

TI WIRELESS TECHNOLOGY— DELIVERING ALL THE PROMISE OF 3G



WLAN Bluetooth® A-GPS UWB
Video Audio Gaming Security Mobility Single-chip
3G - UMTS WCDMA EDGE 2.5G

Making **Wireless** —
Making **3G**

BROAD PORTFOLIO OF FLEXIBLE, SCALABLE SOLUTIONS

From traditional voice-centric mobile phones to the most advanced, multimedia-rich 3G devices, Texas Instruments (TI) delivers the broadest range of complete semiconductor and software solutions to meet requirements of handset manufacturers, mobile operators and application software developers. By delivering a flexible, scalable technology platform across multiple wireless market segments from 2G, 2.5G to 3G and beyond, TI is driving innovative solutions across the wireless industry today and into the future.

Based on open industry standards, TI gives its customers maximum flexibility to deliver unique devices in the shortest time-to-market possible with products that include:

- **OMAP-Vox™ integrated modem and application processing solutions that will include complete chipsets with analog, power management and RF**
- **High-performance OMAP™ applications processors**
- **Complete hardware and software reference designs**
- **Connectivity solutions for *Bluetooth®* technology, Wi-Fi® and GPS**

OMAP™ Applications Processors: Enabling Entertainment and Productivity On-the-Go

Today's wireless handsets deliver capabilities that few would have dreamed of in a mobile environment just a decade ago. Features such as video conferencing, high-resolution digital photography, hi-fi audio and interactive gaming have generated excitement for many wireless users who now are experiencing the new wave of 3G applications.



OMAP  TM
TEXAS INSTRUMENTS TECHNOLOGY



TI's OMAP architecture and its open, flexible applications processors are delivering compelling 3G features. An OMAP processor's high performance and low power consumption for extended battery life makes it ideal—and widely recognized—for enabling the highest-quality mobile experience.

Second-generation OMAP 2 processors are transforming mobile handsets further into essential mobile entertainment and productivity-boosting devices. Designed for the multimedia-intensive demands of 3G, OMAP 2 processors combine consumer electronics-quality applications into the small footprint of a mobile handset for the ultimate 3G experience. TI's OMAP platform is truly setting the pace for 3G handsets. Six of the top seven worldwide 3G handset manufacturers use TI for modems, OMAP processors or both. All 3G FOMA manufacturers use OMAP processors in their handsets.

OMAP-Vox™ SOLUTIONS

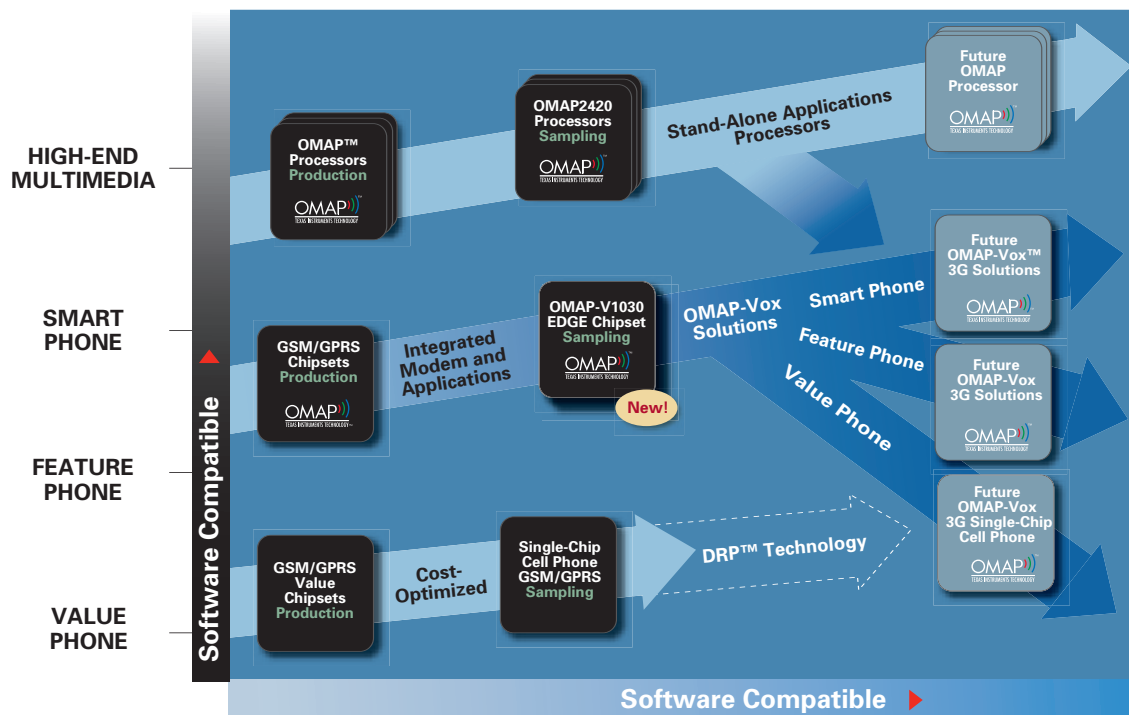
Easy Migration across Multiple Market Segments for GSM/GPRS/EDGE to UMTS

