Siemens VDO Adopts Huntsville Electronics

Chrysler has been trying off and on since the late 1980s to get rid of its captive automotive electronics division, Huntsville Electronics. Finally in early February 2004, Siemens VDO agreed to purchase the operation, which annually ships about $1 billion worth of electronic control units, radios and instrument clusters; 96% of shipments go to Chrysler. The purchase price was not disclosed.

Chrysler is the last of the Big Three carmakers in the United States to dish off its in-house electronics operation. That trend began in February 1999 when General Motors IPO’d Delphi, followed in June 2000 by Ford’s spin off of Visteon in a public offering. The reason: without full immersion in the merchant market, the Big Three’s former captives were not able to compete with the world’s best suppliers on innovation, quality and price. And further, intense competition, mainly from Toyota and Honda, has forced carmakers to focus resources narrowly on their core competencies: development, manufacturing and marketing of cars and trucks.

Siemens VDO will take over the operation of Huntsville in the spring of 2004.

A’s has been the case for the last 15 years, the sticking point in the final months of negotiations was getting an agreement with the United Auto Workers union, which has ably fought to keep Huntsville tied to the collective bargaining agreements the union has made with the Big Three. Chrysler and Siemens VDO had worked out a framework for the purchase and sales agreement in mid-summer 2003, but they had to wait until October 2003 for the UAW to finish its overall negotiations with the Big Three.

In November, Siemens VDO was able to start working on a new contract with the UAW, recently completing the outline of

LIN 2.0 Mux Spec Stirs Controversy

While carmakers on both sides of the Atlantic are committed to advancing a global standard for a low-speed serial data communications network that will help minimize bulky wiring harnesses and reduce costs, hammering out the details of such a standard hasn’t been easy. In September 2003 the LIN (Local Interconnect Network) Consortium released LIN 2.0, which received a warm welcome from German carmakers Mercedes and BMW, but failed to address all the requirements of Ford and General Motors.

The LIN Consortium was founded in 1998 to develop a standard global multiplexing bus inexpensive enough to replace point-to-point wiring, at no additional cost, in doors, headliners, steering wheels, seats and climate control systems. As a result, carmakers would be able to shrink wiring harnesses, add diagnostics capabilities and, most importantly, specify standard interfaces for actuators, sensors, switches and other components. Having plug and play components that would work with any LIN bus, regardless of the supplier, would lead to economies of scale and lower costs for all the OEMs.

When the LIN Consortium was initiated, the primary objective was to come up with a low-cost multiplexing scheme that would complement the Controller Area Network (CAN) protocol. The LIN sub-buses linking vehicle systems would connect to higher speed CAN buses and the rest of the vehicle. That’s one reason why LIN was initially based on the UART (Universal Synchronous Receiver/Transmitter) serial communications hardware used in personal computers. LIN is a 12-volt, single-wire, low-speed multiplexing network.

As of September 2002, when the LIN Consortium held its first international conference to promote the standard to carmakers and suppliers worldwide, LIN had progressed to the point where it seemed that most of the world’s carmakers would probably adopt the standard. (See The Hansen Report, October 2002.) The SA E task force working on J2602, an SA E protocol based on LIN, suggested some revisions to make the standard acceptable to SA E and North American carmakers. Both sides expected to reach an agreement and were confident a single LIN standard would prevail. But when LIN 2.0 was released in September 2003, some changes written into the specification raised concerns for at least one supplier in North America, Motorola, and the J2602 committee, representing the interests of GM and Ford, has taken objection to the revised standard.

LIN 2.0 Not Ready for North America

According to SA E J2602 committee chair Mark Zachos, general manager of the Dearborn Group, Farmington Hills, Michigan, over the last two years there has been good cooperation between his committee and the LIN steering committee. “The work with SA E resulted in a much improved LIN 2.0 specification,” he said. “But LIN 2.0 fell short of the needs of the North American car community. So we’ve had to pick up with J2602 where LIN 2.0 left off. ... The LIN spec still has many things that are undefined, meaning there are different ways to interpret the specification, and that could lead to interoperability problems among ‘standard’ LIN components,” said Mr. Zachos.

