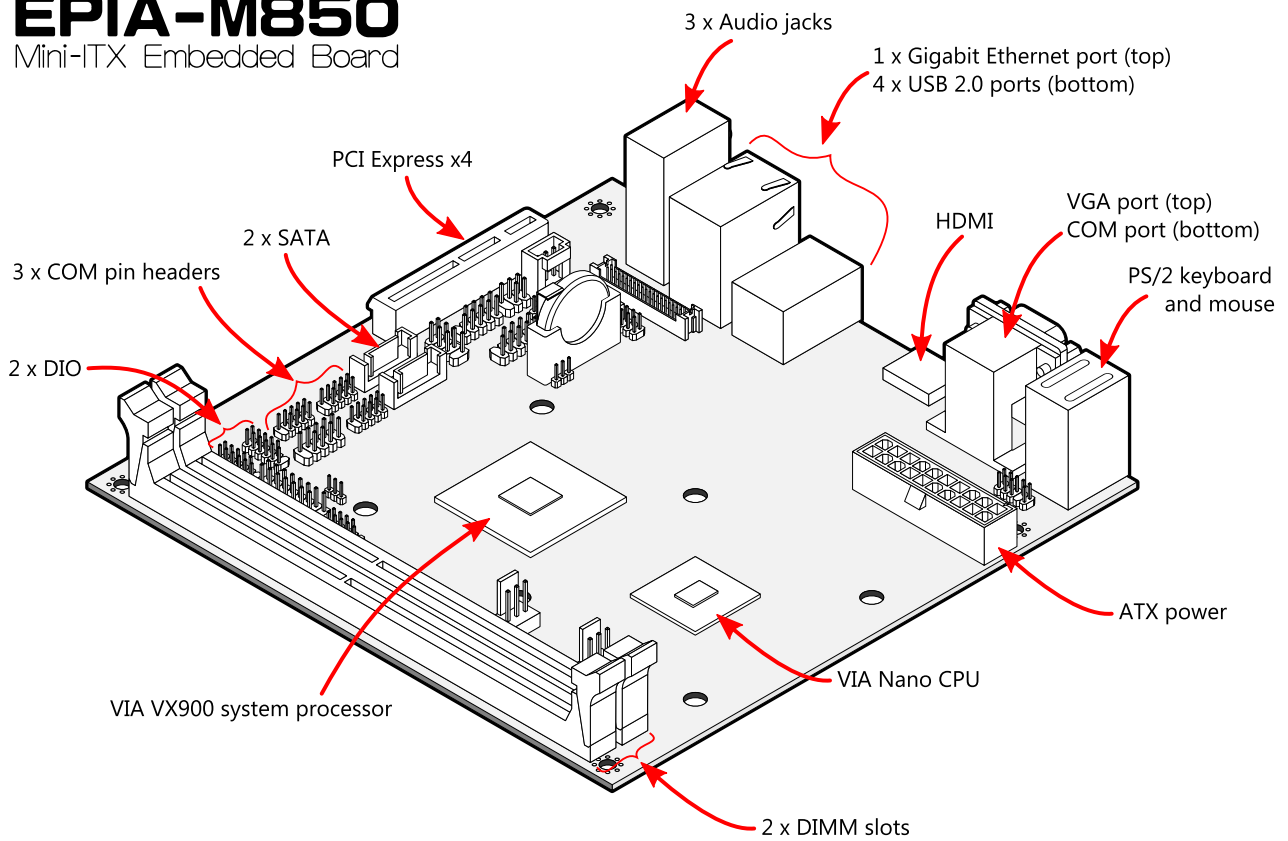


Figure 1: EPIA-M850 layout

VIA EPIA-M850 specifications

Model Name	EPIA-M850-16L	EPIA-M850-12EL
Processor	- VIA 1.6 GHz Nano processor	- VIA 1.2GHz Nano processor
Thermal Solution	- Heatsink with fan	- Fanless heatsink
Chipset	- VIA VX900 Unified Digital Media IGP Chipset	
System Memory	- 2 x DDR3 1066/800 MHz DIMM slot (up to 8 GB)	
VGA	- Integrated VIA C-9 HC3 DX9 3D/2D Graphics and Unified Video Decoding Acceleration	
Onboard SATA	- 2 x SATA connectors with configurable pin 7 (GND/5V) - 2 x SATA power connectors* (for 3.5-inch SATA hard drives)	
Onboard LAN	- 1 x VIA VT6130 PCIe Gigabit LAN controllers	
Onboard Audio	- VIA VT1708S High Definition Audio Codec	
Onboard I/O Connectors	<ul style="list-style-type: none"> - 1 x Dual-channel 24-bit LVDS connector - 1 x LVDS inverters - 2 x USB pin header for 4 additional USB ports - 3 x RS232 COM pin headers - 2 x Digital I/O pin headers (GPI x 8, GPO x 8) - 1 x LPC pin header - 1 x SMBUS pin header - 1 x Front audio pin header - 1 x S/PDIF out connector - 1 x SPI pin header - 1 x PS2 keyboard/mouse pin header - 1 x Front-panel pin header - 2 x Fan connectors for CPU and system fans - 1 x Thermal sensor - 1 x ATX power connector 	
Expansion Slot	- 1 x 4-lane PCIe slot	
