



# FlexRay™ Communication System

## Next-generation, in-vehicle networking solution

### Description

Over the last years the FlexRay™ Consortium—an industry consortium of more than 120 companies—has developed the FlexRay Communications System that provides a time-deterministic communications protocol with a data rate of 10 Mbps for advanced control applications in vehicles.

Aimed at meeting the demands of high-end control applications, the FlexRay communications protocol provides high bandwidth (10 Mbps) and determinism to enable distributed control. FlexRay can also drive cost reductions by reducing the number of parallel CAN networks that have emerged recently to solve bandwidth bottlenecks. The high bandwidth also allows FlexRay to be used as a vehicle-wide network backbone. The redundancy offered by the dual channel architecture addresses requirements of safety-related applications.

### Key Benefits

FlexRay provides customer benefits in many different areas, including:

- Increased network throughput
- Highly deterministic response times
- Dual-channel redundancy
- System-wide synchronized time base

#### Results:

- Enhanced control intelligence
- Simplified vehicle network architecture
- Increased writability of networked subsystems
- Enabling electromechanical replacement of hydraulic components (X-by-wire)

The combination of all these benefits enables next-generation vehicle designs that are safer, more environmentally sensitive, more intelligent, more reliable and offer an improved driving experience.

## Freescal Implementation of FlexRay

In 2004, Freescale introduced the MFR4100, the industry's first stand-alone FlexRay controller that was superseded by the MFR4200 and more recently by the MFR4310. This FlexRay controller can be paired with existing 16- or 32-bit MCUs to enable communication over a FlexRay network.

In addition, Freescale now offers 16- and 32-bit MCU's with integrated FlexRay controllers. A key challenge in FlexRay applications is processing the large amount of data circulating on the FlexRay network. Freescale has made use of the innovative S12X to overcome this issue. At the 16-bit level, the S12XF family provides the

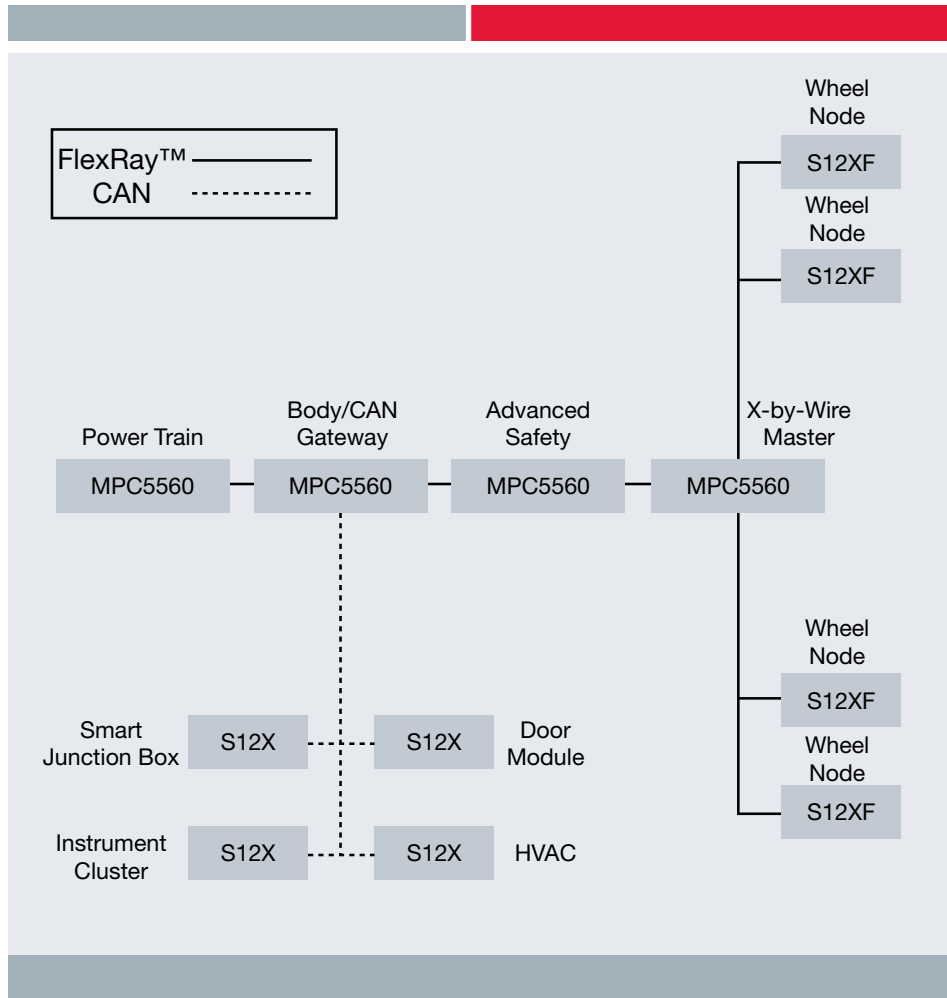
XGATE coprocessor to offload processing from the main CPU. At the 32-bit level, the MPC5500 family of processors built on Power Architecture™ technology connects the FlexRay controller directly to the internal crossbar switch for efficient data transfers within the device.

Freescale Semiconductor provides FlexRay-enabled devices to help car manufacturers network in-car systems to make smarter, integrated, active vehicle control systems a reality.

Freescale has made it a priority to proliferate this network protocol. The combined offering of integrated and stand-alone products gives Freescale customers many options in implementing FlexRay. Continued investment

in FlexRay demonstrates Freescale's commitment to providing next-generation automotive solutions that extend beyond standard MCUs.

Freescal FlexRay Controller Family	Target Applications
MFR4310	Paired with External MCU
S12XF	16-bit Wheel/ Corner Nodes
MPC5510	32-bit Body, Chassis Control
MPC5560	32-bit Engine Control, Safety or Chassis Control



### Resources

- Freescale Home page: [www.freescale.com](http://www.freescale.com)
- Freescale FlexRay Web page: [www.freescale.com/FlexRay](http://www.freescale.com/FlexRay)
- For software drivers, please contact your local Freescale Semiconductor sales representative

### Learn More:

For current information about Freescale products and documentation, please visit [www.freescale.com](http://www.freescale.com).