Perhaps the biggest problem with LIN 2.0 for GM and Ford relates to the cost to implement each node. “The U.S. side is very interested in low-cost A SIC state machine solutions,” explained Mark Zachos. Embodied as an A SIC, a state machine is simply a fixed circuit designed to do certain functions based on what is

Turn to Huntsville, page 3
2003 Roundup of North American Auto Electronics Suppliers

Autoliv Inc.
2003 Consolidated Sales: $5,301 million
Change from 2002: up 19%. Organic growth contributed 5% of the increase; 11% was due to currency effects (56% of Autoliv’s business is in Europe); acquisitions accounted for 4% of year-to-year growth.
2003 Net Income: $266 million, or 5% of sales. Net income improved by 47% compared with 2002. Reported net income includes $25.7 million in one-time licensing revenue.

Excluding the effects of currency exchange rates, Autoliv’s sales in Europe grew 6%, despite a 2% decline in European vehicle production. Lower vehicle production by Detroit carmakers contributed to a 5% drop in Autoliv’s North American sales in 2003. Increased sales of inflatable airbags fueled 21% organic growth in Japan; sales to Japanese customers totaled $380 million, 7% of total Autoliv sales for the year. According to the company, the penetration rate for side airbags in Japan is about 15%. Autoliv expects unit sales of frontal airbags to be flat in 2004.

Delphi Corp.
2003 Net Sales: $28.1 billion
Change from 2002: up 2.4%
2003 Net Loss: $56 million, compared with a net profit margin of 1.3% in 2002.
2003 Sales by Sector
In January 2003, Delphi reorganized its financial reporting segments into two product groups plus the Automotive Holdings Group for product lines that don’t meet income targets.

Dynamics, Propulsion & Thermal sales grew just 1.6% from the prior year, to $12.7 billion. Electrical, Electronics Safety & Interior did better; Sales for 2003 were $14.4 billion, an increase of 5.8% over 2002.

Automotive Holdings Group sales were $3 billion, compared with $3.5 billion in 2002.

While sales to non-GM customers increased 16% in 2003, to $11 billion, GM remains Delphi’s largest customer, accounting for 61% of Delphi sales; most of that business is with GM North America. Delphi’s content per GM North America vehicle was $2,710 in 2003. A boost to non-GM sales should follow Delphi’s 2003 acquisition of Grundig Car Intermedia System GmbH. Grundig’s audio and infotainment customers are primarily European OEMs.

As part of its latest restructuring efforts, Delphi will cut its hourly U.S. workforce by 5,000 in 2004. In the first quarter, Delphi plans to reach an agreement with the UAW that will allow the company to put in place a two-tier wage and benefit structure, further reducing its U.S. labor costs.

Delphi estimated 2004 sales will be essentially flat, in the range of $28 billion to $28.5 billion, but net income will be in the range of $400 million to $500 million.

Huntsville Electronics
2003 Standard Costs: Roughly $1 billion

Change from 2002: About the same as last year
In February 2004, Siemens VDO purchased Huntsville Electronics. (See page 1.) As a division of DaimlerChrysler, Huntsville reported shipments as standard costs. In The Hansen Report’s Roundup of North American Suppliers published in February 2003, Huntsville plant manager Mike Hall said he planned to cut costs from $1,087 million in 2002 to about $900 million for 2003.

Johnson Controls Automotive Group
2003 Consolidated Net Sales (for fiscal year ending September 30, 2003): $17.1 billion. Automotive Group sales account for 76% of revenue.
Change from 2002: up 14% including favorable currency effects; excluding those effects, sales grew 7%.
2003 Operating Income: $879 million, or 5.1% of sales, compared with $863 million in 2002. In North America, Automotive Group sales grew 3%, despite a 3% decline in North American vehicle production. In Europe, automotive sales were up 6% over the prior year, excluding currency effects and the acquisition of Borg Instruments in July 2003.

