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Radar Scope

Kalray

Kalray was founded in July 2008 to develop “the next generation of programmable ICs for embedded computing.” The company’s mission is “to provide a new programmable logic technology to serve the market demand in high performance & flexible ICs.”

Kalray is a spin off from CEA and the incubators Incuballiance & Grain, capitalizing on 20 years of R&D. The company has received strong support from CEA and CEA Leti, which has resulted in signing a contract for technology transfer on 17 patents and creation of a joint laboratory.

The company has raised euro 2.5 million in first round funding from a pool of investors, grouped around Rhone Alpes Creation, CEA Valorisation and ACE Management. Kalray will be seeking an additional 10 million euro funding round in 2010.

Kalray products include a family of massively parallel multi-core processors along with their software tools

chain, which offer to embedded systems designers a complete digital solution for all small- and mid-size production series.

Joel Monnier, Ph.D., (former VP, Director of R&D Central ST Micro-electronics)

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The company is funded by the founders, and is forming a series of synergistic corporate partnerships. The Acuity team consists of the founders plus contractors.

Acuity is currently producing two ultra-stable low-pressure MEMS Piezoresistive sensor die that are targeted to replace existing piezoresistive pressure sensor die and open new applications requiring very accurate low-pressure measurements.

The AC3030 is an advanced, low-pressure (20 to 100 mBar full-scale) sensor die, primarily meant for low-pressure differential pressure applications such as breathing, sleep apnea, industrial, and instrumentation. The device is available in 20, 50 and 100 mbar FS versions.

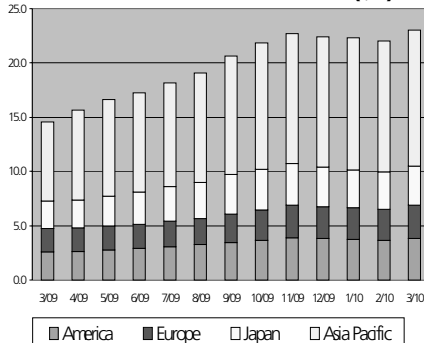
The AC3050 is a lower pressure (10 mBar FS) version of the AC3030, primarily meant for even lower-pressure

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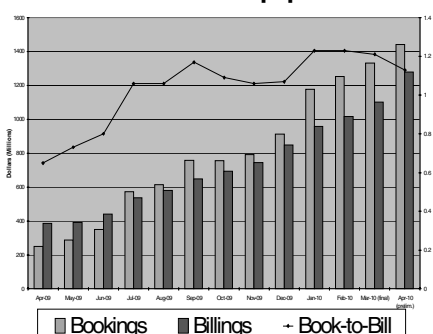
Acuity

Acuity (see July 2008 profile) was founded in 2007 by MEMS industry veterans Jim Knutti and Henry Allen as a fabless provider of high performance, MEMS-based pressure sensors and other MEMS devices that offer expanded capabilities, reliability, and a solid source of supply.

SIA Mar.2010 Global Sales (\$B)



SEMI's N. American Equipment Bk/Bi



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differential pressure applications such low-pressure instrumentation in industrial measurement, medical and HVAC applications. Added stability enables amplified pressure parts with ranges down to 2.5mbar FS.

The devices feature very low zero-drift and tight parameter distribution, enabling very accurate low-pressure measurements and are especially key in many amplified designs. They have a very low-mass diaphragm, which overcomes g-force and vibration errors, improving accuracy and reducing the costs associated with correction schemes.

The very small footprint (1.6 to 1.9 mm²) reduces the effects of package stress and lowers chip costs while featuring sensitivity and stability exceeding that of much larger traditional low pressure sensor die.

Acuity's device structures rely on several proprietary process steps to achieve higher stability while reducing die size. MEMS foundry Semefab fabricates the wafers. Semefab is currently building a new separate MEMS fab to supplement its existing fab.

The primary competitors are vertically integrated traditional MEMS sensor product companies. Acuity argues that the emergence of a mature MEMS infrastructure enables the company to operate as a fabless standard product MEMS supplier without the development, cost, capitalization and capacity utilization burden of its vertically integrated competitors. The company's products offers higher performance and stability.

Additional product families are under development and qualification. The company's focus on high performance pressure will lead to other special

performance and system level MEMS niches. A number of Sensor OEMs currently use Acuity's die.

Dr. Jim Knutti, founder, President and CEO (previously founder, President and CEO of Silicon Microstructures, which was acquired by Elmos Semiconductor, and founder and President of Transensory Devices, which merged with IC Sensors, where he served as president, which was subsequently acquired by EG&G)

Dr. Henry Allen, Vice Founder and VP (previously founder and VP of Transensory Devices, VP, IC Sensors, and founder and VP of Silicon Microstructures)

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Cognovo

Cognovo was formed in 2009 to "change the cellular and wireless industries through Software Defined Modem (SDM) techniques." Cognovo's founding team formed TTPCom over 20 years ago, which grew into the largest provider of IP in the cellular world. TTPCom was floated on the London Stock Exchange in October 2000, grew to 700 people with revenues in excess of US\$100M, and was ultimately acquired by Motorola in 2006.

Post TTPCom, the Cognovo founders decided to build a business around a software defined modem. Its search for processor technology led to ARM and in October 2009 Cognovo was formed when ARM transferred its Vector Signal Processor (VSP) technology and VSP core engineering team to Cognovo in return for an equity stake. Cognovo is currently funded by the founders and ARM. The company has 30 employees.

Cognovo believes that the time is approaching where the demands on terminals to support myriad modes of wireless operation (eg. LTE, HSPA+, E-GPRS, GSM, TD-SCDMA, CDMA2000, WiFi and WiMAX, etc.) require the use of reconfigurable architectures. At the same time, the development of semiconductor technologies and processor architectures has reached the point where it is possible to create user terminals built on SDR techniques that are competitive in both cost and power consumption.

To capitalize on this vision, Cognovo has created a software architecture that complements the capability of the latest generation of flexible baseband processing engines. At the heart of Cognovo's products are two decades of experience in highly parallel processor and tools development, combined with modem and protocol stack design in standards encompassing GSM, 3G, LTE and TD-SCDMA.

The Cognovo SoftModem Platform is a fully programmable solution supporting flexible multi-mode modems from Layer 4/NAS to Layer 0/PHY. The solution delivers software-defined multi-mode in comparable silicon area and power consumption to the typical single mode hardware designs that exist today and in a fraction of the time. Cognovo licenses a range of products including silicon designs, software and tools to support the Cognovo VSP-based Softmodem Platform.

The SoftModem Platform is comprised of Layer1 and Physical Layer processing carried out by the L1PHY Compute Engine, supported by the L1PHY runtime software, together with the Protocol Plane (P-Plane) processing subsystem and Protocol Framework. The modem hardware is a generic computing platform, which means that implementation of the actual Radio Access Technologies (RAT) standard

is purely a software development task. The Protocol Framework is an object oriented software framework to support modular multi-mode protocol stack development.

Based on the Cognovo Vector Signal Processor (VSP), the L1Phy Compute Engine is a high-level programmable computing platform for both Data-Plane and Control-Plane processing of modern multi-mode wireless standards in cellular (GSM/E-GPRS, W-CDMA/TD-SCDMA, HSPA/HSPA+, LTE, LTE-A), wireless (WiFi, WiMAX) and broadcast (DVB, DMB, ISDB-T). The L1PHY supports LTE Cat 4 (150Mbps downlink, 50 Mbps uplink, 2x2 MIMO) entirely in C software at 450MHz with peak power consumption <125mW.

The VSP combines advanced Very Long Instruction Word (VLIW) techniques with power efficient vector arithmetic and datapath to fully exploit instruction and data level parallelism in the algorithmic code it executes. The unique capabilities of the VSP mean that even highly complex MIMO OFDM equalization algorithms may be developed in software and executed in realtime at power levels comparable with dedicated hardware.

The Data Plane (D-Plane) subsystem is programmed in high level C code and is able to execute the entire signal processing requirements of the modem from front-end symbol processing to back-end data packet bit level processing. The VSP is augmented by several modem-specific processing units (dedicated FEC, configurable RF interface) to ensure optimal performance.

The Control Plane (C-Plane) subsystem manages and sequences the operation of the Data Plane. The C-Plane is built around a standard ARM processor and related support components. A dedicated micro-sequencing engine provides a highly power-

efficient means of controlling the individual PHY tasks running on the VSP, especially in low power states such as idle mode and sleep mode.

The Protocol Plane (P-Plane) is an ARM processor-based subsystem designed to support integration of multiple protocol stacks and efficient inter-RAT operation, coupled with intelligent Layer 2 MAC data processing and movement at 100's of Mbps.

Development of the modem is supported by two SDKs, one focused on Physical Layer kernels and a second focused on overall system design, integration and validation. Low-level run-time software is provided for the control plane processor, which is designed to support porting of existing layer 1 code.

Cognovo provides RAT specific optimized libraries to support physical layer development. The initial library release supports the LTE standard. Cognovo is also in discussions with independent providers of wireless technology and will be able to offer protocol stacks and physical layer implementations optimized for the Soft-Modem Platform and ready for production.

Cognovo targets handset OEMs and semiconductor platform suppliers. The HSPA/HSPA+/LTE handset and embedded market is forecast to exceed 500M devices by 2015. A variety of companies such as 4M Wireless, Qasara, Icera, Sandbridge, Silicon Hive, Dorfour, mimoOn, Sigmatix, and Blue Wonder, to name a few, target the 4G market with solutions ranging from ICs to IP to stacks. Today, Cognovo's primary competition is from conventional hardware-centric designs, either in-house at customers or from external sources.

