

INCISOR™

NEWS FROM THE BLUETOOTH™ AND SHORT RANGE RF ENVIRONMENT

ISSUE 67

IN INCISOR THIS MONTH

Welcome to the April 2004 issue of Incisor.

For those working in the European tech industry, March is not a popular month. Why, you ask? The reason is that March is the month that sees a trade event called CeBIT take place in Hanover, Germany. Hanover in March is a very cold, bleak place, and CeBIT is a very long show. And big – probably the world's largest tech event. Attendance as an exhibitor at CeBIT is more a survival exercise than anything else. If the weather doesn't get you, the partying will. Families do not recognise their loved ones when they return from a week at CeBIT.

The upside is that CeBIT traditionally sees many new products announced, and this year was no exception. Incisor has dedicated five whole pages to new Bluetooth products. A bumper month by any standards.

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Bluetooth v1.2 notebook from Fujitsu Siemens has CSR inside

World's first 1.2 qualified end product

CSR has announced that a notebook PC using its BlueCore silicon has just qualified to version 1.2 of the Bluetooth specification. This is the first end product to qualify to v1.2, the improved specification which brings connectivity enhancement to Bluetooth but retains backwards compatibility with existing v1.1 Bluetooth products.

Matthew Philips, vice president of sales for Asia, CSR added, "CSR has been in close collaboration with the SIG to develop the technology that makes up Bluetooth v1.2. We are therefore delighted to see BlueCore silicon in the very first v1.2 qualified product."

The v1.2 Bluetooth-enabled product in question is the Fujitsu LifeBook S7010 mobile computer (see Incisor issue 66 for more information on Fujitsu Siemens Bluetooth/Wi-Fi notebook programme), which ships with CSR's BlueCore IC and has been qualified to be compliant with the Toshiba v1.2 PC stack.

CSR's v1.2 BlueCore offering includes Adaptive Frequency Hopping (AFH) technology. AFH minimises interference between Bluetooth and Wi-Fi radios when operating in the same environment, making it ideal for use in a busy RF environment -

Fujitsu Siemens S7010 provides AFH and other Bluetooth 1.2 features courtesy of CSR BlueCore



such as in Wireless LAN offices and hotspots. CSR's Bluetooth v1.2 solution also employs Fast Connect which significantly improves the usability of Bluetooth devices by reducing device discovery times by up to an order of magnitude.

"Fujitsu Siemens is committed to providing customers with the most complete solutions," said Nick Eades, marketing director, Fujitsu Siemens. "It is inevitable that both Wi-Fi and Bluetooth will be part of the mobile computing road map and co-existence of radio devices within the notebook platform has been a customer concern for some time. Adaptive Frequency Hopping addresses this, and, coupled with the other enhancements of version 1.2 of the Bluetooth spec provides our customers with the most effective and interoperable wireless computing platform."

Bluetooth SIG Appoints Technical Director Microsoft wireless guru hits the road from Seattle to Kansas

The Bluetooth Special Interest Group (BSIG), has announced the appointment of former Microsoft wireless architect Dr. Michael Foley to the position of technical director. The BSIG's news release says that 'Foley will direct the development of future versions of the short-range wireless specification, champion both interoperability and usability initiatives while overseeing the various working groups responsible for the technology's growth.' The BSIG apparently created this position to meet market demand for the technology and to ensure the specification continues to lead the way in the short-range wireless space.

"Globally this past year the market for Bluetooth equipped products nearly doubled, and we are



encouraged for similar growth in 2004. We felt it was critical to create this new position to ensure a high quality experience for the growing number of users and to better prepare the technology to support forthcoming wireless scenarios," said Markus Schetelig, senior manager, local connectivity group at Nokia and chairman of the board for the BSIG. "Mike Foley brings the perfect mix of wireless know-how and Bluetooth specific background to this position."

Foley is not new to the Bluetooth landscape. While at

Microsoft he served as the BSIG's chairman of the board and was involved in the launch of Bluetooth enabled Microsoft hardware products and worked toward the integration of Bluetooth into future versions of Microsoft operating systems.

Any journalist knows that these announcements rarely lack a positive and optimistic quote from the new incumbent, and this was no exception to the rule. "Since its inception, I could see the potential for Bluetooth wireless technology. The growing momentum the technology has seen over the past several years makes this an exciting time in the wireless industry, I am looking forward to being a part of it," said Mike Foley, who began work as technical director at the BSIG on the 1st March, 2004.

Destiny Wireless and BT push digital pen and paper

Regular – and long term - readers of Incisor and its sister publication Apendig will be familiar with the digital pen and paper (DP&P) solution developed and promoted by Swedish company Anoto. Despite enormous promise, this system - which uses a (normally Bluetooth) connected pen to send information either over short distances to a computing device or further via a network-connected cellphone - has so far failed to make a huge impact or capture consumer or enterprise imagination. A recent announcement from UK based Destiny Wireless plc and BT tells us that the two companies are now joining forces to become strategic partners in an effort to improve services and solutions delivered to the business arena using Anoto's DP&P technology.



Could BT/Destiny Wireless push finally help Anoto technology take off?

BT claims successful use of digital pen applications with a range of clients including DHL and FedEx, and says it will work with Destiny Wireless to deliver a DP&P initiative to support logistics companies and other businesses.

Destiny Wireless is the exclusive Anoto agent in the UK, South Africa and Australia and already delivers the solution to a number of companies in the UK, one of which is Peter Duffy, Yorkshire Water Authority's preferred maintenance contractor.

Destiny will introduce DP&P to BT business clients and will develop a bespoke package to suit each company's requirements.

Destiny Wireless CEO Edward Belgeonne believes that DP&P solutions will become an essential part of any business in years to come, as have mobile phones and PCs "Anoto functionality is user friendly and will provide a cost effective solution for a number of business. This is an exciting time at Destiny and we look forward to working with BT to deliver this solution to their customers".

Bluetooth provides Wi-Fi Mini Me

Heavily promoting the use of small computing devices in the enterprise, BLIP Systems believes that with the release of BlipNet 2.5 it has released a product that does for PDA's what Wireless LAN does for laptop computers.

"A Bluetooth network like BlipNet is a competitive alternative to a Wireless LAN network, if you aim to connect small personal devices", said general manager, Peter Knudsen. "If you want to connect PDA's to a company network, a Bluetooth network will provide considerably longer lifetime from the batteries, with no bandwidth bottlenecks.

The bandwidth available on Bluetooth is more than today's PDA's can handle. Furthermore BlipNet is capable of tracking employees that carry Bluetooth enabled PDA's, mobile phones or small tags. It is possible to see who is at work, and who is out of office, It is even possible to see if someone is in a meeting room. We are not competing with Wireless LAN, we look at Wireless LAN and Bluetooth as two technologies complementing each other with each their strong sides. Bluetooth is a technically better alternative when the wireless devices are small personal devices. Also Bluetooth devices are often cheaper than devices with Wireless LAN, at today's

prices you are typically able to buy a BlipNet for the money you save on handheld devices," he continues.

Blip Systems says that with a BlipNet installation at the office employees with handheld computers will have continuous access to the company network, while BlipNet keeps track of the employees, and only requires the user to turn on his device.

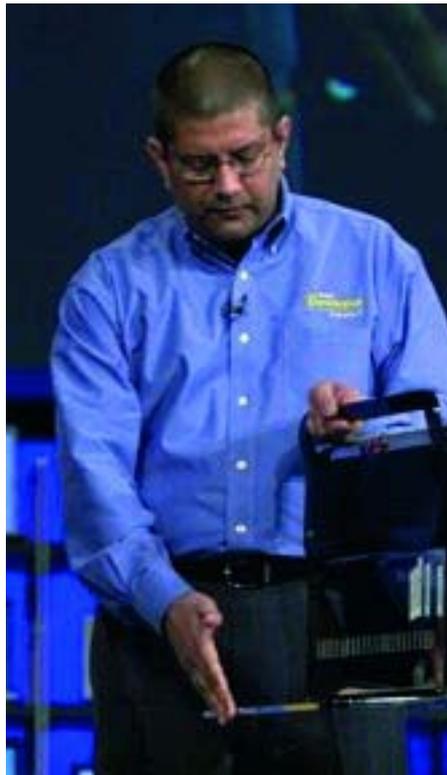
For those worried about security, Knudsen said that BlipNet also supports the Bluetooth standards for encryption of data, and has central control of all units and passwords built in to the BlipServer.

'Florence' Concept PC features wireless coexistence technology co-developed by Silicon Wave and Intel

Concurrent with the recent Intel Developer Forum (IDF) in San Francisco, Silicon Wave announced that its single-chip UltimateBlue Bluetooth solution and the co-developed Intel Wireless Coexistence System are integrated into Intel's latest concept PCs, which were unveiled at the IDF.

There are three concept mobile PCs as part of the project code-named 'Florence'. The 12-inch model features EMA functionality and converts from a laptop to a tablet PC, allowing, claims Intel, maximum flexibility to balance office and mobile demands. The 15.4-inch model features fingerprint and smartcard security, built-in array microphones and camera for collaboration, and EMA functionality. The 17-inch Mobile Entertainment PC allows users to communicate and be entertained around the home with a wide-screen display in a portable design; a wireless Bluetooth keyboard; built-in voice-over-IP handset and remote control; integrated array microphones and camera; and Intel High Definition Audio for high-quality sound. The Intel Wireless Coexistence System is incorporated to minimize interference between Bluetooth and 802.11 wireless technologies, allowing both to operate simultaneously.

"The concept PC program was started over two years ago to showcase Intel's products and to provide customers with a vision of what was possible," said Mike Trainor, chief mobile



Intel's Anand Chandrasekher shows Florence concept PC at IDF Spring 2004 in San Francisco

technology evangelist for Intel Corporation. "Wireless computing is a big part of that vision, and our work with Silicon Wave on a coexistence solution is another example of delivering innovative solutions to real-world problems."

The Intel Wireless Coexistence System ensures that end users experience optimal data throughput, range and responsiveness on wireless LANs while maintaining connectivity with other PCs or peripherals enabled with Bluetooth wireless technology such as keyboards, mice, printers, PDAs, cameras and Smart Phones.

"Both Bluetooth and 802.11 wireless technologies are rapidly being integrated into PCs, so it is critical that we minimize interference issues," said Malachi Bierstein, technical marketing manager for Silicon Wave. "The Intel Wireless Coexistence System plays a key role in delivering seamless wireless connectivity to the Florence concept PC."

Bluetooth SIG All Hands Meeting

The Bluetooth SIG is staging what is called an All Hands Meeting, set to take place on 21-April in Kansas City. Associate and promoter members from all over the globe will convene in this mid-western setting to network with one another, voice opinions, concerns and ideas. The BSIG's main aim is for the time dedicated to the event to

positively impact the direction of Bluetooth wireless technology.

