

INCISOR™

NEWS FROM THE BLUETOOTH™ AND SHORT RANGE RF ENVIRONMENT

ISSUE 65

IN INCISOR THIS MONTH

Welcome to the first issue of Incisor for 2004. As we write there is a feeling of optimism that the tech sector will see a resurgence this year, and certainly the stock markets are reflecting new confidence.

For Incisor the year brings new challenges. In addition to maintaining our position as the only continually published – 65 issues in just over 5 years – Bluetooth magazine, we will formalise the announcement made in our December issue. In that issue we launched a new section – ‘Wireless industry intelligence’.

From now onwards, we will use this section to keep our readers informed of developments in other short-range wireless technologies, including Wi-Fi, ZigBee, UWB, RfID and NFC. This month, in addition to news and market research covering these sectors, we look at the wireless industry from an entirely different perspective – that of a company servicing the UWB market. We hope you enjoy this broadened perspective, and welcome comments.

Our normal feature sections are included, and are listed below:

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The wait is over - CSR will float

Although Incisor’s international subscriber-base precluded our invite to the official announcement meeting, Incisor can report that the speculation over whether Cambridge Silicon Radio (CSR) would float – or rather, when it would float – is over.

In London yesterday (the 25th of January), CSR confirmed that it is seeking a listing on the London Stock Exchange.

Our sources report that 25% of the company will be floated, and soon – before the end of Q1. That means within the next two months. Analysts expect more than UK£60m (approx. \$108m) to be raised, which gives CSR a market capitalisation of about UK£250m (\$450m).

The rationalisation for the float was said to be the need to create a public market for CSR’s ordinary shares, and to strengthen its balance sheet to provide increased security and confidence for its customers.

The flotation will include an offer of new and existing shares to institutional investors in the UK, and internationally, including the United States. Credit Suisse First Boston has been appointed sole bookrunner and sponsor. CSFB and Cazenove have been appointed joint lead managers and will act as joint brokers to CSR. SG Cowen will act as US co-manager.

An acknowledged success story, CSR is privately held. It is one of Europe’s largest-ever semiconductor design start-ups and has so far secured over \$70m of development capital from an impressive list of blue chip corporations and institutional investors including: 3i, ALPS Electric Co Ltd, Amadeus Capital Partners, ARM, Capital Research, Compaq Computer Corporation, Gilde IT



Fund, GlobespanVirata, Intel Capital, LDC, Siemens Ventures, Philips Venture Capital Fund BV, Scottish Equity Partners, Sony Corporation and Wavecom.

Its numbers for the year ending December 31, 2003 look particularly good, with revenue reported at \$67.6m, an increase of 144% on 2002. For the three months ended December 31, it achieved operating profit of \$3.6m (its second consecutive quarter of profitability) on revenue of \$26.7m.

The current management team includes three co-founders - Phil O’Donovan (commercial director), Glen Collinson (sales director) and James Collier (technical director) plus chairman Mike Shone, CEO John Hodgson and director of finance Paul Goodridge. John Whybrow, chairman of building materials company Wolseley Plc and a former chairman of Philips Electronics UK will be CSR’s chairman on listing, while David Tucker, a former M&G investment manager, had been made a non-executive director.

Ericsson tackles consumer interoperability issue

Taking us back to the early days when it typically blazed the Bluetooth trail, Ericsson Technology Licensing has grasped one of the technology's thorniest issues – quality of user experience of Bluetooth. The Swedish ingeneur has launched a program for Bluetooth interoperability testing, which will verify products solely from a user point of view.

The Ericsson Bluetooth Interoperability Program focuses on which functionality different Bluetooth products support when communicating with each other and which user scenarios they can handle. Various Bluetooth devices support different functionality. A computer can for example support the exchanging of business cards with a PDA and vice versa. But it's not easy for a consumer to know which functionality each specific device supports.

"Consumers should not have to care about



Johan Åkesson, Ericsson Technology Licensing

technical details," says Johan Åkesson, marketing director of Ericsson Technology

Licensing. "All they want to know is what their products can do together."

Products that are interoperability tested by Ericsson have already been qualified according to the mandatory Bluetooth Qualification Program, which guarantees a correct Bluetooth implementation. Ericsson's interoperability testing is optional and serves the purpose of testing on an application level. It is performed by Ericsson's independent Bluetooth Qualification Test Facility (BQTF), ensuring high quality and confidentiality.

Ericsson's interoperability testing is targeted at manufacturers of Bluetooth products. With the agreement of the manufacturer, the results will also be made public in a cross-reference list in selected publications.

Several consumer product manufacturers have already shown interest in the interoperability testing program.

Silicon Wave's Terry Bourk selected as chairman of the Bluetooth Architecture Review Board (BARB)

Terry Bourk, senior director of advanced products at Silicon Wave has been selected to serve as chairman of the Bluetooth Architecture Review Board (BARB). Dr. Bourk becomes the first chairman from an Associate member company of the Bluetooth SIG. Previously the position of chairman had been reserved for one of the eight Promoter companies who were the original founders of the Bluetooth Special Interest Group (SIG).

As chairman of the BARB, Terry will lead the committee that in collaboration with the forthcoming Roadmap Committee develops the future direction of Bluetooth technology. In this effort the BARB focuses on the architectural aspects of the enhancement proposal including how Bluetooth specifications



BSIG associate company exec assumes chair

are created and implemented.

"I am honoured to be elected to serve as the chairman of the BARB," said Dr. Bourk. "Bluetooth technology is a mature, robust wireless standard and is quickly being integrated into a growing number of consumer and industrial products today. I expect that this year will also bring an augmentation of certain key profiles."

"Silicon Wave continues to be a company on the forefront of Bluetooth industry developments," said Markus Schetelig, chairman of the board of directors for the Bluetooth SIG and senior manager wireless connectivity for Nokia Corp. "The selection of Terry as chairman is a reflection of his work at the company and of his past 4 years as an active councilor in the BARB."

BSIG says Asian market coming on stream

According to the BSIG's monthly text email newsletter, the Bluetooth market in Korea is finally awakening.

It reports the recent announcement by the Electronics and Telecommunications Research Institute of Korea - a non-profit government-funded research organization for IT - that 60

companies in Korea have achieved Bluetooth SIG certification from 2001 to the first quarter of 2003.

This is the fifth largest number in the world, following Japan, U.S., Taiwan and Sweden. As of May 2003, 32 companies have obtained 65 Bluetooth certifications. Experts expect more

domestic companies to accelerate their development and application of the Bluetooth wireless technology along with the technical support of Korea's Telecommunications Technology Associations.

CATC enhances Bluetooth design verification system

Computer Access Technology Corporation (CATC), a communications protocol company, has announced the availability of Version 2.2 software for the BTTracer/Trainer, CATC's Bluetooth design and verification test system. With this release, the BTTracer/Trainer is compliant with the recently approved Bluetooth V1.2 specification. In addition, the release allows for the creation of a second, completely independent recording channel, includes a Profiles Decode toolbar for easier protocol selection

and debug, and expands Bluetooth test cases support.

BTTracer/Trainer V2.2 provides support for the following: Faster Connect, Adaptive Frequency Hopping (AFH), eSCO, L2CAP Flow and Error Control, QoS Enhancements, LMP, and HCI updates. V2.2 also supports Scatter Mode, Anonymity Mode and Absence Masks, which are expected in the next release of the Bluetooth specification.

The V2.2 release includes several powerful new features that greatly improve traffic

capture, analysis and testing. With the use of the BTTracer auxiliary module, the user can create a completely independent recording channel that can record not only a mixed piconet, but also up to two AFH channels within a single piconet, a true scatternet environment, or two completely independent piconets.

CATC's BTTracer and BTTracer/Trainer bus and protocol analyser is now available.

CSR and CC&C collaborate on Bluetooth printer adapter with dual ports

CSR has announced that its BlueCore silicon has been selected by CC&C Technologies Inc., the wireless module and solution company from Taiwan, to Bluetooth enable the CC&C BT-260 Bluetooth Printer Combo Adapter. The BT-260 is a Bluetooth printer adapter that offers both USB and parallel (1284) ports making it suitable for converting most PC compatible printers to wireless operation up to a range of 100 metres.

Because the BT-260 supports both USB and 1284 (parallel) port printers, the Bluetooth adapter is ideally suited for both home and

office use. The dual-port BT-260 can be plugged into virtually any PC compatible printer to wirelessly network the office. In the home, the Bluetooth Class 1 device provides up to 100m range of Bluetooth connectivity and would, for example, enable a user to work on a notebook PC at the breakfast table and send print commands to the printer that is conveniently tucked away under the bed.

CSR's BlueCore Bluetooth solution has been implemented into CC&C's BT-260 Bluetooth printer adapter with the necessary profiles to choose from. The BT-260 implements both HCRP (Hardcopy Cable Replacement Profile) and

SPP (Serial Port Profile) profiles, thus ensuring compatibility with PC Bluetooth adapters. CC&C was involved in the development of both SPP and HCRP profiles so is well equipped to understand the intricacies of developing workable Bluetooth solutions.

Blue2Net signs large wireless voice over IP contract for SetTopBox

Swedish company Blue2Net AB has signed a contract with TelData HiperLAN Technology to deliver voice over IP for its SetTopBox product.

Blue2Net develops software and Bluetooth hardware for business applications and operators, while TelData HiperLAN Technology is a company that packages content and services through a self developed SetTopBox for the broadcast and IP industries.

The TelData HiperLAN Technology customer will

be able to call via voice over IP as a part of the service. The three-year contract between the two companies includes other Bluetooth services that will be developed for cellular phone applications.

Richard Bohannan from Blue2Net said "We can see that we are at least twelve months ahead in the market to provide this kind of complete solution. The market for phone services is growing every day and customers want more services and applications from one unit. With a SetTopBox you get a phone,

video, DVD, computer, game station, and music centre as all in one unit."

TelData HiperLAN Technology says that the service provided is a perfect complement to its customer's service package. A spokesperson commented "We have suppliers and customers all over Europe, so we are glad to have found this competence."

TelData HiperLAN Technology will deliver the first ten thousand units during Q1 2004. The initial rollout will be in Scandinavia.

... And updates serial RS-232 Bluetooth access point

Blue2Net has released its latest firmware for serial blue2link RS232M, enabling the cable replacement to also act as a stand-alone serial access point. Blue2Net develops Bluetooth software, access points, and cable replacement units for multiple applications.

The company says that the blue2link was originally designed to work as a cable replacement unit. However, with the market requesting new ways to connect to serial equipment and machinery via PDA's, laptops, and mobile phones, the need to add a serial access point functionality into the

stand alone blue2link S232M became clear.

With this new function companies will be able to wirelessly access machines and equipment equipped with a serial port using Bluetooth-enabled laptops, PDA's, and cellular phones.

