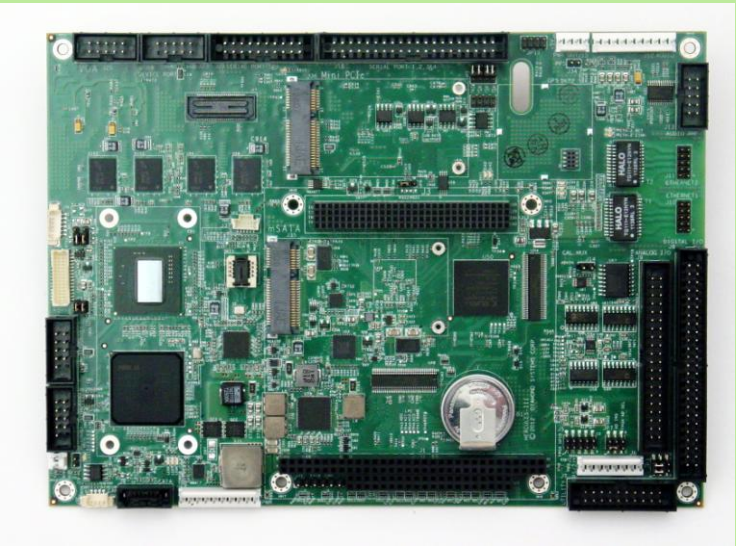
HERCULES III

EBX Single Board Computer

Intel Atom E680T CPU and Integrated Autocalibrating Data Acquisition

3 in 1
CPU+DAQ+PS



- 3-in-1 design (CPU + DAQ + PS) reduces size and cost, increases ruggedness and reliability
- Atom 1.6GHz E680T CPU
  (1.3GHz and 600MHz special order options)
- 1GB or 2GB SDRAM soldered on-board
- PC/104-*Plus* (ISA + PCI) stackthrough expansion
- Support for:
  - five USB 2.0 ports; 1 USB 2.0 device port
  - two RS-232/422/485 ports; four RS-232 ports
  - two Gigabit Ethernet; one CANbus port
  - SATA port for hard drive or solid state flashdisk
  - SATA disk module
  - LVDS LCD display and VGA
  - 40 digital programmable I/O lines
  - mSATA flashdisk mounting location
  - PCIe MiniCard and GPS receiver sockets
  - +7 to +40VDC wide voltage power input
- Optional data acquisition circuitry featuring:
  - multiplexed 32 channel 16-bit A/D with autocalibration
  - 250KHz maximum sample rate
  - four 12-bit D/A channels
  - four pulse width modulators
  - Watchdog timer
  - Autocalibration with Universal Driver software support
- Extremely rugged with soldered RAM and -40°C to +85°C (-40°F to +185°F) operating temperature

Highly Integrated SBC

Hercules III combines all of the functionality of a single board computer with a complete analog and digital data acquisition circuit into a single board, offering the most functionality available in a small, compact form factor. Hercules III is also a viable migration path for Hercules II customers.

Price/Performance Advantage

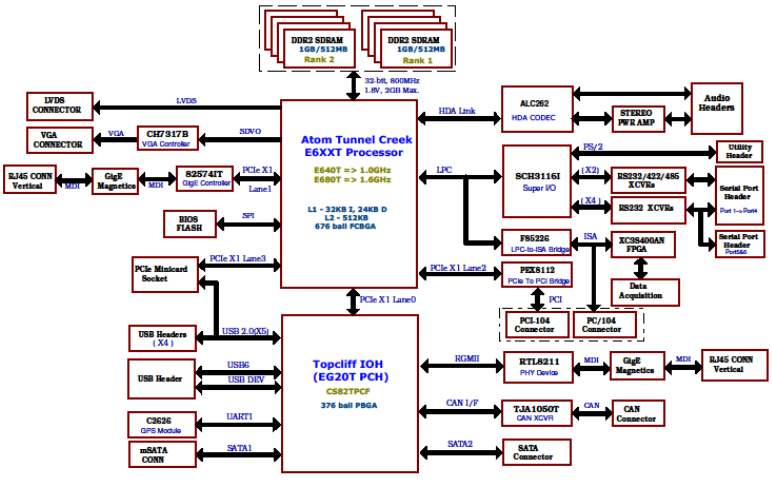
The 1.6GHz Intel Atom E680T CPU offers an excellent price/performance, making Hercules III an ideal choice for a wide variety of embedded computing applications.

Rugged Design

Hercules III was designed with rugged applications in mind. From an operating temperature of -40°C to +85°C, the rugged SDRAM soldered on-board, and its high tolerance for shock and vibration, Hercules III thrives in the most extreme environments.

Development Kit

A complete Development Kit, DK-HRCE1600A-01, is available with all the components you need for your embedded design project. The kit contains a Hercules III SBC, flashdisk with Linux pre-loaded, cable kit, AC adapter, and software CD.