Cognovo is wireless-specific but standards-agnostic and has dimensioned its first platform to support LTE multimo-

de modems. Key advantages include the team's unique heritage, a combination of low-power processor expertise from ARM and cellular modem expertise from TTPCom. Its fully Software Defined Modem approach has key advantages in the multimode modem market (e.g. LTE plus legacy cellular modes) where it achieves major advantages in die size, flexibility, and development efficiency.

In April 2010, the first full release of Cognovo's technology was released to selected customers for trials. Further update releases are planned during 2010.

Gordon Aspin, Ph.D., CEO (previously co-founder & COO of TTP Communications)

Pascal Herczog, CTO (previously Chief System Architect at TTP Communications)

Charles Sturman, VP Sales & Marketing (previously Director of ARM's Vector Signal Processor group and held positions at Acorn Computers, TTPCom and Motorola)

Mark Collins, COO (previously Commercial Director and co-founder of TTP Communications)

Richard Fry, VP Business Development (previously co-founder and Sales and Marketing Director at TTPCom)

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Elastix

Elastix was founded in 2007 "to enable digital designers to deliver the lowest power or highest performance

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by closely tracking PVT variability.” The company secured Series A funding from Adara Ventures, and in September 2009, the Spanish administration granted a total award of over 1.5M euro to Elastix and its partners as part of its AVANZA R&D support program for the period 2009-2011. Elastix has secured \$4.5M to date and is currently seeking Series B funding. The company has 12 employees.

Low power is a key metric for almost all chip designs. While there are techniques and architectures that can help design for reduced power, they do not address the fundamental issue of wasted power caused by variability. The traditional “design for the worst case” approach exacerbates the problem. Optimizing the design for the worst-case performance corner guarantees that the majority of yielding chips are consuming more power than is necessary. There can be as much as a 3x difference in power consumption between yielding chips that are near the slow corner versus chips that operate near the fast corner.

Elastix has developed patent-pending solutions that dramatically lower on-chip power consumption. Elastix’ solution leverages variability to reduce worst-case power consumption and lower average power consumption across all yielding chips. By operating at the cluster level, the technology simplifies global clock trees and avoids many of the complexity and overhead issues of fine-grain async handshaking schemes.

Elastix’ patent-pending technology measures the effects of variability in each individual chip and allows the chip to dynamically adjust its operating conditions to lower power con-

sumption. To achieve this, Elastix utilizes its patent-pending technologies for elastic clocks and elastic voltage scaling. These two technologies work together to minimize power consumption while maintaining the required operating performance of the chip.

Elastic clocks track variability, and clock the circuitry to run close to the actual speed of the logic. When the logic runs slow, the clock runs slow, and vice-versa. Elastic voltage scaling recognizes that the supply voltage can also be scaled to meet performance needs while minimizing power consumption. By constantly measuring the operating performance of the chip (in concert with elastic clocks), the supply voltage can be dynamically tuned to eliminate wasted power while still allowing each chip to meet its performance targets.

Elastic clocks and elastic voltage scaling are both realized by inserting a small amount of circuitry into the chip design. The area overhead is minimal at < 2%. Elastix software tools implement the elements for elastic clocks and voltage scaling in the standard ASIC design flow with minimal impact to the usage of existing tools (Magma, Synopsys flows), such as logic synthesis, placement, routing, timing analysis, formal verification, and test.

Elastix Adaptive Voltage Scaling (Elastix AVS) is a scheme by which Elastix performance monitors are used to measure the process corner and temperature that the die resides in, and control a voltage regulator to output the minimum voltage that guarantees correct chip operation at spec. frequency.

Elastic Voltage Scaling (EVS) is a more aggressive scheme by which Elastix performance monitoring and elastic clocking technology are used

to adapt to the process corner and temperature (like AVS), and recover part of the timing margins set aside for voltage fluctuations and aging which, in turn, is used to scale the voltage lower than AVS.

AVS typically results in a 25% power reduction while EVS results in a 35% power reduction. EVS also improves robustness, adapting to noise and voltage drops while allowing the device to continue to run.

Elastix Voltage Binning (EVB) is a solution by which each clock domain’s natural frequency at a process corner is exposed through elastic clocks driven by Elastix performance monitors. This allows rapid voltage binning of dies by simply measuring the elastic clock frequencies on a tester.

Last year Elastix developed an ARM processor test chip to prove and demonstrate its technology. Ideal customer candidates are developing chips at or below the 45nm node where variability is an issue and Elastix solutions can reduce power and improve robustness. Blocks that are active most of the time are ideal candidates.

The Elastix tools and technologies are currently being used on real designs at strategic customer partners. A large IDM is currently evaluating EVS. AVS is also in evaluation with another customer. Several potential customers are looking at EVB for test binning.

Dugald Stewart, President & CEO (previously held multiple executive roles at Cadence, most recently as VP of Field Operations for the Cadence Verification Acceleration business unit)

Keith Lobo, Executive Chairman (22-year semiconductor industry veteran having helped build LSI Logic (VP/GM), Chips & Technologies (COO) and Quickturn Design Systems (CEO))

Emre Tuncer, Ph.D., Founder, VP & Architect (previously a CTO and VP of Engineering at Magma Design Automation)

Jordi Cortadella, Ph.D., Founder & Chief Scientist (Professor at Universitat Politècnica de Catalunya (UPC), Barcelona, Spain)

Ajay Jain, VP of Business Development, 650.776.1185 (previously worked at LSI Logic, Chips & Technologies, Trident Micro, Quickturn and most recently Cadence)

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Light-Based Technologies

Light-Based Technologies (LBT) was founded in 2004 to develop control solutions for the Solid State Lighting industry. LBT's mission is "to create a leading light control company that truly enables mass market adoption of SSL."

LBT raised \$2.2M in Series A funding on February 9th, 2010. Key investors are Chrysalix Energy and Green Angel Energy. The company has raised \$2.575M to date and plans to seek an additional \$5-10M in new funding over the next 6 months. The company has 11 employees.

With an estimated 150 million phase cut dimmers installed in North American residences, triac (phase cut) dimming is especially important due to the massive installed base. LBT has developed the LB4 phase cut dimming controller IC, which delivers a significantly higher system efficiency compared to other triac compatible (phase-cut) dimmer driver solutions.

The LB4 chip family supports a Current Control dimming methodology that leads to higher efficiencies. This takes advantage of the higher lumen/watt efficacy that LEDs show at lower current levels.

The LB4 family can use one, two, three or all four of its outputs to control multiple channels of LEDs and provide smooth, seamless dimming from any input, including triac dimmers. A software approach is used to interpret the triac signal, which allows for non-linear relationships, similar to incandescent lamps, to be generated.

LEDs vary in terms of luminous output and chromaticity under both Current Control and PWM dimming methodologies. The LB4 family will adjust for these shifts to maintain color and brightness in multi-LED systems; or maintain luminance in single LED systems. Using built-in feed forward correction functions and a choice of calibration options, the LB4 can compensate for a variety of factors to maintain a specific color point.

LBT has partnered with **Bridgelux** and **Elpro Lichttechnik GMBH** to bring to market the new Gamma line of high performance, energy efficient, fully dimmable LED luminaries. The Gamma product line features the Bridgelux Warm White RS Array delivering 3000 lumens. The products also feature optical control, mechanical design and a passive thermal management solution from Elpro; as well as control and power management from LBT through the use of their LB4 IC.

LBT's target market size is \$90M this year growing to \$275M per year by 2013. Key competitors include NXP, Cypress, and ON Semiconductor. LBT argues that its devices offer superior quality dimming (lower light levels achievable without flicker or control

issues), and the best performance in lumens per watt efficiency. Other advantages will be released in the next quarter.

Jeanette Jackson, founder & CEO (many years of experience in sales, service and account management in a variety of industries; established LBT was based on technical developments from her father, Vern Jackson)

Ed Sadowski, VP of Business Development (previously VP of Business Development at Philips Lighting LED Modules & Retrofit BU)

Tom Foxall, CTO (30+ years of experience in electronics design)

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NextOp

NextOp Software was founded in 2006 to deliver assertion-based verification solutions that leverage design and testbench information, allowing design and verification teams to uncover bugs, expose functional coverage holes, and increase verification observability. NextOp has been funded by angel investors and is not seeking venture capital funding at this time.

Design complexity has adversely impacted the ability to have confidence that the RTL functional verification process is complete. Today's verification methodologies include a combination of directed simulation, constrained random simulation, and formal and semi-formal methods.

Directed simulation, based on 'black-box' checkers that test I/O behavior for each feature interaction, is fundamentally not scalable due to the number of complex interactions between features.

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Constrained random simulation utilizes external checkers, which are typically developed independently of the Design under Test, resulting in skipped features and interactions. Formal verification, based on mathematical analysis, requires that users specify sufficient properties to cover all features of the design.

As design complexity increases, assertions and functional coverage properties, which are logic statements to define the intended behavior of a design, are well recognized as an important adjunct to the blackbox checkers used in simulation and formal verification flows. Assertion-based verification enhances directed and constrained random simulation, formal and emulation verification approaches by driving more effective and targeted verification.

However, adoption of assertion-based verification has been slow because it is infeasible to manually generate an adequate number of assertions to the level needed for thorough identification of design problems, and it is unwieldy and time-consuming to manually create sufficient functional coverage properties to identify which tests are missing. The high learning curve for standard assertions languages such as SystemVerilog Assertion (SVA) and Property Specification Language (PSL) is a high barrier to adoption as well.

NextOp is focused on assertion-based verification solutions that uncover corner case bugs, expose functional coverage holes, and increase verification observability. NextOp's solutions fit into existing verification methodologies such as simulation, formal and emulation with sufficient capacity to handle complex SoC designs.

