Huntsville Electronics on the Block

Since the spring of 2001, Daimler-Chrysler has been trying to sell Chrysler Group's in-house electronics manufacturing operation, Huntsville Electronics. The sale of Huntsville will mark the end of vertical integration of automotive electronics at the Big Three. Delphi Automotive was spun off from GM in 1999, Visteon from Ford in 2000.

Located in Huntsville, Ala., Chrysler's in-house electronics parts operation makes electronic boxes and electronic control units, especially powertrain controllers, radios and instrument clusters. At the end of 2000, Huntsville employed 2,929 people and for the year 2000, shipped $995 million worth of product, measured at standard cost.

Goldman Sachs is helping Chrysler find a buyer for Huntsville.

Selling Huntsville is probably a good move for Daimler-Chrysler, because it eventually will free Chrysler to purchase from a group of open market competitors. Today Huntsville gets special treatment from Chrysler, which goes out of its way to keep Huntsville busy with orders, even when it could buy electronics cheaper from other sources. Since it hasn't been forced to compete on a level playing field with the world's best automotive electronics makers, many of Huntsville's products do not provide world-class value. "Unless the market is open, you don't get the world's best parts," explained Heinrich Georg Burghoff, a top electrical engineer at DaimlerChrysler in Germany. The sale of Huntsville will free up investment capital, which DaimlerChrysler would like to use to support its core automotive sector, not in electronics.

Turn to Huntsville, page 3

WAP for Telematics—U nlikely

In 1997, when WAP founders began promoting the Wireless Application Protocol as a means of providing Internet access to mobile phones, telematics developers began to believe that WAP standards could also help them bring the Internet to people in their cars. Mannesmann VDO (now Siemens VDO) and Ericsson formed a strategic alliance in 1999 to develop WAP Internet access for vehicles. The WAP Forum, a global industry association that develops and promotes the standard, chartered a Telematics Expert Group in 2000, and Delphi Automotive Systems touted the WAP-based mobile Internet browsing feature of its Mobile Multimedia platform at the 2000 Consumer Electronics Show.

Now, after five years, the automotive industry is no longer as optimistic about WAP's promise, as telematics developers look for faster, easier-to-use, wireless Internet technology.

The rollout of WAP-enabled mobile phones in Europe has not come at all close to expectations. Customers find WAP phones very frustrating to use. A 9.6 kilobits per second, large data downloads over existing circuit-connected GSM links take too much air time, making WAP applications expensive. It is

What Is WAP:

WAP: Wireless Application Protocol is an open software standard enabling mobile phones, despite their limitations, to browse the Internet. Compared with PCs, mobile Internet phones have lower power, a smaller computer, less memory, a smaller display and tiny, hard-to-use keypads. Wireless connections are slower than fixed networks. WAP software is required to enable both the mobile device and the server.

Main Elements of WAP Specification

1. WAP programming model
2. Markup language based on existing Internet technologies, such as IP (Internet Protocol), HTTP (Hypertext Transfer Protocol), and XML (Extensible Markup Language); WAP 2.0 supports XHTML.
3. Micro-browser specification suitable to a wireless terminal
4. Lightweight protocol stack to minimize bandwidth requirements
5. Access to telephony functionality such as call control, phone book and messaging using WML (Wireless Markup Language) script applets.

Short Life: As more computing capability is added to vehicles and advanced wireless communications technologies bring wireless data links closer to the performance of fixed-line communications, WAP's value to telematics could slip away—in seven years or less.

WAP Forum: The WAP Forum, responsible for developing and promoting the WAP standard, was founded in 1997 by Ericsson, Motorola, Nokia and Phone.com (formerly Unwired Planet). In December 2001 there were 332 members, representing 99% of the handsets sold worldwide.

While WAP is similar to the application protocol used by i-mode mobile phones to access the Internet in Japan, WAP has not been even remotely as successful as i-mode, which had 28.5 million subscribers as of October 2001. More than an Internet application protocol, i-mode is a proprietary, closed system and business division of NTT DoCoMo. i-mode phones can access thousands of i-mode-enabled web sites. (For more on i-mode, please see The Hansen Report, November 2001.)
difficult to input data on a phone’s small keypad and difficult to read text on its small display. Not only are WAP sites difficult to access, but, more importantly, there are still few attractive WAP services available.

