ADVANCING INTO 2020

FEATURES:

PASSION FOR CONNECTIVITY
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FROM THE AUDIO & VOICE BUSINESS UNIT:
- POWERING THE SMART CONNECTED FUTURE
- WIRELESS IN INDUSTRIAL ENVIRONMENTS
- DECT EVOLUTION BEGINS TODAY
1.9 GHz solutions: The clear lane

Dear reader,

Dialog Semiconductor is probably best known in the DECT community for our fully integrated, monolithic DECT / DCT / CAT-iq / ULE processor ICs. These devices combine baseband processing and radio functionality to provide a creative platform for a complete range of DECT / DECT6.0 / JDect/K-DECT and ISM band 2.4 GHz products. But we also help you develop the most innovative applications in the 1.9 GHz interference free frequency band for wireless audio solutions.

During this year’s Voice of IoT conference held in Amsterdam on February 7th, there was one message that really stood out: “the 1.9 GHz DECT frequency band offers the best Quality of Service (QoS) due to its unique protected interference free band”. One picture visibly emphasized this point and the clear benefit of 1.9 GHz. It showed a road with two lanes, one completely congested with scooters and cars and the other with a single cyclist and a clear road ahead. “You get a better quality journey on a clear road than faster vehicles on a totally congested road”.

Our team has been involved in the 1.9 GHz DECT standard from the start in 1992. Since then the standard has evolved and now covers enterprise, residential cordless, HD voice terminals for broadband modems, sensors, and full hi-fi semi-professional audio applications. We continue to closely follow the latest developments, and in the first quarter of this year Dialog was the first company to receive type approval on the new multi-level modulation 1.9 GHz radio solution with the DA14495. It shows our commitment to innovation in this unique market.

The great benefit of Dialog’s 1.9 GHz SoC solution is that it lets you use the chips in new markets and applications that benefit from the interference free frequency band, the low latency communication capabilities and audio processing possibilities. Take a look at the applications bundled in this Dialog Today magazine and let them take you on a journey that showcases the wide spectrum of applications benefiting from this 1.9 GHz standard.

Let’s innovate!

Arend van der Weijden

Creating DECT-based applications often requires quite some knowledge of the chip architecture and RF design, but also of the stack itself and how it is used. And when the product is finished, it needs to be certified and must be (RF) tested in production as well. All-in-all that’s a lot of specialized knowledge and skills.

To make it easy for customers and take away the most difficult parts of a DECT design, Dialog has created fully integrated modules. There are options that support wireless voice or audio, in application areas like Conferencing, Intercom, Tour Guide or Public-Address Systems. They include all the necessary hardware and have the complete stack on board; can be controlled with an extensive API; support all regions; and can be used either as a Fixed Part or Portable Part. All in a single module. What’s more, as there is also an antenna on board, the module is already certified for EU-, US- and J-DECT.

Today’s markets and applications increasingly demand faster time-to-market to take advantage of constantly evolving consumer demands. While this is often the main driver for using a modular solution, the key is that it lets you fully concentrate on the end application.

Many of the solutions in this Dialog Today are based on our modules and hopefully give a flavor of the many opportunities that are possible.

So enjoy!

John Pol
DECT EVOLUTION BEGINS TODAY
DECT is finding great success in new applications.

RIEDEL INTRODUCES BOLERO
Bolero is a point-to-point, full-roaming, DECT-based intercom system in the license-free 1.9GHz frequency range.

GET MORE FROM DECT
Among the latest DECT extensions are some of the highest security levels for wireless communication.

SENNHEISER PRESENTS TEAMCONNECT WIRELESS
Mobile audio conferencing solution for up to 24 participants.

SMART DOOR INTERCOMS
Smart door intercoms are about convenience, letting people answer the door via their phone.

AUDIO-TECHNICA: LEADING AUDIO INNOVATIONS
The manufacture, marketing and distribution of problem-solving audio equipment.

POWERING THE SMART CONNECTED FUTURE
Dialog is on track to sustain its record of innovation, diversification and growth.

DECT GOES ON TOUR
Listen Technologies chose DECT to deliver on an ambitious vision.

NEW DECT APPLICATIONS
DECT-ULE brings extensions to the DECT standard that can open doors.

INTERVIEW: SHURE MICROPHONES
Dialog Today speaks to William Berrie, Technical Lead at Shure UK.

INTERVIEW: ASMUND TIELENS, LIVASSURED
Livassured develops certified medical devices for epilepsy sufferers.

CLASSROOM EDUCATION TOOL THAT IS THE NEW TEACHER’S PET
Swivel takes full advantage of mobile devices to create an ingenious video teaching aid.

PERFECT SOUND FROM THE CLASSROOM TO THE BOARDROOM
Revolabs is using its experience in in DECT-based enterprise wireless microphone systems to push DECT further.

PANASONIC – DELIVERING SUPERIOR SOUND
Panasonic’s DECT-based digital wireless microphone and intercom are developed to make the sound quality even better.

PLANTRONICS DELIVERS ANOTHER FIRST FOR DECT WIRELESS
As popularity of DECT wireless headsets gains momentum so does the need for heightened security requirements.

DECT INTERCOM ENSURES THE HOUSE ALWAYS WINS
When JVCKENWOOD decided to create a wireless intercom solution for casinos, it was clear, DECT was the technology to bet on!

WIRELESS CONNECTIONS IN INDUSTRIAL ENVIRONMENTS
Familiar from cordless voice applications, DECT is an ideal candidate for data links in industrial environments.

DECT: BRINGING BENEFITS TO HOME SECURITY
Panasonic’s video intercom system was named DECT Innovation of the Year at the DECT Today awards.

NEW THROWABLE MICROPHONE BOUNCES ONTO THE MARKET
Essentially a wireless microphone in a padded cover, Catchbox allows anyone to speak simply by throwing it to them.

WIRELESS AUDIO OVER DECT: IN PERFECT SYNC
Dialog, Inteno and Audio Pro show how DECT enables high-quality audio via a standard IAD.

SIPP AND DECT BRINGING PEOPLE TOGETHER!
Wireless headphone parties just got a whole lot simpler.

HOW THE WORLD’S FIRST TRULY WIRELESS SURROUND SOUND SYSTEM CAME TO EXIST
OneAudio believes that good audio should be a part of everybody’s life.

ONE SMALL STEP FOR WIRELESS AUDIO
Plantronics has a long history of working with Dialog Semiconductor to create DECT-based wireless products.

EXPANDING THE COMMERCIAL LIFETIME OF DECT
DECT has a commercial history stretching back 25 years, but what is the future for DECT?
DECT evolution begins today

Although the residential cordless telephone market is saturated, DECT is finding great success in new applications. To make that possible, the technology itself is evolving with new features and capabilities: from previously unused higher data rates to proposals that reduce latency and improve reliability even further. The latest chip from Dialog Semiconductor is the first to support these enhancements to the DECT standard, allowing manufacturers to start their own DECT evolution today.

More than a decade ago DECT was incorporated into the International Mobile Telecommunication standard, known as IMT2000. Among other enhancements, the IMT2000 specification included a provision to increase the technology’s data rate significantly through multi-level modulation. The extra bandwidth enables DECT to handle more than just voice communications. However, with the technology historically targeting mainly residential voice-based applications, for many years it was not necessary to exploit the higher data rate.

The desire to extend DECT beyond voice and into new application areas has grown. To meet this desire, manufacturers need to deliver higher-performance DECT systems that can handle many more connections and data volumes. Now the higher data rate available in the IMT2000 specification is becoming attractive and even essential. For example, it allows DECT to support high-density semi-professional applications, better microphone and intercom systems, and larger smart home and Internet of Things networks.

“The exponential growth in 2.4 GHz applications has increased the need for an evolution in DECT to benefit from the more advanced multi-level modulation in an interference-free frequency band for better quality of service. The increased data brings huge potential for DECT to play a vital role in many applications,” says Arend van der Weijden, Vice President Wireless Audio and Voice at Dialog Semiconductor.

**URLLC ready**

Of course, DECT offers many additional unique benefits over other wireless communication protocols: such as its long range, renowned reliability and low latency. These advantages mean that, with a few tweaks to the basic technology, DECT could be an ideal choice for so-called ultra-reliable, low-latency communication (URLLC) applications such as industrial automation, professional audio solutions and mission-critical systems.

In cooperation with the DECT Forum, ETSI’s DECT technical committee (TC DECT) has been exploring exactly what tweaks are necessary. The committee is working on recommendations that improve latency to below 2 ms, and enhance reliability to below 10⁻⁶. These recommendations are now being discussed with ETSI for consideration as part of the DECT standard. Looking further ahead, there are plans to enhance DECT performance even further as part of the upcoming IMT2020 standard. Proposed further data rate increases would bring applications such as smart cities, augmented reality and self-driving cars within DECT’s reach.

**World’s first DECT evolution silicon**

Now Dialog Semiconductor is helping turn this talk of DECT’s future evolution into concrete reality today. In May of this year, the company announced proof-of-concept silicon of the world’s first “DECT evolution” SoC. The SmartBeat™ DA14495 is a low-power 1.9 GHz solution, and the first chip on the market to support multi-level modulation and increased data rates up to 3.5 MHz.

“By taking advantage of the highest specifications available for DECT, manufacturers can begin opening up exciting new opportunities for the technology. This is precisely what our DA14495 does. It offers the full power of the IMT2000 specification, and allows the further enhancements currently in discussion to be implemented as soon as they are approved. For system designers, it means their DECT evolution can begin today for applications including voice, audio and data,” explains van der Weijden.

**Low power, high performance**

Power consumption is always a key concern, particularly in sensor networks and other ultra-low energy applications. To reduce its power usage, the SmartBeat DA14495 is manufactured in very small geometry CMOS. The SoC integrates an efficient 32-bit ARM Cortex-M0 microcontroller and C-programmable 32-bit Cadence (Tensilica) HiFi 3 DSP. Both processors’ clock speed can be scaled to reduce power consumption even more.

This combination enhances low power usage, while delivering the performance necessary for high-end audio with outstanding sound quality. Moreover, applications such as noise reduction and cancellation, microphone beam forming, audio and voice codecs and sensor fusion algorithms can be run on the integrated DSP.

Overall, the DA14495 can enable products with up to three times less power consumption. This in turn allows smaller batteries to be used, saving space and weight in end-solutions while maximizing battery lifetimes.

**C for security**

As the volume and privacy demands of data carried by wireless links has increased, security has become an increasingly important issue. DECT Forum defines three security level steps within the DECT protocol: steps A, B and C. Most devices to date have featured only the lowest level (step A). A few systems are now being developed with step B security. The DA14495 features step C security, allowing system developers to offer the highest protection for sensitive data as soon as infrastructure for verifying this level of security is available.

“Opening up a wide range of new applications, the DA14495 lets system developers start their own DECT evolution today while future-proofing their systems for upcoming requirements. It’s the ideal stepping stone towards DECT’s long-term future as specified in the IMT2020 standard,” van der Weijden concludes.
The new DECT Evolution

The DA14495 in new applications
- Tour guides
- Intercom systems
- Program Making and Special Events (PMSE) products
- Pro-Audio
- Gaming
- Public Address
- Unified Communication headsets

www.dialog-semiconductor.com
Riedel introduces Bolero

A next-generation, fully artist-integrated wireless intercom system

Bolero is a point-to-point, full-roaming, DECT-based intercom system in the license-free 1.9GHz frequency range. Bolero runs over a standards-based AES67 IP network. Decentralized antennas connect to AES67 switches and then to Riedel’s Artist digital matrix intercom frames equipped with AES67 client cards, creating a fully integrated point-to-point intercom ecosystem with seamless roaming capabilities. By using multiple AES67 switch cascades, Bolero can easily accommodate large areas and long distances. To the system, the belt-packs look just like Riedel Artist panels but are wireless, providing the highest levels of interoperability, programmability, flexibility, and user mobility. A reprogrammable FPGA future-proofs Bolero antennas by permitting upgrades for future networks.

