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DECT Horizons

The 1.9 GHz expert

April 2022

ADVANCING INTO 2022

FEATURES:

DECT BRINGS RELIABILITY IN NEW INDUSTRIAL AUTOMATION TECHNOLOGY

ANCHORING SUCCESS IN EASE OF USE AND SOUND QUALITY

WHITEPAPER: DECT EVOLUTION

EXPANDING THE COMMERCIAL LIFETIME OF DECT

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- WIRELESS CONNECTIONS IN INDUSTRIAL ENVIROMENTS
- GET MORE FROM DECT: MORE SECURITY, MORE USERS

FROM THE AUDIO & VOICE BUSINESS UNIT:

- **THROWABLE MIC BOUNCES ONTO MARKET**
- **PERFECT SOUND FROM CLASSROOM TO BOARDROOM**
- **ONE SMALL STEP FOR WIRELESS AUDIO**

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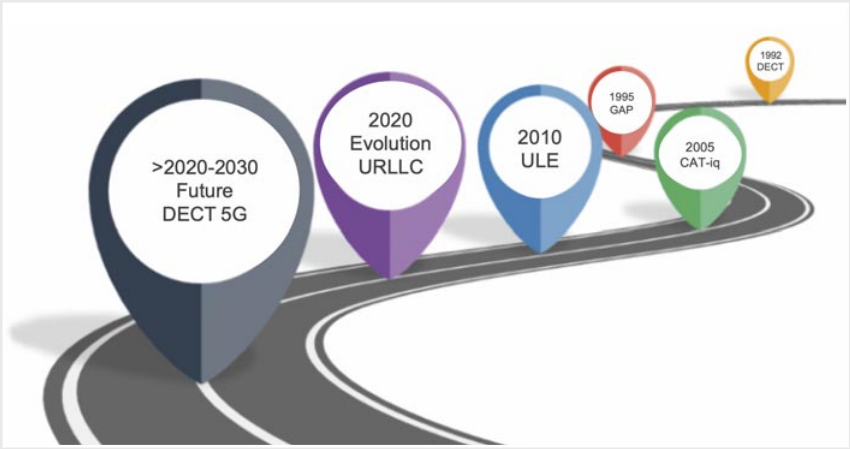
PRODUCED ON BEHALF OF RENESAS ELECTRONICS CORPORATION, (FORMERLY KNOWN AS DIALOG SEMICONDUCTOR)

New DECT 1.9 GHz solution gives a clear horizon

Dear reader,

Renesas electronics continues its 1.9GHz evolution and is actively involved in improving the standard. Since the start of the DECT standard in 1992 we have seen frequent updates of the technology roadmap and standards. This to assure that it adapts to future demands and new application fields. Renesas is continually making new semiconductor improvements and SW updates to meet the new demands. Renesas' goal is to be first in the industry to launch products supporting the new DECT evolution standard using multi-level modulation radios. Renesas is also leading in the support of the increasing security demands in enterprise applications and is innovating in wideband voice and full audio applications.



With our roadmap we see a clear horizon for new application fields, benefiting from the high quality of service in this 1.9GHz DECT band. Whereas the initial DECT standard has been primarily used for residential and enterprise DECT phones, we see the change using the new DECT standards to new fast-growing application fields. In the enterprise applications we have seen in the recent years a double-digit growth in Unified Communication headsets and intercoms, benefiting from the high QoS in the high density radio environments that the new DECT evolution standard is made for. In the home, the DECT standard is now integrated into many broadband modems, offering both voice and IoT services using the ULE (Ultra Low Energy) DECT products. Another new application field is the pro-audio market. DECT products offer real-time low latency communication benefiting from an interference free band. Many microphone systems, public address, intercom and tour-guide systems are now benefiting from the DECT audio quality. Towards the future we see an industrial IoT market developing. The first applications have already been successfully developed. The DECT standard is ideal for real-time control and mission critical applications and offers by nature the possibility to enable voice data integration. The latest update to the standard - DECT NR+ (ETSI DECT2020) - will offer further ultra-low latency and reliable communication and is part of the new IMT2020 5G generation radio standards. This positions the successful DECT standard for the next decades to come.

We are ready for the next step. Let's innovate!

Arend van der Weijden
VP Audio & Voice Product Line

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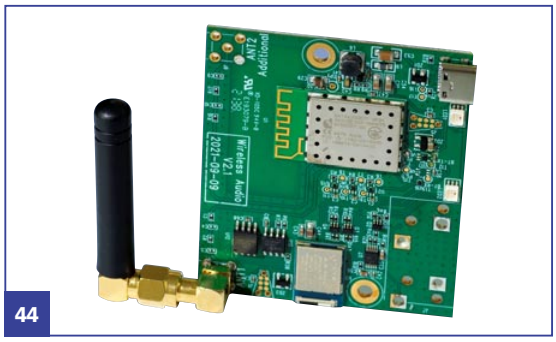
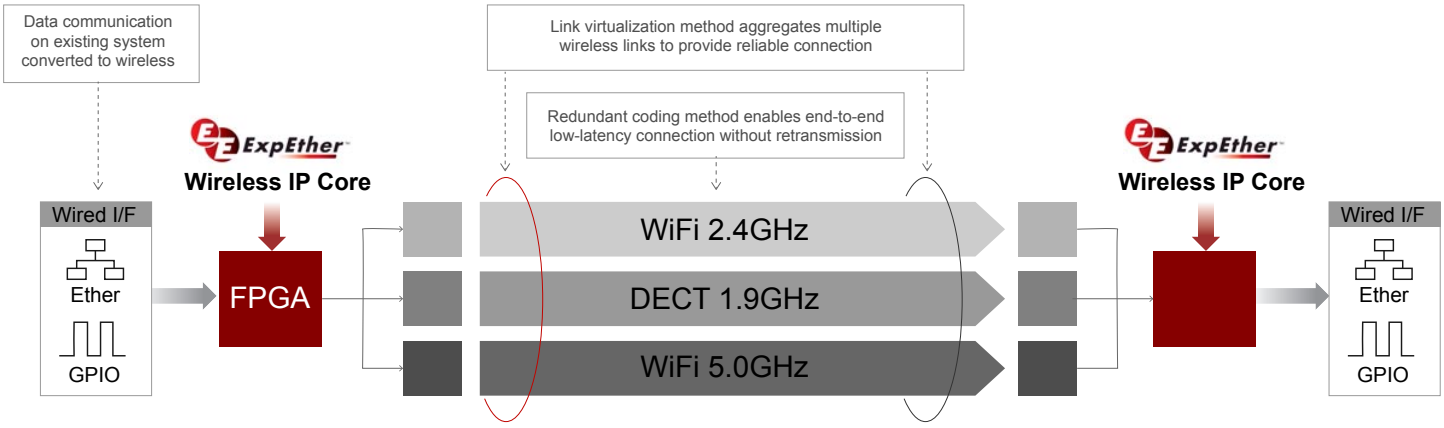


DECT brings reliability in new industrial automation technology

Wireless ExpEther is a new technology that simplifies the integration of information technology with operational technology such as manufacturing equipment. To ensure wireless ExpEther met the needs of applications such as factory automation, Japanese electronics giant NEC needed a wireless channel that could deliver high throughput, low latency and high reliability. Their solution: a mixed technology protocol that combines Wi-Fi for data rates and DECT for reliability and low latency.



ExpEther began as a wired technology based on Ethernet. Developed by NEC and promoted by the ExpEther Consortium, the new technology began making inroads into the industrial automation market, where it allowed industrial equipment to be easily and flexibly connected to sensors, IT equipment and the cloud.

To expand its usefulness and open up new applications both in industrial automation and beyond, the Consortium conceived a wireless extension. The goal was to create a solution that would allow conventional wired networks to be converted into reliable wireless networks simply be connecting a wireless ExpEther adaptor. NEC was tasked with finding the right radio technology to make that work.

Meeting challenging wireless demands

"Industrial automation is a very challenging application for a wireless protocol. There is often a lot of data to be handled, so bandwidth is vital. But there are also some communications, for example human machine interfaces and real-time machine control, that are mission critical and just have to get through on time," explains Jun Suzuki, Manager at NEC.

It was clear that no single wireless protocol could meet all the requirements. Wi-Fi could deliver the high data volumes, but it couldn't provide the reliability and low-latency necessary for the mission critical communications. Only DECT could do that.

NEC's solution was a wireless protocol that combines Wi-Fi at both 2.4 and 5.0 GHz with DECT at 1.9 GHz, and virtualizes them into a single reliable wireless channel. Individual communications are guided to the appropriate radio technology. Packets with a deadline or that are critical to operations are sent via both DECT and Wi-Fi. Less critical packets go via Wi-Fi only. The solution was to be delivered to market in a wireless IP core, realized in an FPGA.

Before that could happen, NEC needed to find a suitable DECT hardware solution that could be integrated with their FPGA. DECT technology is known in Japan, but it was not a familiar technology for the NEC ExpEther team. So, they needed a DECT solution that was easy to work with and a DECT partner they could rely on to support them in the development project.

Accelerating development

A visit to a trade show brought the team into contact with Dialog, now a Renesas company and introduced them to the Renesas cordless voice module (CVM). The Dialog CVM is a complete drop-in solution for long-range wireless communication that has been fully tested and pre-certified. To enable the NEC team to familiarize themselves with the technology and the module itself, Renesas supplied the team with development kits in the form of a Light Data Services (LDS) example.

"The Renesas module was a great option for us. It really reduced the engineering requirements for incorporating DECT into our ExpEther protocol," Suzuki adds.

NEC, Dialog Semiconductor and RTX partnered to design a suitable hardware solution that is integrated into networking products.