Europeans are purchasing more and more WAP-enabled phones because they are inexpensive and have somewhat larger screens than standard cell phones, but only a small percentage of the people who purchase WAP phones use them to connect to the Internet. Vodafone (U.K.), one of the world’s largest mobile phone network operators, said WAP services accounted for just 0.5% of its September 2001 revenues. A according to the Yankee Group (Boston, MA) Wireless Mobile Europe division, T-Mobile (Deutsche Telekom’s mobile telecommunications division) claims just 6.8% of its subscribers are WAP users. The Yankee Group’s Farid Yunus pointed out that at the end of 2000, even though 5% to 11% of all handsets in Western Europe were WAP enabled, the number of WAP users in Western Europe was less than 2% of the total installed base. That means fewer than half the people who had WAP phones at that time used WAP features.

WAP Telematics—Little Interest

So far, only a few WAP-enabled telematics platforms have been added to new production vehicles. The BMW 7 Series uses a WAP browser for its Internet gateway, a feature of the navigation system. Users can, for example, check the weather at their destination or download to the navigation system addresses for restaurants or hotels in their destination city.

Fiat has added WAP capability to its Connect telematics platform, available on the Alpha Romeo 147, the Fiat Stilo and the Lancia Thesis, but despite these WAP-enabled platforms, Fiat is unlikely to use WAP in future Fiat models, said Edoardo Colletti, in charge of the Infomobility division of Targasys, Fiat’s telematics service provider. “WAP is not in our future plans. ... We are focusing on voice-based service, which is less dangerous and intrusive. For drivers using embedded telematics platforms, WAP is mainly a browser.”

A nother indication of the auto industry’s limited interest in WAP can be found at A M I-C, the Automotive Multimedia Interface Collaboration, which is only considering WAP as a possible project for A M I-C’s third release, due in three years, or so. According to A M I-C program manager Pom Mohotra, WAP will not be among the specifications slated for A M I-C’s second release, due by year-end 2002. WAP is only one project among many that A M I-C’s strategic planning committee is considering for a future release. Representing all the world’s major carmakers, with the exception of V W, B MW and D aimmerChrysler, A M I-C intends to come up with standard telematics specifications that carmakers the world over can use.

Second Chance for WAP?

While Europe’s first go at WAP-enabled mobile phones was not successful, WAP promoters have another chance to demonstrate the value of WAP, assuming the latest specification, WAP 2.0, released in August 2001, fixes many of the problems early WAP users experienced. According to the WAP Forum, 2.0 was designed to take advantage of higher bandwidths, faster data speeds, greater processing power and varied screen sizes. Multimedia messaging, faster downloads, improved navigational functions and user-friendly menus are some of the promised benefits. While drivers and passengers may one day be able to dock their WAP 2.0-enabled mobile phones and P D A s in a vehicle’s telematics system, the window of opportunity to apply WAP technology directly to embedded telematics platforms could quickly close as 2.5 and 3 G (third-generation) wireless phone systems emerge, offering wider bandwidth and always-on connections. Embedded telematics platforms will get bigger displays, hotter computers and larger memories. By the time 3 G is available, cars will already have enough computing capability to obsolete the need for WAP; telematics developers will be able to use standard Internet protocols instead of WAP.

How long will the window be open? “At least three to five years,” says Ericsson’s acting general manager for Venture e-Ser-

WAP T elematics... Continued from page 1

vices Par Mattisson. “After five years I trust WAP will be phased out. After that, WAP will still be in use, but not in new products.”

Sponsored by ERTICO (European Road Transport Telematics Implementation Coordination Organization), an industry/government partnership set up by the European Commission, four carmakers in Europe—B MW, F iat, R enault and V olvo—have spent the last two years working on the IT SWAP project to test the applicability of WAP in telematics. The group, which also includes a number of suppliers and wireless network operators, was to conclude its work at the end of 2001 and issue a report of its findings. No report was available at press time.

