Freescale Bonds Plummet

Freescale Ups Auto Segment's R&D After Loss of Market Share

To fund its highly leveraged buyout of Freescale Semiconductor on December 1, 2006, for $16.6 billion, a consortium of private equity investors led by the Blackstone Group borrowed $9.45 billion in Freescale's name. Typical of private equity deals, Freescale was borrowing so heavily that nearly $6 billion of the bonds it would issue were given junk ratings. But now, largely because of the turmoil in the sub-prime mortgage market, but also due to depressed Freescale revenues and cash flow, the values of those bonds have plummeted dramatically.

For example, $1.6 billion of 10 1/8% senior subordinated notes due 2016, which were trading at 100% of par value on May 31, 2007, were recently trading at just 76 ⅝% of par value. At that deflated price the semiannual interest payments would be equivalent to a 15% yield.

So what is the bond market saying about Freescale? For one thing, the market is much less willing to lend money to difficult borrowers, and M oody's Investors Service says Freescale is a more difficult borrower than it was when the bonds were first issued. On December 6, 2007, M oody's lowered Freescale's rating to B1 negative to reflect "the company's weakened credit profile, high financial leverage, reduced asset utilization levels and lower earnings prospects over the near term." A c cording to M oody's, Freescale is one of the more highly leveraged semiconductor companies, and given its weak operating cash generation, is likely to stay that way, with debt equal to six times EBIT DA, at least for the near term. D efined as a high credit risk, B1 is three notches below the top junk bond rating.

Another implication of Freescale's diminished credit position is that it is now highly unlikely the company could instigate the sort of takeover of other semiconductor suppliers it had in mind when it first got involved with Blackstone a year and a half ago. If there is to be a merger of semiconductor players, Freescale would more likely be the target of the acquisition.

But Blackstone is not likely to be in a position to sell its equity stake in Freescale anytime soon since doing so would lead to substantial losses. A c cordin to one high-risk bond trader, "If Freescale's subordinated debt is trading at 75 cents on the dollar, you have to believe that the equity below that debt is significantly down as well."

Potential investors should be sure to read the fine print in Delphi's January 9, 2008, presentation of its business plan to potential lenders, which charts its expectations for the business following emergence from bankruptcy sometime in late February or March of 2008: "A lthough presented with numerical specificity, the projections are based upon a variety of assumptions, some of which have not been achieved to date and may not be realized in the future." C urrently in default on past loans, Delphi now wants to borrow $6,125 million more. D elphi's plan to grow non-G M sales at 9.3% per year, from $13,712 million in 2008 to $17,923 million in 2011, isn't going to happen. S ince 1996, Denso, one of the auto parts makers on the planet, whose number-one customer is Toyota, hasn't made that kind of growth. B etween 1996 and 2006 Denso grew at the annual rate of 8.6%, from $13,2 billion to $30.1 billion, during a decade of faster growth in automotive electronics than we are now seeing. In contrast, most if not all of Delphi's largest non-G M customers are growing more slowly than Toyota.

D elphi expects its operations in Asia, particularly C hina, Korea and India, to provide the largest growth rates. B y 2011 A sia is expected to account for 18% of sales, compared with 7% in 2006. D elphi's Business Plan

<table>
<thead>
<tr>
<th>in $ millions</th>
<th>GM Sales</th>
<th>Non-GM</th>
<th>Total Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>10,546</td>
<td>15,423</td>
<td>25,969</td>
</tr>
<tr>
<td>2008</td>
<td>5,996</td>
<td>13,712</td>
<td>19,708</td>
</tr>
<tr>
<td>2009</td>
<td>5,465</td>
<td>14,821</td>
<td>20,286</td>
</tr>
<tr>
<td>2010</td>
<td>5,479</td>
<td>16,484</td>
<td>21,963</td>
</tr>
<tr>
<td>2011</td>
<td>5,736</td>
<td>17,923</td>
<td>23,659</td>
</tr>
<tr>
<td>2008 to 2011 CAGR</td>
<td>(1.5%)</td>
<td>9.3%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

Freescale Automotive Sales

Over the last few years, Freescale's automotive semiconductor business has not kept pace with the market, threatening its long-held position as the world's number-one supplier. D etailed in the table below is Freescale's automotive semiconductor sales over the last few years:

<table>
<thead>
<tr>
<th>$ billions</th>
<th>2000 to 2004 CAGR: 5.6%</th>
<th>2004 to 2006 CAGR: 2.8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.459</td>
<td>1.536</td>
<td>1.817</td>
</tr>
<tr>
<td>1.92*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*30% of total sales

A ccording to S trategy Analytics, L uton, U.K., the automotive semiconductor market grew 8% per year from 1999 through 2006.

