

Global Electronics Market: A Brief Overview

By Mike Kay

This article will provide a brief global overview of the electronics industry, looking at geographical differences and some specific markets. Due to the many different applications contained within the electronics industry, it would be impossible to provide detailed information on all areas; therefore, only a select few applications having direct involvement with radiation-curing technologies have been chosen.

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Introduction

There are many opportunities for companies involved in radiation curing within the electronics industry. The high-speed, low-temperature, cure-on-demand properties of radiation curing are beneficial to countless electronics manufacturing processes. Radiation-curing technology has shown the ability to improve the manufacturing process while also improving the reliability of the products being made. Radiation-curing processes also provide manufacturers with a way to reduce emissions of volatile organic compounds (VOCs), which is a growing global environmental concern. For these reasons, electronics manufacturing companies adopting radiation-curing technology within their processes can gain an advantage over competitors who are using other assembly techniques.

Since the electronics market decline in 2001-2002, developed regions and countries (such as Europe, the U.S., Japan and Korea) have experienced slow improvement. Based on these areas alone, the electronics industry would be showing almost no growth. However, strong growth in the developing countries and, in particular China, has given strength to global numbers for growth in electronics production. The global worth (cost of good sold) of the electronics manufacturing industry was estimated to be approximately \$923 billion in 2006. Some estimates see the total electronics assembly value growing to \$1.3 trillion in 2011.¹

Asia-Pacific is the largest electronics-manufacturing region. It is estimated that the Asia-Pacific region produces more than half of the world's electronics equipment and components. The second largest region of production is the Americas followed by Europe. The contribution by the Middle East and Africa is much less in comparison with other areas.

Within each of their regions, there are a number of significant countries responsible for the majority of global production. The top three countries for global electronics manufacturing—China, U.S. and Japan—together account for almost 30% of the world's electronics production. The top 10 countries for electronics manufacturing also include South Korea, Malaysia, Singapore and Taiwan, illustrating the strength of Asia in the production of electronics. While Europe combined accounts for a large share of global electronics production, the share of



Cell Phone

individual countries is lower with Germany and the UK being the largest producers.

The Americas

As companies migrate to lower cost production facilities abroad, the U.S. has lost a significant share of the global electronics production. However, while much of the high-volume, low-cost production has been relocated outside of the U.S., it is expected that low-volume, high-mix products will continue to be manufactured there. This is expected to create more opportunities for small- to medium-sized contract electronic manufacturers.

Mexico has been able to attract investment in electronics manufacturing due to its proximity to the U.S. market and lower cost manufacturing. Mexico's largest production sector is computers, followed by consumer products. Mexico's electronics production has also been aided by special customs treatments and foreign investment programs for assembly plants operating in the Mexico territory.

Asia

China has been the main beneficiary of the relocation of high-volume electronics manufacturing facilities to

low-cost countries. Its vast domestic market, labor supply and focus on low-cost production has enabled it to become the major production hub within Asia. China has seen the highest growth in the last few years to become the largest global electronics manufacturer. This has had an effect on other countries in Asia, such as Malaysia and Singapore, which are now looking to focus on higher value products as a means of competing in this region.

Growth in Japan is expected to occur in consumer electronics and components, driven by the demand for products such as LCD TVs. It is expected that price pressures will force Japan to move more manufacturing sites offshore in the long term. Japanese companies are expected to initially produce new products in Japan before manufacturing is moved to lower cost countries.

Taiwan is a significant producer of optical drives for the CD-ROM, DVD-ROM and RW drives, accounting for more than 33% of optical drives in 2006.² Taiwan also remains an important production center for semiconductors and flat panel displays. South Korea focuses much of its manufacturing domestically and has a leading position in both semiconductors and mobile handsets.

Europe

Like the U.S., Western Europe has lost a significant global share of electronics production as companies migrate to lower cost manufacturing centers. Germany, the UK and France dominate production in Western Europe, accounting for more than half of the region's total production. U.S. investment in Ireland has given it a strong position in the production of computer equipment. Like the U.S., it is expected that low-volume, high-mix products will continue to be manufactured in Western Europe.

Markets

The manufacture of components has the largest production value of all the product groups within the electronics market. It is estimated that the manufacture of components accounted for just over 30% of the total electronics production value. Japan is the largest producer of components, followed by the United States and South Korea. The market can be broken down into active (TV tubes, diodes and integrated circuits), passive (printed circuit boards) and other components (microphones, loudspeakers and amplifiers).

Radiation-curing technologies play an important role in the manufacturing process of electronic components and improving product reliability. A UV-curable conformal coating is often applied to printed circuit boards (PCBs) to act as



Hard Drive



LCD Display

protection against moisture, dust, chemicals and temperature extremes that could result in a system failure. Other applications for radiation-curing technology include wire tacking, chip underfill and encapsulation of sensitive components.

Globally, another significant area of electronic production is radio communications, which includes the substantial growth seen by the mobile handset market. Radiation-curing technology is used on a number of applications in the assembly of mobile phones including the LCD screens and camera modules found on many models of mobile phones. Mobile phone vendors shipped more than a billion handsets during 2006, up 22.5% from 833 million units sold in 2005.³ Emerging markets such as China, India and Latin America account for a large portion of this growth. Significant increases in shipments are expected to continue through 2012, which should mean ongoing demand for radiation-curing technologies within this market.

