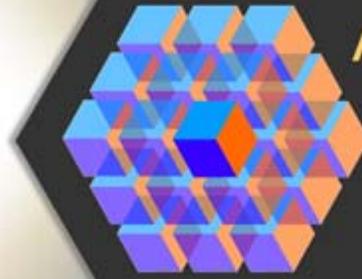


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Assembling the Future

A Newsletter About the Design
and Production of Electronics

ISSUE 004 • APRIL 2011

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[A Wide Panorama From The GlobalPress Electronics Summit](#)

Gabe Moretti

This was my second year as an attendee of the Globalpress event. The event is held mostly to facilitate communication between US based electronics companies and the international press. I live in Florida now and since its economy can be compared to that of a third world country and Italian is my native tongue, I can be considered a foreign editor. So it can be said that living in a state whose governor was the CEO of the medical company that defrauded the US government of the largest amount ever, does have its benefits.

I like the event because it offers me the opportunity to learn about other aspects of the industry, and to understand technical relationships and business opportunities for EDA. This year, just like last year, the event was held at the Chaminade Resort, a wonderful venue on the hills overlooking Santa Cruz, offering views that stretch to Monterey Bay to the south.

There were forty international editors and two US editors, Jim Harrison and myself in attendance. I have no idea how Jim managed to become a "foreign editor" since to the best of my knowledge he does not live in a technologically depressed area of the US. John Byler and Ron Wilson were also there, John for most of the sessions while Ron did not stay that long. But they were moderating the two panels on the program, so to some extent, they were not really there as "foreign" editors. Wally Rhines keynote had the power to convince Ed Sperling to undertake the drive from the Valley, just to hear what he had to say about 3-D packaging. This event also does not qualify Ed as a "foreign editor".

The truly international editors represented fifty one publications, twenty eight from Asia and twenty three from Europe, a numerically well balanced group. China had the largest number of editors, ten in all, while at the other extreme, Udaylal Pai represented seven publications in India all by himself; a very busy writer indeed. Giorgio Fusari of Italy was the next editor representing the most publications with four, while Sophy Caulier writes for three French magazines.

Semiconductor Companies

Phil Gibson, VP Marketing and Web Operations of **National Semiconductor** gave an overview of his company, a week before Texas Instruments announced its intention of purchasing National for \$6.5 billion in cash. In its last full fiscal year National had sales of \$1.42 billion. Of that approximately 45% came from the Industrial sector which include automotive and medical applications, and 25% from components used in the handsets market. The company sees significant growth opportunities in the Power IC market. It expects this sector to have a growth rate of 12% reaching \$15.7 billion by 2014.

National also offers a very easy to operate, yet powerful, web based development environment that supports designs that potentially use its IC products. Webench Designer, Webench Visualizer, and Webench Architect Tools are unique among traditional semiconductor companies.

Intersil is a semiconductor company that has both its own fab in Palm Bay on Florida's central East Coast, and also uses fabrication capabilities from a few other foundries. The company sees growth in both 3G and 4G markets. It addresses three market areas: flat panel displays, optical storage (for CD and DVD recordable products) and power management. During his presentation David Bell, President and CEO, focused on the power management sector. For Intersil this means being present in the data centers that support both broadband communication and cloud computing, in smart phones, in the transmission towers, and in other personal computing devices. Intersil offers a tool, iSim, that is an interactive, web-based tool for selecting and simulating devices from its portfolio. Based on input and output specifications provided by the user, iSim will find all suitable Intersil devices for the application. In many cases, a simulation is also made available for immediate feedback on circuit performance. Currently, iSim is available for power management devices and operational amplifiers.

