

TEST COMES ROARING BACK

After a disastrous 2009, the large publicly held test companies enjoyed booming business in 2010.

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IMAGE: ISTOCKPHOTO/YYSTOM

As the old saying goes, the bigger they are, the harder they fall. But there's a flip side to that: Watch out when they finally get up!

Following a dismal 2009 when overall test-and-measurement revenue declined more than 18%, six of the top 10 publicly held test companies chalked up revenue gains of more than 25% in 2010 (see **table**), with predictions of solid business again this year and in 2012.

"These large companies learned from the slump that followed 9/11 and saved for a rainy day," observed Sujan Sami, industry manager for Frost & Sullivan's Measurement and Instrumentation practice. "Those investments in R&D resulted in new products that customers needed as the economy improved."

Big bounce for "big iron"

Nowhere has the rebound been more robust than in the semiconductor ATE (automatic test equipment) industry—the very sector that took the biggest beating in the recession. Teradyne's revenue surged 96% as the company captured \$800 million from growth in the SOC (system-on-a-chip) test market, according to Mark Jagiela, president of Teradyne's Semiconductor Test Division.

"Customers recognized us with eight points of market share gain in SOC test, bringing our full-year total share to 49%, a new record for Teradyne," said Jagiela, who cited "very strong buying in the

analog, power-management, microcontroller, and wireless segments where we have high share."

During 2010, Teradyne expanded its UltraFlex testers for advanced microprocessors, chipsets, disk drives, and video game devices. But perhaps the biggest introduction was the Neptune hard-disk-drive test system, aimed at the fast-growing 2.5-in. HDD market.

Teradyne's chief rival—Advantest—also enjoyed surging sales, with year-on-year revenue gains of 87% in yen (+109% in dollars). In the memory-test market, long-restrained capital spending for DRAM test systems rebounded early in 2010, observed Keith Lee, president of Advantest America, and demand for mobile DRAM test systems remained robust throughout the year.

"Overall, we recorded a 30% jump in memory-system sales, which is largely attributable to our T5503 and T5585 test systems," said Lee, who also reported healthy sales for SOC testers, "due to an insatiable global demand for smartphones, tablet PCs, and other consumer electronics."

The company's flagship T2000 platform for SOC test now boasts nearly 50 unique customers and has an installed base of more than 1200 systems worldwide. During 2010, Advantest introduced an Enhanced Performance Package for the T2000, which incorporates new modules for executing system-level IC-design verification.

In March of this year, Advantest announced its acquisition of another major player in semiconductor



Takashi Nishijima, president of Yokogawa Meters & Instruments, pointed to the rapid recovery in the global test-and-measurement market, especially in emerging countries.

Courtesy of Yokogawa.



test, Verigy. The Agilent Technologies' spinoff, which recorded a 76% jump in revenue in 2010, had come close to merging in late 2010 with LTX-Credence.

Shortly after the announcement, Jorge Titingier, president and CEO of Verigy, said the deal would benefit test engineers because "both companies put great importance on developing next-generation solutions and capabilities to meet our customers' future roadmaps."

Among the capabilities that Verigy brings to Advantest is its Port Scale RF solution for SOC test, which accounted for more than 40% of the company's 2010 revenue. Another hot product: the V93000 HSM3G, designed for low-cost volume test of DDR3 and DDR4 memory.

Sami of Frost & Sullivan does not view the increasing consolidation in semiconductor test as a negative for customers. "With the broader portfolio of products offered by Teradyne and Advantest, customers can get one-stop shopping," he said.

Another Frost analyst, Jessy Cavazos, added that there are still opportunities for niche companies in semiconductor test, such as Test Evolution, which targets the AXIe open-systems market.

Test tug of war

Just as Advantest and Teradyne are poised for tougher head-to-head battles, so are two other test giants: Danaher and Agilent. In 2010, Danaher added Keithley Instruments to a stable that already included such well-known brands as Tektronix and Fluke. Combined, the Danaher family of test companies recorded \$2.8 billion in sales, edging out Agilent for the number-one spot in the top 10.

Last year, Tektronix introduced a new mixed-signal oscilloscope platform, the MSO/DPO5000 Series, and unveiled new high-bandwidth and low-capacitance passive voltage probes. "Taken together, these products give embedded systems engineers unmatched performance and analysis tools for complex debug and validation tasks," noted Amir Aghdaei, Tektronix president.

