

SEMICONDUCTOR



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FOCUSED ON EMERGING SEMICONDUCTOR COMPANIES

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Radar Scope

Energy Micro AS

Former key executives of Chipcon have founded Energy Micro to develop “the world’s most energy friendly microcontrollers based on modern and powerful microprocessor architectures.” The company’s mission is “to become the leading provider of ultra-low power mixed-signal microcontrollers.” During the next few months Energy Micro will establish a startup team of 10 people and the company will be fully operational beginning on January 1st 2008.

The company has received financial support from Innovation Norway and will seek to establish further financial support through other Norwegian Institutions. The founders and early employees will invest a total of US\$1.5M in startup capital. For the first two years, Energy Micro plans to self-fund the company. Thereafter external capital requirements are anticipated.

By combining extremely low power consumption and high analog and digital integration, EnergetIC products will

be well suited for applications where battery lifetime, performance and analog integration are critical. Energy Micro plans to integrate a broad range of high performance analog and digital peripherals.

The company will offer a broad application range of standard mixed-signal microcontroller families, microcontrollers targeting specific vertical applications and customer-defined solutions with embedded IP. The specifications for the first series of EnergetIC microcontrollers will be finalized in Q1’08 and customer samples are anticipated in Q2’09 with production release in 2H’09.

Geir Førre, President and CEO (previously co-founder and CEO of Chipcon, which was acquired by TI for \$200 millions in January 2006)

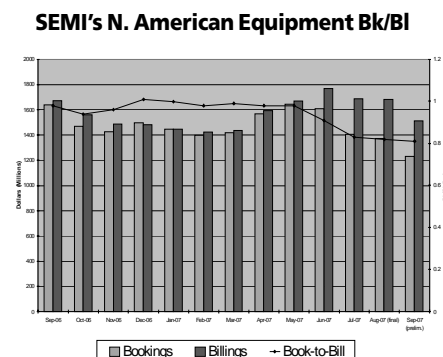
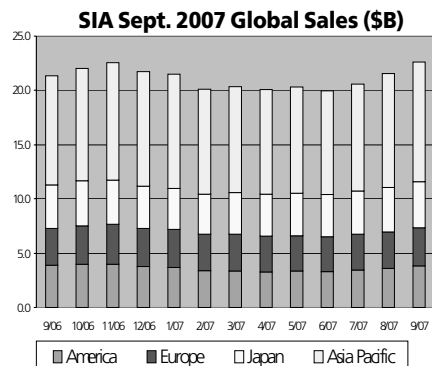
Øyvind Janbu, CTO (one of the early employees at Chipcon)

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LINIGEN

LINIGEN was founded “to develop cooling and power solutions, focusing on breaking through the ‘thermal barrier’ for semiconductors and extending the usability of mobile devices.” The company has been bootstrapped to date by the founders and is seeking \$2M in seed” capital. Total capital requirements in the range of \$10-12M are anticipated over the next three years.

LINIGEN’s patent pending technologies provide efficient ways of cooling electronics and converting heat back into electricity. The clean-tech system generates enough power to satisfy the demand of the microelectronic device (such as a notebook PC), and uses a tank of liquid nitrogen “coolant/fuel” to replace the electrical battery (with the ability to increase “off grid” use by 2x vs. Li ion). The solution uses Liquid Nitrogen (LN2) “fuelant”, which is



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Cliff Rants

Avnera – *Wireless Audio ICs*

It's not difficult to get excited about Avnera. After all, wireless audio is very cool and tangible. Would you rather tell your kids about a wireless audio headset or SONET OC-192 cross-connect demo? But putting that aside, we think Avnera has a hit.

First, to date, wireless audio has been dismal while Avnera's solution is spectacular. The company is focused on delivering solutions that make sense for everyone in the value chain – consumers, OEMs, and retailers. Sure, we found a few rough spots in the OEM products we tried, but those were mainly due to poor execution on the OEM's part, and had little to do with the Avnera chip.

Unlike the wireless video space, which has numerous competitors, is a standards mess, and has few applications, the wireless audio space has few competitors and actually quite a few potential applications. Furthermore, Avnera defines itself as a mixed-signal audio company, not just a wireless audio company. This clearly sets up the company for many line extension opportunities other than die shrinks. Lastly, the company's chips are already in products that are on retailers' shelves. How many startups can say that? From what we have seen, many startups define "design win" rather generously.

Energy Micro – *Ultra-Low Power Microcontrollers*

Does the world need another microcontroller company? Surely, there are already too many to choose from. Luminary has done a great job of rolling out numerous ARM Cortex-based microcontrollers in short time, but again, does the world need them? Given the price point, and the capital requirement, can a company reasonably hope to get a reasonable return on investment?

In Energy Micro's favor? First the founders are not green – they have a prior hit in Chipcon, which was acquired by TI for \$200M. Second, European companies seem to have a knack for spending a whole lot less capital than their American counterparts. Third, the company plans to introduce products as early as Q2'09, which further substantiates the modest capital requirement.

But the one overwhelming thing that troubles us in this arena is the number of design wins required. Embedded microcontroller applications are usually low volume and have a low price point, which means lots of design wins, sales support and customer support, which is very costly. If you look at Microchip, I believe at last count they had shipped 500,000 development systems to date. That's a staggering figure.

And although averages lie, based on their cumulative sales, that equates to only 10,000 units per development system. Translation – you need a lot of design wins, and procuring them is not cheap.

Gainspan – *Wi-Fi-based Sensor Network ICs*

Will Wi-Fi become the new IP? Meaning, will it become this juggernaut that steamrolls everything in its path, whether it was designed for that application or not? That's GainSpan's hope. GainSpan believes that utilizing the widely deployed Wi-Fi infrastructure for sensor networks is a natural fit. And the company argues that it has solved the power challenge, delivering Wi-Fi sensor ICs that can achieve 5-10 years of battery life with one AA battery.

So this begs the question, what does this say about Zigbee? Conversations with Ember brought out some interesting points. For starters, Zigbee has a highly refined and mature software stack specifically designed for industrial strength sensor networks. And the Zigbee Alliance has recently released the latest rev, which has even more refinements. Ember argues that it will be hard to replicate this functionality in the Wi-Fi arena.

Zigbee supports mesh-networks, which is often at the core of its value proposition in the wireless sensor field. Zigbee appears to be gaining traction in three markets: electric meter reading, building automation and home automation, and Ember is doubling unit shipments each quarter. Can these markets, which typically have long gestation periods, generate the volumes required to sustain the Zigbee market? And what will the overlap be between these applications, Zigbee and Wi-Fi-based solutions. Of course, there's one other issue – what about other Wi-Fi companies? The Wi-Fi market has already seen one bloodbath and the current players have substantial assets at their disposal.

LINIGEN – *Liquid Nitrogen Cooling & Power*

I only have two questions for LINIGEN. First, will its technology work? Second, is the LN2 distribution infrastructure in place and if not, how can a startup hope to facilitate that process? Same issue as the electric-car battery swap-out guys – fuel distribution.

S5 Wireless – *Wide-Area Wireless Location Chips*

To us, S5 Wireless isn't a chip company, it's a systems provider. Why? Because its solution is multi-faceted, comprised of a transmitter (Tag), receiver Base Station, Location and Telemetry System and Network Operations Center. That's a system.

With this level of complexity, it's clear that S5's solution will end up serving vertically focused high value markets like airport baggage tracking, hospital and electronic equipment

tracking, supply chain tracking, etc. If the price is right, you can envision that many companies, federal agencies, and other entities will find the idea of wide area tracking compelling.

If this were a company supplying chips for tags, I wouldn't be excited. Tags for pennies just doesn't thrill me. But the prospect delivering a comprehensive high value solution that solves addresses the entire system is compelling. If S5 can pull this off, I think the company will be a winner.

Threllop – *DNA Computing Chips*

We spent a lot of time with these guys and its still challenging to get a handle on just what an electrical DNA computer is. An algorithm, right? After all, we're modeling a biological DNA computer in the electrical domain. Threllop argues that's not the case. The company believes it has a fundamentally new computational architecture that achieves previously unattainable performance levels.

But how generalized is the method? Can it only solve a narrow range of problems or any problem? Is it superior for all three Ps – price, power, and performance? Threllop is still closely guarding its IP, so we couldn't determine the answers to these questions other than to take their simulation results at face value.

Than there's the issue of how to best go to market. IP company? IC company? Systems or applications company? Threllop needs to hone in on its core value proposition and determine how to best capitalize on its IP.

Xtendwave – *Wavelet-based DSL Technology & IP*

Xtendwave has the feel of a contrarian deal. Why? Well, for starters I haven't seen a DSL startup since before the telecom meltdown. Furthermore, everyone is moving to fiber or some sort of 4G wireless technology – right? Who cares about copper?

Well, it turns of lots of people. Face it – copper still is ubiquitous. And fiber is anything but. Fios in my town? Not yet says Verizon.

To survive, traditional telcos must deliver triple play voice, video, and data services. And if the only pipe they have is copper, they need to figure out how to deliver those services using what they have. Pulling fiber is an expensive proposition, especially in rural areas.

Xtendwave believes that its wavelet-based DSL technology (WDSL) solves this challenge. The company has numerous patents and is already engaged with a strategic equipment vendor customer. As an IP company, capital expenditures have been modest to date. If Xtendwave can deliver, it's looking like a winner. ■

Radar Scope

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non-toxic, non-flammable, abundant, renewable and has a fairly well established distribution network.

LINIGEN plans to develop chip coolers, cooler/generators, personal energy and cooling systems, and ultimately, an integrated system for energy storage, power generation and cooling for notebook PCs. LINIGEN is also designing a "thermal platform" that will allow the future introduction of cryo-electronics and high-temperature superconductivity technology to the mass market.

Alexey Palladin, co-founder and CEO (previously CEO of VirtuSphere and a manager at Intel and Microsoft)

Roman Snytsar, CTO and co-founder (Physicist, nuclear and computer scientist, industry experience at Rockwell Intl and Microsoft)

Jerry McGuire, CFO (previously CFO of Forte Design Systems, Darwin Molecular, Adobe Plug-in Source, and others)

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Threllop

Threllop Nanotechnology was founded in 2007 to commercialize its DNA computing technology. The company is currently self-funded and is currently seeking capital.

Today's computing systems store information as ones and zeros. Biological "things" store information in DNA with molecules represented by the letters A, T, C and G. The intrinsic properties of DNA, such as replication and parallelism, provide massive computational capacity and can be applied to complex computational problems. These properties allow DNA computing to solve previously unsolvable mathematical problems. However, a true biological DNA computer has many implementation issues. It is perishable, can produce invalid material, and is difficult to program and control.

Threllop has developed and patented an electronic (as opposed to biological) DNA computing engine, InChroSil, which emulates the computational behavior and information processing of organic DNA. The technology has been validated by numerous academics and has been patented.

Radar Scope

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The company has developed a FPGA prototype to test various algorithms such as Viterbi Decoder, FFT, DFT, DNA memory and the Hamiltonian Path Problem (traveling salesman problem). Simulations and FPGA prototypes have shown how its DNA computing technology can achieve previously unattainable performance for DFTs, FFTs, and Viterbi decoders (where the performance is independent of the number of nodes).

Threelop claims to be the first non-North American company to sign an IC manufacturing contract with MIT, and is currently fabricating its first silicon prototype at MIT's MTL. The technology can be applied to many applications such as signal processing, path routing, cryptography, and DNA sequencing.

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Startup Profiles

3Plus1

3Plus1 Technology (see 9/04 issue) was founded in 2003 to develop "an advanced multiprocessor architecture conceived from the ground up to run next-generation handheld systems." The founders have financed the company since its inception, with additional income from customer investment. The company will be seeking venture capi-

tal in the future.. 3Plus1 has roughly 15 employees.

3Plus1 has created a methodology and architectural approach specifically designed for low-power, concurrent execution of specific applications, including MPEG 2/4, H.263/4, JPEG/2000, 802.11 a/b/g/n, 802.16, Bluetooth, UWB, GSM/GPRS/EDGE, CDMA 2000/WCDMA, MP3, AAC, DVB-H and GPS, in a modular, scalable, heterogeneous multiprocessor architecture. The technology enables software implementation of combinations of these multi-mode scenarios and uses models that can be implemented in a sub-100mw processor core in a standard 90nm low power CMOS process.

3Plus1 recently introduced its first-generation CoolProcessor technology in the form of CoolEngine IP cores for multimedia and communications SoCs targeting mobile consumer products. The first instances of the CoolEngine family comprise two members that take advantage of the intrinsic scaling of the 3Plus1 multiprocessor approach for implementation of JPEG, MPEG, H.263, and H.264 encode and decode operations as well as standard audio applications, GPS and Bluetooth.

