




Access Modem Products



ACCESS: Modems and DSL



As the information content explodes on the Internet, and users continually demand higher data rates, Lucent Technologies is poised to deliver solutions to satisfy the need at every level. The “next big thing” in modem technology, Asymmetric Digital Subscriber Line (ADSL) technology picks up where traditional “voice band” analog modems (V.90, K56flex[†], V.34) leave off. ADSL technology promises to speed up Internet access for years to come. Lucent Technologies Microelectronics Group introduced *WildWire*[™], which can download data at up to 1.5 megabits per second.* That is about 30 times faster than today’s analog modem. Web pages and TV quality video download amazingly fast, all over standard telephone lines.

The Lucent Technologies *WildWire* client chip set, which relies on advanced DSP technology and algorithm design, also supports V.90, K56flex, V.34, and V.17 FAX to ensure backwards compatibility with today’s installed modem base. This cost-effective and low-power solution is ideal for desktop and notebook computer designs.

* While *WildWire* chips are capable of transferring data at 1.5 Mbits/s, users individual line conditions can affect the transfer rate.

† Actual speeds over U.S. telephone lines vary and are less than 56K, due to current FCC regulations and line conditions.

WildWire ADSL and V.90 Modem Chip Set with PCI Bus Interface



The *WildWire* client chip set is the next generation of modem solutions. The *WildWire* chip set consists of a DSP1690 digital signal processor, T7780 ADSL codec, and a CSP1034 analog modem codec. It is the industry's most cost-effective chip set combining ADSL and V.90 functions in one G.Lite compliant solution. This chip set is intended for PCI plug-in card *Windows*¹ applications. In conjunction with the host PC, it implements *WildWire* technology allowing users to connect at rates up to 1.5 Mbits/s downstream, 512 kbits/s upstream. This chip set is backward compatible with V.90 and V.34 analog modems.

Cost-Effective PCI V.90 modem and ADSL solution

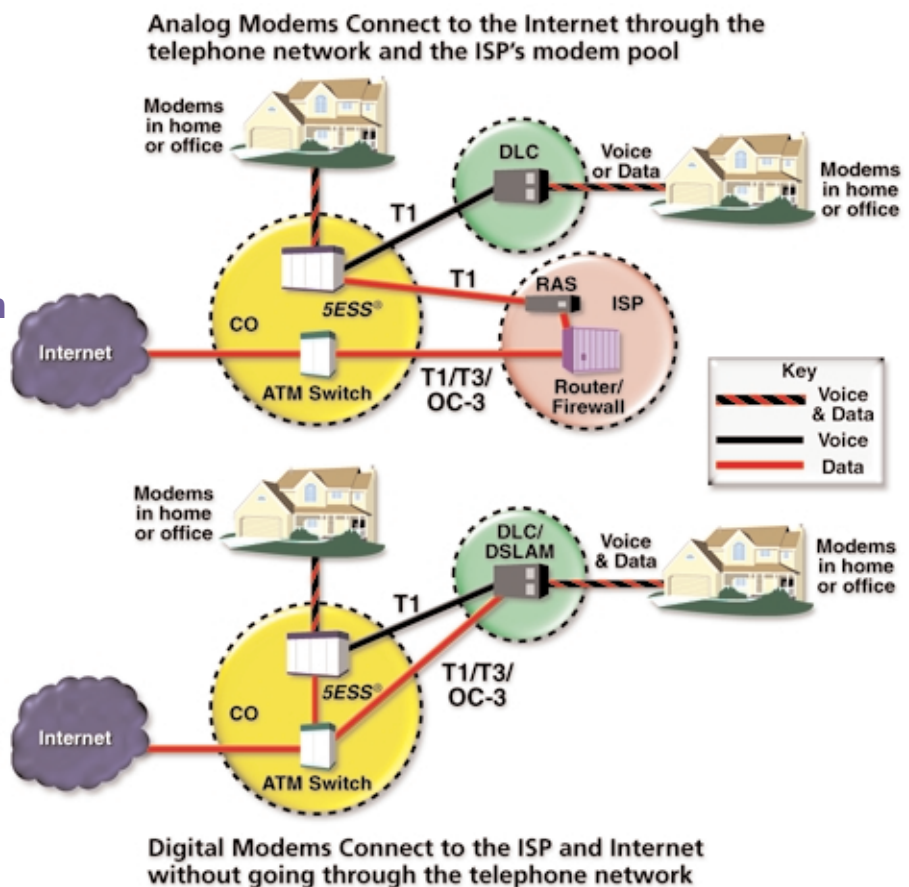
not the central office has an ADSL connection, and an autorate feature allowing the user to transfer data at the highest rate available. Since the ADSL standards are evolving, Lucent's RAM-based architecture is a facilitator of essential software upgrades.