Bolero uses a high-clarity 7KHz voice codec to provide both higher speech intelligibility and more efficient use of RF spectrum. The codec has excellent latency characteristics providing lip sync free communications, while offering excellent processing efficiency, providing outstanding belt-pack battery life, and saving DSP processing power for other functions. The codec produces exceptional audio clarity scores across multiple languages as measured on the PESQ scale. The PESQ score was developed to assess human voice quality, using true voice samples, in telecommunications.

As a result of its highly economical RF bandwidth management, Bolero operates at twice the spectrum efficiency of other DECT-based systems. That equates to up to a category-redefining ten belt-packs per antenna (fully roaming) and up to 100 antennas per system.

With the adjustable power output of Bolero antennas, users can reduce power to enable higher antenna density in a given RF space and therefore improve performance in harsh RF environments. To increase capacity, users can create “islands” of RF spaces. A Bolero belt-pack is registered with a unique system ID, and each belt-pack is capable of “remembering” up to 10 other system IDs. This enables beltpacks to move from island to island; e.g. studio to studio. In this manner, Bolero is able to support deployments of more than 100 beltpacks.

Bolero features Riedel’s exclusive Advanced DECT Receiver (ADR) technology, a multiple-diversity receiver technology specifically designed to improve RF robustness by reducing sensitivity to multipath RF reflections. The unique ADR receiver is able to differentiate between multipath reflections to cancel out group and phase delay, thus reducing audio drop-outs. The net result is a significant improvement in usability as well as fewer frame and bit errors, making the advanced DECT receiver ideal for use in challenging RF environments where other systems might have great difficulty.

Save time, add convenience

Bolero was designed to make life as easy for the customer as possible. With other solutions, registering a belt-pack to the antennas is often a complex process that requires a user to go into the belt-pack menu and apply a pin code. This process can easily take two minutes per belt-pack, adding a significant amount of time if the operator must configure dozens of beltpacks. Bolero incorporates Near-Field Communication (NFC) technology for both the belt-pack and the active antennas, so registration is as easy as simply touching the belt-pack to the antenna.

Based on Riedel’s extensive rental experience, Bolero beltpacks use a combination of premium materials, including high-impact plastics and rubber over-molds, to create a tough device with an ergonomic feel that ensures easy use and handling. The beltpacks also support Bluetooth 4.1, allowing a Bluetooth headset or a smartphone to be connected.

Bolero beltpacks feature four primary channel buttons and two additional buttons for each of the 6 intercom channels, plus a separate “Reply” button that easily facilitates a reply to the last channel that called. Four small rubber pips on the tripod belt clip allow the belt-pack to be used on a desk as a wireless key panel. And, in an industry first, the beltpack includes an integrated mic and speaker that enables it to be used as a two-way radio without requiring a headset.

www.riedel.net/products/intercom/bolero/
DECT is evolving. To address new applications and new market opportunities, this tried-andtrusted wireless technology is adding new features and capabilities. Among the latest extensions are some of the highest security levels for wireless communication plus huge increases in the number of users - without impacting sound quality.

Taking security to new levels

Cybercrime – including eavesdropping on business-sensitive calls – is a growing problem for organizations in all sectors. Thus, for applications such as professional headsets, the ability to protect private conversations is essential.

The DECT Forum defines three cumulative security level steps within the DECT protocol over and above the original security standard. Each higher step includes all the features from the lower steps. Step A addresses certain vulnerability in the original standard and introduces secure DECT certification. Step B adds strong AES 128-bit encryption for authentication, while Step C also encrypts the full audio stream using AES 128-bit keys.

The first chip to offer full Step C security was the SmartBeat™ DA14495 from Dialog Semiconductor. This low-power 1.9-GHz solution features a dedicated crypto engine that speeds up the hugely complex calculations required to implement advanced security algorithms. In fact, this engine exceeds the requirements for Step C, allowing designers to implement even higher, military-standard security in their enterprise level DECT applications.

In particular, it features a random number generator that is compliant with the FIPS 140-2 standard required by the US military and government and increasingly recommended for financial institutions and private companies around the world. The engine also supports AES encryption with 192-bit and 256-bit keys – beyond the 128-bit encryption specified in DECT security Step C.

Radio speed brings greater user density. The SmartBeat™ DA14495 was also the first DECT chip on the market to support multi-level modulation and increased data rates up to 3.5 MHz, features that were included as provisions in the DECT specification when it was incorporated into the IMT2000. The DA14495 can achieve this enhanced data rate thanks to a novel DECT radio transceiver with integrated RF PLL that supports GFSK, π/2-DBPSK, π/4-DQPSK and π/8-DbPSK modulation.

A consequence of this increased data rate is that applications built on the DA14495 can cope with a much larger number of distinct communications simultaneously with no concerns over interference or lagging. For example, the Jabra Engage series of professional headsets combines the DA14495’s high data rate with advanced codecs to pack three times more data into the same number of radio channels.

Consequently, the Engage series, which also boasts the military-grade FIPS 140-2 and AES 256 security, can support up to 4 times as many users in the same space as previous Jabra product ranges. In Europe, that means 210 narrowband audio headsets or 160 wideband audio headsets can operate in the same office with no negative impact on audio quality and no deployment issues.

“We know from our research that calls are getting more complex, longer and more business sensitive – a trend driven mainly by a changed customer journey where people look for help online first and only escalate more complicated problems to a call when they can’t find a solution themselves. We have made the new Jabra Engage series specifically to address those pains, with more wireless capacity to power more people on wireless calls simultaneously. Importantly, during the call, they can reach out for critical information in other parts of the office,” says Per Sundnaes, Senior Portfolio Product Marketing Manager at Jabra.

Evolving to a new market reality

DECT technology is showing its versatility as the wireless protocol of choice for a much wider range of applications. The future of DECT no longer lays in dominating a single billion-unit market but in capturing multiple smaller markets. Thus, the capabilities of DECT will continue to evolve in different direction to address the divergent needs of these markets.

“By taking advantage of the highest specifications available for DECT, manufacturers can begin opening up exciting new opportunities for the technology. The DA14495 lets system developers start their own DECT evolution today while future-proofing their systems for upcoming developments,” says Arend van der Weijden, Vice President Audio and Voice at Dialog Semiconductor.

www.dialog-semiconductor.com/products/audio/wireless-audio/da14495
Sennheiser presents TeamConnect Wireless,
First wireless, mobile audio conferencing solution for up to 24 participants

Ease of use, better sound quality and reliability: TeamConnect Wireless system – the first, go anywhere, portable wireless conferencing solution. As businesses work increasingly flexibly across multiple locations and geographies, the conference call has become an essential stage for business achievement. For this fast-moving and dynamic working environment, Sennheiser’s TeamConnect Wireless brings to an end the age of conference call frustrations, delivering unmatched ease of use and excellent sound quality in a portable system for up to 24 participants.

Launched at ISE 2016, TeamConnect Wireless from Sennheiser is designed to bring an end to the frustrations of setting up ad hoc conference calls. It is a high performing portable conferencing solution for up to 24 people that can be used by anyone, anywhere – thanks to its unmatched ease of use, speed of set up and cutting edge connectivity. The solution was created to fit seamlessly into the independent, “bring your own device” ethos of the most fast-moving and flexible of modern workplaces – all with the audio specialist’s trademark high quality audio. TeamConnect Wireless pairs leading edge functionality with high end design that can look at home in even the most prestigious office environments. Use of premium materials such as glass and aluminum makes the system tough enough to take anywhere, while conveying unmistakable business class elegance.

**Connect smart devices, computers or landlines**
TeamConnect Wireless offers peerless connectivity options, making any device immediately capable of establishing a professional quality conference call in seconds. The stylish portable solution is made up of four units – one master and three satellites that can be easily transported in a durable, easy to transport charging case. The units are wirelessly linked by a DECT connection and provide a flexible system that can be set up in virtually any room or table arrangement. As an alternative to the charging case, TeamConnect Wireless can be supplied with an elegant charging tray as of now.

Users can quickly connect their own Bluetooth smart device or computer wirelessly, with NFC making pairing with compatible devices simple. Wired connections are also possible via USB – ideal for web or video conferencing via a computer – or jack cable, so it can readily fit in to a broad range of hardware set-ups.

**Control everything at a touch**
The system brings a new level of usability to conferencing that makes it easy for anyone to operate with minimal instruction, freeing users from the need for technical support. Simply slide the four units from the case and they automatically power up and link together. The intuitive, touch-sensitive control panel on the master unit allows you to connect devices and control calls, while the satellite units have touch controls for muting or adjusting volume. Uniquely, TeamConnect Wireless supports multiple simultaneous audio channels, so additional callers can be joined to an existing conference by just connecting another device.

With set up taking no time at all, TeamConnect Wireless sets the stage for a brilliant meeting. As a Sennheiser product, it delivers excellent acoustic clarity and speech intelligibility, which allows for natural conversation and improved meeting productivity.

TeamConnect Wireless is optimized for IP solutions, which includes Skype for Business, Cisco Jabber, Webex, and Go-To-Meeting and is part of the TeamConnect Family from Sennheiser which includes the classic TeamConnect Wired system, TeamConnect Wireless and the TeamConnect Ceiling.

www.sennheiser.com/teamconnect-wireless

**ABOUT SENNHEISER**
Audio specialist Sennheiser is one of the world’s leading manufacturers of headphones, microphones and wireless transmission systems. Based in Wedemark near Hanover, Germany, Sennheiser operates its own production facilities in Germany, Ireland and the USA and is active in more than 50 countries. With 19 sales subsidiaries and long-established trading partners, the company supplies innovative products and cutting-edge audio solutions that are optimally tailored to its customers’ needs. Sennheiser is a family-owned company that was founded in 1945 and which today has 2,700 employees around the world that share a passion for audio technology. Since 2013, Sennheiser has been managed by Daniel Sennheiser and Dr. Andreas Sennheiser, the third generation of the family to run the company. In 2014, the Sennheiser Group had sales totaling 635 million. www.sennheiser.com
Smart door intercoms – convenience at a distance

Smart door intercoms are all about convenience. By connecting the doorbell to landline or mobile telephone systems, they let people answer the door from anywhere via their phone. Now a new solution from Telegärtner Elektronik takes that convenience to a new level thanks to a DECT-based wireless connection that makes installation simpler while adding new system features.

How do you make a user-friendly product even more user-friendly? That was the question Telegärtner Elektronik took on when they set out to design a wireless version of their successful DoorLine Slim intercom. A wireless system would do away with the need to link the intercom with the telephone system or routers by running long cables inside the building. But it needed the right wireless connection.

“DECT was the natural choice for our easy-to-use smart door intercom” says Andreas Hopf, Product Manager, Telecommunications at Telegärtner Elektronik. “Firstly, it is the optimal wireless connectivity solution for voice applications. And it is supported by many existing gateways such as FRITZ!Boxes, guaranteeing maximum interoperability. Moreover, its long range and interference-free transmission make it even easier to install intercom stations outside the house.”

Easy to use, easy to design

To implement the DECT connection in its new solution, Telegärtner Elektronik chose the SC14CVMDECT module from Dialog Semiconductor. This integrated radio transceiver and baseband with a complete protocol stack is supplied as a pre-certified and fully tested drop-in module. It is designed to minimize the RF design know-how, resources and effort needed to create new applications.

“The wireless DoorLine Slim had to work with existing gateways, so a GAP (General Access Protocol) compliant DECT solution was essential. We found the Dialog module very easy to program for this application. It is a complete solution and Dialog provided excellent documentation and support, so we didn’t have to spend too much time on the RF link and could focus on creating value-add features that would make the new product more attractive to consumers,” adds Andreas Hopf.

