

The World Leader in High Performance Signal Processing Solutions



Multimedia Starter Kit

Presented by:
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About This Module

- ◆ **This module discusses the Analog Devices (ADI) Blackfin Multimedia Starter Kit and the Blackfin Software Development Kit (SDK). This kit shows users how to develop multimedia applications using readily available off-the-shelf hardware that comes with the kit and VisualDSP++.**
- ◆ **For this training it is recommended that user should have:**
 - ◆ **Familiarity with VisualDSP++**
 - ◆ **Basic knowledge of software terminology**
 - ◆ **Experience in embedded systems**
 - ◆ **Basic knowledge of Blackfin processors and ADI evaluation boards**

Note: Any mention of VisualDSP++ refers to VisualDSP++4.5 or later. Starter kits do not work with older releases of VisualDSP++.



Module Outline

- ◆ **Overview**
- ◆ **Blackfin Starter Kits**
 - What is a Starter Kit?
 - Benefits of Starter Kits
 - The Multimedia Starter Kit
- ◆ **Blackfin SDK**
 - What's in the SDK?
 - Devices Supported by the Multimedia Starter Kit
 - SDK Installation
 - System Services and Device Drivers Fit
- ◆ **Multimedia Starter Kit Software**
 - Multimedia Starter Kit Algorithms
 - Multimedia Starter Sampling of Applications
 - On-line Demo: JPEG-MJPEG Application
- ◆ **Conclusion**
- ◆ **Additional Information**

Overview

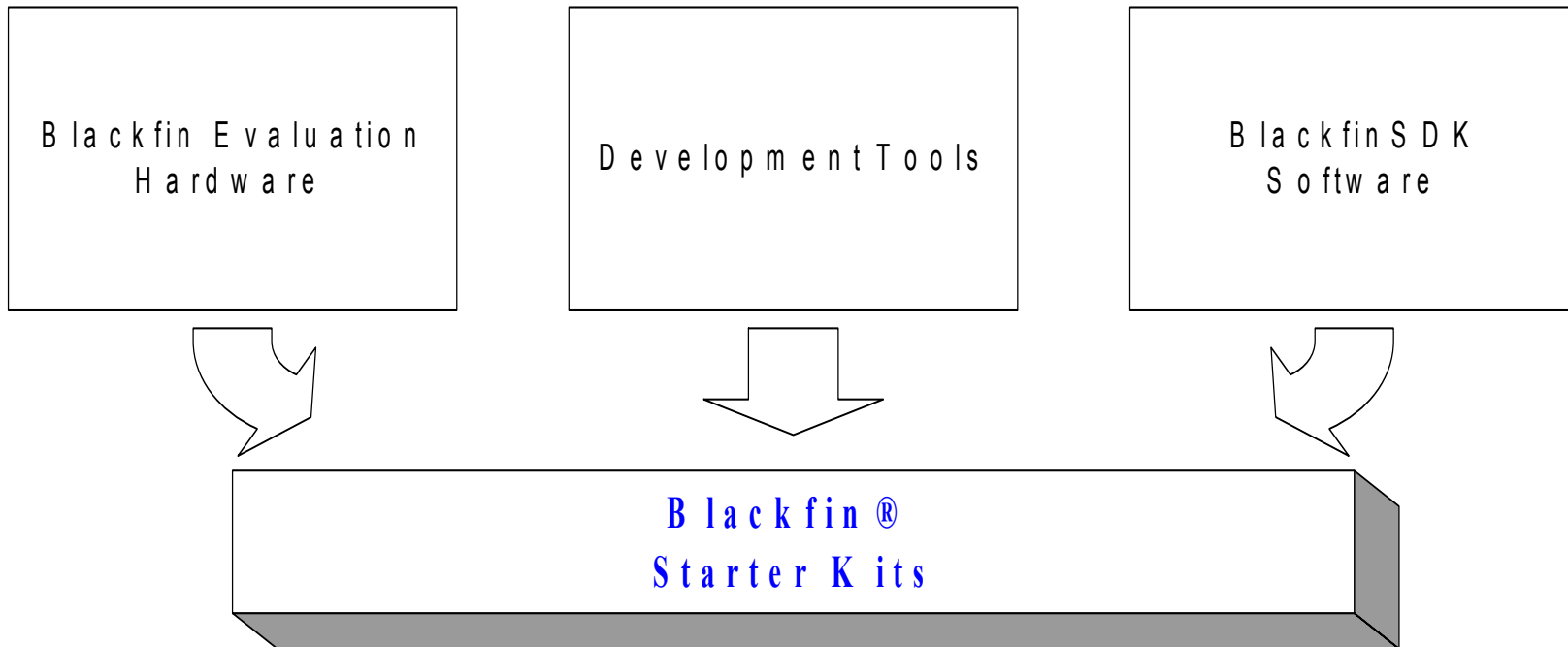
- ◆ **Starter Kits – A bundle of standard ADI hardware, software and tools around the Blackfin Processors**
- ◆ **Blackfin SDK – A collection of industry standard algorithms, applications, utilities and executables**
- ◆ **Benefits**
 - **Building block for evaluating and starting products**
 - **Shortens learning curve bringing products closer to market**
- ◆ **“Stuff Just Works” – Out-of-box experience**
- ◆ **Looking Forward**
 - **Multimedia Starter Kit continues to grow**
 - **More Starter Kits to come**