Other hot areas cited by Aghdaei include PCI Express, where bus speeds require effective test tools, such as the Tektronix TLA7SA00 logic protocol analyzer. Also in demand: instruments to support test work on DDR3 and DDR4

Top-10 test-and-measurement companies in revenue (publicly traded companies)

Company	2010 rank	2009 rank	2010 revenue (millions US\$)	2009 revenue (millions US\$)	Percent change
Danaher	1	2	2,832.9 ¹	2,221.3	27
Agilent Technologies	2	1	2,784.2 ²	2,418.0	15
Teradyne	3	4	1,608.6	819.4	96
Advantest	4	8	1,197.8	571.8	109 ³
National Instruments	5	6	873.2	676.5	29
JDSU	6	7	652.2	595.1	9
Anritsu	7	5	624.1	521.3	19 ³
Verigy	8	10	569.0 ⁴	323.0	76
Spirent Communications	9	9	482.2	427.2	13
Yokogawa	10	NA	432.8	343.3	26 ³

¹Danaher does not report sales for individual business units, such as Tektronix, Fluke, and Keithley Instruments.

²Agilent revenue includes only electronic-measurement operations. Sales of instrumentation for chemical analysis and life sciences totaled \$2.7 billion in 2010.

³Percentage change in dollars reflects the increased value of the yen versus the dollar year on year. The percentage changes in yen for these Japanese companies were +87.2% for Advantest, +10.8% for Anritsu, and +16.3% for Yokogawa's measurement business.

⁴Verigy operated as an independent company in 2010 and was acquired by Advantest in March 2011.

Note: Rohde & Schwarz, a privately held company, reported annual sales of 1.3 billion euros in the fiscal year ending June 2010, versus 1.2 billion euros the previous year.

as well as the new USB 3.0 standard and 100 Gigabit Ethernet communications.

Meanwhile, new products like the model 810 handheld vibration tester for equipment maintenance fueled growth for sister company Fluke. Among other key product introductions cited by Barbara Hult, Fluke's president, is the 190 Series II ScopeMeter, a four-channel device built for 600-V electrical environments found in manufacturing.

"With energy prices uncertain, we anticipate enduring interest in products for measuring and reducing energy consumption," said Hult, "and the march of electronic controls across segments, from manufacturing to commercial buildings, will drive the need for more complex measurements as part of regular maintenance and troubleshooting."

Frost's Cavazos observed that while Danaher has moved to assemble an impressive portfolio of test-and-measurement companies, Agilent remains the industry's "kingpin" in brand recognition.

Ron Nersesian, president of Agilent's Electronic Measurement Group, attributed his business unit's 15% increase in 2010 revenue in large part to the introduction of more than 200 products, including 47 modular instruments in September alone.

"Our September announcement was the largest modular-instrument introduction in the history of the electronic-measurement industry," claimed Nersesian. "We are just scratching the surface in our multiyear plan to develop modular solutions and give customers the products that best fit their measurement needs."

Nersesian said that interest in smartphones is "exploding," which is driving test applications for 3G and 4G communications. The aerospace and defense business is also growing for Agilent, which claims technology leadership in core products such as oscilloscopes, network analyzers, signal analyzers, and signal sources. One example: the Infinium 90000 X-Series oscilloscopes that feature up to a 32-GHz analog bandwidth. On the horizon, added Nersesian, is more business from applications related to cloud computing and green technology.



Advantest's Keith Lee sees "insatiable global demand" for smartphones, tablet PCs, and other consumer electronics.

Courtesy of Advantest.

R&D spawns success

Research investment also paid off for National Instruments in 2010, which notched a 29% jump in revenue. “We have made significant investments in R&D to fully leverage our core platforms of PXI and CompactRIO,” pointed out James Truchard, president and CEO. “Two key developments in PXI in 2010 were the release of the industry’s first PXI vector network analyzer and our new high-density PXI switching platform.”

NI, honored for the 12th consecutive year by *Fortune* as one of “America’s 100 Best Companies to Work For,” reported strong interest in its RF and NI FlexRIO products used in automated validation and production test for smartphones and other mobile devices. The company is also positioning its PXI platform for semiconductor testing. For example, TriQuint Semiconductor reduced the characterization time of its latest power amplifiers from over two weeks to about a day using an NI PXI solution.