> "The rapid development of the ExpEther IP core shows that, thanks to DECT, it is possible to create wireless solutions that deliver the high reliability and low latency required."
>
> **- Jun Suzuki, Manager at NEC**

However, the module was originally designed for peer-to-peer communications and the ExpEther application would require each ExpEther media converter to connect to multiple nodes. So, the NEC team, working closely with Renesas and its software development partner RTX, worked to extend the module beyond a single channel and allow one fixed part (FP) to communicate with four portable parts (PP).

"This was a big challenge made even more difficult by geography, with our engineers in Japan and the Renesas and RTX engineers in Europe, as well as the coronavirus situation. But together we found a way to make it work – even doing all the testing remotely," Suzuki says.

Hitting the market

As a result, the NEC team were able to present the IP core and FPGA in the first half of 2020. The core has now been integrated into networking products by consortium partners such as Contec Co., Ltd. and Union Electronic. The first of these became available to order in the second quarter of 2021.

"Industrial automation places unique demands on wireless technologies. But the rapid development of the ExpEther IP core shows that, thanks to DECT, it is possible to create wireless solutions that deliver the high reliability and low latency required. We can see this solution bringing real benefits to the industrial automation world – and potentially providing a boost to the growing Internet of Things," Suzuki concludes.

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DECT: Anchors success in ease of use and sound quality

Public address (PA) systems are intended for anyone to use – so they need to be easy to operate. But they also convey important information – so must offer reliable transmission with crystal clear sound. Powered by DECT, Anchor Audio's PA portfolio delivers on both fronts. Which is why it is seeing fast-growing success from schools to firing ranges and emergency preparedness systems.

Anchor Audio, an American audio manufacturer, has been producing portable sound systems for almost 50 years. Like many PA system producers in the US, its early wireless systems used the 500-600 MHz frequency band for transmission between portable and fixed parts. Initially this worked well, but as the radio spectrum in this band became filled with mobile phone signals, they started to run into interference problems. And when your systems are used in situations where communication is vital, like education presentations and chain of command ceremonies for generals, you can't afford any interruptions in transmission.

Freedom from interference delivers reliability

"Bandwidth congestion was leading to our signal dropping out or the system suddenly picking up local FM radio stations. To fix it, users would need to go to the back of our system and manually go through all the available channels to find a free one. This was frustrating for them, and really not very user friendly," explains Anchor Audio CEO Alex Jacobs.

So, Anchor started looking for a new wireless connectivity solution that could help them avoid the interference issues. "The 2.4 GHz band was also congested, but DECT has little competition in its 1.9 GHz band – which leads to more reliable transmission. And even if there is other local wireless traffic, DECT's auto-frequency hopping finds a free channel, making life easy for our customers," Jacobs adds.

Combined with long range and low latency, this possibility of easy, interference-free transmission made DECT a good match for Anchor's needs. And in Renesas' wireless audio modules, specifically the SC14WAMDECT Module, Anchor found a solution that would help it implement DECT connectivity easily.

Solutions that are designed to be easy to use

The SC14WAMDECT module is a complete, pre-tested module that combines an integrated baseband, radio transceiver, power amplifier and crystal in a single package. The same module can be used in both the fixed part (FP) and the portable part (PP).

"With Renesas' DECT modules, everything came ready for us – making design in much easier. Renesas also provided great support when we needed it, for example helping us understand the auto-frequency hopping and how best to orient the antenna in the microphone for maximum range,' says Jacobs.

Anchor launched its first DECT-based PA system in 2017 and immediately saw an impact. Customers had much less trouble with interference and breaks in transmission. Since then, Anchor has switched its whole PA portfolio over to DECT, including its latest offering, the Bigfoot 2 all-in-one portable sound system. Bigfoot 2 delivers 130 dB of crystal-clear sound to crowds of 5000 and more and can be set up within 30 seconds – even by new users. Like all Anchor systems, the Bigfoot 2 is built to last and comes with a 6-year guarantee.

Supporting customers through COVID

The recent COVID pandemic has brought unique new pressures for schools and educational institutes. Changing restrictions and local outbreaks have forced them to offer remote learning and even lessons with some students physically present in the classroom and others online at home. Ensuring all these students can hear and understand a teacher who is wearing a facemask is a real challenge for a PA system.

However, Anchor's combination of reliable transmission and excellent sound quality has helped educators rise to this challenge – and that is reflected in an unprecedented level of orders since the pandemic began. Meeting this demand, at a time when the electronics industry is facing its own COVID-related supply issues, has required close cooperation between Anchor and its suppliers.

"Here again, Renesas has been excellent, communicating with us on COVID issues early. With the number of orders that we are receiving, it sometimes feels like we are asking the impossible of Renesas. But they always come back to us with realistic – and ultimately accurate – indications of timeframes, pricing etc. so that we can also give our customers a reliable estimate on delivery times," says Jacobs.

Bigfoot 2 from Anchor.

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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

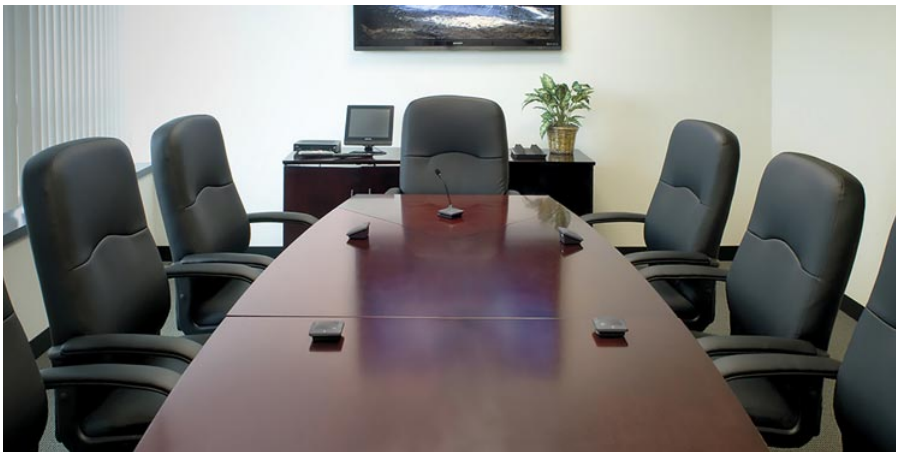
Previously, such systems used the UHF band for transmitting audio from the mic to the central unit. But with many countries wanting to use this band for digital TV, it is becoming very crowded. As a result, many manufacturers are moving to DECT. Revolabs was the first to see the benefits of DECT for 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, now a Renesas company. "Renesas - formerly known as Dialog - 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 Renesas. The SC14493 is a single-chip transceiver, power amplifier and baseband IC for zero blind slot (ZBS) DECT. Together with Renesas' SC14441 single-chip DECT / CAT-iq solution, it provides the wireless communication functionality for Revolabs' 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 concluded.

https://europe.yamaha.com/en/products/unified_communications/

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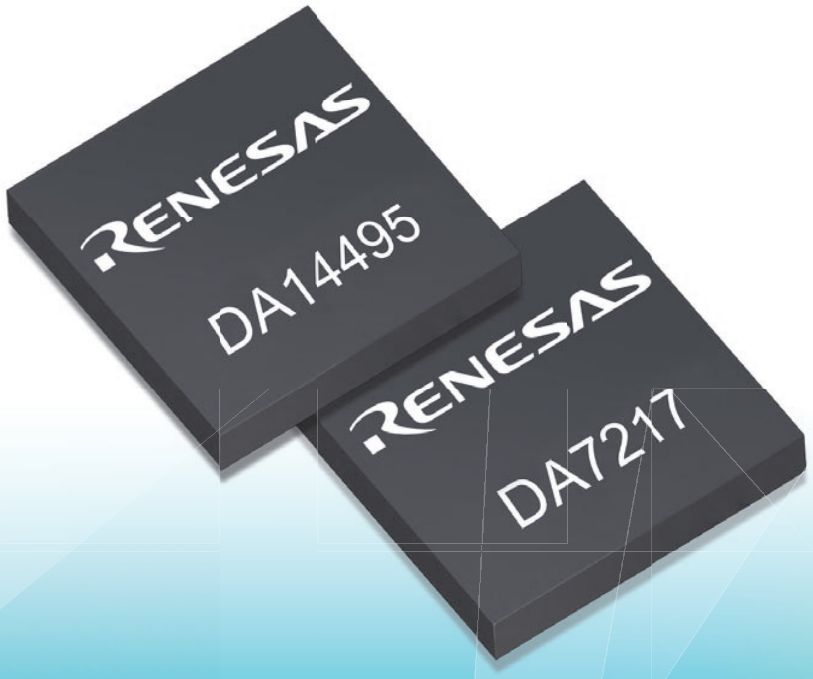
Unleash your **full potential**

DA14495/DA7217

The DECT evolution starts today! This new generation chip set perfectly fits your applications:

- **Professional handsets**
  - Secure and reliable radio link
  - Increased data-speed
  - Mission critical applications
- **Intercom systems**
  - Superb Acoustic Echo Cancelling
  - Excellent wideband audio
  - 12 slot multi-level RF for video/data



- **Sensors**
  - Reduced power consumption
  - Smaller batteries
  - Run sensor fusion software
- **Headsets**
  - Increased density
  - Small form factor
  - Enhanced audio experience
  - Digital Active Noise Cancelling
  - Beamforming mics
- **Voice controlled speakers**
  - Always on voice trigger
  - Command control
  - Far field beamforming mics
- **Microphones**
  - Interference free
  - Increased data speed
  - Run high performance codecs
  - Experience Ultra Low Latency communication

www.dialog-semiconductor.com

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. DECT Horizons talked to Livassured founder and CTO Asmund Tielens to learn more about the thinking behind the use of the DECT wireless solution.

