

A March 2012 snapshot look at what the gurus are saying about the analog and analog asic chip market:

References: Gartner, Semico, Databeans, Instat, ICinsights

Edited by the SPG marketing team

Demand for analog chips, particularly within consumer electronics and communications equipment, remained relatively strong over the past year. This was generally thanks to the rise of smartphones, as well as consistent sales growth in analog radio-frequency (RF) and power management chips used for GPS, Wi-Fi, and Bluetooth segments. Their growth in the mobile market is thanks primarily to the latest power management chips that allow tablet PC and smartphone battery charges to last several hours longer than was previously possible. Likewise, the location and navigation capabilities provided by GPS chipsets let smartphones address the ever growing need to improve the customer experience. Analog chips also are widely found in other high volume consumer electronics products such as HDTVs, set-top boxes, Blu-ray players, and digital video recorders.

Analog products fall into two major categories, general purpose analog and application specific analog. Application specific product revenue is the larger of the two with \$26.3 billion in projected 2011 sales, and a CAGR of 9 percent over the next five years. The general purpose analog market is expected to reach \$18.8 billion in 2011 and will experience higher annual growth of 12 percent on average until 2016.

The analog ASIC market is huge. In fact, research firm **IC Insights (www.insights.com)** reports that almost 60% of the nearly \$37B of analog ICs sold in 2010 were ASICs. The firm also states (www.icinsights.com/news/bulletins/ic), “Total IC unit shipments are forecast to top the 200-billion mark for the first time in 2011. Shipments of analog devices are forecast to surpass 100 billion units in 2011—the first time any product segment has reached that level—and represent 50% of total IC unit shipments.”

Yet very few mixed-signal ASIC design houses fully understand the implications of custom analog design and its applicability to analog centric ASICs. ASICs requiring high analog content should be directed to those design houses that specialize in analog circuit design rather than those who simply select analog IP blocks from a library. Analog ASIC companies have large staffs of competent and experienced analog engineers with expertise in a wide range of analog functions...

However, the large analog IC houses that engage in analog ASIC development, *set high minimum order requirements and high bars regarding who can access their capabilities.*

For example, TI reports that its application-specific analog business focuses on a *small number of large customers*, including Seagate, Sony, Samsung, Hitachi Global Storage Technology, Toshiba, and a few others that require custom application-specific products.

This means that the majority of the smaller customers must seek independent analog or mixed-signal ASIC design houses. When doing so, a review of the ASIC house's patent portfolio will serve as a quick guide to the creativity and analog expertise of the ASIC house's engineering team.

Analog, the semiconductor components tasked with conditioning or manipulating those 'real world' signals such as temperature, position, sound, light and pressure, is critical to applications across all major markets.

Because of its fundamental importance to most product designs, as well as requirements that make integration with digital circuits difficult, analog remains a good bellwether for the general health of the semiconductor industry.

\$M	Q1 10	Q2 10	Q3 10	Q4 10	Q1 11	Q2 11	Q3 11	Q4 11	Q4 10/ Q3 10	Q1 11/ Q4 10
Amplifiers	709	774	815	709	734	777	842	861	-13%	3%
Data converters	678	742	823	739	769	813	810	816	-10%	4%
Interface	563	586	650	623	662	734	760	724	-4%	6%
Power	2 090	2 352	2 498	2 451	2 599	2 943	3 165	3 109	-2%	6%
General purpose analog	4 040	4 453	4 786	4 522	4 764	5 267	5 577	5 511	-6%	5%
Automotive ASSP	1 082	1 118	1 174	1 064	1 156	1 222	1 243	1 282	-9%	9%
Computer ASSP	882	917	886	732	766	820	895	829	-17%	5%
Consumer ASSP	714	764	835	745	777	870	962	888	-11%	4%
Comm ASSP	2 654	2 697	2 788	2 707	2 644	2 574	2 799	2 781	-3%	-2%
Industrial ASSP	559	586	587	506	514	616	628	651	-14%	2%
Total ASSP	5 892	6 081	6 269	5 754	5 858	6 102	6 527	6 430	-8%	2%
Total Analog	9 932	10 534	11 055	10 277	10 622	11 369	12 184	11 942	-7%	3%