For Japan-based Anritsu, not even a deadly tsunami and earthquake could dampen solid business performance in 2010, when revenue grew nearly 11% in yen (19% in dollars). In fact, all three Japanese companies in the top 10 reported a return to normal operations within two months of the March disaster.

“The chief factors that contributed to our revenue were growth in installation of broadband communications networks and the expansion of data-communications services,” said company president Hirokazu Hashimoto. “As a result, our top-performing test products were those that measured mobile communications, including conformance test systems, signaling testers, and field measuring instruments.”

Anritsu’s new MT8220C radio communications analyzer can evaluate and measure 2G, 3G, and 3.5G mobile terminals, as well as LTE devices. Other key product launches included the MW8219A PIM Master,



Agilent introduced more than 200 new products in 2010, including many modular devices, noted Ron Nersesian, president of the company’s Electronic Measurement Group.

Courtesy of Agilent Technologies.

which is designed to accurately locate the source of passive intermodulation, such as near base stations.

Hashimoto said Anritsu’s prospects for 2011 are strong, as the company exploits opportunities in mobile communications. Longer term, he sees growth from automotive electronics, digital household electronics, and machine-to-machine communications.

Another Japan-based company, Yokogawa, gets 80% of its revenue from industrial automation, but its measurement business grew

by 16.3% in yen in 2010 (+26% in dollars). Its areas of focus: precision power measurements, waveform-measuring instruments, and data-acquisition systems.

As for significant new products, Takashi Nishijima, president of Yokogawa Meters & Instruments, pointed to the WT1800 precision power analyzer, which measures power consumption and efficiency in cutting-edge inverter/converter technologies. In addition, the new DL850 ScopeCorder instruments provide flexible solutions for making mixed-signal measurements, especially in mechatronics, aerospace, and vehicle systems.

“The global T&M market has been recovering rapidly,

led especially by growth in emerging countries,” said Nishijima. “We have invested in these regions, maintained our position in major markets, and expect continual and steady growth in 2011 and beyond.”

Communications drives growth

As an engine for growth for the top-10 companies, communications is clearly the pacesetter. “It’s the wireless decade,” said Frost research analyst Mariano

Kimbara, pointing to the strong interest in 3G and 4G technology.

The fate of top-10 companies like JDSU and Spirent Communications is closely tied to adoption of next-generation broadband networks. “Our end-to-end LTE solutions have been an important catalyst in driving our growth,” said David Heard, president of JDSU’s Communications Test and Measurement business segment. “Over the past year, JDSU has announced that our test-and-measurement solutions are helping Chunghwa Telecom, CSL, SingTel, and TDC to efficiently and cost-effectively deploy global LTE networks.”

Frost & Sullivan recognized JDSU, whose revenue grew by 9% in 2010, with the Global Market Share Leadership Award in fiber-optic test. JDSU also won product of the year from *Internet Telephony* for its SART (LTE/4G test) and ESAM (enterprise test) solutions.

Important 2010 product introductions for JDSU included accessLTE, a quality-assurance test solution for mobile service, and the Multi-Port Test Module for the ONT-600, which supports testing and verification for high-speed network elements of 40G and 100G Ethernet.

For Spirent, a 13% jump in 2010 revenue can be traced to equipment that supports such markets as Ethernet installations, LTE, advanced GPS, and data centers focusing on cloud computing, according to CEO Bill Burns. Burns

said that Spirent’s new Avalanche Virtual is the industry’s first “all-in-one” cloud-testing solution, designed to test and measure the performance, availability, security, and scalability of virtualized network infrastructures. In 2010, Spirent also introduced for its flagship TestCenter platform new HyperMetrics modules for testing Ethernet-related network equipment.

Looking ahead, Burn echoed the views of many top-10 test-company executives in noting: “Our customers continue to make investments to bring next-generation technologies to market. As a result, we are confident that the market for test and measurement will show further growth in 2011 and future years.” T&MW



According to Spirent CEO Bill Burns, the company’s new Avalanche Virtual is the industry’s first “all-in-one” cloud-testing solution. Courtesy of Spirent Communications.



Deployment of LTE networks has fueled growth for JDSU, said David Heard, president of the company’s Communications Test and Measurement business segment. Courtesy of JDSU.