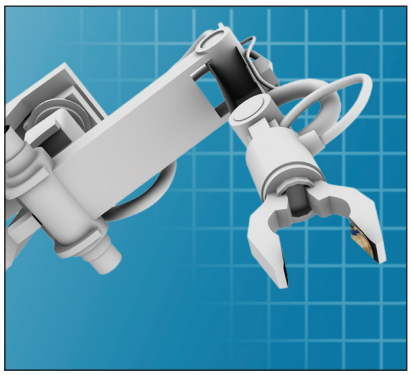
Blackfin Processor Family



Why Choose a Blackfin Processor?

- High performance, 16-/32-bit Blackfin® processor core with DSP and RISC functionality and programmability
  - Eliminates need for multiple separate processors
- Large portfolio of products ranging from 300 MHz to 600 MHz
  - Best-in-class MHz/mW performance
  - Best-in-class price performance
- Software controlled dynamic power management
  - Extends battery life in portable applications
- Application-tuned system peripherals
  - Provides glueless connectivity to a variety of external devices
- Many low cost pin- and code-compatible models
- Industrial temperature range allows for wide range of applications
- Supported by easy to use, world-class development tools
- System-level integration with integrated flash and ADC on certain models
- Processors available with Lockbox® Secure Technology
- World-class ecosystem components and RTOS offerings from leading partners
- On-chip low power codec available on certain models

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ANALOG DEVICES

Blackfin Processors

Part Number	Package[1]	Speed (MHz)	RAM Memory (kB)		Ambient Temp Range (°C)	Key Peripherals	Price Range @ 1k ($U.S.)[2]
ADSP-BF504BCPZ-4[3]	88-lead LFCSP	400	68		−40 to +85	SPI, PPI, SPORT, UART, PWM, ADC control module	Contact ADI
ADSP-BF504KCPZ-4	88-lead LFCSP	400			0 to 70		
ADSP-BF504BCPZ-3F	88-lead LFCSP	300	68	Flash memory 4 MB	−40 to +85	SPI, PPI, SPORT, UART, PWM, ADC control module, 4 MB parallel flash	
ADSP-BF504KCPZ-3F	88-lead LFCSP	300			0 to 70		
ADSP-BF504BCPZ-4F	88-lead LFCSP	400			−40 to +85		
ADSP-BF504KCPZ-4F	88-lead LFCSP	400			0 to 70		
ADSP-BF506BSWZ-3F	120-lead LQFP_EP	300			−40 to +85	SPI, PPI, SPORT, UART, PWM, ADC control module, 4 MB parallel flash, 12-bit ADC	
ADSP-BF506KSWZ-3F	120-lead LQFP_EP	300			0 to 70		
ADSP-BF506BSWZ-4F	120-lead LQFP_EP	400			−40 to +85		
ADSP-BF506KSWZ-4F	120-lead LQFP_EP	400			0 to 70		
ADSP-BF512BSWZ-3	176-lead LQFP_EP	300	116		−40 to +85	PPI, SPI, SPORTs, TWI, UART	6.26 to 9.92
ADSP-BF512BSWZ-4[3]	176-lead LQFP_EP	400			−40 to +85		
ADSP-BF512KBCZ-3	168-ball CSP_BGA	300			0 to 70		
ADSP-BF512KBCZ-4	168-ball CSP_BGA	400			0 to 70		
ADSP-BF512KSWZ-3	176-lead LQFP_EP	300			0 to 70		
ADSP-BF512KSWZ-4	176-lead LQFP_EP	400			0 to 70		
ADSP-BF512BSWZ-4F4	176-lead LQFP_EP	400	116	Flash memory 512	−40 to +85	PPI, SPI, SPORTs, TWI, UART, SPI flash	
ADSP-BF512KBCZ-4F4	168-ball CSP_BGA	400			0 to 70		
ADSP-BF512KSWZ-4F4	176-lead LQFP_EP	400			0 to 70		
ADSP-BF514BSWZ-3	176-lead LQFP_EP	300	116		−40 to +85	PPI, SPI, SPORTs, TWI, UART, SDIO, CE-ATA, eMMC	7.77 to 10.50
ADSP-BF514BSWZ-4	176-lead LQFP_EP	400			−40 to +85		
ADSP-BF514KBCZ-3	168-ball CSP_BGA	300			0 to 70		
ADSP-BF514KBCZ-4	168-ball CSP_BGA	400			0 to 70		
ADSP-BF514KSWZ-3	176-lead LQFP_EP	300			0 to 70		
ADSP-BF514KSWZ-4	176-lead LQFP_EP	400			0 to 70		
ADSP-BF514BSWZ-4F4	176-lead LQFP_EP	400	116	Flash memory 512	−40 to +85	PPI, SPI, SPORTs, TWI, UART, SDIO, CE-ATA, eMMC, SPI flash	
ADSP-BF514KBCZ-4F4	168-ball CSP_BGA	400			0 to 70		
ADSP-BF514KSWZ-4F4	176-lead LQFP_EP	400			0 to 70		
ADSP-BF516BSWZ-3	176-lead LQFP_EP	300	116		−40 to +85	PPI, SPI, SPORTs, TWI, UART, 10/100 Ethernet, SDIO, CE-ATA, eMMC	8.92 to 11.65
ADSP-BF516BSWZ-4	176-lead LQFP_EP	400			−40 to +85		
ADSP-BF516KBCZ-3	168-ball CSP_BGA	300			0 to 70		
ADSP-BF516KBCZ-4	168-ball CSP_BGA	400			0 to 70		
ADSP-BF516KSWZ-3	176-lead LQFP_EP	300			0 to 70		
ADSP-BF516KSWZ-4	176-lead LQFP_EP	400			0 to 70		
ADSP-BF516BSWZ-4F4	176-lead LQFP_EP	400	116	Flash memory 512	−40 to +85	PPI, SPI, SPORTs, TWI, UART, 10/100 Ethernet, SDIO, CE-ATA, eMMC, SPI flash	
ADSP-BF516KBCZ-4F4	168-ball CSP_BGA	400			0 to 70		
ADSP-BF516KSWZ-4F4	176-lead LQFP_EP	400			0 to 70		
ADSP-BF518BSWZ-3	176-lead LQFP_EP	300	116		−40 to +85	PPI, SPI, SPORTs, TWI, UART, 10/100 Ethernet with 1588, SDIO, CE-ATA, eMMC	13.07 to 14.07
ADSP-BF518BSWZ-4[3]	176-lead LQFP_EP	400			−40 to +85		
ADSP-BF518KBCZ-3	168-ball CSP_BGA	300			0 to 70		
ADSP-BF518KBCZ-4	168-ball CSP_BGA	400			0 to 70		
ADSP-BF518KSWZ-3	176-lead LQFP_EP	300			0 to 70		
ADSP-BF518KSWZ-4	176-lead LQFP_EP	400			0 to 70		
ADSP-BF518BSWZ-4F4	176-lead LQFP_EP	400	116	Flash memory 512	−40 to +85	PPI, SPI, SPORTs, TWI, UART, 10/100 Ethernet with 1588, SDIO, CE-ATA, eMMC, SPI flash	
ADSP-BF518KBCZ-4F4	168-ball CSP_BGA	400			0 to 70		
ADSP-BF518KSWZ-4F4	176-lead LQFP_EP	400			0 to 70		