THE HANSEN REPORT ON AUTOMOTIVE ELECTRONICS

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J.D. Power and Associates 2001 Audio Quality Report

J.D. Power and Associates' 2001 Audio Quality Report indicates that demand for car audio systems that include a CD player continues to rise. The configuration most in demand in 2001 was the AM/FM/cassette/single CD player, accounting for 35% of the total market. That was followed by AM/FM/single CD player, with no cassette, at 25% of the market. Market demand is growing for car audio systems with multi-CD changers. Market penetration of AM/FM/cassette-only systems dropped from 20% in 2000 to 13% in 2001.

Based on the responses of 82,000 new vehicle owners who purchased cars or light trucks with factory-installed audio systems, the 2001 Audio Quality Report found that of 13 possible sound-system problems, the most frequently reported were poor radio reception and sound system control problems. Among the other problems reported were CD changers not working reliably and CDs skipping during play, not loading or not ejecting.

Based on a scoring system of problems per 100 vehicles, Alpine Electronics ranked number-one in quality for AM/FM/cassette/single CD player systems. Alpine, with 2.8 problems per 100 vehicles, followed by Fujitsu Ten and Visteon, both at 3.9 problems per 100 vehicles, beat the industry average of 4.8 problems.

Market Penetration by Receiver/Playback Type

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<tr>
<td>AM/FM/Single CD Player</td>
<td>28%</td>
<td>33%</td>
<td>37%</td>
<td>35%</td>
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<tr>
<td>AM/FM/Cassette/Multi-CD Changer</td>
<td>9%</td>
<td>10%</td>
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<tr>
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<td>39%</td>
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<td>AM/FM/Multi-CD Changer</td>
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Source: J.D. Power and Associates

Huntsville...

The Huntsville dealing is part of the industry globalization and consolidation that began in the 1980s as Japanese carmakers moved beyond Japan to the United States and Europe, to manufacture anywhere they could sell a large number of vehicles. Eventually, most of the world’s major carmakers set up manufacturing facilities beyond their home region.

DaimlerChrysler will have a difficult time selling Huntsville, which employs UAW workers who make from $50,000 to $100,000 per year, high by global standards. Unless a new agreement is signed, the latest UAW-Chrysler contract, signed in 1999 to last four years, protects the jobs of UAW workers and makes it nearly impossible to sell Huntsville to another company, unless the UAW is guaranteed the same benefits and the same number of UAW workers it presently employs.

By selling Huntsville, Chrysler will no longer be involved in purchasing electronics components, including ICs. That will make Chrysler engineers less knowledgeable and less informed as they source the electronics they need. “With Huntsville we knew the cost of every component that went into our electronics boxes,” said Bob Gerge, an electronics director at Chrysler. “That gave us definite advantages; but you have to weigh that against what we'll have once Huntsville is sold: Huntsville will be a more competitive supplier.”

The sale of Huntsville is likely to take a while— currently there are more sellers than buyers of automotive electronics companies. Some potential buyers are struggling to maintain positive cash flows because of slowdowns in automotive production. Other suppliers are struggling to digest recent auto electronics or auto electrical acquisitions of their own.

A top below industry average, in alphabetical order, were Clarion, Delphi Delco Electronics, Hyundai Electronics, Mitsubishi Electric (ranked first in 1999 and 2000) and Panasonic.

For AM/FM/single CD player configurations, Visteon had the highest quality rating, with 3.5 problems per 100 vehicles, compared with the industry average of 5.4 problems. Alpine Electronics ranked second, with 4.6 problems and Mitsubishi Electric was third with 4.9.

A top below industry average in this category, listed alphabetically, were Blaupunkt, Clarion, Delphi Delco, FMS Audio (a Sanyo and Mazda joint venture), Hyundai Electronics and Panasonic.

J.D. Power and Associates found growing interest among consumers in new audio technologies. Eighteen percent of the survey respondents said they “definitely or probably” want satellite radio in their next vehicle; 19% definitely or probably want M P3 playback capability.

