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Tracking Fabless, IP & Design-House Startups

Business Microscope

Semiconductor Forecast ... Each year, InsideChips bestows a **Semiconductor Forecast Award** to the best analyst forecaster after actual results are posted by the SIA. The purpose of the program is to identify and recognize top analysts whose methodology and experience result in consistently accurate forecasting.

Based on forecasts made in Q4 2003, the award for the best semiconductor forecast made by a market research firm for 2004 is shared by Bill McClean of IC Insights and Jim Feldhan of SEMICO Research. Both analysts forecasted +27% growth for 2004, which came in very close to the actual +28% growth over 2003 as announced by the Semiconductor Industry Association. McClean also won InsideChips' forecast award for his semiconductor predictions for 2002.

Prior to forming IC Insights, McClean worked at ICE Corporation (acquired by Chipworks). He specializes in tracking global economic conditions, developing IC market forecasts, analyzing capital spending and fab capacity trends, researching ASIC markets and technologies, and following emerging markets for ICs such as cellular phones. Feldhan is the founder of SEMICO, one of the several market research boutiques that spun out of In-Stat during the 1980s. SEMICO is a semiconductor-centric market research firm whose services include consulting, reports, events and newsletters.

The most conservative forecasts for 2004 were 17%, 18% and 19% made by iSupply, IDC, and SIA, respectively. VLSI Research was most optimistic at 32%. The semiconductor forecasts for 2004 average 25.6%.

This year, the industry has cooled from last year's double-digit pace. The average forecast compiled from all analysts is a modest 1.4%.

Readers can view the results of last year's forecasts on InsideChips' download page at www.insidechips.com/downloads.htm.

Table 1 -- Current Market Capitalization of Publicly Held Semiconductor Companies

Company	Symbol	Market Cap	Company	Symbol	Market Cap
Intel	INTC	144,100.0	Vitesse Semiconductor	VTSS	500.9
Texas Instruments	TXN	41,900.0	Genesis Microchip Del	GNSS	460.1
Motorola	MOT	38,500.0	TriQuint Semiconductor	TQNT	454.6
TSMC	TSM	38,100.0	Symmetricom	SYMM	437.0
STMicroelectronics	STM	14,000.0	Adaptec	ADPT	432.9
Analog Devices	ADI	12,800.0	Trident Microsystems	TRID	412.7
Maxim Integrated Products	MXIM	12,400.0	O2Micro International	OIIM	398.4
United Microelectronics	UMC	11,400.0	Zoran	ZRAN	397.8
Linear Technology	LLTC	11,100.0	Audiocodes	AUDC	391.5
Xilinx	XLNX	10,200.0	Actel	ACTL	377.8
Marvell Technology	MRVL	9,200.0	Ixys	SYXI	372.1
Broadcom	BRCM	8,000.0	Pixelworks	PXLW	368.2
Altera	ALTR	7,300.0	Cirrus Logic	CRUS	335.3
Infineon Technologies	IFX	6,800.0	Silicon Storage Technology	SSTI	318.0
National Semiconductor	NSM	6,700.0	Mips Technologies	MIPS	294.2
Advanced Micro Devices	AMD	5,900.0	PLX Technology	PLXT	275.4
Micron Technology.	MU	5,900.0	Standard Microsystems	SMSC	268.1
Microchip Technology	MCHP	5,400.0	Echelon	ELON	255.2
SanDisk	SNDK	5,000.0	Integrated Silicon Solution	ISSI	226.6
Atl Technologies	ATYT	4,000.0	Pericom Semiconductor	PSEM	216.9
Nvidia	NVDA	3,800.0	Virage Logic	VIRL	211.7
QLogic	QLGC	3,400.0	Supertex	SUPX	203.2
International Rectifier	IRF	2,900.0	Sigma Designs	SIGM	191.6
ARM Hldgs Plc	ARMHY	2,600.0	ESS Technology	ESST	184.4
Intersil	ISIL	2,400.0	Monolithic Sys Technology	MOSY	179.4
LSI Logic	LSI	2,100.0	Zarlink Semiconductor	ZL	173.1
Tessera Technologies	TSRA	1,700.0	Nanogen	NGEN	152.4
Vishay Intertechnology	VSH	1,700.0	Transmeta Del	TMTA	136.7
Cypress Semiconductor	CY	1,600.0	TranSwitch	TXCC	126.3
Fairchild Semiconductor	FCS	1,600.0	White Electr Designs	WEDC	121.5
Silicon Laboratories	SLAB	1,600.0	Tower Semiconductor	TSEM	109.5
PMC-Sierra	PMCS	1,500.0	Sirenza Microdevices	SMDI	103.9
Chartered Semiconductor	CHRT	1,400.0	Aware	AWRE	102.1
Integrated Circuit Sys	ICST	1,400.0	Dialog Semiconductor	DLGS	101.4
Rambus	RMBS	1,400.0	California Micro Devices	CAMD	92.8
Semtech	SMTC	1,300.0	Metalink	MTLK	88.8
Integrated Device Technology	IDTI	1,200.0	Quicklogic	QUIK	85.4
Agere Systems	AGR.A	1,100.0	Hi/Fn	HIFN	83.3
Sigmatel	SGTL	1,100.0	Centillium Communications	CTLM	81.5
Atmel	ATML	1,000.0	8X8	EGHT	81.3
Microsemi	MSCC	1,000.0	Catalyst Semiconductor	CATS	80.5
AMIS Hldgs	AMIS	973.1	Advanced Power Technology	APTI	74.3
Siliconix	SILI	969.3	Alliance Semiconductor	ALSC	69.9
Applied Micro Circuits	AMCC	850.3	Ramtron Intl	RMTR	68.6
Omnivision Technologies	OVTI	842.4	ANADIGICS	ANAD	56.9
RF Microdevices	RFMD	834.5	Micro Linear	MLIN	55.7
On Semiconductor	ONNN	812.7	RF Monolithics	RFMI	47.4
Micrelorporated	MCRL	757.1	Tripath Technology	TRPH	44.4
DSP Group	DSPG	708.0	Tvia	TVIA	32.5
Macronix Intl	MXICY	679.8	Simtek	SRAM	32.1
Power Integrations	POWI	669.9	Spectrum Signal Processing	SSPI	24.8
Conexant Systems	CNXT	624.8	NeoMagic	NMGC	15.8
Lattice Semiconductor	LSCC	556.7	Celeritek	CLTK	10.6
Exar	EXAR	529.9	DPAC Technologies	DPAC	9.5
			Logic Devices	LOGC	9.3
			Solitron Devices	SODI	1.2

Market Capitalization Data in Millions of Dollars

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Hytek Eliminates Jobs

Hytek Microsystems has reduced its workforce by nine employees, which represents an approximately 10% reduction in head count. The majority of the terminated employees were dedicated to the Medtronic work cell. In Jan. 2005, Medtronic notified Hytek that it would place no further purchase orders with Hytek, as it intended to develop an internal source of supply. Although Hytek reassigned several of the work cell employees, the company said it was unable to absorb all of them into its current organizational structure.

In Feb. 2005, Hytek entered into a merger agreement with Natel Engineering. The companies expect to close the transaction during Q2 2005. The report of independent auditors on Hytek's Jan. 1, 2005, financial statements includes an explanatory paragraph indicating there is substantial doubt about Hytek's ability to continue as a going concern.

Founded in 1974 and headquartered in Carson City, Nev., Hytek specializes in hybrid microelectronic circuits that are used in military applications, geophysical exploration, medical instrumentation, satellite systems, industrial electronics, opto-electronics and other OEM applications.

Silicon Image Suffers Mass Departure of Board Members

After four members of Silicon Image's board of directors resigned in late April, the company announced that founder David Lee had decided not to stand for re-election to the board at the 2005 annual shareholder meeting.

Lee's decision followed the resignations of Christopher Paisley, chairman of the board and member of the audit, compensation and governance and nominating committees; David Courtney, chairman of the audit committee and member of the governance and nominating committee; Keith McAuliffe, chairman of the compensation committee and member of the audit and governance and nominating committees; and Richard Sanquini, member of the compensation and governance and nominating committees.

Paisley and Courtney stated that they were resigning due to a disagreement over whether or not Lee should be re-nominated to the company's board of directors, and McAuliffe said he resigned due to events surrounding that same issue. The company said Sanquini resigned without stating a reason.

As a result of the resignations, a majority of the board of directors is not "independent" as required by NASDAQ listing requirements, and no directors are serving on the audit committee of the board of directors. NASDAQ listing rules require that the audit committee be comprised of at least three independent directors.

Lee will continue to serve in his current capacity as an executive officer of Silicon Image and chairman of PanelLink Cinema, a wholly owned subsidiary of the company. The board also named Lee Chairman Emeritus of Silicon Image for past contributions.

The company's three remaining board of directors are Steve Tirado, president and CEO; CFO Darrel Slack, who was appointed to the board following the resignations; and David Hodges, an independent director.

Cirrus Logic to Divest Video Product Line

Cirrus Logic is divesting its digital video product line assets to focus exclusively on its core high-precision analog, mixed-signal and embedded ICs for audio and industrial applications. Revenue associated with the digital video product line in the third fiscal quarter, ending Dec. 25, 2004, was $3.1 million, representing 7% of total revenue. Cirrus Logic has retained Lehman Brothers as its exclusive financial advisor in connection with a potential transaction involving the digital video product line assets.
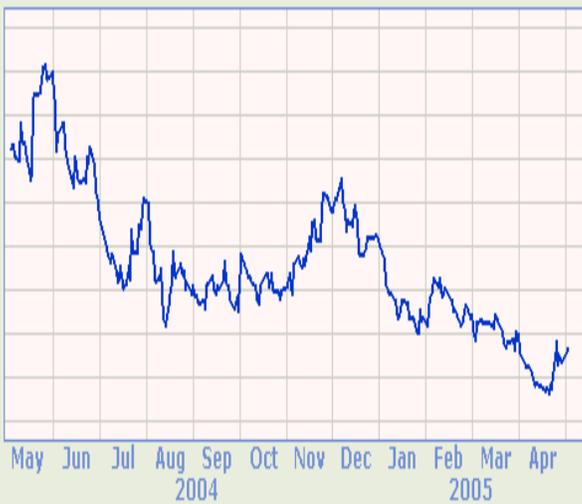
Semiconductor Stock Index

Short Term

Long Term

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Stock Market Scan

Cirrus Logic

Maxim Integrated Products
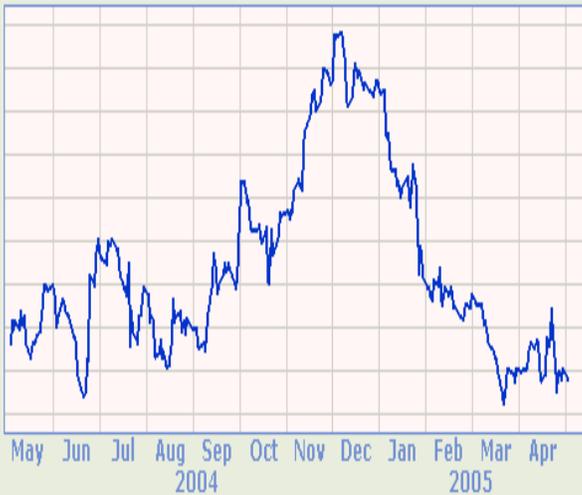
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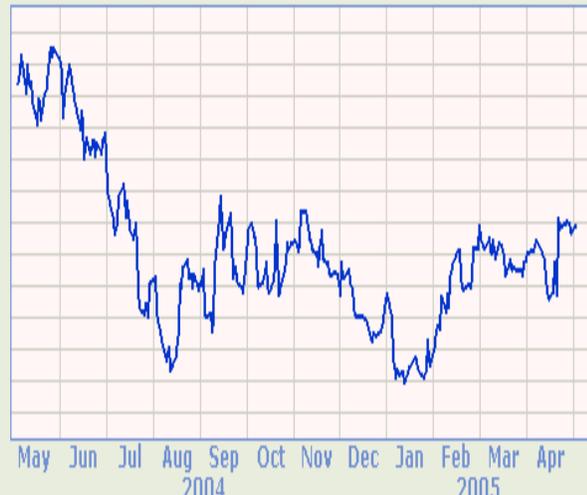
Power Integrations
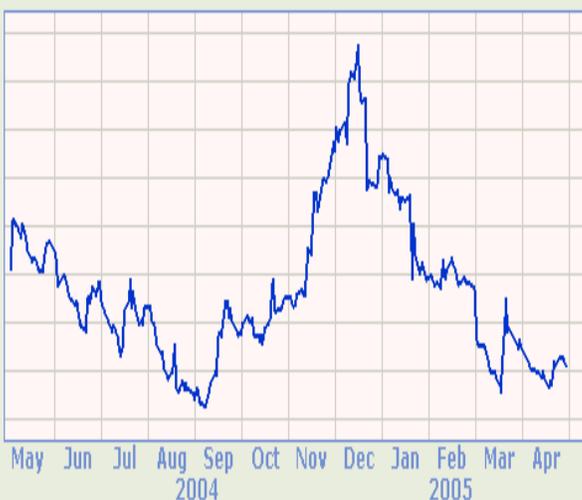
Rambus

Omnivision Technologies

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eASIC Receives Additional $7.5 Million

As follow-on to the previous investment of $5 million in May 2004, Kleiner Perkins Caufield & Byers (KPCB) and Vinod Khosla have provided eASIC with $7.5 million in equity financing.