databeans estimates

A well known marketing research company expects a slowdown in post-holiday product builds for global analog revenue. Fourth quarter revenue is predicted to decline 7% sequentially from \$11,06 billion in the third quarter down to \$10,3 billion. First quarter 2011 sales will rebound slightly from a low fourth quarter, growing 3% sequentially to a little over \$10,6 billion globally. As a whole, pricing will remain consistent and even with additional capacity coming online, there should be little change in pricing from 2010 going into 2011 as most of the realised cost for analog is in design and not necessarily in manufacturing.

Databeans further divides the analog market into two general segments. The first is general purpose analog, which are designed taking a 'standard cell' approach in mind and are products found across all application markets. General purpose analog will experience milder declines in the fourth quarter of 2010, dropping 6% to \$4,5 billion, before returning to quarter three revenues by the beginning of 2011. Power ICs are the largest of these markets, and due to their ubiquitous nature across the industry, will experience the lightest declines of any analog product in the fourth quarter, dropping just 2% to \$2,45 billion in total sales.

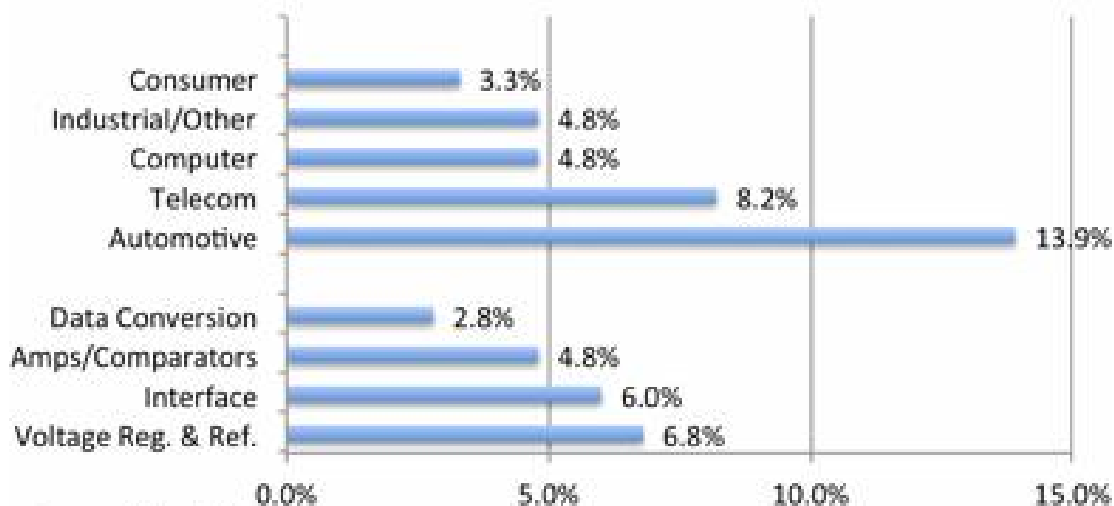
The other major segment of analog products is *application specific* in design and restricted to their respective application markets (automotive, computer, consumer, communications and industrial). Because these products are tied to individual applications, they are *far more vulnerable to the sudden ups and downs* found in their respective markets.

As a whole, the analog ASSP market will decline by 8% down to \$5,6 billion between the third and fourth quarters of 2010. However, it is expected to rebound slightly by 2% sequentially going into the first quarter of 2011. In particular, the computer analog segment will experience the greatest declines of any individual analog market, dropping by approximately 17% from the third quarter to the fourth quarter this year. Industrial analog will follow with another 14% decline, while communications will experience the mildest declines of any analog ASSP category, falling 3% sequentially in the fourth quarter.

