InsideChips.Ventures™

Tracking Fabless, IP & Design-House Startups

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Business Microscope

And the Winners Are ... At its fourth Semiconductor Venture Fair held Feb. 23-24 in San Francisco, Calif., conference producer Infocast announced the winners of the "Most Promising Companies" event. The CEOs of 75 companies presented their business plans at the two-day event, and an audience of semiconductor investment and emerging company professionals, members of the press and semiconductor industry players selected the five winners. InsideChips.com is a media sponsor of this semiconductor startup event.

The five Most Promising Companies (in alphabetical order) were Alereon, Berkana Wireless, iWatt, Replisaurus, and Silicon Optix.

Alereon — Time Domain, one of the oldest companies in the ultra-wideband (UWB) space, spun out its communications division as Alereon in Sept. 2003. Alereon was the first company to demonstrate an entirely in-house designed UWB platform, and the company also co-founded the Multi-Band OFDM Alliance (MBOA) and WiMedia Alliance. The value proposition that Alereon brings is to replace the complex tangle of wiring used to interconnect today's consumer electronics, computer peripheral, mobile devices with high-bandwidth, low-power, and low-cost wireless links. The startup has received $34.5 million to date.

(See our profile of Alereon under the name "Time Domain" in the Jan. 2003 issue of *InsideChips.Ventures*.)

Berkana Wireless — Headquartered in Silicon Valley with a subsidiary in Korea, Berkana markets mixed-signal/RF CMOS ICs for cellular handsets and mobile terminals. The company is also utilizing its analog/RF technology and DSP techniques to develop next-generation, highly integrated and multimode transceivers for EDGE, WCDMA, and other wireless standards. Founded in Feb. 2001, the company has received $36 million to date.

Berkana expects to capitalize on the continued growth of the GSM/GPRS market, the market transition to EDGE and UMTS

in this issue:

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multimode technology, and the increasing market share and influence of Asian OEMs/ODMs. The company currently offers a single-chip GSM/GPRS CMOS chip and is developing the next-generation ICs for 2.75G and 3G technologies.

iWatt — This firm is a power management IC provider whose products address the power conversion market, particularly the off-line adapter sector. As demand for electronic devices increases, so has the market for off-line adapters (or "bricks"). Cell phones, notebooks, inkjet printers, LCD TVs and digital cameras all require AC/DC adapters that deliver power from below 2 W to 300 W. During the past 20 years, innovation in the analog PWM controller field was limited. IWatt was the first company to apply digital techniques to control power conversion, which enabled adapters to be built with smaller footprints and lower bills of materials. Founded in April 2000, the company has received $24.5 million in funding.

Replisaurus Technologies — Based in Sweden, Replisaurus is a semiconductor technology company bringing to market a new microscale metallization process. The technology is based on research on a novel electrochemical deposition technique for interconnects at the Lund Institute of Technology in Sweden. Since its founding in April 2002, Replisaurus has continued to develop the patented ECPR-Electro Chemical Pattern Replication technique for semiconductor manufacturers. The electrochemical replication principle of ECPR combines the precision and resolution of photolithography with ease and efficiency of electrochemical deposition into one single electrochemical printing step. The total cycle time to manufacture a metal layer is reduced from a few hours to a few minutes compared to conventional photolithography based processes.

Replisaurus offers complete production solutions, including replication templates, chemicals, processing guidelines, and equipment solutions in collaboration with equipment suppliers.

Silicon Optix — Silicon Optix is developing advanced video/image digital ICs. The company has developed a patented array-based programmable DSP for digital video, software algorithms from Teranex (a company acquired by Silicon Optix), and eWARP geometry processing. Its strategy is to leverage these technologies to enable next-generation video/image capture, transmission, distribution, editing, storage and display solutions, with an initial focus on large-area displays such as front and rear projection, plasma, and large-area LCD. Silicon Optix is headquartered in San Jose, Calif., with operations in Hannover, Germany; Orlando, Fl.; Taipei, Taiwan; Toronto, Canada; and Shanghai, China. Founded in June 2000, Silicon Optix is well funded with $100 million to date.

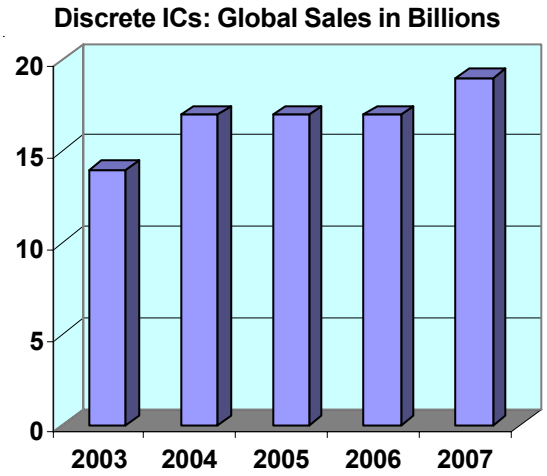


Figure 1

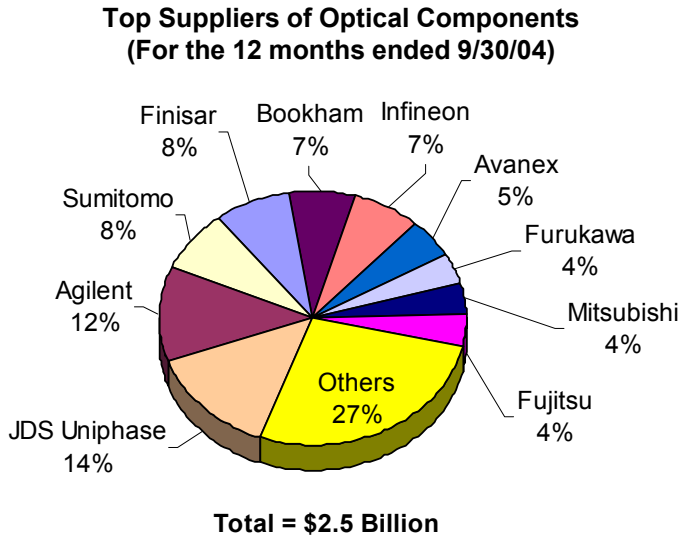


Figure 2

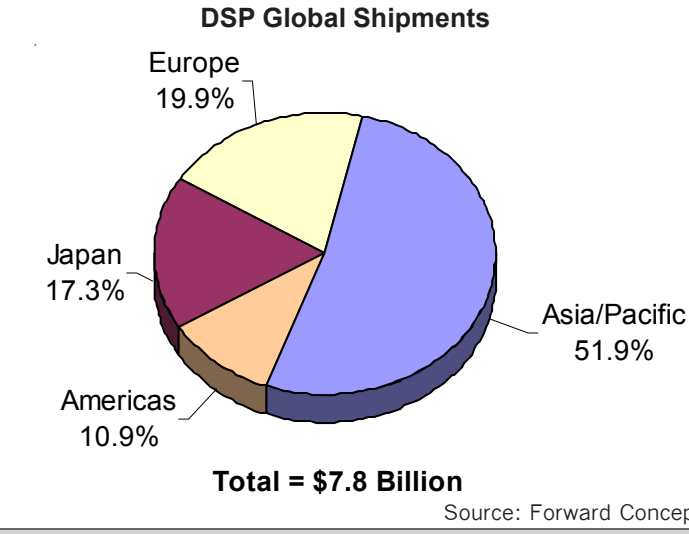


Figure 3

Bits and Bytes

Semiconductor Fab Owners Form Association

Senior manufacturing executives from nine global semiconductor companies — representing more than $7 billion in annual revenue – have formed the Fab Owners Association (FOA), an international, not-for-profit semiconductor manufacturing association.

The current announcing member companies are AMI Semiconductor, Cypress Semiconductor, Delphi Electronics, Fairchild Semiconductor, Intersil, LSI Logic, Micrel Semiconductor, ON Semiconductor and ZME AG.

The FOA's vision is to provide a cooperative environment for executives to discuss and examine common, non-proprietary manufacturing issues and identify practical solutions. The founding companies expect the organization will be able to look at a larger sample of the silicon-manufacturing segment than a single company can.

The Association will facilitate and provide solutions on issues that are more effectively undertaken as an industry association. These include:

- Promote cooperative efforts between FOA member companies to solve common manufacturing problems and improve efficiencies.
- Compile FOA member information and statistics related to semiconductor and MEMS manufacturing and publish this data.
- Explore combining purchasing requirements to further enhance efficiencies.

More information about the FOA is available at the organization's web site: www.waferfabs.org.

Former Volterra Employee Arrested

Volterra Semiconductor (NASDAQ: VLTR) has revealed that federal agents arrested a former employee on Feb. 27, 2005, on a criminal complaint charging the former employee with illegally e-mailing to a semiconductor company in Taiwan proprietary "data sheets" containing product specifications and functionality regarding several of the company's products. Volterra provides these data sheets to its customers subject to non-disclosure obligations.

Volterra believes that the former employee may have also transferred files containing company proprietary information to his personal computers. Although Volterra and federal investigators are in the process of fully determining the extent of the former employee's action with respect to the company's proprietary information, the company does not believe at this time that the transfers or alleged data sheet transmissions have materially impaired the company's intellectual property or otherwise impacted the company's business or operations.

Founded in 1996, Volterra emerged from U.C. Berkeley's InfoPad research project, which was focused on developing a mobile multimedia terminal. The company's ICs employ a proprietary power system architecture and mixed-signal design techniques that integrate power, analog and digital circuits onto a single CMOS semiconductor. The chips eliminate the need for a large number of discrete components required by conventional power management solutions, and are scalable across product platforms and reduce system size and cost.

Volterra launched its IPO in July 2004.

(See our profile of Volterra in the Feb. 2003 issue of *InsideChips.Ventures*.)

Semiconductor Stock Index

Short Term

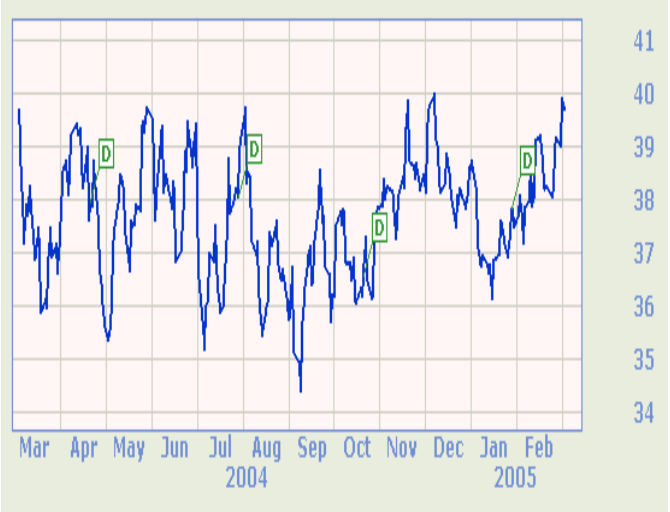
Long Term

Stock Market Scan

DSP Group

ESS Technology

Genesis Microchip



Linear Technology

MIPS Technologies

Volterra

Finance: News, Funding and Acquisitions

Freescale Acquires 3G Baseband Company PrairieComm

Freescale Semiconductor has acquired the assets of PrairieComm, an Illinois-based company developing 3G baseband products. The companies did not disclose financial details of the transaction.

Founded in 1994, PrairieComm develops cellular products such as software, SOC designs and platform designs. The company has a strong background in development and sales of CDMA, TDMA, GSM and UMTS product lines. PrairieComm is headquartered in Rolling Meadows, Ill., with additional offices in Atlanta, Ga., and Bangalore, India. About 120 employees are joining Freescale as part of this transaction, half in India and half in the U.S.

(Premium level members can view our March 2001 review of PrairieComm by logging into InsideChips.com and clicking "Strategic Profiles.")

Contacts:
John Diehl, PrairieComm president and CEO; Tel: 847 871-1800; www.prairiecomm.com.
Alan Campbell, Freescale senior VP and CFO; Tel: 480 768-2130; www.freescale.com.

Nextreme Thermal Solutions Raises $8 Million

Nextreme Thermal Solutions, a developer of next-generation thermoelectric materials and devices, has secured $8 million in Series A financing. Nextreme is a spin-off of R&D company RTI International. SpaceVest, Aurora Funds, Harris & Harris Group and RTI International provided the funding, which will be used to develop thermoelectric devices to address acute thermal management problems in the semiconductor industry and to further develop the application base, including power generation and optical communications.

Nextreme's technology, a thin-film superlattice material made from a semiconductor alloy, emerged from RTI's work with the U.S. Department of Defense. The Office of Naval Research and the Defense Advance Research Projects Agency have provided funding since 1993 for the company's development of the new materials and devices.

Nextreme's superlattice material, when placed directly under a semiconductor hot spot, can efficiently pump heat from the semiconductor package. The form-factor of this ultra-thin thermoelectric device enables direct integration onto the semiconductor or into the chip package.