Founded in 1999, eASIC is a provider of configurable logic and structured ASIC products. The company's configurable logic technology is aimed at dramatically reducing the overall fabrication cost and time of customized high-performance semiconductor chips. Its structured eASIC architecture enables rapid and low-cost ASIC and SOC designs by using proven programmable logic fabric in conjunction with single-via customizable segmented routing. As single-via generates 10x higher throughput of direct-write e-Beam customization, it enables eASIC to offer NRE-free structured ASICs.

Contact:
Zvi Or-Bach, founder and CEO; Tel: 408 879-9400; www.easic.com.

Siano Mobile Silicon Secures Series A Financing

Israel-based Siano Mobile Silicon, a startup developing mobile digital television (MDTV) receiver solutions, has closed its Series A funding of $11.5 million. Jerusalem Venture Partners led the round, which included Walden Israel and Star Ventures.

Founded in June 2004 by a group of Israeli entrepreneurs, Siano is developing an all-CMOS, multi-standard, multi-band integrated receiver. The company is targeting the chip at cellular phones, laptop computers, portable video players, and similar portable consumer devices.

Contact:
Alon Ironi, CEO and president; Tel: +972 (9) 8656993; www.siana-ms.com.

Elixent Attracts Strategic Investment from Panasonic, Toshiba

Reconfigurable semiconductor company Elixent has closed a new round of funding that, when complete, will total $15 million. This latest round includes a strategic investment from Panasonic Digital Concepts Center, the Silicon Valley-based venture capital arm of Matsushita Electric Industrial, and Toshiba. Existing investors 3i, GIMV and NIF Ventures also participated.

Elixent's D-Fabrix reconfigurable algorithm processing (RAP) technology reduces chip development costs by enabling the same device to be used for multiple applications. It does this without incurring the size and power overheads of traditional programmable solutions. This is ideal for the growing convergence of consumer electronics devices as multiple applications can be realized on the same chip.

Contact:
Ralph Weir, VP of marketing; Tel: +44 (0)117 917 5762; www.elixent.com.

Nortel Takes Equity Stake in Sasken

Nortel has invested $10 million in Sasken Communication Technologies for an undisclosed stake in Sasken's fully diluted equity. The two companies have also signed an amendment to an existing services agreement under which they will continue to work together to develop new software and deploy Nortel networking solutions.

Sasken, a pioneer in telecom research and development (R&D) outsourcing, has been a key supplier to Nortel since 1991, and is currently focused on supporting Nortel's GSM digital wireless and enterprise communications solutions. Sasken will also play a major role in training, technical support and other engineering services in Nortel projects in India.

Sasken plans to use this investment to fuel its growth through acquisitions.

Established in 1989, Sasken offers a combination of complementary IP software components, R&D consultancy and software services to semiconductor manufacturers, network equipment companies, and global wireless handset developers. Established in 1989, Sasken employs over 2,000 staff, operating from R&D centers in Bangalore and Pune, India, and has offices in Canada, China, Germany, Japan, Sweden, France, the U.K. and the United States.

Contact:
Rajiv Mody, chairman and CEO; Tel: 91 80 2535 5501; www.sasken.com.

Exar Acquires Infineon's Optical Networking Product Line

Exar is acquiring a significant part of Infineon Technologies' Optical Networking (ON) Business Unit. The acquisition includes assets relating to multi-rate TDM framer products, Fiber Channel over SONET/SDH, Resilient Packet Ring (RPR), as well as certain IP for Data Over SONET products. The companies expect the all-cash transaction to close shortly.

The existing MetroMapper™ family of Ethernet over Sonet products will remain part of Infineon's product portfolio.

The sale of the Optical Networking business unit is part of Infineon's strategy to streamline its business activities to focus on core markets in wireless and broadband access communication. In Feb. 2005, Infineon sold its fiber optics business to Finisar, although it retained its parallel optics and fiber operations. Under the terms of that agreement, Finisar issued 34 million shares (valued at approximately $50 million) for the assets associated with the design, development and manufacture of all optical transceiver products.

Contacts:
Peter Fischl, Infineon executive VP and CFO; Tel: +49 89 234 22404; www.infineon.com.
Ronald Guire, Exar CFO and executive VP; Tel: 510 668-7000; www.exar.com.

Provigent Ups Third Round of Financing to $10 Million

Provigent has increased its third-round funding to $10 million, provided by the company's previous third-round investors: Sequoia Capital, Pitango Venture Capital, Magnum Communications Fund, Ascend Technology Ventures, Delta Ventures, and Andrew Viterbi, co-founder of QUALCOMM.

Provigent previously closed its third round of financing in Sept. 2004 for $8 million. The total amount raised thus far, including the additional $2 million in new funding, stands at $21 million.

Founded in Aug. 2000, Provigent is developing algorithms and SOCs that address the fragmented, non-consumer, point-to-point (PTP) broadband wireless market. Cellular backhaul, which links

cellular and wired networks, represents a major segment of this market. Another strong PTP market is fixed wireless transmission networks, such as those that ILCECs use for connecting their sites. Provigent's third target market is private wireless networks, which are typically deployed by governmental agencies, as well as utilities such as gas, electric, water and others.

Provigent's first product, the PVG-310, is a single-chip modem that integrates all the PHY baseband functionality for broadband wireless transmission systems. All functions are implemented digitally and eliminate the need for external VCOs and loop filters. The company incorporated flexibility by making certain modem parameters software programmable, including data rates, modulation schemes and bandwidth. The startup has already achieved 20 design wins to date.

(See our profile of Provigent in the Oct. 2004 issue of *InsideChips.Ventures*.)

Contact:
Dan Charash, CEO; Tel: 650 962-0183; www.provigent.com.

TeraChip Secures New Funding

Switch fabrics provider TeraChip has raised $7.2 million in its latest funding round, led by Accel Partners and Benchmark Capital. The company also appointed Rod Kay as president and CEO.

TeraChip will use the funding to expand its product portfolio and launch new sales and marketing initiatives internationally. The new funding will accelerate the completion of new products in TeraChip's line of scalable switching solutions. The company plans to increase staff by 10% to 20% over the next year.

Kay succeeds Micha Zeiger, TeraChip's founding CEO, who becomes chairman of the board of directors and CTO. Kay previously served as VP of marketing at Ardent Communications, a voice-over-packet startup acquired by Cisco Systems in 1997. Following the acquisition by Cisco, Kay held executive marketing and business-development positions in Cisco's Enterprise and Service Provider business segments. Earlier, Kay was VP of marketing at XLNT Designs (acquired by Intel) and Ascom Timeplex.

Founded in 2000, TeraChip provides next-generation merchant switch fabrics for switch and router systems. TeraChip's switching solutions are optimized for enterprise (LAN), storage (SAN) and metro (MAN) switching and server-blade systems.

(See our profile of TeraChip in the March 2003 issue of *InsideChips.Ventures*.)

Contact:
Rod Kay, president and CEO; Tel: 650 320-8148; www.tera-chip.com.

TriQuint Sells Optoelectronics Operations in Pennsylvania, Mexico

TriQuint Semiconductor is selling its optoelectronics operations in Breinigsville, Pa., and Matamoros, Mexico, to CyOptics, an optical components manufacturer headquartered in Lehigh Valley, Pa. The asset sale includes the products, manufacturing equipment, inventory, the Mexican entity, related IP rights and other assets that constitute the operation that manufactures indium phosphide (InP) optical chips and components for the optical networking market.

TriQuint's total consideration from the sale of the building and the business will be approximately $32 million and will result in a one-time gain of between $7 million and $8 million. The company will also receive a minority ownership share in CyOptics.

TriQuint will continue to support current optical customers and products based on gallium arsenide, which are not associated with the operations in Pennsylvania and Mexico. CyOptics plans to employ the vast majority of TriQuint's approximately 100 employees in Pennsylvania and approximately 150 employees in Mexico.

In a separate move, TriQuint is selling its nearly 850,000-square-foot opto-electronics facility and surrounding property in Breinigsville, Pa., to Anthem Partners, an affiliate of MRA Group of Plymouth Meeting, Pa. MRA intends to transform the existing facility into an advanced technology center, featuring a combination of technology research and development, bio-medical engineering, high-tech manufacturing, and a related education advancement and conference center. CyOptics will lease approximately 90,000 square feet of space in this facility for its

operations once it has completed its purchase of the business from TriQuint.

Contacts:
Ralph Quinsey, TriQuint president and CEO; Tel: 503 615-9000; www.triquint.com.
Ed Coringrato, CyOptics president and CEO; Tel: 610 336-5758; www.cyoptics.com.
Larry Stuardi, MRA Group president; Tel: 610 238-0500; www.mragroup.net.

Akustica Raises Series B Funding

Akustica, a pioneer in acoustic SOC solutions, has raised $15 million in a Series B round of equity funding. Current investors Rangos Investments and Mobius Technology Ventures co-led the round.

Akustica is commercializing two MEMS-based innovations developed at Carnegie Mellon Univ. by MEMS pioneer Kaigham (Ken) Gabriel and colleagues. The company is enabling OEMs to replace microphones and speakers in mobile phones, hearing aids and other consumer electronic devices with its AkuSound acoustic MEMS SOCs. Gabriel, whom Forbes Magazine called "the architect of the US MEMS Industry, is a co-founder and serves as CTO and chairman.

There are two primary classes of technology Akustica licensed and is continuing to develop, both developed by Gabriel and his students and colleagues at CMU. The first is a unique acoustic MEMS technology that functions as a transducer, capturing and reproducing sounds with the mechanical membrane inside of the chip.

The other technology the company licensed from CMU is CMOS micromachining. Traditionally, achieving large-scale MEMS production required a heavy investment in proprietary and unique fabrication approaches; this has been one of the major roadblocks to successful commercialization of MEMS. As the beneficiary of CMU's 10-year and $30-million investment in CMOS micromachining, Akustica will be able to leverage the world's CMOS production infrastructure.

(See our profile of Akustica in the Nov. 2002 issue of *InsideChips.Ventures*.)

Contact:
Ken Gabriel, chairman and CTO; Tel: 412 390-1730; www.akustica.com.

SST Acquires Flash Memory Technology Company

Flash memory technology specialist Silicon Storage Technology (SST) has acquired substantially all of the shares of privately held Actrans Systems. Founded in 2000 and headquartered in Hsinchu, Taiwan, Actrans Systems is a fabless IC company that designs flash memory and EEPROM. SST plans to incorporate Actrans' split-gate NAND flash technology into its portfolio of licensable IP.

SST will pay Actrans' shareholders approximately $20 million in common stock and cash. SST will merge Actrans' engineers into its Standard Memory Product Group, working in both Taiwan and the United States.

Actrans Systems develops flash memory technology and products and also offers IP services for embedded and customer-specific applications using flash memory and EEPROM IP macros. Actrans' split-gate NAND flash memory technologies use a 0.15- and 0.12-micron process for targeted densities ranging from 256 Mbit to 1Gbit. Powerchip Semiconductor, a licensee of SST's SuperFlash technology and an early investor in Actrans Systems, has validated the technology. SST expects to license these split-gate NAND products to Powerchip and collaborate with the company to bring these and other higher-density products into volume production.

Contact:
Bing Yeh, SST president and CEO; Tel: 408 735-9110; www.sst.com.

Ciclon Semiconductor Purchases Agere's RF LDMOS Product Line

Ciclon Semiconductor Device, a developer of high-frequency LDMOS products, has acquired the RF LDMOS product line of Agere Systems. With the acquisition, Ciclon will acquire certain research and development and manufacturing assets and inventory for ARF4 and ARF5 high-voltage LDMOS technologies. In addition, Agere will license and assign critical IP and software associated with the product line to Ciclon.

LDMOS (laterally diffused metal oxide semiconductor) technology, known for its ability to operate at high voltages and to support high-power applications ranging in frequency from 400 MHz to 3 GHz, has long been the technology of choice in the wireless infrastructure market. Dominating the space for power amplifiers, high-power LDMOS is a critical component in 3G technology roll-out and accounts for nearly $700 million in sales each year, according to Allied Business Intelligence.

Agere said it decided to exit the RF power business as part of its plan to focus resources on core technologies.

