apple micro

PowerPC 460EX Evaluation Kit

Enables comprehensive evaluation of the AppliedMicro 460EX processor, while accelerating customers' hardware and software development time.

Product Highlights

- Comprehensive, easy-to-use evaluation kit designed for customer setup in 15 minutes or less
- Resource CD with system-level benchmarks and sample applications
- Industry-standard U-Boot firmware, Linux operating system and Linux software development tools
- Board schematics, layout files, U-Boot source and Linux source available from the AppliedMicro Web site
- Software development tools CDs from multiple industry-leading suppliers
- Serial cable provides direct connection to the host system for initial configuration
- Ethernet cable provides direct connection to the host system for downloading and running applications
- Remote connection via a router or the Internet is also supported
- On-board JTAG connector enables connection of any compatible external JTAG probe for run-control debugging
- Universal 120-240 V power adapter supports operation worldwide
- Comprehensive processor, board and software documentation on the Resource CD

BUILT ON

Power™

Product Overview

The AppliedMicro Canyonlands evaluation kit provides users with a comprehensive set of resources to evaluate the 460EX processor as well as to start system development.

The Canyonlands evaluation board, incorporating the industry standard Linux operating system and U-Boot firmware, is an optimized, low-cost platform designed specifically for evaluation purposes.
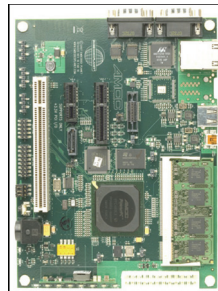
Schematics and layout files for the board are provided so that customers can start their designs from a proven baseline.

Likewise, the Linux code and U-Boot firmware source are available to accelerate customers' software development. The kit includes advanced software development tools from multiple suppliers, to assist customers in selecting the most appropriate development and run-time environments.

Canyonlands Board

The Canyonlands board, with an approximately 7" x 7" form factor, is a custom-designed platform developed by Embedded Planet for evaluating the 460EX processor:

- 1.0 GHz AppliedMicro 460EX processor
- 256 MB DDR2 SDRAM
- 64 MB NOR Flash
- 32 MB NAND Flash
- Two 10/100/1G Ethernet ports
- One USB 2.0 host port
- One USB 2.0 OTG port
- Two PCI Express connectors
- One PCI host connector
- One SATA connector
- Two serial ports
- JTAG and trace connectors
- SPI connector
- Real-time clock
- Linux (2.6 kernel) and file system in Flash
- U-Boot boot firmware in Flash.

Sample Applications and Utilities

The Resource CD provides a wide range of sample applications as a starting point for software development, and utilities to assist in system configuration:

- Web server on evaluation board
- Telnet server on evaluation board
- FTP server on evaluation board
- Web slots game on evaluation board
- Processor / board configuration report
- Ethernet utility to configure IP address, MAC address, and modify EMAC registers.
- Example flash file system for persistent storage
- Script-based Linux root file system build environment

Benchmarks

The Resource CD includes a wide range of industry-standard benchmarks for use in processor performance analysis:

- DBench
- HINT
- Security benchmark for on-chip Turbo Security Engine
- MPEG-4 encode and decode
- STREAM
- TTCP

System Design Resources

Customers can use this kit not only to evaluate the 460EX processor and to do performance analysis, but also as the starting point for their own product designs. To facilitate this, the complete hardware/software design is available to customers at *http://appliedmicro.com/Embedded/Downloads/460EX/*.

- Linux code (source and binary) for the Canyonlands board
- U-Boot firmware (source and binary) for the Canyonlands board
- Linux development tools used to develop the Canyonlands code (from Denx)
- Schematics and layout files for the Canyonlands board
- Benchmark code
- Sample application code

Development Tools & Operating Systems

The Canyonlands evaluation board is provided with Linux (based on the 2.6 kernel) in Flash. This Linux code is available to customers on the Resource CD. Instructions are provided explaining how to load an alternative operating system onto the board, either in addition to or instead of the Linux code supplied in the shipping configuration.

To assist customers in selecting the optimum development tools environment for their system development, the kit includes CDs from industry-leading tools suppliers.