Former RTI entrepreneur-in-residence Jesko von Windheim will lead Nextreme as CEO. Prior to his work with RTI, von Windheim was a co-founder of Cronos Integrated Microsystems, a MEMS company that was acquired for $750 million by JDS Uniphase.

Contact:
Jesko von Windheim, CEO; Tel: 919 541-6000; www.nextremethermal.com.

Siliconix Acquires Vishay Subsidiary

Siliconix, an 80.4%-owned subsidiary of Vishay Intertechnology, has acquired Vishay's former subsidiary, Vishay Semiconductor Itzehoe (VSIG). The purchase price of approximately $10.2 million, which includes all assets and liabilities, was based on an independent appraisal performed on behalf of the Siliconix board of directors. Siliconix also announced that it plans to establish 8-inch wafer production capability at the Itzehoe facility, which the company renamed Siliconix Itzehoe.

VSIG operates a Class 1 wafer-fabrication facility in Itzehoe, Germany, under an agreement with Fraunhofer Gesellschaft. Vishay acquired its 80.4% interest in Siliconix and its 100% interest in VSIG concurrently, as part of the 1998 acquisition of the TEMIC Semiconductor Division of Daimler-Benz. Siliconix had a subcontracting agreement with VSIG.

Siliconix manufactures power MOSFETs, power ICs, analog switches, and multiplexers for computers, cell phones, fixed communications networks, automobiles and other consumer and industrial electronic systems. The company's facilities include a Class 1 wafer fab dedicated to the manufacture of power products in Santa Clara, Calif., as well as the Class 1 wafer fab in Itzehoe, Germany. Assembly and test facilities include a company-owned facility in Taiwan, a joint venture in Shanghai, China, and subcontractors in the Philippines, China, Taiwan and Israel.

Contact:
Nick Bacile, executive VP and COO; Tel: 408 988-8000; www.siliconix.com.

BinOptics Receives $10 Million in Series B Funding

New investors have led BinOptics' $10 million Series B funding round. BinOptics is an emerging supplier of integrated microphotonic chips for datacom, telecom and optical storage applications. The round included FA Technology Ventures and ArrowPath Venture Capital, along with previous investors Draper Fisher Jurvetson and Cayuga Venture Fund II. BinOptics will use the new funding to support product development and production scale-up.

BinOptics manufactures monolithically integrated laser chips based on its proprietary etched facet technology, which significantly reduces the cost of production, testing, and handling compared to conventional laser processing. The technology also enables monolithic integration of multiple functions on a single chip because of its flexibility and high yield.

Contact:
Alex Behfar, CEO; Tel: 607 257-3200; www.binoptics.com.

Microbridge Raises $5.5 million Series B Financing

Microbridge Technologies has closed its Series B equity financing, raising a total of $5.5 million in venture capital. Zon Capital Partners led the round, which included investments by the Business Development Bank of Canada (BDC) Venture Capital, and Schneider Electric Ventures (SEV) of France, along with the existing seed investors Solidarity Fund QFL and Innovatech Montréal. This brings the total investment in Microbridge to date to $7.5 million. The funds will be used for sales and marketing ramp up, product production ramp up and the next stage of technology development.

Microbridge is developing an electronically adjustable microresistor, which the company has named the Rejuster. Unlike traditional trimming techniques, such

as laser trimming — which requires expensive equipment and is unidirectional – the Microbridge Rejustor uses only electrical signals, and is non-volatile and can be adjusted up or down many times to very high precision.

(See our profile of Microbridge in the March 2004 issue of *InsideChips.Ventures*.)

Contact:
Michael Foster, president and CEO; Tel: 514 938-8089; www.mbridgetech.com.

Cypress Buys Imaging Specialist, Eliminates MRAM Subsidiary

Cypress Semiconductor is acquiring digital imaging solutions provider SMaL Camera Technologies, and is divesting itself of Silicon Magnetic Systems (SMS), a subsidiary company founded to commercialize magnetic RAM (MRAM).

Cypress will pay $42.5 million in cash for SMaL Camera Technologies (SCT), plus a performance-based earnout plan, contingent primarily on SCT achieving certain revenue levels. SCT posted sales of $10.5 million in fiscal year 2004.

A group of MIT digital media experts consisting of three professors and one of their students founded Cambirdge, Mass.-based SCT in fall 1999. The company offers CMOS image technology for the consumer, automotive, and security/surveillance markets. The imaging solutions the founders have brought to market are extremely low power and incorporate a unique technology, called Autobrite, that enables cameras to adjust to varying lighting conditions. The company's proprietary Autobrite design enables the imagers to capture between 500 and 1,000 times wider dynamic range than standard imagers.

Cypress expects the SCT acquisition to significantly accelerate its entry into the high-volume CMOS image sensor business, initially targeting the market for three- and five-megapixel cell phone cameras and automotive imaging systems. SCT's product line will complement new cell phone products that Cypress will introduce in the second half of 2005 through its recent FillFactory acquisition. As with FillFactory, SCT will be integrated into Cypress's Memory Products Division (MPD).

Cypress' divestiture of subsidiary Silicon Magnetic Systems (SMS) comes after the three-year-old MRAM project sampled fully functional MRAMs to seven key OEM customers in January. Three of those customers are still in the validation phase of their assessment and four of them have confirmed that they have found the product fully functional.

However, Cypress determined that its original strategy of attacking the SRAM market with the single-transistor, single-magnetic tunneling junction (1T-1MTJ) MRAM technology is no longer viable, which will leave MRAM as a niche technology with higher bit pricing than that of SRAM. While a niche MRAM business could be profitable, Cypress said it has more attractive places to invest than in the capital-intensive MRAM business.

Cypress said Silicon Magnetic Systems will be off the books by the first quarter.

Contact:
T.J. Rodgers, CEO; Tel: 408 943-2600; www.cypress.com.

Natel Engineering, Hytek Enter Into Merger Agreement

Hytek Microsystems and Natel Engineering have entered into a merger agreement. Under the terms of the agreement, Natel will pay $2 per share for all of the issued and outstanding shares of Hytek's common stock. Upon closing of the transaction, Hytek will become a subsidiary of Natel Engineering and will no longer be a public company. The companies expect to close the transaction during the second quarter of 2005.

Founded in 1975, Natel Engineering is an independent manufacturer of a wide variety of microelectronic products, providing mid- to high-volume production to defense, aerospace, fiber optics/optoelectronics, medical, space, RF microwave and telecommunication industries. Natel completed its most recent fiscal year (Jan. 31, 2005) with revenues of approximately $47 million. Natel acquired Power Microelectronics Division from Semtech (1992), Powercube from Unitrode (1994), and Scrantom from Solectron (2003).

Hytek Microsystems, founded in 1974, reported revenues of $7.6 million for the nine months ended Oct. 2, 2004. The company is a manufacturer of microelectronic assemblies with expertise in custom advanced packaging technology used in high-density microelectronic applications. Hytek principally serves defense, space, medical and Hi-Rel commercial markets.

Contacts:
John Cole, Hytek president and CEO; Tel: 775 883-0820; www.hytek.com.
Douglas Russell, Natel COO; Tel: 818 734-6561; www.natelengr.com.

Real Intent Raises $6.5 Million

Real Intent, a supplier of formal assertion-based verification (ABV) software for electronic design verification, has closed a new round of financing in the amount of $6.5 million. Existing investors, including Sun Microsystems co-founder Andy Bechtolsheim, led the financing round.

Real Intent has also expanded its management team with the addition of Pranav Ashar as CTO, Ron Geiss as VP of worldwide sales, and Rich Faris as director of marketing.

Ashar spent more than 10 years with NEC Laboratories, where he was a department head, leading the R&D activities in the areas of hardware and software formal verification, embedded design and autonomic system management.

Geiss was most recently VP of sales at Cadence, covering the company's European global accounts. Prior to this, he was Cadence's VP of sales for Japan. Earlier, he held senior sales management positions with several startups and larger EDA companies, including Arcsys (Avanti), NeoCAD, Daisy, Cadnetix, Spectragraphics and Calma.

Faris most recently managed the most productive channel within Mentor Graphics for FPGA Synthesis Solutions. Prior to that, he held senior and executive roles at IKOS Systems, including VP of information technology, senior director of services, and senior director of marketing.

Real Intent formal verification software is suitable for all phases of design verification, from the earliest hardware language description of a design to the final design description.

Contact:
Prakash Narain, founder and CEO; Tel: 408 982-5444; www.realintent.com.

Motorola Invests in Sequoia Communications

Motorola has invested in multi-mode RF semiconductor company Sequoia Communications in an extension of the series D round, which closed in Dec. 2004. Gabriel Venture Partners led the $15 million December round, which included previous investors Huntington Ventures, Cadence Design Systems, IBM, Tallwood Venture Capital and Nokia Venture Partners.

Sequoia is developing single-chip RF transceivers for multi-mode communications. The company designed its solution to reduce chip cost, component count, PCB size and power consumption, while supporting multiple wireless standards, including GSM/GPRS, EDGE, WCDMA, GPS and WLAN.

Sequoia developed a solution to one of the most significant problems with multimode, which is the incompatible transmit architectures between the modes. The prevailing RF transmit architecture for GSM is polar modulation, while the prevailing WCDMA architecture is direct convert. The incompatible architectures issue must be solved before a one-radio solution can be developed, and the industry is therefore furiously trying to make polar modulation, which is the best architecture, work on EDGE and WCDMA. Sequoia says it has a WCDMA polar transmitter working in silicon already, enabling a single-chip UMTS (GSM, EDGE, WCDMA) multimode radio with a single architecture.

Contact:
David Shepard, CEO; Tel: 858 946-7400; www.sequoia-communications.com.

eSilicon Secures $15 Million In Funding

eSilicon has completed a $15 million Series F financing round, bringing the total amount of venture funding to $86 million. Investor Growth Capital led the round, which included existing shareholders as well as two other new investors, NIF Ventures and CrossBridge Venture Partners. The new funding will provide working capital to expand operations internationally.

eSilicon is a pioneer of the new "fabless ASIC" business model, in which the company serves as a kind of general contractor for semiconductor manufacturing. Founded in 2000, the company manages every step of the IC development process — from specification through manufacturing and delivery of packaged and tested parts.

(See our profile of eSilicon in the Oct. 2003 issue of InsideChips.Ventures.)

Contact:
Jack Harding, president and CEO; Tel: 408 616-4600; www.esilicon.com.

Sandburst Secures $15 Million in Additional Financing

Sandburst, a provider of scalable and adaptable silicon for advanced packet systems, has raised $15 million in additional funding. NeoCarta Ventures led the financing round, which also included new investor SpaceVest and existing investors Greylock, Matrix Partners, 3i US, Investor Growth Capital and Intel Capital. With the round, Sandburst has raised a total of $72 million in equity financing since its inception.

Sandburst delivers adaptive silicon to power advanced Ethernet and IP switches. Sandburst's HiBeam switching architecture is optimized for packets, and is targeted at customers only interested in packet switching. This enables Sandburst to provide a much lower system cost than cell-based architectures that do ATM and TDM as well as IP.

(See our profile of Sandburst in the May 2003 issue of *InsideChips.Ventures*.)

Contact:
Vince Graziani, president and CEO; Tel: 978 689-1600; www.sandburst.com.

Vativ Secures $11 Million in Series B Funding

Vativ Technologies, a provider of DSP-based silicon solutions for high-bandwidth transport over copper, has raised $11 million in a second round of venture funding to launch its high-performance digital television products and its 10-Gbps Ethernet devices. New investor InnoCal Venture Capital led the round, which also includes new investor Intel Digital Home Fund and existing investors Redpoint Venture Capital, Mission Ventures, and QUALCOMM co-founder Andrew Viterbi.

Vativ Technologies' advanced architecture enables higher data rates and lower system costs while providing greater robustness and higher performance;

Contact:
Sreen Raghavan, president and CEO; Tel: 858 658-0050; www.vativ.com.

Intel to Acquire Oplus Technologies

Intel is acquiring Oplus Technologies, a provider of video-processing products and technologies for digital television and digital displays. Based in Yokneam, Israel, Oplus develops ICs and software for flat-panel plasma and LCD-TVs, projection systems, LCD multi-function monitors and emerging digital display applications.

Oplus currently sells three lines of video processors targeted at the full spectrum of digital televisions and digital displays. The company, which has approximately 100 employees, will continue selling products under the Oplus brand name and will report into the Intel Consumer Electronics Group. The companies did not disclose financial details of the transaction.

Contacts:
Glenda Dorchak, Intel VP of Digital Home Group and GM of Consumer Electronics Group; Tel: 408) 765-8080; www.intel.com.
Yair Alpern, Oplus CEO; Tel: 972-4-9592288; www.oplus.com.