JCI attributes its sales growth in 2003 to new business in seating, instrument panels, overhead systems and door and electronics systems. The company is building up its electronics capabilities, first with the purchase of the French instrument maker Sagem SA in 2002, and more recently with the addition of the product line from Borg Instruments, based in Germany. JCI’s HomeLink RF wireless control device is now available in 160 vehicle models worldwide. Other integrated interior electronics products include rear-seat entertainment, Bluetooth hands-free phone/telematics systems, the Raipport docking system and a simple GPS navigation system. Eleven percent of Automotive Group sales are automotive batteries.

For 2004, the company anticipates the Automotive Group’s sales will grow 10% to 14%, assuming at least a slight increase in global vehicle production.

Lear Corp.
2003 Net Sales: $15,746.7 million
Change from 2002: up 9%
2003 Net Income: $380.5 million, or 2.4% of sales, compared with $13.0 million, just 0.1% of sales in 2002.

Lear attributes its 9% sales growth to favorable exchange rates and new business globally, partially offset by lower vehicle production in North America and an unfavorable platform mix in Europe.

Lear expects to grow sales by 3% in 2004 to approximately $16.2 billion, assuming vehicle production volumes of 16 million in North America and 16 million in Europe.

TRW Automotive Inc.
TRW planned to release fourth quarter and 2003 year-end results on February 17, too late to report in this issue. For the nine-month period ending September 2003, pro forma sales were $8.3 billion, up 7% from the same period in 2002. The Blackstone Group acquired TRW Automotive from Northrup Grumman on January 1, 2002.

Blackstone made an initial public offering of TRW stock on February 4, 2004 at an opening price of $27.10 per share. On February 10th the stock was trading slightly lower, at $25.90 per share. As a result of the IPO, Standard and Poor’s upgraded TRW’s corporate rating from BB to BB+, its highest junk bond rating.

Visteon
2003 Consolidated Sales: $17.660 million
Change from 2002: down 4%

Despite growing its non-Ford business in 2003 by $569 million, to $4.2 billion, Visteon still relies heavily on its former parent. Ford and Ford affiliate business contributed 76% of Visteon’s total sales in 2003, compared with 89% the prior year.

In the fourth quarter, Ford took steps to relieve some of Visteon’s financial obligations and improve the supplier’s competitiveness. As part of an agreement announced in December 2003, Ford will take back responsibility for $1.646 million in future retirement benefits due former Ford UAW workers who now work for Visteon. Visteon will pay Ford $150 million to cover further price reductions for Ford’s purchases in 2003. Additionally, Visteon guaranteed annual price reductions on existing parts contracts with Ford covering the next four years. Visteon is in negotiations with the UAW to complete the two-tier wage agreement for workers at Visteon plants.

Looking ahead to 2004, Visteon expects more than 5% growth in revenue, due in part to further growth in sales to non-Ford customers, anticipating non-Ford revenue will exceed $5 billion.

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input. According to Motorola vice president Neil Krohn, who directs engineering and business development for the automotive semiconductor segment from Farmington Hills, Michigan, "Implementing the change from LIN 1.3 to LIN 2.0 costs an additional $0.20 to $0.25 per node." The LIN Consortium expects the number of LIN nodes to grow over the next decade to an average of 20 per vehicle, totaling 1.2 billion LIN nodes per year. Applied globally, a $0.20 cost disadvantage for each LIN 2.0 node would total $240 million annually. “Before the change to LIN 2.0, it was possible to implement something as simple as a door-lock solenoid for as little as $0.20 per node,” said Mr. Krohn.

According to Motorola multiplexing expert and senior field engineer A.J. Pohlmeyer, the cost problem showed up when the LIN Consortium added a mandatory diagnostics and configuration specification to LIN 1.3. “That spec added such a burden in hardware to state-machine nodes as to make them noncompetitive.” Both Mr. Pohlmeyer and Mr. Krohn assert that because Ford and GM are more concerned about costs than European luxury carmakers, the U.S. carmakers want to use state machines at most nodes rather than microcontrollers, which require programming and clocks or crystals. A according to Mr. Pohlmeyer, Motorola has designed and tested state machines that do all the LIN 1.3 protocol transmitting and receiving work and also handle whatever the function is—be it driving an H-bridge for a door lock mechanism or a smart sensor.