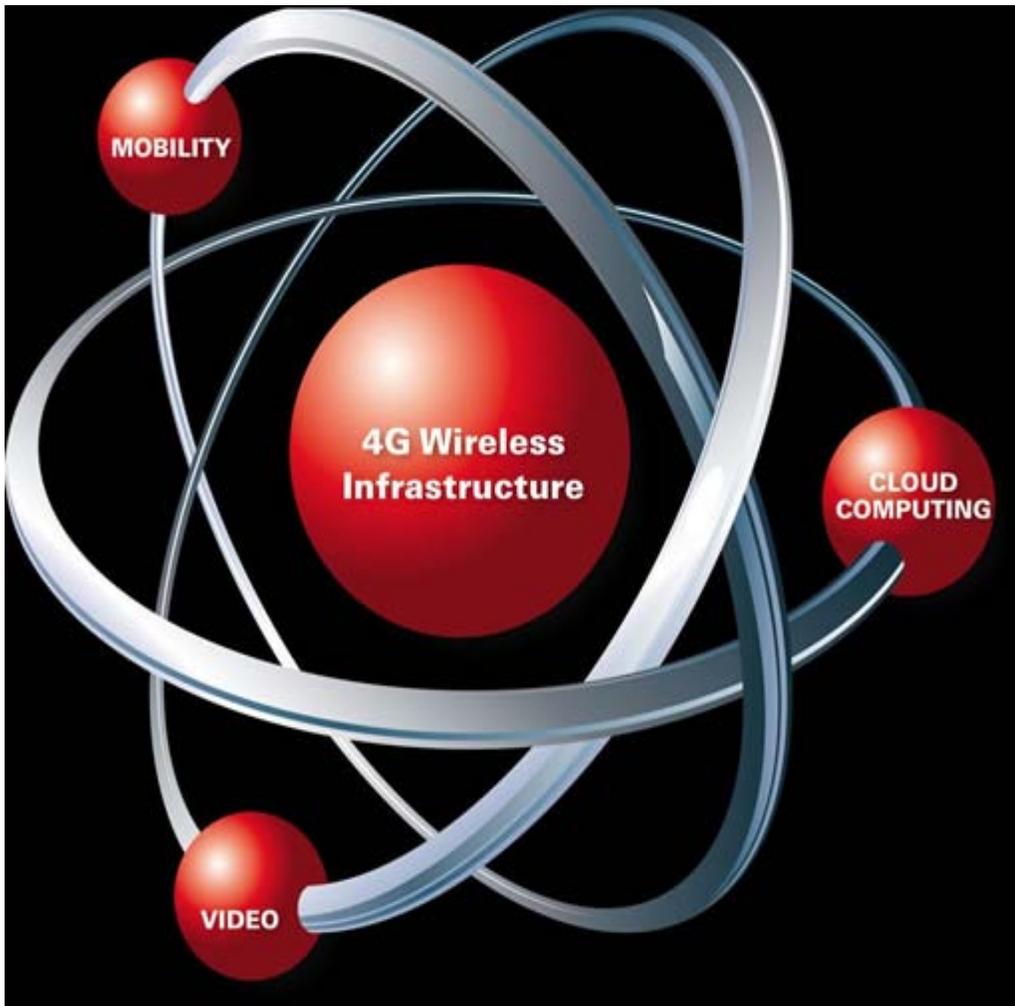
Fabless And IP Companies

Most of these companies are targeting 4G network deployment. Should such deployment experience delays, the industry will show a significant revenue depression.

On Sunday evening, Art Swift, VP Marketing and Business development of **MIPS**, kicked off the for days Summit proceedings with a short presentation, followed by a dinner hosted by the same company. I had worked with MIPS in the late 80's and early 90's when the company was a pioneer in building RISC processors. At that time MIPS had already entered the IP market as well. MIPS continues to develop and market 32 and 64 bit cores as well as development tools and software.

Monday morning the proceedings were kicked off by Graham Robertson, Corporate Vice President of **IDT**. the company focuses on markets related to 4G communication products. It offers analog and digital devices addressing timing, serial switching and interfaces to expand its mixed-signal content

in Communications, Computing and Consumer applications.



[Figure 1: IDT markets focus around the 4G infrastructure]

The company is growing and has made five acquisitions in the past eighteen months, purchasing both technology and market presence. According to Graham Robertson, its Corporate Vice President, IDT sees significant opportunities in markets related to 4G communications applications.

I find Dr. Chris Rowen, Founder and CTO of **Tensilica** an interesting speaker with a profound knowledge of both the technology and the business of the industry. He presented the Xtensa LX4 dataplane processor, intended to support the fastest communication protocols and data rates available in the near future. The LX4, like other processors from Tensilica, is a VLIW architecture. This class of devices have been known to be difficult to use, but Tensilica significantly improves usability by offering its own compiler that make it easy to program the processor using the C language.

Dr. Rowen compared the Xtensa LX4 to the dark matter pervading the universe. Clearly his intent was to make it sound as a breakthrough in the understanding of communication processors architecture. I found it interesting because no one really knows the nature of dark matter. It is postulated that it is "invisible matter". But what if instead it is another form of gravity and its nature is energy and not matter? We do not know what it really is, but we do know what an Xtensa LX4 is.

Broadcom is a fabless semiconductor company that targets the communication market and is positioning itself to serve the deployment of the 4G networks. It had net revenue of \$6.82 billion in fiscal 2010 and owns over 14,600 US and international patents. Their presentation was an opportunity for me to learn of the existence of something called "the mobile backhaul" which is key to the implementation of the mobile Ethernet without which an iPhone is just a phone.

Jim McKeon, Director of Product Marketing Network Switch, went in some details describing the BCM56440 device which he labeled "The World's Most Highly Integrated Mobile Backhaul Switch Silicon". It is the latest member of Broadcom's StrataXGS Family implemented in Power Efficient 40 nm process. Jim claimed that the device can deliver system cost savings up to 50% in last mile applications while preserving legacy network investments.

