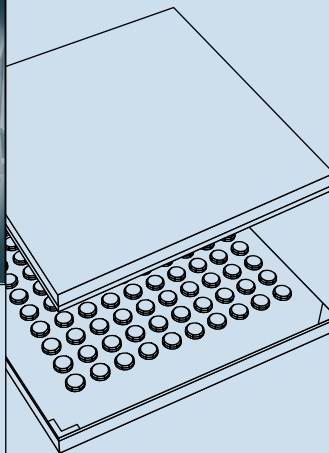# Modems

Conexant offers the most reliable and efficient PC modem chipsets for use in desktops, notebooks, handheld devices, video game consoles, and other personal computing platforms on the market today. Our modem products include V.90/V.92 dial-up modems, ADSL modems, Cable modems, multifunction home networking solutions with V.90/V.92 connectivity and a complete family of audio/communications system devices and advanced audio software modules.

Conexant does not build, sell or support consumer modems. Drivers, other software, installation and application support, repairs and upgrades must be obtained from your modem or computer manufacturer (in the case of pre-installed internal PC modems).

ADSL Modems

Asymmetric Digital Subscriber Line (ADSL) is a modem technology that transforms ordinary phone lines into high-speed digital lines for ultra-fast Internet access. ADSL client products encompass the CPE chipset and PC driver solutions that are optimized to address this growing demand. Our industry leadership has enabled us to bring a variety of solutions to the marketplace. Conexant is a member of the DSL Forum which supports interoperability.

ADSL Customer Premise Equipment

Portfolio of ADSL CPE
In addition to the products described in this section, Conexant offers several variations of its ADSL technology:

- PCI ADSL chipsets
- PCI ADSL/V.92 chipsets
- PCI ADSL/V.92/HomePNA/LAN chipsets
- USB ADSL chipsets
- USB ADSL/V.92 chipsets
- Ethernet/USB ADSL bridge chipsets
- Ethernet/USB ADSL router chipsets
- HomePNA ADSL router chipsets
- Multiport ADSL router chipsets

The unique advantage of this broad portfolio of CPE solutions is the leveraging of a common ADSL core engine (DMT processor, AFE, and Line Driver) across all solutions. This ensures widespread interoperability and strong performance among all of the CPE offerings.

Additionally, driver applications such as Installation Wizard, Control Panel and taskbar application are also leveraged among all USB and Protocol Control Information (PCI) solutions. Likewise, the Ethernet, HomePNA and multiport bridge/router solutions share a common web server for configuration. This synergy allows an OEM to have a common look and feel for all of its CPE solutions across the various form factors. Furthermore, each of the driver applications and web server are completely OEM customizable, including multilanguage support, enabling easy branding and promotion of a portfolio of CPE solutions.

AccessRunner® PCI ADSL Modem Device Set

Full-Rate and G.lite ADSL Modem Delivers End-to-End Internet Connectivity
Conexant's AccessRunner low-power PCI-based ADSL chipset and PC driver solution is optimized to address the growing demand for high-speed Internet access. AccessRunner is a controllerless solution that is fully compliant with both the full-rate ADSL (T1.413 Issue 2 and G.dmt) and the 'splitterless' G.lite (G.992.2)

standards. Compliance ensures that products based on the AccessRunner solution can address the existing installed base and continued deployment of ADSL lines.

Conexant's AccessRunner modem is an "always on" high-speed broadband connection to the Internet. Using existing twisted-pair telephone lines, ADSL technology provides data rates over 100 times the speed of a traditional analog modem, without an interruption in telephone service. With up to 8 Mbps downstream and 1 Mbps upstream data transfer rates, ADSL is the ideal solution for high-bandwidth applications such as access to a corporate network, Internet access, and video delivery. Conexant's ADSL chipsets support the full range of ADSL standards using industry standard Discrete Multitone (DMT) line-code technology. Conexant's versatile ADSL client-side chipset is a cost-effective solution optimized for today's PC market.

Optimized Controllerless ADSL Solution
The PCI ADSL device set consists of a PCI controller, a DMT datapump, an AFE, and a line driver. Using only a fraction of the PC's host processor, this controllerless solution eliminates the need for costly microcontrollers and external memory required in other ADSL modems.

In addition, Conexant's 'softSAR' technology provides the ATM Segmentation and Reassembly (SAR) function as part of the PC driver. However, in order not to unnecessarily burden the host PC and the PCI bus, the idle cell insertion and deletion that takes place when no information is being transferred across the ADSL link is performed as part of the chipset.

Without the need for an external microcontroller or memory, Conexant's AccessRunner is the most cost-effective, optimized solution for the PC environment.

ADSL Drivers
Conexant's PC drivers are designed for use with Windows® 98, Windows® 2000, Windows® ME, Windows® XP, and fully leverage Microsoft's built-in features for the support of ADSL adapter cards. In addition to softSAR functionality, the drivers fully support the recognized standards for Point-to-Point (PPP) over ATM (RFC2364), PPP over Ethernet (RFC2516), Ethernet bridging/routing over ATM (RFC1483), and Classical IP over ATM (RFC1577). A control panel applet is provided for real-time diagnostic information. In addition, hooks are included to allow automatic configuration of the ADSL modem and the drivers.

PCI Controller
The P46 PCI controller is a bridge between the 11627 DMT datapump and the PCI bus. It provides the control, interface, and data manipulation for the datapump, analog front end, and line driver. It is compliant with the PCI 2.2 specification and supports power management.

DMT Datapump

The CX11627 DMT datapump is a T1.413 Issue 2-, G.992.1- and G.992.2-compliant Digital Signal Processor (DSP). The device performs DMT modulation/demodulation, ATM transmission convergence (TC), forward error correction (FEC) encoding/ decoding, data synchronization, and data interleaving. Control and initialization of the datapump is done by the host PC as part of the software drivers.

Analog Front End (AFE)

The CX20431 AFE is designed for use in full-rate and G.lite ADSL modems. The receive path filters out unwanted echo and boosts the wanted signal before performing an Analog-to-Digital (A/D) conversion. The transmit path converts digital data to analog signals and performs a smoothing operation before presenting the signals to the line driver.

Line Driver

The integrated CX20441 line driver is more cost effective and power sensitive than a discrete solution, and is optimized for full-rate and G.lite ADSL modems. It has high bandwidth, low noise and superior linearity.

Features

- ADSL Compliance
  - Full-rate ANSI T1.413 Issue 2 and ITU G.dmt (G.992.1)
  - Splitterless ITU G.lite (G.992.2)
  - DMT modulation and demodulation
  - Rate Adaptive
  - Max downstream 8 Mbps
  - Max upstream 1 Mbps
  - Supports splitterless full rate operation
  - Time detection for low-power mode
  - Dying Gasp
  - Interoperable with all major DSLAMs
- ATM Protocols
  - WAN mode support: PPP over ATM (RFC2364) and PPP over Ethernet (RFC2516)
  - LAN mode support: bridged/routed Ethernet over ATM (RFC1483) and classical IP over ATM (RFC1577)
  - ATM Forum UNI 3.1/4.0 PVC
  - ATM SAR
  - ATM AAL5
  - OAM F4/F5
- PCI Interface
  - Compliant with PCI specification 2.2
  - Supports Power Management
- Operating System Support
  - Windows 95
  - Windows NT 4.0
  - Linux 2.2.16 and 2.4.2

- Windows 98
- Windows 98 SE
- Windows 2000
- Windows ME
- Windows XP
- Driver Applications
  - Windows Control Panel
  - Installation Wizard
  - Task Bar Application
  - All applications are customizable
  - All applications support multiple languages
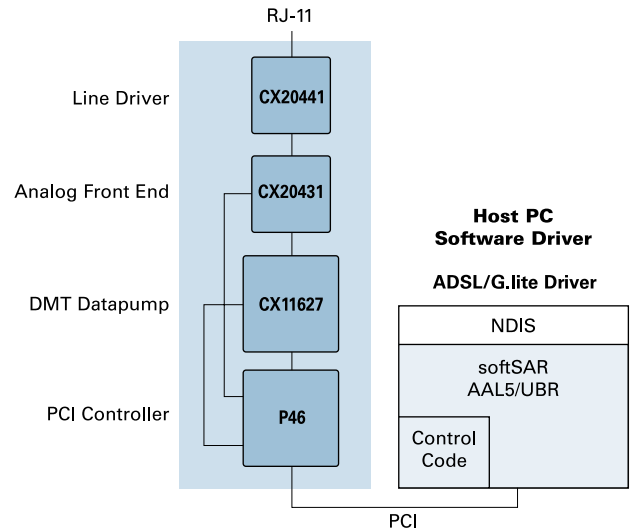
PCI ADSL modem device set and software driver

Part Number	DSAR-L100-309
Description	PCI ADSL Modem Device Set

AccessRunner USB ADSL Modem Device Set

Full-Rate and G.lite ADSL Modem Delivers End-to-End Internet Connectivity

Conexant's AccessRunner USB-based ADSL CPE chipset and PC driver solution is optimized to address the growing demand for high-speed Internet access. With a USB 1.1-compliant interface, it takes advantage of the extreme ease-of-use and Plug-and-Play nature of USB peripherals, making it ideal for both desktop and notebook computers. AccessRunner is fully compliant with both the full-rate ADSL (T1.413 Issue 2 and G.dmt) and the splitterless G.lite (G.992.2) standards. Compliance ensures that products based on the AccessRunner solution can address the existing installed base and continued deployment of ADSL lines.

Conexant's AccessRunner modem is an "always on" high-speed broadband connection to the Internet. Using existing twisted pair telephone lines, ADSL technology provides data rates over

100 times the speed of a traditional analog modem, without an interruption in telephone service. With up to 8 Mbps downstream and 1 Mbps upstream data transfer rates, ADSL is the ideal solution for high-bandwidth applications such as access to a corporate network, Internet access, and video delivery.

Conexant's ADSL chipsets support the full range of ADSL standards using industry-standard DMT line-code technology. The versatile USB ADSL CPE chipset is a cost-effective solution optimized for today's market, which demands ease-of-installation without opening the PC.

The USB interface is specifically designed for quick and easy peripheral installation. Its architecture makes it ideal for high-speed applications like an ADSL modem. With its Plug-and-Play installation and its ubiquitous support among today's PCs, USB is becoming the interface of choice for today's PC users.

USB Controller
Conexant's P52 USB controller is a bridge between the CX11627 DMT datapump and the USB interface. It provides the control, interface, and data manipulation for the datapump, AFE, and line driver, and is compliant with the USB 1.1 specification.

DMT Datapump
The CX11627 DMT datapump is a T1.413 Issue 2, G.992.1, and G.992.2-compliant DSP. The device performs DMT modulation/demodulation, ATM TC, FEC encoding/decoding, data synchronization, and data interleaving. Control and initialization of the datapump is done by the host PC as part of the software drivers.

Analog Front End
The CX20431 AFE is designed for use in full-rate and G.lite ADSL modems. The receive path filters out unwanted echo and boosts the wanted signal before performing an A/D conversion. The transmit path converts digital data-to-analog signals and performs a smoothing operation before presenting the signals to the line driver.

Line Driver
The integrated CX20441 line driver is more cost effective and power sensitive than a discrete solution, and is optimized for full-rate and G.lite ADSL modems. It has highbandwidth, low noise, and superior linearity.

Optimized USB ADSL Solution
This device set consists of a USB controller, a DMT datapump, an AFE and a line driver. The PC drivers use only a fraction of the PC's host processor.

Conexant's softSAR technology provides the ATM SAR function as part of the PC driver. This eliminates the need for a costly dedicated ATM SAR device required in other ADSL modems. However, in order not to unnecessarily burden the host and the

USB, the idle cell insertion and deletion that takes place when no information is being transferred across the ADSL link is performed as part of the chipset.

