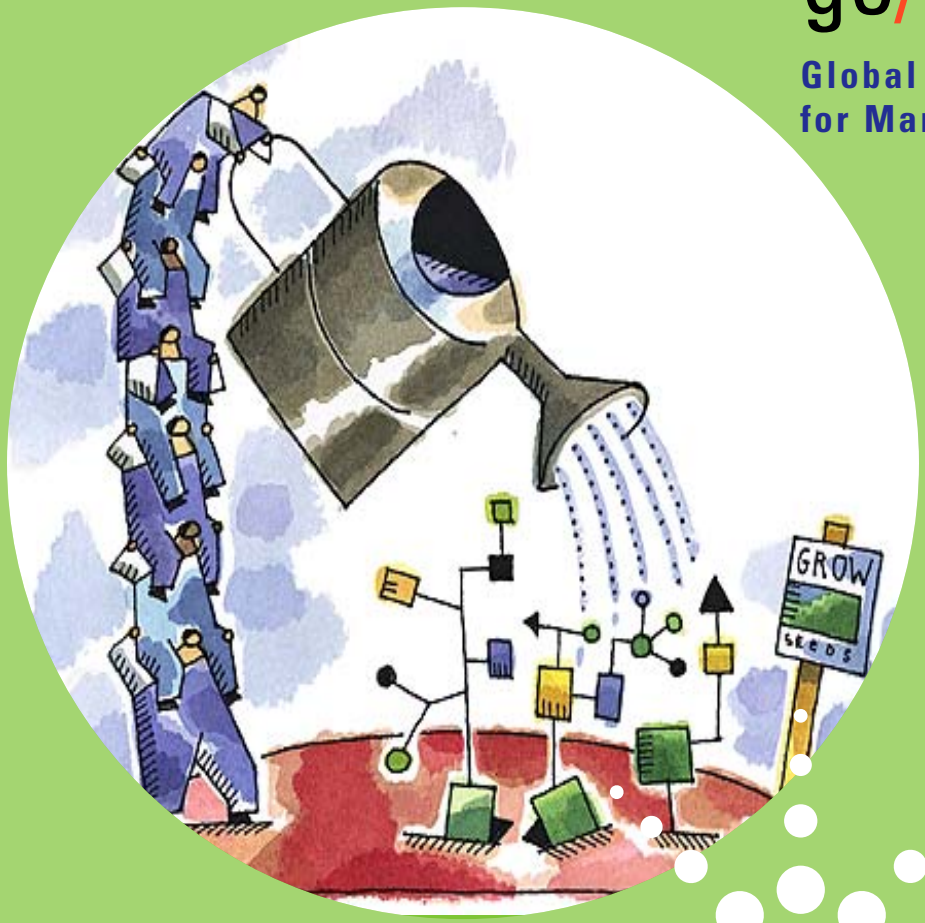
Volume 5, Number 4, Spring 2002

Agilent go/semiconductor

Global Business Ideas and Information for Managers and Test Engineers



THE CHALLENGE: ECONOMIC GROWTH FOR THE SEMICONDUCTOR INDUSTRY

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Agilent Technologies

Post-recession recovery challenges the semiconductor industry

What is the economic outlook for the semiconductor industry? What went wrong to produce such a long and deep recession for this industry? What are semiconductor companies doing to get out of it? Will the up-and-down volatility of the market continue over the next 10 years?

These were just some of the questions discussed by a panel of seven industry leaders and analysts at a recent Fabless Semiconductor Association (FSA) luncheon held in March in San Jose, CA.

The profitability portrait painted for the future was a fairly rosy one, although predictions for full recovery varied, depending upon the industry segment. However, panelists agreed this recession was one of the worst ever, and luckily, it now it seems to be almost over.



What went wrong?

What didn't go wrong seems to be the question, panelists said. Demand dropped, there was a 32 percent decrease in revenues, inventories were too high, some companies were double ordering—and then came the recession.

"Be careful not to pin everything on the economy," said Dan Niles, managing director and senior electronics analyst for Lehman Brothers. "The problems first happened in the first half of 2000, when customers were saying they couldn't get enough and so semiconductor companies built more fabs and hired more people."

His warning: "Customers may have been exaggerating. Use common sense and look at their balance sheets."

It was a combination of Y2K and the deregulation of the telecommunications industry that led to such a sharp decline, said Ronnie Vasishta, VP of technology marketing for LSI Logic. "It was a supply and demand imbalance we had never seen before."

More collaboration needed

From the design stage to delivery, more collaboration and more sharing of industry ideas are needed, panelists said.

"There absolutely has to be a different and more involved level of collaboration between silicon suppliers, fabless houses, and IDMs," said Lawrence Conrad, VP of semiconductors and distribution for Solectron.

And Dr. Ed Ross, president of North America, TSMC agreed, saying that supply chain management is already spending more time collaborating, and thus a sharing of ideas is also needed at the technology end.

"The pain point is the relationship OEMs and SCMs in managing the inventory," said Rebecca Burr, director of market analysis, Xilinx.

Vasishta suggested that responding to customers' needs is not enough — "We need to look at the customers' customers. We need to try to find out who are the players in the end market."

Future markets

While chip sales have been dominated by the PC market, that, too, may

Continued on page 3

change in the future. "The semiconductor industry has grown, so no one item can drive the entire market," said Niles. Consumer electronics, cell phone/PDAs, broadband to homes are all going to be big markets, he added.

Burr suggested that there may be a set of smaller new markets, rather than one major new market. Pressure sensors on the floors of buildings, monitors on company ceilings, cheap DSL lines for the home, the ability to download music and video are all emerging markets, she said.

"The more diversification in the chip market, the less volatility of the market," said Grant Johnson, manager of market intelligence group, Converge.

The China market

Panelists were asked whether China offered a new marketplace, and enthusiasm was high. "TSMC has established an office in China to determine the right time to establish a factory on the mainland," said Ross. "We are paying very close attention to this and to what we do there, because China will be a significant market force."

Lehman Brothers is hiring an analyst to focus exclusively on China. "It will be a big consumer market, and you can't get around the fact that it has a couple of billion people," said Niles.

Solectron looks for low-cost manufacturing centers, and "China already is an enormous market for us," said Conrad. He predicted that Solectron will have a large percentage of its manufacturing in Asia in the near future.

Pixelworks already has 40 employees in China, said Allen Alley, president, CEO and chairman, while Xilinx has established sales offices and sales reps in China, Burr said.

Suggestions for the future

"The semiconductor industry has a terrible history of learning from past errors," said Johnson, and he asked panelists what suggestions they would offer during this upturn. Panelists responded:

- Better use of existing capacity.
- Increasing collaboration.
- More outsourcing.
- More partnering to establish solid long-term relationships.
- Greater reliance on fabs.
- More accurate estimates of the time it takes to meet the reviving demand.
- Realizing the boom/bust is not solely within the semiconductor industry—the end markets are also getting more cyclical.
- More industry consolidation, for technical and financial reasons.

Volatility inevitable?

The volatility is in part due to human behavior, yet the amplitude of the swings can be better managed, Burr said. "We need to look harder at the end customers."

"Last year's volatility will be repeated, but not as strongly, because there is a varietal market," Vasishta said. "Plus the investment community is better attuned to making wiser investments."