Clear, convenient, secure

As a result, the DoorLine Slim DECT system offers a high-quality solution for a wide range of applications from family houses and apartments to residential communities. When anyone rings the doorbell, the system makes a call to the landline or mobile phone number. If it doesn’t get a response, it can automatically dial an alternative number from a user-defined list. This means users need never miss a visitor and can answer the door whether they are at home, at the shops, or away on holiday. Clearly a huge benefit to security as well as to convenience.

The DECT communication between intercom and router is highly secure, with encryption according to DSAA (DECT Standard Authentication Algorithm). And DECT’s wireless-independent frequency range ensures the connection between intercom and router is always stable – making the DoorLine Slim DECT, which also features a door opener control, a reliable solution.

An elegant glass panel with no holes or openings ensures the DoorLine Slim DECT is well protected against adverse weather. Innovative exciter technology allows this surface to act as a loudspeaker. Combined with the excellent voice quality of DECT, this guarantees crystal clear communication from user to caller.

Established in 1962, Audio-Technica is a worldwide group of companies devoted to the design, manufacture, marketing and distribution of problem-solving audio equipment. Initially known for state-of-the-art phonograph cartridges, Audio-Technica now creates high-performance microphones, headphones, wireless systems, mixers and electronic products for home and professional use.

As smartphones and music downloading become more and more widespread, high-resolution digital sound sources are commonplace. The sound quality of these high-resolution devices vastly exceeds that of CDs. These devices can effortlessly generate extraordinary sound quality from recordings made many, many years ago, often bringing to life a sound quality that exceeds that of recordings made using the very latest technology.

This is the power of the digital-audio age. At the same time, we realize that the old sound source recordings are primarily analog. Analog recordings capture a quality that is surprisingly good even by recent standards.

If this case, it is not abnormal to want to hear these recordings as they are, in analog, without converting them to digital signals.

Since its founding in 1962, Audio-Technica has continued to manufacture cartridges and preserve the tradition of analog audio. The appeal and the potential of analog sounds are limitless. This is why we still continue to make cartridges to this day. Cartridges faithfully pick up music information from record grooves so delicate that they almost can’t be seen with the naked eye. This precision technology and our founding spirit have been passed down to this day as important assets that support the very roots of our heritage. Analogue cartridges are always the starting point in our hearts.

Audio-Technica commercialized its first microphones in 1978. The basic principle of microphones, catching mechanical vibrations and converting them into electrical signals, is the same as that for cartridges that pick up the musical signals in the grooves of an analog record. The precision technology honed through our cartridge experiences and achievements are also applied to our microphones. Although this is a very natural concept, it was not an easy task to penetrate the professional market with our significant objectives.

That was a long time ago. Currently Audio-Technica microphones are now favored by professionals in the U.S. and worldwide, being used in various prominent recording projects such as music events and high-profile sports broadcasts.

The shining achievements of these microphones are epitomized by their use for the live broadcasts of the Grammy Awards, held every January or February in Los Angeles. The Grammy Awards are the world’s most prestigious music awards that highlights the most prominent night in the music industry.

Audio-Technica has been continuously providing microphones for musical instruments, stage vocals, speech and various other microphones since the 40th Grammy Awards in 1998.

The unshakable reputation of our microphones has been built over the years through not only their excellent sound quality, but also their unsurpassed reliability, essential during live broadcasts, where perfection is a given.

Sounds are everywhere. This is the sentiment that we hold when making our microphones. They do not just come from the colorful stages of music and sporting events. Sounds can be found in every landscape that you come across on the planet, sound “breathes” along with people and all living things. Audio-Technica microphones are created for these countless uses and surprising discoveries. Microphones for Karaokе use in the entertainment category hold overwhelming market shares in Japan. And conference system products that organically combine advanced technologies have been widely adopted by numerous government, educational and business facilities, gaining unshakable trust.

By building upon our analogue heritage, we will expand the limits of DECT technology, pursuing an ever-changing purity of sound that creates connections and enriches lives. Audio Technica will continue to provide products that deliver high quality sound while pursuing new technologies.

www.audio-technica.com
Dialog Semiconductor will probably be best known to the DECT community for its single-chip family comprising the industry’s first fully integrated, monolithic DECT / DCT / CAT-iq / ULE processor ICs. These ICs combine baseband processing and radio functionality and provide a platform for creating a complete range of DECT / DECT6.0 / K-DECT and ISM band 2.4 GHz models.

Dialog’s single-chip solutions feature a 16-bit CompactRISC™ microcontroller for general processing including power management and non-real-time MMI functionality. In addition, a powerful Gen2DSP core processes the audio streams and delivers the superior voice quality of the CAT-iq standard. All of Dialog’s single-chip DECT / CAT-iq solutions include support for hands-free speakers, LCD displays and LCD backlighting, allowing various products to be developed for different market segments using the same chip.

However, the reality is that Dialog Semiconductor provides a broad portfolio of semiconductor solutions, as we shall see.

**Mixed signal technologies for growth & volume markets**

While DECT, CAT-iq and ULE remain at the core of Dialog’s business, the company is, at heart, a fabless provider of mixed signal integrated circuits optimised for personal portable, low energy short-range wireless, LED solid state lighting and automotive applications.

In touch with today’s gravitation towards mobile computing and communications devices, Dialog has developed leading power management intellectual property (IP) and focuses on power saving technologies. Dialog solutions power today’s smartphones, tablets, ultrabooks and other portable devices, with business units responsible for Power Management, Ultra Low Power Audio, Short-range Wireless Technologies and Low Standby Current, High Efficiency AC/DC Power Conversion.

Alongside developing proprietary solutions that are optimised for specific markets, Dialog also works closely with industry bodies to define and implement new wireless standards and technologies. As a result, Dialog’s solutions for real-time wireless voice and data applications ensure the earliest support for the improved and innovative features specified in these new releases.

One example of this would be Dialog’s SmartPulse™ - wireless sensor network devices which use DECT ULE to provide interference-free connectivity for smart home appliances with ceiling-to-cellar reach and the option of voice control. SmartPulse is used by customers including Philips, AVM, Panasonic, Everspring and Gigaset.

Another example of Dialog’s innovative design process is SmartBond™, a Bluetooth® Smart System on Chip (SoC) that has been designed for the wearable computer, wireless keyboard and mouse, SmartTV remote control and proximity tag/indoor navigation markets. The SmartBond low power solution doubles battery life for Bluetooth Smart products, or alternatively enables fewer batteries to be used in contrast to existing SoCs on the market.

**Test and physical laboratories**

While leveraging the outsourcing model to its fullest for volume manufacturing, Dialog still retains a prototype test facility, including physical analysis capabilities in-house. This facilitates fast ramping to volume manufacturing at the foundry and at packaging and test sub-contractors, achieving best in class industry yields and extremely high quality and reliable products.

Equally important, it allows Dialog to minimise the scope of tests required and the device test time, helping to reduce unit costs. Dialog Semiconductor maintains this test and physical laboratory at Kirchheim, near Stuttgart, Germany.

**The “go to” company for integrated power saving technologies**

With approaching 30 years of experience, Dialog Semiconductor provides flexible and dynamic support, world-class innovation and the assurance of dealing with an established business partner.

Dialog continues to have smartphone and tablet design win success for power management and audio through engagements with the world’s leading, trend-setting global consumer electronics brands. Dialog takes a “total system” approach to minimising energy usage with its highly integrated and configurable power and audio management circuits which enable portable devices to charge faster and support power-hungry multimedia applications and extend consumers’ playtime between charging.

With R&D centres in ten countries, spanning the USA, Europe, APAC and Japan, there is little doubt that Dialog is ideally placed to service global, brand-name OEM clients. Currently the highest growth mixture semiconductor company, Dialog is geared to provide high-volume custom product and ASSP product capability, having developed a broad portfolio of ecosystem partnerships with the leading application processor vendors.

Through continued investment in R&D and strong relationships with its customers, processor and foundry partners, Dialog is on track to sustain its record of innovation, diversification and growth over the coming years.

www.dialog-semiconductor.com
DECT goes on tour

When assistive listening experts Listen Technologies decided to develop a new tour guide communication system, they set themselves a simple-sounding goal: provide the best user experience for guides and their guests. They realized that DECT was the only wireless protocol that would allow them to deliver on their ambitious vision.

Wireless tour guide systems are a growing market, allowing guides to bring visits to life while giving visitors the freedom to wander. But most wireless tour guide systems available today are quite simple affairs that just focus on getting commentary from the guide to the visitor – typically using Wi-Fi or FM radio links.

A game changer

When they started planning their new ListenTALK system, Listen Technologies wanted to change the game with a tour guide system that delivered the best possible experience for guides and visitors alike. Great audio and reliable communication were essential, but so were ease of use, flexibility and long battery lifetimes.

The concept was a system that could switch between group leader and group member simply by inserting a clip – giving complete freedom over the number and size of groups. Those groups could be formed at the push of a button or by tapping units together to pair them via NFC. Furthermore, group members should be able to put questions to the guide without interrupting each other, and with the group leader able to choose who hears the questions: just themselves or the whole group.

Delivering that would take a different wireless technology.

A clear choice

“We have a lot of experience in RF design and did a lot of research into wireless technology options. With all our requirements, there was really only one choice. In contrast to the crowded 2.4 GHz band, DECT has a dedicated spectrum to ensure reliable transmission in any environment. Its low delay enables natural interaction. And it was the only technology to offer two-way communication and meet our power requirements,” says Tracy Bathurst, Senior Vice President of Listen Technologies.

To implement their DECT solution, Listen Technologies chose the SC14492 single-chip audio transceiver and DA7212 stereo codec – both from Dialog Semiconductor. “Dialog is a great DECT partner. They have great products that are highly integrated and meet our power consumption requirements. And they have an extensive code base to help you get going on the integration. Dialog supported us with anything we needed on the hardware and worked really well with our software design partner as well,” Bathurst adds.

A growth area

DECT was an unusual choice for a tour guide system, but one that Bathurst believes will become more common in the coming years. “People used to think that DECT was just a point-to-point technology for phones. But DECT suppliers are starting to open people’s eyes and show that DECT is ideal for broadcasting too.”

That growth, however, could be slowed by an issue Listen Technologies faced in getting their solution certified. ListenTALK has some unique elements to its DECT implementation, particularly in the way it handles broadcasting and initiates the feedback channel. As a result, Listen Technologies had to put in extra effort to help the certification lab understand their implementation.

A resounding success

ListenTALK is now on the market in the ramp-up stage. And it is already gathering rave reviews. With 7 hours of battery lifetime as a group leader unit and 12 hours as a participant, there is never a need to recharge or change batteries even on the longest tours. But, true to Listen Technologies’ original vision, it is the audio quality and ease of use that are really making waves.

“People are saying, ‘Wow, I never knew there was a device that could do this and sound so good!’” Bathurst concludes. “Because of the audio performance and reliability of the link – made possible thanks to DECT – users are finding ways to use ListenTALK beyond the tour guide scenario. And that is giving us great ideas for specific new products to target other applications.”

www.listentech.com
New DECT application sees the light of day

DECT-ULE (ultra-low energy) was designed to reduce DECT’s power consumption for use in sensor networks. But the extensions to the DECT standard that DECT-ULE brings can open doors to all kinds of new applications that don’t depend on low energy consumption. That was exactly the case when Dialog and Panasonic Industrial Devices SUNX teamed up to create a brand new DECT application: a wireless monitoring system for solar panels.

Concerns over fossil fuel reserves and carbon emissions have driven the growth of commercial solar power plants. These plants typically have hundreds or even thousands of photovoltaic (PV) modules producing electricity direct from sunlight. Operators looking to deliver predictable power to the grid need to ensure all their modules are working correctly. But with so many modules, how do you notice a single failure? And how do you identify which one module of the thousands has failed?

