ATHENA II

PC/104 Single Board Computer

500-800MHz VIA Mark CPU and Integrated Autocalibrating Data Acquisition

Highly Integrated SBC
Athena II 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.

Price/Performance Advantage
The VIA Mark CPU running at either 500 or 800MHz offers an excellent balance of performance, power consumption and price, making Athena II an ideal choice for a wide variety of embedded computing applications.

Rugged Design
Athena II was designed with rugged applications in mind. From an operating temperature of -40°C to +85°C, to its soldered SDRAM, Athena II thrives in the most extreme environments.

Fully Integrated Systems
Athena II is available as a complete system with your choice of operating system in a specially designed enclosure that eliminates all cable and provides a rugged, compact, wide-temperature box PC ready for application download and deployment.

Block Diagram

- Low power, Pentium III class, expandable SBC
- 2-in-1 design (CPU + DAQ) reduces size and cost, increases ruggedness and reliability
- VIA Mark processor running at 800/500MHz
- 256MB memory soldered on-board
- Support for:
  - four USB 1.1 ports
  - two RS-232, two RS-232/485 ports
  - 10/100Mbps Ethernet
  - IDE port for hard drive or solid state flashdisk
  - VGA CRT or LVDS LCD display
- Optional data acquisition circuitry featuring:
  - multiplexed 16 channel 16-bit A/D with autocalibration
  - four 12-bit D/A channels
  - 24 digital I/O lines
  - two counter/timers
- Extremely rugged with soldered RAM and -40°C to +85°C (-40°F to +185°F) operating temperature
### CPU Specifications

- **Processor**: VIA Mark CoreFusion CPU at 500 or 800MHz
- **Cooling**: Heat sink, fan-less or with fan
- **Memory**: 256MB DRAM
- **Display type**: VGA CRT and LVDS LCD
- **Display resolution**: 1600 X 1200 maximum
- **USB ports**: 4 USB 1.1
- **Serial ports**: 2 RS-232; (2) RS-232/485
- **Networking**: 10/100Base-T Ethernet
- **Mass storage**: 1 IDE UDMA-33 port
- **Display**: Flashdisk interface
- **Keyboard/Mouse**: PS/2
- **Audio**: AC'97, line-in, line-out, mic
- **Expansion bus**: PC/104 (ISA)
- **Input power**: 5V ±5%
- **Power consumption**: 800MHz: 10W max, 500MHz: 8W max
- **Operating temperature**: -40°C to +85°C (-40°F to +185°F)
- **Shock**: IEC68-2-27
- **Vibration**: MIL-STD-810E 514.4
- **Dimensions**: 4.18” x 4.48” (106mm x 114mm)
- **Weight**: 4.7oz / 133g without heatsink
- **RoHS**: Compliant

### Data Acquisition Specifications

#### ANALOG

- **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, 0-1.25V programmable
- **Max sample rate**: 100kHz
- **Protection**: ±35V on any analog input without damage
- **Nonlinearity**: ±3 LSB, no missing codes
- **On-board FIFO**: 2048 samples, programmable threshold
- **A/D and D/A 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 0.1%
- **Relative accuracy**: ±1 LSB
- **Nonlinearity**: ±1 LSB, monotonic
- **Reset**: Reset to zero-scale or mid-scale (jumper selectable)

#### DIGITAL I/O

- **Number of I/O lines**: 24 lines
- **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 voltage**: Logic 0: 64mA max per line
  - Logic 1: -15mA 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

### Data Acquisition

Athena II’s integrated data acquisition circuit includes 16 analog inputs with 16-bit A/D and 100KHz maximum sample rate, four 12-bit analog outputs, 24 digital I/O lines, 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

Athena II runs Linux, Windows XP, Windows Embedded Standard, QNX, and DOS. Linux, Windows Embedded Stanard, and QNX 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 for each OS to assist in rapid application development.

### Development Kit

Complete Development Kits, DK-ATHM800A-01 & DK-ATHM500A-01, are available with all the components you need to get started on your embedded design project. The kit contains an Athena II SBC, flashdisk with Linux pre-loaded, cable kit, AC adapter, and software CD.

### Ordering Information

- **ATHM500-256A**: Athena II SBC, 500MHz VIA Mark, 256MB RAM, full data acquisition
- **ATHM500-256N**: Athena II SBC, 500MHz VIA Mark, 256MB RAM, no data acquisition
- **ATHM800-256A**: Athena II SBC, 800MHz VIA Mark, 256MB RAM, full data acquisition
- **ATHM800-256N**: Athena II SBC, 800MHz VIA Mark, 256MB RAM, no data acquisition
- **ATHM800-256ALP**: Athena II SBC, 800MHz VIA Mark, 256MB RAM, full data acquisition, low profile heatsink
- **ATHM800-256NLP**: Athena II SBC, 800MHz VIA Mark, 256MB RAM, low profile heatsink
- **DK-ATHM800A-01**: Athena II Development Kit with ATHM800-256A SBC, cables and Linux software
- **DK-ATHM500A-01**: Athena II Development Kit with ATHM500-256A SBC, cables and Linux software
- **SDK-ATHM-LNX**: Athena II Linux Software Development Kit
- **SDK-QNX-LNX**: Athena II QNX Software Development Kit
- **SDK-ATHM-XPE**: Athena II Windows Embedded Standard Software Development Kit
- **C-ATHM-KIT**: Athena II Cable Kit for all on-board I/O
- **OCTAVIO-A5A-AL512-00-17-00**: Octavio-ATHM Embedded Application Server: 500MHz Athena II SBC with data acquisition, 512MB Linux flashdisk, 1.7” enclosure