Lucent Technologies' *WildWire* chip set also includes an autodetect feature that determines whether or

Analog Modem Technology

versus

WildWire Technology



- ADSL client modem chip set
- ITU G.Lite compliant
- G.992.2 compliant
- T1E1.413 compliant
- Up to 1.536 Mbits/s downstream, 512 kbits/s upstream
- Splitterless design, minimizing installation costs
- Integrated Voice & Data
- Simultaneous ADSL and POTS operation
- ITU V.90: Up to 56 kbits/s
- ITU-T V.34 Extended Rates: 33.6 kbits/s to 2.4 kbits/s
- TIA/EIA² 578 Class 1 FAX (V.17)
- PC9x WHQL Certification
- RAM-based Architecture (field upgradable)
- Operating system support: *Windows* 95 & 98 and *Windows* NT 4.0 & 5.0

Home Networking

Lucent's *Home Wire*[™] products will allow consumers to simultaneously access the Internet, play multiplayer video games, share a printer and computer files, and FAX documents from any home PC using one Internet connection, one modem, and one phone line. There will be no more vying to use the same modem and Internet connection simultaneously, no more family feud to use the only printer in the house, and no more drilling holes in home walls to install new wires.

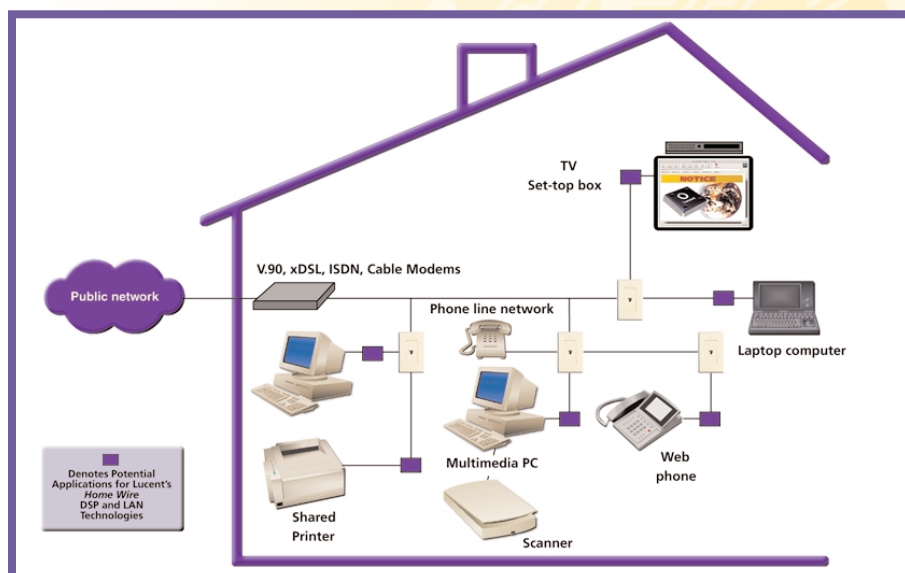
Capable of in-home adaptive data transmission rates from 1 megabits per second (Mbits/s) to 16 Mbits/s, *Home Wire* helps create an inexpensive in-home local area network (LAN) by tapping into the ordinary copper phone wires and using bandwidth that was unused until now. This *Home Wire* solution consists of a dual-speed 10/100 Mbits/s LAN controller, and an analog front end (AFE). Lucent's *Home Wire* solution is compliant with the Home Phoneline Networking Alliance (HomePNA) Draft PHY Specification 2.0 and 1.1, and it is compatible with existing services such as POTS, V.90, G.Lite "Splitterless" DSL (G.992.2).

At its top speed of 16 Mbits/s, more than 250 times the speed of 56 Kbits/s modems, Lucent's *Home Wire* solution will revolutionize the in-home web surfing experience, and complete the transport of high-bandwidth files in a flash. You can now download graphics and video files in the blink of an eye, and connect more devices to home networks that will allow for meaningful multimedia and real-time applications based on queuing quality of service (QoS) such as in-home video distribution, voice compression, and voice over IP (VoIP). It will be the technology foundation for the smart homes of the new millennium!