Cetecom BITE protocol tester goes to V1.2

Anticipating the market's need for updated test equipment, Cetecom Spain has unveiled the V1.2 –compatible version of its BITE Bluetooth platform. This conformance tester now supports the new TTCN test cases for Bluetooth Specifications V1.2 as well as the previous V1.1 test suites.

Version 1.2 of the core specifications provides significant enhancements, such as:

- Adaptive frequency hopping to eliminate interference

- New eSCO packets to improve voice quality
- Accelerated discovery procedures to provide faster connections between Bluetooth devices
- L2CAP Flow and Error Control to avoid errors in transmission when sending large files
- Revised QoS

Andres Moreno, telecommunications director at Cetecom Spain commented, "This is a natural evolution of our BITE platforms and shows Cetecom's

commitment to Bluetooth wireless technology. We are seeing a lot of interest from product manufacturers and BQTFs to get conformance testers supporting V1.2, and we are now ready to help them. Version 1.2 is a great step forward for the Bluetooth wireless technology and we want to be part of it."

Cetecom Spain has also announced that it is providing Rohde & Schwarz with the signaling system and TTCN executable test suites for their Bluetooth Protocol Tester.

Extremely fast Bluetooth RF tests

The R&S CBT and the R&S CBT 32 are two fast Bluetooth testers from Rohde & Schwarz that are claimed to perform extremely fast Bluetooth receiver and transmitter measurements.

For this purpose, they set up a connection to the DUT (device under test) where the tester is the master and the DUT the slave. As required by the specifications, both instruments come with a built-in "dirty transmitter" for receiver tests that simulates impure signals in order to test user equipment under virtually realistic conditions. As soon as the frequency drift parameter is activated, the instruments

determine how and to what extent the user equipment adapts to difficult conditions and tracks the frequency.

In addition to all other transmitter measurements, the R&S CBT and the R&S CBT 32 perform two spectrum measurements, i.e. 20 dB bandwidth and adjacent-channel power (ACP). These measurements are above all relevant for Bluetooth equipment with high transmit power. Moreover, the testers are able to determine average power, peak power, initial carrier frequency tolerance, frequency drift, drift rate and frequency deviation.

Due to these performance values, the smaller and cost-effective R&S CBT 32 is ideal for the production and verification of modules, components and user equipment. It does not have a display of its own but can be connected to an external monitor for error control. The larger R&S CBT is equipped with a graphical display that provides a clear overview of all measurement results. It is therefore optimally suited for development applications.

Both instruments can be remote-controlled serially and via an IEC/IEEE bus.

Bluetooth
Americas 2003

America's Number 1 Bluetooth Event (Inc Bluetooth Developers Conference)

The Official Events of
the Bluetooth SIG
Bluetooth™

Bluetooth Americas 2004 – interest levels sustained!

By Mads Oelholm

From the perspective of this writer, Bluetooth Americas - held in San Jose in December - was largely a success.

The conference was opened by Mike McCammon, the executive director of the SIG. Mike was clearly frustrated by the over-hyping of Bluetooth in the late 90's as well as by the lack of a major breakthrough in the US. It seems like half of the wireless service providers such as Cingular, AT&T and T-Mobile have embraced the technology whereas others like Sprint and Verizon have shunned it.

One probable reason is that there is no real killer application for Bluetooth. Unlike Wi-Fi, which you buy because you want a wireless LAN, very few people buy Bluetooth because of Bluetooth. It just comes with the phone you bought.

From then on people need to be educated as to what Bluetooth can really do for them. And they need to be assured that products will work together. To this end Ericsson has started an interoperability program to make certain that product from various vendors will work together (reported elsewhere in this issue).

We spoke with Johan Åkesson, who is marketing director and a primary Bluetooth evangelist at Ericsson Technology Licensing. He told us that there has been great interest for the program, which is open to all manufacturers of equipment. Bluetooth Americas was also gave Ericsson the opportunity to show off the first Bluetooth version 1.2 compliant chip.

Apart from this the conference was very interesting with lots of new technology being displayed. Brainboxes showed off a variety of interesting products. We talked to managing director Eamonn Walsh. Brain Boxes is traditionally a company associated with RS-232 solutions, but has moved into the Bluetooth



space in order to use the technology as a cable replacement. Eamonn told us that cable replacement is not as simple as it sounds. When you connect a cable between two units you do in general not need any kind of user interface. When you use Bluetooth, you need an interface in order for units to locate each other properly and to establish secure communication. Brainboxes is using Bluetooth in a number of interesting ways including an electronic white board as well as products in the power grid field, where you need to be able to switch equipment on an off before you start repairs.

And then there is still the ongoing debate about a faster Bluetooth. Two different groups have been trying to persuade the SIG to come on board. One group is IEEE 802.15.3 or WiMedia. This group operates with a radio capable of transmitting at 55 Mbps. Availability of production silicon is not expected until the end of this year. Another group is UWB, operating at speeds up to 480 Mbit/s. Both groups want to use a common radio as a basis for several technologies including Bluetooth, USB and

FireWire to run on top of the radio.

It all seems to make sense instead of producing yet another incompatible radio.

There was also plenty of news from the automotive industry. Toyota is running Bluetooth in the Lexus LS430, allowing up to four phones to be paired. In addition, all functions – phone/s, in car entertainment and Sat-Nav display and speakers are integrated.

Microsoft was, of course, also available. Showing off the latest version of Microsoft Windows Automotive - a version of Windows CE especially tailored for the automotive market. Using voice control over Bluetooth and a wireless connection to the Internet, the possibilities are endless. Consider saying 'Petrol' (or 'Gas' for the Americans) into your microphone and getting a list of the nearest spots to refill your car. And if you are not about to run out, you can even get the latest prices and choose the least expensive options.

All in all a very fascinating conference, and we look forward to the European counterpart in Amsterdam.

Bluetooth Americas snapshots



BSIG exec Mike McCamon opens proceedings



Visitor numbers down yet exhibitors such as SMART Modular reported quality, not quantity



Toyota presents state of the art Bluetooth installation in Lexus LS430 - four-wheeled Nirvana for automotive sybarites



"Can anyone display more product wins than CSR?"



Nokia puts Bluetooth in TV with Mediamaster set top box



High on many wish-lists – Toshiba shows Bluetooth stereo headphones

Photography: Joyce Putscher

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Anycom to provide new ultra light-weight headset

Bluetooth wireless accessory manufacturer Anycom has announced a new headset, the Blue HS-700, describing it as one of the smallest Bluetooth headsets available, weighing only 15 grams. Anycom says that it is a very comfortable fit, which makes it almost unnoticeable and comfortable to wear over long periods of time (all-day wear). A combination of fine-tuned microphone sensitivity and with advanced speaker technology is said to provide high quality audio performance.

The HS700 includes one touch use to accept a call, change loudness or activate voice control.

A leather belt case/charger can be used to protect and wear the headset on your belt or act as a charger station. The Blue HS-700 supports both the headset and the hands-free profile therefore providing compatibility to most Bluetooth mobile phones on the market (including the Sony/Ericsson and Nokia line of Bluetooth Phones). The headset comes ready to use and includes the leather belt case/charger, a standard

power supply and the multilingual user manual.

The Blue HS-700 Headset is shipping now through the Anycom distribution and reseller channels with a MSRP of \$99.



Anycom claims all day comfortable use for the Blue HS700 headset

O'Neill unveils snowboard jacket with Infineon 'wearable electronics'

Infineon Technologies and sportswear and sports gear company O'Neill Europe have unveiled the result of a joint product development project: their first 'wearable electronics'-product. Based on O'Neill's specifications, Infineon has developed a chip module suitable for integration into a snowboard jacket. Adapted to withstand raw snowboarding environments, functions such as "mobile telephony by Bluetooth" and "MP3 player" are integrated into the sportswear. This innovation from O'Neill's 2004/05 winter collection for the technologically clued-in snowboarder is named "THE HUB".

"With the product just launched, the groundwork preparatory to full integration of electronic functions in clothing is starting to bear fruit," said Dieter May,

responsible for strategy and emerging businesses at Infineon. "With the first market-ready product to use our technology for integrating electronic functions in clothing, we are again underlining our aim to be the leading solutions provider among semiconductor companies. This basic technology opens up new markets and sales channels for us. Our aim is to expand these significantly starting from our leading position."

Woven into THE HUB snowboard jacket are electrically conductive fabric tracks which connect the chip module to a fabric keyboard and built-in speakers in the helmet. The chip module contains a full-featured MP3 player and a Bluetooth module via which the snowboarder can control a mobile phone. If the snowboarder wants to make a phone call, the stereo system acts as the headset.

The microphone is integrated in the collar of the jacket.

Recent studies by the Venture Development Corporation predict worldwide sales worth over 1 billion euros for the "intelligent textile materials" market by 2007. Since presenting its technology Infineon has discussed firm projects with more than 200 companies from the textile industry. In cooperation with the Vorwerk Teppichwerke carpet plant in Hameln, Germany, Infineon is currently working on an initial prototype of a "smart carpet".



Is this the world's coolest jacket?

Fully automatic Bluetooth washer-dryer from Toshiba

This is only a very brief report, as we have very little information at the moment, but Toshiba has introduced one of the next generation Bluetooth products – a washer dryer!

According to information taken from Toshiba Japan's web site, the washer-dryer can download washer/dryer software for new clothes from the Internet via a home

access point, and the appropriate programme can be carried out. When this washer-dryer breaks down, an error code is transmitted to the access point, and presumably a service engineer will soon arrive at the home's front door.

In common with the much-discussed Bluetooth/wireless-equipped refrigerator, this is one of a

new breed of intelligent home appliance. Look out world, the Jetsons are coming!



But will it teach a man how to use a washing machine?

AT&T Wireless takes Bluetooth to 20+ million GSM subscribers

AT&T Wireless has entered into an agreement to sell the Parrot DriveBlue in-car hands free Bluetooth solution in its stores and through its affiliates. As AT&T Wireless claims to be the largest GSM wireless communications services provider in the US with a GSM coverage of 212 Million POPS, 21.5 million consolidated subscribers and approximately 1,200 stores in the US, Parrot has good reason to feel pleased about this.

The agreement was negotiated by Parrot USA and DCOMM,

the Seattle-based distributor of Parrot. "This agreement is an endorsement of Parrot car kit products in the US" commented Henri Seydoux, Parrot's Chairman and CEO. "We also see it as the beginning of a long-term relationship with AT&T Wireless, which always excels in providing to their customers quality and easy-to-use products."

Parrot states that DriveBlue, introduced last March, was the first no-install Bluetooth car kit on the market. It uses an extensive implementation of the Bluetooth protocol,

and support for phone-specific functionalities.

Users benefit from voice-dialling and one-touch handling of calls. Advanced features such as Wordspotting, dual call, caller ID, auto-answer, private mode and one-touch redialling are available according to the phone model.