Blackfin Starter Kits

What is a Starter Kit?

- ◆ **Collection of ADI off-the-shelf hardware, Blackfin SDK and other software tools.**
- ◆ **Intended for those wanting to use Blackfin Processors.**
- ◆ **Software and tools available for download.**



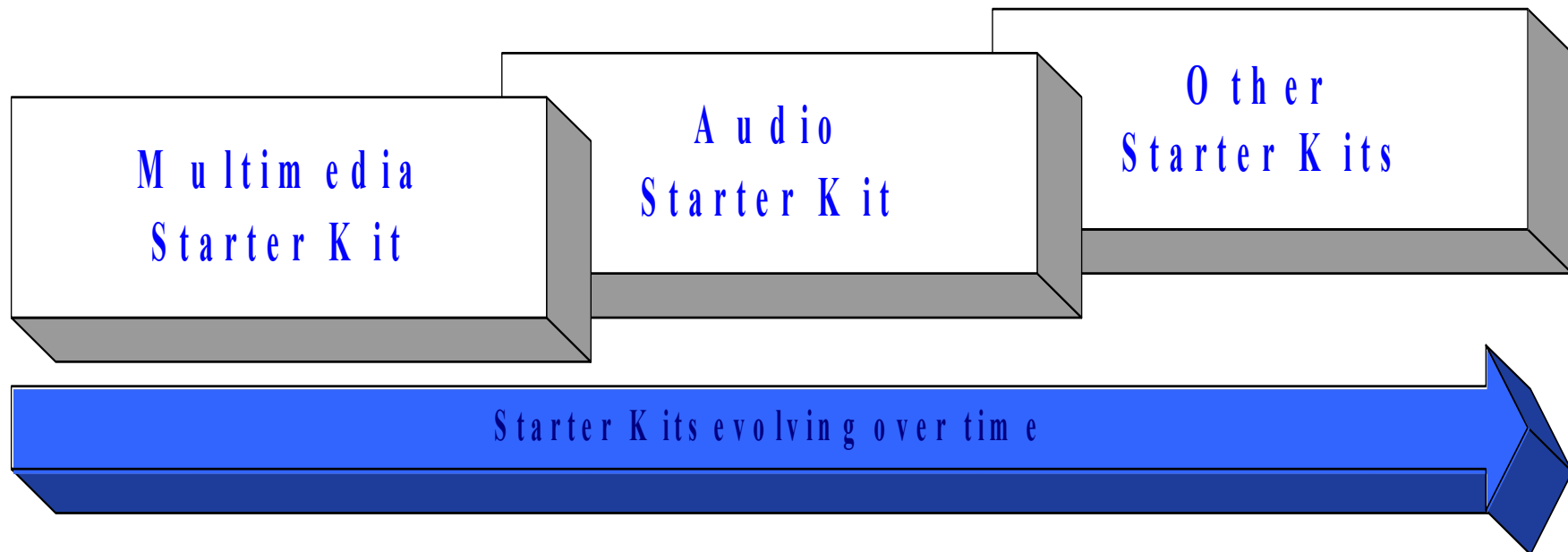


Benefits of Starter Kits

- ◆ **Shorten learning curve and development cycle.**
- ◆ **Gets a user up and running very quickly.**
- ◆ **The basic building blocks for Blackfin products.**
- ◆ **Uses standard tools.**
- ◆ **Attractive price, the SDK at no additional cost.**

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The Multimedia Starter Kit (MMSK)

- ◆ Applications and algorithms.
- ◆ Hardware to run multimedia applications.
- ◆ Tools needed to build and run applications.
- ◆ Two versions (offered separately)
 - ADSP-BF561 EZ-KIT Lite Version
 - ADSP-BF533 EZ-KIT Lite Version

BF561 MMSK

- ◆ BF561 EZ-KIT Lite evaluation board
- ◆ A-V EZ-Extender daughter board
- ◆ USB-LAN EZ-Extender daughter board
- ◆ VisualDSP++ (evaluation version)
- ◆ Blackfin SDK software CD

