

Design Notes & Market Reports

GaN Development Efforts Expanding

As products using Gallium Nitride (GaN) technology continue to gain acceptance in military and commercial applications, development activities at microelectronics companies are accelerating. The Strategy Analytics GaAs and Compound Semiconductor Technologies Service (GaAs) viewpoint, "Compound Semiconductor Industry Review October-December 2011: Microelectronics," captures product, technology, contract and financial announcements for companies such as RFMD, Skyworks Solutions, Fujitsu, ANADIGICS, Agilent, Hittite Microwave, TriQuint Semiconductor, Avago, NXP Semiconductors, Microsemi, Renesas Electronics, Freescale, Broadcom Cree and Murata Manufacturing.

"GaN-based products have demonstrated performance advantages for military systems for some time and they are finally beginning to see acceptance in commercial applications, such as CATV and wireless infrastructure," noted Eric Higham, Director of the Strategy Analytics GaAs and Compound Semiconductor Technologies Service. "As these application areas broaden, the industry is responding by increasing their efforts to develop new products, processes and partnerships."

Asif Anwar, Director, Strategy Analytics Strategic Technologies Practice, added, "Recent announcements indicate growing interest in GaN-on-silicon processing to reduce cost and higher voltage GaN processes, which will improve power handling performance."

This viewpoint summarizes financial, product, contract and employment developments from leading compound semiconductor device suppliers in Q4 2011. These announcements address a variety of commercial and military applications that use gallium arsenide (GaAs), gallium nitride (GaN), Silicon carbide (SiC), silicon germanium (SiGe) and complementary metal-oxide-semiconductor (CMOS) technologies.

--Strategy Analytics
strategyanalytics.com

Personal Tracking: The Next Billion Dollar GPS Market

GPS personal tracking devices and applications are forecast to grow with a CAGR of 40%, with both markets breaking \$1 billion in 2017.

Senior analyst Patrick Connolly says, "The hardware market remained below 100,000 units in 2011. However, it is forecast to reach 2.5 million units in 2017, with significant growth in elderly, health, and lone worker markets. Dedicated devices can offer significant benefits, with insurance and liability increasingly encouraging the use of approved equipment."

"We are also seeing the first signs of leading CE companies entering the market, such as Qualcomm, Apple (via PocketFinder), Garmin, Cobra, etc. and there will also be significant partnerships and acquisitions in this space as new entrants look to add tracking to their portfolio," adds Connolly. Other markets include family, personal items (e.g. luggage), and pet and offender tracking.

There is an addressable market of over 120 million people across these markets alone, with over two million US elderly using non-GPS Personal Emergency Response Systems (PERS). However, awareness, battery life, economic conditions, and high subscription fees remain significant barriers. There is also a fear that smartphone applications will cannibalize the market.

The application market is already booming, with Life360 reaching 10 million downloads for its family locator application. Long term, these solutions will become part of much bigger security and health markets, growing to over 200 million downloads in 2017, as well as the majority of total tracking market revenue.

Group director Dominique Bonte adds, "In particular, carrier platforms represent a major revenue generator opportunity for family locator applications, matching their secure image and offering differentiation to family subscription plans. Companies such as Location Labs and TCS are already seeing success in this space."

--ABI Research
abiresearch.com

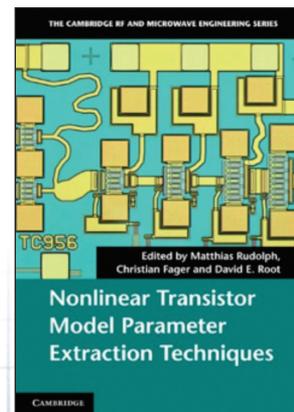
Book Review

Nonlinear Transistor Model Parameter Extraction Techniques

Edited by Matthais Rudolph, Christian Fager, and David E. Root

Cambridge University Press 2012 ISBN 978-0-521-76210-6 Hardback

Having experienced an arms-length association with microwave transistor modelers and designers for about 20 years, this book comes as a pleasant surprise. With many recognized contributors it is organized in a manner that takes the reader through a logical progression from DC models, extrinsic factors, small-signal equivalents to large signal non-linear models.



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Following the earlier chapters, more esoteric subject matter is dealt with in a relatively easy to understand manner. Many useful references are cited throughout. It's nice to see early work of people like Cutice, Angelov, Poon and others referred to as well as much recent work. The placement of noise modeling as the final chapter, albeit useful, seems possibly to be an afterthought.

One of the downsides of having many contributors is that not all chapters are in the same writing style; but that said, the book is far more organized than a collection of technical papers, and takes advantage of a wealth of knowledge that two or three authors would likely not easily create on their own. The three editors have done an excellent job of organizing the content of a 2009 IEEE Microwave Theory and Techniques Society workshop into a very useful book that should be of help to device designers for some time to come.

--Tom Perkins
Sr. Technical Editor

Smart Cards: \$72 Billion by 2016

The market for smart cards, secure ICs, inlays, (biometric) data capture, card personalization, printing and issuance in government, healthcare, and citizen ID will reach a cumulative value of \$72 billion by 2016. The largest proportion of revenues will be from the deployment of national ID cards and e-passports.

The employment of higher-value applications, in particular e-passports and smart national ID cards, alongside the increased focus on multi-application credentials, has accelerated the smart card market value. The market is expected to peak in 2014, before settling at a level close to \$15 billion.