For further information or to purchase the complete report, contact J.D. Power and Associates at 818-889-6330; fax 818-889-2031; www.jdpa.com.

Continued from page 1

For instance, in December 2001, Valeo was forced to put its U.S. operation, Valeo Electrical Systems Inc. (VESI), into bankruptcy proceedings. VESI, which has been hurt by the recent economic climate, says that it has also had problems trying to get its operation into the black. After repeated tries, Valeo has been unable to win cost concessions from its local labor union. Valeo purchased its VESI operation from ITT in 1998. VESI makes automotive wiper and airflow systems and motors.

This past summer, Johnson Controls purchased Sage SA’s automotive electronics business, which makes engine controllers, instrument clusters and telematics products for its two main customers, Renault and PSA.

Magneti Marelli, Fiat's automotive parts unit, has been on the block for some time.
ZF Friedrichshafen

**Background**

According to ZF Friedrichshafen, which considers technology innovations essential to a strong market position, ZF is the world’s largest independent specialist for transmissions and chassis technology. As early as 1921, the company produced a four-speed pre-selection gear change system without a gear-shift lever, and it did so for 75 small car manufacturers. Today, ZF sees its system solutions for automotive customers as a crucial area of growth, and electronics and software development as the keys to success in integrated systems.

ZF customers include all major international vehicle manufacturers of cars, trucks, buses and agricultural/construction machinery. Transmissions account for about half of sales and include manual, automated manual, automatic and continuously variable transmissions (CVT).

**Acquisition of Mannesmann Sachs**

On November 19, 2001, the European Commission authorized the acquisition of Mannesmann Sachs by ZF Friedrichshafen, making ZF the third-largest automotive supplier in Germany and the 15th largest worldwide, based on annual sales to automakers. With the acquisition, the biggest in ZF history, the ZF Group expanded its workforce from 36,400 to 56,750 employees; facilities increased from 60 locations in 16 countries to 117 in 22 countries. In 2001, combined revenues of both companies totaled €9.1 billion (US$11 billion). The acquisition, particularly Sachs vehicle chassis components, suspension modules and complete axle systems, allows ZF to expand its systems business, as well as add more value to existing products and systems.

Since 1987, the Mannesmann Group controlled the majority of Fichtel & Sachs shares; the merger of the shock absorber production activities of Boge A G took place in 1992. Fichtel & Sachs and Boge...
activities became Mannesmann Sachs in 1996. In the first half of 2000, Mannesmann’s five automotive subsidiaries were renamed ATECS, Mannesmann Sachs, and put up for sale; auto cockpit-maker VDO was one of the five subsidiaries. While initially Siemens AG announced it would set up a joint venture, to be called ATECS, Siemens, A utomotive A G, Siemens AG later proposed acquiring 50% plus two shares of ATECS Mannesmann in a consortium agreement with Robert Bosch GmbH. From that deal, approved in August 2000 by the EU Commission, VDO and Siemens A utomotive Systems Group became Siemens VDO A utomotive.

Mannesmann Sachs will now be known as ZF Sachs AG; it will continue to serve its own customers as a separate operating company. In transmission technologies, Sachs has a full range of clutches, torque converters and automatic components for manual transmissions. Its product line also includes fan clutches, chains, chain tensioners, shock absorbers/struts for rail vehicles, and electric drive systems, along with a crankshaft starter/generator assembly that should find 42-volt and hybrid vehicle applications.

Decentralization

In an effort to gain more market and customer proximity, ZF reorganized the company into divisions and decentralized R&D activities by division in early 2000. Corporate R&D at Friedrichshafen still plays a supervisory function, but its role is now more that of a fundamental researcher as well as provider of testing and measuring, activities too expensive to duplicate at the division level.

Electronic development began back in 1955 with the two-speed transmission; ZF’s first microcontroller for transmission was developed in 1980. Electronic control units, currently in all automatic transmissions for passenger cars, are also in some automated manual transmissions for trucks. Although Corporate R&D just developed a control loop for electric steering, the remainder of development for steering systems is handled by the ZF-Bosch joint venture ZF Lenksysteme.