Back Panel I/O	<ul style="list-style-type: none"> - 1 x PS2 stack (keyboard and mouse) - 1 x RS232 COM port - 1 x VGA port - 1 x HDMI[®] port - 1 x RJ-45 Gigabit LAN port - 4 x USB 2.0 ports - 3 x Audio jacks for Line-out, Line-in and Mic-in 	
BIOS	<ul style="list-style-type: none"> - AMI BIOS - 4/8Mbit SPI flash ROM 	
Operating System	Windows 7 / XP / XPe / CE, Linux	
System Monitoring & Management	<ul style="list-style-type: none"> - CPU voltage monitor - System temperature monitor - Wake-on-LAN, Keyboard power-on, RTC Timer power-on, Watch Dog Timer, fan speed monitor - System power management, AC Power failure recovery 	
Operating Temperature	0 °C ~ 60 °C	
Operating Humidity	0% ~ 95% (relative humidity; non-condensing)	
Form Factor	- Mini-ITX (17 cm x 17 cm)	
Compliance	CE/FCC/RoHS/BSMI	

* This specification is subject to change without prior notice.

VIA EPIA-M850 processor SKUs

The VIA EPIA-M850 is available in two speed grades as follows:

- VIA 1.6 GHz Nano processor (EPIA-M850-16L)
- VIA 1.2 GHz Nano processor (EPIA-M850-12EL)

VIA VX900 chipset overview

The VIA VX900 Unified Digital Media 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 VIA VX900 features VIA C-9 HC3 with 2D/3D graphics and video acceleration, DDR3 1066/800 MHz support, motion compensation and dual display support to ensure a rich overall entertainment experience.