The Ciclon team, led by CEO Mark Granahan, is composed primarily of former Agere Systems management and technologists. Key members of the team were involved in the development and qualification of Agere's first-generation technology, ARF4.

Ciclon, which formed in 2004, does not at this time have a web site or contact information.

Contact:
Sohail Khan, Agere exec. VP and chief strategy and development officer; Tel: 610 712-4323; www.agere.com.

TeraVicta Closes $10 Million Financing

RF MEMS switch developer TeraVicta Technologies has closed a $10 million round of financing. Existing shareholders Convergent Investors and Agave Capital provided $7.5 million of equity financing, with new investor Horizon Technology Finance providing an additional $2.5 million.

Additionally, TeraVicta signed a manufacturing agreement with a Hong Kong-based manufacturing partner, China Resources Semiconductor (CRS). CRS, a subsidiary of China Resources Logic, will provide high-volume production quantities of RF MEMS switching devices, augmenting the present volume capabilities of TeraVicta's facility in Austin, Tex.

TeraVicta is shipping its first product, a single-pole, double-throw (SPDT) RF MEMS switch called the TT712.

Contact:
Kenney Roberts, president and CEO; Tel: 512 684-8700; www.teravicta.com.

Morpho Technologies Closes Series C Funding, Hires New CEO

Morpho Technologies, a developer of ultra-high-performance digital signal processors (DSPs), has closed a $10 million series C funding round. Current investors Smart Technology Ventures and BridgeWest co-led the round.

John Rayfield has joined Morpho Technologies as CEO. Following eight years with ARM, most recently as VP of marketing for the U.S., Rayfield formed Novelchange, a strategic business consultancy advising companies in the microprocessor, DSP and semiconductor IP space.

Morpho Technologies designs power-efficient, high-performance, reconfigurable DSP cores, which are based on the company's proprietary MSI architecture coupled with sophisticated development, simulation and design tools. The company is committed to delivering technology designed around software defined radio (SDR) technology, which will enable reconfigurable system architectures for wireless networks.

Contact:
John Rayfield, CEO; Tel: 949 475-0626; www.morphotech.com.

Golden Gate Capital Acquires TDK Semiconductor

Golden Gate Capital has acquired TDK Semiconductor Corporation for an undisclosed sum. The current management team will continue to lead the acquired company, which will maintain its headquarters and operations in Irvine, Calif. The acquired company will continue to be called TDK Semiconductor Corporation for a short transition period until a new name has been established.

TDK Semiconductor develops advanced analog and mixed-signal IC products for consumer, communications, and industrial applications for a large number of global customers.

Contacts:
David Dominik, Golden Gate Capital managing director; Tel: 415 627-1387; www.goldengatecap.com.
Francis Sweeney, TDK U.S.A. president; Tel: 516 535-2600; www.tdk.com.

Xelerated Secures $17 Million in New Funding

Network processor vendor Xelerated has closed a $17 million Series C round with new investors Accel Partners and Amadeus Capital Partners. Existing investors Atlas Venture and Alta Partners also participated in the round. The company will use the funding to build out sales and support globally as well as to accelerate the development of next-generation products.

Founded in Aug. 2000, Xelerated has combined the efficiency of an ASIC with the programmability of network processors. Xelerated's products target network equipment for the enterprise and metro Ethernet markets. The company has several tier-one customers and key partnerships with leading component vendors.

(See our profile of Xelerated in the July 2001 issue of *InsideChips.Ventures*.)

Contact:
Johan Börje, CEO; Tel: 408 850-7155;
 www.xelerated.com.

T-RAM Closes $40 Million Series C Round

T-RAM, a company developing a unique type of memory that combines the speed of SRAM with the density of DRAM, has raised $40 million in a Series C financing round. InterWest Partners led the round, which included new investor CenterPoint Ventures along with the existing investors Tallwood Venture Capital, Mayfield, US Venture Partners and NEA. The company has raised about $86 million to date.

T-RAM is currently offering various configurations of its eZt™ (Enhanced Zero-Turnaround) Late-Late-Write SRAM Pipelined Read; Zt™ (Zero-Turnaround) Late-Late-Write SRAM Pipelined Read; Zt™ (Zero-Turnaround) Late-Late-Write SRAM Flow-Through Read; Pipelined Burst SRAM Pipelined Read, Single Cycle Deselect; Pipelined Burst SRAM Pipelined Read, Double Cycle Deselect; and Pipelined Burst SRAM Flow-Through Read, Single Cycle Deselect.

(See our profile of T-RAM in the Jan. 2004 issue of *InsideChips.Ventures*.)

Contact:
Kenneth Young, president and CEO; Tel: 408 597-3000; www.t-ram.com.

SiRF Technology to Acquire RF Expert Kisel Microelectronics

GPS specialist SiRF Technology is acquiring Kisel Microelectronics, a company with extensive expertise in complex integrated transceiver designs. SiRF has agreed to pay up to $33 million in combination of cash and stock. The boards of directors of both companies and shareholders of Kisel have approved the merger, which the companies expect to close this quarter.

Senior Ericsson designers founded Kisel at the end of 1999 under the name BlueChip IC Design to form a center of excellence for complex RFIC design. Kisel has been involved in the development of multiple radios using a range of process technologies, from SiGe BiCMOS to pure bipolar and analog/RF-CMOS. The company has contributed its expertise to applications such as Bluetooth, WiMAX, WLAN, W-CDMA, UWB, GSM/PCS/DCS, and several ISM applications.

As part of the transaction, SiRF will establish SiRF Technology (Sweden) as a wholly owned subsidiary, and will hire all 19 Kisel employees. The team in Sweden will continue their design services work for selected key customers and will also work in conjunction with the SiRF RF engineering team in San Jose, Calif., on new product developments.

Kisel's managing director, Tomas Melander, will become managing director of SiRF Technology (Sweden).

Contacts:
Michael Canning, SiRF president and CEO; Tel: 408 467-0410; www.sirf.com.
Tomas Melander, Kisel managing director; Tel: +46 8 410 300 60; www.kisel.com.

X-EMI Adds $5 Million to Series A Funding

X-EMI, a semiconductor company delivering technology that significantly reduces electromagnetic interference (EMI) in electronics systems, has added an additional $5 million investment to its Series A round of funding. New investors Access Venture Partners, DFJ Mercury, and MarkPoint Venture Partners provided the funds, joining existing investors A-round investors InterWest Partners, Novus

Ventures, and Waypoint Ventures.

While EMI issues are typically handled by masking them at the end of the design cycle, X-EMI's solution eliminates the problem at the source. The company's chip-based solution is comprised of a transmitter and receiver. The company employs an algorithmic approach that basically destroys the clock and then extracts it at the end to recover a clean clock. X-EMI says its solution adds no jitter or changes in slew rate, and can reduce EMI by several orders of magnitude.

(See our profile of X-EMI in the Jan. 2005 issue of *InsideChips.Ventures*.)

Contact:
Larry Woodson, CEO; Tel: 512 493-9660;
 www.x-emi.com.

Pericom Invests in Frequency Control Products Supplier

Pericom Semiconductor is investing approximately $12.6 million in AKER Technology Taiwan, a Taiwanese crystal and frequency control products manufacturing company. The companies expect the investment to be completed in July 2005, at which point Pericom will hold an approximately 36.4% interest in AKER, making Pericom AKER's largest shareholder. AKER is traded on the Taiwan OTC Exchange (TWO) under the symbol AKER, Code 6174.

This investment will enable Pericom to leverage its existing SaRonix frequency control product line with AKER's low-cost manufacturing and product-development capabilities.

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ATMI Sells its Minority Interest in Emosyn to SST

ATMI, a supplier of materials and materials packaging to semiconductor manufacturers, has sold its 16.4% minority interest in the Emosyn smart card business to Silicon Storage Technology for $3.1 million.

In Sept. 2004, ATMI sold its Emosyn smart card business to Silicon Storage Technology through a newly formed

subsidiary, Emosyn International. ATMI had retained a 16.4% ownership position in that original transaction. ATMI is now selling that remaining portion, which will result in Emosyn becoming a wholly owned subsidiary of SST.

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Avnet Acquires Global Semiconductor Distributor Memec

Avnet is acquiring Memec in a stock and cash transaction valued at approximately $676 million, including the assumption of approximately $194 million of Memec's net debt. Under the terms of the agreement, Memec investors will receive a total of approximately 24.011 million shares of Avnet common stock plus approximately $64 million of cash. Avnet expects the transaction to generate annual synergies of approximately $130 million from cost savings, including $10 million from reduced interest expense.

Memec, a global distributor specializing in semiconductors, generated revenue of approximately $2.3 billion in calendar year 2004. Memec has operations in 33 countries and 130 cities, and is the largest semiconductor distributor focused primarily on design chain services. In calendar year 2004, Memec grew total revenue approximately 27%, with the Americas accounting for 44% of Memec's 2004 revenue followed by the Asia region, including Japan, at 31% and Europe, Middle East and Africa at 25%.

Avnet will integrate Memec, which employs 2,400 people, into its Electronics Marketing Group. After the acquisition, Avnet's Electronics Marketing Group will have operations in 69 countries and anticipated annual sales of more than $8.5 billion.

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Rambus Acquires Digital Core IP From GDA Technologies

Rambus has acquired digital core IP assets from GDA Technologies, an electronic design services (EDS) solution provider. The deal provides Rambus with digital controller IP to complement its existing line of high-speed interface physical layer (PHY) products. Specifically, Rambus is acquiring digital core IP compatible with PCI Express, Ethernet, SPI-4, USB and SATA protocols, as well as products that are currently in development and will be made available based on customer demand.

Prakash Bare, VP of GDA's IP business unit, will move to Rambus as GM of the digital IP business. Rambus will also be extending offers to a number of GDA Technologies employees, both in San Jose, Calif., and Bangalore, India, that are affiliated with the design and development of these digital IP cores.

As part of this agreement, GDA becomes a reseller of these digital controllers and will offer this IP along with its IP and IP-enabled services. Additionally, GDA may use the controllers in custom designs through a technology licensing agreement. GDA Technologies will continue to provide electronic design services, semiconductor IP, verification IP and value-added IP-enabled services.

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TAK Imaging Closes $10 Million Funding Round

TAK Imaging, a provider of dedicated imaging processors and solutions, has received an additional $10 million from its venture partners to support a family of new hardware and software solutions for the photo-enabled printer market. The company plans to launch its first imaging solutions this summer for the inkjet, dye sublimation and multi-function peripheral (MFP) categories of the photo-enabled printer market.

The new funding round includes all current investors: Jerusalem Venture Partners (JVP), Sofinnova Partners, Doughty Hanson Technology Ventures, Ventech, SPEF Venture, Innovacom and CrossBridge Venture Partners of Japan. TAK Imaging raised $16.25 million in its Series C funding round in Jan. 2004.

TAK Imaging has also completed the acquisition of CompuMetric Labs, a Fairhope, Ala.-based printer technology developer and consulting services company. The acquisition bolsters its development of ready-to-customize, system-level solutions for printer OEMs.

Formerly TAK'ASIC, the company changed its name to TAK Imaging on Jan. 1, 2005.

(See our profile of TAK Imaging, under the former TAK'ASIC name, in the Aug. 2003 issue of *InsideChips.Ventures*.)

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ChipMOS to Sell its Stake in First Semiconductor Technology

ChipMOS Technologies has reached an agreement to sell its ownership interest in First Semiconductor Technology (FST) back to FST. ChipMOS Taiwan acquired a 67.83% interest in FST in Nov. 2004 in connection with its acquisition of testing and assembly equipment from First International Computer Testing and Assembly (FICTA).

Under the share repurchase agreement, ChipMOS Taiwan will transfer 2.52 million shares of FST to FST in exchange for total consideration of approximately $2 million, which is equivalent to the book value as of the date ChipMOS Taiwan purchased the shares.

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Analyzing the Analysts

Worldwide Semiconductor Manufacturing Equipment Revenue Grew 64% in 2004

Driven by strong device unit demand and tight manufacturing capacity, worldwide semiconductor manufacturing equipment sales reached $37.6 billion in 2004, a 64.2% increase from 2003, according to Gartner.

The 2004 market was marked by capacity buys with select technologies in especially high demand, such as memory and SOC test, flip-chip bonding, select deposition, etch and photoresist processing. The strength of Asia/Pacific, driven by foundry and memory investment and a cooling in growth in Japan, afforded Europe- and Americas-based equipment vendors an opportunity to regain market share against their Japanese rivals.

The top-10 vendors had double-digit growth in 2004, although Gartner analysts attribute some of these large increases to slow sales in 2003. Applied Materials' revenue increased 96.6% in 2004, as its market share increased from 14% in 2003 to 16.5% in 2004. Canon experienced the largest growth rate, as its revenue increased 121.5% in 2004. (See Table 2.)