In February 2004, the SAE committee will formally send out for balloting its J2602 spec, the U.S. alternative to LIN 2.0. That will soon lead to a recommended practice, which would lead to a standard. If SAE and the LIN committee can’t resolve their differences, it is quite likely that rather than the one global LIN standard that everybody wants, there would be two competing standards.

LIN Consortium Responds

For its part, the LIN steering committee maintains that it has been listening to the SAE committee and has been working with them to address the SAE’s concerns. In a written statement to The Hansen Report, the LIN committee confirmed that “LIN 2.0 is a robust release based on three years of product development and [it] can support multiplex solutions ranging from microcontroller-based devices to ASICs.” The LIN committee points out that only very few of the additional functions introduced in 2.0 are mandatory and stresses that low cost is a very strong requirement of the spec. And, sounding a conciliatory tone, “If feedback from...”

Huntsville...

A two-tier wage agreement that provides for a lower hourly wage for new Huntsville employees. UAW employees typically earn nearly $25 per hour compared with $14 to $20 per hour for non-UAW automotive electronics factory workers.

Huntsville will report to John Sanderson, president and CEO of Siemens VDO Automotive’s North American region. More than anyone at Siemens VDO, John Sanderson is responsible for the deal getting done. “He is the architect, the one in the trenches doing it,” said Siemens VDO spokesman David Ladd. According to John Sanderson, “What made this agreement successful is that Chrysler, Siemens VDO and the UAW were very committed to each other, to finding a solution that would allow Huntsville to be a competitive, viable location that could stand up to any competitor and make it work long term.”

To help make Huntsville more competitive, Siemens VDO plans to introduce economies of scale into the component purchasing process by giving its present suppliers and Huntsville’s current component suppliers the opportunity to bid on the combined business. In order to leverage its engineering investments, Siemens VDO will also work over the long term to engineer “common top-level architectures” for its products so they can easily be modified with minor hardware and software changes to fit a variety of customers and applications.

Siemens VDO intends to serve several carmakers from the Huntsville manufacturing facility. To give Siemens VDO time to make Huntsville more competitive, Chrysler agreed to keep much of its business with Huntsville for “more than a few years,” according to Mr. Sanderson. While the number of factory employees at Huntsville is not likely to grow over the next few years, the new owner intends to bring in a number of its research and development engineers from the States and from Europe who will take on some of the development work that Chrysler was doing. These engineers will help merge Huntsville’s and Siemens’ cultures. Huntsville presently employs about 270 application engineers.

Siemens VDO will hang on to the entire Huntsville product portfolio, which includes audio head units, instrument clusters and powertrain and body electronic control units, products already core to Siemens VDO. Huntsville’s added volume will help pay for Siemens’ existing engineering base, which covers these products. Siemens VDO says it is Europe’s number-two audio head unit supplier. While it is quite interested in the market for combination radio/navigation head units, it is not at all interested in audio systems or speakers.

Over the past 14 years Siemens VDO has been, by far, the world’s fastest-growing automotive electronics supplier, growing from $900 million in its fiscal year ending September 1989 after it purchased Bendix Electronics, to €8.375 billion ($10.6 billion) in its fiscal year ending September 2003, a 19.3% per year growth rate in dollars. Its largest acquisition was VDO AG, in April 2001.◆

Some LIN Node Applications

- Alternator regulators
- Solenoids
- Motors
- Mirror control
- HVAC door blend
- Seat adjustment
- Smart switches to replace relays and fuses
- Sensors
- Rain sensors
- Smart sensors

Continued from page 1

Continued from page 1
Aisin Seiki Background

Aisin Seiki, which began producing auto parts in 1945, mainly serves the Japanese OEM automotive market. When The Hansen Report first profiled Aisin Seiki, in March 1996, Toyota held 21.9% ownership of Aisin and accounted for 65% of Aisin sales. Today Toyota owns 24.6% of Aisin, and Aisin ships 70% of its output to Toyota Motor and Toyota Group companies. Seventy-nine percent of Aisin's sales are made in Japan; 95% of sales are to the automotive industry. Despite its close relationship to Toyota, Aisin manages to sell products to many other carmakers including Suzuki, Mitsubishi Motors, Mazda, Volvo and GM.