ZF employs about 120 people at its newly-built $16 million technical center outside Detroit, Michigan. The company expects to expand further into North America in the coming year. A sia is another area targeted for expansion. To strengthen its global network, ZF standardized its Product Data Management software in 2000, using CA D A M.

Software Development

Software development receives high support at ZF. The company owns the intellectual property for the software it develops. Control algorithms are developed with ZF partners. The company develops software applications using 60% to 70% existing standard software blocks, a high reuse proportion. Configuration management tools, which help designers reprocess software, are now in place for all projects and saved about 20% in software development time in 2000. A utomatic code generation for prototype processes allows functions to be tested in the vehicle at an earlier stage than before. More software configuration management tools would be welcomed, and there is a pressing need for software engineers and closed-loop control engineers, revealed Dr. Runge.

Fifteen years ago, ZF began developing a complete test chain for the transmission, and the company now has test vectors for both the model and the software code derived from the model. The test chain allows integration of the actual electronics control unit. ZF used tools for the first time to create the model, algorithm and automatic software code generation for a module within the new BMW 7 Series six-speed automatic transmission. When asked about companies in the world with continued on following page
ZF Friedrichshafen

a completely integrated tool chain, Dr. Runge responded: "We are one of the first companies to cover the total V diagram." The company will use this same integrated tool chain for a second customer. The tool chain was developed with the help of ETA S G mbH (Stuttgart, Germany), dSPA CE (Paderborn, Germany) and The MathWorks (Natick, Massachusetts), the developer of MATLAB and Simulink, and ClearCase from Rational Software (Cupertino, California). Development of software and control algorithms for transmissions is shared with partners, for instance, predevelopment began with BMW ten years ago.

Low-level application software, OS software and I-O functionality comes from long-time suppliers/partners Siemens and Bosch. Partitioning is handled with all application functionality in software, except some I-O functionality by Bosch in hardware. In the future, some low-level software will be replaced with ASICs.

Motorola's PowerPC

For ten years Dr. Runge has watched the theoretical discussion about whether to integrate the engine controller with the transmission controller or keep each controller separate. Today he sees no real issue since ZF's current transmissions already demand the most powerful controllers available. The transmission controller uses most of the memory available on the chip: There is none left for the engine controller.

Although Bosch is one of the biggest suppliers of transmission ECUs worldwide, and while older controllers used Siemens microprocessors, ZF will use the Motorola PowerPC for all new transmission controls. The company has chosen the Motorola controller not necessarily because it is a 32-bit device, but because it is capable of high-speed computation.

"There is no second source, nobody has a microprocessor for cars like Motorola," noted Dr. Runge.

The PowerPC is used as a bare chip without its component housing. It is packaged with other electrical and mechanical components in a mechatronic package.

Top Five (not ranked)
- BMW
- DaimlerChrysler
- Fiat Group
- Ford Group
- VW Group

Others (not ranked)
- Daewoo
- General Motors
- Hino
- Honda
- Hyundai
- Isuzu
- MAN
- Mazda
- Mitsubishi
- Neoplan
- Nissan
- Paccar
- Porsche
- Proton
- PSA
- Renault
- Scania
- Subaru
- Toyota
- Vanhool
- Volvo

New Transmission Technology

With increased commitments around the world to reduce fuel consumption and emissions, and with demands for better vehicle performance and passenger comfort, more types of transmissions are becoming available worldwide. New fuel-saving types will come faster in Europe and Japan, where fuel prices are higher than in North America. Most ZF production today is in five- and six-speed manual transmissions, four-speed automatic transmissions and five-speed automatic transmissions.

ZF's focus in car transmission technology is the six-speed automatic transmission and the CVT (continuously variable transmission). Until recently, CVTs were used mostly in Japanese vehicles, many of which have engines with low to moderate torque output. However, CVTs are expected to move into mid-range vehicles worldwide in the next few years as the technology evolves. Ford is expected to introduce ZF CVTs in several models in North America after 2003.

