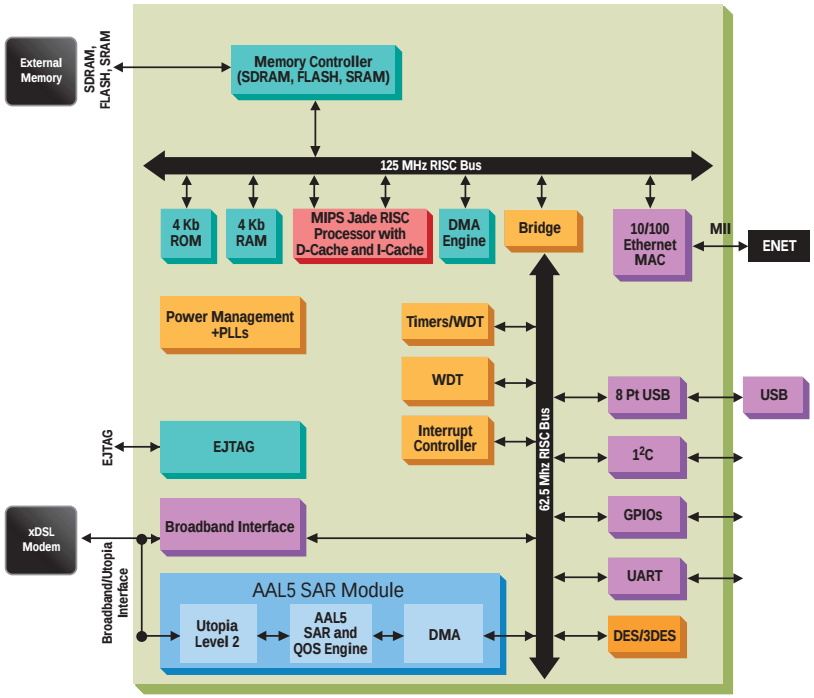
Product Bulletin

AR5 Chipset Family

ADSL Router, Integrated Access Device and Residential Gateway Chipset Solutions



AR5D01 DSL Communications Processor
A superior architecture, including a 32-bit RISC processor and a high-performance DSP, provides outstanding throughput for best-in-class routing and low voice latency.

Key Features:

- Integrated Silicon and Software Solutions (ISSS) for ADSL routers, integrated access devices and residential gateways
- Complete, programmable family of communications processors yields greater return on investment for OEMs
- Open software platform enables customer-specific value-added features and functions
- Full support of home network interfaces enhances flexibility
- Turnkey Linux-based software suite plus VxWorks Board Support Package (BSP)
- AX5-based PHY support for ITU G.992.1 (full-rate G.dmt) and G.992.2 (G.lite)
- IPSEC stack for virtual private network (VPN) termination
- Field-proven Telogy Software™ VoDSL (VoIP + VoATM) product
- Passes DSL Forum TR-048 working with all commonly deployed DSLAMs

The new family of AR5 Asymmetric Digital Subscriber Line (ADSL) Router, Integrated Access Device (IAD) and Residential Gateway (RG) Chipset solutions from Texas Instruments (TI) provide manufacturers with the flexibility and scalability required to address the growing need for efficient distribution of ADSL services throughout homes and small offices. The three complete, programmable AR5 chipsets offer Integrated Silicon and Software Solutions (ISSS) that enable original equipment manufacturers (OEMs) to develop ADSL products quickly and cost-efficiently, while also adding their own intellectual property for product differentiation.

Home routers, IADs and voice-over DSL (VoDSL) gateways based on TI's AR5 chipsets will allow consumers to network multiple PCs and Internet appliances, manage multiple Internet accounts and have increased access to entertainment and business services such as streaming audio-video, real-time video conferencing and virtual private network (VPN) security.

Three Complete Solutions for Greater Flexibility

The AR5 chipset family is made up of three high-performance programmable solutions. Each solution consists of a DSL communications processor plus a common two-chip physical layer (PHY).

- The AR5D01 ADSL Chipset supports high-speed data transfer only. The AR5D01 is based on the TNETD5301 DSL Communications Processor, which integrates a MIPS™ R-4000 32-bit Reduced Instruction Set Computing (RISC)

core, a TMS320C54™ digital signal processor (DSP) core, Asynchronous Transfer Mode (ATM) segmentation and reassembly (SAR) performed in hardware, and numerous key interfaces for home networking. It is targeted at low cost, high performance ADSL routers for the consumer market.

- The AR5V10 ADSL Chipset supports high-speed data transfer plus up to four VoDSL phone lines. The AR5V10 chipset is based on the TNETD5310 DSL Communications Processor.
- The AR5V20 ADSL Chipset supports high-speed data transfer plus up to eight VoDSL lines. The AR5V20 is based on the TNETD5320 DSL Communications Processor, which integrates the same functionality as the TNETD5310, along with a second C5400 DSP core.