Frontier Silicon Closes $28 Million Investment

Frontier Silicon, which has become the market leader in ICs for digital terrestrial broadcasting.in just under four years, has closed a $28 million investment round. New investor ACT Venture Capital led the round, which included existing investors Apax Partners, Alta Berkeley and BlueRun Ventures (formerly Nokia Venture Partners), as well as new investor Quilvest.

Since releasing its first product in 2002, Frontier has secured more than 50 design wins for its semiconductor and modular solutions for digital multimedia products, and is one of Europe's fastest growing startups.

The first of Frontier's three business strands is digital radio, the area for which the company is best known and which generates most of its revenue. The company's second line of business is digital TV ICs for DVB-T products, and the third part of its business is mobile TV.

(See our profile of Frontier in the Jan. 2005 issue of *InsideChips.Ventures*.)

Contact:
Anthony Sethill, CEO; Tel: +44 (0)1923 474200; www.frontier-silicon.com.

Andigilog Completes Series A Financing

Andigilog, a fabless analog and mixed-signal semiconductor company that provides thermal management solutions, has received additional funds totaling $6.2 million from outside investors to complete its Series A financing. Valley Ventures, Mission Ventures and Palisades Ventures led the final investments in the round, bringing the total Series A funds raised to $11 million.

Andigilog has developed a family of analog and digital temperature-sensing products with very high accuracy, which is critical in sensitive notebook PC, handset and other applications. The company also is developing new products for improved thermal management for systems facing heat issues caused by increasing processor speeds and smaller sizes.

Contact:
Bill Sheppard, president and CEO; Tel: 480 940-6200; www.andigilog.com.

MagnaChip Buys Display Driver IC Company

MagnaChip Semiconductor is acquiring International System and Electronics Corp. (ISRON), a display driver IC (DDI) company. The companies did not disclose financial deals of the transaction.

Founded in 2000, ISRON develops mixed-signal semiconductors focused on the small DDI market. ISRON, currently a unit of Japan's Siix Corporation, has 32 employees and achieved 2004 revenues of approximately $21 million. The company provides super-slim TFT LCD drivers, and is developing a one-chip amorphous QVGA solution in high-resolution small panels.

Yoshio Imamura, founder and CEO of ISRON, will join MagnaChip as a core leader of its small panel driver business.

Contacts:
Youm Huh, MagnaChip president and CEO; Tel: 82-43-270-2102; www.magnachip.com.
Yoshio Imamura, ISRON CEO; Tel: +81-(0)6-6266-6400; www.siix.co.jp.

Isonics Completes $22 Million Debt Financing

Isonics, a company developing technology for the homeland security and semiconductor markets, has closed a $22 million convertible debt private placement financing. Isonics anticipates that the proceeds from this financing will enable it to accelerate its growth and acquisition strategy, particularly in the homeland security sector.

Isonics intends to allocate 50% of the net proceeds from the financing to leverage strategic acquisitions of companies with significant revenue and/or positive cash flow in the homeland security, defense and security industries. Isonics may also target acquisitions that can bring important technologies and products that complement and extend the company's existing IP portfolio and strategic direction.

Under the terms of the placement agreement, Isonics issued accredited investors 8% convertible debentures in the aggregate principal amount of $22 million convertible into common stock at $5 per share and 1,540,000 common stock purchase warrants, each of which can be exercised for $6.25 per share for a period of three years.

Isonics may cause the investors to convert the debentures into common stock at a price of $5 per share if the closing bid price exceeds $7.50 for 20 out of 30 consecutive trading days. According to the terms of the agreement, the company has the sole option to pay interest and repay the principal in common stock if certain conditions are met.

Contact:
James Alexander, chairman and CEO; Tel: 303 279-7900; www.isonics.com.

DALSA to Acquire Coreco

DALSA is acquiring all of the issued and outstanding shares of Coreco. The transaction combines Coreco's vision processors, software and smart camera technology with DALSA's high-performance image sensor chips and digital cameras.

For each common share of Coreco, shareholders of Coreco will receive, at their election:

a) 0.5207 of a DALSA common share;

b) $10 in cash; or

c) a combination of cash and DALSA common shares.

The above is subject to a maximum of $35 million in cash available for election. DALSA will pay a total consideration for Coreco of approximately $72 million. The companies expect the transaction to close in late April 2005.

Keith Reuben, president and CEO of Coreco, will join DALSA as president of DALSA Coreco, reporting to DALSA CEO Savvas Chamberlain.

Contacts:
Savvas Chamberlain, DALSA CEO; Tel: 519 886-6000; www.dalsa.com.
Keith Reuben, Coreco president and CEO; Tel: 514 333-1301; www.coreco.com.

Oki Acquires TI Japan's Driver Chip Business for Large TFT-LCDs

Oki Electric is acquiring the driver chip business for large TFT-LCDs from Texas Instruments Japan. Oki will take in all the customers and employees of TI Japan after the transfer, which is planned for the end of March 2005.

TI Japan has developed various industry-standard technologies since 1991 in the TFT LCD driver chip field, such as new interface technologies, new driver methods and new packaging technologies. In 2000, TI Japan developed the mini-LVDS interface method, the mainstream for today's interface.

Oki and TI Japan each hold 8% market share in the non-captive (excluding products for its own panels) large TFTs over 10.4-inch LCD driver chips. Oki has a 25% market share in the 22-inch-and-above large LCD TV-use driver chip market.

Contact:
Akira Kamo, Oki Electric president of Silicon Solution Company; Tel: +81-3-3454-2111; www.oki.com.

Solarflare Secures $48 Million in Funding

Solarflare Communications, a developer of high-performance mixed-signal semiconductor solutions for system connectivity, has raised $48 million in its

Continued on page 23

Analyzing the Analysts

Novel Front-end Manufacturing Technologies Support Advances in Semi Industry

According to Frost & Sullivan, demand for new and improved front-end semiconductor manufacturing technologies such as wafer cleaning and thin-layer deposition is likely to stem from the rapid advancements in the IC industry. Innovative wafer-cleaning technologies, in particular, are crucial to meeting the needs for finer fabrication, higher integration densities, and faster speeds of shrinking device features that support greater functionalities.

Moreover, new processes and technology solutions in wafer cleaning have become essential to meeting the International Technology Roadmap for Semiconductors (ITRS) requirement for reduced surface contamination in the form of foreign metals, micro-roughness, watermarks, and silicon loss.

While silicon wafer wet cleaning is the most widely accepted solution for mainstream chip manufacturing, due to its being a robust and risk-free process, sub-100-nm technologies require non-etching and damage-free techniques for precise interface control.

Novel wafer cleaning techniques such as supercritical CO2 (ScCO2) are under development and show great promise as mainstream cleaning processes due to their high density, low viscosity, and negligible surface tension. ScCO2 technology is likely to enable the semiconductor industry with an integrated solution for the post-etch residue cleaning and the drying of porous low-k materials. It is flexible, as it uses specialty additives to target specific applications such as photo resist image collapse prevention, next-generation lithography photo mask cleaning, and particle removal.

In the deposition industry, advances in separation by implantation of oxygen (SIMOX), atomic layer deposition (ALD) for advanced nodes, and plasma source ion implantation (PSII) will likely be important for meeting the specific needs of sub-100-nm devices.

With regard to the SIMOX technology, the relatively immature state of modeling silicon-on-insulator (SOI) devices poses a significant challenge. Researchers are currently developing refined metrology tools to address this issue.

While there have been significant advancements in wafer cleaning and thin-layer deposition, these techniques must demonstrate tangible advantages over the prevalent competing technologies for quicker acceptance in the market.

Proper cooperation with material suppliers, manufacturing equipment suppliers and semiconductor manufacturers is critical to select the appropriate applications that fully exploit the uniqueness of the technology.

World Front-end Semiconductor Manufacturing Technologies is part of F&S's Semiconductor vertical subscription service. It examines the global trends and developments in next-generation front-end semiconductor manufacturing technologies.

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Capital Spending Will Grow This Year, but Level of Spending only Equal to mid-1990s

Strategic Marketing Associates' latest issue of "International Wafer Fab News" states that, for many companies, 300-mm fabs are keeping budgets strong and actually causing chip capital spending to grow by 2% this year. Samsung is the industry's top spender for the second year in a row, followed by Intel. Both companies plan to increase their spending substantially this year to more than $5 billion each. The industry's largest foundry, TSMC, also plans to increase spending. The bulk of Samsung's and Intel's spending is to build and ramp 300-mm production. The same is true for TSMC and seven other semiconductor companies that are increasing their capital spending to new 300-mm fabs.

However, Strategic Marketing Associates says it is a good news-bad news situation. The bad news is that this spending is still 26% below the industry's peak level in 2000. Although this year's level of spending will be up 57% from the low point in 2002, it is cold comfort for equipment makers, as the current level of activity is still only equal to that of 1996. Equipment makers have improved productivity so much that chip companies can get away with spending less. The ratio of capital spending to revenue is only 20% this year, compared to 30% in 2000.

Strategic Marketing Associates expects 22 new fabs will begin equipping this year. The values of these fabs, when fully equipped, will be nearly $40 billion.

The first wave of 300-mm production fabs began equipping in 2000 and 2001, the second wave began in 2003 and 2004, and the third wave is coming this year. 300-mm fabs will keep the spending budgets plump in 2005. New fab activity will remain strong in 2005 as well, and if chip sales remain positive this year and into next year, 300mm-fab-driven capital spending will continue to grow into 2006.

Strategic Marketing Associates' International Wafer Fab News is a monthly newsletter focusing on wafer fabs and capital spending. It is available in electronic or print form for $355 per year.

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New Report Says Plastics Will Change the Face of the Electronics Industry

Plastic electronics, based on conductive polymers and flexible substrates, will change the face of electronics, according to a new report from NanoMarkets. The analyst firm forecasts the worldwide plastic electronics market will grow to $5.8 billion in 2009, and reach $23.5 billion by 2012.

NanoMarkets expects that displays will account for 46% of the plastic electronics market in 2009, and that memory will account for 38%. By 2012, the markets for logic/processors, flexible solar panels and sensors will all be measured in the billions of dollars.

In 2009, 37% of plastic electronics products will come from the mobile phone sector, but by 2012, plastic electronics will make its

impact felt in numerous other segments. Plastic electronics will enable the creation and production of roll-up displays to be used with computers and mobile phones, flexible solar panels that can be laminated to walls and ceilings or used to power portable equipment and ultra-low-cost RFID tags that will completely replace bar codes in retail outlets. None of these could ever be built using standard CMOS technology.

Electronics built on conductive polymers and flexible substrates offer some compelling advantages over CMOS platforms given their low costs, reduced power consumption and flexibility. They can be printed using techniques similar to those of ink jet printing or rubber-stamping, which would reduce the need for building giant fabs. This in itself makes plastic electronics a serious interest point for the industry as the ability to produce circuits without significant capex or being forced to recoup costs through high-output manufacturing means that the chip companies would be able to capitalize on market opportunities previously unavailable to them.

In addition to analyzing the current and future opportunities for plastic electronics, NanoMarkets' new report, "Plastic Electronics Markets: A Technology Analysis and Eight-Year Forecast" analyzes the strategies of the leading firms in this area including Dow Chemical, DuPont, Eastman Kodak, Fujitsu, General Electric, HP, Infineon, Lucent, Motorola, Philips, Sony and Xerox, as well as smaller firms such as Plastic Logic and Cambridge Display Technology.

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Innovation Will Drive Higher Power Amplifier ASPs

Due to intense vendor price competition and cellular operator negotiating clout, the power amplifier segment of both cellular infrastructure markets and handset markets has seen falling average selling prices (ASPs) over the last several years, especially in the more mature markets such as GSM.

However, with the advent of new standards such as EDGE and 3G, which require going back to the drawing board to meet increased linearity requirements, ABI Research expects to see a rise in power amplifier ASPs.

ABI points out that vendors are using, among others, innovative methods that include adaptive pre-distortion and switching-amplifier techniques to increase efficiency without sacrificing linearity.

The other interesting trends in this segment are tower-mounted amplifiers, plastic packaging, MCPAs, LDMOS MMICs and wideband amplifiers. In addition, gallium nitride (GaN) might finally get on the runway as a substitute for LDMOS.

Even if the story surrounding cellular markets is troubling, says ABI, there will nonetheless be interesting growth in areas such as broadband wireless, WiMAX, WLANs and ultrawideband (UWB).

ABI Research's study, "RF Power Semiconductors: Transistors, FETs, ICs, and Power Modules" discusses these issues in detail for GaAs MMICs, GaAs transistors and silicon transistors. In addition, it examines the drivers for power semiconductors, the key performance parameters such as linearity and efficiency, and recent trends in these spaces. It also forecasts timelines and volumes in individual segments such as cellular, WLAN, military, broadband wireless, and satellite, out to 2009.

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In-Vehicle Networks Create Major Opportunity for Semiconductor Vendors

According to a new report from Strategy Analytics, "Automotive Multiplex Network Growth," 611 million automotive communication nodes will be installed into new vehicles in 2005. The market research firm forecasts this to double to 1.2 billion by 2011.