The consumer electronics sector, which has been lagging behind the average growth trend of the entire industry, is expected to realize improved growth in 2007 and over the next four years. One reason is due to the replacement of CRTs (cathode ray

tube displays) by flat panel displays, especially LCDs for PCs and TVs. LCD TV shipments increased by 56% year over year in the fourth quarter of 2007, giving them a 47% unit share of the TV market.⁴

Radiation-curing technology is used in the assembly of the deflector unit for production of CRTs used for TVs and PC monitors. The decline in production of CRTs has led to a decrease in demand for radiation-curable technology in this application. However, radiation-curing technologies provide the benefits of fast and clear glass to glass laminating for the production of LCD screens. By finding new applications in growing markets, the demand for radiation curable technology will continue to grow with increased demand for these products.

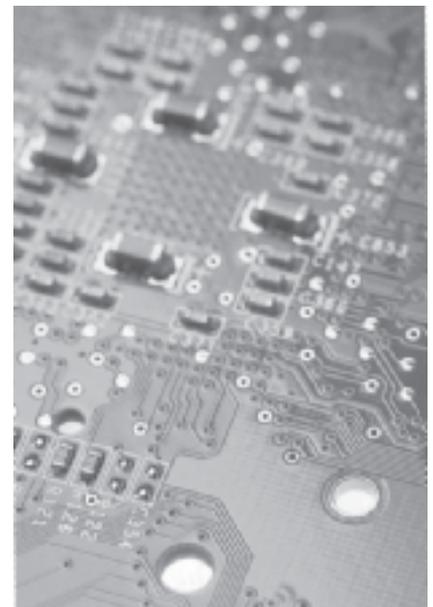
Manufacturing of the optical pick up unit, used in optical drives for CD-ROM, DVD-ROM and RW drives, is an area of electronics manufacturing which has benefited from the fast, cure-on-demand properties of radiation-curing technology. Radiation-curing technologies have been vital for increasing production capacity to meet consumer demands while at the same time lowering the cost of production. Worldwide shipments of optical drives are forecasted to grow by an average of 8.4% over the next 3 years,⁵ maintaining the demand for radiation-curing technologies. New technologies such as Blu-ray drives may be the next product to drive growth in this market if consumer adoption meets some of the market forecasts.

The hard disk drive (HDD) industry is another area within the electronics industry utilizing radiation-curing technology. Recently, the hard disk drive industry has seen increases in product shipments. This is expected to continue for at least the next two years as a result of demand in the

consumer electronics market. The increased number of high definition televisions being purchased by consumers is resulting in increased demand for higher capacity HDDs for digital video recorders.

Strong growth is also expected in sectors such as automotive electronics. This is not because of the number of cars produced, but rather due to the increased comfort, engine efficiency, safety, navigation, information and entertainment features bringing an increasing electronic content to cars. The demand for robust electronics that work for many years in harsh environments (including, heat, corrosion and mechanical vibrations) presents a number of opportunities for UV-curing applications used for protecting critical electronic components from these harsh environments.

Innovation is a key to continuing growth in the electronics industry. There are many examples of this, including the mobile phone market where in the last few years integrated camera phones have been a major force driving the replacement of mobile handsets. In 2004, about one-third of mobile phones incorporated



PCB Printed Circuit Board

an integral camera, growing to nearly half of all mobile devices shipped in 2006.⁶

Radiation curing technology is an important part in the assembly of the integrated camera module for cell phone handsets. The ability to assemble the lens module for the camera in seconds with very little heat, allowed manufactures to ramp up production of the camera module to meet the growing consumer demands. Manufacturers who realized early the benefits of using radiation-curable technologies were able to get an advantage on their competition in production of cell phone camera modules.

Innovations continue to spur growth in this market as Smartphones are the newest and most dynamic area for growth within the mobile handset market. Their use has spread beyond business, being used increasingly by consumers. New features such as music, video, gaming and entertainment are targeted at increasing the use of Smartphones by consumers. Analysts are expecting the smartphone to show growth of 66% in 2007, accounting for up to 12% of all mobile device shipments.⁷

In an effort to reduce manufacturing costs, many branded manufacturers have been forced to outsource more of their production to contract electronic manufacturers (CEM) or electronics manufacturing services (EMS). These outsourced segments are one of the fastest growing areas within the electronics markets. Driven by the electronics market, it is estimated that the EMS industry will grow from the \$223 billion today to an estimated \$442 billion in 2011.⁸

CEMs provide a wide range of services, including manufacture, assembly and testing. Contracts are usually on a build-to-order basis. EMS services include design, component

selection and procurement, prototyping, product assurance, assembly, test, failure analysis, full-supply chain management, worldwide distribution and after-sales support. Contract manufacturers are able to take over existing product lines and produce them more efficiently than the previous owners.

In this way, innovation in electronics includes not only new products and features, but also how these products are produced. The main issues in the electronics industry now are reliability and cost reduction, as seen in many mature industries. This explains the development of CEM, EMS and ODM (original design manufacturers); experts at improving the manufacturing process. These new global players have a significant role in delocalizing production sites and rationalizing both costs and logistics.

Conclusions

This brief overview shows there are many opportunities for radiation-curing technologies in a number of applications within the electronics industry. Markets such as flat panel displays, mobile handsets and optical drives provide good growth opportunities for companies providing radiation-curing products. Innovation is key to the success of the electronics industry. Those suppliers of radiation-curing technology who are able to provide innovative solutions will grow with the industry. Manufacturers who realize the benefits of using radiation curing will gain an advantage over their competition. ■

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