All equipment segments had strong growth. Wafer fab equipment (WFE), the largest sector, saw the strongest growth at 68.6%, following a weak performance in 2003. Packaging and assembly equipment (PAE) expanded by 45.9%, while automated test equipment (ATE) jumped 58.5%.

While the industry experienced significant revenue increases, Gartner analysts said equipment suppliers experienced mixed results as the year came to an end. The positive outcome for the industry in 2004 was the result of tight supply and demand fundamentals. However, the emergence of excess inventories in the second quarter and the subsequent cutbacks in manufacturing in the second half of 2004 heightened the sense of caution. This led to a premature opening of a supply and demand gap, and equipment orders declined in the latter half of the year.

Asia/Pacific was the fastest-growing region, with spending increasing 108% in 2004. Asia/Pacific accounted for more than 50% of all equipment spending in 2004, a first in the history of the industry. Japan's equipment purchases grew 48.4%, while European spending increased 22.8%. Gartner analysts said this slower growth was not from a lack of spending by European companies, but was caused by an export of investment money from Europe largely into the U.S. and Asia. After three consecutive years of decline, equipment spending in the Americas grew 17.8%.

Additional information is available in the Gartner report "Semiconductor Manufacturing Equipment Sales Exploded in 2004."

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New Study Forecasts a Good Year for 3G, but a Down Year For Older Technologies

Forward Concepts concludes in its new in-depth study of the worldwide cell phone market and the chips that go into the phones that 2004 cell phone shipments reached a record 715 million units, including inexpensive PHS/PAS units in China. The study projects that 2005 overall unit sales will increase only by 4.5% to the 746-million level, with larger markets for older technologies declining and offsetting strong gains by newer technologies. For example, Forward Concepts projects that older TDMA shipments will fall by 30%, and even traditional GSM shipments will decline by a projected 23% this year.

On the other hand, cell phones addressing newer high-bandwidth technologies will grow sharply. EDGE cell phones will grow by 51% to the 60-million unit level, WCDMA cell phones will grow by 165% to the 45-million level and CDMA2000 1xEVDO terminals (cards and handsets) will grow by 65% to 16 million units. Although 2G Personal HandyPhone service (PHS) is being rapidly displaced in Japan by newer technologies, cell phones based on PHS will grow by 24% to the 77-million level as the inexpensive units gain ground in China, Taiwan, India and other countries.

Forward Concepts' assessment is that Texas Instruments remains the No. 1 cellular chip provider overall, and also the No. 1 provider of baseband chips for both 2G and 3G/UMTS cellular. And, with its OMAP2 application processor, TI has quickly become number one in that market segment as well. The report states that TI cannot be

Table 2 -- Worldwide Semiconductor Manufacturing Equipment Vendor Revenue Estimates for 2004 ($ Millions)

2004 Rank	2003 Rank	Company	2004 Revenue	2004 Market Share (%)	2003 Revenue	Growth (%)
1	1	Applied Materials	6,310	16.5	3,211	96.6
2	2	Tokyo Electron Ltd.*	4,035	10.5	2,175	85.5
3	3	ASML	2,683	7	1,435	87
4	5	Advantest	2,213	5.8	1,077	105.5
5	6	KLA-Tencor	1,567	4.1	1,005	55.9
6	4	Nikon	1,522	4	1,301	17
7	7	Novellus	1,198	3.1	805	48.8
8	13	Canon	1,176	3.1	531	121.5
9	9	Lam Research	1,155	3	601	92.1
10	14	Dainippon Screen	1,052	2.8	530	98.6
		Others	14,939	40.1	10,220	46.2
		Total	37,850	100	22,891	64.2

*Tokyo Electron announced a change in its accounting rules in 2004, switching from shipment-based to acceptance-based revenue recognition. However, because there is no complete financial picture available for 2004, Gartner continues to report the company in its 2004 market share reports based on shipment-based revenue.

Note: Data includes revenue from acquisitions in 2003 for the entire year.

Source: Gartner Dataquest (April 2005)

complacent, however, as Qualcomm still dominates the CDMA market and has a large number of design-ins for its UMTS baseband chips. Freescale Semiconductor had a very good year in 2004 and is also gaining ground in the cellular chip market.

The cellular handset has become the physical and market magnet that is pulling in the functionality of digital cameras, PDAs, MP3 players, GPS navigation, Bluetooth, and even Wi-Fi, and is quickly becoming the dominant market for each and all of these functions, and more. Forward Concepts' new market study explores the market dynamics of each of these functions and the cell phone chip prospects for each of them.

The new 560-page study, entitled "Global Cellular Handset & Chip Markets," provides detailed forecasts (by technology and by region) of handsets, chips, and subscribers (by country), and profiles cell phone OEMs, ODMs, cellular operators and the key chip vendors. The report also provides estimates of the market shares of the 40 major cell phone vendors, as well as the market shares of the top cell phone chip vendors for digital basebands, analog basebands/power management, RF transceivers, RF power amplifiers, application processors, camera sensors, Bluetooth and color display drivers.

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DSL, Cable Modem and PON
Chip Sales to Grow Steadily

The battle for broadband access into the home continues to heat up as higher bandwidth chip technology innovations ultimately enable service providers to deliver "triple-play" service plans. IDC believes the addition of VoIP and high-definition video services will remain a top priority for many carriers and cable providers worldwide. Increased competition from several fast-moving CLECs, large cellular carriers, and specialized VoIP and IP video service providers, coupled with the desire to increase annual revenues per user (ARPU), will drive further equipment replacement and expansion. In this environment, IDC predicts that the worldwide DSL, cable modem, and PON semiconductor market will pass the $2 billion mark by 2009.

The ability to support faster speeds over 20 Mbps, improved quality of service features, and increased security will fuel demand for a new breed of chip products that will be at the heart of next-generation broadband designs. More highly integrated copper-based DSL and cable modem chips, along with lower cost and more standardized fiber-based PON chips and optical modules, will drive a healthy round of OEM development as service providers plan upgrades to their infrastructure over the next few years.

Two recently released IDC studies explore demand trends and discuss major semiconductor supplier strategies within the DSL, cable modem, and PON equipment markets. The following key findings are presented in these studies:

• For DSL, adoption of higher-speed ADSL2+ technology will continue to drive most carriers' new deployment, while the upcoming VDSL2 standard will drive healthy upgrades in shorter copper loop environments.

• For cable modems, MSOs will continue to aggressively add VoIP capability within their designs as improving DOCSIS standards helps them compete with faster next-generation DSL products.

• For PON, Japan currently drives most deployment activity and will be the largest volume opportunity to chase in the near term. However, certain carriers in the U.S., Korea, China, and Taiwan will also start larger field trials in 2005, which will lead to more mainstream deployments beyond 2006.

• PON will replace DSL completely in fiber to the home (FTTH) environments, while in others it will be employed as a backhaul technology to offer fiber extension to remote DSL terminal infrastructure.

• Although broadband technology has started to reach subscriber saturation points in some well-established markets, emerging countries such as China and India are still showing significant upside opportunities.

IDC's two studies covering these issues are "Worldwide DSL and Cable Modem Semiconductor 2005-2009 Forecast," and "Worldwide PON Semiconductor 2005-2009 Forecast and Analysis."

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IBM's Cell Processor Impressive,
but Not an Intel Killer

A closely guarded secret for five years, IBM's Cell processor has finally been unveiled, and In-Stat expects the chip to have a major impact on the video game market. The goal of Cell developers was to create a new architecture that could process the next generation of broadband media and graphics with greater efficiency than the traditional approaches of ultra-deep pipelines and the ganging of numerous complex and power-inefficient, out-of-order RISC or CISC cores. According to In-Stat, the chip will be a major part of Sony's next-generation game console, and may have other applications, but is unlikely to encroach dramatically on Intel's territory.

While some have called Cell an "Intel killer," In-Stat believes that the only place the Cell processor can be considered competition for Intel will be where the Sony next-generation game console competes with the Media Center PC.

Most of the actual chips in the Cell family are unannounced. The only announced product from the family is the version to be placed in Sony's PlayStation 3. Overall, Sony will remain the market leader in the next generation of consoles with its release of the PlayStation 3, although In-Stat expects both Microsoft and Nintendo to close the gap and release next-generation consoles of their own. In-Stat forecasts that total combined PlayStation 3, Xbox 2 and Revolution revenue will rise from $1.1 billion in 2005 to $9.4 billion in 2008.

The report, "Cell Processors: Separating Reality from Hype," is the first report published from In-Stat's new Emerging Semiconductor Chips & Applications service.

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Emerging Ventures

Update: TransDimension

We first profiled TransDimension, a USB-focused company developing ICs, IP cores and enabling software, in April 2001. Since then, TransDimension has made two key acquisitions, launched four USB chips, and collected an impressive list of big-name customers for its chips and IP products, including Hewlett-Packard, Freescale, Qualcomm and Samsung, among others.

TransDimension began shipping product at the end of 2001, experiencing its breakout year in 2004. The company had $20 million in revenues in 2004, up from $4.9 million in 2003. TransDimension expects to double that to $40 million in 2005.

A key part of TransDimension's success is due to the acquisition of two companies. In Nov. 2001, TransDimension picked up SoftConnex, a provider of embedded USB software for non-Windows environments. The SoftConnex acquisition enables TransDimension to offer three levels of USB software, providing not only the chip driver but also the USB protocol stack and class drivers, such as digital camera, mass storage, video cameras and many others. This is an important differentiator for TransDimension, as it enables the company to offer a complete turnkey solution, while competitors such as Cypress Semiconductor and Philips only provide the chip driver.

The second acquisition involved the assets of ARC International's peripheral connectivity business in June 2004, which provided TransDimension with high-speed USB IP. The company was in a classic make-or-buy situation, where internal development would have required devoting 15 to 18 months and several million dollars. Instead, TransDimension spent $7 million on the ARC assets purchase and not only picked up a proven core and an experienced team, but also an actual business that is generating revenues.

TransDimension's initial IC products were full-speed (12 Mbps) embedded host controllers, but the ARC high-speed assets have enabled the company to develop high-speed chips (480 Mbps).

TransDimension closed a $12 million Series C round in 2004, and then subsequently opened up a $7 million Series D round to do the ARC acquisition. VantagePoint Venture Partners led the series D financing, with participation by iSherpa Capital. GKM Ventures led the Series C financing, which included both Series D participants as well as Rolling Oaks Capital and Shelter Capital Partners. The combined Series C and Series D financings totaled $18.35 million. To date, TransDimension has raised approximately $35 million.

TransDimension, which has 60 employees, has undergone some management changes over the last few years. Ping Liang, who founded TransDimension in 1997 and served as president and CEO, left the company in Aug. 2002. Liang remained on the board of directors until 2004, but is no longer involved with the company.

TransDimension hired Rick Goerner in Feb. 2002 to take over as president and CEO. Previously, Goerner was president and COO of the Texas Instruments/Silicon Systems Storage Products Group. Before its acquisition by TI, he held senior management, business unit, marketing and sales positions at Silicon Systems/TDK Group Company, culminating in his role as COO. Goerner has also held senior sales and marketing positions with Signetics and Teledyne Semiconductor.

Jay Standiford serves as VP of ASIC engineering. Standiford was previously the director of SOC engineering for the Platform Technologies Division of Conexant Systems. He also served as director of engineering for TI's Digital Solutions team, which evolved from the TI Storage Products division, where he held several positions ranging from manager of digital design for HDD read channels to lead project engineer. Prior to TI, Standiford spent time at Silicon Systems/TDK Group and was an honorarium professor at the Univ. of Colorado.

Pete Todd, VP of worldwide sales, was senior VP of account development for Toshiba America Electronic Components. During his 17 years in the industry, Todd has also held various marketing and sales positions within Toshiba, as well as a design engineering position for Northrop.

Mark Becker joined TransDimension as VP of finance/administration and CFO in Feb. 2005. Becker previously served as CFO at wafer foundry Jazz Semiconductor. Prior to Jazz, he held positions at Conexant Systems, Burr-Brown, Crystal Semiconductor and TI.

On the product side of TransDimension's business, the company is shipping a family of four USB chips that accounted for the majority of last year's revenues. TransDimension has shipped more than 10 million of these chips, which are comprised of host controllers, peripheral controllers, and USB On-the-Go (OTG) controllers (USB OTG enables various devices to exchange data directly with each other without going through a PC).

TransDimension is currently focused on the introduction and design-in of the TD242LP, an all-in-one low-power host, peripheral and OTG controller. Other new products include:

• TD1120 — Single-chip USB OTG controller that incorporates a full-speed host and a high-speed peripheral controller;

• TD6100 — Full-speed USB OTG transceiver with built-in high-current charge pump.

Products in development include the TD 2100, TransDimension's first chip that employs the high-speed USB core acquired from ARC; the TD2140, which takes that core design and adds a CEATA interface; and the TD1140, which is the 1120 with a CEATA interface.