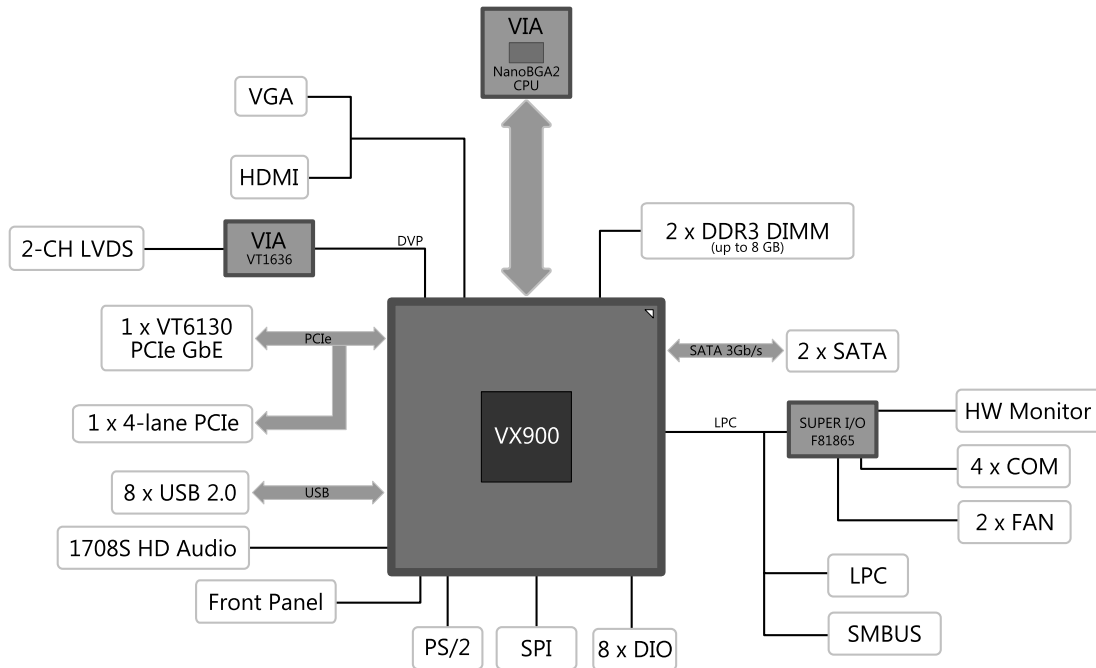


Figure 2: VX900 as implemented in the EPIA-M850

VIA EPIA-M850 mounting hole and board dimensions

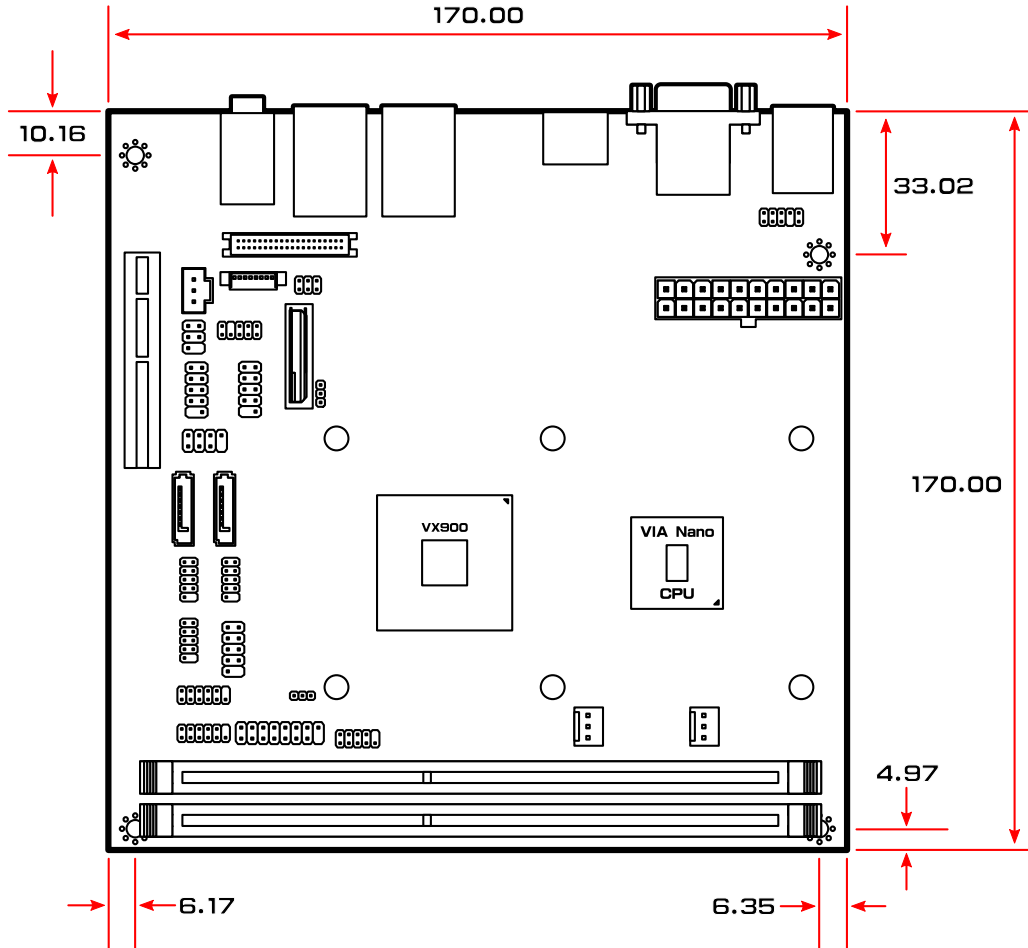


Figure 3: EPIA-M850 mounting hole and board dimensions

VIA EPIA-M850 height distribution

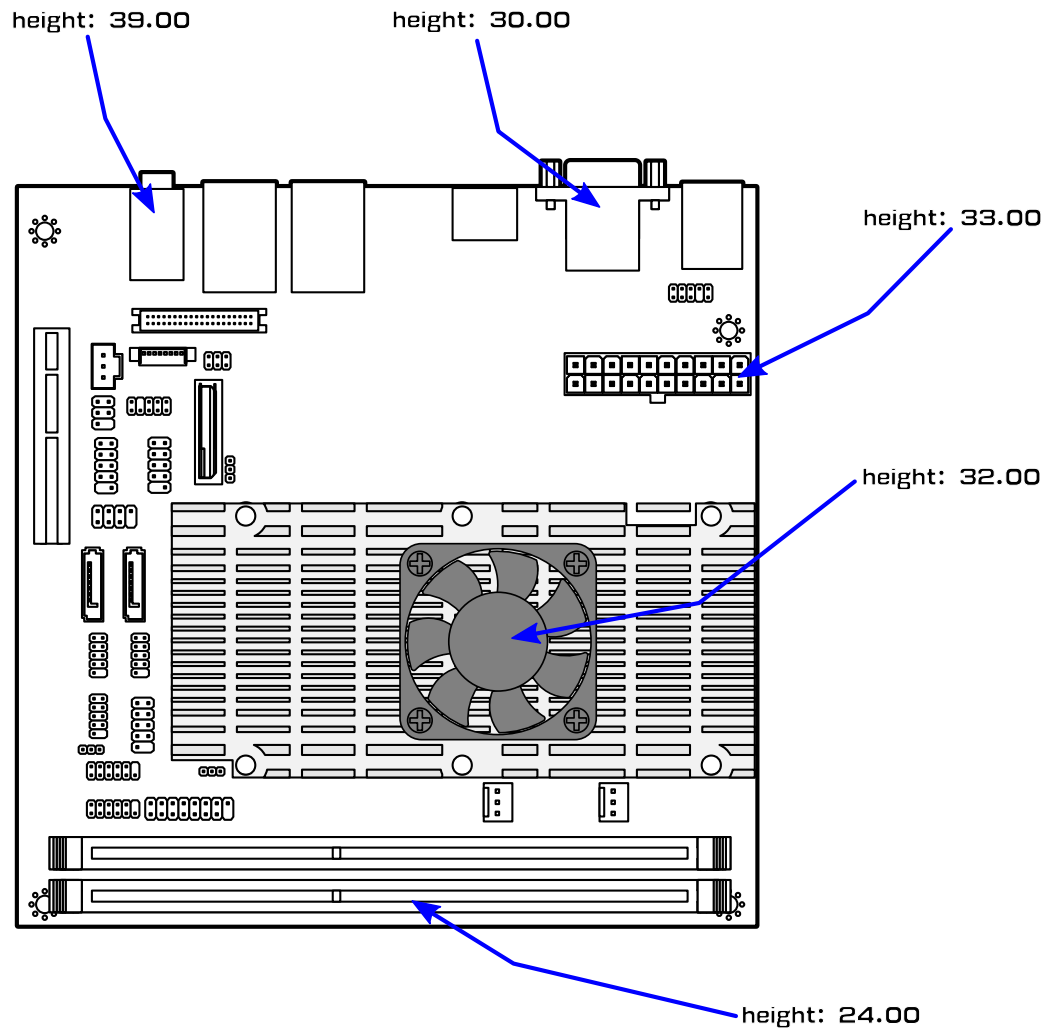


Figure 4: EPIA-M850 component placement and height distribution