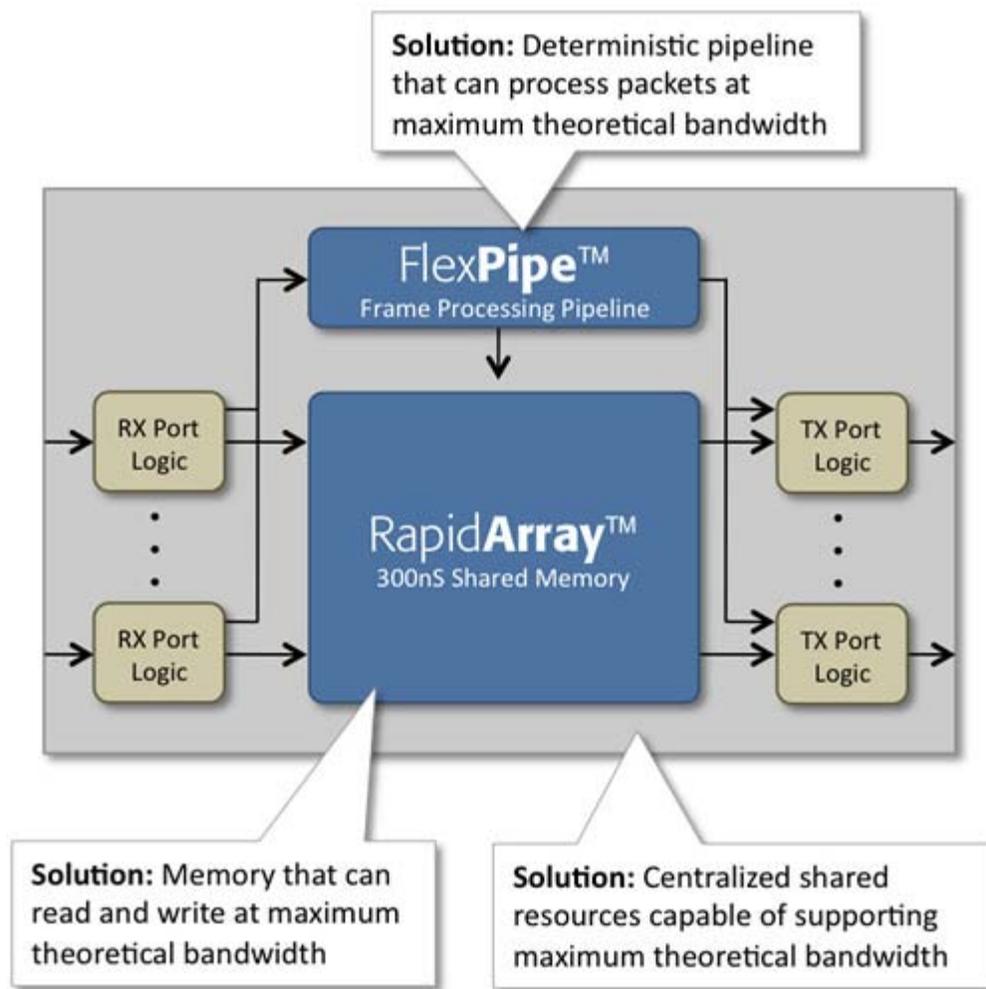
Alereon is a fabless semiconductor company targeting the Ultra Wide Band (UWB) market. UWB is a radio technology that uses wide bandwidth signals to achieve the fastest wireless data rates in the industry. It has fundamental advantages over conventional wireless communication systems, providing 10x the speed of today's 802.11 networks while using one-tenth the power. In fact, the Certified Wireless USB application of UWB technology achieves data rates and plug-and-play capability equivalent to the industry standard wired USB 2.0. UWB has ten times more spectrum than Wi-Fi and thus the opportunity for growth in home wireless applications for entertainment and computing.

The company has a strategic alliance with Samsung. At present it sells a dongle used in the office to control a monitor with a range of 30 feet, and it is working on a product to control a HDTV set in homes with double the range and at half the cost.

SiliconBlue received its funding in 2006. Headquartered in Santa Clara the company supports the development of hand held devices. It implements functions on an FPGA device that add capabilities to an existing platform. Application areas include port expansion, video and imaging, and sensors management for smart phone, hand held digital cameras, and e-readers.

The programmable platform meets form factors and low power requirements. SiliconBlue's mobileWARE is a collection of customizable IP function blocks. The company also offers design services to help its customers realize their ideas in silicon. The company has recently announced its plans to utilize TSMC 40 nm low power process for a new, enhanced family of devices that will offer increased performance on a very small footprint.

Fulcrum Microsystems is a company formed in 2000 by Caltech alumni using a unique asynchronous circuit architecture and design methodology that, according to the company, delivers unparallel performance in terms of throughput and latency while minimizing power consumption. Today the company owns the vast majority of the patents, although Caltech still participates to the success of the company.



[Figure 2 : FM6000 architecture]

Fulcrum is now, according to Dell' Oro Group 2011 market research, the leading commercial switch silicon provider in the data center market. Its latest product, the FM6000 architecture supports over 1 billion packets per second with a 300 nano seconds latency.

