

A High-Performance/Low Power MIPS® SoC 400MHz at .5 Watt

Overview

The RMI Alchemy™ Solutions Au1000™ processor provides a high-performance, low-power, high-integration System-on-a-Chip (SoC) targeting the Internet Edge device market. These devices include WAPs (Wireless Access Points), routers, gateways, printers, point of sale terminals, set-top boxes, and Internet security products, such as firewalls and VPNs (Virtual Private Networking).

Product Description

The Au1000 processor delivers a complete SoC based on the MIPS32® instruction set. Designed for optimal performance at very low power, the Au1000 processor is available up to 500MHz. Power dissipation measures less than half a watt for the 400MHz version. Highly integrated with on-chip memory controllers and Internet access peripherals, the Au1000 processor runs a variety of operating systems, including Windows® CE.NET, Linux, and VxWorks. Moreover, the integration of peripherals with RMI's unique, very high-performance, MIPS-compatible core can provide lower system costs, smaller form factors, lower system power requirements, simpler designs at multiple performance points, and shorter design cycles. The Au1000 processor is available in both standard commercial temperature (0–70°C) and industrial temperature (-40°–+85°C) versions.

Features

High-Speed MIPS CPU Core

- 266, 400 or 500MHz
- MIPS32 Instruction Set
- 32-bit Architecture
- 16KB Instruction and 16KB Data Caches
- High-speed Multiply-Accumulate (MAC) and Divide Unit
- 1.5–1.8V Core, 3.3V I/O

Highly-Integrated System Peripherals

- GPIO (32 total, 5 dedicated for system use)
- Two 10/100 Ethernet Controllers
- USB Device and Host
- Four UARTs
- IrDA Controller (SIR, MIR, FIR)
- AC97 Controller
- I²S Controller
- Two SSI Controllers

High Bandwidth Memory Buses

- 100/125MHz SDRAM Controller
- SRAM/Flash EPROM Controller



Low Power Consumption

Core MHz	Power (mW)
266	<300
400	500
500	900

- Power-saving Modes
 - Idle
 - Sleep
- Pseudo-static Design to 0Hz

Package

- 324-pin PBGA
- 23mm x 23mm

Operating System Support

- Microsoft® Windows CE.NET
- Linux
- VxWorks

Development Tool Support

- MIPS32-compatible Tool Set
- Numerous Third-Party Compilers, Assemblers and Debuggers

Core Microarchitecture Highlights Pipeline

- Scalar 5-stage Pipeline
- Load/Store Adder in 1-stage
- Scalar Branch Techniques Optimized
- Pipelined Register File Access in Fetch Stage
- Zero Penalty Branch

Multiply-Accumulate (MAC) and Divide Unit

- Max Issue Rate of one 32x16 MAC per Clock
- Max Issue Rate of one 32x32 MAC per Every Other Clock
- Operates in Parallel to CPU Pipeline
- Executes all Integer Multiply and Divide Instructions
- 32x16-bit MAC Hardware

RMI Alchemy™ Au1000™ Internet Edge Processor

Internet Edge Processor

MMU

- Instruction and Data Watch Registers for Software Breakpoints
- Separate Interrupt Exception Vector
- TLB
 - 32 Dual-entry, Fully Associative
 - Variable Page Sizes 4KB–16MB
 - 4-entry ITB

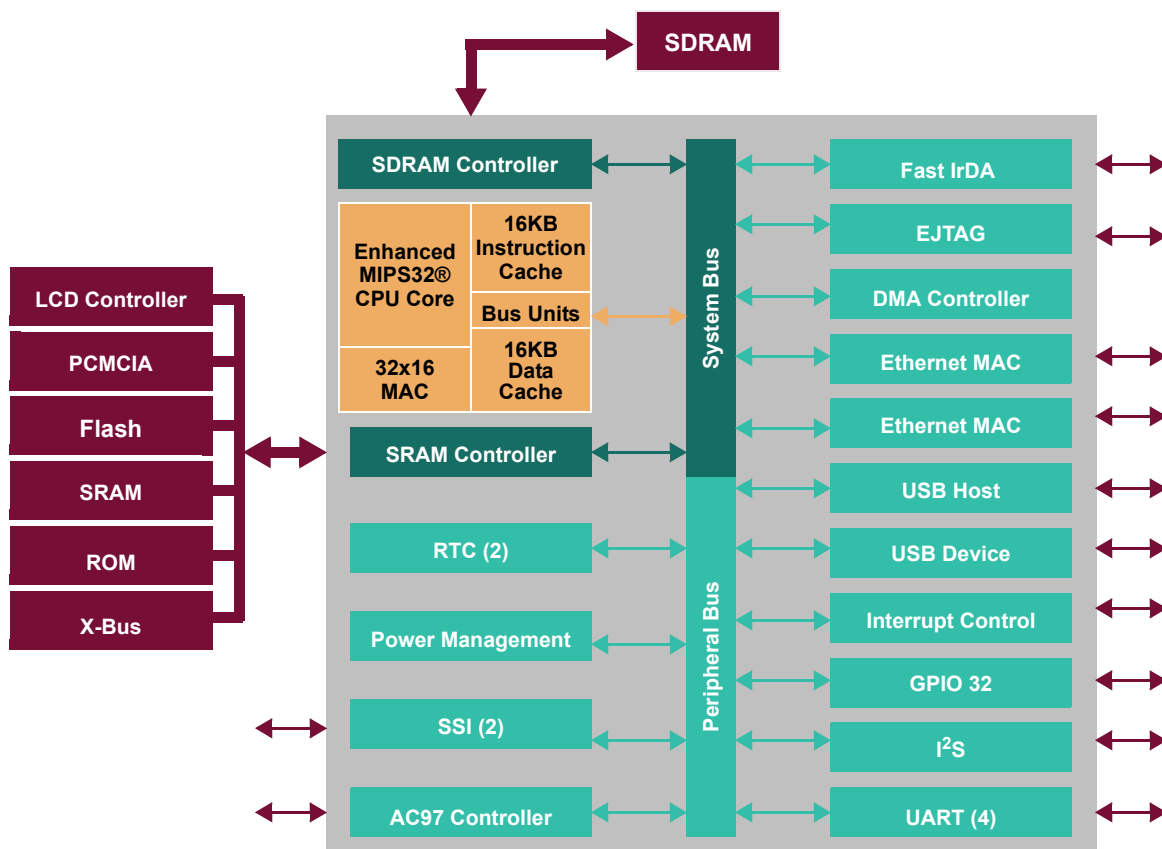
EJTAG Support

Caches

- 16KB Non-Blocking Data Cache
- 16KB Instruction Cache
- Instruction/Data Caches are 4-Way Set Associative
- Write-Back with Read-Allocate
- Cache-management Features
 - Programmable Allocation Policy
 - Line Locking
 - Prefetch Instruction (instructions and data)
- High-speed Access to On-chip Buses

Low Power Consumption

Core MHz	Core Voltage	Power (mW)
266	1.5	<300
400	1.5	500
500	1.8	900



About RMI

Raza Microelectronics, Inc. (RMI®) is a fabless semiconductor company providing highly-integrated feature-rich products ranging from power-optimized System-on-a-Chip (SoC) solutions to High-Performance Processors for the Digital Consumer, Wireless, Networking and Security markets. RMI offers the most advanced and most complete MIPS-Based™ processing solutions with both 32/64-bit architectures supporting frequencies from 300MHz to 1.2GHz. The company is headquartered in Cupertino, CA with offices in Texas, India, Korea, Japan and China. More information about RMI can be found on the company's website at www.RazaMicro.com

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