AT&T provides US boost for Parrot

SMS/email phone from Nokia uses CSR Bluetooth

A famously secretive major player, Nokia is not known for promoting its use of third-party technology. Sometimes, though, we are given a glimpse of what is happening behind the scenes.

Just in time for Bluetooth Americas in early December, a new Nokia phone – the 6820 – appeared amongst the qualified products on the official Bluetooth web site. Also revealed on the site was that this new GSM/GPRS handset uses the CSR BlueCore2-ROM IC, while the below HCI firmware is written and pre-qualified by CSR.

A typically slick Nokia product, the 6820 is designed to take advantage of a full keyboard. With a flip-open design and 5-way scroll, the device enables fast text-input and easy navigation for advanced messaging like mobile e-mail. Users

can select between several e-mail access options for both business and personal use. A built-in e-mail application (POP3, IMAP4, SMTP) with OMA-compliant over-the-air provisioning of e-mail settings will be included with the 6820. The device also supports BlackBerry connectivity for encrypted access to corporate email. High data speeds with EDGE technology provide excellent usability to e-mail services.

The on host software stack is written by Nokia, and while Nokia may have at one time been guilty of limited profile support, or at least omitting certain vital profiles, the 6820 supports a full compliment including the following profiles: FT-Server, GAP, HandsFree-AG, Headset-AG, DUN-GW, OPP-Client, OPP-Server and SIM Access-Server.

Keen to know more about the CSR/Nokia alliance, Incisor

contacted CSR for more information, but to no avail. VP of marketing communications Alan Woolhouse simply responded "I can confirm the information that is in the public domain on the official Bluetooth site, but beyond that cannot comment." Should more information become available about the Anglo/Finnish alliance, Incisor will report at a later date.

The Nokia 6820 is due to start shipping during Q2 2004 in Europe.



Motorola shows low-weight, hi-style headset

A third generation Bluetooth headset from Motorola has now hit the streets – the Motorola HS810. The new headset weighs less than one ounce (20 grams) and offers what Motorola describes as a sleek style with a unique boom microphone, as well as high quality sound.

The new headset features noise-reducing and maximum-security technologies, plus a blue pulsing light to illustrate when users are on a call and to help limit interruptions. To

suit the preference of all users, the headset can be worn over either ear, while the volume control button remains easy to locate and adjust in either position. The headset's improved battery life allows for a talk time of up to five hours and standby time of up to 100 hours. Additionally, charging is simple, as this headset uses the same travel and car chargers as most compatible Motorola phones.

For the Bluetooth enthusiast, the Motorola HS810 stores

device pairing information and wirelessly interacts with up to eight different Bluetooth 1.1 compliant devices, including handsets, PDA's and computers. The complete package includes the headset, charger, lanyard and a carry case in select regions. The suggested retail price is \$119.99.



2nd generation Bluetooth printer adapter from Troy

Well-established as a wireless printing solutions provider, Troy Group has launched the WindConnect II Bluetooth wireless printer adapter that incorporates next generation Bluetooth wireless technology.

Troy says that WindConnect II features a number of advances over its first generation WindConnect adapter. First, with the Basic Printing Profile (BPP), users do not need to load printer specific drivers prior to printing, enhancing customer ease of use. Second, the Basic Imaging Profile (BIP) enables images from camera phones, digital cameras, or PDAs to be printed using an embedded JPEG rendering

engine in the WindConnect II. Third, a much smaller form factor allows the WindConnect II to be more easily carried as a mobile device, and to fit in smaller areas. Finally, the WindConnect II comes in two separate interface versions: parallel port or USB.

WindConnect II also offers printing using the Bluetooth Serial Port Profile (SPP) and Hardcopy Cable Replacement Profile (HCRP) for traditional forms of printing from laptops and desktops that are equipped with printer drivers, and Object Push Profile (OPP) for convenient and quick printing of Objects such as business cards from PDAs or cell phones.

"The added functionality of the Basic Printing and Basic Imaging profiles along with xHTML print technology is truly state-of-the-art," said Harold Yin, executive vice president and general manager of Troy's

Wireless and Connectivity Solutions. Troy WindConnect II Bluetooth printer adapter is available now.



Wireless connectivity for PDA users from Socket

Socket announces battery-powered cordless modem for PDAs/notebooks

Socket Communications has launched what it claims is the first battery-powered cordless 56K modem for PDAs. The Socket Cordless 56K Modem with Bluetooth means users can access the Internet or email through a telephone from any Bluetooth enabled device that supports a Dial-Up Networking (DUN) profile, such as Pocket PCs, Windows notebooks, and Palm devices - without having to be tethered to an analogue phone line and electrical outlet.

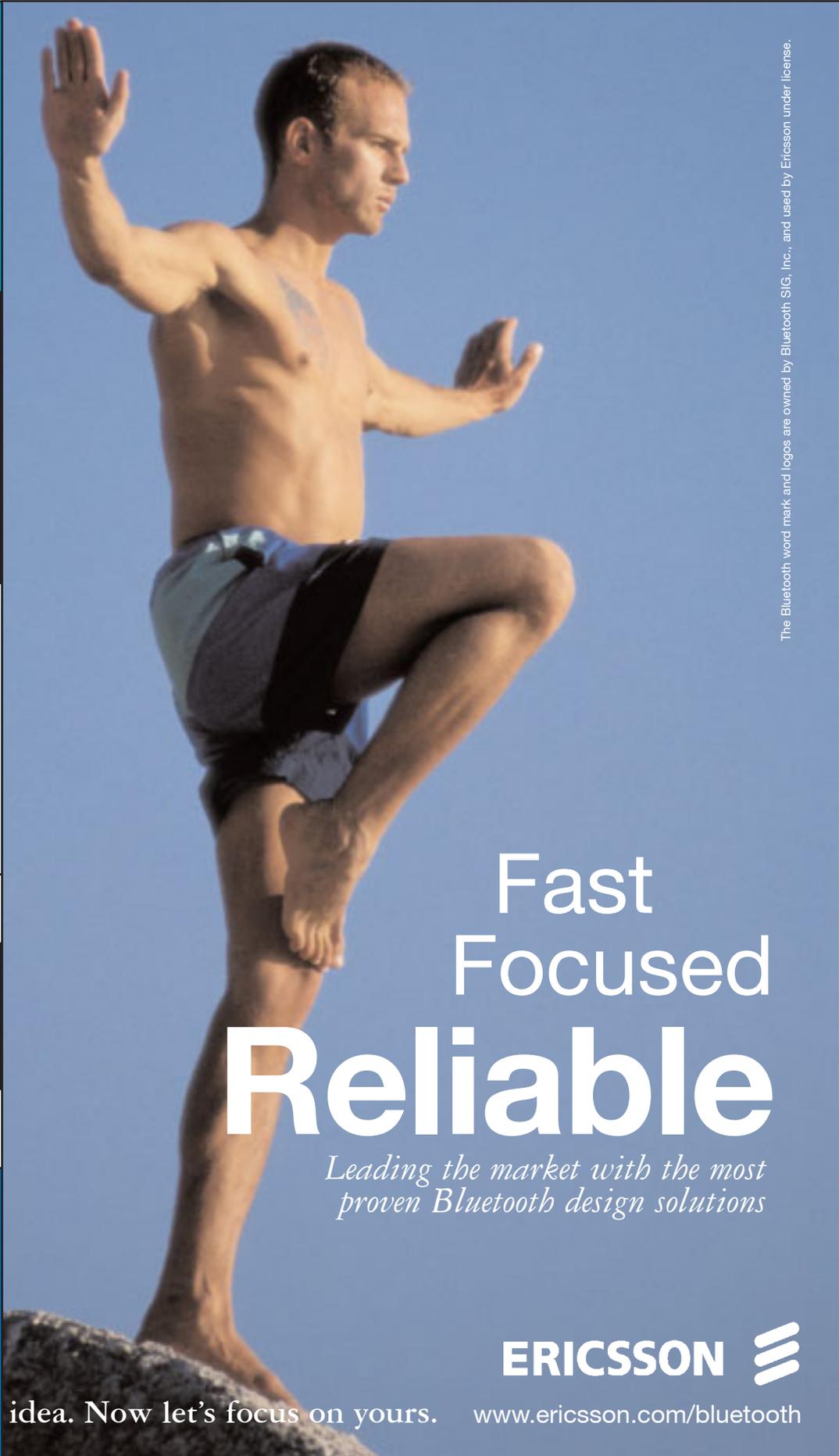
The modem comes with a rechargeable, removable Lithium-ion battery that supplies a minimum of three hours of use. It uses an internal antenna and is a class 1, Bluetooth 1.1-compliant device providing 330 feet of wireless freedom and is also V.92 hardware ready, giving users the option to add call waiting, get online quicker and download files faster.

The modem is certified to work in the United States, Canada, Europe, Australia, New Zealand and Japan and has

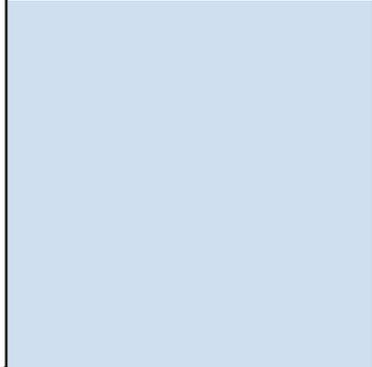
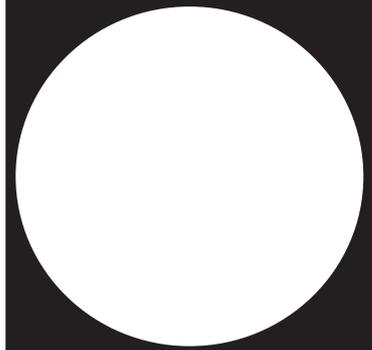
an expected US street price of \$129. Volume shipping will begin the end of Q1, 2004.