Tell us the background to your company.

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.

What were your aims in developing/ launching Livassured Nightwatch?

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.

What are the key defining features of NightWatch?

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 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.

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?

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 inside the home (from the child's room to the parent's room), the power consumption gave us sufficient operating time (24h) with a transmission speed of 5kbps and it gave a better guarantee for good link quality than ISM band transmission - 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 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.

How does DECT ULE integrate with Nightwatch?

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 Renesas 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 Renesas 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.

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

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

DECT: bringing benefits to home security

Ye-Un Lee, Panasonic.

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 issue 3 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.

DECT Wireless Sensor Camera.

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/

Panasonic BUSINESS

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One small step for wireless audio

Partnering with like-minded companies is a great way to develop innovative and successful products. The collaboration between audio communications experts Poly and Renesas has already led to industry-leading wireless headsets – and continues to go from strength to strength.

Poly 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 Renesas, formerly known as 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. Renesas's flexibility, development and willingness to customize solutions without restrictions give us the ingredients to achieve our goals," explains Rod Brownfield, Polys' Senior Product Manager.

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

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

Flexibility in development

Renesas offers both ROM- and Flash-based ICs. This gives Poly 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, Poly uses ROM-based Renesas 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, Poly 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 Poly'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, Poly has also incorporated Renesas' 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 cancellation.

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

"Poly 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 FORUM WHITEPAPER:

DECT Evolution

By Kai Lewandowski, Principal RF Applications Engineer, Connectivity & Audio, Renesas

This document aims to address some changes in the ETSI DECT standard that help increase its suitability to market spaces with stringent latency and/or reliability requirements, such as Industry 4.0 and PMSE (Program Making and Special Events).

DECT Evolution is a mid-term evolution program intended to explore the limits of TDMA/FDMA technology by adding new modulation schemes to increase the bit rate, channel coding, and reduction of latency. It is implemented as a series of improvements in the DECT CI MAC layer, Network layer and audio coding and transmission. The most relevant features of DECT Evolution are:

- Enhanced support of High-Level Modulation and introduction of Modulation and Coding Schemes (MCSs) to increase the data rate.
- New MAC service with limited delay introducing handover with slot position tolerance to give more options to change the channel in highly occupied areas.
- Improved procedures for double simplex bearers to decrease latency and allow asymmetric connections.
- Optimization of MAC control messages to handle the newly introduced slot structures and modulations.
- Support of multiple Data Link Control LU instances per call to provide flexible user data and user control handling.
- Support of multiple U-plane endpoints per connection.
- Support of combinations of slots and combinations of modulation states in multi-bearer connections.
- New improved LC3plus audio codec for narrowband, wideband, super-wideband and full-band voice services.

Two important improvements will be discussed. Both features are covered as part of DECT Evolution and are referred to as Ultra Reliable Low Latency Communication (URLLC) and Low Complexity Communication Codec (LC3plus).

URLLC

The upcoming need to support more stringent latency and reliability requirements for Industry 4.0 and PMSE (Program Making and Special Events) led to the introduction of DECT URLLC (Ultra Reliable Low Latency Communication).

A further reduction of latency and an increase of reliability realized with DECT Evolution is beneficial in several use case scenarios:

- A wireless game controller, not providing sufficiently low latency and reliability, will frustrate the user.
- A wireless public address system used to amplify voices or musical instruments will transfer latency into the well-known "echo effect", making fluent speech, singing or playing an instrument almost impossible.
- Wireless man-to-machine and machine-to-machine interfaces require low latency and high quality of service to support safe operation.

Low Latency

DECT, traditionally, has strong inherent benefits that set it apart from other wireless technologies, notably its dedicated 1.9GHz frequency band (so no overcrowding issues such as in e.g. 2.4GHz) and low latency (typically ~10-15ms for streaming applications). In order to further underscore these benefits, URLLC will improve the DECT latency to below 5ms and further increase reliability, meeting the present and future market demands.

To maintain optimum coexistence with legacy DECT, the basic 10ms frame period is retained. The lower latency supported under URLLC is achieved by defining sub-frames within the 10ms main frame period. This is depicted in Table 1 below.

Slot#	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
	Standard DECT downlink												Standard DECT uplink											
1+1	Cntrl	Audio																						
1+2	Cntrl	Audio											Audio											
1+3	Cntrl	Audio								Audio								Audio						
1+4	Cntrl	Audio						Audio					Audio							Audio				
1+6	Cntrl	Audio				Audio				Audio			Audio					Audio					Audio	
1+8	Cntrl	Audio			Audio			Audio			Audio		Audio				Audio			Audio			Audio	
1+12	Cntrl	Audio		Audio		Audio		Audio		Audio		Audio	Audio		Audio		Audio		Audio		Audio		Audio	

Table 1: Slot configuration for different sub-frames.

Number of Up-/Downlink slots	Slot allocation	Latency [ms]	Downlink Data-rates [kbps]		
			GFSK	DQPSK	D8PSK
1+1	FP- slot + 1*PP slots	10.42	32	64	96
1+2	FP- slot + 2*PP slots	5.42	64	128	192
1+3	FP- slot + 3* PP slots	3.75	96	192	288
1+4	FP- slot + 4*PP slots	2.92	128	256	384
1+6	FP- slot + 6*PP slots	2.08	192	384	576
1+8	FP- slot + 8*PP slots	1.67	256	512	768
1+12	FP- slot + 12*PP slots	1.25	384	768	1152

Table 2: Slot allocation latency and data rates of different sub-frames.

Different shades of grey are used to indicate the length of the sub-frames within the 10ms standard frame to achieve lower latency. Another interesting figure to note is the increased number of portable parts that can simultaneously connect to a fixed part using these scenarios.

The resulting latency per configuration is determined by the length of the sub-frame period, added with one slot length and can be found in Table 2 above.

Note that the latency numbers are for the DECT link only. Any processing delay (e.g. from a CODEC) is not included. The corresponding data-rates are a function of the number of slots used for the link, combined with the modulation method. In this example, three modulation methods (as supported in the DECT standard) are listed, i.e. GFSK, DQPSK and D8PSK.

In Table 2, FP stands for 'Fixed Part' and PP denotes 'Portable Part'. Using Wi-Fi terminology, these can respectively be regarded as 'Access Point' and 'Wireless Client. The summary of this important development is that latency of 1,25ms is possible in certain use cases, making it very interesting for industrial IoT-like process automation.

Reliability

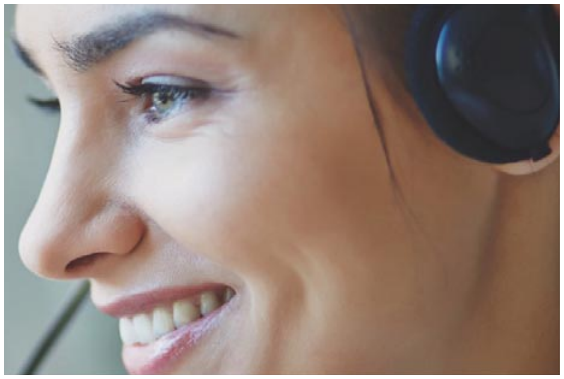
As mentioned already in the introduction, DECT operates in a dedicated frequency band. No other technology is allowed in this frequency band, so, in Europe, DECT is protected against interference from other technologies inside the band. The main limitation under consideration regarding data reliability is interference from other DECT systems. This is the case when multiple DECT FP's are used in the same environment. The following section is less relevant in case of single DECT FP deployment, in which case reliability is inherently ensured.

ETSI EN 301 406 specifies a reference bit error rate better than 10ppm and a reference frame error rate better than 500ppm for inputs powers of -73dBm or greater. Typical applications already largely outperform this and far exceed the 5G requirements when not considering interference from other DECT systems. The better than -90dBm receiver sensitivity of today's DECT systems provides a significant range increase, which helps home and enterprise systems to cover wider areas with less base stations.

Network system simulations have been performed of typical DECT systems. These include the effects of timing misalignment, radio propagation and selectivity, among others. These simulations have focused on the DECT-DECT interference aspects, especially in user-dense scenarios to define data reliability and throughput.

These simulations have pointed out that excellent data reliability is maintained, provided that the FP's are synchronized. With synchronized timing it is ensured that one system's transmissions don't drift into the transmissions of another system, causing data collisions. It has also been confirmed in actual implementations that multi-cell DECT-base systems can meet the reliability requirements, provided they are synchronized.

On top of supporting synchronization, Forward Error Correction (FEC) and other means of redundant data transmission may be considered to further improve data reliability, to make synchronized systems even more robust towards unsynchronized DECT systems in range.



Feature	Supported Range
Frame duration	2.5ms, 5ms and 10ms (2.72ms, 5.44ms, 10.88ms @ 44.1 kHz)
Look ahead delay	2.5ms (2.7ms @ 44.1kHz)
Total algorithmic delay	Frame duration + Look ahead delay = 5ms, 7.5ms, and 12.5ms (for sampling rates other than 44.1kHz)
Supported sampling rates	8, 16, 24, 32, 44.1 and 48kHz
Audio bandwidth	Max. 20kHz for 48kHz
Supported Bit rate	20 to 400 bytes per frame and channel, e.g. 16 to 320kbit/s per channel for 10ms frame length and 48kHz sampling rate
Supported bits per audio sample	No restriction by the algorithm, however optimized for 16, 24, 32 bit depth input

Table 3: Feature summary LC3plus.