Today's high-end vehicles may contain nearly 70 electronic control units networked together to manage the full range of systems and features. Strategy Analytics' study concludes that the automotive control network protocol, CAN, will remain dominant, but emerging application-optimized protocols will also be installed and become industry standards. Some of these protocols will face adoption challenges along the way. Cost, performance and safety issues drive the development of these emerging protocols, although they will need to be cost-competitive with existing solutions for deployment in low-margin volume vehicle production.

The use of in-vehicle networks is part of the solution for OEMs to deliver enhanced vehicle features and improved reliability. The deployment of the LIN sub-bus, fault-tolerant Flexray, safe-by-wire occupant protection bus and high-bandwidth infotainment networks will drive up the number of nodes installed in vehicles, creating significant growth opportunity for semiconductor vendors of bus protocol and driver ICs.

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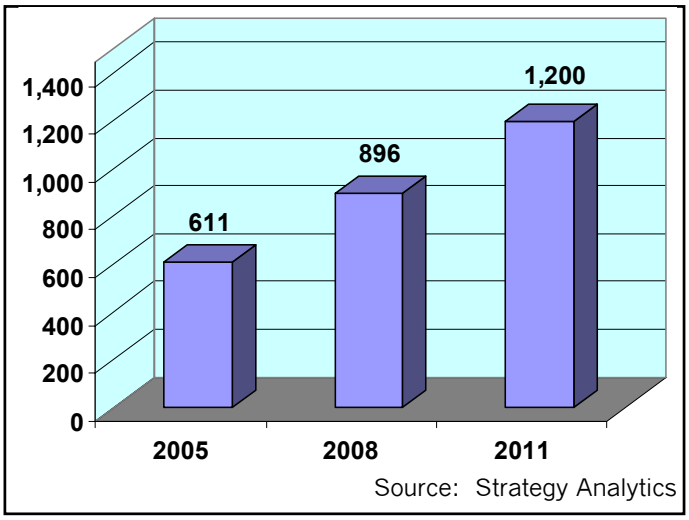
Figure 4 — Automotive Multiplex Node/Transceiver Forecast (Million of Units)



aJile Systems

aJile Systems is a six-year-old company pioneering Java-based processors. Founded in July 1999, aJile is offering a family of low-power networked single-chip Java microprocessors and IP cores to extend the Java paradigm beyond the desktop and server to a wide variety of handheld, mobile and consumer appliances.

The seven founders are veterans of Rockwell Collins, Sun Microsystems, and Centaur Technologies. This group includes four of the principal engineers and designers that developed the world's first low-power Java processor, the Java Embedded Microprocessor (JEM™), as well as advanced Java software development tools at Rockwell Collins.

The JEM1 direct execution Java microprocessor achieved its first silicon in 1997. JEM technology enables low-power embedded applications to be programmed entirely and directly in Java, while also enabling them to achieve the efficiency and performance of comparable conventional embedded processors programmed in C.

aJile's solutions are based on JEM technology, for which the startup has an exclusive license with Rockwell.

CEO George Hwang began his career in 1969 at National Semiconductor as a TTL design engineer, then joined the IC technology development group at Hewlett Packard. In 1980, Hwang led a team from Hewlett-Packard to start his first company, Integrated Device Technology (IDT), which went public in 1984. He launched his second company, ULSI Systems, in 1987.

CTO David Hardin is a well-known expert in the fields of real-time Java and formal methods. Hardin is a primary member of Sun's Real-Time Java Expert Group, and has been involved with real-time embedded Java requirements development since it began with the National Institute for Standards and Technology in June of 1998.

Danh Le Ngoc, who serves as VP of sales and marketing, has more than 23 years of semiconductor experience in product marketing, product definition and applications engineering. He has developed Java processor products, embedded DRAM based 2D/3D graphics accelerators, the embedded RISC MIPS processor, DSPs, bit slice machines, and numerous others. He served as group marketing manager for PicoJava at SUN.

Nick Mykris is aJile's VP of engineering. While at Rockwell Collins, Mykris was a technical manager in the Advanced Technology Center responsible for the development of proprietary stack processors and support environments, including the JEM microprocessor.

Allen Mass, senior engineer, is an embedded systems designer with more than 20 years of experience in HW/SW design, integration, and debug.

Mike Masters, chief hardware architect, has developed CPUs used in embedded systems that vary from highly reliable autopilot applications to low-power GPS engines. He led Rockwell Collins' JEM1 processor design activity that resulted in the world's first Java microprocessor in 1997.

B. Ramkumar, the company's chief software architect, served on the research faculty in Electrical and Computer Engineering at the University of Illinois-Urbana for nearly two years, and then in the Electrical and Computer Engineering department at the University of Iowa for five years, prior to founding Centaur Technologies in 1997.

aJile has raised approximately $10 million thus far. The company's backers include a small venture capital firm, Synapse Capital, as well as several small, un-named companies and numerous angel investors.

aJile is banking on a significant shift occurring from the "desktop-centric" computing model to a "network-centric" model, which is accelerating the need for new generations of 32-bit low-power Java processors. These new embedded Java processors must effectively and securely execute distributed objects over wired and wireless networks.

Under the JEM licensing agreement with Rockwell, aJile has exclusive rights to commercialize existing JEM technologies, as well as to further develop new extensions of the core JEM architecture and technology.

The company's aJ-100 distributed SOC represents the second generation of the JEM™ processors developed at Rockwell Collins. One of the unique implementations of aJile's platform is a multiple JVM feature, which enables multiple Java virtual machines to coexist in the hardware. Each of the JVMs can have its own kernel, thread manager, and resources such as I/O and memory, allowing multiple independent Java applications to execute in a deterministic, time-sliced schedule with full memory protection. For example, one JVM could be dedicated to the private environment, such as a home network, while a second JVM is dedicated to the broadband network. This feature represents one of the key patents aJile has filed.

aJile's aJ-100 also allocates a portion of the on-board SRAM for custom instruction microcode. For example, a customer may want to add a new instruction set to the platform to enhance performance of graphics, security, or any number of things.

Other features include:

- Fast real-time performance of less than 1msec latency, which means the technology could even be used at the sensor level.
- Low power consumption of less than 1mW/Mhz.
- Networking capability of TCP/IP.
- Enhanced security.

Two other startups to watch in this space are Velocity Semiconductor and Nazomi Communications. While aJile provides a pure Java processor, Velocity's micro-controllers support mixed-language development employing industry-standard legacy C code and Java. Nazomi, a supplier of Java hardware acceleration technology, has already made significant inroads into the cell phone market, with more than three million phones incorporating its technology.

(See our profile of Velocity in the Aug. 2003 issue of *InsideChips.Ventures*, and Nazomi in the Nov. 2003 issue.)

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3Plus1 Technology

3Plus1 Technology is developing a low-power, scalable processor family designed to efficiently run concurrent communications and multimedia applications. The company intends the processor family to enable new kinds of mobile devices, such as multi-functional cell phones, PDAs, cameras and portable PCs with long battery life and flexible, downloadable applications. The company's name refers to "price, power and performance, plus programmability."

The four co-founders are Allan Cox, president and CEO; Amir Zarkesh, executive VP of engineering; Reza Sadri, automation flow architect; and Amit Ramchandran, chief hardware architect. The four men self-funded 3Plus1, and have generated revenue along the way through consulting and authoring several reports. 3Plus1 is now looking for its first round of investment, which it expects to be in the $13 million range.

Prior to co-founding 3Plus1, Cox served one year as COO at Quicksilver Technologies, a venture-backed startup developing adaptive computing machines. He also spent 17 years founding and growing the system LSI business for Toshiba in the Americas. During his career at Toshiba, Cox served as GM for the U.S. enterprise and Sr. VP reporting to the president of Toshiba America. He has also served as CTO for LG Semicon, and began his career at Ferranti Semiconductor.

Zarkesh previously spent three years as director of hardware design for the adaptive computing machine SOC at Quicksilver Technology. For a year prior to this, he founded and was president of Zaias, a data-mining and knowledge engineering software startup. Zarkesh was a co-founder of EDA firm Transcendent Design Technology (acquired by Innoveda, which was bought by Mentor Graphics). He also spent time at the Quad Design group of Viewlogic (acquired by Synopsys).

Sadri is currently the CTO for Procom Technology, where he invented that company's NAS virtualization appliance project and, before that, was chief architect of Procom's NAS product line. Before joining Procom in 1996, Sadri worked for ATT Bell Labs on large database and decision support systems.

Ramchandran is currently responsible for system architecture and logic design in SOC Mosaic at TAEC. Earlier, he was the architect and designer of an adaptive processor for multimedia and communication applications at Quicksilver. He was part of the Intel team that taped out the Pentium-3 M series (Tualatin), and also worked at the Center for Self Organizing and Intelligent Systems (CSOIS Utah), as well as the Space Dynamics Lab and Center of Excellence for Smart Sensors in Utah.

3Plus1 brought in John Hauser to serve as principal software engineer. Hauser was previously a senior DSP engineer at Berkeley Design Technology. Prior to that, he was a programmer in International Computer Science Institute (ICSI), working on ICSI's next-generation vector microprocessor.

These five comprise the company's full-time employees, with 20 others serving part time as consultants. According to 3Plus1, this group of consultants is ready to go full time as soon as the company secures investment funding.

3Plus1's processor family will be targeted at battery-operated digital devices that run multiple applications, such as camera-enabled cell phones, voice-enabled PDAs and wireless cameras. While the manufacturers of these products want to add an increasing number of applications, the typical solutions with the necessary flexibility are a mixture of processors and DSPs — an expensive, time-consuming solution that also has a difficult programming model.

3Plus1 designed its products for a limited set of specific applications, an approach that sets it apart from its competition. The applications are:

- H.263/4-HD, MPEG4
- MP3, AAC, WMP10
- JPEG/JPEG2K
- 2D/3D graphics
- 802.11a/b/g/n/i
- 802.16a/e
- UWB
- Bluetooth
- GPS
- GSM/GPRS/EDGE
- CDMA/CDMA2K/WCDMA/HSDPA

3Plus1's processors run concurrent codecs and basebands; the company calls several applications running concurrently "scenarios." A scenario, for example, could be MP3, H.264, Wimax and JPEG. When the user decides to change functionality, the operating system loads a new scenario from memory; this new scenario could be H.264 and phone (GSM, GPRS and EDGE), which will run until a new scenario is demanded.

3Plus1's inventions are the subject of about 20 patents the company has filed. The fundamental technology, called the CoolProcessor architecture, creates low-power and -area programmable solutions that are very efficient at solving these algorithmic challenges. Secondly, 3Plus1 designed it such that a C compilation and DSP programming model can be used when constructing the total design.

The co-founders spent the first six months of the company's life creating a high-level common database with knowledge of the programming model, hardware and application such that it automatically generates in parallel a set of tools, RTL for the processor, and test vectors. Any changes made in those areas generate automatic changes to each of the threads. It is somewhat similar to the kinds of things Tensilica has automated, although that company is doing it for a generalized architecture.

3Plus1's family of products is comprised of chips that contain different combinations of its CoolW and CoolN processor cores. The CoolW is very efficient at running wide types of algorithms — 8, 16, 24 and 32 bits – while the CoolN runs 1-, 4-, 8- and 16-bit algorithms.

The first chip 3Plus1 will release is the 3P5220, which is scheduled for launch at the end of 2005. The "5" in the "5220" indicates it has five processors: two CoolWs, two CoolNs, and an ARM926. The second and third numbers in the "5220", both "2", means it has two CoolW and two CoolN processor cores.

The six chips that will comprise 3Plus1's product family range from the 3P3200 (one CoolW, one CoolN and one ARM) for low-end digital devices, to the top-of-the-line 3P9441 (four each of the CoolW and CoolN, plus one ARM), which can run a high-end multi-mode video phone.

In operation, The ARM processor loads a scenario into direct memory access, after which the applications that make up the scenario run completely contained inside the CoolW and CoolN processors. The ARM processor is not used as a controller for those codecs and basebands, and only comes into play again when the user changes the scenario, at which point the ARM drops the first scenario and loads the new one.

3Plus1's processor cores are sub-100 mW, and 120 mw to 400 mW at chip level. The chips are produced in 0.13-micron CMOS at an undisclosed foundry. The company claims the die size is very small, but will not be releasing details until later this year.

Numerous startups are competing in this space, although the majority of them focus on either multimedia or communications; we have not come across another company that is talking about a single architecture that can run multimedia and communications applications for mobile systems. Nonetheless, companies to watch include Stretch, which is developing a software-configurable processor; Sandbridge, the creator of the Sandblaster baseband processor for multi-mode, multi-platform and multi-function wireless terminals and networks; and U.K.-based Icera Semiconductor, a company claiming to have a new class of processor for wireless terminal devices.