Wireless connectivity for PDA users from Socket





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Two cores are better than one

David Hargreaves and Luke D'Arcy, CSR

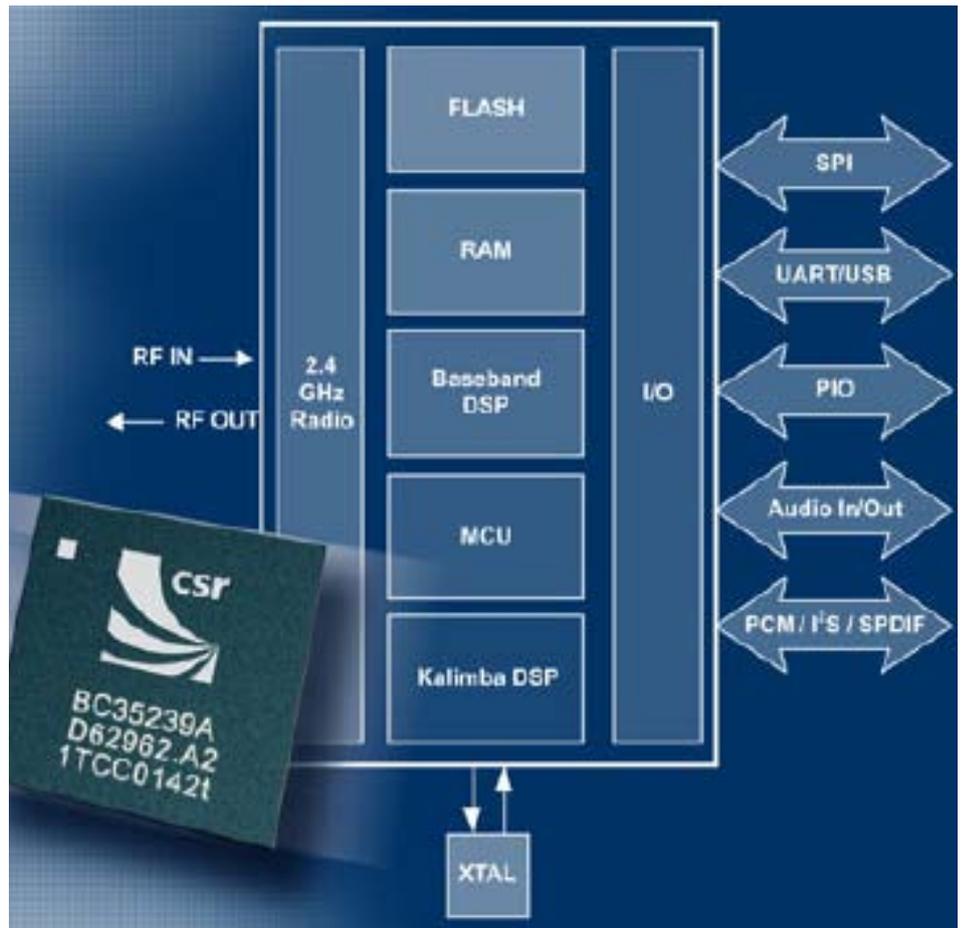
By and large, silicon solutions with just a single RISC processor have been adequate for the Bluetooth market so far (along with some application-specific circuitry/DSP for baseband processing). But as devices need to perform tasks such as echo cancellation and MP3 decoding, the required computational power escalates, and the underlying processing architecture becomes important in terms of issues including power consumption, silicon area and cost.

When creating a single-chip solution for the Bluetooth AV Profile and sophisticated audio wireless products, CSR took the decision to develop a device variant with an additional DSP core - BlueCore3-Multimedia. For some applications this device competes against chips with a single 'powerful' RISC processor core. What's the best technical solution?

RISC alone

Consider how a single processor would handle application-specific tasks like echo and noise cancellation, or MP3 coding/decoding. The RISC processor cores preferred by Bluetooth silicon suppliers are typically third-party devices, and 32 bits wide with a 16 bit operational mode. For Bluetooth applications, the required audio data would typically be 16 bits wide. However, using the 16-bit mode for processing signals can lead to quality problems because the mathematical computations generate rounding errors which end up as signal degradation. The alternative is switching to an overkill 32-bit mode. On a RISC core, the necessary multiplication operations also require many more clock cycles than a DSP would need with its efficient single-cycle multiply-accumulate or MAC instruction (DSPs typically have a higher-throughput Harvard memory architecture as well, which avoids extra clock cycles to load data and coefficients from memory). The end result is greater power consumption.

The signal processing functions, plus the high level management and man machine interface



related aspects of the application are, of course, in addition to the core Bluetooth protocol management duties of the processor. The RISC cores on Bluetooth chips will have been carefully sized to meet a generic spread of Bluetooth applications. Although there is application flexibility in terms of the frequency used to clock the system, the performance of the cores must be well matched to the target application or silicon costs will spiral because the vendor will pay a penalty in terms of die size - and usually a licence fee as well.

The associated and potentially greater risk is that running the complete application on the RISC core can jeopardise core Bluetooth functions. Performing math-intensive operations will

require a lot of clock cycles, yet the core functions of the Bluetooth stack must not be disrupted. This might necessitate very high clock rates and/or extra memory to buffer calculations while the RISC processor services Bluetooth.

Example designs will rarely provide 100% of the application firmware, and even if they do, OEMs will usually modify it to add value and differentiate their products. In the end, all Bluetooth products must go through qualification and rigorous in-house testing, and a bug-free design remains the responsibility of the OEM's product development team. This is hard enough without having to worry about second-order interactions between Bluetooth software and power-hungry audio processing routines.

continued →

DSP coprocessor

Now consider the alternative. The RISC core continues to manage the Bluetooth stack, plus the high level application requirements - which are broadly similar for many applications. In the case of the AV profile or audio processing, the DSP coprocessor runs the application code such as echo and noise cancellation, and/or music file encoding/decoding (and perhaps voice recognition as well). The RISC core - and with it the Bluetooth stack - remains virtually untouched as most application firmware runs on a separate core. So, the device can continue to clock at a power-saving low frequency. In the case of

BlueCore3-Multimedia, the DSP is 24 bits wide, an optimised choice size to handle current and projected Bluetooth audio processing requirements. Using single cycle MACs, the DSP core can also run at a low frequency (12MHz when decoding MP3s for example). This equates to substantial power consumption savings in products. An all-RISC system might have to clock at up to 60MHz to achieve the same result.

It's also worth pointing out that the processor cores in BlueCore3-Multimedia: the XAP RISC processor, and the Kalimba DSP core (which CSR designed), are both license free. There's nothing wrong with using a third party core, but it must

be recognised that Bluetooth is a mass volume business and costs will steadily decline. The correct technical and commercial architecture for Bluetooth application segments, positions both the silicon vendor and its OEM user communities well for continued cost reduction progressions and long term support.

David Hargreaves is a digital design engineer, and Luke D'Arcy is a product marketing manager, with CSR in Cambridge, UK. They can be contacted via: david.hargreaves@csr.com, luke.d'arcy@csr.com

Sponsored contribution

Korean phone designer Bellwave selects BlueCore

Bellwave Co. Ltd., the Korean mobile phone and data module design company, has selected CSR's BlueCore silicon for a new Bluetooth enabled GPRS handset design. Bellwave is supplying its i100TM handset design to one of the largest electronics groups in China, which plans to promote the i100 GPRS handset to the international market, as well as the rapidly expanding Chinese mobile phone market.

In addition to high-speed GPRS, Bellwave's

i100 mobile phone design offers a built-in VGA camera and imaging software; Windows style full colour graphical user interface; Java for downloading new games and applications; WAP and MMS. CSR's BlueCore silicon was selected by Bellwave to enable Bluetooth wireless connectivity between the i100 and a Bluetooth headset or for synchronisation with a Bluetooth enabled PC.

Jeffrey Kang, Bellwave's COO, commented, "The Chinese market is demanding mobile

phones with more than just the basic features - consumers are asking for features such as GPRS for access to high-speed data services and Bluetooth for local wireless connectivity. Kang continued, "Our turnkey handset designs are intended to enable high-volume low cost production. CSR helps us maintain our competitive edge with its BlueCore Bluetooth technology by boosting the functionality of our designs, and without pushing costs beyond the reach of our customers."

North American automotive Bluetooth no longer hampered by lack of devices In 2004 - ABI

Despite growing automotive commitment to Bluetooth, efforts have been significantly impaired by a deficit of Bluetooth-enabled mobile handsets, according to a recent study by technology research firm ABI.

This current lack of compatible handsets is directly attributed to the fact that all current North American Bluetooth handsets operate over GSM/GPRS networks. Because of the lack of satisfactory GSM/GPRS coverage in the region, the adoption of Bluetooth handsets has been hampered. Automakers have also been negatively affected because telephony is the current mainstay for Bluetooth in the vehicle.

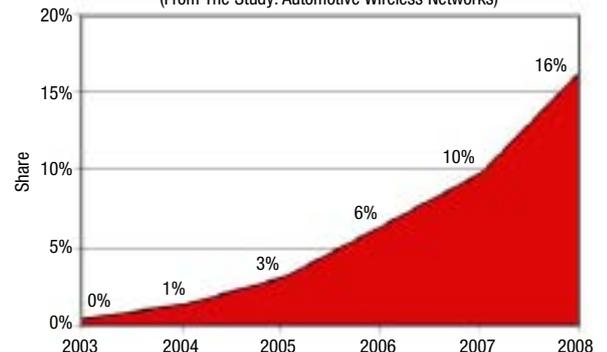
While awareness and support of the Bluetooth protocol continues to climb in other devices such as desktop computers, PDAs, and headsets, adoption in mobile handsets is still

falling by the wayside. ABI has maintained that a lack of CDMA Bluetooth-enabled handsets will continue to undermine Bluetooth's adoption in the automobile until handset manufacturers and wireless carriers can make a serious commitment to support the protocol.

By the first half of 2004, ABI expects that nearly one third of the mobile handset models available in North America will support Bluetooth. This will represent more than twice the amount available during the same period in 2003. Coupled with newly announced Bluetooth commitments by OEMs such as Acura, Audi, Lexus, Lincoln, Maybach, and Toyota, the use of Bluetooth in automotive applications should experience a

significant turning point in in 2004. According to the ABI study, nearly one fifth of the world's vehicles produced in 2008 will feature OEM-installed Bluetooth hardware.

Share of New Vehicles with Factory-Fitted Bluetooth Hardware.
World: 2003-2008
Source: ABI Research
(From The Study: Automotive Wireless Networks)



CTP - an idea whose time has come

by Steve Pearce, Mezoe (CCL)

The remarkable status of mobile handsets as 'must-have' fashion accessories, has made the fixed line telephone business look as if it's been standing still in the last few years. Now, a new concept that allows mobile handsets to be used to receive and make fixed-line calls, appears to be about to inject fresh life into the market.

