Wireless Developer Network

Digital Audio
Freescale Partners
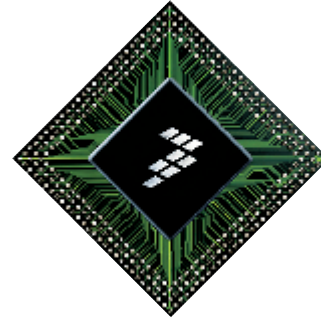
freescale
semiconductor

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For more information about the
Freescale Wireless Developer Network,
visit **www.freescale.com/fwdn**.

Introduction

In the world of audio, Freescale processors are behind it all—playing the music, producing the music, mastering CDs and DVDs, and then playing back that content at movie theaters, in home theaters and in the car. Freescale's software and hardware set the benchmark for audio systems, and our long-standing and continuing partnerships with leading tool companies are an essential part of that leadership.

The partners in this brochure have all developed tools that will help you differentiate your products, add valuable applications, get to market quickly and enrich your customers' audio experience. Each partner is a member of the Freescale Wireless Developer Network, which helps developers make their services available to customers who want to take advantage of our broad portfolio.

Our partners provide hardware and software for Freescale's audio portfolio, which includes:

- The Symphony™ family of audio DSPs is designed to meet the demands of audio electronics system designers by integrating audio peripherals and by supporting the latest generation decoders. Freescale's DSP technology set the de facto standard for professional audio systems when we introduced the first 24-bit DSP in 1987. Many audio industry leaders have standardized on Freescale's DSP technology to deliver high-quality sound in car and home entertainment applications. Our software has been used as a benchmark for new standards.

- Freescale's ColdFire® audio processors are excellent choices for portable and in-car infotainment applications such as satellite radio, CD or hard disk drive (HDD) compressed audio players, USB Thumb® drive players, jukeboxes and MP3 docking stations. Freescale provides the processor, along with compact and efficient reference designs that provide manufacturers cutting edge technology for developing next-generation audio players that can reach the market quickly.

For more information about Freescale's audio portfolio, visit www.freescale.com/digitalaudio.

Freescale Wireless Developer Network

Combining resources from Freescale and industry leaders, our Wireless Developer Network offers advanced pre-integrated platforms and solutions that work out-of-the-box, accelerating your business and giving you a competitive advantage. The Freescale Wireless Developer Network is a global program designed to bring complete platforms to market that include hardware and software solutions, tools, systems integration, consulting and other services. With early access to improved tools, Freescale Wireless Developer Network members are better equipped to deliver mobile and wireless solutions to a global audience in less time, with less effort and at a lower cost.

Audio Algorithms

APT

apt-X® Wireless Audio Compression

The emergence of consumer wireless audio technologies has created a need for high-quality, low-latency compression to deliver real-time digital wireless audio in both stereo and multi-channel formats. The Enhanced apt-X® algorithm from APT meets this new need by operating within the required bandwidth. Enhanced apt-X has high resilience to bit errors and the shortest processing delay of any professional coding algorithm.

Features

- Supports 16-bit, 20-bit and 24-bit audio
- Supports sampling frequencies of 8, 16, 24, 32, 44.1 and 48 kHz
- Mono/stereo, multi-channel audio encode/decode capability
- Highly robust to bit errors and tolerant to tandem coding
- Linear phase response
- Integrated AUTOSYNC™ encoder/decoder synchronization
- Embedded auxiliary data transmission up to 12 kbit/s
- Low complexity, enabling optimized implementation
- Low power consumption requirements
- No external RAM or ROM requirements

A 4:1 audio compression algorithm, Enhanced apt-X can deliver near-lossless 120 dB dynamic range audio with a latency of 1.9 ms for full encode/decode. It has a MHz requirement of 17 MIPS/audio channel and a memory requirement of 6 KB (program memory), 7 KB (XY Memory) + 0.5 KB per additional apt-X audio channel.

Enhanced apt-X is regarded as the *de facto* standard for high-quality audio delivery throughout the pro-audio and broadcast market, with over 10,000 radio stations and 24,000 cinemas worldwide relying on apt-X technology. Discerning studios and broadcasters such as NHK, BBC, ABC, Sirius, Skywalker Sound and Pixar rely upon apt-X as their distribution, contribution and storage medium of choice.