NextOp recently unveiled its flagship assertion synthesis product, BugScope, after four years of development of key technologies and successful work with several customers. By automating the tedious and time-consuming process of generating assertions and coverage properties, NextOp BugScope Assertion Synthesis allows design and verification teams to finally reap the benefits of assertion-based verification in a timely and resource efficient manner.

BugScope is a full-chip assertion synthesis product that leverages design and testbench information to automatically generate assertions and functional coverage properties for progressive and targeted verification of complex designs. These properties enhance existing verification flows by helping design and verification engineers uncover corner-case bugs, expose functional coverage holes and increase verification observability.

BugScope is the first product to automatically generate whitebox assertions and functional coverage properties in SVA, PSL and Verilog formats. BugScope's properties are used to drive progressive, targeted verification via robust, executable design specifications for existing simulation, formal and emulation flows.

Solutions exist for automatically generating assertions based on fixed templates in RTL syntax such as parallel case/full case, etc., or blackbox assertions for standard bus protocols. However, NextOp argues that BugScope is unique in its capability to synthesize assertions and functional coverage properties for design specific control logic. NextOp has a unique use model and an innovative algorithm to examine the stimulus (i.e. simulation test) to create high quality functional assertions and coverage properties.

BugScope is already in production use by multiple semiconductor companies, including Altera, Entropic and Nvidia.

Dr. Yunshan Zhu, co-founder, President and CEO (previously a member of the Advanced Technology Group at Synopsys)

Dr. Yuan Lu, co-founder & CTO (previously a Principle Scientist in Enterprise Switching Group at Broadcom)

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OptiXtal

OptiXtal was founded in 2003 to develop ultra-thin stackable supercapacitors. OptiXtal has received roughly \$1M in friends and family investment and army funding and is currently seeking \$5-10M. The company has 5 employees.

Instead of being tightly wound and contained in heavy metal or ceramic cylinders like other commercially available capacitors, OptiXtal's SuperXcap capacitors are thin, light, flexible and can be easily stacked for added capacitance. SuperXcap capacitors are rated for 2.7V and come in pouches equivalent to 5 or 25 Farads today. The company can provide SuperXcaps in capacitances from 0.1F to 1000F (roughly 1F/Square inch), as well as a wide variety of shapes and configurations.

SuperXcap 5F capacitors have almost 5x the power density by weight and are 1.5x more volumetrically efficient than other capacitors. SuperXcap capacitors are not sensitive to temperature, deliver a constant charge from -40°C to +50°C, and are rated at > 1,000,000 charge/discharge cycles. Competitive

advantages include better energy density ratio, better self-discharge voltage characteristics, better weight-to-energy ratio, and superior formfactor.

The outer shell is made of a metallic membrane and the flexible bendable packets can be configured in a variety of shapes and sizes. Competitive supercapacitors are generally manufactured in a battery-like housing with a battery-like hard shell exterior casing.

The devices have ¼ the ESR (Equivalent Series Resistance) of many competitive supercapacitors. The 5F SuperXcap handles 5 amp maximum current and is rated with an ESR (DC) of 70 mΩ. Typical competitive 5F units offer maximum amps of only 3.4 amp maximum current and an ESR (DC) of 200 mΩ.

By delivering a burst of instantaneous power at the start of battery-driven devices, the OptiXtal SuperXcap can considerably extend a battery's length of service. The SuperXcap re-charges itself in seconds.

SuperXcaps are also ideal for energy harvesting applications, where they can capture energy efficiently and expend it in a single power burst to facilitate information transmission or programmed process controls. SuperXcaps are more efficient than systems based on batteries, which recharge slowly and typically lose their charging capabilities after a few hundred cycles.

SuperXcaps were first introduced in 2007. The company has delivered small quantities to date and has a current production capacity of 4000 units/mth. Additional capital is being sought to build a production facility.

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Sapient Systems

Sapient Systems was founded in 2007 to develop software that lets IC industry decision makers direct, optimize, plan and manage all aspects of product lifecycles, including market research, product planning, execution and discontinuance. The company is self-funded and has a 24 person development team in India.

Today's complex SoC designs are "too big to fail". Decision Makers need to evaluate numerous data points to make and evaluate new product plans and product lifecycle.

Decision making data is generated by disparate people and systems, such as endless emails, spreadsheets and ppts from marketing, engineering, sales, customers, manufacturing and more, making decision making challenging. Hierarchies, social structures and other boundaries that exist across organizations impact the information gathering process as well. This unstructured data model is slow and results in poor decision yields due to incomplete or inaccurate data.

To solve this growing problem, the Sapient-IC Decision Management Framework provides a collaborative, integrated data management framework for decision makers in the IC industry to quantify the impact of complex decision elements in a structured and efficient manner. Sapient-IC is claimed to be the industry's most comprehensive product to provide predictive analytics for market, business and design executives.

Sapient's integrated platform encompasses data integration, predictive analytics and tradeoff analysis to estimate and evaluate target market size, re-

quirements, schedules, and die economics (size, power, cost). This approach enables fast, accurate product planning and alignment to strategic financial business objectives such as market share, profit margins, ROI and breakeven analysis.

Sapient-IC collects data from every organizational level and offers real-time 'what-if' analyses to management. Sapient-IC enables Decision Makers to visualize "what if?" analysis with a single mouse click, generating easy-to-understand graphs and charts displaying how various tradeoffs will impact the bottom line.

A powerful analytical engine presents instantaneous analysis resulting in better decision yields that directly affect the bottom line of the IC business. Sapient incorporates over 1,000 analytic comparisons between die size, power, cost, TTM, manufacturing tradeoffs, and more. A Guardband feature provides early regression analysis to measure the sensitivity of the business plan to schedule delays or growth in die size.

Sapient-IC is a collaborative software tool that runs on a Windows platform, providing data-driven insights to direct, optimize, plan and manage all aspects of the IC product lifecycle – from market research and product definition, to design implementation and product launch. The integrated platform encompasses data integration and predictive analytics to evaluate target market size, requirements, schedules leading to accurate product planning, and alignment to strategic and financial business objectives such as market share, profit margins, ROI and breakeven analysis.

Sapient-IC is available as a free-trial download at www.sapient-inc.com. The commercial version is shipping now and is priced at \$5K. Sapient will

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be introducing additional products over the next year for FPGA designers, and a comprehensive suite of tools that will provide guidance for management to make tradeoffs between multiple design choices, e.g., whether to implement a design in an ASIC or FPGA.

Subash Peddu, Founder & CEO (previously held management and technical roles at Cadence, Silicon Image, Phillips Microelectronics, Lockheed and several other startups and founder of Mihira, a design services company specializing in design implementation and definition of design processes/flows)

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Solexel

Mehrdad Moslehi founded Solexel as Soltaix in 2005 to develop the foundation technology and core IP for a new crystalline silicon solar cell. Solexel was incorporated in February 2007, secured Series A funding in May 2007, and secured Series B financing in July 2008. Investors include KPCM, DAG Ventures, Northgate Capital, Ecofin, Spirox, Technology Partners, Oak Hill, The Westerly Group, and Univest.

Solexel's mission is to develop "high-efficiency, low-cost, crystalline silicon solar cell and module products for grid-tied residential, commercial, and industrial photovoltaic (PV) electricity generation applications."

The company's approach is based on an IP-protected, high-efficiency cell architecture and mono-crystalline silicon material that reduces silicon consumption by a significant margin compared to the current paradigm and substan-

tially eliminates dependency on the silicon feedstock, ingot, and wafer supply chain. Active cell area is made through the use of plentiful, inexpensive silicon gas, as opposed to costly bulk silicon wafers. Solexel's IP also optimizes mono-crystalline silicon's sunlight capture and conversion efficiency.

Solexel's crystalline silicon-based PV modules offer the performance, quality, and sustainability of the best silicon-based PV at the low costs of non-silicon based PV. Solexel uses silicon much more efficiently than traditional silicon-based cells, bringing down costs and better utilizing resources to optimize sunlight capture. Mono-crystalline silicon is a highly stable, proven, environmentally benign, and abundant material.

Low material usage allows Solexel to manufacture solar modules at substantially reduced costs, making solar-based electricity cost competitive with traditional fossil fuel-based electricity generation sources. Its approach maximizes the amount of electricity generated while substantially reducing the overall levelized cost of electricity (LCOE), enabling grid parity for mass global adoption.

Solexel has license agreements with Imec and Max Planck Innovation GmbH.

Max Planck Innovation has signed a co-exclusive license agreement for its Porous-Silicon-Process (PSI process) technology. The method is based on the production and use of a reusable template substrate with a porous structured surface layer. A thin mono-crystalline silicon film is grown on top of the porous layer by epitaxial methods showing the same pattern. Subsequently a structured thin film solar cell can efficiently be separated from the substrate.

Using epitaxy, the film thickness can be reduced to 20 to 30 μm . Conventional solar cells are 200 to 300 μm thick since a thick planar layer has to be produced, which is then structured by removing material. Furthermore the manufacturing process takes less time and requires lower manufacturing temperatures. The template substrate can be made of low-cost porous silicon and can be used several times.

Imec has granted Solexel a non-exclusive license on selected patents related to thin-film solar cell technology. The technology relates to a method to deposit a thin film of monocrystalline material on a substrate. To increase the efficiency of the resulting solar device, the method advocated depositing a porous Si layer between the substrate and the thin film. This porous Si layer has both light-reflecting and light-diffusing properties, which helps confine the incoming light in the thin-film layer, thereby improving the efficiency of the cell.

Solexel plans to enter the market with a high-efficiency mono-crystalline solar module that will use 156mm² cells and will consume substantially less silicon per watt than conventionally fabricated wafer-based solar cells. Besides mainstream PV power panels, Solexel's technology also enables economic production of aesthetically-appealing, high-efficiency, PV products for Building-Integrated Photovoltaics (BIPV) applications.