This '3-in-1' communications capability allows you to make calls as:

- Cellular-to-mobile network, when you're 'out and about'
- Bluetooth-to-fixed-network, when at home or in the office
- Bluetooth-to-local-handset, for 'intercom' calls

I say a 'new' concept, but of course it's not. The Cordless Telephony Profile (CTP) was one of the first profiles to be specified and developed by the Bluetooth community. And, the idea had been floating around the industry for a long time before that, attached to standards like DECT. What's brought it to the fore now is not just the recent move by a major telco to launch the concept, but the cost reduction progress of Bluetooth silicon. Single chip solutions such as CSR's BlueCore - now available with on-chip peripherals such as voice codecs - have brought the BOM of a cordless phone implementation to the kind of level that is highly attractive, and unmatched by other current technologies. Comparing BOM estimates for a typical domestic cordless handset-plus-base station pair shows that Bluetooth is a highly attractive solution:

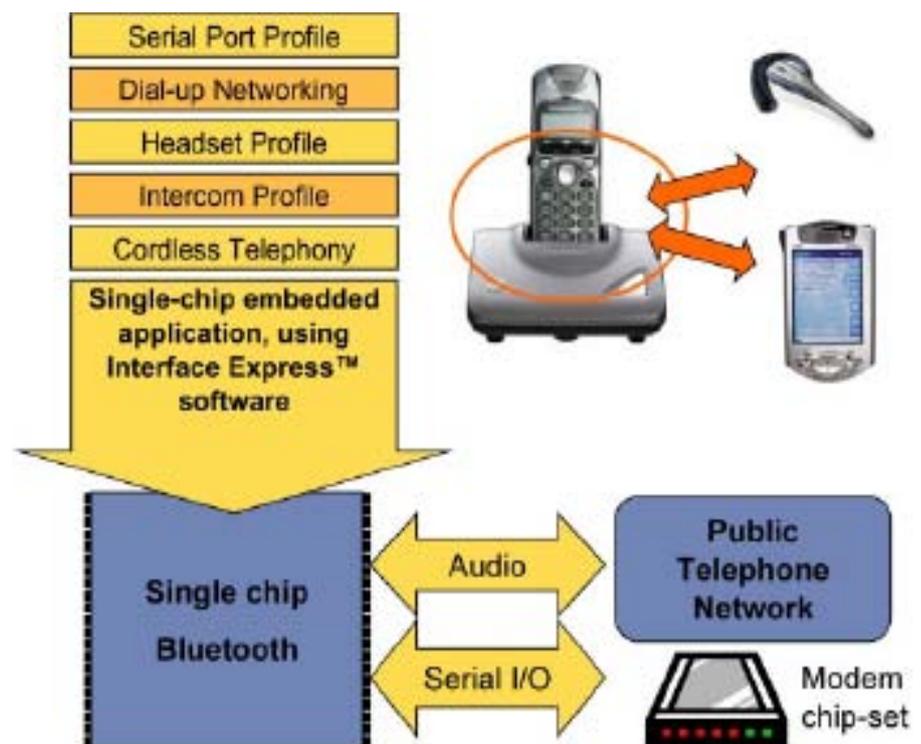
Suitability

Cost is only one element of suitability, however. How well does Bluetooth stack up when measured against other parameters?

The range capability is not spectacular but certainly adequate. In terms of audio quality, it's beaten by DECT, but on a par with digital spread-spectrum communication schemes. There's been criticism of Bluetooth audio quality, but it's pretty good already - better than GSM certainly - and the v1.2 spec introduces more robust error-corrected packet types that push quality even higher.

In terms of functionality, the relevant CTP and Intercom Profiles provide a comprehensive suite of call control and connection management features and services as well as the all-important security features. The current Bluetooth specification can also be used to provide 'value-added' services over fixed-line cordless telephones, such as Caller-ID and SMS.

Where it really scores though is on power consumption. In power save mode, waiting for an incoming call, CSR's BlueCore chip, for example, consumes just 1mW. The very best GSM phones require 2-5mW for example, and our survey of



Technology	Frequency	Audio quality	Range	BOM (\$)
Analog	46-49, & 900MHz	Poor	Poor	30
Digital spread-spectrum	900MHz, & 2.4/5.8GHz	OK	OK	40
DECT	2.4GHz	Good	Good	40
Bluetooth	2.4GHz	OK	OK	25

Bluetooth offers much richer functionality for the home communications point market

chipsets for other personal-area wireless standards (DECT and 802.11a, b, g) shows levels starting at 80mW and spiralling up to nearly 2W. Along with BOM, this parameter is absolutely crucial, as a 3-in-1 phone will effectively be a constant always-on companion.

continued →

Product potential

So, pushing the argument forward - just what phone products can be achieved with Bluetooth? 3-in-1 functionality is easy; as existing Bluetooth equipped mobiles only need the addition of software and possibly also some minor additional voice routing circuitry - a fairly modest design iteration.

Also technically feasible is the idea of using Bluetooth to act as a cellular connection when in range, running GSM protocols over a Bluetooth link to a base station; this would be ideal for the emerging pico-base station coverage scenarios. As this is not currently specified by the Bluetooth SIG, building such an architecture would not be without problems but would give some very interesting advantages in terms of coverage, quality, cost, and 1-handset/1-number capability.

Roaming between base stations (hand-over capability), even though it's not part of the current Bluetooth specification, is a real possibility for commercial CTP-based solutions,

as proven proprietary solutions are already available.

The figure shows that low cost hardware and ready-made software solutions could be used to implement a very attractive home cordless telephone product. Not only would it cost less than a DECT phone, but also it would do a great deal more, offering dial-up network access and use with a Bluetooth headset. Plus, a simple and very low cost handset implemented on a single chip equipped with Intercom and CTP Profiles is all that's required for additional home handsets.

The Mezo Interface Express Bluetooth software already offers all the fundamental features required for any of the added-value variants outlined. It is also possible to deliver these feature rich solutions, as 'host-less' single-chip solutions, through the combined services of Mezo's parent Cambridge Consultants - which was selected by CSR as its partner for delivering custom on-chip BlueCore projects.

This article draws on a presentation at Bluetooth Americas. For more information, contact the author:

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BT launches wireless "office in an hour"

UK provider BT has launched "Office in an Hour" to make it easier for firms using more than one PC to link them together by setting up an office network within 60 minutes. BT research among firms with up to 50 employees showed that one in eight (13 per cent) use more than one PC that are not linked together.

The new system will enable firms to share files and peripherals, such as printers and broadband internet access, between PCs without needing expensive systems, technical know-how or complicated cabling.

Office in an Hour creates a wireless network within the office, so PCs can easily communicate with each other without having to be physically joined together. BT says that as no cabling is required, it is quick, easy and inexpensive to set up a network for up to 10 PCs.

Mick Hegarty, ICT general manager, BT Business, said: "Until now, many firms have been put off building an office network because it has been expensive, time-consuming and

technically difficult. Office in an Hour solves all these problems in one fell swoop. Colleagues wishing to share files and printers will no longer have to pass their documents to and fro on floppy disks.

Everything needed to set up Office in an Hour comes in a single box, complete with a step-by-step installation guide and free help desk technical support. According to BT's press materials, once it is set up there are no ongoing maintenance costs and it is easy to add new users if the business expands. If the firm relocates, the whole system can simply be unplugged and reinstalled in the new premises.

The BT Office in an Hour - Wireless Network package costs £399.99 (ex. VAT) and includes wireless connections for four laptop or desktop PCs (additional laptop or desktop PCs can be added to the network for an additional £39.99 (ex. VAT) each); a broadband modem to enable the network to connect to a fast internet connection, installation CD; quick start and user guides and freephone help desk support details.

This all sounds remarkably simple. But - this

is networking and this is a BT package. Either of these on its own can be hard to work with. Put them together and, to use the well-worn phrase - caveat emptor!

Silicon Wave SiW3000 single chip solution 1.2 qualified

Silicon Wave's SiW3000 UltimateBlue single-chip and HCI software solution has received certification for the recently released Version 1.2 of the Bluetooth Specification. The SiW3000 IC is in volume production today and is available exclusively from RF Micro Devices, Silicon Wave's global channel partner for its CMOS single-chip radio processor and stand-alone radio modem Bluetooth solutions.

"Version 1.2 of the Bluetooth Specification was created to give consumers a more reliable and robust user experience," said Mike Yin, director of Bluetooth marketing for Silicon Wave. "Our customers can immediately take advantage of the newest Bluetooth feature-set by using the SiW3000 single-chip in their designs."

The SiW3000 UltimateBlue single-chip on a low cost 0.18-micron CMOS process combines a direct

conversion radio modem with an ARM7TDMI processor core, Bluetooth baseband logic, and complete protocol software in ROM. All active RF components have been integrated. The radio processor's baseband delivers the extra MIPS needed for embedded applications and enables full scatternet support without performance degradation.

Impulsoft launches Bluetooth stereo kit for automotive market

Impulsoft recently announced the launch of iWIND - Impulsoft Wireless Stereo Kit for Automotive applications. This solution provides support for both stereo and voice applications, making it easy for automotive customers to integrate Bluetooth into their telematics platform.

Impulsoft Private Limited is a short-range wireless solutions company, headquartered in Bangalore India with a branch office in California. According to the company's press statement, iWIND addresses the increasingly demanding needs of the automotive market to add wireless entertainment capability to the telematics

platform. It includes a hardware reference design and software components for adding Bluetooth stereo and voice capability to automotive applications. iWIND features enhanced versions of Impulsoft's reference designs for stereo adapter (iWISA) and headphone (iWISH). Some of the key enhancements include the Remote Control feature, and user-selectable multi-channel transmission and reception in iWISH and iWISA. Additionally, iWIND supports handsfree and headset profiles, making it simpler for automotive OEM customers to migrate existing voice-only Bluetooth solutions to a platform with voice and stereo capability. iWIND also provides optional echo and noise

cancellation software to deliver superior quality audio for the automotive environment.

Some of the applications that iWIND wireless enables include rear seat entertainment, streaming music from personal jukebox to the car's telematics platform, multi-channel transmission and reception, and handsfree cellular telephony.

"Impulsoft is working with multiple automotive customers to deliver solutions that address the demanding needs of the automotive market," said K. Srikrishna, Chief Executive Officer of Impulsoft. "Customers are looking at innovative applications, and this requires a comprehensive Bluetooth solution with support for both voice and stereo."

Texas Instruments does 1.2 too

Texas Instruments Incorporated (TI) has announced its second-generation, single-chip Bluetooth solution, the BRF6150 which provides full support for Bluetooth specification version 1.2. TI also claims that its power management expertise delivers the industry's first Bluetooth solution with direct connection to the battery and power shut-down mode. This minimizes power consumption and simplifies Bluetooth integration into the device.

TI further claims that the BRF6150 chip delivers the industry's lowest active mode power consumption. With 12mA for voice link, the chip is

said to consume 30 percent less power than TI's closest competitor. The BRF6150's shut-down mode reduces power consumption further by powering down the chip to 6uA when it is not in use. In addition, the chip's direct connection to all available battery types eliminates the need for external voltage regulators, reducing integration requirements for mobile device manufacturers. The solution requires only 11 external components, which significantly eases electronic device design complexity.

