More Parts Branding Could Pay Off

Saddled with high fixed costs, Ford, General Motors, Chrysler and other carmakers have for years been leaning on their suppliers to reduce prices. As a result, profits have suffered and a number of suppliers are hurting. One way suppliers are fighting low prices is by taking their case directly to consumers through long term investments in brand building.

Support for that idea came recently from an automotive market research firm in Nürnberg, Germany, puls GmbH, which sent us the results of some consumer research. The data strongly support the view that parts suppliers should invest in programs that build brand recognition and awareness directly with consumers.

A part of its monthly Internet survey of 2,000 German consumers, last November puls posed a series of questions to gauge consumer views on ingredient parts pertaining to the car. The German researchers found that 59.5% of respondents thought it is either “very important” or “important” to buy cars that use parts from leading suppliers. The majority of those respondents, 65.1%, said it increases the quality of the car, and 44.6% said it increases the value of the car.

Turn to Branding, page 2

In an aided question, the following percentages of respondents said they were prepared to pay more for cars that use these parts from these suppliers:

- Brakes by Brembo: 37.8%
- Audio systems by Bose: 34.9%
- Clutches by Sachs: 33.7%
- Rims by BBS: 26.0%
- Active steering by ZF: 23.8%
- Sunroof by Webasto: 17.1%

Source: puls GmbH, Automotive Components Insight Trendmonitor

Continental Purchases Motorola’s Automotive Unit

Germany’s Growing Influence

Last month the center of gravity of the automotive electronics industry took another shift away from Detroit—this time toward Germany—with the acquisition by Continental AG of Motorola’s automotive electronics business. Starting with car radios, Motorola had been in the automotive electronics business for 75 years. Continental paid $1 billion in cash for the business, which had $1.6 billion in sales in 2005 and no debt.

Motorola had been flirting off and on with the idea of selling its automotive unit for the last six years and finally put the business in play last fall. In 2004, Motorola spun off its semiconductor business, now known as Freescale, the world’s number-one supplier of automotive semiconductors.

According to insiders, the Motorola automotive business unit had been mostly profitable, making EBIT margins from 3% to 10%, depending on the product line, and growing sales at about 8% to 10% per year. While that growth is a few percent faster than the auto electronics market, it wasn’t enough. Motorola wanted to see 15% annual sales growth and at least 10% EBIT margins.

More compelling in Motorola’s decision to opt out of automotive electronics, however, was the fact that it had become such a small part of the company, accounting for just 4% of total sales. A automotive was a drain on management’s attention, and there wasn’t enough synergy between automotive electronics and cell phones. Moreover, it can’t have helped that Motorola’s largest automotive customers were General Motors and Ford, the two carmakers most desperate to lower their parts costs.

Despite the seller’s disinterest in the business, Continental, which had been promising investors for months that it would make a major acquisition, finds much to like about Motorola Automotive. “It’s a great fit,” Continental Automotive Systems division president, Karl-Thomas Neumann, told us recently. “We are a strong player in Europe but not in North America, while Motorola is a strong player in North America but not in Europe.” Continental’s acquisition of DaimlerChrysler’s Temic business in 2001 put Continental into powertrain electronics in Europe. Motorola is a leading independent supplier of powertrain electronics in the United States.

According to Glenn Mercer, director of automotive services for McKinsey & Co., one of the things that set the buyer apart from the seller is that “Continental is committed to the automotive industry, even though it isn’t as profitable as making cell phones.” For the last few years, Motorola’s automotive business has been more profitable than most automotive businesses.

Continental also appreciates Motorola’s telematics business. A key source of OnStar, BMW Assist and LoJack hardware, Motorola is the world’s number-one supplier in a market that Continental expects will surely grow. “I’m still confident that sooner or later there is going to be a big future in telematics,” declared Dr. Neumann. “We want to be a leading and comprehensive supplier of safety systems, and the telematics emergency call business was missing,” he noted.

As Ford and GM shrink, and as other American companies sell out, Detroit is steadily losing influence over the automotive electronics world, a trend that has been ongoing for 20 years. The Continental acquisition of Motorola is indicative that the trend is likely to continue. According to an investment banker close to the acquisition, the trend is likely to continue.
The Consumer Electronics Association recently released the results of a market research study it commissioned to assess the current use of consumer electronics in automobiles and to gauge American consumers' future interest in using these electronic devices, either as a driver or passenger. The research showed falling interest levels for traditional consumer electronics such as AM/FM radio, CD players and cell phones, and a substantial growth potential for OnStar-type safety/security/telematics systems and navigation.

