# ADSP-BF522 Low Power Blackfin Processor with Advanced Peripherals

## Key Features

- Low power performance extends battery life for portable applications: as low as <0.16 mW/MHz @ 250 MHz

- Application-tuned peripherals provide glueless connectivity to a greater range of external devices for improved flexibility and competitiveness

- Lockbox™ secure technology: hardware-enabled security for code and content protection

## Architectural Features

- High performance 16-/32-bit embedded processor core

- Blackfin® Processor core with up to 600 MHz (1200 MMACS) performance

## High Level of Integration

- 132 kB of on-chip SRAM

- Parallel peripheral interface (PPI) provides a glueless interface to many image sensors and display drivers

- 2 dual-channel, full-duplex synchronous serial ports supporting 8 stereo I²S channels

- 12 peripheral DMA channels supporting one- and two-dimensional data transfers

- NAND flash controller with 8-bit interface for commands, addresses, and data

- Connectivity: host DMA port, UARTs, SPORTs, SPI®, and TWI

- Memory controller providing glueless connection to multiple banks of external SDRAM, SRAM, flash, or ROM

- 289-ball, 12 mm × 12 mm, 0.5 mm pitch mini-BGA (commercial temperature range 0°C to 70°C)

## System-in-Package

- For space-constrained audio applications the ADSP-BF522C supports an embedded low power stereo codec
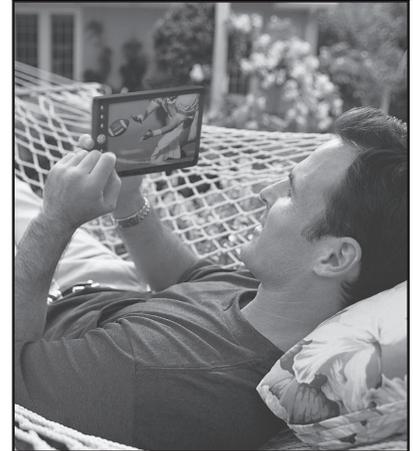
## Overview

The ADSP-BF522 Blackfin Processor combines high performance, power efficiency, and system integration to enable highly optimized designs without compromises. With built-in peripheral selectivity, the ADSP-BF522 provides the greatest flexibility for today's most demanding convergent signal processing applications. With power consumption as low as 0.16 mW/MHz and performance up to 600 MHz, applications can now add greater signal processing performance without sacrificing battery life.

The ADSP-BF522 supports peripheral flexibility and system scalability to enable developers to create products that fit the target needs.

The high performance 16-/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 portable applications, including consumer, communications, and industrial/instrumentation.

## Designed for Building Optimal Solutions

The ADSP-BF522 delivers optimum price, power, and performance for applications where each of these critical elements plays a key part in the selection process. The ADSP-BF522 provides peripheral flexibility to complement its high performance processing. The HDMA (host direct memory access) and NAND flash controller are just a few of the peripheral options on the ADSP-BF522—not to mention the availability of up to 48 GPIO signals.

Configured as a coprocessor in applications where flexibility is required to support a variety of multimedia applications, the ADSP-BF522 offers the processing performance along with scalable power management that provides freedom from design constraints to developers who need to maintain flexibility in their design.

For battery-powered applications that either enhance the multimedia experience or deliver a full mobile TV implementation, the ADSP-BF522 represents the ideal solution to release design innovation.

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## Designed for Security: Lockbox Secure Technology

Lockbox secure technology offers a platform for digital rights management (DRM) content protection that is required for devices such as media players. It provides publicly accessible, user-programmable OTP memory that enables customers to program their own device IDs and helps to ensure that these device IDs remain tamper proof.

Lockbox secure technology also features private, secure OTP memory that enables customers to program their own private device assets (for example, private keys) and to ensure that these assets are secure (not accessible, and invisible to unauthorized users) and tamper proof.

The secure mode provides a secure processing environment in which only authorized code is allowed to access sensitive device assets. This enables customers to implement systems in which only authenticated, trusted code can perform DRM operations or critical subsets of it (for example, license handling or rights object handling).

## Designed for Performance, Power Efficiency, and Flexibility

The ADSP-BF522 offers up to 600 MHz performance and up to 1200 MMACS. This processor core is supported by an advanced DMA controller 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.

Blackfin Processors also offer enhanced power management capabilities by integrating on-chip core voltage regulation circuitry. This on-chip voltage regulator 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.

With multiple configuration options, designers can choose the feature set, power/MIPS profile, and cost point to meet their system requirements.
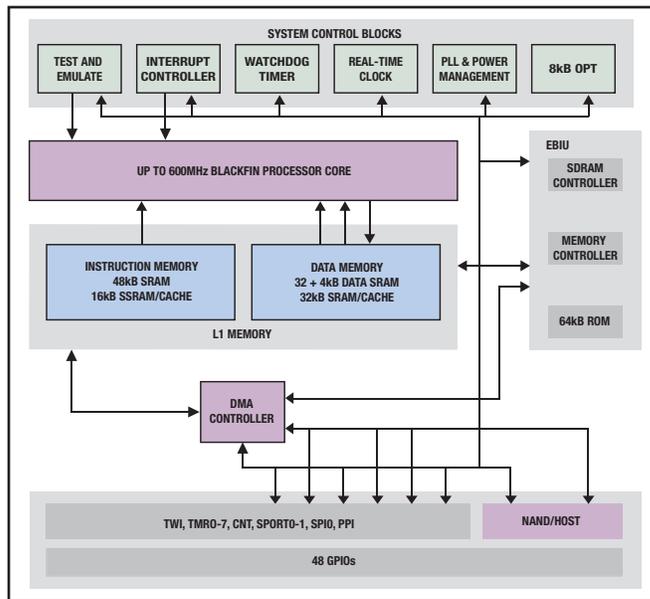
### Peripheral options include:

- Host DMA port
- NAND flash controller
- Multifunction serial ports supporting I²S audio capability
- UART
- SPI-compatible port
- Parallel port (PPI) with ITU-R BT.656 video support

Hence the ADSP-BF522 can address a wide variety of existing and emerging applications.

## Development Tools

Blackfin Processors are supported by:

- 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.

- Green Hills® Software's industry-leading MULTI® embedded software development environment and integrated emulators.

- Open-source development tools, GCC tool chain, µClinux™ kernel, board support packages, and associated debugging environment. Visit *www.blackfin.uclinux.org* for more information.

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