

# Datasheet

## Diamond Systems

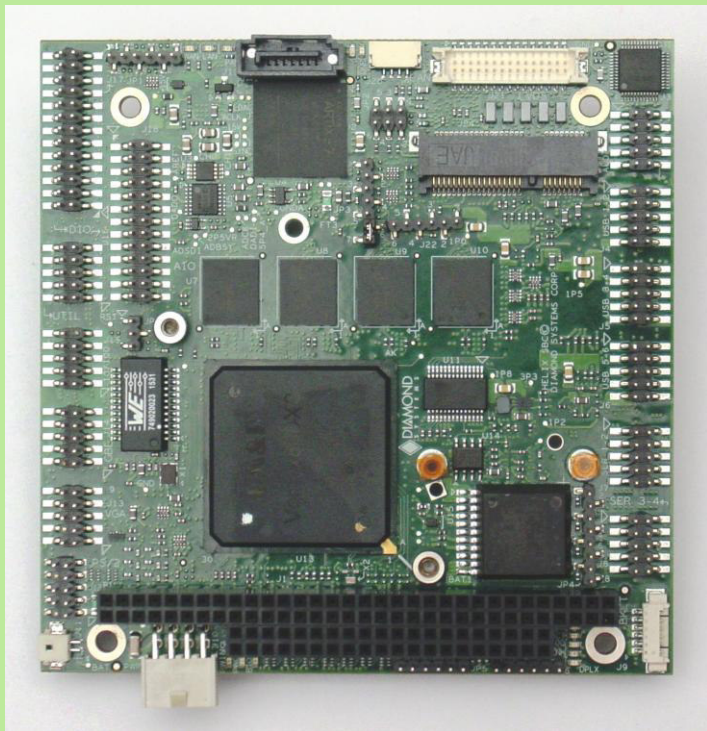
### Helix

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# HELIX PC/104 SBC

## Rugged SBC with DMP Vortex86DX3 CPU, Soldered Memory and Data Acquisition



- ◆ 1GHz DMP Vortex86DX3 dual core SoC
- ◆ Up to 2GB DDR3 SDRAM soldered on board
- ◆ I/O Support:
  - 3 or 6 USB 2.0 ports (model dependent)
  - 2 RS-232/422/485 & 2 RS-232 ports
  - 1 10/100Mbps Ethernet port
  - 1 Gigabit Ethernet port
  - 1 SATA port for disk-on-module or external drive
  - 1 mSATA socket
  - 24-bit dual channel LVDS LCD display
  - VGA CRT
  - HD audio
  - PCIe MiniCard socket
- ◆ Data Acquisition:
  - 16 16-bit analog inputs
  - 100KHz max sample rate
  - 4 16-bit analog outputs
  - Up to 27 digital I/O lines with programmable direction
  - 8 counter/timers
  - 4 pulse width modulators
- ◆ PC/104 stackable I/O expansion capability
- ◆ PC/104 extended form factor (4.0" x 4.0")
- ◆ Extremely rugged with soldered RAM and -40°C to +85°C (-40°F to +185°F) operating temperature

### Rugged Mid-Range SBC

Helix is a compact, rugged, single board computer that features the DMP Vortex86DX3 system on chip (SoC) in an extended PC/104 form factor. The full rectangular shape provides more coastline for I/O connectors than other boards its size. In this compact form factor, Helix includes a wide range of I/O plus data acquisition functionality, meeting the majority of today's connectivity requirements in a single board.

### Flexible I/O Expansion

Helix supports stackable I/O expansion with PC/104 I/O modules and provides a PCIe MiniCard socket for additional I/O expansion. I/O modules featuring WiFi, Ethernet, analog I/O, digital I/O, and CAN are available in the PCIe MiniCard form factor, providing compact expandability without increasing the total height of the system.

### Rugged Design

The Helix SBC was designed with rugged applications in mind. With an operating temperature of -40°C to +85°C, soldered on-board memory, and thicker PCB, Helix is an excellent choice for vehicle and other harsh environment applications.

### Feature Overview

Diamond's family of Helix PC/104 SBCs combines mid-range CPU performance, standard PC I/O, and on-board data acquisition circuitry at a competitive price. Available PC I/O includes up to 6 USB 2.0, 4 serial ports (2 RS-232/422/485 and 2 RS-232), 1 10/100Mbps Ethernet, 1 Gigabit Ethernet port, and a SATA port. The data acquisition circuit includes 16 16-bit analog inputs, 4 16-bit analog outputs and 27 digital I/O lines configurable as counter/timers and pulse width modulators.

### Software Support

Helix SBCs run Linux and Windows Embedded Standard 7. Both Linux and Windows Embedded 7 Software Development Kits are available with bootable images and drivers to get you started on your design project right out of the box.

### Development Kits

Complete Development Kits with a bootable operating system are available with all the components you need to get started on your embedded design project. The kit contains a Helix SBC, 32GB MLC SATA-DOM flashdisk with your choice of Windows Embedded 7 or Linux pre-loaded, cable kit and software CD.