Many goals and discussion topics have been set for the All Hands Meeting. Some of the most important topics include continuing to improve interoperability, prioritising markets and applications, improving the qualification program and process, addressing security concerns, and

determining the technology roadmap moving forward, among others. The BSIG hopes to have many updates resulting from this meeting of the special interest group's members.

Quite how this event sits in the Bluetooth calendar, Incisor is not sure. Is it the new - BSIG rather than externally - organised developers conference? We shall see.

First Bluetooth test lab in Mainland China

Spanish test house Centro de Tecnología de las Comunicaciones, S.A. (CETECOM) has been chosen by the State Radio Monitoring Center (SRMC) to supply its BITE Bluetooth conformance test solutions in Beijing, People's Republic of China. This will allow SRMC to offer Bluetooth qualification testing services to Chinese manufacturers.

The deal will see CETECOM delivering BITE RF and Protocols conformance testers and providing full training and technical support to help SRMC become an officially recognized BQTF (Bluetooth Qualification Test Facility), the first in Mainland China.

Andres Moreno, Telecommunications Director at CETECOM Spain said "This is excellent news



for the Chinese industry and for the whole Bluetooth community. Now Bluetooth manufacturers will be able to test and qualify their devices in Mainland China, with local staff and state-of-the-art test facilities. We believe that China will become one of the most important Bluetooth-countries in the world, and thus, an official BQTF is an important step. We feel very proud that BITE has been the selected test platforms".

Cetecom establishes a test house presence in Chinese market

connectBlue receives "E-mark" approval

With the new "E-mark" for Serial Port Adapters – Directive 95/54/EC, known as "the automotive EMC directives" – connectBlue claims to have taken another step ahead to make it easier to implement, and sub-assemble, Bluetooth products in automotive applications.

For the developer this means no need for the troublesome, timely and costly testing for individual 'Declaration of Conformity', and can buy standard products such as connectBlue's off the shelf.

connectBlue is apparently involved in several

vehicle projects where "E-mark" is required. Italian company digigroup provides solutions for wireless diagnostic and preventive maintenance support for buses. By using Bluetooth products from connectBlue, digigroup has estimated that it can expect savings of 20 percent for maintenance and 60 percent for vehicle breakdowns in service.

The "E-mark", Directive 95/54/EC, is a separate Directive that links with the type approval regime which is compulsory across the entire EU for all passenger cars designed for speed exceeding 25 km/h. The position on spare

parts is slightly more complicated since, in the case of EMC, Member States are permitted to refuse the sale and entry into service of new ESAs ('Electrical/Electronic Sub-assemblies'), which do not comply with the requirements of the directive.

While developing Bluetooth solutions, connectBlue has worked closely with Malmö, Sweden -based ONROX to manufacture Bluetooth products for the industrial electronics market. All work is performed in accordance with certified quality assurance process.

IVT shows Class 1 Bluetooth CTP supported GSM phone with Bluetooth PSTN and ADSL Access Points

Bluetooth solutions provider IVT has shown what it claims to be the worlds first Class 1 Bluetooth, Cordless Telephony Profile (CTP) supported GSM phone, making and receiving voice calls through their Bluetooth PSTN and ADSL Voice & Data Gateway through the fixed line network. The current range demonstrated was within 100m.

"These products enable the merging of mobile networks and fixed line networks, and provide consumers more convenient and cost effective connections. The products are in the pre-production stage and IVT is ready to take sample orders" commented Dr. Qiang Gao, CEO of IVT.

The PSTN Voice, ADSL voice and data access point also supports the Class 1 Bluetooth CTP,

Intercom Profile and Headset Profile for voice. The ADSL access point supports the PAN profile to allow a Bluetooth-enabled PC or PDA access online internet speeds of up to 721kbps. IVT says that Cordless Telephony Profile embedded in class one Bluetooth handsets is seen as a sibling to DECT.

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Ericsson Technology Licensing and NEC sign Bluetooth agreement

Incisor talks to Maria Khorsand, President, Ericsson Technology Licensing

Coincident with Ericsson Technology Licensing announcing that it has signed a license agreement with NEC Corporation for Bluetooth software, Incisor discussed the significance of the deal with president of Ericsson Technology Licensing, Maria Khorsand. The agreement sees NEC licensing Ericsson's Core Bluetooth Software Stack B-C1 and B-C3 to be used in its new 3G mobile phone.

NEC is one of a small number of handset manufacturers that have risen to the challenge of providing handsets to be used on today's nascent 3G networks. NEC's e616 uses the Ericsson B-C1 Stack, based on Bluetooth v 1.1, with functionality including headset and dial-up support. In addition to person-to-person video, the e616 offers audio and video streaming, video recording and playback and a built-in GPS (Global Positioning System) for location-enabled services. A formidable phone.

Despite Incisor's asking the obvious question, Ericsson chose not to comment on whose Bluetooth silicon its software was combined with "The important point is that the OEM customer has a choice of silicon and software platforms," said Maria Khorsand, continuing "It is a reflection of the hard work that has been done by the Bluetooth SIG companies that a customer such as NEC can select complementary silicon and software from a range of vendors, in the confident knowledge that they will be compatible and interoperable." A little Incisor detective work revealed that - according to CSR's web site - it is Cambridge Silicon Radio's BlueCore silicon that completes the Bluetooth package alongside Ericsson's software.

This is the first license agreement between Ericsson and NEC for Bluetooth, and according to Khorsand is an end product of a recent business focus "We have been very strong in the



Ericsson Technology Licensing president Maria Khorsand has overseen two years substantial growth

semiconductor market, but now, one of our major strategies has been to increase our penetration within the OEM sector - including handset manufacturers. We have formed a business unit to address this. We see Asia as a particularly important geographical territory, and Ericsson has made a determined effort to increase its presence in Japan, Taiwan and Korea, for example. We are therefore particularly pleased to be able to make this announcement, as NEC is Japan's largest cellphone manufacturer, and a major global player. The e616 phone is one of the world's most sophisticated and advanced 3G cellphones, and

so the selection of Ericsson's software is a vindication of the quality of our product."

The agreement also includes the licensing of Ericsson's recently announced Bluetooth 1.2 stack, the Ericsson Core Bluetooth Software Stack B-C3. The stack includes all the Bluetooth functionality required in the current and the expected next generation of mobile phones, such as support for headsets and handsfree, audio streaming and Java APIs. Incisor asked Khorsand when we will be seeing phones supporting advanced applications such as audio streaming? "Ericsson cannot say when its customers will implement phones that support these applications, but what we can see is that the consumers are becoming more aware of ways in which Bluetooth functionality can expand and enhance the way that they can use a handset. Headsets were the original driver, but now we see - on the large playing field of the open market, but also amongst our own families, friends and colleagues - that more and more people are using Bluetooth to transfer data, to share or transport images that they have taken with their camera phones, and to become involved in multi-player gaming, et cetera. It will



3G + Bluetooth = state of the art cellphone

not be long before there are handsets and applications to take advantage of the capabilities that we have built into the Bluetooth silicon and software that is available today.”

And what of Ericsson's view of the outlook for Bluetooth, and its own fortunes? Khorsand commented “As a company, Ericsson Technology Licensing has a long-term business model. We have achieved 50% growth year on year for the last two years, and this in a difficult market. We are pleased with this, but there is always more to do.” Reflecting on the latest announcement, Khorsand added “We are very

pleased to be awarded a contract by NEC, which is not only the largest Japanese mobile phone manufacturer, it is also a major promoter of Bluetooth technology. Alongside the commitment of companies such as our own, Philips, Samsung, ST and many others, Ericsson believes that NEC's embracement of this technology will further drive the adoption of Bluetooth in mobile phones.”

And the answer to that much-asked question – what volume of Bluetooth silicon will ship in 2004? Khorsand responded, “2003 saw a 100% growth rate, with a figure of around 60 million

units shipped. We would cautiously estimate a similar growth rate for 2004, taking total chip volumes to around 120 million units.”

Whatever the final number, Ericsson seems sure to remain one of the key players in the burgeoning Bluetooth marketplace.

Bluetooth products

Socket showcases new Bluetooth connectivity and data collection products

Socket Communications made the journey to CeBIT 2004 and showcased new Bluetooth cordless connectivity products and data collection solutions. These included:

SOCKET CORDLESS HAND SCANNER:

Combines the power of laser barcode scanning with the convenience of Bluetooth in a compact device that fits in the palm of your hand. It connects to a Palm PDA, Pocket PC, Notebook, XP Tablet, desktop computer or Symbian OS devices with Bluetooth capabilities.



SOCKET CORDLESS SERIAL ADAPTER:

Eliminates conventional RS-232 serial cables, providing an easy-to-use, invisible connection between devices. It will communicate with another Cordless Serial Adapter or any other Bluetooth enabled device.



SOCKET CORDLESS 56K MODEM:

As shown in last month's Incisor, this battery-powered 56K modem connects to mobile devices using Bluetooth wireless technology.

“Our growing family of cordless products enable mobile professionals to add new and exciting possibilities for customers to enhance their handheld devices using Bluetooth wireless technology.” says Martin Croome, European General Manager of Socket Communications.



Is Nokia a phone company, or a camera company?

Using CeBIT in Hanover, Germany as its venue, Nokia has added more Bluetooth-enabled products to its ever-increasing portfolio, and continued its seemingly unstoppable path into the digital imaging market.

On a makeshift catwalk, Nokia grabbed the spotlight with the introduction of the sleek Nokia 7610 imaging device, the company's first megapixel camera phone. Note that Nokia's own press materials call this an imaging device first, and later as a camera phone. Encased in lairy dual-tone ruby and onyx-coloured covers, the slim Nokia 7610 phone offers capturing, printing, storing and sending of photo-quality images and videos, and is based on the Series 60 Platform.

Pictures can be turned into prints in just a few seconds via a Bluetooth connection to a compatible printer or by using a printer kiosk available in Nokia branded retail locations or other photo shops

The tri-band model is planned to be available during the second quarter of 2004 in two variants, GSM 900/1800/1900 and GSM 850/1800/1900. It is expected to retail for approximately €500.



Another innovation available for the Nokia 7610 is the Nokia Lifeblog application, which adds an automatic digital diary to the pockets of

trendsetters. The phone application records and organizes digital content - such as images, videos or messages - creating a personal logbook or multimedia memo directly on the phone.

Gather your digital memories with the Nokia Image Album



Nokia announced two more additions to its imaging experience product line. The first, the Nokia Image Album, has a 20 GB hard disk drive to store digital images, video clips and messages which the user can view, share, organize and edit on TV screen using a remote control. Images can be transferred to the Nokia Image Album by sending them from a compatible mobile phone using Bluetooth wireless technology or infrared, via USB from a digital camera or from memory cards.

Additionally, the images can be printed from the Nokia Image Album via a compatible printer using Bluetooth wireless technology.