Without the need for an additional ATM SAR device, Conexant's AccessRunner is the most cost-effective, optimized solution designed for the USB.
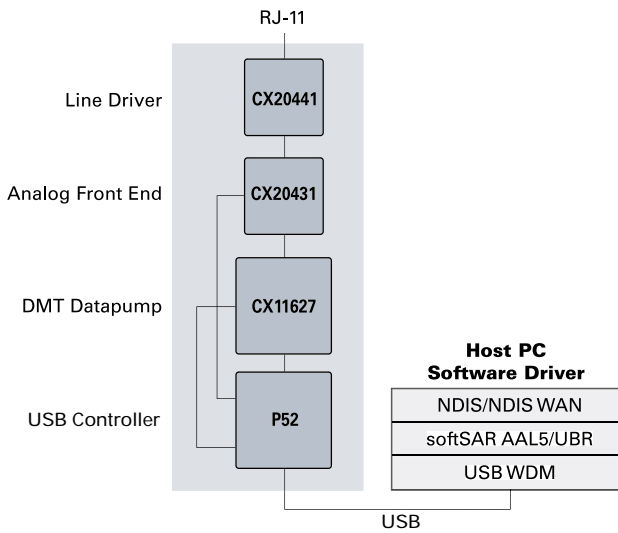
ADSL Drivers
Conexant's PC drivers are designed for use with Windows® 98, Windows® ME, Windows® 2000, and Windows® XP, and fully leverage Microsoft's built-in features for the support of USB ADSL peripherals. In addition to softSAR functionality, the drivers fully support the recognized standards for PPP over ATM (RFC2364), PPP over Ethernet (RFC2516), Ethernet bridging/routing ATM (RFC1483) and classical IP over ATM (RF1577). A control panel applet is provided for real-time diagnostic information, and hooks are included to allow automatic configuration of the ADSL modem and the drivers.

Features
- ADSL Compliance
  - Compliant with ADSL standards
  - Full-rate ANSI T1.413 Issue 2 and ITU G.dmt (G.992.1)
  - Splitterless ITU G.lite (G.992.2)
  - DMT modulation and demodulation
  - Rate Adaptive
  - Max downstream 8 Mbps
  - Max upstream 1 Mbps
  - Supports splitterless full rate operation
  - Time detection for low-power mode
  - Dying Gasp
  - Interoperable with all major DSLAMs
- ATM Protocols
  - WAN mode support: PPP over ATM (RFC2364) and PPP over Ethernet (RFC2516)
  - LAN mode support: bridged/routed Ethernet over ATM (RFC1483) and classical IP over ATM (RFC1577)
  - ATM Forum UNI 3.1/4.0 PVC
  - ATM SAR
  - ATM AAL5
  - OAM F4/F5
- USB Interface
  - Compliant with USB specification 1.1
  - USB full speed (12 Mbps)
  - Vendor specific descriptors
  - Bus-powered
- Operating System Support
  - Windows 98

- Windows 98 SE
- Windows 2000
- Windows ME
- Windows XP
- Plug and Play Installation
- **Driver Applications**
  - Windows Control Panel
  - Installation Wizard
  - Task Bar Application
  - Customizable applications for all drivers
  - All applications support multiple languages

USB ADSL modem device set and software driver

Part Number	DSAR-L100-501
Description	USB ADSL Modem Device Set

AccessRunner Ethernet/USB ADSL Modem Device Set

Full-Rate and G.lite ADSL Modem Delivers High-Speed Internet Connectivity

Conexant's AccessRunner Ethernet/USB ADSL CPE solution is optimized to address the growing demand for high-speed Internet access. With both a USB 1.1-compliant interface and an IEEE 802.3-compliant Ethernet interface, it provides the widest array of connectivity options without relying on host PC drivers. This ADSL solution is not limited by host PC processor speed, operating system or memory configuration. The AccessRunner device set is fully compliant with the full-rate ADSL (T1.413 Issue 2 and G.dmt) and the splitterless G.lite (G.992.2) standards. Compliance ensures that products based on the AccessRunner solution can address the existing installed base and continued deployment of ADSL lines.

Conexant's AccessRunner modem is an "always-on" high-speed broadband connection to the Internet. Using existing twisted pair telephone lines, ADSL technology provides data rates more than 100 times as fast as a traditional dial-up modem delivers, without an interruption in telephone service. With data transfer rates of up to 8 Mbps downstream and 1 Mbps upstream, ADSL is the ideal solution for high-bandwidth applications such as access to a corporate network, Internet access and video delivery.

Conexant's ADSL chipsets support the full range of ADSL standards using industry-standard DMT line-code technology. By automatically selecting the Ethernet or USB interface when the appropriate cable is connected, the dual-interface Ethernet/USB ADSL CPE chipset is a cost-effective, versatile solution that supports all system environments.

Optimized Ethernet/USB ADSL Solution

The Ethernet/USB ADSL device set consists of an ADSL controller, a DMT datapump, an AFE and a line driver. No host PC drivers are required. All software and protocol stacks necessary for ADSL are run in embedded firmware on the ADSL controller.

Web-based Management

All provisioning, configuration and management for the AccessRunner Ethernet/USB modem device set is done via a Web browser. The ADSL controller's integrated Web server allows for user management through a straight-forward and familiar interface. The Web server is fully configurable, allowing OEMs to customize both functionality and appearance. The embedded file system implemented by the ADSL controller simplifies Web server customization, and also enables system upgrades via File Transfer Protocol (FTP).

ADSL Controller

Conexant's P52 ADSL controller contains an integrated USB 1.1-compliant and IEEE 802.3-compliant Ethernet Media Access Control (MAC) interface. The controller is a bridge between the CX11627 DMT datapump and both of these host interfaces. It provides the control, interface and a data manipulation for the datapump, AFE and line driver. ATM SAR functions, as well as encapsulation protocols (i.e., PPP over ATM, classical IP over ATM, bridged/routed Ethernet over ATM, and PPP over Ethernet), are performed by the ADSL controller.

DMT Datapump

The CX11627 DMT datapump is a T1.413 Issue- 2-G.992.1- and G.992.2-compliant DSP. The device performs DMT modulation/demodulation, ATM TC, FEC encoding/decoding, data synchronization and data interleaving.

Analog Front End (AFE)

The CX20431 AFE is designed for use in full-rate and G.lite ADSL modems. The receive path filters out unwanted echo and boosts the wanted signal before performing an A/D conversion. The

transmit path converts digital data-to-analog signals and performs a smoothing operation before presenting the signals to the line driver.

Line Driver

The integrated CX20441 line driver is more cost effective and power sensitive than a discrete solution, and is optimized for full-rate and G.lite ADSL modems. It has high bandwidth, low noise and superior linearity.

Features

- **ADSL Compliance**
  - Compliant with ADSL standards
    - Full-rate ANSI TI.413 Issue 2 and ITU G.dmt (G.992.1) standards
    - Splitterless ITU G.lite (G.992.2) specification
  - DMT modulation and demodulation
  - Full-rate adaptive modem
    - Maximum downstream rate of 8 Mbps
    - Maximum upstream rate of 1 Mbps
  - Tone detection for low power mode
  - Supports splitterless ADSL implementation
  - Supports Dying Gasp
  - Interoperable with all major DSLAM equipment
- **ATM Protocols**
  - WAN mode support: PPP over ATM (RFC 2364) and PPP over Ethernet (RFC 2516)
  - LAN mode support: bridged/routed Ethernet over ATM (RFC 1483) and classical IP over ATM (RFC 1577)
  - ATM Forum UNI 3.1/4.0 PVC
  - Up to 8 VCs (virtual circuits)
  - ATM SAR (segmentation and reassembly)
  - ATM AAL5 (adaption layer type 5)
  - OAM F4/F5
- **Bridge Mode**
  - Ethernet to ADSL self learning Transparent Bridging (IEEE 802.1D)
  - Supports up to 128 MAC learning addresses
- **Router Mode**
  - IP routing-RIPv2
  - Static routing
  - DHCP (dynamic host configuration protocol) server and client
  - NAPT (network address and port translation)
  - NAT (network access translation)
  - ICMP (Internet control message protocol)
  - Simultaneous Ethernet and USB operation

- **Security**
  - User authentication for PPP
  - PAP (password authentication protocol)
  - CHAP (challenge authentication protocol)
  - Password-protected system management
- **Ethernet Interface**
  - IEEE 802.3 compliant
  - 10/100 Mbps
- **USB Interface**
  - Compliant with USB Specification, Revision 1.1
  - USB full speed (12 Mbps)
  - Vendor-specific descriptors
- **HTTP Web-Based Management**
  - Firmware upgrade via FTP
  - Customizable Web pages
  - WAN and LAN side connection statistics
  - Configuration of static routes and routing table
  - Configuration of NAPT
  - Password-protected access
  - Selection of bridge or router mode
  - PPP user ID and password
  - Configuration of VCs (virtual circuits)
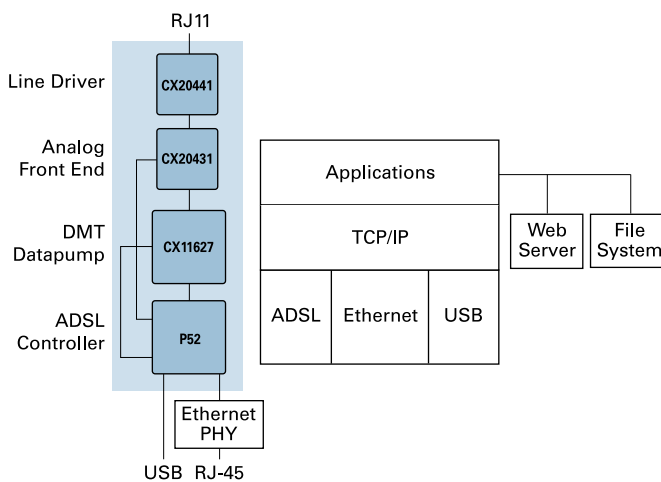
Ethernet/USB ADSL device set and embedded firmware

Part Number	DSAR-L100-519
Description	Ethernet/USB ADSL Modem Device Set

AccessRunner ADSL/V.92/HomePNA 2.0/Ethernet-PCI Modem Device Set

A Four-in-One Solution

Conexant has integrated four of the most commonly used communications technologies — ADSL, V.92, home phoneline

networking and Ethernet — into one robust solution that can support any combination of the four functions concurrently. This solution lets OEMs use just one PCI slot to support all communication needs in the PC.

Our industry leadership has enabled us to bring the first such combination solution to the marketplace. Conexant is a member of the DSL Forum, which supports interoperability. Our V.90/V.92 technology is the leading 56 KBps technology in the world. We are a founding member of HomePNA, an industry group spearheading efforts to create standards-based products for easy-to-use, reliable and affordable home connectivity.

Conexant's SuperComms™ Architecture

This solution is based on Conexant's SuperComms architecture, which enables board manufacturers and PC OEMs to combine communications functions in a single board. The SuperComms architecture uses a PCI bus interface, buffering and an arbiter to manage all the interrupt handling for ADSL, V.92 modem connectivity, HomePNA, and Ethernet operations.

PCI Controller

Conexant's P51 PCI controller is a bridge between the PCI bus and the other devices. It integrates the system-side device for V.92, DSL interfaces, and incorporates 2 MACS for HomePNA and Emulated Local Area Network (ELAN). The P51 complies with the PCI 2.2 specification and supports power management.

DMT Datapump

The CX11627 DMT datapump is a DSP that complies with T1.413 Issue 2, G.992.1 and G.992.2. The device performs DMT modulation/demodulation, TC, forward error correction (FEC), encoding/decoding, data synchronization and data interleaving. The software drivers enable the host PC to control and initialize the datapump.

Analog Front End

The CX20431 AFE is designed for use in full rate and G.lite ADSL modems. The receive path filters out unwanted echo and boosts the wanted signal before performing an A/D conversion. The transmit path converts digital data-to-analog signals and performs a smoothing operation before presenting the signals to the line driver.

Line Driver

The integrated CX20441 line driver is more cost effective and power sensitive than a discrete solution, and is optimized for full rate and G.lite ADSL modems. It has high bandwidth, low noise and superior linearity.

HomePNA 1.0 or 2.0 Physical-Layer Analog Front End

The combo modem supports either of the specifications proposed by the HomePNA 1.0 (1 Mbps) or HomePNA 2.0 (10 Mbps). The phoneline network is an Ethernet-compatible LAN that uses

existing telephone wiring to link computers and devices without interrupting phone service. Products that comply with these specifications and combine home networking with high-speed Internet access will enable users to enjoy networked gaming and share peripherals, files, applications and Internet access over one phoneline. Appliances such as digital TV Set-Top Boxes, Internet phones and digital cameras also can be connected via phoneline.

V.92 Modem with SmartDAA™

The V.90/V.92 data modem receives data at up to 56 KBps, and sends at up to V.34 rates. A V.80 synchronous access mode supports host-controlled communication protocols with H.324 support. The modem solutions also features Wake-on-Ring, Caller ID detection, and digital PBX line protection.

Our silicon Data Access Arrangement (DAA) solution, SmartDAA, replaces a portion of the DAA segment of a modem or other communications device, and provides all of the interface circuitry, off-hook relay, loop current holding, impedance matching and ring detection needed for a complete solution. It is designed to meet domestic and international line-interface requirements.

