

Product Bulletin

# AR7Wi Wireless ADSL Router



The AR7Wi wireless DSL router design brings together the established technologies of TI's AR7 family of single-chip ADSL solutions with the TNETW1230 MAC/baseband processor, TNETW2522M RF Front End, and optional High Power Secondary Transceiver for 802.11b/g WLAN access points (APs).

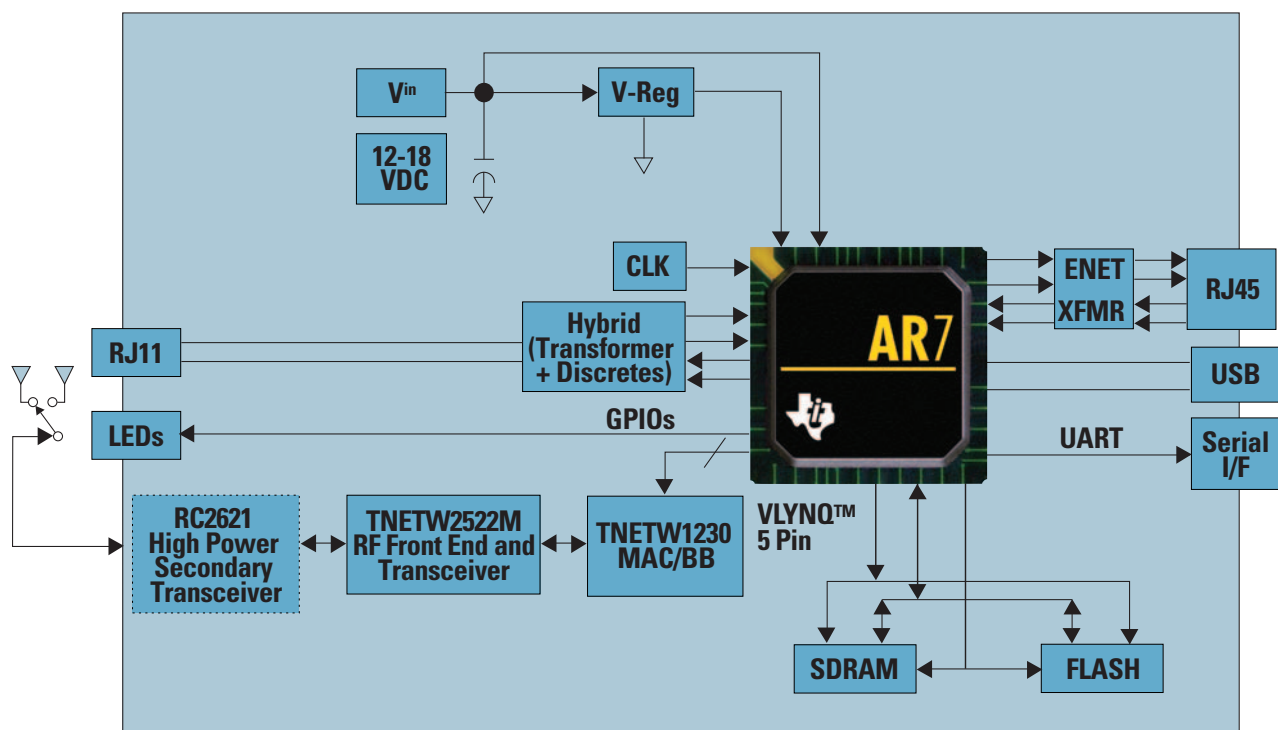
By migrating from an AR7-based standalone modem design to a combined ADSL/802.11 WLAN residential gateway (RG) design, system manufacturers can take advantage of the com-

mon tools, development environments and software support packages shared by both platforms. These efficiencies enable design teams to quickly utilize the same development methodologies to rapidly bring ADSL/802.11 RGs to market. In conjunction with TI's existing client adapter solutions for PC, mini-PCI and embedded applications, the AR7Wi provides manufacturers with a complete solution for wireless connectivity.