The CoolEngine family of cores is scalable and upwardly code-compatible with a single programming model. The company's internally developed and automated methodology is capable of generating RTL, simulation, analysis, and verification tools from an internal design language for the CoolProcessor Architecture. Development of software applications follows a standard DSP tool flow.

The CoolEngine family is an scalable set of processor IP that can concurrently run multi-mode CODECs (CODECs and MODEMs) for multimedia and communications applications at close to ASIC efficiencies, according to the

company. The CoolEngine-1010 and CoolEngine-1020, the first two CoolEngine processor IPs from 3Plus1's first generation family are targeted for video/audio codec applications. These IPs include a CoolDMA and master/slave interface ready to be connected to all standard SoC buses including AHB Bus, AXI Bus and Sonics Interconnect.

The CoolEngine-I family is capable of running concurrent set of applications including Video Codec, WMV D1 decoding/encoding, Video pre/post processing, Audio Codec, Image Codec, and Image Signal Processing Algorithms.

Working with strategic customers, CoolEngine has shown up to 2X area and power advantages over leading configurable processor approaches and shows near-ASIC like efficiencies in a fully programmable architecture.

The company is currently delivering its initial applications-development software and FPGA Emulator Boards to strategic customers. The CoolEngine-1010 and CoolEngine-1020 IP cores are currently available and have been shipped to customers. Future products will incorporate another processor core, making the devices better suite for combined codec/modem applications.

Allan Cox, President, CEO, and Co-founder (previously COO at QuickSilver Technology and SVP of Systems IC Business Unit at Toshiba America Electronic Components)

Dr. Amir Zarkesh, EVP, Engineering, and Co-founder (previously Director of Hardware Engineering at QuickSilver and founder and CEO of ZAIAS)

Amit Ramchandran, VP, Engineering, and Co-founder (previously an

architect and designer of an adaptive processor, at Quicksilver)

Ron Adolphson, Treasurer (previously CFO of BayStone Software, until its sale to Remedy)

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Avnera

Avnera was founded in March 2004 to develop ICs that “enable breakthrough products in wireless audio, VoIP, and powered speaker market to be delivered at disruptive price points.” The company has raised \$42 million to date in three rounds of funding (\$12.75M Series A, \$15M Series B, \$14.7M Series C) and is fully funded. Investors include Altien Ventures, Bessemer Venture Partners, Best Buy, DAG Ventures, Intel Capital, JAFCO Ventures, Panasonic Venture Group, Polycom and Redpoint Ventures. Avnera has 60 employees worldwide.

Avnera has introduced a wireless audio technology for wireless speakers, microphones, headphones and headsets that delivers uncompressed CD-quality sound without interference. The breakthrough is a new streaming transmission technology and six layers of interference protection, all on a single piece of silicon that’s plug-and-play easy to use at a 30% lower total system cost.

Traditional wireless audio technologies have poor sound quality because they were designed to transmit data, not real-time music. If a packet is dropped in a data transmission system it’s resent by the transmitter, which is fine for data applications but can create interruptions in music, as well as noise clicks and pops. Furthermore, wired solutions simply don’t work for some

applications. As one example, 40% of home theater buyers don’t hook up their rear surround problems because of the wiring challenge.

To address this problem Avnera created a real-time streaming transmission technology designed specifically for music. Avnera incorporates six sound quality innovations that reconstruct corrupted packets when they arrive, rather than re-sending them, to improve signal reception and virtually eliminate interference.

The company employs audio-specific forward error correction (FEC) to let the receiver repair lost data due to bursts of interference, eliminating the need to retransmit data. Psycho-acoustic techniques and time dispersion spread out errors in time, allowing the Avnera system to conceal longer bursts of interference.

The technology has a small spectrum footprint in the 2.4 GHz spectrum, allowing the system to use any of 40 possible channels, making it more resilient to interference in addition to making it less of an interferer to other systems. A dynamic frequency selection algorithm chooses the optimal channel for communication and seamlessly switches channels if required.

Support for two separate antenna systems, with instantaneous switching to the one that is sending/receiving the best signal, provides superior performance in indoor and in-motion applications. Dynamic power control allows the RF amplifier to increase power if the receiver is far away, or decrease power if it’s close, making the system power efficient and less of an interferer to other wireless systems.

Many wireless systems require software and drivers. AvneraAudio-based products are plug-and-play, and do not require any software or profiles. The

wireless client and base are linked via a simple one-push button and the OEM can pre-link devices so users don’t have to do anything when they open the box. Avnera-enabled products also have 50% more range at the same output power as other wireless products and aren’t affected by other wireless devices.

The first two product families under the AvneraAudio brand, the AudioMagic and VoiceMagic families, provide a high performance system at 30% lower system cost than competitors, according to the company, due to their high levels of integration. For instance, a typical wireless stereo headset requires 8 chips (receiver, Flash, battery charger, ADC, uP supervisor, 3 voltage regulators) and 131 separate parts while an Avnera-based solution requires 2 chips and 65 parts.

The devices employ a hardwired, not programmable DSP, which lower power significantly compared to other solutions. As an example, Avnera-based wireless HD headphones from Acoustic Research feature a 12-hour battery life.

The AudioMagic chip enables uncompressed CD-quality sound for music applications. The VoiceMagic chip offers wideband voice (16KHz sampling rate) transmission, fixed end-to-end voice latency to support echo cancellation and a small and cost-efficient form factor. We demo’d the Acoustic Research headphones and can say they are better than any wireless headphone we have ever tried.

Currently, Avnera offers six chips (and modules), comprised of two client-side devices and four host-side devices (usb and I²c) versions. The devices are roughly \$7 each at low 1Ku volume levels or \$10 for a module version, which provides a complete RF subsystem

Startup Profiles

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solution. Additional products will be introduced around CES. The company's roadmap include both wired and wireless audio solutions.

Avnera is enabling numerous end-consumer products from major consumer electronics companies. A dozen products from companies including Audio-nine, Acoustic Research, Rocketfish a Best Buy Brand, SDI Technology's iHome product line, as well as enterprise products from Polycom, are scheduled for release in Q1. A headset designed for Internet phone calling using an Avnera chip will soon be Skype Certified.

Three AvneraAudio-based products, Acoustic Research Wireless Headphones (which we tried), Polycom CX400 Cordless Phone, and Rocketfish Wireless Rear Speaker Kit, are already on the shelves and available for purchase worldwide.

Manpreet Khaira, Chairman, President & CEO (previously founder, president & CEO of Mobilian, which was acquired by Intel)

Thomas Irrgang, VP of Business Development (most recently platform manager for the SigmaDSP group at Analog Devices)

Mats Myrberg, VP, Product of Development (most recently worked at Microsoft working with Windows Media and Microsoft's Digital Rights Management technology)

Monica Enand, Director of Business Development (previously a Program Manager in IBM's technical support division)

Chris O'Connor, co-founder & Chief IC Architect (previously RF Systems Engineer at Maxim)

Raj Garg, co-founder & VP of Sales (previously Director RF, Mixed Signal ASICs at Maxim)

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CamSemi

Cambridge Semiconductor (CamSemi, see 5/03 and 2/05 issue) was spun out of Cambridge University's Department of Engineering in August 2000 with a £250,000 seed investment from the Cambridge University Challenge Fund, to develop "a new generation of high-voltage ICs, incorporating high performance power transistors and control electronics on a single silicon chip."

The company raised £3.75 million in Series A funding, led by 3i (£1.7M) and including Scottish Equity Partners (£1.3M) and TTP Ventures (£650K), with additional investment from Odyssey Ventures and the University of Cambridge. CamSemi recently raised \$26 million (£13 million) in Series C funding, led by 3i and existing shareholders Scottish Equity Partners (SEP) and TTP Ventures, along with new investor Carbon Trust.

Given initiatives such as ENERGY STAR and the California Energy Commission, manufacturers are under increasing market and legislative pressures to stop producing bulky and energy-inefficient linear transformers that place an unnecessary burden on the environment. However, until today, a manufacturer's only option was to migrate to much more costly and complex SMPS flyback or Ringing Choke Converter (RCC) designs.

When CamSemi first introduced its mixed-signal controller concept and RDFC [Resonant Discontinuous Forward Converter] topology to early-

adopter customers, the feedback was so positive that the company took the strategic decision to bring them to market in advance of its other product developments. The company's goal is to enable energy-efficient off-line power conversion without a cost penalty.

CamSemi now provides off-line power management ICs for optimized energy-efficient off-line power conversion. CamSemi's products are based on its portfolio of patented and proprietary technologies including intelligent control architectures and PowerBrane, which allows near-ideal performance switching of power devices such as LIGBTs and MOSFETs. Initial products are targeted at the switch mode power supply and lighting sectors.

CamSemi recently launched its first products, a family of performance controller ICs that will enable power supply designers and volume manufacturers to develop more energy-efficient products at lower cost than existing inefficient solutions. The devices are optimized for high volume, low cost, single rail input markets while offering double the efficiency over traditional linear supplies.

The C2470 family is based on recent advances in intelligent digital/analog control, coupled with a neat and simple resonant single-switch topology that has never before been exploited in an integrated form for off-line AC to DC power conversion. This patented, proprietary approach allows manufacturers to secure operating efficiencies in excess of 80% and 100 mW standby but at a new low-cost price point. In contrast, linear power supplies typically operate with power conversion efficiencies of 50% or even less and standby consumptions of 1 W.

The new controllers simplify circuit design by cutting a manufacturer's bill of materials, improving margins and speeding up product development cycles while also providing built-in protection and other features as standard within the controller. They employ sophisticated mixed signal control allowing the use of lower cost bipolar junction transistors, as opposed to more expensive MOSFETs and lead to lower overall system costs than the currently popular SMPS flyback designs. At output power ratings of around 6W and above they become cheaper than linear power supplies, currently the industry's lowest-cost standard solution for off-line power conversion but which suffer from poor conversion efficiency and are bulky.

While offering higher performance and superior safety features, products based on the C2470 family are cost competitive with iron-cored linear transformers and significantly cheaper than currently popular Switched Mode Power Supply (SMPS) approaches. A forward resonant topology provides naturally high efficiency and low EMI, enabling manufacturers to produce small, lightweight and more energy-efficient supplies without having to design-in complex EMI filtering circuitry typically needed with SMPS.

The devices can easily be incorporated into energy-efficient power supplies, for a wide range of applications, with only minimal changes to layouts and components allowing multiple new product developments to be carried out in parallel. By operating in resonant mode, EMI is greatly reduced enabling the replacement of linear power supplies in demanding applications such as audio products and cordless phone chargers. As secondary feedback circuitry is no longer required, component counts are lower, circuits are simpler

and with no opto-couplers or 'Y' capacitors safety approval is easier.

The C2470 family uses a tiny ferrite core in place of bulky and heavy iron-cored transformers. A mini adapter based on the C2470 family and RDFC topology offers twice the power conversion efficiency of traditional linear adapters and weighs just 45g compared with 550g.

CamSemi's first products are already available to the worldwide market and shipping in volume. The first three members from the C2470 family are for the 6 to 40 W power range and are available in volume for applications such as battery chargers, mini adapters, routers, cordless phones and audio systems. The C2472PX2, the SO23-6 device, is \$0.45 at 1Ku quantities.

David Baillie, CEO (formerly director of worldwide strategic accounts for LSI Logic Europe and VP and GM of the Consumer Networked Products Division of C-Cube)

Gehan Amaratunga, Ph.D., Founder, Director & CTO (Professor of Engineering and Head of Electronics, Power and Energy Conversion at the University of Cambridge)

Florin Udrea, Ph.D., Founder & Director (a lecturer in the Engineering Department at the University of Cambridge and an advanced EPSRC fellow)

John Lee, Director & CFO (previously held senior financial and general management positions in both multinational and younger technology companies)

Zahid Ansari, VP of Operations (previously a VP of Orbit Semiconductor, now Flextronics Semiconductor)

John Miller, VP of Business Development

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EtherWaves

EtherWaves was founded to develop and license digital radio and mobile TV IP, targeting the automotive, SoC and consumer electronic markets. The company is based upon the acquisition on Sonarics Labs' DAB/DMB technology in 2006. Sonarics Labs was founded roughly 5 years ago. EtherWaves has secured \$2 million in funding from Evolution Fund VC and plans to seek an additional \$8 million in strategic funding. The company has already reached breakeven. EtherWaves has 12 employees.