Micro Electro Mechanical Systems (MEMS)

One of the advantages of attending the Globalpress Electronic Summit is to meet companies that market Microelectromechanical systems devices or MEMS as they are commonly called. These devices are now found in a large portion of consumers products. Practically any portable electronic device has at least one of them inside, and late model cars have more than one. Last year Karen Lightman, Managing Director of the MEMS Industry Group (MIG) had presented an overview of the industry. This year it was the turn of MIG Board member Alissa Fitzgerald to give editors an overview of the industry.

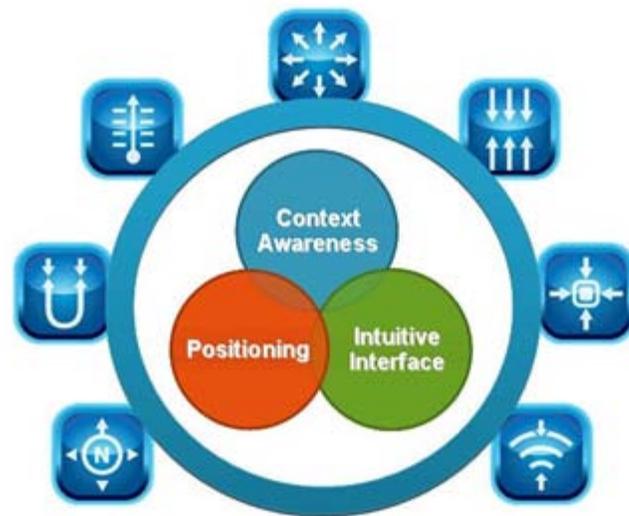
The growth rate of the MEMS market should attract the attention of EDA companies. HIS iSuppli forecasts a CAGR of 10.7% so that by 2014 this segment will reach \$9.8 billion in revenue, about twice the value of what EDA will be. The MIG now has over 100 members, in spite of the fact that when you talk to people involved in ESL, supposedly the EDA tools segment concerned with system level design, you hardly ever hear the word MEMS spoken. Our industry is still suffering from digital withdrawal and stubbornly avoids reality in pursuit of the next process technology node. It is clear

to me that just chasing Moore's Law is not the best way to solve system level design issues.

I searched in vain for an EDA company name in the list of MIG members. The problem seems to be that the mechanical part of the MEMS is getting in the way of people who have sworn exclusive allegiance to developing tools for designers using only electrons.

Freescale Semiconductor, a full fledged semiconductor company, chose to present during the MEMS segment. Glen Burchers, Director of Global Segment Marketing started by saying that the MEMS content in mobile devices will increase by five fold in the next two years. Freescale has already shipped over one billion MEMS devices in its 31 years of activity in this area.

Context Awareness – Augmented Reality



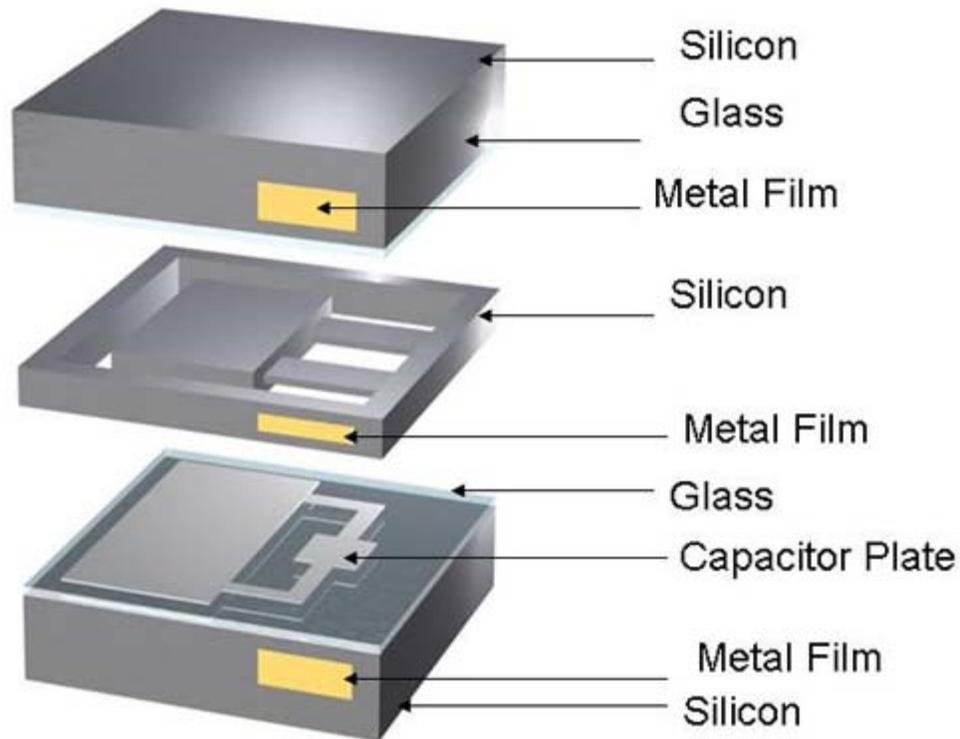
[Figure 3: The various MEMS types needed to support context awareness]

Freescale, who by the way has filed a S-1 form and is in the process of an IPO, develops and markets a wide variety of MEMS devices including: accelerometers, magnetometers, gyroscopes, pressure sensors, capacitive touch sensors, intelligent sensor hubs, and even an application processor based on the ARM Cortex A9 that supports Android, Windows, Ubuntu, QNX, Linux, Linaro, Adobe Flash, and Skype environments. Freescale MEMS can be found in smart phones, tablets, eReaders, and automotive infotainment products.

