We're on your design team

Since 1995, Motorola has had a worldwide team of engineers focused on the occupant safety market. We understand the unique problems faced by safety-system designers, and we stand ready to help you meet your goals.

As increased functional requirements of automotive occupant safety systems continue to be mandated, the need for more advanced control systems is also increasing. Now, more than ever, it is important to team up with the leader in automotive semiconductor solutions. Occupant safety systems will quickly move toward occupant sensing, inter-vehicle communications, and even collision avoidance; and Motorola will continue to stay one step ahead, by developing the enabling technologies for the safety systems of the future.

Discover the future on-line

To learn more about occupant safety solutions using DigitalDNA™ from Motorola, visit the Motorola Transportation Systems Group at www.mot-sps.com/automotive; or call 1-800-441-2447 to speak with a Motorola representative.

Digital DNA™ from Motorola

OCCUPANT SAFETY SOLUTIONS

BR1775/D, Rev. 3

- Highly integrated 8- and 16-bit microcontrollers
- High performance 32-bit M•CORE™ microcontrollers
- Cost-effective micromachined sensors for advanced crash detection and occupant restraint systems
- Custom SMARTMOS™ technology for mixed-signal solutions
- Setting the standard for advanced airbag technology – introducing the Distributed Systems Interface

Digital DNA™ from Motorola

Occupant safety systems have been credited for saving thousands of lives, and today the airbags in millions of vehicles rely on Motorola components. Today's state-of-the-art, single-point sensing architectures are built from highly integrated components, loaded with software, and packaged into ever smaller form factors to meet the requirements of automobile manufacturers around the world.

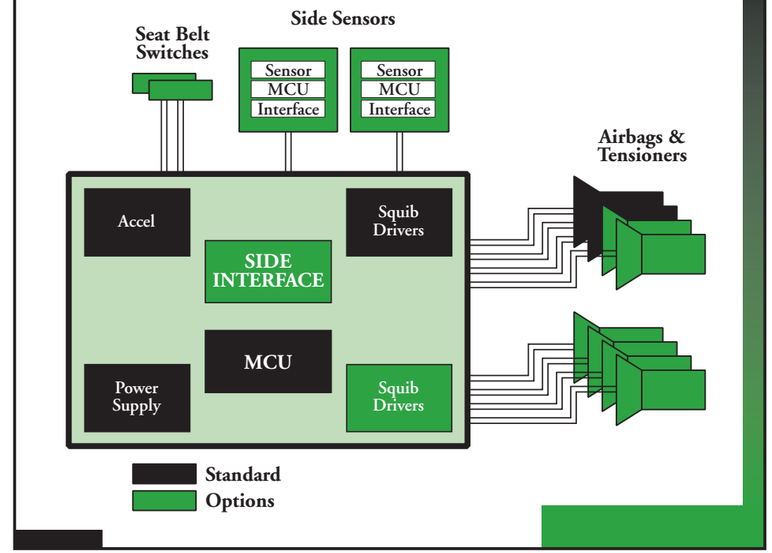
As the #1 supplier of semiconductors to the automotive industry, Motorola delivers proven silicon solutions for single-point sensing applications that feature:

- highly integrated 8- and 16-bit microcontrollers
- high performance 32-bit M•CORE™ microcontrollers
- cost effective micromachined sensors for advanced crash detection and occupant restraint systems
- custom SMARTMOS™ technology for mixed-signal solutions

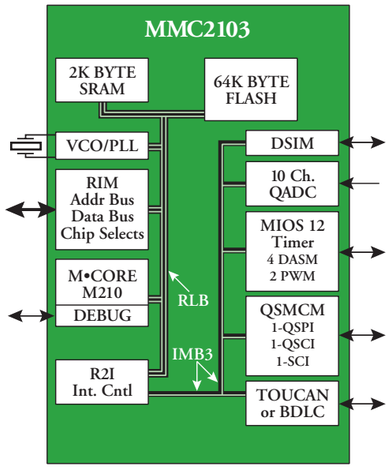
Embedded Controllers: A Motorola legacy

Motorola's 8- and 16-bit microcontroller solutions form the backbone of millions of occupant safety systems on the road today. The 8-bit 68HC05, 68HC08, 68HC11 and 16-bit 68HC12 product families provide the industry's broadest range of performance and features, allowing you to choose a part that is ideally suited to your needs. Compact, high performance CPUs are combined with the peripheral modules that today's automotive applications demand: industry-standard serial modules; A/D converters; and multiple types of memory, from mask ROM to byte-erasable and Flash EEPROM.

SINGLE POINT SENSING ARCHITECTURE



And to meet the requirements of advanced airbag systems, Motorola is introducing a new family of M•CORE processors optimized for occupant safety needs. The 32-bit RISC-based, low power, high performance processor architecture is combined with automotive-specific peripherals including integrated Flash memory, queued A/D converters, serial modules, communication protocols (J1850 and CAN) and a complete lineup of hardware and software development tools. The first device in the occupant safety product family is the Flash-based MMC2103 which includes an onboard Distributed Systems Interface module.