Based on Conexant's patented Digital Isolation Barrier (DIB) technology, this silicon DAA product eliminates the need for the costly analog transformers, relay and opto-isolators that are typically used in discrete DAA implementations.
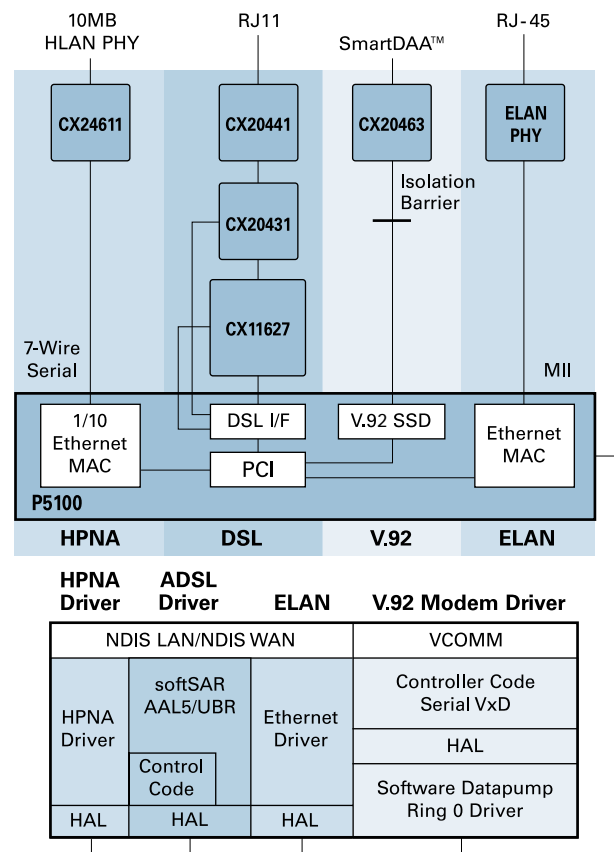
AccessRunner ADSL/V.92/HomePNA 2.0/
Ethernet-PCI modem device set diagram

Features

- **ADSL Compliance**
  - Full-rate ANSI T1.413 Issue 2 and ITU G.dmt (G.992.1)
  - Splitterless ITU G.lite (G.992.2)
  - DMT modulation and demodulation
  - Rate Adaptive
  - Max downstream 8 Mbps
  - Max upstream 1 Mbps
  - Supports splitterless full rate operation
  - Time detection for low power mode
  - Dying Gasp
  - Interoperable with all major DSLAMs

- **ATM Protocols**
  - WAN mode support: PPP over ATM (RFC2364) and PPP over Ethernet (RFC2516)
  - LAN mode support: bridged/routed Ethernet over ATM (RFC1483) and classical IP over ATM (RFC1577)
  - ATM Forum UNI 3.1/4.0 PVC
  - ATM SAR
  - ATM AAL5
  - OAM F4/F5

- **PCI Interface**
  - Compliant with PCI specification 2.2
  - Supports Power Management

- **Operating System Support**
  - Linux 2.2.16 and 2.4.2
  - Windows 98
  - Windows 98 SE
  - Windows 2000
  - Windows ME
  - Windows XP

- **Driver Applications**
  - Windows Control Panel
  - Installation Wizard
  - Task Bar Application
  - All applications are customizable
  - All applications support multiple languages

V.92 Modem

- V.92 data modem with receive rates up to 56 KBps and send rates up to V.34 rates
  - ITU-T V.92, K56flex, V.34 (33.6 KBps), V.32 bis, V.32, V.22 bis, V.22, V.23, and V.21; Bell 212A and 103
  - V.42 LAPM and MNP 2-4 error correction
  - V.42 bis and MNP 5 data compression
  - V.250 and V.251 commands
- V.17 fax modem with send and receive rates up to 14.4 KBps
  - V.17, V.29, V.27 ter, and V.21 channel 2
  - EIA/TIA 578 class 1 and T.31 class 1.0 commands
- V.80 synchronous access mode supports host-controlled communication protocols with H.324 interface support
- V.8/V.8 bis and V.251 commands
- Data/fax call discrimination
- Host software/MMX-based digital signal processing

Home Phoneline Networking

- Supports 1 Mbps HomePNA 1.0 or 10 Mbps HomePNA 2.0
- Uses existing phonelines, no new wires required

Ethernet LAN Interface

- 10 Mbps IEEE 802.3- 10BASE-T-compliant

Part Number	DSAR-L100-422
Description	ADSL/V.92/HomePNA 2.0/Ethernet-PCI Modem Device Set

InfoSurge™ Cable Modems

The Conexant InfoSurge family of cable modem products includes ICs, Software, and Reference Designs to enable manufacturers to develop a complete cable modem solution. The completeness of the product line reduces customers' development risk and time to market with a whole suite of cost effective solutions.

The heart of the InfoSurge family is the single-chip cable modem ICs, which features a programmable network processing engine architecture. This programmability accommodates application specific requirements, worldwide standards including DOCSIS, EuroDOCSIS, Digital Video Broadcast (DVB) and customers' unique intellectual property. Manufacturers can use these base products in developing internal and external PC cable modems as well as Set Top Boxes and residential gateways that support home networking and IP telephony.

InfoSurge Cable Modem IC Solutions

Conexant's InfoSurge IC Solutions support internal and external PC cable modem applications, as well as digital Set Top Boxes and residential gateways that supporting home networking and IP telephony. The CN9414 Single-Chip Cable Modem IC is the only device of its kind to include a programmable MAC layer that can be software-upgraded to support new feature sets and industry standards. When used in conjunction with the CN2811 single-chip digital cable tuner, manufacturers can enjoy a system solution from a single provider that maintains industry-leading efficiency and lowers total product costs.

CX24943 Next Generation Single-Chip Cable Modem IC
The CX24943 Single-Chip Cable Modem IC is Conexant's latest

addition to the InfoSurge™ family of products, which support a variety of broadband applications. The CX24943 builds on the proven architecture of its predecessor and leads the industry in cost-effectiveness—through software programmability, high integration, robust performance, low power, and compact design. Furthermore, its flexible architecture accommodates application specific requirements, worldwide standards, and unique value added features, enabling manufacturers to produce advanced, diverse, yet affordable, consumer premise equipment (CPE) to take advantage of this rapidly expanding market. The CX24943 supports internal and external PC cable modems, home networking gateway products, IP (Internet Protocol) telephony products, and digital set-top boxes. DOCSIS/EuroDOCSIS 1.0/1.1 Cable Modem Reference Designs--based on the CX24943 and CN2811 RF Tuner--are available to qualified customers worldwide.

Features

- High Level of Integration
- Dual sw programmable network-processing engines
- 225 MHz system processor
- Less than 500mW typical power dissipation
- Embedded IEEE 802.3 MAC with MII
- Support for DOCSIS/EuroDOCSIS 1.0/1.1 and Home Networking standards
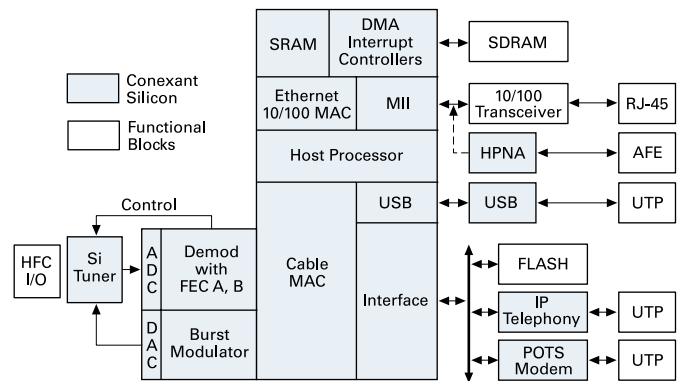
CN9414 Single-Chip Cable Modem

The CN9414 is the first true single-chip cable modem for the

Part Number	CX24943
Description	Next Generation Single-Chip Cable Modem IC

production of cable modem products with 10/100 Ethernet, USB or PCI interfaces. The product's enhanced programmable cable MAC gives the customer the advantage of field upgrades of low-level MAC code to Multiple System Operator (MSO)-required management upgrades. The CN9414 has been designed to not only meet the DOCSIS 1.0 and 1.1 specifications, but also the EuroDOCSIS and DVB specifications.

Features

- Direct IF sampling at 44 MHz and 36 MHz (DOCSIS/EuroDOCSIS/DVB)
- Integrated A/D and D/A
- FEC Annex A, B and support; 12, 17, 34, 51, 68, 102, and 204 (internal)
- Embedded ARM9 HOST microprocessor
- Integrated 10/100 Ethernet MAC with MII
- 12 Mb USB peripheral transceiver
- Low-cost support for 16/64 Mb SDRAM Technology

CN9414 system block diagram

Part Number	CN9414
Description	Single-Chip Cable Modem

CN2811 Digital Cable Tuner RF IC

The CN2811 is a single-chip digital cable tuner. The CN2811 supports both DOCSIS and DVB/DAVIC standards for computer cable modems and Set Top Boxes. The chip provides dual-conversion technology, which offers superior digital performance, reduced tuner systems bill of materials cost and requires no calibration. The tuner converts a 50 — 860 MHz RF signal to an IF signal at either 36 or 44 MHz. The device works seamlessly with Conexant's digital cable transceiver solutions.
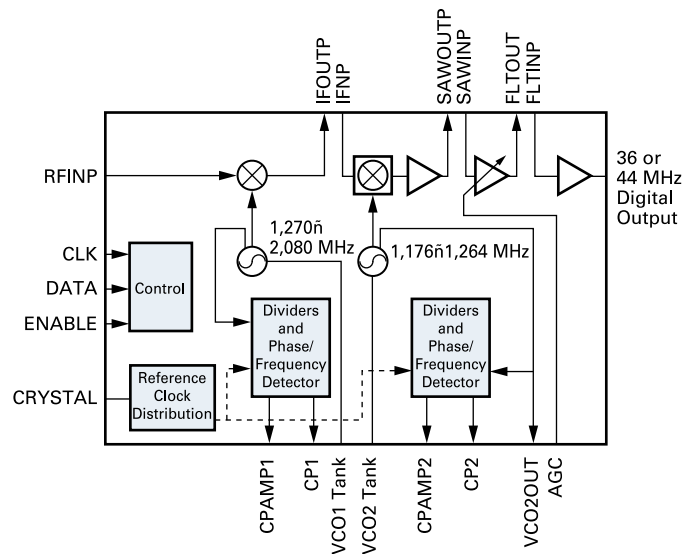
CN2811 functional block diagram

Features

- Single-chip RF to IF CATV receiver
- 50 — 860 MHz frequency band
- 36 — 44 MHz IF output
- Dual conversion architecture meets DOCSIS 1.1 requirements

- 48-pin ETQFP
- Reference designs available

Part Number	CN2811
Description	Digital Cable Tuner RF IC

InfoSurge Cable Modem Reference Designs

Conexant's Cable Modem Reference Designs include all the silicon and software necessary to create a complete subscriber modem that can support all popular worldwide cable-modem standards. Manufacturers can add their own box and branding, while retaining the unprecedented flexibility to software-upgrade their platforms to customize feature sets, support new standards or migrate to future capabilities such as Internet Protocol (IP) telephony and home networking. The heart of the Conexant cable modem reference design is the InfoSurge CN9414 single-chip cable modem IC, the industry's only solution to feature a programmable MAC layer that manufacturers can software-upgrade or re-program to support DOCSIS, EuroDOCSIS, Digital Video Broadcast (DVB) and proprietary cable modem standards.

CN9420CM DOCSIS Cable Modem Reference Design

Conexant's CN9420CM cable modem reference design is a complete DOCSIS external cable modem built upon the InfoSurge family's CN9414 single-chip cable modem integrated circuit. The CN9414's high-degree of integration helps to significantly reduce the overall cost of a cable modem. At the same time, the industry's first programmable cable MAC architecture provides the ultimate in flexibility and upgradeability.

The CN9420CM provides a baseline for a variety of implementations, including DOCSIS 1.0, DOCSIS 1.1, and IP telephony. The CN9420CM may also be used as an effective evaluation platform that provides headers for Joint Test Action Group (JTAG) and RS-232, as well as expandability for BER testing, constellation visibility, and IP telephony.

Features

- InfoSurge CN9414 single-chip cable modem
  - Highest level of integration
  - Programmable MAC architecture
- Complete solution including all software
  - DOCSIS-certifiable code
  - @Home-approvable code
  - WQHL-certifiable Windows drivers
  - Software upgradeable to DOCSIS 1.1
- Support for Ethernet or USB

Part Number	CX9420CM
Description	DOCSIS Cable Modem Reference Design

CX9440CM DOCSIS PCI Cable Modem Reference Design

Conexant's CX9440CM PCI non-host-based cable modem reference design is a complete DOCSIS solution built upon the InfoSurge family's CN9414 single-chip cable modem integrated circuit. The CN9414's high degree of integration helps to significantly reduce the overall cost of a cable modem, while the programmable cable MAC architecture provides the ultimate in flexibility and upgradeability. The CX9440CM offers the industry a path for integrating cable modems inside the PC, opening up new channels and significantly reducing provisioning complexity.