Innovative Micro Technology is a privately held semiconductor company founded in 2000 with facilities in beautiful Santa Barbara, California. It claims to be the largest pure-play MEMS foundry in the US. Its business model has the company involved in various phases of product development for its customers starting from just a concept, to customer provided design and process flow. The company has developed and fabricated devices with 4 and 5 wafer bonded stacks, on board reflective and refractive optics, and has used a wide variety of materials including metals, polymers, glass, silicon and more. It has packaged devices with 3D microfluidics applications and magnetically driven actuators with extreme sensitivity and precision.

VTI Technologies is headquartered in Finland with offices worldwide. Automotive systems represent one of the largest market for its products. They include: antilock braking, electronic

stability programs, electric parking brake, hill start assistance, electronically controlled suspension, anti-vibration of engines, inclination of the car, and heartbeat detection inside the car. In addition VTI accelerometers are present in pacemakers, and the medical sector is a major driver in the growth of high value (read higher priced) MEMS market.



[Figure 4: An example of a 3D MEMS device]

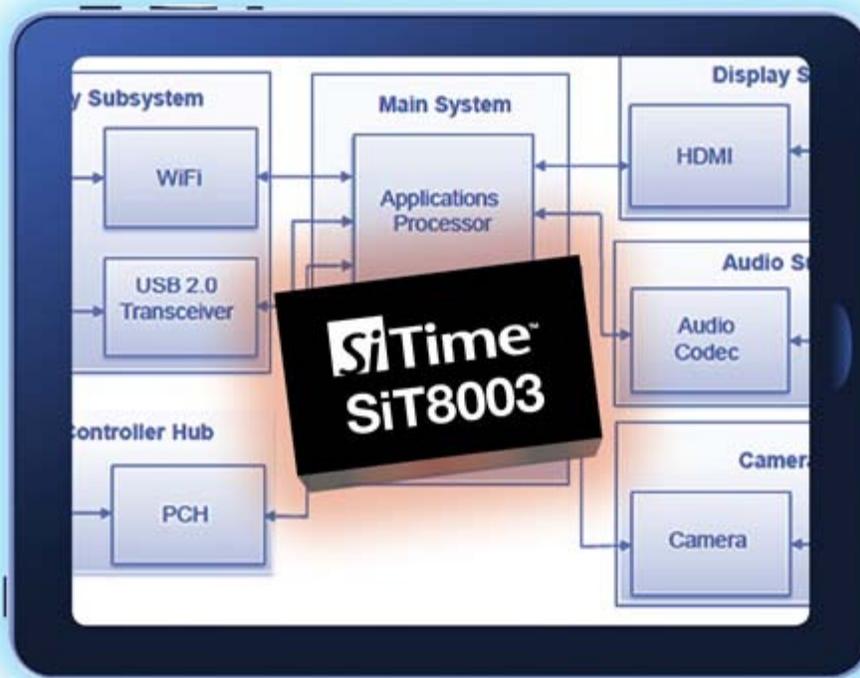
VTI employs a hybrid manufacturing strategy. It utilizes its own fabrication capacity for automotive and medical products as well as for R&D purposes and mass produces high volume chips for consumer products through a supply chain in Asia. Its 3D technology has enabled the fabrication of 3-axis gyroscopes used in gaming, remote controllers, and mobile phones. It also makes it possible to produce silicon based resonators for low cost, small form factor, and high reliability devices.

Akustica is a wholly owned subsidiary of Bosch that specializes in MEMS microphones. The company was founded in 2001 and has its headquarters in Pittsburgh, PA. It was acquired by Robert Bosch in 2009. Akustica states that it has the only single chip MEMS microphone in production. Stefan Finkbeiner, CEO and General Manager of the company took the occasion of the presentation to introduce the company latest product, the AKU230 digital-output microphone (see also [Akustica's AKU230 Digital Microphone Includes World's Smallest Fully Integrated MEMS Device](#)). The new device enables the placement of the microphone in the display section of a laptop, eliminates audio signal interference from RF and EM noise sources, and supports single-wire stereo output for microphone arrays.

The AKU230 sports a membrane that is less than 400 micron in size with the total chip area that is less than 0.70 mm square. Akustica believes that the growth of the MEMS microphone market comprising of cell phone and laptop applications will sustain a CAGR of 41% resulting in over 450

million units shipped by 2014.