In terms of individual market share, the analog and mixed signal markets remain relatively concentrated, *with the top 10 suppliers easily owning a majority share of the industry. This has kept competition somewhat lower and made large swings in market share uncommon. Texas Instruments, STMicroelectronics and Infineon remain among the list of overall market leaders in analog ICs.*

Analog Market Overview

CAGRs for Analog Device Sales (2011-2016F)



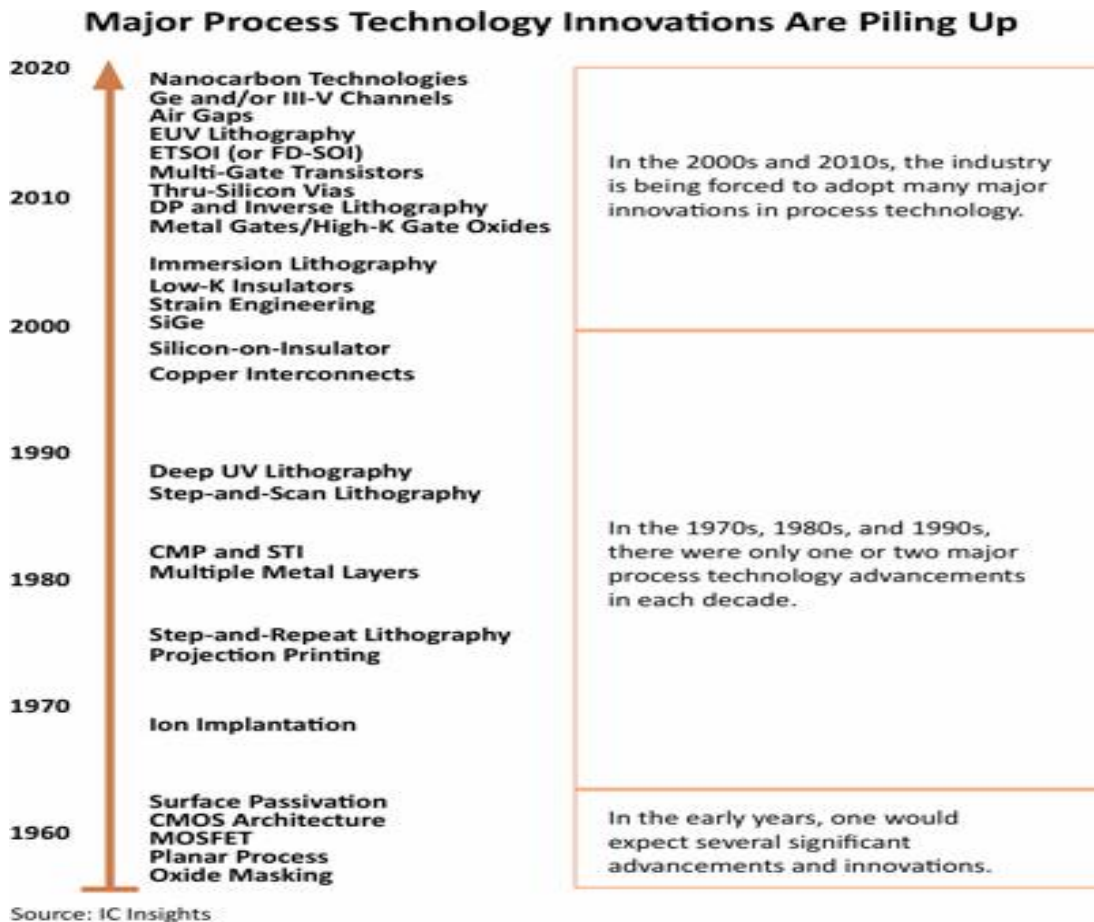
Source: IC Insights

Analog signals can be thought of as those that represent elements and conditions experienced in the "real" world. These include factors such as light, sound, temperature, and pressure. Analog signals are a continuous representation of phenomena in terms of

