Every day signal processing technology is shaping the human experience. It touches us daily through the consumer electronics we own or will own. Combining silicon and software, Texas Instruments’ (TI) unique approach to digital signal processing (DSP) delivers the necessary intelligence and performance shaping the market today.

Signal processing enables consumer electronics that are more powerful, portable and power-efficient, and digital signal processors provide the flexibility for these new products that feature accessibility, better sound quality and compact size. DSP enables consumer electronics manufacturers to offer portable and cost-efficient products, which results in more consumer purchases. Changing the human experience, DSP also has enabled products to feature life-like sound and new sleek, compact equipment that offers consumers more freedom in fitting these new devices into their lifestyles. As a result, DSP has become a critical enabler for the world’s most popular digital consumer products.

From large-screen televisions with the highest quality picture to handheld devices that combine voice, audio, video, imaging, data and multimedia communications, TI’s signal processing technologies are used by leading consumer electronics companies to develop products that bring digital quality to daily life. Providing comprehensive digital end-to-end audio solutions, TI captures the attention and affection of consumers, creating today’s digital lifestyle.

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Technology for Real Life.

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The portable Internet audio player market has exploded with new technologies, devices and design challenges for the consumer electronics and wireless terminal industries. Today's portable audio systems have as much processing horsepower as the fabled first Cray supercomputer developed in the 1960s. These days, portable Internet audio players can be as small as credit cards and are lightweight, easy to carry, have a long battery life and do not contain any moving parts.

Due to audio-friendly compression technologies, inexpensive mass storage, battery-friendly processors and integrated performance analog output technology, portable audio has been a major hit with consumers. One of the hottest uses for the Internet is downloading music. MP3 files are populating the web by the hundreds of thousands. Manufacturers are building the devices. The whole music world is changing, and this is creating tremendous growth opportunities for the companies that get there first.

Think of what's next – downloading talking books, movies, favorite TV shows, next-generation devices.

As portable audio demands benchmark vendor tools and scalable processing engines, high levels of reuse, integrated systems-on-chips and overall shorter development cycles, TI answers with its complete audio solutions for programmable, second-generation portable players. Yet, this is only the beginning as our technology expands to other exciting end-equipments like players with CD plus hard disk drive storage capability and portable jukeboxes with video capabilities.

Radios are a part of our daily lives by waking us up in the morning or listening to the radio at your desk or home. But, the radio we know today is changing with the use of DSP technology. Originally an analog application, radio is crossing over into the digital revolution and the change will have far reaching implications, such as CD-like sound and wireless data functionality including stock prices and traffic reports over radio frequencies.

There are two standards at the forefront of this revolution. Eureka-147 DAB has been broadcasting in several countries such as the United Kingdom, Germany and Canada and also is found in Asia in such places as Singapore and Taiwan. In the United States, the selected standard is HD Radio™ technology, developed by iBiquity Digital Corporation.

As the brains of the digital radio, DSPs allow the acquisition, demodulation, deinterleaving and audio decode, all on a single chip. Beyond the radio signal processing technology requirements, programmable, scalable DSP technology is required to meet an increasing demand for feature-rich and integrated end products. Offering comprehensive DSP solutions to the signal processing challenges of digital radio, TI provides low-risk solutions for a quickly changing digital radio market through its TMS320DRE200 and TMS320DRI200 DSP-based digital baseband chips.

Whether your end-equipment takes the form of an automotive digital radio, a clock radio, PC digital radios, or handheld radios, digital radio is touching your life daily.
elopment, signal proc
dible range, demonstrat
ne human experience.
Home Theater

With the emergence and rapid acceptance of digital media such as the DVD format, home theater has become a force in the marketplace. As the engine behind the life-like, high-fidelity surround sound requested by customers today, the audio-visual (AV) receiver is one of the most essential functions in home theater systems.

Driven by the move to a digital signal chain fuelled by digital media and content, the demand for a more life-like listening experience in the home and the proliferation of decoding standards, the receiver and surround-sound decode markets are growing rapidly.

As meeting market windows and releasing feature-rich differentiated products on time are becoming a challenge, manufacturers need higher performance scalable audio processing solutions, shorter development cycles and easier development processes more than ever. TI’s TMS320DA610 audio DSP has the performance, flexibility and integration that enables advanced features such as automatic room correction and speaker virtualization in mass-market products and also enables field upgradability. Whether it’s for high-fidelity receivers that deliver the most realistic listening experience or cost-driven feature-rich systems for the mass market, TI is meeting and exceeding these design demands with its audio DSP, digital amplifiers and analog solutions for the home theater.

Wireless/Cellular

While the 3G wireless revolution has captured the attention of the industry and the general public, a quieter evolution in the functionality of 2.5G wireless handsets also is taking place. Increasingly, handsets are integrating multiple applications including digital still image capture and sophisticated ring tones using methods such as MIDI synthesis and compressed audio playback. These features extend the device to new, personalized forms of consumer utility and not only add value to the user, but also increase revenue opportunities for service providers.