BF533 MMSK

- ◆ BF533 EZ-KIT Lite evaluation board
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Download Blackfin SDK

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Blackfin Software Development Kit (SDK)



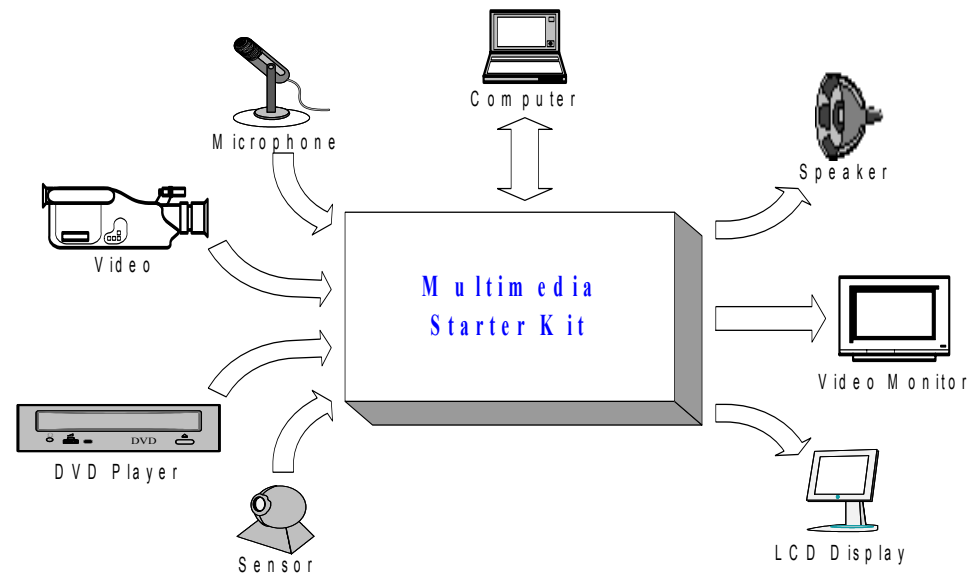
What's in the SDK?

- ◆ Industry standard algorithms
- ◆ Pre-built binary and source code
- ◆ Fully functional non-demo applications
- ◆ Build and run right out of the box
- ◆ Source code utilities
- ◆ PC based executables
- ◆ Release notes and how to documents

Algorithms
Utilities
Applications
Documents
PC Executables

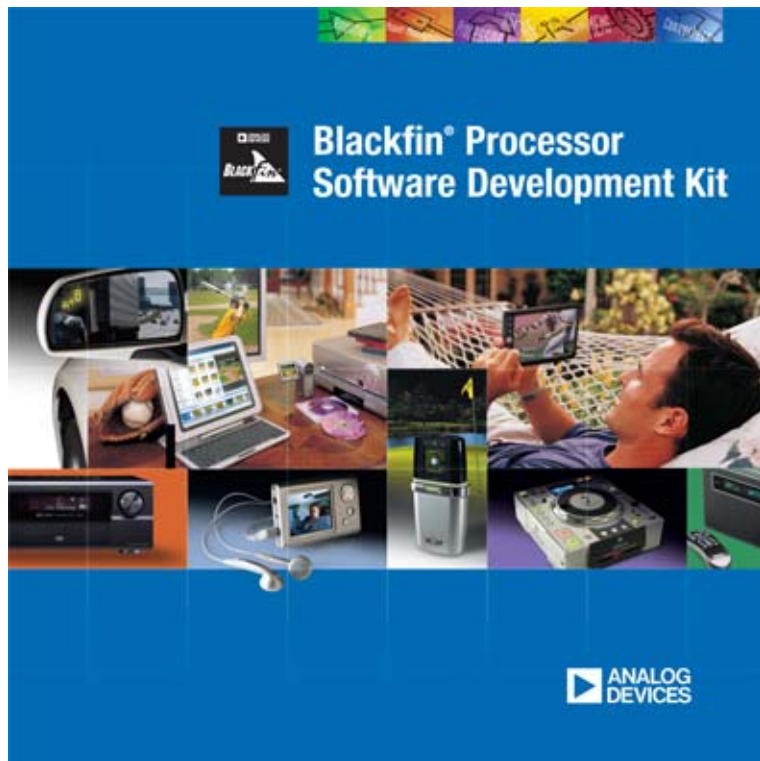
Devices Supported by Multimedia Starter Kit

- Video source, typically DVD player
- Video display monitor
- LCD displays
- CMOS Sensors
- Audio source
- Speakers



Note: Consult application “readme.txt” for a list of products used and specific board revision tested with.

