CIRRUS LOGIC®

EP9302

High-Performance ARM9™ System-on-Chip Processor
High-Performance ARM920T Design Ideal for Broad Range of Applications

EP9302

Providing a high-performance design that includes an agile 200 MHz ARM920T processor, the EP9302 is ideal for a wide range of industrial and consumer electronic applications. Designers of Internet radios, point-of sale terminals, industrial and building controls, jukeboxes, telematic control systems, set-top boxes, biometric security systems, lottery machines, fitness equipment, security systems, networked camera, MP3 mixer, GSM modem and VOIP will benefit from the EP9302's integrated architecture and advanced features. Furthermore, by enabling or disabling the EP9302's peripheral interfaces, designers can reduce development costs and accelerate time to market by creating a single platform that can be easily modified to deliver a variety of differentiated end products. To top it all off, the EP9302 is also one of the most attractively priced ARM9™ processors in the world.

EP9302 FEATURES

- **200 MHz ARM920T Processor**
  - 16 KB data cache and 16 KB instruction cache
  - MMU enabling Linux® and Windows CE®
  - 100 MHz system bus
- **MaverickCrunch™ Math Engine**
  - Floating point, integer and signal processing instructions
  - Optimized for digital music compression algorithms
  - Hardware interlocks allow in-line coding
- **MaverickKey™ IDs for Digital Rights Management or Design IP Security**
  - 32-bit unique ID
  - 128-bit random ID

- **Integrated Peripheral Interfaces**
  - Five input A/D with 12-bit resolution
  - 1/10/100 Mbps Ethernet MAC
  - Two-port USB 2.0 Full Speed host (OHCI)
  - Two UARTs (16550 Type), including soft modem support
  - IrDA interface, slow mode
  - SPI™ port
  - AC'97 interface
  - I²S interface
- **External Memory Options**
  - 16-bit SDRAM interface, up to two banks
  - 16/8-bit SRAM/Flash/ROM I/F
  - Serial EEPROM interface

- **Internal Peripherals**
  - Real-Time clock with software trim
  - 12 DMA channels for data transfer that maximizes system performance
  - Boot ROM
  - Dual PLLs control all clock domains
  - Watchdog timer
  - Two general purpose 16-bit timers
  - General purpose 32-bit timer
  - 40-bit debug timer
- **General-Purpose I/Os**
  - 16 enhanced GPIOs including interrupt capability
  - 8 additional optional GPIOs multiplexed on peripherals

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OVERVIEW

High-Performance ARM920T Processor Core

The EP9302 features an advanced ARM920T processor design with an MMU that supports Linux®, Windows CE® and many other embedded operating systems. The ARM920T's 32-bit microcontroller architecture, with a five-stage pipeline, delivers impressive performance at very low power. The included 16 KB instruction cache and 16 KB data cache provide zero-cycle latency to the current program and data, or can be locked to provide guaranteed no-latency access to critical instructions and data. For applications with instruction memory size restrictions, the ARM920T's compressed Thumb® instruction set provides a space-efficient design that maximizes external instruction memory usage.

MaverickCrunch™ Math Engine for Ultra-Fast Math Processing

The MaverickCrunch engine is an advanced mixed-mode math coprocessor that greatly accelerates the single and double-precision integer and floating-point processing capabilities of the ARM920T processor core. The engine simplifies the end-user's programming task by using predefined coprocessor instructions, by utilizing standard ARM compiler tools, and by requiring just one debugger session for the entire system. Furthermore, the integrated design provides a single instruction stream and the advantage of zero latency for cached instructions. To emulate this capability, competitors' solutions add a DSP to the system, which requires separate compiler/linker/debugger tool sets. This additional DSP requires programmers to write two separate programs and debug them simultaneously, which can result in frustration and costly delays.

The single-cycle integer multiply-accumulate instruction in the MaverickCrunch engine allows the EP9302 to offer unique speed and performance while encoding digital audio and video formats, processing data via Ethernet and performing other math-intensive computing and data-processing functions in consumer and industrial electronics.

