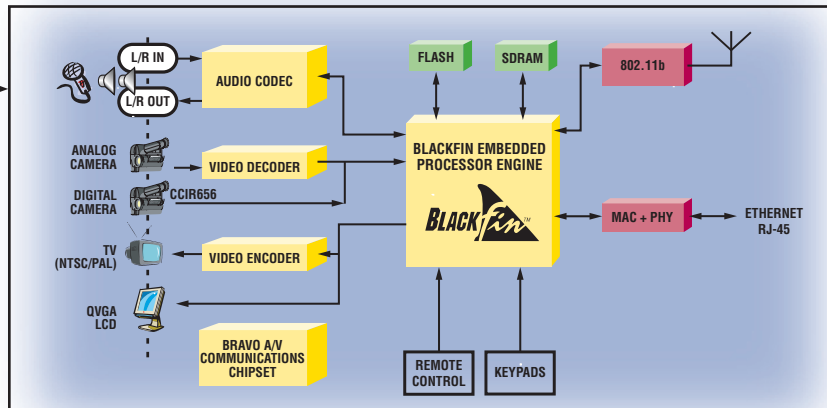


Blackfin BRAVO Videophone—Audio/Video Communications Chipset/Reference Design



Blackfin BRAVO Broadband Audio/Video Communications Reference Design

Complete Videophone Solution Reduces Time-to-Market by Up to 80%

Do you need to get to market quickly with a videophone solution that is highly integrated, cost-effective, standards compliant, and fully tested? Would you rather spend your time differentiating your product instead of trying to get software modules from various suppliers to work together?

Analog Devices' Blackfin® BRAVO™ videophone A/V communications reference design is a complete system solution for building feature-rich, high performance, low cost videophones. The design includes the complete suite of software for videophone applications, all controlled by a comprehensive set of application program interfaces (APIs). The easy to use APIs provide the functionality for customization and control of core system functions, letting you focus on adding high value through product differentiation.

Up to 30 FPS CIF Full Color Video Communications for Broadband Networks

No compromise on performance here. The Blackfin BRAVO videophone solution delivers full motion, full color video, superior audio quality, advanced call control features, and more. At the heart of the chipset is the Analog Devices Blackfin Processor. The processor includes an enhanced instruction set to support multimedia audio and video functionality, with an architecture that is optimized to perform equally well on both control and numeric algorithms.

The video capabilities include support for ITU standard H.263 and H.264 video codecs, picture-in-picture, high resolution graphics with overlay, alpha keying, chroma keying, and antiflicker filtering. On the input, the chipset includes an integrated glueless interface to standard NTSC/PAL analog composite cameras and CCIR656 compatible CMOS sensors. On the output, the chipset enables direct connection to a standard NTSC/PAL TV or a QVGA LCD panel.

For audio, the design supports ITU standard compliant G.711, G.722*, G.722.1*, G.723.1, and G.729AB audio codecs, with future support for multiline SLICs, G.168 ITU standard compliant network echo cancellation, and acoustic echo cancellation (AEC) for enhanced audio clarity. Optionally, RF transceivers can be included in the design to provide cordless audio capability.

Reference Design Kit

The reference design kit includes the videophone development platform, full system software, documentation, and technical support.

Features

- Provides full motion, full color video at up to 30 fps in CIF resolution.
- H.323 and SIP compliant with autodetection.
- Supports H.263 and H.264 video codecs and G.711, G.723.1, G.729AB, G.722*, and G.722.1* audio codecs.
- Integrated acoustic echo cancellation (AEC) with noise cancellation for high quality, full duplex speakerphone functionality.
- Adaptive jitter buffer, packet loss concealment (PLC), voice activity detection (VAD), and comfort noise generation (CNG) for smooth high quality audio under various network conditions.
- Ethernet and WLAN interfaces with QoS.
- Optional IEEE 802.11x connectivity supports WEP, WPA, and QoS.
- Quality of service (QoS) features include Difserve, 802.1p, and TOS.
- Advanced call control features include call forward, call transfer, call hold, call waiting, and 3-way conferencing.
- Scalable bit rate and Ethernet port enable operation with cable, xDSL, LAN, 3G, and fiber.
- CMOS sensor or NTSC/PAL inputs.
- Gatekeeper registration and auto answer.
- Security password to limit access to authorized personnel only.
- Development board, sample applications, and all necessary support included.
- Flexible software to enable customized GUIs.
- Complete, highly integrated, and cost-effective system design.