The common two-chip AX5 PHY includes:

- The TNETD5100 ADSL Transceiver, a programmable TMS320C6000™ DSP-based engine dedicated to high-speed ADSL transmission and reception.
- The TNETD5014 ADSL Codec and Line Driver/Receiver, a highly integrated ADSL analog front end (AFE) with support for both full-rate G.dmt and G.lite.

Included with the chipset is TI's industry-leading system and development software and Telogy Software™, the de facto standard in voice-over Internet protocol (VoIP). In addition, the chipset fully supports both Linux and VxWorks, providing industry-standard host accessibility. These ISSS enable the development of ADSL routers, IADs and RGs that will be the cornerstone of networked homes and offices in the future.

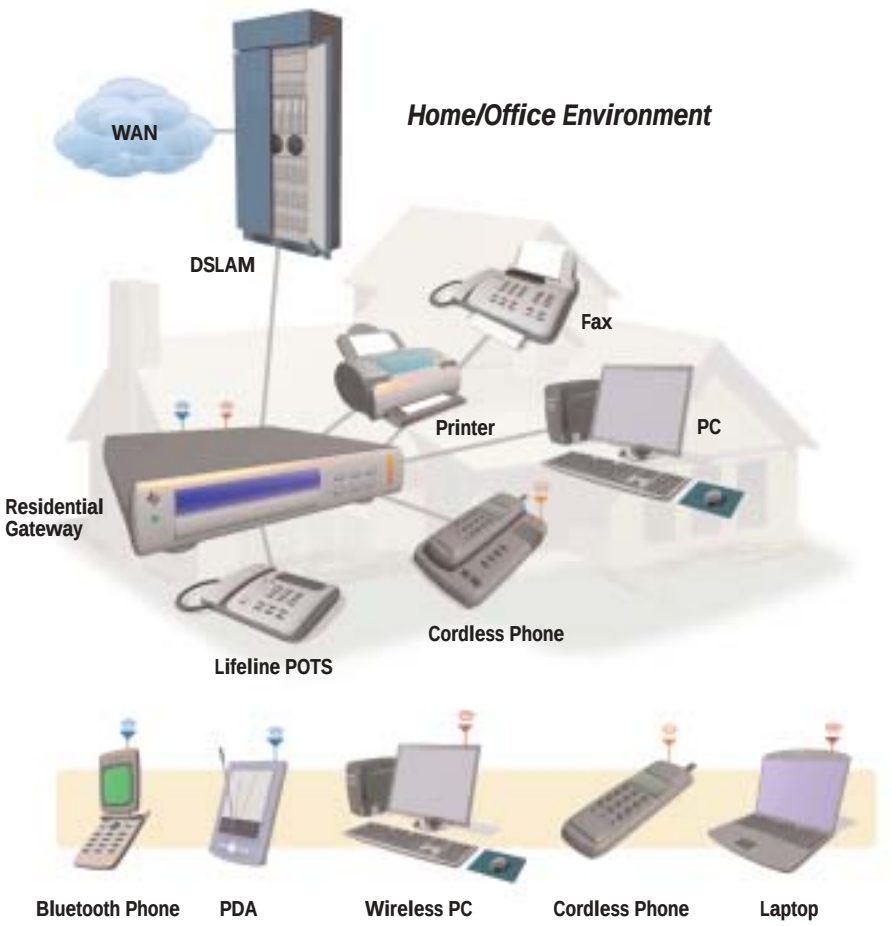
AR5 Addresses Multiple Market Segments

	Home Router	SOHO Router	SME Router	RG	SOHO Gateway	IAD	SME Gateway
AR5D01	D	D	D				
AR5V10				DV (4)	DV (4)	DV (4)	
AR5V20						DV (8)	DV (8)