Cutting costs for solar power plants

Panasonic Industrial Devices SUNX wanted to give solar power plant operators a simple and cost effective way to answer those questions. So they teamed up with fellow ULE Alliance member Dialog Semiconductor to develop a DECT-based wireless monitoring system for solar farms. The system monitors the output from each module – or string of modules connected in series – and sends the results to a central data collation point via DECT. The central unit can be connected to the internet, allowing the operator to monitor the plant remotely.

The system offers plant operators a number of benefits. Firstly, it allows them to immediately spot any failures in the solar array and pinpoint the module or string where the failure has occurred. This allows them to improve the efficiency of their maintenance and repair programs. Moreover, as a wireless system, it can be installed as part of a new plant or retrofitted to existing arrays at lower cost and complexity than a wired solution.

New directions

Solar panels may not be everyone’s first thought for a DECT application, but DECT-ULE is in fact a natural choice for such a system. Originally targeting sensor networks, DECT-ULE has extended the number of Portable Parts (PP) that can connect to one Fixed Part (FP). For example, Dialog’s software allows up to 128 PPs per FP. This is ideal given the large number of modules in a solar plant, allowing operators to cover their entire array with just a few base stations. What’s more, the sleep / wake-up cycle is a natural fit for the periodic monitoring solar modules require.

“The solar power monitoring system shows how the Internet of Things extensions that came from the DECT-ULE technology are opening up new applications for standard DECT. Through this collaboration with Panasonic Industrial Devices SUNX, we’ve taken DECT in a completely new direction,” said Patrick Barels, Principal Applications Engineer at Dialog Semiconductor.

Panasonic developed the monitoring nodes and base stations based on Dialog’s SmartPulse wireless modules and development boards.

To support a high ratio of nodes to base stations, the two companies developed an innovative time-multiplexing approach. This ensures each of the hundred or so monitoring nodes connects to the base station every 10 minutes – without interference or signals crashing.

DECT’s blend of characteristics was the perfect match for the system we wanted to create, and working with Dialog made developing the communications side simpler – so we could focus on the application. Together, we’ve created a system that can help solar power plants control their operating costs and deliver reliable power output to the grid.

Testing in the field

In-field testing was a key part of the development and verification of the new Panasonic Industrial Devices SUNX wireless monitoring system. These tests were carried out in conjunction with NTT facilities out at various solar arrays in Japan, including the Onomichi Solar Power Plant near Hiroshima. The plant’s solar array was split into 4 sections each containing 110 strings of around 12 solar modules. Each section had a central data concentrator / DECT base station, and each string had a DECT-enabled monitoring node.
Shure microphones and audio systems

For when failure is not an option

Audio quality is a theme that is deeply embedded in all things DECT, and it goes without saying that this is also true for DECT Forum member company Shure. Throughout its history, Shure believes that the success and reputation of its brand has been defined by a continuous commitment to Total Quality.

Shure microphones have played a part in many global events - Shure was there, for example, when Elvis stepped into Sun Studios and when JFK vowed to put a man on the moon and has been on the world’s biggest stages, from Live Earth to the Oval Office, ever since.

It’s been over a decade since Shure cut the cable and added wireless products to its portfolio, recognising that presenters and performers love the freedom and flexibility that wireless can provide. Singing or speaking, vocal or instrumental, Shure says that its mission is to bring the sound and reliability of its microphones to the world of wireless. How reliable? Well, Shure told Dialog Today that failure is not an option.

Knowing that Shure is now using DECT across a number of its systems, we decided to learn a little more about why Shure selected DECT and how the technology enhances Shure’s wireless mic and conference systems portfolio. We spoke with William Berrie, Technical Lead at Shure UK.

DT: Tell us a little about Shure’s background – the origins of your company, the markets serviced etc.

WB: Shure was founded in Chicago, USA in 1925 by S. N. Shure, originally selling radio kits by mail from a space in his father’s warehouse. This was a burgeoning market, as consumers couldn’t buy complete radios at the time. In the 1930s, after acting as a distributor for a local microphone manufacturer, Shure started to design microphones under its own brand name. Our archetypal, uniquely designed model 55 was first made in 1939. That’s the one that you see Elvis using, with his hand wrapped around the mic stand! Shure continued and supplied mics to the military during World War 2. We still use military-spec processes today for all the microphones that we make – we’re constantly trying to give our customers good quality products.

In 1993, the US Post Office released a stamp featuring Elvis and Shure’s microphone.

Shure has manufactured wireless mics for some time now. An early wireless mic called the Vagabond was first developed in 1953, and wireless microphones were contemplated by Shure engineers as early as the 1940s, so wireless is not a new thing for us. Our first mainstream wireless mics – the L Series – were launched in the 1990s.

Our customers today come, of course, from the professional audio market, but in recent times the integrated systems market, and our in-ear and headphones for retail markets have rapidly grown in importance to us.

DT: We use a lot of audio devices when making digital video for the DECT Forum media channel. Shure doesn’t seem to feature very often in the video production space. Is there a reason for that?

WB: I think that Shure downplayed that market for a while, but today we have new products in that space. There are new boom mics, for example, that can be fitted to cameras. Of course, a lot of content creation today is handled using smartphones, so we also have a series of mics that can be used with iOS and Android phones.

DT: Tell us about the split between Shure’s wired and wireless products.

WB: Well, I’m not a marketing guy, and it depends whether you are talking about numbers of units sold, or value, but I think that in monetary terms wireless is more valuable to us, and wireless may now have overtaken wired in terms of numbers sold. Wireless is still growing for us, and is where a lot of the new developments are happening, but Shure is still investing in the wired mic business too. It’s still important to us.
DT: Where does DECT/ULE fit into your portfolio?
WB: We introduced a wireless variant of our Microflex conferencing system that used DECT technology in 2013. I say ‘the DECT technology’ because of course we sell in the US on the UPCS 1920-1930 MHz band. We’re not currently using ULE, but we are considering it for future low-latency applications.

DT: What were the compelling reasons to use DECT?
WB: The wires, really! We didn’t want wires running across expensive boardroom tables. It also makes the room set-up that much more flexible and also that much simpler for installers.

The key attractions of DECT were that it is license exempt and that it is self-organising. We can achieve good microphone density and we can co-exist and interoperate well with other users of the same spectrum. For comparison purposes, we do have products that operate in the ISM band, but we have to limit the number of mics we can use in the ISM band because there is just so much going on, and strange, weird things happening.

DT: Can you put numbers on that? How many DECT mics can be used together, and how many ISM-band mics?
WB: It’s not exactly the same scenarios that we are aiming at, but as an example, in the USA we can support 24 DECT microphones in one large area or room. If we do need to cram more microphones in we can do that by slightly reducing the bandwidth and using more compression in the codec. If we were using ISM band mics it would probably be in a smaller venue, but we would also have to limit the number we could use to between 4 and 8.

DT: So it seems that DECT did offer Shure distinct advantages then?
WB: Yes it did, but one of the key things is that you can just switch it on and it works, which is not the case with other, similar systems.

DT: Is DECT’s independent spectrum important to Shure, and if so, why?
WB: Yes, it is. Traditionally, microphones were using the TV bands but those have now been auctioned away. Though there is still some ISM TV band availability, overall there is very little room. And of course you are still taking risks if you are using what spectrum there is available and if you want it to just work when you switch it on. The fact that DECT offers regulated spectrum, and everybody is following rules, is great for us. We know what we can expect to get out of a system. There are places where the DECT spectrum is busy. If you’ve got a call centre located above you in a multi-story building, for example, you could have some issues. But we can use spectrum monitoring and work out how many microphones we are going to be able to support. This allows us to assure customers in that neighbourhood as to what they can expect. In DECT, everything is built in and everything just works. This is great for us. We use DECT and our customers like the products and they like the ease of use. That really is the bottom line for us.

DT: What do you see as the future needs for the wireless audio space?
WB: Audio quality is, of course, a given, but then our customers tell us that low-latency and high density are what they want. The work that is being done and the possibilities in Ultra-Reliable Low-Latency Communication (URLLC) and 5G do look important to us and can provide opportunities that we can build on. That and keeping the fair use licensing safe spectrum is important for us and for our customers.

Shure is not the only company operating in this sector, and we know that other contributors experience the same issues that we do and express the same preference for DECT. We have made good business from DECT and our customers like the products and they like the ease of use. That really is the bottom line for us.
DECT/ULE aid detection of nocturnal seizures for epilepsy patients

Livassured develops certified medical device

Most of us will be aware of epilepsy, which is a condition that affects the brain. When someone has epilepsy, it means they have a tendency to have epileptic seizures.

Epilepsy can start at any age and there are many different types. Some types of epilepsy last for a limited time and the person eventually stops having seizures. But for many people epilepsy is a life-long and severely debilitating condition. There has been recent scientific research that suggests that on average 20% of people with refractory epilepsy will die of a seizure. (This is about 100x more frequent than death from a traffic accident.)

What is without doubt is that parents and caregivers need the best tools they can have in order to alert them to severe nightly epileptic seizures. Dutch company Livassured has developed a product called NightWatch, which detects the majority of clinically urgent epileptic seizures at an early stage. It improves the quality of care provided and alleviates the care tasks of professionals watching over patients who suffer from severe nightly epileptic seizures.

In a classic example of technology developers selecting and integrating best available solutions, NightWatch uses DECT and ULE. Dialog Today talked to Livassured founder and CTO Asmund Tielens to learn more about the thinking behind the use of the DECT wireless solution.

DT: Tell us the background to your company.
AT: My background has been in electronic devices, including, VoIP and DECT telephones, and baby monitors. In this last case there is a lot of crossover into the market for epilepsy warning devices. A baby monitor is a device that links a baby to a parent, and which must provide a reliable connection. 100% of baby monitors in the home are based on DECT. Six years ago, and based on our experience and know-how in this area, the "Tele-Epilepsie Consortium", which is made up of the large epilepsy centres in the Netherlands, asked Mark Bloemendaal and myself for help integrating their seizure detection IP into an electronics device. The consortium started with a single aim – to provide a better device that could provide warnings during the night. This was the beginning of the start-up that we named Livassured.

We thought at the outset that creating this device would be very easy and simple, but it proved to be anything but. 5 years into the development process we can detect 85% of seizures, and we’re pretty happy about that, as this is much better than any other device on the market.

DT: What were your aims in developing/launching Livassured NightWatch?
AT: There has been recent scientific research that suggests that 20% of people with epilepsy could die of a seizure. You can imagine, then, that parents of a child with epilepsy could be very worried. Today, with the advent of the Internet, and better communication of medical facts, people are much aware of this possibility. If the epilepsy sufferer is attended at night, for example by a room-mate, the chances are already 3x better. We believe that Nightwatch can save the lives of many more people with refractory epilepsy, and for a relatively a low price.

DT: What are the key defining features of NightWatch?
AT: Undoubtedly, the most important feature is the quality of the detection, the best possible sensitivity and positive predictive value which together contribute to make sure that Nightwatch recognises significantly more
DECT/ULE AID DETECTION OF NOCTURNAL SEIZURES FOR EPILEPSY PATIENTS

of the clinically urgent seizures than any other device on the market, and with the fewest possible false alarms. Then there is better connectivity - better connectivity to the emergency room in an institution and best connectivity to smartphones. Both the doctors and the parents of a child with epilepsy are typically very keen to know what has happened during a night, and so the data passed to the cellphone is very valuable.

So what we are offering today is care. In the future we want to offer a cure resulting from optimization of the medication. In order to be able to do this you need to know the quality of the night's sleep. We aim to provide better connectivity to the cloud so that doctors can examine the data and make suitable judgements.

DT: You are obviously firmly in the DECT/ULE camp. Why is DECT/ULE important to you and how long have you been working with the technology?