LC3plus

With the introduction of the 3GPP Enhanced Voice Service (EVS) in 2014, the mobile voice communication was enriched with the Super Wide Band (SWB) audio quality. However, this technical development came along with a significant increase in computational complexity and memory demands, limiting deployment to relatively powerful mobile phones. LC3plus aims to provide the low complexity counterpart of EVS in order to make SWB also available on low-cost terminals such as used in DECT systems. The codec allows perfect interoperability between mobile and other networks by means of transcoding and fits well to the requirements of DECT terminal equipment in terms of complexity. Due to the codec's flexible design the applications are not limited to voice services but can be extended to high quality music streaming as well.

Modes of operation

The LC3plus codec can operate at highly flexible modes, which are summarized in Table 3 opposite. It supports coding of speech and audio for several audio bandwidths, using the sampling frequencies 8 kHz, 16 kHz, 24 kHz, 32 kHz or 48 kHz. The LC3plus codec may also be used for streaming audio and therefore also supports CD sampling rate (44.1 kHz). It supports encoding and decoding using either a 2.5 ms, 5 ms or 10 ms frame duration. A large number of compressed frame sizes from 20 bytes to 400 bytes can be configured.

Use case (high level)		Availability	Cycle time	Typical payload size	# of devices	Typical service area
Motion control	Printing machine	>99.9999%	< 2 ms	20 bytes	>100	100 m x 100 m x 30 m
	Machine tool	>99.9999%	< 0.5 ms	50 bytes	~20	15 m x 15 m x 3 m
	Packaging machine	>99.9999%	< 1 ms	40 bytes	~50	10 m x 5 m x 3 m
Mobile robots	Cooperative motion control	>99.9999%	1 ms	40-250 bytes	100	< 1 km²
	Video-operated remote control	>99.9999%	10 – 100 ms	15 – 150 kbytes	100	< 1 km²
Mobile control panels with safety functions	Assembly robots or milling machines	>99.9999%	4-8 ms	40-250 bytes	4	10 m x 10 m
	Mobile cranes	>99.9999%	12 ms	40-250 bytes	2	40 m x 60 m
Process automation (process monitoring)		>99.99%	> 50 ms	Varies	10000 devices per km²	

Source: ZVEI

Table 4: Industrial Use cases.

Similarly, the inherent flexibility brought by DECT Evolution offers system architects a range of supported frame sizes, sampling rates and audio bandwidth, enabling new and upgraded product feature sets in areas such as broadcasting, live recording, as well as audio streaming for conferencing systems and wireless loudspeakers.

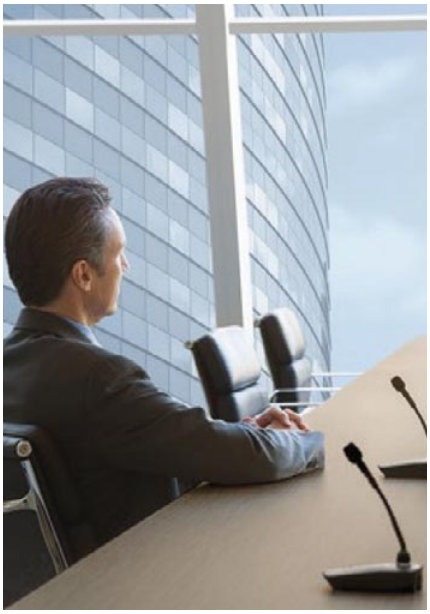
Applications that could potentially profit from DECT Evolution

DECT Evolution is part of the current DECT standard and enables manufacturers and system integrators to develop applications that can be implemented using the current DECT GFSK interface. This "evolution path" was already foreseen in the DECT base standard and considered in the MAC and PHY layers. Implementations are already available in silicon. This improvement in the functional scope allows DECT (Evolution) systems to address a range of applications, which were hitherto out of scope. Industrial wireless is one such area. It is characterized by its stringent requirements for reliability and (low)latency, as well as Quality of Service (Traffic Classification and Prioritization) and device density. The 5G Industrial Use case table (Table 4. above) from ZVEI shows some typical industrial use cases and their requirements. DECT Evolution already fulfills many of the key requirements mentioned in several such use cases. For instance, when considering Range, Density, Latency and System Availability, Process automation would profit greatly from this upgrade of the technology.

Other segments like healthcare (Telecare, remote monitoring) would also benefit from this improved latency and data bandwidth.

Conclusion

DECT is a proven reliable wireless technology. DECT Evolution brings a host of improvements to the technology based on currently available silicon. With the URLLC and LC3plus additions to the DECT ETSI standard, significant improvements can be achieved in terms of data reliability, latency and audio performance. This is especially beneficial for well-known applications in PMSE (Program Making and Special Events), but also in healthcare, and potentially new applications areas such as industrial automation. DECT Evolution was conceived to optimize the potential of legacy DECT, remaining flexible, backward compatible and competitive, and open the door to a wide range of application fields like:



- Call centers and offices with high density of DECT headsets
- Low latency game controllers
- Critical man-to-machine and machine-to-machine interfaces in Industry 4.0
- Controller and wireless sensors for augmented reality
- Smart Home and building automation
- Process automation
- Connected healthcare sensors
- Mobile robots
- … and much more

RENESAS

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 Renesas. 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 Renesas module very easy to program for this application. It is a complete solution and Renesas 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," Hopf added.

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.

https://www.dialog-semiconductor.com/products/connectivity/voice-over-dect/cordless-voice-module-cvm

Expanding the commercial lifetime of DECT

DECT has a commercial history stretching over 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.

"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

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, Renesas' SmartBeat™ DA14495 can be upgraded to the proposed URLLC frame / slot structure just by updating the firmware.

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 99.999% 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 definitory.

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
Portfolio Manager I Business Communication
SENNHEISER electronic GmbH & Co KG

Panasonic

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 Renesas, 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 Renesas 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

Renesas 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 Renesas' single-chip DECT / CAT-iq processors and Renesas 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, Renesas 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.

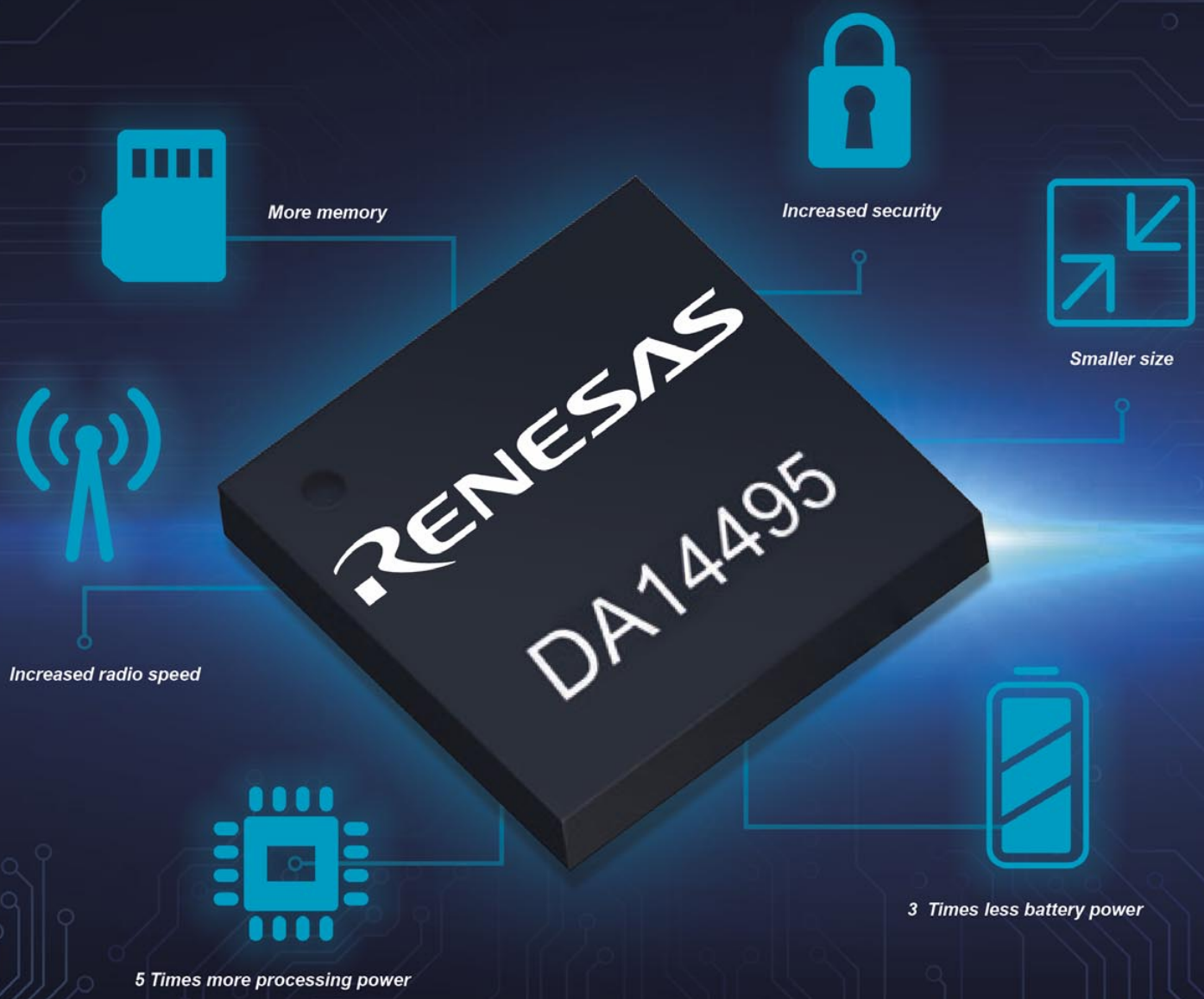
Cooperation makes happy customers

Of course, a redesign on this scale is a major development project. "One of the benefits of working with Renesas 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.