Sonarics Labs' technology empowers thousands of digital radio receivers implemented on general purpose DSPs and has been deployed in German luxury car infotainment systems. The technology features strong fading channel algorithms for mobile and automotive applications. Leveraging this proven DAB/DMB technology, EtherWaves enables SoCs, embedded with standard core processors, to compete in the digital radio and mobile TV markets. Its solutions simultaneously support DAB, DAB+, T-DMB, DRM, FM and HD Radio.

IMSiS technology adds multi-standard digital broadcasting reception to practically any embedded processor by adding a minimal set of silicon accelerators and using IMSiS core-agnostic software. Powered by patent-pending IMSiS™ technology, EtherWave's roadmap includes compliancy with DMB T (China), ISDB T (Japan) and DVB H standards.

Etherwaves' product suite is comprised of the following:

Startup Profiles

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- ClearSignal-SoC for semiconductor companies developing chips for the consumer electronic market.
- ClearSignal-Auto for automotive OEM and system integrators.
- ClearSignal-CE for consumer electronic manufacturers.
- ClearSignal-Accel for consumer electronic manufacturers with R&D capabilities.

ClearSignal-SoC is a package of silicon and software IP that adds multi-standard Digital Broadcasting (DAB, DAB-IP, T-DMB, DRM and HD Radio) receiving capability to the customer's SoC. It is designed to use existing SoC blocks with minimal additions. The software is core-agnostic and the IP hardware blocks are standards-based.

ClearSignal-Auto is a package of software IP targeted to be executed on Analog Devices' Blackfin processors, thus providing multimode Digital Broadcasting capability in an automotive receiver. It is a proven solution that has been deployed in high-end German cars.

The ClearSignal-CE family is comprised of ClearSignal-Sonata, a complete DAB+ production-ready module with a low-cost BOM, the ClearSignal-Juliet DAB+/DMB optimized stand-alone platform, ClearSignal-RD reference design for a complete and enhanced Digital Radio solution, and ClearSignal-RF for RF IC and tuner companies, enabling them to demonstrate the capabilities of their RF circuit within a complete Digital Radio.

Sonata is a complete DAB+ production-ready module, for less than \$10. The Sonata DAB+ model is based on

a single Analog Device BlackFin BF532 low cost DSP in conjunction with Etherwaves' software. Sonata also utilizes Silicon Motions' FC 2501 Triple-Band T-DMB and DAB Tuner IC. Sonata provides a Eureka 147 DAB and DAB+ receiver equipped with the latest features expected from a high-end digital radio product; FM radio reception with RDS, a MP3/WMA/AAC player supported by a SD Card, crystalized sound processing and clock radio functionality.

ClearSignal-Accel is a novel solution for easily adding multi-standard DAB/DMB receiver capability to existing or new devices. ClearSignal-Accel is comprised of a low-cost FPGA and a software application designed to be ported to an existing processor or DSP. Future plans include solutions for HD-Radio (US), ISDB-T, and XM Radio/Sirius.

Audi car radios are powered by EtherWaves technology. Bush, British Telecom, Magibox, itec Dynamic, and Acoustic Solutions also use the technology in various consumer devices.

The target market size is roughly 800 million units, according to Etherwaves. The primary competition is ICs from Panasonic, Philips, and Atmel. Etherwaves Software Defined Radio solution covers multiple standards, is designed to be easily ported to the customer's existing processor, such as a DSP or ARM, or to a multimedia processor, is designed to execute together with the customer's applications, and can decode 2 ensembles (or multiplexes) from 2 tuners simultaneously on a single DSP chip, i.e. for listening to audio and simultaneously decoding traffic data on a different ensemble or watching video, or scanning DRM in the background, or for diversity reception.

Ben Gagin, CEO (previously co-founder of successful hi-tech Israeli companies)

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Gainspan

Gainspan was spun out of Intel in September 2006 to develop Wi-Fi-based sensor network ICs and software for battery-powered wireless networked devices. Gainspan was previously funded as part of the New Business Initiatives within Intel, and has secured funding from New Venture Partners, OVP Venture Partners, Sigma Partners, and Intel Capital. The company is headquartered in Silicon Valley with a subsidiary in Bangalore, India.

GainSpan recently unveiled a wireless sensor network solution that utilizes the widely deployed Wi-Fi infrastructure while providing years of battery life for sensors and other connected devices. GainSpan's semiconductor and software solutions deliver the security, manageability, and convenience benefits of Wi-Fi along with 5-10 years of extended battery life (with one AA battery) needed for applications such as temperature monitoring for energy management, condition monitoring of industrial equipment in manufacturing plants or streetlights in metro areas.

The GainSpan GS1010 ultra low-power SoC leverages the widely deployed Wi-Fi (IEEE 802.11) network. Utilizing this infrastructure enables the deployment of sensor systems using standard tools and knowledge base, and seamless integration with existing management systems, including enterprise

network management systems, as well as existing SCADA industrial and building automation systems.

The chip's power management feature provides years of battery life and enables a new class of Wi-Fi products that open the door to many new applications and usage models that improve indoor and outdoor air quality, reduce energy consumption, cut costs and improve operational efficiencies.

The GS1010 supports a range of products and applications with an embedded 802.11b/g radio, two 32-bit ARM7 microcontrollers, real-time clock (RTC) and power management unit, FLASH and SRAM memories along with multiple I/Os, and support for location awareness. GainSpan also offers the GainSpan Management System (GMS), a software solution that sits in the network and addresses specific needs of managing Wi-Fi sensors and other connected devices.

The GS1010 is sampling now, with production scheduled for December 2007, and is priced at \$15 in 10,000 unit quantities.

Aginova, a provider of wireless sensor networks for condition based maintenance and storage monitoring, has been working with Zigbee-based solutions for infrastructure applications for the past three years. However, installing a stable wireless sensor network has been a major and costly undertaking. Using GainSpan's Wi-Fi-based solutions, Aginova found that the almost ubiquitous nature of Wi-Fi reduced total system cost and the 'off the shelf' tools made development easy.

Apprion plans to incorporate GainSpan Wi-Fi sensor technology in Apprion's Industrial Wireless Applications Network System - the ION system. **MicroStrain** plans to incorporate GainSpan's Wi-Fi sensor technology in

next-generation wireless monitoring systems. GainSpan's solution is rapidly becoming a building block in **Nivis'** industrial and commercial wireless platforms. **Sensicast** believes that GainSpan is the first company to meet its stringent requirements for battery-operated Wi-Fi sensor networks. The GS1010 allows **Oceana Sensor** customers to utilize their existing Wi-Fi network to deploy and redeploy vital sensors.

Vijay Parmar, President & CEO (previously GM of the same business within Intel via the acquisition of VxTel, where he served as VP of Marketing)

Jim Mravca, VP of Marketing (previously VP of Strategic Marketing at Motia, a smart antenna silicon startup, and SVP of strategic marketing at WJ Communications)

Lew Adams, CTO

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Sunnyvale, CA 94085
Tel: 408.689.2129
www.gainspan.com

Perpetuum

Perpetuum was spun out of the University of Southampton in 2004 to develop microgenerators that harvest energy, usually from vibrations. The company secured seed funding from IP2IPO and SULIS at the end of 2004. Perpetuum raised £2.2m in Series A financing led by Quester (£1,425,000), and including £650,000 from Top Technology Ventures and £125,000 from existing investor SULIS. Recently, Perpetuum completed a £5 million Series B funding round led by Environmental Technologies Fund (ETF) and including Quester, and Top Technology.

Perpetuum's electro mechanical devices convert the kinetic energy from vibrations into usable electrical power to drive sensors, microprocessors and

transmitters. Vibration energy-harvesting microgenerators are based on a highly optimized magnetic circuit coupled to a mechanical resonator. This arrangement transforms the kinetic energy of vibration into electrical current. The devices produce several milliwatts of power and operate with minimal vibration levels at mains frequencies.

The PMG17 converts kinetic energy from vibration of equipment running at mains frequency (50 or 60Hz) into electrical energy and can generate a minimum of 100uW when attached to a surface exhibiting a minimum vibration magnitude of 16mg between 59Hz and 60Hz. The device covers a large bandwidth so it can accommodate commonly observed slip frequencies of 60Hz AC motors. The microgenerator is designed for condition monitoring and process instrumentation in industrial applications, without the need for batteries, expensive cabling or maintenance.

The PMG17 microgenerators are intended for use on machinery driven by AC motors and harvest the commonly found "twice-line-frequency" vibration. Even with as little as 25mg (RMS) vibration within a 2Hz bandwidth, they will always produce a minimum power of 0.5mW, while delivering up to 40mW when there is more vibration available.

The device can generate enough to power a wireless transmitter to send data every few minutes, or smaller amounts of data, such as a temperature reading, several times a second. The microgenerator is easy to install - it is simply screwed into place, or can be held in place by magnets. It is then left in place with no need for maintenance.

The PMG27 and PMG37 are designed for aerospace and transportation applications, respectively. The company is

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also developing the PMGXX series of MEMS-based vibration energy-harvesting microgenerators for medical applications and believes that a silicon package 5mm x 5mm x 1.5mm could produce a few hundred microwatts under suitable conditions.

Mike McTighe, Chairman (also chairman of CamSemi, Frontier Silicon, Corvil, Phyworks and Nujira)

Roy Freeland, CEO (previously ran Meggitt Electronics, was Group GM at Bowthorpe (Spirent) and CEO of United Industries)

Rich Mangan, Director (previously held senior positions at AT&T, Lucent and Telcordia)

Stephen Roberts, Ph.D., Technical Manager (previously held a technical management position in silicon integrated optics at Bookham Technology)

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Southampton Science Park,
Southampton, Hants. SO16 7NS UK
Tel: +44 (0) 23 8076 5888
www.perpetuum.com

S5 Wireless

S5 Wireless was founded in 2003 to develop "a breakthrough technology enabling leading manufacturers to add ultra low-cost, wide-area wireless location and telemetry capabilities to virtually any device."

S5 has already been awarded three contracts from the Department of Homeland Security based on S5's technology and its applicability to shipping container and small boat tracking. S5 has been awarded \$1.2 million in contracts from the Department of Homeland Security to develop wireless communication systems to track and

monitor cargo containers. In September 2006, S5 raised \$11.5 million in Series B financing led by Eagle River Holdings, Craig McCaw's investment company, with existing investor vSpring Capital and Wasatch Venture Fund also participating.

The S5 system is comprised of the transmitter (Tag), receiver Base Station (BS), Location and Telemetry System (LATS) and Network Operations Center (NOC). S5's technology is frequency independent and operates reliably and securely in the typically noisy unlicensed 915 MHz and 2.4 GHz ISM band spectrums.

The technology uses a DSSS (Direct Sequence Spread Spectrum) physical layer based on a unique patented coding and modulation approach that provides high processing gain to enable operation in very high interference environments and provides the capability to process many simultaneously arriving signals. Furthermore, S5's DSSS technology requires approximately 50 time less processing hardware to implement than typical high processing gain systems.

When an S5 mobile device transmission occurs, the signal travels to each of the network base stations. When the transmission is detected, it is time stamped with time of arrival at the base station. The time-difference of arrival (TDOA) information of the transmitted signal at each of the multiple base stations is routed to a positioning server (located in the core network) where S5's triangulation algorithms determine the position of the transmitting mobile device. With this approach, the S5 system provides wide area coverage that can blanket an entire metropolitan area and accuracy that is equivalent to GPS, according to S5.

The S5 location chip is much smaller than a dime, will cost less than \$1, operates for years on a single battery and works outdoors and indoors, even deep inside large buildings. Unlike existing approaches, S5's solution sheds resource requirements from the device by placing most of the system's intelligence into the base stations and network infrastructure. This reduces chip cost and complexity, as the S5 chips simply "wake up, transmit, and go back to sleep." The chips also have the ability to send data, providing telemetry capabilities.

The chip is distributed in three forms: the S5-Chip, S5-Module and S5-Tag.

The S5-Chip, the basic building block of the S5 system, is a 5mm² chip that can be incorporated into items manufacturers wish to enable with location-based services and telemetry capabilities.

The S5-Module integrates the S5-Chip and all additional electronic components except for a battery and antenna.

S5-Tags incorporate the necessary electronics, battery compartment, antenna elements and external housings to allow partners to prototype, test and leverage S5 product designs in their own applications.

Markets served by S5 include: airport baggage tracking, child and elderly location, construction site security, consumer safety and security, E911 location, hospital and electronic equipment tracking, insurance, law enforcement, location assisted search, location aware advertising, M2M, medical device location and telemetry, package tracking, pet location, photo location tagging, retail delivery management, sensors, social networking, supply chain tracking and more.

S5 has successfully fabricated its client-side chip. The technology is proven and demonstrable with a prototype network installed and operational in the Salt Lake City area. Additional information and S5-Chip sampling are expected before the end of the year.

