

Testing and Measuring industry

Current Trends & Future Prospects

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Testing and measurement are two equally important terms associated with every manufacturing industry. It is concentrated on production of specific tools that can be used to analyse, validate and then verify the measurements related to electronic and mechanical systems. These tools play an important role in any industry, starting from research and development (R&D) to production and services. Owing to the rapid evolution and increasing competition, the need for having accurate and high definition measurement tool has gone up significantly. Moreover, the increasing R&D activities across various spheres are further expected to incentivise the growth of the Testing and Measurement (T&M) industry.

It has often been proved that attaining a perfect measurement is

never scientifically possible because the measurements differ in even the slightest measure, depending on the nature of the object measured. However, the T&M industry has not been discouraged by this factor and has been continuously innovating and adapting to the changing standards. The T&M industry players are now making use of multi-core parallel test systems in order to experiment more. There has also been a steady increase in the level of internet connectivity integration, wireless communication, HD videos and high-quality audio adoption. Consumer base for the T&M industry, which was once centred on the defence and aerospace industry, has now shifted and expanded to include electrical and electronics industry, communications and semiconductor manufacturing.

As far as the product types are concerned, the T&M industry can be divided into two main categories.

- The traditional box instruments
- The modular instruments

However, as far as segmented growth is concerned, the modular market is expected to grow at a steadier pace than its traditional counterpart. Modular instrumentation makes use of shared components, user defined software and high-speed buses in order to meet the needs of Automated Test equipment (ATE). PCI eXtensions for Instrumentation (PXI) are the most widely used and popularly favoured among the different

modular platforms. The share of modular instruments is expected to go up from 11.5 percent in 2011 to 22.0 percent in 2018.

New instruments and technologies

The technologies and instruments used in the industry today have also changed a lot. They have in fact evolved to meet the ever increasing demands of industries. There exists a gamut of instrument types that are structured and designed to take care of any end-use requirement. The instruments developed today are mostly application-specific products that are engineered to meet almost every end-use requirement. While a multiple number of equipments used in this industry are electronic in nature, the use of high-definition optical and audio measurement devices have also gained popularity.

Owing to the increasing complexities in measurement, there has been a strategic shift towards software packages. These packages work in combination with T&M devices to codify, validate and then organise the data acquired by them.

Some of the recently introduced tools are:

Wireless instruments: The adoption of inexpensive RF technologies, which are now integrated into everyday applications, has done a world of good for the T&M industry. Since consumers today are



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EXPERT TAKE

Trends in Testing & Measuring Industry

as told to Electrical Mirror



Babu T K, CEO
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When it comes to Product Innovation, products with technical advantage or feature may not be the only requirement, it need to have many other aspects which may not be directly linked to improve the performance but gives reliability, ease of test and calibration. In my opinion a product innovation should include,

- ⇒ Wireless communication such as Zigbee, Wifi, optic communication etc., or even wired communication such as RS485, 232 etc., to be incorporated for mass soft driven calibration or recalibration at later stage at site.
- ⇒ Up gradation of firmware remotely as the technology trend changes or, the additional requirements may come or bug to be fixed on quickly etc., to reduce down time.
- ⇒ Products with field calibration, mainly software calibration would give edge over the rest.
- ⇒ Remote calibration would be the future requirement as some of the organization or statutory body demand for recalibration certificate. Apart from implementing Design for Manufacture, Design for Reliability using the software modules will improve reliability.

more in favour of instruments with more functionality and seamless mobility, the importance of wireless instruments in the T&M industry has gone up. Introduction and use of brand new technologies like LT and MIMO antennae having 2x2 configuration with capability of enabling data rates of 100 Mbps in downlink and uplinking capabilities of up to 50 Mbps means that these equipments can easily handle multiple radio access technologies in order to facilitate testing.

Serial Data Communication: USB compliance testing has now emerged as one of the most important areas for the test and measurement industry. The shift from parallel to high-speed serial data communication has led to this shift in trend. There are already about six billion USB devices worldwide and the number is ever increasing. The USB 3.0, equipped with latest technology and designs is set to meet the increasing demand.