Nokia Image Viewer SU-5

The second product is the portable Nokia Image Viewer SU-5 with remote control. Users can show and share images from their compatible phones on a TV screen or video projector at home or in the office. Images are transferred from a compatible mobile phone to the Nokia Image Viewer via Pop-Port connector or from MultiMediaCard (MMC card). The Nokia Image Viewer is planned to be available in the second quarter of 2004.

Advanced Car Kit



Nokia says that the Advanced Car Kit's compatibility with a broad variety of mobile phones means there is no need to install a new handsfree system each time a different phone is used: The new car kit is Nokia's first to combine two connection methods - wireless connection via Bluetooth, as well as conventional wired connection via mobile holders supporting phones using Nokia's Pop-Port connector. This gives users a choice between using their mobile phone in the mobile holder or leaving the phone in a briefcase or handbag and taking advantage of Bluetooth. With either option the phone can be operated using a remote control button, which offers functions including answering or ending calls and adjusting volume. The Nokia Advanced Car Kit includes automatic radio muting. It is expected to be available during the 2nd quarter of 2004 in Europe, Asia and the Americas.

TomTom Navigator 3 Bluetooth

Dutch company TomTom is a global provider of software for handheld computers and mobile phones and claims that its latest product – Navigator 3 Bluetooth - has all the best elements of the successful first version, like uncluttered maps, easy-to-use controls, and crystal clear on-screen directions and verbal instructions.



TomTom Navigator 3 adds further flexibility by offering Bluetooth plus what TomTom says is the smallest and lightest GPS device on the market. Navigator 3 uses Bluetooth technology to connect the GPS receiver and the Pocket PC and works with Bluetooth-enabled Pocket PCs.

It is claimed to be compact enough to allow the user to even carry it around in a pocket or mount it discreetly in a car, making this a powerful navigation solution in or out of the car.

Guided by 3D colour maps and spoken instructions the user can plan the best route, including multiple stops to pick up colleagues on the way to a meeting or friends on the way to a restaurant. The Major Roads of Europe feature makes planning and navigating international trips easier - plan the best route from Munich to Lyon, and TomTom will navigate you door to door across Western Europe.

Navigator 3 uses Bluetooth version 1.1 silicon

and TomTom claims 5-6 hours continuous GPS & Bluetooth usage.



TomTom Traffic

Tom Tom has also launched TomTom Traffic, which is an optional subscription service that gives real-time traffic information. TomTom Traffic alerts you when there is a jam on the motorway in your region. You can either re-route around the jam, or plan the fastest route. Sometimes, it is faster to drive through a small motorway delay, and you can choose to let TomTom guide you the best way. In addition to the subscription, the Pocket PC has to be

connected to the internet over a GPRS connection.

All TomTom Navigator 3 purchases and upgrades come with a free three-month trial subscription to TomTom Traffic. After that, pay just €49 per year or €9.95 per month.

TomTom Traffic will become available in May 2004, in the UK, Germany, France and the Netherlands only.



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Infusion

Parrot introduces 3 new Bluetooth after-market car kits

Bluetooth car kit specialist Parrot is showing a new line of car kits combining Bluetooth, GPS, GSM/GPRS and SIM Access Profile technologies. The modular line is claimed to provide seamless connectivity inside and outside the vehicle, ease-of-use with finely tuned information flows, simplified and flexible installation, extensive hardware integration, and low acquisition cost.

The new car kits are said to be designed based on feedback gained by the company from users and initial OEM experiences. The focus was on providing a good user experience by supplying an easy-to-grasp visual and voice-based interface minimizing workload.

A Handsfree Console offers a single interface with a touch-and-feel already familiar to most users and is combined with a new line of Bluetooth handsfree kits - the CK3100 Advanced Car Kit, CK3300 GPS Car Kit, and CK3500 Professional Car Kit. Drivers use a central knob, dual push buttons and a large-letter screen to navigate through a set of menu-options. In addition to voice recognition, drivers hear messages or the caller on the car speakers.

The Handsfree Console connects to the car kit control unit located underneath the dashboard. The control unit connects with GSM/GPRS networks for voice and data, and wirelessly links to personal devices inside the vehicle to provide voice, data, handsfree control, and even GPS signals over Bluetooth.

Parrot says that it has adopted a modular approach with a handsfree function performed by hardware common to all car kits. Additional clusters of functions are handled by add-on boards. All car kits run the same software, functionalities being enabled according to the hardware available inside the control box. PDA-based GPS navigation is performed by a GPS add-on board, while off-board server-based services are performed by another add-on board featuring both a GPS receiver and a GSM/GPRS dual band module.

Main features of the three versions of the car kit are:

CK3100 Advanced Car Kit

- Handsfree for all Bluetooth phones
- Displays the Phonebook and caller ID on console
- Voice recognition speed dialling, one-touch operation
- Mutes the radio, uses the car stereo speakers

CK3300 GPS Car Kit

- Adds navigation to Bluetooth enabled PDAs
- All CK3100 handsfree features supported
- Built-in GPS receiver, wireless broadcast inside the car
- Compatible with all Smartphone/PDA-based navigation software

CK3500 Professional Car Kit:

- Adds off-board professional services
- All CK3300 handsfree and navigation features supported
- Built-in GSM Dual Band with external antenna connector
- SIM card reader with SIM Access Profile (SIM car, SIM driver)
- SD card reader with remote read/write capabilities

Parrot claims that all three products are designed for all vehicles, all Bluetooth phones, all PDA-navigation. The Parrot Handsfree Console and new Parrot car kits are after-market products, designed to be easily retrofitted inside any vehicle, or to be offered as an option to new car owners at dealerships. A variety of install accessories are supplied with the Handsfree Console, offering dashboard, ceiling, radio or air fan mounting options.



Bluetooth enables new functionality for latest Sony Ericsson announcements

As we can see from the phenomenal number of new Bluetooth products in this issue, CeBIT in Hanover in March is still a seismic centre of tech activity. Not to be left out, Sony Ericsson rolled out a selection of new products that underpin the company's support for Bluetooth, and demonstrate that – like rival Nokia – Sony Ericsson is blazing new trails for a once cellphone-centric company.

S700 – 1.3 megapixel camera phone

The S700 is a camera phone with QuickShare and swivel-opening design. It offers a three way communication style; photo shoot, browse and talk, or text and e-mail. The S700 also takes mobile imaging to the next level and is the result of working in close cooperation with Sony Corporation's camera experts. It features an integrated 1.3 megapixel CCD digital camera for taking high quality photos and a 2.3 inch 262K TFT colour screen to display digital quality images.

Compatibility with Memory Stick Duo extends the memory capacity of the S700 to fully support mobile imaging.

The innovative 180° swivel design enables users to enjoy three completely new styles of communication. With the phone closed, it is possible to view messages, browse menus, and make calls via 5-way navigation easily manipulated by thumb or single finger, or to use the soft keys under the LCD screen for interaction. Then, turn the phone over to enjoy a new mobile imaging style based on the tried and tested digital camera form factor. Finally open in a swivel motion to access the phone's key pad for easy texting or e-mails.



Compatibility with MemoryStick Duo, Bluetooth and infrared means the S700 offers a wide range of connectivity options so images or video clips can be stored or transferred for editing and easy enjoyment on a PC or other consumer devices

T637 camera phone

For cellphone users in the Americas, Sony Ericsson unveiled the T637, which will be one of the first Sony Ericsson mobile phones to incorporate the Push to Talk over Cellular (PoC) technology – allowing quick one-to-one or group communications instantly, similar to a two-way radio. In addition, the T637 features a dual front - one is a digital camera enabling consumers to take a picture, while the other side is a mobile phone offering easy access to communications, imaging and gaming.

Using Sony Ericsson's QuickShare application, a picture can be taken with just two clicks and shared between the phone, a PC and other consumer devices - either locally over Bluetooth, Infrared or cable, or across the mobile phone networks with MMS or e-mail.

Akono HBH-600 Bluetooth headset

Sony Ericsson has gone funky with the latest addition to its portfolio of Bluetooth handsfree solutions; the Akono Headset HBH-600. The HBH-600 is said to retain all the key characteristics of the best selling HBH 65 headset. However the HBH-600 also brings a new level of personalization to handsfree solutions with



exchangeable Style-Up covers that allow users to personalize their accessory to reflect their individual style. The HBH-600 will be available in Q2 2004.

Bluetooth Car Handsfree HCB 300

This newest addition to Sony Ericsson's portfolio of in-car accessories offers a Colour ID interface that makes it easy to share the device with other people who drive the same car. The HCB-300 is ideal for users who lead active lives and have a keen interest in taking advantage of the latest technology.

The HCB 300 can handle up to five different user profiles. Each user chooses an identification colour from the Colour ID feature. When the car ignition is engaged, the HCB-300 automatically connects to the last phone used in the car displaying the pre-selected Colour ID for that phone. If a user with the Colour ID 'blue' drove the car last, the display will indicate the Bluetooth connection with a blue screen interface. If the next person in the car is a different user with a Colour ID 'green', the HCB-300 will first try to connect to the 'blue' phone, as it was the last used in the car, then automatically search and find the 'green' Colour ID user's profile. A user can manually change the Colour ID with one key push or simply wait for the HCB-300 to find the phone. The Colour ID feature allows an entire family or group of colleagues using the same company car to use the same HCB-300.

The HCB-300 will be available in stores in Q3 2004.

Bluetooth Media Viewer MMV-100

According to Sony Ericsson the Media Viewer MMV-100 takes Bluetooth wireless technology to a new level and expands the number of ways images and audio can be transferred between devices. The MMV 100 plugs directly into a TV or





digital projector, to allow users to send images from a mobile phone to a large screen via Bluetooth.

Instead of pairing one phone with one Bluetooth device, the MMV-100 can handle 'many-to-one' connectivity, meaning several people can use their phones to transfer images to one screen. It also enables the transfer of AMR and MP3 audio files directly from a Bluetooth-equipped mobile phone enabling

music files to be enjoyed through the superior sound quality of a television's speakers. In addition, the MMV-100 is a work tool. Presentations saved as images and stored on a mobile phone such as the K700 or S700 can be transferred via Bluetooth to a bigger screen in a meeting or conference room.

The MMV-100 will be available in Q2 2004

Jabra introduces range of new Bluetooth products

Well-known headset company Jabra has launched its latest Bluetooth products, including the Jabra SP100 Bluetooth speakerphone and three new headsets, at CeBIT 2004.



Jabra SP100

SP100

With the fact in mind that hands-free legislation is currently in place in more than 35 countries and still expanding, Jabra has launched the SP100 Bluetooth speakerphone for the millions of drivers wanting to use mobiles on the road everyday.

Jabra's speakerphone is supplied with both a visor clip and a suction mount as two car mounting accessories. The microphone features a pivoting arm, which can be positioned for optimum voice pick-up. The volume can also be adjusted so that even large groups in noisy surroundings can hear phone conversations clearly.