Michael Wingert, President & CEO (previously EVP and GM of Seagate, President and COO of Maxtor, and CEO of Cornice)

Mehrdad Moslehi, Ph.D., Founder, Executive Chairman, & CTO (previously founding President & CEO until June 2009, his 3rd startup, extensive experience at ITRC, Honeywell-Synertek, GE-Intersil, Xerox PARC, Stanford, TI, CVC, Veeco,

Semizone, and Solexel, and Prolific Inventor holding over 220 patents)

Jonathan Michael, CFO (previously CFO for Sonim, Solyndra, TAK Imaging, and IXIMobile, and VP of Finance at Fairchild Semiconductor)

Kami Honardoost, SVP of Manufacturing (previously managed disk drive media engineering and operations for Seagate, Maxtor, and Komag)

Homi Fatemi, VP of Sales, Marketing, & Business Development (previously held engineering, sales and business development roles at Fairchild, Intel, AMD, Norsam, HPL, and YDI)

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Vennsa

Vennsa Technologies was founded in Sept. 2006 to develop EDA tools dedicated to debugging and error localization. Leveraging over 15 years of research and patented IP from the University of Toronto, Vennsa's technology has been validated by numerous industrial partners.

The company is funded by private angels and a number of government funds in Canada. In a year or so, Vennsa may seek an additional \$1-2M in funding. Vennsa currently has 14 employees.

Debugging is one of the most time consuming and resource intensive tasks in the IC design cycle. Debugging accounts for 60% of verification – weeks and months per design. Today, locating and fixing bugs is performed 100% manually. Engineers rely on waveform viewers, visualization tools, navigation aids, and built-in debug features,

which require manual intervention and provide no automation.

Vennsa OnPoint is claimed to be the first and only automated debugging tool that localizes the source of functional errors without any user guidance. OnPoint automates the manual tasks of debug and error localization at the register transfer level (RTL), drastically reducing the time required to locate and correct errors.

OnPoint picks-up where formal verification tools leave off by automatically pointing to the lines of code where the problem can be fixed. When failures occur, OnPoint helps engineers quickly identify the root cause of errors and remove the bugs. OnPoint improves productivity, saves weeks or months of effort and guarantees faster design closure.

Once verification fails, OnPoint uses proprietary technology to automatically analyze the design and return the root cause of errors. OnPoint works with existing formal flows to automatically locate the source of failure at the RTL or in assertions and assumptions. Each error source contains a location in the source code, a hint for performing a fix, a rank for targeting high priority sources, a waveform with correction values, and a summary of debug information.

Vennsa uses SystemVerilog and property specification language (PSL) analyzers and elaborators from Verific Design Automation as the front end for OnPoint.

Vennsa has initially focused on smaller segments of the market like formal verification on its way to much larger and more lucrative markets. Analysts do not track the debug market; however, Vennsa estimates the entire market to be roughly \$500M/year with segments within reaching \$100-200M/year.

There is no direct competition at this point, as Vennsa is the first and only company to deliver debug tools that automate much of the manual effort. Vennsa offer automated debug or automated root cause analysis that removes the need for users to back-trace, analyze and navigate through the design. The solution is based on 15+ year of research on this topic and the founders are top experts in this field.

Vennsa complements other debugging aids in the market such as Springsoft Verdi, Synopsys DVE, Mentor Questa, and Cadence Incisive, and partners with many of these companies.

Dr. Andreas Veneris, co-founder, President and CEO (15 years of R&D experience in debugging with more than 50 publications and five patents in that field; associate professor at the University of Toronto)

Dr. Sean Safarpour, co-founder, CTO and VP of Engineering (previously held ASIC and FPGA design and verification positions at Westbay Networks, Vector12, Infineon, Altera, and Brooks Automation)

Naoto Kimura, President of Sales, Japan Region (previously president of Averant Japan K.K. and a sales representative of other formal tools in Japan)

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People

Conexant has recognized the contributions of **Dwight Decker** upon his retirement from the company's Board. Decker joined Rockwell in 1989 and served as Conexant's chairman and CEO from the time of the company's spin-off from Rockwell in 1999 through February 2004, when he stepped away as CEO and continued as Chairman. He returned as CEO later that year and retired from the position in July 2007. In 2008, Decker resigned as non-executive chairman and has served as a director since then. Decker continues to serve on boards that include International Rectifier, Mindspeed, and Pacific Mutual Holding Company.

CyberOptics has hired **Daniel Good** as VP of Corporate Development. Good previously served as VP, Worldwide Marketing and Product Management for Storage Genetics. CyberOptics is a provider of sensors and inspection systems that provide process yield and throughput improvement solutions for the electronic assembly and semiconductor capital equipment markets.

FormFactor announced that **Mario Ruscev**, CEO and member of the Board, and **Jean Bernard Vernet**, SVP, CFO, have both resigned. **G. Carl Everett Jr.**, current member of the Board, has been named CEO and **Richard DeLateur** has been named CFO. Everett founded GCE Ventures and has served as a venture partner at Accel LLP. He has held several management positions at Dell and Intel, one of which was SVP and GM of the Microprocessor Products Group at Intel. DeLateur is a 20-year veteran of Intel's finance team including six years as VP and Group Controller of WW Technology and Manufacturing. More recently, he served as CFO at Fluidigm and Topsin.

Power Integrations has terminated its CFO **Bill Roeschlein**. The termination

was not prompted by any regulatory issues and is not related to the company's financial statements or other reporting obligations.

Quantum Materials announced that its wholly owned subsidiary, **Solterra Renewable Technologies**, has appointed **Toshi Ando** to the newly created position of Senior Director Asian Business Development, reporting to the CEO. Ando most recently served as Director of Strategic Alliances for W&W Communications of Japan. Based in Fremont, California, Ando will focus on promoting alliances and strategic partnerships for the broader application of Solterra's quantum dot and quantum dot solar cell technologies.

TiaLinx, a developer of mm-wave integrated radio and antenna arrays and beamforming technology, has appointed **Dr. Mehran Mokhtari** as VP of Advanced Product Development. Dr. Mokhtari is a veteran of many advanced research laboratories in the U.S., Fortune 500 wireless communications companies, and defense industries.

WiSpry, a provider of tunable RFICs for the wireless industry, has promoted **Jeffrey Hilbert** as president. Hilbert, who is the founder of WiSpry, and served as its past president and COO, intends to build on the company's development success by beginning to ship the industry's first tunable RF-MEMS enabled products tailored to optimizing antenna efficiencies, providing increased battery life, improved quality of service and lower overall costs. WiSpry has recently begun shipping its tunable RF-MEMS devices to a Tier 1 mobile handset manufacturer. Russ Garcia, former CEO, will continue to serve on WiSpry's Board as vice chairman. ■

Funding & IPOs

Cadence has entered into a definitive agreement to acquire **Denali Software**,

a provider of EDA software and IP, for \$315 million in cash. Denali is expected to have approximately \$45 million in cash at closing. Denali delivers the most widely used solutions for deploying PCI Express, USB, NAND Flash and DDR SDRAM subsystems in electronic designs.

CardioMEMS, a medical technology company that is commercializing wireless sensing and communication technology for the human body, has completed a \$37.9M financing round. The CardioMEMS wireless HF sensor is a miniature device implanted into the patient's pulmonary artery using a simple, catheter-based procedure. The pulmonary artery pressure is then measured and displayed using the CardioMEMS electronic monitoring system. www.cardiomems.com

ClariPhy, a provider of mixed-signal, DSP (MXSP) ICs for optical networks, has secured \$24M in Series C funding from new strategic investors Oclaro (\$7.5M), a tier-one provider of optical communications and laser components, and multiple telecom OEMs. All existing venture investors participated, including Norwest Venture Partners, Allegis Capital, Onset Ventures and Pacific General Ventures. In 2009, Oclaro used ClariPhy's MLSE IC to boost the performance of its TL9000 transponder for 10G networks.

ClariPhy will use the funding to deliver a new class of single chip MXSP ICs that significantly increase an optical network's reach and tolerance to impairments, while reducing cost of ownership for both OEMs and Service Providers. The company's line of 10G, 40G and 100G networking chips are based on advanced MXSP schemes such as Maximum Likelihood Sequence Estimation (MLSE) and Coherent Detection that approach the limits of achievable performance.

Oclaro is a leader in the 40 Gbps market, with a leading market-share

position in regional and metro networks. In the Differential Quadrature Phase Shift Keying (DQPSK) and Differential Phase Shift Keying (DPSK) space for regional and first-generation long-haul markets respectively, Oclaro already offers Lithium Niobate (LiNbO₃) and Indium Phosphide (InP) component solutions. At the sub-system level, the Oclaro vertical-integration model has resulted in ground-breaking technology disruption, as demonstrated by Oclaro's fully-qualified 40 Gb/s DQPSK 300-pin transponder solution for regional and metro applications. Dr. Paul Voois, cofounder and CEO. www.clariphy.com

Crocus Technology, a developer of Magnetic Random Access Memory (MRAM), has received an 8 million euro investment from AGF Private Equity, CDC Innovation, CEA Investissement, Nanodimension, Sofinnova Ventures, and Ventech. The new funding will be used to complete the production transfer of its 130nm MRAM technology to manufacturing partner Tower Semiconductor and for continued product development. The company has also appointed **Dr. Bertrand Cambou** as CEO and Chairman. Most recently, Cambou served as president of SST, which was acquired in April 2010 by Microchip. In previous roles, he served as president and CEO of Spansion, SVP of AMD's memory group, and COO at Gemplus.