David Carter, President and CEO (previously an Entrepreneur-In-Residence for DFJ affiliate, Wasatch Venture Fund and founded Vertical Technologies, which was acquired by Zebra Technologies, and Thoughtstar, which was acquired by iManage, now INTERWOVEN)

Jim Baker, CTO (previously a principal NetWave, Time Domain and Alereon)

Ildar Fazulyanov, CFO (more than 7 years of venture capital, investment banking and management consulting experience with vSpring Capital, Lehman Brothers and Bain & Company)

Sy Prestwich, VP & Chief Scientist, Founder (12 years experience in wireless, signal processing and product development work at firms including 3Com and Micro Linear)

Ken Arneson, VP of Business Development (previously VP of Business Development within McCaw Cellular (AT&T Wireless) Messaging Division and co-founded Xypoint, which was sold to TeleCommunication Systems)

Eliot Weitz, VP of Software Engineering (previously CTO at 5square Systems, Director of Engineering at GenSys Software, CTO of Medstory.com, and Director of Application Development for Vertical Networks)

Steve Chacko, Director of Product Marketing (13+ years of experience at a number of wireless companies, including ViaSat)

Scott Bevan, Director of Digital Design, Founder (14+ years experience at USRobotics, 3Com, TI, and Micro Linear)

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www.s5w.com

Xtendwave

Xtendwave was founded in June 2001 "to extend the reach of quality broadband signals over existing telecom networks." The company has been angel funded and in February 2007 secured \$10 million from a private equity group. The company has less than 20 employees.

Today's dominant DSL solutions, ADSL and VDSL, do not achieve the data rates required to deliver triple-play services at long distances. VDSL should achieve 20-25Mbps at 6,000 to 8,000 feet, but Xtendwave argues that the real world distance to achieve this rate is more like 3,000 to 4,000 feet.

To overcome these limitations, Xtendwave has developed Adaptive Filter Bank Modulation (AFBM) baseband technology, which is based on wavelets and helps signals achieve longer reach over copper using the existing plant. The technology does not break Shannon's Law, wire bond, alter power or utilize compression.

Xtendwave argues that its technology, coined WDSL, outperforms all currently available approaches. By delivering high data rates over extended distances, Xtendwave extends the reach of broadband to a greater percentage of existing wire line customers without new build outs or network re-engineering. Service providers can deploy new

triple play services to compete with offerings from cable companies.

The benefits of wavelet technology has been known for some time; however, Xtendwave believes the recent convergence of lower costs and higher processing power makes real-time calculation of wavelets feasible for telecom applications. Xtendwave has 17 utility patents and 14 provisional patents related to its wavelet technology.

While the technology has many applications, the most pressing opportunity is to deliver broadband service to geographically isolated populations who are already connected to copper wire infrastructure. Third party testing has demonstrated that Xtendwave can deliver 1.5Mbps over standard copper lines at 20,000 feet from a central office. This allows Xtendwave to deliver over 200Kbps at distances beyond 27,000 feet reaching more than 99% of households in the U.S. AFBM technology also has applications across other communications platforms such as cable, fiber, and wireless.

The technology is in trials now and is currently available for licensing. It has been demonstrated on an FPGA and Xtendwave is currently fabricating a chip at TSMC for a strategic equipment vendor customer.

Mort Aaronson, Chairman (previously VP of Market Management, MCI Business Markets, President & COO of Aerie Networks and CEO Ricochet Networks)

Marc Landry, CEO (previously with TI, Kingston Memory, Visiontek and founded Go Figure Technology)

Julia Woodward, CFO (previously owned an investment banking/consulting firm)

www.xtendwave.com ■

People

Actel has named **Jay Legenhausen** as SVP of worldwide sales. Legenhausen most recently served as VP of sales, Americas at Cypress. www.actel.com

Atmel has appointed **Christian Fleutelot** as the new Head and Managing Director of Secure Microcontroller Solutions (SMS) Product Line. Fleutelot previously was head of smart card ICs and ARM-based microcontrollers at European Silicon Structure (ES2), which was acquired by Atmel in 1995. www.atmel.com

Cirrus Logic has named former president and COO of Freescale, **Scott Anderson**, as SVP and GM of the Mixed-Signal Audio division. Anderson fills the position vacated when **Jason Rhode** was named president and CEO in May. www.cirrus.com

CoFluent Design, an Electronic System Level (ESL) company focused on delivering software solutions for early system architecture exploration and performance analysis, has appointed **Denis Février** as CFO. Février previously held similar positions at various multinational companies like Tyco Healthcare France and Key Plastics Automotive Group.

ColdWatt has named **Gregg Cook** VP of sales and marketing. Cook previously was the VP of strategic sales for Power-One and CEO of Fast-Chip. Joe Lamoreux, CEO. www.coldwatt.com

Coresonic AB, a provider of baseband processor IP technology, has appointed **Rick Clucas** as CEO. Clucas was the founder and CTO of ARC. He has also spent some time as CTO of an Investment Bank working with technology companies and more recently as a business consultant to technology startups and as CEO of Ignios. www.coresonic.com

Cortina Systems has named **James Mao** as GM of the Asia Pacific region.

Mao previously held executive and GM positions in both public and startup companies, such as UTStarcom, Turin Networks, Pegasus, and Nortel. Amir Nayyerhabibi, CEO & president. www.cortina-systems.com

CSR announced that **Joep van Beurden**, currently CEO of NexWave, will join the Board of CSR and assume the role of CEO with effect from November 1st. **John Scarisbrick** is stepping down from the Board and his role as CEO on the November 1st. Prior to joining NexWave, Joep held senior positions at Canesta, a fabless semiconductor company, and Philips Components.

Cymer, a supplier of excimer laser light sources used in semiconductor manufacturing, has named **Frank Hochstenbach** as president of Cymer Europe. Hochstenbach previously served as executive director of sales and marketing, applications and product development for Bede Scientific Instruments and senior director of a global account for Applied Materials. Ed Brown, president and COO. www.cymer.com

DFT Microsystems has appointed **Ken Skala** as VP of Marketing. Skala previously spent more than 5 years at Credence Systems where he was responsible for product architecture, development and initial product marketing for the Diamond test platform. Prior to Credence, he founded Kinetix Microsystems. David Lisk, president and CEO. www.dftmicrosystems.com

Dialight Lumidrives, a UK-based LED technology provider, has appointed **Paul Williams** as north and midlands sales manager and **Carl George** as design engineer. Gordon Routledge, managing director. www.dialight.com

EVE, a provider of hardware/software co-verification solutions, has promoted **Tsugumi Fujitani** to VP of Japan and Asia Sales and appointed **Masao Fujimoto** as GM of EVE K.K., a wholly owned subsidiary based in Yokohama, Japan. Fujitani, formerly GM of EVE K.K., has

relocated to EVE's U.S. headquarters in Santa Clara, while Fujimoto will be based in Yokohama office. Before joining EVE in 2004, Fujitani managed Tera Systems' operations in Japan and was CEO and co-founder of Spinnaker Systems. Most recently, Fujimoto was senior sales manager in Japan at MoSys. www.eve-team.com

Exar has appointed **Trong Vu** as Chief Information Officer and VP of Information Technology, reporting to Ralph Schmitt, president and CEO. Vu previously was a VP of IT at Mattson Technology as well as serving as IT director at LSI Logic and National. www.exar.com

FlipChip has appointed **David McComb** as Global VP of Sales and Marketing for its semiconductor wafer scale packaging and bumping business. McComb joined FCI as the Director of European Business and Sales in September 2005. **Dave Clark** will move up to European Accounts Manager with additional responsibilities for the co-ordination of FCI developments in 3D packaging. In the US market, Bruce Bowers, Jay Hayes and Jim Graham will continue their work and Janine Schmitz will take on the role as Internal Sales Manager. Bob Forcier, president and CEO. www.flipchip.com

Gennum (TSX: GND), a provider of video and data communications ICs, has appointed **Ewald Liess** as its European Sales Director and has opened a sales and support office in Munich, Germany. The new office, headed by Liess, will serve Eastern and Western Europe, the Middle East and Africa (EMEA). Liess was most recently Automotive Sales Account Director for Infineon. Klaus Mueller, SVP, Global Sales. www.gennum.com

Icera has promoted **Fabrice Moizan** to VP of Sales reporting to Nigel Toon, VP Sales & Marketing. Moizan joined Icera in 2005 as GM, Sales, from Cypress. Co-founder **Steve Allpress** has been appointed CTO in addition to his current

role of VP Modem Software. www.icerasemi.com

IDT's president and CEO, **Greg Lang**, will retire upon satisfactory completion of a search for his successor. Lang has served as President and CEO of IDT since January 2003. www.IDT.com

Impinj has appointed **Leon de Ridder** as Director of Sales for Europe, the Middle East and Africa (EMEA). Based in Zeewolde, the Netherlands, de Ridder joins Impinj after more than a decade at Omron (based in Kyoto, Japan), where he was most recently GM of the European RFID Division. Michael Kastner, VP of sales. www.impinj.com

International Rectifier has promoted **Paul Rolls** from VP of Americas sales to acting SVP, global sales reporting to acting CEO Don Dancer. **Nick Cataldo** has been promoted from global VP of sales for IR's aerospace and defense business segment to VP, Americas sales and will also report to Dancer. www.irf.com

MathStar has appointed **Russell Corvese** as VP of worldwide sales. Corvese previously was senior director of Americas field marketing at Fairchild and director of sales, Japan and director of sales, North American distribution at Actel. Doug Pihl, CEO. www.mathstar.com

MicroCHIPS, a developer of biosensing and drug delivery devices, has appointed **Robert Farra** as VP of R&D. MicroCHIPS is pioneering "smart" implantable devices to create sophisticated monitoring and therapy systems. Its devices are based on advances in the fields of MEMS, implant technologies, drug formulation and chemical sensing. www.mchips.com

MoSys has appointed **Mehdi Bathaee** as COO. In July of this year, MoSys acquired the mixed signal products division from Atmel and is now actively licensing the complex mixed-signal megacells that are contained in the Atmel chip designs. Bathaee was former-

ly GM of the Network Storage Products Group of Atmel and joined MoSys as part of the acquisition. Chet Silvestri, president and CEO. www.mosys.com

NemeriX has appointed **Luc Seraphin** and **Jacques Combet** as Managing Directors. Seraphin was promoted internally to Managing Director from VP Worldwide Sales & Business Development. Ke previously served as EVP & GM of Agere's Mobile Terminals Division. Combet most recently held senior management positions in the mobile phone sector at Alcatel, in particular as President of the Mobile Phone Division. www.nemerix.com

NetXen, a provider of 10-Gigabit Ethernet adapter chips, has appointed **Walt Wallach** as VP of software engineering and **Chuck Tybur** as VP of worldwide sales. Wallach previously was VP of Software and Strategy at Penguin Computing, VP of engineering at SUMA Technologies, and chief technology director at NetFRAME Systems. Tybur most recently served as worldwide director of sales operations for Intel's "World Ahead" group. Govind Kizhepat, founder and CEO. www.netxen.com

Oerlikon Solar, a supplier of field-proven turnkey solutions for the mass production of thin-film silicon solar modules, named **Christopher Smith** as head of Sales and Customer Support. Smith previously held VP, GM and managing director positions at Applied Materials.

Optichron has named **Thomas Carlson** as CFO. Previously Carlson had served as VP, Finance, CFO, secretary and acting VP of Operations for Caspian Networks. Optichron has also closed an additional \$12 million of equity financing that the company will use to ramp production of its digital pre-distortion (DPD) IC introduced in March of this year. Investors included US Venture Partners, TL Ventures, Battery Ventures, and VentureTech Alliance. Total funding to date is \$38 million.

Optichron's OP4400 is a claimed to be the industry's highest-performance digital pre-distortion (DPD) linearization device. The OP4400 implements Optichron's signal processing technology to eliminate nonlinear distortion, the dominant performance limiter for expensive power amplifiers (PA) used in wireless infrastructure and other signal processing applications. Perry Constantine, CEO. www.optichron.com

SanDisk has appointed **Jim Brelsford** as SVP, general counsel and corporate secretary reporting to Judy Bruner, EVP, Administration and CFO. Brelsford previously was EVP of corporate development, and prior to that general counsel, at the worldwide mobile media company Hands-On-Mobile.