Applications

As consumer audio applications start to require more channels for stereo delivery and begin to interact with video, the available bandwidth is under ever-greater stress and the need for compression grows. However, the bandwidth efficiencies gained by using compression should not be at the expense of audio performance.

The core strengths of minimal delay, error resilience and high audio quality make Enhanced apt-X the perfect enabler for wireless headsets, wireless microphones, wireless 5.1-channel surround and wireless live broadcasting. Leading OEMs such as Panasonic, Samsung and Shure are already realizing the benefits of apt-X in new digital wireless audio systems over Bluetooth™ and other proprietary RF systems.

APT and Freescale

APT has made its range of apt-X audio compression solutions available on the Freescale family of 56XXX DSPs. apt-X is well-proven on this platform, enabling many broadcast, professional and consumer applications with the outstanding audio quality and low latency attributes of apt-X audio coding.

BBE Sound, Inc.

BBE's Technologies are Highly Efficient, and Reside in a Low-Footprint Package on the Symphony™ DSP563xx Family of 24-bit DSPs

BBE Sound's technologies perform like an auto-focus feature for your ears by bringing out the nuances and subtleties typically found only in live music.

- Musical realism—Music has a great "live presence" with BBE. Thanks to BBE processing, the audio entertainment experience is closer to the professional sound quality experienced at major concerts.
- Speech intelligibility—Even at lower volume levels, products that feature BBE give the spoken word increased clarity and intelligibility.
- Lifelike movie experience—Watching a film on DVD through an A/V system featuring BBE reveals details otherwise inaudible.
- Improves simulated surround effects—BBE works with any surround technology to maximize the spatial qualities of "surround sound" effects while maintaining the clarity and definition BBE is known for.

BBE High Definition Sound—In a Nutshell

All music that is amplified through a loudspeaker suffers some loss of fidelity—or subtle distortions—caused by the inherent characteristics of the loudspeaker itself. The BBE system addresses these problems by compensating for phase and amplitude distortions and, in effect, delivering the signal to the speaker in a form which allows it to reproduce the original live performance more fully and more faithfully.

Why BBE Was Developed

When we listen to live music, all of the highs and lows reach our ears in the same relationship to each other as when they were created by the instruments. If this same live music were to be recorded and played back through a loudspeaker system, the loudspeaker would introduce frequency-dependent phase shifting. The inductance of the speaker's voice coil creates a stronger impedance as the signal's frequency increases, resulting in a time delay. Consequently, high frequencies arrive at the listener's ear later than signals undergoing low frequencies. The resulting signal is distorted in the time domain to the listener's ear.

In order to address the inherent problems of loudspeaker design, BBE developed a circuit that has two primary functions. The first adjusts the phase relationships of the low, mid and high frequencies. Since a loudspeaker's natural tendency is to add progressively longer delay times to higher frequencies, the BBE sound processing system adds progressively longer delay times to lower frequencies. This creates a kind of "mirror" curve to the time delay curve created by the speaker, neutralizing its phase distortion.

The second major element of BBE augments the higher and lower frequencies. The BBE system provides a dynamic augmentation which combines with the phase compensation feature to restore the brilliance and clarity of the original sound. The result is, as one professional journal phrased it, "The most hearable advance in audio technology since high fidelity itself!"

All the Sound You've Never Heard

Founded in 1985, BBE Sound, Inc. develops advanced audio technologies for the professional audio and consumer electronic markets. When combined with Freescale's superior DSPs, BBE Sound delivers audio technologies with swift time-to-market capabilities, easy-to-implement audio features, competitive prices, and world-renowned brand recognition.

Based in California, the company has offices in Japan, Korea, China and Europe. Visit **www.bbesound.com**.

Dolby Laboratories

Freescale Symphony™ Digital Processors Enable Dolby Technology

Dolby Laboratories has a rich, 40-year history of developing advanced audio technologies that enhance personal and home entertainment. Dolby® surround audio solutions accurately re-create the cinema experience in the home, while simultaneously enabling consumers to enjoy their surround entertainment experience on the go in portable and mobile applications. Freescale is a key strategic partner, implementing and delivering to the marketplace a variety of platform solutions that feature the most advanced Dolby entertainment solutions.

To learn more about Dolby technologies, contact Tony Nguyen at **txn@dolby.com**, or visit **www.dolby.com**.