(See our profile of Stretch in the June 2004 issue of *InsideChips.Ventures*.; Sandbridge, Dec. 2002; and Icera, July 2003.)

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Calypto Design Systems

Calypto Design Systems is attempting to bridge the gap between electronic system level (ESL) design and IC implementation with technology that enables designers to functionally verify their RTL designs much more easily and efficiently. Calypto's technology, a sequential equivalency checker, provides designers with a tool that can determine whether higher-level models are functionally equivalent to their RTL implementations. The verification problem that the company is tackling is important to ASIC and IC designers, who increasingly need to work at abstraction levels above RTL to deal with the complexity of IC design and verification and to meet their ever-increasing timing and power constraints.

Calypto's founders did not begin with a technology they intended to commercialize, but instead launched the company to address the specific problem of comparing high-level models to RTL code. Tallwood Venture Capital partner Dado Banatao was eager to solve this verification problem, and began discussing the possibility with Devadas Varma, an EDA veteran and founder of Caltos Capital. Varma, who serves as CEO and president, brought together a group of five founders to launch Calypto in Dec. 2002.

Before founding Caltos Capital, Varma was the CTO of Ambit Design Systems, a Cadence Fellow and a VP and CTO of the Ambit Group of Cadence. He has also held senior engineering positions at Silicon Compiler Systems, Mentor Graphics and Viewlogic Systems.

Co-founder and VP of engineering Gagan Hasteer was previously the director of engineering at Innologic Systems, a startup in the formal verification arena eventually acquired by Synopsys. Prior to Innologic, Hasteer was an early member of the Ambit Design Systems engineering team, and a consultant with the Formal Verification Group of the MIPS division of SGI.

Anmol Mathur, co-founder and chief architect, was the architect of the datapath synthesis and optimization group at Ambit Design Systems and Cadence. Prior to Ambit, Mathur was part of a team at the MIPS division of SGI that developed an RTL-to-gate-level equivalence checker and property checker.

The final two co-founders are Sumit Roy and Venkat Krishnaswamy. Roy previously served as product architect of low power and logic synthesis tools at Cadence Design Systems and, before that, senior manager for low power synthesis at Ambit Design Systems.

Krishnaswamy was a senior member of the Niagara design team for Sun Microsystems, and a member of the Intel Pentium IV design team.

Calypto rounded out its management team with Michael Sanie as VP of marketing and business development, and Larry Lapides as VP of sales. Sanie was previously the group director of strategic industry initiatives at Cadence. Earlier, he was the director of marketing and business development for IC design at Numerical Technologies, and held marketing and engineering positions at Cadence, Actel, Compass Design Automation and VLSI Technologies.

Lapides spent the previous six years at Verisity Design, where he held executive positions in business operations, marketing, and worldwide sales. Earlier, he held the positions of director of North American sales and director of product marketing for Exemplar Logic and Mentor Graphics, respectively.

Calypto also opened an office in Japan, hiring Eiki Suzuki to serve as president of Calypto Design Systems, K.K. Suzuki previously served as executive advisor, leading the Japanese business for Cadence and Get2Chip. He was a founder, CEO and executive advisor for SC Hightech and Sumisho Electron Devices.

Tallwood and Walden International initially provided the company with about $6 million. JAFCO Ventures and Infineon Ventures (acquired by Cipio Partners in Jan. 2005) joined Tallwood and Walden for the Sept. 2004 $16.5 million B round. Calypto has 44 employees.

Over the years, designers have tackled functional verification by raising the level of abstraction. The industry has moved from Spice to gate level to higher levels of description, sacrificing detail to handle more complex designs. Simulation has been, and

still is, the dominant way to do verification, but simulation is both time-intensive and prone to errors in these large, complex designs.

The industry is therefore moving to electronic system level (ESL) descriptions, which are higher levels of abstraction that are more compact and concise and less error prone. One of the significant hurdles to ESL, however, is that it is very difficult to verify that the high-level models are functionally equivalent to the RTL implementations. The role that Calypto intends to play in the emerging ESL market is to enable designers to describe and verify designs at a higher level, allowing downstream tools to implement the verified designs.

Calypto is keenly aware that ESL is a continuum, not a discrete, well-defined space. Designers, therefore, do not make a single leap to ESL, but instead stake out a comfortable spot on this system-to-RTL continuum and gradually move up the system level. Calypto's technology provides a way for design and verification engineers to move between different levels of abstraction within the continuum, enabling them to make changes to designs at the system or micro-architectural level and then quickly verify them.

Designers are moving up in abstraction in two different ways: sequential abstraction and data abstraction. Sequential abstraction is moving a design from a fully scheduled, timed implementation in to an un-timed or even fully algorithmic description. Data abstraction is the migration from managing "bits" to managing "words" or even complete data structures.

Sequential abstraction represents the most immediate shift. Designers often need to modify their designs during implementation to meet power, timing, and area constraints. Sequential changes include, for example, re-timing, resource sharing and pipelining. These are currently performed manually in most cases, and simulation and other verification solutions are time consuming and prone to errors. Simulation-based verification requires engineers to spend a lot of effort creating test benches and test vectors, which are no longer valid, of course, when they change the sequential behavior of the design.

The challenge for designers is determining which sequential changes to make in order to meet constraints, automating these sequential changes once they are identified and, most importantly, verifying that those changes did not introduce bugs. This last point is where Calypto comes in.

Calypto is in the final phases of beta testing with several un-named companies, and expects to launch its product in Q2 2005.

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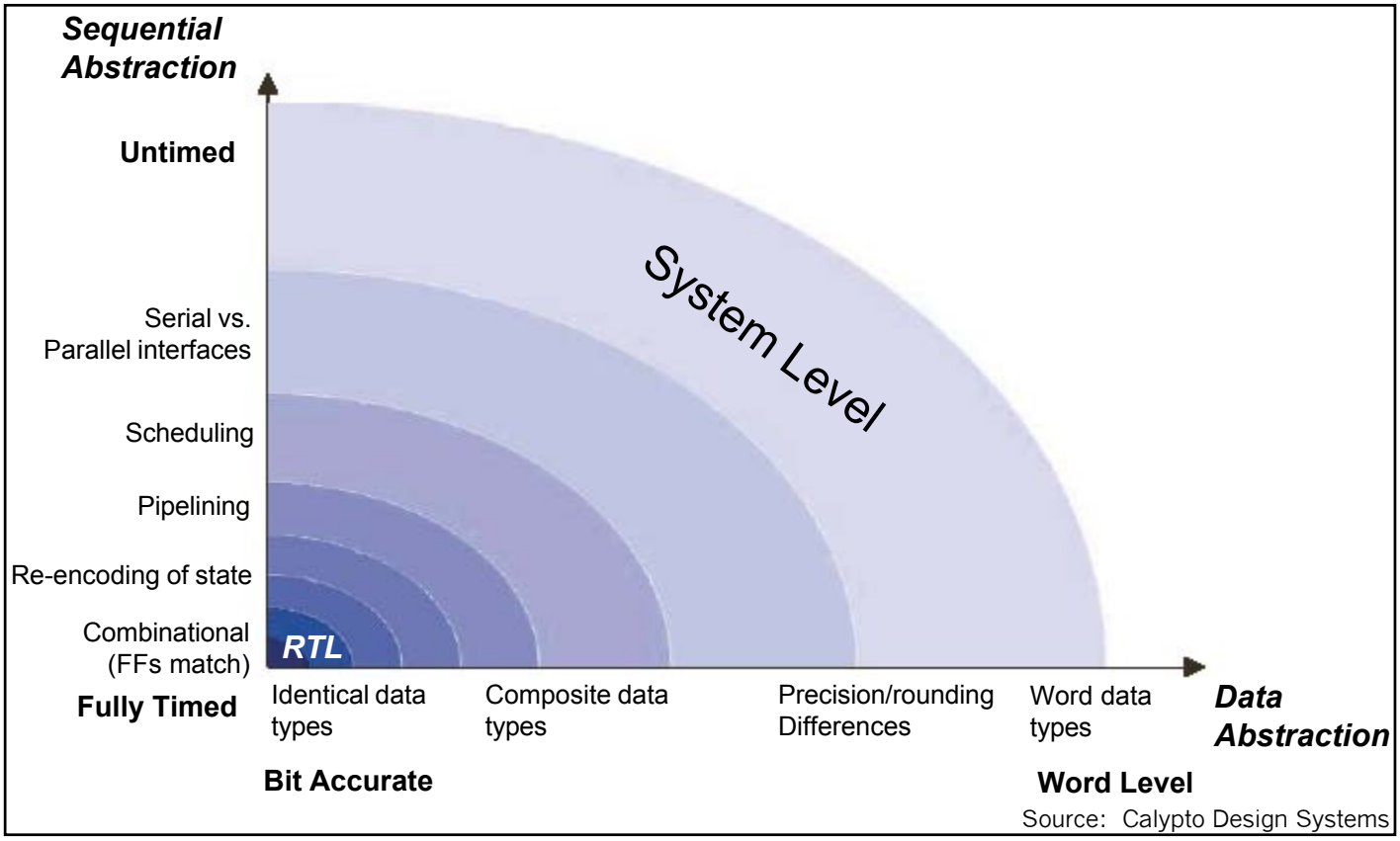
Figure 5 -- RTL to System-Level Continuum



FOCUS Enhancements

Although video-centric FOCUS Enhancements is a public company and not a startup, its semiconductor division is devoting significant resources into developing UWB chipsets for video distribution in the home. As we are very interested in this emerging wireless technology and have covered numerous UWB startups, we elected to provide a profile of FOCUS's efforts in this area.

FOCUS Enhancements is listed on the NASDAQ with the trading symbol FCSE. The bulk of the company's revenues are generated by its systems side, which develops and sells solutions for the entire video production workflow. These products consist of digital video mixers, eMac/iMac desktop-to-TV scan converters, FireStore direct-to-edit products, and CenterStage video processors.

FOCUS has acquired numerous companies over the years, with key acquisitions including TView in 1996, Videonics in 2001, and both Visual Circuits and COMO in 2004. The TView acquisition was the basis for FOCUS's chip group.

The semiconductor group's current line of products consists of a video processor, scan converter, and several digital video co-processors for scan conversion. While PC-to-TV conversion is usually abysmal, Microsoft was sufficiently impressed with FOCUS's FS454 scan converter that it chose the chip for its initial run of XBox games. Sales of the FS454 represented a significant chunk of FOCUS's revenues for a short period.

Unfortunately, the TV-out technology was eventually incorporated into the graphics chipset and, in Jan. 2004, Microsoft ceased placing significant orders for the FS454. The vast majority of shipments of the FS454 had been to Microsoft, and those sales represented 37% of FOCUS' total revenues for the year ended Dec. 31, 2003, but only 7% of revenues for the nine months ended Sept. 30, 2004. FOCUS's semiconductor product revenues for the three months ended Sept. 30, 2004, were $655,000, down 91% from the $7.4 million generated during the same quarter one year earlier.

With UWB representing a potentially enormous market, FOCUS is likely hoping that a major play in the segment can revitalize its chip business. And the company might just achieve that, as it is focusing solely on a UWB application that the majority of UWB companies have steadily abandoned: video distribution in the home.

Curiously, while consumer electronic companies would be thrilled to have a high-bandwidth wireless media distribution technology, most UWB companies have stopped promoting that particular use for UWB. Instead, they are focusing on short-reach, high-data-rate applications, such as wireless USB.

FOCUS is in the market to deliver wireless video distribution in the home, period. The company is focused exclusively on that use and has no interest in any other application for the technology. To that end, the FOCUS chip group went beyond the IEEE target of 110 Mbps over 10 meters and built a radio that can deliver nearly 220 Mbps over 22 meters. The company started from the notion that it had to be able to deliver long-distance, uncompressed, standard-definition video, which requires about 216 Mbps just to start the transfer.

Because of its focus on video distribution, the company really *had* to go faster and farther than everybody else. FOCUS requires the high speed because it wants sufficient headroom to ensure quality of service and to support multiple streams. The longer distance, of course, enables consumers to deliver content to multiple locations throughout the house. While long distances will require additional nodes, the company expects consumers will consider that acceptable.

FOCUS has two manufacturing partners, one for the digital part and the other for the radio. The company is using the MBOA-developed MAC, which TSMC will produce in CMOS. Jazz Semiconductor, a pure-play foundry focused on advanced mixed-signal, analog and RF processes, is producing the analog chip in SiGe (see our profile of Jazz in the Oct. 2003 issue of *InsideChips.Ventures*.). Over time, FOCUS expects the chipset will migrate to a single-chip CMOS solution.

FOCUS is a member of the Multiband OFDM Alliance (MBOA), the industry group promoting OFDM against the rival direct sequence technology. These two groups are stuck in a standoff, which will likely result in both camps going to market with their respective – and incompatible — technologies. The market will need to sort this one out, and we expect that the 170-member MBOA will eventually prevail. The MBOA includes nine of the world's top 10 semiconductor companies and nearly all of the big consumer electronics companies, while Freescale is the only heavyweight on the direct sequence side.