SDK Installation



- ◆ Installation module provided on CD.
- ◆ Downloadable from ADI web site.*
- ◆ Several license agreements presented as click-thru options.
 - M/JPEG Components
 - Ogg Audio Components
 - SRGP Components

*Need required Hardware to use: <http://www.analog.com/processors/platforms/sdk.html>



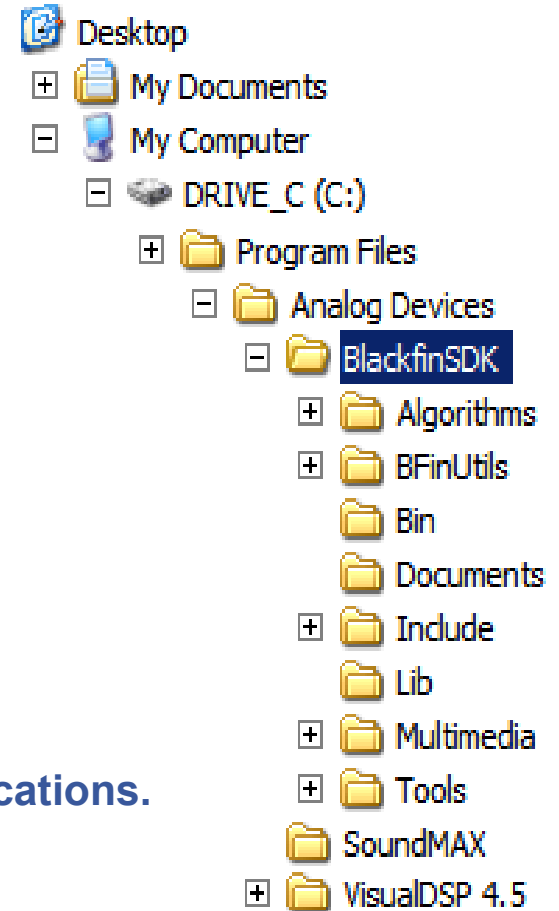
SDK Root Folder on the Disk

- ◆ **Default installation folders**
 - **VisualDSP++ – “C:\Program Files\Analog Devices\VisualDSP 4.5”**
 - **Blackfin SDK - “C:\Program Files\Analog Devices\BlackfinSDK”**
- ◆ **All application and algorithm code is relative to the root of the SDK folder.**
- ◆ **Future updates installs into different folder to protect previous work.**



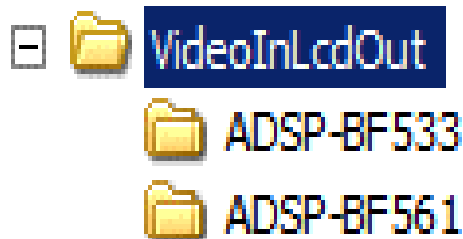
Layout in the SDK Folder

- ◆ **Algorithms**
 - Algorithm source code and related files.
- ◆ **BFinUtils**
 - Common utilities and source code.
- ◆ **Bin**
 - Executables used on the PC.
- ◆ **Documents**
 - Release notes and related docs.
- ◆ **Include**
 - Common include files.
- ◆ **Lib**
 - Pre-built library binaries.
- ◆ **Multimedia**
 - Source code and related files for the multimedia applications.
- ◆ **Tools**
 - Drivers and general purpose modules.



Layout in the Multimedia Application Folder

- ◆ Each Application is placed into its own subfolder.
- ◆ Each with subfolders for specific supported processors.
 - ADSP-BF533 – For the BF533 EZ-KIT Lite.
 - ADSP-BF561 – For the BF561 EZ-KIT Lite.
- ◆ Application common source code and include files are placed elsewhere.
- ◆ Build folders appear when a build configuration is selected.





System Services and Device Drivers Fit

- ◆ **All SDK applications use system services and device drivers.**
- ◆ **Services and drivers are delivered with VisualDSP++ tool.**
- ◆ **System services**
 - **Functionality common to embedded systems.**
 - **Simple and efficient access into the hardware with improved performance.**
 - **Common APIs across Blackfin® processors.**
- ◆ **Device Drivers**
 - **Standardized interface to the hardware components.**
 - **Modeled by the driver model created for Blackfin® Processors.**



Multimedia Starter Kit Software



Multimedia Starter Kit Algorithms

◆ Algorithms Included

- **JPEG and Motion JPEG** – Provided without source code but as pre-built binary only. It is able to encode and decode JPEG and MJPEG data.
- **Ogg Vorbis** – Provided with source code and pre-built binary used decoding of Vorbis encoded audio content.
- **Ogg Speex** – Provide with source code and pre-built binary used to encode and decode voice stream.