Dolby Digital—It's the standard
Dolby Digital technology is the standard for many major entertainment formats, including DVD-Video and North American HDTV, delivering cinematic 5.1-channel sound to millions of households worldwide.

Dolby Digital Plus—A captivating new entertainment experience
Offering all the capabilities of Dolby Digital and then some, Dolby Digital Plus provides the flexibility and efficiency to deliver more channels of compelling surround sound for high-definition video delivery by cable and direct broadcast satellite (DBS), IPTV, high-definition disc-based media, and online content.

Dolby Digital EX—Extra-dimensional sounds
Dolby Digital EX takes the Dolby Digital 5.1-channel setup one step further with an additional center surround channel for extra-dimensional detail and an enveloping surround sound effect. This technology enables listeners to pinpoint sounds originating directly behind them.

Dolby TrueHD—The ultimate high-definition media audio experience
Dolby TrueHD is Dolby's next-generation 100% lossless technology developed for high-definition disc-based media. In the home, Dolby TrueHD delivers bit-for-bit playback performance equivalent to studio masters.

Dolby Pro Logic® IIx—7.1 surround for the home
Dolby Pro Logic IIx into a 6.1- or 7.1-channel surround transforms any stereo or 5.1-channel source into a 6.1- or 7.1-channel surround sound. Built on Dolby Pro Logic II, this technology adds more channels and support for multichannel DVD movies, music, broadcasts and video games.

Dolby Headphone—Surround sound through any pair of headphones
Dolby Headphone technology accurately simulates the performance of a 5.1-channel surround sound speaker system through stereo headphones. Compatible with any set of headphones, Dolby Headphone technology can be found in select A/V receivers, dedicated headphone devices and video game products.

Dolby Virtual Speaker—5.1-channel surround sound from just two speakers
Dolby Virtual Speaker technology simulates the performance of a 5.1-speaker surround sound listening environment from just two speakers. This makes it an ideal technology for digital TVs, stereo, mini-systems, PCs and a variety of consumer audio/visual products.

Dolby Digital 5.1 Creator—Home movies in surround sound
Dolby Digital 5.1 Creator delivers the power to master personal Dolby Digital 5.1 soundtracks on DVD-video discs at home. Discs created with Dolby Digital 5.1 Creator are designed to be compatible with virtually every DVD-video player equipped with Dolby Digital decoding.

DTS

DTS, DTS-ES, Neo6, DTS96/24 and DTS-HD
Made Possible by Freescale Symphony™ Digital Signal Processors

DTS Digital Audio—The Audio Format for the Future

DTS has led the way in delivering digital audio quality hardly imaginable just a few years ago. The DTS digital audio format brings movies to life, making you part of the action on the screen and creating a rich, fully enveloping surround sound experience for music. It's no surprise that DTS is considered by many to be the premium high-definition (HD) audio format to complement HD video and is featured in over 80 million consumer electronics products worldwide.

With its outstanding performance, flexible features and backward compatibility, DTS is the audio format for the future. For more information, visit **www.dts.com**.

Core Plus Extension Design

In addition to sound quality, the success of the DTS digital audio format rests in the core plus extension decoder design, which ensures full backward compatibility with all DTS decoders in use. The core decoder contains the original DTS 5.1 channel data stream, while extensions to the core can include advanced features such as additional channels, higher data rates and lossless audio reproduction. It's a scalable design that allows additional features to be added as technology evolves.

The core decoder is known as DTS Coherent Acoustics, a 16-24-bit/44.1 or 48 kHz sampling rate audio format with a data rate up to 1.5 Mbps, over twice the rate of competing formats:

- DTS-ES, or Extended Surround adds a center-surround channel for 6.1-channel audio, and expands on the original 5.1 channel format to provide a fuller, more enveloping surround sound experience.
- DTS 96/24 provides a higher sampling rate of 96 kHz and 24 bits of digital audio for extended high frequency response and much greater dynamic range approaching studio quality for home audio.
- DTS Neo:6 expands stereo source material such as CDs, radio, VHS or other stereo sources into multi-channel audio, providing a more natural 5.1 or 6.1-channel surround sound experience than a typical matrix decoder. DTS Neo:6 features music and cinema modes.