Freescale's Automotive Business

B ecause of Freescale's credit situation, a couple of investment analysts have asked for my views about Freescale's competitive position in the automotive industry. T en percent of Freescale sales ended up in transportation applications. W hat follows is some of what I told the analysts.

T urn to Freescale, page 8
We spoke at length recently with Peter Rieth, senior vice president, systems and technology for Continental’s chassis and safety division, about integrated chassis systems, how they work and what they mean to safe handling. Continental is a pioneer in brake and chassis systems and one of the top two producers of electronic stability control systems worldwide.

According to Dr. Rieth, the next step in chassis safety is ESC II. A proven lifesaver, electronic stability control keeps the vehicle from skidding sideways by controlling the brake pressure on each wheel and by controlling the traction coming from the engine. ESC II adds a third, more powerful control element: the ability to control the steering. “With this system we have a 10% to 15% improvement in stopping distance on split-μ road surfaces,” declared Dr. Rieth.

“With standard ESC, when the car becomes unstable ESC brakes on one side to make the car move in the right direction, where the driver wants it to go. Now imagine you are in Sweden and you have dry pavement on one side and ice on the other side and an elk in front of you. You want to stop as fast as possible. You hit the brakes. The ABS and ESC immediately detect that there is a wheel lock on the low friction side, indicative of a split-μ condition. If the car braked hard at that point, it would immediately slide to the high-μ side, making the car unstable. So instead the system releases brake pressure, which makes the car stable, but it is no longer braking. The system then increases the pressure very, very carefully to give the driver—an inexperienced or inattentive driver—the opportunity to countersteer. You could say the car is underbraked, to keep it stable, but this makes for a longer stopping distance.

“Now with ESC II, imagine you have Formula One champion Michael Schumacher driving. Once the split-μ situation is realized, the system can maintain full brake pressure to quickly slow the vehicle, because immediately the system automatically countersteers via the electric steering,” explained Dr. Rieth.

Steering provides greater yaw moment to stabilize the vehicle than the braking does, because steering acts on half the length of the vehicle compared with half the width of the vehicle for side braking.

The Continental ESC II algorithm is installed on the BMW W 3 Series, Peugeot 207, and on Volkswagen’s PQ35 platform, which includes the Golf, Jetta and Touran; Audi A 3 and TT; and Skoda Octavia; and Seat Leon and Toledo. The VW platform already has electric power steering, which serves as the steering actuator, so implementing ESC II is only a matter of adding software.

But ESC II is more comfortable for the driver if the steering actuator adjusts the steering without turning the steering wheel. The Active Steering option on the BMW W 3 Series does not turn the steering wheel.

“When you have an angle overlay system [active front steering], you feel nothing in a split-μ situation. You keep the steering wheel straight, the car brakes straight and brakes 15% better than a car not so equipped. If you just have electric power steering, the car still brakes 15% better, but when you hit the brakes, the steering wheel in your hand will immediately turn to the low friction side as ESC II countersteers. While that quick movement could startle you, you will perceive it as a steering action recommendation. Steering intervention is then phased out leaving the driver back in control.”

Radar-Controlled Four-Wheel Steering

What’s next after ESC II? “To have optimal braking—1g or a little more, depending on the tires—we brake with four wheels. To have optimal acceleration—also up to 1g—you must have four-wheel drive. A nd now, to have optimal lateral steering capability, you have to steer on four wheels. Because when you have a very high-mass car, 1.5 to 2 tons, when you want to turn you have this damned inertia. The car wants to continue going straight. A nd cars with two-wheel steering also have a tendency to oscillate back and forth. If you do a very fast double-lane changing maneuver you get this snake-like movement, which can cause the driver to lose control.

