ADSP-21mod FAMILY
INTERNET GATEWAY PROCESSORS
Maximizing Port Density for Voice and Data Applications

KEY FEATURES:

- Supports up to 40 independent communications ports in a single device

- Handles voice, data, or fax connections via dynamic host configuration

- Dynamic Internet Voice Access™ (diva™) technology delivers high quality, flexible, voice over network service.

- OEMs have the option of licensing ADI software or developing their own

- Requires no external RAM, results in minimal component count and low bill-of-materials cost

- Low 25mW per port (typical) power consumption is optimized for high capacity systems

- Fully programmable on-chip RAM allows field upgrades to new communication protocols

- Open architecture is extendable to evolving infrastructure applications and supported by ADI application software and a full suite of programming tools

OVERVIEW

The ADSP-21mod Family of Internet Gateway Processors maximizes port density for remote access networking applications and enables multiservice connectivity. The ADSP-21mod Family's single chip design provides an extremely dense solution implementing up to 40 communications channels in a single package. This results in significant space savings, allowing OEMs to increase channel capacity within an existing modem or voice gateway chassis.

ADI's Dynamic Internet Voice Access™(diva™) technology delivers the voice quality needed for high

Quality of Service (QoS) systems and the flexibility needed to inter-operate with future voice over network gateways.

Extending ADI's lead in programmable DSP and memory integration capability, the ADSP-21mod Family employs on-chip RAM and is fully downloadable. All modem and Voice over Network (VoN) Protocol functions can be implemented without using external memory reducing required space and increasing density. This also ensures that field upgrades and evolving infrastructure applications can be added via software. The device is a multi-service platform to connect users
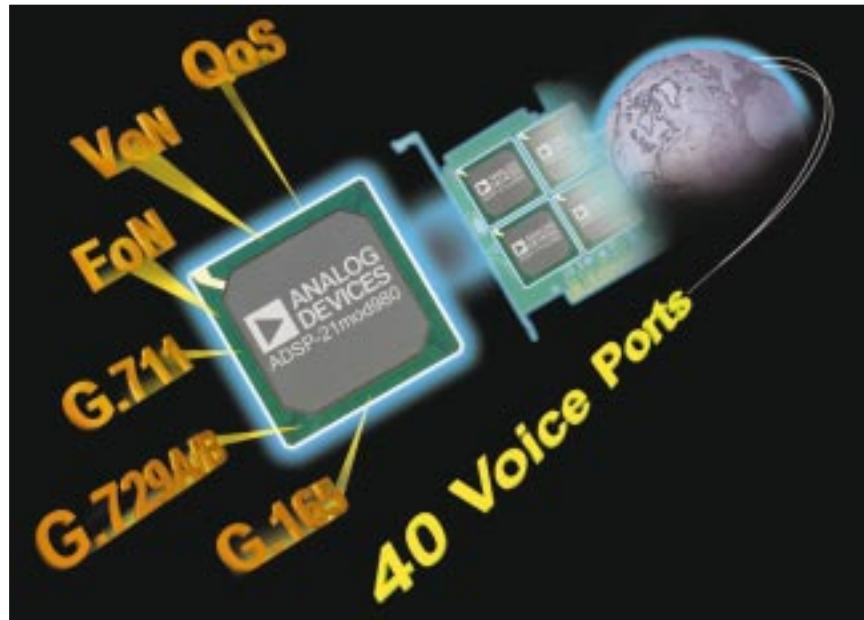
Voice over network technology running on ADI's ADSP-21mod980 Internet Gateway Processor achieves an industry-leading 40 channels on a single chip.

**ANALOG
DEVICES**

accessing the Internet, regardless, of whether the connection is V.90, fax, VoN, or ISDN.

Doubling Capacity Every Nine Months

Since the introduction of the ADSP-21mod870 in 1997, ADI has successfully doubled port capacity every nine months and achieved the goal of providing industry-leading density and support for evolving Internet protocols and data types. ADI's family of Internet Gateway Processors are embedded 16-bit DSPs and software solutions that have enabled the development of new Internet access products including high-density remote access servers and remote access concentrators, VoIP gateways, multi-service gateways, and modem test equipment.