DTS-HD: High-Definition Audio for High-Definition Video

DTS-HD Audio is the newest extension to the original 5.1-channel core with substantially improved audio performance and features to support HD DVD and Blu-ray Disc optical disc formats.

DTS-HD Audio supports three levels of performance based on the capabilities of the home audio equipment used for playback:

- DTS-HD Master Audio
  - o Lossless audio with variable data rates up to 24.5 Mbps for Blu-ray Disc and up to 18.0 Mbps for HD DVD
  - o Up to 7.1 channels at 96 kHz and 24 bits; up to 192 kHz and 24 bits for 2.0 channels
  - o Multiple speaker re-mapping configurations for 7.1 channel systems
  - o Secondary audio/sub-audio stream for supplemental audio content
- DTS-HD High Resolution Audio
  - o Extended high-resolution audio with constant data rates from 1.5 Mbps to 6.0 Mbps for Blu-ray Disc and from 1.5 Mbps to 3.0 Mbps for HD DVD
  - o Up to 7.1 channels at 96 kHz and 24 bits
  - o Speaker remapping for 7.1 channel systems
  - o Secondary audio/sub-audio streams
- DTS Digital Surround Audio
  - o The original DTS Coherent Acoustics core decoder with a full bit rate of 1.5 Mbps
  - o Up to 6.1 channels at 48 kHz and 24 bits or 5.1 channels at 96 kHz and 24 bits
  - o DTS Digital Surround is a mandatory audio format for Blu-ray and HD DVD standards

Neural Audio

Neural-THX® Surround: Taking Surround to the Next Level

The Neural-THX® Surround technology enables broadcast and encoded content to be encoded into 5.1-channel format, transmitted in a two-channel format to the home, and then decoded back to 5.1 by the onboard decoder in the receiver. In addition, it enables 7.1-channel support for next-generation video game titles. Freescale's Symphony DSP5637x family of processors for A/V receivers supports Neural-THX Surround.

Neural-THX Surround has been chosen as the official surround sound broadcast format for XM Satellite Radio's "XM HD Surround," and is used by other leading FM/HD radio stations in the U.S. and worldwide. Neural-THX Surround delivers the rich envelopment and discrete image detail of surround sound in a format 100% compatible with stereo.

Also available for television broadcast, Neural-THX Surround will soon be available in CD/DVD encoded format for movies and video games. Neural-THX Surround is capable of delivering full 360 degree 7.1-channel surround sound for video games on any console, using any output format, all the time… delivering more of the game to gamers!

Neural-THX Surround draws the brain's attention to sonic details in musical instruments, vocals and ambience that are typically masked by other playback systems. This allows the listener to fully experience the richness and subtleties in recorded performance as never before for both surround encoded material and regular stereo material such as CDs or digital media players. Neural-THX Surround is taking surround to the next level, bringing surround directly to your ears!

Freescale and Neural Audio

Freescale has been an official implementation partner of Neural-THX Surround since its early release in A/V receiver home entertainment systems. By leveraging the power of Freescale's DSP processors, Neural-THX Surround enabled products deliver stunning surround sound entertainment experiences.

QSound Labs Inc.

microQ and QSurround® Mobile

QSound's microQ® audio engine and QSurround® Mobile solution provide the ultimate audio capabilities for today's mobile device marketplace. They offer Freescale silicon a variety of audio solutions representing the culmination of over fifteen years of PC host and DSP audio software development and product deployment. QSound's modular audio suite consists of the following major components:

- **mQSynth™ Polyphonic Wavetable Synthesizer**—For ring tones and background music in interactive applications, mQSynth plays musical scores contained in performance files (MIDI and other formats) using digital sample-based instruments.

- **mQ3D™ Positional 3D Audio Engine**—mQ3D places multiple sounds independently in 3D space for interactive gaming. Applicable to arbitrary streams or mQSynth synthesizer channels using native or custom instruments and sound effects. Optional: QEM™ environmental modeling (reverberation).

- **mQFX™ Digital Effects**—Enhancing the music listening experience, the mQFX suite includes:
  - QXpander® 3D stereo sound stage expansion
  - QSizzle™ dynamic high-frequency enhancement
  - QRumble™ dynamic low-frequency enhancement
  - QVerb™ reverberation
  - QCompressor™ dynamic range control
  - QEqualizer™ static multi-band equalization
  - QLimiter™ anti-saturation dynamic range control
  - QLoudness™ Fletcher-Munson equalization loudness curve

Modular, scalable components make microQ readily adaptable to any target environment, with the requirement for platform-specific code reduced to input and output interfaces.