Ogg Vorbis Edge Detection
JPEG & MJPEG Ogg Speex SRGP



Multimedia Starter Kit Algorithms

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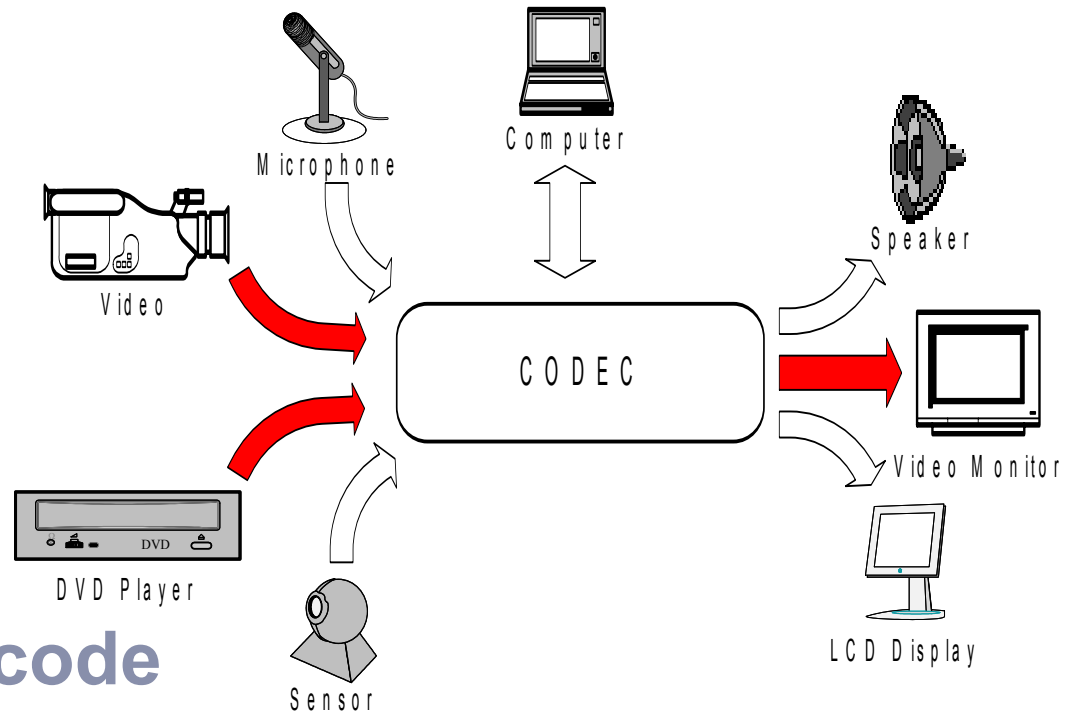
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More Algorithms to Come

Ogg Vorbis Edge Detection
JPEG & MJPEG Ogg Speex SRGP

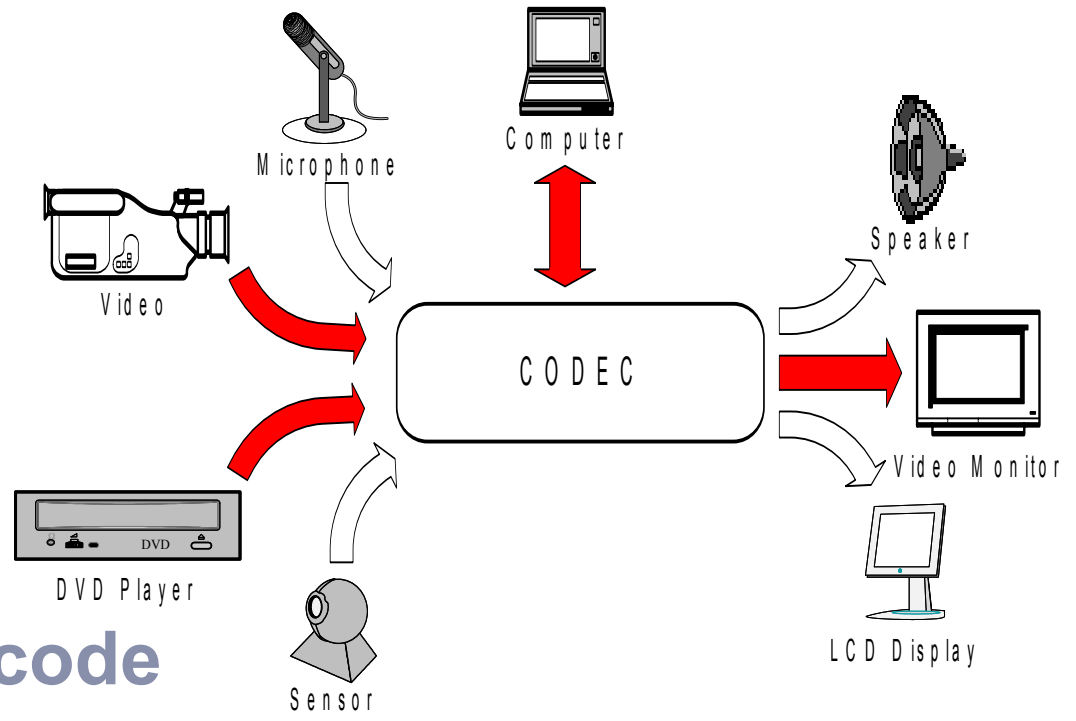
Multimedia Starter Kit Sampling of Applications