[1]Packages: LQFP_EP (low profile quad flat pack exposed pad); CSP_BGA (chip scale package ball grid array); PBGA (plastic ball grid array); LFCSP (lead frame chip scale package).

[2]All pricing is budgetary and subject to change.

[3]Available in automotive grade.

Blackfin Processors (continued)

Part Number	Package[1]	Speed (MHz)	RAM Memory (kB)	Ambient Temp Range (°C)	Key Peripherals	Price Range @ 1k ($U.S.)[2]
ADSP-BF522KBCZ-3	289-ball CSP_BGA	300	132	0 to 70	PPI, SPI, SPORTs, NAND interface, TWI, host DMA, UART, Lockbox	Contact ADI
ADSP-BF522BBCZ-3A	208-ball CSP_BGA			−40 to +☒85		
ADSP-BF522KBCZ-3C2	289-ball CSP_BGA			0 to 70		
ADSP-BF522KBCZ-4	289-ball CSP_BGA	400		0 to 70		
ADSP-BF522BBCZ-4A	208-ball CSP_BGA			−40 to +85		
ADSP-BF522KBCZ-4C2	289-ball CSP_BGA			0 to 70		
ADSP-BF523KBCZ-5	289-ball CSP_BGA	533		0 to 70		13.46 to 19.24
ADSP-BF523BBCZ-5A	208-ball CSP_BGA			−40 to +85		
ADSP-BF523KBCZ-5C2	289-ball CSP_BGA			0 to 70		
ADSP-BF523KBCZ-6	289-ball CSP_BGA	600				
ADSP-BF523KBCZ-6A	208-ball CSP_BGA					
ADSP-BF523KBCZ-6C2	289-ball CSP_BGA					
ADSP-BF524KBCZ-3	289-ball CSP_BGA	300	132	0 to 70	PPI, SPI, SPORTs, NAND interface, TWI, host DMA, UART, Lockbox, HS USB OTG	Contact ADI
ADSP-BF524BBCZ-3A	208-ball CSP_BGA			−40 to +85		
ADSP-BF524KBCZ-3C2	289-ball CSP_BGA			0 to 70		
ADSP-BF524KBCZ-4	289-ball CSP_BGA	400		0 to 70		
ADSP-BF524BBCZ-4A	208-ball CSP_BGA			−40 to +85		
ADSP-BF524KBCZ-4C2	289-ball CSP_BGA			0 to 70		
ADSP-BF525KBCZ-5	289-ball CSP_BGA	533		0 to 70		15.17 to 21.00
ADSP-BF525BBCZ-5A[3]	208-ball CSP_BGA			−40 to +85		
ADSP-BF525KBCZ-5C2	289-ball CSP_BGA			0 to 70		
ADSP-BF525KBCZ-6	289-ball CSP_BGA	600				
ADSP-BF525KBCZ-6A	208-ball CSP_BGA					
ADSP-BF525KBCZ-6C2	289-ball CSP_BGA					
ADSP-BF526KBCZ-3	289-ball CSP_BGA	300	132	0 to 70	PPI, SPI, SPORTs, 10/100 Ethernet, TWI, host DMA, NAND interface, UART, Lockbox, HS USB OTG	Contact ADI
ADSP-BF526BBCZ-3A	208-ball CSP_BGA			−40 to +85		
ADSP-BF526KBCZ-3C2	289-ball CSP_BGA			0 to 70		
ADSP-BF526KBCZ-4	289-ball CSP_BGA	400		0 to 70		
ADSP-BF526BBCZ-4A	208-ball CSP_BGA			−40 to +85		
ADSP-BF526KBCZ-4C2	289-ball CSP_BGA			0 to 70		
ADSP-BF527KBCZ-5	289-ball CSP_BGA	533		0 to 70		16.99 to 22.89
ADSP-BF527BBCZ-5A	208-ball CSP_BGA			−40 to +85		
ADSP-BF527KBCZ-5C2	289-ball CSP_BGA			0 to 70		
ADSP-BF527KBCZ-6	289-ball CSP_BGA	600				
ADSP-BF527KBCZ-6A	208-ball CSP_BGA					
ADSP-BF527KBCZ-6C2	289-ball CSP_BGA					

[1]Packages: LQFP_EP (low profile quad flat pack exposed pad); CSP_BGA (chip scale package ball grid array); PBGA (plastic ball grid array); LFCSP (lead frame chip scale package).