Features

- InfoSurge CN9414 single-chip cable modem offering
  - Highest level of integration for lowest BOM
  - Programmable MAC architecture
- Complete solution including all software
  - DOCSIS-certifiable code
  - @Home-approvable code
  - WHQL-certifiable Windows drivers
  - Linux drivers
  - Software-upgradeable to DOCSIS 1.1
- PC 99-compliant

Part Number	CX9440CM
Description	DOCSIS PCI Cable Modem Reference Design

CX9450CM EuroDOCSIS Cable Modem Reference Design

Conexant's CX9450CM Cable Modem Reference Design is a complete EuroDOCSIS external cable modem built upon the InfoSurge family's CN9414 single-chip cable modem integrated circuit. The CN9414's high-degree of integration helps to significantly reduce the overall cost of a cable modem. At the same time, the industry's first programmable cable MAC architecture provides the ultimate in flexibility and upgradeability.

The CX9450CM provides a baseline for a variety of implementations, including EuroDOCSIS 1.0, EuroDOCSIS 1.1 and IP telephony. The CX9450CM can also be used as an effective evaluation platform that provides headers for JTAG and RS-232, as well as expandability for BER testing and constellation visibility.

Features

- InfoSurge CN9414 single-chip cable modem integrated circuit
- Software-upgradeable to EuroDOCSIS 1.1 (no hardware changes required)
- Complete solution including all software
  - Integrated VxWorks operating system
  - SNMP for network management
  - Baseline privacy for security

- Support for Ethernet or USB
- Low cost

Part Number	CX9450CM
Description	EuroDOCSIS Cable Modem Reference Design

CX9430CM DVB Cable Modem Reference Design

Conexant's CX9430CM is a complete cable modem development kit designed to support the DVB and European Cable Communications Association (ECCA) specifications. The CX9430CM is built upon the InfoSurge family's CN9414 single-chip cable modem integrated circuit. The CN9414's high degree of integration helps to significantly reduce the overall cost of the cable modem. At the same time, the industry's first programmable cable MAC architecture provides the ultimate in flexibility and upgradeability.
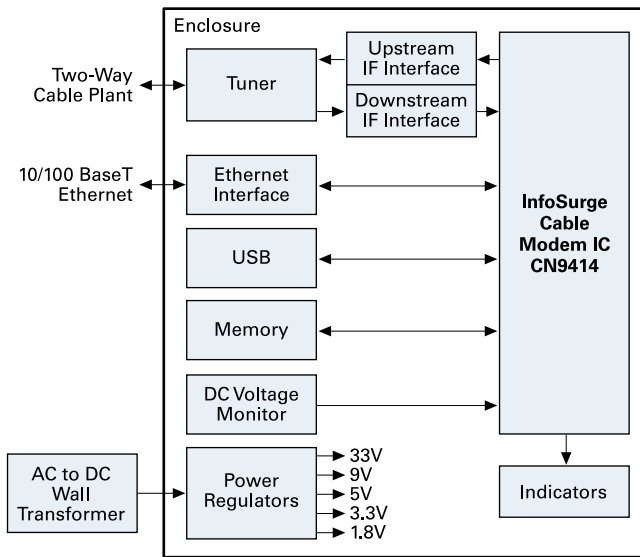
Cable Modem Reference Design block diagram

- Supports DVB and EuroModem Class A standards
- Software-upgradeable to Class B via download from INA
- VxWorks real-time operating system
- SNMP for network management
- API layer definitions for additional stacks enable development of additional applications
- Works with commercially available INAs

Part Number	CX9430CM
Description	DVB Cable Modem Reference Design

CX9421CM DOCSIS Silicon Tuner Cable Modem Reference Design

Conexant's Silicon Cable Tuner Reference Design includes all the hardware and software necessary to evaluate Conexant's silicon tuners for cable applications.

CN2811 EVK Evaluation Kit

Conexant's CN2811 Evaluation Kit (EVK) provides a complete set of tools to evaluate the performance of the CN2811 digital cable tuner. The CN2811 EVK features a dual conversion architecture, DOCSIS and DAVIC compliance, maximum tuner performance for digital applications and a bill of materials cost lower than comparable tuner products. The evaluation kit consists of two reference design boards for the tuner section of a cable modem design. One board supports U.S. applications and the other is designed for European applications.

Part Number	CN2811 EVK
Description	Evaluation Kit

InfoSurge Cable Modem Software Solutions

Conexant's reference kits come with all the software needed to meet DOCSIS 1.0, DOCSIS 1.1, EuroDOCSIS, DVB, @Home and USB WHQL requirements. The software package includes system controller code and peripheral drivers, as well as code for the programmable network-processing engine. Furthermore, royalty-free redistribution rights for the VxWorks operating system, and the SNMP software are included, resulting in significant cost savings. A number of other feature enhancements are available with the software for further product differentiation.
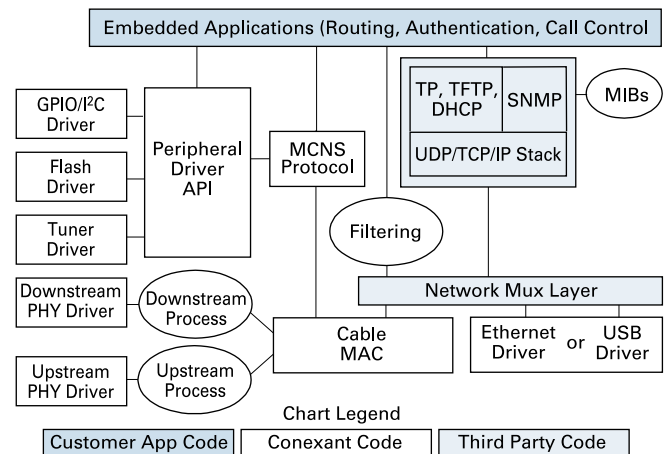
Cable Modem Software block diagram

Fixed Wireless Modems

Conexant's fixed wireless solutions are targeted for the emerging Point-to-Multipoint Markets in the U.S. (MMDS) and internationally (3.5 GHz). As standards are just starting to evolve for these market segments, Conexant's broadband modem ICs offer a high level of flexibility with a fully programmable MAC. Conexant is an active member of various standards bodies that are creating next-generation specifications and products that will offer non-line of sight solutions.

CX24942 Single-Chip Broadband Wireless Modem

The InfoSurge family of products supporting broadband access applications presents the industry with yet another example of Conexant's ability to meet the growing needs of an emerging market segment. The CX24942, Conexant's single-chip broadband wireless modem within the InfoSurge family of products, offers a unique solution supporting worldwide fixed wireless deployment with a multitude of peripheral connections, including Ethernet and USB. The CX24942 supports internal and external PC broadband wireless modem applications, as well as digital Set Top boxes, home networking, and IP telephony products. This unique IC excels in three very important categories when choosing a solution for broadband access applications: cost, performance and flexibility through field programmability.

Features

- Direct IF sampling at 44 and 36 MHz
- Integrated A/Ds and D/As
- FEC A, B and support
- Programmable MAC
- Embedded ARM 9 HOST µP
- Integrated 10/100 Ethernet MAC with MII
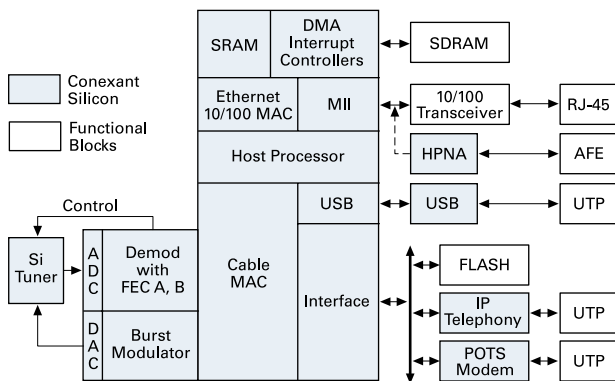
CX24942 system diagram

Part Number	CX24942
Description	Single-Chip Broadband Wireless Modem

CX9470CM Broadband Wireless Modem Reference Design

Conexant's CX9470CM Broadband Wireless Modem Reference Design is a complete external broadband wireless modem built upon the InfoSurge family's CX24942 single-chip broadband modem integrated circuit. The CX24942's high-degree of integration helps to significantly reduce the overall cost of a broadband modem. At the same time, the industry's first programmable MAC architecture provides the ultimate in flexibility and upgradeability, often replacing costly Field Programmable Gate Array (FPGA)-based wireless solutions. The executable firmware provided with the CX9470CM is DOCSIS-certifiable code. Customers can use this code for time-to-market considerations or utilize the flexibility of the programmable MAC and develop standards-based or their own proprietary code.

Features

- InfoSurge CX24942 Single Chip Broadband Modem
  - Highest level of integration
  - Programmable MAC architecture
- Complete solution including all software
  - DOCSIS-certifiable code
  - @Home-approvable code
  - WQHL-certifiable Windows drivers
  - Software upgradeable to DOCSIS 1.1
- Support for Ethernet or USB
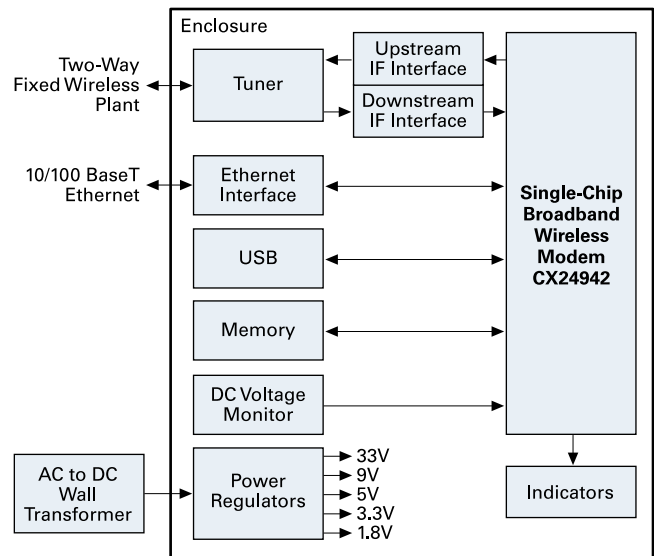
CX9470CM system diagram

Part Number	CX9470CM
Description	Broadband Wireless Modem Reference Design

Dial-Up Modems

Dial-up modems provide Internet access over Public Switched Telephone Network (PSTN) and remain one of the most frequently used ways to go online. We made the world's first dial-up modem in the 1970s, and have shipped millions of them since. Conexant continues to improve dial-up modems, using the V.44 and V.92 technologies.

Controller-Based Modem Solutions

Conexant's SmartSCM,™ with integrated SmartDAA™ technology, offers ease of use and quick time to market for equipment manufacturers worldwide. The SmartSCM device incorporates memories and silicon DAA interface functions into a single device.

In addition to the SmartSCM, Conexant offers the SmartACF™ and SCXXD device sets. The downloadable architecture of SmartACF and SCXXD device sets allows flexibility in updating or customizing modem firmware from the host to the Multipoint Control Unit (MCU). Also supported is the ability to download the DSP code modules transparently to the host/DTE from the MCU. The SmartACF device set features an interface to SmartDAA technology, making it ideal for worldwide solutions.

The Complete Solution
In addition to offering industry-leading modem chipsets, we also provide all the support services you need to integrate our ICs successfully into your applications, and take your products to market.

- Comprehensive costs
- Fast time-to-market
- Dedicated engineering resources
- Worldwide support
- Complete certification services
- Fully integrated solutions
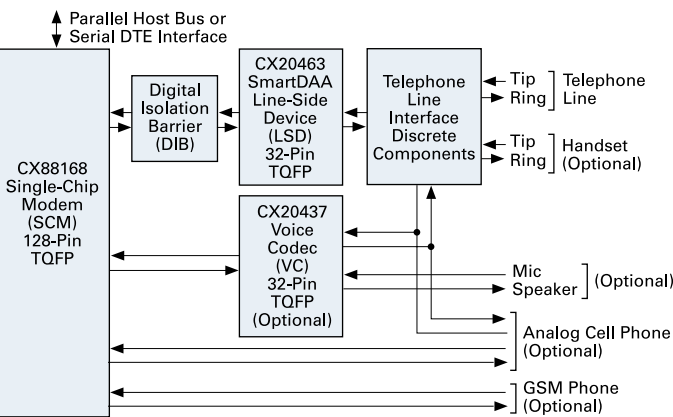
SmartSCM block diagram

Our combination of robust technology and comprehensive support makes Conexant the ideal choice for your dial-up modem design. You make the appliances; we enable them to connect to the Internet and each other.