Icera's investors have provided a further \$45M in equity capital to accelerate the growth of its market share. All existing preferred shareholders, including Accel Ventures, Amadeus Capital Partners, Atlas Venture, Balderton Capital and DFJ Esprit, participated fully in the funding round. Icera's Adaptive Wireless™ modem technology is focused today on 3G (HSPA+, HSPA) and 2G (GSM, GPRS, EDGE) cellular voice and data modem chipsets and firmware, with 4G (LTE) scheduled in the near future. Adaptive Wireless™ executes

the entire modem in software on an Icera processor. www.icerasemi.com

Innova Dynamics, a startup developing advanced materials technology and cleantech spun out of the University of Pennsylvania, has secured \$5.5 million in Series A financing led by Rho Ventures and including MentorTech Ventures. Innova's initial focus is to commercialize its flagship patent-pending Innlay technology, which enables the rapid and efficient creation of vastly improved and unprecedented material properties and devices. Alexander Mittal, CEO.

International Battery (IB), a manufacturer of large-format, prismatic lithium-ion cells, batteries, and systems, announced the first closing of its \$35 million Series C financing round, led by Digital Power Capital, an affiliate of Wexford Capital LP. The Company's products are used in a variety of stationary (including electric utility/smart grid), transportation and military applications. The company's low-cost, water-based manufacturing process avoids the use of toxic solvents, which are standard in lithium battery manufacturing today. Dr. Ake Almgren, President and CEO.

Joule has closed a \$30 million second round of funding, further strengthening the company's position as it advances from testing to high-capacity production of renewable diesel fuel starting in 2012. The round includes investments from undisclosed institutional and private sources that joined Flagship Ventures, Joule's founding venture capital investor. Joule's Helioculture solar platform converts sunlight and waste CO₂ directly into liquid fuels in a continuous process that is not limited by costly biomass intermediates, processing or use of precious natural resources. www.jouleunlimited.com

Movidius has secured US\$7.5 million in Series B funding with existing share-

holders including Celtic House Venture Partners, Capital E, Emertec Gestion, AIB Seed Capital Fund and angel investors. Movidius develops video editing and post-production ICs for the creation of User Generated Content for mobile social networking. Movidius is now sampling product to major players in the mobile market, and is moving from development to product deployment. Mass production is expected to begin later in 2010, with mobile handsets containing those products due to hit the market early in 2011. Sean Mitchell, CEO. www.movidius.com

Netronome, developer of network flow processors, has closed a \$23 million oversubscribed Series D round of funding led by new investor DFJ Esprit, and including previous investors Raptor Group, Tudor Ventures and Top Technology. The round also included investment from FORE Systems founders Robert Sansom and Eric Cooper, and Analysys founder David Cleevly.

The funding comes during a period of record growth for the company, including a 5X increase in annual revenue and five consecutive quarters with record sales. Netronome plans to more than double its revenue in 2010. Netronome began shipping its new flagship product, the NFP-3240, to customers in late 2009. Customer design wins include shared service blades in switches and routers, 3G and LTE wireless infrastructure, security appliances and virtualized servers. Niel Viljoen, founder and CEO.

Sand 9, a startup company developing timing oscillator and frequency control technology for the wireless device market, has closed a \$12 million Series B round led by new investor Commonwealth Capital Ventures and including previous investors Flybridge Capital Partners, General Catalyst Partners and Khosla Ventures. The funding will be used to accelerate sales and marketing and expand product manufacturing to volume shipment levels. Sand 9 has

Funding & IPOs

(Continued from page 11)

developed a Temperature Compensated MEMS Oscillator (TCMO) to replace quartz crystal frequency sources in high performance applications such as 3G cellular, GPS and other communications. Vince Graziani, CEO. www.sand9.com

Sidense, a developer of Logic Non-Volatile Memory (LNVM) IP cores, has raised \$5 million in Series B growth capital financing led by VentureLink Funds of Canada and including existing funding partners Tech Capital Partners and Trellis Capital of Canada and Vertex Venture Capital of Israel. Sidense's 1T-Fuse single transistor, split-channel antifuse technology enables the design and development of one-time-programmable (OTP) or emulated multi-time-programmable (MTP) memory blocks that are reliable, low-cost, scalable and secure alternatives to discrete flash, Mask ROM, electronic fuse (eFuse) and embedded flash memory. Sidense OTP memory is currently embedded in over 90 customer designs. The IP is offered at and has been adopted by all top-tier foundries and selected IDMs.

Solaria, a manufacturer of solar photovoltaic modules, has closed \$45 million in a financing round led by CMEA Capital and DBL Investors. Other participants include current investors Sigma Partners and NGEN Partners and new investors Mitsui Ventures and Savitr Capital. Based on its patented low-cost technology, Solaria's modules provide reliable performance while matching form, fit and performance of conventional PV modules. Its Modules offer crystalline performance at substantially lower cost. Solaria is now offering the Solaria module to customers in North America, Europe, and Asia. Daniel Shugar, CEO. www.solaria.com

Spansion has received funding from Silver Lake Sumeru, the middle market investment group of Silver Lake. Spansion filed for reorganization under Chapter 11 of the U.S. Bankruptcy Code in March 2009 and successfully emerged from bankruptcy on May 10, 2010 as a re-organized entity with strong operating results and a well capitalized balance sheet. Spansion currently has approximately \$480 million in debt, \$230 million of cash and a \$65 million undrawn, asset-backed, line of credit.

SunEdison, the solar energy development division of MEMC Electronic Materials (NYSE: WFR), announced an agreement with First Reserve to establish a joint venture that could provide for the acquisition of up to \$1.5 billion in current and future SunEdison solar photovoltaic energy projects. SunEdison is one of the leading solar project developers, with more than 350 solar electric power plants constructed and under management. First Reserve is one of the largest private equity and energy infrastructure investors, with \$20 billion under management. ■

Mergers & Acquisitions

Avnet launched a tender offer bid for **Unidux**, a publicly traded company (TSE: 9897), substantially expanding its presence and customer base in the Japanese market. Established in 1972, Unidux is an electronics components distributor primarily serving Japanese OEMs. For calendar year 2009, Unidux generated revenue of approximately US\$370 million.

Coherent (NASDAQ: COHR) has acquired **Beam Dynamics** for \$6.25 million in cash. The acquisition enhances Coherent's application knowledge and development capabilities, and also provides a pathway to expand its presence in the market for precision laser processing workstations. Coherent has also

entered into a joint development agreement with **SiOnyx** for solar cell manufacturing using black silicon processing, which is based upon the interaction of ultrafast laser light and silicon in a controlled environment.

INSIDE Contactless, a provider of contactless secure transaction chip technologies, has entered into an agreement to purchase for cash consideration **Atmel's Secure Microcontroller Solutions (SMS) business**. Terms were not disclosed. The transaction will be financed by the existing INSIDE investors led by Gimv and Sofinnova Partners, along with the French sovereign wealth fund, Fonds Stratégique d'Investissement (FSI). Atmel also will make an investment in INSIDE. The resulting organization will be the largest fabless semiconductor company in France, and one of the largest in Europe. INSIDE would enter into a multi-year supply agreement to continue sourcing wafers from the fabrication operation in Rousset, France that Atmel recently agreed to sell to **LFoundry GmbH**. www.insidecontactless.com

M/A-COM and **Mimix Broadband** have signed a definitive merger agreement that will add Mimix and its subsidiaries to the M/A-COM Tech family of companies. Terms were not disclosed. Mimix is a fabless supplier of GaAs ICs from DC to 50 GHz for RF, microwave and millimeter-wave applications. Joe Thomas, CEO, M/A-COM; Rick Montgomery, CEO, Mimix; John Ocampo, founder of GaAs Labs, LLC and Chairman of M/A-COM Tech. www.macomtech.com, www.mimixbroadband.com

MEMC Electronic Materials (NYSE:WFR) has reached a definitive agreement to acquire **Solaicx**, headquartered in Santa Clara, California for \$66 million in cash plus an investment amount estimated to be approximately \$10 million and an earn-out of up to an additional \$27.6 million in cash and

stock. Solaicx has developed proprietary continuous crystal growth manufacturing technology, which yields low-cost, high-efficiency monocrystalline silicon wafers for the photovoltaic solar industry.

The Solaicx technology allows for very high-volume crystal growth compared to the silicon ingots produced in the traditional precision semiconductor manufacturing process. Solaicx has approximately 80 employees and a large-scale production facility in Portland, Oregon. The monocrystalline silicon market is forecast to grow at a CAGR of about 50% during the next three years. This transaction positions MEMC to significantly reduce the cost of monocrystalline silicon.

Microchip has sold certain non-core assets from its **SST subsidiary**. The product lines sold included NAND Drives, NAND controllers, Smart Card ICs, Combo Memory, Concurrent SuperFlash, Small-Sector Flash and many-time Programmable Flash memories. The buyer, **Greenliant Systems**, is a new company founded by Bing Yeh, the ex-Chairman and CEO of SST. Approximately 100 employees (18% of SST's workforce) transferred to Greenliant. Terms were not disclosed.

NXT has acquired **Audium Semiconductor's** IP to create 25W-per-channel USB-powered loudspeaker platforms. NXT, best known for its flat panel loudspeaker technology, intends to use Audium ICs to provide customers with complete audio platforms incorporating its proven Balanced Mode Radiator (BMR) technology together with ultra-efficient power amplifiers.

PMC-Sierra has entered into a definitive agreement to acquire **Adaptec's channel storage business** for approximately \$34 million in cash and assumption of certain liabilities. The channel storage business includes Adaptec's RAID storage product line, a global

value-added reseller customer base, board logistics capabilities, and SSD cache performance solutions. Based on industry data, PMC-Sierra estimates total channel revenues for x86 RAID products to be approximately \$200 million. Adaptec is the second largest supplier of x86 RAID products through the channel.