For cell phone manufacturers, the most pressing design issue is integrating these various applications into an ever-shrinking package. Texas Instruments alleviates this challenge with its single-chip programmable solution based on a DSP, such as the TMS320DA105, which offers the flexibility to support all of these applications cost-effectively and can be upgraded to add new requirements in the future. To this end, TI’s DSPs are revolutionizing wireless communications, enabling digital audio anytime, anyplace.

Automotive

A constant companion to commuters around the world, AM/FM radio will be improved with Eureka-147 DAB and HD Radio™ technology. This revolutionary change will be brought to this important application from aftermarket and original equipment model receiver manufacturers. TI is ready to support this next-generation of car receivers with the TMS320DRE200 and TMS320DRI200 solutions. These chips handle all of the baseband processing required to implement Eureka 147 and iBiquity’s HD Radio technology and can help save automotive radio set manufacturers valuable time to market.
TI Delivers HD Radio™ Technology Today

As the mainstay for terrestrial broadcast radio in the United States for more than 80 years, analog AM/FM broadcasters have provided listening enjoyment for millions of Americans. Within the past 10 years, a dedicated effort, led by iBiquity Digital Corporation, created a new type of radio technology that improves upon existing analog AM/FM radio – HD Radio technology.

**HD Radio Technology**

**CD-like Sound**
HD Radio technology makes it possible for stations to transmit the digital quality that listeners now demand, without the static, hiss, pops and fades of today’s AM and FM broadcasts.

**Data at Your Fingertips**
HD Radio technology will allow stations to transmit wireless data and digital audio to people at work, at home or in the car – anywhere, anytime. Since wireless data is transmitted on the same channel as digital audio, listeners will be able to receive music and program information, as well as local weather and traffic reports, news, stock quotes, sports scores, emergency warnings and more without straying from a station. AM and FM stations will be able to offer new and exciting services, as well as innovative and compelling advertising, never before contemplated.

**Easy Transition From Analog to Digital**
Unlike digital television, the new digital radio signals are added to today’s broadcasts, ensuring current radios will continue to work for years to come. New digital radios will be able to receive not only the new digital signals, but today’s broadcasts as well. Given that listeners will receive the digital broadcasts at the same dial positions where they tune today, they will know exactly where to find their favorite stations. With digital broadcasting, stations have the potential to increase their loyal audiences and advertising revenues without risking the loss of a single listener.

In October 2002, the FCC issued a historic Report and Order that effectively allows U.S. broadcasters to proceed with HD Radio broadcasts. This sets the stage for implementation of HD Radio technology with receiver manufacturers, many of which will demonstrate at the CES2003 show. This implementation will be based on TI’s TMS320DRI200 digital baseband for HD Radio technology. Created in conjunction with iBiquity, the DRI200 chip provides the following benefits to those receiver manufacturers:

**Key Benefits**
- **Fast time-to-market** – Available today, the DSP-based solution enables receiver manufacturers to deliver HD Radio in 2003
- **Low risk** – With evolving standards, changes can be made easily in software
- **Enables product integration** – Software approach offers ability to quickly and easily create integrated and innovative products
- **Low-cost roadmap** – DRI200 chipset lowers system cost and shrinks form factor
Hot off the Presses
TI’S LATEST INDUSTRY NEWS

4Q 02
Perstel delivers first handheld DAB Radio to U.K. retail shelves. For more information, visit: www.ti.com/perstelpr

TIs Aureus™ Audio DSP enables manufacturers to add DTS 96/24 with 70 percent of performance left for enhanced features and differentiation. For more information, visit: www.ti.com/aureuspr

3Q 02
JVC chooses 32/64bit audio DSP from Texas Instruments for its new RX-DP20VBK A/V receiver. For more information, visit: www.ti.com/jvcpr

TI digital audio processor packs highest audio performance into one of the smallest – 38-PIN/43MM² – packages. For more information, visit: www.ti.com/audioprocr

Texas Instruments and iBiquity announce availability of industry’s first chip for HD Radio™ technology. For more information, visit: www.ti.com/ibiquitypr

2Q 02
TI hears customers’ need for cost-competitive, high-powered and high-quality digital sound in new markets. For more information, visit: www.ti.com/digsoundpr

Texas Instruments Eureka DAB design and support enable TYtelstar to enter growing market for digital radio receivers. For more information, visit: www.ti.com/tytelstarpr

1Q 02
TIs Eureka DAB solution powers breakthrough DAB radio product for Maycom. For more information, visit: www.ti.com/maycompr

TI and iBiquity usher in era of IBOC digital AM and FM broadcast technology at CES. For more information, visit: www.ti.com/ibocpr

Panasonic chooses Texas Instruments’ DSP to enable digital audio in its new DVD player. For more information, visit: www.ti.com/panasonicpr

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Digitally-Driven

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