SiTime is the undisputed market leader in silicon based timing devices. It produces resonators, oscillators, and clock generators. Every electronic system requires a clock, and generating a clock in silicon is arguably a cheaper and in fact more reliable solution than using a crystal. Yole Development market research showed that SiTime owns 85% market share of the silicon based timing devices. The company expects to break the 100 million unit per year shipped next year and expects the total number of unit shipped in one year to be well above the 600 million in 2015.



[Figure 5: The SiT8003 is a very popular silicon ascillator from SiTime]

SiTime can deliver a silicon oscillator meeting the customer specification within 3 to 5 weeks from receiving the order versus the 8 to 16 weeks required for a crystal oscillator. It relies on a number of foundries throughout the world from Tower/Jazz in Irvine, CA to TSMC, with assembly and test done both in UTAC, Thailand and Carsem in Malaysia.

A Growing Market For FPGA

Four vendors of programmable logic devices presented at the Summit. This market is growing, both due to improved performance of the devices and increasing costs of ASIC development which in turn make programmable devices prices more attractive.

Bradley Howe, VP of IC Engineering at **Altera**, spoke about the company's involvement in the optical transmission market. Speed of communication is critical in order to provide services that arguably consumers have been waiting for and, more importantly, are ready to pay for. Examples are entire HD movies downloaded in seconds, 3D video conferencing, even from mobile phones, holographic email messages, and video surveillance systems with real time threat alerts. Copper, as

the transmission medium cannot support such speed, so optical interconnect is the best available solution. I for one, have an optical connection to the internet, TV, and even my land phone.

Altera is in the Bandwidth Expansion business and is planning optically interconnected devices with the goals of :

- a) reducing system complexity, cost and power requirements
- b) eliminating signal integrity issues that are inherent in copper based solutions
- c) and enabling optical connections for chip to chip, card to card, and chip to backplane

To this end Altera is leveraging its transceiver technology to provide optical interconnection to the market this year.

Andy Pease, President and CEO, talked about **Quicklogic's** underlying company focus on next generation mobile platforms. In particular Andy talked about the ArticLink VX Platform family of products. He said that the highly integrated yet flexible architecture enables the platform family to be deployed as Customer Specific Standard Product solutions in display subsystems for smart phones, tablets, and smartbooks.

The key is Quicklogic's VEE technology, based on the iridix algorithm from Apical Limited. It greatly enhances the ability to see the contents of displays under challenging viewing conditions by dynamically optimizing video characteristics on a pixel-by-pixel basis to provide a superior viewing experience to the user, regardless of ambient lighting. This solution, combined with the company DPO technology to reduce power requirements up to 36%, allows the design and implementation of a very user friendly display that can be seen in any ambient light.

Darin Billerbeck, President and CEO of **Lattice Semiconductor**, used his presentation to describe the financial health of the company, the growing market opportunities he sees, and to differentiate the business approach from those of other programmable device vendors. Lattice competes in the low density and mid-range PLDs segment, and in the power management markets. It differentiates itself with low power and low cost. The goal is to support its customers to rapidly implement differentiated features and reduce time to market. Lattice sales are predominantly international, with 85% of revenue coming from outside the US, mostly from Asia (66%). The major application area is communications, followed by industrial and computing while consumer products account for just 12%. Not surprisingly the company realizes 62% of its revenue from its top 50 accounts.

