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Agilent go/semiconductor

Global Business Ideas and Information for Managers and Test Engineers



TOYS MEAN BIG BUSINESS FOR SEMICONDUCTOR MANUFACTURERS

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Agilent Technologies

Ask your vendors some hard questions

By Doug Larson



Doug Larson is Agilent's worldwide field marketing program manager for the ATE division.

As America's worldwide field marketing program manager, I am fortunate that I get to see our customers—and potential customers—at industry events many times throughout the year. Recently, I've been asking them how their business is doing and what their plans are. Nine out of 10 times I hear, "We are taking the time available to us in this slowdown to re-evaluate our current test strategy"

Great, I think. So I then ask, "What does this mean?" A handful are specific: "We learned through this downturn that we did not have enough flexibility. Discovering this, we are asking to look at our vendors' roadmaps again to see how we fit in with them. We also are looking at system capabilities to help us better grow in the future."

Nevertheless, I am surprised at the number of customers who are uncertain about where they should be looking or what they should inquire about.

What areas should they be examining—and what questions should they be asking?

Relationship. You bet. You want someone who understands your needs. You want a company that has knowledge of the industries and where they are heading. It's important that your vendor delivers what is promised, and perhaps more importantly, delivers it on time.

Leadership. All ATE vendors claim to have it, but that's because they each use their own definition of it. What exactly is leadership? We think it is defined in three areas:
1. Technology leadership. Is your ATE vendor meeting your future technology needs at a price/performance level that is acceptable to you? For example, high-speed serial applications are becoming a hot area. Is your ATE vendor equipped to handle these and are they scaling to Moore's Law? Most ATE vendors aren't. They come out with a new application heavily loaded with R&D costs and pass them off to the customer. But ATE vendors with a single, scalable platform—like Agilent's—can better meet your price/performance requirements while handling the latest hot application like high-speed serial testing.

Make sure your vendors have the economic wherewithal to continue to be around. This should be a very real concern to you at this time.

Furthermore, how many ATE vendors currently have their own fabs? Agilent does. As a result, we have greater insight into the high-volume manufacturing environment. We know what is needed to take a chip from silicon to ship. We are dealing with the critical apps on a daily basis and building those solutions into our test systems.

Finally, who is coming up with the latest breakthrough technologies or practices? Proprietary innovations such as per-pin architecture, concurrent testing, design for test (DFT) alliances, and Pay-Per-Use technologies have kept Agilent ahead of the pack.

2. Support leadership. Take some time to look at a company's technology direction. See where support fits into that direction. Can the vendor be there for you 24x7x365 to meet your technology in terms of number, quality and worldwide location of resources?

3. Longevity leadership. Let's fact it, the latest economic downturn is causing significant problems for some ATE vendors. Make sure your vendors have the economic wherewithal to continue to be around. This should be a very real concern to you at this time. The pain of having many systems from one vendor

Continued on page 19

DID YOU ? KNOW

Do trees have memories?

Apple trees, do, in a sense, have a memory, said Dr. Marvin Pritts, professor of horticulture at the Cornell University College of Agriculture and Life Sciences. After a draught, the apple tree may produce a bumper crop the following year. "The buds for flowers and fruit for next year are formed in late summer, so the size of next year's crop is determined in advance.

"Apples are notorious for biennual bearing," he said, meaning big crops one year are followed by small crops next year.

To predict next year's crop, look to the preceding fall. Enough moisture, mild temperatures and plenty of sunshine contribute to a big crop the following year.

Source: The New York Times



Agilent introduces web debugging service

Debugging a complicated test system via the web is a new service offered to customers who own Agilent semiconductor test equipment, including the Agilent 93000 model.

Called the "Next Generation Secure Remote Access Solution," this web-based service provides a way for Agilent to access a customer's system controller and debug both the hardware and software at the customer site.

All the customer needs is a PC, an Internet explorer browser and a X-Windows client (to access the Unix Controller workstation from the PC).

The customer calls Agilent's support center, describes the problem, and then signs onto the web site with an ID and password provided by Agilent.

"We do a phone conference with the customer. Both the customer and the Agilent technician are simultaneously connected on both the phone and the computer," said Jean Lemaire, Agilent's senior technical consultant for Automated Test Systems.

"The Agilent remote technician can access the customer's system software to perform the debugging that is needed, while the customer watches the entire operation. The customer has full control of the link, and can limit what the technician is accessing," he said.

Information is exchanged between the support staff and the customer to explore the problem areas specific to the customer site, and then debug the software program or the hardware problem.

Customers can be interconnected in less than a half hour after reporting a problem, and this support service is typically available worldwide on a 24x7 basis.

The Agilent remote technician can access the customer's system software to perform the debugging that is needed, while the customer watches the entire operation.

Specifically, Secure Remote Access:

- Provides high-speed, secure remote connection to Agilent Semiconductor Test Equipment.
- Enables online meetings that will diagnose and fix problems.
- Demonstrates how to use an application.
- Allows the customer to view and annotate diagrams and schematics.
- Uploads specific files for analysis.
- Provides to the customer download patches or updates.
- Remotely reconfigures a customer's system.
- Dramatically improves the customer's problem-solving capabilities.
- Enables Agilent to share diagrams and other training materials with the customer.

The customer must give prior permission for remote control or file-sharing operations. Only approved Agilent support professionals have access to your system. The web-based program works with existing firewall technology to enforce password protection and provide SSL and encryption protection.

Secure Remote Access is available through standard hardware support agreement offerings. Contact your local Agilent support sales representative for more information. ◆

Web debugging case study

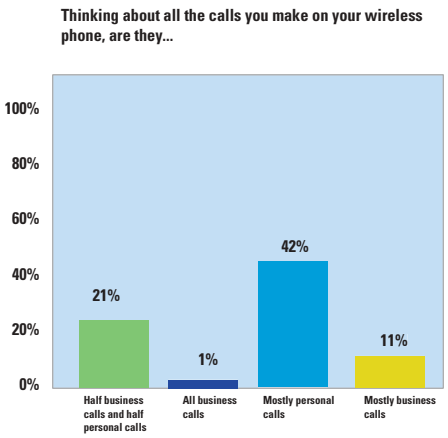
Jean Lemaire, a senior technical consultant for Agilent, was working with a customer in Ottawa, Canada, who had a unique software bug that the factory could not duplicate. His company had an Agilent 93000 SOC test system.

"We went online, and, while I was sitting with the customer, I had an Agilent R&D engineer in Germany connected with us. We initiated a series of debug commands. Germany was controlling the software at a low entry level, and within a half hour the engineer put his finger on the problem, and knew exactly where to go in the complex software of the test system to it. The entire debugging session took less than an hour," Lemaire said.

"Typically, a lot of verbal investigation between the engineer and the customer takes place beforehand, but once we establish the web connection, it usually takes anywhere from 15 minutes to an hour to determine the exact problem and how to fix it," he said.

DID YOU ? KNOW

Cell phone use survey



Harris Poll online survey

Not just child's play: Toys mean big business for semiconductor manufacturing



The holiday sales boost was welcomed by chipmakers. There will be 320 capacitors in every Xbox. That would mean $200 million in sales for capacitor companies in the next two years if Microsoft hits its sales targets.

So what will be weighing down Santa's sleigh next Christmas?

It used to be a question that only toy manufacturers and retailers asked themselves each year in an effort to grab a healthy chunk of the Christmas toy-buying spree and of the $65 billion global toy market. But now, semiconductor manufacturers are increasingly preoccupied with forecasting which toys will be hot each holiday season.