AT: We have now been working with DECT ULE for 5 years. It was important that we transmit all raw data from the ARM sensor (at about 5kbps) to a PC, yet we only had room for a small battery. We needed 24 hours of battery life. DECT ULE was an obvious choice since it gave us robust range - i.e. a better risk assessment of our medical product. All the raw data that we transmit about movement and heartbeat is 4,000 bits per second. DECT is 32,000 bits per second, so we're only using one eighth of the speed of DECT. Then, DECT ULE allows us to only switch the radio on to transmit just once per second instead of 100 times per second. This wasn't necessarily, by the way, a great choice, as one disturbance per second looks a bit like a heartbeat!

When the sensor it not in use at night, it sits on the re-charger. With DECT ULE we actually have 3 days of battery life, but we don't wish to use that as we wish to create a fixed routine for the user - they wear it all night on their arm, and then take it off and charge it during the day.

The other point is that this is a medical product - a Class 1 medical product. With any medical product you start with a spec, and then you do a risk analysis. You look at dangers, hazards and as the producer you have to take responsibility for any risks. It is obviously easier to take that responsibility if the risk is low. This is another area where using DECT is an advantage because it does not suffer the same problems that products operating over Bluetooth or Wi-Fi do as a result of them operating in the congested ISM band. This makes it easier for you as the producer to accept the remaining risks. We just don't have to worry about what might happen if there are 20 people in the house and they all have their cellphones switched on and the child is also streaming Netflix on another channel. Pretty much all wearables are Bluetooth-based, but these are more in the 'gadget' category, not medical products. It's hard to imagine in a professional environment that a hospital could be monitoring a patient through Bluetooth and cellphones. DECT is just a different story.

DT: How does DECT/ULE integrate with Nightwatch?

AT: Well, we're a start-up and fairly limited in design resources. At the beginning our volumes are low – in the thousands - and so we cannot amortize high R&D costs. The Nightwatch sensor includes a Dialog Semiconductor DECT ULE module with integrated microprocessor and DSP which also handles the seizure detection algorithms. It is essentially a complete cordless phone in a module, with a heart-rate monitor, an accelerometer and a light-sensor in place of a microphone. This is ideal for applications like ours. The microprocessor from Dialog Semiconductor has a lot of horsepower, more than we actually need.

Using this ready-made, inexpensive module made it very easy to produce a prototype that ended up being very close to the production unit.

DT: How do you see Livassured developing with DECT/ULE in the future?

AT: We have seen that future versions of Bluetooth will provide long-range connectivity. If you have a low data rate, by adding a lot of redundancy, you can significantly increase range. We believe that every future cellphone will have that and so we asked two companies to do comparisons between a DECT ULE module and Bluetooth long range (LR) module. They found that the range of Bluetooth LR is less than DECT.

Combine DECT's longer range with the undoubted benefit of dedicated spectrum and a regulated and restricted band - which gives us an easier risk assessment for the medical device case - and we believe that DECT ULE will continue to be the technology of the next generation.

www.livassured.com
Classroom education tool that is the new teacher’s pet

Education has come a long way since ‘chalk and talk’. Of course it still has its place but, thanks to today’s technology, teachers now have a broader, more entertaining mix of techniques and media available, and new ways of interacting with students. Swivl™ takes full advantage of mobile devices to create an ingenious video teaching aid that is enhanced by the unique capabilities of DECT audio and data streaming.

“The idea for Swivl came out of seeing the power of video as a tool for learning,” says Vladimir Tetelbaum, Swivl’s CTO and co-founder. When people can see a replay of themselves, it helps them figure out how to do things better. The same applies if a group of people is being viewed, for example a class of students: video and audio feedback gives everyone extra insight into their performance.

Swivl™ is an imaginative video and audio capture solution that makes full use of modern technology to help people learn. Video is captured on a tablet or other mobile device mounted in a robotic base unit, while sound is picked up by remote ‘markers’ that can be attached to clothing, held in the hand or placed on a desk. The sound is transmitted wirelessly to the base unit which packages the audio streams together and sends them via USB to be recorded in-sync with the video on the mobile device. The audio and video can then be uploaded into the Swivl Cloud to be watched or shared later.

For the best possible learning experience, the robotic base unit moves the camera to capture the speaker according to data received by the markers. All this – video capture, audio capture and camera positioning – needs to happen in real time.

Teachers do it with class!

“When we began in 2011, we were looking at all kinds of learning applications. But we soon realised that education is at the forefront of using media technology to enhance learning. So we have optimized our solution to suit the needs of the classroom,” adds Tetelbaum.

Since then, Swivl has built up a customer base of some 20,000 in the US, UK, Australia, Europe, Asia and the Middle East. Core uses include teachers’ professional development and student aids such as lecture capture, lecture home viewing and practical exercises. Earlier this year, Swivl launched its third-generation system, the C-series, generating excitement and rapid uptake. The new system features a number of improvements in both hardware and software functionality – including support for a greater number of markers and audio streams.

Mark my words!

Audio quality is particularly important for educational settings, both clarity of voice and the ability to pinpoint who is saying what. And it is essential that audio and video remained synced. To deliver this in real-time with more audio channels, Swivl needed to upgrade their wireless connectivity solution. They chose DECT.

“The 2.4 GHz band is becoming oversaturated and that was already causing problems for some of our customers. We also wanted to help teachers reach more students in smaller groups by increasing the number of microphones. So we needed a multi-channel technology. DECT seemed the logical choice. Its low latency was also attractive for real-time use,” Tetelbaum explains.

With DECT providing a bi-directional link for both audio and data, the C-series can currently support up to 5 markers; And Swivl plans to increase this number even further. Each stream is treated independently so users can select different ones when reviewing the video in the Swivl Cloud platform, and thus focus on particular student groups.

Doing the homework

To avoid the complexity and time needed to do their own RF design and buying and learning all about using a DECT Stack, Swivl looked for a drop-in module with a stack included to implement DECT. It found the ideal match for its system in Dialog Semiconductor’s Cordless Voice Module (CVM).

“Dialog’s CVM delivered the functionality we needed in a form factor that fitted our highly compact markers. But what really impressed us was the support Dialog was prepared to offer a small company like us: answering our questions fast and introducing us to possible third-party design partners. Dialog also helped with regulatory updates. As a result, our entire product design cycle was completed in nine months,” Tetelbaum concludes.

“The C-series and DECT are the next big step for our company’s growth. And Dialog really helped us deliver it.”

www.swivl.com
Perfect sound from
the classroom to the
boardroom

Changes in spectrum usage regulation can often open up new opportunities for DECT. For example, the global growth of digital TV is seeing DECT become the technology of choice for audio conferencing solutions. As the pioneer in DECT-based enterprise wireless microphone systems, Revolabs was ahead of the curve in making that switch. Now, in its third-generation solution, it is using that experience to push DECT further than ever.

Whether it’s for giving presentations in large conference rooms or teleconferencing with many people in open boardroom, enterprise-level wireless microphone systems offer much greater flexibility. You can put microphones anywhere, right in front of each speaker or attached to their clothing, enabling much more natural communication.

The right technology
Previously, such systems used the UHF band for transmitting audio from the mic to the central unit. But with many countries wanting to use this band for digital TV, it is becoming very crowded. As a result, many manufacturers are moving to DECT. Revolabs was the first to see the benefits of DECT for such applications, effectively inventing the DECT wireless microphone for enterprise applications.

“DECT’s ability to support multiple audio streams is ideal for applications where you have 30 or more microphones in one installation. Moreover, its automatic channel selection gives it great error resilience. So there is no disruption of the audio – and that’s essential when people are trying to communicate with large groups,” explains Tim Root, Revolabs’s CTO.

Root also points to DECT’s resilience to noise, support for advanced encryption and ability to manage the wireless power levels as being important factors in Revolabs technology choice.

Drawing on shared experience in DECT
Revolabs has been working in DECT for over ten years now. And throughout that period, its DECT partner has been Dialog Semiconductor. “Dialog – or SiTel as it was then – had very strong third-party support which helped us get started very quickly. Its products are also highly integrated which helps us keep costs down, and are very good on power consumption,” Root adds.

The two companies have developed a strong relationship, and regularly share their respective product roadmaps. This helps both companies to innovate more effectively.

“Due to this sharing, Revolabs was one of the first companies to bring a product to market using the SC14493 – our new integrated communications solution for the microphone market,” says Marius Bouman, Marketing Manager at Dialog Semiconductor.

The SC14493 is a single-chip transceiver, power amplifier and baseband IC for zero blind slot (ZBS) DECT. Together with Dialog’s SC14441 single-chip DECT / CAT-iq solution, it provides the wireless communication functionality for Revolabs’s Executive Elite™ 4- and 8-Channel Next Generation Wireless Microphone Systems.

“The Executive Elite is our third-generation DECT wireless microphone system. We’ve learned a lot from the market about what feature sets people want. By leveraging the DECT ULE architecture and then optimizing it ourselves for our specific application, we’ve been able to deliver a solution that delivers on those requirements,” says Root.

An Elite performer
One of Revolabs’s key innovations is to use all the DECT slots to maximize the number of simultaneous connections without signals crashing. As a result, the Executive Elite systems supports up to 76 microphones in a 100 metre radius – compared to around 40 for most competing solutions. No matter how many microphones are in use, the system delivers crystal clear sound every time. And its AES-256 encryption ensures nobody can listen in without authorisation.

In addition, the Executive Elite pushes microphone talk-time from 8 to 20 hours with a single set of rechargeable AA batteries. Revolabs has also been able to separate the receiver antenna from the central signal processing unit. This gives much greater installation flexibility, allowing the antenna to be located in the same room as the microphones for better reception while the base unit is hidden away out of sight.

“We are keen to keep pushing the boundaries of what is possible with DECT. As DECT evolves, we aim to take advantage of any future developments to create new systems that support even higher sound quality and microphone densities,” Root concludes.

www.dialog-semiconductor.com
uc.yamaha.com/
Panasonic wireless solutions: delivering superior sound

With their easy set-up and reliable, interference-free operation, Panasonic’s DECT-based digital wireless microphone and intercom systems were already popular in the education and retail markets. But feedback from customers was that they would really appreciate it if the sound quality was even better. Panasonic Connected Solutions Company listened and, with the support of their DECT partner Dialog Semiconductor, they delivered.

The WX-SR100 series wireless microphone system was originally developed for use in classrooms, while its cousin the WCS wireless audio system targeted shops and fast-food restaurants. Both employed DECT as their wireless protocol, with the standard G.722 wideband codec. This gave them a frequency range from 100 Hz to 8 kHz.

“This was good, but some of our customers were asking if we could increase the sound quality further. So as part of a project to redesign both systems, we asked Dialog to help us improve the frequency response of our systems,” says Satoko Yano, Product Planner at Panasonic Connected Solutions Company’s Media Entertainment Business Division.

Doubling the frequency range

Dialog responded by suggesting the CELT codec. A fundamental part of the successful Opus audio format, CELT is a full-band, general-purpose codec developed specifically for high-quality audio at various bitrates. Independent testing has shown that it performs very well both in technical measurements and perceived sound quality.

CELT is implemented in a number of Dialog’s single-chip DECT / CAT-iq processors and Dialog suggested that its SC14493 would be a good fit for Panasonic’s needs. This compact, highly integrated IC combines a powerful 16-bit CompactRISC™ microcontroller and Gen2DSP core with full radio functionality and auxiliary hardware. To help Panasonic understand what CELT could do for their solutions, Dialog provided the product development team with evaluation boards for the SC14493.

“We were very happy with the results of our investigations with the evaluation boards. They showed that the SC14493 and CELT codec would allow us to double the microphone system’s frequency range up to 15 kHz,” Satoko adds.

All-round improvement

And so, Panasonic Connected Solutions Company went ahead with developing a new generation of wireless microphone solutions WX-SR200. Switching to the SC14493 enabled Panasonic to build other upgrades into their new solutions. For example, the new systems feature 16 channels per system rather than 12, allowing more microphones to connect to the same base station and operate without interfering with each other. In addition, the first-generation products required an antenna per two microphones. In contrast, with the new solutions, only one antenna is needed no matter how many microphones are used, making the system both cheaper and more flexible for customers to install.