“But when the rear wheels are steered in the same direction as the front, the car makes a crab-like movement to the side, without a yaw moment, without pivoting, and this is much more stable,” said Dr. Rieth. “But nobody likes this car. Especially the driving dynamics guys, who prefer the car to have a little oversteer, to give it turning agility, responsiveness.

“So what is the answer? Combine headway control technology (radar) and global chassis control with the rear-wheel steering. If the radar senses a real emergency, then even these drivers who like the sporty fishtailing will say yes to the crab movement to avoid a collision. Have the car as agile and sporty as everyone likes, as long as there is no emergency situation.”

India-Based Software Industry

According to KPIT Cummins Infosystems, the India-based software industry is estimated to have employed approximately 1.6 million people, who together generated $39.7 billion in revenue in the fiscal year ending March 2007. The industry is expected to grow to $60 billion by 2010.

| Engineering services and R&D plus software products, 16% |
| IT-enabled services & business process outsourcing (e.g. payroll), 24% |
| Information technology services, 60% |

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NHTSA's Kanianthra on What's after ESC

Just because electronic stability control (ESC) and tire pressure monitoring have been mandated in the United States, don’t expect another mandated electronics safety feature anytime soon. Joseph Kanianthra, associate administrator for vehicle safety research at the National Highway Traffic Safety Administration (NHTSA), believes the very earliest such a mandate could be put in place is 2012. Mr. Kanianthra, who has been with NHTSA for 29 years, was quick to point out, however, that he was only voicing “one man’s hunch, not the NHTSA plan.”

Mr. Kanianthra elaborated: “Right now we are looking at lane departure warning systems, blind-spot detection systems and brake assist systems. Given our resources these are the only systems we can undertake at this time. The research was started about a year ago and has one more year to go. We need to develop test procedures and see if there is significant potential for crash reduction or crash severity. Maybe by 2009 we will have completed that work. Then the agency will have to decide how to deal with it, so the earliest you would see some agency action would be after 2009. And then it takes another two years, minimum, to put something in place if we decide to mandate.”

Mandates from NHTSA normally trail the market by many years. For example, ESC (electronic stability control) was developed by Bosch and introduced on the Mercedes S-Class in 1995. NHTSA’s regulation to install ESC in light vehicles will take effect with the 2009 model year and be phased in over three years. That’s 14 years from market introduction to first mandated installation. Regardless, Ford had already decided to make ESC standard on all new vehicles by the end of 2009, and GM will do the same by 2010. ESC is not yet mandated in Europe.

When it comes to rulemaking, it is not nearly as easy as it used to be, when we did crashworthiness and even electronic stability control. ESC is totally passive; the driver doesn’t even know what it does or how it operates or anything. Passive systems are much more amenable to regulations,” noted Mr. Kanianthra. A BS was never mandated because it involves the driver, who must forcefully slam on the brakes to fully engage the system. Some drivers don’t do that in a panic situation.

The European Commission has proposed requiring brake assist on all new vehicles, but brake assist is not likely to be mandated by NHTSA because like A BS, it involves the driver in the safety equation. Brake assist senses the speed and force with which the driver applies the brakes. If it detects panic braking, additional force is automatically applied to reduce stopping time. But, said Mr. Kanianthra, “To be able to mandate, you have to have a fully automatic system. Before you get to fully automatic, you have to start with advanced braking technology such as brake assist. It’s a progressive, evolutionary process, as drivers get used to new features. These systems are dependent on sensors and algorithms, but they are also dependent on how much workload they impose on the driver, and how well the driver reacts and copes with them.”

We asked which safety system after ESC appears most promising. Mr. Kanianthra, who oversees all vehicle safety research at NHTSA, with a budget of $30 million, thinks collision mitigation braking is the next frontier in automotive safety. A ready on the streets in a few vehicles, collision mitigation braking works with camera- or radar-based adaptive cruise control. If the system senses a possible collision and the driver’s action is deemed insufficient, the brakes are automatically applied to prevent or reduce the severity of a crash.