Why? One need only browse the "Hot Dozen," the list of 12 toys that *Toy Wishes* Magazine predicted to be the top sellers of holiday 2001. Here they are, in alphabetical order (see sidebar for descriptions of toys and chip usage):

- Action eye Mike Wasowski & glowing bedtime Sulley
- Aquatic rescue command center
- Battlebots
- Bob the builder electronic toy scoop
- e-Kara real karaoke
- Game Boy advance
- GameCube
- Hot Wheels fireboy raceway
- Imagination desk
- My Princess Cinderella
- Sugerplum Princess Barbie
- XBox

What do all these toys have in common? That's right. All 12 of last year's top holiday toy selections from *Toy Wishes* Magazine have at least one chip—everything from CMOS image sensors to memory and microprocessors.

Professor Nicholas P. Negroponte, the Jerome B. Wiesner Professor of Media Technology and director of the Media Laboratory, said recently on an MIT panel discussion that many toys today have a higher semiconductor content than computers on a desktop. "There may be more Barbie dolls than Americans connected to the Internet in five years," he added.

A peek into the crystal ball

What does all this mean for semiconductor manufacturers? For one thing, the toy market is still small when compared with PCs. In the year 2000, 130 million PCs were sold, so sales of even a few million game consoles are still not enough to make up for the decline in PC sales growth. Still, the holiday sales boost is welcome for chipmakers. There will be 320 capacitors in every Xbox. That would mean $200 million in sales for capacitor companies in the next two years if Microsoft hits its sales targets. Nvidia Corp., which has two chips inside the Xbox—a GPU and media processor—could ship 10M units; about 10 percent of their revenue.

While the boom in high-tech toys is good for business, supplying the toy market also has its drawbacks. Like almost every other market that uses semiconductors, toys are often ahead of their time. One influential Wall Street analyst predicted last November that Microsoft Corp. could lose as much as $1 billion on its new Xbox video game console before breaking even in fiscal 2004.

As a key link at the bottom of the supply chain, semiconductor manufacturers often lead the market, producing breakthrough chips that wind up in toys that may not hit the big time for several years. This leads to the classic semiconductor dilemma—the difficulty of accurately forecasting demand and setting production levels for maximum profitability.

Chip shortages hurt toy makers

An added challenge for semiconductor manufacturers is spikes in demand. During the 2000 holiday season, there was a dire shortage of processors, memory, and other chips used across a variety of different electronic devices, from cell phone handsets to Barbie dolls. Amid the shortage of much-sought after chips, some chirpy dolls and marching toy soldiers faced stiff competition from a myriad of other electronic devices to get off the assembly lines. The toy world began scrambling for electronic components. Chip producers, facing an explosion in demand for semiconductors used in hi-tech gadgets such as cell phones and other wireless hand-held devices, were unable to meet demand and in many cases, it was the toy makers who lost out.

The world's largest toy maker, Mattel Inc., for instance, sailed through its first and second quarters of 2000 when toy sales are always at their lowest after the mad rush of the holidays. But as it entered the third quarter, it found itself in a quandary when its suppliers said it would take double the time normally needed to supply semiconductors, wreaking havoc on its production schedule.

Leading the market

As far as the toy industry goes, the only sure prediction is that the market will remain relatively unpredictable. Even industry experts throw up their hands when asked what will be found stuffed in Santa's sleigh next Christmas.

"That's an 'astonishingly difficult' question," says John Baulch, publisher of Toys 'n' Playthings magazine. "The toy industry has become a fashion business, making it almost impossible to predict what's going to be big."

No matter which toys become popular, semiconductor manufacturers will need to continue to develop chips that make toys talk, walk, "see," and display video games with astonishing interactivity and speed. Whether or not kids and the market are ready for the advances in technology is a different matter. One thing is certain: Toy makers and chip manufacturers must start working much closer together to ensure a steady supply of chips for today's techie toys. ◆

Previous Christmas hits

1999 - Pokemon
1998 - Furby
1997 - Teletubbies
1996 - Action Man
1995 - Power Rangers

Source: BBC News Online

• ACTION EYE MIKE WASOWSKI & GLOWING BEDTIME SULLEY
Based on the stars of the Disney/Pixar film Monster's, Inc. Sulley is a horned but huggable pal who can say a variety of phrases and glow in the dark. Mike is Sulley's wisecracking sidekick whose one eye springs into action as he recites sayings from the movie.

• AQUATIC RESCUE COMMAND CENTER
From Fisher-Price, the command center is the "ultimate" action figure headquarters for its Rescue Heroes characters. It is loaded with sound effects and Voice Tech Cards that bring missions to life.

• BATTLEBOTS
Billed as "your own ultimate destruction machine," kids can maneuver Tiger Electronics' BattleBots via radio remote control.

• BOB THE BUILDER ELECTRONIC TALKING SCOOP
Bob the Builder features Bob and his friends as they work together to help the town's inhabitants solve their problems. Scoop, Bob's best friend, is a backhoe that loves to help. Press his smokestack and he'll lift his bucket and declare, "Can we fix it? Yes we can!" Electronic Talking Scoop also features a Bob the Builder figure who, when attached, recites encouraging phrases.

• E-KARA REAL KARAOKE
For kids who dream of being pop stars, e-kara Real Karaoke is a portable karaoke system. Kids can link up to 11 duet microphones for a real sing-along.

• GAME BOY ADVANCE
Game Boy Advance is Nintendo's latest gaming system.

• GAMECUBE
Nintendo's video game console, the GameCube is a new platform for all of the Nintendo games.

• HOT WHEELS FIREBALL RACEWAY
The latest Hot Wheels play environment from Mattel. Kids can send their Hot Wheels cars racing into nine different high-speed crash zones.

• IMAGINATION DESK
With this interactive learning center, children can color, write, draw, imagine and learn as the special voice chips reinforce number and letter skills.

• MY PRINCESS CINDERELLA
Playmates' My Princess Cinderella is an interactive doll that transports children into the story of the fabled princess.

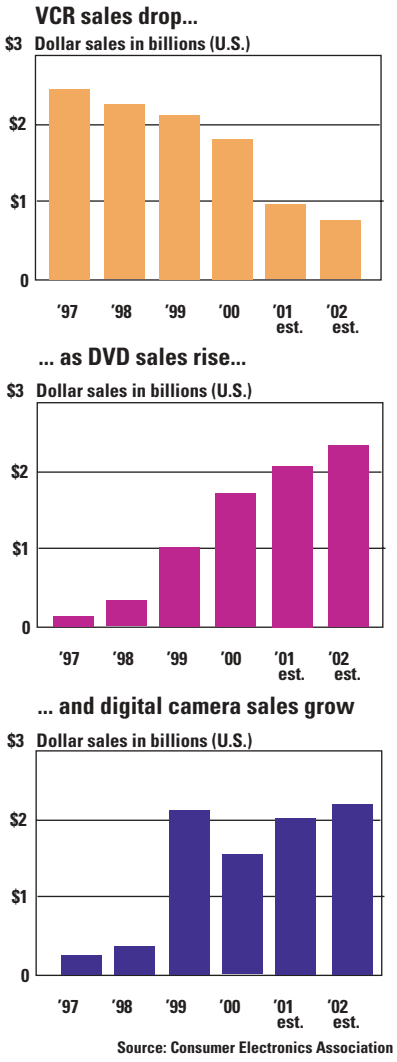
• SUGARPLUM PRINCESS BARBIE
This Barbie stars in a full-length home video of the holiday classic, The Nutcracker. She also can transform her ballet outfit into the whimsical costume of the Sugarplum Princess. Sugarplum Princess Barbie can dance just the way she does in the home video.

• XBOX
Microsoft's new gaming system, with a 733 MHz engine, a lot of memory, and high-speed image rendering.

Predicting the future of the memory market

DID YOU ? KNOW

Consumer momentum shifts to digital cameras, entertainment centers



Sales of video cassette recorders are projected to fall as consumers buy more DVD players, while sales of digital cameras are expected to total more than 7 million units,up 30 percent from 2001.