The ADSP-21mod Family offers a single-point interface for multiple lines to transmit voice, data, or fax. It addresses many of the Internet access challenges faced by Long Distance Service Suppliers, Local Exchange Carriers, Competitive Local Exchange Carriers, and business enterprise networks.

By providing 40 ports of high quality voice, it is now possible for even the largest service providers to move from circuit switch networks to high efficiency, cost-effective VoIP networks.

Field-Proven

In 1997, the ADSP-21mod Family began shipping in volume and since then, it has been widely deployed throughout the world. ADI lab tests consistently demonstrate higher quality, reliability, and a higher degree of inter-operability than other competing solutions. All members of the ADSP-21mod family are code-compatible so that OEMs can preserve their investment in system software.

Maximizing QoS

For Service Providers to widely deploy VoN technology, they need voice quality comparable to the PSTN. ADI's diva™ technology optimizes voice quality through high quality speech codecs, advanced jitter buffer management, and robust echo cancellation.

Over the last several years, the proliferation of client modem types has caused an inordinate number of permutations of client, phone line, and head-end. The ADSP-21mod Family provides an unparalleled capability to analyze and diagnose a connection in real time. The system host can access a rich catalog of useful detail that includes call start-up, rate negotiation, protocol options available, received signal quality, round trip delay estimate, received data errors, symbol and data rates used, and renegotiations requested. Such information is invaluable to the carrier or ISP who is trying to minimize
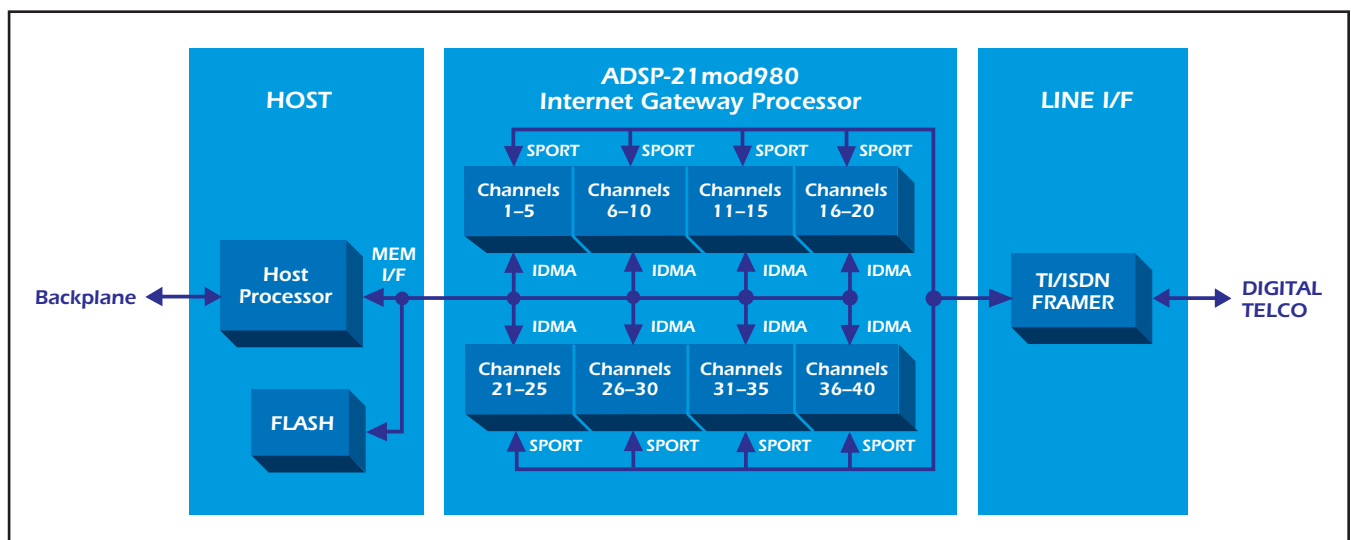
ADSP-21mod980 System Block Diagram

customer support costs and resolve network issues remotely.

