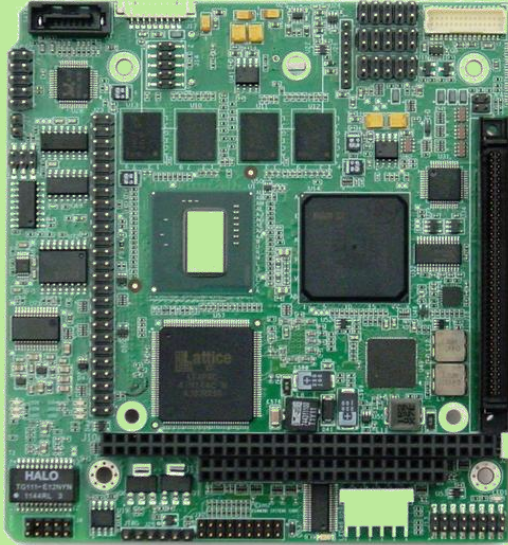


# ATHENA III



## PC/104 Single Board Computer

### Intel Atom E640T CPU and Integrated Autocalibrating Data Acquisition



#### Highly Integrated SBC

Athena 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. Athena III is also an excellent migration path for Athena II customers.

#### Price/Performance/Power Optimization

The 1GHz Intel Atom E640T CPU offers an excellent balance of performance, power consumption and price, making Athena III an ideal choice for a wide variety of embedded computing applications.

#### Rugged Design

Athena III was designed with rugged applications in mind. From an operating temperature of -40°C to +80°C, to its soldered DRAM, Athena III thrives in the most extreme environments.

- ◆ Highly integrated Intel Atom E-Series SBC
- ◆ 2-in-1 design (CPU + DAQ) reduces size and cost, increases ruggedness and reliability
- ◆ Intel Atom 1GHz E640T or 1.6GHz E680T CPU
- ◆ 1GB memory soldered on-board (2GB memory special order option)
- ◆ PC/104 (ISA) stackthrough expansion
- ◆ Support for:
  - Four USB 2.0 ports
  - Four RS-232/422/485 ports
  - One Gigabit Ethernet
  - SATA port for hard drive or solid state flashdisk
  - VGA CRT or LVDS LCD display
  - USB flashdisk mounting location
  - 24 programmable digital I/O lines
- ◆ Optional data acquisition circuitry featuring:
  - Multiplexed 16 channel 16-bit A/D with autocalibration
  - 200KHz maximum sample rate
  - Four 12-bit D/A channels
  - Two counter/timers
  - Autocalibration with Universal Driver software support
- ◆ Extremely rugged with -40°C to +80°C (-40°F to +176°F) operating temperature
- ◆ Highly resistant to shock and vibration
- ◆ Ruggedization / customization options available
  - Conformal coating
  - Shock / vibration testing
  - Hardwired configuration
  - Burn-in testing
  - Custom BIOS settings
- ◆ Fully backward compatible with Athena II with almost 3 times the CPU performance



# Athena III: Small Form Factor SBC



## CPU Specifications

<b>Processor</b>	Intel Atom E640T CPU at 1GHz or E680T CPU at 1.6GHz
<b>Cooling</b>	Heat sink, fan-less
<b>Memory</b>	1GB soldered-on DRAM (also available with 2GB DRAM)
<b>Display type</b>	VGA CRT and LVDS LCD
<b>Display resolution</b>	VGA 1600 X 1200 maximum LVDS 1280 X 768 maximum
<b>USB ports</b>	4 USB 2.0
<b>Serial ports</b>	4 RS-232/422/485
<b>Networking</b>	1 Gigabit Ethernet
<b>Mass storage</b>	1 SATA port; USB flashdisk interface
<b>Keyboard/Mouse</b>	PS/2
<b>Audio</b>	HD Audio
<b>Expansion bus</b>	PC/104 (ISA)
<b>Input power</b>	5V $\pm$ 5%
<b>Power consumption</b>	9.4W
<b>Operating temperature</b>	-40°C to +80°C (-40°F to +176°F)
<b>Shock</b>	IEC68-2-27 compatible
<b>Vibration</b>	MIL-STD-810E 514.4 compatible
<b>Dimensions</b>	4.175" x 4.475" (106mm x 114mm)
<b>Weight</b>	8.8oz (249g) with heat sink
<b>RoHS</b>	Compliant

