

A High-Performance/Low Power MIPS® SoC with LCD Controller

Overview

The RMI Alchemy™ Solutions Au1100® processor, a follow-on to the RMI Alchemy™ Solutions Au1000™ processor, provides a high-performance, low-power, high-integration System-on-a-Chip (SoC) with the inclusion of an LCD controller and further reduction in power over the Au1000 processor. The Au1100 processor targets Mobile Information Appliances (IAs). These IAs include Web pads, telematics, PDAs, and multimedia handheld computing devices.

Product Description

The Au1100 processor delivers a complete SoC based on the MIPS32® instruction set. Designed for optimal performance at a very low power, the Au1100 processor is available up to 500MHz. Power dissipation measures less than 0.25 watt for the 400MHz version. It features highly-integrated technology including on-chip SDRAM, SRAM/Flash EPROM memory controllers, an LCD controller, 10/100 Ethernet Controller, USB Host and Device, UARTs (3), and GPIOs (up to 48, 13 dedicated). In addition, the incorporation of peripherals with this 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.

Features

High-Speed MIPS® CPU Core

- 333, 400 or 500MHz
- MIPS32 Instruction Set
- 32-bit Architecture
- 16KB Instruction and 16KB Data Caches
- High-speed Multiply-Accumulate (MAC) and Divide Unit
- 1.1–1.3V Core, 2.5/3.3V I/O

Highly-Integrated System Peripherals

- GPIO (48 total, 13 dedicated for system use)
- 10/100 Ethernet Controller
- USB Device and Host Controller
- Three UARTs
- IrDA Controller
- AC97 Controller
- I²S Controller
- Two Secure Digital (SD) Controllers
- Two SSI Controllers
- LCD Controller
- PCMCIA Interface Controller



On-Chip LCD Controller

- Single and Dual Panel Color
- TFT and STN Displays
- Up to 640x480 or 800x600 at 16bpp
 - Supported through Unified SDRAM-Based Frame Buffer
- Hardware Rotate for Portrait-vs-Landscape (90, 180, 270, up to 320 x 240)

High Bandwidth Memory Buses

- 100/125MHz SDRAM Controller
 - 2.5–3.3V SDRAM Support
- SRAM/Flash EPROM Controller

Low System Power

Core MHz	Power (mW)
333	<200
400	250
500	400

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

Package

- 399-pin PBGA
- 17mm x 17mm

Operating System Support

- Microsoft® Windows® CE.NET
- Linux
- VxWorks

RMI Alchemy™ Au1100® Internet Edge Processor

Internet Edge Processor

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 I-stage
- Scalar Branch Techniques Optimized
- Pipelined Register File Access in Fetch Stage
- Zero Penalty Branch

Multiply-Accumulate (MAC) and Divide Unit

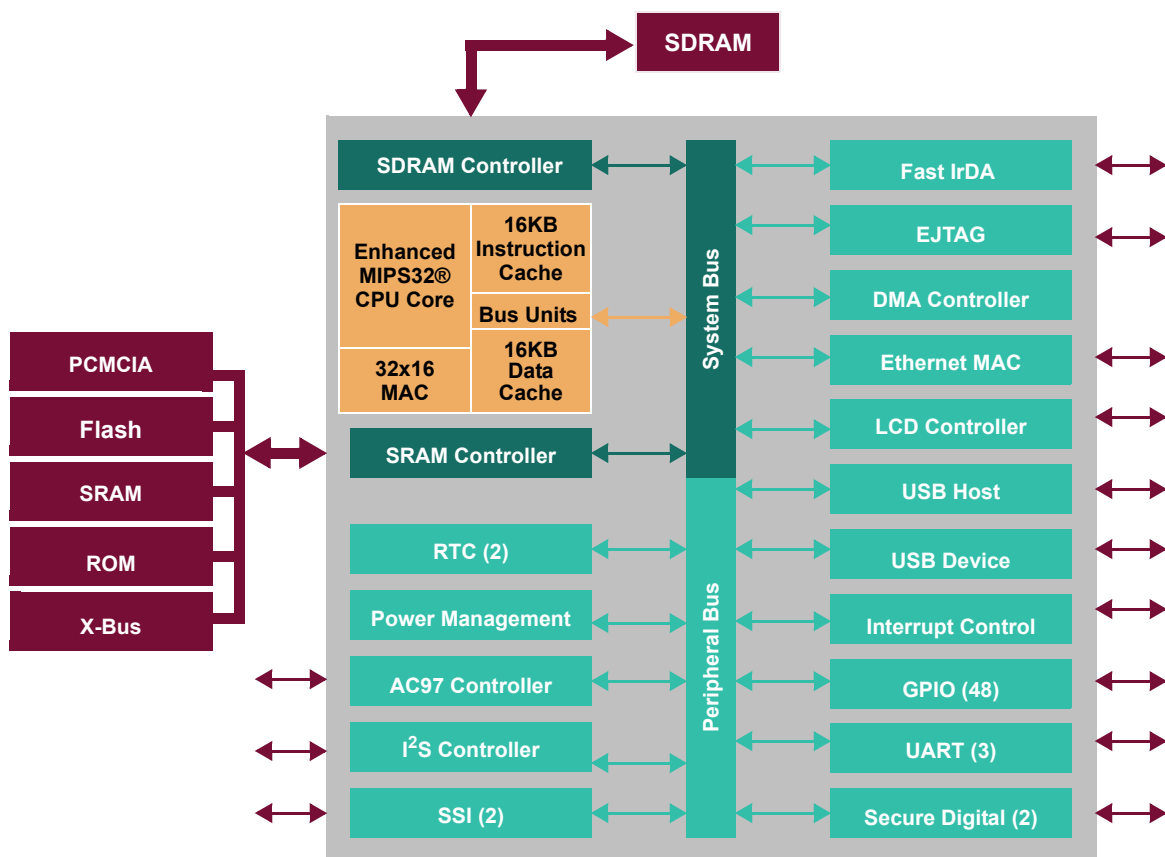
- Max Issue Rate of one 32x16 MAC per Clock
- Max Issue Rate of one 32x32 MAC per Every Other Clock
- Operates in Parallel to CPU Pipeline
- Executes all Integer Multiply and Divide Instructions
- 32x16-bit MAC Hardware

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

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 Instructions (instructions and data)
- High-speed Access to On-chip Buses



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

© 2006 Raza Microelectronics, Inc. All right reserved. RMI and Au1100 are registered trademarks and RMI Alchemy and Au1000 are trademarks of Raza Microelectronics, Inc. MIPS32 is a registered trademark of MIPS Technologies, Inc. Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other jurisdictions. Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies.