Vehicle Security

While vehicles play an important role in our daily lives, vehicular systems are increasingly expected to be safer and provide the same level of personalized assistance and ease of use that motor vehicle drivers and passengers demand from their smartphones and tablets. Because of the tangible benefits offered through advanced automotive electronics, manufacturers are rapidly providing development solutions that hide design complexity. These ready-made solutions are delivering on the promise of enhanced safety, cost and performance available through more advanced ADAS, motor control, engine management, in-vehicle interfaces and extra-vehicle communications.

Solution

Driving a new wave of smart vehicles

Seamlessly synced within the operating system of your vehicle, Avnet Telematics Box Application will interest many enterprises with its ability to manage vehicle-tracking capabilities.

Innovation is the key to automotive security

Advancements in automotive technologies continue to make driving safer, simpler and easier. Passive Keyless Entry and Start, in particular, is an innovation now enjoyed by many drivers of modern vehicles.

Products - Vehicle Security

As vehicles are what we rely on much in our daily life, safety is one important part of it. Together with industry leading companies, Avnet provides you the most popular options here to support your Vehicle security.

- **Infineon**: AURIX™ 32-bit microcontroller family
- **Molex**: Automotive Bulb Sockets
- **NXP**: Secure Gateway Processor - SPC5746CSK1MKU6
- **NXP - Qualcomm**: NFC based 2 wheeler security system
- **ON Semiconductor**: ASX340CS: VGA 1/4” CMOS Image Sensor System-on-Chip
- **Texas Instruments**: Automotive, Base Station IC: TRF4140-Q1
- **VISHAY**: Low Profile 1500W TVS TPC11CA thru 36CA
Smart technology has expanded to encompass all aspects of everyday human interactions. From smart devices in homes to offices, schools and now, increasingly, even in our vehicles. Everything can now be interconnected and made easily accessible through the controls in your hand, or specifically, your smartphone.

Avnet is heralding a new wave of smart devices with the Avnet Telematics Box Application. Seamlessly synced within the operating system of your vehicle, this innovative feature will interest many enterprises with its ability to manage vehicle-tracking capabilities. In addition, personal vehicle owners would also be highly interested in how this application pushes vehicle security to the next level. With state-of-the-art anti-theft systems and surveillance support to embed external automotive cameras, the Telematics Box Application sets the stage for a smart automotive gateway system that syncs and collects smart data on vehicles.

Features

- LTE / Wi-Fi / BT / GPS support
- Satellite cover: GLONASS, GPS, Galileo, QZSS, BeiDou
- Wi-Fi / BT support for smartphone communication
- Embedded battery designed for emergency rescue when main battery is out of order

System

- MCU: ST
- GPS: ST
- Sensor: ST
- Power management: TI
- NiMH Battery: GP
- Wi-Fi: Murata

Target Applications

- Telematics Box (Automotive black box)
- Anti-theft system
- GPS tracking system

▲ TOP

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Solution

Innovation is the key to automotive security

Avnet's latest venture into automotive security resulted in a key groundbreaking innovation—the Passive Keyless Entry (PKE) system for homes and vehicles. The PKE system combines a Key Tag and Base station board with an LCD display made compatible with most PCs. It even includes software for running the system.

When in operation, this state-of-the-art system transmits data between the Base station and the Key Tag—the Base sends a 125kHz carrier frequency while the Key Tag responds with UHF (434MHz).

Strategic immobilization functions embedded into the PKE system also allows for password support and crypto mode for added security. This feature is especially crucial in managing access controls in homes and vehicles.

Features

• Single-Chip Security Transponder and Keyless Entry solution with on-chip multi-channel UHF Transmitter
• 16 Bit RISC Architecture (MRK III)
• 3D LF Interface uses RSSI (receive signal strength indicator) over wide dynamic range for key localization within 5 meters
• LCD and GUI support

Systems

• KEY Fob: NCF29A1
• MCU: SKEAZ128MLH4
• Power IC: UJA1169TX
• RF Receiver: NCK2912
• LF Driver: NJJ29C0

Target Applications

• Vehicle control system access
• Home control system access

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Infineon’s AURIX™ 32-bit microcontroller family, with its embedded Hardware Security Module (HSM), is a perfect fit for automotive applications, where specific security functionalities are required. Typical examples of such applications are tuning protection, immobilizer, secure on-board communication etc. Infineon not only offers a scalable portfolio of compatible AURIX devices, with integrated HSM, but also the necessary SW packages as well as support services. This provides our customers with everything they need to fulfill the security requirements of their applications.

Features

• TriCore Multicore Architecture
• New Timer Architecture (GTM)
• ISO26262 ASIL-D concept
• Programmable Security Hardware

Application

• Powertrain: Designed for engine management, transmission and hybrid
• Safety Applications: Optimized for Active Safety and Driver Assistance

Product Benefits

• Secure Platform
• Security Standard Compliance
• Backward Compatibility
• Security Differentiation
• Convergence of security and safety
• Secure Process
• Secure Failure Analysis

Downloads

Technical Documentation:
To get access to AURIX™ documentation, please register under myInfineon.com (only company address allowed, no private mail.) Then, send login name to: AURIX@infineon.com.
Molex's wide selection of innovative bulb socket solutions provide world-class safety for vehicles.

Features:
- Molex's unparalleled selection of innovative bulb socket solutions matches the needs of vehicle makers around the world for safety, performance, variety, and robust features.

Applications:
- Front indicator
- Brake light
- Reversing light
- Rear fog light
- Rear indicator
- Tail light
- Side indicator
- Parking/marker light

Learn More
Secure Gateway Processor - SPC5746CSK1MKU6

Ultra-Reliable MCUs for Automotive & Industrial Control and Gateway Application

Secure auto communications

Block Diagram

Learn More

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The 2 wheeler NFC security demo consists of the MCU board mounted with relay, LEDs for indication & a regulator and is connected through RS-232 cable to a reader board (powered by MCU board) consisting of NFC reader and NFC Antenna coil. Due to the use of RS232 driver on both the boards the distance between the Reader board and the MCU board can easily go up to 2 meters. The reader board is placed near to the Ignition key switch and NFC tag will be one of the items tagging along with the vehicle key in the Key chain. When the user inserts the ignition key in the vehicle and turns on the ignition, the board gets powered. The NFC tag being part of the Ignition Key Keychain, gets authenticated by reader and relay is energized which in turn routes the battery power to the other parts of the vehicle. In the absence of or in-appropriate /un-paired tag the authentication fails and the relay is not energized and the vehicle doesn’t start.

Features

• Checks for Valid NFC tag at Power on (waits for 5 Sec).
• Ok indication via green LED and fail indication via Red Led.
• Both relays On after Successful NFC tag validation. This is Normal Mode (with no jumper J1)
• For re-validation Power-On necessary.
• Can store Ids of 2 NFC cards.
• Learn mode enabled with Jumper J1 populated and valid for 5 sec after Power On.
• Ok indication via green LED and fail indication via Red Led.
• No relay operation in Learn mode.
• Id learning is saved as per LIFO pattern and only 2 Ids are in programmed in the internal EeProm of MCU.

Application:

• 2-wheeler security system
• Application which needs NFC authentication system

Product Benefits

• Low cost technology as it is widely being used in hundreds of commercial applications.
• High level of security as is well proven in the use in banking applications.
• Easy secure management of tag/key loss through Mobile channel.

Solution uses a low-cost Kinetis MCU from NXP

Learn More

KEA16
MFRC522
G5QRL
TLF8051
The TRF4140 low-frequency (LF) transceiver base station device is intended for immobilizer and PEPS systems to communicate with LF transponders, remote keyless entry, and passive entry devices and also to support wireless charging. The antenna driver stage consists of several MOSFET antenna drivers to send modulated LF transmissions and a receiver for detection and demodulation of LF transponder responses. The responses can be from either a half-duplex (HDX) transponder or a full-duplex (FDX) transponder.