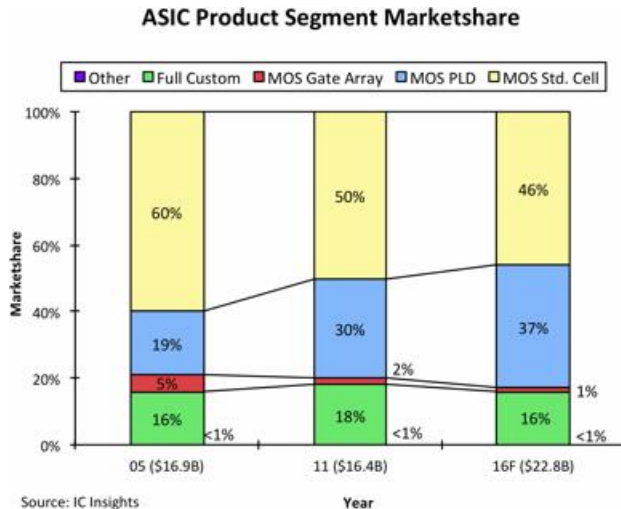
points along a scale. Hype and hoopla surrounding advances in the world of digital ICs often overshadows developments in the analog IC business, but as noted in this section, the analog market continues to play a steady role in the IC industry. Important market, unit shipment, and pricing data for the overall analog market and for individual segments within this market (e.g., amplifiers, interface, comparators, etc.) are provided.

Technology Trends

The success and proliferation of the integrated circuit since its discovery in the late 1950s has been due to the ability of manufacturers to continue offering more for the money. This ability to reduce the cost of ICs per performance has been driven by the continuous and rapid development of new and improved process technologies. Section 14 covers a variety of process technology related trends, such as the advanced lithography methods needed to continue shrinking chip geometries, new interconnect schemes, strain engineering for improved performance and lower power consumption, 3D integration, novel transistor structures, and the migration to larger wafers.



The application-specific IC (ASIC) and system-on-chip (SOC) market is an important segment of the IC industry. This section offers extensive coverage of ASIC/SOC market trends. Dollar, unit shipment, and average selling price information is provided for the total ASIC market, as well as for the standard cell, gate array, and PLD sub-segments.



ASIC Design Starts: Communications Dominate but Smart Grid and Transportation Growing Faster

Phoenix, AZ - March 6, 2012 -- The ASIC design start landscape has seen dramatic changes as end market demand rose and fell due to the financial meltdown in 2008, recovery in 2009 and 2010 and more uncertainty due to natural disasters and financial market fluctuations in 2011. Rising consumer spending for mobile and portable electronic devices helped mitigate some of the impact of these fluctuations on the ASIC design start landscape.

Another result of this tumult is the repartitioning of the System-on-a-Chip (SoC) market into three categories instead of the traditional two categories. Performance SoCs become Advanced Performance Multicore SoCs. Value SoCs become Value Multicore SoCs and a new category of SoC, the Basic SoC, was created. These changes reflect the new ways silicon designers are crafting their silicon solutions to meet changing market requirements and increasing design costs. The new definitions reflect the trends towards using multiple CPU cores in the end silicon to increase performance and the extensive use of on-chip Interconnects to tie these CPU cores together. The new Basic SoC category is a reflection of the increasing use of CPU cores from 3rd Party Intellectual Property (SIP) vendors on Micro Controllers that had previously used proprietary CPUs to increase performance and reduce design cycle times.

These changes and many more are outlined in a new report from [Semico Research Corp.](#) entitled: ASIC Design Starts by Key End Market Applications, SC101-12, February 2012.

This report looks at changes and trends in 71 end applications concentrated in the Computer, Consumer, Communications, Transportation and Industrial market categories. The report tracks the design starts and unit shipments of nine different types of ASIC products--Analog, Mixed Signal, Gate Array, Advanced Performance Multicore SoCs, Value Multicore SoCs, Basic SoCs, PLDs, FPGAs and Structured ASICs--used in each of the 71 applications. Forecasts for all end applications, ASIC design starts and unit shipments are given through 2016 using 2011 as a base year.