ZF Six-Speed Automatic Transmission

ZF points to the development of the world's first six-speed automatic transmission as an example of ZF's commitment to be a technology leader. At the end of 1997, engineers in the ZF Car Transmission division came up with the concept, and corporate approval came early in 1998. By mid-2001, just three-and-a-half years later, the six-speed transmission was ready for production; the worldwide launch was on the MY 2002 BMW 7 Series. More new transmission business is expected from BMW as the carmaker has announced it will launch 20 new models and three new engine ranges over the next six years.

ZF has a North American customer that will use six-speed automatics on several vehicle lines by MY 2004. In Europe, ZF automatic six-speed transmissions will next appear on the Jaguar S-Type, and Audi A8 in mid-2002, and are expected in a number of European models soon.

Six-speed transmissions provide both rapid acceleration and fuel efficiency. Shifting is done with minimum interruptions to traction, and shift points are set to maximize fuel-efficiency. ZF claims its version, compared with an automatic five-speed transmission, is 13% lighter, has 30% fewer components, gets 5% better acceleration and uses up to 7% less fuel. When the vehicle is stationary, even when in gear, the electronic Stand-by-Control (SBC) system allows the input clutch to disconnect the engine from the driveline so the engine consumes less fuel.

A combination of hydraulics and electronics in the ZF mechatronic module reduces the number of cable and plug connections, and enhances shift quality, by receiving information from the vehicle about current driving conditions and initiating optimal shift timing to cope with such conditions as drag resistance (weight and slope) as well as driver behavior. The mechatronic module allows the transmission to range from sporty to economical.

ZF's six-speed 6 HP 32 transmission can handle up to 750 Nm of input torque. That will make it a good fit with larger diesel engines. Diesels are favored in Europe for their fuel economy. ZF's six-speed transmission was originally designed for...
upscale vehicles with eight to twelve cylinders. A complete line of six-speed automatic transmissions is planned under the name myTronic6.

**Continuous Variable Transmission**

CVTs provide faster acceleration with considerably lower fuel consumption and fewer harmful emissions, compared with four-speed automatic transmissions like those found in small and mid-sized engines. Plus, the engine operates more consistently in its optimal speed range than it can with a multi-ratio transmission.

“CVTs are the ideal solution ... for small and mid-sized engines up to 2.5 liters, including diesel engines,” suggested Dr. Gerhard Wagner, ZF group vice president, in ZF’s 2000 annual report.

The ZF-Ecotronic CVT product line has no gears but an infinite number of ratios, unlike a conventional automatic, which changes gears based on predetermined gear ratios. Power in the CVT moves between two adjustable discs via a steel link belt able to withstand high levels of load. The axial distances of the disc pairs can vary, so the engine speed ratio, which is transferred by the link belt, changes in a continuously variable manner. The ZF-Ecotronic line has three products: Input torque is 165 Nm for the VT1, 250 Nm for the CFT 23 and 350 Nm for the CFT 35.

The ZF-Ecotronic control unit takes into account not only vehicle and engine data, but also variable data like the present speed, accelerator position and acceleration. The ZF-Ecotronic uses this data to determine the optimal control commands for the engine and transmission. The ZF-Ecotronic control unit is able to learn and adapts its shift management to the driver’s driving style. The driver can change between automatic, continuously variable drive mode and a hand-shift mode with virtual six-speed behavior. The number of virtual gears is determined by software and can be changed to ZF’s customers’ specifications.

ZF Batavia LLC (Batavia, Ohio, USA) is a joint venture that was set up by Ford (49%) and ZF (51%) in 1999 to develop CVT technology. In 2000, the JV produced 262,800 four-speed automatic transmissions, which amounted to sales of €401 million ($361 million) with 1,277 employees. Batavia was expected to start production of the CVT product CFT 23 for Ford vehicles at the end of 2001, with CVT production ramping up to one million units by 2005, but production for Ford is not expected until 2003.

