



# ADSP-BF538/ADSP-BF538F Blackfin Processors with Integrated Flash Memory

## Key Features

### Blackfin® Processors Offer Features Attractive to a Broad Application Base

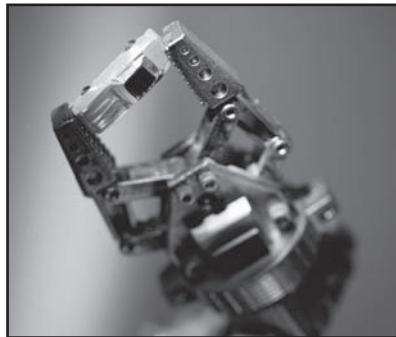
- Powerful and flexible cache architecture suitable for soft real-time control tasks and industry-standard operating systems, plus hard real-time signal processing tasks
- Addition of on-board flash memory for code storage of complex system applications that run on a powerful 400 MHz or 500 MHz processor
- Applications-tuned peripherals provide glueless connectivity to general-purpose converters in data acquisition applications
- Enhanced dynamic power management with on-chip voltage regulation

## Architectural Features

- High performance 16-/32-bit embedded processor core
- 10-stage RISC MCU/DSP pipeline with mixed 16-/32-bit ISA for optimal code density
- Full SIMD architecture, including instructions for accelerated video and image processing
- Memory management unit (MMU), supporting full memory protection for an isolated and secure environment

## Product Integration Features

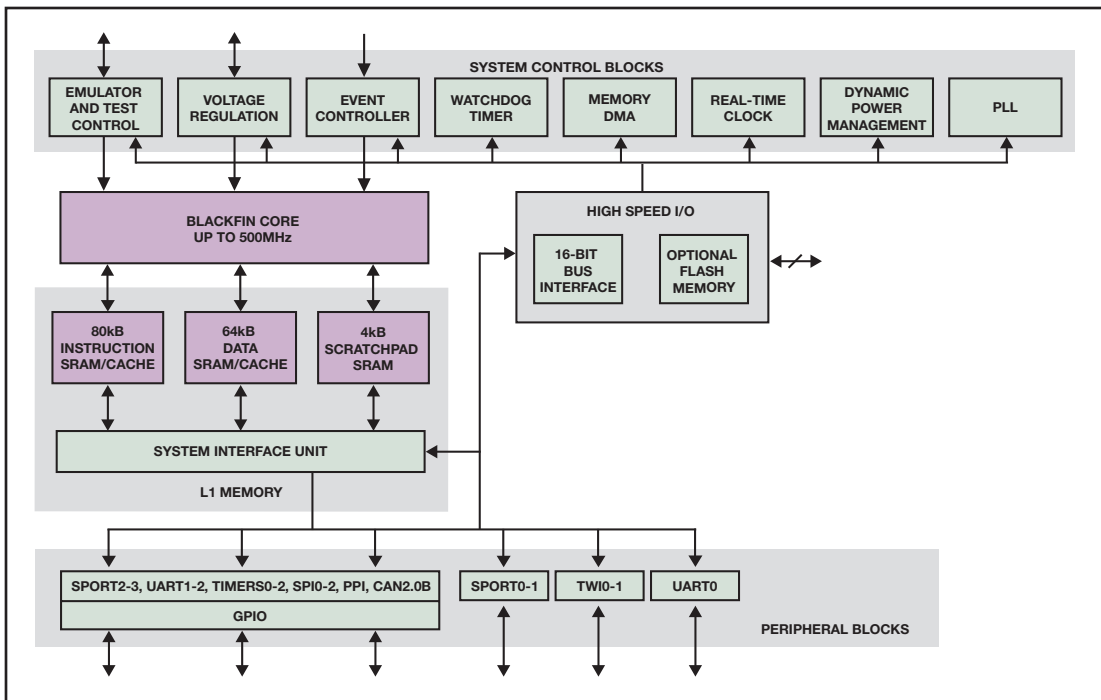
- On-board 512 kB or 1 MB of flash memory on ADSP-BF538F devices
- More SPORT, UART, SPI, and TWI peripherals over popular ADSP-BF533 processor
- Controller area network (CAN) 2.0B interface
- Enhanced DMA controller for high bandwidth throughput accommodating multiple peripherals
- 148 kB on-chip, full-speed SRAM
- Glueless SDRAM, SRAM, and flash controllers
- Glueless video capture/display port
- 316-ball, lead-free mini-BGA package
- Industrial temperature range
- Multiple pin- and code-compatible derivatives



## Multiple Connections Allow for Complex Systems

With two new members, the Blackfin Processor family has been expanded to address the ever increasing need for more connection possibilities. This connectivity is coupled with 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. System designers can take advantage of the combined control and signal processing capabilities of the processor core across a wide range of end applications through the code compatibility of these new family members with existing Blackfin offerings.

The ADSP-BF538 and ADSP-BF538F are functional extensions of the popular ADSP-BF533 processor, and they are ideally suited for applications with multiple device connections. The ADSP-BF538 offers equivalent embedded memory and is well-suited for applications such as video security/surveillance and industrial-environment-based distributed control/factory automation applications. The ADSP-BF538F incorporates on-board flash memory. Both devices are ideally suited for a broad range of industrial, instrumentation, and medical appliance applications, allowing for broad connection possibilities coupled with a mix of control and signal processing needs based on the end product.



### Designed for Embedded Development

The ADSP-BF538F is an exciting new addition to the Blackfin family. It is the first product to integrate flash memory alongside the Blackfin Processor. There are two choices available in the ADSP-BF538F family, one with 512 kB of on-board flash memory and one with 1 MB of on-board flash memory. Both offer large code space for complex embedded systems and fast access time to the Blackfin core.

This is in addition to the complementary Blackfin Processor memory system that offers a powerful and flexible cache architecture that can dynamically balance between the hard real-time tasks desired in SRAM, soft real-time control tasks, and an operating system (OS) requiring cache functionality. Dynamic power management additionally lowers power consumption for extending battery life or for minimizing power dissipation in enclosed applications.

### Designed as an Integrated System

In addition to the embedded connectivity of CAN, the ADSP-BF538/ADSP-BF538F processors include a variety of general-purpose functions designed to minimize external IC count and provide broad control and communication. Peripherals include three SPI-compatible ports, three UARTs, four SPORT ports, three multifunction timers, up to 54 general-purpose I/Os, dual 2-wire interface for I<sup>2</sup>C operation, a real-time clock, a watchdog timer, an event controller, and a JTAG/debug interface. The flexible parallel peripheral interface (PPI) offers a direct connection to a variety of video encoders/decoders, display drivers, image sensors, and general-purpose converters.

### 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 PCI-based or USB-based emulators.
- Green Hills® Software award-winning MULTI® Embedded Software Development Environment and associated emulators.

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