- ◆ StreamEdgeDetection
- ◆ JPEG-MJPEG
- ◆ SensorCapture
- ◆ SensorStream
- ◆ VideoCapture
- ◆ VideoStream
- ◆ VorbisPlayer
- ◆ SpeexEncodeDecode
- ◆ SRGP



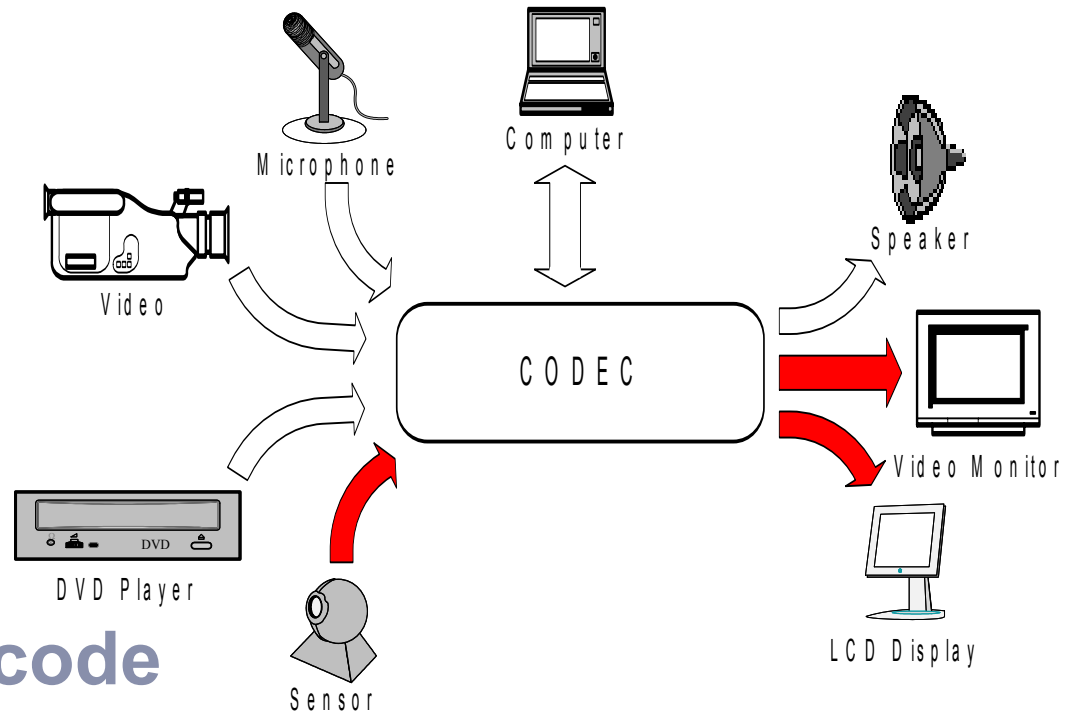
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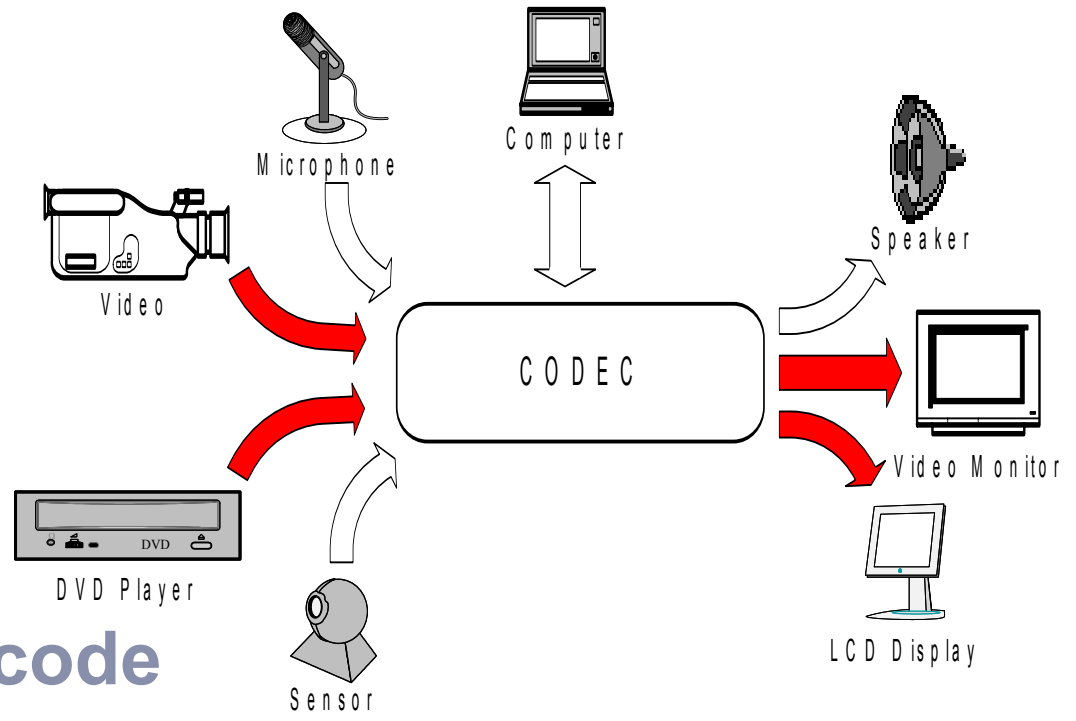