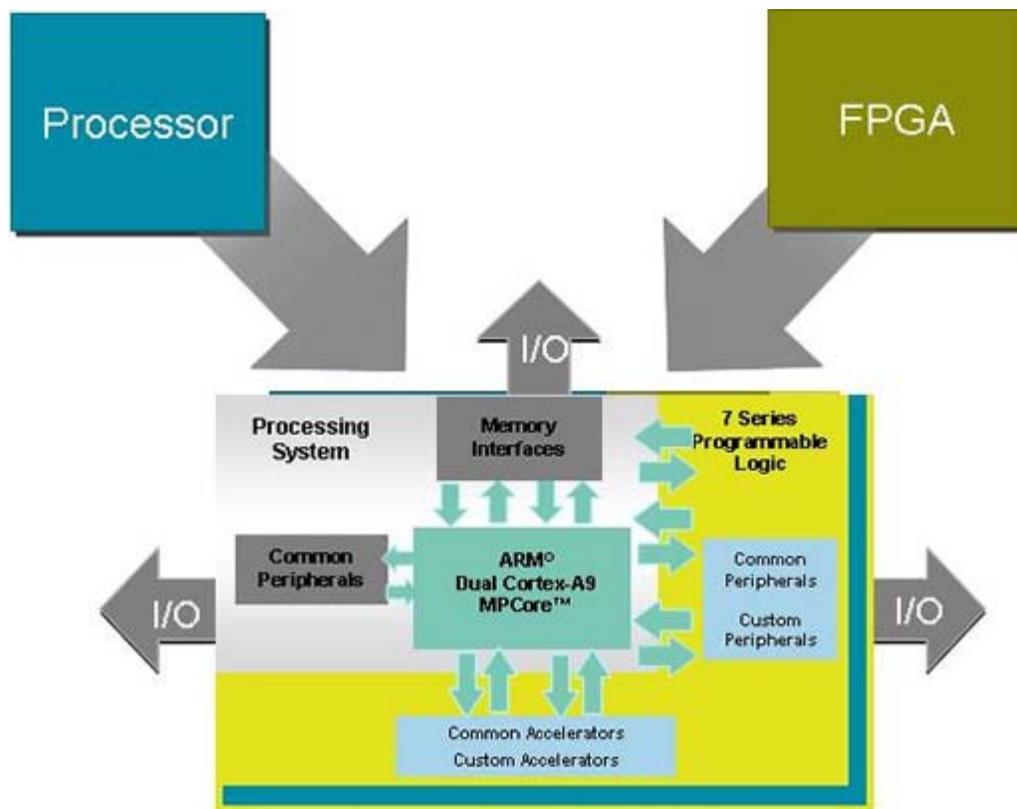
In 2010 Lattice had revenue of \$297.8 million with a GAAP net income of \$57.1 million. It sees its TAM growing from \$2.7 billion to \$5.5 billion by 2015. Mr. Billerbeck spoke briefly about the MACHX02 PLD family that he compared to the Swiss Army knife of PLDs. It is optimized for system and consumer designs, has a static power consumption of only 19 uW, comes in a package as small as 2.5 mm square, and offers a host of integrated functions.

Xilinx sounds more and more like a complete systems company, at least after hearing Vin Ratford, senior VP of worldwide marketing, describe the company's product mix. Vin started the presentation by introducing the Kintex-7 device, fabricated in 28 nm process, the Kintex-7 boards, the AXI4 IP and targeted reference designs, and the ISE 13.1 Design development suite. And he was not done

yet!

The 7 series of products is a response to the higher NRE costs for ASIC designs at 65 nm and below processes. With every new process node using smaller geometries, the family of Xilinx products has increased, and now the company offers four families: Artix, Kintex, Virtex, and Zynq. The 7 series offers a unified architecture that enables common software and IP support and uses a common process. Moving from the 40 nm to the 28 nm HPL process resulted in a 50% power requirement reduction in all three major categories: static, dynamic, and I/O power.

The series is fabricated using stack die technology, has integrated analog functions, and Xilinx claims the industry highest bandwidth for an FPGA device. For example the Virtex-7 device supports 28 Gbps transmission speed. The series is divided into four families. Artix-7 combines low power and low BOM cost (\$2 - \$7) with superior performance, the Kintex-7 claims the industry's best price/performance ratio, and the Virtex-7 the industry highest system performance and capacity. And then there is the Zynq. As can be seen from the figure below, the Zynq-7000 is a full system architecture that incorporates a ARM A9 core, various I/O interfaces and programmable fabric all in one die. The device will not be available until some time in the second half of this year, but development support is already deliverable from as many as seven vendors, including Xilinx of course. In the demo room after the talk, I did see a Zynq emulation platform running Android.



[Figure 6: Zynq from Xilinx provides a complete system on an FPGA]

Xilinx believes so strongly that every editor at the Globalpress summit is an engineer that it gave each of us a Spartan-6 LX9 development board with the ISE 12 development software. I can only surmise that the popularity of ISE 13.1 is so great that ISE 12 is now free yet good enough to impress editors.

EDA, The Enabling Technology

There were only four EDA companies attending the summit. Some of the marketing professionals at companies that did not attend seem to think that there was not enough time for one-on-one meetings with editors, although I am not sure how they plan to have those meetings by traveling around the globe in what certainly must be an asynchronous event. I believe that the reason is quite different: companies are relying more and more on the web, both through their own presence and by using social media avenues even if those electronic meeting places are not designed for real marketing of high technology products. Of course Synopsys had a good excuse. SNUG was being held the same week. Yet, what seems to be a lowering of the regards that EDA companies have for professional editors, appears confirmed by their attitude toward events like the Globalpress Electronics Summit. I believe that EDA companies speak only to the converted through social media, and that if one really needs more time with an editor, one could always pay for one additional night in a hotel. The cost is less than paying a marketing professional to write blogs that most professionals either ignore or read only to amuse themselves.

Berkeley Design Automation presentation was delivered by its CEO, Ravi Subramanian. He chose this opportunity to deliver a very instructional speech on the business and technological drivers of the electronics industry. This was truly a speech worthy of a CEO. A look at the worldwide electronic systems market in the 2009 - 2013 time slice authored by IC Insights, points out that computer and office systems sector still dominates spending averaging between 30 and 35% of total, but its compounded average growth rate (CAGR) is less than 2%, while government and military spending representing only about 5% of total spending shows a CAGR of over 4%. But communications is the sector that offers the greater possibility, representing the second largest spending by sector at between 25 and 30%, with a CAGR over 3%. This growth is fueled mostly by mobile internet devices and applications.