[2]All pricing is budgetary and subject to change.

[3]Available in automotive grade.

Blackfin Processors (continued)

Part Number	Package[1]	Speed (MHz)	RAM Memory (kB)	Ambient Temp Range (°C)	Key Peripherals	Price Range @ 1k ($U.S.)[2]
ADSP-BF531SBB400	169-ball PBGA	400	52	−40 to +85	PPI, UART, SPI, 2 SPORTs, 3 timers, 16 GPIOs	5.70 to 12.81
ADSP-BF531SBBC400	160-ball CSP_BGA					
ADSP-BF531SBBCZ400[3]	160-ball CSP_BGA					
ADSP-BF531SBBZ400[3]	169-ball PBGA					
ADSP-BF531SBSTZ400[3]	176-lead LQFP					
ADSP-BF532SBBC400	160-ball CSP_BGA	400	84	−40 to +85		9.33 to 17.31
ADSP-BF532SBBCZ400[3]	160-ball CSP_BGA					
ADSP-BF532SBSTZ400[3]	176-lead LQFP					
ADSP-BF532SBB400	169-ball PBGA					
ADSP-BF532SBBZ400	169-ball PBGA					
ADSP-BF533SBBC400	160-ball CSP_BGA	400	148	−40 to +85	PPI, UART, SPI, 2 SPORTs, 3 timers, 16 GPIOs	12.19 to 22.21
ADSP-BF533SBBCZ400	160-ball CSP_BGA	400				
ADSP-BF533SBBZ400	169-ball PBGA	400				
ADSP-BF533SBSTZ400	176-lead LQFP	400				
ADSP-BF533SBBC500	160-ball CSP_BGA	500				
ADSP-BF533SBBCZ500[3]	160-ball CSP_BGA	500				
ADSP-BF533SBB500	160-ball CSP_BGA	500				
ADSP-BF533SBBZ500[3]	169-ball PBGA	500				
ADSP-BF533SBBC-5V	160-ball CSP_BGA	533				
ADSP-BF533SBBCZ-5V	160-ball CSP_BGA	533				
ADSP-BF533SKBC-6V	160-ball CSP_BGA	600		0 to 70		
ADSP-BF533SKBCZ-6V	160-ball CSP_BGA	600				
ADSP-BF534BBC-4A	182-ball CSP_BGA	400	132	−40 to +85	CAN®, PPI/SPI, TWI, 8 timers, 48 GPIOs, 2 SPORTs/UARTs	12.40 to 18.53
ADSP-BF534BBCZ-4A[3]	182-ball CSP_BGA	400				
ADSP-BF534BBCZ-4B[3]	208-ball CSP_BGA	400				
ADSP-BF534BBC-5A	182-ball CSP_BGA	500				
ADSP-BF534BBCZ-5A	182-ball CSP_BGA	500				
ADSP-BF534BBCZ-5B	208-ball CSP_BGA	500				
ADSP-BF534YBCZ-4B[3]	208-ball CSP_BGA	400		−40 to +105		
ADSP-BF535PBB-200	260-ball PBGA	200	308	−40 to +85	2 SPIs, 2 SPORTs, USB device, PCI	30.36 to 45.92
ADSP-BF535PBBZ-200	260-ball PBGA	200		−40 to +85		
ADSP-BF535PKB-300	260-ball PBGA	300		0 to 70		
ADSP-BF535PKBZ-300	260-ball PBGA	300		0 to 70		
ADSP-BF535PBB-300	260-ball PBGA	300		−40 to +85		
ADSP-BF535PKB-350	260-ball PBGA	350		0 to 70		
ADSP-BF535PKBZ-350	260-ball PBGA	350		0 to 70		
ADSP-BF536BBC-3A	182-ball CSP_BGA	300	100	−40 to +85	10/100 Ethernet, CAN, PPI, TWI, 8 timers, 48 GPIOs, 2 SPORTs/UARTs, SPI	10.07 to 14.42
ADSP-BF536BBCZ-3A	182-ball CSP_BGA	300				
ADSP-BF536BBCZ-3B	208-ball CSP_BGA	300				
ADSP-BF536BBC-4A	182-ball CSP_BGA	400				
ADSP-BF536BBCZ-4A	182-ball CSP_BGA	400				
ADSP-BF536BBCZ-4B	208-ball CSP_BGA	400				

[1]Packages: LQFP_EP (low profile quad flat pack exposed pad); CSP_BGA (chip scale package ball grid array); PBGA (plastic ball grid array); LFCSP (lead frame chip scale package).

[2]All pricing is budgetary and subject to change.

[3]Available in automotive grade.