Some of the data discussed in 145 pages with 148 tables and 78 graphs are:

- Total ASIC design starts increased 11.1% in 2011 on top of a 9.8% growth in 2010. Semico is forecasting continued growth with an increase of 10.2% in 2012.
- Total ASIC design starts are forecast to show a CAGR of 6.6% from 2012 - 2016.
- The number of 'first time' designs in the SoC market increased 6.9% in 2011 while derivative SoC designs increased 12.0%.
- The fastest growing category of silicon solution is the Basic SoC at a CAGR of 24.1% driven in part by new applications in Smart Grid and the Internet of Things.
- The largest end market for ASIC design starts is the Communications market with 40.9% of the total.
- The fastest growing market category is the Transportation segment with a CAGR of 9.0%.
- The Industrial category also saw increased growth with the rise of Smart Grid applications with a 9.0% CAGR through the forecast period.

This report is the first of a two-part series on ASIC Design Starts. The second is ASIC Design Starts: New Growth Ahead, SC102-12, February 2012, that looks at design complexity, gate counts, starts by process geometry, regional design starts and gives forecasts for design starts and unit shipments by ASIC product type and end market category. The reports can be purchased individually or together.

To learn more, contact Jim Feldhan at 602-997-0337.

Analog to Reach \$61.9 Billion by 2015

Phoenix, AZ - October 5, 2011 -- The semiconductor market may be experiencing a downturn, but that doesn't have to mean all news is bad news. Analog, within the Computing, Consumer, and Communications markets, will see some strong growth over the next few years, growing 13.8%, 8.6%, and 12.8% in 2011, 2012, and 2013 respectively.

These numbers are pulled from our MAP Model database, Semico's way to track semiconductor migration within end-use markets. This method accounts for about 80% of the overall market.

Our overall Analog numbers include the following categories:

- Standard Linear
- Amplifiers
- Interface
- Voltage Regulators and Reference Circuits
- Data Conversion Circuits
- Comparators
- Application Specific Analog ICs (Small Scale Complexity)
- Application Specific Analog ICs (Medium Scale Complexity)
- Application Specific Analog ICs (Large Scale Complexity)

All of these categories combined will reach \$61.9 billion, a 7.9% increase over 2010's \$42.4 billion.

Breaking this number out farther, we can see that in 2010, the consumer market accounted for 33.3% of the Analog market, but in 2015, it will only account for 23.4%. Where is that Analog migrating?

To smartphones.

In fact, "High Performance Analog IC: The Catalyst for Electronic System Success," is the title of Jim Feldhan's speech for the annual Analog Semiconductor Leaders' Forum being held on October 13th, 2011 in South Korea. It is being held during i-SEDEX at the Korea International Exhibition Center. This Forum is the place to learn about high-performance analog trends.

Gartner: Chip market to grow 5.1% in 2011

June 22, 2011 // Peter Clarke



The global semiconductor market will be \$315 billion in 2011, an increase of 5.1 percent on 2010, according to market research firm Gartner Inc. This is down from Gartner's previous forecast, given in the first quarter, for 6.2 percent growth this year.

The company believes that there is a general stagnation with the exception of a bright spot in demand for smartphones and tablet computers which will be responsible for two-third of revenue growth for the period 2011 to 2013.

The 2011 chip market is going to be affected by the earthquake and tsunami that struck Japan but despite concerns about the supply of silicon wafers, batteries, packaging and specialized materials, the situation has "not derailed the electronics industry," Gartner said.

"The disaster in Japan clearly had an impact on the semiconductor market, and supply chain behavior, but it is less than initially feared," said Peter Middleton, principal research analyst at Gartner. "In response, in the last two weeks of March, vendors stepped up efforts to secure supply in the face of uncertainty and potential shortfalls — leading to some double ordering which continued into the second quarter. We think vendors were cautious with their second quarter guidance, and we expect the majority will exceed those estimates."

"Although the impact is less than feared, we are anticipating some residual effects in the third quarter of 2011 as friction in the supply chain may impact some production and some surprises may occur," Mr. Middleton said. "However, once third-quarter trends are established and supply chain participants are satisfied that all issues are understood and production is normalized, we expect an effort to draw down inventory, which will weaken the semiconductor market in late 2011 and early 2012."

Gartner forecasts worldwide application-specific standard product (ASSP) revenue to reach \$79.7 billion in 2011 and grow to \$99.4 billion by the end of 2015.