Q *What do you get when you combine Lucent's expertise in digital signal processing (DSP), local area networking (LAN) and home phone line wiring?*

A *Lucent Technologies new Home Wire, the industry's broadest family of communications chips for the new home networking market.*



All-in-One Communications Center enabled by Venus® based Modem chip set. Combines Telephone, FAX, and answering machine capability when the PC is off.

Lucent Technologies has created a modem chip set solution that enables a modem to be an answering machine, speakerphone, and FAX machine; with all the data download capability and performance of today's fastest V.90 56 kbits/s modems—even while a PC is turned off. This capability is made possible by a software-based enhancement to Lucent's previously announced *Venus* modem chip set.

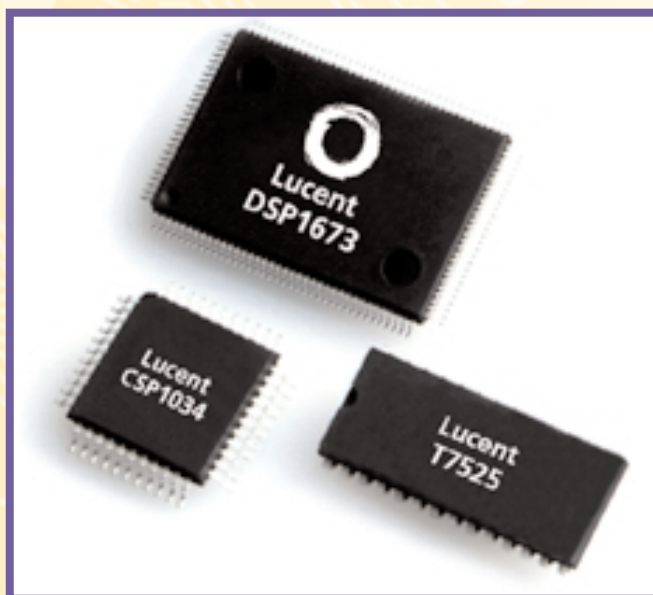
As a stand-alone answering machine, it can digitally store over 20 minutes of messages, and it can retrieve and store over 30 pages of FAXes. In addition, it has all the features you would expect from a top-of-the line answering machine which includes time stamping of messages, greeting update, remote message retrieval and more. It can even call you when you are away from the office to let you know that a message or FAX has been received.

As a stand-alone telephone, it can work as a full-duplex speakerphone for hands free conversation, and it can detect and display caller ID information and signal call waiting.

If this device is connected to your PC, a wonderful transformation occurs. Now you have a high-performance modem that can handle all of your data download needs. And it works in conjunction with common phone applications to enhance the user interaction. Now your PC can retrieve and play back stored messages and display FAXes that came in while your PC was off.

Q *What do you get when you cross a modem with a telephone?*

A *The next step in personal and small business data communications.*



Voice:

- Message record and playback
- Full-duplex speakerphone
- Volume and mute control

Answering machine:

- Record, delete, listen—local or remote
- Update greeting
- Follow me (automatically calls remote number when message or FAX is received)
- Stores over 20 minutes of messages
- Stores over 30 pages of FAXes
- Message/FAX indications
- Keypad interface
- Optional LCD display

Telephone:

- Caller ID
- Call waiting
- Dial pad interface

Data:

- V.90, 56 Kbits/s data downloads
- V.34, 33.6 kbits/s data downloads
- V.32bis and fallbacks
- V.23
- V.42 LAPM
- V.42bis

FAX :

- ITU-T V.17, V.27, V.27ter, V.21 ch2
- Class 1 & Class 2
- Remote message & FAX retrieval

Modem Chip Set Solution for Embedded Applications—DPV Series



The DPV DSP coupled with a CSP1034C codec offers a very efficient 3 V modem solution for embedded applications where a separate modem microcontroller is not required: stand-alone FAX machines, multifunction peripherals, Internet appliances, Internet screen phones, Net TVs, WinCE, & set-top boxes.