QSurround Mobile delivers a well-established QSound Labs technology that renders mono, stereo and multi-channel surround audio with maximum spatial impact over stereo headphones and stereo speakers such as docking stations.

QSurround Mobile delivers a feature set and footprint optimized for mobile platforms, in a variety of flexible standalone and integrated configurations. QSurround Mobile handles mono and stereo formats in addition to discrete multi-channel surround, with target-specific processing for earphones, narrow and wide geometry (mobile vs. docked) speaker systems. QSurround Mobile maximizes the sonic potential of mobile TV formats such as DVB-H, T-DMB and ISDB-T.

Freescale and QSound

QSound brings new life to audio quality for mobile devices. QSound's market leading microQ® and QSurround® Mobile technologies provide highly efficient digital audio capabilities and enhancements to Freescale silicon. QSound algorithms deliver a full, more natural and immersive audio experience enabling the creation of true entertainment devices. QSound's market ready audio solutions are highly optimized and commercially deployed in the embedded software market and allow handset manufacturers to differentiate their products through enhanced music playback, digital audio effects, virtual surround sound, 3D game sound and polyphonic ring tones. Whether your Freescale silicon needs audio enhancements, 3D effects, ring tones or virtual surround sound you can obtain industry-leading, extremely efficient and very small footprint solutions through QSound Labs.

To experience QSound quality, please contact us at **info@qsound.com** or visit **www.qsound.com**.

THX® Ltd.

Freescale Symphony Digital Signal Processors and THX Certified Products Deliver Stunning Surround Sound Experiences

Considered the benchmark for audio quality, THX® technologies and certification programs are designed for home theater enthusiasts who demand peak performance from their AV entertainment systems. Freescale semiconductors support THX post-processing features and algorithms in THX Certified AV receivers and pre-amplifier products from leading consumer electronics brands. By leveraging the power of Freescale Symphony DSP processors, THX Certified products deliver stunning surround sound experiences.

THX technology features in AV devices are designed to compensate for the acoustical errors that occur when movies, music and games are translated from the professional studio to the home environment. The result? The home audience always experiences the true impact of entertainment content on their surround sound systems. The THX technology features include:

- Neural-THX Surround, enables broadcast content to be encoded into 5.1-channel format, transmitted in a two-channel format to the home, then decoded back to 5.1 by the onboard decoder in the receiver. In addition, it enables 7.1-channel support for next generation video game titles.

- THX Listening Modes (Cinema, Music, Games): THX Advanced Speaker Array™ (ASA) recreates the studio sound field in the home by digitally reconfiguring the surround channels for whatever content you are playing. This technology establishes THX Listening Modes, making it convenient to have one speaker setup for movies, music and games.
  - o THX Cinema Mode: recreates the ambiance of the movie theater by positioning the 5.1 mix to immerse you in the movie's soundtrack. This creates a theatrical surround sound playback experience—putting you in the middle of the movie.
  - o THX Games Mode: distributes the sound effects and dialogue generated by the game engine to place the audio from a 5.1 mix source in the appropriate "action" location—creating a far more interactive gaming experience.
  - o THX Music Mode: emulates the original studio environment by repositioning the 5.1 surround sound mix further behind you for an accurate and increased sense of spaciousness and localization—placing you directly in the recording session.

- THX Surround EX: decodes the third surround channel from the traditional two surround channels, creating a totally immersive entertainment experience. This enables sound designers to deliver more realistic "flyovers" through an additional surround channel.

- THX Re-EQ™ adapts and restores the accurate tonal balance of a movie soundtrack for the home environment.

- THX Timbre Matching™ filters the information going to the surrounds to closely match the tonal characteristics of the sound coming from the front—ensuring seamless and smooth panning between the speakers.

- THX Boundary Gain Compensation applies a filter to all output channels to equalize the bass, resulting in more true and accurate response. This corrects the way low-frequency sound is perceived at seating positions close to walls.