Mr. Kanianthra expects “fairly substantial” penetration of these safety features in the U.S. by 2011:

- Brake assist systems
- Adaptive cruise control
- Roll stability control
- Lane departure warning
- Blind spot warning

And these by 2014 or 2015:

- Rear-end collision avoidance
- Roll control
- Automatic brake

“Three-fourths of crashes happen because of driving task errors, for example stepping on the accelerator instead of the brake pedal—or the driver looked but did not see, or looked but did not realize the car ahead was stopped. A nother 14% of crashes are a result of impairment of some kind, which can be alcohol, drugs, drowsiness, fatigue or a combination of factors. That means 90% of the problems are driver related, which tells me I need to help these drivers overcome their deficiencies with what I call driver assistance systems. That should be the first attempt before making things fully automatic,” asserted Mr. K. Kalianthra.

Because the viability of driver assistance systems, such as lane departure warning, blind spot warning and drowsy driver monitoring, depends on how drivers respond, Mr. Kalianthra believes further human factors research is critical. NHTSA has several human factors research projects ongoing and is looking at engaging universities and other institutions to do more.

NHTSA is also initiating some research in collaboration with the industry to develop sensors and technologies that can monitor and accurately access a driver’s level of alcohol impairment.

The agency also promotes the adoption of some of the most promising safety features by educating the public through its www.safercar.gov website, and by placing New Car Assessment Program (NCAP) safety ratings on the sales stickers of new vehicles. NHTSA already provides rollover ratings as part of NCAP to help consumers decide which vehicles are at the least risk of rollover accidents in a single-vehicle crash.

NHTSA is investigating the feasibility of adding crash avoidance ratings to encourage market demand for technologies with promising safety benefits. Two high priority technologies that NHTSA may want to encourage are lane keeping assistance and rear-end collision avoidance. Rear-end crashes are the most frequent type, accounting for 30% of all crashes. Lane departure warning and prevention systems address run-off-the-road accidents, responsible for 40% of all fatal crashes.
The Company Profile... KPIT Cummins Infosystems

**Background**

KPIT Cummins Infosystems is not at all like the companies we usually write about in these pages. Compared with most of the suppliers we profile, this 15-year-old, Pune, India-based company is very small: total automotive industry revenue for its fiscal year ending March 2008 will come to just 2.3 billion rupees ($58.6 million). Most of this revenue is from information technology consulting, business intelligence and business process outsourcing—activities outside the primary focus of The Hansen Report. Only 1,528 million rupees ($39 million) worth of embedded software engineering falls into our automotive electronics bailiwick.

Nevertheless, KPIT Cummins is a company worthy of a close look. Its main automotive product is software, which is probably the single most important ingredient in creating appealing vehicles. KPIT counts 13 automotive OEMs and 30 tier-two automotive industry vendors among its customers. Five of them are heavy-duty truck OEMs, heavy-duty truck tier ones or off-road equipment makers. The company also serves seven of the world's top 20 semiconductor companies.

KPIT intends to build a global information technology company with sales of $250 million and $40 million in profits by fiscal 2010. KPIT is fast growing and ambitious and represents the sort of company that in a decade could seriously challenge existing automotive software providers.

KPIT asserts that its "Star Customer" program has been responsible for much of its sales growth. Under the program, KPIT focuses its marketing efforts on specific targeted companies that are either in manufacturing (especially semiconductor and automotive) or financial services. Presently, KPIT serves 21 Star Customers globally, although it will only name Cummins and Renesas. In fiscal 2007, Star Customers accounted for 81% of revenues.

Fifty-one percent of KPIT revenue in fiscal 2007 came from software services provided at the customer's site; 49% was produced by engineers stationed at KPIT software development centers.

The company maintains a large development center at its headquarters in Pune, three development centers in Bangalore and one in Poland. Bangalore and Pune are highly industrialized areas known for an abundance of English-speaking engineers willing to work for a fraction of the remuneration demanded by software engineers in the West.

Fifteen sales offices are located in nine countries across the globe. KPIT Cummins stock is listed on the National...
KPIT Cummins Embedded Automotive Software Services*

FY 2007
Sales: Rs. 735 million ($18.7 million), 79.6% of which came from the Automotive Electronics line of business (LOB); the remainder is from the Semiconductor Solutions LOB.

