ALWAYS THINKING AHEAD

Motorola is currently developing new products to provide high-performance solutions for Passive Entry and TPMS.

A future generation of highly integrated multi-band transceivers is under development for bi-directional RF communications in automotive and home applications. With this new generation of products, Motorola will provide optimal solutions for future applications in areas such as passive entry and two-way RKE.

DISCOVER THE FUTURE ON-LINE

To learn more about access and remote control system solutions using Digital DNA from Motorola, visit the Transportation and Standard Products Systems Group at http://e-www.motorola.com.

A BROAD PORTFOLIO OF ACCESS AND REMOTE CONTROL COMPONENTS

PART NUMBER	DESCRIPTION	KEY FEATURES
RF Products		
MC33493	UHF Transmitter	315/434/868MHz OOK/FSK
MC33591	UHF Receiver	315/434MHz OOK/FSK, 500kHz IF
MC33592	UHF Receiver	315/434MHz OOK, 300kHz IF
MC33593	UHF Receiver	868MHz OOK/FSK, 500kHz IF
MC33594	UHF Receiver	Same as MC33591, extended T°
Microcontrollers		
68HC908RK2	MCU (FLASH)	Low voltage (1.8V)
Integrated Device		
68HC908RF2	MCU (FLASH)	Low voltage
	+UHF Transmitter	315/434/868MHz OOK/FSK
Immobilizer Device		
MC33690	Tag Reader	125kHz ASK
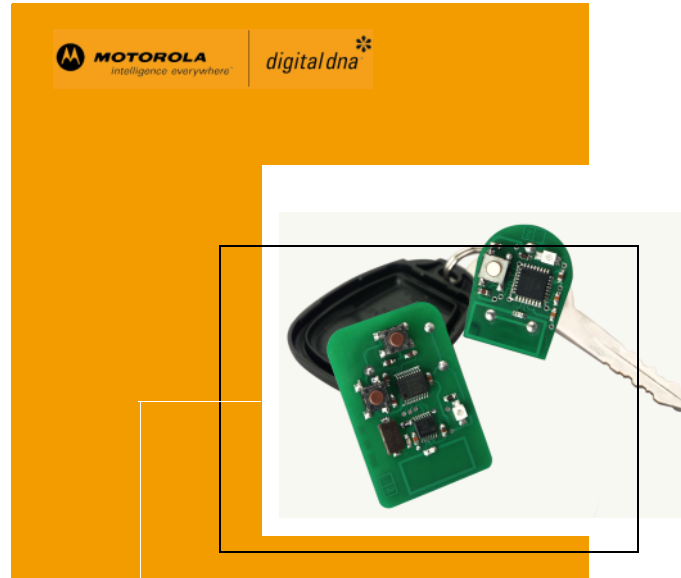
Access and Remote Control Systems

MOTOROLA

Motorola's system-level approach to vehicle access and remote control is the key to new levels of driver convenience and security. Motorola solutions bring together all of the components needed for automotive access and remote control applications with optimal system partitioning. Our unique product portfolio includes industry-leading microcontrollers, analog and RF products, sensors (TPMS) and application-enabling software. The result? Fully integrated hardware and software resources, for faster development cycles in application areas like the following.

REMOTE KEYLESS ENTRY (RKE) SYSTEMS

RKE systems that make it possible to unlock doors and release trunk latches remotely, using a keyfob or other similar device, are among the most popular vehicle access applications today. Most RKE systems also combine anti-theft alarms and panic buttons, features that enhance the system by adding the benefit of security. Motorola was one of the early pioneers in RKE system development and is now the first to offer an integrated low-voltage microcontroller with embedded RF for developers of RKE applications.

VEHICLE IMMOBILIZATION SYSTEMS

More and more automotive manufactures worldwide are incorporating anti-theft vehicle immobilization technology into their designs, with the goal of increasing security and decreasing theft. In fact, European automakers have been mandated to include immobilization systems in all new vehicles because European insurance companies now require mobilization systems as a condition of acquiring insurance. This trend, which began in Germany, is now the de facto standard for the entire automotive industry

Motorola's vehicle access control solutions, which include the microcontrollers, tag readers, transmitters, and receivers to combine RKE and vehicle immobilization into one system, offer a quick design-in solution to meet this growing market.