VIA EPIA-M850 side profile

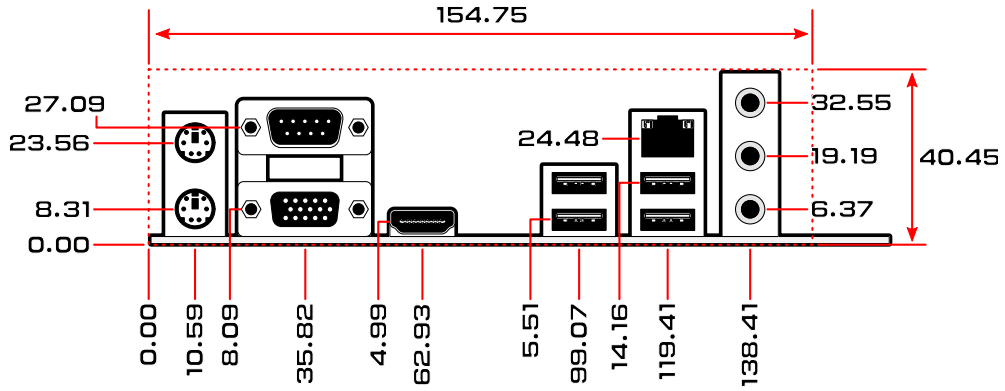


Figure 5: EPIA-M850 back panel ports

Power consumption

Power consumption tests were performed on the VIA EPIA-M850 for both processor options. The following tables are a comprehensive breakdown of the voltage, amp and wattage values while running common system applications.

