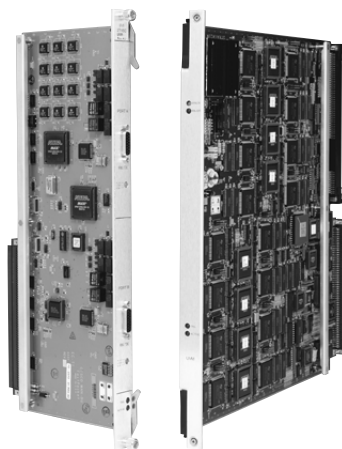


Universal Voice Module (UVM)

THE UNIVERSAL VOICE MODULE (UVM) IS A HIGH-PERFORMANCE VOICE MODULE FOR CISCO IGX8410, IGX8420, AND IGX8430 WIDE-AREA SWITCHES. THE UVM IS SUITABLE FOR ALL ENTERPRISE AND SERVICE PROVIDER VOICE APPLICATIONS AND OFFERS TOLL-QUALITY VOICE AND EFFICIENTLY UTILIZES WIDE-AREA BANDWIDTH. BANDWIDTH SAVINGS ACHIEVED THROUGH VOICE COMPRESSION AND SILENCE SUPPRESSION CAN BE APPLIED TO BURSTY TRAFFIC AND A HIGHER NUMBER OF VOICE CHANNELS PER TRUNK.



Key Features

Superior Performance

The UVM uses 16 digital signal processors (DSPs) and an MC68302 control processor with advanced software to support the following functions:

- T1/E1/J1 interfaces
- Clear transport of A-law and μ -Law PCM voice
- 32 kbps and 24 kbps adaptive differential pulse code modulation (ADPCM), 16 kbps low-delay code excited linear prediction (LD-CELP), and 8 kbps conjugate structure algebraic code excited linear prediction (CS-ACELP) compression
- Voice activity detection (VAD)
- Echo cancellation
- Fax relay
- Modem detection
- Super-rate data connections
- D-channel compression

- Statistics collection
- Standards-based alarm and fault management
- Simple Network Management Protocol (SNMP) configuration and access via platform software
- Redundancy with standby switchover
- CAS or CCS signaling

Voice Compression

The UVM supports the following standards-based compression algorithms:

- ADPCM (G.726): 32 channels per module (24 for T1)
- LD-CELP (G.728): 16 channels per module
- CS-ACELP (G.729): 16 channels per module
- CS-ACELP (G.729a): 32 channels per module (24 for T1)

Support for a range of compressions allows customers to select the compression quality and bandwidth savings appropriate for their applications. 16 kbps LD-CELP and 8 kbps CS-ACELP compression provide very high-quality and low-bit-rate voice, while reducing total bandwidth requirements.

Voice Activity Detection

VAD uses the latest digital signal processing techniques to distinguish between silence and speech on a voice connection. VAD reduces the bandwidth requirements of a voice connection by not generating traffic during periods of silence in an active voice connection. VAD reduces bandwidth consumption without degrading voice quality. VAD, combined with ADPCM, LD-CELP or CS-ACELP compression, achieves significant savings over uncompressed voice traffic.

On-board Echo Cancellation

The UVM uses special echo cancellation chips to provide near-end echo cancellation on a per-connection basis. Up to 64 ms of near-end delay can be canceled. Onboard echo cancellation reduces equipment requirements, potential points-of-failure, and facilitates high-quality voice connections. The echo canceller complies with ITU-T standards G.164 and G.165.

Fax Relay and Modem Detection

The UVM continually senses and detects fax and modem carrier tones. With fax relay, connections do not need to be upgraded upon fax detection. Group 3 fax is demodulated and transmitted as a 9.6 kbps data stream across the network, and remodulated at the receiving UVM. Thus, low-bandwidth trunks can carry fax traffic at approximately the same bit rate as compressed voice. Fax demodulation provides highly efficient transport of fax traffic.

When a data modem is detected, the channel is upgraded to clear Pulse Code Modulation (PCM) transport to ensure completely transparent connectivity.

Fax relay and modem detection ensure compatibility with all voice-grade data connections.

Super-Rate Data Connections

The UVM supports super-rate data connections. A super-rate data connection is an aggregate of timeslots that functions as a single logical connection. A super-rate data connection is composed of any combination of contiguous 64 kbps timeslots up to a maximum of eight timeslots totaling 512 kbps.