The changes and challenges that lie ahead for memory technology

Today, memory technology is at a perplexing crossroads in several different end-use applications, and it raises critical questions for the memory suppliers. Will lowest cost per bit continue to favor DRAM? Or will SRAM be preferred because of its higher speed and lower power consumption? Might Flash memory finally emerge as a compromise, and absorb demand from both DRAM and SRAM?

"We are looking at really fundamental changes in the industry as we have known it—both for the memory manufacturers themselves and the equipment companies that supply them," said Bob Merritt, Vice President of Semico Research Corporation. Merritt recently addressed a group of R&D engineers at Agilent Technologies' Santa Clara, California facility.

"As the OEMs require higher levels of performance, we are seeing wider separation between commodity products for PC applications and memory requirements for other applications."

Merritt pointed out that certain performance characteristics of several applications have already pushed beyond the limits of today's commodity memory products. Data networking applications are replacing PCs as the force driving performance requirements for new memory architecture. As data rates continue to increase, the amount of time allocated to process an information packet has approached the limits of commodity memory products.

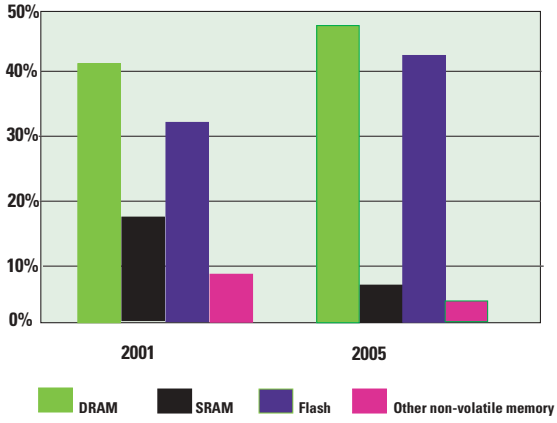
The following chart shows the amount of time available to process a 40 byte packet (360 bits including parity) as it passes through a router.

Application	Data Rate or Processing Speed	Time available to process a 40 Byte Packet
Gbit Ethernet	1 Gbit/sec	360nsec
OC48	2.5 Gbit/sec	144nsec
OC192	10Gbit/sec	36nsec
OC768	40 Gbit/sec	9.0nsec
	100Gbit/sec	3.5nsec

Source: Semico Research

Another important memory application is mobile data and cellular handsets. "These designs require lower power memory while retaining some attributes of SRAM, DRAM, and Flash. The impact on the memory market of building 500 million cellular phones a year —especially as new applications require increased memory in each phone—is very significant," Merritt said.

As these, and other high volume applications, absorb more memory, Semico is forecasting new levels of memory product differentiation, and significant redistribution of revenue among the various memory technologies during the next four years.



Strategies vary

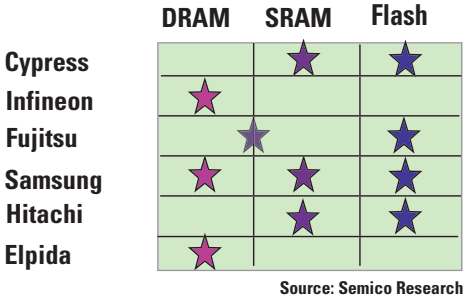
Semico predicts that the diminished role of the PC in providing a conven-

A major challenge for the companies that support semiconductor development and testing is that memory manufacturers will ultimately promote memory solutions that are most beneficial to their own product strategies.

ient "standard" for commodity memory, coupled with the emergence of new requirements for the communications system OEMs—which promise to be as demanding as they are diverse—will force memory suppliers to alter their long-term market vision and product strategies.

A major challenge for the companies that support semiconductor development and testing is that memory manufacturers will ultimately promote memory solutions that are most beneficial to their own product strategies. What may seem to be in the best interest of the memory "industry" often gets lost as companies rush for market share with different technologies and different strategies.

The following chart, for example, compares the product mix of several memory manufacturers pursuing cellular handset designs. Each supplier has a unique mix of products, which often results in different motivations for supporting one technology over another. What do these trends mean for companies that provide the manufacturing infrastructure?



Source: Semico Research

A major concern for all memory suppliers is the timing—and financing—of the transition to 300mm wafers. A strong recovery in 2002 would help by providing the essential revenue boost necessary to fund the transition. But a strong near term recovery might also mean more reliance on existing (200mm) fabs. A delayed recovery on the other hand could lead to further consolidation, providing additional 200mm capacity to the remaining memory suppliers, resulting in an even more arduous transition to the newer equipment.

Merritt emphasized that Semico's latest forecast of 22 percent revenue growth in 2002 (for the semiconductor industry as a whole) reflects confidence in healthy macroeconomic conditions, with the first signs of recovery becoming clearly visible in the second quarter.

While there is general agreement that the recovery will begin in 2002, there is less consensus about what market segments may lead that recovery. What does seem certain, however, is that the future direction of the memory market could make the PC-centric era, just ending, look stable by comparison. ◆

Editor's Note: *Background information and analysis for this article was taken from the following Semico Research reports:*
—DRAM Market Report VM101-2-01 (June 2001)
—Flash Memory Forecast NV101M-4-01 (Dec. 2001)
—Content Addressable Memory Study CM102-1-01 (Nov. 2001)*
—SRAM Market Report VM121-1-01 (Nov. 2001)*
**These are the first in a new series of Semico studies on High Performance Memory. Other reports in this series will become available throughout 2002.*

For more information about Semico Research reports, please contact Craig Steadman at 602-997-0337 or go to www.semico.com.

DID YOU ? KNOW

Silicon Valley Jargon

Geeked

Nerdy synonym for "psyched."

Gastrobots

Robots that can digest organic matter and turn it into power. Researchers have created gastrobot that run on sugar cubes and are now working on models that can process slugs.

Managing the blood supply

Keeping an eye on a company's talent pool to prevent ideas, strategies, and performance from becoming anemic.

Doorway scam

A Web diversion ploy that involves setting up a phony page to place high in search engine results. When users click on the link, they're sent to an unrelated, usually pornographic, site.

Dot-orging

Leaving the dotcom sector for the calmer waters of a dot-org.

Big hat, no cattle

Texas expression used to dismiss a cowboy wannabe. In Lone Star IT circles, it describes a technician with a certificate or degree in computer science, but little or no field experience.

Sneakers-up

A dotcom that's gone belly-up. Reminiscent of the older hacker slang "casters-up," meaning a broken-down or dead computer.

Source: Wired magazine

Silterra qualifies its 0.18-micron process

Foundries in Malaysia still aren't seeing much business, but the enterprises are moving forward in technology development as they weather the economic downturn of 2001 and early 2002.

Silterra Malaysia Sdn. Bhd. in Kulim recently announced that it has qualified its 0.18-micron process technology with 2Mbit SRAM chips. The wafers revealed high yields and low defect density, which puts the foundry on a par with other foundries across the globe.

In related news, 1st Silicon (Malaysia) Sdn. Bhd., based in Kuching, announced late autumn that it had qualified its foundry services with the International Standards Organization.

While Silterra is making improvements to its process technology, the utilization rate at its fabs still remains relatively low, according to Steve Della Rocchetta, executive VP of sales and marketing.

"We're getting our yields up and our defect densities down to equal the best in the industry," Della Rocchetta said. "We're doing a bang-up job."

While utilization rates remain low at Silterra, Della Rocchetta said the company is starting to see improvements in customer order activity, with a tremendous amount of activity in prototyping on the company's 0.18-micron process, he said.