The greater employment of smart cards is adding further value for vendors as more countries look to migrate from legacy-based solutions to secure smart card-based ones and next generation credentials. Shipments of smart credentials will overtake legacy in 2014. The keys to this shift are several countries: France, Brazil, and Poland are moving to dual interface national ID cards and China has a pending upgrade to a microcontroller national ID.

Research analyst Phil Sealy comments, "Contactless is the new 'must have' technology in the ID space. Contactless projects have already shown success, deploying within national ID projects in Germany, Egypt, and most notably, China. The trend to adopt a contactless interface will continue throughout the forecast period. We expect to see strong and continued adoption of dual interface ICs primarily utilized in national ID cards."

Group director John Devlin adds, "This market has produced some excellent YoY growth over the past few years as vendors add value and increase the appeal of

smart card-based solutions. Shipment growth should continue for at least the next four years. The next phase in India's Aadhaar project could be a real game changer. The project could form the basis for a whole range of services deploying in both an online and offline manner, across both government and commercial sectors."

ABI Research's report, "Smart Cards in Government and Healthcare Citizen ID," addresses the barriers and drivers of planning and deploying infrastructure and issuance of citizen-deployed documents and discusses the future market changes and developments.

--ABI Research
Abiresearch.com

Global LTE Phone Shipments to Grow Tenfold This Year

According to the latest research from Strategy Analytics, global LTE phone shipments will grow tenfold to reach 67 million units in 2012. It is a breakout year for 4G technology. Companies leading the growth spurt will include Apple, Samsung, HTC and others.

Neil Shah, Analyst at Strategy Analytics, said, "We forecast global LTE phone shipments to grow tenfold from 6.8 million units in 2011 to 67.0 million in 2012. Major countries driving LTE growth this year will include the United States, Japan and South Korea. Multiple operators, such as Verizon Wireless, NTT Docomo and SK Telecom, are aggressively expanding their LTE networks. Key vendors leading the push into LTE phones will include Apple, Samsung, HTC, LG, Nokia, Motorola, Pantech and Fujitsu."

Neil Mawston, Executive Director at Strategy Analytics, added, "The mobile industry is entering a breakout year for 4G LTE technology. Multiple operators and multiple phone vendors will be launching dozens of LTE models across numerous countries worldwide. LTE has quickly become a high-growth, high-value market that no operator, service developer, device vendor or component maker can afford to ignore."

Tom Kang, Director at Strategy Analytics, added, "The LTE phone segment is expanding at a rapid rate this year, but there will undoubtedly be growing pains in this early phase. Many LTE phones and data plans will be relatively expensive, which means operators will need to invest generous subsidies to make 4G more affordable for subscribers. Meanwhile, consumers will be concerned about LTE usability issues, such as shortened battery life, excessive device weight, or sudden bill shock caused by high data consumption."

--Strategy Analytics
strategyanalytics.com

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Global BTS Market Volumes Declined 11.9% in 2011

The global base transmitting station (BTS) market declined by 11.9% in units in 2011, according to the latest report from EJL Wireless Research titled "Global Base Station Market Analysis and Forecast, 8th Edition, 2011-2016."

"The decline in 2011 was the first ever in BTS shipments since 2001 with weakness in India accounting for a substantial portion of the decline in GSM BTS," says founder and President, Earl Lum. The report provides a unique perspective on the global shipments and demand for base station equipment covering all air interface standards and frequencies and major OEMs including Alcatel-Lucent, Ericsson, Huawei Technologies, Nokia Siemens Networks (including Motorola), Samsung Electronics and ZTE.

- Some key and notable facts from the analysis include:
- EJL Wireless Research LLC was correct in predicting a decline in overall BTS shipments for 2011 with a forecast variance of 8.2%

- EJL Wireless Research LLC was correct in predicting overall LTE BTS shipments for 2011 with a forecast variance of 10.6%
- EJL Wireless Research LLC was correct in predicting overall W-CDMA/HSPA+ BTS shipments for 2011 with a forecast variance of 3.7%

"Similar to the BTS transceiver market, LTE BTS shipments were up in 2011 but delays in spectrum auctions in Spain, Italy and France pushed some forecasted shipments into 2012. We estimate that TDD-LTE BTS accounted for 6% of overall LTE BTS shipments in 2011. Distributed RRU BTS shipments were 48% of the overall market and are expected to grow to 74% by 2016," says Lum.

Some key predictions from EJL Wireless Research LLC for 2012:

- Global BTS shipments will be down
 - Global BTS GSM shipments are expected to remain the largest category
 - Global BTS LTE shipments are expected to increase 42% and become the second largest category
 - Global BTS W-CDMA/HSPA+ shipments are expected to decline by 50%

The top suppliers for overall base station shipments as well as by air interface standards for 2011

were:

- Overall #1 BTS Supplier: Ericsson
- Overall #1 GSM BTS Supplier: Huawei Technologies
- Overall #1 W-CDMA/HSPA+ BTS Supplier: Ericsson
- Overall #1 CDMA BTS Supplier: ZTE
- Overall #1 LTE BTS Supplier: Ericsson

--EJL Wireless Research LLC
ejlwireless.com

Global BTS LTE shipments are expected to increase 42% and become the second largest category