- THX Adaptive Decorrelation™ changes one surround channel's time and phase relationship with respect to the other surround channel, expanding the listening position to create the same spacious audio experience as in a movie theater.

Waves

MaxxVoice

Today's challenge in audio quality is no longer bandwidth or signal-to-noise ratio, as advancements in digital electronics allow digital voice, music and media to be transmitted and stored easily. The limitations in wireless voice and audio quality are now the acoustic limitations from small speaker systems, low power amplifiers and background noise of the listening environment.

Waves is the leading provider of audio signal processing tools which are used in recording and mastering virtually every top movie soundtrack, music and video game worldwide. Fifteen years of pro audio signal processing leadership has enabled Waves to create a unique understanding of psycho-acoustics, the science of how we perceive sound. By applying this knowledge of how hearing systems work, new signal processing technologies have been developed that enable the entire audio system to be further optimized. These technologies can shrink the size of loudspeakers while simultaneously improving the loudness, clarity and richness of the audio and voice content.

Waves offers MaxxVoice technology, which consists of two separate psycho-acoustic DSP algorithms.

- MaxxBass is a patented bass algorithm that extends the perceived bass frequencies 1.5 octaves below the physical loudspeaker roll-off. This is accomplished using several psycho-acoustic phenomena including the Principle of the Missing Fundamental and the Perceptual Loudness Contour.
- MaxxVoice is a patented dynamics compensation algorithm that combines high-level peak limiting, low-level compression and noise gating technologies. Overall performance is substantially improved in terms of intelligibility/clarity, maximum loudness, and more natural response than with automatic gain control solutions used widely today in the wireless industry.

Freescale and Waves

Waves MaxxVoice is a software-only solution for Freescale's Mobile eXtreme Convergence (MXC) wireless solutions. Solutions are available for voice and music modes. This solution is already shipping in leading models from mobile phone manufacturers.
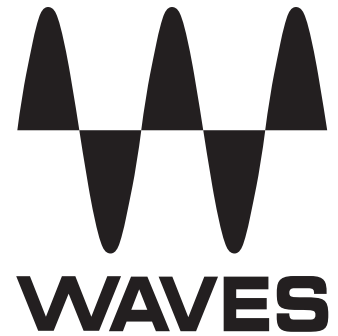
For more information, visit **www.maxx.com.**

Components

AKM Semiconductor, Inc.

AKM is the world's premier supplier of digital audio converter ICs

Offering over 150 unique data conversion products for digital audio applications, AKM has the right choice for professional, consumer, portable and automotive applications. AKM products are widely applied in professional applications, both for leading performance specifications and the best sound quality. Using AKM products to convert digital audio in and out of Freescale DSPs ensures that the best possible audio performance will be preserved. All of AKM's professional products provide 24-bit word lengths and support 192 kHz sampling rates to meet demanding performance specifications. AKM has all of the ingredients necessary for cooking up great products: a seasoned design staff, our leading-edge mixed signal fabrication facility and innovative technology. We specialize in integrating analog circuits into our mixed-signal cores, minimizing your design efforts and shortening time-to-market. Our analog circuits are used in many of our products, establishing us as a leading innovator of mixed-signal and analog ICs, and differentiating us from our competitors.

For more information visit our website at **www.akm.com** or contact our technical support staff at **1-888-AKMSEMI (256-7364)**.

Key Mixed-Signal and Analog Technologies

- True capless headphone drivers
- Low power video converters
- Integrated video line drivers and filters
- Class D amplifiers with boost converters
- High accuracy analog PLLs
- Adjustable and fixed gain microphone amplifiers
- Dual-rail CMOS converters
- Ground-referenced audio and video outputs
- Analog and hybrid volume controls

- Multi-level delta-sigma modulators
- Extraordinary digital filters
- Wideband audio ADC performance
- Analog programmable gain amplifiers
- Piezo speaker drivers
- High-power headphone amplifiers
- Analog automatic level control (ALC)
- Flat out-of-band noise delta-sigma converters
- Charge pumps for generating negative rails

It's All About the Audio

With over 150 products to choose from, it's not always easy to select the best choice. There are some simple logos to identify the top-level market for our devices, depending on their best application.