The Aisin Group includes Aisin Seiki Co. Ltd. and 106 consolidated companies. Among the largest subsidiaries is Aisin AW, which makes automatic transmissions and navigation units.

Aisin's principles start with "quality first," and focus on value creation through research and development as well as on continuous global growth. Aisin's annual report states that "creating unprecedented technology or product is a manufacturer's mission." Aisin Seiki has consistently spent 5.2% or more of net sales on R&D; in fiscal 2003, R&D investment was 5.7% of sales. The corporate R&D center is focused on electronics, the utilization of light materials and the design of small, lightweight parts.

W hy do customers buy from Aisin rather than Aisin's competitors? Aisin says it's because of the company's many years of experience. Another key strength is a close affiliation with Toyota, arguably the best carmaker in the world. With Toyota its number-one parts customer, Toyota's exemplary vehicle quality performance gives testament to Aisin's parts quality. According to Aisin, its early application of the Total Quality Management method has enabled the company to deliver world-class technology and products. A quality and management tool, TQM seeks cooperation from all employees to reduce waste and achieve continuous improvement in all aspects of the business. Adopters of TQM include Toyota, Ford and Motorola.

Aisin Seiki Consolidated Net Sales and Margins, by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Operating Margin</th>
<th>Net Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 1999</td>
<td>3.1</td>
<td>0.9</td>
</tr>
<tr>
<td>FY 2000</td>
<td>5.1</td>
<td>1.8</td>
</tr>
<tr>
<td>FY 2001</td>
<td>5.7</td>
<td>-0.6</td>
</tr>
<tr>
<td>FY 2002</td>
<td>5.0</td>
<td>2.1</td>
</tr>
<tr>
<td>FY 2003</td>
<td>5.7</td>
<td>3.4</td>
</tr>
<tr>
<td>FY 2004 (Plan)</td>
<td>5.2</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Aisin Seiki Consolidated Net Sales

FY 2003 Sales: ¥1,408 billion ($13.3 billion)

Europe, 6%
North America, 9%
Japan, 79%
Asia and Others, 6%

Aisin Seiki Consolidated Employees

FY 2001 to FY 2003 Annual Growth Rate: 10.1%

FY 2001: 36,300
FY 2002: 40,200
FY 2003: 44,200

Aisin Seiki Background

Aisin Seiki, which began producing auto parts in 1945, mainly serves the Japanese OEM automotive market. When The Hansen Report first profiled Aisin Seiki, in March 1996, Toyota held 21.9% ownership of Aisin and accounted for 65% of Aisin sales. Today Toyota owns 24.6% of Aisin, and Aisin ships 70% of its output to Toyota Motor and Toyota Group companies. Seventy-nine percent of Aisin's sales are made in Japan; 95% of sales are to the automotive industry. Despite its close relationship to Toyota, Aisin manages to sell products to many other carmakers including Suzuki, Mitsubishi Motors, Mazda, Volvo and GM.
Aisin Seiki 2003 Consolidated Automotive Sales by Product Segment

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Information</td>
<td>73,277 (689)</td>
<td>131,892 (1,240)</td>
<td>257,477 (2,421)</td>
<td>596,374 (5,607)</td>
</tr>
<tr>
<td>Engine</td>
<td>1,062.4 (10.0)</td>
<td>1,156.3 (10.9)</td>
<td>1,340.5 (12.5)</td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brake &amp; chassis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drivetrain</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Total Automotive</strong></td>
<td><strong>1,340,530 (12,604)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Distinctions Claimed by Aisin Seiki

- The world's number-one maker of automatic transmissions, after carmakers' in-house production
- World's first company to commercialize a front-wheel drive 6-speed transmission

Promising New Products and Technologies

One component of Aisin’s management strategy, according to its annual report, is “accelerating development and ensuring reliability.” Aisin strongly believes it is important to commercialize and release developed technologies as products as quickly as possible, without sacrificing quality of course, to establish market leadership. One example of putting that belief into practice is Aisin’s work with image processing technology, the area Aisin named as most promising in terms of future sales. Image processing applications include parking assist systems, which help guide the vehicle into tight parking spaces, and lane departure warning systems, which alert the driver when the vehicle wanders out of the travel lane.