One important aspect of 3G success is the ability to bring advanced services to the broadest possible population of mobile users. TI's new OMAP-Vox platform is the answer. With new OMAP-Vox solutions, TI adds modem functionality to its successful OMAP architecture, and with software compatibility across the platform, customers can easily scale across multiple market segments from GSM/GPRS/EDGE to UMTS. OMAP-Vox solutions are optimized to efficiently run a dynamic mixture of applications and communications functions on the same hardware. They integrate proven modem and applications processing onto a single chip with a common software platform that can be reused for evolving market segment requirements.

Targeted from cost-effective phones to high-end mobile entertainment phones enabled by TI's OMAP 2 architecture, the new OMAP-Vox platform continues TI's legacy of software compatibility and reuse, therefore saving years of software design effort. This software will serve as the foundation for applications and communications development on all OMAP-Vox solutions, saving manufacturers time and money. This allows customers to design a variety of handsets to meet the high-volume 2.5G marketplace today with a quick migration to 3G.

From antenna-to-applications, the OMAP-Vox platform offers complete system solutions encompassing an integrated modem and applications processor, RF, analog and power management functions, complete field-tested protocol stack software, applications software suite, a competitive form-factor handset reference design and a complete development toolkit.

TI OMAP-Vox™ Solutions



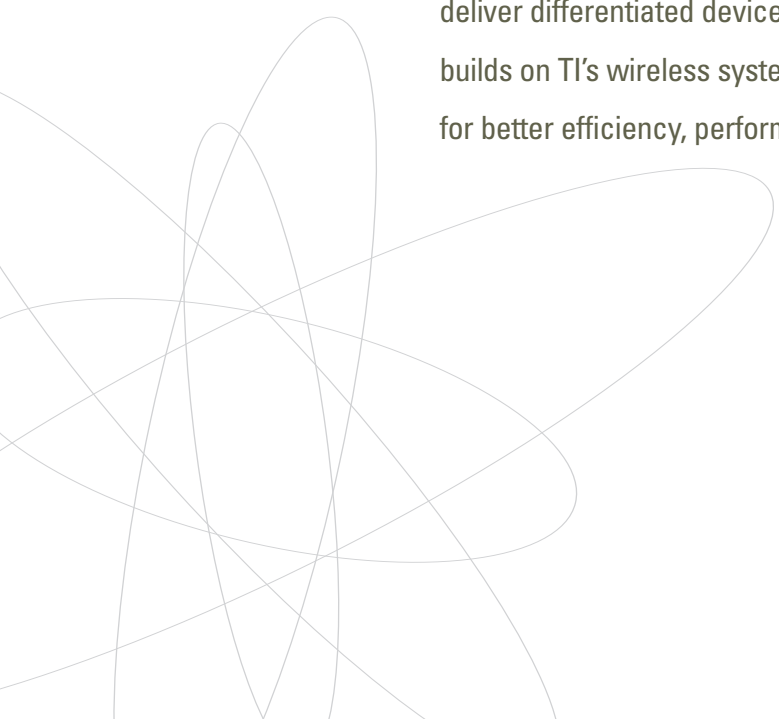


The first product in the OMAP-Vox family is the OMAPV1030 GSM/GPRS/EDGE chipset—the industry’s most integrated and optimized solution to enable mid-range multimedia devices. The OMAPV1030 solution is built on TI’s leading modem and OMAP technology and leverages TI’s advanced high-volume 90-nm digital process technology. OMAPV1030 enables applications such as high-quality video capture and playback, video streaming downloads, megapixel digital still cameras and interactive 2D/3D gaming. The OMAPV1030 processor is sampling now with volume production expected in 3Q05.