Average Number of Engineers in Automotive Electronics LOB: 700

Automotive Electronics LOB Sales per Engineer: $21,265

Product: Embedded software engineering services, all vehicle domains

Largest Application Domain: Powertrain

Largest Customer: Cummins

Region Served: 55% of revenues came from U.S. customers

*KIPIT is organized into six lines of business (LOBs). Each LOB is set up as an independent profit center.

- Auto Electronics (KPIT Cummins + CG Smith acquisition)
- Semiconductor Solutions
- Business Intelligence
- Global Business Solutions
- Manufacturing
- Diversified Financial Services

KPIT Cummins Sales by Region

FY 2007 Total: Rs. 4,537.02 million ($118.0 million)

Rest of World: 8.9%

U.K.: 29.2%

USA: 61.9%

Stock Exchange of India as well as the Bombay and Pune Stock Exchanges.

Automotive Business Background

One of six business units within KPIT, what the company calls the Automotive Electronics line of business provides engineering services to automotive OEMs including carmakers, commercial vehicle makers and off-road vehicle makers as well as automotive tier-one suppliers.

KPIT Infosystems, incorporated in 1991, entered the embedded automotive software business in 2002, when it merged with Cummins Infosystems Ltd. Cummins Infosystems was the Indian software development arm of Cummins Inc. (Columbus, Indiana), one of the world’s largest producers of diesel engines. Cummins Infosystems employed 50 engineers, many devoted to IT software development and testing. At the time of the merger with KPIT, Cummins was not outsourcing any embedded systems work, and KPIT realized there was an opportunity to develop an embedded systems business with Cummins as well as with other Star Customers, including Renesas.

A key component of the newly formed company’s growth strategy was to sufficiently leverage business with seven Star Customers to reach its goal of $100 million in sales by fiscal 2007. By fiscal 2005, KPIT was confident that its plan was going to be successful and turned its strategic thinking toward future growth, beyond 2007. A thorough assessment of its capabilities and market opportunities, KPIT decided to change from primarily customer-focused to industry-focused and targeted the automotive market. New active safety applications, global emissions and fuel economy regulations, and advanced infotainment and communications systems virtually guaranteed greater demand for software development services.

Building the Automotive Business

In 2006 KPIT paid 380 million rupees ($9.7 million) in cash, equal to 1.3 times sales, to acquire CG Smith Software, a provider of real-time and embedded software services with experience in automotive electronics, particularly with instrument clusters and safety systems development. CG Smith was incorporated in 1994 as a joint venture between Crompton Greaves Ltd., an Indian company, and Smith & Co.

With 200 employees and offices in Bangalore, Detroit and London, CG Smith had sales of 292 million rupees ($7.43 million) in its 2006 fiscal year, with a 4.5% net margin.

At the time of the acquisition, KPIT Cummins had about $2.5 million of automotive electronics sales, with a focus on powertrain and body electronics software. KPIT’s automotive business is now headquartered in Bangalore, at the former CG Smith Software facilities. CG Smith was renamed KPIT Cummins Infosystems

continued on following page
**KPIT Cummins Infosystems**

**Top Ten Embedded Automotive Software Services* Customers**

In fiscal 2008, the top ten customers will account for 65% of sales, with 80% of that output applied to passenger cars and 20% applied to commercial vehicles. Except for Cummins, KPIT does not have permission from its customers to release their names.

- #1 Cummins
- #2 U.S. Carmaker
- #3 European Tier-One
- #4 European Carmaker
- #5 Asian Carmaker
- #6 European Off-Highway OEM
- #7 U.S. Industrial and Farm Equipment Tier-One
- #8 U.S. Tier-One
- #9 Asian Tier-One
- #10 Asian Tier-One

*Includes Automotive Electronics LOB and the automotive part of Semiconductor LOB design services.

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(Bangalore). Like Pune, Bangalore is rich in engineering talent and has some automotive bona fides, given that Toyota, Bosch and Delphi each have a presence there. Bangalore is located 500-plus miles southeast of Pune, in southern India, halfway between the western and eastern coasts.