"These cycles – they are our lot in life," said Alley.

Yet, inevitably, panelists concluded, there will continue to be this volatility in the semiconductor markets. Ross summarized the reason why: "The boom-bust cycle will never go away. We are dealing with human beings who are always going to overreact in both boom and bust times." ◆



'The semiconductor market has grown, so no one item can drive the entire market.'

UTAC selects Agilent for testing of network processing and high-speed devices

High-performance Agilent 93000 test platform enables UTAC to gain greater success in SOC testing arena

Singapore – United Test and Assembly Center Limited (UTAC) recently installed the high-performance Agilent P600 model of the Agilent 93000 SOC Series test systems at UTAC's Singapore Test Facility. The Agilent 93000 allows UTAC to meet increasing industry demands for System-on-a-Chip (SOC) and System-in-a-Package (SIP) device tests. The newest test system is an extension of UTAC's existing wide array of SOC testers and provides greater testing capabilities in terms of accuracy, speed, reliability and throughput to drive down overall testing costs.

The Agilent 93000 SOC Series is a single scalable test platform that enables UTAC to match today's silicon requirements for analog, high-speed digital, RF, embedded memory and scan test capabilities on high-speed network processing and wired/ wireless communications products. The test system is designed for maximum flexibility to allow usage of the same test system from device characterization to volume production, speeding product time to market.

"We are confident that the selection of the Agilent 93000 test platform will lead us to gain a stronger foothold in SOC testing for network and communications products such as high-speed network processor, Hypertransport, Gigabit Ethernet, Bluetooth and xDSL," said Chok Yean Hung, vice president of product and test engineering at UTAC. "The multi-site test function drives down the cost of test by allowing higher test parallelism."

"Selecting the 93000 marks a significant milestone for us as we move from engineering to high-volume manufacturing," said Albert Ng, vice president, sales and marketing of UTAC. "We can now offer the industry the most sophisticated test platform to meet our customer's stringent quality and cost-effective needs for complex SOC and SIP devices." ◆

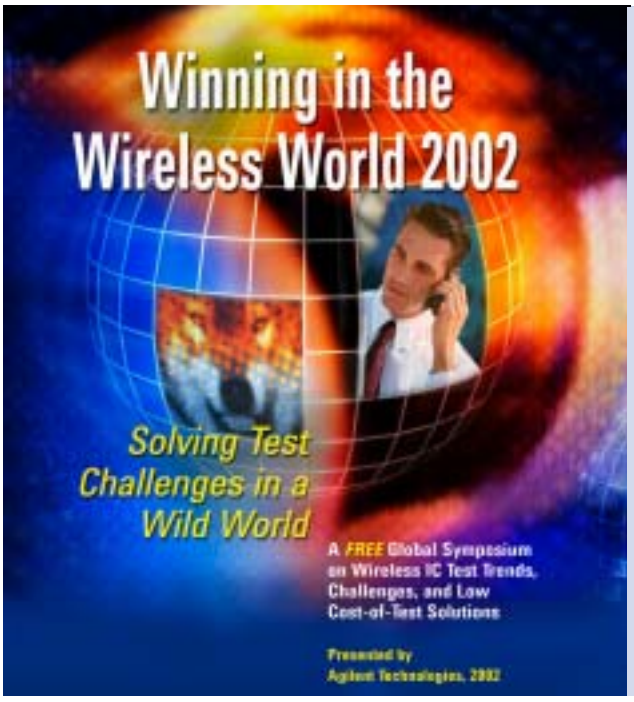
DID YOU ? KNOW

How big were the largest known armadillos?

Ten thousand years ago, there were 600-pound armadillos in Florida. A recently discovered skeleton found in a limestone quarry came from an animal that would have been six feet long and three feet high at the shoulder.

The newly discovered species is called Holmesina septentrionalis. It appeared about 500,000 years ago, evolving from a dog-sized armadillo, and vanished during a wave of North American extinctions about 10,000 years ago.

Today's largest North American armadillos weigh only eight pounds or so, and eat ants, beetles, and termites. But that diet probably would not have been enough for the Florida giants. Researchers are studying the fossil's teeth to discover what it might have eaten.



Asia Road Show

Come see a live demo of Agilent's 93000 SOC Series BLUETOOTH™ Solution.

Registration for this fast-paced event is free, but seating is limited. Ensure your place by registering today.

Agilent Wireless leaders will also present their exclusive knowledge and expertise to provide the latest tools and techniques to help you meet the wild growth of the wireless industry.

Asia Dates and Locations

6-8 May — Hsinchu, Taiwan
(Includes Bluetooth test demonstration)
7-13 June — Singapore
(Includes Bluetooth test demonstration)
Korea — August
Final dates to be announced.
Japan —
Final dates to be announced.

For more information and to register online, please go to: www.agilent.com/see/wireless_world2002

UMC annual vendors' survey results: Agilent support is #1

UMC recently gave a number one ranking to the Agilent Taiwan support team for achieving quality check. The award was part of a recent vendor survey conducted by UMC.

Similar to all quality-conscious companies, UMC has its own internal quality checks for all its vendors, to ensure high quality output, optimal efficiency and fast turnaround time for its customers.

Price and performance are key elements for ranking the vendors, along with training, application support, maintenance, response efficiency, as well as several other criteria.

As a result of the award of a contract with UMC, Agilent was able to plan and anticipate UMC's support needs and work with all its engineers to meet UMC maintenance and application needs.

A UMC spokesman said, "UMC has successfully achieved a high quality output combined with a fast turnaround time to its customers through an organized and close working relationship with our vendors."

China: Oil profit falls

The China Petroleum and Chemical Corp. announced in early April that its net profit fell 181 percent last year, hit by 2001 decreasing oil prices and the worldwide economic slowdown. The company, also known as Sinopec, earned 16.03 billion yuan ($1.94 billion) in 2001 compared with 19.58 billion yuan in 2000. Sinopec, a division of the state-owned China Petroleum Corp., mainland China's largest integrated petroleum and petrochemical company, said the decline in oil prices, coupled with slimmer refining margins and an oversupply of refined oil products, made 2001 a rough year.

Source: The New York Times

Japan's business confidence is steady, survey finds

Corporate managers expect conditions in Japan, the world's second largest economy, to improve by midyear as a recovery overseas and revamping efforts at home take hold, according to a widely followed survey by the Bank of Japan. The central bank's Tankan survey of business conditions found manufacturers' sentiment about current conditions unchanged from three months ago. Economists had forecast a small gain in the index.

Executives in almost every industry expect sales and profits to increase three months from the beginning of April, suggesting the index will rise sharply next quarter.

The global downturn that started in late 2000, coupled with persistent deflation in Japan over the last four years, has forced Japanese manufacturers to slash inventories, close factories and lay off hundreds of thousands of workers. But as always, Japan's economy is led by its biggest manufacturers, which stand to gain rapidly from economic recovery in the United States and in Asia.

Source: The New York Times

Singapore Telecom to expand mobile business in Indonesia

Pressing its expansion abroad even as the global telecommunications industry consolidates, Singapore Telecommunications announced in early April that it would pay U.S. $429 million to expand its presence in Indonesia's booming market for mobile phone service.