Semi-conductor chips: There has been a steady progress in designing ever-more equipped front-end Integrated Chips for gen-next instruments.

There has been a steady inclusion of multiple microprocessors into the design of inexpensive instruments owing to their decreasing prices. This has enabled each instrument function have its own dedicated microprocessor, allow-

ing higher throughput as not a single program has to wait for its turn to get processed by the processor.

T&M designers are also coming up with instruments that are capable of testing the highly capable components that are incorporated into devices like cellphones, consumer electronics and other wireless devices.

Market size and share

According to the Annual Investor Conference-NATI 2012 report, the total market size of the T&M Industry is around USD 17 billion, with the Electrical and Electronics industry consuming up to 25 percent of the overall production (USD 4.4 billion). The structural or physical industry comes in second, constituting almost 23 percent (USD 4 billion) of the entire consumption. The other industries include wireless or RF, real-time set and semiconductor.

The US has been able to attain leadership position as the largest T&M market globally, according to the latest report on General Purpose Electronic Test and Measurement Instruments. Being the technology leaders in the electrical and electronic T&M instrument manufacturing, the US has done well to emerge as one of the most competitive players in the advanced high-end T&M market

segment.

Industry reports reveal that the US instrument manufacturing for measuring and testing the electrical and electricity signals has grown at a steady pace. The industry was able to generate overall revenue of USD 10.4 billion in 2011. The estimated gross profit stood at 30.29 percent. The overall import of the country was valued at USD 6 billion from across 124 countries. The total domestic demand for the industry stood at USD 8.7 billion in 2011, showing steady signs of improvement.

Major Players

The global T&M industry has been dominated by players like Advantest Corporation, Agilent Technologies, Anritsu Corp., Aeroflex Inc., Anritsu Corp., Astro-Med Inc., Danahar Corporation, Danaher Corporation, B&K Precision Corp., Keithley Instruments, JDS Uniphase Corp., LeCroy Corporation, Pico Technology, National Instruments Corporation, Rohde & Schwarz, Stanford Research Systems, Yokogawa Electric Corp. and Willtek Communications GmbH, among others.

Agilent Technologies

Agilent Technologies is the industry leader in the T&M market. It has three major areas of operation:

- Electronic measurement
- Chemical analysis
- Life sciences

The company's major area of operation, electronic measurement, contributes to over 50 percent of the overall revenue. With introduction and increasing demand for smartphone technologies and ever expanding geographical reach, the company has registered steady revenue growth.

National Instruments Corporation

It is the leading global supplier of PXI modular instrumentation having a market share of 60 percent in the T&M industry. The company has recently acquired Phase Matrix, which has helped the company gain insights into modular instrumentation industry. It has also helped the company to perfect the process of creating fast switching synthesizers and a Radio Frequency (RF) system design portfolio, which is critically important to the company's hardware and software offering. The company is further expected to expand the frequency range of its products to 26.5 GHz on the basis of PXI platform for RX, which will upgrade the current product offering to higher frequency applications.

Anritsu

With the mobile market expanding at a steady pace, Japan-based Anritsu has been able to register robust growth since 2010. It provides top performing test products to the mobile communicating segments and metro networks. The markets that Anritsu caters are Japan, the US, Europe, Middle East, Africa and Asia.

The new MT8220C radio communications analyser introduced by the company has the ability to evaluate and measure 2G, 3G and 3.5G mobile terminals, besides catering to the LTE devices. The company's MW8219A PIM Master is designed to measure accurately and locate the source of passive intermodulation, which can be found near base stations.

JDSU

This US-based company has recently acquired one of Agilent's test units, which has helped to strengthen the company's communications test market-

ing positioning. More than 100 wireless service providers across the world have announced the implementation of LTE, which includes players like Bell Canada, AT&T, China Telecom, China Mobile, NTT Docomo, etc.