Ninety percent of KPIT Cummins’ automotive sales come from engineering services; 10% is from product sales, namely vehicle network components including the communications layer, network manager, boot loader and diagnostics kernel.

The vision of the embedded automotive software services business is to be the world’s number-one product engineering partner to the auto industry. To support that vision KPIT Cummins has established four main efforts:

- Building strong relationships with the world’s leading carmakers, tier-one and semiconductor suppliers
- Strengthening its capability to manage large end-to-end solutions
- Enlisting and retaining the best human capital
- Zero defect delivery

The company acknowledges that its employees are its most critical asset. Approximately 550 engineers work on automotive projects in Pune, and close to 450 work in Bangalore. KPIT draws talent from local universities in both areas. Candidates are given an aptitude test and, if accepted, undergo three months of in-house training.

KPIT’s engineers are paid at par with the industry. Those who have three to five years of experience are paid about $17,800 in total compensation per year. Project managers with seven to eight years of experience earn about $30,000; senior program managers with 15 years of automotive experience get $51,000.

**Automotive Expertise**

KPIT aims to be the global leader in outsourced embedded software development for automotive applications, and the global leader in outsourced hardware and software development for semiconductor makers—two endeavors that should feed on each other given the unique requirements of automotive software and automotive hardware. KPIT’s customers include six of the top-ten semiconductor companies worldwide. “Semiconductor manufacturers leverage our knowledge of automotive applications, while tier-ones and OEM’s leverage our knowledge of semiconductors to design their applications,” wrote KPIT in a statement to The Hansen Report.

In the fall of 2006, the Japanese semiconductor supplier Renesas, a KPIT Star Customer, decided to increase the number of dedicated KPIT engineers working on its behalf from 100 to 500 by 2009. Renesas, one of the fastest growing major suppliers of automotive semi-conductors

![Hardware Platforms](https://example.com/hardware-platforms.png)

**Device Drivers**

- CAN
- LIN
- Flexray
- MOST
- USB

**Memory**

- GPIO
- IDB1394

**GPIO**

- GPRS
- GPS

**Operating Systems**

- ECOS
- QNX
- VxWorks
- pSOS
- Nucleus

**Tools and Equipment**

- Matlab
- Simulink
- ASCET-SD
- Rhapsody
- RTRT
- Hindsight
- MSnergy

**Languages**

- Embedded C, C++, Assembly, ADA

**KPIT Services and Products**

- AUTOSAR migration
- AUTOSAR microcontroller abstraction layer development
- System level (control strategies)
- Requirements engineering and systems testing
- Embedded software development
- Model-based software development
- Independent verification and validation
- Integration
- Mechanical engineering design

**Products**

- Vehicle network components
- Communications
- Network management
- Software download layer
- Diagnostics kernel
- AUTOSAR basic software components and tools
- KPIT OTCG (Opcode Test Code Generator) process verification tool

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The Hansen Report on Automotive Electronics, Portsmouth, NH USA www.hansenreport.com
Distinctions Claimed by KPIT

- More automotive embedded software experience than any other Indian company: more than 1,000 projects so far
- No Indian company does more automotive electronics business with European, North American and Japanese customers: 13 OEMs, 30 tier-ones
- Only company in India with networking IP that is used in vehicle programs: 49 different ECUs and 20 different microcontrollers
- The only Indian software shop willing to tackle any RFP involving embedded automotive electronics
- Largest third-party offshore automotive development center, with 230 engineers
- One of only two companies in the world to be certified to Automotive SPICE Level 5
- First Indian company to become a member of JASPAR (Japan Automotive Software Platform and Architecture)
- Premium member of AUTOSAR since 2005; 150 engineers work on AUTOSAR related projects.

and the world’s number-one supplier of microcontrollers, will use KPIT’s offshore development facility for software and hardware design and verification of SoCs (systems on a chip).