UNLEASH YOUR FULL POTENTIAL



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RENESAS

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

Renesas 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:
https://www.dialog-semiconductor.com/products/connectivity/voice-over-dect/cordless-voice-module-cvm

audio-technica

From Phonograph Cartridges to Leading Innovations in Electro-Acoustic Design and Manufacturing

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 the first headphones in 1974. The place to listen to music then was mostly limited to inside the house. Now times have changed. There is a high demand for diverse types of headphones for listening to music anywhere, anytime, which was unimaginable in the past. Today's audio is literally in our hands, especially thanks to our smartphones.

Consequently, demand for wireless headphones has increased rapidly in recent years. Wireless headphones are indeed convenient and easy to use. However, getting rid of the cord doesn't mean better sound. It is therefore up to the competence of headphone designers to obtain the sound quality that matches that of wired headphones.

For Audio-Technica, which has been producing headphones for many years as a company dedicated to sound, the goal is the same for both wired and wireless headphones: the world's best sound quality. As headphones divide into wired and wireless, we seek the best quality and realistic sound for both using our original technology.

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 Karaoke 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

Poly: taking more than small steps

DECT Horizons talks to Rob Boni, Senior Global Product Manager, Enterprise Wireless, Poly

DECT Horizons readers may be familiar with the names Plantronics and Polycom, but now we need to think about Poly, the company resulting from the merger of the two companies in 2019. Proudly championing the fact that the famous words spoken from the moon – "One small step…" – were transmitted on one of its headsets, Poly now positions itself as a provider of audio expertise with powerful video and screen sharing capabilities to take the friction out of collaboration. As the lines between home and the office blur, Poly's public mission statement is to make it easier to hear, share and see, wherever, whenever.

Headquartered in San Jose and Santa Cruz, California, Poly has more than 6,500 employees working in 75 offices located in 35 different countries. The company has more than 1,500 patents in force worldwide and is a confirmed and long-term user of DECT. These facts alone would be enough reason to talk to the company, but we were now interested to know two things: first, what was the thinking behind bringing Plantronics and Polycom together and, second, how had the global pandemic and resulting #workfromhome movement affected this global provider of enterprise headset solutions?

DECT Horizons spoke with Rob Boni, who came to Poly from the Plantronics side of the equation.

Can you tell us about the merger of Plantronics and Polycom, and what was the motivation?

The integration of these two companies was just such a great fit in terms of providing an end to end solution – from a phone, to video equipment, to the headset - and managing each element plays a part in the communication.

Rob Boni.

From Plantronics' position as a headset company, the motivation that came from our senior management was 'we're great as a headset business, but if we ever want to get more into the market, we need to have an end-to-end solution'. The integration with Polycom made perfect sense because Polycom brought the rest of the proposition, i.e. the phone, including speakerphones and video equipment. Our plan was to add headsets to that package, and to make sure that our headsets worked flawlessly with the Polycom equipment. We feel that this move has made us a major player in the same markets as companies like Cisco, and, frankly, we are better at the headset side of it than anybody else.

Creating for ourselves such a strong and competitive position in the market, then, was the motivation for the two companies coming together. We are now capable of providing our customers with a complete audio and video solution.

How is your business coping with the current circumstances, during which the global pandemic is forcing people to work away from their offices?

As you can probably imagine, with many enterprise businesses requiring people to work from home, we're very busy right now in the headset world. People need the equipment to be able to work from home efficiently. This is a good thing, from a business perspective, but there's no doubt that this is also a trying time.

And during the health crisis, how important has voice connectivity become?

The reality is that at this moment, we simply cannot provide enough headsets to satisfy demand. The #workfromhome movement means that video and headset solutions are extremely important. So at the moment I would say that specifically voice connections – and you can throw video in there as well – are absolutely crucial. We are doing everything we can to build as many headsets and provide solutions as possible. There is a feeling in the industry that the companies needing this equipment are placing orders on every headset manufacturer that they can and that the way it is working out is that whoever can provide the equipment the quickest is the company that is actually getting the order.

At this time it is extremely important for us to not only stay safe, but to provide this equipment as fast as we can. I would have to say that this is probably not going to change. I hope and expect that we will get past this pandemic, but I believe that the new normal is not going to be the same as the old normal. I think that there will be a lot more companies not just allowing their employees to work from home, but requiring them to do so. That being the case, our headsets – and specifically our DECT headsets because of the great audio that they provide – are a big part of our roadmap and very important to us going forward.

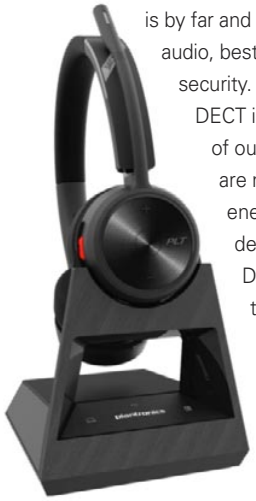
Poly DT13 headset.

> " Our headsets – and specifically our DECT headsets because of the great audio that they provide – are a big part of our roadmap and very important to us going forward."

Is DECT an important part of your product philosophy? Where does it fit in?
Absolutely. DECT has always been an important part of our business, though, to be frank and honest, prior to the merger with Polycom, Plantronics really focused its effort, its development and its dollars into the unified communications (UC) space. That means multiple connectivity from desk and mobile phones, PCs etc and using one headset across all of your communication networks.

While this was going on, things were a little stagnant on the DECT side. We were the market leader in DECT, and we knew it. This being so, we were investing more in our Bluetooth and Voyager line of products as the feeling was that these were the real 'up and comers' for UC applications. However, we've since realised that our DECT products are a huge part of that picture because of the multi-connectivity aspect of these products and because of the great audio and the great range you get with DECT.

Imagine that you are one of the people who is now working from home. If you have a DECT headset in your office, your bedroom or wherever you are working, you can roam about the house and stay connected to the conversation while you are multi-tasking. That's difficult to do with a Bluetooth headset, even allowing for the fact that we now have Class 1 Bluetooth which has a better range. I think that it is generally recognized – and certainly by our company – that DECT is by far and away still best for audio, best for range and best for security. As a result of this, DECT is a very important part of our philosophy and we are now focusing more energy and more of our development into the DECT line, as opposed to a couple of years back when we were focusing more on Bluetooth. We're still developing Bluetooth products, but we now realise the importance of continuing our DECT development, and continuing to get products into the market that are competitive.



Our focus has shifted back as, to be honest, we've seen what our competition has done, and we realise that this is important to the world. We knew we needed to get back in the game and come up with some killer products. We're now in the middle of developing some really cool new DECT products.

> " DECT is by far and away still best for audio, best for range and best for security."

As a voice technology, DECT has managed to evolve with the market requirements in terms of density and dependability, what else makes DECT important for your business?
It is the great range and audio and density performance that makes DECT a really important part of our business. Maybe with more people working from home the density piece of it is currently not quite as important, but, going forward, density is a big part of what we need. As you probably know, DECT density here in the USA is half of what it is in Europe, due to there being half of the channels. We have had some density issues, but as we move forward, and as we improve the density performance, this will help us and our customers to deploy DECT throughout their enterprise without having to mix and match with corded solutions and/or other wireless technologies.

So, yes, absolutely, the dependability of DECT's audio and range are really important to our business and for our market. Our DECT products are the ones that allow us to do this most efficiently.

Looking to the future, what roles do high definition voice (HD Voice) and state of the art security play in a typical enterprise product?
Great audio is a pillar of our company and something we have always prided ourselves on, therefore HD Voice is important to us. Then, as security requirements grow we want to be able to implement those in our products too. Security is a big issue with many of our customers, none less than the big financial institutions and medical institutions. They are always asking about security and want to know when we will be able to offer the next levels.

That means that HD Voice and high levels of security are extremely important to us and to all of our customers.

With DECT-2020 currently in specification in ETSI, the next generation of DECT promises to bring more performance in terms of density, lower latency, bandwidth, and reliability. Is that in line with your own requirements for DECT-5G, and what will it be used for?
My understanding for DECT-5G is that it is a high data rate, low latency technology. Bandwidth, reliability, high security and low latency are all extremely important to our DECT products and our portfolio in general. Developments in these areas are exactly what we are looking for. Low latency, for example, is a particular area in which we have had customer feedback and requests.

It's a little early to talk about specific applications, but I can tell you this direction that DECT is taking is completely, 100% in-line with our requirements. Our engineering group is very good at adopting these new technologies as soon as they are available and creating building blocks that allow us to implement them across multiple applications quickly and efficiently.

My technical colleagues are attending a lot of the DECT Forum meetings at which developments in DECT-2020 and DECT-5G are discussed and mapped out. They bring the ideas back to us in product management so that we can discuss and plan how they can be used and rolled out. Our continual goal is to research and make available technology that can improve our customer's experience when using our products.

We are looking forward to adopting these new DECT technologies and implementing them in our products.

RENESAS

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 Renesas, 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 trans-mission 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 Renesas 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 Renesas 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 iopsys software platform. This attractive functionality allows our customers to offer new services and create new revenue streams."

To complete the demo, Renesas 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 FileMe file sharing application with Digital Living Network Alliance (DLNA) control point capabilities. This allows the FileMe 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 Renesas-Inteno-Audio Pro demonstrator uses the Opus Custom codec implemented in the software running on the SC14492 (and all Renesas 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 Renesas-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 Renesas. "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/en/audio-pro-business/

KENWOOD

DECT intercom ensures the house always wins

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, now a Renesas company.