Tessera has entered into a definitive agreement to acquire **Siimpel**, a developer of MEMS-based camera solutions for mobile imaging applications, for approximately \$15 million in cash. Siimpel's MEMS-based auto focus and shutter solutions complement Tessera's EDOF technology. Tessera does not anticipate a revenue contribution in Q2'10 from this acquisition. The company expects to incur additional Q2 non-GAAP operating expense of between \$1.8 and \$1.9 million.

Wintegra has filed a registration statement with the U.S. SEC for the proposed IPO of its common stock – again. The joint book-running managers will be Barclays Capital Inc. and Deutsche Bank.

Zarlink has sold the assets of its Optical Products group to **Tyco Electronics** for approximately \$15 million in cash. This transaction enables Zarlink to focus on network timing, medical wireless and line circuit initiatives. ■

Business & Financials

AMIMON has surpassed half a million units in chipset sales and orders. AMIMON has been experiencing very strong and rapidly growing demand for its wireless 1080p WHDI™ (Wireless Home Digital Interface™) chipset. With a very strong first quarter and multiple new WHDI products to be launched in the next few months, AMIMON is on track to crossing the one million chipset sales milestone by the holiday season of this year. The company claims that 9 out of 10 wireless

HDTV systems in the market use its chipsets.

Ember has reached a key milestone in its quest to become the foremost provider of ZigBee technology for smart meters and Home Area Network (HAN) products when it became the first company to ship more than 10 million ZigBee wireless chips. This milestone is reflected in record revenues and sales bookings, making Ember well positioned for almost 300% annual revenue growth in 2010. ZigBee chipset shipments are projected to reach as high as 192 million units in 2014, up from just over 5 million units in 2008, according to West Technology Research Solutions. Bob LeFort, CEO. www.ember.com

Icera could quickly emerge as the third most successful supplier of LTE basebands and chipsets after Qualcomm and ST-Ericsson, reports **Strategy Analytics**. Through its lead in soft modems, and the progress it has already made with OEMs in W-CDMA/HSPA embedded data modems and USB dongles, it appears that Icera is well placed for LTE success, ahead of Infineon, Broadcom, MediaTek, the Japanese suppliers and a host of start-ups. According to Strategy Analytics, "in terms of size, power, consumption and reconfigurability, Icera appears to have a one to two year technology lead on mainstream suppliers Qualcomm, ST-Ericsson and Infineon in the slim modem space." Icera's basebands and chipsets have already received positive attention from Nokia, Samsung and LG. www.strategyanalytics.com

INSIDE Contactless announced that shipments of its MicroPass intelligent payment platform have surpassed the 200 million unit mark, with production volume doubling in the 18 months since reaching 100 million units in November 2008. MicroPass is available from all major bank card brand certified manufacturers in North America and now powers more contactless bank cards

Business

(Continued from page 13)

than any other core technology available in the market. Last year, INSIDE opened a new operational facility in Bangkok, Thailand to increase its production capacity to meet an anticipated demand of up to 500 million MicroPass contactless payment microprocessors annually. INSIDE Contactless has delivered more than 400 million contactless platforms worldwide.

Phyworks, a provider of analog and mixed signal ICs for high-speed communication, has shipped its 30 millionth chip and predicts revenue growth in 2010 of 90%. The company cites revenue increases in core PON, mobile backhaul and equalizer markets as key contributing factors to its on-going success.

SiTime's cumulative shipments of its MEMS First CMOS oscillators and clock generators are expected to exceed 20 million units in May 2010. SiTime has 85% share of the MEMS-based timing market, according to **Yole Développement**, a MEMS technology consulting firm. The report also forecasted that the MEMS-based timing market will grow at a CAGR of 80% from 2010 to 2015. Rajesh Vashist, CEO.

Stacatto Communications is now **Veebeam**, in recognition of the company's new focus in bringing to market a simple, affordable consumer electronics device to wirelessly deliver high quality Internet video content from the laptop to the flat screen.

Telegent has shipped 80 million free-to-air mobile TV receiver chips since it first launched its mobile TV receiver technology in mid-2007. Currently Telegent counts among its customers more than 100 device manufacturers, including a top three global handset manufacturer, two of the top five mobile handset manufacturers in Taiwan,

and eight of the top ten design houses in China. Forward Concepts estimates that 78 million broadcast TV handsets were shipped globally in 2009.

Telegent is now leveraging its success of the last two years to broaden its product portfolio of 'converged TV' solutions. In preparation for continuing organizational growth, **Samuel Sheng**, president and CEO, has asked Telegent's Board to begin the search for his successor, following which he will resume the role of CTO in order to concentrate on further developing and expanding Telegent's technology platform. In addition, Telegent has **withdrawn its registration statement for an IPO**. www.telegent.com ■

Market Research

Worldwide semiconductor sales in March were \$23.1 billion, an increase of 4.6% from February when sales were \$22.0 billion, reports the **SIA**. Sales increased by 58.3% from March 2009 when sales were \$14.6 billion. Q1'09 marked the low point in semiconductor sales during the global economic recession. Sales for Q1'10 were \$69.2 billion compared to \$43.7 billion for Q1'009. www.sia-online.org

North America-based manufacturers of semiconductor equipment posted \$1.44 billion in orders in April 2010 and a book-to-bill ratio of 1.13, according to **SEMI**. The three-month average of worldwide bookings in April 2010 was \$1.44 billion, up 8.1% from the final March 2010 level of \$1.33 billion, and 478.7% above the \$249.0 million in orders posted in April 2009. The three-month average of worldwide billings in April 2010 was \$1.28 billion, up 16.2% from the final March 2010 level of \$1.10 billion, and 231.7% above the April 2009 billings level of \$385.7 million. www.semi.org

After the **chip business's** 36.7% expansion of 2000, the industry is expected

to finally break the 30% barrier once again in 2010, with revenue set to rise to \$300.3 billion, up 30.6% from \$229.9 billion in 2009, according to **iSuppli**. However, unlike the Internet-crazed spike in 2000, growth in chip sales this year will be driven by real fundamental supply/factors that slowly have been gaining momentum during the past 12 months. Strong sales growth is predicted for 2010 in PCs, mobile handsets, LCD-TVs and other semiconductor-rich electronic systems.

This year will mark an all-time annual high for global semiconductor revenue, eclipsing the previous record of \$274 billion set in 2007 by about 9%. Dramatic growth in DRAM revenues will be a major driver of growth in the overall semiconductor market. DRAM revenue growth in 2010 is projected to reach nearly 77%. Other major growth drivers in 2010 will be NAND flash memory, analog ICs, discretes, LEDs and PLDs. All of these major market segments are forecasted to attain growth of more than 30% during the year.

The market for high-brightness LEDs in LCD TVs will be restricted by a shortage of key semiconductor materials in 2H'10, according to **Strategy Analytics**. The rapid penetration of LED backlighting modules in LCD TVs has already seen demand soar, for capital equipment, particularly for the metal-organic chemical vapor deposition (MOCVD) reactors used to make gallium nitride (GaN) LEDs. A similar trend is now evident in the supply of consumables, specifically the metal-organic material trimethylgallium (TMG) and sapphire wafers. Demand for TMG already exceeds the available supply; thus manufacturers need to absorb a 20% price increase in the near term. A shortage of sapphire wafers, upon which most blue and white LEDs are produced, is also likely in 2H'10.

Approximately **35 million netbooks** shipped in 2009, according to **ABI**

Research. In 2010, netbook shipments are expected to reach 58 million while a new element has been added to the mobile consumer electronics market equation: the media tablet, initially personified by Apple's iPad. The firm conservatively forecasts media tablet sales of about eight million in 2010. ■

Emerging Trends

A group of industry leaders throughout the electronics industry have launched the **Hardware Intrinsic Security (HIS) Initiative**, an educational forum dedicated to reduce barriers and advance the adoption of HIS solutions. The HIS approach provides greater security at a lower cost per chip by enabling secure key storage without storing the key. With Intrinsic-ID serving as the managing sponsor, members are comprised of advisors from the following companies: Cisco, imec, Intrinsic-ID, Irdeto, NXP, SiVenture, TSMC and Virage Logic. www.hisinitiative.org ■

New Products

Atheros has demonstrated the performance of its Ethernet-over-Coax (EoC) solution for last mile broadband access. Atheros' AR7400 powerline chipset offers PHY rates of 700 Mbps and up to 350 Mbps of actual throughput over coax cables. The AR7400 complies with the new IEEE 1901 draft standard for powerline networking and interoperates with the vast installed base of HomePlug AV products. Two of China's largest cable operators, Jiangsu Cable Networks (JSCN) and Oriental Cable Networks (OCN), have adopted the standard into their EoC specifications. Both operators will deploy Atheros' EoC technology as they strengthen their infrastructure to support next-generation broadband and digital TV services.

Cavium has unveiled the OCTEON II CN68XX/67XX processor families,

which integrate 8 to 32 enhanced MIPS64 cores with up to 48GHz of 64-bit compute power in a single chip combined with over 85 L3-L7 application and security acceleration engines, virtualization features, 100Gbps of connectivity, and a new Real Time Power Optimizer™ that dynamically adjusts power depending upon the application-level processing requirement. The new OCTEON II processors deliver up to 4x higher performance and up to 3x improvement in performance/watt over the OCTEON Plus processors in a fully software compatible fashion. The CN68XX will sample in Q4. The CN68XX will be offered in 16, 24, and 32-core options. Various members will be offered with different hardware acceleration options, speed grades and price points. The CN67XX is pin and software compatible with the CN68XX and will be offered in 8, 12, and 16-core options, and will also sample in Q4.