SiBEAM has appointed **David Yao** as VP of Sales for Asia Pacific. Yao previously was VP of Field Sales at Silicon Image and director of sales in Japan for Trident Microsystems. John Lemoncheck, president and CEO. www.sibeam.com

Silicon Image has named **Hal Covert** as CFO succeeding Robert Freeman, who served as CFO from November 2005 and previously served as interim CFO from August 2005 to November 2005. Covert previously served as CFO at Openwave Systems. Steve Tirado, president and CEO. www.siliconimage.com

Simtek has appointed **Andrew Broom** as VP of Engineering report to president and CEO, Harold Blomquist. Broom previously served as VP of product development at AMI. www.simtek.com

Solarflare has appointed **Dean Barnat** as VP of operations. Barnat previously was VP of operations for RF Magic, which was acquired by Entropic Communications in June 2007. Barnat Russell Stern, CEO. www.solarflare.com

Spansion has appointed **Gary Wang**, previously corporate VP of Asia Pacific Sales and Marketing, to the newly cre-

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ated position of president, Spansion Greater China.

Teradici, provider of the PC-over-IP technology platform, has named **Randy Groves** as CTO and **Joe Gorfinkle** as VP of worldwide sales. Groves previously was CTO for the Dell Product Group. Gorfinkle previously was VP of sales for NVIDIA, managing its Professional Workstation, Consumer and Channel segments. He also served as NVIDIA's GM of European sales. Dan Cordingley, president and CEO. www.teradici.com

Tilera has appointed **Omid Tahernia** as President and CEO. Tahernia was previously the VP and GM of the Processing Solutions Group at Xilinx. Prior to joining Xilinx, he served as VP and GM of the Wireless and Mobile Systems Division at Motorola SPS. He succeeds Devesh Garg, who has returned to Bessemer Venture Partners, where he was employed prior to Tilera.

Trident Microsystems has appointed **Sylvia Summers** as CEO. Summers most recently served as EVP, Consumer Smart Card and Industrial Division at Spansion. Prior to joining Spansion, she served as VP and GM of the embedded business unit for AMD's Memory Products business. From August 2001 until May 2002, she served as president and CEO of Silvan Networks. Dr. JH Chang, President. www.tridentmicro.com

Ubidyne, a provider of digital radio technology for the cellular industry, has appointed **Mike Levis** as COO. Levis most recently was EVP of Xignal Technologies AG and VP of Marketing for Xicor. Ken Hawk, CEO. www.ubidyne.com

WiQuest has appointed **Steve Perna** as President and CEO, replacing founding CEO Dr. Matthew Shoemake who was named chief strategy officer. Perna previously spent 12 years at PMC-Sierra

where he held the executive positions of VP marketing and VP/GM. www.WiQuest.com

Xilinx has appointed **Scott Hover-Smoot** as VP, general counsel and secretary, reporting to Wim Roelandts, chairman, president and CEO. Hover-Smoot most recently served as regional counsel and director with TSMC. Before that, he served as VP and general counsel of California Micro Devices. **Vincent "Vin" Ratford** was promoted from VP of marketing, business development and silicon architecture for processing solutions group (PSG) to VP and GM of PSG. Ratford succeeds Omid Tahernia who departed Xilinx to become CEO at Tilera. Prior to joining Xilinx, Ratford served as president and CEO of AccelChip. www.xilinx.com

XMOS has appointed **Richard Terrill** as EVP of Marketing. Terrill previously served as VP of Marketing at Velogix and before that was with Xilinx, where he was responsible for worldwide strategic marketing. James Foster, President and CEO. www.xmos.com

Ziptronix, a developer of 3D semiconductor integration strategies and processes, has appointed **Kenneth Donahue** as President and CEO. Donahue previously served as SVP and GM of the Wafer Level Processing business unit at Amkor. He was also a member of the startup management team at Unitive, joining that company in 1998 as CFO and ultimately becoming President and CEO, a role he filled until Unitive's acquisition by Amkor in 2004. Prior to Unitive, he was EVP and CFO of Zevatech, a manufacturer and distributor of electronics assembly equipment that was acquired by Esec. www.ziptronix.com

Zilog has named **Rick Bosshardt** as VP of worldwide distribution sales. Bosshardt previously was VP of global distribution at Freescale and VP of worldwide distribution sales for Microchip. Darin Billerbeck, president and CEO. www.zilog.com ■

Funding & IPOs

HelioVolt, a producer of highly-efficient thin film solar products, announced the final closing of its Series B funding round for a total of \$101 million, with investments from Sequel Venture Partners, Noventi Ventures, and Passport Capital. The additional funding will be used to accelerate scale-up and global deployment of HelioVolt's proprietary manufacturing process for Copper Indium Gallium Selenide (CIGS) building-integrated solar products. The initial tranche closed at \$77 million in August of this year and was led by Paladin Capital Group and the Masdar Clean Tech Fund. Additional participants in the first closing of HelioVolt's Series B include returning investor New Enterprise Associates as well as Solúcar Energia, Morgan Stanley Principal Investments, Sunton United Energy and Yellowstone Capital. Dr. BJ Stanbery, founder and CEO. www.heliovolta.com

Jordan Valley Semiconductors has secured \$11 million in funding from Intel Capital as the sole investor in the round. In return, Intel Capital will receive a significant stake in the Israeli company. Jordan Valley has been developing tools for semiconductor metrology based on X-ray technology for more than 12 years. Isaac Mazor, CEO. www.jordanvalleysemi.com

Konarka, developer of Power Plastic, a material that converts light to energy, has raised \$45 million in financing led by Mackenzie Financial and co-led by existing investor, Good Energies. New investor Pegasus Capital participated, as did existing lead investors from prior rounds including Draper Fisher Jurvetson (DFJ), Asenqua Ventures, New Enterprise Associates (NEA) and 3i. Other participating current investors include Vanguard Ventures, Chevron, Massachusetts Green Energy Fund, NGEN Partners, Angeleno Group and Asenqua Ventures. The financing was agented by Lehman Brothers. Rick Hess, president and CEO. www.konarka.com

LedEngin, a supplier of high power LED components and light source modules, has closed \$11 million in Series C funding led by Partech International and including previous investor WK Technology Fund, and private investor Dr. Lu. LedEngin began first customer samples in Q1'07. Today, more than 100 customers have sampled LedEngin products, and the company now has several products shipping in volume. David Tahmassebi, CEO. www.ledengin.com

Light Blue Optics, a developer of holographic laser projection technology, has closed a US\$26 million Series A funding round, led by Earlybird Venture Capital and Capital-E. Existing investors 3i plc, who led LBO's US\$3.5 million seed-funding round, and NESTA also participated. LBO has already released engineering samples to key customers and strategic development partners. The company estimates that the total available market for miniature projection systems will exceed \$5 billion by 2012. Dr. Chris Harris, CEO. www.lightblueoptics.com

Planar Energy Devices has secured \$4 million in Series A financing from Battelle Ventures and Innovation Valley Partners. The company, which is developing thin-film batteries, is a spinout of the U.S. Department of Energy's National Renewable Energy Laboratory. Scott Faris, founder and CEO. www.planarenergy.com

Quellan has closed \$20 million in Series C financing from new investors W.L. Gore & Associates, Harbinger Venture Management, JAFCO and Glynn Capital Management. Existing investors Menlo Ventures, Yamacraw Capital Seed Fund, Cordova Ventures, Samsung Ventures America, and VentureTech Alliance also participated. Quellan has also formed a Strategic Alliance with Gore under which the Companies will collaborate on high performance data center interconnects that reduce power, extend reach and increase speed. By integrating Quellan's Q:ACTIVE semiconduc-

tors with Gore's advanced cabling, Gore's new "Active Cables" will deliver dramatically lighter, thinner and further reaching cabling to Data Centers. D. Tony Stelliga, president and CEO. www.quellan.com

Rapport has closed \$18.5 million in Series C financing led by Centurion Holdings. The KC256 multicore, reconfigurable processor, with 256 processing elements, is under deployment in modules, boards, and systems for many applications from intelligent sensors to deep packet investigation. Frank Sinton, President. www.rapportincorporated.com

Siimpel, a developer of MEMS-based solutions for mobile imaging applications, has secured funding from Motorola Ventures. Siimpel's MEMS solution will allow devices such as cell phones to provide features such as auto-focus, shutter and zoom. Tony Tang, CEO.

Staccato has closed an additional \$17.5M in equity financing from Allegis Capital, Bay Partners, Charles River Ventures, Formative Ventures, Interwest Partners, and Vision Capital, among others. The funding will be used to launch Staccato's first-generation, 110nm single-chip solution, and to continue development of its second-generation 65nm single-chip, Certified Wireless USB and Bluetooth v3.0 products. Staccato's Ripcord product family recently earned official WiMedia Platform Certification. Marty Colombatto, chairman and CEO. www.staccatocommunications.com

u-blox, a chipset provider, has completed an IPO on the SWX Swiss Exchange. In fiscal 2006, u-blox generated sales of CHF 54.4 million and a net profit of CHF 7.4 million. For the six months ended June 30, 2007 the company recorded sales of CHF 39.4 million. Thomas Seiler, CEO.

VELOX Semiconductor, a manufacturer of Gallium Nitride (GaN) transistors and diodes, announces an ATP

(Advanced Technology Program) award from the U. S. Department of Commerce's National Institute of Standards and Technology (NIST). The NIST award is for development of high-voltage (600 Volt and 1200 Volt), high-current (20 Amp and 100 Amp) electronic switches based on VELOX's Gallium Nitride-on-Silicon (GaN on Si) technology. The program funding will advance VELOX's efforts in developing new enhancement-mode Field Effect Transistors (FETs). The ATP funding for the two-year program will total \$2 million and matching funds from a variety of sources will make the total program cost of approximately \$3,280,000. VELOX has already developed 600V GaN Schottky diodes for consumer and power supply applications, which are in the final stages of development before transition to production. Thomas Hierl, CEO. www.veloxsemi.com

Zilker Labs, provider of Digital-DC power conversion ICs, has closed \$10 million in Series D funding from existing investors Sevin Rosen Funds, North Bridge Venture Partners and H.I.G. Ventures. Bob Bridge, CEO. www.zilkerlabs.com ■

Mergers & Acquisitions

Amtech Systems (NASDAQ:ASYS), a supplier of production and automation systems and related supplies for manufacturing solar cells, semiconductors and wafers, has acquired **R2D Ingenierie**, a solar cell and semiconductor automation equipment manufacturing company located in Montpellier, France for approximately \$6.1 million. R2D has provided automation solutions to the semiconductor industry since 1989 and more recently to Amtech for its solar customers. For its fiscal year ended December 31, 2006, R2D recognized net revenue of approximately \$4.9 million and operating income of approximately \$797,000. Lina Derias, President of R2D; J.S. Whang, President and CEO of Amtech.

Mergers & Acquisitions

(Continued from page 15)

Apache Design Solutions has signed a definitive agreement to acquire **Optimal**, a provider of 3D power, signal, and thermal analysis solutions for package, SiP, and board designs, for an undisclosed amount. Optimal's production proven package and PCB extraction and analysis solution for power, signal, and thermal integrity compliments Apache's newly introduced Sentinel product line targeted at system power and I/O signal integrity. Optimal has more than 60 active customers worldwide. Andrew Yang, CEO of Apache; Dave DeMaria, CEO of Optimal. www.apache-da.com

Leadis has acquired IP from **Nuelight** that will add value in the development of AMOLED display drivers. The acquired technology improves manufacturing yields by correcting non-uniform brightness without increasing backplane complexity and improving the lifetime of displays by correcting image sticking. With the use of Electrical Pixel correction algorithms, the patent-pending technology also enables the change of calibration of each pixel through the display driver. www.leadis.com

NetLogic has signed a definitive agreement to acquire **Aeluros**, a provider of 10-Gigabit Phys, for \$57 million in cash and up to an additional \$20 million in performance incentives. Aeluros products are being designed into numerous next-generation systems at leading networking OEMs and optical module manufacturers. Stefanos Sidiropoulos, CEO of Aeluros; Ron Jankov, president and CEO of NetLogic. www.netlogic-micro.com, www.aeluros.com

Silicon & Software Systems (S3), a provider of mixed signal IP for consumer products, has acquired **Acacia Semiconductor S.A.**, a developer of high-performance data converter IP based in Portugal. Acacia was founded in 2003 as a spin-off from the Microelectronics Signal-Processing group at CRI-UNINOVA, an R&D sub-unit as-

sociated with the Faculty of Science and Technology of Lisbon (FCT), in Portugal. John O'Brien, CEO, S3; Bernardo Henriques, co-founder and CEO of Acacia. www.s3group.com, www.acacia-semi.com

Spansion has acquired long term partner **Saifun Semiconductors** (Nasdaq: SFUN), a provider of IP for the non-volatile memory (NVM) market, for \$368 million on a fully-diluted basis, or approximately \$135 million net of cash acquired and cash distributed to Saifun shareholders. This transaction consolidates all MirrorBit and NROM IP, design and manufacturing expertise into a single company. Saifun will operate as a wholly owned subsidiary and will drive Spansion's technology licensing business.