Customers using TI’s TCS Wireless Chipsets will also be able to reuse the GSM/GPRS protocol stack software when migrating to the OMAP-Vox platform. These complete, scalable solutions deliver the necessary elements to bring differentiated mobile devices to market fast, including a broad range of hardware, software, reference designs, development tools and support.

High-Performance Analog

High-performance, discrete and integrated analog products fit into any mobile device design by tightly integrating power management, battery management, noise reduction, signal conversion and signal conditioning to help manufacturers deliver differentiated devices and further opportunities. TI’s analog expertise builds on TI’s wireless systems expertise and integration with digital components for better efficiency, performance and functionality.





M-Shield™ Security Technology

Enhanced mobile capabilities have heightened the importance of security among manufacturers, operators and consumers, and TI takes a system-level approach to provide a more secure environment over software alone. TI's M-Shield security solution is embedded in most OMAP processors and chipsets to deliver security for a wide range of usage scenarios. These include digital rights management protecting downloads and content from being pirated, enterprise-class solutions to enable secure file sharing with VPN, firewall and antivirus support, and financial security like point of sale transactions, secure storage of credit card information and more.

This must-have requirement is met through a unique, comprehensive set of system-level security features, software libraries and services for manufacturers to add enhanced handset protection, such as:

- **Secure boot and flash**
- **Interconnect protection**
- **Secure execution environment**
- **Hardware encryption accelerators**
- **Unique IMEI numbers and SIM lock**
- **Third-party programmable support model for further security enhancements**

Software, Applications and Support for Fast Development, Differentiation

Over 15 years of wireless experience has culminated in TI's approach that goes well beyond silicon. Beyond hardware, TI's software and support offerings give manufacturers the ability to develop differentiated wireless devices with fast time-to-market.





Complete Reference Designs

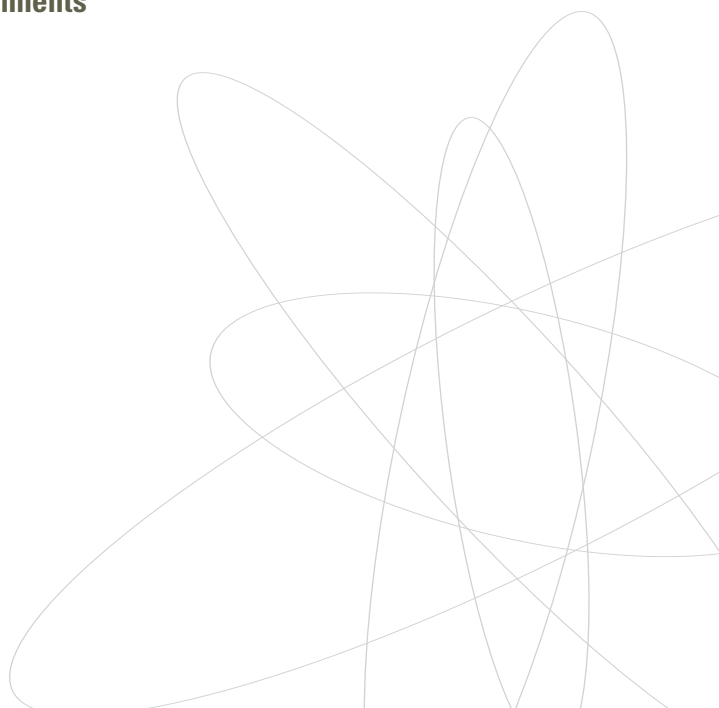
Complete, manufacturing-quality reference designs are available that are fully tested and type-approved with:

- **Full BOM and component list**
- **Board design and layout**
- **Complete and fully validated wireless software suite**
- **Customizable, user-ready interface**
- **Multimedia and PIM applications**
- **Global support infrastructure from design start through full-scale production**

Operating Systems Support

A robust development environment is available to customers through TI's collaboration with major operating system and software providers who are extremely easy to use and speed development time. High-level features vary, but can include:

- **Support for major wireless communications standards**
- **Integrated development environments**
- **Driver support**
- **Accelerated DSP software**
- **JTAG emulators and more**





OMAP Developer Network

TI's OMAP Developer Network provides the most compelling applications, services and multimedia modules for the OMAP applications processors and OMAP-Vox solutions for product differentiation and return on investment:

- **Streaming media**
- **3D gaming**
- **Video conferencing**
- **Digital television**
- **Voice recognition**
- **High-end audio**
- **Speech recognition**
- **Location-based services**
- **Security**



Independent OMAP Technology Centers (OTC)

TI and its OTC partners deliver support and solutions that leverage the continuously evolving wireless marketplace and complexities, such as:

- **Systems integration**
- **Wireless systems architecture**
- **Embedded software development**
- **Hardware design**
- **RF and antenna design**
- **Communications protocols and telephony**
- **Support of all mobile standards**
- **Multimedia codec development**
- **Algorithm development**

Broadest Range of Mobile Connectivity Options

To address the need for concurrent operation on today's complex mobile devices, TI's integrated, proven wireless connectivity solutions ensure multi-mode operation and access to a variety of network connections for service anytime, anywhere on a variety of wireless networks. Highly integrated *Bluetooth* technology, mobile WLAN, assisted GPS (A-GPS) and Digital TV offerings give manufacturers a distinct competitive advantage. TI is also looking to the future by driving development of future standards such as RFID for mobile phones, UWB, FM radio and others.





Bluetooth® Wireless Technology

TI's highly integrated single-chip *Bluetooth* solutions are based on TI's Digital RF Processor (DRP™) technology, reducing component count, total BOM and power consumption, along with many other key benefits:

- Up to 3X the *Bluetooth* speed with enhanced data rate (EDR) support
- 30 percent smaller die over current solutions
- 3X less power consumption
- Improved bandwidth for 2.5G and 3G applications
- Scalability for future *Bluetooth* enhancements
- Lower solution and BOM costs
- WLAN coexistence/interoperability

Mobile WLAN

TI has played a leading role in developing open IEEE 802.11 specifications, leading to solutions well-suited for mobile and battery-powered designs.

Optimized at the hardware, firmware and driver level, TI solutions deliver the power efficiency, small size, data/access security and spectrum sharing required for mobile WLAN handsets. Innovative performance levels, the industry's lowest power and smallest size and interoperability across mobile standards bring embedded and battery-powered applications a new level of functionality and extended battery life.

TI's experience also has resulted in a coexistence package for WLAN and *Bluetooth* wireless technologies in co-located environments.



Assisted GPS

TI's highly integrated, optimized A-GPS solution delivers faster, more accurate location-based services over a wider area. Operation in stand-alone, MS-assisted or MS-based modes—and intelligent transfers between modes as required—brings precision location capabilities to all wireless segments. By saving on board space, customers benefit from overall reduced costs and greater flexibility. Programmability gives customers the ability to easily upgrade as geolocation algorithms, standards and applications evolve.

Digital TV

In support of open standards, TI is developing the industry's first single-chip broadcast Digital TV solution for the highest-quality live television broadcasts with full audio. Code named "Hollywood," the solution combines TI's consumer electronics expertise with its wireless know-how to give users an extremely robust mobile viewing experience in a tightly integrated solution.