Applications

- Broadband videophone
- Home gateways/servers
- Interactive remote game consoles
- Video conferencing set-top units
- Distance learning
- Enterprise video communications
- Telemedicine

Hardware Specifications

External Memory

- 2 M × 16 Flash
- 4 M × 16 (×2) SDRAM

Video Display

- NTSC, PAL, RGB, and S-Video
- CCIR601/CCIR656
- Programmable luma filters
- Square pixel support, interlaced/noninterlaced operation, master/slave

Video Capture

- PAL and NTSC composite
- RCA phono input and 4 optional inputs
- 6 TAP interpolation horizontal scaling
- 2 TAP interpolation vertical scaling
- Programmable brightness, contrast, hue, saturation, and luma decimation filter
- I²C[®] control
- Digital camera interface (CCIR656)

Audio I/O

- Microphone—1 channel for dynamic or condenser microphone
- Speaker—1 W @ 8 Ω
- 4 kHz to 48 kHz sampling rates
- Programmable gain
- Optional RF transceiver for cordless phone function

Functional Specifications

Protocol Stacks

- ITU standards H.323, SIP, H.245, H.225, H.450*, H.235*, Q.931, RTP, and RTCP
- TCP/IP, UDP, DHCP, ARP, PPPoE
- Static NAT, STUN*, UPnP™*, SMS*, and MMS*
- Data channel video*

Video

- H.263 and H.264
- QCIF, CIF (up to 30 fps), and 4CIF (still images)

Audio

- G.711, G.723.1, G.729AB, G.722*, and G.722.1*
- AEC* and G.168 network echo cancellation*
- Multiline SLIC interface*

Communications Ports

- Ethernet and UART
- IEEE 802.11x*

*Future support

SIP Features

- SIP according to RFC 3261
- SIP instant messaging, RFC 3428
- SIP presence, RFCs 3856, 3863, 3903
- Offer answer model with SDP, RFC 3264
- HTTP digest access authentication, RFC 2617
- Method to locate SIP servers, RFC 3263
- Configurable signaling and RTP ports
- Out-of-band DTMF tones, RFC 2833
- Call hold using reINVITE method
- Call forwarding, call waiting, call transfer
- 3-way conference*
- Privacy extensions for asserted identity within trusted network, RFC 3325*

Reference Design Includes

- System architecture and user manuals
- Schematics, BOM, and Gerber files
- User interface source code
- Core functions in library/object code
- Diagnostics, test plan, and training kit

Videophone Reference Design

- Complete system solution for building videophones. Reduces time to market up to 80%.
- Videophone reference design engine can be used as a standalone product or integrated into a larger system.
- Software includes the full suite of software/firmware required for the application, including audio codecs, and H.323/SIP/network stacks. A comprehensive set of application program interfaces (APIs) allows easy customization and control of core functions.
- Documentation includes software and hardware manuals that cover system architecture, operation, APIs, schematics, BOM, Gerber files, diagnostics, and test plan.
- Development platform: The videophone reference design kit (RDK) serves as the development platform and includes videophone development boards, complete system software, and full documentation.
- Remote software update support—allows updating of the software on the board remotely via a standard PC.

Ordering Information

Contact Analog Devices, Inc. for ordering information and for information concerning available development platforms and software tools. Designers of products using this reference design will be required to sign a license agreement with ADI. For more information on the BRAVO Videophone solution, email systems.solutions@analog.com.

Analog Devices, Inc.
Worldwide Headquarters
Analog Devices, Inc.
One Technology Way
P.O. Box 9106
Norwood, MA 02062-9106
U.S.A.
Tel: 781.329.4700
(800.262.5643,
U.S.A. only)
Fax: 781.461.3113

Analog Devices, Inc.
Europe Headquarters
Analog Devices SA
17-19 rue Georges Besse
Antony, 92160
France
Tel: 33.1.46.74.45.00
Fax: 33.1.46.74.45.01

Analog Devices, Inc.
Japan Headquarters
Analog Devices, KK
New Pier Takeshiba
South Tower Building
1-16-1 Kaigan, Minato-ku,
Tokyo, 105-6891
Japan
Tel: 813.5402.8210
Fax: 813.5402.1064

Analog Devices, Inc.
Southeast Asia Headquarters
Analog Devices
22/F One Corporate Avenue
222 Hu Bin Road
Shanghai, 200021
China
Tel: 86.21.5150.3000
Fax: 86.21.5150.3222

**Embedded Processing
and DSP Support**
U.S.A.:
processor.support@analog.com
Fax: 781.461.3010
Europe:
processor.europe@analog.com
Fax: 49.89.76903.157
www.analog.com/processors