TransDimension is also developing products for the UWB market. While existing UWB companies are focused on the PC side, TransDimension is addressing the underserved non-PC, or peripheral, side of this market. The company's TD5100 will be a wireless USB host and scheduler block with an MBOA MAC provided by its partner company, Blue7 Communications (see our profile of Blue 7, a UWB startup developing both the RF and baseband in CMOS, in the Oct. 2003 issue of *InsideChips.Ventures*). TransDimension also partnered with StonestreetOne, a provider of short-range wireless software solutions, to provide a complete wireless USB software solution.

On the IP side of TransDimension's

business, the company's goal is to continue generating revenues from its investment in IP, but to engage a partner to handle pre-sales support, technical negotiations, contracting, and support and maintenance work. TransDimension had initially entered into an agreement with ARM, whereby ARM would license and represent the IP to its customers. After ARM's acquisition of Artisan, however, TransDimension saw that its IP would not have received adequate visibility. The company found a good replacement partner in an un-named company that supplies USB PHYs.

The company currently has about 45 licensees.

TransDimension's strategy is to generate 75% to 80% of its revenue via its chip products, and the remaining 20% to 25% from software and IP licensing. In 2004, about $16 million of the company's $20 million in revenues was in chips, with the remaining $4 million evenly split between IP and software.

We believe TransDimension has positioned itself well in the burgeoning USB and OTG markets. The company wisely acquired SoftConnex and ARC's USB business, both for relatively little money, and both of which enhanced TransDimension's IC products and IP/software portfolio. The company's value proposition is that it can provide complete turnkey solutions, an important factor in the CE industry, where companies have limited amounts of time to bring out new products. In addition to delivering a number of "firsts" in the industry — embedded USB host controller, for example, and OTG chip – TransDimension appears to have a good grasp of what devices its customers will need to enable future CE products. The company's early focus on providing UWB solutions for the non-PC side of the wireless market enables it to both leverage its existing software and gain traction before this space becomes flooded with competitors.

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Silicon Optix

Spun out of Genesis Microchip in June 2000, Silicon Optix is developing video/image digital-processing ICs for the high-end video market. The company's primary initiative is a video-processing chip that combines a programmable and very powerful DSP, high-quality algorithms and proprietary geometry processing. Silicon Optix is initially targeting large-area displays, although its objective is to be much more than just a display chip company. Large displays represent the short-term low-hanging fruit, while the company's long-term objective is to be a platform digital video DSP company that addresses everything from capture and transmission to distribution, editing, storage and display.

Headquartered in San Jose, Calif., Silicon Optix has grown to 160 people in seven locations. All R&D is performed in San Jose and Orlando, Fla., in the U.S., and Toronto in Canada. The company maintains an applications team in Hanover, Germany, and a customer support office in Taiwan and two in China.

Silicon Optix has raised about $100 million over three funding rounds: $9 million Series A in 2000, $48 million Series B in 2002/2003, and $43 million Series C in 2004. The company's major investors are Polaris, Canaan, Apax, InterWest, Focus, Origin, Primaxis and Acer Ventures. Genesis owns less than 1% of Silicon Optix.

Paul Russo, who serves as chairman, president and CEO, is the principal founder of Silicon Optix. Russo was the founder of Genesis Microchip, and served as CEO and director from its inception in 1987 through 2000, and as chairman through April 2001. Russo was previously GM of GE´s Microelectronics Center, and senior manager in GE´s Industrial Electronics Group. From 1970 to 1980, Russo was a member of the technical staff and head of microsystems research at RCA´s David Sarnoff Research Center. He currently serves as an outside director of ATI Technologies.

Silicon Optix has made two key acquisitions along the way. In Sept. 2003, the company acquired Liesegang Electronics (LE), a subsidiary of Liesegang that served as its development arm. When Liesegang switched to an OEM model, it decided to unload the approximately 15-person LE, which Silicon Optix reportedly picked up for a bargain price in the low single-digit millions.

The most significant acquisition was Teranex, which Silicon Optix bought in 2004. Teranex is a systems company that designs converters, post-processors and noise reducers for professionals working in broadcasting and post-production houses. Silicon Optix initially engaged with Teranex in 2001 to essentially put a Teranex box on a chip. Because Silicon Optix had certain exclusivity rights to the IP, the company was able to buy Teranex when its VCs decided to sell the company. We believe the transaction was approximately $10 million – a steal, considering the technology Silicon Optix picked up.

Lockheed Martin spent a decade and close to a $100 million developing a powerful SIMD architecture for video processing, eventually spinning out the technology as Teranex, which spent another $50 million of venture capital money perfecting software and algorithms to run on the processor. Early on, Silicon Optix recognized that, with 0.13-micron technology, it could make a chip with the performance of the old Teranex boxes and which also incorporated its own proprietary geometry processing to create the ultimate video processor.

To do this from scratch would likely be a $300 million initiative, while Silicon Optix has been able to leverage the 10-plus years and $150 million investment in the foundation of the DSP architecture and algorithms. It provides a significant barrier to entry for others that want to address the high-end video equipment market.

Silicon Optix debated whether to keep Teranex as a business unit, eventually realizing that, as a business unit, Teranex could serve as a great vehicle for driving leading-edge IP. Silicon Optix is maintaining code compatibility across all its products, and therefore expects to ultimately implement on its chips all the innovations that come out of Teranex.

Silicon Optix's chip products consist of the sxZX1, sxW1, and REON, plus the recently released top-of-the-line Realta.

When the company spun out of Genesis it picked up a couple of the mother company's chips, the sxZX1 and sxW1, along with the customer base. The REON chip is the result of the Liesegang acquisition. Silicon Optix has between 40 and 50 customers using its older chips.

The company's flagship product, the Realta, provides video processing capabilities equivalent to those in the high-end $60,000 Teranex Xantus system. The Realta aggregates the three legs of the company's technology IP: high-quality real-time geometry processing (all of the older chips provide this as well); a patented DSP processor, which is the part of the story that has roots at Lockheed Martin ; and proven high-quality algorithms, which can be implemented in hard-wired form or as software that runs on the processor. The REALTA also employs a 32-bit Tensilica core to control the chip.

Silicon Optix's real-time geometry processing (known as WARP, a digital video effect involving any two- or three-dimensional change in shape of an input picture) can do high-definition video pixel-by-pixel in real time, and apply intelligence to each individual pixel. By applying strong image processing in this way, the company is able to mimic the function of lenses, enabling customers to employ lower-cost and lower-quality optics and then improving the image quality digitally.

The company's geometry processing also provides very-high-quality 2D off-axis correction, enabling users to place a projector anywhere in a room and still maintain a high-quality rectangular image. In addition, REALTA can capture a wide-angle image with a wide-angle lens and sensor, and then take any portion of the warped image and unwrap it in real time. This enables pan, tilt, and zoom functionality digitally with no moving parts.

The company's DSP platform is the beneficiary of the Lockheed Martin/Teranex/Silicon Optix development history discussed earlier. The SIMD device has 3,072 processors running at 330 MHz for more than a trillion OPS. The DSP represents about half the chip.

Silicon Optix is selling the Realta for approximately $90 for volumes in the 50,000-units-per-year range. Although pricey, the Realta is going into products that cost thousands. The first CE product to ship with the Realta chip is Denon's flagship DVD player, the DVD-5910, which has a suggested retail price of $3500.

Silicon Optix also offers systems products for professional AV and home theater installations. However, except for the very-high-end Teranex equipment, the company is moving to an OEM model for these other box systems. A customer that does not want to spend the R&D resources but still wants the technology can buy these systems and just slap its name on them.

Although the company has bitten off quite a bit for a startup, Silicon Optix has formidable technology and appears to know its markets and customers very well. Instead of competing with Genesis and ATI Technologies in the low-end, high-volume market, the company has staked out a position in the high-end CE market – similar to the positioning of BMW or Mercedes in the auto industry, where volumes are still good and margins are higher. The company even has the equivalent of a Rolls Royce in Teranex. By serving as a video DSP solutions company that offers code-compatible middle-range chips, higher-end chips, blades, boxes and Teranex systems, as well as a range of services, software and tools, we believe the company is going to succeed in establishing "stickiness" with customers.

Hamid Farzaneh, executive VP of sales and business development, was previously co-founder and COO of Motion Sense, a fabless MEMS controller startup. Prior to Motion Sense, Farzaneh was executive VP/COO of Genesis Microchip, and VP of sales and marketing at ASAT. Earlier, he spent seven years at National Semiconductor in marketing and business development.

CTO Louie Lee, a co-founder of Silicon Optix, was previously manager of the Advanced Technology Development Department at Genesis Microchip. Before Genesis, Lee served as manager of architecture at Matrox Typhoon Technologies, a subsidiary of Matrox Graphics. He also served as design center manager and program manager at LSI Logic. He was engineering manager at Litton Systems from 1984 to 1994, and started his career at Perle Systems.

Kent Goodin, executive VP of engineering and technology, was the VP of VLSI engineering at Parama Networks. Before Parama, he served as GM of the Mediamatics Group at National Semiconductor and, from 1988 to 1996, worked in various engineering and management roles at Weitek.

Stephen Wood serves as VP of sales and customer support. Wood was previously VP of pro A/V engineering of Focus Enhancements, and president and co-founder of PC Video Conversion (acquired by Focus in 1998). Earlier, he was sales and marketing manager at Redlake, and image processing product specialist at MetraByte (acquired by the Keithley Corporation). Wood started his career as a sales engineer with Matrox Electronics.

Dennis Crespo is the company's VP of marketing. Crespo previously served as VP of sales and marketing at Arithmos (now ST Micro). He has also been director of marketing at S3, marketing manager for Weitek, and product manager at Diamond Multimedia Systems.

Douglas Lucky, VP of finance and corporate development, was a partner with RBC Capital Partners Technology Fund, where he co-led the Series A investment in Silicon Optix. He previously spent 15 years as partner and senior VP with Ernst & Young Corporate Finance.

Michael Hopton, based in Toronto, is VP of operations. Hopton joined the company from Genesis, where he was manager of manufacturing engineering. Before Genesis, he worked as a senior product engineer for Texas Instruments in its mixed-signal ASIC division.

Eric Erdman joined the company as executive VP of operations and CFO in April 2005. Erdman spent the last decade at Genesis Microchip. He initially served as CFO, and spent the last two years as interim CEO.

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Auvitek International

Founded in March 2004, Auvitek International is developing a portfolio of high-performance DTV/HDTV demodulation processors for the digital television (DTV) market. With mandatory DTV adoption deadlines in place in many countries, the stage is set for DTV to really take off in the mass consumer market. Auvitek's objective is to reduce the electronics BOM for DTV manufacturers, who can then provide much more affordable DTVs to consumers.

Auvitek's primary founders, Ping Dong and Victor Ren, came from ESS Technology. Ren, who serves as Auvitek's COO, was VP of marketing at ESS from 2002 to 2004. Before that, he was VP of sales and business development at Stream Machine and, following Cirrus Logic's acquisition of that company, spent three years as VP of product marketing at Cirrus. He was also president and CEO of Onward Electronics & Technology, which he founded as a joint venture company in China with the Ministry of Electronics Industry. Previous positions include serving as a consultant with Xerox Technology Venture/Terabank Systems, president and CEO of Vistro Computers, and director of advanced product planning and marketing at Ramtek.

Dong, Auvitek's CEO, was Sr. VP of communication engineering at ESS Technology. He joined ESS via its acquisition of OSEE Technology, which he founded and where he served as CEO. Before that, he developed modem software for video conferencing systems at Integrated Information Technology (later 8X8). Earlier, he worked in Motorola's Codex R/D group, where he focused on digital communication, DSP algorithm R&D in high-speed modems, DSL, and wireless communication.

In Sept. 2004, Auvitek closed a $4 million first round of funding, led by KLM Capital Group, Storm Ventures and VenGlobal Capital.

Ten of Auvitek's 35 employees develop the core technology in the U.S., with the remaining 25 engineers performing peripheral system-level design at its office in Shanghai, China.

TV tuners currently on the market are either two separate tuners for analog and digital, or a far more expensive multimedia analog/digital tuner:

• Multimedia tuner for analog/digital — $12 to $15

• Analog tuner — $4 to $6

• Half tuner (digital) — < $4.

Auvitek integrated the entire analog and digital receiving path into one chip, which enables the use of the reduced-cost digital half tuner for both digital and analog. The company's initial chip will sell for about $14, which the company says will save manufacturers about $8 to $10, as they no longer need to use separate tuners or expensive multimedia tuners.

The company's first products, the AU8501 and AU8502, are demodulators + analog TV decoders + BTSC decoders that will address the U.S. terrestrial ATSC market. Follow-on chips will address the European and China markets. Auvitek will launch the 8501 in Q3 2005.