With an installed base of more than 50 million DSL ports and 17 million 802.11 WLAN APs and clients, the interoperability, reliability and proven track record

**Key Features:**

- Complete solution for ADSL/802.11b/g wireless gateway with Network Support Package (NSP) software stack support for Linux® OS
- Modular architecture for flexible design and easy adaptation for varied market segments and regional requirements
- Comprehensive reference design includes schematics, layouts, Gerber files, configuration utilities, router software, drivers, technical documentation and application notes
- Easy migration from data only modem/router design to wireless modem/router design
- WLAN data rates higher than 100 megabits per second (Mbps) in 802.11g+ mode
- Dynamic Adaptive Equalization™ (DAE) extends effective reach with higher data rates
- Secondary Transceiver option extends WLAN's effective range
- Comprehensive compliance with all DSL and 802.11 Wi-Fi® standards



of TI's broadband technology provide high-performance in a platform broadly deployed by service providers worldwide.

### **Two Configuration Options**

To satisfy the broad range of market needs, AR7Wi has two available configurations:

- An integrated solution, the AR7Wi, places all of the needed components on the RG's motherboard in less than 2.1 square inches of board space. This level of silicon integration enables bill of materials (BOM) cost efficiencies to be passed through to manufacturers, making for an exceedingly cost-competitive RG in the marketplace. In addition, the relatively low number of components in the AR7Wi simplifies assembly and manufacture, while increasing the design's reliability.
- The other design option, AR7W, involves implementing the RG's 802.11 WLAN functionality on a mini-PCI mezzanine card plugged into the ADSL motherboard. With this approach, RG manufacturers can still take advantage of the AR7 software environment, including its roadmap to future upgrades, while maintaining the option to select vendors who supply the mezzanine card and radio. In addition, the AR7W design gives manufacturers added options for specifying the location of the mezzanine card to accommodate back panel and enclosure considerations.

### **Software Environment**

Both AR7Wi configuration options offer the same robust software environment, featuring extensive operating system (OS) support, drivers, complete documentation, development tools and application programming interfaces (APIs) for accelerated customization and market differentiation. The AR7Wi

software environment supports all of the pertinent industry initiatives for security, quality of service (QoS) and others.

Included with AR7 is a Network Support Package (NSP), supporting Linux® OS and ensuring code portability among different designs. Moreover, the AR7's APIs give manufacturers the ability to quickly incorporate differentiating features to meet the demands of various market segments or geographic regions. For example, the AR7Wi's NSP includes applications such as web-based management, content filtering and support for virtual private networks (VPN) so manufacturers can quickly customize these capabilities to achieve differentiation.

The software environment for the AR7Wi's WLAN module supports a wide range of potential configurations. The device's Access Point Development Kit (APDK) for the Linux OS includes complete drivers for an 802.11 WLAN access point, a sample graphical user interface (GUI), a unified configuration utility and enhanced performance for various security

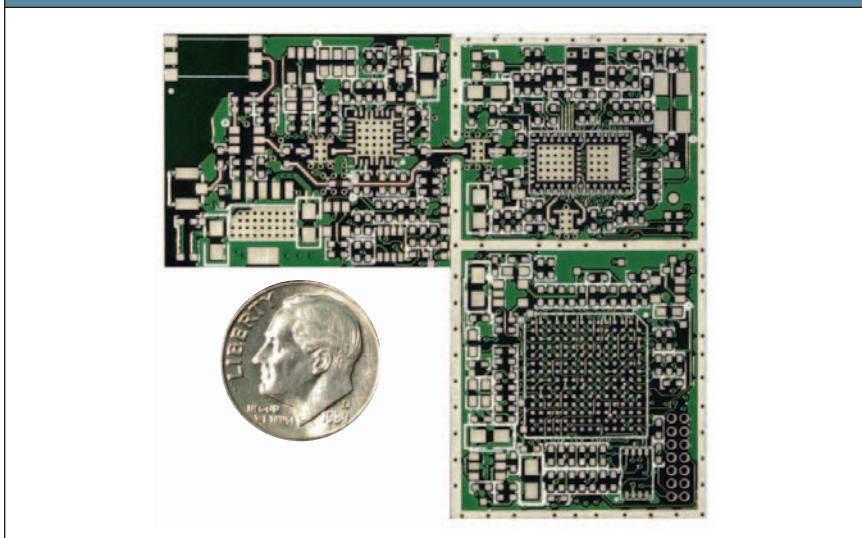
standards such as the Wi-Fi Protected Access™ (WPA) standard. Additionally, hardware-based accelerators for Advanced Encryption Standard (AES) are embedded in the TNETW1230, ensuring its compliance with the mandatory and optional requirements of the 802.11i draft standard.