Key E/E Products

Among all of the products Aisin sells that have electronics content, the top three in terms of sales are: electronically controlled transmissions, at 4 million units per year; ABS electronics control units (ECUs) at 840,000 pieces per year; and navigation systems at 700,000 units per year. Leading electrical and electronic components include solenoids for electronically controlled transmissions (7 million units per year); ABS sensors (6.9 million units per year); and transmission sensors (6 million units per year). Aisin manufactures about 8.2 million ECUs annually, plus solenoids and sensors, at its Handa electronics plant in Hanka, Aichi. The Handa electronics facility employs about 500 people.

Aisin Consolidated Sales by Top Automotive Customers Ranked by Sales

<table>
<thead>
<tr>
<th></th>
<th>Total FY 2003 Automotive Sales: $1,340,530 million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In $ millions (dollars)</td>
</tr>
<tr>
<td>#1 Toyota Group</td>
<td>985,844 (9,268)</td>
</tr>
<tr>
<td>#2 Suzuki Motors</td>
<td>53,659 (519)</td>
</tr>
<tr>
<td>#3 Mitsubishi Motors</td>
<td>39,716 (373)</td>
</tr>
<tr>
<td>#4 Volvo</td>
<td>28,287 (266)</td>
</tr>
<tr>
<td>#5 Mazda Motor</td>
<td>12,882 (121)</td>
</tr>
<tr>
<td>#6 General Motors</td>
<td>11,847 (111)</td>
</tr>
<tr>
<td>#7 Isuzu</td>
<td>10,353 (97)</td>
</tr>
<tr>
<td>#8 Honda Motor</td>
<td>8,845 (83)</td>
</tr>
<tr>
<td>#9 Volkswagen</td>
<td>5,790 (54)</td>
</tr>
<tr>
<td>#10 Nissan</td>
<td>5,569 (52)</td>
</tr>
<tr>
<td>#11 Renault</td>
<td>5,068 (48)</td>
</tr>
<tr>
<td>Other</td>
<td>172,670 (1,623)</td>
</tr>
</tbody>
</table>
Aisin Seiki

**DRIVETRAIN**
- Electronic control systems for automatic transmissions
- Throttle sensors
- Electronic control units
- Shift position switches
- Oil temperature switches
- Solenoid valves
- Automatic transmissions for medium-duty trucks and buses
- Automatic transmissions for light-duty trucks and recreational vehicles
- Automatic transmissions for passenger cars
- Manual transmissions for passenger cars, medium-duty trucks and buses
- Continuously variable transmissions
- Power-shift transmissions for forklift trucks
- Automated manual transmissions
- Differentials with 2WD-4WD shift actuators for all-terrain vehicles
- Motor shift actuators
- Clutch covers
- Clutch discs
- Flywheels with torsion damper
- Torque converters

**BRAKE & CHASSIS**
- Suspension and Steering Systems
- Power tilt & telescopically adjustable steering column with computer
- Active rear steering systems
- Electronic control units
- Actuators
- Air suspension systems
- Height sensors
- Control valves
- Electronic control units
- Compressors and dryers
- **Brake Systems**
  - Anti-lock braking systems
  - Speed sensors integrated with hub
  - Speed sensors
  - Control modulators
  - Stability control systems
- Electronic control units
- Hydraulic boosters
- Disc brake calipers
- Brake pads
- Disc brake rotors
- Brake assemblies
- Rear drums
- Parking brakes
- Tandem master cylinders with brake assist booster
- Dual proportioning valves
- Load sensing proportional valves