While 24% of the respondents said they currently use a navigation device in the car, 47% indicated they would be interested in using one in the future. Curiously, 78% of the people interested in using navigation in the car would prefer that the navigation device was integrated in the car rather than portable. Note, however, that the survey question did not include any mention of the price of integrated systems vs. portable devices, nor how the system would be updated throughout the life of the vehicle.

Strangely, the CEA survey showed future interest to be lower than current usage for these products: DVD players, games, TV, component speakers, digital radio, MP3/iPod options and wireless headsets. Future interest in satellite radio was just 2% higher than current usage and future interest in Internet was just 3% higher than current usage.

The study recommends that the consumer electronics industry work with car manufacturers to increase the number of power outlets in their vehicles. Consumers preferred three outlets, on average, but younger consumers indicated they would prefer four.

When CEA asked consumers about their preferences for device controls, 40% of the respondents preferred a single master control; 29% said they preferred two controls. Most respondents, 70%, opted to have the controls located in the front center console.

For more information or to purchase the entire study, contact Joe Bates, jbates@ce.org, or visit www.ce.org.

Branding...

Many of the German consumers even said they would be willing to pay an additional charge for parts furnished by certain brand suppliers, namely, Brembo brakes (37.8%), audio systems by Bose (34.9%), and clutches by Sachs (33.7%), among others. (See the chart on page one for a full list.)

Component branding is not at all new. We have all seen promotions for personal computers that boast “Intel Inside,” which led to great profits not only for Intel, but also for the manufacturers who installed Intel processors in their machines. But branding OEM auto parts is fairly rare. The few brand names that are used usually belong to the carmaker. General Motors has its OnStar telematics system. BMW promotes its own Steptronic automatic transmission and N asca leather upholstery. M ercedes advertises its Distronic adaptive cruise control and Parktronic ultrasonic parking system brands. If there is extra margin to be made with good brands, it’s money that the carmakers want to keep, not share with parts suppliers.

Yet some supplier brands are actively promoted by carmakers, particularly audio system brands: BMW sells Logic 7, M ercedes sells Harman Kardon and Lexus sells M ark Levinson branded audio systems, all of which are produced by Logic 7, Harman Kardon and Levinson, respectively.

CEA Surveys Consumer Interest in Mobile Electronics

U.S. Consumers’ Current Usage and Future Interest in Mobile CE Products

<table>
<thead>
<tr>
<th>Component</th>
<th>Current Usage</th>
<th>Future Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD player</td>
<td>30%</td>
<td>35%</td>
</tr>
<tr>
<td>Game</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>TV</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Component speaker</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>Digital radio</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Mp3</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>Ipod</td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td>Satellite radio</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>Internet</td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td>Navigation</td>
<td>25%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Note: Consumers aren’t asked about listening to AM/FM radio and/or CDs.

The Hansen Report on Automotive Electronics

© 2006 Paul Hansen Associates, 150 Pinehurst Rd., Portsmouth, NH 03801, USA. Telephone: 603-431-5859. Fax: 603-431-5791. Email: info@hansenreport.com. All rights reserved. Materials may not be reproduced in any form without written permission. The Hansen Report on Automotive Electronics is published 10 times a year, monthly; July/August and December/January are combined issues. The annual subscription rate is $717 (North America), $747 (elsewhere). Back issues are available for $50 each; see our online index at www.hansenreport.com. Paul Hansen Associates is a strategy and market research firm consulting to the electronics industry.

Publisher/Editor Paul Hansen
Managing Editor/ Brianne Wolfe
Circulation Manager Joe Bates

ISSN 1040-1105

Continued from page 1
Dave McNamara on Automotive Electronics

We had the opportunity to interview veteran automotive electronics engineer Dave McNamara, who recently retired from Ford to start his own consulting business, McNamara Technology Solutions. Mr. McNamara has watched automotive electronics almost from its beginning, first as a supplier and then as an OEM customer. Starting in 1976, he was a product engineer with Ford’s electronics division, which became Visteon, where he worked first on sensors and later on the world’s first electronic compass. He received a couple of patents for an oil quality monitor, helped pioneer route-guidance navigation systems, and eventually moved into strategic and technology planning positions. In 1995 Mr. McNamara left the parts manufacturing side of Ford to manage an advanced electronics engineering group. There he helped launch North America’s first ultrasonic parking aid and one of the world’s first radar adaptive cruise-control systems, on the Jaguar. In 1999 he picked up responsibility for audio, family entertainment systems and navigation product development for Ford North America. From 2002 until his retirement Mr. McNamara led the advanced infotainment systems team at Ford Research.