Along the way, the Panasonic team also managed to reduce power consumption so that the microphones can operate from a single AA battery. As a result, they could redesign the look and feel of the microphones, making them much lighter and easier to hold. “This is a real differentiator from competitors’ DECT microphones,” Satoko points out.

Cooperation makes happy customers

Of course, a redesign on this scale is a major development project. “One of the benefits of working with Dialog is the support they give you,” says Satoko. “They are always there with technical information on their products or to answer any questions our team may have. Their engineers really helped us understand the CELT codec, how to get the best out of it and how to minimize latency in the system.”

The new microphone and intercom solutions are now on the market in Japan, with Panasonic looking at a global release sometime in the future. The team believes the new capabilities of these systems could see the second-generation products find a market in other applications for example with the microphone solution moving beyond school classrooms to larger venues such as universities, offices and conference centers.

Feedback from customers suggests the project to upgrade the microphone and intercom systems has been a great success. “They tell us that they really like the new, improved sound quality. And if our customers are happy, then so are we,” says Satoko.
Plantronics delivers another first for DECT Wireless

A pioneer in wearable technology, Plantronics is once again delivering a first-to-market advantage for customers. As popularity of DECT wireless headsets gains momentum across all industries – headset industry analysts predict product shipments to triple in the next 7 years — so does the need for heightened security requirements.

Plantronics leads the headset industry with certification in new DECT Forum security standards that go beyond traditional authentication and encryption measures. Customers benefit with greater choice and flexibility in wireless headsets because Plantronics keeps ahead of dynamic technology demands to ensure robust, secure communication solutions.

From a garage to the moon and back

Plantronics was started by two airline pilots working in a garage, intent on developing a breakthrough in commercial aviation headsets. Together, they pioneered the world’s first lightweight headset. Plantronics MS50 was the headset used in outer space by astronaut Wally Schirra for the Mercury mission, and soon after, Neil Armstrong used a Plantronics headset to utter his legendary words, “That’s one small step for man, one giant leap for mankind.”

Plantronics remains a global leader in audio technology today. From Bluetooth® and DECT headsets to mission-critical environments and unified communications (UC), Plantronics continues to raise the bar on matchless audio quality and innovation. Our products are used by everyone from pilots, astronauts and 911 emergency workers to 100% of Fortune 100 companies.

Plantronics wireless excellence

With the advent of UC, wireless technologies are increasingly in demand across many enterprises. Workers use the PC as a softphone and connect using audio devices, such as headsets, to collaborate more effectively and improve productivity and mobility. DECT wireless technology is a key attribute in accelerating headset-to-softphone usage, which analysts expect will double over the next few years.

Plantronics is at the forefront of this important trend with cutting-edge yet proven technology, quality, security and service. We have engineered some of the smallest DECT radio boards in the industry. We launched our first DECT wireless products in Europe in 2002, and in 2005, Plantronics engineer Steve Cahill was instrumental in outlining the DECT specifications for bringing the technology to the US. We were the first company to occupy the newly created UCP S band for DECT in the US, and released Plantronics CS55, CS70N and SupraPlus Wireless headset models.

Scroll forward. Our now legendary CS500™ Series set a new wireless standard for desk phone communication with the lightest DECT headset on the market and up to 350 feet of range for stellar hands-free performance. Our flagship Plantronics Savi 700 Series DECT wireless solutions deliver intelligent multi-device connectivity, the same long-range wireless performance in an equally lightweight convertible headset.

Securing the future of DECT tech

When the DECT Forum announced its latest security standards, we began working to adopt the recommendations for implementation within our products. The expanded security guidelines cover authentication, encryption, call setup, call progress and tear down, and include a stringent certification process for full members of the DECT Forum. Plantronics has been a member of the DECT Forum since 2002, with full membership since 2006.

Obtaining DECT Forum Security Certification requires products to meet all compliance criteria and be submitted for independent verification at an approved test lab. Plantronics’ CS500 Series with the DECT Security Certification Logo and security enhancements are already available. Customers can expect the updated security-certified Plantronics Savi 700 Series products to be available a little later this year, and Savi 400 products in early 2015. For customers wishing to update existing Savi products to the same security level, we will be making the firmware upgrades available online via the Plantronics website.

For more information, please visit www.plantronics.com.
Casinos can be very lively places; brightly colored and with lots going on. They can also be very noisy. This is certainly true of casinos in Japan which, among the many types of gaming machines, feature the popular ‘pachinko’ tables. Pachinko is a pinball-like game. It involves small steel balls bouncing around a vertical table. With 100s of pachinko tables next to each other, the collective racket can make it difficult to be heard.

For the casino to operate smoothly, employees in the public areas need to be able to communicate clearly and easily with each other and with colleagues behind the scenes. But in such an environment, that is a big challenge.

When Japanese electronics giant JVCKENWOOD decided to create a wireless intercom solution specifically for this market, they knew the requirements would be high. It would need to support large numbers of users with crystal clear sound and without missing a single word. That meant a wireless communication technology that could eliminate the chance of interference; support many simultaneous audio connections; and deliver high voice clarity with low latency for responsive voice processing. It was clear, DECT was the technology to bet on!

A smart bet

“In pre-development, we compared DECT with other wireless protocols such as Wi-Fi and Japan’s PHS,” explains Shoji Ota, Product Marketing Manager at JVCKENWOOD. “DECT had many advantages including its protected frequency band and anti-interference measures, large number of connections per base station, audio delay time, and more. Overall, it offered better quality of service and more reliable audio for our voice-driven intercom system, where lots of users can be listening at the same time.”

In realizing the wireless communications for their casino intercom, JVCKENWOOD worked closely with wireless design experts RTX A/S and chip manufacturer Dialog Semiconductor.

“JVCKENWOOD approached us with the requirements for a system with 10 duplex audio connections plus many more people just listening,” says Jesper Nør, International Sales Director at RTX. “Delivering a large enough capacity and low enough latency was going to be a real challenge. But thanks to our close relationship with Dialog and deep understanding of exactly what their products can do, we were able to recommend the brand new SC14493 DECT SoC. It was the only DECT solution with the right radio characteristics and sufficient onboard processing power.”

Hitting the DECT jackpot

Available as both a standalone SoC and a drop-in wireless module, Dialog’s SC14493 SmartBeat™ wireless audio solution is perfect for high-quality and fixed low-latency applications. It supports point-to-point, point-to-multipoint and multipoint-to-point audio and data channels. The solution also incorporates the Opus Custom HiFi audio CODEC, together with support for G.726 and G.722 narrowband and wideband voice CODECs, acoustic echo cancellation, noise reduction, and microphone and speaker equalization.

Crucially, the SC14493 features a “zero blind slot” radio implementation. By minimizing the time taken to reconfigure the radio from transmit to receive mode, this implementation ensures every available time slot in the DECT multiplexing can be used. So every word spoken into the intercom is transmitted clearly to the listeners.

We have a winner

“With Dialog and RTX, we knew we had partners with an intimate knowledge of the DECT technology and protocol stack – partners who had a strong record of development achievements and product quality. Of course, their development support and solution provision capability were also very attractive,” adds Shoji Ota.

The resulting ProTalk WD-K10 intercom system offers robust and reliable two-way communication with up to 10 people talking simultaneously. Simple-to-use, it can significantly ease day-to-day operations through more natural staff contact and coordination. And although it was originally designed for the challenging environment of busy Japanese casinos, it can deliver those benefits to a host of applications – both indoors and out.

“JVCKENWOOD DECT systems are now available in both Japan and the EU. We are getting a lot of interest in many markets with applications ranging from sports events and broadcasting to construction sites. That just shows the flexibility DECT offers in providing reliable, clear communication anywhere,” concludes Shoji Ota.
Wireless connections in industrial environments

How to ensure factory-critical data arrives at the right time

With factories becoming increasingly data driven, the need for operational flexibility makes wireless communication an attractive option for sharing information between machines and people. But that communication needs to be fast and reliable.

Perhaps more familiar from cordless voice applications, DECT is an ideal candidate for data links in industrial environments. In addition to voice and audio, the DECT specification includes support for Light Data Services (LDS) with data rates up to 54 kbit/s. This is sufficient for exchanging data between stations within a factory.

Crucially, DECT operates in a dedicated frequency band ensuring interference-free data transmission for maximum reliability. Moreover, it has a range of up to 300 meters, allowing it to cover whole factories with simple network topologies.

The fast route to reliable connections

Dialog Semiconductor offers a simple route for exploring the value of DECT in wireless data connections through its pre-certified and fully tested drop-in modules. These contain all the hardware and software necessary to incorporate wireless connectivity into a system, allowing new applications to be created with the minimum of RF design know-how, resources and effort.

The Cordless Voice Module (CVM) is of particular interest for industrial applications as it supports voice as well as data connections. This means that, in case of an emergency event at a particular station, the central control room can talk directly to operators at that station to find out exactly what is going on.

The CVM operates in the industrial temperature range (-40 to +85 °C), so is well suited to this harsh environment. Moreover, the in-module Flash memory supports system development and enables in-field upgrades.

To further streamline development, the CVM is supplied with a full development kit which includes, among other things, example software for making the most of DECT’s LDS feature. With a DECT protocol delay of just 10 ms, this is a fast and secure way to communicate critical data within industrial environments.

CVM key features

- Integrated radio transceiver and baseband with a complete protocol stack
- Supports voice and data
- Data rates up to 54 kbit/s
- Transmission range up to 300 meters
- Small form factor (19.6 mm x 18.0 mm x 2.7 mm)
- Integrated antenna and external antenna pin
- Fully EU, FCC and Japan-DECT certified

Benefits

- Interference-free transmission in licensed, royalty-free 1.9 GHz band
- Simple network design and installation
- Rapid system development with minimal RF design requirements
- Eliminates need for RF testing
- Complete development kit includes development tools and example software.

For more details, please visit: www.dialogsemiconductor.com/products/connectivity/voice-over-dect/cordless-voice-module-cvm
Panasonic’s video intercom system has been named DECT Innovation of the Year at the DECT Today awards. So what lies behind the success? Panasonic Marketing Manager Ye-Un Lee discusses.

In the last issue of DECT Today, Panasonic’s new video intercom system was shortlisted for a DECT innovation award.

Sitting alongside a number of more traditional DECT telephony solutions, the video intercom platform (VL-SWD501) and accompanying surveillance camera (VL-WD812) demonstrated a new era in the use of DECT technology.

DECT technology for security is a relatively new phenomenon. But the technology has tremendous potential for use in domestic security systems.

Last year, Panasonic’s wireless video intercom system became a market leader in Japan. The wireless monitor even created a market for sub-monitors in Japan and increased the demand for a second monitor drastically. Panasonic Video Intercom systems were successfully launched in Europe in 2014. Part of this success is down to the ease of installation and stability that DECT gives the system.

The design means that there is no troublesome wiring required when adding on to the system. Simply update the settings quickly and easily on the screen. You can add up to six sub monitors, two door phones and four DECT Wireless Sensor Cameras for large homes. It gives clear benefits for installers as well as end users. The wireless video intercom system saves cost and time, is applicable anywhere in the house and allows numerous flexible layouts. It also provides a super wide angle camera (horizontal 170 degrees, vertical 115 degrees), SD recording function, a large 5-inch touch panel and a slim and stylish design.

The use of DECT makes it possible to check on visitors using the wireless monitor anywhere in the home and respond promptly. The wireless monitors come with a range of 100m, so that users can talk from the living room, kitchen or anywhere else in the home or garden. Up to two DECT repeaters can be connected to further increase the usage area.

There is no loss of functionality either. For instance, like standard wired security systems, it’s possible to use the DECT Wireless Sensor Camera to capture heat and movement, making it possible to monitor locations that you are concerned about. Like conventional wired systems, at night a white LED shines to drive intruders away.