Although most consumers use TV services such as cable and satellite, the fact that governments around the world have mandated deadlines for digital TV means that every TV sold must eventually have a built-in terrestrial tuner (see Table 3). In the U.S., the FCC has implemented a staggered schedule with varying deadlines between July 1, 2004, and July 1, 2007 (see Table 4). However, analog TV broadcasts will continue until 2010, providing Auvitek with a potentially huge opportunity for its ATSC chips.

For quick market entry, Auvitek is targeting the 8501, which has a built-in PCI bus, at PC add-on DTV peripherals. Multimedia PCs are growing in popularity, and they all have built-in TV tuner cards (currently analog, but digital tuners are coming soon). Auvitek's 8502, which does not have a PCI bus, is targeted at digital TVs and STBs.

Auvitek chose to address the terrestrial DTV market first as it is a more difficult proposition than cable or satellite, and far fewer companies are competing on the terrestrial side. In the future, Auvitek plans to expand its scope to address the larger DTV market.

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Note: Auvitek is in the process of moving, so no contact telephone number is available. Check the company's web site in summer 2005 for updated contact information.

Table 3 -- Mandatory DTV Adoption

Country	Year
U.S.	2007
Europe	2010
Japan	2011
China	2015

Table 4 -- FCC DTV Build-in Schedule

Product	Schedule
Receivers with screen sizes 36 inches and above	50% of a responsible party's units must include DTV tuners effective July 1, 2004; 100% of such units must include DTV tuners effective July 1, 2005.
Receivers with screen sizes 25 to 35 inches	50% of a responsible party's units must include DTV tuners effective July 1, 2005; 100% of such units must include DTV tuners effective July 1, 2006.
Receivers with screen sizes 13 to 24 inches	100% of all such units must include DTV tuners effective July 1, 2007.
TV Interface Devices: DVD players/recorders, etc., that receive broadcast television signals	100% of all such units must include DTV tuners effective July 1, 2007.

Siano Mobile Silicon

Founded in June 2004, Siano is the brainchild of Alon Ironi and Hamutal Raab, the former CEO and COO, respectively, of Emblaze Semiconductor. The 30-person startup is developing an all-CMOS, multi-standard, multi-band integrated receiver for the emerging mobile digital TV (MDTV) market.

When Zoran acquired Emblaze Semiconductor in 2004, Ironi and Raab began looking for their next venture. Discussions with Asian and European contacts convinced them that MDTV was going to be the next big thing in cell phones, so they organized a small team and came up with a low-power and small-size architecture well suited to this application.

Ironi serves as CEO, president and acting VP of marketing for Siano. In addition to his previous role as CEO of Emblaze Semiconductor, Ironi has been Entrepreneur in Residence at Concord VC, GM of Zoran Israel and VP of engineering at Zoran, where he was in charge of Zoran's overall engineering activity worldwide.

Raab, who was COO at Emblaze Semiconductor, holds the same position at Sirano. Previously, she was VP of operations at Lenslet Labs, and VP of human resources at Zoran.

Sirano's management team also includes Lior Peleg as VP of R&D, Guy Shochet as CTO, and Amnon Harpak as chief engineer.

Peleg was a member of the team that established Ethernet solutions provider Mysticom, where he was director of IC engineering and product development. Prior to that, he held several design and management positions at National Semiconductor.

Shochet was among the core team that established Metalink, where he was VP of the Wireless Business Unit. Before that, he was associate VP of R&D at Metalink and, earlier, was an R&D staff engineer with the Communications Corps of the IDF.

Harpak was a co-founder of xDSL solutions provider Savan Communication (acquired by Infineon in 2000), where he was system engineering and application group manager as well as R&D manager. Prior to Savan, he was a leading hardware and system engineer and a communications design expert at Nexus, Orckit and DSP Group.

Siano approached a number of VCs in spring 2004, once the company had something to show. Many felt that the market would not be very big or would require too much funding. But Jerusalem Venture Partners (JVP) was hot on the idea from the beginning, helping Siano research the market and develop a comprehensive business plan. JVP provided a Series A bridge loan, and Siano added Walden Israel and Star Ventures to the round and came up with $11.5 million.

Seeking to add a board member that had a lot of experience and exposure in the semiconductor industry, Siano approached former Infineon Technologies CEO Ulrich Schumacher in fall 2004. Schumacher accepted the company's offer, joining Ironi and the three VCs on Sirano's board of directors.

Siano is just about ready to tape out its first chip, the SMS1000. While the company waits for samples to arrive this summer, it is continuing with the design of the mass-production version, which is reduced in silicon area and power.

Siano says its key differentiator is dramatically lower power consumption. The company moved several functions out of the RF domain and into the digital domain, for example, and the chip runs at a frequency that is less than 50% that of its competitors. The company also integrated multiple standards on one piece of silicon without paying the penalty of additional area.

The company expects to be the first to have a zero-IF RF tuner made in CMOS. Although a cost-effective and power-efficient way to convert an RF signal to baseband, noise can be a problem in CMOS implementations. Siano has patented certain methods for dealing with this problem, enabling an entire solution based on CMOS.

Several different standards for mobile DTV are in place around the world. These include three primary open standards developed by industry associations and companies in the MDTV space:

• DMB (digital media broadcast), already deployed in Korea;

• DVB-H (digital video broadcast — handheld) is the European standard;

• ISDB-T (integrated services digital broadcast - terrestrial) is the Japanese standard.

The MDTV situation in China is currently unresolved. Two groups in China have competing standards, both with domestic semiconductor companies on their respective sides; Nokia is pushing to get a license for DVB-H trials; and the larger Korean companies are applying pressure on China to allow them to go ahead with a trial for DMB. Although China will likely have at least one mobile digital TV service available in time for the Beijing 2008 Olympic games, which standard and when it will happen is still open. The possibility exists that different standards will be implemented in different provinces.

Startups competing in the mobile DTV market include Frontier Silicon and DiBcom. Frontier, a company best known for its digital audio broadcasting chips, has DMB chips for the Korean market that have been designed into first-generation mobile TV products such as mobile phones and PDAs. The company is also addressing DVB-H, Europe's mobile TV standard.

DiBcom, based in Palaiseau, France, has two initial ICs, one designed for high-speed environments such as automobiles, and one for portable applications that do not need to move as fast.

In addition, an April 2005 press release named a number of chip companies that are publicly announcing support for DVB-H. These include the startups mentioned above, as well as Freescale, Intel, Microtune, S-Communications, TTPCom, and Texas Instruments, which introduced a chip for DVB-H and ISDB-T MDTV, code-named "Hollywood," in Oct. 2004.

ElectriPHY

ElectriPHY is a two-year-old startup developing high-performance chips for the emerging VDSL market. The company's products are optimized for "triple-play" services — voice, video and data — while delivering low power and cost.

Founded in April 2003, ElectriPHY has 27 employees and about 10 consultants. Bay Partners and Lightspeed Venture Partners co-led the $9 million Series A round, and the company is in the process of raising Series B funding.

The two co-founders, Jim Apfel and Zhi-Yuan Guan, both have extensive experience in the modem industry. Apfel serves as executive VP of sales and marketing and focuses on the business side of the company, while CTO Guan heads up the technical end.

Prior to ElectriPHY, Apfel developed skills in executive management, worldwide sales and marketing and new business development at Aspex, Conexant, Diamond Multimedia and Element 14. He is active in the industry standards committees, including T1E1.4, ETSI and ITU-T.

Guan previously held development and management positions at Digicom Systems, General Datacom, Philips Labs, TV/Com and High Speed Communications. He has led the development of solutions for satellite modems, DSP-based voice modems, ADSL, SHDSL, & VDSL chipsets and multiple modulation schemes including QAM/QPSK/VSB/OFDM.

ElectriPHY brought in 32-year high-tech veteran Ray Farnham in Jan. 2005 to head the company as president and CEO. Farnham most recently was the president and CEO of Precision I/O and, before that, president and CEO of IDS Software Systems (acquired by PDF Solutions in Sept. 2003). Earlier, he served as a director, chairman of the board, president and CEO of Hi/fn (which Farnham took public in 1998), executive VP of Integrated Device Technology, and president and CEO of Opti. From 1972 through 1993, he held numerous management positions at National Semiconductor, culminating with president of the Communication and Computing Group.

Mike Atkin and Jay Aggarwal round out ElectriPHY's management team as VP of engineering and director of marketing, respectively.

Atkin joined ElectriPHY 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.

Prior to ElectriPHY, Aggarwal held various marketing and sales management roles at semiconductor companies that include Xilinx and Altera. He has more than 15 years of general management, marketing and sales experience in semiconductors.

VDSL (very-high-speed DSL) is the next-generation high-speed broadband-access technology that dramatically increases data rates over current DSL capabilities. ADSL, widely deployed in the installed base, provides 1 Mbps to 1.5 Mbps of downstream performance. The latest ADSL technology, ADSL2+, increases bandwidth to 24 Mbps downstream and 3 Mbps up, but is basically out of gas – performance cannot be substantially improved from this point on.

The future therefore appears to belong to VDSL, which, in its initial implementation, provides 52 Mbps downstream and 30 Mbps up. Telcos are very excited about the technology, as it enables them to deliver triple-play voice, video and data and to finally compete with cable operators.

Service providers can distribute VDSL to customers in a number of ways. For example:

• Directly from the central office via long-reach copper connections;

• Fiber feed to a campus environment, with copper distribution throughout the campus;

• Fiber to the node in a residential environment, with copper distribution from the node to individual subscribers;

• Fiber to multi-tenant buildings, with copper distribution throughout the structure.

VDSL is very heavily deployed in Japan and Korea, and is being rolled out now in China, which is ElectriPHY's initial focus market. Service providers will roll out VDSL in North America and Europe in 2006 and 2007 with the advent and implementation of the next generation, called VDSL2. Currently, providers such as SBC Communications and Qwest are offering VDSL in select areas.

ElectriPHY is focusing on providing small, low-cost and -power chips with high performance, which are the factors most important to carriers. The company developed an architecture that delivers less than 1 W per port at full data rate, which the company claims is 40% to 50% less than competitive solutions. To reduce die size, ElectriPHY implemented a number of system features on chip, which eliminates the need for equipment manufacturer and carriers to put additional filters and discrete components on the board.

The company also developed internally a number of RISC machine functions that eliminated the need to license a processor core from another company. This saved ElectriPHY quite a bit of die size as well as the economic burden of paying royalties.

Along with low power and die size, ElectriPHY is able to provide high performance as a result of the first implementation of a technology called dynamic spectrum management (DSM). DSM, which has been extensively researched by John Cioffi at Stanford, analyzes the electrical environment to which a given pair of wires is exposed. DSM looks at both the physical characteristics of the line (impedance) and, more importantly, the interference environment created by adjacent wires.

ElectriPHY developed algorithms for DSM that made possible the first practical implementation of the technology. These algorithms enable the company to analyze the electrical environment on a dynamic basis and adjust the frequency spectrum to optimize rate and reach. The result is that, at any given point in time, all subscribers are experiencing the best possible spectrum utilization and bandwidth.

The company's Phybrwire products

consist of two chipsets: The four-port, four-band Phybrwire 400 VDSL chipset for the central office and the single-port Phybrwire 100 VDSL for customer premise equipment. Both families are comprised of an advanced digital transceiver (ADX) device and a high-precision analog front end (AFE). The chips are VDSL in, Ethernet out.

Because the frequency spectrum used for transmission varies depending on geography – North America has a band plan, as does Japan, China, etc. – Phybrwire provides a software-configurable band plan, enabling ElectriPHY to ship the same products to a worldwide market.

ElectriPHY has sampled Phybrwire to several customers, and expects to have VDSL2 products later this year.

The price for Phybrwire is $6.95 per port, which will be one of the company's most attractive features. This price point for VDSL approaches ADSL2+ pricing, which is about $6.50 per port, and is well below competing VDSL solutions from the incumbents in this space, Ikanos and Metalink, at $12 to $15 per port.

ElectriPHY is promising a die size that is one-third to one-quarter that of solutions from Ikanos and Metalink at a given technology node. The company claims per-port power consumption that is one-half to one-third that of the incumbents.

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FineArch

Ken Ohta and Toshiyuki Kouchi, two SOC designers formerly with Motorola Japan Sendai Semiconductor Design Center (now Freescale Semiconductor Japan) launched FineArch in Feb. 2000 to develop an original CPU and DSP for mobile entertainment devices. Unlike typical Japanese semiconductor startups, which often ramp up business by providing design services to OEM companies, FineArch implemented an IP business model right from the start.

FineArch is primarily targeting portable music player applications that use the Ogg Vorbis format, a new "license-free and royalty-free" compression format for digital music players. Ogg Vorbis can provide higher sound quality and better compression than the MP3 format, but it requires more complex data processing than MP3, especially for the encoder/decoder function. The great benefit of Ogg Vorbis is that the format is completely free, open, and unpatented.