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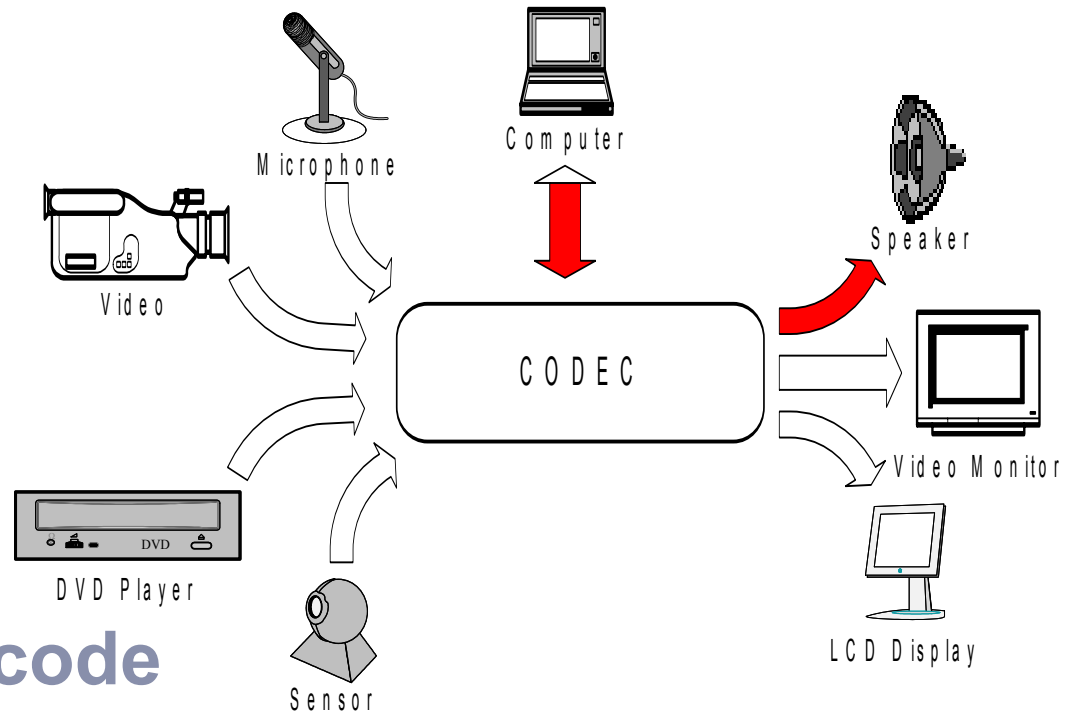
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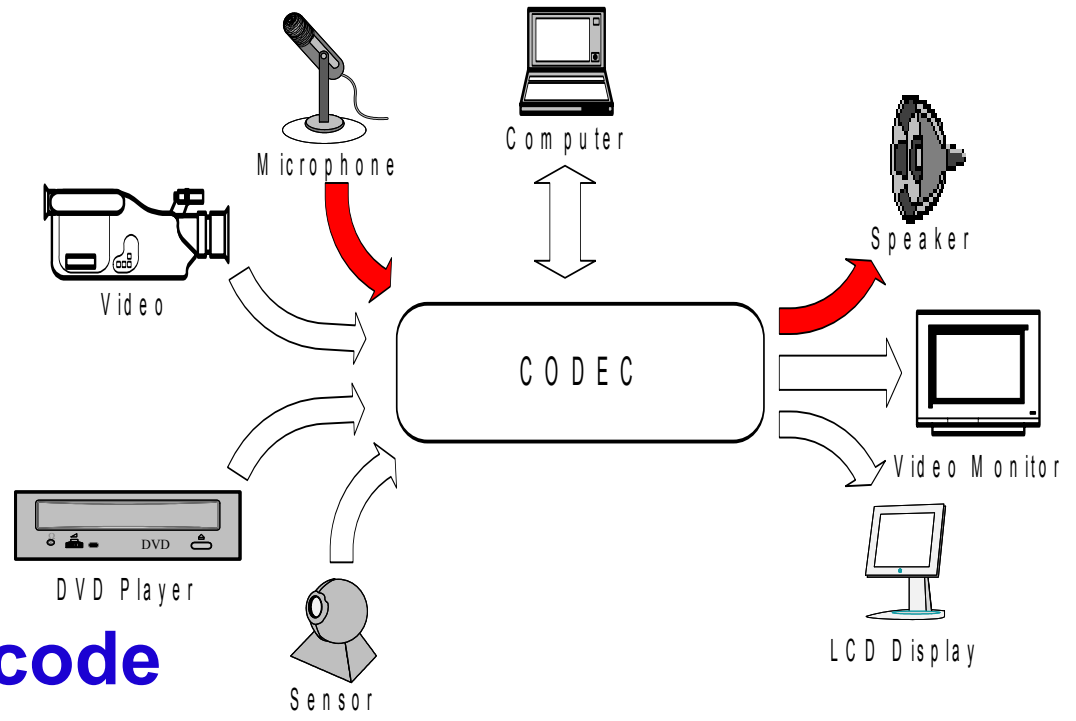
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Online Demo: JPEG-MJPEG Application

