

# LabVIEW for Embedded Applications

## NI LabVIEW Embedded Module for ADI Blackfin Processors Development Kit

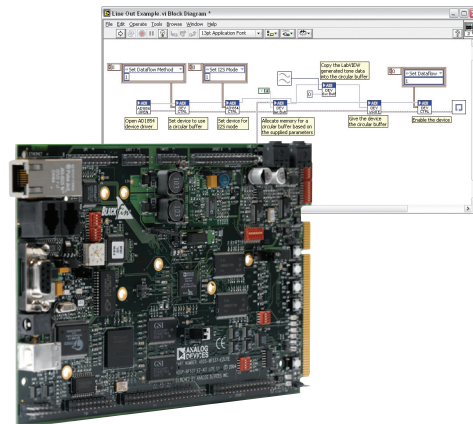
- Combine LabVIEW graphical programming with Blackfin processors for rapid application development
- Target high-performance, low-power Blackfin family – ADSP-BF53x and 54x variants
- Integrate existing C code with graphical code through inline C Node
- Use fully integrated component drivers for several popular ADI converters
- Use more than 140 hard-optimized signal processing functions
- Visualize your data with advanced debugging capabilities including LabVIEW front panels and statistical profiling

### Included Software

- Analog Devices VisualDSP++ Version 5.0
- LabVIEW Full Development System for Windows Version 8.5

### Included Hardware

- Analog Devices Blackfin 537 EZ-KIT Lite



## NI LabVIEW Embedded Module for ADI Blackfin Processors

The NI LabVIEW Embedded Module for ADI Blackfin Processors delivers an integrated, plug-and-play embedded programming experience. The module builds on National Instruments 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. The complete ADI VisualDSP++ development and debugging environment is included with the LabVIEW Embedded Module for Blackfin Processors, so you can easily deploy LabVIEW code along with fully integrated debugging capabilities.

By seamlessly integrating with the VisualDSP++ compiler, linker, and debugging interface, you have the ability to easily single step through your graphical code in LabVIEW while visualizing the embedded code – both C and ASM – within the debugger. With this module, you can integrate VisualDSP++-specific compiler options into LabVIEW such as the ability to enable cache, optimize linking, and view live front-panel updates via background telemetry channel (BTC) technology on-chip JTAG debugging.

Use the VisualDSP++ environment to create sophisticated drivers or to process legacy code. Key features include the native C/C++ compiler, advanced graphical plotting tools, statistical profiling, and the VisualDSP++ Kernel, with which you can implement your code in a more structured and easier manner. The LabVIEW Embedded Module for Blackfin Processors offers you a powerful yet easy-to-use programming tool with flexibility that significantly reduces your time to market.

## Common Component Driver Interface for Integrated Development

The LabVIEW Embedded Module for Blackfin Processors interfaces directly to the VisualDSP++ Blackfin System Services driver model for optimized I/O access to on-chip and off-chip peripherals, such as codecs, A/Ds, D/As, and communication devices. The module includes a standardized component device driver library for Blackfin evaluation hardware onboard peripherals. A common component driver model provides consistent representation and a driver you can reuse from design to design.

The component driver architecture supports multiple devices running simultaneously in a system. To control physical components from the

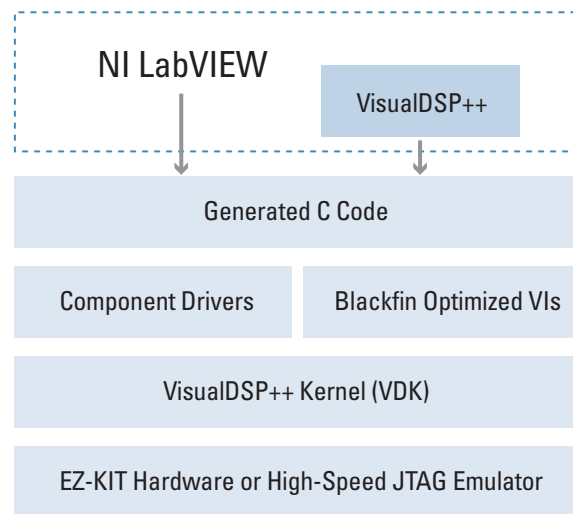


Figure 1. NI LabVIEW Embedded Module for ADI Blackfin Processors System Design and Hierarchy