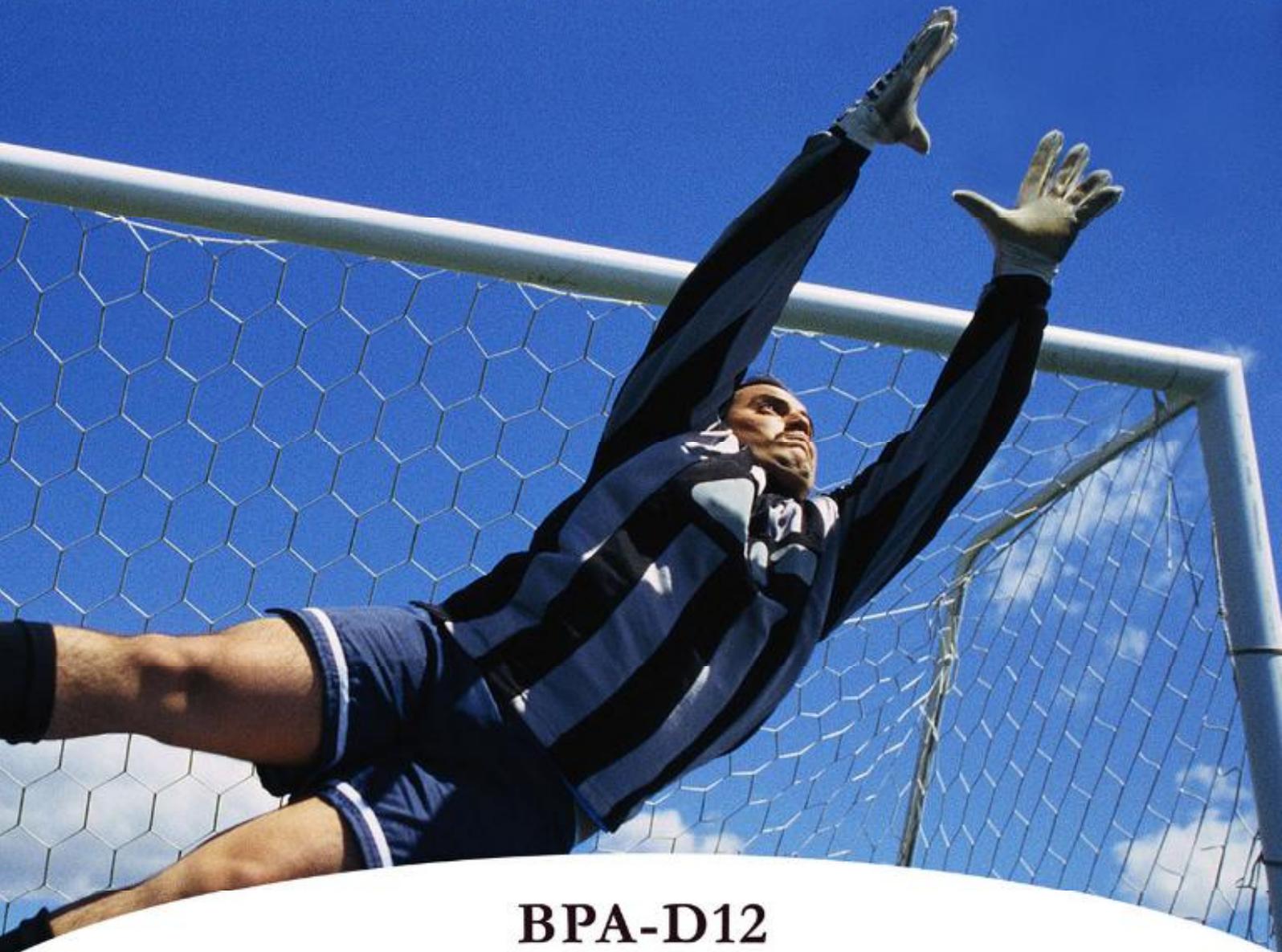
And if coexistence is required, TI says that its solution for collocated Bluetooth and Wi-Fi, tailored for mobile terminals, is the only coexistence

solution shipping today in commercial products. The BRF6150, which utilizes AFH and eSCO, offers an upgrade to the current coexistence solution.

"Our solution is ideal for the wireless device market, offering the industry's lowest power consumption and most comprehensive and effective solution for Bluetooth/Wi-Fi interference issues," said Ari Rauch, general manager of TI's Short Distance Wireless Group.

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Artimi says - make way, UWB is coming, and soon!

After five years of covering the Wireless Personal Area Network (WPAN) and short-range wireless industry, and focusing on Bluetooth technology in particular, Incisor has inevitably become rather RF-centric. As part of our expanded editorial coverage we have already started to explore new wireless worlds, including the alternative universe known as Ultra Wide Band (UWB).

This is a whole new ballpark, or can of worms, depending on your outlook.

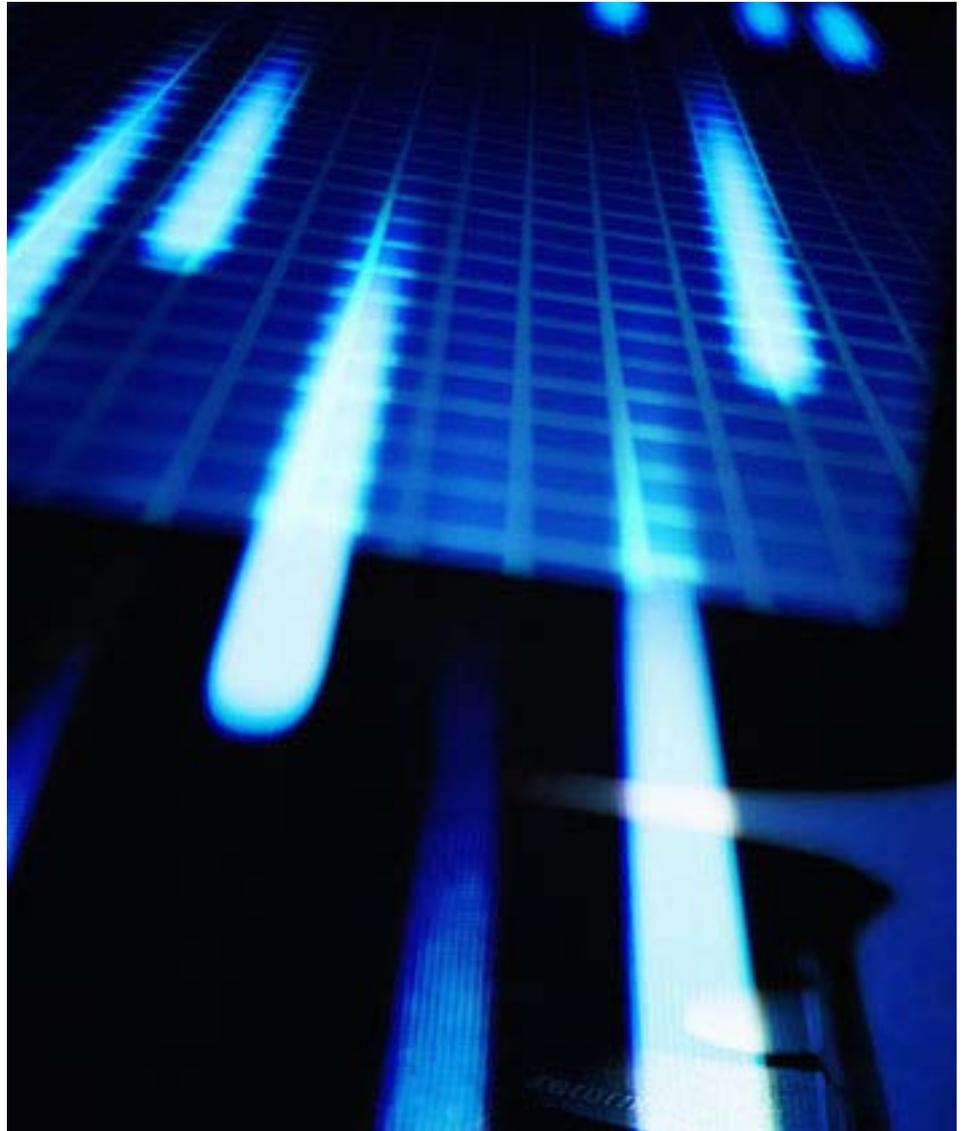
Why is this so different? Well, UWB does not use an RF carrier, but instead it is a method of sending information using high frequency low energy pulses. Its protagonists claim that UWB has the potential of orders of magnitude and greater spatial capacity compared to other current or emerging technologies, allowing much faster and denser wireless networks. What is more, whilst fears rumble on of an impending crunch in RF spectrum availability that will impede the evolution and proliferation of wireless technologies, UWB is said to open up a vast new spectrum.

After reporting the UWB views of primarily Bluetooth-aligned industry Svengalies, we thought it time to look out from inside UWB, and not vice versa, and so we spoke to Artimi, one of the UWB industry's trailblazers

Based in the UK's silicon heartland of Cambridge, Artimi Ltd was formed in 2002 and is a fabless semiconductor company developing all CMOS design silicon solutions for high bandwidth wireless connectivity based on UWB technology. It's mission statement says that its solutions provide high data rate, low power consumption and low cost silicon solutions for ubiquitous Wireless Local Area Network (WLAN) and WPAN applications.

Artimi claims that its real advantage is in the tight internal design and proprietary advanced signal processing of its solutions. In essence, the same chip can be used in low-power location and beacon applications as well as for higher performance network data applications.

We caught up with commercial director Richard Delabarca and VP of sales and Marketing Tom Cooper while the two were on a



US-tour of venture capitalists. After its over-subscribed initial funding, Artimi closed a further private investor round in October 2003 and is now about to finalise the third round, when not less than US\$17 million of new investment is forecast. Investor confidence in UWB, then, seems strong.

We kicked-off our conversation by asking Artimi how they would respond to one comment that UWB was nothing but 'an interesting research project'?

Cooper was quick to rebuff this suggestion. "The GSM guys said that about Bluetooth, and

look where that is now. There is a place for every technology, and sooner or later each will have its day. It is also important to bear in mind that times are changing. This is an increasingly wireless aware and knowledgeable world. The time taken to go from a new trend to earning revenue is much shorter than it used to be." Introducing a note of mild irony, Cooper also highlighted another important, if subtle trend. "Technologies have often evolved, and then gone looking for a market. UWB is different, in that it immediately provides useful features for a market that exists today."

Even within the minds of those people that know the wireless industry well, there remains uncertainty about which technologies will ultimately best serve what market sector. In order to best understand UWB's pitch, we asked Richard Delabarca to give his view on where UWB sits.

"One important point to remember is that any of the short-range RF technologies can run on top of UWB. Bluetooth, for example, which we consider to have been launched with modest performance expectations. You could consider UWB as Bluetooth on steroids." We asked Delabarca to be specific about UWB's main intended function. "While there are many different options for delivering data wirelessly, most deal with relatively low-rate transfer. UWB is intended to service the needs of the high volume content delivery market. It is about wirelessly delivering large amounts of data – voice, images and video for example – between content delivery devices over short distances, in other words within a room. We are talking about a PC to DVD link, TV to DVD, or stereo sound to speakers. In this scenario, 5-10 metres is ample, and this is what we are concentrating on. In this environment, UWB has all of the performance that is needed, and is robust, reliable and variable."