In addition, Jabra SP100 is equipped with a mute button that is useful for telephone conferencing. A headset port is available when more privacy is required. The SP100 is supplied with rechargeable batteries, which Jabra says provide up to 12 hours of talk time and 20 days of standby time between charging. It can also be charged with an AC power adaptor or operated

with standard AA batteries. The SP100 will be available at the end of Q2 2004 with a suggested retail price of £99.99

CeBIT also saw the announcement of three new Bluetooth headsets to be launched in early Q3 this year.



Jabra BT500

Jabra BT500

Jabra intends the BT500 to be the choice of the business professional who requires high performance and superior comfort. Weighing only 20 grams, the BT500 offers up to 8 hours of talk time and 240 hours of standby time. Additional features include an LED indicator to inform charging and battery level, and a dedicated pairing button. Jabra also claims increased range, faster connection to the phone and improved audio quality. The Jabra BT500 will be available early Q3 2004.

Jabra BT800

Described as a full feature headset, Jabra's BT800 features a blue backlit LED display for caller ID and a jog wheel to access menu options. Users can select favourite ringing tones in the headset, or use the built-in call-vibrate feature. DSP (Digital Signal Processing) improves audio clarity in noisy and windy



Jabra BT800

environments. It weighs 25 grams. The Jabra BT800 complies with Bluetooth version 1.2 and offers 6 hours of talk time and 200 hours of standby time. It will be available early Q3 2004.



Jabra BT110

Jabra BT110

This is Jabra's entry-level headset. It provides 15 hours of talk time on a single AAA battery and its automatic power-down feature means the user never has to worry about standby time. Both the headset and hands-free profile are supported, making the headset compatible with all Bluetooth phones. The headset weighs 26 grams (including battery) Launch date is again, early Q3 2004.

ANYCOM Headset/Car Kit Blue HCC-110

German company Anycom GmbH has launched what could be a very convenient solution for anyone wanting or needing to use a cellphone handsfree. Not content with providing a simple headset, Anycom has developed a Bluetooth combo product that combines a lightweight headset with a simple to install in-car handsfree unit.

Anycom can't claim the first installation-free (or at least very simple to install) car kit, as there are others on the market. Incisor reviewed the Parrot solution in issue 56, for example. It can, though, claim to have blazed the trail for the combined in-car and headset package, which keeps the handsfree experience going wherever the user may be.

The Anycom HC-110 system comprises three parts. A main unit incorporating the speaker and system electronics that is plugged into the car's 12 volt cigarette lighter, a detachable headset that clips onto the main unit when not in use, and a separate battery-powered wireless microphone, which is intended to be clipped onto the car's sun visor. It is

the fact that all components communicate with each other wirelessly that makes the installation so simple, avoiding expensive installation charges and the complication of changeover when the customer changes cars. This is handy more often than you might think. With an in-car kit like this, your handsfree solution can easily travel with you – on business trips where hire cars are involved, for example. The combination of headset and car kit also allows you to change between handsfree and headset within a call, if you need privacy or if you are leaving your car while talking.

Under normal circumstances calls are made and received via the car-kit's speaker and microphone, while the headset remains clipped onto the main unit, having its battery charged/topped-up.



Anycom headset clips to main unit when not in use

Features

Anycom has gone beyond providing the most simple solution, and has designed in various technical enhancements to improve quality of performance and convenience. These include integrated noise reduction combined with an adjustable microphone gain. An internal analog speech processor (ASP) makes the distinction between speech and the background noise, to prevent disturbances. It is designed to manage what Anycom describes as a perfect semi-duplex mode. A tone control switches between 'H' - 'high tones' raised and 'L' – bass tones raised. It is also intended to prevent static and cross-talk. The microphone unit can normally be left switched on, as it automatically switches to low power consumption (> 1.8 microwatts) stand-by mode. Anycom suggests that one set of AAA batteries in the microphone will handle

about 500 calls, at a rate of 3 calls a day. That would theoretically give a battery life of about 5 months. We can't comment as our batteries have not run out yet!

In terms of mechanical features, the main unit features a swivel mechanism so that it can be positioned and angled for best performance and least intrusion. The microphone uses a simple clip to attach it - normally to the sun visor. A length of wire provides the aerial for the microphone, and is intended to be run along the length of the visor using another clip to hold it in place. If we were to be pedantic, we could comment that this is perhaps the least elegant aspect of the installation. A wire-free solution ought to be just that, really. In fairness, and with a little planning, the aerial and microphone can be positioned so as to be reasonably unobtrusive.



The headset, which uses a familiar push/swivel switch to control its functions, is claimed to be one of the smallest Bluetooth headsets available. It weighs just 15 grams and is generally comfortable to wear for a long period of time, though the plastic clip that slips around the ear could possibly be a little thicker to reduce the feeling that clumsy mounting of the unit on the ear might result in a Vincent Van Gogh experience.

Installation and usage

It is hard to fill much space concerning the installation, as any process that takes less than three minutes is hard to write up as a complex and demanding challenge. The Anycom HCC-110 is intended to be quick and simple to install, and it is. It is hard to imagine anyone being able to mess this up. This has the further benefit that a user will be more able, and more inclined to move the system around from one car to another, to his boat or anywhere else that he might have a car-style power socket. Referring specifically to the Bluetooth aspect, the Bluetooth SIG has banged on about the quality of the out of box experience, and the 5-minute installation target. No problems for Anycom here. Convenience counts for a lot and this product has it.

Likewise, pairing the HCC-110 – in this case with an Ericsson T68i (when is some kind vendor going to update our handset platform!!) – was simple and painless. Anycom says that the product is compatible with any Bluetooth handset that supports the headset or hands-free profiles.

And so we set off to use the Anycom product. With a little adjustment, we can report that in hands-free mode – i.e. with the headset left clipped to the main unit – the experience is good. A little better than the Parrot DriveBlue unit that we tested in the middle of last year. The BMW car that was used as the test vehicle happened to have a fully integrated car kit, and

there is no pretending that the Anycom system offers the same quality of experience. Sound quality is inevitably poorer compared to that provided by the car's speakers, there is no connection to and automatic suppression of the car's sound system when a call is made/received, people called reported that it was more difficult – though not unacceptably so – to hear what we were saying and there is some hangover of aggressive noise suppression and the semi-duplex connection interfering with the flow of the conversation. To be fair to Anycom, this isn't really a fair comparison, and referring again to other Bluetooth in-car kits the HCC-110 performed well.

When used separately, both in and out of the car, the very light headset provided good audio quality and was comfortable to wear for extended periods. In fact, and if we have one small criticism of the Anycom product in use, it is that the length of the period during which the headset can be worn is limited more by battery life than by levels of comfort. Our reviewer tested the Anycom product on a 3 hour car journey and on both outbound and return legs the headset ran out of battery life, despite being full charged in both cases and not having been in continuous use. Anycom claims up to 3 hours talktime, but in practice our experience suggest more like an hour and a half to two hours.

Summary

Despite small reservations related to headset battery life and the mild inelegance of the microphone aerial installation, it is hard to fault the Anycom HCC-110. It is extremely simple to install. It pairs successfully with a Bluetooth phone, and in use it does exactly what it is supposed to do. What is more, we feel that in respect of improving levels of convenience and transportability, it succeeds very well.

A UK retailer currently lists the HCC-110 at a street price of £82.95, and the Parrot DriveBlue unit for £77.45. As the Anycom kit includes a headset, this must be seen as good value.

Incisor would recommend this product



v1.2: more than a tick in the box

by Clive Chelsom-Pill, CSR

To claim v1.2 status, Bluetooth silicon providers have to support adaptive frequency hopping. In the rush to claim compatibility, some silicon vendors have launched ICs implementing just AFH-related features. But there are optional v1.2 features as well, and for good product performance, it pays to investigate. At least three are very important:

- eSCO
- Interlaced inquiry scan
- Interlaced page scan

With rapidly-escalating numbers of wireless devices now operating in the ISM band, the retransmission possibilities offered by eSCO adds an important quality safeguard for voice connections. The two new interlaced scanning features support much faster connections between devices - an important usability feature for products using the HID Profile such as a mouse, and of general relevance for the increasing numbers of 'deeply embedded' battery-powered Bluetooth systems.

As with many existing features of v1.1 Bluetooth which some silicon vendors still do not support - CQDDR and Park Mode are prime examples - the richness of an IC's Bluetooth support greatly improves the overall performance and quality of end products. Offering a rich Bluetooth implementation was a fundamental principle of CSR's first two chip designs, and this is one of the reasons why BlueCore silicon features in such a large proportion of the Bluetooth products on the market today.

This principle has been carried forward to our third generation silicon, and the ROM and DSP/codec equipped

variants of BlueCore3 implement both v1.2 mandatory and optional features - including hardware-related upgrades such as eSCO. As for the existing BlueCore2 generation of ICs, all the firmware-related v1.2 features that can be implemented have been - to the extent that this second-generation architecture offers a richer platform than many other options on the market today. For CSR's BlueCore ICs, the only exception to full Bluetooth implementation is support for SCO connections to more than one master - a function for which there is no immediate customer

demand - but for which support will nevertheless be introduced soon.

This support gives BlueCore users the option of upgrading firmware on an existing product using the chip's DFU support mechanism for example. Alternatively, if eSCO-related features are required, developers have the possibility to upgrade to a BlueCore3 platform.

Interoperability demands functionality

The richness of the Bluetooth implementation is a key force in OEM's design decisions as they upgrade to v1.2. Now that Bluetooth has substantial market penetration, it will be of even greater importance, so that devices have the interoperability to function well in more than the target applications they were originally designed for.

The table provides a useful checklist for developers looking to implement Bluetooth or upgrade v1.1 based designs. While some of these features may be of peripheral importance for some applications (e.g. the AUX1 packet), others offer the means to ensure that product designs meet and exceed the expectations of users.

CSR's BlueCore is the platform used in the only three qualified end-products so far (at the time of writing), and also in 10 modules from ALPS, Murata and Taiyo Yuden - offering the quickest route to market.

Clive Chelsom-Pill is Commercial Manager with CSR: contact clive.chelsom-pill@csr.com

	BC2-Ext	BC3	Competitor
Baseband			
AFH kernel	✓	✓	
eSCO	x	✓	
EV3	x	✓	
EV4	x	✓	
EV5	x	✓	
Interlaced inquiry scan	✓	✓	
Interlaced page scan	✓	✓	
HV2	✓	✓	
HV3	✓	✓	
AUX1	✓	✓	
SCO/eSCO to >1 master	x	x	
Paging RO	✓	✓	
Transparent SCO	✓	✓	
Scatternet: master & slave	✓	✓	
Scatternet: multiple slaves	✓	✓	
Link Manager			
AFH Chan classification	✓	✓	
eSCO	x	✓	
Broadcast encryption	✓	✓	
Request page mode	✓	✓	
Request page scan mode	✓	✓	
Park mode	✓	✓	
Request extended features	✓	✓	
CQDDR	✓	✓	

Table. A function checklist for developers with BlueCore2 and 3 attributes checked. BlueCore3 adds hardware for eSCO-related performance.