"JVCKENWOOD approached us with the requirements for a system with 10 duplex audio connections plus many more people just listening," says Jesper Noer, 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 Renesas 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, Renesas' 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 Renesas 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.

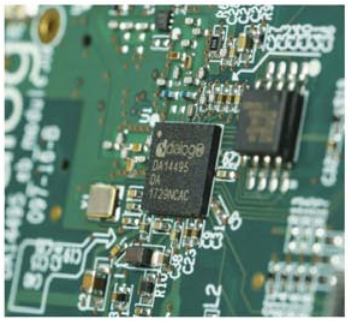
RENESAS

The new DECT Evolution

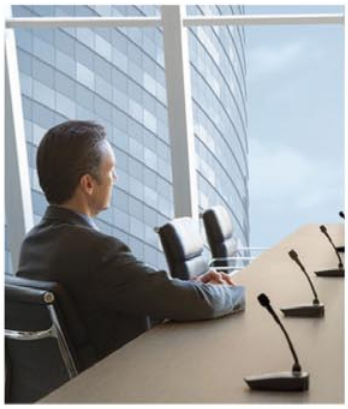
Do more with ultra reliable low latency communication.
More security. More data. More users. More applications.







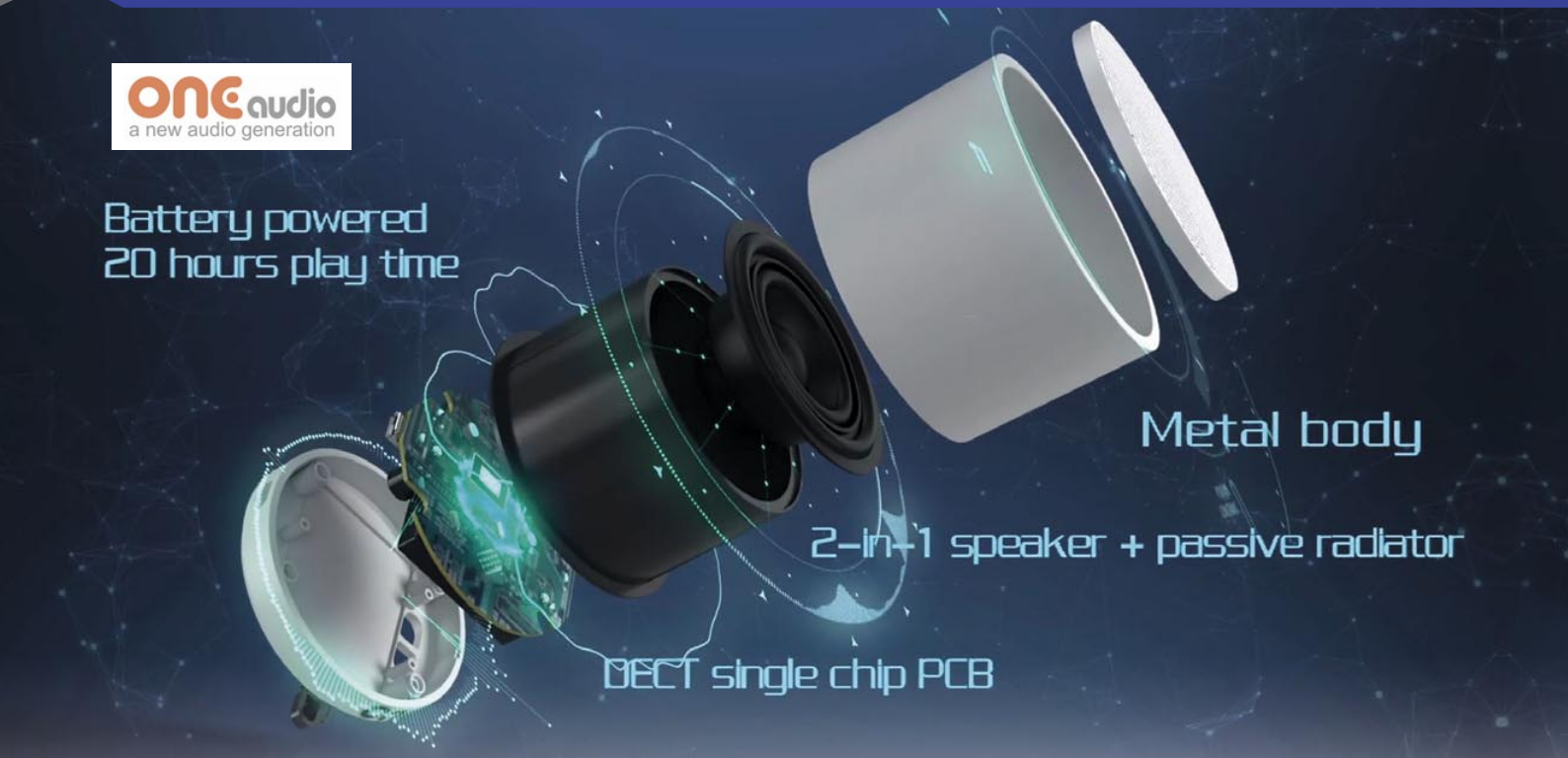




The DA14495 in new applications

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

www.dialog-semiconductor.com



How the world's first truly wireless surround sound system came to exist

By Kenneth, chief engineer at ONEaudio

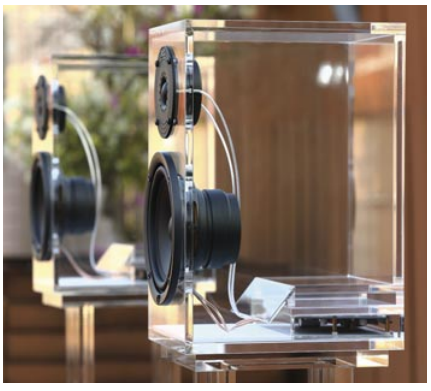
I want to make a change. I would like everyone to be able to enjoy high quality music with a simple setup and at an affordable price, so that good audio would be a part of everybody's life. That concept has driven me for 10 years.

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 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/

New throwable microphone bounces onto the market

In June 2018, Catchbox extended its throwable microphone offering with a new, DECT-enabled model for large, conference-sized venues. Incorporating a DECT module from Renesas, 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 Renesas, which kept our development cycle to a minimum and allowed us to bring the new product to market much quicker."

Renesas' Wireless Audio Module (SC14WAMDECT) is a complete, drop-in DECT solution, designed specifically for applications that demand clear and reliable sound. It combines a radio transceiver, baseband processor, power amplifier and antenna with a full DECT protocol stack in one pre-certified and fully tested module.

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."

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.

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 repellent."

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. 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 Renesas and keeping a close eye on the new features offered by the company's latest DECT solutions.

https://catchbox.com/

RENESAS

Get more from DECT: more security, more users

DECT is evolving. To address new applications and new market opportunities, this tried-and-trusted 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 Renesas. 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, pi/2-DBPSK, pi/4-DQPSK and pi/8-D8PSK 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 Renesas.

https://www.dialog-semiconductor.com/products/dect/smartbeat-da14495

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 Renesas. "Renesas 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. Renesas 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."

http://www.listentech.com/

Poly delivers another first for DECT Wireless

A pioneer in wearable technology, Poly 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.

Poly 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 Poly keeps ahead of dynamic technology demands to ensure robust, secure communication solutions.

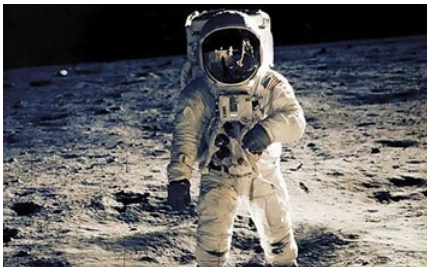
From a garage to the moon and back

Poly 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. Poly MS50 was the headset used in outer space by astronaut Wally Schirra for the Mercury mission, and soon after, Neil Armstrong used a Poly headset to utter his legendary words, "That's one small step for man, one giant leap for mankind."

Poly 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.

Poly 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



Neil Armstrong walked on the moon and uttered the legendary words: "That's one small step for man, one giant leap for mankind" through a Poly headset.

mobility. DECT wireless technology is a key attribute in accelerating headset-to-softphone usage, which analysts expect will double over the next few years.

Poly 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, Poly 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 UCPS band for DECT in the US, and released Poly CS55, CS70N and SupraPlus Wireless headset models.

Our flagship DECT headset system, Savi 700 Series features multi-device connectivity to meet the evolving needs of enterprise workers.

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 Poly 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. Poly 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. Polys' CS500 Series with the DECT Security Certification Logo and security enhancements are already available. Customers can expect the updated security-certified Poly 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 Poly website.

For more information, please visit **www.poly.com**.

RENESAS

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 over-saturated 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.

