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## Helios PC/104 SBC

PC/104 SBC with Vortex86DX CPU and Integrated Autocalibrating Data Acquisition



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## Description

Helios is a low power, mid-range performance PC/104 form factor single board computer combining a highly integrated CPU with Diamond Systems' renowned high-accuracy data acquisition circuitry on a single board, reducing size and cost while increasing ruggedness. Helios utilizes a Vortex integrated single chip CPU operating at 800MHz or 1GHz, and 256MB of DRAM soldered on-board.

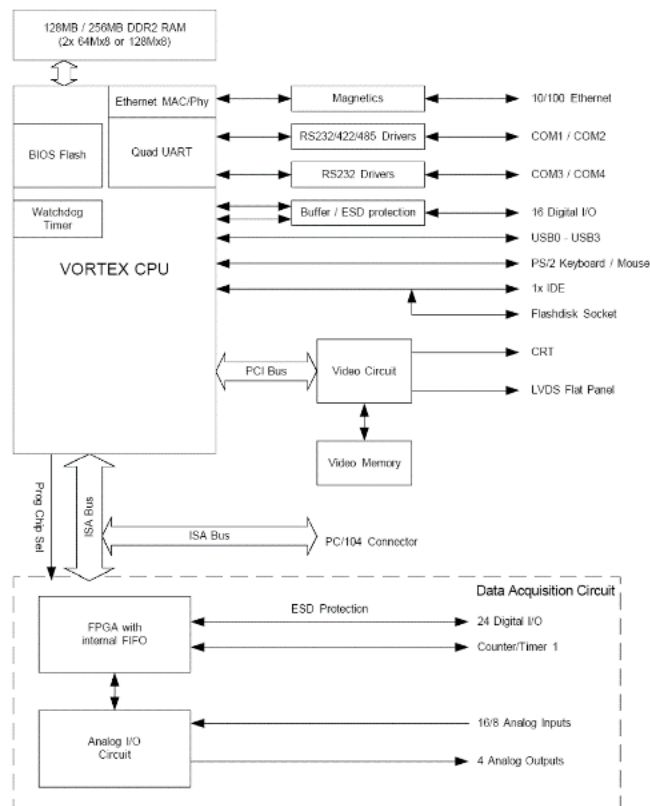
Helios incorporates advanced features such as four USB 2.0 ports, an IDE hard drive interface, mounting capability for a solid state flashdisk up to 4GB, and CRT/LVDS LCD graphics. Helios also provides a 10/100Base-T Ethernet interface, two RS-232 serial ports, two RS-232/422/485 serial ports and legacy keyboard and mouse interfaces.

Helios includes an on-board 2MB bootable flash drive with FreeDOS installed. This flash drive offers additional cost savings for DOS applications, since no additional storage medium is required. It also enables you to quickly verify Helios's operation. Just connect keyboard, monitor, and power, and Helios boots up to DOS so you can verify proper working condition as well as test the various features on the single board computer.

Helios is extremely rugged, featuring on-board soldered DRAM and -40°C to +85°C fan-less operation. Optional hardwired jumpers and latching connectors are available for increased resistance to shock and vibration. Conformal coating is available as an extra cost option.

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## System Block Diagram



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## Integrated Data Acquisition

## FEATURES

### CPU Features

- Vortex86DX CPU at 1GHz or
- 256MB of soldered DRAM
- On-board 2MB bootable flash FreeDOS installed
- 4 USB 2.0 ports
- 2 RS-232, 2 RS-232/422/485
- 10/100Base-T Ethernet
- 1 IDE UDMA-100 port
- Flashdisk interface
- CRT and LVDS LCD
- PC/104 ISA expansion bus
- -40°C to +85°C operation

### Data Acquisition

- 16 wide-range analog input down to 0-1.25V
- 16-bit A/D resolution
- Single-channel, multi-channel robin, and multi-channel scan
- 250KHz maximum sample rate
- 2048 A/D sample FIFO with programmable threshold
- Interrupt-based A/D data transfer FIFO support
- Programmable input ranges
- 4 wide-range analog output simultaneous update capability
- 12-bit D/A resolution
- Multi-range autocalibration accuracy
- 40 digital I/O lines with programmable direction
- 16-bit and 24-bit counter/timer
- Field-upgradeable logic circuit performance upgrades or customizations

## ACCESSORIES

Customers who use this product

• Helios Development Kit

• Helios Software Development Kit

• Pandora PC/104 Enclosure for Helios SBCs

• IDE Flashdisks

• Helios Cable Kit

This product can be customized ruggedized. Click here for more information.