Since 2002, Spansion has been a licensee of Saifun's NROM IP, which has formed the cornerstone of Spansion's MirrorBit technology. MirrorBit Technology now represents nearly one fourth of the entire NOR Flash memory segment, and generates revenues at a run rate approaching \$2 billion per year. Boaz Eitan, CEO of Saifun; Bertrand Cambou, president and CEO, Spansion. www.spansion.com

Synopsys has acquired **Sandwork Design**, a provider of analog and mixed-signal (AMS) verification solutions. Terms were not disclosed. Already interoperable with the Synopsys Discovery AMS simulators HSPICE, HSIM and Nanosim, the Sandwork tools include SPICE Explorer, a transistor-level design debugging environment, WaveView Analyzer a high-capacity, high-performance AMS waveform analyzer, and SpiceCheck for fast electrical rule checks of transistor-level netlists. Dr. Jack Yao, CEO of Sandwork. www.synopsys.com

TI has acquired **POWERPRECISE Solutions**, a fabless portable power management IC company based in Herndon, Virginia. Terms were not disclosed. POWERPRECISE was founded in 2002

and has 29 employees. Dave Heacock, SVP of TI's high-volume analog business; Gary Davison, founder, CEO and president of POWERPRECISE. power.ti.com, www.ti.com ■

Business & Financials

CopperGate has shipped more than 2 million HomePNA 3.1 CopperStream chipsets to OEM customers worldwide. Customers include leading IP set-top box, residential gateway, Ethernet bridge, and ONT manufacturers such as Actontec, Motorola, 2Wire, Scientific Atlanta, Zhone, Sendtek, ReadyLinks, Cameo, Occam tii Network Technologies, Entone, and Hitron, as well as telco test equipment manufacturers Sunrise Telecom and IneoQuest. HomePNA 3.1 is being deployed by leading telcos worldwide including AT&T, Telus, KDDI and Sonaecom for their triple-play IPTV service. Gabi Hilevitz, CEO. www.copper-gate.com

Cypress has shipped over 250 million PSoC mixed-signal arrays. Cypress currently has over 5,000 PSoC customers across the globe in applications as diverse as consumer electronics, handsets, computing and networking equipment, industrial systems, and automotive systems. Cypress had surpassed 100 million units in June 2006 and expects revenue growth to continue. New PSoC design wins are also on a record pace, 40% higher than 2006 results. The PSoC mixed-signal array integrates programmable analog and digital blocks with an 8-bit microcontroller. Babak Hedayati, SVP of Marketing and Applications. www.cypress.com

For **Cypress'** latest quarter, Q3'07, semiconductor revenue was \$215.2 million while SunPower solar cell/module revenue was \$234.3 million. Semiconductor gross margin was 45.4% while SunPower GM was 18.9%.

Dubai Silicon Oasis Authority (DSOA) has chosen Synopsys' Professional Services and Synopsys' Pilot Design Environment to establish the

Dubai Circuit Design (DCD) center. This center is the region's first chip design center for physical implementation of advanced ICs. DCD will focus on delivering physical design services for U.S., European and Asian customers. Jihad Kiwan, DCD managing director and Technology and Investment Generation executive director at DSOA.

GeneSiC Semiconductor, a provider of high-temperature, high-power and ultra high-voltage silicon carbide (SiC) devices, has received several recent grant awards from the US Department of Energy. The three separate SBIR and STTR grants are being used by GeneSiC to demonstrate novel high-voltage SiC devices for a variety of energy storage, power grid, high-temperature and high-energy physics applications. Dr. Ranbir Singh, President. www.genesicsemi.com

Himax (Nasdaq: HIMX) plans to spin-off its LCD TV and monitor chipset operation into **Himax Media Solutions, Inc.**, a wholly-owned subsidiary to be set up shortly. Himax has identified certain strategic investors and has planned to invite them to partner with the company in the future. Jordan Wu, President and CEO of Himax and newly appointed Chairman of Himax Media Solutions. www.himax.com.tw

Pixelplus (Nasdaq: PXPL), a Korean CMOS image sensor company, has completed the sale of its entire 37.5% shareholding interest in Pixelplus Technology, the company's former subsidiary in Taiwan. **Dr. Sang-Soo Lee**, the company's CTO, EVP, and member of Board has resigned.

Solarflare has successfully com-

pleted conformance and interoperability tests at the University of New Hampshire Interoperability Lab (UNH-IOL) in Durham, New Hampshire. Solarflare was the only 10GBASE-T PHY company to successfully operate on the worst-case, 105-meter link in the lab defined in terms of insertion loss and alien cross talk. Solarflare's 10Xpress10GBASE-T PHY supports distances of greater than 100 meters on UTP Category 6A cabling, 100 meters on STP Category 6, 55 meters on UTP Category 6, and 45 meters on UTP Category 5E cabling. www.solarflare.com

Transmeta has reached an agreement with **Intel** to settle all claims between them and to license the Transmeta patent portfolio to Intel for use in current and future Intel products. The agreement provides for Intel to make an initial \$150 million payment to Transmeta as well as to pay Transmeta an annual license fee of \$20 million for each of the next five years. Les Crudele, president and CEO. www.transmeta.com

TriQuint has shipped five million integrated QUANTUM Tx Modules for use in **Vodafone's** ultra low-cost models 125 and 225 GSM/GPRS handsets, which are designed and manufactured by ZTE. ABI Research estimates that the global market for ultra low cost handsets will be more than 330 million units in 2011. The Modules include two power ampli-

fier ICs, two low pass filters, a CMOS controller, and a single-pole four-throw RF switch in a 6 by 6 mm package. Tim Dunn, VP for Handsets. www.triquint.com/rf ■

Market Research

Worldwide sales of semiconductors rose sharply in September to \$22.6 billion, an increase of 5.9% from September 2006 when sales were \$21.3 billion, reports the **SIA**. Sales were up 5% from August 2007 when sales were \$21.5 billion. Third-quarter sales of \$67.8 billion increased 5.9% from the like period of 2006 when sales were \$64 billion. Third-quarter sales were 13.2% higher than Q2'07 when sales were \$59.9 billion. For the first nine months of 2007 sales were \$188.8 billion, 3.5% ahead of the \$182.5 billion for the first nine months of 2006. www.sia-online.org

North American-based manufacturers of semiconductor equipment posted \$1.23 billion in orders in September 2007 and a book-to-bill ratio of 0.81, according to **SEMI**. The three-month average of worldwide bookings in September 2007 was \$1.23 billion, down about 10% from the final August 2007 level of \$1.37 billion and 25% less than the \$1.64 billion in orders posted in September 2006. The three-month average of worldwide billings in September 2007

WW Semiconductor Capital and Equipment Spending Forecasts (\$M)

	2005	2006	2007	2008	2009	2010	2011
Semic Capital	47,197	56,313	57,145	54,603	59,786	54,568	58,560
Growth (%)	-2.8	19.3	1.5	-4.4	9.5	-8.7	7.3
Capital Equip.	34,141	41,950	43,673	43,796	48,057	43,079	48,539
Growth (%)	-10.0	22.9	4.1	0.3	9.7	-10.4	12.7
Wafer Fab Equip.	25,952	32,610	34,707	34,267	38,159	34,410	38,133
Growth (%)	-8.5	25.7	6.4	-1.3	11.4	-9.8	10.8
Packaging and Asm	4,416	5,218	5,041	5,318	5,514	4,855	5,735
Growth (%)	-7.7	18.2	-3.4	5.5	3.7	-12.0	18.1
ATE	3,7739	4,122	3,925	4,211	4,384	3,815	4,672
Growth (%)	-21.2	9.3	-4.8	7.3	4.1	-13.0	22.5
Other 13,056	14,363	13,4712	10,807	11,729	11,488	10,021	
Growth (%)	23.0	10.0	-6.2	-19.8	8.5	-2.1	-12.8

Source: Gartner (October 2007)

Market Research

(Continued from page 17)

was \$1.51 billion, 10% less than the final August 2007 level of \$1.68 billion and about 9% less than the September 2006 billings level of \$1.67 billion. www.semi.org

Semiconductor capital equipment growth is slowing, and the trough will push out into Q1'08, leading to flat growth in 2008, reports **Gartner**. Worldwide semiconductor capital equipment spending is projected to total \$43.7 billion in 2007, a 4.1% increase from last year. In 2008, the worldwide spending is expected to increase 0.3%. www.gartner.com

The current market for **Tire Pressure Monitoring Systems (TPMS) pressure sensors** is expected to reach \$183M in 2012 from \$168M in 2007, seeing a CAGR of 2% till 2012 in revenue due to a strong erosion of prices, despite an increase of 12% in volume, if nothing changes in European or Asian legislation, reports **Yole Développement**. 99% of direct TPM Systems currently use MEMS pressure sensors. TPMS sensors are mandatory on all new cars sold in the U.S. since September 1, 2007. www.yole.fr

ABI Research forecasts substantial numbers of WiMAX subscribers worldwide: more than 95 million using CPE devices by 2012, and almost 200 million using mobile devices, with some overlap between the two groups. ■

Emerging Trends

IMEC has developed a 2-channel wireless EEG (electroencephalography or monitoring of brain waves) system powered by a thermo-electric generator that uses the body heat dissipated naturally from the forehead. The entire system is wearable and integrated into a headband. The small size, low power consumption of only 0.8mW and autonomous operation increase the patient's autonomy and quality of life.

The EEG system uses IMEC's ultra-low power biopotential readout ASIC to extract high-quality EEG signals with micro-power consumption. A low-power digital signal-processing block encodes the extracted EEG data, which is sent to a PC via a 2.4GHz wireless radio. The whole system consumes only 0.8mW.

The thermoelectric generator is mounted on the forehead and converts the heat flow between the skin and air into electrical power. The generator is composed of 10 thermoelectric units interconnected in a flexible way. At room temperature, the generated power is about 2-2.5mW or 0.03mW/cm², which is the theoretical limit of power generation on human skin. Higher power generation would cause an uncomfortable sense of cold. Future research targets further reduction of the power consumption of the different system components including the radio and processor. Also, a semiconductor process for manufacturing thermopiles is under development.

Intel is opening its newest \$3 billion microprocessor factory, called Fab 32, in Chandler, Ariz. as it prepares to ship its first 45nm processors on Nov. 12. Two more 45nm factories will open next year. The facility has 1 million square feet and more than 1,000 employees.

Sony will launch XEL-1, the world's first organic light emitting diode (OLED) TV, on December 1, 2007. In September 2007, Sony commenced mass production of its independently developed "Organic Panel", used in XEL-1. The launch of XEL-1 represents the first stage in Sony's OLED TV business, and Sony will continue to advance its OLED TV development, while focusing on long-term business growth. The XEL-1 is an 11-inch OLED TV that is approximately 3mm thick at its thinnest point. It has high contrast (1,000,000:1), high peak brightness, excellent color reproduction, rapid response time, and low power consumption (as low as 45W).

Ubiquiti Networks has introduced XtremeRange7, a 700MHz WiFi radio. The XR7 was designed specifically for 700MHz mobile WiFi test networks as well as long-distance, outdoor broadband wireless and public safety applications. It is based on silicon and software solutions from Atheros and has been tested to link beyond distances of 50km and can achieve TCP/IP data rates greater than 50Mbps. Robert Pera, President. www.ubnt.com

The city of Gothenburg (or Göteborg), Sweden, will soon form the world's largest **ZigBee network** when it deploys the NURI AiMiR Advanced Meter-reading Management (AMM) System for its 270,000 homes. The NURI AiMiR meter reading unit is based on **Ember's** ZigBee technology. www.ember.com ■

New Products

Akros Silicon has introduced the AS1130, an extension to its family of Power over Ethernet (PoE) Powered Device (PD) controllers. The AS1130 provides the same small footprint and high integration as its predecessors, the AS1113 and AS1124. In addition, the new device provides up to 30W power delivery on the network cable, allowing for the deployment of high-end security cameras and WLAN access points. In its most recent 5-year forecast, Dell'Oro Group predicts that PoE shipments will grow from 32M ports in 2006 to 145M ports in 2011. \$1.66 @ 1Ku. Ven Shan, VP of marketing. www.akrossilicon.com

Cavium has introduced the OCTEON Plus CN58XX Low-Power (LP) 4-core to 16-core processor family, the newest addition to the OCTEON Multi-core MIPS64 Processor family. The OCTEON Plus CN58XX family incorporates innovative power management techniques and process optimizations to deliver the power of 16x MIPS64 cores while consuming less than 1 Watt per core. The product family consists of 6 different software-compatible parts

combining 4 to 16x cnMIPS Plus cores at up to 600MHz, 2MB of L2 cache, advanced hardware acceleration for packet processing, QoS, TCP, compression decompression, security, and pattern matching along with integrated 10G and 1G networking interfaces. YJ Kim, director of OCTEON marketing. www.caviumnetworks.com

Ember has unveiled EmberZNet PRO 3.1, the first ZigBee networking software to support the new ZigBee PRO Feature Set, announced earlier this month by the ZigBee Alliance. The EmberZNet PRO 3.1 stack combines the increased scalability, security and resilience of the ZigBee PRO Feature Set with compatible Ember-specific innovations for denser networks, "sleepy" (i.e. power saving) nodes and mobile nodes. These features make EmberZNet PRO 3.1 well suited for applications in advanced metering infrastructure (AMI), home automation and monitoring, and building automation systems.