**BODY**
- Door Components
- Outside door handles
- Antenna integrated door handles for smart key system
- Inside door handles
- Power sliding door systems
- Slide door closures
- Power back door systems
- Door frames
- Door checks
- Door hinges
- X-arm type window regulators
- Power door latches
- **Roof, Exterior and Structural Components**
  - Roof moldings
  - Rear spoilers
  - Roof rails
  - Slide panels for sunroofs
  - Microcomputer-controlled sunroofs
- **Seat Components**
  - Power seats
  - Occupant weight sensors
  - Manually operated seats
  - Passenger detection sensors
- **Other**
  - Airbag satellite sensors
  - Seat slide sensors for airbag control systems

**ENGINE**
- Valvetrain and Lubrication
- Oil control valves
- Variable valve timing
- Automatic belt tensioners
- Timing chain case assemblies
- Water pumps
- Oil pumps
- Pistons
- **Aluminum Components**
  - Fuel rails
  - Transmission cases
- Intake and Exhaust Manifolds
  - Turbo chargers
  - Resin type intake manifolds
- Cooling
  - Fan coupling
  - Water pumps
- **Magnesium Components**
  - Magnesium type headcovers

**INFORMATION & OTHER**
- Navigation systems
- Parking assist systems including ECU
- Lane departure warning systems including ECU
- Front and side monitor systems
  including ECU
- Daytime running light computers
- Height sensors for automatic headlight leveling
- GPS antennas

◆ Parking Assist Systems
Aisin Seiki considers its Parking Assist System the most promising E/E product in terms of future sales. A nual production of Parking Assist Systems is already at 600,000 units. The Parking Assist System is designed to help drivers park their vehicles while in reverse by monitoring the rear of the car with a camera mounted just above the license plate. The system reads the steering angles as the driver backs into a space and displays a guide line on the navigation monitor that indicates the path the driver should follow, but the driver must manually steer into the parking space. Some systems include audible guidance.

Today Aisin Seiki’s Parking Assist System is installed in 25 car models including the Mercedes A-class, and models from M-azda and Daihatsu.

◆ Intelligent Parking Assist
Last fall, Toyota introduced Aisin Seiki’s Intelligent Parking Assist System on the second-generation Prius hybrid vehicle. The first of its kind in the world, Aisin's system can actually park the car itself, with minimal involvement from the driver. The driver simply pulls up to a parking space, turns on the system, and the vehicle automatically shifts into reverse and steers itself backwards into the space. The driver maintains control of the vehicle's speed by applying the brakes. Intelligent parking systems automatically steer the vehicle with an electric power steering system, which uses an electric motor to adjust the steering.

So far, about 80% of MY 2004 Prius buyers have opted for the ¥230,000 ($2,164) option package that includes Intelligent Parking Assist and the navigation system. Intelligent parking is still only available on the Prius and only in Japan. While Toyota engineers don’t expect intelligent parking to be as popular as airbags or ABS, the system will soon be applied to gasoline-powered vehicles. “We have high expectations for the system,” a top Toyota engineer told us recently.

◆ Lane Departure Warning
Introduce in May 2002 and currently in production on Toyota Alphard, Cardina and Ipsum models, the Aisin Seiki lane-departure warning system uses one rear-facing camera to keep track of yellow or white lane markings. If the driver wavers from his lane without first signaling his intention to change lanes, the system sounds an alarm. To save costs, the system can share the same rear-facing camera for all vehicles. The Hansen Report on Automotive Electronics, Portsmouth, NH USA www.hansenreport.com
Aisin AW

Aisin Seiki to make automatic transmissions, initially for Toyota Motor Corporation. Today Aisin AW supplies automatic transmissions to 32 carmakers in 16 countries; 30% of automatic transmission sales are to non-Japanese automakers, according to the Japan Credit Rating agency. The company sold a total of 3.75 million automatic transmissions in fiscal 2003 and plans to sell about 4 million in 2004. While penetration rates for automatic transmissions in light vehicles are very high in Japan (95%) and in the States, the market in Europe still has a lot of room for growth. Aisin can offer sophisticated electronically controlled automatic transmissions that will help carmakers meet tougher CO2 standards coming in Europe, and still meet rising consumer demand for AT.