The electric lock release supports up to four doors, each of which can be operated from the main monitor or a sub monitor. The gate or door lock can be easily and quickly released from anywhere in the house.

Panasonic is committed to creating the smart homes of the future. It’s our passion to enable “A Better life (and), A Better World” as we promise through our brand. We see the vast majority of devices ultimately being ‘smart’. That means, embedding connectivity in our products, whilst ensuring a reliable and secure network to allow for centrally managed platforms and developing cloud services, to provide more flexibility and scalability to each solution.

There is a lot of new innovation in DECT at the moment which is symptomatic of the health of the technology. Whether it is traditional telephony, security or video, we think DECT has a role to play in the smart home of the future.

http://business.panasonic.co.uk/security-solutions/
New throwable microphone bounces onto the market

In June this year, Catchbox extended its throwable microphone offering with a new, DECT-enabled model for large, conference-sized venues. Incorporating a DECT module from Dialog Semiconductor, the new product provides the longest operating range with interference-free performance for clear voice audio.

Essentially a wireless microphone in a padded cover, Catchbox allows anyone to take the floor and speak simply by throwing it to them. Catchbox makes it easy for audiences to contribute to events without the hassle of cables, or time lost passing the microphone from hand to hand. It is great for breaking the ice, getting the audience involved or just for making it clear whose turn it is to talk.

Catchbox wireless microphones have been on the market for four years. They have achieved great success, providing solutions for a wide range of applications including corporate meetings, events and conferences, education, and even places of worship. Its sensitive electronics are encased in a tough, lightweight plastic housing and then wrapped in a soft cover, protecting it from damage and from injuring anyone who mis-times their catch.

“For our latest product, as well as operating at long range, we needed a wireless solution that consumed as little power as possible,” says Mikelis Studers, CEO and co-founder of Catchbox. “We also wanted it to be immune to interference in different environments. As it is also license free, DECT was the ideal protocol, ticking all the boxes. We chose a DECT Wireless Audio Module from Dialog Semiconductor, which kept our development cycle to a minimum and allowed us to bring the new product to market much quicker.”

Initially developed for cordless phones, DECT is also the ideal solution for wireless voice. And Catchbox has further improved on the voice quality by integrating a high-quality microphone and dedicated software tuned for speech.

Making the most of DECT’s capabilities

The DECT-enabled Catchbox Plus provides the longest range in the portfolio – about 100 meters – and is therefore capable of being used at large venues such as events and conferences. It is also the first Catchbox product to offer wireless charging.

“We like to keep our products simple so it’s easy for all our customers, from the complete novice to the audio professional, to use Catchbox,” says Mikelis. “Wireless charging fits perfectly with our simplicity approach; you don’t have to worry about charging it up between uses and can just wake it up with a shake when you want to use it.”

Designed with users in mind

Shipped all over the globe, every Catchbox product boasts elements that are hand made in Europe. This includes the protective covers which are sewn by hand in Latvia. The cover uses a special, highly durable, nano-teflon coating that repels dirt and avoids stains while also being printable.

“The printable fabric means we can customize products with the customer’s own design, such as a logo, image or message,” says Mikelis. “And as it will be handled by many people, and occasionally dropped on the floor, the fabric is durable, anti-bacterial and dirt repellant.”

The Catchbox also features a unique software algorithm that draws data from an embedded gyroscope sensor that detects when the Catchbox is being thrown and cuts out the microphone so there is no whistling as it flies through the air, or any ‘clunks’ if it gets dropped. A and a patent-pending magnetic locking system ensures that the microphone assemble stays securely locked in the cover, even in the event of a mishap.

Catchbox is looking to include even more innovations in future products, while still maintaining the overall simplicity and ease-of-use. To this end, they are continuing to build their relationship with Dialog and keeping a close eye on the new features offered by the company’s latest DECT solutions.
Wireless audio over DECT: in perfect sync

Whether you’re listening to your favorite music as you move around the house or enjoying a film in perfect surround sound, wireless audio provides more freedom and enjoyment without the clutter and hassle of cables.

But redistributing high-quality audio around the home without annoying delays or interruptions is a challenge that requires the right technology choices. A proof-of-concept project by Dialog, Inteno and Audio Pro shows how DECT enables high-quality audio via a standard IAD, allowing gateway makers and telecoms companies to offer a whole new range of services.

DECT is a mature and proven wireless connectivity technology. It made its name in cordless telephony, where it is the de facto global standard with an installed base of more than half a billion products. In recent years – particularly since the emergence of the ULE variant – DECT’s unique mix of characteristics has seen DECT used in a wider range of applications such as home automation and security.

Hitting the right notes

Meanwhile, the growth in popularity of online music services like Spotify and internet radio is driving interest in wireless audio systems. People love having a vast music catalog at their fingertips, but they don’t want to be tied to their computer or the small speakers of their phones to listen to it. Wireless audio makes that possible but to be successful, systems need to deliver crystal-clear sound easily in a variety of set ups. That in turn requires a wireless technology that can deliver reliable, high-bandwidth transmission with sufficient range.

There are, of course, a number of possible wireless technologies. But DECT offers the best fit for wireless audio applications. For example, with a link budget of up to 120 dB and typical indoor range of around 100 meters, DECT easily covers the whole house and garden without resorting to complex “mesh topologies” or restricting the base station position.

Unlike Wi-Fi and Bluetooth, DECT operates in a technology-exclusive frequency band rather than the already congested 2.4 GHz band. This guarantees no interference from other nearby wireless applications, so no annoying loss of signal. What’s more, the band is royalty free, helping reduce costs.

DECT also natively supports multi-room set-ups that let different users listen to different audio streams simultaneously from the same base station. Its combination of medium access techniques divide the available spectrum into a number of separate physical channels, while Dynamic Channel Allocation ensures each transmission uses the least busy channel. What’s more, DECT’s bi-directional data channels allow users to pick tracks and control the sound remotely.

Always in time

A key challenge for multi-speaker wireless audio set-ups is ensuring the signals to each speaker remain synchronized. This is particularly difficult for packet-based technologies such as Wi-Fi and Bluetooth, which is why many Bluetooth speaker systems include both speakers in one unit.

By contrast, as a time-domain technology, DECT offers built-in synchronization between left and right speakers to within 1 µs. Hence it is possible to create true stereo systems with separate speakers that can be placed anywhere the user likes for maximum convenience and listening enjoyment.

Thanks to its configurable, fixed low latency (10 ms maximum protocol air latency), DECT also supports real-time applications such as audio synced to video. Together, these features allow users to easily add wireless speakers to their (wired) home theater systems to create a full – and fully synchronized – surround sound system whenever they want it.

The demo

To fully explore the benefits DECT brings to wireless audio, IC manufacturer Dialog teamed up with Inteno, a gateway manufacturer known for its iopsys open software platform.
The two companies created a proof-of-concept demonstrator that integrates DECT wireless audio into an existing Inteno gateway using a Dialog wireless audio module based on its SmartBeat SC14492 IC.

"Integrating the DECT wireless audio functionality was a relatively easy task," explains Conny Franzén, CEO of Inteno. "We see DECT wireless audio as yet another differentiator proof of the flexibility of our iopsis software platform. This attractive functionality allows our customers to offer new services and create new revenue streams."

To complete the demo, Dialog and Inteno worked with speaker manufacturer Audio Pro. Using the SmartBeat SC14492 IC, the Audio Pro ADDON T12 Bluetooth speaker was modified to accept DECT signals, by a simple modification to the I2S interface. In tests using an IC evaluation board, Audio Pro achieved line-of-sight transmission ranges up to 550 meters.

Inteno also extended its FileMé file sharing application with Digital Living Network Alliance (DLNA) control point capabilities. This allows the FileMé applications for Android and iOS to detect and stream audio to any media renderer in the home. Using the DLNA technology and the DECT-enabled Inteno gateway, any control point can play any available local or remote audio file through the selected DECT speakers.

"DECT-based wireless audio is very interesting for speaker companies like ours," says Tobias Hansson, R&D Manager from Audio Pro. "It would allow us to expand our portfolio with a new generation of fully synchronized stereo systems, giving consumers the convenience of wireless audio throughout the home with excellent sound quality and no interruptions.

Perfect pitch

A key factor in the success of any wireless audio system is the sound quality it delivers. For the best sound, the wireless technology must be matched to an audio codec that complements its capabilities. The Dialog-Inteno-Audio Pro demonstrator uses the Opus Custom codec implemented in the software running on the SC14492 (and all Dialog SmartBeat ICs).

Opus Custom is the ideal codec for DECT. It is a multi-bitrate codec that supports the full audio bandwidth (≥20 kHz stereo). Like DECT, Opus offers a configurable, fixed low latency, eliminating the need for additional buffering. And its excellent sound quality has been demonstrated in numerous independent tests including listening tests by Google and Nokia.

Opus also brings benefits for commercialization. For example, it is open source so base station and speaker manufacturers don’t have to pay royalties – helping keep system costs down.

A chart topper

The Dialog-Inteno-Audio Pro demonstrator is the first proof-of-concept for DECT wireless audio in broadband IADs and gateways. It is further evidence of the flexibility and growing applicability of this familiar wireless technology.

"The success of the proof-of-concept demonstrator shows just how well-suited DECT is for high-quality wireless audio streaming,” says Adrie van Meijeren, Business Development Manager at Dialog Semiconductor. “The optimized combination of DECT and the Opus Custom codec makes it possible to create wireless audio systems with unprecedented sound quality, range and user friendliness at an affordable price."

www.audioprobusiness.com
SIPP and DECT bringing people together!

Wireless headphone parties, hyped throughout the festival world, just got a whole lot simpler thanks to a new DECT-based wireless audio system.

There is an increasing demand for quieter concerts, performances and events. Concerts have been conducted under this concept for many years. In 1999, The Flaming Lips played the South by Southwest festival in Austin, Texas. Dubbed the world’s first headphones concert, the band distributed mini FM radios to the audience and used an FM generator to transmit the music. But these early attempts were plagued with technical difficulties due to battery lifetimes and systems that were complicated to set up and use.

Now demand for sponsors to organize some kind of special with music and sound is gaining ground. Moreover the entertainment industry plans to produce more sustainable/green events that reduce noise pollution and the risk of hearing damage. Visitors also like to be surprised and have more sources of music to choose from. The challenge is getting a large number of music channels at a festival and to ensure good reception for the headphones.
Wireless entertainment made simple

A simpler option is a new technology called Sound Input Per Person (SIPP.fm). Based on 1.9 GHZ DECT, this wireless audio system provides robust and uninterrupted digital audio reception for a very large numbers of receivers/headsets simultaneously. It can accommodate 8 music channels in areas up to 10 hectares, so is ideal for on-site use at events, concert halls, nightclubs and theme parks, although the architecture of this technology can go far beyond these figures.

Using 1.9 GHZ DECT technology has many advantages. No interference, over 1 km range and many operating music channels that can be used in parallel. This is very difficult in the congested 2.4 GHz band. Hence, until now wireless headphone systems were using analog or proprietary digital solutions in the different ISM bands. These systems suffer from drop-outs and interference issues, especially when the systems scale up.

The new technology is being developed by Audivers BV of Almere, the Netherlands. Audivers is also bringing a matching headphone design to market. These new systems use Dialog’s SC14493 single chip audio solution. Its dedicated integrated DSPs ensure high-quality hi-fi stereo through the advanced audio codec. The results are amazing, both in robustness and audio quality.

Party time for all

During this year’s festival season the new generation of wireless headphones have been used at major open-air festivals such as the Pitch festival in Amsterdam, the Heineken Silence Show at Lowlands, as well as the famous indoor North Sea Jazz festival. This shows the flexibility of the system, capable of scaling from 100 users up to 10,000+ and handling multiple acts simultaneously in close proximity without disturbance. The integrated battery management solution in the SC14493 allows the headphones to operate for more than 8 hours.

