ADSP-BF542 High Performance Convergent Multimedia Blackfin Processor

Key Features

- Higher system performance that accommodates advanced systems while also decreasing overall system cost via:
  - High bandwidth bus infrastructure
  - System peripherals that provide glueless connectivity to a greater range of external devices
- Lockbox™ Technology Hardware-enabled security for code protection

Architectural Features

- Blackfin Processor core with up to 600 MHz (1200 MMACS) performance
- 2 independent DMA controllers

High Level of Integration

- Connectivity: high speed USB OTG, UARTs, SPORTs, SPIs, TWI, and CAN®
- Human interface: 32-bit up/down counter/thumbwheel interface, 8 × 8 keypad interface
- Expansion: SD/SDIO and ATAPI-6 interface
- Multimedia: 8-bit/16-bit parallel peripheral controller with pixel compositor hardware accelerator
- Synchronous memory interface for DDR/mobile DDR connectivity
- Asynchronous memory interface for SRAM, EEPROM, NAND/NOR flash connectivity
- 400-ball, 17 mm × 17 mm mini-BGA, 0.8 mm pitch
- Industrial temperature ranges: −40°C to +85°C

Overview

The ADSP-BF542 Blackfin® Processor delivers greater system performance for the most challenging converged signal processing applications. With ample on-chip memory, system bandwidth, and numerous peripherals, designers can build demanding applications while reducing system costs.

The high performance 16-bit/32-bit Blackfin embedded processor core, the flexible cache architecture, the enhanced DMA subsystem, and the dynamic power management (DPM) functionality allow system designers a flexible platform to address a wide range of applications, including consumer, communications, automotive, and industrial/instrumentation.

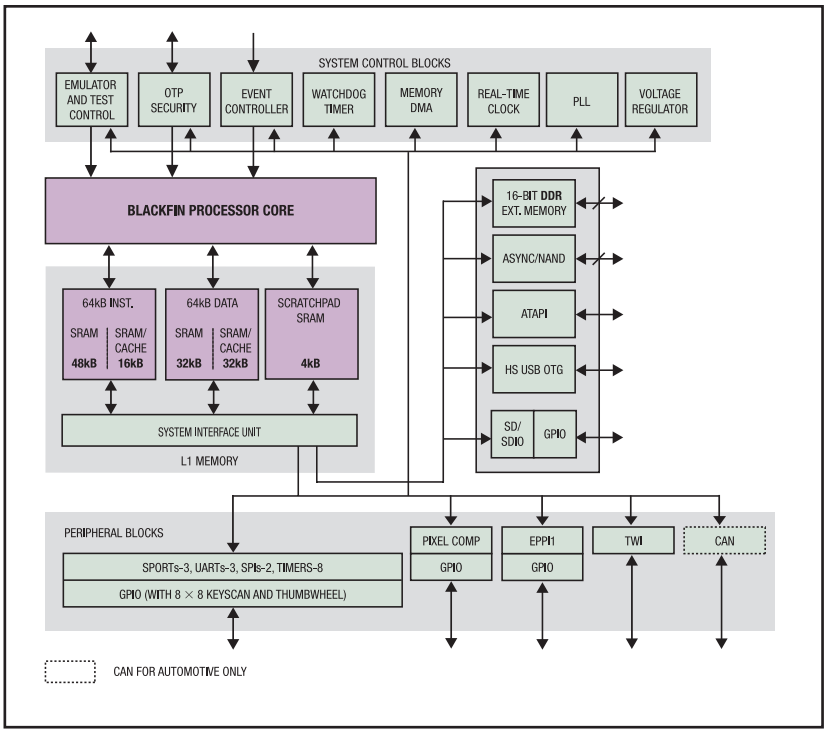
The ADSP-BF542 offers up to 600 MHz/1200 MMACS of performance. This processor core is supported by two independent, advanced DMA controllers supporting one- and two-dimensional DMA transfers between on-chip memory, off-chip memory, and system peripherals. The combination of the processor core speed and the DMA controller allows for efficient processing of audio, voice, video, and image data.

ANALOG DEVICES

Blackfin Processors also offer enhanced power management capabilities by integrating on-chip core controller circuitry. This on-chip controller allows for the core and system clocks to be dynamically modified via a digital divider circuit, providing system designers an additional tool for optimization of power and performance.

Designed for Security: Lockbox Technology

IP protection has become a necessary part of today's embedded applications. The ADSP-BF542 provides a security scheme that balances flexibility and upgradability with performance through the inclusion of a firmware-based solution including OTP memory to enable users to implement private keys for secure access to program code.



ADSP-BF542 Designed for System Performance

The ADSP-BF542 was specifically designed to meet the needs of convergent multimedia applications where system performance and low cost are essential ingredients. The integration of multimedia, human interface, and connectivity peripherals combined with increased system bandwidth and on-chip memory provides customers a platform to design the most demanding applications.

Many multimedia enhancements have also been included on the ADSP-BF542 to offload processor MIPS through hardware integration, expand LCD capabilities, and shorten customer development time. A hardware acceleration block, the pixel compositor, has been developed to execute text/graphics overlays, color conversion, and alpha blending. This block significantly reduces processor core overhead associated with software RGB-YUV color conversion and alpha blending.

Expanded Peripherals

The ADSP-BF542 provides peripheral flexibility to complement its high performance processing. These rich system-level peripherals are well suited for industrial multimedia applications where multiple standards are prevalent and system performance is required.

For human interface capability, the ADSP-BF542 provides a 32-bit up/down counter that can sense 2-bit quadrature or binary codes as typically emitted by industrial drives or manual thumbwheels. An 8 × 8 keypad interface is also included.

To enhance connectivity, a high speed USB On-the-Go (OTG) with integrated PHY has been incorporated along with standard serial connections provided by multiple on-chip SPORT, SPI, UART, TWI, and CAN (available for automotive) interfaces. These provide glueless interfaces to multiple off-chip devices, including consumer and communication products, Bluetooth,® and other application-specific interfaces. This level of integration is perfect for the emerging and constantly changing products and standards in convergent multimedia applications.

For interfacing off-chip to storage media including hard drives, CD/DVD drives, and NAND flash products, the ADSP-BF542 has implemented an SD/SDIO controller, an ATAPI-6 interface and an 8-bit/16-bit NAND flash controller.

Development Tools

Blackfin Processors are supported by:

- The Analog Devices CROSSCORE® brand of industry-leading development tools. The CROSSCORE components include the VisualDSP++® software development environment, EZ-KIT Lite® evaluation systems, EZ-Extender® daughterboards, and USB-based emulators.
- Third-party developers: Over 100 third parties provide software, hardware, and consulting services to support Blackfin embedded processors. For more information, visit *www.analog.com/processors/collaborative*.

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