There is much to learn from Mr. McNamara’s experience, for example, what it takes to win significant contracts with the likes of Ford. “Suppliers aren’t nearly proactive enough when it comes to program management and getting the key skills onboard in the project’s early stages. I can remember two suppliers in particular who hired people who knew the Ford system, even before they got a production commitment. That impressed us.” He also noted that “Too many times, suppliers are kept at arm’s length; working on gaining that customer access is important.”

Mr. McNamara provided examples of two suppliers who brought exceptional value to Ford: Pioneer is a highly effective and trustworthy supplier of dual-media radio systems, navigation and audiophile equipment, with outstanding program management teams; and Delphi, with millimeter-wave radar sensors, because of their commitment to bring us their best technology and willingness to partner with us during these difficult financial times.”

Which infotainment technologies are hottest right now? “All things wireless, software operating systems and digital memory technologies—hard disk drives and Flash. A II are key enablers that will lead to revenue opportunities for carmakers. High-speed wireless will replace cables in vehicles and lead to TCP/IP (transmission control protocol/Internet protocol) addressable components with plug and play features.”

Aiso hot, according to Mr. McNamara, is digital short range communications including vehicle-to-vehicle and vehicle-to-infrastructure communications, which have enormous potential to improve safety. “This is something we should all be experimenting with and understanding ... ‘transponding’ from one car to another that I’m stopped in the middle of the highway; or the wipers are on, I’m heading into a storm.” Several OEMs, suppliers and the United States Department of Transportation are launching the Vehicle Infrastructure Initiative to allow vehicles to communicate with a low-cost roadside infrastructure, as well as with each other, in real time. This capability, in combination with a nationwide data collection and processing network, will enable significant improvements in safety, mobility and convenience.

“In active safety, the next frontier is extending the bumper of the vehicle to include forward collision warning and blind spot detection.” Mr. McNamara, who is presently working with clients in the area of active safety and wireless technology, will focus on strategy development and mentoring of suppliers. Contact Mr. McNamara by email at dmcnamara@connectedvehicle.org.

Aisin Seiki FY 2005 Financial Results

Aisin Seiki is the fiscal year ending March 31, 2006.

Aisin Seiki
FY 2005 Consolidated Net Sales:
¥2,120.6 billion ($19.3 billion)
Change from FY 2004: 15.9% growth
FY 2005 Net Income:
¥61.1 billion ($557 million), or 2.9% of sales compared with 2.6% net margin in FY 2004.
FY 2006 Estimated Sales:
¥2,250 billion ($20.5 billion)
Change from FY 2005: 6.1% growth
FY 2006 Estimated Net Income:
¥61 billion ($556 million)

Automotive products account for 95.6% of Aisin Seiki sales. With 59,500 employees, Aisin operates 132 subsidiaries worldwide. Seventy-two percent of sales were to customers in Japan; North America’s largest customer contributed 16.4%; Europeans, 6.7% of sales.

Aisin Seiki FY 2005 Financial Results

Aisin Seiki FY 2005 Consolidated Net Sales:
¥2,120.6 billion ($19.3 billion)
Change from FY 2004: 15.9% growth
FY 2005 Net Income:
¥61.1 billion ($557 million), or 2.9% of sales compared with 2.6% net margin in FY 2004.
FY 2006 Estimated Sales:
¥2,250 billion ($20.5 billion)
Change from FY 2005: 6.1% growth
FY 2006 Estimated Net Income:
¥61 billion ($556 million)

Aottomotive products account for 95.6% of Aisin Seiki sales. With 59,500 employees, Aisin operates 132 subsidiaries worldwide. Seventy-two percent of sales were to customers in Japan; North America’s largest customer contributed 16.4%; Europeans, 6.7% of sales.