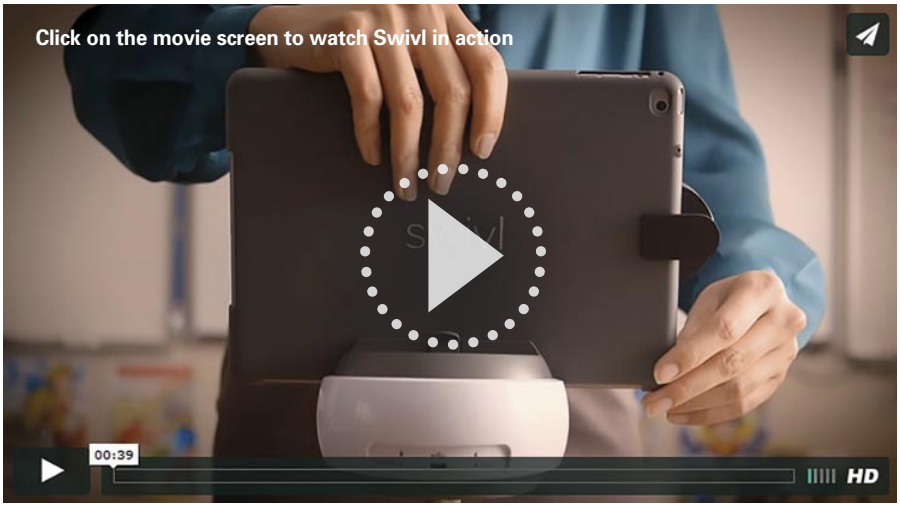
Doing the homework

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 Renesas Cordless Voice Module (CVM).

"Renesas'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 they were prepared to offer a small company like us: answering our questions fast and introducing us to possible third-party design partners. Renesas 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 Renesas really helped us deliver it."

www.swivl.com



Shure microphones and audio systems

For when failure is not an option


Shure's classic 55 mic

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 DECT Horizons 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.

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

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.

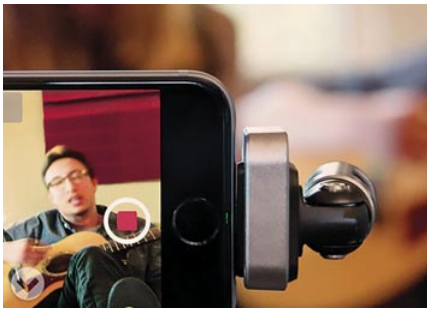
In 1993, the US Post Office released a stamp featuring Elvis and Shure's microphone.

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.

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?

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.



Shure – iPhone mic.

Tell us about the split between Shure's wired and wireless products.

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.

Microflex.

Where does DECT/ULE fit into your portfolio?

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

What were the compelling reasons to use DECT?

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.

Can you put numbers on that? How many DECT mics can be used together, and how many ISM-band mics?

It's not exactly the same scenarios that we are aiming at, but as an example, in the USA we can support 24 DECTmicrophones 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.

So it seems that DECT did offer Shure distinct advantages then?

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.

Is DECT's independent spectrum important to Shure, and if so, why?

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.

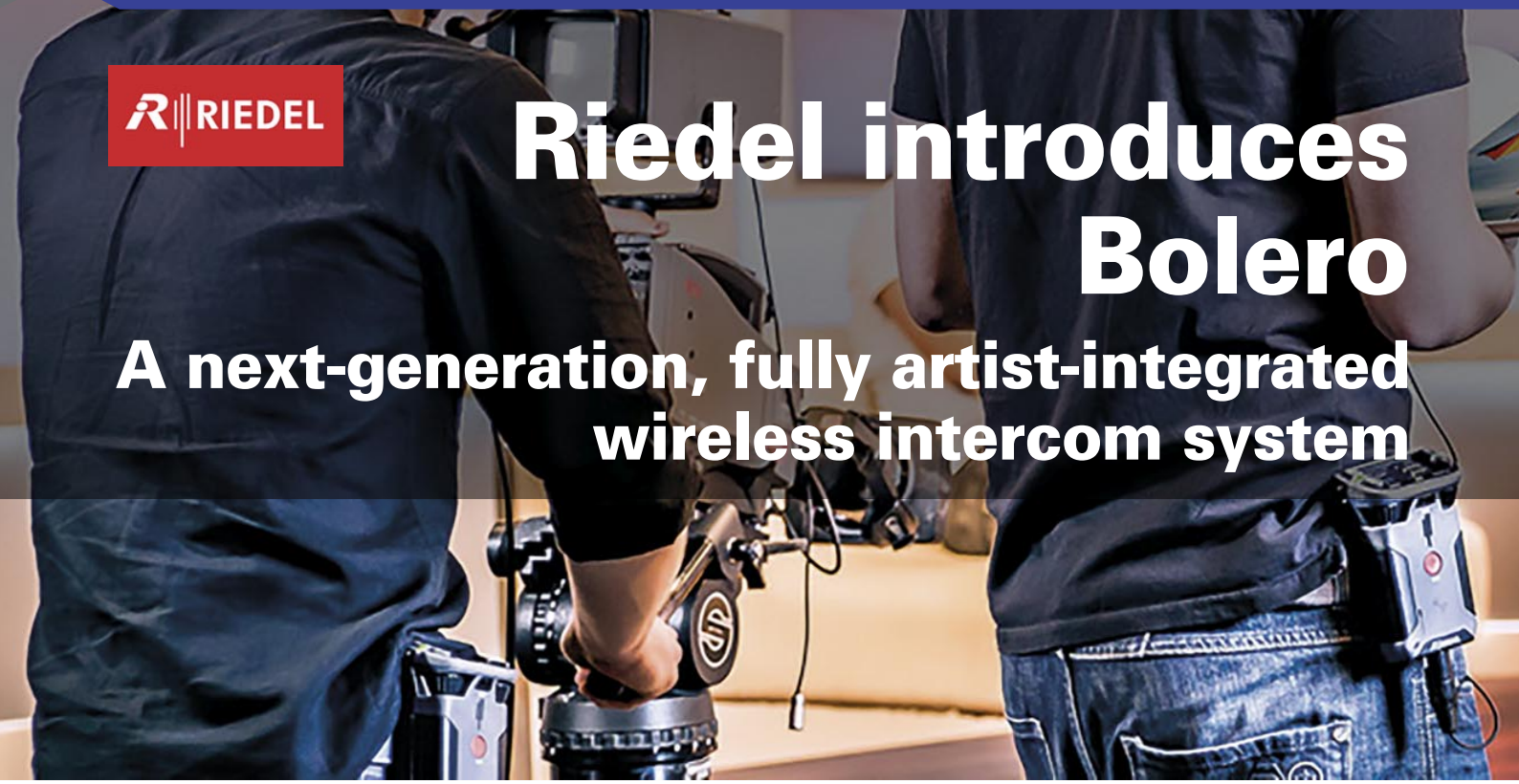
There are places where the DECT spectrum is busy. If you've got a call centre located above you in a multi-story building, for example, you could have some issues. But we can use spectrum monitoring and work out how many microphones we are going to be able to support. This allows us to assure customers in that neighbourhood as to what they can expect. In DECT, everything is built in and everything just works. This is great for us.

What do you see as the future needs for the wireless audio space?

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.

www.shure.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 beltpack is registered with a unique system ID, and each beltpack 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 beltpack to the antennas is often a complex process that requires a user to go into the beltpack menu and apply a pin code. This process can easily take two minutes per beltpack, adding a significant amount of time if the operator must configure dozens of beltpacks. Bolero incorporates Near-Field Communication (NFC) technology for both the beltpack and the active antennas, so registration is as easy as simply touching the beltpack 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 beltpack 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/

RENESAS

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 Renesas 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 Renesas 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 Renesas.

Panasonic developed the monitoring nodes and base stations based on Renesas'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 Renesas 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.

SENNHEISER COMMUNICATIONS

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 flexible 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

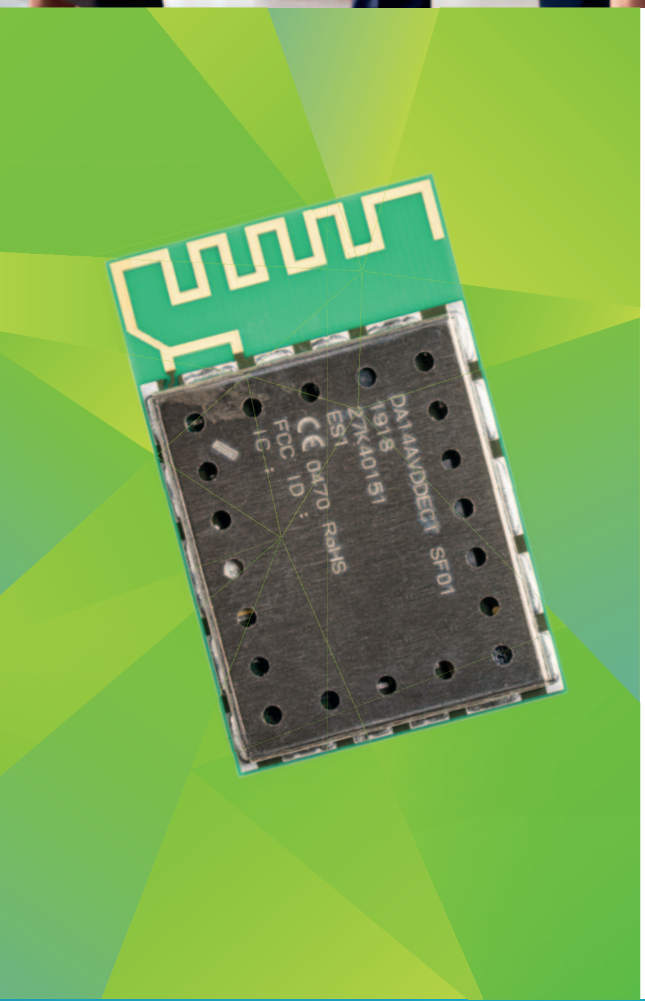
ABOUT SENNHEISER

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**

ABOUT SENNHEISER BUSINESS COMMUNICATION

As part of the Sennheiser Professional Systems segment, the Sennheiser Business Communication division is focused on providing innovative audio solutions for the corporate market. Sennheiser Business Communication provides speaker systems, audio distribution networks, conference systems, installed microphones and tour guide and information systems, reaching the corporate market via specialist channel partners and AV resellers/integrators, continually innovating to accelerate and simplify the convergence of the AV and IT. The division draws on Sennheiser's rich, 70-year history of setting new milestones in audio excellence to bring new standards to business communications. The latest addition in the portfolio is TeamConnect Wireless – a portable and wireless audio conferencing solution - designed to empower businesses to thrive in sophisticated work environments and meet business professionals' growing expectations for better and more flexible workplace communications and collaborations.