Automotive sensors from Motorola

The ability to accurately and consistently sense the characteristics of the automotive environment is essential to the effectiveness of any automotive safety system. Determining the difference between hitting a pothole and a "crash" event requires rugged, accurate sensing systems that are strategically distributed throughout the vehicle. Since 1994, Motorola's Sensor Products Division has produced more than 90 million silicon, micromachined accelerometers and pressure sensors that are expressly designed for the automotive environment.

Motorola's accelerometers use surface micromachining (MEMS) technology for a capacitive "sensing" structure. Each device is coupled with a control ASIC and packaged in industry-standard plastic packaging. Motorola offers both x-lateral and z-axis sensing for unparalleled applications versatility and system flexibility.

Automotive-grade pressure sensors, found in applications such as side crash systems and seat belt pretensioners, are also micromachined devices which contain integrated on-chip circuitry.

Together, Motorola's accelerometers and pressure sensors have proven to be rugged, reliable, and cost efficient devices. You'll find them designed into automotive occupant safety platforms around the world.

SMARTMOS™ mixed-signal solutions

The problems of interfacing high precision components with the harsh automotive environment is why many designers rely on Motorola's SMARTMOS™ technology. Ideally suited for rugged automotive applications, SMARTMOS™ solutions offer a cost-effective blend of analog, digital, and robust power silicon that enables integrated, mixed-signal, power control ICs. Motorola's SMARTMOS™ technology brings a wide range of benefits to today's occupant safety designs.

- Component Reductions: Greatly reduced board space via access to multiple technologies on one IC
- Power Flexibility: Integrate high-side, low-side, or "H" outputs
- Durability: TMOS power drivers for superb safe operating area (SOA)
- Efficiency: High speed serial I/O to MCU
- Precision: Control of output currents and thermal overload conditions, plus advanced load diagnostic capability
- High Performance Analog: Precision and reduced operating current
- Robustness: High voltage capability of power, analog, and CMOS exceeds automotive requirements

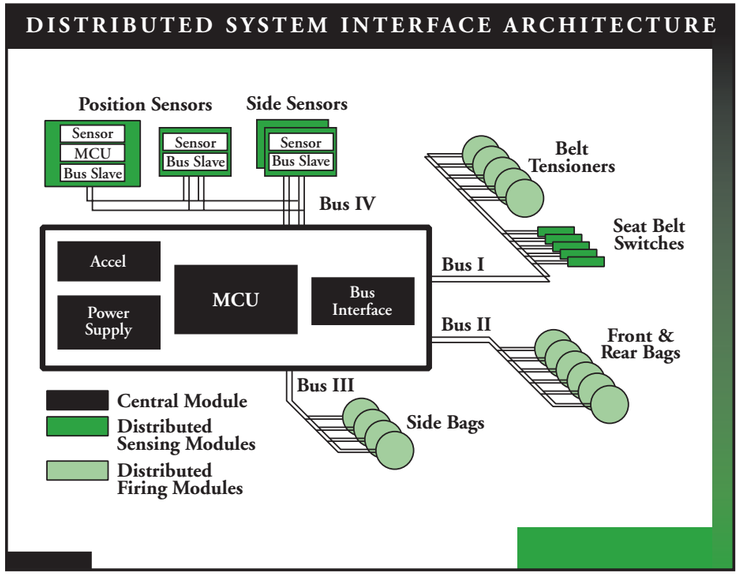
SMARTMOS™ solutions implement traditional analog functions with smaller die sizes; and a modular process produces components with the minimum number of process steps for each circuit, minimizing overhead. The large library of circuit functions available includes the following.

- Power: Multi-output power switches with advanced load diagnostics
- Analog: Traditional analog amplifiers, precision references, regulators, multiplex transceivers, etc.
- Digital: Sub-micron, CMOS-based power controllers for discrete MOSFETs and switching supplies; industry-standard serial interfaces such as SPI and SCI and the new DSI; synthesized logic and embedded controllers; and small amounts of non-volatile memory for ID, trim, and other needs.

SMARTMOS™ squib drivers, power supplies, communications interfaces, and other devices for occupant safety systems are in vehicles around the globe. To address your particular application needs, Motorola has experienced SMARTMOS™ design teams in place around the world, including Phoenix, AZ; Detroit, MI; Toulouse, France; Sao Paulo, Brazil; and Sendai, Japan.

Always thinking ahead: Your future with Motorola

As more airbags and sensors are added to vehicles, distributed system architectures are being developed to handle more complex I/O requirements. These systems minimize module size and wiring in highly complex systems and increase essential intelligence in remote sensing locations. Motorola silicon solutions are integral in creating standard components for distributed architectures that meet the need for enhanced passenger safety while delivering unprecedented flexibility to vehicle manufacturers.



One of these distributed system architectures, the Distributed Systems Interface (DSI), resulted from a cooperative development effort between TRW's Advanced Safety Products group and Motorola's automotive silicon systems experts. Together, we crafted the first such system that integrates both remote sensors and actuators under the same protocol, providing maximum flexibility for safety-systems designers. To encourage the rapid proliferation and adoption of the system as a standard, TRW and Motorola are offering the key technologies required to implement the system to third-party adopters without royalty or licensing fees.

Several devices to implement the first DSI system are available in sample quantities today, with other devices on the way. Contact your local Motorola representative for the latest availability and device details.