Telekomunikasi Indonesia will sell to Singapore Telecommunications a 12.7 percent block of shares in Telekosel, the country's largest cellular phone operator. And it agreed to fold another cellular subsidiary into Telkomsel, doubling its capacity. The deal is subject to shareholder approval.

Source: The New York Times

DID YOU ? KNOW



It's warming! It's cooling!

Antarctica is experiencing some of the fastest warming in the world. Antarctica is cooling.

Some of its glaciers are thinning, while some are thickening. Ice shelves are disappearing, while more sea ice is forming.

Scientists have reported these findings in recent months. While contradictory, they all may be true.

The reason: Antarctica is 5.4 million square miles, one-third larger than the United States, and its weather patterns are as varied as occurs on other continents. All of Asia does not warm — or cool — simultaneously.

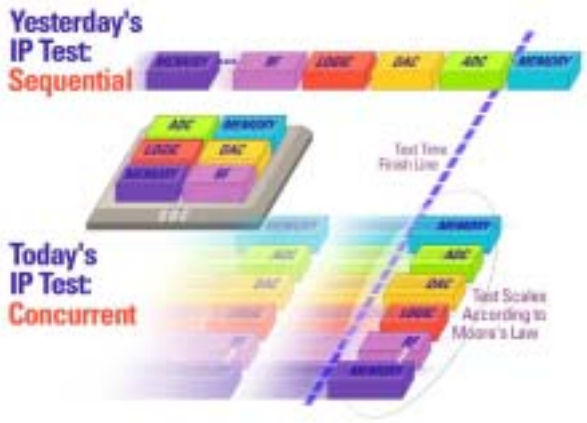
Ninety percent of the world's ice lies on Antarctica, in ice sheets that are on average 1.3 miles thick, or in sheets that have flowed offshore to form floating platforms of ice along the coast, hundreds to thousands of feet thick.

The third component of Antarctic ice is a thin layer of frozen oceans, or sea ice, that grows and shrinks with the seasons. A few feet thick, sea ice covers one million square miles of ocean in summer, and grows to six million square miles in winter, doubling the size of the continent.

Fears that the world's oceans will deepen if Antarctica's ice sheets turn to water are unfounded. The temperatures in the Antarctic interior average minus 70 degrees or colder. Even a 10-degree temperature rise — greater than climate models' worst-case predictions — would leave almost all of the ice frozen.

Source: The New York Times

A new approach for greater test efficiency



This is an abstract of an article, "Reining in the Cost of Test" by Wilson Spence of Agilent Technologies, which first appeared in EE-Evaluation Engineering, January 2002. To see the entire article, please visit the web site at: www.evaluationengineering.com

The rising cost of test has prompted the industry to look at new ways to test faster and eliminate inefficiencies. One way for increasing throughput has been through multi-site testing. Testing multiple devices simultaneously can enhance throughput dramatically, scaling to accommodate two, four, eight — up to 64 devices.

To test more devices simultaneously requires more tester resources. Multisite testing also places significant demands on the test team. It requires that the team create special fixturing to support multiple devices and generate the requisite test programs.

A promising new approach for greater tester efficiency is concurrent test. Such a testing method allows for simultaneous testing of different intellectual property (IP) blocks within a hierarchical SOC design. This not only allows multiple blocks to be tested at the same time, thus shortening test time, but also allows tester resources to be used at full capacity (see below).

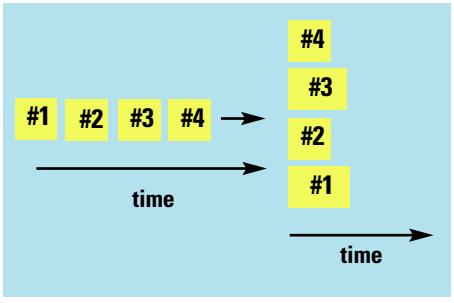
Indeed, as SOC complexity rises, concurrent test is more efficient because IP blocks can be tested in parallel. It is ideal for testing complex ICs for such consumer industries as Bluetooth™ enabled devices where RF, analog and digital circuitry are all combined on a single SOC.

Concurrent test is best implemented using a flexible, test processor-per-pin architecture as opposed to the traditional shared-resource architecture that most testers have. Basically, every pin in this new type of tester platform provides complete period, timing, levels, patterns, and sequencing.

With such a flexible arrangement, there can be a grouping of pins into virtual ports to test IP blocks. Each port can act as if it were an independent machine, with different test periods and loop/subroutine instructions. Once the test is complete, the tester can immediately be reconfigured and assembled into new port configurations to conduct a completely different set of tests.

With this elastic architecture, the tester can provide full support for concurrent tests on potentially dozens of ports with different sequencing. Even the need for different test speeds --- often to address the increasing clock domains among the different blocks in an SOC – can be supported, allowing for higher levels of concurrent test

To make concurrent test work, the processor-per-pin hardware must be supported by a software environment that decouples the testing of each IP block. That way, concurrent test can support "n" simultaneous test programs



Example of concurrent test flow

on the same device by focusing each test program on a different I/O or internal core section of the device.
To achieve maximum return, concurrent test requires some consideration by the IC designer early in the design cycle. Although concurrent test does not entail a major overhaul in how designers create their ICs, there are some requirements SOC designers must keep in mind. Specifically, IP blocks that are to be tested concurrently must be isolated and made independently accessible, observable, and controllable.

Finally, combining the capabilities of concurrent test and multi-site test yields the benefits of concurrent test per chip, multiplied by the number of chips simultaneously being tested through multi-site testing. ◆

(Reprinted with permission.)

Special introductory offer: one-year SmarTest PT license available for free

Agilent is introducing concurrent test capabilities for the Agilent 93000 SOC Series Tester, and for a limited time you can obtain a one-year license to use this capability for free.

The one-year license for the SmarTest Parallel Test typically costs U.S. $18,144, but until June 30, 2002, it is available at no charge.

A SmarTest PT license is needed in order to do:

- Advanced concurrent test (>2 IP blocks tested simultaneously)
- Advanced multiport testing (>2 ports)
- Advanced fractional bus testing (>2 busses)

To get this license:

- Ask your sales representative to place a standard order before 30 June 02, for N1155A/Option#110.
- Ensure that your 93000 SOC Series tester has, or will be upgraded to SmarTest 3.2.3 before intending to use any SmarTest Parallel Test features.
- Make sure you redeem your license as soon as you receive the product materials. This offer will expire 60 days after the ship date, and you will not be able to obtain a license after that time.
- Order as many Option #110s as you have 93000 SOC Series testers in production for which you may be interested in advanced parallel test capabilities in the next year. ◆

DID YOU ? KNOW

Sniffing out bombs: Canines vs. machine

In the nationwide scramble to better protect air travelers, a key job — checking passengers and bags for explosives — is being carried out by two very different sniffers. One is FAA-trained dogs; the other is the latest in ion mobility spectrometry, which can detect minute traces of explosives. The dogs tend to be sporting breeds like retrievers, German shepherds and Belgian malinois. Most IMS scanners are made by Barringer Technologies of Warren, New Jersey, or Ion Track Instruments of Wilmington, Massachusetts. Here's how they compare:



Golden retriever:

Size: 23 by 25 inches; 70 pounds
In service: 190 dogs and their handlers at 40 U.S. airports.
On order: 90 dogs at 25 airports by end of 2002.
Cost per unit: $10,000.
Method: Draws sample into nasal cavity, where air molecules come into contact with a network of membranes. The air stimulates smell receptor cells that connect to the large olfactory bulb in the dog's brain.
Energy sources: Standard kibble; rubber toy called Kong.
Performance: Identifies explosives almost instantly from a distance, even when masked by other substances. Able to smell explosive traces as fine as one part per billion. Can be trained to sniff out 12 types of explosives.
Pros: Versatile, sensitive, mobile, and follows its nose.
Cons: Needs regular breaks; has accidents on Gucci luggage.



