

# HELIOS



CPU + Data Acquisition on a single board

## 800MHz PC/104 SINGLE BOARD COMPUTER WITH INTEGRATED DATA ACQUISITION



- Low power, mid-range PC/104 expandable single board
- 2 in 1: Integrated CPU and data acquisition reduces size and cost, increases ruggedness
- Fully featured including support for four USB 2.0 ports, four serial ports, 10/100Base-T Ethernet, IDE hard drive, flashdisk and VGA CRT or LVDS LCD display
- Optional data acquisition featuring multiplexed 16 channel 16-bit A/D with autocalibration, 4 12-bit D/A, up to 40 DIO and two counter/timers
- Extremely rugged with soldered RAM and -40°C to +85°C operating temperature computer

### DESCRIPTION

Helios is a mid-performance PC/104 form factor single board computer combining a low power, highly integrated CPU with Diamond Systems' renowned high-accuracy data acquisition circuitry on a single board. Helios utilizes a Vortex86DX/SX integrated single chip CPU running at either 300MHz or 800MHz and comes with either 128MB or 256MB of DRAM soldered on-board to offer multiple price/performance levels for a wide range of applications.

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 VGA/LVDS LCD graphics. Helios also provides a 10/100Base-T Ethernet interface, four RS-232 serial ports (two have RS-422/485 multiprotocol capability) and PS/2 keyboard and mouse interfaces. Helios supports Linux, Windows CE and DOS.

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.

### CPU SPECIFICATIONS

<b>Processor</b>	Vortex86SX/DX at 300 or 800MHz
<b>Cooling</b>	Heat sink, fan-less
<b>Operating Temperature</b>	-40°C to +85°C
<b>Memory</b>	128MB or 256MB DRAM
<b>Bus Interface</b>	PC/104 (ISA)
<b>Display Type</b>	VGA CRT and LVDS LCD
<b>Display Resolution</b>	1280X1024 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>Keyboard / Mouse</b>	PS/2
<b>Audio</b>	Speaker out
<b>Dimensions</b>	3.550" x 3.775" (90mm x 96mm)
<b>Weight</b>	2.5oz / 71g
<b>Input power</b>	5V ±5%
<b>Power consumption</b>	800MHz: 5.0W 300MHz: 3.5W
<b>RoHS</b>	Compliant

### FOR MORE INFORMATION

Diamond Systems Corporation  
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Mountain View, CA 94043  
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## DATA ACQUISITION

Helios's integrated data acquisition features include 16 analog inputs with 16-bit A/D and 100KHz sample rate, 4 12-bit analog outputs, up to 40 digital I/O lines, and 2 counter/timers. It uses an enhanced 512-sample FIFO with programmable threshold for maximum flexibility and data reliability.

The analog circuitry utilizes Diamond Systems' industry-leading autocalibration technology to calibrate its A/D and D/A circuits. This means you get analog I/O performance with the maximum possible accuracy over the full operating temperature range of the product.

Diamond Systems' free Universal Driver containing data acquisition programming software for Linux, Windows XP/CE, and DOS is included.

## HELIOS DEVELOPMENT KIT

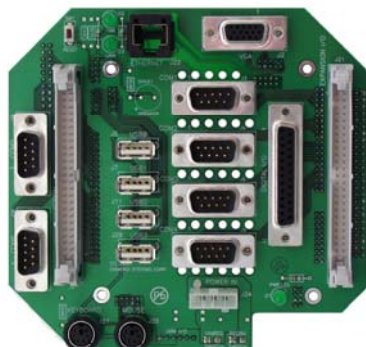
A Helios Development Kit is available with all the components you need to get started on your embedded design project. The kit contains a Helios board, flashdisk module with Linux installed, cable kit, AC adapter, and software CD.

### 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 to instantly convert all I/O to PC-style connectors:



Pandora cable-free enclosure system for Helios SBC



Panel I/O board provides industry-standard I/O connectors for Helios

## DATA ACQUISITION SPECIFICATIONS

ANALOG INPUTS	
Number of inputs	16 single-ended or 8 differential, user selectable
A/D resolution	16 bits
Input ranges	±10V, ±5V, ±2.5V, ±1.25V, 0-10V, 0-5V, 0-2.5V programmable
Max Sample Rate	100KHz
Protection	±35V on any analog input without damage
Nonlinearity	±3LSB, no missing codes
On-board FIFO	512 samples, programmable threshold
A/D and D/A Calibration	Autocalibration with software support
ANALOG OUTPUTS	
Number of outputs	4, 12-bit resolution
Output ranges	±5V, ±10V, 0-5V, 0-10V
Output current	±5mA max per channel
Settling time	10µS 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	
No. of I/O lines	DV Models: 16 lines AV Models: 40 lines
Input voltage	Logic 0: -0.5V min, 0.8V max Logic 1: 2.0V min, 5.5V max
Input current	±3µA max
Output voltage	Logic 0: 0.0V min, 0.4V max Logic 1: 2.4V min, 3.3V max
Output current	Logic 0: 12mA max per line Logic 1: -8mA max per line
COUNTER / TIMERS	
A/D Pacer clock	24-bit down counter
Clock source	10MHz on-board clock or external signal
General purpose	16-bit down counter

## ORDERING INFORMATION

Part Number	Description
HLV800-256AV	Helios SBC, 800MHz Vortex86DX, 256MB RAM, full data acquisition, VGA/LCD video
HLV800-256DV	Helios SBC, 800MHz Vortex86DX, 256MB RAM, digital I/O, VGA/LCD video
HLV300-128DV	Helios SBC, 300MHz Vortex86SX, 128MB RAM, digital I/O, VGA/LCD video
DK-HLV800-01	Helios Development Kit with HLV800-256AV SBC, cables and Linux software
C-HLV-KIT	Helios Cable Kit