

MICRO SENSORS – WORLD WIDE MARKETS AND ECONOMIC IMPACT

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Abstract: Within the next 5 years MEMS sensors and actuators seem to consolidate their position in established IT peripheral markets for read/write heads and inkjet heads, in addition to creating new opportunities in areas such as microphones, memories, micro energy sources and chip coolers. The automotive sector is expected to remain a major application field with several high-volume safety products including air bags and tire pressure monitoring systems. The major boost to the growing market will be the consumer electronics segment, which is forecast to almost quadruple its share from 6% of the MST/MEMS market in 2004 to 22% in 2009. This paper is based on the "NEXUS Market Analysis III, 2005-2009" which has been published by the NEXUS Task Force on "Market Analysis for MST" in December 2005 and is available through the enablingMNT group.

Keywords: markets, exploitation, commercialization

Introduction

The Nexus Market analysis for Microsystems has been one of the most recognized source of market data for Microsystems worldwide since 1998. The Task Force Market Analysis has released the updated report entitled "Market Analysis for MEMS and Microsystems III 2005- 2009." This follows on from the highly successful 1996-2002 and 2000-2005 reports that have become industry standards. The new report is completely revised. It shows new MEMS/MST products, application fields and a worldwide regional analysis of competencies

The total market for MEMS and Microsystems

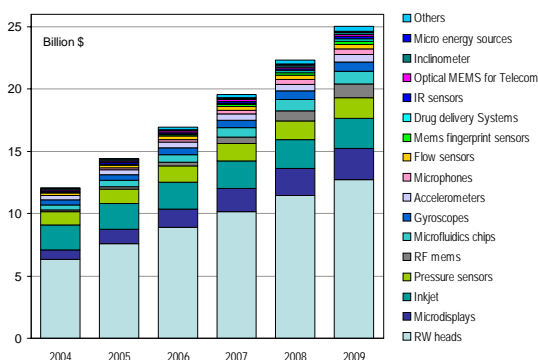
The new study estimates a projected market growth for 1st level packaged Microsystems and MEMS from US\$ 12 billion in 2004 to 25 billion in 2009. This corresponds to an Annual Compound Growth Rate (CAGR) of 16%. Considering the traditional NEXUS definition used in the reports I and II - the market for the smallest unit, incorporating MST component(s), that is commercially available - the market will increase from US\$ 33.5 billion in 2004 to US\$ 57.1 billion.

Figure 1 features the market for 26 MEMS/MST products investigated in the study. Three products will still account for 70% of the market in 2009: read/write heads, Inkjet heads and micro-displays.

RW heads will still represent around 51% of the market in 2009. Traditional application for PCs will grow moderately; however, the RW market is experiencing a renaissance in consumer electronics as hard discs are entering music players (e.g. in every famous i-pod), in smart phones (Samsung introduced the first cell phone with HDD in 2004), as well as digital video cameras, set top players, DVD recorders, etc.

Inkjet heads will continue to be one of the most profitable markets for MEMS. The main driver for inkjet heads in the next 4 years is the printing of digital photos – especially cell phone cameras – growing at 15% to 20% per year. A major trend is the integration of non-disposable inkjet heads in the printer instead of disposable print heads in cartridges. After Epson and Canon, HP is starting to ship printers with integrated print head. This will slow down the growth in units; however, the value of these non-disposable print heads is 3 to 5 times higher.

Microdisplays are the blockbuster of the 2004-2009 period. Micro-displays revenues will overtake inkjet heads in 2009 as Texas Instruments is forging ahead with the DLP chip for front projectors and rear projection TVs. DLP technology dominated the front projector market with almost 40% market share in 2004 and is also dominating the large screen rear projection market segment. The emergence of new MEMS micro displays products such as iMoD displays for mobile handsets from Qualcomm is also worth noticing.



* Other are: Microreaction, chip cooler, MEMS memories, liquid lenses, microspectrometer, wafer probes, micro-mirrors for optical processing, micro-pumps, micromotors, chemical analysis systems

Figure 1: Total market for 26 MST/MEMS products

Other fast growing markets are microphones, RF MEMS, and tire pressure monitors next to established pressure and motion sensors, which are increasingly being driven by consumer applications.