With ten years of automotive software experience, KPIT is confident it can tackle work in every automotive domain—powertrain, chassis, safety, body and infotainment. Nevertheless, it feels its experience is strongest in the following:

Powertrain
- Automotive-grade software
- Control strategies

Telematics, Infotainment, Navigation
- Platforms and stacks
- Automotive-grade software services
- Architecture

AUTOSAR
- Basic embedded software components
- Application migration methodology

Chassis, Safety
- Automotive-grade software services based on SIL (safety integrity level) requirements
- ECU reduction methodologies
- Safety extension of AUTOSAR basic software

KPIT is investing roughly 4% of the Automotive Electronics LOB’s fiscal 2008 revenue in R&D to bolster its capabilities in four software engineering domains: AUTOSAR tools and intellectual property; powertrain systems capability; chassis systems capability; and infotainment and telematics framework IP.

Fifty-five percent of the automotive business unit’s sales are made to customers based in the United States, with 35% going to customers in Europe, and 10% to customers in Asia. But KPIT is in the process of doubling its sales force serving Japan and Korea from five to 10 people, which it expects will double Asia’s share of revenues to 20% by the 2010 fiscal year. Another seven automotive sales people are stationed in Europe (in Reading, England; Munich, Germany; and Paris); four more are in Detroit, Michigan.

Aaccording to Anup Sable, vice president of KPIT Cummins Infosystems and in charge of the embedded automotive software services business, which he founded, the Indian automotive industry has not yet gotten to the point where it is developing much of its own automotive software locally. Rather, most automotive software comes to Indian carmakers from the global tier-one suppliers based outside of India—companies such as Continental, Visteon, Delphi, Bosch and Denso.

“We have a much better understanding of the [embedded software] market in the U.S., Europe, Japan and Korea than the Indian market. Though, KPIT is presently exploring the nascent Indian market with the expectation that it is likely to progress very quickly once it gets started,” he said.

Embedded software development is KPIT’s biggest application area, accounting for 35% of sales. The company automatically generates software code from models using many of the leading modeling tools. Most KPIT modeling is done in the powertrain domain, followed in order by hybrid applications and body control applications.

After modeling and embedded software development, the automotive business unit’s next-biggest service activity is independent verification and validation, which accounts for 20% of sales. Such work typically involves instrument clusters, HMI, audio or navigation devices. KPIT writes the test suites and executes the test cases using an in-house developed automated tool, for maximum productivity.

Automotive Quality

“First and foremost, when an automotive customer considers outsourcing, the biggest question, once you have demonstrated that you have the experience, is whether the product will be delivered with quality utmost,” noted Mr. Sable, “because the impact of a defect can be very large and could lead to fatalities. Our greatest strength is that we have the kind of tight processes that lead to zero-defect delivery.” To convince customers that quality is high, KPIT encourages them to look at nearly eight years of project data. “We make a lot of data visible to the client including effort variances, schedule variances, defects and any rework that may have been required,” noted Mr. Sable.

In December 2007, KPIT Cummins was awarded Automotive SPICE Maturity Level 5 certification. Only two companies in the world have achieved that certification; the first was KPIT’s competitor Wipro Technologies Automotive Group, based in Bangalore, which was certified in 2006. A according to a KPIT Cummins press release, the SPICE assessment team leader remarked: “The achievement supports KPIT Cummins’ position as a world leader in the development of embedded software and related solutions for automotive applications. It firmly establishes its quality and processes as ‘best in class’ in the industry.”

KPIT also cites its SEI-CMMI level 5 accreditation for quality practices, and TÜV IEC 61508 SIL (Safety Integrity Level) 2 certification for specific safety-critical projects done for customers.
Freescale...Continued from page 1

Over the last several years, Freescale has had an off-and-on relationship with the auto industry, at least in terms of the R&D it has been willing to invest in automotive projects. While it is now in the black, Freescale’s automotive business hasn’t always been profitable. And therefore the company has been investing more vigorously in other more promising markets, including the consumer electronics and industrial markets.

Freescale has been the world’s number-one supplier of automotive semiconductors, but lately it has not been keeping pace with the market. In recent years, Freescale’s share of the automotive market has declined. According to Strategy Analytics, Freescale had a 14.6% share in 1999. By 2006, its $1.92 billion in automotive sales gave the company an 11% share of the market.