Itemiser:

Size: 18 by 21 inches; 43 pounds
In service: 882 IMS units at 179 U.S. airports.
On order: 425 IMS units for duty by end of 2002.
Cost per unit: $38,000.
Method: Analyzes a trace swiped from baggage onto a cotton or lint sample or sucked into its specimen detector. A heater vaporizes the sample, ionizing it. Explosives are identified by the size and shape of telltale ions.
Energy sources: Standard AC power.
Performance: Needs 5 to 7 seconds to analyze a sample; has an error rate of less than 1 percent. Can run 24x7 and detect as little as 1 nanogram of explosives, including PETN, TNT, C4, RDX, Semtex, and EDGN.
Pros: Any airport security guard can operate it.
Cons: Expensive; operated by airport security guards.

Source: Wired magazine

Agilent offers WLAN IC test solutions

DID YOU ? KNOW



Teeing off

Golf ball manufacturers are looking to aerospace experts to help them make a more perfect ball. U.S. Golf Association rules say that a ball must be at least 1.68 inches in diameter and weigh no more than 1.62 ounces, and must be a sphere. Other than that, the sky's the limits.

Callaway is planning to introduce a ball that replaces traditional dimples with a honeycomb of hexagons. Tests so far indicate the ball will typically go 10 yards farther than the competition.

In place of a conventional ball's 300 to 500 dimples, the HX Red has a "tubular lattice network" of 220 hexagons and 12 pentagons. The lattice solves an ancient problem of golf ball flight: how to reduce drag.

A regular dimpled ball reduces spherical surface area to about 25 percent; the rest consists of indentations that produce a so-called turbulent boundary layer, which smooths airflow around the ball and cuts down on drag. Callaway's lattice network has a pattern that covers 100 percent of the ball, creating the most efficient aerodynamics yet possible.

Other features: The outer layer is molded from thermoset polyurethane, which compresses like a sponge on impact. The second layer is harder and thicker, and when the energy of the club reaches this layer, it is translated into kinetic force, causing the ball to travel quicker and longer. The core is rubber and heavy metal, and can carry the ball an average of 280 yards.

Upcoming enhancements for challenging RF tests

WLAN is growing in popularity, but many challenges remain for this changing technology. Chip integration levels are increasing while prices continue to drop, and a number of standards exist — each with different requirements.

Agilent is actively monitoring the changes in this volatile market and offers the technology necessary to meet the demanding requirements of WLAN IC test — today and tomorrow.

Changing standards

The IEEE 802.11b standard, at 2.4 GHz and utilizing the DSSS carrier technique, is the most popular standard today. However, the higher data rate 802.11a standard, using the OFDM carrier technique in the 5 GHz U-NII band, is gaining market share. Additional standards continue to emerge. The 802.11g standard at 2.4 GHz, utilizing OFDM, was recently approved. Such a volatile market demands a test solution that can meet the changing requirements.

Price erosion

As competition increases in the WLAN appliance market, prices continue to drop — requiring WLAN chipset prices to also decrease. Some industry analysts expect that by 2005 the WLAN chipset will sell for less than $20. In order to achieve this low price, a test solution with the lowest cost-of-test is required.

Increasing chip integration

A key trend with today's wireless devices is higher levels of integration. WLAN chipsets (see figure below) are no exception. Higher levels of integration are already being achieved with even more integration expected in the future. This increasing functionality on fewer chips results in unprecedented chip complexity, requiring a robust test solution with all the necessary test capability – analog, digital, RF, scan, and embedded memory.

Regardless of the device standard, or the level of integration, or if the chip to be tested is a power amplifier, RF/IF, Modulator/Demodulator, or baseband processor/medium access controller, Agilent provides cost-effective test solutions.

Agilent test solutions

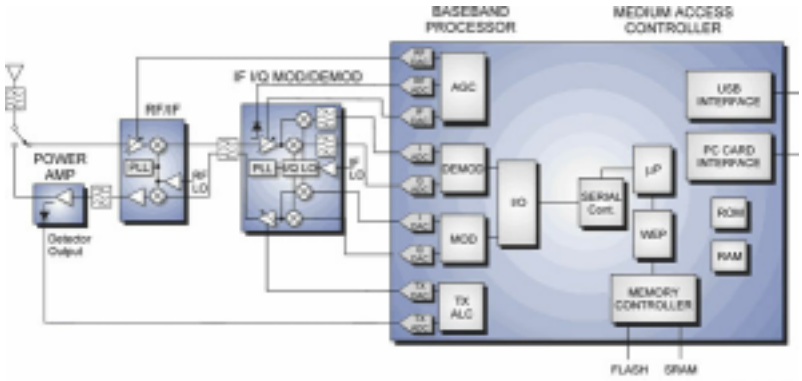
Agilent 84000 RFIC Series

The RFIC section of the WLAN chipset can be tested with the Agilent 84000. Currently the Agilent 84000 provides the required test capability for 802.11a RF devices. Upcoming enhancements include a wider bandwidth RF receiver.

With its high accuracy and repeatability, the Agilent 84000 has the high performance RF test demanded by the market, while providing a cost-effective solution for WLAN RFIC test.

Agilent 93000 SOC Series

The baseband processor/medium access controller IC can easily be tested by the C*e* models of the Agilent 93000. The Agilent 93000 provides all the necessary test capability required



— including digital, analog, scan, and embedded memory — at the low cost-of-test demanded in this competitive market.

With increasing levels of integration, certain devices will require a single platform that provides full test capability. In order to provide the test solution that is required, Agilent has integrated RF test capability, with the RF Measurement Suite, into the Agilent 93000.

The RF Measurement Suite for the Agilent 93000 currently offers 8 GHz modulated stimulus and 8 GHz measure capability, providing the frequency coverage required for WLAN, including the 5 GHz 802.11a standard. In addition, up to 12 RF ports for quad-site test are available, as well as three-tone stimulus and BER measurement capability. The next release of the RF Measurement Suite, available in the summer of 2002, will provide additional capability for WLAN RF SOC test on the Agilent 93000.

The enhancements include support for the OFDM carrier technique used in the 802.11a and 802.11g standards. A new, wide bandwidth RF receiver will also be available to perform complex WLAN measurements, such as Error Vector Magnitude (EVM) and Adjacent Channel Power (ACPR). The 40 MHz IF bandwidth RF receiver will save test time and increase device throughput by performing ACPR and modulated power measurements in a single acquisition.