**Automated Manual Transmissions**

While the fastest-growing types of passenger-car transmissions are the six-speed and CVTs, automated manual transmissions are a fast-growing segment in commercial trucks and buses in Europe. Manual transmissions with five speeds for passenger vehicles and light trucks are also popular. In 2002, the company plans the production launch of a new six-speed manual transmission, which is expected to yield a 10% increase in sales revenue.

**Shift-by-Wire**

ZF’s shift-by-wire automation in clutch and gearshift actuation has been in European buses and trucks for about 20 years, and now comes with full or partial automation, initiated by the driver with a floor lever or button on the steering wheel. ZF makes shift-by-wire transmissions using a special electrohydraulic control unit, and other suppliers will follow ZF’s lead, the company predicts. A nice design feature is that the gear selector lever can go anywhere the driver can reach. In cars, shift-by-wire is a problem since in the park position, there is a mechanical brake, noted Dr. Runge, adding that in the new BMW 7 series, there is an electrohydraulic parking brake, which uses CAN. The company has two signed shift-by-wire development contracts, one for a German company and one for an American company. ZF has already made prototype transmissions for those customers.

**Chassis Division**

In the Chassis division, sales of front and rear complete axles for Daimler-Chrysler vehicles and for the X5 BMW are growing fastest. Other customers are carmakers in Europe as well as in North and Central America, Africa and China; the company also has licensees in Asia and Africa. Products include axle systems, wheel control/location and wheel suspension modules, transverse links/control arms, suspension joints, tie rods, stabilizer links, gearshift systems (automatic and manual), shift-by-wire and the patented Lemförder-Shifttronicâ gearshifts.

**ZF Lenksysteme**

ZF first introduced an electronically controlled power steering system, the Servolectric, in 1997, but because ZF was neither the first- or second-ranked supplier of power steering products, the company felt it needed a partner and joined with Bosch to set up the joint venture in 1999, called ZF Lenksysteme. Key products include electrohydraulic steering columns, steering systems and servo units, as well as electronic controls for electric steering systems. ZF Lenksysteme operates 13 plants worldwide, including one in Oakwood, Georgia, USA and one in Hebron, Kentucky, USA.

ZF Lenksysteme considers electric-hydraulic power steering (EHPS) a fast-growing market in Europe, where fuel costs are high. The ZF Servolectric line of EHPS uses power for steering only when needed, unlike hydraulic steering, which draws power even when driving in a straight line.

EPS (electric power steering), which will totally eliminate pump, hoses and fluid, will come out after EHPS and will offer a number of additional benefits. In EPS systems, the absence of a steering column allows designers a broader scope of freedom; engine compartment construction is simplified for left- and right-handed driving; there are potential improvements in crash designs; potholes or unbalanced tires do not transmit problems up to the steering wheel.

**How Suppliers Might Help**

The company is looking for suppliers of pressure control rotors, solenoid pressure control valves, proportional control solenoids. Accuracy and low cost are crucial. ZF would like to find speed sensors based on Hall or some other technology that can operate at very low velocities. The company would also welcome rapid prototyping tools and software configuration management tools. ◆
Dura Pushing Shift-by-Wire

Almost all light vehicles today use cables to communicate the driver’s intentions to the transmission. The next stage of development underway at a number of carmakers focuses on so-called hybrid systems, which are part electric and part cable. Fully-electric shift-by-wire systems, which use no cables, will need many more years to develop, as suppliers research designs that comply with U.S. safety standards.

Hybrid systems could reach substantial volumes after 2005, according to engineers at Dura Automotive Systems, Rochester Hills, Michigan. Dura, North America’s number-one supplier of shifter systems, is already delivering production hybrid shift-by-wire components, which Chrysler uses in its AutoStick shifter. A AutoStick, available on Chrysler’s Dodge Intrepid, Chrysler 300M and Prowler models, functions as either an automatic transmission or an electronic-manual transmission.