With Apple's application-specific integrated circuit (ASIC) investment and a commanding grip on popular mobile devices, the ASIC market will experience solid growth through 2015.

The highest overall growth through 2015 is coming from nonoptical sensors, which are primarily driven by automotive applications, but high growth is coming from the increased use of sensors in consumer electronics, especially smartphones, tablets and video game hardware.

"One critical trend is the introduction of new generations of high-performance mobile application processors, which form the heart of both smartphones and media tablets," said Jon Erensen, research director at Gartner. "These high-end processors, combined with

higher amounts of DRAM and NAND flash memory, will enable the performance and storage required for advanced new applications, including context-aware computing, augmented reality and computational photography."

"The similarity in architecture between smartphones and media tablets enables handset and tablet OEMs to centralize design around the application processor, which hosts the operating system of choice, and allows the vendor to leverage that design across multiple product categories," Erensen said.

Analog Integrated Circuits Market to 2020 - Increasing Demand for Energy Efficient Electronics to Drive Market Growth

18 Jan 2011

GBI Research

GBI Research's "[Analog Integrated Circuits Market to 2020 - Increasing Demand for Energy Efficient Electronics to Drive Market Growth](#)" report does an incisive analysis of the analog ICs category of semiconductor devices. Increased in portable electronics and handsets production will increase the sales of analog ICs. Power management ICs, signal processing components, and interfaces are identified the high-growth market segments within the Analog IC category.

The power management sector accounted for 52% of the overall general purpose analog IC consumption in 2010. Power management ICs fall under analog ICs and are used to increase the power efficiency of electronic devices. Power management ICs are used extensively in portable devices. They facilitate addition of more functions while minimizing the battery drain.

The use of analog ICs is increasing in wireless applications. The analog IC technology will play key role in the future wireless systems such as 4G cellular phone systems, wireless sensor networking systems and broadband wireless networking systems. Wireless systems need analog ICs mainly in their transceiver chips (which contain transmitters & receivers) for signal processing. Other application areas of analog ICs in wireless systems are wireless data access cards, wireless LAN cards, wireless mouse, wireless repeater, so on.

Analog & Mixed Signal ASICs are penetrating into newer applications which will bring sales growth opportunities. ASICs constituted about 60% of the total analog ICs consumed in 2009.

Rapid technological advancements are happening in the categories of (PMASICs) Power Management ASICs and Sensor ASICs. Power Management ASICs find applications in consumer electronic devices such as mp3 players, digital cameras, LCD screens, Customer Premises Equipment (CPE) such as cable modems and routers, Mobile TVs, flash memory drives (USB drives), mobiles, cell phones and other commonly battery powered devices. ASICs are used in pressure sensors, sound or audio sensors, opto-sensors. Mixed signal ASICs are increasingly used as MEMS sensors, image sensors and temperature sensors.

The mixed signals ICs have witnessed strong growth with the increased use of 3G cell phones and other portable gadgets. A mixed signal IC is used for processing both analog and digital signals. Mixed signal ICs are categorized as analog ICs when analog blocks occupy a substantial portion of the chip area.

Mixed signal ICs are finding applications in diverse areas that include telecommunication, automotive, grid-connected power electronics, and bio-medical equipment. With the widening application range, growth can be expected in application specific mixed signal ICs in specific purpose applications like automotive, communication, telecommunication and multimedia sectors.

Portable devices are going to drive the growth for analog chips. Portable devices are run on batteries and require efficient power management to extend battery life. The cell phone market offers a huge potential for growth of analog ICs followed by the computer segment. The increasing use of mobile computing is expected to fuel the battery management market.

Growth in solar PV installations will cause demand growth for analog ICs. Analog ICs are primarily used for two functionalities namely voltage and current monitoring in power inverters for solar PV applications. In addition, analog ICs are used in smart meters that measure energy in solar appliances. Growth in deployment of smart meters that require analog functions is expected to drive the demand of analog ICs.

Spurt in demand of analog ICs has exacerbated the supply shortage in 2010. This has also increased the average selling price of analog ICs. This demand supply imbalance will persist throughout 2010 and is expected to increase the lead times.