To provide customers with the best possible implementation and ensure high performance of the radio, FOCUS feels it is equally as important to supply modules as it is to supply chips. The company will also provide reference designs. Part of the semiconductor group's value is that FOCUS's systems level groups represent a significant resource in developing these additional products.

FOCUS expects to launch the chips in mid to late summer, followed by the modules and reference designs in late fall/early winter.

As previously mentioned, most UWB startups have drifted away from video distribution to focus on high-data-rate, short-reach applications. One company that our sources tell us is also interested in video distribution is WiQuest, a company we recently profiled that is still in stealth mode. WiQuest does, however, have an impressive pedigree, with a management team comprised of well-known and highly regarded communications industry veterans.

Another UWB company that appears to be targeting video distribution is Blue 7 Communications, whose founders and employees have a great deal of experience in consumer electronics.

Other UWB startups worth keeping an eye on include Staccato Communications, Wisair, Artimi and Alereon, although these companies are all focused on short-reach applications.

(See our profile of Wisair in the Aug. 2003 issue of *InsideChips.Ventures*; Staccato, June 2003; Alereon, under its former name "Time Domain," Jan. 2003; WiQuest, Feb. 2005; and Blue 7, Oct. 2003. Also see our profile of XtremeSpectrum, the direct sequence UWB chip developer bought by Freescale that represents the technology behind Freescale's UWB products, in the April 2002 issue.)

Brett Moyer heads FOCUS as president, CEO and director. Moyer joined FOCUS in May 1997, and assumed his current position in Sept. 2002. From 1986 until 1997, Moyer worked at Zenith Electronics, where he was most recently the VP and GM of Zenith's Commercial Products Division. He was also VP of sales planning and operations.

Thomas Hamilton, GM of the semiconductor group, joined FOCUS in Sept. 1996. He previously served as VP of engineering and CTO and, prior to that, was president, CEO and co-founder of TView (acquired by FOCUS in 1996). He was also VP of engineering at TSSI, and held a variety of engineering and marketing management positions at Tektronix.

Michael Kelly is FOCUS's VP of marketing – semiconductor group. Kelly joined FOCUS in 2002 from Maxtek (a division of Tektronix), where he led marketing and sales. He previously presided over a self-owned consulting firm, Bay Pointe Associates. From 1984 to 1996, Kelly held various positions with General Electric, including president and CEO of Automated Test International.

Steve Morton, VP of engineering, joined FOCUS in 1996 through the acquisition of TView, where he was executive VP and co-founder. From 1971 to 1992, Morton held various engineering management positions at Tektronix.

Several members of FOCUS's management team arrived at the company through the 2001 acquisition of Videonics, including Mark D'Addio, VP of worldwide professional sales; Gary Williams, CFO and VP of finance; Jeff Burt, VP of operations; and Michael Conway, VP of marketing;

The management team also includes David O'Kelly, a 25-year veteran of the professional and consumer video industry who serves as VP of business development; and William Schillhammer, who was VP of sales and marketing for Digital Vision and is FOCUS's VP of OEM sales.

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Phyworks

Phyworks is developing a portfolio of chips that will comprise the entire IC content of various optical modules for the datacom and telecom markets. The chips target the physical layer of LANs, SANs, WANs and FTTH, addressing cost, size, power, and performance issues to enable cost-effective optical modules.

Founded July 2001, Phyworks launched on $1.5 million in seed funding provided by the founders and a private investor. The company raised $10.1 million in its Feb. 2002 Series A round from Atlas Ventures, Add Partners and Prelude Ventures. Phyworks raised $13.3 million in its Sept. 2003 Series B round from Advent Ventures and A-round investors pre-emption rights.

Phyworks is headquartered in Bristol, U.K., with offices in San Jose, Calif., and Japan. The company has 40 employees.

Phyworks originally set out to enable mass adoption of 10-Gbps optical technology and provide a way for the metro market to migrate from 2.5 Gbps to 10 Gbps. Phyworks' initial technology was electronic dispersion compensation (EDC) and forward error correction (FEC) chips that worked together to drive down the costs in the metro market.

At the end of 2003, Phyworks had its EDC chip in fab and was just about to go to fab with the FEC chip when the company realized that the downturn had wiped out the market for its parts. The company decided not to tape out the FEC chip. All was not lost, however, because EDC technology had become very important in the data communications market. EDC nullifies dispersion — the temporal spreading of a light signal due to the signals traveling at different speeds through a fiber – enabling enterprises to leverage their installed base of multi-mode fiber (MMF).

Another force nudging Phyworks in a new direction was the Fibre Channel market move from 1 Gbps to 2 Gbps, and the current move from 2 Gbps to 4 Gbps. All the new products must be multi-rate 1-, 2- and 4-Gbps devices, requiring module manufacturers to acquire a whole new set of ICs. This situation has created an unexpected opportunity for Phyworks.

The price for the 1- and 2-Gbps multi-rate optical modules has fallen over last couple of years, but has stabilized at about $18 to $20. The rough cost structure for these modules is about $6 for the transmitter optical sub-assembly (TOSA) and receiver optical sub-assembly (ROSA) in high volume, and about $8 for the ICs (laser driver, post amplifier, digital diagnostics chip, and transimpedance amplifier). These parts alone add up to $14, and manufacturers still need to pay for the circuit board, assembly, etc. Module makers are having a difficult time making money in this market.

Phyworks' strategy is not to develop a point solution, such as an EDC chip, but to provide all the IC content that goes into the module. To accomplish this, Phyworks developed a single-chip solution, the PHY1070, which replaces three of the four chips mentioned above: laser driver, post amplifier and digital diagnostics chip. Along with the PHY1094 transimpedance amplifier (TIA), which resides in the ROSA, the company can sell the entire chipset that goes inside the module for less than $3. Phyworks' multi-rate chip not only enables customers to design to 4 Gbps (while also operating at 1 Gbps and 2 Gbps), it also knocked several chips out of the system and took $5 in parts out of their modules.

Phyworks designed the PHY1070 in such a way that the company can produce different flavors of it fairly easily. The basic functionality of the chip remains the same, but the company can add special features to address specific markets. For example:

- For the SAN — PHY1070 with PHY1094 TIA for SFP modules; 1.25 to 4.25 Gbps.

- For the WAN — Similar to the SAN line card, but employs PHY1075. This part differs from the PHY1070 in that it is designed to drive an edge-emitting product, but it uses the same PHY1094 TIA in the ROSA.

For 10-Gbps applications in the LAN, WAN and SAN, Phyworks will be introducing a 10-Gbps EDC IC, 10-Gbps TIA, and 10-Gbps XFP re-timer/driver. The XFP form factor is the next-generation pluggable module, and is intended to be flexible enough to support OC192/STM-64, 10-Gbps Fibre Channel, G.709, and 10-

Gbps Ethernet. The one-size-fits-all module design should enable very low cost 10-Gbps solutions.

Phyworks' goal is to enable a sub-$200 XFP module, so the company expects to provide chipsets for these modules that cost no more than $50.

The company's PHY1060 EDC IC for 10-Gbps modules comes in a 5-mm x 5-mm BGA package and consumes 500 mW. Phyworks expects this chip to be the first on the market to meet the LRM standard, which specifies running 300 meters over the existing installed base of multimode fiber.

See Table 1 for Phyworks' entire product portfolio.

Phyworks uses TSMC for CMOS parts and Jazz Semiconductor for the SiGe products. ASE does the packaging, and Copenhagen-based Delta does test development.

The market for chips in Phyworks' target space is somewhat fragmented. Maxim, for example, supplies many of the ICs for the optical modules, but does not have EDC technology. Several startups are developing EDC ICs, although so far only Phyworks and Scintera have products available. ClariPhy Communications, recently funded in Nov. 2004, expects to have a CMOS EDC chip that enables 10-Gbps transmission over 300 meters of multimode fiber by the second half of 2005. Another competitor, Big Bear Networks, has EDC technology called Photronic Signal Processing (PSP).

(See our profiles of Scintera in the Oct. 2003 issue of *InsideChips.Ventures*, ClariPhy, Dec. 2004; and Big Bear, Jan. 2004.)

Tier-one optical module manufacturers Finisar, JDSU, Intel and Agilent represent another competitive camp, as these companies have in-house IC design teams. However, Phyworks says it has already made inroads with these companies, securing a design win with one of the tier ones and close to securing a win with a second one. The company also has six design wins in Japan.

Two-thirds of Phyworks' management team has a shared background at Microcosm Communications, another U.K.-based startup developing chips for optical networks that was acquired in 2000 by Conexant for approximately $160 million.

Phyworks co-founder Stephen King heads the company as CEO. Before Phyworks, King spent the previous nine years in the fiber optics industry, serving as business development manager for fiber optic transceiver products at Maxtek Components, VP of business development at Microcosm Communications (acquired in 2000 by Conexant for approximately $160 million), and VP of marketing and applications at Conexant Systems in the ICON (ICs for Optical Networks) product group.

Co-founder and CTO Nick Weiner has worked in Europe, the U.S. and Asia on analog and digital ICs as a designer and design manager. Previously, he was director of engineering at Microcosm Communications.

Chris Bryson joined the company as director of marketing in July 2001. Bryson previously headed up the marketing team at Microcosm Communications and, before that, served in a key engineering role at Ascom Telecommunications, and spent several years at GEC-Marconi.

Paul Denny, VP of product development, joined Phyworks in July 2001 from Microcosm, where he was director of engineering. Previous experience includes eight years developing CMOS frequency synthesizers for wireless communications, and he has worked at National Semiconductor, Nortel Networks and Zarlink.

Terry Thomas is the company's VP of sales. Before joining the company in May 2004, he spent 28 years in senior sales and marketing roles with technology companies, including VP of worldwide sales at Picolight. Thomas provides Phyworks with a key link to its customers' customers, as he was previously selling modules to those companies. Thomas has also held senior management roles at Infineon and Philips.

Tim Esparon, VP of manufacturing operations, joined the company in Aug. 2004. He previously held senior roles at 3D Labs, including manufacturing and quality director and VP of worldwide operations. He has also held senior management positions at Micronas Semiconductor, SCI, and Hughes Microelectronics.

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Phyworks Product Lines

Table 1a -- 125Mbps - 4Gbps (LAN, SAN, WAN)

Chip	Name	Status
TxRx ICs	PHY1070/75	Available
TIAs	PHY1093/94	Available

Table 1b -- FTTx (Burst Mode, PON, etc.)

Chip	Name	Status
TxRx ICs	PHY1078	In Fab
TIAs	PHY1092	Available

Table 1c -- 10Gbps (LAN, SAN, WAN)

Chip	Name	Status
10-Gbps EDC IC	PHY1060	In Fab
10-Gbps TIA	PHY1090	Q1 05 Fab
10-Gbps XFP re-timer/driver	PHY1085/86	Q2 05 Fab

Britestream Networks

We first profiled Britestream Networks in Nov. 2001, when the company was named LayerN Networks. The company, which focuses on security technology, changed its name in fall 2004 after determining that it needed to reposition itself and address its target markets from a slightly different angle.

In the beginning, LayerN and just about every other company approached the security problem from a performance standpoint. Security was very slow, so the typical strategy was to make it fast. Even LayerN's name was a reference to the mathematics behind the technology. As it turned out, however, it wasn't the performance that attracted customers to LayerN's products, but the ease of use and integration and the overall lower total cost of ownership.

The company also learned that its customers would eagerly welcome a NIC solution. Thus, LayerN repositioned itself to focus on providing a board-level solution, and changed its name to Britestream to reflect the fact that, in addition to performance, the company solved the security problem with a flow-through NIC plug-in solution.

Britestream currently offers the BN1010 SSL security NIC, as well as the BN2010 SSL security ASIC.

Mike Salas, Oscar Mitchell and Rajat Datta founded Britestream/LayerN, which now has approximately 50 employees, in March 2000. The company initially raised $16.5 million in Series A funding, back in the days when a three-person company could do that. Britestream then secured a $25 million series B round in mid-2004. The company's primary backers include Austin Ventures, Granite Ventures, and Texas Instruments.

Britestream's repositioning in 2004 was not a major reorganization, although Salas stepped down from the CEO position. However, the move had been in the works for about a year, as Salas had asked the board to bring in an experienced CEO who could take the company to the next level.

In June 2004, Britestream brought in Bob Weinschenk to take on the role of president and CEO. Weinschenk was previously president and CEO of digital imaging and capture specialist Pixim. Earlier, he had served as GM of Lucent Technologies' Microelectronics Division.

New additions to the management team since we profiled LayerN in 2001 are Keith McAuliffe, COO; Charisse Castagnoli, VP of business development; and Nadia Mansour, VP of worldwide sales.