Enhanced use case performance with better sound quality



The DA14AVDDECT module is our latest DECT module solution, targeting the high-end wireless application market.

- Supports up to 4 microphones (PP) on one receiver (FP)
- 16kHz audio bandwidth high end voice/audio quality
- Transmitter (PP) consumes down to 46mA (LPM) when talking

- Supports up to 1024 listeners (PP) from one broadcasting system (FP)
- 20kHz audio bandwidth for super high-end voice/audio quality for broadcasting
- One full duplex return channel with the broadcaster for Interaction
- Receiver (PP) consumes down to 35mA (LPM) when listening

www.dialog-semiconductor.com

RENESAS

Lights, cameras, action!

For TV shows, getting the perfect shot means having the camera operator being in the right place at the right time to focus in on the action. That takes constant communication between the director's box and the camera team. A new wireless intercom system from Hollyland Technology makes that communication simpler and more reliable than ever. And it's one of the first DECT-based solutions to be designed and built in China.

In a studio, where the positions and movements of actors or presenters is known beforehand, setting up the perfect shot is easier. Camera positions can be planned and are relatively static, so can be controlled via a wired connection. However, for larger, more dynamic sets or outdoor production, getting the right shot is much more challenging. Distances may make cabling impractical and if camera operators need to be close into the action, a cable connection could even be a safety hazard.

In these situations, wireless communication offers a way forward. But the wireless link needs to be reliable with good audio quality and long range so that the camera never misses the perfect shot.

Dedicated to delivering

This is something that that wireless video and audio experts at Hollyland Technology understands. It offers a range of wireless intercom solutions targeting applications such as television broadcasting. Based in China – where DECT is not approved for use – the company initially focused on Wi-Fi-based intercoms for the Asian market. But when it started to address the US market, Hollyland saw it as an opportunity to explore the potential of other wireless communication technologies.

"Wi-Fi offers good audio quality and two-way communication. But it operates in a very crowded spectrum and that can lead to interference issues, particularly in a busy studio where you need to direct multiple cameras," explains Vincent Ma, co-founder of Hollyland. "With its dedicated band, DECT avoids the interference problem which is a real plus when the director needs to control multiple camera operators."

DECT has many other attractive features for digital intercoms targeting TV applications. It allows two-way interaction between the director and individual camera operators, while its long operating range suitable for large venues such as concerts or sports events.

And for outdoor shoots, wireless DECT intercoms allow camera operators to get close to action, regardless of the location. A great example of this is the show Man versus Wild,

in which Bear Grylls shows the audience how to survive challenging outdoor situations. Often shot in remote outdoor locations, the show used a DECT wireless solution from Hollyland to capture the action.

Man versus Wild used the Mars T1000 and Syscom 1000T, Hollyland's first DECT-based intercom. "For the professional market in the USA, we needed to be able to offer a solution that delivered high-quality full-duplex audio over long distances. DECT was the ideal choice," Ma says.

Although an expert in wireless audio, like most Chinese companies, Hollyland had no experience with DECT. So when developing the Syscom 1000T, finding the right DECT partner and solution was vital.

"Dialog Semiconductor, a Renesas Company has a long history in DECT, and unlike other companies it has a local office in Hong Kong and support staff that speak Chinese. It makes a real difference for our experts to be able to talk technology in their own language. And their technical support is not like other companies either. We can talk about the technology, roadmaps and schedules, then set targets and meet commitments one by one," Ma adds.

For the Syscom 1000T, Hollyland chose the SC14CVMDECT cordless voice module. This combines all necessary hardware and software into a single drop-in solution that is pre-certified for use in various regulatory regimes.

"Renesas' modules let you develop new applications quicker and more cost efficiently. And they make it easier to control quality and consistency for RF. Together with the pre-certification, that really reduced the cost and time it took to start shipping the Syscom 1000T," says Ma.

A second generation

With their success in Man versus Wild and several other high-profile shows, Hollyland has proven their credentials and shown that Chinese manufacturers can deliver high-quality products for the professional market. Looking forward, Hollyland is working on its next-generation solution. For this, it needed a next-generation DECT solution and, thanks to its relationship with Renesas, it found it in their newly released DA14AVDDECT Audio Voice Data module.

Like the SC14CVMDECT, the new module includes a state-of-the-art DECT radio, a multi-core, power amplifier, stereo CODEC, battery management and onboard antenna. But compared to its predecessor, the DA14AVDDECT delivers 20 Hz – 20 kHz wideband audio and supports 8 wireless users from a single module.

http://www.hollyland-tech.com/

HOLLYLAND
For a better view!

STREAMIT

Bringing Wireless Convenience to Professional Audio Streaming

Music and announcements are a key part of both branding and the customer experience for everything from retail outlets to hospitality venues. But ensuring high audio quality has always meant relying on costly and inflexible wired installations. Now, Dutch audio streaming experts Streamit are bringing the convenience of wireless audio to the professional sector

Locations such as fashion stores and supermarkets, restaurants and hotels, fitness centers and live events use distributed audio and music to connect with new customers and improve their experience. To date, the market for in-store audio systems has been dominated almost exclusively by permanently wired solutions. However, these are expensive and difficult to install in the first place, and later upgrades incur even more costs and hassle.

"Many of our customers were asking for wireless solutions based on Wi-Fi because it was familiar from their internet solutions. Some were even trying solutions based on off-the-shelf consumer Wi-Fi products," explains Johan van der Stoel, Managing Director of Streamit. "But Wi-Fi can't guarantee uninterrupted streaming because it operates in a crowded waveband. And those consumer systems take a lot of time and effort to start up each morning in a professional environment."

The right technology for customers' needs

While it was clear that Wi-Fi wasn't the answer, it was also clear that the professional

audio market needed a high-quality wireless streaming solution. So Streamit set about finding a suitable wireless technology that could be the basis for such a solution. They found their answer at the trade show Embedded World 2020.

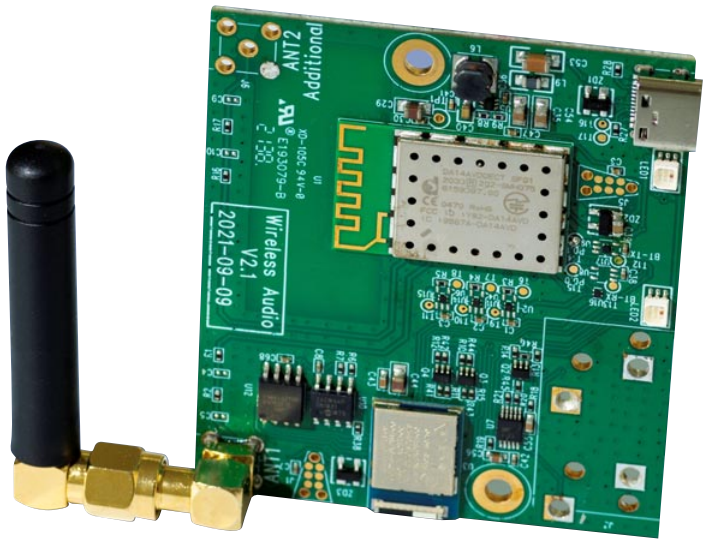
"We started talking to Renesas (then Dialog) about DECT. We already knew DECT was renowned for reliability and had a longer range than Wi-Fi. When we learned about its audio quality and broadcast capabilities, we realized it had all the right capabilities for our needs," says van der Stoel.

Streamit, with support from Renesas, began exploring the possibilities of developing an audio streaming solution based on DECT technology. Based on advice from Renesas, they soon focused their development efforts around the Renesas DECT AVD module. The module is a complete drop-in solution for next-generation wireless applications and combines all necessary hardware – including radio, multi-core processor, RF amplifier and battery management.

A technology platform for the whole market

Initially, Streamit focused on developing its own proprietary solution, in the form of wireless transmitters and receivers that could be used alongside its LISA streaming audio player and third-party speakers. However, they soon realized the potential of the technology to give customers more freedom to choose the system components and configuration that best suits their needs. Subsequently, they have further developed the solution into the IRIS platform featuring a module that original equipment manufacturers (OEMs) can integrate directly into own professional audio solutions.

"The Renesas DECT AVD module was ideal for development. Together with the DECT software stack that Renesas supplied, it allowed us to move quickly to a prototype. And we had fantastic support from Renesas that really helped make the project a success," says van der Stoel.



Performance and convenience

Ease of use was a vital consideration, as customers are not keen on spending time and money just to train staff on how to use the music system. The hardware within the module means Streamit could use the same hardware design for both transmitters and receivers, and Renesas tailored the software stack to allow nodes to be switched between transmitter and receiver operation after installation. Thanks to Bluetooth functionality and Streamit's own app, users can make this switch at will via their smartphone – simplifying both the set-up and operation of in-store audio systems.

With prototypes successfully developed, the IRIS platform is currently undergoing final testing including for audio performance. "The platform was designed for applications wherever low-cost 100 V speakers are used. And, while we haven't finished fully benchmarking the platform's audio performance, we know we can easily deliver performance beyond that of such speakers."

Streamit plans to launch its IRIS platform to the market in mid-2022, initially targeting applications ranging from schools, university campuses and office buildings to retail outlets, hotels, restaurants and events.

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