Sponsored contribution

The Bluetooth paradox: to become ubiquitous it must disappear

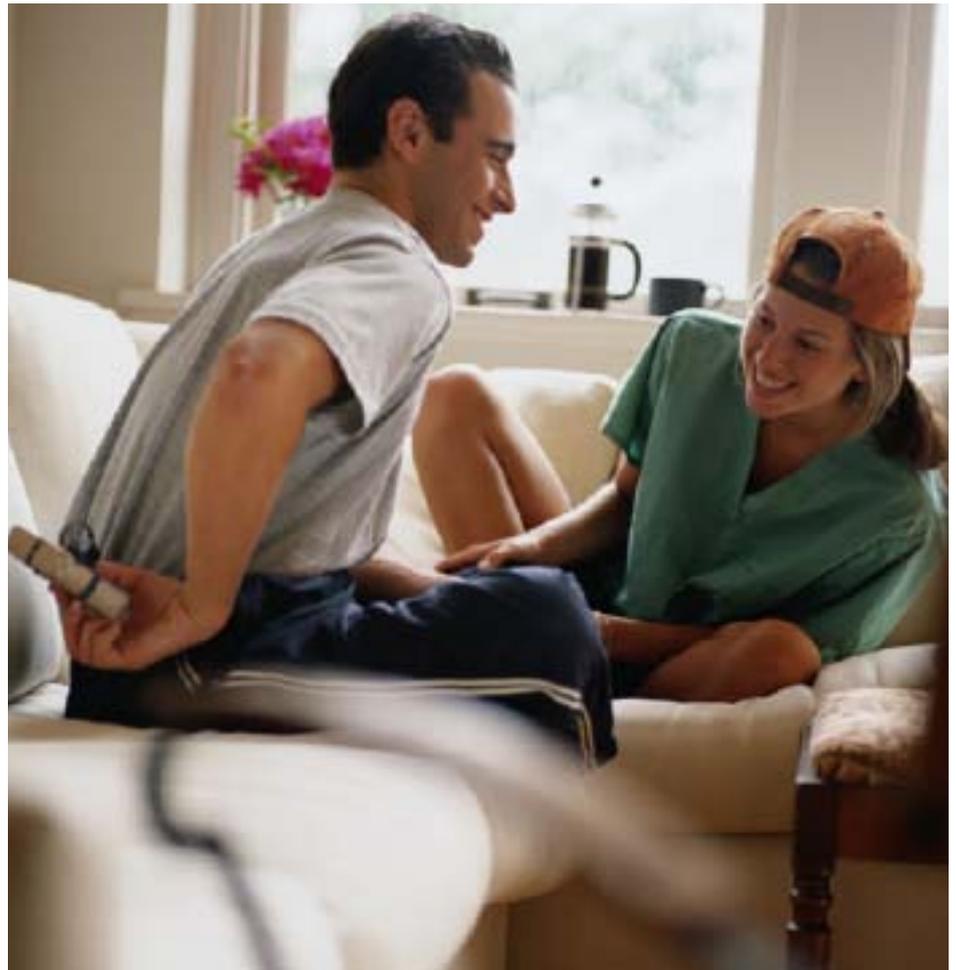
There comes a time in the development of a technology when it no longer matters to consumers how something works, but if it works. In the case of wireless devices, consumers do not really care how they are sending data, but only where they are sending it.

For instance, how many consumers care or understand which technology or modulation technique their mobile phones are using? Probably very few. From a technology standpoint, all they really care about is, that wherever they travel, if they have a signal, can make a call, and can be heard. Bluetooth is approaching this stage of development. The high-tech gadget-loving first adopters will soon give way to mainstream consumers, and the way Bluetooth enabled products are marketed should change as well. The bottom line is: in order to be fully engaged in consumer applications, Bluetooth needs to disappear.

For it to “disappear” as a technology and emerge as a function, Bluetooth equipped devices need to work without the user playing an active role. After a one-time configuration and pairing, personal devices can be configured to communicate between themselves when an event occurs, and information can be automatically shared between the devices.

For instance, if someone is listening through a wireless headset to an MP3 player and receives a phone call, the MP3 audio will be suppressed and the call can come through the headset. In this case, the event was the phone call. The three devices communicated with each other, and the user simply spoke to the caller.

How hard should the configuration be? Well, currently it is analogous to programming a “universal remote” for audio/visual equipment. To ultimately be successful, module vendors and OEMs will need to invest in technical support programs, including the development of easy to follow instructions, quick access to software downloads, interoperability guides,



and even live technical support in order to minimize the trouble for consumers trying to align their devices. To streamline this process, Bluetooth silicon manufacturers and OEMs partnering with a module manufacturer should ensure that it has a good technical support system already in place.

Bluetooth is not a line-of-site technology, and OEMs can capitalize on this in the marketplace as a major strength. In fact, vendors of Bluetooth enabled products can position them as a leap away from previous-generation wireless data transfer technologies, such as Infrared (IR), which requires a direct line of site

to point-and-shoot. For this new generation of wireless Bluetooth products, consumers should understand that they merely need to be in the vicinity of other wireless data devices in order for the advanced functionality to work.

For example, personal digital assistants (PDAs) can be configured to ask for electronic business cards from other PDAs in their vicinity at a trade show. PDA security levels can be set to automatically send out business card information or ask the PDA owner for approval first. In a shopping centre, a server can push coupons to PDAs in the area for discounts at nearby stores.

As it gets easier for the consumer to use Bluetooth enabled devices, it is also getting easier for designers to include Bluetooth capability in new and existing products. Manufacturers such as SMART Modular Technologies, Inc. are combining the required silicon, RAM, FLASH, and intelligence for Bluetooth functionality in plug-and-play PC card and mini-modules for new designs as well as products such as the USB adapter for legacy equipment.



Bluetooth USB
couldn't be simpler.

Engineers at SMART have built and continue to expand a library of technical support materials and interoperability guides to assist OEMs and consumers in programming Bluetooth enabled devices to work together. These interoperability guides take users screen by screen, choice by choice, and walk them through the session of configuring devices.

As we move forward and the technology becomes embedded in products outside of traditional communications products, Bluetooth programmers are also starting to develop application-specific software.

SMART Modular Technologies is already in the planning stages of application-specific modules with software for specific devices built in. For instance, in the future, instead of general purpose software linking a PDA to a refrigerator, there will be a module with software in it that is specific to the application. So, when a person walks near his or her refrigerator with a PDA, it will automatically send all of the information



RS232 now
wireless too.

that it has available, such as you are running out of milk or the freezer needs service.

Application specific modules such as these will help to make Bluetooth even more transparent - all the while it is becoming ubiquitous.

Sponsored contribution

Wireless is the most important platform driving innovation in consumer electronics - TI

Wireless has become the most important platform in consumer electronics and will be a primary focal point for innovation in coming years, or so said Rich Templeton, chief operating officer for Texas Instruments in a keynote address at the 3GSM World Congress.

"Wireless technology provides a low-cost, low-power platform to make it practical to expand the value of a cell phone beyond voice," Templeton said. "We're not far from the day when smartphones are projected to outsell laptop and desktop computers combined. Last year, camera phones became the best selling cameras outpacing digital still cameras, which themselves surpassed film cameras for the first time."

Templeton predicted that cell phones soon would become the prevailing devices worldwide for accessing the Internet, listening to music, capturing and watching video, and for organizing personal information. However, Templeton stressed that application-specific devices such as digital still cameras, digital audio players and many

others still have a bright future in their own right. "Some people will exclusively rely on smartphones that deliver everything, but most people will use both multi-function cell phones and dedicated devices as their preferences and situations dictate."

To substantiate Templeton's forecasts away from the keynote platform, and using real applications and advanced cell phones that are commercially available from TI customers, TI demonstrated streaming video, fingerprint authentication and 3D gaming enabled by the first-generation of OMAP processors. The company also showed how advanced cell phones can transmit images directly to a television via Bluetooth networking, allowing information from the phones to appear on large-screen displays. A new handset was shown that integrates multiple TI technologies including an OMAP processor and GPRS, Bluetooth and 802.11 connections. The handset enables simultaneous web browsing while conducting a GPRS voice call using a Bluetooth headset. Templeton said the

deployment of second-generation processors, known as OMAP 2 and announced earlier in the week, will enable even higher-quality consumer applications on the wireless platform. For example, OMAP 2 processors increase video performance by 4X and 3D graphics capability by 40X compared to prior versions.

Templeton said these "demonstrations are evidence of the velocity in GSM and wireless overall. It took about 10 years to really develop digital voice and sleek form factors. Camera phones have become very popular in just two years, and we'll see the same thing happen with other features such as videophones and digital TV in just one year."

Templeton also announced that TI has successfully made the world's first GSM cellular phone call using digital RF technology. With TI's new digital RF processor successfully making calls, the company's next step is to absorb this function into the company's integrated digital baseband for wireless communications.

New Bluetooth radio modem from Silicon Wave and RF Micro Devices for CDMA mobile phones

Continuing their co-operative marketing alliance, Silicon Wave and RF Micro Devices have announced a new UltimateBlue Bluetooth single-chip IC. The SiW1722 is aimed squarely at CDMA mobile phones using CDMA chipsets with an integrated Bluetooth baseband. Implemented on CMOS process technology, the highly integrated direct conversion radio modem's on-chip RF matching feature helps drive down cost by eliminating all external RF matching components, making it ideal for direct PCB insertion.

"The unique on-chip matching of the SiW1722 allows direct connection to the antenna which simplifies design and reduces component count. The net result for an OEM is a lower cost mobile phone that can be introduced to market faster" said Steve Brown, vice president business



development and product marketing for Silicon Wave

Frank Morese, vice president of wireless connectivity at RF Micro Devices, said, "The SiW1722 enables us to better support our

increasing base of customers who are engaging us to provide more comprehensive wireless solutions."

The SiW1722 IC is designed to consume up to 20 percent less power than previous Silicon Wave products. Its direct conversion architecture allows digital filtering for excellent interference rejection and fewer spurious responses resulting in superior RF performance.

Samples of the SiW1722 IC are available exclusively from RF Micro Devices. The SiW1722 is available in a 5mm x 5mm QFN-32 pin package or as bumped die. Volume production is anticipated in Q3 2004.

Fujitsu introduces new Bluetooth module for embedded apps

Fujitsu Microelectronics Europe (FME) has announced a new Bluetooth surface-mount type module (version 1.1 compliant) that is aimed at embedded applications.

The MBH7BTZ03 features a small footprint of 10 x 9.5 x 1.9mm. It has a UART hardware interface, a high rank protocol stack (L2CAP, SDP, RFCOMM) and GAP, SPP & DUN profiles to reduce the burden on the host CPU. Users are able to choose between the Host Controller Interface (HCI) and the Serial Port Profile (SPP) interface. The latter includes the upper level protocol stack for serial communication. The software interface is a simple text-based command control.