Blackfin Processors (continued)

Part Number	Package[1]	Speed (MHz)	RAM Memory (kB)	Ambient Temp Range (°C)	Key Peripherals	Price Range @ 1k ($U.S.)[2]
ADSP-BF537BBC-5A	182-ball CSP_BGA	500	132	−40 to +85	10/100 Ethernet, CAN, PPI, TWI, 8 timers, 48 GPIOs, 2 SPORTs/UARTs, SPI	17.15 to 21.20
ADSP-BF537BBCZ-5A	182-ball CSP_BGA	500				
ADSP-BF537BBCZ-5B	208-ball CSP_BGA	500				
ADSP-BF537BBCZ-5AV	182-ball CSP_BGA	533				
ADSP-BF537BBCZ-5BV	208-ball CSP_BGA	533				
ADSP-BF537KBCZ-6AV	182-ball CSP_BGA	600		0 to 70		
ADSP-BF537KBCZ-6BV	208-ball CSP_BGA	600				
ADSP-BF538BBCZ-4A	316-ball CSP_BGA	400	148	−40 to +85	CAN 2.0B, 54 GPIOs, 4 SPORTs, 3 UARTs, 3 SPIs, 2 TWIs, PPI, 8 MB flash	16.03 to 20.67
ADSP-BF538BBCZ-4F8	316-ball CSP_BGA	400				
ADSP-BF538BBCZ-5A	316-ball CSP_BGA	533				
ADSP-BF538BBCZ-5F8	316-ball CSP_BGA	533				
ADSP-BF539BBCZ-5A[3]	316-ball CSP_BGA	533			MXVR, CAN, 54 GPIOs, 4 SPORTs, 3 UARTs, 3 SPIs, 2 TWIs, PPI, 8 MB flash	Contact ADI
ADSP-BF539BBCZ-5F8[3]	316-ball CSP_BGA	533				
ADSP-BF542BBCZ-5A[3]	400-ball CSP_BGA	533	132	−40 to +85	CAN,[4] HS USB OTG, 3 EPPIs, pixel comp, ATAPI-6, Lockbox	15.66 to 22.12
ADSP-BF542KBCZ-6A	400-ball CSP_BGA	600		0 to 70		
ADSP-BF542MBBCZ-5M[5]	400-ball CSP_BGA	533		−40 to +85		
ADSP-BF544BBCZ-5A[3]	400-ball CSP_BGA	533	196	−40 to +85	CAN,[4] Host DMA, 3 EPPIs, pixel comp, Lockbox	
ADSP-BF544MBBCZ-5M[5]	400-ball CSP_BGA	533	132			
ADSP-BF547BBCZ-5A	400-ball CSP_BGA	533	260	−40 to +85	HS USB OTC, 3 EPPIs, pixel comp, ATAPI-6, Lockbox	
ADSP-BF547KBCZ-6A	400-ball CSP_BGA	600	260	0 to 70		
ADSP-BF547MBBCZ-5M[5]	400-ball CSP_BGA	533	132	−40 to +85		
ADSP-BF548BBCZ-5A	400-ball CSP_BGA	533	260	−40 to +85	HS USB OTG, 3 EPPIs, pixel comp, ATAPI-6, Lockbox, CAN	
ADSP-BF548MBBCZ-5M[5]	400-ball CSP_BGA	533	132			
ADBF549WBBCZ502[3, 5]	400-ball CSP_BGA	533	260		MXVR, CAN, HS USB OTG, ATAPI-6, 3 EPPIs, pixel comp, Lockbox	
ADBF549MWBBCZ503[3]	400-ball CSP_BGA	533	132			
ADSP-BF561SKB500	297-ball PBGA	500	328	0 to 70	2 PPIs, UART, 12 timers, 2 SPORTs	20.40 to 35.74
ADSP-BF561SKBZ500	297-ball PBGA	500		0 to 70		
ADSP-BF561SKBCZ-5A	256-ball CSP_BGA	500		0 to 70		
ADSP-BF561SKBCZ-5V	256-ball CSP_BGA	533		0 to 70		
ADSP-BF561SBB500	297-ball PBGA	500		−40 to +85		
ADSP-BF561SBBZ500[3]	297-ball PBGA	500		−40 to +85		
ADSP-BF561SBBCZ-5A[3]	256-ball CSP_BGA	500		−40 to +85		
ADSP-BF561SKB600	297-ball PBGA	600		0 to 70		
ADSP-BF561SKBZ600	297-ball PBGA	600		0 to 70		
ADSP-BF561SKBCZ500	256-ball CSP_BGA	500		−40 to +85		
ADSP-BF561SKBCZ-6A	256-ball CSP_BGA	600		0 to 70		
ADSP-BF561SKBCZ-6V	256-ball CSP_BGA	600		0 to 70		
ADSP-BF561SBB600	297-ball PBGA	600		−40 to +85		
ADSP-BF561SBBZ600	297-ball PBGA	600		−40 to +85		

[1]Packages: LQFP_EP (low profile quad flat pack exposed pad); CSP_BGA (chip scale package ball grid array); PBGA (plastic ball grid array); LFCSP (lead frame chip scale package).

[2]All pricing is budgetary and subject to change.

[3]Available in automotive grade.

[4]Available on automotive-grade parts only.

[5]M designates support for 1.8 V mobile DDR memory.

Development Tools

The Blackfin processor is supported by the Analog Devices CROSSCORE® line of robust and flexible development tools.

VisualDSP++ Software

VisualDSP++® software delivers efficient project management, enabling programmers to move easily between editing, building, and debugging within a single interface. Key features include an optimizing C/C++ compiler, advanced plotting tools, embedded OS support (VDK), award-winning statistical profiling, TCP/IP and USB support, free software upgrades, and technical support.