DesignArt Networks, a provider of single-chip 4G base station SoCs with actual field deployments, announced the first two members of its next-generation DAN3000 open SoC family. With the DAN3400 and DAN3100 SoCs, DesignArt provides system vendors with a complete end-to-end development framework for any type of base station product, enabling single-SoC solutions ranging from picocell access points to large-scale distributed MacroBTS applications.

The DAN3400, the flagship SoC of DesignArt's new technology platform, has a patented multi-layer, multi-core architecture comprised of two completely software-defined high-performance sub-systems – an embedded base station and a digital front-end design for high-output RF applications. The DAN3400 enables Compact BTS solutions ranging from the lowest-cost 4G access points all the way up to multi-carrier, multi-protocol, multi-sector macrocells, based on one single R&D

software and hardware development framework. The DAN3100 offers a targeted solution for digital radio designs, e.g. multi-carrier, multi-mode remote radio head (RRH) products. First samples in Q3'10. Oz Barak, CEO. www.designartnetworks.com

Freescale has entered the GaAs MMIC market with the introduction of four new devices for macro base stations, repeaters and femtocells. The company has introduced an enhancement-mode pHEMT MMIC low-noise amplifier, two-stage InGaP HBT power amplifier and two broadband MMIC amplifiers. The new MMICs are the first of many planned Freescale MMIC devices currently under development to cover popular wireless bands and applications. Gavin Woods, VP and GM, RF Division.

Global Communication Semiconductors (GCS), a pure-play III-V compound semiconductor wafer foundry, has introduced a Terahertz diode MMIC foundry process to address the millimeter-wave transceiver requirements. Until now, THz diodes have only been available as discrete devices, according to the company. The integration of a discrete THz diode into a circuit assembly with other active and passive components required wire bonding, which is not desirable.

GCS has developed a planar Schottky diode process with THz performance. This fully monolithic process, with MIM capacitor, spiral inductor, thin film resistor and backside via features, is now offered as a standard foundry process. The THz diode process has been demonstrated as a mixer in a W-Band up-converter with a conversion loss of 6 dB, with a LO frequency of 91.8GHz (12 dBm) and an IF of 2.25 GHz. The process is ideal for applications in mm-wave frequency transceivers, as well as Terahertz imaging systems. Jerry Curtis, CEO. www.gcsincorp.com

New Products

(Continued from page 15)

Integra Technologies, a manufacturer of high power pulsed RF transistors, announced the development of High Voltage Gallium Nitride on Silicon technology. Leveraging a world-class design team and internal wafer fabrication facility with nearly two years of R&D has culminated in launch of two new products. The devices operate over the instantaneous bandwidth covering 2.7 GHz to 3.1 GHz in the S-band frequency range. Under 300 μ s (microsec) pulse width and 10% duty cycle pulsing conditions, the devices typically supply a minimum of 25 or 50 watts of peak output power. Integra claims to have developed the first high voltage GaN-on-silicon HEMT process with drain-source breakdowns exceeding 200 volts. Samples now. John Titizian, founder and president. www.integra.tech.com

Kaai announced shipments of its new blue laser diode product for display and specialty applications. Kaai's new blue laser diode is designed for integration into portable applications such as embedded and companion pico projectors and features 60 mW of 445 nm single mode output power in a compact TO 38 package. Kaai's blue lasers are based on the company's patented InGaN semiconductor technology and are fabricated on GaN substrates. Kaai is a wholly owned subsidiary of Soraa and was founded in 2008 by semiconductor laser pioneers Professors Shuji Nakamura, Steven Denbaars and James Speck of University of California, Santa Barbara. www.kaai.com

Liquavista BV announced the latest development in its range of LCD2.0 electrowetting products. The demonstration of a full color and monochrome 8.5" display, available across the entire range of current technology platforms, LiquavistaBright, LiquavistaColor and LiquavistaVivid, proves consumers can

now enjoy all the benefits of Liquavista's technology across all sizes and applications. The latest large area displays bring XGA resolution (1024 x 768), which combined with video capabilities will fuel further breakthroughs in the delivery of content and applications to eReaders, and more.

Menta SAS, a provider of embedded-FPGA IP, has unveiled eFPGA Creator, the first complete development tool suite that allows designers to create customizable programmable logic architecture. By providing full control over the parameters of the embedded-FPGA structure, eFPGA Creator gives users the ability to define, build, analyze and validate the target capacity, performance, interconnect density and programming method. Laurent Roug , founder and CEO. www.menta.fr

Percello's PRC6600 Femtocell SoC is now available. The device is claimed to be the most powerful digital baseband SoC for enterprise and outdoor femtocell use. The chip contains an 800 MHz MIPS CPU and its peripherals, femtocell L1 engine (FLE) and embedded DDRs. As a result, it does not require any external memory or digital parts on the board. The PRC6600 is compliant with 3GPP Home Node B (HNB) specs and is capable of supporting 24 HSPA+ 21.6/5.76 Mbps users and up to 32 UMTS voice calls at a range of 3,000 meters. It also is designed for optimal outdoor use, supporting high velocities and receive diversity. Samples now; production in Q4.

RFMD has qualified its second high-power Gallium Nitride (GaN) process technology, which achieves 1-2dB higher gain and 6dB greater linearity than RFMD's first high-power GaN process at moderately lower power density. RFMD's GaN2 targets CATV broadband transmission products and other multi-market applications and is optimized for higher linearity, higher gain and lower voltage operation.

RFMD's first high-power GaN process was qualified in the June 2009 quarter and delivers much higher power density and voltage breakdown than competing technologies. Additional technologies in development include MMIC process modules.

RFMD has added high power Integrated Passive Component (IPC) technology to its foundry services portfolio. RFMD's IPC technology is complementary to its GaN technology, and other power semiconductor technologies, for the design of multi-chip modules (MCMs). RFMD's IPC technology provides all of the passive circuit components necessary to enable matching networks, including MIM capacitors, multi-layer stacked capacitors, thin-film resistors and inductors. Additionally, three metal interconnect layers are available for complex routing and increased current-handling capability.

SIBeam has introduced the first WirelessHD/WiGig solution, the SB8110 WirelessHD/WiGig RF transceiver and associated SK8100 Development Kit. Based on both the WirelessHD and the WiGig standard, the SB8110 is available immediately and the SK8100 kit will be available in June 2010. The SB8110 WirelessHD/WiGig RF Transceiver supports both single carrier and OFDM modulation schemes and can be used to create either a WirelessHD only, WiGig only or dual mode WirelessHD/WiGig product.

Solarflare has begun sampling a 40nm quad-port 10GBASE-T PHY chip. Solarflare's fourth-generation PHY, the SFT9104, developed at its labs in Orange County, CA, has passed testing on links up to 100 meters, meeting a critical requirement in the 10GBASE-T standard for broad deployment. Under normal 100-meter operation, the SFT9104 consumes just 2.5 watts per port. The chip has multiple data center power modes including a 1.5 watts ultra-low power and latency mode for in-

the-rack applications. Sampling now; production in Q4.

SoloPower, a manufacturer of high efficiency thin-film solar photovoltaic (PV) cells and lightweight flexible solar modules, announced that the National Renewable Energy Laboratories (NREL) in Golden, Colorado have confirmed that the Company's flexible solar panels have achieved an aperture efficiency of 11%.

STMicro has extended its motion-sensor portfolio with a 3-axis digital-output accelerometer that combines drastically reduced power consumption (as low as 2 microamps; > 90% lower) with miniature footprint (3x3x1 mm) and enhanced functionality. Prod. in early Q3; \$0.85 @ 100Ku.

TowerJazz announced design kit availability for its next-gen. 130nm SiGe BiCMOS technology (SBL13) for high volume consumer RF applications. The SBL13 process combines SiGe bipolar performance with a mature 130nm CMOS copper (Cu) backend to achieve high performance RF with more integrated digital logic.

The technology is targeted at wireless RF and digital TV tuner applications. SBL13 is the first SiGe BiCMOS process to be built in its Israeli fab, and TowerJazz is the only foundry with SiGe BiCMOS in more than one fab. Design wins already secured on this platform have the potential for \$50M to \$100M of wafer sales from multiple consumer RF applications.

Wisair will unveil its new 2nd generation WSR602 CMOS single chip wireless USB solution at Computex. The new chip offers PCI Express/WHCI interface and additional frequency bands, including WiMedia BG1 and BG3, BG4 & BG6 upper bands (3.1GHz to 9.5GHz). Production in Q4. David Yaish, President & CEO. ■

Licensing & Partnerships

Lime Microsystems and **AirWalk Communications**, developer of IP-based CDMA cellular radio network equipment, have cooperated on the development of a high-performance, low-cost radio solution for AirWalk's EdgePoint PRO enterprise femtocell. Lime Micro's configurable broadband transceiver, the LMS6002, supports operation over multiple frequency bands, enabling the development of dual band femtocells with frequency-agile pilot beacons while reducing band-specific parts count.

Peregrine Semiconductor has formed an exclusive joint development agreement with **IBM** for the development and manufacture of future generations of Peregrine's patented UltraCMOS™ silicon-on-sapphire (SOS) process technology. When fully qualified, the next-generation UltraCMOS RF ICs will be manufactured by IBM for Peregrine in the jointly-developed 180nm process at IBM's 200mm semiconductor manufacturing facility in Burlington, Vermont. Collaboration between the two companies began in 2008.

