CIRRUS LOGIC®

Leading the Digital Entertainment Revolution™

EP9307

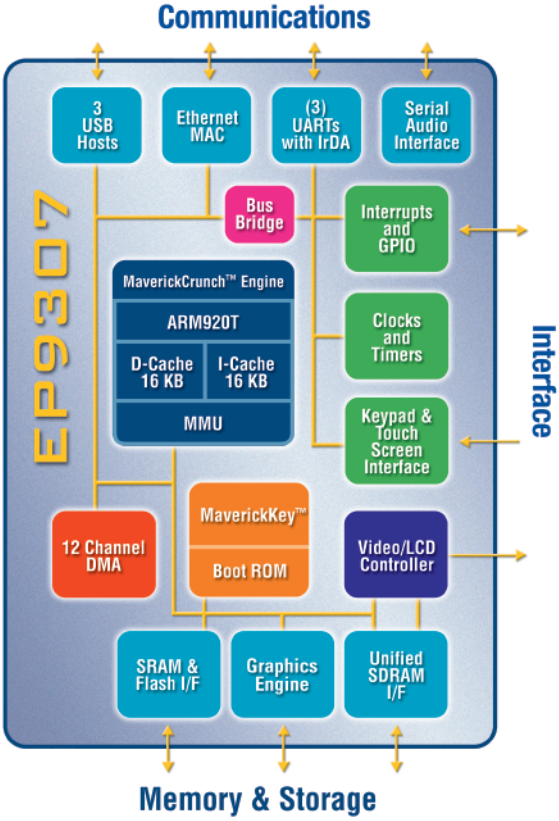
PRODUCT BULLETIN

Universal Platform System-on-Chip Processor

High-Performance ARM920T Design Ideal for Broad Range of Applications

EP9307 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
  - 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
  - Graphics accelerator
  - Three-port USB 2.0 Full Speed host (OHCI)
  - Three UARTs (16550 Type)
  - IrDA interface, slow and fast mode
  - LCD interface with dedicated SDRAM channel
  - Touch screen interface
  - SPI port
  - AC'97 interface
  - I^2S interface, up to 6 channels
  - 8x8 keypad
- External Memory Options
  - 32-bit SDRAM interface, up to four banks
  - 32/16/8-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
  - 14 enhanced GPIOs including interrupt capability
  - 18 additional optional GPIOs multiplexed on peripherals



The EP9307 is a highly integrated system-on-chip processor that paves the way for a multitude of next-generation consumer and industrial electronic products. Designers of digital jukeboxes, telematic control systems, thin clients, point-of-sale terminals, industrial controls, biometric security systems, and GPS devices will benefit from the EP9307's integrated architecture and advanced features. In fact, with amazingly agile performance provided by a 200 MHz ARM920T processor, and featuring an incredibly wide breadth of peripheral interfaces, the EP9307 is well suited to an even broader range of high volume applications. Furthermore, by enabling or disabling the EP9307'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.

EP9307 Applications

- Digital audio jukeboxes
- Portable audio/video players
- Telematic control systems
- Point-of-sale terminals
- Thin clients
- Internet TVs
- Biometric security systems
- Industrial controls
- GPS & fleet management systems
- Educational toys
- Voting machines
- Medical equipment
- Available in 272-ball TFBGA

Overview

High-Performance ARM920T Processor Core

The EP9307 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 EP9307 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.

Graphics Accelerator

The EP9307 contains a hardware graphics acceleration engine that improves graphic performance by handling block copy, block fill and hardware line draw operations. The graphics accelerator is used in the system to offload graphics operations from the processor.

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 EP9307 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 EP9307 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 Three-port USB 2.0 Full Speed Host with Transceivers

The EP9307 integrates three 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 three-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 EP9307 integrates a 1/10/100 Mbps Ethernet Media Access Controller (MAC) on board. With a simple connection to an MII-based external PHY, an EP9307-based system has easy, high-performance, cost-effective Internet capability.

Support for a Wide Array of Display Interfaces with a Flexible Raster Controller

The EP9307 processor provides timing and interface signals for digital LCD, TFT, and CRT displays. It is fully programmable for either non-interlaced or dual-scan color and grayscale flat panel displays, with up to 18 bits-per-pixel of color resolution. System performance is enhanced with a separate dedicated data path to the SDRAM-based frame buffer, which supports resolutions up to 1024x768. A 16-bit PWM provides control for LCD panel contrast.

In addition, the EP9307 provides direct timing and interface signals for TV displays, with support for both NTSC and PAL formats through either RGB or YCrCb outputs.

High Quality Sound Delivered in Multiple Audio Configurations

The EP9307 delivers SPI, I²S and AC'97 serial interface support. The processor can be configured to provide up to six-channel I²S 24-bit audio. 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 EP9307 features a unified memory address model in which all memory devices are accessed over a common address/data bus. A separate internal port is dedicated to the read-only Raster/Display refresh engine, while the rest of the memory accesses are performed via the high-speed processor bus. The SRAM memory controller supports 8, 16 and 32-bit devices and accommodates an internal boot ROM concurrently with a 32-bit SDRAM memory.

16-Bit Analog-to-Digital Converter (ADC) Provides an Integrated Touch-Screen Interface or General ADC Functionality

The EP9307 includes a 16-bit ADC, which can be utilized either as a touch-screen interface or for general ADC functionality. The touch-screen interface performs all sampling, averaging, ADC range checking, and control for a wide variety of analog-resistive touch screens. To improve system performance, the controller only interrupts the processor when a meaningful change occurs. The touch-screen hardware may be disabled, and the switch matrix and ADC controlled directly for general ADC usage if desired.

Plays Windows® Media

ARM POWERED®

8x8 Keypad Interface Reduces BOM Costs

The keypad circuitry scans an 8x8 array of 64 normally open, single pole switches. Any one or two keys depressed will be de-bounced and decoded. An interrupt is generated whenever a stable set of depressed keys is detected. If the keypad is not utilized, the 16 column/row pins may be used as general-purpose I/Os.

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 EP9307 includes both enhanced and standard general-purpose I/O pins (GPIOs). The 14 different enhanced GPIOs may individually be configured as inputs, outputs, or interrupt-enabled inputs. There are an additional 18 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 EP9307.

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