While Silterra is busy proving technology on its own SRAM products, that process is the same for logic circuits, Della Rocchetta said. Silterra is also positioning itself for system-on-a-chip capability with embedded SRAM capability and a mixed signal process, he said.

Silterra has 10 customers engaged in wafer production at its fab, Della Rocchetta said. The company has also announced that LSI Logic Inc. and Seiko Instruments are among its customers.

Silterra has an installed capacity of 18,000 wafers per year, but that is less than half of an expected 40,000 wafers per month that the company hopes to achieve when it reaches full capacity.

During the downturn, Silterra has focused on bringing its 0.25-micron, 0.22-micron and 0.18-micron processes on line. Now that it has achieved 0.18-micron process qualification, Della Rocchetta said Silterra will work on refining the technology before starting with the equipment move-in for 0.13-micron process technology.

Silterra hopes to introduce its 0.13-micron process by late 2002. That goals seems likely, Della Rocchetta said, because the company has a good track record of achieving its technology goals on time.

"We've introduced every technology node on schedule," he said. "They have been producing high yields on their first runs. We're focused on our CMOS process. We are not diverted into putting our technology into other areas. We have a lot of competent individuals working for us."

The company said it has achieved 85 percent yields on the first lot of wafers to pass through its 0.18-micron fab line. Since then yields have been pushed up to 90 percent. The process is capable of supporting six layers of metal and revenue wafers were scheduled to start shipping in the fourth quarter. ◆

—Electronic News

Agilent and STATS to deliver next-generation, high-end, mixed-signal communications device testing

Agilent Technologies and ST Assembly Test Services Ltd. ("STATS") of Singapore will jointly deliver mixed-signal device testing for emerging technologies in the communications market. The collaboration between the two companies is expected to help decrease time to market for leading communications design houses worldwide.

"Communications customers today are constantly looking for revolutionary testing technologies in an increasingly competitive business environment," said June Chia, STATS Executive VP, Worldwide Sales and Marketing. "By combining the mixed-signal test leadership of STATS and the cutting-edge test technology of Agilent, we present a compelling value proposition for communications customers in both the wireless and wired sectors."

Under the agreement, STATS has installed Agilent's versatile 93000 SOC Series Test System in its Test Development Center (TDC) in Singapore, part of STATS' global TDC network covering the United States, Europe and Asia. STATS' global TDCs provide sophisticated software engineering services, including test program development, conversion and optimization for customers. These TDCs are situated close to customers to facilitate quick ramp and time to market. STATS' agreement with Agilent also encompasses technology sharing, manufacturing support, test application development, conversion and de-bugging services. As part of its continuing strategy to invest in key capabilities for future growth, STATS plans to purchase and install multiple Agilent 93000 SOC systems in STATS and its subsidiaries in the near future.

"STATS is confident that the performance and flexibility of the 93000 SOC Test System will meet customers' requirements at a competitive price," said Yih Neng Lee, vice president of Agilent's Asia Operations. "STATS has chosen the 93000 SOC Series as a key preferred solution to broaden support for their customers in the communications and mixed-signal SOC sectors. The 93000 platform's flexible architecture and bandwidth will better enable STATS to meet its customers' requirements." ◆

Agilent invited to participate in Motorola's KLM Technology Symposium 2001

Motorola Malaysia held the KLM Technology Symposium 2001 on 6 Nov 2001 in Kuala Lumpur, Malaysia. Agilent Technologies was invited by Motorola to serve as the only external speaker invited from the event. More than 250 engineers from Motorola attended the event.

Daniel See, Regional Consultation, Asia presented "Challenges and Requirements of Testing SOC." The address discussed the challenges of testing complex SOC devices with functional blocks of analog, mixed-signal,RF, high speed buses, communications, digital, embedded memory. ◆

DID YOU ? KNOW

Disorder in the court

These are things people actually said in U.S. courts, word for word, taken down and now published by court reporters — who surprisingly stayed calm while these inane exchanges between lawyers and witnesses were taking place.

Q: What is your date of birth?
A: July fifteenth.
Q: What year?
A: Every year.

Q: Now doctor, isn't it true that when a person dies in his sleep, he doesn't know about it until the next morning?

Q: Were you present when your picture was taken?

Q: So the date of conception (of the baby) was August 8th?
A: Yes.
Q: And what were you doing at that time?

Q: How was your first marriage terminated?
A: By death.
Q: And by whose death was it terminated?

Q: Doctor, how many autopsies have you performed on dead people?
A: All my autopsies are performed on dead people.

Q: Doctor, before you performed the autopsy, did you check for a pulse?
A: No.
Q: Did you check for blood pressure?
A: No.
Q: Did you check for breathing?
A: No.
Q: So, then it is possible that the patient was alive when you began the autopsy?
A: No.
Q: How can you be so sure, Doctor?
A: Because his brain was sitting on my desk in a jar.
Q: But could the patient have still been alive, nevertheless?
A: Yes, it is possible that he could have been alive and practicing law somewhere.



Agilent holds its third 4070 series user group meeting

Agilent Korea held the third 4070 series users group meeting last fall in Yang Peoug Youm Kwang Youth Center, Korea. Customers from SEC, Hynix, Anam, Eoncom and third party (Yulim hitech) joined this event. Two messages were delivered to its Korean semiconductor parameter test (SPT) customers:
• The Agilent parametric test business unit helps to provide open communication among 4070 series users in order to ensure customer satisfaction.
• Agilent parametric test solutions continue to provide customers with maximum value even during the industry's economic downturn.



Samsung ranks fourth in handset market

Samsung Electronics, the country's largest mobile handset maker, ranked fourth on the global market in terms of market share during the year 2000 third quarter. (Fourth quarter results were not yet available.)

Citing the latest data released by Dataquest, Samsung said it has sold 7.1 million units in the July-to-September period, carving out a 7.5 percent global market share. The performance is up three notches from the year's earlier quarter when it ranked seventh, with a 4.0 percent market share.

The No. 1 handset maker is Nokia with 33.4 percent market share, followed by Motorola with 15.7 percent and Ericsson with 8.0 percent. LG Electronics, the country's second largest handset maker, ranked eighth on the Dataquest list, with 3.1 percent market share.

Samsung said it will focus on medium- and high-end models in getting a share in the CDMA 2001 1x market in the U.S. and the GPR Market in Europe. The total handset market for both domestic and overseas was set at 28 million units for the year 2000.

— Korea Herald

Samsung introduces new technology for chip production

Samsung Electronics, the world's largest computer memory chipmaker, recently announced that it started chip production using 300mm wafer (12-inch) technology, the first company in the world to do so, underscoring its resolve to grapple with a protracted slump in the global chip market.

"Samsung has set up facilities for operating 300mm wafers at Hwaseong and the mass production of 512Mb double data rate SDRAM, Flash and SRAM has

kicked off," said Hwang Chang-gyu, president of Samsung's memory chip division. Compared with existing 200mm wafers, Samsung's new 300mm wafers are known to increase production volume by 250 percent. The global semiconductor industry has been keen to seize the initiative in the 300mm wafer market.

Samsung Electronics also aims to rank second by the end of 2005 and raise its share of the global memory chip market to 30 percent. Samsung, already the largest memory chip maker, is selling 40 percent of its chips below production cost, reflecting a record downturn in the global chip market. Still, Korea's top big-cap share expects growth in non-PC sectors such as consumer electronics and network systems.

—Korea Herald

Autos, not chips, now Korea's top export to the U.S.

Automobiles have raced ahead of semiconductors as South Korea's top export to the key U.S. market and local automakers are confident they can hit targets despite a slowdown in the world's largest economy. Semiconductor exports played a major role in the nation's recovery from the 1997-98 financial crisis and their export value was double that of cars until this year, Ministry of Commerce data showed.