Aisin Seiki FY 2005 Financial Results

Aisin Seiki FY 2005 Consolidated Net Sales:
¥2,120.6 billion ($19.3 billion)
Change from FY 2004: 15.9% growth
FY 2005 Net Income:
¥61.1 billion ($557 million), or 2.9% of sales compared with 2.6% net margin in FY 2004.
FY 2006 Estimated Sales:
¥2,250 billion ($20.5 billion)
Change from FY 2005: 6.1% growth
FY 2006 Estimated Net Income:
¥61 billion ($556 million)

Aottomotive products account for 95.6% of Aisin Seiki sales. With 59,500 employees, Aisin operates 132 subsidiaries worldwide. Seventy-two percent of sales were to customers in Japan; North America’s largest customer contributed 16.4%; Europeans, 6.7% of sales.

Aisin Seiki FY 2005 Financial Results

Aisin Seiki FY 2005 Consolidated Net Sales:
¥2,120.6 billion ($19.3 billion)
Change from FY 2004: 15.9% growth
FY 2005 Net Income:
¥61.1 billion ($557 million), or 2.9% of sales compared with 2.6% net margin in FY 2004.
FY 2006 Estimated Sales:
¥2,250 billion ($20.5 billion)
Change from FY 2005: 6.1% growth
FY 2006 Estimated Net Income:
¥61 billion ($556 million)

Aottomotive products account for 95.6% of Aisin Seiki sales. With 59,500 employees, Aisin operates 132 subsidiaries worldwide. Seventy-two percent of sales were to customers in Japan; North America’s largest customer contributed 16.4%; Europeans, 6.7% of sales.

Aisin Seiki FY 2005 Financial Results

Aisin Seiki FY 2005 Consolidated Net Sales:
¥2,120.6 billion ($19.3 billion)
Change from FY 2004: 15.9% growth
FY 2005 Net Income:
¥61.1 billion ($557 million), or 2.9% of sales compared with 2.6% net margin in FY 2004.
FY 2006 Estimated Sales:
¥2,250 billion ($20.5 billion)
Change from FY 2005: 6.1% growth
FY 2006 Estimated Net Income:
¥61 billion ($556 million)

Aottomotive products account for 95.6% of Aisin Seiki sales. With 59,500 employees, Aisin operates 132 subsidiaries worldwide. Seventy-two percent of sales were to customers in Japan; North America’s largest customer contributed 16.4%; Europeans, 6.7% of sales.
The Company Profile...

**ZF Friedrichshafen**

### Background

The company was incorporated in 1915 as Zahnradfabrik Friedrichshafen (ZF) to produce gears and transmissions for Zeppelin airships. Much of the company's initial financing came from the Zeppelin Foundation, which had been formed to administer a fund of some six million German marks donated to help Ferdinand Graf von Zeppelin recover his losses following the crash of an early airship. At the close of World War I, ZF started building automotive transmissions and ventured into steering systems in 1932. Production facilities in Friedrichshafen were destroyed by bombings in World War II, and ZF was not permitted to resume manufacturing aircraft parts at that time.

According to the terms of the Zeppelin Foundation charter, if the company was no longer able to continue the founders' intention, making aircraft, the Zeppelin Foundation funds were to be turned over to the city of Friedrichshafen and used for charitable and social purposes. In 1947 the city of Friedrichshafen became the majority owner of ZF and continues to administer the Zeppelin Foundation, supporting hospitals, education, cultural enrichment and recreation.

By 1965, ZF was making automatic transmissions for BMW and Peugeot.

Since that time, ZF has diversified into several areas of the automotive industry, including chassis components and axle systems. ZF is now one of the world's leading suppliers of transmission components, and a major competitor of several other automotive suppliers.

**Products:**

- Transmissions, steering systems, chassis components and axle systems
- Automatic and manual transmissions
- Gearboxes
- Drive systems
- Electric drive systems
- Anti-lock braking systems
- Chassis systems

**Ownership:**

- Zeppelin Foundation, Friedrichshafen, 93.8%
- Dr. Juergen Ulderup-Stiftung, 6.2%

**Employees:**

53,279 at year end 2005; 5,000 are engineers

**Sales:**

€10,833 million

**Cash Flow from Operating Activities:**

€1.12 million

**R&D:**

5% of sales

**Net Margin:**

2000: 2.9%  2001: 2.2%  2002: 0.3%  2003: 1.8%  2004: 1.8%  2005: 2.3%

**Sales by Region:**

- Germany, 40.3%
- Rest of Western Europe, 29.0%
- Asia-Pacific, 7.0%
- Africa, 1.4%
- Eastern Europe, 3.0%
- No. America, 16.0%
- So. America, 3.3%