Hercules III: EBX SBC with Intel E-Series CPU

CPU Specifications

Processor	Intel Atom 1.6GHz E680T CPU (also available at 1.3GHz and 600MHz)
Cooling	Heat sink, fan-less
Memory	1GB or 2GB SDRAM soldered on-board
Display type	LVDS LCD and VGA CRT
Display resolution	1600 X 1200 maximum
USB ports	5 USB 2.0; 1 USB 2.0 device port
Serial ports	2 RS-232/422/485; 4 RS-232
CANbus	1 CANbus 2.0 port
Networking	2 Gigabit Ethernet
Mass storage	1 SATA port; 1 mSATA Disk Module interface
Keyboard/Mouse	PS/2
Audio	HD Audio Realtek ALC262 CODEC
Expansion sockets	PCIe MiniCard full-size socket Trimble Condor C2626 GPS receiver socket
Expansion bus	PC/104-*Plus* (ISA + PCI)
Input power	+7 to +40V input provides 55W total power
Power consump	13.8W nominal; 20W maximum
Operating temp	-40°C to +85°C (-40°F to +185°F)
Shock	MIL-STD-202G, Method 213B compatible
Vibration	MIL-STD-202G, Method 214A compatible
Dimensions	5.75" x 8.0" (146mm x 203mm) EBX standard form factor
RoHS	Compliant

Data Acquisition Specifications

ANALOG	
Number of inputs	32 single-ended or 16 differential, 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	250KHz
Protection	±35V on any analog input without damage
Nonlinearity	±3LSB, no missing codes
On-board FIFO	2048 samples, programmable threshold
DAQ calibration	Autocalibration with software support
Number of outputs	4, 12-bit resolution
Output ranges	±5V, ±10V, 0-5V, 0-10V
Output current	±5mA max per channel
Settling time	6µS max to 0.01%
Relative accuracy	±1 LSB
Nonlinearity	±1 LSB, monotonic
Reset	Reset to zero-scale or mid-scale
DIGITAL I/O	
Digital I/O lines	40 lines, programmable direction
Input voltage	Logic 0: 0.0V min, 0.8V max Logic 1: 2.0V min, 5.0V max
Input current	±1µA max
Output voltage	Logic 0: 0.0V min, 0.33V max Logic 1: 2.4V min, 5.0V max
Output current	Logic 0: 64mA max per line Logic 1: -15mA max per line
COUNTER / TIMERS	
PWM	4 pulse width modulators
Watchdog timer	Programmable WDT
A/D Pacer clock	32-bit down counter
Clock source	10MHz on-board clock or external signal
General purpose	16-bit down counter

Data Acquisition

Hercules III's integrated data acquisition circuit includes 32 analog inputs with 16-bit A/D and 250KHz maximum sample rate, four 12-bit analog outputs, 40 digital I/O lines, four pulse with modulators, a watchdog timer, and two counter/timers. It uses an enhanced 2048-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.

Software Support

Hercules III runs Linux, Windows Embedded Standard 7, and Windows Embedded CE. Windows Embedded Standard 7 and Linux Software Development Kits are available with a bootable OS image and drivers. Diamond's Universal Driver software is also included. It provides a C programming library for the integrated data acquisition circuit, demo programs, and example code to assist in application development.

Ordering Information

HRCE1600A-1G	Hercules III SBC, 1.6GHz Atom E680T CPU, 1GB RAM, full data acquisition
HRCE1600D-1G	Hercules III SBC, 1.6GHz Atom E680T CPU, 1GB RAM, DIO only (MOQ of 50)
HRCE1600A-2G	Hercules III SBC, 1.6GHz Atom E680T CPU, 2GB RAM, full data acquisition (MOQ of 50)
HRCE1600D-2G	Hercules III SBC, 1.6GHz Atom E680T CPU, 2GB RAM, DIO only (MOQ of 50)
DK-HRCE1600A-01	Hercules III Development Kit with HRCE1600A-1G SBC, cables and Linux OS
SDK-HRCE-LNX	Hercules III Linux Software Development Kit
SDK-HRCE-WE7	Hercules III Windows Embedded Standard 7 Software Development Kit
SDK-HRCE-WCE	Hercules III Windows CE Software Development Kit
C-HRCE-KIT	Hercules III Cable Kit for on-board I/O
OPT-HRCE-GPS	Add-on Trimble Condor C2626 GPS receiver

Hercules III: EBX SBC

Upgrade Path for Long Product Life

Hercules III is a backward compatible single board computer upgrade for Diamond's Hercules II SBC.

To provide long term support for its customers, with Hercules III Diamond Systems' maintains and extends its Hercules SBC platform by providing a drop in replacement for Hercules II that is highly compatible and offers improved performance.

The table below highlights the differences between the Hercules III and Hercules SBCs.

Hercules III and Hercules II Differences

Feature	Hercules III	Hercules II
CPU	Intel Atom E680T	VIA Mark Corefusion
CPU Speed	1.6GHz	800MHz
CPU Mark	tbd	tbd
Memory	1GB or 2GB SDRAM on-board	256MB or 512MB on-board
USB Ports	6 USB 2.0 (1 as device port)	4 USB 1.1
Serial Ports	4 RS-232 2 RS-232/422/485	2 RS-232 2 RS-232/485
Ethernet	2 Gigabit	1 10/100Base-T
Mass Storage – External	1 SATA 1.0	1 IDE UDMA-100
Mass Storage – Internal	mSATA flashdisk up to 64GB	IDE flashdisk up to 4GB CompactFlash socket
Display	LCD; VGA or DVI	LCD; VGA
Audio	HD Audio CODEC	Audio CODEC
Expansion	PC/104-*Plus* PCIe MiniCard socket GPS receiver socket	PC/104-*Plus*
CAN bus port	1	No
System controller	10 GPIO, 4 A/D, 4 PWM	No
MTBF timer	Yes	No
Wake on timer	Yes	No
Power Consumption	13.8W	16W