Video Transport over Super-Rate Data Connections

Super-rate data connections may be used to transport Nx64 kbps video connections. If the transported video application conforms to the H.221 video codec framing protocol, then the UVM may be used to preserve bandwidth any time the video application is idle. When enabled, the UVM's Idle Code Suppression (ICS) feature automatically detects idle time on the video connections and does not generate any traffic across the WAN until video activity is detected again.

D-Channel Compression

Utilizing D-channel compression, the bandwidth required for carrying CCS signaling between attached PBXs can be minimized. In traditional applications, the D-channel requires 64 kbps of dedicated bandwidth. Utilizing D-channel compression, this requirement can be greatly reduced.

Technical Specifications

Hardware

- MC68302 control processor
- MT9122 echo cancellers
- TMS 320C32 DSPs (16 per module)

Physical Layer

Description	T1	E1	J1
Line Rate	1.544 Mbps	2.048 Mbps	2.048 Mbps
Jitter	+/- 32 ppm	+/- 50 ppm	+/- 50 ppm
Connector Type	DB15	DB15 or BNC	DB15
Impedance	100 Ohms	120 Ohms (DB15) or 75 Ohms (BNC)	110 Ohms
Cable Length	0-655 ft	—	—
Line Coding	AMI with ZCS (Zero Code Suppression), AMI with B8ZS, AMI	AMI with HDB3, AMI	CMI
Idle Code	7F Hex	54 Hex	7F Hex
Framing Format	D4, ESF	G.704	TTC-2M/JJ-20-11
Signaling	CAS (Robbed Bit), CCS	CAS, CCS	CAS, CCS
Signaling Conditioning	Configurable	Configurable	Configurable
Standards	ANSI T1.102, T1.231, T1.403, ITU-T G.824	ITU-T G.703, G.704, G.706, G.732, G.735-9, G.775, G.823, G.826, I.431	Applicable JATE Standards

Physical/Electrical Specifications

Dimensions	Front card: 15.25 x 16.25 inches Back card: 6.5 x 16.25 inches
Weight	Front card: 8 lbs (3.6 kg) Back card: 4 lbs (1.8 kg)
Input Power	-48V DC
Power Consumption	55W
Electrical and Safety Standards	FCC Part 15 Bellcore GR1089-CORE IEC 801-2, 801-3, 801-4, 801-5, 825-1 (Class 1) EN 55022, 60950 UL 1950

Description	Parameters
Interfaces	2 (Second interface is used for passing unprocessed voice channels to a second UVM.)
Voice Channels	PCM: 32 channels per module (24 FOR T1) ADPCM (G.726): 32 channels per module (24 for T1) LD-CELP (G.728): 16 channels per module CS-ACELP (G.729): 16 channels per module CS-ACELP (G.729a): 32 channels per module (24 for T1) When mixing connection types, the overall capacity varies between 16 and 32 channels
Voice Activity Detection	Configurable threshold on a per-channel basis
Echo Cancellation	Per G.164 and G.165 24 channels for T1 or 32 channels for E1 and J1
Fax Relay at 9.6 kbps	16 channels per module
Fax and Modem Transmission Using PCM Transport	32 channels per module (24 for T1)
PCM Encoding Types	μ -Law or A-Law encoding End-to-end conversion available
Channel Gain Control	-8 dB to +6 dB Configurable on ingress and egress
Quantizing Distortion	2.5 Quantizing Distortion Units (QDUs) with 32 kbps ADPCM over 1 hop plus 0.7 QDUs with Digital Loss PAD (μ -law or A-law)
Nominal Transmission Loss	0 dB at 1 kHz



Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters

Cisco Systems Europe s.a.r.l.
Parc Evolic, Batiment L1/L2
16 Avenue du Quebec
Villebon, BP 706
91961 Courtaboeuf Cedex
France
<http://www-europe.cisco.com>
Tel: 33 1 69 18 61 00
Fax: 33 1 69 28 83 26

Americas

Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-7660
Fax: 408 527-0883

Asia Headquarters

Nihon Cisco Systems K.K.
Fuji Building, 9th Floor
3-2-3 Marunouchi
Chiyoda-ku, Tokyo 100
Japan
<http://www.cisco.com>
Tel: 81 3 5219 6250
Fax: 81 3 5219 6001

Cisco Systems has more than 200 offices in the following countries. Addresses, phone numbers, and fax numbers are listed on the Cisco Connection Online Web site at <http://www.cisco.com/offices>.

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