**2005 Sales:**

- €10,833 million

**2000 to 2005 CAGR:**

12.1%

**Employees by Year:**


**511 patent applications to the German Patent and Trademark Office.

ZF is organized into 11 profit and loss centers, each serving global markets. The company operates 122 plants located in 26 countries. Aproximately 4,500 employees work in research and development worldwide. Not only does ZF aim to source and produce locally what it manufactures, but the company also aims to conduct R&D locally. Technical centers in China and Brazil are under construction. ZF will continue to invest about 5% of sales in R&D. In 2005 ZF submitted 511 patent applications to the German Patent and Trademark Office.

The company anticipates modest sales growth in 2006 with its workforce remaining roughly at the current level for the next few years. To meet its customers' needs, ZF emphasizes technology, quality and service. If there is one guiding principle for new product development throughout ZF it is the improvement of fuel economy and reduction of emissions. Roughly one-third of ZF sales come from products which entered volume production within the last four years.

According to the company, ZF's strongest competitors are Aisin Seiki and JATCO for automatic transmissions and Getrag for manual transmissions. For electric power steering the company's strongest competitors are TRW, Delphi and Koyo Seiko.

ZF's purchasing volume increased to €5,982 million in 2005, accounting for 55% of sales.

**Electronics**

With the exception of some modules for shift levers, ZF manufactures none of

the electronic control units (ECUs) that go with its transmissions, driveline, steering and damping control systems. In Europe those ECUs are manufactured by Bosch, Siemens VDO and Wabco. In the States, Continental (formerly the automotive division of Motorola) is the manufacturer. ZF designs the ECUs in cooperation with its suppliers who take charge of the ECU construction. ZF purchases roughly 2.5 million ECUs per year.

More electronics are being mounted inside ZF’s components, so the company looks for robust technologies such as hybrid modules that can stand up to the harsh automotive environment. Manufactured by Bosch, the electronic control unit for ZF- Lenksysteme’s electric power steering system is packaged within the motor and is built using low-temperature, co-fired ceramic (LT CC) hybrid circuit assembly processes. The power MOSFET drivers are packaged using direct bonded copper technology to maximize thermal cooling.

ZF develops its own software control systems using a RTiSAN tools for algorithm design, other tools for implementation, and ETA S and dSPA CE tools for automatic code generation. ZF also uses IBM Rational configuration and change management tools. ZF software development processes are certified to different quality management models like Bootstrap, CMM and SPICE level 3. Among quality management models like Bootstraps, CMM and SPICE level 3. Among the approximately 5,000 ZF engineers, 350 to 400 of them function as electrical engineers; 75% to 80% of the electrical engineers are involved with software.

H arald Deiss is head of electronics development; he replaced Wolfgang Runge in 2004.

### Six-Speed Automatic Transmission

One of ZF’s fastest-growing products is its six-speed automatic transmission, even though ZF began producing the six-speed automatic in 2001. According to ZF, most of its transmission customers are switching over from five-speed automatic transmissions, and sales have continued to increase each year. In 2005 ZF produced approximately 1.28 million passenger car transmissions; 885,000 of them were six-speed automatics.

With six speeds, the engine can run closer to its optimal speed, producing better fuel economy and smoother acceleration. ZF’s six-speed transmission can handle up to 750 Nm of drive torque with better acceleration and fuel efficiency than a five-speed automatic. Industry estimates of fuel savings realized by six-speed transmissions compared with four-speed automatics range from 3% to 7%.

ZF continues to improve its six-speed transmission and recently added a new fuel-saving feature. The transmission’s stand-by control function automatically uncouples the transmission from the engine when the car is at a standstill.

ZF’s five-speed automatic transmission debuted in the 1992 BMW 5 Series, and its first six-speed came out in the 2002 BMW 7 Series. Mercedes-Benz’s 7G-TRONIC was the industry’s first seven-speed, introduced in 2003. At the 2006 Detroit Auto Show Toyota featured an eight-speed automatic transmission, which will be available on the 2007 Lexus LS 460.
ZF Friedrichshafen

Adaptive cruise control, A BS and electronic stability control—not only improves vehicle dynamics and comfort, but also significantly increases safety. An electronically networked vehicle will respond more precisely in critical situations such as a driver suddenly swerving and braking to avoid an obstacle.