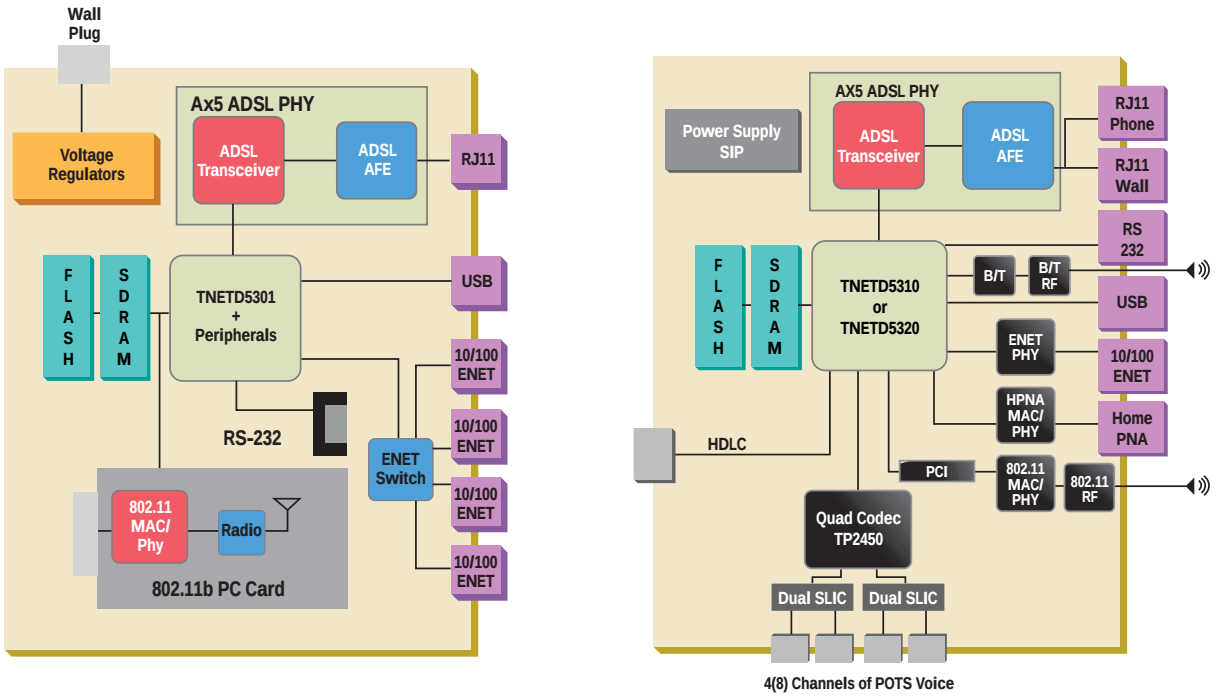
D = data DV(4) = data + 4 channels voice DV (8) = data + 8 channels voice

Extending TI Technology

The new family of AR5 products expands TI's widely used ADSL portfolio with advanced solutions targeted at the rapidly growing market for residential and office DSL networking. The chipsets combine TI's leadership DSP and analog technology with premier networking software and systems expertise. In addition, all TI ADSL products are rigorously tested in local exchange carrier (LEC) labs and in the field for interoperability with competitive solutions.



The versatile AR5 chipset family supports home and office networking IADs and RGs offering a wide variety of wired and wireless services.



The flexible AR5 design can be utilized in 4-port wireless router applications. It can also function as a gateway, supporting 4 or 8 channels of POTS voice + data.

The AR5 family leverages four earlier generations of programmable ADSL PHY products that support G.dmt and G.lite deployment in all major phone networks. Since the chipsets are based on TI's new DSL communications processor, they enable OEM-specific value-added features and functions for greater return on investment.

The Key to Residential and Office Networking

Providing both data and voice, IADs and RGs offer the key link between today's separate communications services and tomorrow's converged services. In the near future, voice, data and video will enter the home and office through a single intelligent access point, then diverge to different locations via wired and wireless media.

The AR5 chipset family offers a compact, easy-to-design solution that reduces development cost and shortens time-to-market, yet provides the versatility to add a wide variety of features for different products. Future generations of TI ADSL residential chipsets will integrate greater functionality into smaller solutions that provide even more application flexibility.

A High-Performance Solution

The AR5's superior architecture provides best-in-class routing performance for fast packet delivery and low voice latency for higher speech quality. Hardware-assisted encryption supports IPSEC for VPN termination, providing security with speed. Multichannel ATM support is provided by a dedicated hardware function for SAR with firmware quality of service (QoS) support.

Networking versatility comes from a variety of interfaces that provide connection to wired and wireless Ethernet, Universal Serial Bus (USB), High-Level Data Link Control (HDLC), Home Phoneline Network Alliance (HPNA), Bluetooth™ and other wireless local area network (WLAN) devices.

Industry's Leading Voice Solution

The AR5V10 and AR5V20 chipsets include a complete, unmatched software solution for voice that has been fully integrated and tested. The solution is based on Telogy Software for low bit rate (LBR) delivery of toll-quality voice via packet transport. Full support for VoIP and Voice-over Asynchronous Transfer Mode (VoATM) is provided, in addition to Channelized Voice-over DSL (CVoDSL). The modular voice solution offers a robust application program interface (API) for value-added product differentiation. The industry's largest installed customer base has proven the success of TI's voice solution in the field.

Operating system (OS) support includes the Linux Reference Design Software Package (RSP) and both Linux and VxWorks™ Platform Support Packages (PSP). The flexibility and ease of use provided by these industry-standard OS interfaces help make applications more portable, allowing developers to quickly address different market segments and manufacturer preferences.