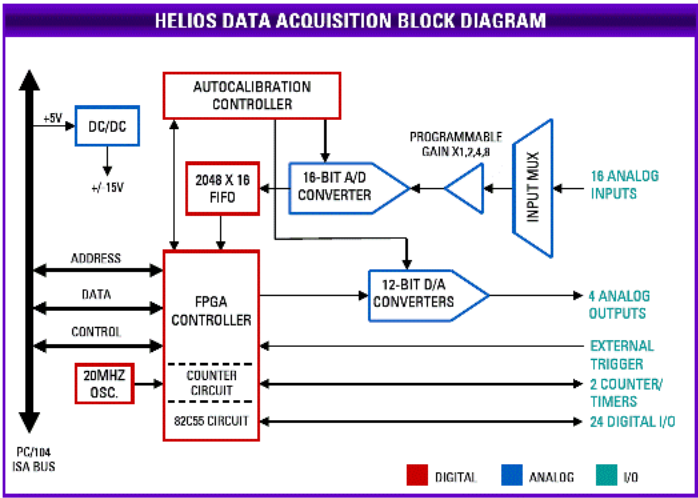
## ONLINE SUPPORT

- See Helios PC/104 SBC Technical Resources
- Request Product Information
- Request Technical Support

## DOWNLOADS

- Helios Datasheet (.pdf, 189.9 kb)
- Octavio-HLV User Manual (.pdf, 1,013.8 kb)
- Helios User Manual (.pdf, 2.1 MB)
- Helios Quick Start Guide (.pdf, 290.0 kb)
- Helios Panel I/O Board User Manual (.pdf, 534.5 kb)

Helios includes a complete autocalibrating jumper-less analog and digital I/O circuit similar to our top-of-the-line PC/104 analog I/O board. It contains 16 analog inputs with 16-bit resolution, backed by a 2048 sample FIFO with programmable threshold. Programmable input ranges from a wide-range +/-10V down to 0-1.25V are provided. The analog includes 4 D/A channels with 12-bit resolution and jumperless output range selection and simultaneous update capability. On the digital side, Helios provides 40 digital I/O lines with direction, as well as two counter/timers for A/D sample rate control, pulse counting, frequency generation, or other applications. Its advanced control logic has more features and flexibility for almost any application, such as internal/external A/D clock source, scan and single-sample modes, and our exclusive programmable FIFO threshold that lets you tune the board's performance for your application. The data acquisition circuit is fully supported by our Universal Driver software for a wide range of operating systems.



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◆ **Helios Development Kits**

A Helios System Development Kit (DK-HLV800A-01) is available with all the components you need to get started on your embedded design project. The kit contains a Helios 800MHz of RAM and integrated data acquisition, 128MB flashdisk module with a bootable Linux image installed, cable kit, and software CD.

Two software development kits are also available for Helios; a Linux kit and a Windows CE kit. The Helios Linux Kit (SDK-HLV-LNX) contains a 256MB flashdisk with a bootable linux: loaded, a software CD with the linux tool chain and a backup image, and documentation. The Helios Windows CE Kit (SDK-HLV-WCE) contains a 128MB flashdisk with a bootable V image pre-loaded, a software CD with development tools and a backup image, and documentation.

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◆ **C-HLV-KIT: Cable kit for Helios PC/104 SBC**

The Helios cable kit includes cables for Helios input and output. Many cables are also available individually.