The Power Class 2 module provides an output of +4dBm max, and a receiver sensitivity of -70dBm. The module operates from a 2.2 to



3.6Vdc supply and offers a power consumption of just 30µA in Deep Sleep Mode.

FME has also developed an applications board, which incorporates a Fujitsu microcontroller and integrated memory in addition to the Bluetooth

module. Prototype boards are currently being tested and will soon be available with software examples and source code. This allows customers to build and test very fast stand-alone systems such as hand held products or other mobile devices with low current consumption for wireless communications.

Adding an external antenna to the MBH7BTZ03 can create Bluetooth wireless technology enabled products. The module has been in mass production since December 2003.

Intel and Broadcom take stance against WAPI

Will stop selling Wi-Fi chips to China

As reported last month in Incisor, the Chinese government has passed a law stating that, starting from 1 June, all Wi-Fi chips sold must comply with the Wired Authentication and Privacy Infrastructure (WAPI) standard. The encryption algorithm was developed in China and is controlled by local Chinese companies.

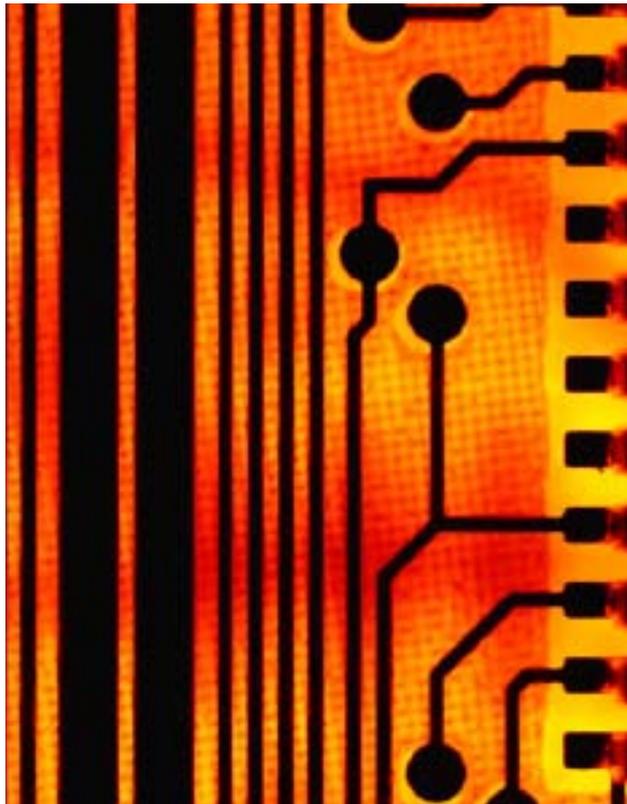
Chuck Mulloy of Intel has said that while his company and others have looked at the technology, it hasn't figured out a satisfactory way to incorporate the standard into its existing line of Wi-Fi chips. As a result, Intel will stop offering its Wi-Fi chips in China after the beginning of June, because selling them would be illegal.

The company is continuing to work with local PC manufacturers and the government on the issue, but it does not have enough information about WAPI at present to understand when or whether it will be able to ship chips that conform to the standard.

"There are real concerns about whether we can deliver a product with the quality our customers will require," Mulloy said. "We made a commitment to tell our customers in March, and we concluded that from a technical perspective, we weren't going to hit the 1 June deadline."

Broadcom, one of the larger Wi-Fi chipmakers, also plans to stop shipping chips to China, but it said it is trying to resolve the issue. "We intend to comply with the law," a Broadcom representative said. "We don't have enough information to do WAPI right now." Other US and European manufacturers plan to follow suit, the representative added.

The WAPI issue has become a flash point in Chinese-US trade relations. Under Chinese regulations, established chipmakers have to



license or partner with local companies, such as Lenovo, to legally obtain WAPI technology. In turn, this has provoked concern that the regulation exists as a way to jump-start the country's local Wi-Fi industry.

Earlier this month, US Secretary of Commerce Donald Evans, Secretary of State Colin Powell and US Trade representative Robert Zoellick sent a letter to Chinese Vice Premier Wu Yi and others to reconsider the law. "We are particularly concerned that the new rules would require foreign suppliers to enter into joint ventures with Chinese companies and transfer technology to them," the letter stated. "Such compelled investment would appear to be inconsistent with China's World Trade Organisation commitments."

While local industries typically benefit from

these types of regulations, other motives are usually present, said Lawrence J. Lau, Kwoh-Ting Li professor of economic development at Stanford University. "I believe there are genuine security concerns on China's part, although the domestic industry is also likely to benefit," he stated in an email. "However, most of the time these technology standards are intended to provide protection for domestic industry against foreign imports."

Lau further added that these types of regulations often do not have their intended effect. "Our cellphones do not work in Japan, so the Japanese manufacturers and distributors have a lock in their home market," he said. "However, that did not exactly help Japan. Today none of the leading cellphone companies are Japanese. By setting a different standard, Japan has actually limited the growth of its own cellphone companies."

China also is pushing domestically developed technical standards on a wide range of technologies, from DVDs to third-generation mobile phones.

The Semiconductor Industry Association has been urging the US government to force China to reform its value-added tax (VAT) regulations. Chips imported into China face a 17 per cent VAT. Whereas, chips made in the country face only a 3 per cent VAT. Consequently, Chinese manufacturers or multinational manufacturers that have built Chinese plants have an unfair advantage, according to the organisation.

Conversely, other organisations are seeking greater cooperation. The US semiconductor equipment manufacturing industry is trying to push the United States into greater cooperation with China. Under current regulations, US equipment makers can't easily ship high-end

equipment to China. As a result, US manufacturers are losing out on sales to European and Asian competitors, according to

the Semiconductor Equipment and Materials Institute and others.

A relaxation of the regulations is expected

sometime this month, according to a recent report from the US Taiwan Business Council.

Chinese won't roll over

Unsurprisingly, the US company's stance has not been taken lying down.

According to a report in the Financial Times, Chinese regulators have dismissed Intel's plans to boycott the country's WiFi chip market. The regulators warned that China is a "strategic market" and that Intel will miss out on the evolution of WiFi if it does not participate with China's new standard,

WAPI. One regulator added, "I think Intel should calm down." China's remarks are the latest blow in this growing high tech trade battle between the U.S. and China.

Adding fuel to the fire, some critics also claim that WAPI is designed with a so-called "back door" that would allow the Chinese government to spy on WiFi Internet connections. Last week, the Bush administration sent a letter to Beijing,

urging the country to back down from its demands. Thus far, the U.S. government's actions have had little influence with China's WiFi regulators.

TI pushes forward with Wi-Fi for cellphones

Texas Instruments (TI) has unveiled its third generation 802.11 solution specifically designed for mobile devices such as cell phones, smartphones and PDAs. TI's premise is that with cell phones and mobile devices becoming the prevailing communication and entertainment devices for consumers, Wi-Fi connectivity provides faster speeds so consumers can download more information, photos and music faster.

The new chipset can be configured for 802.11b/g or 802.11a/b/g operation using different WLAN RF solutions from TI, and is said to offer manufacturers size, power and cost reductions, and considerably improved battery savings.

The two-chip 802.11b/g solution combines the TNETW1250 single-chip MAC/baseband processor with the TNETW3422M radio frequency front end (RFFE) and power amplifier chip. This platform provides more than 50 percent reduction in board size compared to TI's previous 802.11 mobile chipset. The design also utilizes 25 percent less board area than competitive solutions.

By focusing on manufacturers' system-level design needs for handsets, TI believes it has laid

the groundwork for a highly optimized dual-mode handset. The TNETW1250 chipset has been designed to be used with TI's OMAP application processors, GSM, GPRS, CDMA and EDGE chipsets and single-chip Bluetooth solution. Architecture innovations in the TNETW1250 such as on-chip power management, re-use of cellular clock frequencies, and low pin-count host interfaces were included to eliminate barriers for integration of WLAN into cellular handset designs.

"2004 is expected to be a pivotal year for Wi-Fi enabled portable devices, as more 802.11-enabled cell phones and PDAs hit the market," said Marc Cetto, general manager of TI's Mobile Connectivity Solutions. "Today, several companies are offering phones and PDAs using TI's 802.11b mobile solutions. The TNETW1250 platform will allow manufacturers to quickly deploy new 802.11a/b/g-enabled mobile devices that are smaller and offer maximum battery life."

Accompanying the TNETW1250, TI is also announcing the TNETW3422M, a highly optimized 2.4GHz single-chip, RF transceiver and power amplifier. This radio, which uses

direct conversion architecture, is ideal for use in a cellular handset for size, cost and power consumption advantages. Also, the absence of intermediate frequency noise enables much simpler RF planning inside the complex environment of a cell phone.

The chipset is expected to be in production mid-year.

Wi-Fi Protected Access Security sees strong adoption

Stringent testing ensures security and interoperability

The Wi-Fi Alliance has announced that over 175 products from over 40 of the world's leading technology manufacturers have received Wi-Fi Protected Access (WPA) security certification since testing began in April of 2003. WPA is the current state-of-the-art wireless LAN security technology. The Wi-Fi Alliance has taken the proactive move of requiring WPA for all Wi-Fi certifications awarded since September 2003.

Wi-Fi Protected Access is the security replacement for WEP (Wired Equivalent Privacy). Since WEP can be compromised, the Wi-Fi Alliance recommends it should not be considered a secure mechanism to protect Wi-Fi wireless LAN traffic and suggests that WPA be enabled in wireless LAN applications where data security is a concern. WPA has proven to be a very secure and easily implemented security solution. WEP should only be used when a more secure wireless LAN security solution is not available.

"Wi-Fi Protected Access meets the wireless LAN security needs of both enterprises and individuals," said Wi-Fi Alliance managing director, Frank Hanzlik. "There are also plans to add additional security capabilities to WPA with the next version of WPA called WPA2. Products certified for WPA2 are anticipated to be available in the middle of 2004. However, users need not wait for WPA2. WPA2 is an enhancement, but most business and personal security needs are met by WPA today," Hanzlik added.

Industry analysts have also found that Wi-Fi Protected Access and Wi-Fi certification have had a positive impact on the security of Wi-Fi technology. Synergy Research has observed that, "Until recently, depressed IT spending had a significant negative impact on the market for enterprise wireless products. Furthermore, security has also been a major concern with Enterprise IT professionals, which has also slowed adoption. However, now that the Wi-Fi Protected Access security solution is available, Synergy has seen a marked increase

in Enterprise WLAN sales."

The Wi-Fi Alliance currently performs four independent interoperability certifications including IEEE 802.11a, 802.11b, 802.11g and WPA in addition to a combination of all of these technologies.