— Reuters

Hynix rolls out MCU for car audio

Hynix Semiconductor has completed development as well as launched volume production of a microcontroller unit (MCU) for car audio systems. The 8-bit MCU is equipped with Phase Locked Loop (PLL), 32KB code read only memory (ROM), and 1KB data random access memory (RAM) for digitalized frequency selection functions. The chip enables basic tuning while also accessing any CD player, CD changer, MP3 player, or other radio data system function integral to the audio device.

By applying Register Transfer Level (RTL) technology in a System-on-a-chip (SOC) environment, Hynix expects prompt design technology upgrades which quickly address changes in circuit width while reducing development time. "Car audio makers at home and in Southeast Asia are currently developing products equipped with our MCU. We expect revenue of 60 billion won for this device over the next three years," said Chae Jae-ho, Hynix vice president for MCUs produced by the Standard Products unit of the System IC division. ◆

-- Korea Herald

DID YOU ? KNOW



Not all scientists are right…

Mars, the "Red Planet," has always held a fascination for those interested in the possibility of life on other planets. In 1895 a professor of astronomy, Samuel Leland Phelps, wrote in a book called World Making that with a new 40-inch telescope being built by the University of Chicago, "It will be possible to see cities on Mars, to detect navies in [its] harbors, and the smoke of great manufacturing cities and towns... Is Mars inhabited? There can be little doubt of it... conditions are all favorable for life, and life, too, of a high order. Is it possible to know this of a certainty? Certainly."

The photos of Mars now confirm that there is no evidence for the things that Professor Leland thought we would see with an Earth-based telescope.

Mars has a rotational period of 24 hours and 37 minutes, a period for revolution about the sun of 687 days, and a diameter of 6800 km (about half that of Earth). It also has:

- A reddish hue over 3/5 of the planet, which we now known to be caused by red dust and rocks on the surface of the planet.
- Polar ice caps waxing and waning with the seasons that we now know to be composed both of dry ice (frozen carbon dioxide) and water ice.
- Surface markings that some originally thought looked like "canals" from Earth. These are now known to be features like the edges of mountain ranges.
- Areas of changing color that were once thought to correspond to vegetation. We now believe these regions of changing color to be due to blowing sand, not vegetation.
- An atmosphere with clouds.

Time-to-market solutions allow customers to test parts sooner

When your test system is delivered, the Agilent services and support team can help you reduce the time it takes to successfully test parts. During the time-to-market phase, Agilent offers:

- Site preparation and verification that include floor plan and test system configuration, site safety considerations, power and cooling tools, and communications tools such as telephone, modem, and Internet access.
- System installation that includes uncrating and positioning of the test system; loading the operating system and utility software; and running initialization, diagnostic, and verification procedures, and system calibration.
- Verification of test system compliance including compliance definition, system diagnostic procedures, acceptance testing, environmental and safety verification, standards device testing and correlation, and performance reports.
- Test application consulting for engineering and test characterization, device testing, and integration as well as training aimed at maximizing test system use and applying the latest test strategies.
- Basic user training for technicians and test engineers including how to program the test system.
- Application conversion services help you better utilize your test capacity by quickly converting pre-existing non-Agilent test programs to your Agilent production test platform.

One customer, SSMC, recently commented on Agilent's support services "We are pleased and impressed with Agilent's ability to deliver within such a short time. We appreciate the team's efficiency and commitment to our aggressive start-up plans. It allows us to concentrate on building our processes and to continue to leverage on Agilent's outstanding capabilities," said Tony Lear, CEO of SSMC. ◆

Customer education service offered by Agilent

Agilent experts offer customer education courses covering applications, operations, and software. The courses help build basic technical skills and learn new test techniques, regardless of background or proficiency, and enable one to shorten startup times on complex test systems, learn more rapidly, avoid mistakes, improve the quality of measurements, and increase the accuracy of data. Agilent offers a wide variety of formats to meet customer needs including classroom and on-site training.

The benefits

Shorter time to full test system use
Multiple training tools, including several computer-based modules, shorten the time necessary one to learn complex test applications and help avoid startup mistakes.

Increased knowledge
Agilent education courses provide a person with the knowledge, documentation, and hands-on experience required to maximize productivity right from the start.

Consistent, worldwide training
The Agilent global network of qualified instructors ensures that the quality and content of the sessions are consistent, no matter where a plant is located. ◆

Training courses available

In Taiwan, there are a number of training courses on computers, semiconductor engineer school, semiconductor test systems, and board test and inspection systems. Classes are scheduled on several dates in January, February and March.

For more information on the courses, please call Dana Yu at 886-3-5521053 in Singapore or Eros Shen at 886-3-5521055, or visit the web site at http://ec_agilent.eos.net.tw.

Singapore also has training courses during the winter months in basic and advanced user application, mixed signal test, and SPECS user basic. For further inquires or registrations, please contact Wee Swee Rose at (65) 2158626, or e-mail her at swee-rose_wee@agilent.com.

Agilent streamlines test program development and reduces cost of test for flash memory manufacturers

A flexible and complete test solution for memory in consumer electronic devices

Agilent's new Versatest Series Model V4100 TDS is a cost-effective and compact test development system that provides a complete test solution for non-volatile memory required in many popular consumer electronics—from wireless communications devices to digital cameras.

Available in performance levels of 40, 70 and 100 MHz, the Model V4100 TDS is fully compatible with the Agilent Versatest Series Model V4400 memory test system, enabling test programs from the Model V4100 TDS to be transferred directly to the Model V4400 for production.

The combination of both models—V4400 and V4100 TDS—provides a flexible and complete test solution, from development to production, for memory applications including flash memory, SRAM, embedded memory and for pure logic applications. Test engineers can now quickly and effectively build a program and debug their device while saving the valuable production tester resources by using the V4100 TDS to develop test programs in a lab environment instead of on the production floor.

"The V4100 TDS is another milestone in providing our customers with a complete memory test solution, while lowering the cost of test of memory required in many popular consumer electronics—from wireless communications devices to digital cameras," said Gayn Erickson, marketing manager of Agilent's Memory Test Division. "The V4100 TDS helps reduce the cost of test by enabling the test engineer to optimize test programs and to take advantage of the same capability of the V4400 system resources."

Requiring a mere 5.3 square-foot area (0.49 square meters), the V4100 TDS features a small footprint, which is better suited for lab use and further helps to trim the cost of test by minimizing the use of valuable floor space. The V4100 TDS is designed with a flexible interface for greater versatility in system use. Its single, detachable test head allows for a wide range of applications, from testing packaged parts to wafer sort and final test. The test head is also capable of supporting up to two test site modules, the same modules that are used in the V4400 memory test system, resulting in perfect correlation. The V4100 TDS can test up to 128 pin-count devices when used in combined resource mode.

The Agilent Versatest Series Model V4100 TDS is expected to ship in March 2002. More information is available from the Agilent Web site at www.agilent.com/see/memorytest. ◆

DID YOU ? KNOW



Flies' ears inspire new microphones

In the past decade, biologists discovered a new mechanism by which animals locate sounds. The finding emerged from the observation that a parasitic fly stalks crickets by sound, even though the fly's head is too small for any of the previously known sound-localization mechanisms to work. Now, engineers are creating a micro-microphone inspired by the fly's extraordinary ear.

"The fly has given us an entirely different way of looking at microphone design," says Ronald N. Miles of the State University of New York at Binghamton. For one thing, the new design strategy could lead to hearing aids that hide within a person's ear canal yet gather sound primarily from the direction the listener is facing, its developers say. It may also find use in battlefield-surveillance devices and yet more compact substitutes for microphones now used in cell phones and other communications gear.

Last year, a Canadian study showed that female flies of the species Ormia ochracea pinpoint sounds to within 2 compass degrees—as precisely as an owl does.