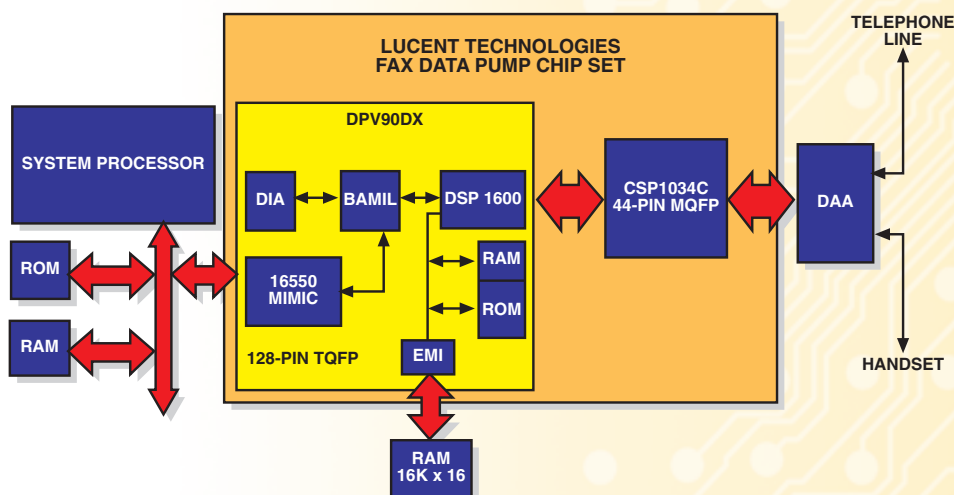
For traditional modem design and other applications requiring a complete integrated embedded modem chip set, Lucent's *Venus* chip set is a superior choice. All DSP firmware available for the *Venus* data pump to support modes such as V.34 FAX and V.90 data can be used without modification on DPV devices.

The DPV family includes three devices:

- **DPV34X.** Supports V.34/V.17/V.29 (and lower) FAX rates for FAX-only applications.
- **DPV34DX.** Supports V.34 data as well as V.34/V.17/V.29 FAX modes.
- **DPV90DX.** Supports V.90/V.34 data and V.34/V.17/V.29 FAX. This device requires 16K x 16 external SRAM for V.90 operation.

The DPV34X, DPV34DX, and DPV90DX (3 V) data pumps are available in 128-pin TQFP packages. These data pumps are used with the CSP1034C 3 V codec available in 44-pin MQFP and 48-pin TQFP packages.

- O.S. independent
- Ease of software portability to any host processor
- 128-pin TQFP package
- V.90 data & FAX capabilities
- Low-power sleep mode
- Requires only a single 3.3 V supply



DPV Data Pump Block Diagram

Modem Chip Sets with Integrated Controller–Venus

The *Venus* chip set, consisting of the DSP1673 or DSP1675 and CSP1034, is the Lucent Technologies modem solution with an integrated controller. The high level of integration enables designers to create low-cost, high-performance, low-power, full-featured modems. This chip set supports V.90 data rates (up to 56 kbits/s), ITU-T V.34 extended rates (33,600 bits/s to 2,400 bits/s), V.42 Error Correction and V.42bis and *MNP*³ 5 data compression, AT Command Set, TIA/EIA 578 Class 1/Class2 FAX (V.17, V.29, V.29, V.27ter, V.21 Channel 2), telephone answering machine (TAM) with caller ID, integrated Plug and Play functionality, high-precision sigma-delta codec with integrated hybrid, *SIMULTALK*[®] full-duplex speakerphone (T7525 required), and RAM-based architecture (for upgradability). The *Venus* PC Card chip set also supports *Motorola*⁴ MC Cellular Direct Connect and Enhanced Throughput Cellular (*ETC*⁵). The DSP1675 *Venus* device supports 3.3 V operations.

In addition to feature richness, *Venus* provides operating system independence by supporting *Windows* 3.1, *Windows* 95/98, *Windows* NT, Complete DOS support, *OS/2*⁶, *LINUX*, *Macintosh*⁷, and *UNIX*⁸. *Venus* modem chip sets are available for ISA plug-in cards, serial box modems, PC Card applications, USB Modems and Controller based PCI Modems.

The *Venus* chip set along with the Lucent USBINT device is one of the first USB modem solutions. It enables modem designers to provide USB connectivity for desktop PCs, laptops and portable units with minimal design effort. Built-in USB power management features make bus-powered modems possible, which is very attractive for portable OEM manufacturers because it eliminates the need for an external power source.

Venus–single-chip modem DSPs with an integrated controller.

This chip set is based on Lucent's 3 V technology providing low power consumption. It is fully compliant with the universal serial bus specification 1.0 and supports USB communication device class specification.

Using a *Venus* chip set with the Lucent PITA interface allows for a cost-effective PCI Controller based modem design. The PITA device sits cleanly between the PCI bus and the *Venus* host interface with no glue logic required.