## Data Acquisition Specifications

<b>ANALOG</b>	
<b>Number of 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>	200KHz
<b>Protection</b>	$\pm$ 35V on any analog input without damage
<b>Nonlinearity</b>	$\pm$ 3LSB, no missing codes
<b>On-board FIFO</b>	512 samples, programmable threshold
<b>A/D and D/A calibration</b>	Autocalibration with software support
<b>Number of outputs</b>	4, 12-bit resolution
<b>Output ranges</b>	$\pm$ 5V, $\pm$ 10V, 0-5V, 0-10V
<b>Output current</b>	$\pm$ 5mA max per channel
<b>Settling time</b>	6 $\mu$ S max to 0.01%
<b>Relative accuracy</b>	$\pm$ 1 LSB
<b>Nonlinearity</b>	$\pm$ 1 LSB, monotonic
<b>DIGITAL I/O</b>	
<b>Number of I/O lines</b>	24 lines, programmable direction
<b>Input voltage</b>	Logic 0 : 0.0V min, 0.8V max Logic 1 : 2.0V min, 5.0V max
<b>Input current</b>	$\pm$ 1 $\mu$ A max
<b>Output voltage</b>	Logic 0 : 0.0V min, 0.33V max Logic 1 : 2.4V min, 5.0V max
<b>Output current</b>	Logic 0 : 64mA max per line Logic 1 : -15mA max per line
<b>COUNTER / TIMERS</b>	
<b>A/D Pacer clock</b>	32-bit down counter
<b>Clock source</b>	10MHz on-board clock or external signal
<b>General purpose</b>	16-bit down counter

## Data Acquisition

Athena III's integrated data acquisition circuit includes 16 analog inputs with 16-bit A/D and 200KHz maximum sample rate, four 12-bit analog outputs, 24 digital I/O lines, and two 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 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

Athena III runs Linux, Windows Embedded Standard 7, and Windows Embedded CE. Linux and Windows Embedded Standard 7 Software Development Kits are available with bootable images and drivers to get you started on your design project right out of the box. Diamond's free industry-leading 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 rapid application development.

## Development Kit

A complete Development Kit, DK-ATHE-A-LNX, is available with all the components you need to get started on your embedded design project. The kit contains an Athena III SBC, flashdisk with Linux pre-loaded, cable kit, AC adapter, and software CD.

## Ordering Information

<b>ATHE1000A-1G</b>	Athena III SBC, 1GHz Atom E640T CPU, 1GB RAM, full data acquisition
<b>ATHE1000D-1G</b>	Athena III SBC, 1GHz Atom E640T CPU, 1GB RAM, digital I/O only
<b>ATHE1600A-1G</b>	Athena III SBC, 1.6GHz Atom E680T CPU, 1GB RAM, full data acquisition
<b>ATHE1600D-1G</b>	Athena III SBC, 1.6GHz Atom E680T CPU, 1GB RAM, digital I/O only
<b>DK-ATHE-A-LNX</b>	Athena III Development Kit with ATHE1600A-1G SBC, cables and Linux software
<b>DK-ATHE-A-WE7</b>	Athena III Development Kit with ATHE1600A-1G SBC, cables and WE7 software
<b>SDK-ATHE-A-WE7</b>	Athena III Windows Embedded Standard 7 Software Development Kit
<b>SDK-ATHE-A-LNX</b>	Athena III Linux Software Development Kit
<b>C-ATHE-KIT</b>	Athena III Cable Kit for all on-board I/O
<b>FDU-1G-XT</b>	1GB USB Flashdisk
<b>FDU-2G-XT</b>	2GB USB Flashdisk
<b>FDU-4G-XT</b>	4GB USB Flashdisk
<b>FDU-8G-XT</b>	8GB USB Flashdisk

# Athena III: Small Form Factor SBC

## Upgrade Path for Long Product Life

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

To provide long term support for its customers, with Athena III Diamond Systems maintains and extends its Athena SBC platform by providing a drop in replacement for Athena II that is highly compatible and offers improved performance. All connector locations and pinouts have been preserved with the exception of the IDE, Gigabit Ethernet, power input, and LVDS backlight connectors.

The table below highlights the differences between the Athena III and Athena II SBCs.

## Athena III and Athena II Differences

Feature	Athena III	Athena II
<b>CPU</b>	Intel Atom E640T or E680T	VIA Mark
<b>CPU Speed</b>	1.0GHz or 1.6GHz	500MHz or 800MHz
<b>CPU Rating (Passmark)</b>	160 at 1.0GHz	56 at 800MHz
<b>Memory</b>	1GB on-board	256MB on-board
<b>USB Ports</b>	4 USB 2.0	4 USB 1.1
<b>Serial Ports</b>	4 RS-232/422/485	2 RS-232 2 RS-232/485
<b>Ethernet</b>	1 Gigabit	1 10/100Base-T
<b>Mass Storage – External</b>	1 SATA	1 IDE UDMA-33
<b>Mass Storage – Internal</b>	USB flashdisk up to 8GB	IDE flashdisk up to 4GB
<b>LVDS Resolution</b>	24 bit	16 bit
<b>Analog I/O</b>	16 16-bit A/D @200KHz 4 12-bit D/A	16 16-bit A/D @100KHz 4 12-bit D/A
<b>Digital I/O</b>	24 DIO standard	Optional 24 DIO with DAQ
<b>Operating Temperature</b>	-40°C to +80°C	-40°C to +70°C or -40°C to +85°C
<b>Power Consumption</b>	9.4W	10W