In 2007, 40% to 45% of Freescale’s auto sales were dependent on North America, so that region’s lackluster performance in 2007 will be exaggerated in Freescale’s 2007 automotive numbers. Not only was light vehicle production by Ford, GM and Chrysler off by 5% but Delphi, Freescale’s largest customer, experienced a 2% sales decline.

In contrast Toyota’s global sales rose by 6% in 2007; there are very few semiconductors made by Free-scale on Toyota vehicles.

Hoping it can stop further erosion of market share while increasing its margins, Freescale decided to increase its investment in automotive customers. The company will spend 27% more on automotive R&D in 2008 than it did in 2007, though the increase isn’t nearly enough to bring automotive R&D up to the corporate level of 20% to 21% of sales, according to Paul Grimme. Mr. Grimme is senior vice president of Freescale, in charge of the microcontroller division and the product side of the automotive business. Further, by the end of 2008, more than 400 people will have been added to the 1,500 non-manufacturing employees attached to the automotive business, a 27% increase. It should be pointed out that such increases won’t give a boost to sales for another three years, at least.

Freescale recently reorganized into four product groups: microcontrollers, wireless, networking microprocessors, and analog and sensor technologies. The Transportation and Standard Products group will be no more. A new marketing and sales manager was just hired who will soon name a manager to take charge of automotive sales and marketing activities, globally. Freescale expects the automotive semiconductor market to grow at 6% per year.

One of the most promising uses of that increased R&D funding is the collaboration between Freescale and Continental to design a high-performance, triple-core microcontroller optimized for electronically controlled braking systems. Based on Freescale’s Power architecture technology, the device is designed to double the performance of existing MCUs. It contains 3 MB of flash, FlexRay technology and Continental’s failsafe technology, which fulfills all requirements of Safety Integrity Level 3 (SIL 3) applications. The project includes the design of AUTOSAR-compliant low-level device drivers.

Some other positive developments should be noted. Freescale’s 32-bit i.MX, an ARM core microcontroller devices developed for the wireless market have also found a home in the Ford Sync connectivity platform, which runs on a Microsoft Auto software platform. Ford is on track to sell 30,000 Sync-equipped units in the first three months since the feature was introduced this fall. By early 2009, Ford expects to sell as many as one million Sync-equipped vehicles.

Freescale is much keener about its own 32-bit Power architecture devices which, says Mr. Grimme, are gaining momentum, especially in powertrain and chassis applications. Freescale recently sampled one 90-nanometer flash-based device; three more samples are due out soon. Freescale and STMicroelectronics have been working jointly since 2006 developing a line of 32-bit Power architecture MCUs for the auto industry that will span the entire price range and cover a wide range of applications.

Freescale also has some promising sensor applications in the works: A single-package tire pressure monitoring solution that includes the microcontroller, sensor and transmitter; a 77-GHz radar sensor; and a combined low-g and gyro sensor.

Notes From CES 2008

The automotive industry’s growing partnership with consumer electronics was highlighted again at this year’s Consumer Electronics Show in Las Vegas. Telematics is alive and well.

Ford announced some upgrades coming for its Sync infotainment platform, introduced at CES last year, notably 911 Assist. Sync will automatically dial 911 in the event of an airbag deployment. While this free emergency notification feature could challenge OnStar’s dominance, it requires that the driver has his own Bluetooth phone turned on, properly paired and connected with Sync. Earlier versions of Sync already on the road can be updated with this and other new features.

Continental, which provides the hardware for Sync, announced its own Microsoft Auto-based multimedia platform (MM P) this year, which will also be upgradeable with new software as more features become available. The platform includes Bluetooth for hands-free phone operation and wireless streaming of audio and video content, but uses a touchscreen interface for the infotainment features. Ford’s exclusive right to use the Microsoft Auto software expires at the end of 2008.

Multifunction navigation devices with Internet connectivity are on the horizon. Clarion plans to begin shipments of its MIND (Mobile Internet Navigation Device) in 2008. The current version uses WiFi; future offerings will have WiFi ax or 3G wireless Internet connections.

Delphi is working with Autonet Mobile on Internet-based telematics services over WiFi. Alpine, OKI Electric and Runcom demonstrated a navigation system with streaming content based on Mobile WIM ax. Magellan’s Elite 5340 connects to Google Local Search via GPRS.