Emerging markets include wafer probes, liquid lenses for autofocus/zoom in camera phones, micro-motors, micro-spectrometers, micro-pumps and micro-reaction products. NEXUS also considers products that will begin to impact markets at the end of the decade, namely micro fuel cells, MEMS memories and e-fuses, chip coolers.

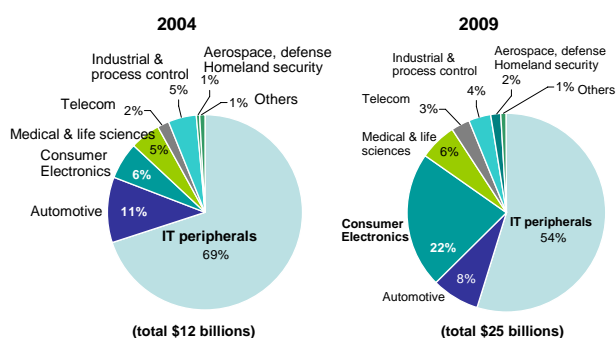


Figure 2: MST/MEMS market by application fields

The market by application field as shown in figure 3 may be subdivided into three main application fields: IT peripherals, Automotive and Consumer Electronics.

IT peripherals will by far remain the first application field of MEMS and MST in 2009, mainly with RW heads and inkjet heads. However, the share of IT peripherals will decrease from 69% to 54%.

Automotive will remain a major application field with several killer application fields such as airbags or Tire Pressure Monitoring (TPMS). Numbers of units will still grow at a rapid pace; however, the growth in revenue will be moderate due to a continuous pressure on prices (e.g. gyroscopes: + 15% /year in units but 8% in revenue).

Consumer electronics will experience the strongest market growth in the time period under consideration and will overtake automotive. The share of consumer electronics in MEMS/MST markets will grow from 6% in 2004 to 22% in 2009.

NEXUS identified the three drivers for MEMS in consumer electronics as the following:

Large screens High Definition Television for everybody. Indeed, the market for rear projection TVs is skyrocketing from 6.5 M units in 2005 to 11.9 M units in 2009 according to iSuppli Corp.

More storage in digital equipment. HDD enter digital video cameras, music players, smart phones... Shipment of HDDs is expected to explode in consumer electronics from 10 M units in 2004 to 200 M units in 2009.

Mobile handset... After MEMS accelerometers from ADI which entered a cell phone from NTT Docomo in September 2003, a number of MEMS products are following including pressure sensors, gyroscopes, MEMS display, micro fuel cell, MEMS fingerprint, liquid lenses, thermopiles...

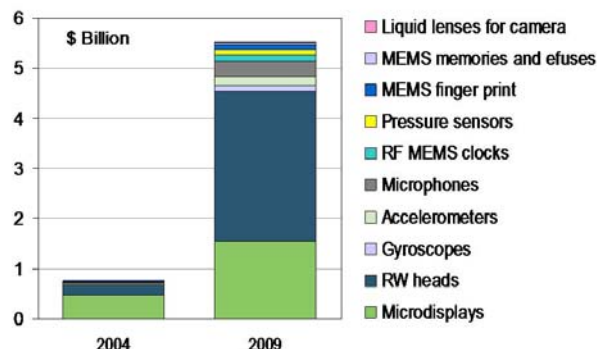


Figure 3: Market for MST/MEMS in consumer electronics

Conclusion

The MEMS/MST market volume was worth \$12 billion in 2004. It is expected to reach \$25 billion in 2009. The growth is still rapid: 16% CAGR in value in 2004–2009. Consumer electronics will drive market growth in the next 4 years. With regard to products, 14 out of 26 MEMS/MST products are expected to exceed \$100 million in revenue in 2009. Completely new products in 2009 will include micro fuel cells, MEMS memories, chip coolers, liquid lenses for cell phone zoom and autofocus.

Note

A copy of the presentation will be made available on request.

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