Highly Intergrated

The on-chip DMA port provides an efficient means of communication between a host system and the ADSP-21mod device. It is used to access the on-chip memory of the DSP without interrupting operation. It supports a 16-bit multiplexed address and data bus. The DMA port is completely asynchronous and can be active while the ADSP-21mod device is at full speed.

The ADSP-21mod Family incorporates a multichannel synchronous serial port for serial communication (SPORT). It provides a fully programmable and flexible serial interface to a serial PCM stream, typically derived from a channelized T1, E1, or ISDN connection. Serial port parameters such as frame delay, frame length, polarity, and word length can be programmed to meet a variety of application requirements.

Host Application Programming Interface

The software supplied with the ADSP-21mod Family includes a comprehensive Application Programming Interface (API). The API specifies the details of how to read and write data to the ADSP-21mod device. It describes all of the architectural elements that comprise a system, such as internal memory organization, DMA port operation, and serial port operation.

The API also defines how data transfers occur and includes DSP buffer types, FIFO operation, service request signaling, data formats, status and parameter tables, and DSP overlay operation. In addition, the API specifies modem or voice set-up and control modes.

Modem Features
Data Mode
PSTN:
- ITU-T V.90
- K56Flex™
- ITU-T V.34+ (33.6 KBPS)
- ITU-T V.34
- ITU-T V.32bis
- ITU-T V.32
- ITU-T V.22bis
- ITU-T V.22
- ITU-T V.23
- ITU-T V.21
- Bell 212
- Bell 103
- ITU-T V.8 start-up
- ITU-T V.8bis start-up

ISDN:
- 64KBPS HDLC
- 56KBPS HDLC

Fax Mode
- ITU-T V.17
- ITU-T V.29
- ITU-T V.27ter
- TU-T V.21 channel 2

Error Correction
- ITU-T V.42
- LAPM
- MNP2-4

Data Compression
- V.42bis
- MNP5

Control Functions
- ITU-T T.30 fax
- Class 2, Class 2.0, and Group 3 fax
- ITU-T V.110 rate adaptation
- ITU-T V.120p
- PPP Asynchronous Framing Support (RFC 1662)

Voice Features
- Selectable Speech Codecs: G.711, G.729A/B
- In-band modem transport over G.711
- G.165 Line Echo Canceller with 32ms Tail Length
- DTMF, MF Detection and Generation
- CNG Detection
- Tone Relay Support
- RTP Framing
- Voice and Data/Fax Call Discrimination
- Voice Activity Detection, Silence Suppression
- Comfort Noise Insertion
- Adaptive Jitter Buffer Management

PRODUCT SELECTION GUIDE

	Number of Ports	Software Features	Package
ADSP-21mod980-240 Voice Solution (600 MIPs)	40	G.711	352 PBGA (35mm)
ADSP-21mod980-216 Voice Solution (600 MIPs)	16	G.729 A/B, G.711	352 PBGA (35mm)
ADSP-21mod980-110 Integrated Modem Solution (600 MIPs)	8	Modem	352 PBGA (35mm)
ADSP-21mod970-110 Integrated Modem Solution (312 MIPs)	6	Modem	304 PBGA (31mm)
ADSP-21mod870-110 Integrated Modem Solution (52 MIPs)	1	Modem	100 LQFP (16mm)
ADSP-21mod870-000 Device (52 MIPs)	---	---	100 LQFP (16mm)
ADSP-21mod970-000 Device (312 MIPs)	---	---	304 PBGA (31mm)
ADSP-21mod980-000 Device (600 MIPs)	---	---	352 PBGA (35mm)

Voice Solution includes an ADSP-21modXX0-XXX device and DSP software from ADI that supports voice functions as specified in separate data sheets.

Integrated Modem Solution includes an ADSP-21modXX0-000 device and DSP software from ADI that supports datapump and controller functions as specified in separate data sheets.

Device denotes an ADSP-21modXX0-000 processor.

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