Since demand for electronic stability control systems has blossomed, carmakers are exploring the benefits of linking ESC systems with ZF’s continuous damping control system. Electronic damping control can improve braking performance by maintaining consistent tire patch loads on rough road surfaces.

Because of the added complexity that networking brings, it will take many years to prove out some of these driveline/chassis integration concepts. One application that could come sooner than later is a stability control system that doesn’t rely on the brakes as an actuator. Instead it depends on wheel traction, damping and active steering control to stabilize the vehicle. A new organization called ZF Engineering has been established to respond to customers wishing to set up integration projects.

Continuous Damping Control (CDC)
ZF Sachs continuous damping control systems automatically adjust the stiffness of the dampers to maintain a smooth ride. The CDC system’s control mechanism operates according to the “skyhook” principle, which aims at keeping the body of the vehicle calm, as if it is linked to a rail in the sky that runs parallel to the road.

The system gets its inputs from five accelerometers: three attached to the vehicle and two to the tower area, one over the left or right rear wheel, either on the control arm or the shock absorber. Body perturbations are minimized by continuously varying a proportional valve in each shock absorber. The system’s OEM cost ranges from $485 to $700 depending on volume. ZF will soon start shipping CDC systems to a new North American customer.

ZF has been making software improvements since it first introduced a CDC system based on the skyhook algorithm, in the late 1990s. Today’s CDC can share information with A BS or electronic stability control systems via a CAN bus or any kind of high-speed LAN. The Opel Astra introduced in 2004 was the first compact car to offer CDC networked with stability control and A BS. A according to ZF, production vehicles with fully integrated (beyond data sharing) CDC and ESC are in development and could be available in about 18 months.

Dual Clutch Transmissions
ZF is expecting fast growth from its new electro-hydraulically controlled dual clutch transmission. The 7-speed transmission consists of two sub-drives connected to the engine via a dual clutch module with two parallel power-shift clutches. One sub-drive handles the even gears, the other the odd gears. While the vehicle is running from one sub-drive, the next gear is pre-selected in the other. As a result, shifting takes place within a few milliseconds with almost no interruption in traction force. Well-suited to sports cars, the transmission yields fuel savings and consequently, lower emissions. ZF is developing the transmission under contract with a German carmaker. That development will take at least another two to three years.

Hybrid Drive Technology
In September 2005, ZF formed a strategic partnership with Continental to develop, produce and sell hybrid systems and components for passenger cars. ZF brings to the partnership its knowledge of hybrid components, modules and transmission systems and Continental brings its expertise in power electronics, energy management and electronic braking systems. Each partner will engineer and manufacture the components that comprise the hybrid system at their own facilities. The collaboration says it could start shipping parallel hybrid drive systems in 2007. The partnership’s first customer is Volkswagen which placed an order for electric drive systems in January 2006: Continental will supply the power elec-
tronics and ZF the electric motor, clutch and dual-mass flywheel.

ZF has established a separate organizational unit, Hybrid Drives, under the direction of corporate R & D to establish ZF as a "system leader in the field of hybrid drive systems."

ZF Sachs has been developing electric motors for more than ten years. One such motor is the DynaStart crankshaft generator, a permanently excited synchronous machine. Mounted on the crankshaft between the engine and transmission, DynaStart can accelerate the engine up to idle speed in less than 300 milliseconds, making it suitable to start-stop operation. In traction boost mode, the motor is capable of supplying 100 Nm of torque at power levels in excess of 10 kW. According to the company, fuel consumption can be reduced by up to 10% with DynaStart.

---

ServoElectric Electric Power Steering

Initially designed into small cars as parking aids, electric power steering (EPS) systems are now available for large cars as well. Depending on how much space is available for installation, how much electrical power is available and the amount of rack and pinion steering force that is required, EPS can be connected to the steering column, the pinion gear or parallel to the steering rack.

The main benefit of EPS is reduced fuel consumption. ZFLS' electric power steering system consumes up to 85% less energy than hydraulic power steering.

According to ZFLS, EPS systems will gradually outnumber hydraulic systems in Europe and Asia, with the exception of China, where unit sales of hydraulic systems will maintain strong growth. In Europe the demand for EPS will outpace the demand for hydraulic power steering by 2009, according to the company, based on the high-volume, lower and middle class vehicle segments. A II Volkswagen Group models based on the Golf platform have ZFLS electric power steering, as does the new Passat.