C-HLV-KIT includes the following cables:

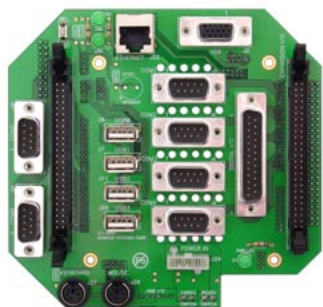
No.	Qty	Cable	Description	Drawing
1	1	6981004	IDE, 44 conductor 2mm ribbon cable	<a href="#">Show</a>
2	1	6981006	Output power cable	<a href="#">Show</a>
3	1	6981009	Power input cable	<a href="#">Show</a>
4	2	6981082	Dual USB 2.0 type A	<a href="#">Show</a>
5	1	6981083	Keyboard/Mouse, 2mm 2x4 crimp to 2x Mini-DIN-6	<a href="#">Show</a>
6	1	6981084	VGA	<a href="#">Show</a>
7	1	6981161	RJ45PNL-CRIMP2x5 2mm, 12"	<a href="#">Show</a>
8	1	6981163	CRIMP50xIDC50FxIDC50F, 21 0.1"x2MMx2MM Data Acquisition	<a href="#">Show</a>
9	1	6981164	Ribbon cable for Opto-isolated GPIO	<a href="#">Show</a>
10	1	6981166	IDC40F 2mm-DB9Mx4, 12" Serial Ports 1-4	<a href="#">Show</a>
11	1	6981169	Ribbon cable for GPIO, A/D, and misc	<a href="#">Show</a>
12	1	6981180	External Battery	<a href="#">Show</a>

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◆ **Pandora and Panel I/O Board**

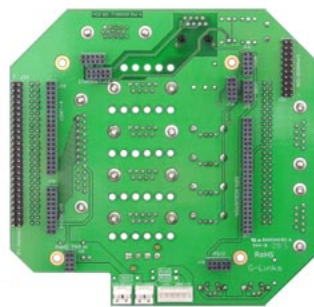


Helios single board computers can be mounted inside Diamond's Pandora PC/104 enclosure with a cable-free panel I/O board to form a rugged, compact, completely self-contained computer system. The Pandora enclosure, coupled with the panel I/O board, features fast and easy assembly due to the fact that most or all internal cables can be eliminated. Rather than the installation of special corner mounts or forcing the stack into a set of corner guides, the entire stack is bolted directly to the front plate of the case, forming a rugged, easily-handled unit.

[Click here for more information on the Pandora PC/104 Enclosure.](#)



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Bottom  
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#### Transition Cables or PC-Style Connectors

All I/O on Helios is made available on 2mm pitch pin headers for use with low-cost cables. To enhance the use of Helios in harsh environments requiring outstanding resistance to shock and vibration, Diamond Systems offers our rugged Pandora PC/104 enclosure that provides a cable-free configuration via a small panel I/O board that installs directly on top of the Helios, converting all I/O to PC-style connectors:

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#### Specifications

##### CPU

<b>Processor</b>	Vortex86DX at 1GHz or 800MHz
<b>Memory</b>	256MB of on-board DRAM
<b>Bus Interface</b>	PC/104 (ISA)
<b>Display Type</b>	CRT and LVDS LCD
<b>Display Resolution</b>	1280 x 1024 maximum
<b>USB Ports</b>	(4) USB 2.0
<b>Serial Ports</b>	(2) RS-232; (2) RS-232/422/485
<b>Networking</b>	10/100Base-T Ethernet
<b>Mass Storage</b>	(1) IDE UDMA-100 port, Flashdisk interface
<b>On-board storage</b>	2MB bootable flash drive with FreeDOS installed
<b>Keyboard / Mouse</b>	PS/2
<b>Input power</b>	5V $\pm$ 5%
<b>Power Consumption</b>	HLV800-256AV: 5.4W typical, 7.3W maximum HLV800-256DV: 4.3W
<b>Cooling</b>	Heat sink, no fan
<b>Operating Temperature</b>	-40°C to +85°C (800MHz models) -40°C to +71°C (1GHz models)
<b>Dimensions</b>	3.550" x 3.775" (90mm x 96mm)
<b>Weight</b>	2.5 oz / 70.8g
<b>MTBF</b>	HLV800-256AV: 65,535 hours
<b>RoHS</b>	Compliant