(More information about Ogg Vorbis can be found at www.xiph.org)

In July 2003, FineArch revealed its first system-level IP product for Ogg Vorbis-based music players. The product consists of hardware IP for silicon implementation and software IP (firmware) running on the hardware IP. The hardware IP is based on the company's proprietary "MultiCore" architecture, which integrates a 32-bit configurable RISC processor and a 32-bit VLIW DSP with SRAM, ROM and interfacing functions, including SD card and USB. Both the RISC processor and DSP are FinArch's proprietary designs, for which the company has filed five patents.

FineArch had earlier tried to sell its system-level IP to major consumer manufacturers, but shifted its business model from IP provider to fabless chip supplier in Jan. 2005. At the same time, FineArch unveiled its first standard silicon product, the FS-500, which featured the company's application firmware optimized for Ogg Vorbis music players. The FS-500 integrates all the key functions required for music players that support the Ogg Vorbis format, and the processing firmware is embedded into internal ROM. In addition to all the functions the company previously implemented in its system-level IP, the FS-500 also integrates a delta-sigma D to A converter, which can drive D-class audio amplifiers. In addition to Ogg Vorbis, the chip can also decode MP3 and WAV signals.

Fabricated using Fujitsu's 0.18-micron CMOS process, the FS-500 can decode Ogg Vorbis signals from multiple sources at a low clock rate of 8 MHz without external SRAM, resulting in lower power dissipation and longer battery life — important factors for portable consumer electronics products. According to FineArch, a single U3 battery can provide users with 38 hours of continuous operation replaying music compressed in Ogg Vorbis. The FS-500 also supports various sound-effect functions, such as equalization, echo, panning, and phase-shift stereophonic sound images (Virtual 3D).

FineArch is now sampling the FS-500 in a 144-pin LQFP package with the evaluation board implemented as a complete Ogg Vorbis music player design. The company expects to begin volume production of the FS-500 within the year in a 176-pin FPBGA package. The volume production version will support additional formats, such as WMA, AAC, ADPCM and AC3.

FineArch is still a small-scale operation, employing fewer than 10 people under CEO Ohta. However, the company was able to attract Shinichi Okamoto, formerly CTO of Sony Computer Entertainment (SCE), to serve as director of strategic business development at FineArch. Okamoto was a key person at SCE, and is widely known and respected in the worldwide electronic entertainment industry. He was responsible for developing SCE's game-computing machine, Play Station (PS), as well as PS-2 and Play Station Portable (PSP). He was also involved in the recently announced "CELL" architecture jointly developed by Sony, SCE, Toshiba and IBM. After leaving SCE in mid-2004, Okamoto has worked as an independent R&D consultant, and he is an advisory board member of PC peripheral supplier Logitech.

FineArch has held two relatively small financial rounds. The company has named Japan Asia Investment Co. (JAIC) as one of the investors, although no other details are available. FineArch is currently holding its Series C round, and is aiming to raise another $2 million or $3 million.

FineArch has already announced plans for two new products: The FS-300 is a lower-cost version of FS-500, and the FS-700 is a high-end version. The FS-300 will support limited signal formats and interface functions, while the FS-700 will support a wide range of signal formats, including MPEG4 and interfacing functions such as ATA and USB 2.0.

We have heard that Ogg Vorbis is more popular in Korea than in Japan. To succeed as a fabless semiconductor firm, FineArch

will have to enhance its sales and marketing capabilities in the Asian market.

Ponté Solutions

Named after the Italian word for "bridge," Ponté Solutions is building a bridge between design and manufacturing by bringing model-based yield analysis into the design process. While yield has traditionally been the domain of IC manufacturing, Ponté believes yield issues have become as much a design problem as a fab problem. The company's technology provides visibility into these yield issues right from the beginning, enabling designers to deal with problems that otherwise haunt them at the manufacturing stage.

The company originally launched in Oct. 2001 under the name "E-Z-CAD," changing it to Ponté Solutions in April 2005. Ponté raised $10 million in Series A funding from Telos Venture Partners, US Venture Partners and Incubic.

Ponté has about 60 employees, about 50 of whom are based in the company's Armenia office. The company is headquartered in Mountain View, Calif., and has sales offices in France and Japan.

EDA veteran Alex Alexanian, who serves as president and CEO, founded the company with CTO Ara Markosian and VP of engineering Sedrak Sargisian, Prior to founding Ponté, Alexanian was president, CEO and founder of Mosaic Systems, a provider of ultra-fast semiconductor memory solutions for high-end networking and computing. Previously, he worked for several years as a member of consulting staff at Cadence Design Systems, and he has worked at several institutions in Armenia doing research and engineering, building mainframes and programmable logic controllers for industrial automation.

Markosian previously held positions as director of engineering at Monterey Design Systems and Aristo Technology. He was also the founder of Arset, acquired by Aristo, acquired in turn by Monterey. Earlier, Markosian acquired design and engineering experience at Compass Design Automation and VLSI Technologies.

Prior to co-founding Ponté, Sargisian served as director of engineering at Monterey Design Systems and Aristo Technology (acquired by Monterey). Previously, Sedrak held senior software engineering positions at Compass Design Automation, Intel, Mars/GEC Industrial Control and Yerevan Physics Institute/JINR.

In April 2005, Ponté brought in Nitin Deo to serve as senior VP of marketing. Deo previously spent six years at Magma Design Automation, where he served as VP of sales for Japan before assuming the role of marketing and business development executive. Previously, he was VP of marketing at Moscape (acquired by Magma), VP of marketing at Mayasoft (acquired by E.piphany), and spent four years at Synopsys in various marketing and business development roles. His IC design and applications experience includes several years at Fujitsu and Mitsubishi.

Arklin Kee, VP of business development, served as VP of sales and business development for Gigascale IC. Previously, he worked for InTime Software as VP of business development, and for Cadence as VP of business development. He started his career as a technical associate at Bell Telephone Laboratories.

Ponté is not yet disclosing the details of its first product, which will be launched later this year, but the company has begun revealing the nature of its technology.

Traditional rules-based methodologies, says Ponté, are not able to provide sufficient visibility into yield issues at sub-130-nm process nodes. The design-specific aspect is lost in these rules, which do not actually depict the specifics of nanometer properties and are completely design independent. It is not unusual for two different designs following the same rules to achieve dramatically different yields.

Ponté's vision is to supply tools that can provide visibility at the design stage, helping to analyze, predict and enhance yields early in the process. The company intends its tools to help drive down the cost of silicon by providing more predictable and better-optimized processes that accelerate overall time to volume production.

To implement this vision, Ponté is leveraging three core technologies: a comprehensive unified yield modeling platform, which enables strong correlation with fab results; high-capacity data processing that can process billions of nanometer structures overnight; and robust yield analysis technology that delivers design-content-specific analysis for various random and systematic defects, enables "what-if" analysis, and is orders of magnitude faster than rule-based systems.

Because foundries are very protective of their IP, Ponté decided to work initially with IDMs, where design and fab are within the same company. Ponté's strategy to get into the foundries is to work through their customers. Although foundries are more challenging, Ponté is addressing IP protection issues with an encryption mechanism that conceals process specifics while still providing sufficient information to designers for use in modeling, analysis, prediction and optimization.

Ponté's first product will be a yield-analysis tool, which will provide designers with yield visibility at different phases of the design flow. The company says the analysis technology is the cornerstone on which it will build other products.

Many EDA companies are developing DFM and DFY solutions, although Ponté is unique in bringing statistical yield modeling into the IC design flow. There is also competition with advanced IDMs, such as Intel, IBM and several others, which have internal tools that tie together design and manufacturing. Another set of competitors approach the problem either after completion of the design, or after manufacturing prototypes. The good news for all of these companies is that DFM and DFY are so important, and the problems so great, that there is lots of room for different products and approaches.

Agreements and Marketing Alliances

Wavesat, CRC and C-DOT Address Fixed WiMAX For Rural Broadband

WiMAX silicon specialist Wavesat has begun working with India's C-DOT and Canada's Communications Research Centre Canada (CRC) to build a cost-effective fixed wireless access solution based on the IEEE 802.16-2004 standard. C-DOT is a telecom technology centre of the Government of India, and the CRC is the Government of Canada's primary research facility into telecommunications technologies.

C-DOT and CRC have taken steps to embark on the joint development of a MILTON (microwave-light organized network)-based core broadband platform for India, powered by Wavesat's WiMAX silicon chip technology.

Founded in 1993, Wavesat is a fabless semiconductor company focused on developing modem chips for WiMAX-compliant systems. The company is headquartered in Montreal, Canada.

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Michel Guay, Wavesat president and CEO; Tel: 514 684-0200; www.wavesat.com.

Freescale, Philips to Drive Common FlexRay Technology

To help the drive toward a common standard for next-generation in-vehicle networks, Freescale Semiconductor and Philips have agreed to share their FlexRay technologies. The agreement supports the development, availability and compatibility of semiconductor-based FlexRay products from Philips and Freescale.

FlexRay is a new network communication system targeted specifically at the next generation of automotive applications, or "by-wire" applications. FlexRay will enable next-generation, high-bandwidth control applications, including powertrain and body systems. It will ultimately target by-wire solutions for active chassis management, braking systems and steering.

Philips and Freescale, both founding members of the FlexRay Consortium, will combine their in-vehicle networking expertise and use a common FlexRay protocol engine design and a common System C-based reference software model to ensure interoperability of their FlexRay devices.

The shared FlexRay protocol engine design and the jointly developed executable protocol model are now available for license from Freescale. Philips and Freescale plan to introduce additional FlexRay products during 2005. The first vehicles equipped with networking capabilities based on the FlexRay protocol are anticipated in 2006.

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Paul Grimme, Freescale Sr. VP and GM of automotive business; Tel: 480 768-2130; www.freescale.com.

Lattice, Synplicity Ink Development and Marketing Agreement

Lattice Semiconductor and Synplicity have signed a comprehensive development and marketing agreement to enhance and promote Lattice FPGA device performance in Synplicity's Synplify Pro FPGA synthesis tool during the second half of 2005. The agreement calls for significant enhancements, including register retiming, pipelining, and memory inferencing, to strengthen support for Lattice FPGAs. The Synplify Pro software currently supports all Lattice digital programmable logic devices, including the new non-volatile LatticeXP FPGAs.

Synplify Pro software, Lattice-only, node-locked, supporting all Lattice digital programmable devices, is currently available from Synplicity starting at $20,000.

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Joe Gianelli, Synplicity VP of business development; Tel: 408 215-6000; www.synplicity.com.

National Licenses Gigabit Ethernet PHY Core to Alliance

Alliance Semiconductor has licensed National Semiconductor's gigabit Ethernet physical layer (PHY) core for use in its next generation of networking devices. National's gigabit Ethernet PHY core has a field-proven architecture that delivers gigabit-per-second performance, low power consumption, and enhanced testability. The core is a fully featured single-port Ethernet PHY supporting 10BaseT, 100BaseTX and 1000BaseT Ethernet protocols, enabling a cost-effective migration path from existing fast Ethernet applications.

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FlipChip, NEC Sign Cross-Licensing Agreement

FlipChip International and NEC Electronics have entered into an extensive patent cross-licensing agreement for advanced wafer-level packaging, flip-chip bumping, solder-bump reinforcement and wafer applied underfill technologies. As part of the agreement, FlipChip will license its wafer-level packaging patents, including Ultra CSP, Polymer Collar, and Spheron product types, to NEC Electronics. NEC will license its redistribution wafer-level packaging, solder-bump reinforcement and wafer applied underfill patents to FlipChip.

Wafer level packaging, a process in which semiconductors are packaged on the wafer prior to dicing, offers significant advantages in form factor and weight that enable real chip-scale packaging (CSP). The two companies will apply these advanced packaging technologies to devices such as discrete components, logic, ASICs, microprocessors, flash memory and other next-generation devices for applications in the mobile phone, digital still camera, automotive, PDA and other emerging markets.

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ASICs, IP and Design Services

Atrenta Unveils Predictive Development Solutions

EDA firm Atrenta has released a new line of 1Team EDA solutions. The 1Team product family is a new kind of design-automation solution, called Predictive Development, which turns the expensive and error-prone activity of system development into a more predictable, manageable and reliable process.

Atrenta's 1Team solutions augment, rather than replace, existing development tools. Added to customers' established design flows, Atrenta solutions enhance each phase of the system development cycle, from initial planning through design and implementation.

The first member of the family, 1Team Implement, is a unified physical planning, design and implementation solution, from architectural planning to RTL design to initial placement. 1Team Implement includes:

• Team:Architect — Predictive implementation for IC architects; quickly evaluate design trade-offs such as timing and area; optimize architectural hand-off to RTL design teams.

• Team:Create — Predictive implementation for RTL designers. Create physically optimized logic designs.

• Team:Construct — Predictive implementation for IC physical implementation teams. Quickly validate timing and area projections and rapidly generate high-quality initial floorplans.