EZ-Board Evaluation Boards

The EZ-Board™ evaluation board provides developers with a low cost platform for initial evaluation of the processors via an external emulator or μClinux.™ The EZ-Board evaluation board has an expansion interface that allows for modularity with different EZ-Extender boards.

EZ-KIT Lite Evaluation Kit

The EZ-KIT Lite® evaluation kit is a standalone evaluation board and evaluation suite of VisualDSP++ software to facilitate architecture evaluation.

EZ-Extender Daughter Boards

EZ-Extender® daughter boards enable developers to access and connect various peripherals from Analog Devices and third parties to the expansion interface of the EZ-KIT Lite evaluation kits.

Emulators

Analog Devices cost-effective and high performance emulators provide an easy, portable, nonintrusive, target-based debugging solution for Analog Devices JTAG processors and DSPs.

These powerful emulators perform a wide range of emulation functions, including single-step and full-speed execution with predefined breakpoints, and viewing and/or altering of register and memory contents.

Debug Agent Board

The Standalone Debug Agent is intended to provide a modular low cost emulation solution for EZ-Board evaluation boards as well as evaluation boards designed by third parties. The Standalone Debug Agent is very similar to the Debug Agent that is on existing EZ-KIT Lite evaluation boards but will have the flexibility to move from one board to another.

Software Modules

Analog Devices has a wide range of tested and optimized software modules available, including decoders, encoders, codecs, and other algorithms that provide multimedia functions for the Blackfin and SHARC processor families. The software modules allow engineers to quickly and easily incorporate these functions, providing a faster development path to the end product. In addition, the highly optimized software modules feature a consistent API and framework to ensure rapid development of multiple functions. Visit *www.analog.com/software* for more information.

Platforms and Reference Designs

Platforms and reference designs help jump-start your design. They include comprehensive software suites with documented APIs running on application-specific evaluation boards. The easy to use APIs enable customization and control of core system functions, letting you focus on adding value through product differentiation. For more information on Analog Devices platforms, reference designs, and third-party reference designs, visit *www.analog.com/referencedesigns*.

Extended Development Tools and Support

Starter Kits

Analog Devices starter kits provide everything you need to get started on an application. Kits contain a Blackfin EZ-KIT Lite, EZ-Extender daughter board(s), and the software development kit (SDK), which contains sample code, “how to” documents, and various encoders/decoders that make getting started on an application easy and shorten the learning curve.

Software Development Kits

The SDK contains example software, source code, device drivers, algorithms, utilities information, and application notes that allow you to develop processor applications. The software can be used as a framework, or as examples of how to use certain aspects and peripherals, in conjunction with an ADI processor. The SDK is included in the starter kits and is also downloadable for free, provided you have the required hardware, at *www.analog.com/sdk/downloads.*

μClinux

The μClinux kernel and GNU toolchain are available for the Blackfin processor and can be downloaded from the μClinux for Blackfin processor website (*www.blackfin.uclinux.org*), which is the central repository for all Blackfin processor open-source projects. One of the board support packages available is the ADSP-BF537 STAMP μClinux kernel board support package (BSP). The BSP is composed of the ADSP-BF537 STAMP development board (including the full complement of memory along with serial and network interfaces), a recent copy of the open-source development tools, μClinux kernel, and bootloader. The STAMP board is specifically designed to support the development and porting of open-source μClinux applications.

NI LabVIEW Embedded Module for ADI Blackfin Processors

The NI LabVIEW™ Embedded Module for ADI Blackfin processors is a comprehensive graphical development environment for embedded design. This module builds on NI LabVIEW embedded technology, which facilitates dataflow graphical programming for embedded systems and includes hundreds of analysis and signal processing functions, integrated I/O, and an interactive debugging interface. With the NI LabVIEW Embedded Module for ADI Blackfin processors, users can easily access essential VisualDSP++ specific compiler options through LabVIEW, such as the ability to enable cache, optimize linking, and view live front-panel updates via JTAG. To help debug those challenging designs, users can connect the host development PC evaluation hardware or end product using an ADI JTAG emulator. LabVIEW includes a wide array of built-in visualization features including tools for charting and graphing real-time data, and reconfiguring attributes of data presentation, such as colors, font size, and graph types. Furthermore, users can dynamically tune applications at run time through live front panel controls.