SmartSCM™ Single-Chip Modem Device

Enabling Communications for Any Platform
Internet connectivity and the ability to transfer and collect data anytime, anywhere has created an explosion of non-PC communication platforms. The SmartSCM, single-chip V.90 modem device set enables quick time-to-market for a wide range of information/Internet appliances. PSTN telephone lines worldwide support analog data at up to 56 KBps, analog fax at up to 14.4 KBps, telephony extensions, voice/speakerphone (optional) and parallel or serial host interface operation.

Highly Integrated Solution
The SmartSCM integrates the modem controller, datapump, memories, and the SmartDAA interface into a single die. The external memory interface can be used for customized modem code and added/modified country profiles executed using external flash ROM, or serial EEPROM and RAM.

The device set consists of the single-chip modem in a 128-pin TQFP package and SmartDAA line side device in a 32-pin TQFP package. The optional voice CODEC, in a 32-pin TQFP package supports voice and full-duplex speakerphone operation with interfaces to a microphone and speaker.

Applications

Set Top Boxes	Email devices
POS terminals	Web tablets
Electronic books	Handheld PCs
Internet phones	Gaming platforms
Metering	Net TVs
Thin clients	MP3 players

SmartDAA Technology
Conexant's SmartDAA technology eliminates the need for costly relay and opto-isolators that are typically used in discrete DAA implementations. It provides all necessary interface circuitry, off-hook relay, loop current holding, impedance matching and ring detection. It is designed to meet both domestic and international line interface requirements, with enough flexibility to meet worldwide regulatory requirements. SmartDAA delivers a host of features, such as:

- Call-waiting detection
- Extension pickup detection
- Line-in-use detection
- Remote hang-up detection

SmartSCM

		SmartSCM/14	SmartSCM/14S	SmartSCM/33	SmartSCM/33S	SmartSCM/56	SmartSCM/56S
Data Modem:	V.90	x	x	x	x		
	K56flex	x	x	x	x		
	V.34	x	x				
	V.32 bis						
	V.32						
	V.22 bis						
	V.22						
	V.23						
	V.21						
	Bell 212A						
	Bell 103						
	V.42LAPM						
	MNP 2-4						
Fax Modem:	V.17	x		x		x	
	V.29						
	V.27 ter						
	V.21ch.2						
Class 1 Fax Commands							
Class 2 Fax Commands							
Features:	FDSP	x		x		x	
	Data/Fax						
	W-Class						
AT Commands							
ADPCM							
Group 3							
T.30 Protocol							
Call Progress							
Caller ID*							
Distinctive Ring							
DTMF/Pulse Dial							
16C550 Bus Interface							
Memory Requirements		nil	nil	nil	nil	nil	nil
Power Required (mW)		470	470	470	470	470	470
Sleep Power		140	140	140	140	140	140
No of Chips: PLCC		x	x	x	x	x	x
PQFP							
CARDBUS		x	x	x	x	x	x
Serial							
Parallel							
PCMCIA/Cardbus		x	x	x	x	x	x
Data Sheet no: 100xxx.		490C	490C	490C	490C	490C	490C
Des. Guide no.		491A	491A	491A	491A	491A	491A

*Caller ID functions available for European Countries on some types.

  supported
x not supported

Part Number	DS56-L145-0xx
Description	SmartSCM Single Chip Modem with SmartDAA

Product Features

- Data
  - ITU-T V.90/K56flex, V.34, V.32 bis, V.32, V.22 bis, V.22, V.23, and V.21; Bell 212A and Bell 103
  - V.42 LAPM and MNP 2-4 error correction
  - V.42 bis and MNP 5 data compression
- Fax
  - Send and receive rates up to 14.4 KBps V.17, V.29, V.27 ter, and V.21 channel 2
  - EIA/TIA 578 Class 1 and T.31 Class 1.0, and EIA/TIA 578 Class 2 commands
  - Advanced Features Include:
    - Concurrent DTMF, ring, and caller ID detection
    - Blacklisting and call progress tone detection
    - Digital PBX detection and protection
    - Extension pickup detection
    - Remote hang-up detection
    - Line-in-use detection
    - Pulse-dialing support
    - Sleep mode
    - V.250 (ex V.25 ter) and V.251 (ex V.25 ter Annex A) commands
    - V.22 bis fast connect
    - Internal ROM includes default values for several countries and TBR21-compliant profiles that can be overridden by values stored in external serial EEPROM or external flash ROM
    - Host Interface: Serial TTL or Parallel

Conexant Intelligent Modems Support V.92

All of Conexant's host-controlled modems support V.92, as do some of the company's new controller-based modems. Because both the client and server modem software require an update to support V.92, compliance with this standard will vary by region and service provider.

SmartACF™ Modem Device Set

Conexant's SmartACF V.92 modem device set with SmartDAA technology enables modem designers to develop a single world-wide modem for desktop PCs, Internet appliances and portable units with minimum design effort. V.92 features quick connect, PCM Upstream and modem-on-hold. This new data-compression protocol delivers data rates 10 percent through 120 percent faster than those achieved by the V.42 bis protocol. The device set supports analog

SmartACF

		SmartACF/14	SmartACF/14S	SmartACF/33	SmartACF/33S	SmartACF/56	SmartACF/56S	SmartACFL56S-PCC
Data Modem:	V.90	x	x	x	x	x	x	x
	V.92							
	V.34	x	x					
	V.32 bis							
	V.32							
	V.22 bis							
	V.22							
	V.23							
	V.21							
	Bell 212A							
	Bell 103							
	V.42LAPM							
	MNP 2-4							
Fax Modem:	V.17							
	V.29							
	V.27 ter							
	V.21ch.2							
Class 1 Fax Commands								
Class 2 Fax Commands								
Features:	AudioSpan	x	x	x	x	x	x	x
	FDSP	x		x		x		
	Data/Fax							
	VoiceView Q61	x	x	x	x	x	x	x
	DSVD V.70	x	x	x	x	x	x	
	W-Class							
	AT Commands							
	ADPCM							
	Group 3							
	T.30 Protocol							
	Call Progress							
	*Caller ID							
	Distinctive Ring							
	DTMF/Pulse Dial							
16C550 Bus Interface								
Memory Requirements		128K x 8 or 256K x 8 ROM						
Power Required (mW)		600	610	600	610	600	610	TBA
Sleep Power		TBA	TBA	TBA	TBA	TBA	TBA	TBA
No of Chips: PLCC		x	x	x	x	x	x	x
	PQFP	3	4	3	4	3	4	4
	CARDBUS	x	x	x	x	x	x	
	Serial							x
	Parallel							x
Data Sheet no: MDxxx		252	252	252	252	252	100	444
Des. Guide no.		1127	1127	1127	1127	1127	1127	tba

*Caller ID functions available for European Countries on some types.
Note. Two memory configurations are possible:
a.) 256K x 8 ROM/FLASH + 128K x 8 RAM (support and download)
b.) 128K x 8 ROM/FLASH + 32K x 8 RAM* (V.32 and V.34 based only)
Note: For Low Power applications please call us for information, the RC56LD family is suitable for PCMCIA/PC card applications.
*Note: New controllers with internal 32K x 8 RAM are available therefore reducing chipcount and PCB area.

    supported
x not supported

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data at up to 56 KBps, analog fax at up to 14.4 KBps, Telephone Answering Machine (TAM)/telephony extensions and voice/speakerphone (optional). The new V.44 standard is also supported.

Quick Connect
This feature approximates the always on connection of broadband access solutions by enabling dial-up modems to complete the modem handshake sequence 30 percent through 40 percent faster than before.

PCM Upstream
Using a new modulation for upstream data (a variation of PCM), V.92 supports a maximum upstream data rate of 48 KBps, as compared to 33.6 KBps for V.90. At the maximum rate, this represents a 40 percent improvement in upstream throughput. Users will also see throughput improvements when uploading digital audio and image files.

Modem-on-Hold
Call waiting is a popular feature offered by many telephone companies around the world. Unfortunately, a call-waiting event may disconnect a modem when it is in use, frustrating the user and often prompting a call to the OEM or ISP support center. Modem-on-hold allows the modem to remain online during a call-waiting event, thereby eliminating the need to redial to get back on the Internet.

SmartDAA
Conexant's proprietary SmartDAA technology eliminates the need for the costly analog transformer, relays and opto-isolators typically used in discrete DAA implementations. The SmartDAA architecture also simplifies product implementation by eliminating the need for country-specific board configurations and enables worldwide homologation of a single modem board design and a single Bill of Materials (BOM).

The system-powered SmartDAA operates reliably without drawing power from the line. Line-powered DAAs, on the other hand, operate poorly when the line current is insufficient due to long lines or poor line conditions. Enhanced features, such as monitoring of local extension status without going off-hook, are also supported. Incorporating Conexant's proprietary Digital Isolation Barrier (DIB) design and other innovative DAA features, the SmartDAA architecture simplifies application design, minimizes layout area and reduces component cost.

Device Details
The SmartACF device set consists of a CX81300 modem controller and DSP (MCD) in a 128-pin TQFP, and a CX20463 SmartDAA line side device (LSD) in a 32-pin TQFP. It supports data/fax/TAM operation with a hardware-based modem controller, digital signal processing, and DAA/telephone line interface functions. The speakerphone option (S models) supports position-independent, Full-Duplex Speakerphone (FDSP) and analog cellular operation.

Product Features

- Data
  - V.92/V.90/V.34/V.32 bis device
  - V.44, V.42 bis and MNP 5 data compression
  - ITU-T V.90/K56flex, V.34, V.32 bis, V.32, V.22 bis, V.22, V.23, and V.21; Bell 212A and Bell 103
  - V.42 LAPM and MNP 2 – 4 error correction
  - V.42 bis and MNP 5 data compression
- Fax
  - Send and receive rates up to 14.4 KBps V.17, V.29, V.27 ter, and V.21 channel 2
  - EIA/TIA 578 Class 1 and T.31 Class 1.0, and EIA/TIA 578 Class 2 commands

Advanced Features:

- Concurrent DTMF, ring, and caller ID detection
- Blacklisting and call progress tone detection
- Digital PBX detection and protection
- Extension pickup detection
- Remote hang-up detection
- Line-in-use detection
- Pulse-dialing support
- Sleep mode
- V.250 (ex V.25 ter) and V.251 (ex V.25 ter Annex A) commands
- V.22bis fast connect

- Internal ROM includes default values for several countries and TBR21-compliant profiles. These can be overridden by values stored in external serial EEPROM or external flash ROM
- Host Interface: Serial TTL or Parallel

Part Number	DS56-L147-0xx
Description	SmartACF Modem Device Set

V.92 Improves the Dial-up Modem Experience

1. Quick connect – This feature approximates the always on connection of broadband access solutions by enabling dial-up modems to complete a connection to an Internet service provider (ISP) significantly faster than with V.90.

2. Modem-on-hold – An incoming call alert allows the modem to go on-hold, allowing incoming calls. When the incoming call is complete, the modem will reconnect using the quick connect method.

3. PCM Upstream – This new modulation method increases the upstream data rate from 33,600 bps to 48 KBps.

4. NetWaiting™ – Features an easy-to-use interface that is configurable through the preferences menu. The user has the ability to specify call options, ignoring all incoming calls, accepting all incoming calls and disconnecting the Internet connection, or screening all incoming calls and prompting the user.

SCXXD Modem Device Set

Conexant's CX06827 single-chip V.92 modem device set enables modem designers to develop modems for desktop PCs and Internet appliances. V.92 features include quick connect, PCM Upstream and modem-on-hold. The new V.44 standard is also supported. This new data-compression protocol delivers data rates 10 percent through 120 percent faster than those achieved by the V.42 bis protocol. The device set supports analog data at up to 56 KBps, analog fax at up to 14.4 KBps, TAM/telephony extensions and voice/speakerphone (optional), and parallel/serial host interface operation, depending on the model.

Because the modem features external firmware, modem designers can update and customize firmware code as needed. In TAM mode, enhanced 2- or 4-bit-per-sample coding schemes at a sample rate of 8 KHz provide flexible format compatibility and allow efficient digital storage of voice/audio. Also supported are 8-bit linear and IMA 4-bit ADPCM coding. This mode supports applications such as digital TAM, voice annotation, and recording from and playback to the telephone line. The speakerphone option (S models), includes a CX20437 Voice CODEC (VC) in a 32-pin TQFP. This option supports position-independent, FDSP operation using microphone and speaker, as well as other voice/TAM applications using handset or headset.