### **Proven ADSL Capabilities**

The AR7Wi builds on the demonstrated interoperability, reliability and consumer acceptance of TI's AR7 family of ADSL technology. With features like TurboDSL™ Packet Accelerator, the AR7Wi ensures end-user performance satisfaction in the most demanding multi-user scenarios. TurboDSL boosts downstream performance by 3X to meet the throughput requirements of bandwidth-intensive applications like interactive gaming and streaming media.

The AR7 helps service providers extend subscriber coverage and significantly improves data rates to more residences in a given service area. Technologies such as echo cancellation, configurable equaliza-

**Wireless LAN module consisting of the TNETW1230, TNETW2522 and the RC2621**



*The total area of the WLAN portion of the AR7Wi design is less than 2.1 square inches, reducing total board area and cost.*

tion structures, switchable hybrid and programmable transmit and receive filters make up AR7's unique Dynamic Adaptive Equalization™ (DAE) technology. These enhancements specifically address line impairments such as ISI, RFI and bridge taps and give service providers the assurance of an extended ADSL service area where robust broadband performance is expected.

The AR7Wi supports all ADSL standards including G.992.1 (G.dmt) Annexes A, B, C, I, J, G.992.2 (G.lite) and ANSI T1.413 issue 2. The AR7Wi can be trained to support the higher downstream rates of ADSL2, ADSL2+, Extended-Reach ADSL (READSL) and All Digital Loop ADSL.

### **High-Performance WLAN Connectivity**

With performance enhancing features like the TNETW1230's 802.11g+ mode, an AR7Wi residential gateway supports data rates of over 100 Mbps. A new packet-bursting feature accelerates the data throughput rates of AR7Wi by altering the interframe spacing to transmit more data with less overhead. In settings where the WLAN signaling range must cover a large footprint, TI's optional Secondary Transceiver chip dynamically amplifies output power up to the

802.11 standard's maximum of 1 Watt, thereby achieving an extended effective signaling range.

The AR7Wi's TNETW1230 is a Wi-Fi CERTIFIED™ medium-access controller (MAC) and spread-spectrum baseband processor which is compliant with all current 802.11 standards, including draft standards 802.11i for security and 802.11e for quality of service (QoS).

### **TI Support—Reducing Time-to-Market**

Over the years, TI has earned a reputation for stellar customer support. In fact, the comprehensive nature of TI's support programs in many cases has given manufacturers a competitive advantage in their markets by shortening the typical time-to-market for new product introductions.

The AR7Wi reference design includes comprehensive support programs that have been developed for TI's ADSL and 802.11 WLAN technologies. These include classroom and regional training programs, a comprehensive eServices support system providing online access to TI's applications engineering teams, enrollment in TI's interOps Test Labs and weekly product updates. Crucial support services are available at key points in the develop-

ment cycle, including hardware design review, hardware diagnostics check and initial on-site software/hardware integration. In addition, TI can assist with system interoperability and performance tuning. TI's technical support teams are made up of applications experts dedicated to sharing their knowledge and insight.

Moreover, a wealth of documentation including white papers, technical manuals, datasheets, application notes and frequently asked questions has been produced to help project teams complete their development quickly and effectively.

### **For More Information**

To learn more about the AR7Wi residential gateway solution and TI's other ADSL and 802.11 WLAN products, contact your local TI field sales office or visit [www.ti.com/ar7vwi](http://www.ti.com/ar7vwi)

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