McAuliffe has spent time with a number of high-tech startups, including RLX Technologies, Surgient Networks and ClearCube Technology. Prior to his involvement with startups, he spent 16 years with Compaq Computer, where he held several positions, including design engineer, project manager/director, VP of engineering for the Industry Standard Server Division, and VP and GM of Compaq's Service Provider and dotCOM Business Unit.

Prior to joining Britestream, Castagnoli was director of business development for Internet Security Systems (ISS). Previously, she held positions as technical evangelist for Haystack Labs, an early intrusion-detection company, and VP of engineering and OEM sales for SecureWare. For eight years prior to that, she developed and managed complex UNIX systems, such as telephony systems and supercomputers.

Mansour previously held executive positions at Cisco Systems, Lucent Technologies, 3Com, DEC, Mirapoint, Vernier Networks, and SRI International. She has more than 20 years of worldwide sales, marketing, business development and operational experience.

Britestream is specifically focused on SSL, and does not address IPSec at all. Because SSL is built into every browser in the world, Britestream does not have to worry about client-side distribution, allowing the company to focus on the other end of the pipe where all the traffic comes together. Because SSL is so ubiquitous, it is a compelling solution for users who tend to change locations frequently. IPSec, by contrast, provides a nailed-down connection between two dedicated endpoints, requiring both the client side and server side to be loaded with software and/or hardware that can communicate with each other.

That being said, IPSec and SSL share the same algorithms, so if BriteStream ever identifies an opportunity in the IPSec market, the company could theoretically move into the IPSec space very easily.

The problems with SSL that Britestream is solving are that it's slow, causing applications to experience a 10- to 100-fold slowdown; it's rationed, because SSL overhead results in fewer applications and less content being secured; and it's complex, requiring sophisticated protocol processing for both TCP/IP and SSL.

Britestream's solution provides 100% SSL offload, with dual in-stream TCP/IP processing engines eliminating the need for host CPU cycles. It also eliminates the need to ration security or maintain both secure and non-secure servers.

Britestream had to address both networking and security in order to make the solution in-stream and flow-through. In other words, to enable security to work within an existing networking infrastructure, the BN2010 chip must not only be able to handle all the cryptography engines, it must also be intelligent about what's occurring on the network. The security/networking combination made for a very big and complex chip — 123 million transistors.

The move to providing board-level solutions was strategically important to Britestream, as a parallel revenue stream existed in areas where the time to market and time to revenue were much quicker than the typical ASIC development. As the BN1010 is a plug-and-play NIC that requires no new software or hardware, it is very appealing to a number of customers that do not have the desire or capability to design the ASIC into their application.

A software-based firewall company, for example, would not likely have the expertise to implement an ASIC solution, but the company could bundle Britestream's NIC onto a 1U appliance preloaded with its software and offer a combined solution. The NIC solution represents a huge market expansion opportunity for Britestream, as the company can now sell to traditional hardware OEMs as well as certain kinds of software companies and, beyond that, to value-added resellers, system integrators, and other channels.

Continued on page 20

Agreements and Marketing Alliances

Kilopass to Provide Tower Semi with Field-Programmable NVM

Kilopass Technology, a provider of NVM IP for standard CMOS logic, has established a foundry technology agreement with Tower Semiconductor for Kilopass's XPM™ technology. XPM enables SOC designers to use low-cost, non-volatile code and data storage, while significantly shortening an SOC's time-to-market. Based on Tower's 0.18-micron CMOS process technology, Kilopass' embedded non-volatile XPM memory technology is designed to enhance manufacturability through 100% compliance with Tower's standard CMOS rules.

Kilopass' XPM memory has unique security characteristics that make it effectively impossible to reverse-engineer. Because the memory block is embedded, information is secured internal to the SOC's design. There is no floating charge as with flash technology, so low-cost passive reverse-engineering methods are not possible. In addition, an XPM memory cell has no visible indicators that would reveal its state, if the chip were to be de-layered.

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SEQUANS Integrates ARM Cores into WiMAX Technology

WiMAX chip company SEQUANS Communications is collaborating with ARM to integrate the ARM926EJ-S processor into its infrastructure and subscriber range of WiMAX chip sets.

In addition to the ARM926EJ-S processor, SEQUANS also licensed the AMBA Design Kit (ADK) solution and the VFP9-S vector floating-point coprocessor. The ADK toolkit reduces design time and the VFP9-S coprocessor maintains the clock speed of the ARM926EJ-S processor during heavy data packet throughput. SEQUANS will integrate the ARM technology into the design cycle of both its primary product groups: the WiNetPRO-BS baseband SOC solution for WiMAX base stations, and the WiNetPRO-SS baseband SOC solution for WiMAX subscriber stations.

Founded in Sept. 2003, SEQUANS Communications supplies silicon and software for broadband wireless access.

(See our profile of SEQUANS in the Sept. 2004 issue of *InsideChips.Ventures*.)

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Zoran Licenses Apogee Direct Digital Amplification (DDX) ICs

Digital audio amplification pioneer Apogee Technology has licensed its DDX Controller output technology to Zoran for integration into the latter's DVD and other consumer electronics ICs. Under the agreement, Zoran will market ICs integrating DDX output and Apogee will support customer product development and market DDX Power IC solutions to end users.

Apogee's DDX consists of a controller with patented DDX output modulation, licensed by Zoran, combined with a DDX power device, which is available from Apogee in a range of power options up to 240 W.

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NEC Electronics Licenses Rambus Backplane Serial Link Interface

NEC Electronics has licensed the Rambus' RaSer X backplane serial link interface for high-performance ASIC applications. The Rambus RaSer X interface solution is designed to tackle the toughest interconnect problems associated with backplane environments in high-speed enterprise switches and routers, storage area network switches and blade servers. The first serial link cell licensed to NEC Electronics will operate at 6.25 Gbps.

RaSer X enables up to four times the bandwidth of existing solutions. The technology incorporates a multi-tap transmitter and receiver equalizer, low-jitter transmitter, high-sensitivity receiver and calibrated on-chip termination resistors, as well as the Auto-Adapt feature that continuously adjusts multiple coefficients of both the transmit feed forward equalizer (FFE) and the receive decision feedback equalizer (DFE) to compensate for humidity and temperature variances.

The Rambus RaSer serial link interface family includes 0.18-micron, 0.13-micron, 90-nm and 65-nm versions on multiple foundry processes.

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Kevin Donnelly, Rambus VP of the Logic Interface Division; Tel: 650 947-5000; www.rambus.com.

SpiraTech, Novas Team Up

SpiraTech, a developer of mixed-abstraction verification, has entered into an OEM agreement with debug systems provider Novas Software. Under the agreement, SpiraTech's Cohesive technology will supply transaction capture and generation technology for Novas's new nESL system debug product.

The Novas-SpiraTech collaboration will produce a highly automated transaction-based debug solution, raising the visualization and understanding of complex on-chip communications structures to the electronic system level (ESL) of abstraction. The companies promise a savings of many weeks of debug and analysis cycles for typical SOC designs.

Novas will offer SpiraTech's technology within its nESL product to automatically extract transaction information that inherently exists within system and hardware design and verification environments. Transactions will then be displayed both graphically and textually within the Novas nESL environment for debug and analysis.

The SpiraTech technology will be packaged as the nTE (Transaction Extractor) option for Novas's new nESL product. Pricing starts at $2,500 for a one-year license.

(See our profile of SpiraTech in the Jan. 2005 issue of *InsideChips.Ventures*.)

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Scott Sandler, Novas president and CEO; Tel: 408 467-7888; www.novas.com.

ASICs, IP and Design Services

Agilent Launches Asia Mobile Development Center in Korea

Agilent Technologies has established the Agilent Asia Mobile Development Center in Seoul, Korea, which will provide a new base for R&D, marketing and applications support close to Agilent's growing number of Asian customers.

The new center will focus on mobile-technology R&D, marketing and applications support. Its initial staff will include more than 50 engineers, including the engineering team from recently acquired Wavics. The center will concentrate on Agilent's mobile handset component portfolio, and the R&D team will also create next-generation front-end modules that integrate an Agilent PA with one of its miniature FBAR duplexers.

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ASML Licenses Technology Patents to Intel

ASML has entered into a license agreement with Intel for several lithography patents that can be used to design or produce advanced masks. The licensing agreement includes ASML's Scattering Bar Technology, which enhances the performance and value of ASML lithography systems by increasing the manufacturing process window, thereby contributing to higher yields.

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Rambus Licenses Serial Link Technology to STMicro

Rambus has licensed its RaSer Fibre Channel and PCI Express serial link technologies to STMicroelectronics, which will incorporate them into the ST 90-nm process technology library.

The Rambus family of RaSer cells offers designers scalable serial link architectures that are optimized to address current and future serial link applications requiring the highest bandwidth and channel count on a single chip. The RaSer serial link family includes a variety of backplane serial interfaces; Gigabit and 10-Gigabit Ethernet PHYs; XAUI and double-XAUI serial interfaces; PCI Express and Turbo PCI Express PHYs; 1-, 2- and 4-Gbps Fibre Channel and SONET/SDH 2.5Gbps PHYs; and 5- to 12.5-Gbps high-speed serial interfaces. These solutions currently support all major foundry processes ranging from 180 nm to 65 nm.

The Rambus RaSer serial link technology is offered as a library cell for ASIC and ASSP designs. A complete serial link solution, each RaSer cell contains serializer, transmitter, receiver, deserializer, clock multiplier and clock recovery circuitry. As a replacement to discrete serial link components, the RaSer family may be integrated with other communications functions in order to offer better integration and reduced component cost.

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NVIDIA Opens New Design Center in India

NVIDIA has continued its expansion in the Asia-Pacific region with the opening of a new design center in Bangalore, India. The Bangalore design center will be modeled on existing NVIDIA's design centers, with a state-of-the-art facility and data center allowing top-to-bottom design of advanced graphics and digital media processors for a wide range of platforms.

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Elixent Licenses Pulsic's Lyric Physical Design Framework

Pulsic, an EDA company delivering shape-based IC physical design solutions for analog, mixed-signal and custom digital designs, has licensed its Lyric Physical Design Framework to Elixent. The framework will reduce the time required to port Elixent's D-Fabrix reconfigurable algorithm processing (RAP) technology to multiple silicon processes, many of which are proprietary to its tier one customer base. Elixent will use Lyric for automatic and interactive routing of its advanced cell designs for its D-Fabrix RAP cores on these proprietary DSM silicon processes. The D-Fabrix array is automatically compiled from a library of cells designed by Elixent engineers at transistor level to give it the best possible speed and power performance in the smallest possible area.

(See our profile of Elixent in the May 2003 issue of *InsideChips.Ventures*.)

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Emerging Ventures, Cont.

Continued from page 18

Both operating system and platform independent, Britestream's BN1010 NIC can be loaded into any box from Sun, HP, Dell or any other company. This enables customers to re-bundle Britestream's solutions and sell to a wide range of their own customers.

Britestream is largely competing with legacy software, which is the way security has traditionally been done and is still very prevalent in the security landscape. Software-based solutions are rife with shortcomings, which include not only performance issues but also the time-consuming and costly patching process when holes are identified.

Co-processors offer an improvement over software, but only marginally. They also tend to be difficult to integrate, store private key info in vulnerable software, and consume CPU cycles. Security customers have typically heard numerous co-processor pitches, and one of the obstacles Britestream encounters is convincing the skeptics that, rather than sitting behind the processor, its solution represents a new paradigm in which security lives in the datapath.

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The Fast Track ... People & Organizations

Aprio Technologies Names CEO

EDA firm Aprio Technologies has named Mike Gianfagna as its new president and CEO. Gianfagna most recently served as VP of marketing at custom chip provider eSilicon. Prior to that, he was VP and GM of the System Level Design Group at Cadence Design Systems. Gianfagna also served as VP of sales at Zycad, a specialty computer hardware vendor. Gianfagna's career began at RCA Solid State, where he was part of the team that launched the company's ASIC business in the early 1980s. He has also held senior management positions at General Electric Solid State and Harris Semiconductor (now Intersil).

Founded in 2003, Aprio is developing the next generation of optical proximity correction (OPC) tools, which not only enable full-chip OPC runtimes that are 3x faster than conventional tools, they drastically cut runtimes of subsequent passes by allowing users to apply OPC only to selected areas.

(See our profile of Aprio in the Feb. 2005 issue of *InsideChips.Ventures*.)

ElectriPHY Appoints VP of Engineering

ElectriPHY, a startup developing advanced IC devices that accelerate broadband access, has appointed semiconductor industry veteran Mike Atkin as VP of engineering. Atkin joins ElectriPHY with more than 30 years of semiconductor product development and management experience. He joins the company from LSI Logic, where he was most recently VP of engineering for the Communications Standard Products Group, and prior to that, VP of ASIC customer engineering. Previously, he spent 19 years at National Semiconductor in various executive and product development management roles, most recently as VP of engineering for the Information Appliance group, responsible for National's microprocessor design activities.