The side-by-side eardrums of the fly span only about a millimeter. Unlike any other known ear structure, there's a bridge of stiff material connecting the two membranes almost as a hinge might. Other small-headed animals, including birds and frogs, use an internal air tube between ears to discern direction information, he adds.

Vibration studies by Miles and his colleagues have revealed that, because of its bridge, the fly ear responds to sound with mixtures of two motions: rocking like a teeter-totter and flapping like a wing. What's more, the location in the fly's ear structure of the peak amplitude from the vibrations reveals the direction of the sound source.

Source: Science News

Achieve measurements at production throughput for high-speed digital, differential interfaces with Agilent's 93000 SOC Series NP-models

DID YOU ? KNOW

Top 10 Tech Trends for 2002

Online music
Big record labels get serious

Smartphone
Ditch separate phone and handheld computer

DVD recording
Expect prices to drop, demand to grow.

Telecom packaging
Cellphone and long distance deals by midyear.

Wireless data
Technology is here, reasonable pricing is not.

Video games
Leap from the living room to the Internet.

Connected schools
Online grade books, parent conferences.

E-bills
Moving closer to critical mass.

Home networks
Wireless hubs gaining tractions.

Interactive TV
'Still waiting...

Source: San Jose Mercury News

Consumerization of the Internet and increasing processing speed of personal computers have caused the demand for data bandwidth to explode. Increasing demand for bandwidth requires faster and wider data transfer interfaces both within and between computers. Industry players have proposed standards such as Rapid IO, HyperTransport, 3GI/O, Infiniband, and embedded SerDes to satisfy this market gap.

Agilent Technologies' NP2500/NP1700 models of the Agilent 93000 SOC Series directly address the demands of testing high-speed network equipment and high-speed computer busses by incorporating unique capabilities for:

- **Testing high-speed low voltage differential technology**
  High-speed interface technologies deploy low voltage differential signaling (LVDS). This technology requires higher transmission rates and greater bandwidth with lower power consumption and shrinking voltage levels, posing challenges to standard single-ended ATE. The NP-models address these issues with up to 256 high-speed digital, true differential pairs that match the differential operation of emerging interfaces standard environments (please refer to Figure 1). These true-to-life test conditions ensure that the device will be functional in its intended application, thus improving time-to-market and time-to-volume. The NP-models also support autonomous, single-ended capability. This flexibility between single-ended and differential operation provides increased application coverage and versatility.

Standard ATE compared to Agilent retiming

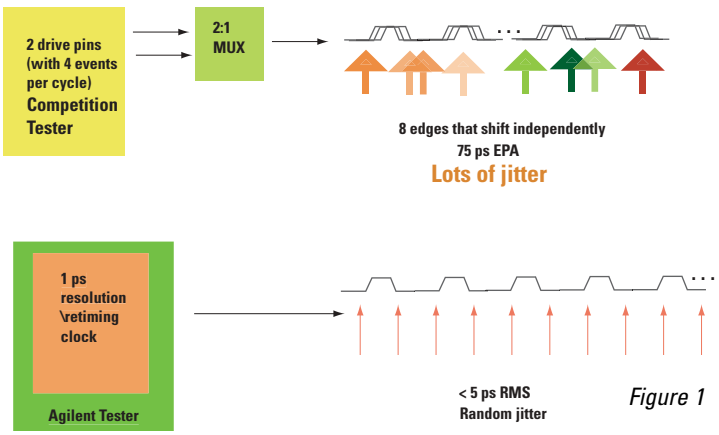


Figure 1

Block Diagram: Native Source Synchronous

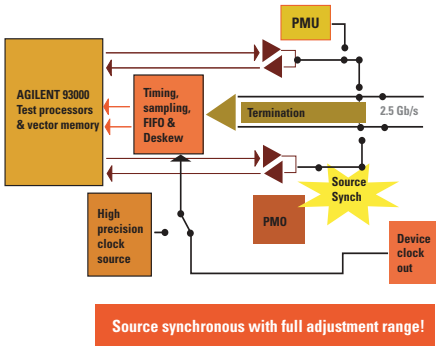


Figure 2

- **Facilitating less complicated and quicker jitter measurements**
  The NP2500 model uses a proprietary retiming scheme that provides considerably lower jitter than the conventional pin muxing method used by traditional ATE architectures as shown in Figure 2. Retiming uses only one precision clock rather than combining multiple independent events to generate high data rate signals. This methodology results in a considerably cleaner signal than a conventional pin muxing methodology. The fine timing resolution of 1 picosecond provides test engineers

with the capability to perform accurate jitter measurements of less than 5 ps directly with the pin electronics, no extra instrumentation is required. Because of the unique tester per pin architecture of the Agilent 93000 SOC Series, these measurements can be executed in parallel across all pins providing a throughput of 60 ports in less than a second.

- **Supporting source synchronous devices**
  The NP2500 also provides users with advanced support for source-synchronous interconnect technologies. Native source synchronous support is a technology that enables the "device clock out" of the device under test (DUT) to be used as the reference timing for the tester's stimulation and measurement signals. This technique, illustrated in Figure 3, synchronizes the DUT timing to the tester timing, allowing the device to signal the tester to start looking for valid data thereby improving the system margin. The strobe support allows the tester to be synchronized to the DUT's outgoing clock, eliminating the time consuming task of searching for the optimum measurement point. Not only does this technique result in dramatically reduced test times, but it also emulates the device's operational environment therefore guaranteeing more accurate test coverage.

Summary

Through the use of true differential digital channels, retiming circuitry and native source synchronous support, Agilent's new NP-models provide engineering test at production throughput to the widely deployed Agilent 93000 SOC Series. ◆

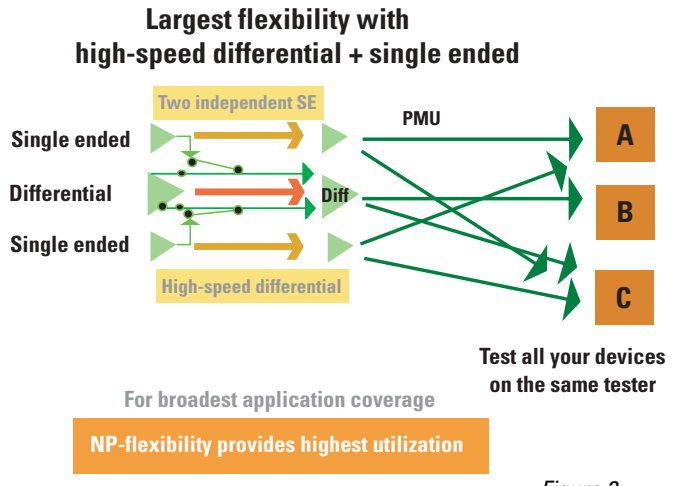


Figure 3

DID YOU ? KNOW



Beauty lights up the brain

Given the opportunity, many men will gladly spend time gazing at beautiful women's faces.

Though the news may not come as much of a shock, the researchers who report the finding in a new study say it may still lend some insight into how the brain works.

Scientists at Massachusetts General Hospital said they wanted to see how the brain responded when heterosexual men were exposed to photographs of women and men in varying degrees of attractiveness.

The researchers found, among other things, that the part of the brain that responds to facial beauty is the same area that is activated by food, recreational drugs and money.

The men surveyed were divided into groups and shown a series of photographs portraying attractive women, average women, attractive men and average men. The men lingered longer over the beautiful women.

Meanwhile, brain scans showed the "reward circuitry" of the brain lighting up as the men looked at the attractive women's pictures, but not those of men.

Philips and QUALCOMM choose Agilent for testing of next-generation devices

DID YOU ? KNOW



Commercial applications for a water-hoarding beetle

Beetles in the Namib Desert in southwestern Africa have a covering that captures water from the environment—and their system can be easily made and may have commercial applications.