Products awarded the Wi-Fi CERTIFIED logo have undergone independent testing at one of four labs in Tokyo, Japan; San Jose, California; Winnersh, UK; or Taipei, Taiwan. The Wi-Fi interoperability certification program has become the international standard for providing high-quality interoperability testing for IEEE 802.11-based products

Cisco engages with T-Mobile

In an interesting, cross-industry move, Cisco Systems has announced that it has agreed to a memorandum of understanding (MoU) with T-Mobile - which for the sake of this press announcement is described as 'Europe's leading wireless local area network (WLAN) provider' - to accelerate the development, introduction and use of wireless LAN (WLAN) hotspots for business use across Europe, the Middle East and Africa (EMEA). T-Mobile International is one of Deutsche Telekom's four strategic divisions, and concentrates on what it assesses to be the most dynamic markets in Europe and the United States.

The MoU has already resulted in a number of

joint initiatives, including the creation of wireless LANs in 100 Starwood Hotels across the five European countries where T-Mobile has a presence: Germany, the UK, Netherlands, the Czech Republic and Austria.

"At Starwood Hotels our customers require both high-speed Internet connectivity and great customer service. T-Mobile's wireless LAN service provides that for us and that's why we've chosen to install their service in over 99 of our hotels in Europe," said Brian Pratt, vice president eBusiness, Starwood Hotels. "Both Cisco and T-Mobile are great brands and great partners to Starwood Hotels, helping us deliver the greatest experience for our customers."

The two companies are also collaborating on

the delivery of wireless networking services to university students - both on and off-campus - across Europe. The coming year will see sales, marketing, product development and infrastructure projects focused on driving wireless LAN adoption in the healthcare, public sector and corporate sectors.

"T-Mobile is committed and shares the vision with Cisco of providing seamless mobile connectivity and wireless LAN plays a key role," commented Martin Witt, executive vice president WLAN for T-Mobile.

Insight says W-Fi and 2/3G will co-exist

War driving - traveling through neighborhoods using laptop software to find and classify WiFi hotspots - is the kind of spectator sport that ought to have the telecommunications industry on its feet cheering. So says a new report - Wi-Fi in North America and Europe: Telecommunications' future 2003-2008 from research company Insight Research Corporation.

In Europe and North America, Insight says that WiFi is one of the few bright spots on the technology landscape. In these regions, wireless local area networking (LAN) technology is springing up in airports, cafes, and along city streets, creating ubiquitous broadband access in public and private spaces.

Insight's investigations suggest that WiFi growth will not come at the expense of 2.5G, 3G, or private wireless networks, nor will it come at the expense of xDSL, cable modems, or other forms of wired broadband access. WiFi's impact on telecommunications revenue, rather, will be multiplicative; creating bigger broadband networking opportunities for all participants.

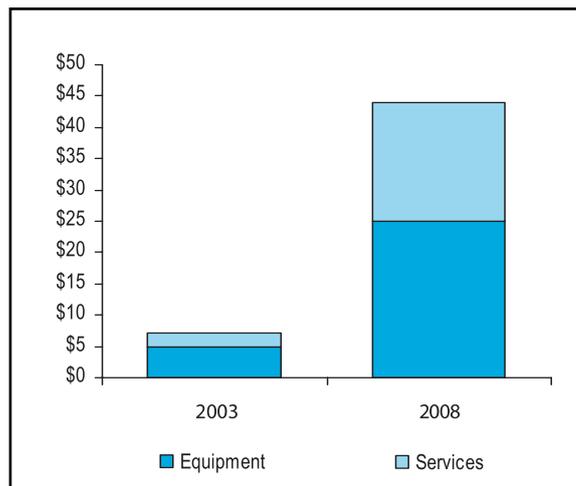


Figure I-1 Total Worldwide WiFi Revenue, 2003-2008 (\$Billions)

Total worldwide WiFi revenue over the forecast period is shown in Figure I-1. Equipment revenues will grow at a compound annual growth rate (CAGR) of 8.2 percent from about \$4.9 billion in 2003 to \$24.8 billion in 2008, while service revenues will grow at a CAGR of 52.6 percent from about \$2.3 billion in 2003 to \$19.1 billion in 2008.

Comparing WiFi in North America and Europe

Insight suggests that a number of factors will drive European adoption of WiFi at a faster rate than North American growth over the forecast period:

- Given Europe's older stock of commercial buildings, WiFi becomes an attractive way to upgrade for networking without the expense associated with inside wiring.
- Europe has an established highly mobile communication-oriented population thanks to the success of global system for mobile communications (GSM).
- Europe's café culture and ubiquitous mass transit systems lend themselves to public hotspots.
- A concentrated population in a relatively small geographic area improves the economics of a hotspot business model.
- Office PCs' adoption in Europe lags North American rates suggesting fewer WiFi upgrades and more new units shipped with WiFi capability.

While North American adoption put WiFi on the map just a few years ago, adoption in Europe increased dramatically since 2002. This upswing has come about due to a much more cautious European approach to further 3G investments, a general acknowledgement that the European alternative to WiFi (HiperLAN2) lacks support, and the removal of many regulatory hurdles.

A number of European countries still face WiFi obstacles, but by-and-large the Europeans have done a volte-face.

The situation in the UK is emblematic of what Insight sees unrolling across the rest of Europe. While WiFi in North America (US and Canada) initially developed much more rapidly than in the

UK, for a number of reasons the UK has recently surpassed North America in its level of WiFi usage.

North America's relative size versus the UK is one of the major factors that will hamper growth. The likelihood of WiFi covering a substantial section of the North America is indeed remote for the foreseeable future, and Insight doesn't anticipate that those coverage gaps will be fully reconciled by mobile data services, so wireless data growth will eventually start to slow. In the UK, on the other hand, spaces between WiFi coverage areas will be small and can generally be bridged with general packet radio service (GPRS) and universal mobile telecommunications system (UMTS), creating the preconditions for ubiquitous access.

Population density also affects WiFi markets. WiFi poses a better economic value to large concentrations of potential users in relatively small areas. Population density in North America is very low relative to the UK.

Another data point is the prevalence of mobile phones in the UK, where mobile phone penetration rates are expected to reach over 88 percent by 2004. Data services in the UK already represent about 12 percent of revenue for mobile companies, and are expected to near 20 percent in 2004. While the majority of the revenues come from short-message services (SMS) or low-speed data access, the UK consumers are more familiar with mobile services, and mobile data in particular, and are thus much more likely to respond favorably as WiFi services become both more readily available and new form factors are introduced.

The mode of transportation also affects WiFi's potential. Public transport is more popular in the UK than North America, a mode of transportation that allows the use of WLAN services. Since much of the business travel in the US is by plane and involves overnight stays, the focus has been on building out WiFi in hotels and airports. In the UK, with trains and cars the prevailing mode of business travel, the focus has been on rolling out WiFi at roadside shops and train stations.

Trains have provided an excellent venue for

WiFi in the UK, with rail cars enabled for the many business travelers using their laptops. Plans are underway to do the same with airplanes in North America through a company called Sky Way Communications, but there will be greater technical hurdles to overcome.

On the negative side of the ledger, the UK

mobile operators spent a veritable fortune acquiring 3G licenses, which has proved to be a financial and strategic burden given the slow rollout of 3G. The UK operators' investments in 3G have damped their enthusiasm for WiFi, as they feared a cannibalization of existing revenue streams. While that fear has lessened lately, US

companies are experiencing an easier transition to 3G services, and are being much more proactive in integrating WiFi with mobile services, which is helping to spur the market.

www.insight-corp.com

...meanwhile, In-Stat gives business insights for the Wireless LAN

WLAN is growing in popularity among US companies. In January 2004, In-Stat/MDR conducted a survey of network administrators who are knowledgeable and personally involved in their organization's purchase and use of LAN equipment and services.

Currently, the vast majority of surveyed companies use a wired LAN, with nearly half of companies using a wireless LAN in addition to a wired LAN. Other findings include:

- Currently, 802.11b is the most popular

technology used within WLANs, with most of the survey respondents using this 11 Mbps, 2.4 GHz technology.

- Smaller firms are more likely to offer access to a higher percentage of the workforce. This is predominantly due to easier management of fewer devices and users.
- Most companies that have a WLAN offer basic corporate LAN access. This includes Internet access, e-mail, Intranet, file sharing, and printer sharing.
- While 802.11b is the most common WLAN

technology currently deployed, it is not the most popular for future WLAN deployments.

- Generally, companies that are planning to deploy a WLAN are going to provide access to a large percentage of the employees within the company.
- Surprisingly, many respondents have no plans for deploying a WLAN in the future. The most common reason for not planning a deployment of a WLAN is the lack of need for one.

Nokia, Philips and Sony establish NFC Forum

Nokia Corporation, Royal Philips Electronics and Sony Corporation have established the Near Field Communication (NFC) Forum to enable the use of touch-based interactions in consumer electronics, mobile devices, PCs, smart objects and for payment purposes. Touch-based interactions will allow users to access content and services in an intuitive way by touching smart objects and connecting devices just by holding them next to each other. The three will drive the forum, which will promote implementation and standardization of NFC technology to ensure interoperability between devices and services.

As featured in issue 61 of Incisor, NFC technology evolved from a combination of

contactless identification (RFID) and interconnection technologies. NFC operates in the 13.56 MHz frequency range, over a distance of typically a few centimetres and is standardized in ISO 18092, ECMA 340, and ETSI TS 102 190. NFC is also compatible with the broadly established contactless smart card infrastructure based on ISO 14443 A, i.e. Philips MIFARE technology, as well as Sony's FeliCa card.

The vision of the NFC Forum sees consumers seeking easier ways to interact with their immediate environment and to enable easy communication between their electronic devices and gain access to services. The goal, therefore, is to enable users to access content and services in an intuitive way. To bring this vision to life, Nokia, Philips and Sony are encouraging

other leading companies from mobile communications, consumer electronics, chip manufacturing, computing, media and entertainment, telecom and payment services to join the NFC Forum.

"At Philips our focus is giving consumers easy access to information, entertainment and services - NFC does just that," said Scott McGregor, president and CEO, Philips Semiconductors. "Enabling easy transfer of information between consumer devices from phone numbers to electronic transactions, NFC bridges today's connectivity gap and allows 'connected consumers' to interact with their environment. By pushing the technology with the backing of an industry organization such as the NFC Forum, NFC will soon open up a range of new opportunities for the consumer."

USB goes wireless

Intel used last months Intel Developer Forum in San Francisco to show wireless USB for the first time. Roving reporter Mads Oelholm provides a snapshot view:

The wireless USB demonstration was conducted by Intel Chief Technology Office Pat Gelsinger, and showed live data transfer at full USB speed - 480 Mbps.

Wireless USB uses UWB as the physical medium. UWB is the lower layers of the protocol (PHY and MAC). On top of this you can put USB or IEEE 1394 - or Bluetooth (if the Bluetooth SIG wants). The beauty is that USB, 1394 etc. all share the same radio and therefore can coexist peacefully.

UWB differs from other wireless technologies in its use of spectrum. Whereas most technologies use a very narrow spectrum combined with a relative high transmit power, UWB can use the entire spectrum between 3.1 and 10.6 GHz combined with very low transmit power.