- Audio4pro™ points out the products with the highest performance to meet demanding pro applications such as recording and live sound. Performance and sound quality are among the highest in the industry for this select group of products.
- Audio4home™ identifies products designed for consumer applications including home and car audio. These products often feature high channel counts for surround-sound, outstanding cost-to-performance ratio, and integration of audio transport functions.
- Audio2go™ identifies products designed for mobile applications, emphasizing low power, small size, and high integration. Popular features include speaker drivers, headphone amps, PLLs and microphone preamps.

Freescale and AKM

Freescale's DSP architecture has proven to be one of the most efficient and cost-effective architecture for audio applications in a growing number of professional, consumer and automotive audio products. Based upon this architecture, Freescale's Symphony audio DSP family is supported by a robust offering of software, reference designs, development tools and strong global technical support-including application support-in every region. Using AKM products to convert digital audio in and out of Freescale DSP's ensures that the best possible audio performance will be preserved.

FREESYSTEMS™

Freesystems Pte Ltd

Wireless Dolby® Headphone System

The Wireless Dolby® Headphone System is designed to transmit both uncompressed CD quality stereo audio and Dolby® headphone surround sound. This high-performance system can support multiple wireless headphones that are integrated with the FS2207 module.

By using FreeSystems existing hardware and DSP firmware, this off-the-shelf product will help consumer electronics manufacturers realize their wireless audio products or applications rapidly, without the need to understand RF or develop any embedded firmware.

FreeSystems Wireless Dolby Headphone System allows you to enjoy high-quality Dolby Digital 5.1-channel DVDs without disturbing your family members. At the same time, you can experience the pleasures of high fidelity and true digital wireless audio transmission in your personal space.

Powered by Freespan™ RF Wireless Digital Audio Technology and advanced DSP decoders from Freescale, the system is able to provide a realistic, true-to-life 5.1 channel surround sound experience.

Features

- Delivers realistic 5.1-channel surround sound over any wireless headphones integrated with Freespan technology
- Decode Dolby AC3/Pro Logic II/DTS/AAC
- Multiple input sources (analog and 2x SPDIF)
- Analog level input (1 or 2 Vrms)
- Coexist with other 2.4 GHz devices
- Long battery life for headphone receiver (>15 hours with 2 AA batteries)
- 8 selectable RF channels and auto power off sequence
- Broadcast mode supports multiple wireless headphones

FreeSystems Advantages

FreeSystems has vast experience in developing RF and baseband ICs as well as designing full wireless audio systems. With know-how in RF technologies, digital signal processing and audio processing algorithms, FreeSystems has developed a unique set of core competencies in:

- RF, antenna design and EMI optimization
- System architecture and design
- Signal processing
- Design for manufacturing

Freescale and Freesystems

FreeSystems develops Freespan™ technology which provides an advanced and robust, uncompromised and uncompressed wireless digital audio link for wireless speaker and headphone applications. FreeSystems Ready-To-Go wireless audio products are highly optimized and are commercially ready for deployment upon request.

FreeSystems has been working with Freescale for many years to develop state-of-the-art audio products for the entertainment market. Our solution complements Freescale's Dolby Headphone and Dolby Virtual Speaker processor reference designs to provide seamless product solutions to customers.

STS

Wireless Digital Audio Solutions

STS, a leading fabless semiconductor company for wireless audio solutions, provides uncompressed high CD-quality sound in the home entertainment, PC multimedia, portable media and infotainment markets. The inherent technology offers unrivalled characteristics in the number of channel audio links, as well as interference robustness and co-existence with other applications in the 2.4GHz ISM band environment without compromising audio quality. It also supports users with wireless data functionality for bi-directional transmission.

STS provides a wire-replacement, robust, guaranteed QoS wireless platform capable of delivering multi-channel uncompressed CD quality sound to multiple receivers with very low latency. With an effective range of 50 to 300 meters, STS technology allows for longer transmission distance within a swift response time. The platform is developed for low power consumption, enabling longer usage span.

Different module form factors are available, depending on the application. This helps customers to differentiate and complement their product development and positioning.

STS supports our customers in seizing new opportunities in the digital and electronic consumer market. With a strong clientele base in Europe, the United States and the Asia Pacific region, STS technology is set to revolutionize the audiophile experience.