These suppliers include:

- Denx Software Engineering

Through the AppliedMicro Partners program, many other companies provide operating systems and development tools that support the AppliedMicro 460EX processor. For details of all the companies offering applicable products and services, please visit the AppliedMicro Partners home page at *http://www.appliedmicro/Embedded/Partners/*.

Accessories

The evaluation kit includes:

- A serial cable for connection between the board and the host system, used during initial board configuration
- An Ethernet cable for direct connection between the board and the host system (although connection via the Internet or a router is also supported)
- A universal 120-240 V power adaptor that supports operation worldwide

Ordering Information

The Canyonlands evaluation kit may be ordered from AppliedMicro or any authorized AppliedMicro distributor using part number EV-460EX-KIT-05. For more information, please visit *http://www.appliedmicro.com/Sales.*

AppliedMicro Partners Ecosystem

AppliedMicro's embedded processors are supported by an extensive ecosystem of products and services from a wide range of leading suppliers. The AppliedMicro Partners program includes industry-standard providers of:

- Embedded operating systems
- Hardware and software development tools
- Software platforms
- Board-level products
- System design services
- Technical training
- Silicon partners

For full details of the products and services available through the AppliedMicro Partners program, or to browse support available for a specific processor, please visit *http://www.appliedmicro.com/Embedded/Partners/*.

PowerPC 460EX Technical Specifications

CPU Complex

- Power Architecture 440 processor core
- Up to 1.0 GHz/2000 DMIPS
- 32KB 1-cache/D-cache with parity
- 256KB L2 cache with parity
- FPU (2Mflops/MHz Single and Double Precision)

Memory and Bus Architecture

- On chip Peripheral Bus - 32-bit, 100 MHz
- External Bus Controller - 32-bit data/27-bit address 100MHz
- 32/64-bit DDR1/2 up to 400Mbps with optional ECC (up to 8GB)
- 64KB of on chip SRAM (OCM)

System Resources

- Up to 64 general purpose I/Os
- Interrupt Controller with 16 external interrupts
- 4-channel DMA controller

High Speed & inter-Chip Connectivity

- PCI-Express ports - one "x4" lane and one "x1" lane
- PCI v2.3 compliant, 32-bit, 66Mhz
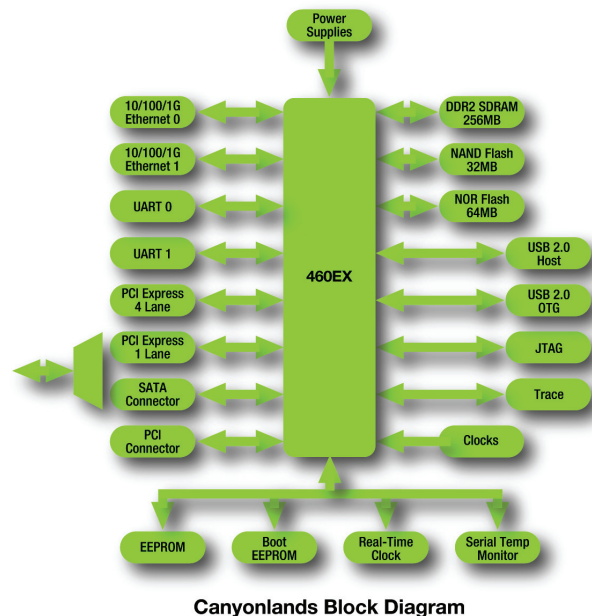- 2 IIC with boot strap controller
- SPI

Network Connectivity

- Two 10/100/1G Ethernet MACs
- TCP/IP hardware assist and QoS
- USB 2.0 OTG and Host with ULPI Interfaces
- Four UARTs

Special Functionality

- Turbo Security Engine: Optional on-chip IPSec/SSL/bulk data security
- Acceleration engine (Crypto Engine)
- Kasumi encryption/decryption engine
- SATA II single port (mux'd with 2nd PCI-e port)

Power

- <4W typical power @ 1 GHz

Canyonlands Block Diagram