With these upcoming enhancements, the Agilent 93000 with RF Measurement Suite will be able to test both the RF section and the baseband processor/medium access controller IC. Regardless of the level of integration, Agilent's test solutions provide the right test at the right cost. ◆



Tame the Wild World of Wireless Devices

A FREE global symposium

Agilent Technologies is offering a one-day symposium in seven different countries to help prepare semiconductor manufacturers measure the performance of wireless IC devices. Agilent wireless leaders will present their exclusive knowledge and expertise to provide the latest test tools and techniques needed to meet the wild growth of the wireless industry.

The seminar will include the following topics:
- Wireless Trends
- Driving Down the Cost of Test for *BLUETOOTH*™ ICs
- Wireless LAN Test Challenges
- GPRS: The Next Evolution of GSM
- Testing of High Integration, Wireless Baseband Processors
- Concurrent Test

The symposia will be held as follows:
- Asia
- Taiwan — 6 – 8 May 2002
- Singapore — 7 – 13 June 2002
- Korea — August. Final dates to be announced.

- United States
- San Diego, CA — 29 May 2002

- Europe
- Stockholm, Sweden — 4 June 2002
- Munich, Germany — 6 June 2002

- Japan
  Final dates to be announced.

Registration:
To register, please visit the Agilent web site at **www.agilent.com/see/wireless_world2002**

Customer quotes:

"Very informative, should be more of these symposiums available."

"Very impressed with the quality of the materials presented and high energy of the presenters."

Agilent expands mixed-signal test capabilities of 93000 test series with analog modules

DID YOU ? KNOW

More about the common cold

Scientists are learning more about the common cold, which is common at every latitude and longitude in the world—in the Sahara, in Greenland, in Delhi, in Ulaanbaatar.

Colds are curiously seasonal. No matter what the temperature or how subtle the change in weather, in most parts of the world and in both hemispheres the cold season begins in early fall, goes on through winter, and peaks again in mid-spring.



How do you catch a cold? Scientists are finding that hands may be the biggest culprit. A contagious person can leave the cold virus (through sneezing or handling objects) on a variety of nonporous surfaces. If cold-free people touch these contaminated surfaces—including other people's hands—the virus is picked up at least 60 percent of the time, according to one study. Once on your hands, rubbing your eyes or fingering your nose can contaminate you.

Conclusion: Contact with your hands is how a cold virus gets passed around. The best way to avoid a cold is to wash your hands frequently and not touch people with other colds.

Source: The New Yorker

Modules for DVD, set-top box and xDSL devices provide greater accuracy and better yields

Four analog modules that will expand the mixed-signal testing capabilities of the Agilent 93000 SOC Test Series for emerging digital consumer devices were recently introduced by Agilent. These modules offer wide frequency coverage, high resolution, greater accuracy and low noise when testing DVD, set-top box and xDSL devices, resulting in lower cost of test and higher yields.

The four new modules are the:
- Broadband High-speed AWG
- Broadband High-speed Digitizer
- Broadband High-resolution AWG and
- Broadband High-resolution Digitizer.

These were designed specifically to meet or exceed high-throughput demands with greater accuracy, allowing test engineers to more easily identify failed components before the product is shipped.

"Agilent continues to innovate to bring better capability to the 93000 SOC Test Series, and these new analog modules represent another milestone in providing our customers with a complete test solution," said Tom Newsom, vice president and general manager of Agilent's SOC Business Unit. "The modules add yet another layer of capabilities to the Agilent 93000 test platform, further improving the customer's return on investment and lowering the cost of test required for advanced digital consumer electronics—especially in the optical disk drive and broadband access markets."

The Broadband High-speed AWG and the Broadband High-speed Digitizer are designed for testing emerging DVD, set-top box devices. The AWG module operates at 500 megasamples per second (Msps) and the digitizer module operates at 320 Msps (with 700 MHz bandwidth), both with 12-bit resolution. The high-speed modules enable full test coverage of set-top box demodulators and optical disk drive analog front-ends. With signals up to 500 Msps, customers get a frequency advantage for testing future devices.

The Broadband High-resolution AWG and Broadband High-resolution Digitizer are designed for the test of xDSL devices. The Broadband High-resolution AWG features 16-bit resolution and 30 Msps. The Broadband High-resolution digitizer features 16-bit resolution, 5 Msps, 20 MHz measurement bandwidth and 90 dB spurious free dynamic range. Instead of using the traditional loop-back test methodology in use today to characterize an xDSL modem, the AWG and digitizers can be connected to the device under test to stimulate and measure the device at specified boundary conditions, therefore providing better fault coverage. In addition to improving coverage and accuracy, the device can be tested in less time. This is because high resolution and 90 db spurious free dynamic range eliminate the need for averaging or filtering.

The Agilent 93000 SOC Series is a single scalable platform that meets the needs of mixed-signal system-on-chip (SOC) production testing with data rates up to 1.25 Gb/s, overall timing accuracy (OTA) of +/- 200 ps and standard configurations of up to 1,024 digital pins.

The Broadband High-Speed AWG module is available now. The Broadband High-Speed Digitizer, the Broadband High-Resolution AWG and the Broadband High-Resolution Digitizer modules are expected to be available in June 2002. More information is available on the Agilent Web site at www.agilent.com/see/semi-test-press.◆

NEC selects Agilent's test platform for broadband and mobile electronics

Agilent's 93000 to provide mixed-signal devices in a single scalable platform

NEC Corporation, the world's largest manufacturer of system large-scale integration (LSI) devices, has selected the Agilent 93000 SOC Series test system to test next-generation mixed-signal devices for the broadband and mobile electronics market. NEC Electron Devices chose the Agilent test system for its ability to provide high throughput and high-performance analog test capabilities and support, as well as for its ability to scale easily to meet NEC's widely varied application and cost-of-test requirements.

The Agilent 93000 SOC Series lowers overall capital equipment investment by providing multi-site test capabilities. It also provides the lowest cost of test available in a single scalable platform. The system's flexibility allows customers to apply the appropriate testing requirements for design, characterization and manufacturing of ICs. In addition, the Agilent 93000 SOC Series provides customers with the flexibility to test a broad range of applications. This results in higher system utilization and reduces the number of test systems required on the manufacturing floor. It also minimizes the number of platforms that require support, thereby lowering cost of ownership.

"NEC Electron Devices is at the forefront of advanced technology for broadband and mobile applications," said Tom Newsom, vice president and general manager, Agilent's SOC Business Unit. "We are pleased that they have confidence in our 93000 SOC test system and engineering support to meet their business needs." ◆

DID YOU ? KNOW

Mind over cursor matters

Move your cursor effortless by simply thinking about it? This could be a possibility some day in the not too distant future.

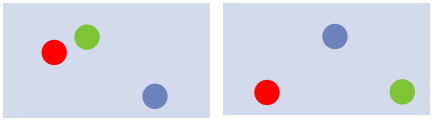
A rhesus macaque monkey at a Brown University laboratory can move a cursor on a computer screen just by thinking about it — playing a pinball game in which every time a red target dot pops up, the monkey moves a cursor to meet the target quickly and accurately.

The monkey doesn't use a mouse or a joystick, rather it plays the game mentally, controlling where it wants the cursor to go by thinking. (See the pinball video game the monkey played at http://donoghue.neuro.brown.edu/multimedia.php.)