But other wireless technologies can do this. Even slow old Bluetooth is being developed for voice and stereo sound, surely? "Bluetooth is great at delivering certain types of content at a certain range, and has great Quality of Service (QoS)," said Cooper. "UWB does that, but has the performance to make voice and particularly video transfer a reality. You must remember that in the world of voice communication, if a communication link degrades or is slow, the brain will cope – there is a 'better late than never' philosophy. Video content delivery doesn't suffer this degraded delivery at all well. In this case it is 'better never than late'."

We mentioned near the beginning of this interview that Artimi is one of the UWB industry's trailblazers, and plans to be amongst the first to ship product. "With its acquisition of Extreme Spectrum, Motorola is already out there, but with a four chip solution. Artimi, on the other hand, will ship a single chip UWB solution by Q4 this year," said Cooper. "This will be a 500Mbps product. We estimate that the rest of the industry will take until Q2/Q3 2005 to get to this stage."

Which all sounds very impressive. Yet

questions remain, including cost (and cost-competitiveness with other wireless options) and standards? On the former, Delabarca was bullish. "While pricing has not been finalised, we know our targets and as a benchmark, expect to be competitive with Bluetooth." It is fair to say that Incisor's eyebrows rose at this point ...

All of this still leaves the thorny issue of standards, or rather, lack of them. We have documented in detail in previous issues (and again in this issue) the current battle between the Motorola-led bi-phasic modulation camp and the Intel/Ti-driven OFDM alternative UWB flavour, the latter seeming to enjoy the tacit support of the IEEE. How would Artimi cope, planning to ship early product and with two potential technology options to pursue?

"We feel that in the short term, the dual-standard compromise proposal that is on the table will probably be the way forward, and in truth we are not troubled by this issue as we can support whichever solution we need. That is as likely to be driven by market forces as it is by standardisation," said Cooper. "You should understand that there is strong pull today from the manufacturers of consumer electronics products, and the automotive and industrial industries, and that these companies do not wish to wait while standards issues are resolved. This being so, it is inevitable that pre-standard, semi-proprietary products will be launched to satisfy that demand – dongles, connectors etc."

So it seems that UWB will become a market product sooner than some of the vendors of silicon and connectivity products using alternative – RF-based – wireless solutions might wish to be the case.

Even if it happens in a rather less orderly fashion than a standards - driven industry, and the standards organisations themselves may wish. What an interesting prospect!

Texas Instruments offers royalty-free licenses for UWB

Incisor has reported previously, and elsewhere in this issue, on the current split that is dividing the UWB camp. The rival groups are headed by Motorola on one side, which favours bi-phasic pulse modulation and a Intel and TI on the other. The latter companies favour orthogonal frequency division modulation (OFDM). Of the two modulation alternatives, OFDM is currently enjoying most support, including from the IEEE.

Now, and in what is described as an effort to ensure rapid adoption of UWB technology in wireless personal area network (WPAN) applications, TI has announced its plans to offer royalty-free licenses under TI essential patents directed toward the IEEE 802.15.3a standard, pending ratification of the MultiBand OFDM

Alliance's (MBOA) proposal as the new IEEE 802.15.3a standard for high speed WPANs. This may well serve UWB generally, but it obviously also furthers the TI/Intel OFDM cause in particular.

TI is a member of the MBOA, and considers that its royalty-free offering will enable consumer electronic and PC manufacturers to quickly deliver a variety of high performance, interoperable wireless applications, such as streaming video from set top boxes to HDTVs.

"TI hopes to promote rapid industry adoption by offering royalty-free WPAN technology to the IEEE 802.15.3a standardization effort, since our technology will be crucial in enabling high-performance WPAN applications," said Yoram Solomon, general manager of TI's consumer

networking business unit. "This offering is an effort to remove potential barriers to commercial adoption of this technology. Ensuring interoperability and having multiple silicon sources will help assure market growth of UWB technology."

End users are expected to benefit from the deployment of high-rate TI-based UWB products as soon as early 2005.

Sadly, none of this effort is likely to be enough to stop various contenders from producing proprietary or semi-proprietary UWB products. And everyone knows how such actions can hamstring a technology, and make its genesis that much more painful, and prolonged.

"Ultra-Wideband (UWB) market primed for strong growth" - report

Finalization of the 802.15.3a standards process is critical to driving mass-market adoption of UWB; according to a new report from Parks Associates, which goes on to predict that PC, mobile CE, and fixed CE applications will drive growth.

Parks Associates' report Personal Area Connectivity Solutions: The Next Generation predicts that ultra-wideband (UWB) communications systems, which enable short-range and very robust wireless connectivity between devices, will propagate within the

next five years.

According to this report, the total addressable market (TAM) for this connectivity solution will exceed 100 million devices annually by the end of 2008.

The report also warns that uncertainties about the finalization of the IEEE 802.15.3a standard may slow this market at the outset. However, once the standard is in place, the PC industry will likely lead the way with large deployments of UWB-enabled PCs and peripheral interconnect solutions, followed by the mobile CE space (digital cameras

and music players) and the fixed CE segment (HDTVs, projectors, and A/V receivers).

"The adoption of a widely accepted industry standard such as 802.15.3a is essential in matching UWB's market reality to its very high expectations," said Kurt Scherf, vice president of research at Parks Associates. "A universal standard is particularly critical among larger CE and PC vendors, who are seeking a wireless solution that meets their needs across platforms and requirements. We believe that UWB could very well be that unifying communications technology."

Intel moves back from 802.11a

Intel has introduced a raft of new WLAN products - the Intel PRO/Wireless 2200BG network connection, enabling both 802.11b and 802.11g wireless networking capabilities, seemingly indicating a move to abandon its earlier push for the 802.11a standard.

According to Intel's announcement, the technology delivers a new level of wireless network performance for notebook PCs based on Centrino mobile technology. The Intel PRO/Wireless 2200BG is software upgradeable, allowing it to support future security and other service enhancements. The PRO/Wireless

2200BG consists of a communications and radio chip.

A number of major notebook manufacturers including Toshiba, Sony and Fujitsu are thought to be launching new notebooks based on PRO/Wireless 2200BG Centrinos in the next few weeks.

BT and McDonalds put BT Openzone Wi-Fi hotspots on the menu

But will the concept be flame-grilled? Following on from Incisor's report of a US roll-out two issues ago, UK operator BT has announced what it describes as a huge boost to its campaign to bring public Wi-Fi to every community in the UK by installing BT Openzone access points in more than 500 McDonald's restaurants in the next few months.

The two companies have teamed up to offer millions of diners who visit McDonald's restaurants the ability to log on to the internet using wireless broadband, via their WiFi-enabled laptop or PDA, as they grab a bite to eat. Cynics, however, remain unconvinced, as we see below.

The BT Openzone access points will be installed in McDonald's flagship and drive-thru restaurants by the end of March, taking the total number of BT Openzone live sites to more than 2,000.

The majority of the McDonald's sites will be in drive-thru restaurants, which are popular with business travellers. BT already has an extensive network of BT Openzone hotspots at premium locations targeted at the business traveller, such as

airports, railway stations and hotels.

Steve Andrews, BT's managing director for products and enterprises, said: "The scale of BT's network means that wireless broadband is growing from a premium offering for the few into something that will become part of everyone's lives, whether that's for work, or for simply surfing the web or emailing friends as a pay-as-you-go customer.

BT Openzone access points will be installed in refurbished flagship London restaurants in The Strand, Oxford Street and Liverpool Street station and rolled out in most drive-thrus across the country. McDonald's wants to offer this exciting new service to customers who want to eat and stay connected while working on the move.

Peter Richards, chief development officer, McDonald's, said: "Today's customer is more time-pressed than ever and we think it's important to meet the needs of busy professional and family lifestyles by offering services that are both easy to use and relevant. We want the Golden Arches to be the first choice for a great meal and a place to go 'wireless'.

McDonald's already has Wi-Fi agreements covering around

400 restaurants in New York, San Francisco, Chicago and Philadelphia in the United States.

For all that this is an interesting development, BT should be aware that cynicism over the placement of Wi-Fi hotspots in fast food outlets remains high, and a recent report seems to provide ammunition for the doubters. The study from Jupiter Research found that while 70 percent of online consumers were aware of WiFi hotspots availability in public spaces, only 6 percent of consumers have used them. Starbucks has reported that of the 22 million customers who visit Starbucks outlets in North America in a typical week, only 25,000 were taking advantage of WiFi availability in the stores. With so few people using hotspots, profits are hard to come by. John Yunker of Pyramid Research says: "I do believe there is money to be made but (not) as a stand-alone service. The major carriers, both fixed and wireless, will be the ones who benefit," he said.

It remains to be seen whether British burger junkies will disprove this apparent level of Wi-Fi hotspot disinterest amongst road-warriors.

Hotspot installations sizzle, yet user response is cool

In-Stat/MDR has found that, while hotspot venue growth has outpaced earlier expectations, there are still troubling issues surrounding low usage rates. According to the research firm, over the past several years, hotspot venue availability has increased extraordinarily. Worldwide locations have grown from a few hundred locations worldwide in 2000 to 40,000 locations in 2003, according to In-Stat/MDR.

Yet, despite these successes in venue growth and the elevated awareness due to media coverage, usage of hotspots continues to lag. In-Stat/MDR discovered concerning usage trends in a study conducted of potential business users. The survey explored usage trends for Visitor Based Networks (VBNs), which includes both wired (such as a hotel guestroom broadband connection) and wireless (i.e. hotspot) public access service. While results showed that slightly over half of the respondents had used a VBN, it was found that the occasions of use were, on average, infrequent. In all venues, except hotels, the majority of respondents indicated only using hotspots less than 6 times per year and the average monthly VBN expenditure among users was only \$12.10.

Other In-Stat/MDR findings include:

- 62 percent of VBN-using respondents indicated that availability of broadband would influence their choice of venues to visit, but over half of those respondents indicated that it would only affect their choice if access were free.
- Incidence of usage was higher among those respondents that travel away from their hometowns than among those that are mobile within their home city (i.e. visiting client, partners, etc.).
- 93 percent of respondents that use a VBN while traveling generally carry a laptop, and 60 percent of those that generally carry a laptop have WLAN-access capabilities.
- The majority of VBN users (71 percent) process the cost of access through their company.

Incisor comment:

We know that if you look at the numbers for hardware and infrastructure sales a positive and optimistic outlook is permissible. In-Stat/MDR reports that WiFi hardware shipments more than tripled in 2003 to 22.7 million network interface card (NICs) and access point units, up from 7.2 million in 2002, revenues rose 140 percent to \$1.7 billion in 2003 from 2002's

revenue figure of \$700 million and the forecast is that WiFi sales will reach \$40 million in 2006.