- ISA Half Card
- PC Card Interface
- USB Support
- PCI Support
- Operating System Independent

Modem Chip Sets with Host-Based Controllers



PCI Bus Interface **DMars^a**

The PCI Host-Based Modem Chip Set is the next generation of host-based controller modem solutions. The integrated PCI interface allows it to have greater access to host PC system resources. In conjunction with the host PC, it implements V.90 technology, with which PC users can achieve Internet connection rates up to 56 kbits/s with backward compatibility with existing V.34 modems.

The modem provides the optimal parallel interface since it connects directly with the host PC's PCI bus. This eliminates the 16550 UART bottleneck to allow users to expect maximum data throughput for higher than conventional data rates.

This chip set offers an on-chip PCI interface that supports both slave and master operation. Extensive bit I/O controls provide hooks for international and domestic DAAs.

ISA Bus Interface **DApollo**

Spearheading the controllerless solution is the Apollo family of host-based controller modems. The Apollo chip set is available in the following versions:

- A full-featured version consisting of a DSP1644 and a CSP1034AH and an optional T7525 audio codec for speakerphone functionality. TAPI compliant voice and telephony applications will work in conjunction with this modem solution.
- A data/FAX only chip set comprised of a DSP1641B and CSP1034 Codec. Both support the K56flex/V.90 technology for data rates up to 56 kbits/s, as well as fallbacks for V.34 data at V.34 extended rates (33.6 kbits/s and 31.2 kbits/s) and FAX rates up to 14.4 kbits/s.



- V.90 ITU-T: Up to 56 kbits/s
- V.42 Error Correction and V.42bis and MNP 5 Data Compression
- ITU-T V.34 Extended Rates: 33.6 kbits/s to 2.4 kbits/s
- TIA/EIA 578 Class 1 FAX (V.17)
- Telephone Answering Machine (TAM) with Caller ID
- SIMULTALK Full-duplex Speakerphone
- Host-based DSVD (ITU-T V.70)
- V.80 Support for POTS-based Videoconferencing (H.324)
- High-Precision Sigma-Delta Codec with Integrated Hybrid
- Integrated PCI or ISA Interface
- PC9x WHQL Certification
- ACPI Power Management (Mars Only)
- Optimized for notebook and desktop applications
- No onboard SRAM

Solid-State Line-Powered DAA CSP1035/1036–Perseus™

The *Perseus* Codec is a line-powered DAA+Codec that supports worldwide standards for DAA function with all programmable circuits on-chip.

The *Perseus* Codec is designed by Bell Labs to interface directly to Lucent's latest modem devices using a high voltage isolated interface capable of meeting international isolation standards.

Perseus contains circuits to support all modem analog front-end requirements, direct connect cellular, caller ID, hook switch, and ring detect using fewer components than any other competitive solution anywhere in the world. *Perseus* operates on the line side for PSTN calls and on the secondary side when used in cellular operation. Built-in caller ID circuits enable a low-power mode (~ 1.5 mA) that applies the CND FSK tones directly to a digital port on the host DSP device. A similar circuit supplies ring detect information to the same port. This function eliminates external components for ring detect and caller ID.

The CSP1035 and CSP1036 are members of the new *Perseus* family of V.90 codec devices. The highly integrated CSP1035 and CSP1036 codec devices eliminate the need for a bulky transformer and reduce the cost, size, and power of V.90 DAAs. The CSP1035 is designed for international applications (CTR21, JATE) while the CSP1036 is designed for FCC applications. Both are designed to interface directly to the DSP1648, HV90PC, DSP1673(V8), DSP1675(V3), and DSP1691 devices.