Features

- ITU-T data modem – V.92
- ITU-T V.90, V.34, V.32 bis, V.32, V.22 bis, V.22, V.23, and V.21; Bell 212A and Bell 103
- V.44, V.42 bis and MNP 5 data compression

SmartHCF

		SmartHCF/S-USB	SmartHCF/W	SmartHCF/WS	SmartHCF-USB
Data Modem:	V.90				
	V.34				
	V.32 bis				
	V.32				
	V.22 bis				
	V.22				
	V.23				
	V.21				
	Bell 212A				
	Bell 103				
	V.42LAPM				
	MNP 2-4				
Fax Modem:	V.34	x	x	x	x
	V.17				
	V.29				
	V.27 ter				
	V.21ch.2				
	Class 1 Fax Commands				
	Class 2 Fax Commands	x	x	x	x
Features:	AudioSpan	x	x	x	x
	FDSP		x		x
	Data/Fax				
	VoiceView Q61	x	x	x	x
	DSVD V.70	x	x	x	x
	W-Class				
	AT Commands				
	ADPCM				
	Group 3				
	T.30 Protocol				
	Call Progress				
	*Caller ID				
	Distinctive Ring	x	x	x	x
	DTMF/Pulse Dial				
	16C550 Bus Interface	x	x	x	x
	Memory Requirements	nil	nil	nil	nil
	Power Required (mW)	790	400	400	790
	Sleep Power	<1	160	160	<1
	No of Chips: PLCC	x	x	x	x
	PQFP	4	2	3	3
	PCMCIA/CARDBUS		Optional		
	Serial	x	x	x	x
	Parallel	x	x	x	x
	PCI				
	Data Sheet no 100xxx.	-	-	-	492
	Des. Guide no 100xxx:	492	497	492	493

*Caller ID functions available for European Countries on some types.

Note. Two memory configurations are possible:

a.) 256K x 8 ROM/FLASH + 128K x 8 RAM (support and download) b.) 128K x 8 ROM/FLASH + 32K x 8 RAMª

Note: For Low Power applications please call us for information, the RC56LD family is suitable for PCMCIA/PC card applications.

ª Note: New controllers with internal 32K x 8 RAM are available therefore reducing chipcount and PCB area.

  supported
x not supported

- V.42 LAPM and MNP 2 – 4 error correction
- V.250 and V.251 commands
- Fax modem send and receive rates up to 14.4 KBps
- V.17, V.29, V.27 ter, and V.21 channel 2
- EIA/TIA 578 Class 1 and T.31 Class 1.0, and EIA/TIA 578 Class 2 commands
- Downloadable architecture
- Caller ID detection
- Call progress, blacklisting
- Caller ID and distinctive ring detect
- Telephony/TAM
- FDSP mode using optional CX20437 voice CODEC (S models)
- Parallel 16550A UART-compatible interface
  - Serial ITU-T V.24 (EIA/TIA-232-E) logical interface
- Direct mode (serial DTE interface)
- Flow control and speed buffering
- Automatic format/speed sensing
- Serial async/sync data; parallel async data
- CX06827 ACF: 144-pin TQFP
- CX20437 VC: 32-pin TQFP (for S models only)
- Available in V.34 and V.32 bis modems in pin-compatible packages

Applications

Desktop modems

Remote monitoring and data collection system

Standalone TAM/fax machines

Set Top Boxes

Internet appliances

Part Number	DS56-L144-301
Description	SC56D Modem Device Set (Aftermarket)
Part Number	DS56-L147-021
Description	SC56D Modem Device Set (Embedded)
Part Number	DS28-L147-021
Description	SC336D Modem Device Set
Part Number	DS96-L147-021
Description	SC144D Modem Device Set

Controllerless-Based Modem Solutions

The Conexant SmartHCF Host-Controlled (aka Controllerless PCI) V.90 Modem Device Family with SmartDAA technology supports analog data up to 56 KBps, analog fax to 14.4 KBps, Telephone Answering Machine (TAM), voice/speakerphone (optional), worldwide Data Access Arrangement (DAA) interface (optional),

and PCI Bus interface operation. The modem operates with PSTN telephone lines in the U.S. and optionally, worldwide. Conexant's USB modem solution takes the V.92/V.90 modem chipset family one step further to provide an inexpensive, easy-to-use, campact external modem.

SmartHCF™ Modem Device Set

The SmartHCF device set, consisting of a P9573 Host Side Device (HSD) in a 100-pin TQFP and a 20463 SmartDAA Line Side Device (LSD) in a 32-pin TQFP, supports data/fax/TAM operation with hardware-based digital signal processing and DAA/telephone line interface functions. The optional 20437 Voice CODEC (VC), in a 32-pin TQFP, supports voice/FDSP operation with interfaces to a microphone, speaker, and telephone handset/headset. In V.90 data mode, the modem can receive data at line speeds up to 56K from a digitally connected V.90-compatible central site modem. In this mode, the modem can transmit data at line speeds up to V.34 rates.

This modem device set is pin-compatible with the SmartHSF modem, which supplies similar functionality with host MMX-based signal processing.

Conexant's SmartDAA proprietary technology eliminates the need for a costly line transformer, relays, and opto-isolators typically used in discrete DAA implementations. The SmartDAA architecture also simplifies product implementation by eliminating the need for country-specific board configurations. This enables worldwide homologation of a single modem board design.

The SmartDAA system-powered DAA operates reliably without drawing power from the line, unlike line-powered DAAs which operate poorly when line current is insufficient due to long lines or poor line conditions. Enhanced features, such as line-in-use detection, are also supported. Incorporating Conexant's proprietary Digital Isolation Barrier (DIB) design (patent pending) and other innovative DAA features, the SmartDAA architecture simplifies application design, minimizes layout area, and reduces component cost.

In V.34 data mode, the modem operates at line speeds up to 33.6 KBps. When applicable, error correction (V.42/MNP 2-4) and data compression (V.42 bis/MNP 5) maximize data transfer integrity and boost average data throughput. Non-error-correcting mode is also supported.

Part Number	DS56-L511-011
Description	SmartHCF/S-USB
Part Number	DS56-L152-061
Description	SmartHCF/W V.92 Modem
Part Number	DS56-L152-071
Description	SmartHCF/WS V.92 Modem

Fax Group 3 send and receive rates are supported up to 14.4 KBps with T.30 protocol. V.80 synchronous access mode supports host-controlled communication protocols, e.g., H.324 video conferencing. Audio recording and playback over the telephone line interface using A-Law, μ-Law, or linear coding at 8 KHz sample rate supports applications such as remote digital TAM.

SmartHCF USB Modem Device Set

Conexant's SmartHCF Universal Serial Bus (USB) modem solution takes the V.90 modem chipset family one step further to provide an inexpensive, easy-to-use, compact external modem. With the addition of Conexant's SmartDAA technology, the SmartHCF USB modem enables system designers to have a single worldwide solution for a truly global, low-cost external modem with USB connectivity for desktop and mobile PCs, requiring minimal design efforts.

The SmartHCF USB modem chipset takes advantage of the USB's power management capability, enabling our customers to lower their costs by eliminating the need for an external power supply. Furthermore, the SmartDAA includes remote hang up, extension off-hook, and call-waiting detection support, as well as digital PBX line protection.

Conexant's SmartHCF USB chipset consists of three devices:
- Conexant USB Interface Device (UID)
- Conexant P93 datapump
- Conexant 20463 SmartDAA technology

Features
- ITU-T V.90 and K56flex modem
- Compliant with USB 1.1 specification
- Support for Windows® 98 and Windows® 2000
- USB power management
- Low-cost external solution
- Incorporates SmartDAA technology
- Full featured (V.90, fax and voice)
- Fax Class 1

Conexant supplies USB drivers for Windows® 98 and Windows® 2000, which includes support for power management features that allow the PC to go into suspend mode, and then resume when there is a wake-up event. Conexant's SmartHCF USB solution brings the

Internet to the desktop at V.90 speeds and is packed with features such as Fax Class 1 support and telephone answering machine functionality. SmartDAA technology reduces design costs by eliminating many of the discrete devices that are needed for a traditional discrete DAA. This allows modem designers to homologate a single worldwide design, enabling a quicker time to market.

Modem reference kits are available to help OEM partners accelerate their time to production.

Features

- USB Modem
  - ITU-T V.90 and K56flex
  - V.34 (33.6 KBps), V.32 bis, V.32, V.22 bis, V.22, V.23, and V.21; meets Bell 212A 1200 bps and 103 300 bps standards
  - V.42 LAPM, MNP 2-4, and MNP 10 error correction
  - V.42 bis and MNP 5 data compression
  - Group 3 fax modems supporting V.17 14400/12000/9600/7200 bps, V.29 9600/7200 bps, and V.27 ter 4800/2400 bps transmit/receive, V.21 Channel 2 300 bps transmit and receive
  - Fax Class 1
  - Communication software compatible AT command sets
  - Complies with ITU V.250
  - Complies with ITU V.253
  - Voice/TAM support
- UID
  - Compliant with USB 1.1 specification
  - On-chip PLL
  - On-chip full-speed USB transceivers
  - Remote wake-up and power management
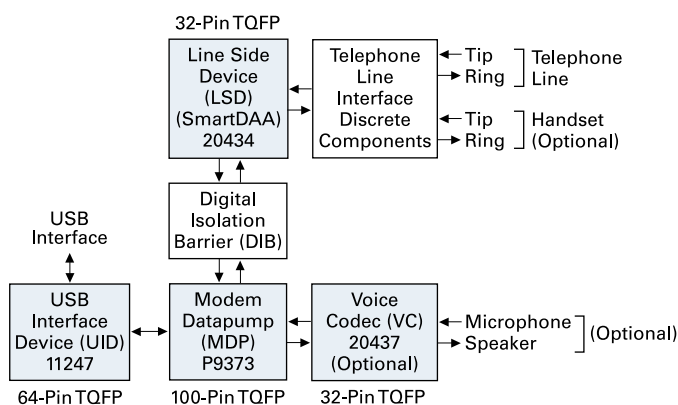
SmartHCF USB modem simplified interface diagram

Part Number	DS56-L511-001
Description	SmartHCF/S-USB V.92 Modem with SmartDAA

CNH56D-USB Modem Device Set

Host-Controlled V.90/K56flex™ Modem Device Set with USB Interface Device (CX11247) and Modem Datapump (R6789) for USB Applications

The Conexant CNH56D-USB Host-Controlled Modem Device Family supports high-speed analog data, 14.4 KBps fax, TAM, and optional Speakerphone (SP) operation. The modems operate with PSTN telephone lines world-wide.

The modem is packaged in a 2-device set consisting of a CX11247 USB Interface Device (UID) in a 64-pin TQFP and an R6789 Modem Datapump (MDP) in a 100-pin Plastic Quad Flat Pack (PQFP). Host-controlled modem software is also provided.

Operating with a +5V power from the USB, this device set supports applications in such designs as external USB modems. Downloadable architecture allows updating of MDP executable code.

All models support remote audio recording and remote audio playback over the telephone line interface using A-Law, μ-Law, or linear coding at 8.0 KHz sample rate to support applications such as digital TAM and voice annotation. The SP model supports position independent, FDSP. Fax Group 3 send and receive rates are supported up to 14.4 KBps with T.30 protocol. V.80 synchronous access mode supports host-controlled communication protocols. e.g., H.324 video conferencing.

A reference design kit in electronic form is available to minimize application design time and costs.

Features

- V.90 data/V.17 fax modem
- Data/Fax/Voice call discrimination
- Hardware-based Digital Signal Processor (DSP)
- Full-duplex Speakerphone mode (SP model)
- Worldwide operation
- Industry standard communication commands
- USB features
  - Universal Serial Bus Specification Rev. 1.1-compliant
  - USB full speed (12 Mbps)
  - Suspend/Resume
  - Vendor specific descriptions
- Four LED driver outputs
- System compatibilities
  - Windows 98, Windows 2000
  - Microsoft PC 98- and PC 99-compliant
- V.80 synchronous access mode
- Thin packages that support low profile designs

Applications

USB external modems

Part Number	DS56-L510-001/011
Description	CNH56D-USB Host-Controlled USB V.92 Modem Device Set

Soft Modem-Based Solutions

Conexant's line of software modem solutions are proven, reliable products with cumulative shipments exceeding 31 million units to over 60 countries worldwide. Drawing on Conexant's modem technology development, we deliver the latest V.92 features to enhance the end user's Internet experience. Extensively tested in Conexant's TBR-21-accredited laboratories in France, our PCI, USB and AC-Link products are backed by the company's 20-year history in modem innovations.