Blackfin Processor Development Tools

Blackfin Processor	Hardware		Emulator	VisualDSP++ Development Software	Additional Software Available
ADSP-BF504 ADSP-BF504F ADSP-BF506F	ADZS-BF506F-EZLITE ***Key Features*** • ADSP-BF506F Blackfin processor with integrated 12-bit ADC and 4 MB stacked flash • 12-bit ADC input connectors • UART interface/DB9 connector • SDIO interface • Expansion interface • Standalone debug agent interface		ADZS-ICE-100B ADZS-USB-ICE ADZS-HPUSB-ICE	VDSP-BKFN-PC-TEST VDSP-BLKFN-PC-FULL VDSP-BLKFN-PCFLOAT VDSP-BLKFN-PCFLT-5	VDSP-LABVIEW-EMB (All parts except ADSP-BF535 and ADSP-BF0x family) VDSP-LABVIEW-EVAL (All parts except ADSP-BF535 and ADSP-BF0x family) Mathworks™ (ADSP-BF531/ADSP-BF532/ ADSP-BF533/ADSP-BF534/ ADSP-BF536/ADSP-BF537/ ADSP-BF538/ADSP-BF539 only) µClinux—open source (All parts except ADSP-BF535 and ADSP-50x family) GNU toolchain (Not available for the ADSP-BF535)
ADSP-BF512 ADSP-BF512F ADSP-BF514 ADSP-BF514F ADSP-BF516 ADSP-BF516F ADSP-BF518 ADSP-BF518F	ADZS-BF518F-EZBRD ***Key Features*** • ADSP-BF518F Blackfin processor • SDRAM • Flash • SPI flash • Audio codec • Power analysis interface • Ethernet PHY • Analog-to-digital converter • Thumbwheel • UART • RTC battery	ADZS-BF518F-EZLITE ADZS-BFLLCD-EZEXT ADZS-DBGAGENT-BRD ADZS-BLUET-EZEXT ADZS-BFSHUSB-EZEXT			
ADSP-BF522 ADSP-BF522C ADSP-BF524 ADSP-BF524C ADSP-BF526 ADSP-BF526C	ADZS-BF526-EZBRD ***Key Features*** • ADSP-BF526 Blackfin processor • SDRAM • Flash: 4 MB (2M × 16) • NAND flash: 2 Gb • SPI flash • Audio codec • Power analysis interface • Ethernet PHY • Battery or USB bus powered	ADZS-BF526-EZLITE ADZS-DBGAGENT-BRD ADZS-BFLLCD-EZEXT ADZS-BLUET-EZEXT ADZS-BFSHUSB-EZEXT			
ADSP-BF523 ADSP-BF523C ADSP-BF525 ADSP-BF525C ADSP-BF527 ADSP-BF527C	ADZS-BF527-EZLITE ***Key Features*** • ADSP-BF527 Blackfin processor • SDRAM • NAND flash: 4 Gb • Audio codec • HS USB OTG • Ethernet PHY • LCD display • Touch screen/keyboard controller	ADZS-BF527-MPSKIT ADZS-BFAV-EZEXT ADZS-BFFPGA-EZEXT			
ADSP-BF531 ADSP-BF532 ADSP-BF533	ADZS-BF533-EZLITE ***Key Features*** ADSP-BF533 Blackfin processor • 64 MB (32M × 16-bit) SDRAM • 2 MB (512k × 16-bit × 2) • Flash memory AD1836 96 kHz audio codec with 4 input and 6 output RCA jacks • ADV7183 video decoder with 3 input RCA jacks • ADV7171 video encoder with 3 output RCA jacks • ADM3202 RS-232 line driver/ receiver	ADZS-BF-EZEXT-1 ADZS-BFAV-EZEXT ADZS-USBLAN-EZEXT ADZS-BFAUDIO-EZEXT ADZS-BFFPGA-EZEXT ADZS-BF533-MMSKIT			

Blackfin Processor Development Tools (continued)

Blackfin Processor	Hardware		Emulator	VisualDSP++ Development Software	Additional Software Available
ADSP-BF534 ADSP-BF536 ADSP-BF537	ADZS-BF537-EZLITE ***Key Features*** • ADSP-BF537 Blackfin processor • Max core clock rate of 600 MHz • 64 MB (32M × 16) SDRAM, 4 MB (2M × 16) flash memory • SMSC LAN83C185 10/100 PHY with RJ45 connector • CAN TJA1041 transceiver with 2 RJ10 connectors • AD1871 96 kHz stereo ADC with 1/8" jack connector • AD1854 96 kHz stereo DAC with 1/8" jack connector • RS-232 UART line driver/receiver • National Instruments Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) interface	ADZS-BLUET-EZEXT ADZS-BFAV-EZEXT ADZS-BFLLCD-EZEXT ADZS-USBLAN-EZEXT ADZS-BFAUDIO-EZEXT ADZS-BFFPGA-EZEXT ADZS-BF537-ASKIT Additional Hardware • ADSP-BF537-STAMP • PHYTEC Phycore®	ADZS-ICE-100B ADZS-USB-ICE ADZS-HPUSB-ICE	VDSP-BKFN-PC-TEST VDSP-BLKFN-PC-FULL VDSP-BLKFN-PCFLOAT VDSP-BLKFN-PCFLT-5	VDSP-LABVIEW-EMB (All parts except ADSP-BF535 and ADSP-BF0x family) VDSP-LABVIEW-EVAL (All parts except ADSP-BF535 and ADSP-BF0x family) Mathworks (ADSP-BF531/ADSP-BF532/ ADSP-BF533/ADSP-BF534/ ADSP-BF536/ADSP-BF537/ ADSP-BF538/ADSP-BF539 only) µClinux—open source (All parts except ADSP-BF535 and ADSP-50x family) GNU toolchain (Not available for the ADSP-BF535)
ADSP-BF538 ADSP-BF538F	ADZS-BF538F-EZLITE ***Key Features*** • ADSP-BF538F Blackfin processor • 64 MB (32M × 16) SDRAM • 4 MB (2M × 16) flash memory • ADM3202 RS-232 line driver/receiver • AD1871 96 kHz stereo ADC • AD1854 96 kHz stereo DAC • TJA1041 transceiver • 2 RJ10 connectors • 9 LEDs	ADZS-BFLLCD-EZEXT			
ADSP-BF542 ADSP-BF544 ADSP-BF547 ADSP-BF548 ADSP-BF549	ADZS-BF548-EZLITE ***Key Features*** • ADSP-BF548 Blackfin processor • DDR SDRAM • BURST flash • NAND flash • Hard drive • LCD display • AC'97 codec • Ethernet PHY • Touch screen/keyboard controller	ADZS-BLUET-EZEXT ADZS-BFAV-EZEXT ADZS-BFFPGA-EZEXT ADZS-BFLLCD-EZEXT ADZS-BF548-MPSKIT			
ADSP-BF561	ADZS-BF561-EZLITE ***Key Features*** • ADSP-BF561 Blackfin processor • 64 MB (16M × 16-bit × 2) SDRAM • 8 MB (4M × 16-bit) flash memory • AD1836 multichannel 96 kHz audio codec • RCA jacks for stereo audio input/output • ADV7183A advanced 10-bit video decoder • 3 RCA jacks for composite (CVBS), differential component (YUV), or S-Video (Y/C) input • ADV7179 chip scale NTSC/PAL video encoder • 3 RCA jacks for composite (CVBS), component (RGB), differential component (YUV), or S-Video (Y/C) output	ADZS-BF561-MMSKIT			