Today’s hybrid shift-by-wire replaces some of the manual, cable-operated driver controls, and while it makes the transmission $40 to $50 more expensive, shift-by-wire provides several advantages over cables:

◆ With shift-by-wire, outputs can be fed to the vehicle’s CAN network for delivery to the PRNDL (park, reverse, neutral, drive, low) indicator.
◆ Shift points can be more easily adjusted for best fuel economy and/or performance.
◆ Without cables, shift-by-wire is more compact, giving designers freedom to place the shifter closer to the driver, which leaves more space for other features, for example, another driver-operated switch or a cup holder.
◆ Shift-by-wire systems take less time to install compared with cables. Cables must be carefully routed to minimize noise and to avoid contact with the exhaust system.
◆ Shift-by-wire uses switches, either noncontact electronic types like those using H-all-effect semiconductors, or mechanical types, for example microswitches, which communicate with actuators, either electrohydraulic or electromotor, to shift the transmission gears.

For now, the only positions that could feasibly be electric are shift positions one, two and three, according to Dura engineers. Reverse, park, and neutral will remain cable-controlled for now. U.S. Federal Motor Vehicle Safety Standard 114 states that the park position must keep the car from rolling no more than 150 mm on a 10% grade. A fully-electric system may require a back-up mechanical device for park in case the battery system fails.

A special challenge for electric shifting is getting the transmission in and out of park, which requires fairly strong force, especially when the car is on a hill. A mechanical component, the park pawl, actually locks the vehicle in place. A fully electric system requires a large motor capable of disengaging the pawl under severe loads. “The real trick is making a system that can pull the vehicle out of park under all conditions,” explained Bill McDonald a Dura Automotive engineering manager.

Dura has already received requests from two OEMs to develop shift-by-wire levers that can output to a CAN bus. Dura anticipates inquiries from other OEMs, interior system suppliers and transmission suppliers. For more information, call Dura at 240-299-7613. Other Dura products include electronic throttle controls, electric parking brake systems, power seating and adjustable pedal-control systems.

After 2001 Advertising Slide, 2002 Uncertain

Those on the advertising side of the automotive electronics business share a common send-off for 2001. “Good riddance.” Most agree that advertising fell by about 20% last year, a particularly rough drop after a banner year in 2000. Looking forward, there’s little optimism that advertising will pick up before the second or third quarter of 2002.

The sharp decline in advertising for auto electronic components comes in sharp contrast to last year when, driven by high demand for electronic features and a hot electronics market, the makers of electronic components and modules were beefing up their marketing efforts. “In 2000, for the first time in many years, technology was our number-one category,” said Larry Schlagheck, advertising director for Automotive News. “This year, it’s down to number four. Component suppliers are way down.”

It wasn’t just in automotive electronics that the advertising segment of electronics industry marketing spending was down during 2000. In the closely-watched electronics and manufacturing segment, overall page counts dropped by 19%, with many leading publications sliding by 25% to 30%, according to market watcher C M R, a Taylor Nelson Sofres company in New York City.

With the consensus that automotive electronics advertising expenditures dropped by 20% to 25% last year, the big question now is when might things start to pick up. As in the overall economy, there are signs that point in both directions. Even those seeing signs of an upturn in the short term say that a clear picture won’t be seen until much later in 2002. “Right now, January is a little better than last January,” said Dyanne Lathrop, sales manager for Wards Automotive. “A sign will be how things go at the Convergence show in October.”

Observers agree that a sustained increase in advertising will be some time coming. Paul Klapproth, communications director at Siemens VDO Automotive, observed, “Some people may be cutting back their ads until they see an upturn. There are all kinds of strategies.”

Those strategies are sometimes dependent on special situations. Siemens Automotive is currently establishing recognition for its name change—to Siemens VDO Automotive—so it is one of the few that has not trimmed back its ad placements. “Our expenditures are fairly flat. We’ve tried to protect advertising as much as possible,” Mr. Klapproth said.

For those advertisers who have cut back, increasing ad spending may be difficult. Even before the downturn, many component and module suppliers were seeing their margins shrink. Mr. Schlagheck noted, “Even when times were good, they were still getting beat up with low pricing. Electronic components is a terrible side of the business. I don’t see that coming back strongly next year.”