In the actual demonstration – which worked successfully, incidentally - several sub bands in the spectrum between 3.1 and 5 GHz were used to achieve the high throughput. The demonstration was conducted using equipment from Wisair



Intel Chief Technology Officer Pat Gelsinger shows off Wireless USB at the Intel Developer Forum in San Francisco.

UWB is far from complete as a standard. The battle is still raging between Motorola on one side and the MBOA on the other side. Motorola suggests using a single band, and the MBOA is in favour of multiple sub bands. The MBOA includes members like Intel and Texas Instruments in addition to some of the large consumer electronics company.

The companies behind MBOA have recently decided to form their own SIG instead of waiting for a decision from the IEEE. The result will hopefully be a working UWB standard later this

year. This standard can then form the basis for building upper layer protocols such as USB and IEEE 1394 (FireWire) on top.

This also begs the question: What about High Speed Bluetooth? Wouldn't it be nice to incorporate Bluetooth as one of the upper layer protocols and thereby avoid the potential for problems with coexistence?

I guess only time will show, but one thing is certain: UWB is here to stay. Hopefully we should see the first silicon by the end of the year and products by some time next year.

Motorola versus the Rest of the UWB World

According to a recent report from ABI Research, the possibility of obtaining consensus on a single Ultrawideband (UWB) standard for Wireless Personal Area Networks (WPAN) has disappeared. As reported previously in Incisor, there are two standards on the table, one proposed by Motorola and a couple of other companies, and the other proposed by nearly all the remaining industry heavyweights, including Intel, Texas Instruments, Philips, Microsoft, Fujitsu, NEC, Hewlett Packard, Infineon, and STMicroelectronics.

This is not the first time a company singularly attempted to drive a technology against massive

opposition. In the 1990s Qualcomm successfully achieved this with CDMA for digital cellular. Qualcomm won that battle and it is noteworthy to examine three significant parallels that may be drawn between these efforts:

- Qualcomm's pioneers were not proposing an unknown or exotic technology - CDMA had been used by the military for close to forty years;
- The company relentlessly played up a few key benefits of CDMA over and over again until finally even the operators took notice; and
- Qualcomm did not have to worry about inter-operating with systems other than their own.

Will the UWB camp with Motorola at its helm be able to pull off a similar feat? They have the advantage that the technology on which their standard is based, DSSS (direct sequence spread spectrum), is a well-understood technology and has been used in other wireless areas for many years. They have constantly been claiming a couple of benefits, including Federal Communications Commission (FCC) interference compliance under any and all interpretations, and a significant time-to-market advantage over the competition. But what about the last point: will the UWB solution for a WPAN have to interoperate with all other WPAN networks?

It is one thing to win the standards battle, but it is another thing to win the customer war. Other questions remain: Would an OEM choose the DSSS UWB solution even at the expense of losing interoperability? Is it possible that an OEM

may decide to differentiate their product by offering a 100 Mbit multimedia data rate before any of their competition by using the DSSS UWB?

ABI Research' addresses these questions in its

report, "Ultrawideband: Standards, Technology, OEM Strategy, and Markets & Applications Spaces".

MBOA rejects IEEE controller of choice

The Multiband-OFDM Alliance (MBOA), led by Intel and Texas Instruments, has forged a new media-access controller (MAC) for Ultrawideband (UWB).

Details of the new MAC were developed during a five-day session of the MBOA and means that the alliance has, for all practical purposes, rejected the 802.15.3 MAC, which

the IEEE 802.15.3a task group had hoped to make the controller of choice for the physical layer (PHY) the group would eventually specify. (MBOA's MAC, which combines proposals made by Philips, Sony, and Alereon, differs substantially from the 802.15.3 version.) The move also makes it less likely that the IEEE task group will find a compromise solution to bridge

MBOA's standard with that promoted by a rival group, which includes Motorola, CRL, decaWave, and Oki Semiconductor. The latter coalition -- which will announce the formation of a new group called the UWB Forum to compete with MBOA -- is promoting a direct-sequence UWB (DS-UWB) proposal.

Nokia Mobile RFID Kit

At the CeBIT2004 trade show Nokia launched the Nokia Mobile RFID Kit, calling this the first integrated solution targeted to the mobile productivity verticals. Combined with the Nokia 5140, the Nokia Mobile RFID Kit is the first GSM phone integrated product offering with RFID reading capability.

The Nokia Mobile RFID Kit is part of the Nokia Field Force Solution and operates in the 13.56MHz frequency range, at a very short range of typically 2-3 centimetres, using the ISO-14443A standard. The short reading distance is optimal for field force solutions where tags placed in premises and devices are read individually by a workforce that moves.

Nokia intends that the Mobile RFID Kit will extend the mobility of field force personnel by integrating RFID reader technology to a familiar portable device. Simply by touching a smart object, the user can initiate tasks in their Nokia phone - call and send text messages or access databases and record new data entries.

"There are numerous ways to utilize the Nokia Mobile RFID Kit in a business", said Gerhard Romen, Head of Market Development, Nokia Ventures Organization. "The user can easily launch services and conveniently access phone functions like dial or send messages, just by

touching smart objects, in this case RFID tags. The phone reader will read the content of the smart object, and translate it to an action. For example, a field service engineer can intuitively start browsing the latest service instructions to repair a machine on site. It is also possible to collect meter reading data to the phone by keying the reading into the phone, replacing the paper and pen method still widely in use today. The Kit can also replace the pen and paper method in recording time and attendance, for example."

The Nokia Mobile RFID Kit contains two Xpress-on RFID Reader Shells compatible with the Nokia 5140 mobile phone, the relevant application software for the phone, and twenty RFID tags.

Shipments of the Kit will begin mid-2004.



5140 cellphone at the heart of Nokia Mobile RFID kit

Incisor Directory of Bluetooth industry companies

As time goes on, more and more companies join the Bluetooth Special Interest Group (SIG), becoming part of the global network of companies that are working to take Bluetooth technology to market.

On an ongoing basis, Incisor includes a listing of companies providing products and services within the Bluetooth sector.

Beyond the simple listing, wherever there is an open book icon (📖) alongside the company name, you will be able to obtain more information and

contact details for that company by clicking on the icon. This provides a link to an expanded profile of that company.

Incisor continues to be the only continuously published magazine dedicated to Bluetooth technology, and is received at more than 1200 companies across the world, and enjoyed by an estimated readership of 25,000 individuals. To add your company or a profile for your company to this directory listing, email: directorylisting@click.co.uk



Access point/gateway products

- BLIP Systems
- Clipcomm Inc.
- Commil Ltd
- lesswire AG
- Inventel** 
- Pico Communications
- Red-M
- Tadlys
- Wireless Networks Inc.

Antennas

- Fractus
- GigaAnt

Cellular handsets

- Mitsubishi Electric Telecom Europe
- Motorola
- Nokia
- Philips
- Sony Ericsson

Communications Consulting

- Alpine Communications
- PA Consulting Group

Connectivity/Hardware products

- 3Com
- Anycom, Inc.
- Brain Boxes Ltd** 
- Ensure Technologies
- Logitech
- MediaSolv.com
- Socket Communications
- Tactel AB
- TDK Systems
- Troy Group
- Xircom

Digital pen and paper technology

- Anoto

Hardware and software design/IP

- Adamya Technologies
- ARC Wireless Solutions Inc.
- Atinav Inc.
- Colligo Networks Inc.
- Cosmic Co Ltd
- DsIT Technologies Ltd

Ericsson Technology Licensing Company

- Impulsesoft
- IVT Corporation
- LinTech GmbH
- Mecel AB
- MindTree Consulting
- NewLogic Technologies
- Parthus Technologies
- Penell A/S
- RTX Telecom
- Stollmann E+V GmbH
- Tality Corporation
- Teleca
- TTPCom Ltd.
- WaveLab Engineering AG

Headsets

- GN Netcom
- Plantronics

Industrial products

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- BlueGiga Technologies
- ConnectBlue AB

Market research & analysis

- ARC Group
- Baskerville** 
- Chorleywood Consulting
- EMC
- IMS Research

Mobile Computing products

- Casio
- Fujitsu Siemens Computers
- IBM
- Palm
- Samsung Electronics
- Sony Information Technology Europe
- Toshiba Information Systems

OEM solutions

SMART Modular Technologies

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- Alcatel Microelectronics
- Atmel Corporation
- Brightcom Technologies, Inc.
- Conexant Systems, Inc.

Cambridge Silicon Radio (CSR)

- Infineon Technologies
- Intel Corporation
- KC Technology Inc
- National Semiconductor GmbH
- Philips Semiconductors** 
- RF Micro Devices
- SiGe Semiconductor
- Silicon & Software Solutions

Silicon Wave

- Spirea
- STMicroelectronics

- Texas Instruments, Inc.
- XEMICS SA
- Zeevo, Inc.

Software solutions & applications

- Bandspeed
- Mezoe** 
- Microsage Wireless
- Norwood Systems
- Open Interface
- RegiSoft
- Rococo Software
- SofBlue Inc.
- WIDCOMM** 
- Zi Corporation

Test Equipment

- Anritsu
- Berkeley Varitronics Systems
- Catalyst Enterprises
- CETECOM Spain** 
- IAR Systems
- Tektronix, Inc.
- Tescom Co Ltd

Test houses

- 7 layers** 
- CETECOM Inc.** 
- ETS DR.GENZ GmbH
- Intertek ETL SEMKO** 
- Radio Frequency Investigation (RFI)** 

Wireless industry calendar of events

DATE	EVENT	LOCATION	NOTES	LINK
April 6 - 7 2004	The Wireless LAN Event	Olympia, London, UK	The Wireless LAN Event is supported by Intel, HP, BT, Nortel Networks and more	www.wlanevent.com
April 19 - 24 2004	Bluetooth SIG All Hands Meeting	Fairmont Kansas City, Missouri, USA	Convention for associate and promoter members from all over the globe	www.bluetooth.org
April 26 - 28 2004	Wireless M2M Communications Forum	London, UK	-	www.telecoms-events.com
May 14 - 15 2004	2004 Wireless Telecommunications Symposium	Pomona, California, USA	An IEEE forum for industry, government and academic leaders and experts on wireless Internet and WML, UWB, 802.11, Bluetooth and 3G/4G.	http://www.csupomona.edu/~wtsi/
June 8 - 10 2004	Wireless Connectivity World	Amsterdam RAI, Netherlands	-	www.wiconworld.com
Sep 27 - Oct 1 2004	3GSM World Congress Asia	Suntec International Convention & Exhibition Center, Singapore	-	http://www.gsmconferences.com/3gsmasia/
tbc, October 2004	WiCon Asia	Singapore	-	www.wiconworld.com/asia
November 8 - 10 2004	WiCon Americas	Santa Clara Convention Center	-	www.wiconworld.com/americas

Further Bluetooth events will be added to the calendar as soon as they are announced. See notes below regarding editorial submissions.

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