Blackfin Processor Product Portfolio

Value → Highest Performance

	Future	ADSP-BF504 ADSP-BF504F ADSP-BF506F	ADSP-BF512	ADSP-BF514 ADSP-BF516 ADSP-BF518	ADSP-BF522 ADSP-BF524 ADSP-BF526	ADSP-BF523 ADSP-BF525 ADSP-BF527	ADSP-BF531 ADSP-BF532	ADSP-BF533	ADSP-BF534 ADSP-BF535 ADSP-BF536	ADSP-BF537	ADSP-BF538 ADSP-BF539	ADSP-BF542 ADSP-BF544 ADSP-BF547 ADSP-BF548 ADSP-BF549	ADSP-BF561	Future
Low BOM Cost	•	•	•		•	•	•							
Baseline Connectivity	•	•	•		•	•	•	•					•	
System-Level Connectivity		•		•	•	•			•	•	•	•		•
Low Standby	•	•	•	•	•									•
Lockbox™ Security			•	•	•	•						•		•
System Integration (Flash, Mixed-Signal)		•	•	•	•	•					•			
600 MHz or Greater						•		•		•		•	•	•
Multicore													•	•

Automotive grade available.

Blackfin Processor Target Applications

ADSP-BF504/ADSP-BF504F/ADSP-BF506F: Optimized for industrial control and advanced power applications as well as low cost general-purpose DSP applications.

ADSP-BF512/ADSP-BF514/ADSP-BF516/ADSP-BF518: Low cost, low power, general-purpose parts with enhanced Internet and consumer connectivity.

ADSP-BF523/ADSP-BF525/ADSP-BF527 and ADSP-BF522/ADSP-BF524/ADSP-BF526: Low power processors that balance the combination of high performance, power efficiency, and system integration to enable highly optimized designs.

ADSP-BF531/ADSP-BF532: Low power, general-purpose processors for audio, voice, imaging, biometrics, and industrial applications.

ADSP-BF533: High performance for consumer video, security/surveillance, broadband home gateways, and automotive vision systems.

ADSP-BF534: CAN connectivity for automotive, industrial, and medical applications.

ADSP-BF535: Optimized for networked Internet appliances, central office/network switches, industrial control, and automation applications.

ADSP-BF536/ADSP-BF537: Embedded network connectivity for video, industrial, biometrics, instrumentation, medical, and consumer appliances.

ADSP-BF538/ADSP-BF538F: Ideally suited for a broad range of industrial, instrumentation, and medical appliance applications.

ADSP-BF542/ADSP-BF544/ADSP-BF547/ADSP-BF548/ADSP-BF549: High performance convergent multimedia processors with a flexible platform for industrial, instrumentation, consumer, communications, and automotive applications.

ADSP-BF561: Symmetric multiprocessor optimized for high performance signal and media processing.

Third-Party Developers

More than 200 third parties provide software, hardware, and consulting services to support Blackfin embedded processors. For more information, visit *www.analog.com/processors/collaborative.*

Hardware

- Companion chip/chipsets
- Development boards
- Development systems
- Emulators
- Evaluation/starter boards
- Reference designs
- COTS DSP boards
- Daughter boards

Software and Algorithms

- Speech G.7xx
- Telephony (DTMF, caller ID, etc.)
- Echo cancellation
- Audio (MP3, AAC/AAC+, WMA9, Dolby® DTS® etc.)
- Video/imaging (JPEG, MPEG-2/MPEG-4, H.264, H.263, WMV9, etc.)
- Image processing
- Facial/object recognition software
- VoIP suites
- Embedded Web browser
- Voice recognition
- Proprietary algorithms (3D audio effects, etc.)

OS/RTOS

- Green Hills® Software/INTEGRITY®
- Green Hills Software/*velOSity*™
- Green Hills Software/µ-*velOSity*™
- Express Logic/ThreadX®
- Micriµm µC/OS-II
- Quadros Systems/RTXC™ Quadros
- Unicoi Systems™/Fusion™
- KADAK Systems/KwikNet™
- Open Source/µClinux
- Analog Devices VisualDSP++ Kernel

Design Test, Verification and Validation

- National Instruments
- The MathWorks

Software IDDE Tools

- Green Hills Software/MULTI®
- GAIO TECHNOLOGY/Blackfin design kit

HW Development Kits

- PHYTEC/Rapid Development Kits
- Arcturus Networks

Design Services

- Boston Engineering
- Schmid Engineering
- Advanced Energy Conversion

Complimentary Support Resources

EngineerZone
www.EZ.analog.com

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Companion Power Selection Guide for the Blackfin Processor

ADI power management products provide optimized power for Blackfin products—whether it's a single processor or multiple processors, in handheld or high power applications, ADI has a solution to meet your needs.

How to Use This Guide

Determine the peak current requirement for each rail of your processor by referring to the relevant data sheets and engineer-to-engineer notes. Then, use this companion guide to select a power solution that offers the required V_{OUT} for that rail.