The Indian scenario

There has been significant growth in the T&M industry in India over the last few years, which is a reflection of the fact that it plays a critical role in any industry. The increasing R&D activities across the

country are further expected to augment growth of the sector, currently growing at an annual rate of 20 percent on a year-on-year basis. Industry insiders opine that the T&M industry has potential of touching the magic figure of USD 1 billion in the next three years.

Experts add that the growth of the general purpose test equipments is set to be directly proportional with the growth of the electronic industry in the region. The investment has also been high in



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MARKET MAVENS

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as told to *Electrical Mirror*



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The world is moving towards automation & T&M industry is not isolated. We are experiencing increasing use of built-in sensors in equipment's. High precision sensor-based test and measurement technology contributes in uninterrupted production with high quality assurance. These sensors can connect with the T&M device for data acquisition & analysis. Remote monitoring of the equipment is also a demand of the industry & is expected to increase in future. There is an increasing trend to use of wireless technologies in T&M. Fluke has launched innovative products where it is possible to detach measuring unit with the display. Recently Fluke has launched a product called CNX wireless DMM which can connect wirelessly with ten field modules to measure current voltage & temperature. This trend is expected to continue in future also.

The integration of multiple parameters on a single platform is also a trend which is going to percolate in future T&M instrumentation.

fields like design, R&D and manufacturing. Even though the markets behaved slightly cautiously in 2012 owing to the existing economic climate, it is considered to be just a temporary phase. Fundamentals for investment by private players remain strong and various government policies like National Policy for Electronics and National Manufacturing Policy are expected to strengthen the electronics and other general purpose test equipment market growth in the country in years to come.

Insiders also point out easy accessibility and cost efficiency as major contributors behind this steady growth. The major players dominating the Indian market are Yokogawa India Ltd, Agilent Technologies India Pvt. Ltd, Rohde & Schwarz India Pvt. Ltd, Aimil Ltd, Aplab Ltd, Rishabh Instruments Pvt. Ltd, Sci-entech Technologies Pvt. Ltd, Tektronix (India) Pvt. Ltd, Synergy Measurement Technologies Pvt. Ltd, Mecro Instruments Pvt. Ltd, etc.

Meeting the increasing demand of power sector

India being a country with the second largest population, the demand for power and electricity is quite high. Moreover, as the government plans to add over 88,000 MW of power generation capacity during the Twelfth Five-

Year Plan (2012-17) period, prospects of growth in this sector is definitely going to be on a higher side. There are also plans of investing INR 1.4 trillion in the sector to create about 6-7 lakh job opportunities during the Twelfth Five-Year Plan.

With T&M contributing hugely to the proper functioning of the power sector, the future of the industry looks bright. Setting up of new power generation plants and other supporting evacuation infrastructure is likely to influence the growth prospects of the T&M industry. Moreover, the Indian power transmission is moving to EHV and UHVAC class, which is further expected to generate demand for even more sophisticated equipments.

The T&M industry has also contributed hugely to the renewable energy production. Solar energy production, which is at the centre of much attention, has intensified the need for instruments like solar cell, measurement solutions, solar module and MPPT/inverter test.

India has also been a hub for producing equipments like oscilloscopes, which are the fundamental tools for testing and debugging in all the spheres of product development and manufacturing.

Another industry that has been hugely depending on the T&M industry in India is the mobile industry. With the launch of services like 3G and 4G, the demand for T&M tools is set to be consid-

erably high. However, the high-prices for T&M equipments and solutions continue to be a major challenge for the industry.

The increasing demand for data-intensive services has also boosted T&M industry growth, thereby helping in the emergence of a new trend.

Therefore, it can be said that the growth potential for the T&M industry is going to be relatively high both in India as well as globally. The industry is one of the most revolutionary and dynamic ones with the machines becoming increasingly compact and accurate. As countries look to invest more on developing tools that provide them with compact and accurate results, a huge segmented growth is never going to be too much of an expectation ■



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