HSFi Modem Device

The Conexant CX11252 (HSFi) Host-Processed V.92/V.90 Modem supports V.92 and V.90 analog data modem operation with V.44 data compression and supports 14.4 KBps fax modem operation. In addition, the modem supports remote TAM, soft speakerphone and PCI/Mini Bus interface operation. The modem operates with PSTN telephone lines in the U.S./Japan/Canada and worldwide.

The CX11252 alone supports an analog interface to an OEM-provided DAA. This configuration supports data/fax/TAM and software speakerphone. Discrete input/output lines interface to off-hook relay control and ring detection circuits. This is the lowest-cost solution for operation in the U.S./Japan/Canada/China/South America/CTR21 (TBR21). The countries supported are defined by the OEM-provided DAA.

Optimized to provide the lowest-cost design in the price-sensitive modem markets, the CX11252 is ideally suited for host-processed PCI/Mini PCI Bus-based desktop or mobile applications such as motherboards, system boards and plug-in cards.

The CX11252 incorporates the following circuits internally to reduce the application board BOM cost:

- An internal voltage regulator allows operation in +5 V PCI systems without requiring an external regulator.
- An internal power switching circuit detects and selects operation from one of three power sources: PCI +5 V, PCI +3.3 V, or Vaux +3.3, which may be available in different combinations to a modem from a PC. This allows a single modem configuration to be used with different PCI-based PC designs.

- An internal ringwake filter eliminates the need for an external diode/resistor/capacitor circuit.

The external EEPROM may be removed; contact the local sales office for possibility.

The CX11252 integrates all digital and analog circuits into a single Very Large Scale Integration (VLSI) die packaged in a 100-pin TQFP. Internal digital circuits include PCI Bus interface logic, +5 V voltage regulator, PCI Bus power switching, ROM, RAM, control and status registers, general purpose input/output, internal ring-wake filter, and CODEC interface.

The analog CODEC circuit includes a differential transmit analog output. Modem datapump and controller functions, traditionally implemented in dedicated hardware, are processed in a Pentium MMX-compatible PC using host-signal processing modem software.

Features

- Data Modem
  - ITU-T V.92, V.90, K56flex, V.34, V.32 bis, V.32, V.22 bis, V.22, V.23, and V.21; Bell 212A and Bell 103
  - Quick connect
  - Modem-on-hold
  - V.250 and V.251 commands
- Data compression
  - V.44 data compression for optimal downloading of Internet Web data
  - V.42 bis/MNP 5 data compression
  - V.42 LAPM/MNP 2 – 4 error correction
- Fax Modem
  - V.17, V.29, V.27 ter, and V.21 ch 2
  - EIA/TIA 578 Class 1 and T.31 Class 1.0 commands
- Telephony/remote TAM
  - V.253 commands
  - 8-bit µ-Law/A-Law coding (G.711)
  - 8-bit/16-bit linear coding
  - 8 KHz sample rate
  - Concurrent DTMF detect, ring detect and Caller ID
- V.80 synchronous access mode with H.324 interface support
- V.8/V.8 bis and V.251 commands
- Data/Fax call discrimination
- Internal circuits eliminate external components
  - EEPROM
  - +5 V to +3.3 V voltage regulator
  - PCI +5 V, PCI +3.3 V power switching circuit
  - Ringwake eliminating external diode/resistor/capacitor circuit

SmartHSF

	SmartHSF	SmartHSF/MC-PCI	SmartHSF/MCWS-PCI	SmartHSF/MS-PCI	SmartHSF/MWC-PCI	SmartHSF/MWS-PCI	SmartHSF/W
Data Modem: V.90							
K56flex							
V.34							
V.32 bis							
V.32							
V.22 bis							
V.22							
V.23							
V.21							
Bell 212A							
Bell 103							
V.42LAPM							
MNP 2-4							
Fax Modem: V.34	x	x	x	x	x	x	x
V.17							
V.29							
V.27 ter							
V.21ch.2							
Class 1 Fax Commands							
Class 2 Fax Commands	x	x	x	x	x	x	x
Features: AudioSpan	x	x	x	x	x	x	x
FDSP	x	x			x		x
Data/Fax							
DSVD V.70	x	x	x	x	x	x	x
W-Class	x	x		x			
AT Commands							
ADPCM							
Group 3							
T.30 Protocol							
Call Progress							
Caller ID*							
Distinctive Ring	x	x	x	x	x	x	x
DTMF/Pulse Dial							
16C550 Bus Interface	x	x	x	x	x	x	x
Memory Requirements	nil	nil	nil	nil	nil	nil	nil
Power Required (mW)	TBA	150	150	150	150	150	150
Sleep Power	TBA	7	7	7	7	7	TBA
No of Chips: PLCC	x	x	x	x	x	x	x
PQFP	2	2	3	3	2	3	2
CARDBUS	x	474	474	474	474	474	x
Serial	x	x	x	x	x	x	x
Parallel	x	x	x	x	x	x	
PCI							
Data Sheet no.	-	474	474	474	474	474	-
Des. Guide no.	1220	473	473	473	473	473	1220

*Caller ID functions available for European Countries on some types.

Note. Two memory configurations are possible:

a.) 256K x 8 ROM/FLASH + 128K x 8 RAM (support and download)

b.) 128K x 8 ROM/FLASH + 32K x 8 RAM[a]

Note: For Low Power applications please call us for information, the RC56LD family is suitable for PCMCIA/PC card applications.

[a] Note: New controllers with internal 32K x 8 RAM are available therefore reducing chipcount and PCB area.

   supported
x not supported

- Worldwide operation
  - Complies to requirements of TBR21 and all other countries
  - Caller ID detection, Call progress, blacklisting

Part Number	DS56-L483-021
Description	HSFi Host-Processed Modem Device

SmartHSF Modem Device Set

The Conexant SmartHSF Host-Processed (SoftK56™) V.90 PCI Modem Device Family with SmartDAA technology supports analog data up to 56 KBps, analog fax to 14.4 KBps, TAM, and PCI Bus/Mini PCI host interface operation. In addition, the device set optionally supports cellular phone interface (PDC high speed/PDC packet data, PHS data, CDMA/CDMA Packet data, GSM data) or voice/speakerphone. These modem devices meet the size and power requirements of the mobile environment. The modem operates with PSTN telephone lines in the U.S./Japan/Canada and, optionally, worldwide. Optional cellular interface supports Japanese Personal Digital Cellular (PDC) and Personal Handyphone System (PHS) phones, Global System for Mobile Communications (GSM) phones, and cdmaOne (IS-95A/IS-95B) phones. Modem and cellular data protocol software is provided.

Conexant's SmartDAA proprietary technology eliminates the need for a costly line transformer, relays, and opto-isolators typically used in discrete Data Access Arrangement (DAA) implementations. The SmartDAA architecture also simplifies product implementation by eliminating the need for country-specific board configurations enabling worldwide homologation of a single modem board design.

The SmartHSF device set, consisting of a CX11242 HSD in a 100-pin TQFP and a CX20463 SmartDAA LSD in a 32-pin TQFP, supports data/fax/TAM operation with host software-based digital signal processing and cell phone/DAA/telephone line interface functions.

The optional CX20437 VC, in a 32-pin TQFP, supports voice/FDSP operation with interfaces to a microphone, speaker, and telephone handset/headset. Because some cellular interface signals and CX20437 VC interface signals share the same CX11250 HSD pins, speakerphone configuration does not support the cellular interface. In V.90 data mode, the modem can receive data at speeds up to 56 KBps from a digitally connected V.90 compatible central site modem. In this mode, the modem can transmit data at speeds up to V.34 rates.

In V.34 data mode, the modem operates at line speeds up to 33.6 KBps. When applicable, error correction (V.42/MNP 2-4) and data compression (V.42 bis/MNP 5) maximize data transfer integrity

and boost average data throughput. Non-error-correcting mode is also supported.

Fax Group 3 send and receive rates are supported up to 14.4 KBps with T.30 protocol. V.80 synchronous access mode supports host-controlled communication protocols, e.g., H.324 video conferencing. Audio recording and playback over the telephone line interface using A-Law, μ-Law, or linear coding at 8 KHz sample rate supports applications such as remote digital TAM.

Part Number	DS56-L155-1xx
Description	SmartHSF Modem Device Set

SmartMC II™/SmartAMC™ and AC-Link Modem Device Sets

Conexant Offers a Family of AC-Link Modem and Audio/Modem Devices to Support Mobile and Desktop PC Applications

Conexant's SmartMC II™ and SmartAMC™ system solutions provide the lowest system costs, improved time-to-market and enhanced features and performance. The product family includes all the necessary hardware and software (algorithms and drivers) required to support modem-only or audio/modem solutions. The Conexant AC-Link system solutions support a wide range of architectures including MDC card or Mini PCI designs using the Conexant RipTide™ digital controllers, and motherboard designs using either the Conexant RipTide™ digital controllers or core logic solutions incorporating digital audio and modem support.

Motherboard designs include desktop solutions using the Advanced Communications Riser (ACR), Audio Modem Riser (AMR) or Communications Network Riser (CNR) connectors, and notebook designs using the Mobile Daughter Card (MDC) or Mini PCI connector, or custom form factors. Conexant played an important role in the definition of the AMR and MDC specifications and has helped define the majority of core logic solutions introduced on the market.

Motherboard configurations using the ACR, AMR, CNR, MDC or Mini PCI architectures simplify the modem homologation process by allowing the card to be certified independent of the actual system motherboard design. These architectures also support the ability to remove all analog circuitry from the motherboard, leading to higher-quality audio and reduced motherboard complexity.

The SmartMC II and SmartAMC system solutions meet the PC 99 System Design Guide specifications, offering significant benefits such as better overall system performance and standards based power-management support.

These solutions provide all the features of Conexant's industry-leading SoftK56 software modem. The communications control code for the SmartMC II and SmartAMC are also equivalent to other Conexant modem products. This common control code allows OEMs that have already tested the HSF modem with their standard applications to move quickly into production with the SmartMC II and SmartAMC. In addition to standard modem features, all three chipsets offer Caller ID, enabling users to identify the source of incoming calls. The chipsets also feature Wake-On-Ring functionality, allowing PCs in a low-power, suspended state to automatically turn back on after receiving a phone call. This unique feature enables PCs to receive incoming messages that they would otherwise miss. Conexant's modem CODEC fully supports Intel's AC 97 version 2.1 specification, designed to help PC manufacturers adopt new modem technologies more quickly and cost-effectively. Conexant collaborated with Intel to develop this specification, and contributed key modem technology.

Because the modems are software based, they can be upgraded for value-added features such as standards, simply by downloading the appropriate drivers.

SmartMC II Modem Device Set

The SmartMC II modem CODEC device set supports analog data communications at up to 56 KBps, analog fax at 14.4 KBps, and voice/remote TAM. SmartMC II also supports AC-Link (AV 97) operation for ACR, AMR and CNR interface and MDC and Mini PCI applications. Enhanced features, such as monitoring of local extension status without going off-hook, are also supported. The device set consists of a Host Side Device (HSD) in a 48-pin TQFP, and a LSD in a 32-pin TQFP.

SmartAMC Modem Device Set

Conexant's SmartAMC audio modem CODEC device supports analog data at up to 56 KBps, analog fax at 14.4 KBps, voice/remote TAM functionality, and a 90dB SNR.

SmartAMC also enables AC-Link operation for ACR, AMR and CNR interfaces, and MDC or Mini PCI applications. The SmartAMC also supports the following enhanced features: Monitoring of local extension status without going off-hook; voice/remote TAM; HRTF;

A3D; EAX 1.0/2.0; Conexant Player; enhanced speakerphone; and voice over games. The device set consists of a HSD in a 48-pin TQFP, and a line side device LSD in a 32-pin TQFP.