Active Steering

EPS systems are not only used to make it easier to steer the vehicles while parking, they are also used to active steer control systems. Launched in 2003, Lenksysteme's first active steering project went into volume production on the 2004 BMW 5 Series. ZFLS' power steering system is part of BMW W's Active Front Steering (AFS) feature now available on some BMW 1, 3, 5, X5 and 6 Series models. The system varies the steering ratio according to the vehicle's speed to maximize the steering wheel's effect on turning during parking maneuvers, while lessening the effect of sudden steering wheel motions while driving at high speed.

In the new BMW 3 Series due in late 2006, AFS is integrated with stability control. Future AFS systems will also be integrated with antilock braking systems, according to ZFLS.

BMW has said it will use EPS to activate lane departure warning feedback through the steering wheel, as if the vehicle is driving over a rumble strip, and as part of an active yaw-torque control system, where the steering angle is adjusted along with the brakes to help stabilize the vehicle.

Variable Displacement Hydraulic Pumps

Despite the fuel efficiencies of EPS, approximately 40 million hydraulic power steering systems are still manufactured worldwide each year, according to ZFLS, accounting for the majority of power steering systems made globally. And since hydraulic power steering systems are still being improved, they will continue to hold a strong position in the market for years to come. ZFLS is developing a variable vane hydraulic pump that consumes 40% less energy than constant displacement pumps. The new pump will go into mass production on a German luxury vehicle at the end of 2006. Hydraulically controlled, the pump's displacement varies according to its speed.
Harman International, a company that has been quite profitable. Cadillac and other carmakers promote Bose branded audio systems. XM and Sirius satellite radio brands are widely promoted by carmakers. And Volvo sells factory-installed Dolby Pro Logic Surround Sound systems. Dolby Laboratories had an 15.9% net margin in its 2005 fiscal year.

Beyond audio systems, supplier-branded products are harder to find. Volvo, Lexus and others offer HomeLink. Universal Transceivers (garage door openers) from Johnson Controls. Johnson Controls is a profitable company. Acura and other carmakers offer some vehicles with Brembo brake components. Brembo is a profitable company, with 5.7% net margin in 2005.

Brembo gets its reputation by actively supporting car racing, as does the Italian seat maker Recaro, whose seats, with the Recaro logo prominently displayed, are offered not just on Lamborghinis, Jaguars and Aston Martins, but also on vehicles from Honda, Toyota, Audi, GM, Ford and others.

The deal: “There are no A merican companies that could be buyers. The people who are doing well in North A merica you can count on the fingers of one hand. Johnson Controls is doing fine, BorgWarner is doing fine, a few others are doing okay. But none of them were particularly strong in the electronics area. In a different world you’d expect Delphi and Visteon to be looking at these electronics assets from M otorola or whomever else. But the only A merican buyers are financial sponsors, and you can’t get financing in the auto market in North A merica.”

Should big pieces of Visteon or Delphi change hands, the most likely bidders would include Continental, Siemens V DO, R obert Bosch, Denso, A isin Seiki, Yazaki and M agna, the only North A merican company.

With EBIT margins projected to continue in the high teens through 2008, Continental is in a good position to stick with its acquisition policy. Continental is particularly interested in auto electronics businesses in North America and Asia, and so is Siemens V DO.

Having successfully transitioned the H untsville Electronics operation from a C hrysler cost center to a profit center and “due to growth forecasts for automotive electronics,” Siemens V DO will move on other acquisitions of automotive electronic businesses “if the fit is correct and the assets reinforce our core strategic business areas,” wrote Dave Ladd, manager of North A merican public relations, in an email to The Hansen Report. “We have the support of the Siemens AG board, and Siemens has the cash.” Siemens V DO took over the Huntsville operation in April 2004.

Robert Bosch G mbH should also be listed among the German companies definitively interested in acquisitions. In Bosch’s annual press conference in April, CEO Franz Fehrenbach said “...we are on the lookout for possible acquisitions. If such opportunities arise in automotive technology, then we will take advantage of them.”

Even when it comes to fundamental building-block technology, U.S. companies are losing influence. While Freescale has the largest share of the automotive semiconductor business, the German company Infineon is only a few percentage points behind in share, followed by ST M icroelectronics, a firm with French and Italian roots, followed by three J apanese companies, Renesas, N EC and Toshiba.