Freescale and STS

Through strategic partnerships, STS and Freescale are consolidating their technology platforms and APIs to push the technology front of the next-generation wireless audio products and devices. Freescale was one of the first to create a reference design to support the popular Dolby Headphone algorithm using the Symphony™ DSP56371, the DH1 reference for Dolby Headphone surround sound products. Following the success of the DH1, Freescale has teamed up with STS to create the DH3 reference design which includes STS's 2.4GHz wireless audio transceiver to eliminate the need for headphone wires.

For more information, visit **http://www.sts.sg**.

Uncompressed High Quality Audio

Interference Robustness & Co-existence

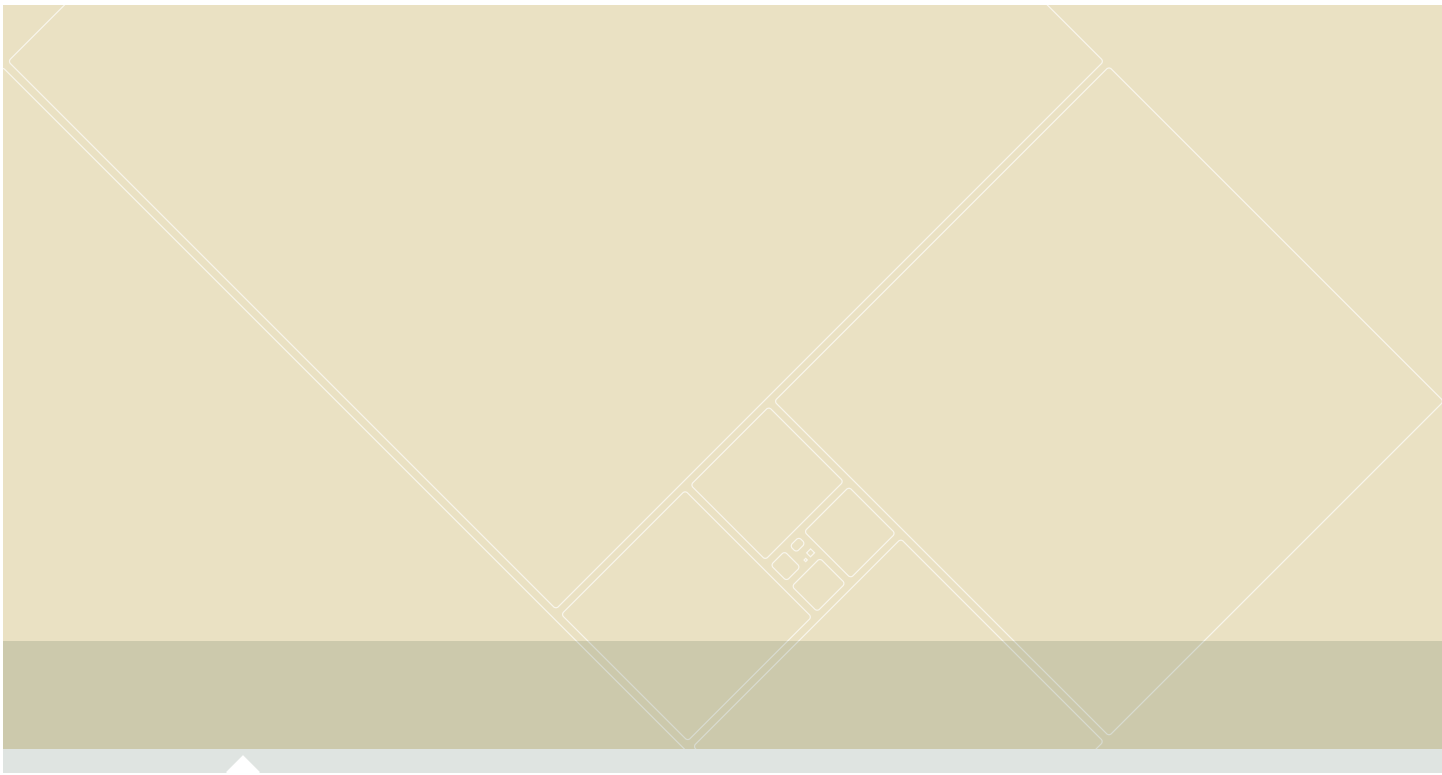Multi-room Topology

Low Power

Bi-Directional Data Channel

Worldwide ISM Band

Digital Modulation

Learn More: For more information about Freescale products
please visit www.freescale.com