The Namib Desert, which has the highest sand dunes in the world, gets almost no rainfall. But it does have early morning fog, which normally would be lost to heat and wind.

But the beetles studied by University of Oxford researchers are able to collect water from the fog using a bumpy surface on their backs. The bumps are about half a millimeter in diameter, and their peaks are covered with a substance that is water-loving, or hydrophilic. The valleys between the bumps are covered in wax, and thus repel water. As fog passes over the beetle, tiny droplets collect on the peaks, and accumulate into larger droplets until their mass is such that they overcome the forces holding them to the peaks and roll into the valleys. The droplets are also large enough to withstand the force of the wind and roll down the back to the beetle's mouth.

The researchers experimented with their own version of this covering and found it easy to fabricate. Such a system, they say, has potential uses in water-trapping tents and building coverings for use in harsh environments.

Philips Semiconductors, a world leader in silicon systems for wireless communications, selected the Agilent 93000 SOC Series for volume testing of Philips Semiconductors' next-generation cellular baseband integrated circuits (ICs).

And QUALCOMM, pioneer and world leader of Code Division Multiple Access (CDMA) digital wireless technology, has added two new Agilent 93000 SOC Series test systems to its existing array of 93000 systems. This will enable characterization and test development of next-generation cellular baseband processor IC (integrated circuit) devices.

The purchase will enable QUALCOMM CDMA Technologies to characterize devices on the same platform used for production test. Using the Agilent 93000 for both engineering and production test will accelerate time to market by avoiding lengthy test plan conversions and ensuring correlation between characterization and production test.

For Philips Semiconductors, the yield and throughput results achieved using the Agilent 93000 for testing the complex mixed-signal devices demonstrated the tester's speed, site-to-site and tester-to-tester correlation, and its measurement repeatability. These strengths provide Philips with the competitive advantage needed to continue delivering high-quality, cost-effective products to the wireless market.

"The Agilent 93000's high reliability and stability makes it an ideal platform for high-volume production testing. The flexibility of the system aligns with our widely varying testing needs to address multiple market segments, now and in the future," said Rimmer Hylkema, director of Test Operations ATO, Philips Semiconductors.

The 93000 significantly reduces test time, thereby driving down cost of test, by supporting both multi-site test, where more than one device is tested simultaneously, and concurrent test which enables several functional elements on a single device to be tested in parallel.

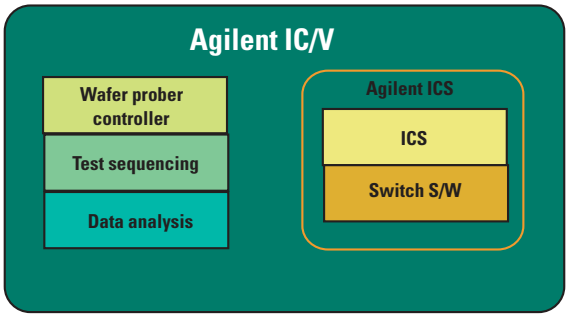
"QUALCOMM's selection of the Agilent 93000 for baseband IC production test was driven by QUALCOMM's need to continuously reduce cost-of-test," said Don Schrock, president of QUALCOMM CDMA Technologies. "The Agilent 93000's ability to support both multi-site test and concurrent test for baseband processors were important factors in QUALCOMM's selection of the Agilent 93000."

"The wireless market is constantly changing, and integration levels for baseband processors continue to increase dramatically every year with GPS, Bluetooth™ and many other functional elements soon to be added to already complex baseband processors," said John Scruggs, senior vice president and general manager of Agilent's Automated Test Group. "The Agilent 93000 has the capability to test highly integrated devices that can have digital, analog, RF and embedded memory on a single chip or in a single package, enabling the 93000 to meet future integration challenges." ◆

Demonstration version of I/CV now available

The previous issue of *go/semiconductor* described the features and benefits of Agilent's I/CV automation software in great detail. A demonstration version of this software is now available on CD-ROM. If you are curious as to the advantages of using Agilent I/CV to automate your parametric instrument measurements, you now have the means to sample the product at no cost to you. The CD also contains an interactive presentation explaining the features and benefits of Agilent I/CV in great detail.

Agilent I/CV contains Agilent ICS (Interactive Characterization Software) as an integrated part of the overall product. I/CV uses ICS as its measurement "engine." ICS has a large user base (more than 2,000 copies installed worldwide), and is a well-proven and stable product. However, I/CV has many additional capabilities. I/CV provides easy wafer prober control, which allows a person to synchronize instrument measurements with a wafer prober. It also enables one to create entire test sequences and to control the test flow via conditional branching statements. I/CV can display wafer-mapping results in real time, and it can also aid in the post-test analysis of measurement results across a wafer. Finally, I/CV has built-in data analysis features that enables one to analyze data as it is being generated, remotely from your desk. If you are a current ICS user, then upgrade to I/CV at a reduced cost. Agilent I/CV runs on MS Windows NT and 2000, and it can reside on the same PC as a wafer prober.



Metrics Technology (www.metricstech.com), an Agilent technology partner, is the actual creator of this software. Agilent sells and supports I/CV through an agreement with Metrics. The software can be purchased either through Agilent or Metrics, with the only difference being the company who sells the product then becomes the primary support contact.

To obtain your free copy of this CD, please contact your local Agilent sales representative. The publication number is 5988-5023EN or contact your local sales representative. ◆

DID YOU ? KNOW



One little letter makes a big difference

The following expressions are the responses from winners of a *New York* magazine contest who were asked to take a well-known expression in a foreign language, change a single letter and provide a definition for the new expression:

RIGOR MORRIS
The cat is dead.

HARLEZ-VOUS FRANCAIS?
Can you drive a French motorcycle?

VENI, VIPI, VICI
I came, I'm a very important person, I conquered

VENI, VIDI, VISA
I came, I saw, I shopped.

POSH MORTEM
Death styles of the rich and famous

MONAGE A TROIS
I am three years old

HASTE CUISINE
Fast French food

QUIP PRO QUO
A fast retort

CARNE DIEM
Seize the meat

CARPE DIEM
Complain all day

Gains in chip industry fuel hope in Korea

As many industrialized nations wonder how low the global economic slump will take them, there are signs emerging that South Korea may have found bottom and turned up again.

The chip business, a fountain of gloom last year, is a source of hope now. Hynix Semiconductor, the world's No. 3 maker of commodity dynamic random access memory chips (DRAMs), said in early January that it had raised prices about 30 percent, its third increase in a month.

There were also indications that Hynix, struggling to revamp, is making progress in talks to sell some operations to an American rival, Micron Technologies, the No. 2 DRAM maker, to raise cash.

The leader in the field, Samsung Electronics, also reported that prices were heading higher, and analysts said Micron and a major German manufacturer, Infineon Technologies, could expect better terms in new sales contracts with customers.

Analysts said the fact that Hynix no longer had to cut its prices to win orders was a sign that consumer demand was firming up for the computers and electronic goods that use the chips.

Chip makers had a terrible year in 2001, with DRAM prices falling more than half. Most DRAM chips are sold on contracts, but some trade in a spot market, where prices rose about 9 percent in early January.