##### DATA ACQUISITION SPECIFICATIONS

<b>Analog Inputs</b>	16 single-ended or 8 differential, user selectable
<b>A/D resolution</b>	16 bits
<b>Input ranges</b>	$\pm$ 10V, $\pm$ 5V, $\pm$ 2.5V, $\pm$ 1.25V, 0-10V, 0-5V, 0-2.5V programmable
<b>Max Sample Rate</b>	250KHz
<b>Protection</b>	$\pm$ 35V on any analog input without damage
<b>Nonlinearity</b>	$\pm$ 3LSB, no missing codes
<b>On-board FIFO</b>	2048 samples, programmable threshold
<b>A/D and D/A Calibration</b>	Autocalibration with software support
<b>Analog Outputs</b>	4, 12-bit resolution
<b>Output ranges</b>	$\pm$ 5V, $\pm$ 10V, 0-5V, 0-10V
<b>Input impedance</b>	$10^4$ to $10^{13}$ ohms
<b>Output current</b>	$\pm$ 5mA max per channel
<b>Settling time</b>	10 $\mu$ S max to 0.012%

Relative accuracy	±2 LSB
Nonlinearity	±2 LSB, monotonic
Reset	Reset to zero-scale or mid-scale (jumper selectable)
Digital I/O lines	Up to 40 programmable direction
Input voltage	Logic 0: 0V min, 0.8V max Logic 1: 2.0V min, 5.5V max
Input current	1µA at 3.3V, -5µA at 0V
Output voltage	Logic 0: 0.0V min, 0.55V max Logic 1: 2.0V min, 3.3V max
Output current	Logic 0: 64mA max at 0.55V Logic 1: 32mA max at 2V
A/D Pacer clock	24-bit down counter
Clock source	10MHz on-board clock or external signal
General purpose	16-bit down counter

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Helios PC/104 SBC		available models:	quantity:
HLV1000-256AV	Helios SBC, 1GHz Vortex86DX, 256MB RAM, full data acquisition, VGA/LCD video		<input type="text" value="0"/>
HLV1000-256DV	Helios SBC, 1GHz Vortex86DX, 256MB RAM, digital I/O, VGA/LCD video		<input type="text" value="0"/>
HLV800-256AV	Helios SBC, 800MHz Vortex86DX, 256MB RAM, full data acquisition, VGA/LCD video		<input type="text" value="0"/>
HLV800-256DV	Helios SBC, 800MHz Vortex86DX, 256MB RAM, digital I/O, VGA/LCD video		<input type="text" value="0"/>
DK-HLV800A-01	Helios Development Kit with HLV800-256AV SBC, cables and software		<input type="text" value="0"/>
C-HLV-KIT	Helios Cable Kit		<input type="text" value="0"/>
SDK-HLV-LNX	Helios Linux 2.6.23 Software Development Kit with Linux image on 256MB flashdisk and software tools on CD, and documentation		<input type="text" value="0"/>
SDK-HLV-WCE	Helios Windows Embedded CE 6.0 Software Development Kit with 128MB flashdisk		<input type="text" value="0"/>
			<input type="text" value="0"/>
		<a href="#">view your online quote</a>	<a href="#">add to quote</a>

Cables and accessories		available models:	quantity:
C-HLV-KIT	C-HLV-KIT cable kit		<input type="text" value="0"/>
6981004	IDE, 44 conductor 2mm ribbon cable		<input type="text" value="0"/>
6981006	Output power cable		<input type="text" value="0"/>
6981009	Power input cable		<input type="text" value="0"/>
6981082	Dual USB 2.0 type A		<input type="text" value="0"/>
6981083	Keyboard/Mouse, 2mm 2x4 crimp to 2x Mini-DIN-6		<input type="text" value="0"/>
6981084	VGA		<input type="text" value="0"/>
6981161	RJ45PNL-CRIMP2x5 2mm, 12"		<input type="text" value="0"/>
6981163	CRIMP50xIDC50FxIDC50F, 21 0.1"x2MMx2MM Data Acquisition		<input type="text" value="0"/>
6981164	Ribbon cable for Opto-isolated GPIO		<input type="text" value="0"/>
6981166	IDC40F 2mm-DB9Mx4, 12" Serial Ports 1-4		<input type="text" value="0"/>
6981169	Ribbon cable for GPIO, A/D, and misc		<input type="text" value="0"/>
6981180	External Battery		<input type="text" value="0"/>
		<a href="#">view your online quote</a>	<a href="#">add to quote</a>

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