## LabVIEW for Embedded Applications

module, you can use the Device Manager VI library, which offers a simple, straightforward interface regardless of how many components are active at any point in time. The Device Manager provides the access point into the physical component driver and is presented as LabVIEW VIs. These VIs map to six C functions:

- Init – Provides data and initializes the device manager.
- Open – Opens the component for use.
- Control – Sets and senses component-specific parameters.
- Read – Reads data from a component or queues reception buffers to a component.
- Write – Writes data to a component or queues transmission buffers to a component.
- Close – Closes the component.

In addition to the application programming interface (API) VIs based on LabVIEW in the Device Manager, the module includes a call-back mechanism to execute VIs in response to real-time events such as buffer processing, or an unexpected event, such as an error condition generated by the component.

Finally, the System Services driver model controls the Interrupt Manager, DMA Manager, and Deferred Callback services. The System Services functionality also is available to physical drivers. For example, a UART driver may need to know the SCLK frequency to configure the UART to operate at a specific baud rate. Through the Power Management service, the UART physical driver can ascertain the current SCLK frequency.

Protocol drivers include TCP/IP, UDP, SPI, PPI, SPORT, UART, and USB. Component drivers include the AD1854, AD1871, AD7476A, AD7266, and AD1836 Analog Devices components. The module device driver API is an

open interface, so you can use your existing component drivers within this architecture.

## VisualDSP++ Kernel

The LabVIEW Embedded Module for Blackfin Processors includes the VisualDSP++ Kernel (VDK), providing state-of-the-art scheduling and resource allocation tailored specifically to address the memory and timing constraints of high-performance applications. The module takes advantage of VDK to work with multiple threads, time processes, and OS services.

## On-Chip Debugging

By combining the dataflow graphical programming power with the LabVIEW Embedded Module for Blackfin Processors, you gain real-time, front-panel debugging capabilities. Connect the host development PC to your evaluation hardware or end product using an ADI high-speed emulator to observe your code graphically or textually. To help you debug those challenging designs, LabVIEW includes a wide array of visualization features, such as tools for charting and graphing, so you can present data that meets your application needs. You can reconfigure attributes of your data presentation, such as colors, font size, and graph types, as well as dynamically rotate and zoom with no programming.

The LabVIEW Embedded Module for Blackfin Processors is compatible with all Analog Devices JTAG emulators.

## Evaluation Kit

If you are interested in test-driving the LabVIEW Embedded Module for Blackfin Processors, NI offers a 60-day evaluation kit that includes software, hardware, and documentation.

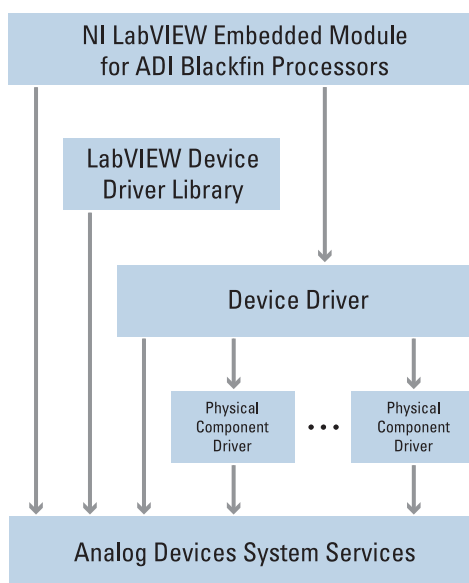


Figure 2. Use a common component driver architecture to reduce time to application and reuse physical component driver code.

### Ordering Information

NI LabVIEW Embedded Module for ADI Blackfin Processors Development Kit with SSP .....	779482-09
NI LabVIEW Embedded Module for ADI Blackfin Processors Evaluation Kit .....	779966-03

### BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to [ni.com/labview/blackfin](http://ni.com/labview/blackfin).

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