Hardware Installation and Configuration

Connect Blackfin USB-LAN EZ-Extender on top of
ADSP-BF561 EZ-KIT Lite

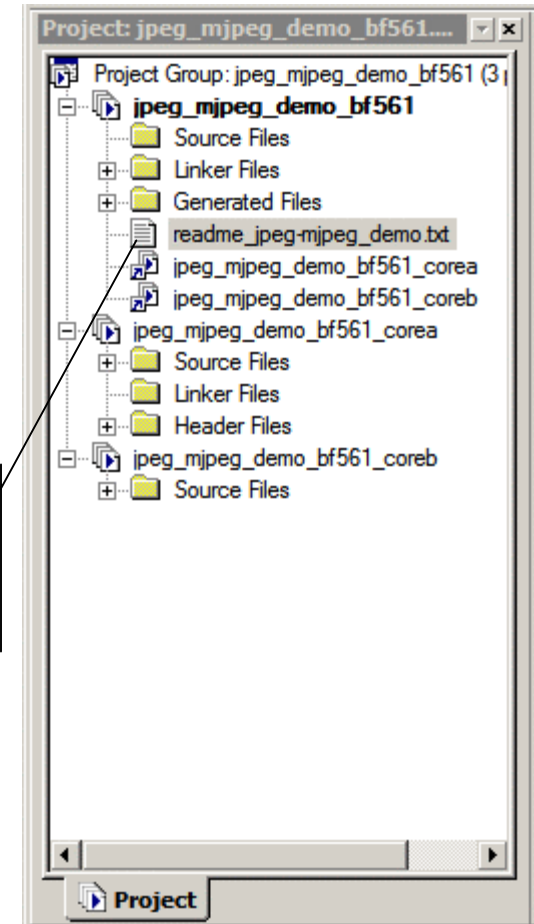
-- BF561 Ez Kit --

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SW 11: 1(O FF) 2(O FF) 3(O FF) 4(O FF)

-- Blackfin USB-LAN EZ-Extender --

SW 1: 1(O N) 2(O N) 3(O N) 4(O FF)
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Open and
follow
instructions
in file





Conclusion

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Additional Information

- ◆ **Reference material**
 - **Blackfin Starter Kits**
 - ◆ <http://www.analog.com/processors/software>
 - **Blackfin SDK**
 - ◆ <http://www.analog.com/sdk/downloads>
 - **VisualDSP++ 4.5**
 - ◆ <http://www.analog.com/blackfin/visualdsp>
 - **Services & Drivers**
 - ◆ In VisualDSP++4.5 subfolder “Blackfin/docs”
 - **HW Schematics & Layout**
 - ◆ <ftp://ftp.analog.com/pub/tools/Hardware>
 - **BOLD Training**
 - ◆ <http://www.analog.com/BOLD>
- ◆ **For questions, click “Ask A Question” button.**