Team Implement is available now. Atrenta will roll out additional 1Team products in the coming months.

Atrenta launched in 2001 with its SpyGlass Predictive Analysis technology, which enables designers to look ahead into the design cycle and foresee downstream problems. The company has grown to 200 people and achieved 66% average compounded growth for four straight years

(See our profile of Atrenta in the April 2003 issue of *InsideChips.Ventures.*)

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  www.atrenta.com.

ARM Licenses Processors to Chipnuts Technology

Chipnuts Technology, a Shanghai, China-based IC design company has licensed the ARM7TDMI processor and ARM926EJ-S processor through the ARM Foundry Program. Chipnuts will design both low- and high-end power-efficient multimedia chip sets based on the two processors.

The Thumb® instruction set-integrated ARM7TDMI processor provides an optimized combination of performance, power and area characteristics. It is ideal for low-end mobile handsets running multimedia applications. The ARM926EJ-S processor incorporates ARM Jazelle® Java acceleration technology, DSP instruction extensions and the memory management unit (MMU) to enable designers to develop systems with high performance and rich application features. These capabilities are well suited to the development of next-generation smart phones, PDAs and multimedia decoding devices.

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  founder; Tel: +86-21-54561360;
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Calypto Launches Industry's First Sequential Equivalence Checker

Calypto Design Systems has introduced its SLEC™ product family, which delivers dramatic improvement in IC functional verification. SLEC offers design teams increased productivity, confidence and flexibility in making changes to meet their IC power and performance goals.

The SLEC product family is the first commercially available platform that proves functional equivalence between two IC designs that contain differences in levels of abstraction and sequential behavior. SLEC can verify designs with sequential differences such as micro-architectural changes, state machine modifications, timing re-balancing, and interface differences. The SLEC sequential equivalence checking software is based on a patent-pending hybrid verification technology that, unlike traditional combinational equivalence checkers, can support designs with sequential differences.

The SLEC product family initially includes two products: SLEC SYSTEM and SLEC RTL. SLEC SYSTEM is used by design teams to check that RTL implementations match a system-level design, while SLEC RTL checks functional equivalence between two versions of an RTL design that have dramatically different architectures and timing.

Pricing for SLEC products begins at $175,000 for a one-year floating license on Linux platforms.

(See our profile of Calypto in the March 2005 issue of *InsideChips.Ventures.*)

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  www.calypto.com.

Bluespec Adds Co-simulation to Its Cycle-Accurate Models

Bluespec, a developer of a behavioral synthesis solution for control logic and complex datapaths, has added co-simulation capabilities to its model-simulation technology. The addition of co-simulation enables hardware chip designers to use Bluespec's cycle-accurate models in SystemC or Verilog modeling environments, providing them with the flexibility to leverage accelerated models in the most appropriate and preferred environment for a given stage in design.

Bluespec is a startup tackling the verification challenges associated with increased design complexity. While some companies are attempting to improve the productivity of the verification engineer through better testbenches, Bluespec is targeting the root cause of the problem by addressing design complexity itself. The company's toolset elevates the level of abstraction for designers while providing full hardware synthesis down to RTL without compromise to the quality of the RTL. The company claims its tool reduces both design time to verified netlist and design errors by up to 50%.

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

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The Fast Track ... People & Organizations

Fujitsu Microelectronics America Names New President and CEO

Fujitsu Microelectronics America (FMA) has named Kazuyuki Kawauchi president and CEO. Kawauchi assumed his new post on April 1, the beginning of the company's fiscal year. He replaces Kazuo "Ken" Iida, who becomes an advisor to Fujitsu Microelectronics America and will remain in the United States for a year.

Kawauchi has held various management positions at Fujitsu and its affiliates. Before joining FMA, he was GM of Fujitsu's Technology Development Division of the Electronic Devices Group, where he was in charge of developing technologies and methodologies for 90-nm devices. Before that, he was VP of Fujitsu's design methodology and infrastructure group, Worldwide System LSI Technology (WWSLT), headquartered in Fujitsu Microelectronics in the United States. Kawauchi first joined Fujitsu in 1978 as an LSI engineer in the CAD Development Division.

Former Cadence Senior VP Joins picoChip as CEO

picoChip has appointed Guillaume d'Eyssautier to serve as the company's CEO. d'Eyssautier joins picoChip from Cadence Design Systems, where he was senior VP and GM EMEA. Prior to joining Cadence, he served as VP for EMEA at IBM Technology Group, which included IBM Microelectronics. He also worked for Conexant (Rockwell Semiconductor Systems) and GEC-Plessey Semiconductors. His early career included positions at Philips Semiconductors, Signetics and Matra Harris Semiconductors.

Founded in 2000 and located in Bath, U.K., picoChip provides to equipment makers flexible wireless solutions that minimize time to market, costs, and power consumption. At the heart of the company's offering is a scalable, multi-processor baseband IC that combines the computational density of a dedicated ASIC with the programmability of a traditional high-end DSP.

(See our profile of picoChip in the Aug. 2002 issue of *InsideChips.Ventures*.)

Industry Veteran to Serve as President of Xilinx K.K.

Xilinx has promoted Hitoshi Yoshizawa to president of the company's Japan subsidiary, Xilinx, K.K., from his current position as director of sales for consumer and industrial market segments. He succeeds Motihiro Kitajima, who will continue as chairman of the board for Xilinx, K.K.

Prior to joining Xilinx, Yoshizawa served in a variety of executive positions with NEC from 1972 to 2003 in Japan and the U.S. His most recent post was GM of the ASIC business units for NEC Electronics. Previously, he held positions at NEC in semiconductor EDA development, ASIC customer field support, and business development within the ASIC and Communication ASSP. Since April 2002, he ran ASIC business units as GM.

Kawasaki Microelectronics Hires New President and CEO

Kawasaki Microelectronics has named Yukio Yamauchi as president and CEO. Yamauchi succeeds Susumu Hirano, who will remain with K-Micro as a senior executive advisor. Yamauchi, who has more than 30 years of industry experience, most recently served as K-Micro's CTO.

LogicVision Hires New Marketing Director

Paul Scrivens has joined LogicVision as director of marketing for mixed-signal and ETAccess products. Scrivens will report to Stephen Pateras, senior director of corporate product marketing.

Scrivens has spent the last 20-plus years in the semiconductor test industry specializing in mixed-signal testing. He was a founder of mixed-signal ATE at LTX, becoming the VP and linear division manager in 1980. He served as VP of marketing for Credence Systems' mixed-signal product line, mixed-signal division manager for the silicon design validation group at IMS, president of U.S. operations at SZ Testsysteme, and sales and marketing manager for Keithly instruments parametric systems. Before joining the ATE industry, Scrivens was a mixed-signal design engineer and manager in the U.K.

TransChip Hires VP of Sales

TransChip, a developer of CMOS camera solutions for camera phones, has hired Ronen Avron as VP of sales. Avron joined TransChip from Metalink, where he was VP of worldwide sales. Prior to that, he served as regional director of sales and business development at Gilat Satellite Networks, where he was responsible for the Asia-Pacific region. Between 1995 and 1999, Avron was based in Seoul, Korea, where he managed the Korean and Taiwanese offices of Rafael IAA and was responsible for sales, marketing and business development. Earlier, he was sales and marketing manager for Asia Pacific at RND, part of the RAD Group.

(See our profile of TransChip in the July 2002 issue of *InsideChips.Ventures*.)

Silicon Image Appoints New CFO

Silicon Image has appointed Darrel Slack to the position of CFO. Slack most recently served as CFO at Centillium Communications. Earlier, he held investment-banking positions with Credit Suisse First Boston and Salomon Smith Barney, where he was responsible for a variety of technology securities underwritings and M&A advisory engagements. Prior to this, Slack spent 10 years with the U.S. Air Force, most recently as commander for the C-12 flight-training program.

Slack replaces CFO Bob Gargus, who announced his intention to leave the company in Aug. of 2004.

M2000 Names VP of Business Development

M2000, a Paris, France-based developer of reconfigurable semiconductor IP, has named Ali Erdengiz VP of business development. He will be based in the company's Sunnyvale, Calif., office.

Erdengiz joins M2000 from Altera, where he was senior director of HardCopy business operations. Prior to that, he was with Fujitsu Microelectronics America as director of its "Infotainment" (digital television, cable modem, and networking) product line, in charge of advanced semiconductor development. He began his

career in chip development with Thomson-CSF France (currently ST Microelectronics) before moving to Fairchild Semiconductor and National Semiconductor.

M2000 is developing state-of-the-art configurable logic technology for the reconfigurable SOC market.

Tower Taps Applied Materials Veteran for CEO Position

Tower Semiconductor has appointed Russell Ellwanger CEO of the company. Most recently, Ellwanger was group VP at Applied Materials Corporation. He has served as GM of Applied Global Services (AGS), GM of the CMP and Electroplating Business Group, co-GM of the Metrology and Inspection Business Group and VP of the 300-mm Program Office. Ellwanger has also held executive positions at Novellus Systems and research & development management positions at Philips Semiconductor.

Texas Instruments Expands RFID Management Team

Texas Instruments has expanded its RFID management team with the addition of three new director positions. The company has named Shawn Rogers director of wireless commerce and Tag-it products; Mikael Ahlund director of RFID healthcare; and William Santini director of technology development.

Rogers is a founding member and chief technical editor of the High Speed Backplane Initiative (HSBI) and a founding member of the Reduced Gigabit Media Independent Interface (RGMII) Consortium. Since 1999, he has been a contributing member of the IEEE 802.3 Ethernet Standards group.

Ahlund began his career as a business analyst and planning manager at General Electric and, during his 17 years at the company, also served as marketing and product-development manager and GM of GE Medical's ultrasound business. Most recently, he was a consultant to medical equipment manufacturers.

Santini was previously director of development for DSL client premise equipment in the Broadband Communications Group at Texas Instruments. Before joining Texas

Instruments, he was VP of engineering at Interphase and EXFO (formerly Gnubi Communication), both of Dallas, Tex.

Silicon Laboratories Promotes Wireless Veteran to Vice President

Silicon Laboratories has promoted Dan Rabinovitsj to VP of the company's wireless products group. Rabinovitsj is one of the founding members of Silicon Laboratories' wireless team and has been serving in senior leadership positions since the group's inception. He replaces Ed Healy, who served as VP of wireless products since the group was created and was one of the company's earliest contributors to the wireless business. Healy is leaving the company to take the position of CEO at a non-competing startup.

Rabinovitsj joined Silicon Laboratories seven years ago and has been responsible for marketing, business development and new product development across multiple design groups. Prior to joining Silicon Laboratories, he was the director of marketing at Indesign, and also served as director of marketing for Oasis Silicon Systems and product marketing manager for AMD.

eSilicon Taps Altera Exec to Head Marketing

eSilicon, a supplier of custom ICs, has hired Hugh Durdan as VP of marketing. Durdan, a 25-year veteran of the semiconductor industry, formerly served as VP of the CCI and Technical Services business group at Altera, where he grew revenue from $350 million to $550 million in two years, booked more than $1 billion worth of design wins and spear-headed Altera's expansion into the digital consumer market. Prior to Altera, he served as VP and GM of the computer and consumer divisions at LSI Logic, as well as various management and engineering roles at Mylex and Digital Equipment Corporation.

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. The company basically manages the details involved in producing working silicon, enabling its customers to focus on their design-related core competencies.

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

Bay Microsystems Adds New Executives to Management Team

Jeff Wolf has joined Bay Microsystems as senior VP of marketing, and the company also named Gerry Jankauskas CTO.

Prior to joining Bay, Wolf was VP of business development at CPU Technology, a company delivering high-performance embedded multiprocessing SOCs for government and commercial applications. Prior to that, he was VP of worldwide sales and operations at Ubicom, and he served at LSI Logic for 16 years in a range of marketing and sales roles, including VP of marketing and VP and GM of Pan Asia.

Jankauskas has been serving as Bay's VP of system architecture since 2003. Prior to Bay, he was chief architect at Cratos Networks and systems architect at 3Com (U.S. Robotics) Carrier Systems Group. He also worked at GTE in systems and development engineering roles applying commercial networking equipment to military applications.

Bay Microsystems develops programmable packet processors, software and network elements for high-performance intelligent networks.

AGEIA Adds Two New Execs to Management Team

AGEIA Technologies has appointed startup veteran Andy Keane to the post of VP of marketing, and games professional Kathy Schoback to the position of VP of content acquisition.

Keane has nearly 20 years of experience in the hardware technology industry, holding executive-level marketing positions at companies such as 3Dfx Interactive, Morphics Technologies, PMC-Sierra and Quantum Effect Devices.

Schoback currently serves as chair emeritus for the International Game Developers Association, and is a member of the GDC advisory board. She has nearly 15 years of experience in the gaming industry, serving the majority of her career at Sega of America and Eidos.

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Companies Mentioned in This Issue