AudioCoded™ Enabling Technology Products

AC491xxx High Density Voice over Packet Processor

The **AC491xxx** family of DSPs is an ideal solution for high density, carrier class Voice over IP gateways. Featuring high channel density (up to 240 channels of non-compressed voice, or 120 channels of compressed voice), low power consumption (less than 5 mW/ch for non-compressed voice), and low footprint (16x16 mm) with no external memory required, the AC491xxx provides an excellent building block for high density gateways. Field-proven, feature rich software and reference design, enables the rapid development and fast time-to-market of the complete solution.

DELIVER FEATURE-RICH TECHNOLOGIES

The AC491xxx voice over packet processor combines up to 120 channels of toll quality low bit rate (LBR) voice compression or 240 G.711 channels, which are processed with an improved G.168-2002[1] compliant echo canceller (configurable tail length of up to 128 msec). Other voice quality enhancers include Adaptive Voice Activity Detection, Comfort Noise Generation and Adaptive Jitter Buffer. Field-proven G3 Fax Relay, compliant with the T.38 ASN.1 standard, is a major enhancement to the AC491xxx offering. The Fax Relay, that can withstand delays of up to 10 seconds in the network, has passed several interoperability tests with major OEMs in the world, and was tested with numerous fax machines. The Fax Relay functionality does not alter the channel density.

ENHANCE SYSTEM SOLUTIONS

The AC491xxx also provides RTP/RTCP Packetization and DTMF relay, or AAL2 Packetization. This feature offloads the Packet Processor from such tasks. RTP Packets may be optionally encrypted according to state of the art encryption algorithm AES. The AC491xxx also offers a new set of media processing technologies, such as fast/slow voice playback, automatic gain control, energy detector, and packet to packet Transcoding (LBR to PCM in one channel). These features enable developers of Media Server Platforms to exploit AudioCodes' vast experience in the voice over packet market for significantly shortening their time-to-market.

FIELD-PROVEN REFERENCE DESIGN

By using the AC491xxx in its other high density applications, AudioCodes has the unique capability to offer its VoP Processor customers field-proven reference designs, which are used and tested by customers throughout the world.

The AC491xxx offers an easy to integrate Utopia Level 2 interface for media packets, which is suitable for many popular Network Processors. For control packets, an Enhanced HPI interface is used. Suitable drivers are supplied with the AC491xxx for fast software integration.

AC491xxx FEATURES

- Wireline, wireless & cable low bit rate Voice Coders
- G.168-2000 (future: G.168-2002[1]) compliant Echo Canceller
- T.38 compliant Fax Relay (does not reduce LBR density)
- In-Band Signaling, international caller ID support
- IPmedia™ features
- PacketCable media encryption (AES)
- Adaptive Jitter Buffer
- RTP/RTCP Packetization

1 Standard pending ITU final approval

- **No need for external memory**
- **Low per-channel cost, power and footprint**
- **Field-proven reference designs**
- **Proprietary evaluation & development tools**

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AC491xxx

SOFTWARE SPECIFICATIONS[1]

Channel Density	
Uncompressed 64 kbps Voice	Up to 240
Compressed Voice	Up to 120

Voice Functions	
Voice Coders	• G.711 PCM (µ/A-law) at 64 kbps • G.723.1 ACELP at 5.3 kbps • G.726 ADPCM at 16-40 kbps • GSM 6.10 Full Rate at 13.2 kbps • G.727 E-ADPCM at 16-40 kbps • NetCoder® at 6.4-9.6 kbps • G.729A/B CS-ACELP at 8 kbps • GSM Enhanced Full Rate at 12.2 kbps • G.723.1 MP-MLQ at 6.3 kbps
Other Available Voice Coders (upon request)	• G.729E at 11.8 kbps • QCELP 8 Up to 8.55 kbps • AMR at 4.75-12.2 kbps • QCELP 13 Up to 13.3 kbps • G.728 LD-CELP 16 kbps • EVRC Up to 8.55 kbps
Echo Canceller	G.168-2000 (future: G.168-2002[2]) compliant with programmable echo tail of up to 128 msec
3 Way Conferencing	Conferencing of 3 participants from PSTN or IP
Quality Enhancement	• Voice Activity Detection (VAD) • Comfort Noise Generation (CNG) • Packet Loss Concealment (PLC) • Adaptive Jitter Buffer
IPmedia™ Features	• Fast/slow voice playback and announcements • Automatic Gain Control • Energy and Answer detectors • Packet to Packet Transcoding

Data Functions	
Voice/Fax/Data	Automatic detection and switching
Fax Support	T.38 compliant G3 Fax Relay, 2.4-14.4 kbps or PCM bypass
Modem Support	Automatic switch to PCM for up to V.92 rates

Signaling	
In-band Signaling Detection and Generation	• DTMF TIA 464B • MF R1, R2 • SS4, SS5 • User Defined and Call Progress tones
Out-of-band Signaling	CAS ABCD (From Standard Framers)
Caller ID Detection and Generation	• Telcordia (Bellcore) On Hook and Off Hook Service (Type 1 & 2) • ETSI On Hook and Off Hook Service (Type 1 & 2) • NTT Number Display (Type 1)

Packetization	
RTP/RTCP	Per RFC 1889, 1890, 2198
DTMF Relay	Per RFC 2833
AAL2 Encapsulation	Per I.366.2 and AF-VMOA-0145.00

Host Services	
HDLC Framing	For CCS signaling (ISDN, V5.2)
SS7 Signaling	MTP1 per Q.703

Encryption	
RTP Payload	• 128 bit AES • 56 bit key DES, 168 bit key 3 DES (future) • Authentication HMAC MD5, HMAC SHA1

1 Please contact AudioCodes representative for specific software availability
2 Standard pending ITU final approval

HARDWARE SPECIFICATIONS

PCM Interface	8.192 up to 32.768 Mbps, A/µ-Law
Host Post Interface (control and status)	16 bit Bidirectional
Utopia Interface (packet exchange)	Utopia level 2, 16 bit, 50 MHz
Power Supply	+1.2V (core), +3.3V (I/O)
Power Consumption	1200 mW (typ)
Operational Temperature Range	0ºC - 85ºC
Package	284 pin MicroStar BGA , 0.8 mil

APPLICATIONS

- Carrier Class Voice over IP Gateways
- Class 4 and Class 5 Switches Replacements
- Trunking & Access Gateways
- Wireless (UMTS, CDMA, GSM) and Cable High Density Gateways Applications
- Large PBXs

ABOUT AUDIOCODES

AudioCodes Ltd. (NASDAQ: AUDC) designs, develops and markets Voice over Packet media gateway technologies and systems for converged networks. The company is a market leader in voice compression technology and the key originator of the ITU G.723.1 standard for the emerging Voice over IP market. AudioCodes' product line includes enabling technology products such as Voice over Packet chip processors, VoIP communication boards, VoIP media gateway modules and CPE devices. In addition, AudioCodes provides OEMs with media gateway system solutions for packet networks in the wireline, wireless, broadband access and media server markets.

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