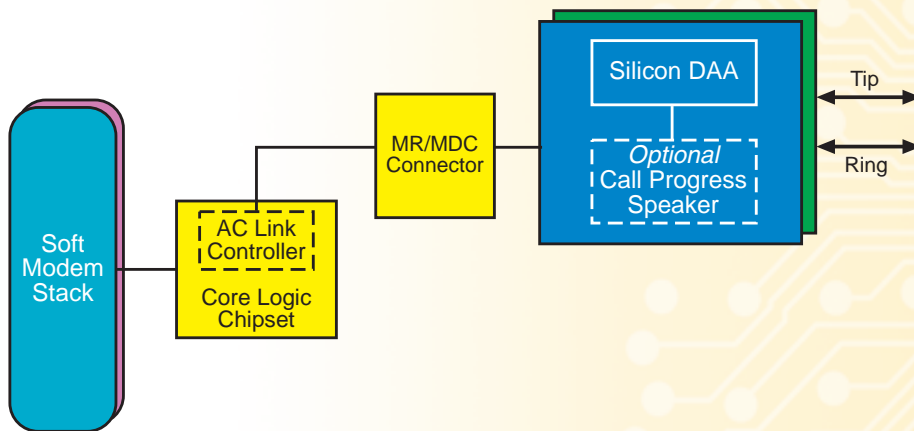


- Transformerless domestic and international DAA
- No optical coupling required
- Line powered: no system power consumption
- Programmable caller ID and ring detect thresholds
- Programmable impedance termination
- Programmable hybrid
- Programmable dc loop holding circuitry
- Programmable country specific overcurrent protection
- Programmable ac transmit gain
- Pulse dial capability
- Six general-purpose bit outputs (pulse shape and spark quench, etc.)
- Software-controlled polarity reversal detection
- Digital PBX line guard built in
- Single 48-pin TQFP package isolation standards

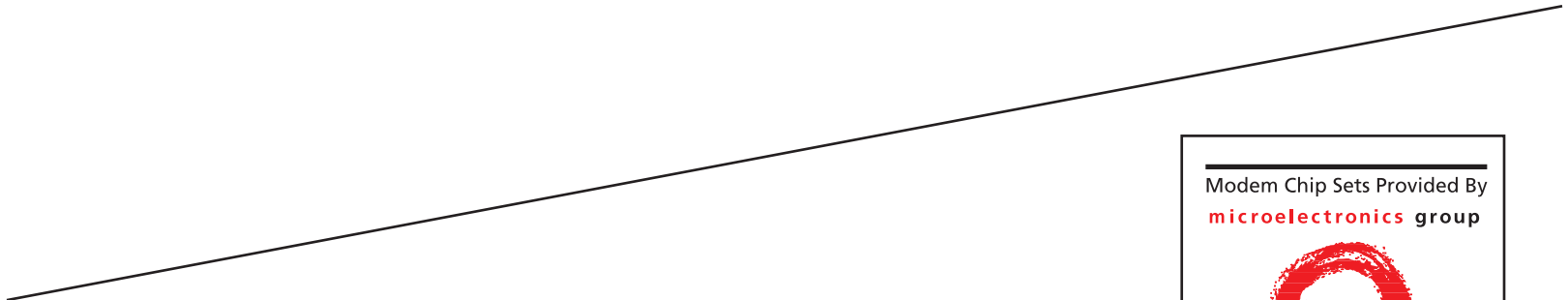
AC-Link Soft Modem Chip Set

The LU97 chip set is an integrated direct access arrangement (DAA) that provides a programmable line interface to meet international telephone line requirements. The LU97 chip set is available in two 16-pin small outline packages (AC'97 interface on CSP1037 and telephone line interface on CSP1037A/B). The chip set eliminates the need for an AFE, an isolation transformer, relays, opto-isolators, and a 2-wire to 4-wire hybrid. The LU97 chip set dramatically reduces the number of discrete components and cost required to achieve compliance with international regulatory requirements. The CSP1037 complies with AC'97/MC'97 Interface Specification Rev. 2.1.


The chip set is fully programmable to meet worldwide telephone line interface requirements, including those described by CTR21, JATE, FCC, and various country-specific PTT specifications. The programmable parameters of the LU97 chip set include ac termination, dc termination, ringer impedance, and ringer threshold. The LU97 chip set has been designed to meet stringent worldwide requirements for out-of-band energy, billing-tone immunity, lightning surges, and safety requirements.



- Operating system support:
 - Windows 95, 98, 2000
 - PC '99 compliant
 - ACPI compliant
- High-speed data mode capabilities:
 - ITU-T V.90 data rates 28000 bits/s–56000 bits/s
 - ITU-T V.34 extended rates: 33600 bits/s–2400 bits/s V.32terbo, V.32bis, and fallbacks
- FAX mode capabilities:
 - ITU-T V.17, V.29, V.27ter, and V.21 Ch 2
 - TIA/EIA 578 Class 1 FAX
- Video-ready modem interface (VRRM) V.80
- Complete DAA includes the following:
 - AC'97/MC'97 2.1 compliant
 - International line interface
 - Compliant with FCC, CTR21, JATE, and other PTTs
- Applications:
 - Modem riser cards
 - Mobile daughter cards



Modem Chip Sets Provided By
microelectronics group



Lucent Technologies



**The
Lucent
Edge™**

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