Enabled by TI's DRP and advanced process technology, this single-chip solution is an example of how TI is bringing living room entertainment to the mobile phone through:

- **Performance required to drive mass adoption—25-30 frames per second**
- **Maximum power efficiency—targeting three hours of TV time on one battery charge**
- **Smaller board area**
- **Lower overall system costs to enable a broad range of consumer mobile phones**

An Open, Flexible Approach

Support of open industry standards allows manufacturers to develop unique systems and offer a range of handset models. Open standards give users access to the broader services, expanded range and roaming abilities that are essential components of true 3G implementation.

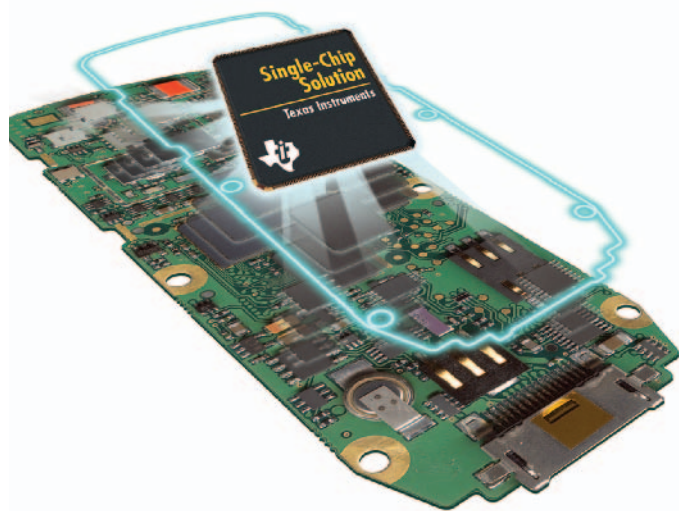
Choices give customers maximum flexibility, and TI delivers options through a modular wireless portfolio with all the essential technologies for developing complete systems. Built-in compatibility and support for open standards make TI an effective choice for implementing complete product offerings that are also scalable across standards from GSM/GPRS/EDGE to UMTS and beyond.





Driving Technology Integration

TI design and manufacturing teams collaborate closely to turn silicon expertise into highly integrated, advanced solutions for customers quickly and cost-effectively. Continued advancements in process technology and high-volume manufacturing allow TI to tightly integrate and add functionality to run advanced applications, enable smaller form factors, extend battery life and reduce costs.



Digital RF Processor (DRP™) Technology

TI's innovative DRP technology enables unprecedented levels of integration by enabling radio frequency processing in digital CMOS logic to reduce board space, extend battery life and drive down system cost. By simplifying the wireless transmit and receive functions and providing much-needed board space to accommodate the advanced functionality required by today's applications, DRP plays a significant role in TI's wireless integration roadmap with:

- **Three generations of *Bluetooth* wireless technology single-chip devices**
- **A single-chip solution for GSM/GPRS mobile phones that integrates digital baseband, analog baseband, RF, power management and memory**
- **The design of a single-chip solution for broadcast digital TV for mobile phones**
- **Future single-chip solutions for GPS, WLAN, UMTS and others**