A special feature of the SIPP headphones are LEDs mounted in the headband. The LEDs are directly controlled using DECT’s data channel and can change color depending on the music channel selected or on the ‘beats’, giving off a flashy, party atmosphere.

At a concert, fans can tune into different elements of the music, for example just the vocals or the lead guitar. Meanwhile foreign visitors can follow events in their native language. Listeners can adjust the volume, so can listen as loud as they like without disturbing residents who live nearby. Thus SIPP technology can be regarded as an innovative product with very high social value.

The headphones are not only suitable for events but also for home use and smartphones (with a minor change) using a 3.5mm jack analog input.

Audivers BV is a dedicated company specializing in development and the delivery of wireless headphone systems for major music events worldwide with strong connections to the music industry. The switch to the 1.9GHz wireless DECT standard makes a big difference in quality and allows for further expansion of the product in the near future.

Take a look on YouTube channel ‘SIPP.fm’ to see how the wireless headphones work and how much fun they can be.

www.audivers.com
Unleash your full potential

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- **Intercom systems**
  - Superb Acoustic Echo Cancelling
  - Excellent wideband audio
  - 12 slot multi-level RF for video/data

- **Headsets**
  - Increased density
  - Small form factor
  - Enhanced audio experience
  - Digital Active Noise Cancelling
  - Beamforming mics

- **Voice controlled speakers**
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  - Command control
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- **Microphones**
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  - Increased data speed
  - Run high performance codecs
  - Experience Ultra Low Latency communication

www.dialog-semiconductor.com
How the world's first truly wireless surround sound system came to exist

By Kenneth, chief engineer at ONEaudio

I want to make a change. I would like everyone to be able to enjoy high quality music with a simple setup and at an affordable price, so that good audio would be a part of everybody's life. That concept has driven me for 10 years.

I've loved DIY hi-fi from a young age, and enjoy designing amplifier circuits and speaker assemblies. While my interest in hi-fi design has increased with age, audio product innovation has lagged behind. All high-end audio products are very expensive and involve complicated setup. It seems that only people with spare money are entitled to enjoy high-quality music. And even if you spend a lot on luxury accessories, you cannot guarantee to be able to hear the difference, or be sure the quality is worth the price.

So, five years ago, I set my heart on finding the solution, gradually turning my engineering job from system design of short-range wireless communication to audio design. At that time, Bluetooth was the hot topic in wireless audio and Wi-Fi was a promising system for high-end audio. Going with the flow, we made prototypes to test the two platforms. However, both systems suffered from timing errors in channel sliding and time jitter in channel lock. Time error has completely destroyed the musicality and sound stage. That is why most wireless audio systems cannot deliver audiophile grade sound.

Disappointed with those two popular platforms, we started to look elsewhere. Our 15-year experience with DECT technology told me that it was the perfect solution because of its unique characteristics: it provides accurate timing in channel synchronization and a dedicated channel of data transmission.

If this concept proved workable, we thought, a whole new world of wireless audio products would be opened. Audiophile audio systems will become wireless, no more cables, CD player and amplifiers, and at only one-tenth of the price. This also means that even portable speakers can play audiophile sound.

The immediate problem for us was the absence of any DECT software platform specific for audio application. We had to do the development work from ground zero. This translated into huge engineering time and investment. There was no past reference, and no one knew what level of sound quality DECT technology could attain.

Even so, we decided to play the game. For five years, we worked very hard and overcame many hurdles. Our mission was not to be satisfied with mediocre music quality but to keep on refining it.

Now, I am proud to say that our dream has come true. The sound quality we deliver is even better than my expectation. The DECT Innovation Award that we received at the 2016 DECT World Conference in Barcelona is very solid recognition of our efforts, applying DECT as the breakthrough for high-end audio products.

ONESurround is, then, the world's first true wireless surround with no power cord and speaker cable. Even a mini-size speaker shows how powerful DECT technology can be. We need your support to make the ONE big leap in our DECT journey.

http://oneaudio.com.hk/
UNLEASH YOUR FULL POTENTIAL

Be touched by the new standard that’ll boost any DECT audio performance

True performance unleashed
Be touched. Discover our smart technology at www.dialog-semiconductor.com
Partnering with like-minded companies is a great way to develop innovative and successful products. The collaboration between audio communications experts Plantronics and Dialog Semiconductor has already led to industry-leading wireless headsets – and continues to go from strength to strength.

Plantronics has a long history of taking audio communication further. It was one of their headsets that brought us Neil Armstrong’s legendary first words from the Moon. Today, they are still renowned for simple, clear communication.

For more than a decade, Plantronics has been working with Dialog Semiconductor to create DECT-based wireless products that deliver best-in-class audio. Both companies agree that the success of their collaboration is down to constant communication at all levels – from engineering teams to senior management.

“We have a very collaborative relationship. Dialog’s flexibility, development and willingness to customize solutions without restrictions give us the ingredients to achieve our goals,” explains Rod Brownfield, Plantronics’ Senior Product Manager.

“As companies, our skills complement each other perfectly,” adds Dialog’s Vice President of Wireless, Audio and Voice Arend van der Weijden. “Dialog always tries to deliver optimized yet flexible chip solutions. Plantronics has great in-house expertise in audio and how to develop these applications.”

In addition to IC solutions, Dialog also provides reference-design schematics and software development kits with technical support to help Plantronics keep the supply chain moving. Evaluation boards and control software allow Plantronics to quickly evaluate parts to speed development.

**Flexibility in development**

Dialog offers both ROM- and Flash-based ICs. This gives Plantronics great flexibility in developing products and offer solutions for specific use-case applications. “When we design a product, it is probably going be in the market for three to five years. With Flash-based ICs, we can design products that can be periodically updated and deliver a continuous stream of value-added features and benefits. Meanwhile, the ROM-based chips let us optimize designs for cost,” says Brownfield.

For example, Plantronics uses ROM-based Dialog chips in its cost-competitive CS500 headsets, and Flash-based IC in its Savi 400 and 700 ranges. When the DECT security standard was enhanced recently, Plantronics was able to offer a firmware update for the Savi 700 headset, allowing customers to easily upgrade to higher security. This update, the most downloaded in Plantronics’s history, was especially useful for the company’s government clients, who value security above all else in audio communications.

**Audio performance**

For many years, Plantronics has also incorporated Dialog’s SC14480 and SC14450 audio processors into its products. The SC14480 is a single-chip DECT / CAT-iq solution that can be found in almost all of Plantronics audio products and is ideal for headset applications. Meanwhile, the 240-MIPS SC14450 features a 16-bit CompactRISC™ processor, plus two user-programmable Gen2DSPs and runs multiple audio codecs with best-in-class acoustic echo cancelation.

Both processors support DECT and DECT 6.0, the North American variant that operates at 1.9 GHz. This allows Plantronics to support global markets with a single product design.

“Plantronics is renowned as a company that sets the standard for audio quality, and then surpasses it. With our audio processors, they can create solutions or audio professionals that expect that wireless products work with the same quality as wired products,” concludes van der Weijden.
DECT has a commercial history stretching back 25 years, initially in PBX applications and then in residential cordless phones. But it is no secret that these markets have stalled, having first become saturated and now becoming obsolete. So, what is the future for DECT? How do we secure its commercial lifetime and market for the coming years and decades?

These are questions the whole DECT community is grappling with. Regular readers of this magazine will know that each issue brings new articles about new applications. The range of applicability for DECT is becoming more diverse, and the future of the technology lies not in dominating one or two billion-unit markets but in being in hundreds or even thousands of smaller (million-unit) applications.

In targeting applications, manufacturers and development partners naturally play to the strengths of DECT technology such as great audio capabilities, easy set-up and high quality of service. Of these, perhaps the most critical differentiator for DECT is quality of service. Wi-Fi may be inherently faster than DECT but, like all technologies operating in ISM bands such as 2.4 GHz, it suffers from bandwidth overcrowding and related interference issues. It is the motorway that always has traffic jams, whereas with DECT there is always open road ahead.

There are many areas where DECT’s unique characteristics make it a good candidate to become the wireless technology of choice for multiple applications. Two key ones are semi-professional audio and Industry 4.0. Neither area has yet coalesced on a single wireless technology. Thus, now is a period of huge opportunity for DECT to establish itself in these growing markets. So how does DECT stack up against the alternatives in terms of customer requirements?
Customer requirements
Semi-professional audio applications such as Unified Communication headsets and program-making special event (PMSE) solutions need to deliver quality out of the box with minimal set-up. Low latency is essential to maintain lip synchronization. In this area, DECT is competing with technologies such as IR, V/UHF and 2.4 GHz, and is seen as strong on quality of service and ease of installation. Being license free is also a plus. However, there are concerns over latency for applications beyond voice.

Meanwhile, with the emergence of Industry 4.0, manufacturers in all areas are looking for wireless technologies to support the factory of the future – particularly in motion control, process monitoring and autonomous guided vehicles. These applications have strict requirements in terms of latency and reliability. And with throughputs going up and production becoming more complex, these requirements are getting tougher: with latencies of 1-4 ms and reliability above 99.9999% on the roadmap for the near future.

Pushing the boundaries today
Over the last four years or so, the DECT community has done a great job pushing the boundaries of what is possible with the current DECT standard. But as the demands of these two application areas show, we need to go further.

As a first step, DECT technology could be modified relatively simply to deliver so-called ultra-reliable, low-latency communication (URLLC). The necessary modifications include incorporating forward error correction (FEC) and adding more flexibility in the TDMA / FDMA frame structure. Currently, DECT is limited to 10 ms frames consisting of 24 slots. Proposals currently being discussed would allow slot structures that can be regarded as integer sub-parts of the basic 10 ms frame, with the same slot periods for optimum coexistence with legacy DECT systems.

These changes could enable latencies between 2 and 10 ms. The DECT standard prescribes a maximum reference bit error rate of up to 10 ppm, equivalent to 99.999% reliability. Adding FEC will enhance DECT reliability even further – perfect for PMSE and most industrial automation applications. And these changes can be realized today. Already type approved for the current DECT standard, Dialog’s SmartBeat™ DA14495 can be upgraded to the proposed URLLC frame / slot structure just by updating the firmware. Dialog is planning to release a URLLC proof-of-concept demonstrator based on the DA14495 later this year.

Securing a long-term future
The proposed URLLC extensions to the current standard are a great first step towards extending the lifetime of DECT and could be in commercial use with 1-3 years. Looking further ahead, ETSI’s DECT technical committee (TC DECT) is developing proposals for a more extensive upgrade of the technology – known as DECT 5G. Among other changes, this is likely to include a new radio PHY / MAC engine. The technological target for this upgrade is to push latency below 1 ms, increase reliability above 99.9999% and significantly enhance the data rate. This would put all currently proposed Industry 4.0 and semi-professional audio applications in reach, as well as opening the door to use in autonomous driving and smart cities.

The end goal of this effort is to have the proposal adopted into the upcoming IMT2020 standard. Doing so would secure DECT’s exclusive band within the radio spectrum, maintaining the interference-free quality of service that is fast becoming DECT’s most attractive definitive.

DECT has a commercial history stretching back 25 years. The planned evolution and eventual inclusion in IMT2020 could mean a commercial future of twice that.

“Sennheiser electronic choose DECT as technology basis for its SpeechLine Digital Wireless microphone system. The dedicated to speech solution combines professional performance with ease of use, as frequency coordination is not necessary as with microphones in the UHF range.”

Mr. Kai Tossing
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Portfolio Manager / Business Communication
SENNHEISER electronic GmbH & Co KG
DIALOG brings with DECT technology for Connectivity, Audio and Voice.

Contact:
Arend van der Weijden

Email:
arend.van.der.weijden@diasemi.com

Telephone: +31 73 640 8822

www.dialog-semiconductor.com