The project is the latest in a series of serious research efforts in brain-machine interfaces, a field in which researchers eavesdrop on the brain as it plans motion, and then write programs that can translate those thoughts into specific movements.

Researchers hope that such programs will one day help some paralyzed people use their thoughts to control the functions of robotic limbs, or to command cursors on a screen to write e-mail or navigate the Internet.

The experiment, which was first reported in *Nature* magazine, was led by Dr. John P. Donoghue, a professor of neuroscience who leads the brain science program at Brown.



The red circle is the target, the green circle is the cursor, and the blue circle at left is the home position when the game is in play. The monkey receives a reward at each target acquisition after which the target jumps to a new random position. On the left is shown the results of a monkey who moved the cursor just thinking about it; on the right is the neural control in neutral position.

Source: The New York Times

New devices require new performance standards

DID YOU ? KNOW

Mixing and matching the authors

The *Washington Post* had an invitational contest — readers were asked to combine the works of two authors, and to provide a suitable description of the merged book. The prize winners:

"Green Eggs and Hamlet"
Would you kill him in his bed?
Thrust a dagger through his head?
I would not, could not, kill the King.
I could not do that evil thing.
I would not wed this girl, you see.
Now get her to a nunnery.

"Of Three Blind Mice and Men"
Burgess Meredith has his limbs hacked off by a psychopathic farmer's wife. Did you ever see such a sight in your life?

"2001: A Space Iliad"
The Hal 9000 computer wages an insane 10-year war against the Greeks after falling victim to the Y2K bug.

"Rikki-Kon-Tiki-Tavi"
Thor Heyerdahl recounts his attempt to prove Rudyard Kipling's theory that the mongoose first came to India on a raft from Polynesia.

"The Remains of the Day of the Jackal"
A formal English butler puts his loyalty to his employer above all else, until he is persuaded to join a plot to assassinate Charles de Gaulle.

"Paradise Lost in Space"
Satan. Moloch and Belial are sentenced to spend eternity in a flying saucer with a goofy robot, an evil scientist and two annoying children.

"The Invisible Man of La Mancha"
Don Quixote discovers a mysterious elixir, which renders him invisible. He proceeds to go on a mad rampage of corruption and terror, attacking innocent people in the streets and all the while singing "To Fight the Invisible Man!" until he is finally stopped by a windmill.'



Modern electronic devices that permeate our daily lives now require performance at temperature extremes that were previously only requested for applications such as military equipment, automobiles, etc. For example, a cell phone or PDA must be able to function in conditions that range from the extreme cold of an arctic winter to the extreme heat of a Saharan desert. Therefore, IC manufacturers have begun to evaluate device characteristics at low and high temperatures in the process monitor phase, which traditionally has only been performed at room temperature.

A number of measurement challenges are encountered when measuring at low temperature, since this is the more difficult of the two temperature extremes at which to measure.

The primary difficulty encountered when performing low-temperature parametric test is water condensation within the test head. As anyone who has grasped a chilled beverage container in a humid environment knows, ambient air can contain a great deal of moisture. Any water condensation occurring on a low-leakage probe card will immediately destroy the integrity of the probe card and render all low-current measurements useless. The real challenge in low-temperature testing is to devise a means to remove moisture from the air surrounding the probe card without affecting the delicate low-current measurements.

Agilent Technologies and ACCRETECH (Tokyo Seimitsu Co., Ltd) have jointly created a solution to enable the performance of production parametric test at a temperature range from –40 degrees Celsius to 150 degree Celsius. The solution employs the Agilent 4073A Ultra Advanced Parametric Tester and ACCRETECH UF300A automatic wafer prober. Figure 1 shows the hardware configuration.

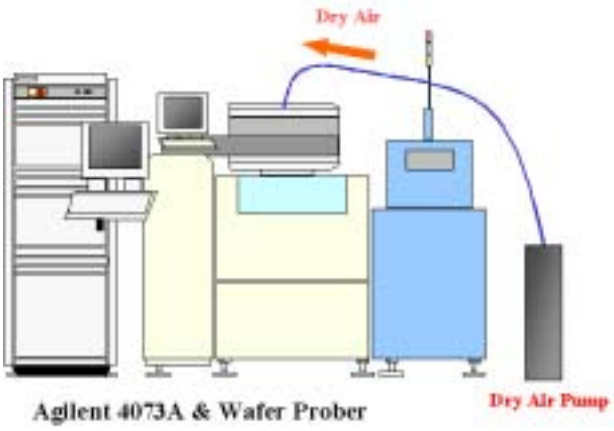


Figure 1

A cooling system and a dry air pump have been added to the standard Agilent 4073A and ACCRETECH UF300A wafer prober configuration. The cooling system controls the chuck temperature that in turn cools down the wafer. The cooling system takes about 20 minutes to go from 25 degrees Celsius to –40 degrees Celsius. The dry air pump prevents moisture in the air from condensing inside the wafer probing area, on the wafer loading area (load port), and on the probe card surface area. In particular, avoiding condensation on the probe card is critical to achieving accurate low-current measurements. A lid on the top of the testhead isolates the wafer environment from the surrounding air, and an air hose running through the lid enables the dry air to fill the space between the probe card and the test

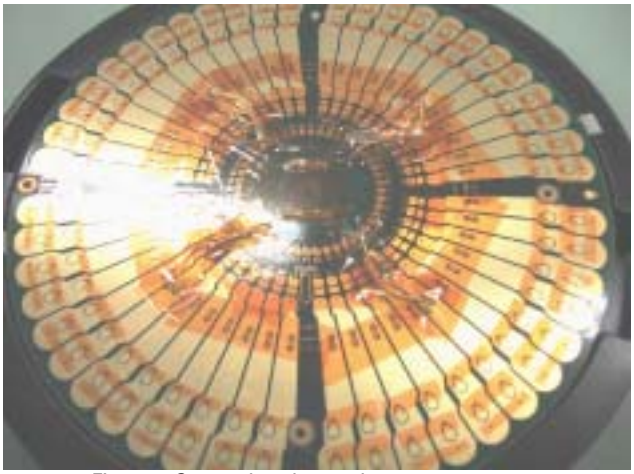


Figure 2 Covered probe card

head. Figure 2 shows the special probe card used for this testing, which has the openings for probe needles and most of the through holes on the probe card closed.

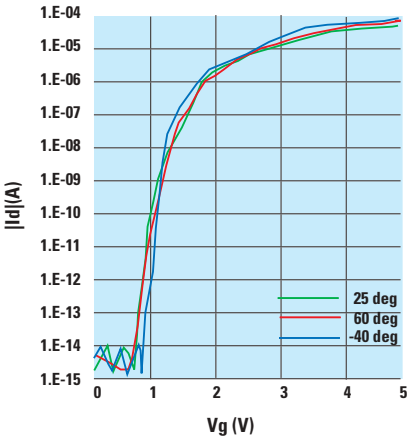


Figure 3

As the data in Figure 3 shows, in using the aforementioned setup the Agilent 4073A was able to accurately measure the Id-Vg characteristics of a MOSFET at temperatures of 60, 25, and –40 degrees Celsius. Of course, with a hot chuck in place this system could also be used to evaluate process parameters at high temperature as well. As expected from device physics considerations, the Id-Vg curve shifts downward as the device temperature becomes lower. In all cases, the noise levels are near the ten femto-ampere level. Please note that in order to realize the full measurement potential of the Agilent 4073A one must use an ultra-low leakage probe card designed specifically for the 4073A tester, which was not used in this case. For this experiment a standard probe card made by MJC (Micronics Japan Co., Ltd.) was used.