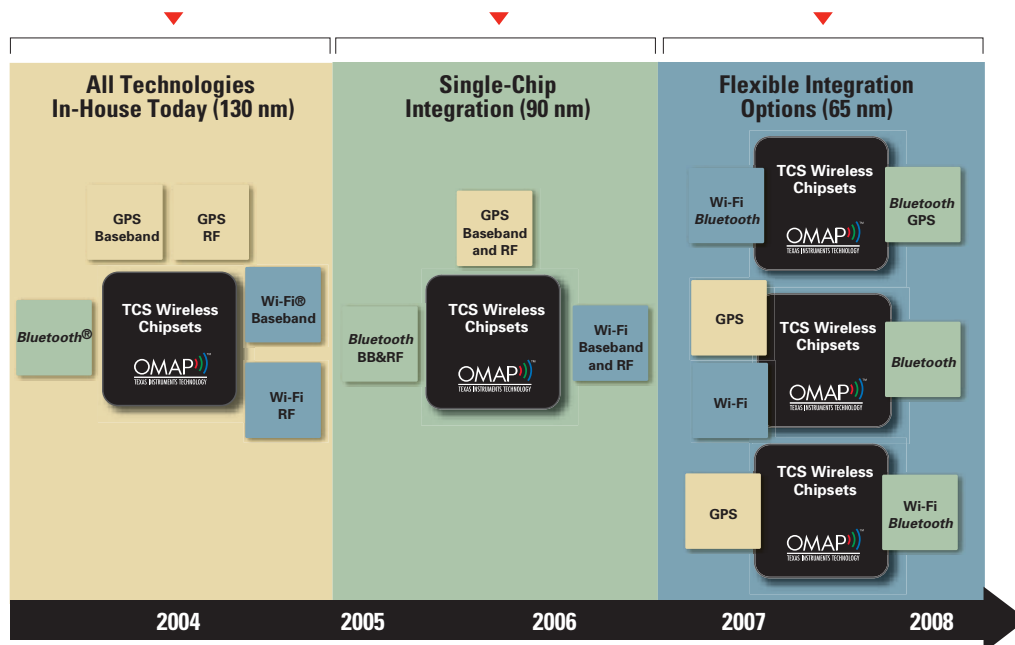


Flexible Integration Approach

Manufacturers are faced with a plethora of choices when it comes to developing differentiated wireless devices, especially as the wide range of applications and connectivity options evolve. Groups of consumers require different levels of functionality, and different areas of the world also have varying requirements. Fortunately, TI's deep industry experience, broad product portfolio and integration strength give customers a unique perspective of how to best combine technologies that deliver capabilities users demand.

TI's flexible integration approach ensures that emerging technologies are optimized on individual systems and networks in the cellular network prior to integration in SoC solutions. This approach gives customers access to the right technologies and applications at the right time, place and price point to meet mass deployment objectives. By optimizing subsystems first and following with integration, manufacturers have fast and easy access to building blocks when demand rises for a particular capability. With various technologies available today to mix and match, TI helps its customers develop innovative, unique and integrated solutions with optimal system performance, flexibility and cost efficiency.

Integration Delivers Lowest Cost, Most Flexible Product Roadmap





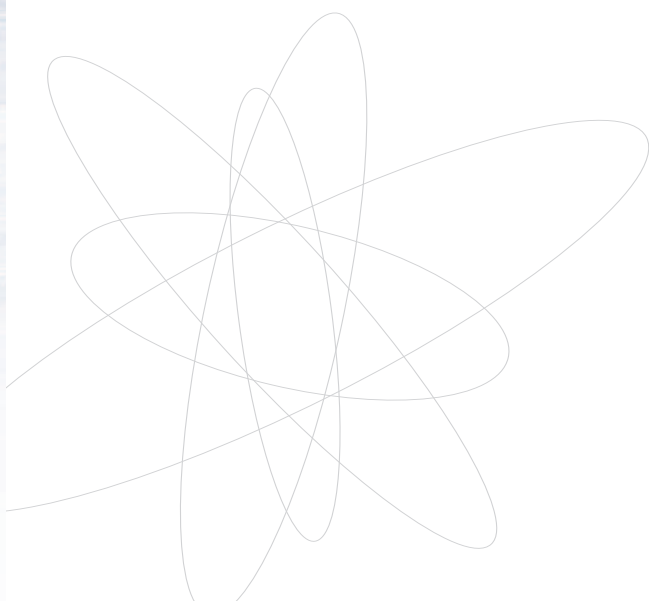
The Future Beyond 3G

Involvement in industry groups and standards bodies is important in giving customers a competitive edge. TI's work continues well beyond 3G and into the future to support development of standards such as OFDM, HSDPA and others. In addition, continued process technology and manufacturing advancements will further wireless integration, increasing functionality and decreasing size and cost of future TI solutions.

SUMMARY

TI is committed to the wireless marketplace and its future growth. By offering the broadest range of open, flexible and scalable technology solutions, its customers are well-positioned to bring exciting wireless services to mainstream users across a range of devices and at affordable price points.

www.ti.com/wireless



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