Founded in 2003, ElectriPHY provides high-performance, highly programmable VDSL chipsets that will enable "triple-play" services (voice, video and data).

Analogix Hires VP of Sales

Analogix Semiconductor has appointed Mark Vecchiarelli to the position of VP of sales. Vecchiarelli was most recently VP of sales for Teradiant and Zettacom, developers of high-performance networking semiconductors. Previously, he was director of west coast sales for AMCC, and he has also held senior sales positions at semiconductor firms such as Transwitch, LG Semicon and OKI Semiconductor.

Founded in March 2002, Analogix is developing physical layer transceivers (SerDes) that enable interconnect over copper at speeds previously only possible over fiber. The company's advanced analog + DSP-based architecture provides highly robust signal conditioning for eliminating noise while enabling higher performance over longer distances.

(See our profile of Analogix in the April 2004 issue of *InsideChips.Ventures*.)

Aegis Taps JDS Uniphase Executive to Lead Company

Aegis Semiconductor, a supplier of cost-effective wavelength monitoring and control solutions, has named Donald Bossi as president and CEO. Bossi succeeds Aegis founder Matthias Wagner, who has served as CEO since the company's inception. Wagner will remain with the company as executive VP of strategy and will continue to serve as a member of its board of directors.

Prior to joining Aegis, Bossi held various senior management positions over 10 years at JDS Uniphase, most recently as senior VP responsible for the Transmission Products Group. Bossi's earlier career experience includes management and technical positions at United Technologies Corporation, MIT Lincoln Laboratory, and RCA Laboratories. He also serves on the boards of directors for two other privately held companies.

Princeton University spin-off Aegis Semiconductor is combining optical interference coatings and thin-film semiconductor materials to create dynamically tunable optical products.

(See our profile of Aegis in the Dec. 2004 issue of *InsideChips.Ventures*.)

WLAN Veteran Joins WiDeFi as VP of Marketing

WiDeFi has appointed wireless industry pioneer and vice-chairman of the IEEE 802.11 WLAN Standard Working Group, Al Petrick, to the position of VP of marketing and business development. Prior to WiDeFi, Petrick served as VP of business development for IceFyre Semiconductor. Previously, at Intersil (now Conexant), Petrick led the development of the highly successful PRISM WLAN product line. Petrick has published and co-authored various marketing and technical papers on wireless voice and data communications as well as the "IEEE 802.11 Handbook, A Designers Companion." Earlier, Petrick held a series of increasingly senior positions with Direct2Data Technologies, American Neuralogix, Mnemonics and Lockheed/Sanders.

Founded in July 2002, WiDeFi is tackling the problem of extending coverage in wireless LANs and broadband wireless access (BWA) applications with an inexpensive repeater called Xtender. The RF device only requires power—no configuration is necessary—and it can instantly double the coverage of an 802.11 network.

(See our profile of WiDeFi in the Oct. 2003 issue of *InsideChips.Ventures*.)

Kodiak Venture Partners Adds VP of Finance, Technology Partner

Kodiak Venture Partners, a seed- and early-stage venture capital firm focusing on communications/IT, semiconductor and software companies, has added Penny Breen as VP of finance. Additionally, Murray Berkowitz has been appointed Technology Partner, from his previous role of entrepreneur-in-residence.

Prior to joining the firm, Breen served as a finance consultant at Globespan Capital Partners, a venture capital firm focused on information technology investments, where she was responsible for working on various high-level financial and legal projects. Before serving as a consultant, Breen was CFO at Delta Global Trading.

Berkowitz, who joined Kodiak in Sept. 2004 as entrepreneur-in-residence, has been

appointed technology partner. This change signifies the development of Berkowitz's role at Kodiak. In his new position, he will continue to focus on developing new software investment opportunities, and provide business strategy and technical guidance for portfolio companies.

Pintail Adds VP of Sales, Expands Worldwide Sales and Support

Roy Schmidt has joined Pintail Technologies, a provider of semiconductor test improvement solutions, as VP of worldwide sales. Most recently, Schmidt was VP of fabless strategic accounts at NPTest. Previously, he spent more than 20 years with HP/Agilent in various senior sales management roles focused on opening new markets for leading-edge semiconductor test technologies.

Pintail has also expanded its worldwide sales and technical support team into Asia and Europe. In addition to three existing business offices in Dallas, Tex., and the Bay Area, Pintail will now offer sales and service in the following regions of Asia and Europe:

- Singapore — K. H. Koh and Albert Wong
- Taiwan — Scott Chang
- U.K. (London) — Andy Langridge
- Switzerland — Ruedi Egger
- Germany (Munich) — Erwin Nowak

Launched in 1999, Pintail is developing software solutions to reduce the high cost of test. The company employs real-time data collection and decision-making as a means to bring statistical process control into the chip world, and is promising test time reductions of 5% to 30%.

(See our profile of Pintail in the May 2004 issue of *InsideChips.Ventures*.)

TransDimension Appoints VP of Finance/Administration and CFO

TransDimension has appointed Mark Becker as VP of finance/administration and CFO. Prior to TransDimension, Becker served as CFO at Jazz Semiconductor, an independent wafer foundry. Before Jazz, he held positions at Conexant Systems, Burr-Brown, Crystal Semiconductor and Texas Instruments.

Exar Chooses Acting CEO and President to Head Company

Exar has named Roubik Gregorian as CEO and president. Since the retirement of Donald Ciffone on Sept. 10, 2004, Gregorian has served as acting CEO and president. Gregorian, who has more than 25 years of industry experience, has been with Exar for 10 years in positions with increasing responsibilities. Immediately prior to Sept. 2004, he had been exec. VP and GM of the Communications Division and COO.

Tripath Technology Appoints CFO

Tripath Technology has appointed Jeffrey Garon as VP of finance and CFO. Garon replaces Clarke Seniff, who is leaving the company to pursue other opportunities.

From 1998 until 2003, Garon was VP of finance, CFO and corporate secretary of Silicon Storage Technology (SST). Prior to SST, he served as president and senior operating officer of The Garon Financial Group, a financial engineering firm that he founded in 1994 specializing in the development and execution of business strategies. Before this, he was VP and CFO of Monster Cable Products. Garon has also held positions with Visual Edge Technology, Oracle, Ashton-Tate, Teledyne Microelectronics and Allied Aerospace.

Cymer Taps Industry Veteran to Head Chipmaker Operations

Cymer, a supplier of deep ultraviolet (DUV) light sources used in semiconductor manufacturing, has hired Jim McGuire as senior VP of chipmaker operations. McGuire will report directly to Bill Alexander, Cymer's executive VP of worldwide customer operations.

McGuire has spent the last nine years at Novellus Systems, where he most recently served as VP of strategic sales. Prior to this, he was Novellus's VP of customer satisfaction and VP of marketing. Before Novellus, McGuire served for six years at Applied Materials in a variety of capacities, including manager of business operations for Texas Instruments. From 1976 to 1989, he held a variety of sales, marketing and operations management roles at various semiconductor companies, including Texas Instruments.

eASIC Appoints President of eASIC Japan

eASIC, a provider of configurable logic and structured ASIC products, has hired Seiji Miwa as president of eASIC Japan. Miwa will report to Salah Werfelli, executive VP of strategic business worldwide. In conjunction with this appointment, eASIC has opened an office in Tokyo.

Before joining eASIC, Miwa served as president of AmmoCore Japan. Previously, he was chairman and president of Magma Design Automation, K.K. Japan. Prior to Magma, Miwa served as president and then chairman at Cadence Design Systems, K.K. Japan. Miwa moved his career to chip design and test when he joined the Japanese subsidiary of Teradyne as a vice president. Earlier in his career, he held several management positions at Topre, including board member, executive VP of R&D, and GM of new business units.

Tehuti Networks Appoints VP of Marketing and Sales

Tehuti Networks, a startup developing technology to accelerate TCP/IP processing, has added Blaine Kohl as VP of marketing and sales. Kohl was most recently VP of marketing at Bandspeed. Prior to that, she served at Intel as director of marketing, where she led the market development and strategic investments for 10-Gigabit Ethernet and iSCSI platforms.

Tehuti Networks has developed technology to accelerate TCP/IP processing in Gigabit Ethernet networks and is expanding the technology to 10-Gigabit Ethernet. Whereas high-end TOEs are implemented in hardware and very expensive, and low-end TOEs are software-based and cheap, Tehuti is taking a middle path by optimizing the hardware/software split to provide high performance at a low cost.

(See our profile of Tehuti in the Jan. 2005 issue of *InsideChips.Ventures*.)

Sierra Design Automation Expands Management Team

Sierra Design Automation has expanded its presence in Japan and the U.S. by opening regional offices in Tokyo and Dallas, Tex.

Sierra has hired Takashi Suzuki as GM of Sierra Design Automation KK. Takashi comes from Cadence Design Systems Japan, where he most recently served as the director of global account sales. Suzuki has also worked at Cadence, Teradyne, Intergraph, Bruel&Kaer, and Daisy/Cadnetix.

Another new member of Sierra's Japanese management team is Yu Hirano, who has been appointed chairman of Sierra KK. For the last four years, Hirano has served as a consultant/advisor for EDA firms venturing into the Japanese market. He was formerly the president, and later chairman, of Nihon Synopsys and GM of overseas marketing at Fujitsu Semiconductor Group.

Joining Sierra's Silicon Valley management team is Sudhakar Jilla, who is assuming the director of marketing role. Prior to Sierra, Jilla served in various roles over the course of a 10-year career at Synopsys.

Sierra also expanded operations within the U.S., opening a sales and support office in Dallas, Tex. Dale Troutt will head the new office as director of sales, central region U.S. Previously, Troutt served as the regional sales director for Monterey Design Systems and held the position of executive account manager at Synopsys.

AuthenTec Names Director of European Marketing and Sales

Biometric fingerprint sensor specialist AuthenTec has named Marc Gebert director of marketing and sales in Europe. Gebert, who will be based in Germany, was previously CEO of AD-Vision Technologies in Munich. Previously, he held a variety of senior level positions of increasing responsibility at Broadcom, and served as VP and GM with Infineon, account manager with LSI Logic, and product marketing manager and technical project leader with EPCOS (which was previously Siemens Matsushita).

Faraday Appoints VP of Business Development

Faraday Technology has appointed Christopher Moezzi VP of business development. Moezzi was previously senior director of strategic marketing at Conexant/Globespan. Prior to Globespan, he was director of marketing and business development at T-sqware, and he has also held marketing and engineering positions at Lucent Technologies, 3Com and Apple Computers.

Finance: News, Funding and Acquisitions, Cont.

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latest funding round. Oak Investment Partners joined with previous investors Foundation Capital, Anthem Venture Partners, Intel Capital and Miramar Ventures to complete the new financing. Solarflare has now raised $78 million in total funding to date.

Solarflare's products enable a new generation of Ethernet technology that will deliver 10-Gbps networking performance over standard twisted-pair copper cabling, rather than expensive fiber. In 2004, the company demonstrated the world's first CMOS device capable of sustaining full-duplex 10-Gbps operation over long distances using twisted-pair copper cable types, including Category 5e, 6, 6e, and 7.

Solarflare expects to begin shipping its fully standards-compliant transceiver later this year.

(See our profile of Solarflare in the July 2004 issue of *InsideChips.Ventures*.)

Contact:
Russell Stern, CEO; Tel: 949 581-6830; 949 581-4695; Web: www.solarflare.com.

T-Networks Closes Series C Financing

T-Networks, a supplier of 10- and 40-Gbps indium phosphide (InP) optical transmitters, has raised $5.75 million in Series C financing, bringing the company's total invested capital to $60 million. TL Ventures led T-Networks' third round of equity financing, which also included Greylock Partners, U.S. Venture Partners and Sequoia Capital.

T-Networks develops integrated InP solutions for optical transmission systems that exceed the distance-extinction-power (DEP) product for other optical semiconductor technologies. Currently, T-Networks is providing a wide variety of cooled and uncooled products for 10- and 40-Gbps transmission to several tier-one system OEMs and module vendors.

Contact:
Aaron Fisher, CEO and president; Tel: 610 289-5040; www.tnetworksinc.com.

RF-MEMS Startup Secures $6.5 Million in Series A Funding

Wispry, an RF-MEMS developer of low-cost, high-performance tunable RF components and modules for the wireless industry, has closed $6.5 million in Series A financing. Blueprint Ventures led the round, which included additional investment from American River Ventures, Sid R. Bass Associates and Shepherd Ventures, as well as existing investors.

Wispry was formed through a corporate-spinout of the RF/wireless business unit of MEMS software design company Coventor. Wispry is enabling cost-effective integration of tunable, reconfigurable RF front-ends for the multi-mode and multi-standard handset market. The company's initial products include a line of low-loss RF-switches for mode switching, band switching and antenna diversity.

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Companies Mentioned in This Issue