Features

- Core Logic Support
  - ICH (Intel)
  - VIA
  - ALI (Acer Labs)
  - SIS

Advanced Power Management

- Fax Modem
  - V.17, V.29, V.27 ter, and V.21 ch 2

- EIA/TIA 578 Class 1 and T.31 Class 1.2 commands

- Voice, telephony (TAM and SP models)
  - TIA-695 command set
  - 8-bit m-Law/A-law/linear coding
  - 8000 Hz sample rate
  - TAM support with concurrent DTMF detect, ring detect and Caller ID

- V.80 synchronous access mode supports host-controlled communication protocols
  - H.324 interface support

- V.8/V.8 bis and AT commands

- (V.25 ter with Annex A)

- Full-Duplex Speakerphone (FDSP) mode
  - Loop gain control, transmit and receive path AGC

- Data/Fax/Voice call discrimination

- Multi-country support
  - Call progress, blacklisting

- Caller ID single profile stored in host

- System compatibilities
  - Windows 95, Windows 95 OSR2, Windows 98, Windows NT 4.0, Millennium, Windows 2000 operating systems
  - Microsoft's PPC 98 Design Initiative-compliant
  - Unimodem/V compliant

- AC-Link
  - AC97 2.1
  - ACR 1.0
  - AMR1.01
  - CNR 1.0
  - MDC 1.0
  - Mini PCI 1.0

- Supports PCI bus power management
  - ACPI power management registers
  - PME APM support

- +3.3 V operation with +5 V tolerant digital inputs

- +5 V or +3.3 V analog operation

SmartAMC

- Combined Audio/Modem CODEC (AMC)
  - AC 97 CODEC V.21-compliant (AMC 97)

- Audio
  - Stereo full-duplex CODEC with 18-bit resolution
  - Six audio analog input channels
  - Three audio analog output channels
  - 3-D spatialization
  - Delta-Sigma Converts for enhanced performance
  - High-quality SRC
  - Digital mixing
  - HRTF-3D (A3D)
  - EAX 1.0/2.0
  - Conexant's Endless Wave Technology

- Full-duplex speakerphone (FDSP) mode (SP models)
  - Switching to/from data, fax and DSVD
  - Microphone gain and muting
  - Speaker volume control and muting
  - Adaptive acoustic, line and handset echo cancellation concurrent with DSVD
  - Acoustic echo cancellation concurrent with DSVD

- Device packages
  - SmartAMC: 48-pin TQFP

SmartMC II

- Device packages:
  - SmartMC II: 48-pin TQFP
  - LC in 32-pin TQFP

Part Number	DSAC-L300-201
Description	SmartMC II Modem Codec
Part Number	DSAC-L500-001
Description	SmartAMC Audio Modem Codec

Controllerless Embedded Modem Solutions

Internet connectivity and the ability to transfer and collect data anytime, anywhere has created an explosion in non-PC communication platforms. TRISIGNAL's Phantom™ embedded control code supports data speeds up to 56 KBps using the V.90 or V.92 standard. Its modem control code (call setup, error connection, compression, fax, etc.) is highly-structured and portable, to allow rapid migration to different processors.

Embedded Modems Featuring TRISIGNAL's Phantom™ Embedded Control Code

The TRISIGNAL embedded control code is also easily ported to various operating systems due to its OS Abstraction Layer. Below are currently supported processors and operating systems that may be mixed and matched depending on customer needs:

Processors	Operating Systems
MIIPS 4000	Windows CE
SH3	BeIA
SH4	VxWorks
Power PC	QNX
Pentium	Palm OS
Geode	PSOS
Elan	Linux
StrongARM	Windows 9X and Windows 2000

These solutions are licensed in either object or source code to customers for inclusion in their target product application. The licenses provide all necessary modem code and engineering support for layout and optimization assistance to ensure high modem performance. The code used in these designs has an installed base approaching 20 million units and is well proven and tested. Typically, a customer licensing a Conexant/TRISIGNAL modem design can have the modem section ported and functional on prototypes within a few weeks.

All TRISIGNAL designs come with everything you need to embed the modem. The designs include full electrical schematics, complete BOM and a production kit. TRISIGNAL also ensures that its code is ported and runs successfully on your final hardware and operating system.

Conexant, partnered with TRISIGNAL, can provide a controllerless modem design depending on customer requirements. These embedded modem designs have been integrated into leading consumer appliances such as the Sony eVilla, JVC Interlink, Sega Dreamcast, HP Jornada, NEC MobilePro, and Compaq Aero.

Supported Devices Include:

Set-Top Boxes	Internet Phones
Email Devices	Gaming Platforms
POS Terminals	Metering
Remote Data Collection	NetTVs
Web Tablets	Thin Clients
Electronic Books	MP3 Players
Handheld PCs	Internet Radios/Jukeboxes

Features

- V.44 data compression
- Call waiting detection
- CID Type I
- CID Type II (where available)
- Suitable for Serial, PCI, Cardbus, PCMCIA and embedded platforms
- Full duplex V.90 or V.92 operation with line probing and automatic fallback to other V Series modems
- Automatic Speed Select establishes connection at highest common speed
- Automatic Error Control establishes connection at highest possible error correction level
- Full call progress monitoring
- Serial speeds to 460.8 KBps
- Comprehensive local and remote diagnostics, local analog loopback, local analog loopback with self test, local digital loopback, remote digital loopback, remote digital loopback with self test
- Asynchronous operation at all speeds

- Compatible with GSTN 2-wire telephone network or leased line
- MNP levels 2 to 5 with automatic fallback capabilities
- High-performance V.42/V.42 bis capabilities
- Programmable transmit level from 0 dBm to -20 dBm
- Automatic answer and redial functions
- Tone and pulse dialing
- 10 telephone number storage in non-volatile memory
- Compatible with most popular communication packages
- Security mode/Password access
- Flash memory upgradeable
- Compatibility
  - ITU V.90 (56000 bps)
  - ITU V.34 (up to 33600 bps)
  - ITU V.32 bis (14400 bps, 12000 bps, 9600 bps, 7200 bps)
  - ITU V.32 (9600 bps, 4800 bps)
  - ITU V.17 (14400 bps, 12000 bps, 9600 bps, 7200 bps)
  - ITU V.29 (9600 bps, 7200 bps)
  - ITU V.27 ter (4800 bps, 2400 bps)
  - ITU V.23 (1200/75 bps)
  - ITU V.22 bis (2400 bps, 1200 bps)
  - ITU V.22 and Bell 212A (1200 bps)
  - ITU V.21 (300 bps)
  - Bell 103 (300 bps)
- Extended, industry standard "AT" command set
  - ITU V.25
  - ITU V.25 bis
  - ITU V.42 error correction
  - ITU V.42 bis data compression
- MNP level 2 through 5 error correction (inclusive)
- International DAA and related controller code
- Options
  - MNP10
  - KEY Encryption
  - H.324 suite (DSVD, V.8, V.8bis, V.80, V.25ter)
  - Error Control
- Data Compression
  - ITU V.42bis compression protocol
  - V.42bis EC
  - MNP 5
  - Fax Functionality

ModemXpert™

Today, most users buy computers primarily so they can connect to the Internet. More PCs feature internal modems — such as Conexant's industry-leading controllerless and software modems — so that users can go online as soon as they take their systems out of the box. Going online is usually a painless process, but can be difficult, especially for novice users. Finding the cause of a problem is a challenge in itself, since it may lie with the PC, the modem,

the telephone line or the Internet service provider. Users who have problems merging onto the information superhighway call their PC OEMs for support, which at $15 to $25 per call, directly subtracts from the OEM's bottom line. (In fact, Internet connection problems will account for an increasing percentage of support calls — and the cost of those calls continues to rise.) Sufficiently frustrated users may even return their PCs, resulting in lost sales. To help your end-users make the most of their Web experience, Conexant introduces ModemXpert, part of the V.Next family of modem features. This innovative application helps users troubleshoot any problems they experience connecting to the Internet with Conexant modems.

Diagnostic programs are usually designed by third-party companies. As a result, they are often generic, addressing only the most common modem features and issues. But ModemXpert was designed by Conexant. With more than 30 years of modem experience, we are able to anticipate the kinds of difficulties that your end-users may encounter. In fact, ModemXpert is the most powerful diagnostic program in the industry because it is actually part of the modem software driver design. As a result, ModemXpert addresses common problems and complaints such as:

- No dial tone
- Low throughput
- No connects
- Dropped connects

It also allows for accurate hardware tests prior to the return (and the associated costs) of a functional modem. An automatic Windows-based program is not only comprehensive, it is also easy to use. In fact, it's automatic. When ModemXpert detects a connection problem, it pops up instantly to help users resolve the problem. Furthermore, the program is intuitive, so it helps even novice users establish or regain their Internet connections.

ModemXpert gives users the assistance they need, when they need it. Pre-emptive alerts assist end-user problem resolution. Because ModemXpert detects and solves Internet-connection problems automatically, it reduces the need for users to call you for technical support. Even if users do decide to call you, this valuable product can help them describe their problems more accurately to your support representatives, resulting in faster and more accurate service. In either case, ModemXpert increases customer satisfaction and helps you minimize your post-sale support costs.

In addition, because satisfied users are more likely to keep the computers they buy, ModemXpert minimizes returns — in particular, those due to falsely perceived modem malfunctions. This low-cost solution greatly enhances the value of the modem and, thus, the PC. In the process, it increases customer satisfaction and builds your bottom line. ModemXpert is available for license at $0.25 per copy.

V.92 – The New Standard

V.92 is the new International Telecommunication Union (ITU) standard that improves the dial-up modem experience in three ways: quicker handshake time, faster upstream data rate and modem-on-hold.

Quick Connect
This feature approximates the always-on connection of broadband access solutions by enabling dial-up modems to complete a connection to an Internet Service Provider (ISP) significantly faster than with V.90.

Preliminary tests show that, on average, connect times are 30 percent through 40 percent faster with V.92 than with V.90. ISPs will benefit from the time savings because they log millions of sessions every day.

Quick connect works by "training" the client modem on the first call. Analog characteristics and digital impairment information are captured in a profile stored on the local disk drive or, for external modems, in RAM. The V.92 modem looks for this local profile and checks whether the server modem is V.92-capable. If it is, the V.92 modem proceeds with the quick connect handshake.

PCM Upstream
Using a new modulation for upstream data (a variation of Pulse Code Modulation [PCM]), V.92 supports a maximum upstream data rate of 48 KBps, as compared to 33.6 KBps for V.90. At the maximum rate, this represents a 30 percent improvement in upstream throughput. Users will also see throughput improvements when uploading digital audio and image files.

Modem-on-Hold
Call waiting is a popular feature offered by many telephone companies around the world. Unfortunately, a call waiting event will disconnect a modem when it is in use, frustrating the user and often prompting a call to the OEM or ISP support center. Modem-on-hold allows the modem to remain online during a call waiting event, and thereby reduces user frustration and support costs. Computer users who must share an RJ-11 jack with the phone will see two benefits. First, the modem will not be disconnected due to a call waiting event. Second, the user does not have to stay off the Internet to wait for an important phone call. The converse is also true; the user can stay connected to the Internet and make an outgoing phone call. After the voice call is complete, the user continues surfing the Net. In this way, modem-on-hold approximates another feature of broadband, because the user can make and receive phone calls while staying connected to the Internet.

NetWaiting™

For customer convenience, Conexant bundles a modem-on-hold application called NetWaiting. The NetWaiting applet supports the following features:

- Intercept MOH events triggered by the modem drivers, through the API supplied by the modem manufacturer
- If calls are screened, prompt user for a decision when a incoming call shows up, (with display of the Caller-ID or friendly name, if present): Accept call and put modem on hold, or reject call and continue Internet session. If the session is not a V.92 session, then accepting the call will automatically terminate the Internet session
- Display of the remaining time before making a decision on the incoming call (V.92 only)
- Display the on-hold remaining time allotted by the ISP and let the user either disconnect the Internet connection or hang up the call and resume the Internet session
- Allow the user to place outgoing calls by putting the modem on hold if an Internet connection is engaged
- Allow the user to configure the behavior of the applet through a "Preferences" menu:
  - Enable/disable MOH (immediate action)
  - Specify per call options: Ignore all incoming calls, Accept all incoming calls and disconnect Internet connection, Screen all incoming calls and prompt the user (active at the next Internet session)
  - Ability to edit a friendly name table to display Caller-IDs in a meaningful way for the user (immediate action)

V.44 – New Data-Compression Protocol

V.44 is a new data-compression protocol that delivers data rates 10 percent through 120 percent faster than those achieved by the existing V.42 bis compression protocol.

Faster Browsing

The most popular activity on the Internet is browsing, and this is where V.44 delivers the greatest improvement over V.42 bis, so users can enjoy speeds up to 120 percent faster than with the older protocol. Popular sites such as Amazon.com and eBay use highly compressible HTML files, so online shopping is faster than ever. V.44 also increases data throughput for email (by 27 percent), Word documents (by 21 percent), Power Point files (by 10 percent), and C source files (by 45 percent).

Conexant Intelligent Modem Devices Support V.44

All of Conexant's host-controlled modems support V.44, as do some of the company's new controller-based modems.

Because both the client and server modem software require an update to support V.44, compliance with this standard will vary by region and service provider.