PASSIVE ENTRY SYSTEMS

In a passive entry system, no specific user action – such as inserting a key in a lock – is necessary to achieve secure vehicle entry. Motorola is paving the way for new applications in hands-free passive entry by developing complete system-level solutions with optimized hardware and software partitioning.

TIRE PRESSURE MONITORING SYSTEM (TPMS)

Advanced RF and sensor products from Motorola are the central components in a system solution that enables a driver to monitor the pressure and temperature remotely, using the same type of device that enables RKE and vehicle immobilization. Drivers are able to quickly determine if they have a low or flat tire without having to risk life and limb on a busy highway. The system monitors the tire pressure based on information from the MPXY8020 pressure sensor located within the wheel wells and transferred via a radio frequency link; the Motorola chip set allows the same receiver to be shared between the RKE and TPMS systems, thereby reducing the total system cost.

MEETING YOUR SECURITY NEEDS

At the core of Motorola's RKE and vehicle immobilization designs is a security algorithm, based on advanced cryptographic techniques, that has been optimized for our microcontrollers and is fully compliant with the most stringent vehicle security specifications, as certified by John Gordon Concept Labs. The re-synchronization algorithm is also compliant with RAM-based and EE-PROM-based systems.

Motorola's vehicle entry and immobilization solutions meet the following key security requirements:
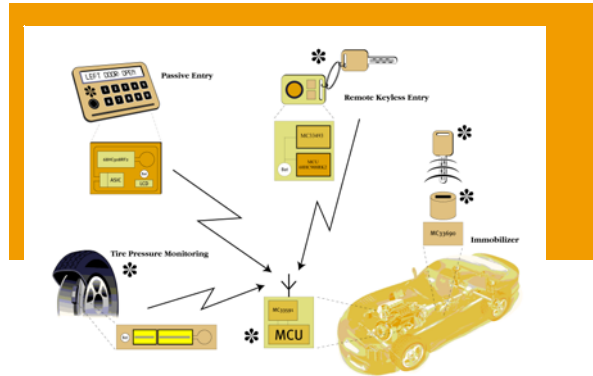
- **Time-based scanning:**
  Key and algorithm designed to withstand 32-day continuous scan at 5 messages per second.
- **Anti-playback provisions:**
  MAC-based security code (key not transmitted) and lockout on previously used synchronization codes.
- **Attack by cryptoanalysis:**
  No known method of inverting encryption without possession of key.
- **Synchronization:**
  Windows length target = 256; secure auto and manual re-synchronization.

COMPLETE SYSTEM SOLUTIONS

Motorola/s Digital DNA system solutions for access and remote control applications enable a comprehensive approach to RKE, passive entry, vehicle immobilization, and tire pressure monitoring, with all the microcontrollers, RF products, and software you need. This integrated approach also provides you with a migration path that will accommodate your future plans without having to completely rework your original designs.

ADDRESSING REGIONAL DIFFERENCES

As the #1 automotive semiconductor manufacturer, Motorola understands the importance of regional standards differences and the challenges they can bring. Our broad portfolio offers the flexibility to meet the needs of engineers designing access and remote control applications worldwide, and specifically, our chip sets and system solutions can handle both the frequency band and modulation differences between the U.S., Europe, and Asia/Pacific, as outlined.

REGION	FREQUENCY BAND	MODULATION
U.S.	315 MHz	Mostly OOK*
Europe	434 MHz	Mostly OOK; FSK** for high-end applications
Asia/Pacific	315 MHz	OOK; FSK in Japan

* On Off Keying
** Frequency Shift Keying

THE CURRENT LINE-UP

Motorola's access and remote control portfolio encompasses analog and RF products, microcontrollers, sensors, and even software. The 68HC908RK2 is the inaugural member of our new generation of low-voltage microcontrollers with full functionality at 1.8V. Development tools and samples are currently available.

The family of UHF receivers from Motorola, the MC3359x, provides an optimized system solution when used with our UHF transmitter MC33493.

The second member of the family, the MC68HC908RF2, is the industry-first microcontroller (MCU) with embedded RF functions. This ground-breaking device is now available in production volume.

The MC33593 targets a new frequency band, 868MHz, where new applications will soon appear.

NON-AUTOMOTIVE APPLICATIONS

With the development of RF short range data transmission links, powerful chip sets are now available. While these products were developed for use in automotive access and remote control applications, they are versatile enough to also be used in industrial and consumer applications, such as remote control door and window opening, alarm systems, and home networking.

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