Source: The New York Times

DID YOU ? KNOW



2001 Redux—are we there yet?

The rerelease of the movie, *2001: A Space Odyssey,* brings to mind the visions of progress to date—less than the original movie promised. But there have been some scientific advancements:

Emotional intelligence
Kismet, a robot now under development by the Humanoid Robotics Group at MIT's AI Lab, mimics human emotion and interaction. It can use eye contact and facial expressions to lure visitors into baby-talk-style conversations. The robot responds to praise or scolding by recognizing voice patterns, and pulls back when physically threatened.
www.ai.mit.edu/projects/humanoid-robotics-group/kismet/kismet.html

International space station
Scheduled for completion in 2006, the $22 billion ISS is receiving funding from Canada, Brazil, Japan, Russia, the U.S., and the European Space Agency. Multinational crews will conduct zero-gravity experiments in its 747-sized live/work space.
spaceflight.nasa.gov/station

Plasma rocket engine
NASA's projected 2018 Mars mission would ride a steam of superhot ionized hydrogen contained only by a magnetic field. Plasma power, which is being tested on a very small scale, would enable astronauts to reach Mars in 115 days, compared with the 10 months it would take traditional rockets.
spaceflight.nasa.gov/mars/technology/propulsion/asp/vasimr.html.

Source:Wired magazine

Quarterly review of the Fabless stock index

The Fabless Stock Index (FABLS) was launched in 1998 as a measurable means of highlighting fabless semiconductor companies. The Index tracks publicly traded, fabless semiconductor companies that meet or exceed a market capitalization criterion. (see www.fsa.org)

The Fabless Semiconductor Association/Merrill Lynch Fabless Stock Index finished three months ending in October 2001 with a decline of 16 percent. Although disappointing,this is an improvement from the prior three-month period.

It has become much more difficult to forecast earnings for any semiconductor company, fabless or integrated, since Sept. 11, and the lack of certainty about the future is one thing that stocks hate.

The good news is that the fabless model isn't being treated any worse than other parts of the semiconductor business, at least in terms of stock price performance. This is significant since the fabless segment of the semiconductor business has often been thought of as the newer, higher-growth and higher-risk place to be. The fact that FABLS has done better during the extraordinary volatility of the last three months is testament to the fact that the street is assigning real value to the durability of the fabless business model and not just its growth potential.

We are please to see the street beginning to realize the tremendous value that the fabless model offers to investors at all stages of the semiconductor cycle.

— Joe Osha, first vice president, Global Securities Research and Economics, Merrill Lynch

Source: Fabless Forum, a publication of the Fabless Semiconductor Assn.

Ask your vendors

Continued from page 2

on your floor and then find that vendor is no longer in business could cripple your productions.

System scalability and flexibility. Tired of looking around and seeing all this extra test capacity? Wouldn't it be nice to trim this number in difficult times? This could be one of the most critical variables to ensure future success. System scalability is something you can control—it is the ability to use the right amount of test, and have one test platform that tests high-speed digital, analog, serial communications, as well as scan, embedded memory and RF. Scalability allows for maximum flexibility and provides the right amount of test for your specific needs. One system is all that you need now.

Ultimate cost-of-test. We are not just talking sticker price here, but the entire cost of ownership. We spend so much time initially on the system price, but the real costs come from owning the machine over its lifetime. Make sure to compare fixed costs, lifetime utilization rates, recurring costs, yield and throughput. We've seen instances where electricity alone can be 10 times more from one vendor compared to another—for competing systems.

In this difficult period, take time to re-establish relationships with your current ATE vendor, or take some time to compare vendors. Agilent's customers have sat down and evaluated our platform story—DFT methodologies and scalability/cost-of-test—and have said our roadmap is the best in the industry.

Position yourself for success. And on the way, put Agilent to the test. Ask us some good questions. We know you'll like the answers. ◆

Ensuring wafer level reliability—a free seminar—win an Xbox

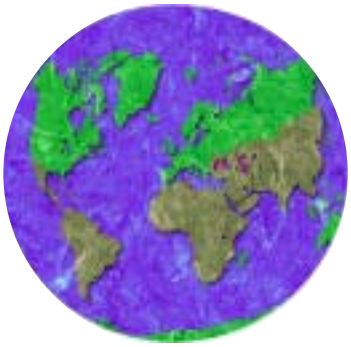
Agilent Technologies and Sandia Technologies are offering a FREE Web-based Wafer Level Reliability seminar and a chance to win a Microsoft Xbox. By attending this event, you are automatically registered in the drawing for the Xbox. The event is live at your desk on January 29, 2002.

Why attend? Shortened production lifetimes have increased the importance of wafer level reliability (WLR). Wafer fabs must use WLR data to ensure the reliability of their production process and to provide data to their customers. Reduced development times also drive the need for fast and accurate reliability assessment in development and qualification. In these seminars, the customer will learn how a predictive WLR approach has helped meet these challenges for companies such as TSMC, IBM, Applied Materials and Samsung.

Both events will be held on January 29, 2002. Live—at your desk.

Please go to our web site at www.agilent.com/see/WLR_seminar to register for the event(s).

DID YOU ? KNOW



The best—and worst— countries for e-business expansion

Ready to go global in e-business? You'd better first make sure the world is ready for it.

The Economist Intelligence Unit recently published its country-by-country rankings of e-business readiness. The survey takes into account "elements of Internet and e-business infrastructure: not just connectivity, but also social and cultural factors, the legal environment for e-business, the development of e-commerce and the existence of supporting e-services."

The results are divided among 60 countries into four categories:
e-business leaders, e-business contenders, e-business followers, and e-business laggards. Here are the best and the worst: (For the complete list, visit the web site at http://click.email-publisher.com/maaaevmaaQEVua9fLl9b/)

E-business leaders	E-business laggards
1. U.S.: 8.73	48. Bulgaria: 3.38
2. Australia: 8.29	49. China: 3.36
3. U.K.: 8.10	50. (tie) Ecuador: 3.30
4. Canada: 8.09	50. (tie) Iran: 3.30
5. Norway: 8.07	52. (tie) Romania: 3.20
6. Sweden: 7.98	52. (tie) Ukraine: 3.20
7. Singapore: 7.87	54. (tie) Algeria: 3.16
8. Finland: 7.83	54. (tie) Indonesia 3.16
9. Denmark: 7.70	56. Nigeria: 2.91
10. Netherlands: 7.69	57. Kazakhastan: 2.76
11. Switzerland: 7.67	58. Vietnam: 2.76
12. Germany: 7.51	59. Azerbaijan: 2.72
13. Hong Kong: 7.45	60. Pakistan: 2.66

Source: e-Business Communication Association and The Economist Intelligence Unit ebusiness Forum

Global | Calendar

JANUARY

Ensuring Wafer Level Reliability Seminar
January 29
Sign up on the web at
www/agilent.com/see/wire_seminar

FEBRUARY

SEMICON/Korea
February 5 – 7
Seoul, Korea

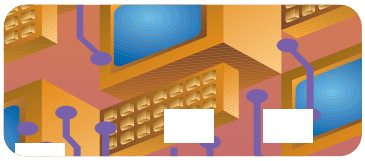
Semiconductor Venture Fair
February 20 – 21
San Francisco, CA
www.fsa.org

MARCH

High Speed Serial Test Seminar
Date: late March
Santa Clara, CA
To register, call 1.866.ATE-TEST

SEMICON/ China
March 26 – 27
Shanghai, China

RF Measurement Suite Asia Roadshow
March — May
Taiwan, Singapore and Korea
Contact your local sales representative
for more information



For more information, please contact your Agilent sales engineer. Or visit our Website at:

http://www.agilent.com/go/semiconductor

Agilent around the world

- Agilent Semiconductor Test Factories
- Agilent Sales and Support Offices

More than 3,500 Agilent semiconductor test systems are installed worldwide.



For more information on Agilent products, applications or services, and for a current sales office listing, visit our web site, **www.agilent.com/go/semiconductor**. You can also contact one of the following centers and ask for a test and measurement sales representative.

Agilent Technologies, U.S.A.
tel. (1.800) 452.4844 (Englewood, CO)

Canada Ltd..
tel. (1.877) 894.4414 (Mississauga, Ontario)

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