As reported above, a recent Jupiter Research study found that while 70 percent of online consumers were aware of WiFi hotspots availability in public spaces, only 6 percent of consumers have used them. It isn't hard to see that despite the optimism, with so few people using hotspots, profits are hard to come by.

This is not the first time that a technology has been pushed onto the market without a clearly defined business case and reasonable evidence of consumer demand. At this time, there is little indication that the business user or private individual wants to be able to access online services while chilling over a cappuccino, or while on a burger binge. Where is the pull to match the industry push?

How long the impressive growth in the spread of hotspots can continue remains to be seen. After all, any reduction in the ambitious programme would mean that the industry's pockets were not filled as quickly, and some people's future would not be as bright.

And that wouldn't do, would it, when the tech sector is enjoying resurgence?

Wavesat and Atmel join forces to attack the WiMAX market

Canadian fabless semiconductor company Wavesat Inc., which develops Orthogonal Frequency Division Multiplexing (OFDM) Broadband Wireless Access (BWA) modem silicon, will work with Atmel's SiliconCITY capability to design and manufacture WiMAX compliant IEEE-802.16d chips. Wavesat is a principle member of the WiMAX Forum and has been working on this new OFDM modem technology since 1997. Apparently, more than a dozen system-makers are using

Wavesat's development kits to design next-generation BWA systems.

While Wi-Fi is now the international standard for home and office wireless networking, industry observers believe that WiMAX, or 802.16 technology, can have an equal or greater impact on the future of data transmission. With a range of up to 30 miles and data rates up to 70Mbps, WiMAX is expected to help bring broadband access to rural areas and developing countries where it isn't economical to deploy

traditional last-mile connections. In a recent early test, Intel has reported that a WiMAX antenna on top of Intel's corporate headquarters in Santa Clara, California was able to receive a 7 megabit data signal from the hills above Silicon Valley, more than 20 kilometres away.

Wavesat and Atmel will have the DM256 chip available in Q2 2004.

Europe grows WiFi faster than North America

Established wireline and wireless network providers will be among the big beneficiaries of the \$163 billion to be spent worldwide over the next five years on WiFi services and equipment, according to a new market research study from Insight Research Corporation.

Insight Research's analysis of the WiFi industry, WiFi in North America and Europe: Telecommunications' Future 2003-2008, suggests that wireless LAN technology —

increasingly popping up in public spaces such as airports and cafés, in private residences, and in businesses — will grow faster in Europe than North America. Worldwide WiFi revenues are expected to grow from \$7 billion in 2003 to over \$44 billion by 2008, at a compounded annual rate of 44 percent.

"Some analysts believe that broadband access is driving the adoption of WiFi, while others contend that WiFi is driving broadband," says Robert Rosenberg, Insight research president.

"Our analysis suggests that they drive each other in a complementary way — creating greater demand for broadband services across the board. We expect growth of European WiFi services to surpass North American service revenue well before the end of our forecast period," Rosenberg explains.

Wi-Fi jumps on board the TGV

SNCF, France's national rail operator, wants to harness Wi-Fi technology for the benefit of its customers — and it is doing so with Clic TGV, a transport/telecoms venture backed by a dozen high-tech players and specialist content providers. The new service enables customers to access a range of information and entertainment programmes broadcast on a Wi-Fi network during their high-speed rail trip. Clic TGV has been successfully tested and deployed since mid-November 2003 (for an initial six months) on SNCF high-speed trains along the Paris-Bordeaux-Pau line (which goes all the way to the Spanish border in the South-West).

Wi-Fi-equipped personal computers will be available for hire from departure stations at the Cintrains stand. For passengers with a portable computer equipped with Wi-Fi and headphones, the Clic TGV service is free of charge. An access code enables users to connect to the service. For those who need to hire the equipment, charges are low — €8 to hire a portable computer equipped with Wi-Fi and headphones, and €3 for headphones alone. The experimental phase should confirm the operating principle of Wi-Fi on board Trains Grande Vitesse (TGV, or high-speed trains) that travel at 300kmph, and the technological linkage in place between the ground and the train. Depending on the results

of a customer study, Clic TGV is expected to be extended to other lines in the near future.



For those who don't regard a train journey as a blissful escape from the connected world ...

Philips and Visa showcase contactless payment and connectivity at CES

Royal Philips Electronics and Visa International have joined forces to show how the latest contactless technology can change the way digital content and services are distributed, paid for and accessed by today's universally connected consumer.

Following the announcement of an alliance between the two companies in May last year, Philips and Visa International have been exploring the market by proposing demos and concepts across different industries - including communications, consumer electronics, computing and digital content providers. The two organizations showcased proofs of concept at the Consumer Electronics Show (CES) in Las Vegas that demonstrated the power of breakthrough technologies, such as Philips' Near Field Communication (NFC) technology and Visa's Verified by Visa, an authentication service based on the industry standard 3-D Secure. This enables Visa cardholders to safely shop online using a unique password.

"Each of Visa's regions evolves differently reflecting unique local operating environments and market demands. Visa International is fully committed to providing secure payment options that are tailored to the changing needs of our member financial institutions, merchants and the evolving lifestyles of their customers," said Gaylon Howe, executive vice president, Consumer Product Platforms, Visa International.

"As we move into the roll-out phase of NFC technology, we are proud to present showcases which represent the first step in providing people with secure access to attractive content using their mobile devices as the central element," said Scott McGregor, president and chief executive officer, Philips Semiconductors.

The two organizations showed proofs of concept at CES, highlighting the unique value derived from combining the latest consumer electronics, wireless connectivity and secure, universal payment. In one scenario, music lovers could download the right to listen to a song to their PDA or their Visa payment card either by



holding the PDA near a smart poster of their favourite Universal Music pop star or by holding their contactless Visa card near a store kiosk selling songs. The smart poster contained an embedded microchip that sent the information to the PDA using Philips' Near Field Communications (NFC) technology. Payment was easy and secure using the Verified by Visa solution and the song rights could then be stored utilizing Visa Smart Secure Storage (VS3). The kiosk was enabled with RFID technology to capture payment information from the card and transfer the rights to be stored in VS3. In both

cases to hear the song, the user simply transferred the song rights to a Philips Streamium Internet radio using NFC, and the song was then played over the Internet. Other scenarios demonstrated ticketing and travel applications.

Having demonstrated the technical concept of these applications, Philips and Visa International will continue to assess market demand, and develop stakeholder business cases that reflect the deployment opportunities and challenges within various global markets.

“Single chip ZigBee solutions will catalyse RF revolution in home and industrial market” - CCL

The low cost and power attributes of the ZigBee radio standard will vastly increase the wireless market, and 2004 will be the critical design-in year predicts product development consultancy Cambridge Consultants Ltd (CCL). The view onto the future also forecasts that home and industrial automation applications in particular will benefit, and pioneering ZigBee-enabled products should start to appear before the year's end.

However, CCL expects design trends to follow a similar path to the Bluetooth market, which only started to take off with the arrival of single-chip solutions integrating both the radio and the application-specific control functions. The conditions are now right for this silicon design phase using ZigBee, but industry leaders must initiate design cycles soon if they want products on the shelf for the critical high-growth market phases starting in 2005.

"Mass volume shipments will only start to build when OEMs are able to deliver products

based on single chips," says Nick Horne, manager of CCL's radio communications products business unit. "The system-on-chip approach allows complete ZigBee nodes to be built for around two dollars - a fraction of competing radio technologies - and a cost threshold that will radically change product design concepts."

ZigBee offers a particularly cost-effective approach to wireless-enabling products because the radio has been designed specifically to be small in silicon area, and very efficient on software code space. The standard also offers mesh networking, delivering longer-range communication without the expense of power amplifiers, and supports a very large number of nodes. Combined with the lean control system, says CCL, these attributes allow ZigBee to implement wireless communications in a form that meets the demanding requirements of home and industrial automation OEMs.

The first commercial ZigBee silicon products

are highly likely to be applied to general-purpose radio-centric devices, and application-specific variants will only start to appear once market demand is proven. Moving straight to an ASIC solution has the potential to cut as much as a year off the normal timescales necessary to achieve the optimum cost-effective ZigBee nodes.

Chip design cycles might normally require around 12 months, but this timescale can be halved if the vendor has ZigBee radio IP and a library of compatible microcontroller functions.

"ZigBee technology and its support base have matured to such an extent that there is little doubt now that it will be a major platform for the wireless revolution," adds Horne. "Delivering cost-optimised products early in the ZigBee commercialisation cycle is likely to put OEMs in influential positions in their market segments, and CCL expects application-specific silicon to be a major catalyst for such success during the first few years of this standard's life."

Philips RFID chip enables museum visitors to take home exhibits in 'digital rucksack'

With more than 500 million RFID chips sold, Royal Philips Electronics claims to be the number one worldwide in the development and production of RFID chip . Some of this silicon output has been supplied to the Vienna Technical Museum in Austria to equip its advanced multimedia visitor orientation system.

As part of "medien.welten," an exhibition that shows visitors the evolution of media technology from ancient times to present day, the visitor orientation system is an intelligent communication plan using contactless smart cards to offer visitors new, individual and

interactive ways of experiencing their visit to the museum. With new discoveries to be made with every visit, the Vienna Technical Museum aims to give its visitors the chance to actively participate in the progression of changes in communication and information technology.

As well as acting as a virtual, interactive guide, the card allows visitors to collect and store their favourite experiences from the museum in a multimedia format so that they can be taken away in a 'digital rucksack' to share with friends and family - even after the initial visit for at least three months following. Using a personal access

code marked on the card, users can access their personal information files via the museum's website and email that data to friends.

The smart card is equipped with an I-CODE RFID chip developed by Philips. I-CODE was designed for high volume logistics applications, such as supply chain management systems for retailers, rental services (book and video libraries), tracking of products, and for manufacturing automation. I-CODE technology can also be employed in access control systems where longer read/write ranges are needed, such as in museums, trade fairs or exhibitions.

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

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Anoto

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7 layers 📖
CETECOM Inc. 📖
ETL Semko
ETS DR.GENZ GmbH
Radio Frequency Investigation (RFI) 📖

Wireless industry calendar of events

DATE	EVENT	LOCATION	NOTES	LINK
Feb 23 - 26 2004	3GSM World Congress 04	Cannes, France	-	http://www.3gsmworldcongress.com/congress/
April 26 - 28 2004	Wireless M2M Communications Forum	London, UK	-	www.telecoms-events.com
June 8 - 10 2004	Wireless Connectivity World	Amsterdam RAI, Netherlands	-	www.wiconworld.com
SEP 27 - 1 OCT 2004	3GSM World Congress Asia	Suntec International Convention & Exhibition Center, Singapore	-	http://www.gsmconferences.com/3gsmasia/

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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