For more information on this low-temperature, low-current parametric measurement solution please contact your local Agilent sales representative. ◆

DID YOU ? KNOW



What kind of eyes does a starfish have?

From the look of it, you might think that a starfish has no eyes. But in fact, it has an eye on the end of each arm. Most starfish have five arms, so they also have five eyes, but some starfish have as many as 20 arms (or more), and as many eyes.

The very simple eyes of a starfish are unable to form images. Each eye is a tiny spot of red pigment that is sensitive to light. Nerves run from the pigment spots to the starfish's central nerve ring.

The signals from the eyespots affect the animal's behavior, enabling it to avoid light that is too bright and change its light preferences according to the time of day, water chemistry, and other factors. Since a starfish has no brain, it would not be able to make much use of images, even if its eyes were able to form them.



Custom web sites can save time, increase productivity

DID YOU ? KNOW

What's your sign?

Instead of Astrological Signs, how about these:
What's Your Business Sign?

MARKETING
You are ambitious, yet stupid. You chose a marketing degree to avoid having to study in college, concentrating instead on drinking and socializing which is pretty much what your job responsibilities are now.
Least compatible with Sales.

SALES
Laziest of all signs, often referred to as "marketing without a degree." You are also self-centered and paranoid. Unless someone calls you and begs you to take their money, you like to avoid contact with customers so you can "concentrate on the big picture." You seek admiration for your golf game throughout your life.

TECHNOLOGY
Unable to control anything in your personal life, you are instead content to completely control everything that happens at your workplace. Often even YOU don't understand what you are saying but who can tell. It is written that Geeks shall inherit the Earth.

ENGINEERING
One of only two signs that actually studied in school. It is said that engineers place 90 percent of all Personal Ads. You can be happy with yourself; your office is full of all the latest "ergodynamic" gadgets.

MANAGEMENT/MIDDLE MANAGEMENT
Catty, cutthroat, yet completely spineless, you are destined to remain at your current job for the rest of your life. Unable to make a single decision you tend to measure your worth by the number of meetings you can schedule for yourself. Best suited to marry other "Middle Managers" as everyone in your social circle is a "Middle Manager."

PARTNER, PRESIDENT, CEO
You are brilliant or lucky. Your inability to figure out complex systems such as the fax machine suggests the latter.

A recent survey of potential users of custom web sites shows that customers want to go to sites that offer convenient, one-stop shopping for parts, for finding trouble-shooting data, tracking product changes, and for downloading application information or user manuals anytime from anywhere in the world.

A custom web site, often called an extranet portal, is an area of a company's general web site that is customized for a specific significant customer. Custom web sites are usually password protected and are accessible only to the customer for whom they were created. These web sites, which have the goal of delivering information that significantly improve both productivity and customer satisfaction, usually contain such items as:

- account contacts
- customer tools and solutions
- products, services, and available training
- business reports, installation support plans, and warranty information.

Customers using these sites can reduce the amount of redundant tasks, which can result in a tremendous employee time saving, thus increasing productivity. In fact, Agilent's Automatic Test Group Memory Test Division recently designed a custom web site for a large manufacturer of flash memory that is expected to result in savings of tens of thousands of dollars in employee time annually. The site was designed by Mike Landgraf, eBusiness Team Manager, ATG Memory Test Division

The metrics

These gains in productivity can be measured quantifiably by applying this formula:
Overall time saved = (task time saved) x (frequency of task) x (# of users)
Where
Task time saved = Time required to accomplish a task using a non Web-based process minus the time required to accomplish the same task using a Web-based process.

Figure 1

Job function	Task	Task time saved	Frequency per month	# sites	Hours saved per month
Customer	**Productivity**	**(time savings for Memory Manufacturer)**			
Test engineer	Track repair parts, research product reports or application notes	1 hr.	4	5	20 hrs./month
Manufacturing technician	User document search	.5 hrs.	12		6 hrs./month
Manufacturing engineers	User document search	.5 hrs.	28		14 hrs./month
Total hrs.					40 hrs./month

For example, saving 30 minutes to accomplish a task that is repeated four times per month across a community of 100 Web site users yields 200 hours per month of time saved.

.5 hours x 4/month x 100 = 200 hours per month

The power of "create once, distribute to many" is the sustainable productivity advantage of the Internet.

Productivity Gains Realized

Using the metric above, the effectiveness of the Internet as it is applied to major account web sites can be measured quantifiably. The data presented in Figure 1 demonstrates how a major account web site constructed by Agilent provided measurable gains in productivity.

For customers, productivity gains are defined as those realized by the large manufacturer of flash memory. The customer can use the web site to review new products, research specifications, and reference user manuals. It is a convenient, one-stop shop to search for parts, finding trouble-shooting data, change control and download applications information from anywhere in the world. All this information is available online, and can be a real asset in a semiconductor clean room environment.

Internal productivity gains

If, for example, an account manager spends 20 hours a week addressing installed-base issues, he could save five of those hours by utilizing the customer-specific custom web site to respond to his customer's questions. Applications and support engineers can also use the same web site and save additional hours monthly.

In addition to dramatic costs savings, this Internet technology has other benefits. Instead of driving to customer sites several times a week to deliver product documentation or to troubleshoot systems, a support engineer also has the option of eSupport or web software downloads or other downloads.

Customers indeed realize the value of a custom web site when gains in productivity are measured.

Private portals

This system is not just for large manufacturers but rather for all manufacturers that want to personalize their web portal, and to specify company requirements.

For further information, contact an Agilent field representative or go to www.agilent.com/see/memorytest. ◆

Survey Feedback

In a recent Intel Users Group survey, over 90 percent of the respondents said the web site would improve their productivity.

Customer feedback findings directly attributed the following benefits:

- Access to current version of documents 7x24.
- Convent access to business reports, not having to search on the hard drive.
- One stop shop portal provides a very convenient access to all of Agilent and HP equipment/specs.
- Information to plan training classes.

Customers have stated they have direct access to Agilent's latest technical information, repair history and change control data, enabling them to maximize their equipment uptime..

Agilent Technologies presents

FLASH FORWARD

Tomorrow's Flash Memory Test Solutions

A FREE Symposium on solutions for wireless communications and in code and data storage applications

Wednesday, June 26, 2002
Agilent Technologies
Customer Executive Center, Building 50
Santa Clara, California

Today's Flash Memory Trends

Do you know where the market is heading? Are you concerned about the following issues?

- **Density**
- **Voltage**
- **Package options**
- **Cost-of-test**
- **Stacked chips**
- **Overall performance**
- **Time reduction**
- **Test reliability**
- **Test optimization**

At this powerful one-day symposium, top industry analysts, will discuss the latest market data and assessments of semiconductor technology requirements,market trends and roadmaps. In addition, Agilent engineers will share with you their exclusive knowledge and insight about the techniques and methodologies necessary to test tomorrow's flash technology.