The ADIsimPower™ design tool offers a complete set of features to create a complete BOM for all of these solutions. Visit *analog.com/ADIsimPower*.

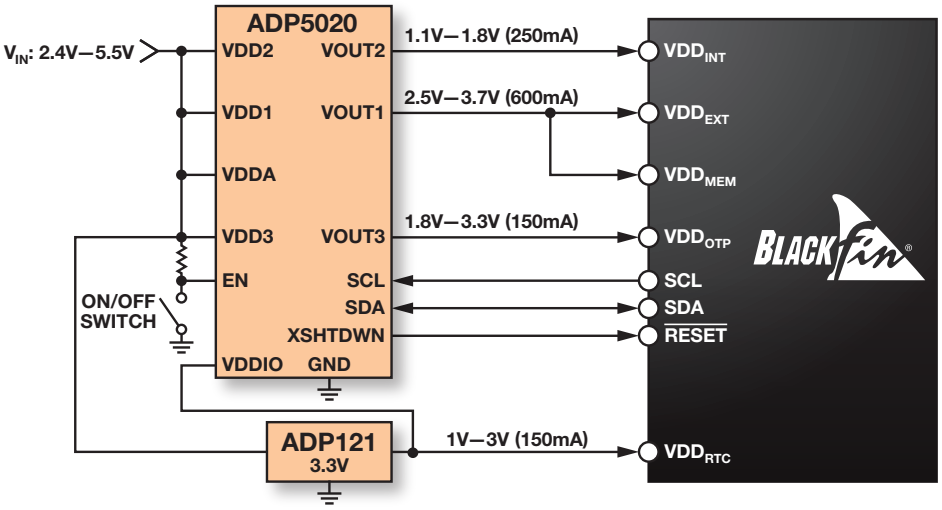
		Linear Regulators											Switching Regulators								SC[1]	
	Part Number	ADP121	ADP170	ADP220	ADP1706	ADP1707	ADP1715	ADP1720	ADP1740 ADP1741	ADP1752 ADP1753	ADP1754 ADP1755		ADP2102	ADP2105	ADP2106	ADP2107	ADP2108	ADP2114	ADP2504	ADP5020	ADP1829	ADP1864
	V_{IN} (V)	2.5–5.5	1.6–3.6	2.5–5.5	2.5–5.5	2.5–5.5	2.5–5.5	4.0–28	1.6–3.6	1.6–3.6	1.6–3.6		2.7–5.5	2.7–5.5	2.7–5.5	2.7–5.5	2.3–5.5	2.7–5.5	2.3–5.5	2.4–5.5	3.0–18	3.15–14
	V_{OUT} (V)	1.2–3.3	0.8–3.0	0.8–2.8	0.75–3.3, soft start	0.75–3.3, with tracking	0.8–5.0	1.225–5.0	0.75–3.0	0.75–2.5	0.75–2.5		0.8–1.875	1.2–3.3	1.2–3.3	1.2–3.3	1–3.3	0.8–3.3	2.8–5.0	N/A	N/A	N/A
	I_{OUT} Max (A)	150 mA	300 mA	2 outputs: 200 mA, 200 mA	1	1	500 mA	50 mA	2	800 mA	1.2		600 mA	1	1.5	2	600 mA	2/2, 1/3, or 4 single	1	3 outputs: 250 mA, 600 mA, 150 mA	20	5
VDD_{INT} Domain	ADSP-BF51x		•				•													•		
	ADSP-BF522/ADSP-BF524/ADSP-BF526		•				•													•		
	ADSP-BF523/ADSP-BF525/ADSP-BF527				•	•	•			•			•					•		•		
	ADSP-BF531/ADSP-BF532/ADSP-BF533						•			•			•							•		
	ADSP-BF533				•	•					•											
	ADSP-BF534/ADSP-BF536						•			•			•							•		
	ADSP-BF534/ADSP-BF536/ADSP-BF537				•	•					•							•				
	ADSP-BF538/ADSP-BF539				•	•					•							•				
	ADSP-BF54x								•									•				
	ADSP-BF561								•									•				
Other Domains[2]		Min Voltage (V)	Nominal Voltages (V)	Max Voltage (V)	Max Current (mA)																	
	VDD_{EXT}	1.7	1.8, 2.5, 3.3	3.6	N/A	•			•	•	•				•	•	•	•	•	•		
	VDD_{MEM}	1.7	1.8, 2.5, 3.3	3.6	N/A	•			•	•	•	•			•	•	•	•	•	•		
	VDD_{DDR}	2.5	2.6	2.7	N/A	•	•	•	•	•	•		•		•	•	•	•	•	•		
	VDD_{USB}	3	3.3	3.6	30	•			•	•	•	•			•	•	•	•	•	•		
	VDD_{OTP}	2.25	2.5	2.75	25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		

[1]SC = switching controllers [2]Refer to the relevant data sheet and engineer-to-engineer note to determine the exact "other domain" requirements of each individual processor.

Many applications power more than one device or domain using a single regulator. Compute and add the maximum current draw for each device and domain in a particular application before choosing a regulator.

The regulators marked in this guide support the current draw at the maximum specified frequency, voltage, and industrial temperature. Regulators not marked as compatible with a particular processor may still be appropriate depending on the frequency, voltage, temperature, and application code used.

Example* Power Solution for the Blackfin Processor



*Numerous variables affect the power requirements of an embedded system. Ambient temperature, core and system frequency, supply voltages, pin capacitances, power modes, application code, and peripheral utilization all contribute to the average power requirements; therefore, this is just one suggested solution.

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