Ravi pointed out that an electronic platform contains five major areas of functionality: connectivity support, application processor, sensors and display, memory, and power management. But it is useless to build a product if there are no consumers willing or capable of purchasing it. This is true regardless of one's political inclination, and is a message that seems too often lost to politicians, especially those in developed countries.

The data presented by Ravi shows that developing countries will be the ones fueling the growth of the electronics industry. A growth in population, coupled with a growth in spending power, will increase consumption and thus revenue for those companies who have the right vision and can implement correctly. According to Ravi, approximately 460 million people in emerging markets will enter the middle class between 2010 and 2015, an increase of 70%. There is a weakness in his thesis. He defines middle class as people with income between \$6,000 and \$30,000 a year, hardly a definition that applies to the developed countries. And this does not take into consideration the fact that such a rise in income will generate at least an equal rise in consumer prices, thus disposable income will not be at the level he implies. But it is not debatable that there will be more electronics devices sold in the world, with companies competing for the revenue. Success will require a combination of lower cost, greater integration, and correct time to market.

These platforms will see an ever increasing amount of analog circuits in the system, while the move to more advanced processing nodes is transforming what once were relatively simple digital circuitry into analog circuitry due to the impact of first and second order effects and the gap between

nominal and silicon performance due to statistical effects.

Berkeley Design Automation is positioned to help designers with its Analog FastSpice Platform that has delivered over 900 successful production circuits including some at the 28 nm node. Both TSMC and Globalfoundries have certified the tool for 28 nm, and are now in the process of certifying it for the 22 nm process.

Mentor Graphics neither ignores editors nor misses an opportunity to dialogue with them. Both the keynote by Wally Rhines, President and CEO, and a presentation by Stephen Pateras, Product Marketing Director for Silicon Test Solutions, addressed the issue of 3D packaging and testing. Their presentations were already covered [in this article](#).

The Tessent tool now provides the ability to test die packaged in 3D and provides a number of test functions including BIST, MemoryBIST, ATPG, and TSV and offers TestKompress and SoCScan capabilities for 3D packages as well. The goal is to reduce the cost of testing such devices by reducing the number of required patterns, supporting memory BIST, reusing both BIST and ATPG patterns, and enabling parallel test capability through hierarchical BIST and ATPG.

Apache Design Solutions is in the process of its initial public offering, but that did not stop Andrew Yang, its CEO, from presenting at the Summit. According to Gary Smith's 2009 Marketshare Report, Apache had a 73% share in the physical power analysis market, and iSuppli states that its products are the signoff solution for the top twenty semiconductor companies. Apache has been growing strongly from practically its inception and although its financial information is still private, it can be conservatively counted as one of the top ten EDA companies in terms of annual revenue. Andrew stated that the company has been profitable since 2008 and that it experienced revenue growth of 27% in 2010 over the previous year.

PowerArtist helps to analyze power at the RTL in order to reduce power consumption, RedHawk helps designers during physical design to deal with power integrity issues in order to achieve power signoff, Sentinel deals with I/O integrity, power, and signal integrity as well as EMI issues at the package and PCB level. Finally Totem deals with power integrity and noise analysis issues in analog design and targets the development of analog IP. Everyone in the industry recognizes that power consumption must be significantly decreased in all electronic applications or there will not be enough power in the grid to sustain functionality. And of course, portable electronic devices must provide ever increasing functionality, and coupled with improve batteries, efficient use of the power source is critical. Apache is certainly well positioned and has the right technology to play a major role in providing the required solutions.

AWR develops and markets tools that help designers of high frequency circuits and systems. Sherry Hess, VP of Marketing, pointed out that the company, founded in 1994, experienced revenue growth every year since 1998, the year its first product was introduced. In fact, the week after the summit, AWR released its financial results for its last physical year during which it saw an increase in revenue of 30%. Today the company's product portfolio includes Microwave Office, Visual System Simulator, Analog Office, and AXIEM. AWR pays a lot of attention to the human interface of its tools, which mimics that of Microsoft Office products. Thus using any of AWR's tools is quite intuitive. The AWR environment allows for very easy interface with other EDA tools from various vendors, such as MATLAB from Mathworks, Cadence through OpenAccess, and Mentor Graphics tools for design capture, layout, and verification, as well as other vendors addressing a number of

development issues.

Microwave Office supports the design of RF and Microwave circuits, Visual System Simulator provides system simulation software for RF communications in most commonly used standards, AXIEM allows electromagnetic analysis through 3D planar software tools, and Analog Office supports the design of high frequency ICs. AWR has a long list of foundry partners that have qualified the software for their processes including GaAs & GaN, RF CMOS, and SoS/Sol.

Correction: The original version of this article attributed Graham Robertson's presentation to Art Swift, and the description of Art Swift's presentation was added.