In-Depth Design Support

TI makes development of systems based on the AR5 chipset family much faster with in-depth support. Hardware support includes the AR5D reference design and the AR5 evaluation module (EVM) for data and four voice channels, which demonstrate how the chipset can be used in systems ranging from simple ADSL routers to high-end IAD/RGs with wireless home networking.

TI Products for ADSL Systems

The AR5 chipset family is designed to interface seamlessly with other TI devices in a VoDSL system. To compliment the AR5V chipsets, TI offers a POTS (plain old telephone service) solution for voice over broadband featuring quad- and dual-channel programmable codecs that integrate key analog linecard functionality onto a single device. The codec, when used with Intersil's Dual Ringing Subscriber Line Interface Circuit (SLIC), provides a flexible, low-power solution that simplifies system design and lowers manufacturing costs. The TP2450 quad- and TP2250 dual-channel codecs can be used in any CPE application. They provide complete coding/decoding and voiceband filtering, include software for call processing, and support line testing and signaling functions for up to four independent channels of voice access.

The AR5 platform for VoDSL offers up to eight channels of managed voice.

Other TI solutions extend the functionality of the IAD/RG to home networking. TI's Bluetooth chipset is based on leading wireless process technology to achieve ultra-low power consumption, as well as greater reception range through extremely high sensitivity. TI's 802.11b Wireless Ethernet solution features circuitry designed to minimize noise and distortion, doubling the effective data rate of the system.

In addition, TI offers optimized power management solutions for ADSL routers, IADs and RGs. Options include complete plug-in modules tailored for the AR5 chipsets, as well as discrete power devices for flexibility. See the Power Management website at: **power.ti.com**

For More Information

To learn more about the AR5 chipset family and TI's other leadership DSL products, contact your local TI field sales office or visit: **www.ti.com/rd/dslgateway** Find out how the high performance and flexibility of TI's AR5 chipsets can enhance your next ADSL router, IAD or RG design.

AR5 Chipset Family

AR5D

- Programmable 125-MHz MIPS32™ R-4000 32-bit "Jade" RISC processor with instruction/data cache and memory management
- ATM SAR hardware with QoS firmware scheduler provides 32 channels of AAL5
- 56- and 40-bit encryption with IPSEC hardware assist for security
- Supports shared and arbitrated Utopia and Xbus interfaces for TI DSL and cable modem solutions
- High-throughput memory interface including 1x or 1/2x clock SDRAM
- USB function controller
- 1x media-independent interface for Ethernet PHY and/or HPNA MAC/PHY
- Two 1-Mbps Bluetooth-compliant UARTS

AR5V

- Programmable 125-MHz MIPS32™ R-4000 32-bit "Jade" RISC processor with instruction/data cache and memory management
- Programmable 133-MIPS TMS320C54x™ DSP with direct path to SAR for low delay (one DSP in TNETD5310, two DSPs in TNETD5320)
- ATM SAR hardware with QoS firmware scheduler provides eight channels of AAL2 and 32 channels of AAL5
- 56- and 40-bit encryption with IPSEC hardware assist for security
- 32-channel HDLC controller with 2-Mbps time-division-multiplexed (TDM) buffering
- Supports shared and arbitrated Utopia and Xbus interfaces for TI DSL and cable modem solutions
- Glueless interface to TI's TP2450 quad or TP2250 dual voice codec/filter
- High-throughput memory interface including 1x or 1/2x clock SDRAM
- PCI expansion bus for 802.11b wireless LAN
- USB function controller
- 2x media-independent interface for Ethernet PHY and HPNA MAC/PHY
- Two 1-Mbps Bluetooth-compliant UARTS

PHY Devices *(common to all chipsets)*

TNETD5100 ADSL Transceiver

- Programmable 1600-MIPS TMS320C6200™ DSP core with VelociTI™ very-long instruction word (VLIW) architecture performs up to eight 32-bit instructions simultaneously
- 1-Mbit on-chip instruction/data cache with enhanced DMA control for sustained high throughput
- Glueless 32-bit external memory interface to synchronous and asynchronous devices
- Glueless interface to TNETD5014 AFE

TNETD5014 ADSL Codec and Line Driver/Receiver

- Complete AFE integrates 14-bit ADC and DAC, line driver/receiver, TX/RX filter, programmable gain amplifiers and equalizer
- Supports both full-rate G.dmt (ITU G.992.1) Annex A, and G.lite (ITU G.992.2) ADSL transmission
- Coexists with Bluetooth™, Wireless Ethernet (802.11b) and HPNA devices
- Low power consumption

TI Worldwide Technical Support

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