Integrated Five-Input, Multiplexed A/D Controller

The EP9302 integrates a signed 12-bit analog-to-digital converter with a multiplexed front-end that is controlled through a software-configured switch matrix. This matrix allows routing of the five input signals to the A/D sample input or to the +REF and -REF inputs. If external REF inputs are not required, the A/D REF inputs can be internally switched to VDD and GND allowing all five inputs to be sampled. Reading a sampled result enables a convert command for the next sample. These capabilities are especially useful in process control and instrumentation applications as well as voltage or temperature monitoring.

MaverickKey™ Unique ID Secures Digital Content and OEM Designs

MaverickKey unique hardware programmed IDs provide an excellent solution to the growing concern over secure Web content and commerce. With Internet security playing an important role in the delivery of digital media such as books or music, traditional software methods are quickly becoming unreliable. The MaverickKey unique IDs provide OEMs with a method of utilizing specific hardware IDs for DRM (Digital Rights Management) mechanisms.

Both a specific 32-bit ID as well as a 128-bit random ID is programmed into the EP9302 through the use of laser probing technology. These IDs can then be used to match secure copyrighted content with the ID of the target device that the EP9302 is powering, and then deliver the copyrighted information over a secure connection. In addition, secure transactions can benefit by matching device IDs to server IDs.

MaverickKey IDs can also be used by OEMs and design houses to protect against design piracy by presetting ranges for unique IDs. For more information on securing your design using MaverickKey, please contact your Cirrus Logic sales representative.

Integrated Two-port USB 2.0 Full Speed Host with Transceivers

The EP9302 integrates two USB 2.0 Full Speed host ports. Fully compliant to the OHCI USB 2.0 Full Speed specification (12 Mbps), the host ports can be used to provide connections to a number of external devices including mass storage devices, external portable devices such as audio players or cameras, printers or USB hubs. Naturally, the two-port USB host also supports the USB 2.0 Low Speed standard. This provides the opportunity to create a wide array of flexible system configurations.

Integrated Ethernet MAC Reduces BOM Costs

The EP9302 integrates a 1/10/100 Mbps Ethernet Media Access Controller (MAC) on board. With a simple connection to an MII-based external PHY, an EP9302-based system has easy, high-performance, cost-effective Internet capability.

High-Quality Sound Delivered in Multiple Audio Configurations

The EP9302 delivers SPI, I²S and AC'97 serial interface support. The AC'97 port supports multiple CODECs for cost-effective stereo audio output. Cirrus Logic provides high-performance audio decode and encode algorithms for a number of popular formats including MP3, Windows Media® Audio and AAC™.

General-Purpose Memory Interface (SDRAM, SRAM, ROM, & FLASH)

The EP9302 features a unified memory address model in which all memory devices are accessed over a common address/data bus. The SRAM memory controller supports 8- or 16-bit devices and accommodates an internal boot ROM concurrently with a 8- or 16-bit SDRAM memory.

Multiple Booting Mechanisms Increase Flexibility

The processor includes a 16 KB boot ROM to set up standard configurations. Optionally, the processor may be booted from FLASH memory, over the SPI serial interface or through the UART. This boot flexibility makes it easy to design user-controlled, field-upgradable systems.

Abundant General Purpose I/Os Build Flexible Systems

The EP9302 includes both enhanced and standard general- purpose I/O pins (GPIOs). The 16 different enhanced GPIOs may individually be configured as inputs, outputs or interrupt-enabled inputs. There are an additional 8 standard GPIOs that may individually be used as inputs, outputs or open-drain pins. The standard GPIOs are multiplexed with peripheral function pins, so the number available depends on the utilization of peripherals. Together, the enhanced and standard GPIOs facilitate easy system design with external peripherals not integrated on the EP9302.

The Cirrus Logic ARM9™ Embedded Processor Family

EP9315

EP9312

Premium-Featured Solutions
Connected, high-performance graphics system with mass storage

EP9307

Full-Featured Solutions
Connected, high-performance graphics terminals

EP9302

EP9301

Entry-Level Solutions
Non-graphical terminals, standard connectivity

Plays Windows® Media™

ARM POWERED®

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