EmberZNet PRO 3.1 users can create wireless networks that are larger, scaling to potentially thousands of nodes enabled by the Stochastic Addressing, Many-to-One / Source Routing and Asymmetric Link Handling features. The networks can be denser, enabled by Ember's Intelligent Table Management that assures network stability even when dozens of routing nodes are within close proximity. Skip Ashton, VP of engineering. www.ember.com

EZchip has introduced a new family of network processors targeting Ethernet Access applications. Several models of the network processors, named NPA, will be offered in 2008 with combinations of 100-Megabit, 1-Gigabit and 10-Gigabit Ethernet ports with an aggregate throughput of up to 10-Gigabits, at varying price points starting at under \$100. The NPA product family addresses the transition of carrier access from ATM/TDM-based networks to Ethernet packet-based networks and the provisioning of triple-play services. The NPA is a scaled down version of EZchip's NP-3

30-Gigabit network processor, and features the same architecture, integrated traffic management and full software compatibility with the NP-3.

Similar to EZchip's other network processors, the NPA family delivers a variety of applications such as L2 switching, Q-in-Q, PBT, VPLS, MPLS and IPv4/IPv6 routing through programming. Other features include integrated hierarchical traffic management and dedicated hardware for OAM (Operations, Administration and Maintenance) processing offload. Samples in 2008; prices start at under \$100 in quantities. Eli Fruchter, president and CEO. www.ezchip.com

Horizon Semiconductors has introduced a universal SoC enabling dual channel true 1080/60p decoding for next generation media players/recorders supporting the HD-DVD and Blu-Ray(TM) optical disc formats, as well as legacy red laser DVD format. Today's current generation of advanced 60fps STB/DVD products decode 1920x1080 at 24fps/30fps and subsequently perform frame rate conversion to reach 60fps. In contrast, Hz7220 natively supports true 1080/60p decoding and playback. Amir Morad, president and CEO. www.horizonsemi.com

Gyration, a provider of motion-sensing controllers, has introduced the next generation of human motion-sensing technology. UltraSense technology includes multiple motion sensors and a core control chip containing a sophisticated set of patented algorithms, power management features and integration capabilities. It offers "five degrees of freedom" and breakthrough sensing accuracy for consumer control devices for PC, PC-TV integration, gaming and set top box applications. The UltraSense design provides all the subsystem integration and signal processing required to guarantee "perfect motion control", with two rotational and three linear axes of motion detection. Tom Quinn, president. www.gyration.com

MediaPhy has introduced the second member of its product family, the J-Solo, designed specifically to address the rapidly growing Japanese mobile TV market. The Linley Group estimates that Japan will be the single-largest mobile TV market through 2011. The all CMOS single-die JSolo covers ISDB-T 1-3-13 segments, enabling seamless mobile TV throughout Japan. Among the most advanced features of the J-Solo device is Smart-Seg, which allows seamless switching between 1-seg, 3-seg and 13-seg modes, enabling best quality reception at all times in all locations. Sample this month; production in Q1'08. Terry Leeder, CEO and President.

Nextreme, a manufacturer of micro-scale thermal and power management products for the electronics industry, has integrated cooling and power generation into the widely accepted copper pillar bumping process used in high-volume flip chip electronic packaging. Nextreme's innovation creates a thermally active copper pillar bump. When electrical current is passed through Nextreme's thermal bump, one side cools rapidly relative to the other. Alternatively, when heat passes through the thermal bump, the bump actually generates power.

Nextreme added this functionality by incorporating a thin film of proprietary nano-material into a proven and widely available manufacturing technique called solder bumping. Manufacturing of discrete thermal management devices from Nextreme will be supported with production at the company's US facility in North Carolina; die level integration will largely be outsourced off shore; and wafer level processing will be licensed to merchant and captive providers of wafer-level flip chip processes. Jesko von Windheim, CEO. www.nextreme.com/bump

Octasic has introduced its Opus DSP architecture, which changes the fundamental design of DSPs. Through its asynchronous design, Opus provides three times more performance per watt

Company Financials

Company	Symbol	Next Qtr Outlook	Current Qtr				Last Qtr		Yr-ago Qtr			Sales Growth	Qtr	Ending
			Sales	Net	Margin	GM	Sales	Net	Sales	Net	GM			
Actel	ACTL	-1 to +3%	47.9	n/a	n/a	n/a	48.8	n/a	49	n/a	n/a	-2%	3Q07	30-Sep
Actions Semi	ACTS	\$32-35	27	10.3	38%	52%	27	9.8	46	20.5	57%	-41%	3Q07	30-Sep
Altera	ALTR	Dwn 0-4%	316	69.0	22%	64%	320	80.5	341	87.4	68%	-7%	3Q07	28-Sep
AMCC	AMCC	n/a	58	-8.1	-14%	48%	50	-16.4	76	-13.9	54%	-24%	2Q08	30-Sep
AMD	AMD	Up	1632	-396.0	-24%	41%	1378	-600.0	1328	136.0	51%	23%	3Q07	29-Sep
AMI	AMIS	Dwn 0-2%	155	n/a	n/a	n/a	157	7.0	159	n/a	n/a	-3%	3Q07	29-Sep
Anadigics	ANAD	Up 10-14%	60	2.4	4%	34%	54	1.9	44	-1.3	31%	36%	2Q07	29-Sep
AnalogicTech	AATI	\$30.6-\$32.5	31	2.6	8%	54%	26	-0.9	20	-1.5	55%	52%	3Q07	30-Sep
ARM (GBP)	ARMHY	Up	63	8.6	14%	89%	66	8.8	65	9.4	87%	-3%	3Q07	30-Sep
Atheros	ATHR	n/a	106	9.7	9%	49%	101	9.3	80	6.3	47%	34%	3Q07	30-Sep
Atmel	ATML	Up 0-2%	418	16.6	4%	36%	404	0.7	432	124.3	35%	-3%	3Q07	30-Sep
AuthenTec	AUTH	\$15.2-15.5	15	0.5	3%	48%	12	-6.7	8	-2.6	40%	84%	3Q07	28-Sep
Broadcom	BRCM	n/a	950	27.8	3%	51%	898	34.3	903	110.2	50%	5%	3Q07	30-Sep
C.M.D.	CAMD	\$13-16	16	0.6	4%	32%	13	-1.1	19	1.4	40%	-14%	2Q08	30-Sep
Cadence	CDNS	\$465-\$475	401	72.7	18%	87%	391	59.6	366	42.1	86%	10%	3Q07	29-Sep
Catalyst	CATS	n/a	20	0.7	4%	36%	18	-0.5	15	-0.3	32%	31%	1Q08	29-Jul
Cavium	CAVM	CAVM	14	1.3	9%	63%	13	-0.1	9	-1.7	58%	54%	3Q07	30-Sep
Chartered	CHRT	\$340	355	114.8	32%	19%	324	-27.1	355	26.8	27%	0%	3Q07	30-Sep
Cirrus	CRUS	\$47-51	47	-0.3	-1%	57%	41	4.0	48	9.3	59%	-2%	2Q08	29-Sep
Cypress	CY	n/a	450	29.8	7%	32%	373	363.4	290	10.7	43%	55%	3Q07	30-Sep
Dialog	DLGS	Up	25	-5.5	-22%	56%	14	-6.8	20	-23.8	-1%	25%	3Q07	30-Sep
DSP Group	DSPG	n/a	62	-7.5	-12%	40%	52	3.0	64	8.2	41%	-3%	3Q07	30-Sep
ESS	ESST	\$16-19	18	-0.1	-1%	39%	17	-0.7	23	-4.4	-17%	-24%	3Q07	30-Sep
Fairchild	FCS	Up 1-3%	427	20.3	5%	30%	409	3.4	417	25.1	31%	2%	3Q07	30-Sep
FormFactor	FORM	n/a	125	n/a	n/a	n/a	114	18.7	97	n/a	n/a	29%	3Q07	29-Sep
Freescale	n/a	n/a	1446	-261.0	-18%	40%	1376	-288.0	1619	257.0	46%	-11%	3Q07	28-Sep
Hi/fn	HIFN	n/a	11	0.6	5%	68%	12	0.3	9	-2.3	60%	21%	3Q07	30-Sep
IDT	IDTI	n/a	204	4.8	2%	43%	199	-1.1	205	-0.7	42%	-1%	2Q08	30-Sep
Ikanos	IKAN	\$29-31	27	-13.0	-48%	37%	26	-7.2	37	-3.6	37%	-26%	3Q07	30-Sep
Intel	INTC	\$10.5-\$11.1	10090	1860.0	18%	52%	8680	1278.0	8739	1301.0	95%	15%	3Q07	29-Sep
Intersil	ISIL	Up 5-7%	198	35.9	18%	56%	178	31.2	193	37.7	58%	3%	3Q07	29-Sep
ISSI	ISSI	n/a	63	3.3	5%	20%	60	4.9	60	0.1	20%	6%	4Q07	30-Sep
Lanoptics (EZchip)	LNOP	n/a	5	-0.8	-15%	62%	5	-1.6	2	-2.1	57%	148%	3Q07	30-Sep
Lattice	LSCC	\$57-\$59	58	-4.4	-8%	54%	59	-1.5	64	0.9	56%	-8%	3Q07	29-Sep
Leadis	LDIS	\$6-7M	10	-8.4	-85%	10%	10	-6.2	22	-2.8	13%	-56%	3Q07	30-Sep
Linear Tech	LLTC	Up 1-4%	282	91.5	33%	77%	268	95.7	292	112.4	78%	-4%	1Q08	30-Sep
LogicVision	LGVN	\$2.8-\$3	3	-0.7	-23%	73%	3	-1.1	3	-1.7	74%	11%	3Q07	30-Sep
LSI Logic	LSI	\$700-730	727	-140.6	-19%	43%	670	-377.9	493	43.6	44%	48%	3Q07	30-Sep
Magma Design	LAVA	\$53-55	54	-6.4	-12%	78%	50	-11.3	42	-12.4	69%	27%	2Q08	30-Sep
Magnachip	n/a	n/a	200	-8.4	-4%	16%	n/a	n/a	171	-47.7	12%	17%	3Q07	30-Sep
Mellanox	MLNX	n/a	23	7.0	31%	75%	20	5.6	13	2.9	72%	69%	3Q07	30-Sep
Metalink	MTLK	n/a	4	-5.2	-133%	54%	3	-5.6	4	-3.9	52%	-7%	3Q07	30-Sep
Micrel	MCRL	Up 2-4%	65	9.4	14%	58%	65	8.6	74	11.8	59%	-11%	3Q07	30-Sep
Microchip	MCHP	Dwn 0-6%	259	60.7	23%	60%	264	80.3	268	79.5	60%	-3%	2Q08	30-Sep
Micron	MU	n/a	1437	-158.0	-11%	12%	1294	-225.0	1373	64.0	24%	5%	4Q07	30-Aug
Microtune	TUNE	\$21.5-22.5	24	1.2	5%	50%	25	2.1	18	-1.5	49%	32%	3Q07	30-Sep
Mindspeed	MSPD	Up 1-6%	34	-0.5	-11%	69%	33	-2.5	32	-7.4	64%	5%	4Q07	30-Sep
Mono Power	MPWR	\$37-39	40	8.3	21%	63%	31	-6.4	27	-1.9	66%	47%	3Q07	30-Sep
MoSys	MOSY	Flat	4	-2.8	-70%	83%	4	-0.1	4	-2.9	95%	0%	3Q07	30-Sep
Nanometrics	NANO	n/a	39	2.0	5%	44%	37	0.3	29	-6.6	39%	33%	3Q07	29-Sep
National	NSM	Up 4-7%	472	85.6	18%	63%	456	90.1	541	120.1	62%	-13%	1Q08	28-Aug
NetLogic	NETL	n/a	28	3.5	13%	64%	26	2.3	27	3.4	61%	3%	2Q08	30-Sep
Omnivision	OVTI	\$210-230	173	13.0	8%	23%	119	-1.5	137	15.9	36%	26%	1Q08	31-Jul
ON Semi	ONNN	Up 0-2%	403	63.8	16%	39%	381	63.3	421	76.8	38%	-4%	3Q07	28-Sep
Pericom	PSEM	\$39.3-40.8	39	3.9	10%	36%	32	2.1	31	1.6	34%	25%	4Q07	29-Sep
Pixelplus	PXPL	n/a	5	-1.6	-31%	27%	6	-1.8	8	-5.2	-15%	-36%	3Q07	30-Sep
Pixelworks	PXLW	\$25-27	28	-4.4	-16%	43%	27	-7.6	36	-17.7	37%	-23%	3Q07	30-Sep
PLX	PLXT	\$21.5-22.5	21	1.0	5%	62%	20	-0.1	21	1.0	58%	1%	3Q07	30-Sep
PMC-Sierra	PMCS	n/a	118	-5.9	-5%	66%	104	-22.2	117	-11.5	66%	1%	3Q07	30-Sep
Power Integrations	POWI.PK	Flat	50	6.8	14%	53%	43	6.8	44	2.7	54%	12%	3Q07	30-Sep
Qlogic	QLGC	n/a	140	22.6	16%	65%	140	19.0	145	30.4	68%	-3%	2Q08	30-Sep
Quicklogic	QUIC	n/a	9	-1.5	-17%	52%	9	-3.0	9	-2.1	53%	6%	3Q07	30-Sep
Ramtron	RMTR	n/a	13	1.1	8%	54%	12	0.2	11	0.5	54%	20%	3Q07	30-Sep
RF Micro Devices	RFMD	\$265-280M	256	14.5	6%	32%	212	25.3	247	-20.0	35%	4%	2Q08	29-Sep