Managing test costs in economic downturns

DID YOU ? KNOW



All about Tuesday [n. TOOZ-day]

Tuesday is traditionally the third day of the seven-day week. For many people, Tuesday is the most productive day of the week, when we are still relatively fresh and energetic yet fully involved in the week's activities.

Fittingly for such an active, productive day, the Romans called it Dies Martis (day of Mars, the war god), translating from the Greek hemera Areos (day of Ares).

The Germanic cultures borrowed the custom of naming days after gods but used Tiu, their own god of war and the sky, naming the day Tiwesdaeg (Tiu's day). Tiu was derived from the same root as Latin deus (god), which also gave us English diety. Swedish Tisdag and Danish Tirsdag also reflect this origin.

In Russian, this day is called vtornik, which simply means "second day." In Vietnam it is also the second day. In Japanese, Tuesday is "kayoo-bi," which translates into "fire day."

Managing test costs is always an issue, but it becomes even more important during economic downtimes, because business has dropped and cash flow must be optimized. One of the ways some managers try to cut costs is by reducing or eliminating support contracts.

But such service reductions may not be as economical as first appears, because if things go wrong, and a parts or operational breakdown occurs, you may end up paying more for repairs than any service contract would ever have cost.

With an Agilent service contract, you can choose the type of service protection to suit your needs, anywhere from a full-scale 24x7 on-site protection to simply parts protection. In any case, once you are covered by an Agilent contract, help is just a quick phone call away.

Without a service contract, the wait for help can be as long as three days--- but remember that then you also must face the unanticipated expenses of parts and labor.

In addition, the lost revenue due to an equipment breakdown must be considered. Agilent estimates that for a medium complexity ASIC, the cost of an hour of lost production can average about $3,000. Downtime can quickly mount up even when purchasing expedited service.

Thus, with an extended global warranty and service contracts, you can eliminate the expenses of unexpected repairs, get fast response, and lock in savings for an extended period of time. Support agreements offer peace of mind, protect the test system investment, and ensure peak performance and uptime throughout the system's life.

Agilent's extensive portfolio of service and support agreements include hardware and software contracts and calibration services. Customers can also arrange to have test systems moved, hardware upgraded, and configurations optimized, as well as get assistance with planning and installing a software update. In addition, a number of training courses are available to allow customers to maximize their expertise and system utilization.

Agilent's Semiconductor Uptime



Thus, with an extended global warranty and service contracts, you can eliminate the expenses of unexpected repairs, get fast response, and lock in savings for an extended period of time.

Support Services program consists of a team of highly trained, global experts who are ready to respond to all test needs and to help quickly install, integrate, maintain, repair and optimize a test system over the life cycle of your semiconductor products. Choose the right level of service for your needs at an affordable price.

Contract features include telephone assistance, remote troubleshooting and support capabilities, and escalation management. A variety of response times and daily coverage allow you to tailor the contract to your specific business needs. Contracts with the Preventive Maintenance feature keep your system in peak operating efficiency. Including parts as a feature of your cooperative contract can also eliminate expensive surprises and unplanned costs.

Agilent also can come to your facility to maintain your systems. One of our experienced customer engineers will troubleshoot and repair any hardware problem. To speed up the repair process, they may begin the troubleshooting process by phone.

The benefits to you are:
- Investment protection.
- Dependable and timely response and repairs get you up and running quickly.
- Regular updates of system software ensure you have the latest releases.
- Scheduled preventive maintenance can fit your schedule.
- Calibration and ISO9000 Certification of your Agilent test systems can keep them in top operating condition
- Remote diagnostics and troubleshooting by system experts can quickly get to the root of the problem
- Escalation processes and access to worldwide test and measurement resources are available for fast problem resolution.

Call your Agilent sales representative for an analysis of your support needs. ◆

DID YOU ? KNOW



Something a bit fancier for your Palm

Montblanc, the maker of luxury writing instruments, has introduced the TouchP Pen line of styluses for the Palm V hand-held computer. Making that Montblanc statement of elegance can cost you anywhere from $45 for the gold-plated or platinum version, to $3,910 for the diamond-studded solid platinum model. (There are also diamond-studded versions in stainless steel for $1,465 and solid gold for $2,930.)

The Touch Pen can be purchased from Montblanc dealers or on-line from the company's Web site at www.montblanc.com.

Just remember, this 1/4" x 4" stylus can be purchased in a three-pack plain Palm V version for about $10.

Source: The New York Times

Global | Calendar

APRIL

April 24 – 26
SEMICON/Europa
Nuremberg, Germany

MAY

May 6 – 8
Winning in the Wireless World Symposium
Asia Road Show
(Includes Bluetooth™ demonstration)
Hsinchu, Taiwan

May 8 – 9
SEMICON/Singapore
Singapore

May 21
Wireless Expo Korea
Seoul, Korea

May 29
Winning in the Wireless World Symposium
San Diego, CA

JUNE

June 4
Winning in the Wireless World Symposium
Stockholm, Sweden

June 6
Winning in the Wireless World Symposium
Munich, Germany

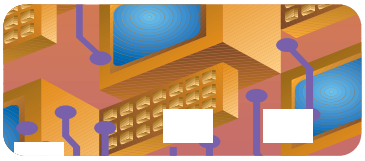
June 7 – 13
Agilent 93000 SOC Series Road Show
Winning in the Wireless World Symposium
Asia Road Show
(Includes Bluetooth™ demonstration)
Singapore

June 26 – 29
Nepcon Malaysia
Malaysia

JULY

July 17 – 24
SEMICON/West
San Francisco and San Jose, California

For more information on these events, please visit Agilent's web page at:
http://www.ate.agilent.com/ste/events/events_index.shtml



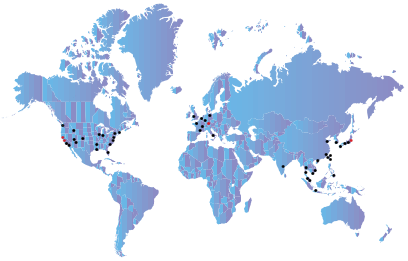
For more information, please contact your Agilent sales engineer. Or visit our Website at:

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

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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)

Europe
tel. (31 20) 547.9999 (Amstelveen, The Netherlands)

Japan
tel. (81-426) 56.7832 (Tokyo)

Latin America
tel. (305) 267.4245 (Miami, FL, USA)

Australia/New Zealand
tel. (1.800) 629.485 (Forest Hill, Victoria, Australia)
tel. (0.800) 738.378 (New Zealand)

Asia Pacific:
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tel. (852) 2599.7889

Taiwan
tel. (886-2) 717.9524

Korea
tel. (822) 769.0800

Singapore
tel. (65) (1.800) 292.8100

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Executive Editors
Sherry Scholer
Jim Hutchinson

Project Manager, Editor and Designer
Diana Diamond, Diamond Communications & Design

Contributors:
Teresa Bongolan
DeAnna Coleman
Tracy Hoff
Noel McLaughlin
Gabi Miles
Joan Sollers
Alan Wadsworth

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