This development marks the first commercial use of 200mm (8-inch) wafer processing for silicon-on-sapphire process. Migration to 200mm wafers facilitates the evolution of the process to advanced 180nm, 130nm and 90nm nodes, provides access to advanced manufacturing toolsets and enables significantly expanded digital integration capability. The first 180nm UltraCMOS RFICs have sampled to a key customer and commercial production release is expected in 2011. Initial product roadmaps include configurable RF cellular front ends in the form of high-power RF switches, tunable components, and power amplifiers. www.psemi.com

Redpine Signals and **Renesas** announced 802.11a/b/g/n wireless connectivity solutions that make it easy for

system engineers to add single-stream 802.11n Wi-Fi capability to embedded systems that use Renesas' R8C, RX and SuperH™ microcontrollers. These solutions are based on the Connect-io-n and n-Link series of modules from Redpine. Redpine and Renesas have collaborated to provide a Wi-Fi starter kit based on the Renesas R8C series of low-power microcontrollers. ■

Design Wins

Gigle Networks announced that **Aztech Electronics Pte** has selected the Gigle Networks HomePlug AV chipset and Mediastream technology to create Asia's first gigabit powerline adapter. Gigle's GGL541 chipset delivers 1Gbps data rates over a home's existing AC powerlines using Gigle's Mediastream technology, and simultaneously supports 200Mbps performance using industry-standard HomePlug AV technology.

SandForce announced a record performance benchmark of **IBM POWER7** systems with SandForce-based SSDs. The benchmark results showed dramatic improvements in processing efficiency and price/performance, using "multi-level cell" (MLC) flash technology. IBM POWER7 is the first enterprise server in the industry to use SandForce SSD Processor technology.

An IBM POWER7 system with MLC SSDs based on SandForce Processors recently achieved 150,000 transactions per minute per CPU core running the TPC-C Online Transaction Processing benchmark, nearly a 50% improvement in processing efficiency per core as compared to the next leading system.

Siverge announced that its Griffin flagship product has been selected by **Raisecom**, a provider of telecom equipment and network solutions, for the next generation of its Access products. ■

Company Financials

Company	Symbol	Next Qtr Outlook	Current Qtr				Last Qtr			Yr-ago Qtr			Sales Growth	Qtr	Ending
			Sales	Net	Margin	GM	Sales	Net	GM	Sales	Net	GM			
Actions Semi	ACTS	\$8.5-9.5M	8	-0.9	-11%	39%	8	-7.5	34%	12	-1.5	34%	-35%	1Q10	31-Mar
Analog Devices	ADI	\$695-715M	668	167.1	25%	65%	603	120.5	61%	475	51.8	55%	41%	2Q10	1-May
Applied Materials	AMAT	-250	2296	264.0	12%	40%	1849	82.8	38%	1020	-255.4	15%	125%	2Q10	2-May
Atmel	ATML	n/s	349	16.6	5%	38%	344	-83.3	37%	272	3.6	35%	28%	1Q10	31-Mar
AuthenTec	AUTH	\$10.4-11.4M	9	-4.7	-51%	49%	8	-3.0	46%	7	-4.5	47%	31%	1Q10	2-Apr
Avago	n/a	Up 4-7%	515	90.0	17%	45%	456	38.0	43%	325	-31.0	30%	58%	2Q10	2-May
ChipMOS	IMOS	Up 17-23%	9	-8.8	-104%	-1388%	113	-8.9	-14%	72	-62.5	-52%	-88%	1Q10	31-Mar
CSR	CSR	\$210-225M	173	3.3	2%	47%	198	20.4	47%	81	-11.3	41%	115%	1Q10	2-Apr
Dialog	DLG	\$64-69M	61	4.9	8%	46%	78	19.9	48%	36	0.8	37%	70%	1Q10	2-Apr
Diodes	DIOD	\$142-148M	137	15.0	11%	35%	130	14.2	32%	78	-10.8	19%	75%	1Q10	31-Mar
Evergreen Solar	ESLR	n/a	79	-23.9	-30%	8%	75	-98.1	12%	56	-64.5	1%	41%	1Q10	4-Apr
Exar	EXAR	\$39-41M	39	-3.3	-9%	50%	34	-3.8	50%	24	-4.6	58%	61%	4Q10	28-Mar
Ezchip	EZCH	Up	14	2.9	21%	69%	13	14.9	68%	10	1.4	66%	39%	1Q10	31-Mar
First Solar	FSLR	Up	568	172.3	30%	50%	641	141.6	42%	418	164.6	56%	36%	1Q10	27-Mar
GigOptix	GGOX	n/a	5	-2.2	-42%	49%	3	-7.2	-6%	4	-1.0	59%	29%	1Q10	4-Apr
GSI	GSIT	\$23.1-23.9M	21	3.8	18%	43%	17	2.0	43%	14	1.2	37%	56%	4Q10	31-Mar
IDT	IDTI	n/a	138	1.0	1%	48%	143	-7.4	42%	107	-720.7	31%	28%	4Q10	28-Mar
Ikanos	IKAN	\$56-59M	57	-4.4	-8%	38%	58	-9.1	30%	21	-6.1	41%	177%	1Q10	4-Apr
IXYS	IXYS	n/a	77	4.0	5%	32%	64	0.4	25%	58	-10.9	8%	32%	4Q10	31-Mar
Kopin	KOPN	n/a	26	1.0	4%	31%	33	5.3	35%	22	1.9	32%	19%	1Q10	27-Mar
Magma Design	LAVA	\$31-31.5M	34	-0.7	-2%	84%	31	-2.6	83%	34	-9.9	65%	-1%	4Q10	2-May
Marvell	MRVL	n/a	856	205.8	24%	60%	843	204.8	60%	521	-111.5	51%	64%	1Q11	1-May
Maxlinear	MXL	n/a	16	0.1	1%	68%	n/a	n/a	n/a	9	0.0	65%	83%	1Q10	31-Mar
MEMSIC	MEMS	\$8.5-9M	7.3	-2	-32%	40%	5.6	-1	n/a	7	0.1	48%	11%	1Q10	31-Mar
Mentor	MENT	\$180M	181	-23.0	-13%	83%	237	39.4	87%	194	-13.0	85%	-7%	1Q10	30-Apr
Microchip	MCHP	\$300M	278	75.7	27%	61%	250	69.4	58%	173	22.0	48%	60%	4Q10	31-Mar
Nanometrics	NANO	Up	37	5.9	16%	55%	26	-0.3	51%	10	-10.6	29%	268%	1Q10	3-Apr
NVIDIA	NVDA	Dwn 3-5%	1002	137.6	14%	46%	983	131.1	45%	664	-201.3	30%	51%	1Q11	2-May
NXP	---	n/a	1165	-310.0	-27%	37%	1161	-349.0	34%	702	-589.0	10%	66%	1Q10	31-Mar
O2Micro	OIIM	n/a	35	6.0	17%	62%	33	2.1	61%	23	-2.7	55%	51%	1Q10	31-Mar
Omnivision	OVTI	\$190-210M	157	3.5	2%	25%	157	5.0	25%	89	-20.1	17%	76%	4Q10	30-Apr
ON Semi	ONNN	\$565-580M	550	63.0	11%	41%	497	68.0	39%	379	-33.9	30%	45%	1Q10	2-Apr
Pericom	PSEM	\$40-42M	37	3.1	8%	35%	36	2.5	34%	24	0.3	36%	50%	3Q10	27-Mar
Quicklogic	QUIK	n/a	5	-0.1	-2%	61%	4	-1.9	49%	5	-1.6	61%	17%	1Q10	4-Apr
Semtech	SMTC	Up 6-10%	102	10.8	11%	56%	85	9.5	54%	60	4.9	55%	70%	1Q11	2-May
Sigma Designs	SIGM	n/a	65	1.1	2%	49%	68	-2.8	41%	51	2.7	47%	27%	1Q11	1-May
SMIC	SMI	Up 3-5%	352	-181.9	n/a	15%	333	-482.0	11%	333	-617.7	8%	6%	1Q10	31-Mar
Spreadtrum	SPRD	\$65-68M	52	6.6	13%	45%	42	1.4	42%	8	-8.3	20%	535%	1Q10	31-Mar
Sunpower	SPWRA	\$380-420M	347	12.6	4%	21%	548	-9.9	20%	212	8.5	15%	64%	1Q10	4-Apr
Supertex	SUPX	Up 15-20%	21	1.2	6%	46%	17	2.0	48%	15	0.9	42%	37%	4Q10	3-Apr
Synopsys	SNPS	\$330-338M	338	39.5	12%	80%	330	132.8	80%	337	48.3	81%	0%	2Q10	30-Apr
Tower	TSEM	\$123-128M	114	-36.2	-32%	14%	101	-31.4	6%	58	-27.9	-29%	96%	1Q10	31-Mar
Trident	TRID	\$150-165M	90	-3.9	-4%	15%	32	-23.4	16%	7	-16.6	7%	1210%	3Q10	31-Mar
Verigy	VRGY	\$140-150M	120	-1.0	-1%	48%	106	-6.0	44%	71	-30.0	31%	69%	2Q10	30-Apr
Vimicro	VIMC	\$19-20M	24	-2.1	-9%	30%	21	2.1	28%	22	-8.5	21%	7%	4Q09	31-Dec
Virage Logic	VIRL	\$26-27M	25	-1.1	-4%	84%	22	-2.2	79%	11	-26.3	78%	129%	2Q10	31-Mar
Vishay	VSH	\$660-700M	640.5	45.4	7%	26%	607	28.5	23%	450	-29.1	15%	42%	1Q10	3-Apr
Vitesse	VTSS	n/a	44	-34.1	-78%	56%	42	-34.0	54%	35	-7.1	47%	27%	2Q10	31-Mar
Wolfson	Wf.I	\$30-35M	29	-5.0	-18%	52%	28	-3.8	51%	25	-3.4	50%	13%	1Q10	4-Apr
Zarlink	ZL	Up 3-5%	59	6.3	11%	53%	54	0.1	52%	51	-50.3	48%	14%	3Q10	26-Mar

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Philadelphia SOX Index



TSMC – Foundry Barometer



Micron – DRAM Barometer



SanDisk – Flash Barometer



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