Company Financials

Company	Symbol	Next Qtr Outlook	Current Qtr				Last Qtr		Yr-ago Qtr			Sales Growth		
			Sales	Net	Margin	GM	Sales	Net	Sales	Net	GM	Qtr	Ending	
Saifun	SFUN	n/a	9	2.5	28%	57%	n/a	n/a	16	1.3	79%	-43%	3Q07	30-Sep
SanDisk	SNDK	n/a	1037	84.6	8%	33%	827	28.5	751	103.3	39%	38%	3Q07	30-Sep
Sigma Designs	SIGM	Up 20%	42	8.6	20%	52%	36	5.4	20	0.2	44%	111%	2Q07	4-Aug
Silicon Labs	SLAB	\$93-97	88	20.4	23%	60%	76	7.5	73	4.7	65%	20%	3Q07	29-Sep
Silicon Motion	SIMO	\$50-52	46	10.0	22%	53%	44	8.3	32	8.9	0.5	44%	3Q07	30-Sep
Simtek	SMTK	n/a	9	-0.2	-2%	49%	8	-0.8	8	-0.2	40%	5%	3Q07	30-Sep
Sirenza	SMDI	n/a	46	2.7	6%	45%	47	2.8	40	3.3	45%	16%	3Q07	30-Sep
Sirf	SIRF	n/a	91	-16.1	-18%	52%	71	2.1	64	2.6	56%	43%	3Q07	30-Sep
SMSC	SMSC	n/a	98	9.3	10%	51%	82	3.2	97	5.7	46%	1%	2Q08	31-Aug
SST	SSTI	\$100-108	108	n/a	n/a	n/a	99	n/a	116	n/a	n/a	-7%	3Q07	30-Sep
ST Micro	STM	Up 4-9%	2565	187.0	7%	35%	2418	-758.0	2513	207.0	36%	2%	3Q07	29-Sep
STATS ChipPAC	STTS	n/a	414	27.9	7%	20%	370	7.4	397	18.5	20%	4%	3Q07	30-Sep
Supertex	SUPX	n/a	22	4.5	20%	59%	21	4.5	27	6.0	61%	-17%	2Q08	29-Sep
Synplicity	SYNP	\$19-20	19	1.5	8%	89%	17	0.6	16	1.6	95%	19%	3Q07	30-Sep
T.I.	TXN	\$3.5-\$3.7	3663	776.0	21%	54%	3424	610.0	3761	702.0	51%	-3%	3Q07	30-Sep
Techwell	TWLL	\$16-16.5	15	5.4	36%	61%	15	2.6	15	4.5	58%	1%	3Q07	30-Sep
TranSwitch	TXCC	7.2-7.5	7	-4.5	-63%	64%	9	-4.4	10	-0.7	68%	-25%	3Q07	30-Sep
Trident	TRID	\$70-72	88	10.1	11%	51%	71	6.8	71	10.5	52%	24%	1Q08	30-Sep
TriQuint	TQNT	\$125-130M	123	1.9	2%	32%	114	1.4	103	8.1	32%	19%	3Q07	30-Sep
TSMC	TSM	Up 3-6%	2700	930.0	34%	46%	2274	778	2503	988	50%	8%	3Q07	30-Sep
Vishay	VSH	n/a	729.6	35.2	5%	24%	716	40.7	654	32.5	26%	11%	3Q07	29-Sep
Volterra	VLTR	n/a	19	0.5	3%	54%	19	0.5	20	1.8	52%	-6%	3Q07	30-Sep
Wolfson	Wf.I	\$66-72	70	10.5	15%	52%	50	5.9	58	7.7	52%	21%	3Q07	30-Sep
Xilinx	XLNX	Up 2-6%	445	89.7	20%	62%	446	84.3	467	93.0	61%	-5%	2Q08	29-Sep
Zarlink	ZL	\$55-58	50	-15.9	-32%	46%	31	-5.0	38	6.9	53%	30%	2Q08	28-Sep
Zoran	ZRAN	\$128-132	146	13.1	9%	52%	130	0.2	129	1.9	48%	13%	3Q08	30-Sep

Last Minute Startup Additions

aTempo

Nick Weiner, co-founder of Phyworks, founded aTempo in April 2007 to develop multi-gigabit serial communications ICs for the PC market. The company is based at the University of Bristol's SETSquared Business Acceleration Centre.

aTempo is focused on next-generation data rates for serial links such as USB 3.0 at 4.8 Gbps; PCI Express 3.0 at 8 Gbps; FireWire 3200 at 4 Gbps and both SAS and SATA at up to 6 Gbps. aTempo's technology makes these data rates practical using the lowest cost cables, lowest cost circuit boards, lowest cost connectors and low cost, low power silicon. This is achieved using a combination of novel signal processing IP and CMOS circuit implementation IP, which together offer a new level of performance for multi-gigabit per second serial links.

Nick Weiner, Founder (previously co-founder and CTO of Phyworks and VP, Engineering at Microcosm)

University Gate East, Park Row, Bristol, BS1 5UB, UK

Tel: +44 (0) 7887 932456

www.atempo-io.com

Silicon Basis

Silicon Basis was founded to commercialize its FPGA technology, SiTela (Italian for fabric), which is aimed at consumer markets. The company has licensed the underlying FPGA technology developed at the University of California at Berkeley, and has developed additional technology to achieve power and density requirements, which are better than 100M operations per milliwatt.

Rob Beat, founder

www.siliconbasis.com ■

New Products

(Continued from page 19)

than current DSP architectures on the market today. The Opus maintains a traditional programming model preserving customers' investment in applications and skill set. Octasic's Vocallo multicore media gateway DSP is the first Octasic product based on the Opus core. Doug Morrissey, CTO. www.octasic.com

picoChip's PC102 multicore signal processing device has a 40-fold advantage in price-performance over traditional DSP processors solutions in key communications benchmarks, and 8-times higher absolute performance, according to new results published by Berkeley Design Technology (BDTI). The PC102 picoArray can implement 14 benchmark channels in a single device running 160MHz. This represents a cost per channel of \$6.78, some 40x less than the figure for competing traditional DSPs such as TI's TMS320C6455, running at 1GHz. The results were obtained using a standard production-grade 130nm version of the PC102: picoChip expects a further 3x price-performance improvement with its newer PC20x family in 90nm process technology. Guillaume d'Eyssautier, president and CEO.

Renesas has begun shipping the SH-Mobile G3, which was jointly developed with NTT DoCoMo, Fujitsu, Mitsubishi Electric, Sharp, and Sony Ericsson Mobile Communications for 3G mobile phones. Shipments of evaluation samples to these handset manufacturers started in October 2007. Powered by the G3 system LSI, the jointly developed 3G mobile phone platform is targeted for completion in Q3'08. The SH-Mobile G3 supports HSDPA cat. 8 data transfer at up to 7.2 Mbps and dual-mode communications including W-CDMA and GSM/GPRS. www.renesas.com

UMC's 65-nm RFCMOS process is ready for customer design-in. Several

customers are engaged for this RF process, which is targeted for next generation wireless SoC applications including WiFi, WiMax, wireless USB, and cellular. The RF process is derived directly from UMC's standard 65nm CMOS logic process, which was qualified in early 2006 and is currently in volume production for a variety of customer products. UMC currently has 11 customers for the 65-nm technology node with over 30 product tape-outs. Over 25 products have been functionally validated with 7 products already in volume production. Two advanced 300mm fabs have been dedicated to 65nm production. Lee Chung, VP of Corporate Marketing. www.umc.com

WiSpry has introduced its product family of MEMS tunable digital capacitors, which integrate low power CMOS control and voltage generation logic with an array of tunable RF-MEMS digital capacitors to provide an ultra linear, digitally programmable, variable capacitance solution on a single silicon die. Products using WiSpry's tunable digital capacitors will enable mobile wireless devices to implement digitally programmable matching, filtering and other critical RF functions in wireless front-end systems. Samples in Q2'08. Russ Garcia, president and CEO. www.wispry.com ■

Design Wins

CEVA's CEVA-Teak DSP core has been licensed by **NXP** for ultra-low-cost cellular solutions. Other customers include Broadcom, Chipnuts, EoNex, Infineon, InterDigital, Renesas, ROHM, Sharp, Spreadtrum and VIA, as well as yet-to-be-announced major European and Taiwanese chipset suppliers. Gartner reports CEVA's share of the worldwide market in 2006 at 53% based on design IP revenue. Gideon Wertheizer, CEO. www.ceva-dsp.com

NXP announced that **Hi-Tech Wealth (HTW)** has selected the NXP Nexpيريا Cellular System Solution 5110 for the

first commercial solar-powered mobile phone. Designed in by Laucant Technology, NXP's system solution optimizes solar charging by enabling ultra-low power consumption for industry-leading standby and talk times. The solar phone allows users to recharge its battery in real-time, leveraging any light source, even candlelight – ensuring a longer standby time versus any other mobile phone. www.nxp.com

Qualcomm and **Ubixon**, a developer of portable consumer devices, announced their collaboration with **Audiovox** to bring a direct view MEMS display to market. Based on a reflective technology, Qualcomm's Interferometric Modulation (IMOD) MEMS displays require no backlighting, has superb viewing quality and low power consumption.

The Acoustic Research ARWH1 headset from Audiovox Accessories is the first product to feature an IMOD display from Qualcomm. The ARWH2 headset will be available in retail locations by November 2007 with a MSRP of \$99.99. The Acoustic Research ARWH1 is one of the first Bluetooth headsets capable of delivering visual information, such as caller ID, battery level and status alerts, as icons and text on the main screen. Qualcomm is also collaborating with **Hisense Communication**, one of China's top electronics manufacturers, to bring to market mobile phones with Qualcomm MEMS displays.

SiConnect has signed a memorandum of understanding with **ST&T** of Taiwan to develop powerline communication based audio equipment for the home. ST&T will use SiConnect's single-chip PLi050A audio powerline transceiver in the joint development project. Chris Wade, CEO. ■

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Philadelphia SOX Index



TSMC – Foundry Barometer



Micron – DRAM Barometer



SanDisk – Flash Barometer



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- ✓ **EtherWaves** – Digital Radio & Mobile TV IP
- ✓ **Energy Micro** – Ultra-Low Power Mixed-Signal Microcontrollers
- ✓ **Gainspan** – Wi-Fi-based Sensor Network ICs
- ✓ **LINIGEN** – Liquid Nitrogen-based Cooling & Power Solutions
- ✓ **Perpetuum** – Vibration Energy Harvesting Microgenerators
- ✓ **S5 Wireless** – Wide-Area Wireless Location & Telemetry Chips
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