Hybrid Powertrain Systems

Aisin AW develops and manufactures hybrid powertrain systems and traction motors. AW is supplying some component parts to Toyota's second-generation Prius hybrid-electric vehicle. Later in 2004, Aisin AW will start shipping hybrid systems to Ford for a hybrid version of the Ford Escape. Ford will annually purchase 10,000 to 20,000 sets. Toyota licensed its first-generation hybrid technology to Ford.

Navigation

According to Aisin, 40% of newly registered cars in Japan are equipped with a navigation system. In 2003 Aisin AW sold 700,000 navigation systems to carmakers and to aftermarket retailers. While standalone navigation systems are still costly, Aisin expects that navigation unit costs will begin to decline as infrastructure-based telematics systems such as Toyota's G-Book proliferate. Aisin believes telematics navigation will spread “fairly quickly.” Since 1998 Toyota has been using Aisin’s NAVI-MATIC automatic transmission, which selects optimal shift points according to information about how the vehicle is being driven, the condition of the vehicle and information from the navigation system about the vehicle’s location. For example, it can determine whether the vehicle is going down or up a hill, or whether it is approaching a hairpin turn. NAVI-MATIC is installed on the Toyota Crown and Mark II.
Electronic stability control (ESC) will get no boost from NHTSA (National Highway Traffic Safety Administration) anytime soon. Results from the first batch of dynamic rollover tests announced in early February offer few clues about whether or not ESC limits some vehicles' propensity to roll over when a driver tries to make sharp turns at relatively high speeds.

Of the 25 model-year 2004 SUVs recently subjected to NHTSA’s new fishhook maneuver, only three of them come equipped with electronic stability control as a standard feature: two Toyota 4Runner, (one 2-WD, one 4-WD) and the Volvo SC90. The Volvo got 4 stars and the two Toyotas got three stars, but so did all but one of the rated SUVS that were not equipped with stability control. None of the vehicles got five stars, the highest rating. Five-star vehicles carry a 10% rollover risk; 4-star vehicles carry a 10% to 20% risk of a rollover; 3 stars mean a 20% to 30% risk. One vehicle that tipped up on two wheels got 2 stars; 6 of the tested vehicles are still under review.

Despite the fact that many vehicles offer electronic stability control as an option, in the future NHTSA will dynamically test only vehicles that have ESC standard. A safety agency will miss an opportunity to develop information that could guide consumers on the worthiness of the feature. In NHTSA’s defense, not all stability control systems are built alike, which makes it difficult to make claims covering all such systems.

According to NHTSA chief of media relations, Tim Hurd: “We will be able to say that electronic stability control is a worthwhile safety feature when the real world evidence gives us a basis to do so. NHTSA’s administrator [Dr. Jeffrey Runge] has said that ESC is promising technology and we list the availability of ESC in our list of safety technology in our ‘Buying a Safer Car’ brochure.”

Electronic Stability Control Promoted in Japan

Three brake system suppliers, Bosch, Continental Teves and the Toyota affiliate Advics, a division of Aisin Seiki, have jointly produced a brochure promoting the safety benefits of electronic stability control (ESC) systems to Japanese consumers. ESC systems prevent accidents, particularly rollover accidents, and save lives by automatically keeping the vehicle from skidding out of control or off the road. Such systems are very popular in Europe—about 40% of new vehicles there are equipped with ESC—but not so popular in Japan or the States, where many consumers are still unfamiliar with the safety benefits of ESC. One problem stability control promoters face is what to call the feature. The system goes by at least 12 different names, depending on the manufacturer, which makes it difficult to build product recognition.

In promoting the safety features of ESC, the brochure points out that skidding is a factor in 65.5% of accidents where vehicles leave the road, not including accidents caused by inattention. According to the data, inappropriate steering and misjudgment of the road are the primary causes of skidding.

Perhaps the most compelling evidence of the effectiveness of electronic stability control comes from Toyota, which analyzed accidents involving three Toyota models, some with stability control and some without. Vehicles with stability control were 35% less likely to be involved in single-vehicle accidents and 30% less likely to be involved in frontal accidents. In Japan some insurance companies give car owners a 5% discount for vehicles with stability control and an additional 5% if the vehicle has ABS.

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