VIA EPIA-M850 1.6 GHz

A. 100% CPU usage

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.5	1.630
Main Board +5V	4.93	5.6	27.608
Main Board 5VSB	5.03	0.0	0.000
Main Board +12V	12.39	0.0	0.000
Total Power Consumption			29.238

B. Burn-in 3DMark06, 1280 x 1024 (bench mode)

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	4.96	4.7	23.312
Main Board 5VSB	5.04	0.0	0.000
Main Board +12V	12.37	0.1	1.237
Total Power Consumption			27.157

C. Power DVD 8.0 (H.264 1080i, 10MB movie)

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.9	2.934
Main Board +5V	5.00	3.0	15.000
Main Board 5VSB	5.05	0.0	0.000
Main Board +12V	12.32	0.2	2.464
Total Power Consumption			20.398

D. Power DVD 8.0 (MPEG2 1080p, 40MB movie)

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	5.00	3.1	15.500
Main Board 5VSB	5.05	0.0	0.000
Main Board +12V	12.33	0.1	1.233
Total Power Consumption			19.341

E. Power DVD 8.0 (WMV9 1920 x 1080, 40MB movie)

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	4.95	4.5	22.275
Main Board 5VSB	5.04	0.0	0.000
Main Board +12V	12.37	0.1	1.237
		Total Power Consumption	26.120

F. Idle

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	5.04	1.8	9.072
Main Board 5VSB	5.05	0.0	0.000
Main Board +12V	12.26	0.1	1.226
		Total Power Consumption	12.906

VIA EPIA-M850 1.2 GHz
A. 100% CPU usage

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	4.93	3.8	18.734
Main Board 5VSB	5.04	0.0	0.000
Main Board +12V	12.48	0.0	0.000
		Total Power Consumption	21.342

B. Burn-in 3DMark06, 1280 x 1024 (bench mode)

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	4.94	3.5	17.290
Main Board 5VSB	5.04	0.0	0.000
Main Board +12V	12.47	0.0	0.000
		Total Power Consumption	19.898

C. Power DVD 8.0 (H.264 1080i, 10MB movie)

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	4.97	2.3	11.431
Main Board 5VSB	5.05	0.0	0.000
Main Board +12V	12.43	0.0	0.000
		Total Power Consumption	14.039

D. Power DVD 8.0 (MPEG2 1080p, 40MB movie)

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	4.96	2.2	10.912
Main Board 5VSB	5.05	0.0	0.000
Main Board +12V	12.45	0.0	0.000
		Total Power Consumption	13.520

E. Power DVD 8.0 (WMV9 1920 x 1080, 40MB movie)

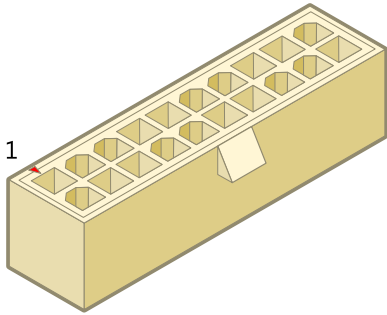
	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	4.94	3.4	16.796
Main Board 5VSB	5.04	0.0	0.000
Main Board +12V	12.48	0.0	0.000
		Total Power Consumption	19.404

F. Idle

	Measured Voltage	Measure Amp	Watts
Main Board +3.3V	3.26	0.8	2.608
Main Board +5V	4.99	1.6	7.984
Main Board 5VSB	5.05	0.0	0.000
Main Board +12V	12.41	0.0	0.000
		Total Power Consumption	10.592

Power Specifications

The VIA EPIA-M850 mainboard is available with an industry standard 20-pin ATX connector for connecting to the power supply.



Pin	Signal	Pin	Signal
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	Gnd	13	Gnd
4	+5V	14	PS_ON
5	Gnd	15	Gnd
6	+5V	16	Gnd
7	Gnd	17	Gnd
8	PW_OK	18	-5V
9	+5V_SB	19	+5V
10	+12V	20	+5V

VIA EPIA-M850 Microsoft and Linux driver support

MICROSOFT DRIVER SUPPORT

The VIA EPIA-M850 mainboard is compatible with Microsoft operating systems. The latest Windows 2000 and Windows XP drivers can be downloaded from the VIA Embedded website at www.viaembedded.com.

For embedded operating systems (Windows CE and Windows XP Embedded), the related drivers can be found in the VIA Embedded website at www.viaembedded.com.

LINUX DRIVER SUPPORT

The VIA EPIA-M850 mainboard is highly compatible with many Linux distributions.

Support and drivers are provided through various methods including:

- Drivers provided by VIA
- Using a driver built into a distribution package
- Visiting www.viaembedded.com for the latest updated drivers
- 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 to your VIA Embedded support contact.

Contact information

For more information on the VIA EPIA-M850 Mini-ITX mainboard contact your sales representative or visit our website at www.viaembedded.com

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