# Helix: 1GHz Vortex86DX3 PC/104 SBC

## Specifications

<b>Processor</b>	1.0GHz dual core DMP Vortex86DX3
<b>Memory</b>	Up to 2GB onboard 64-bit DDR3 SDRAM
<b>Display type</b>	24-bit dual channel LVDS LCD flat panel VGA CRT
<b>Display resolution</b>	LVDS: 1920 X 1080 maximum VGA: 1920 X 1080 maximum 1280 x 1024 maximum in dual display mode
<b>USB ports</b>	3 USB 2.0 (D model); 6 USB 2.0 (A model)
<b>Serial ports</b>	2 RS-232/422/485 & 2 RS-232 ports
<b>Networking</b>	1 10/100Mbps Ethernet 1 Gigabit Ethernet port
<b>Mass storage</b>	1 SATA 1.5Gbps port for external hard drive or SATA DOM 1 mSATA port shared with PCIe MiniCard
<b>Analog inputs</b>	16 16-bit
<b>Input ranges</b>	±10V, ±5V, 0-10V, 0-5V programmable
<b>Sample rate</b>	100KHz maximum
<b>On-board FIFO</b>	2048 samples, programmable threshold
<b>DAQ calibration</b>	Autocalibration values stored in EEPROM
<b>Analog outputs</b>	4 16-bit
<b>Output ranges</b>	0-5V, 0-2.5V programmable
<b>Digital I/O</b>	27 programmable lines (A model) 16 programmable lines (D model)
<b>PWMs</b>	4 24-bit pulse width modulators
<b>Counter/timers</b>	8 32-bit counter/timers
<b>Keyboard/mouse</b>	PS/2
<b>Audio</b>	HD Audio ALC892 CODEC with stereo line out, line in and microphone
<b>WDT</b>	Programmable watchdog timer 0-255 seconds
<b>Expansion socket</b>	PCIe MiniCard socket shared with mSATA
<b>Expansion bus</b>	PC/104 (ISA) stackable I/O expansion
<b>Input power</b>	+5VDC +/-5%
<b>Power consumption</b>	7.5W idle (without DAQ) 10.5W idle (with DAQ)
<b>Operating temp</b>	-40°C to +85°C (-40°F to +185°F)
<b>Shock</b>	MIL-STD-202G compatible
<b>Vibration</b>	MIL-STD-202G compatible
<b>Dimensions</b>	4.0" x 4.0" (102mm x 102mm)
<b>Weight</b>	2.5oz (70.8g) with heat sink
<b>RoHS</b>	Compliant

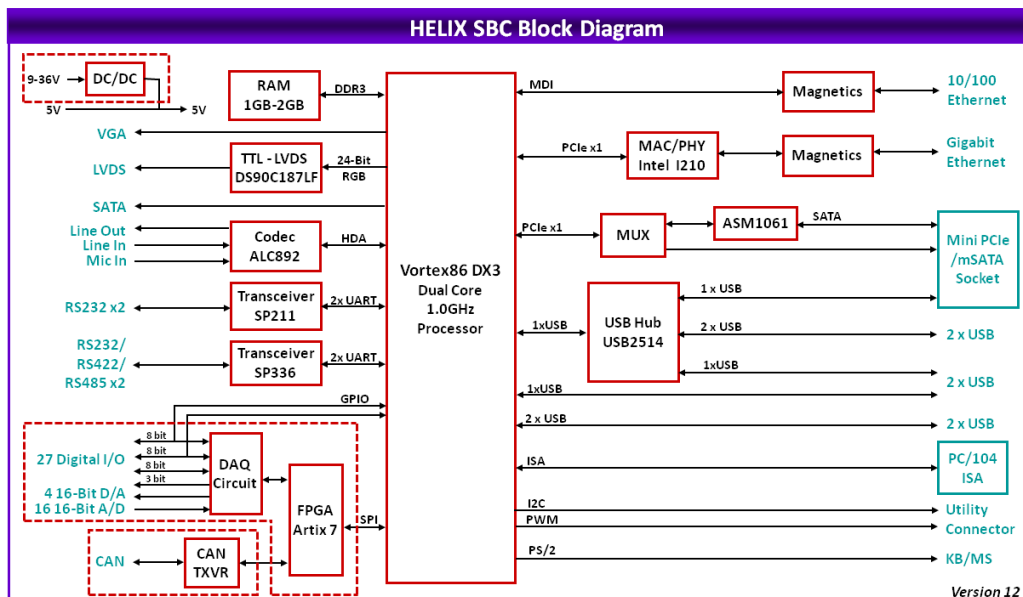
## Ordering Information

<b>HLX1000-2GA</b>	Helix SBC, 1.0GHz Vortex86DX3 CPU, 2GB DDR3 SDRAM, analog I/O, digital I/O, extended temperature
<b>HLX1000-1GD</b>	Helix SBC, 1.0GHz Vortex86DX3 CPU, 1GB DDR3 SDRAM, digital I/O, extended temp
<b>HLX1000-2GD</b>	Helix SBC, 1.0GHz Vortex86DX3 CPU, 2GB DDR3 SDRAM, digital I/O, extended temp (minimum order quantities apply)
<b>DK-HLXA-WE7</b>	Helix Development Kit with HLX1000-2GA SBC, cables and Windows Embedded 7 OS
<b>DK-HLXA-LNX</b>	Helix Development Kit with HLX1000-2GA SBC, cables and Linux
<b>DK-HLXD-WE7</b>	Helix Development Kit with HLX1000-1GD SBC, cables and Windows Embedded 7 OS
<b>DK-HLXD-LNX</b>	Helix Development Kit with HLX1000-1GD SBC, cables and Linux
<b>SDK-HLX-WE7</b>	Helix Windows Embedded 7 Software Development Kit
<b>SDK-HLX-LNX</b>	Helix Linux Software Development Kit
<b>CK-HLX-01</b>	Helix Cable Kit for most on board I/O

## Customization Options

The following customization options are available for the Helix single board computer. Minimum order quantities apply.

- 2GB on-board RAM instead of 1GB
- 1 CANbus 2.0 port
- 9-36V 50W DC/DC wide voltage power input
- Latching connectors instead of pin headers
- Extended life backup battery
- Replace configuration jumpers with 0 ohm resistors
- Low profile heatsink
- Conformal coating
- Custom BIOS
- Custom FPGA code



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