The HDX communication scheme uses frequency shift keying (FSK) as the uplink modulation. The FDX communication scheme uses amplitude shift keying (ASK) as the uplink modulation, also known as load modulation or backscatter modulation. The device can drive LF antennas to provide a wake-up and data sequence (PEPS), and it can also receive transponder responses on any or all channels (immobilizer).

The TRF4140 device lets the user implement an intelligent system, suitable for wireless power charging (WPC). The WPC system can periodically check the surrounding environment for available devices to be powered while minimizing idle power, monitor all communications from the mobile device being wirelessly powered, and control the output power that is applied to the transmitter coil according to information received from the powered device. The system can manage fault conditions associated with power transfer and can control status signals by using current measurement and LED-capable I/Os to indicate operating modes. The TRF4140 device needs VDD supply (5 V) for its control blocks and to feed the integrated logic voltage regulator. The antenna driver is supplied separately by VDDH (4 V to 20 V). This voltage can be used to generate a sine-wave output signal for superior EMC performance, which is important for remote antenna applications with several meters of antenna cable.

The TRF4140 device manages all timings required for a communication sequence without the need for an accurate host controller interaction. In conjunction with transmit and receive FIFOs, the host controller is off-loaded from all timing-critical events, which enables easy host controller process scheduling. In particular, the host controller start-up process for an automotive body control module is tremendously relaxed by this base station device. The TRF4140 device supports sequence preloading and sequence execution on external events to start the immobilization process exactly when the key fob is detected. So, delays due to configuration can be avoided in inconvenient time frames.

**Features**

- Integrated Boost Controller for Wide Supply Voltage Range With Jump Start and Load Dump Protection
- Antenna Driver With up to 20-V Peak-to-Peak Output Voltage Amplitude and up to 1-A Peak Antenna Current With Sine-Wave or Square-Wave Output
- Flexible Host Control Interface
  - 3-Wire SPI
  - 4-Wire SPI
  - Configurable I/O Functions to Extend Controller Interface Such as an Interrupt Request Signal
  - Interface Voltage Supply Range From 2.5 V to 5.5 V
- Ultra-Low Current Consumption in Sleep State
- Fractional Synthesizer With 10-kHz to 500 kHz Frequency Range With 60-Hz Step Size
- PSK and ASK Transmitter Stage
- FSK and ASK Receiver and Demodulator
- Four Programmable Half-Bridge MOSFET Antenna Drivers
- Pairs of Half-Bridge Antenna Drivers can be Used Together as a Full-Bridge Driver to Double the Possible Output Voltage Amplitude
- Antenna Current Measurement With 5-Bit Resolution for High Side and Low Side of Antenna Driver Stages
- Programmable Antenna Driver Output Voltage in Sine-Wave Mode
- Supply-Controlled Antenna Driver Voltage in Square-Wave Mode
- Output Stage is Overload Protected for Overcurrent and Overtemperature Conditions
- Antenna Driver Diagnostics: Short to Ground, Short to Antenna Driver Supply Voltage, and Open Load Detection
- Supports On-Off Keying With Data Rates up to 70 kbps for Downlink and Uplink

**Application**

- Car Access
- Immobilizers
- Passive Entry, Passive Start (PEPS)
- Wireless Power Charging (Qi, WPC, PMA)
Low Profile 1500W TVS TPC11CA thru 36CA

Bi-directional in SMPC package

Industrial 1st generation 1500W High Power Density Bi-Directional TVS in Low Profile SMPC package

Features

- Junction passivation optimized PAR® design
- TJ = 185 °C capability suitable for high reliability and automotive requirement
- Very low profile - typical height of 1.1 mm
- Excellent clamping capability
- Low leakage current
- Very fast response time
- AEC-Q101 qualified available

Application:
Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for automotive, consumer, computer, industrial, and telecommunication.

Product Benefits

- TJ = 185 °C capability suitable for high reliability and automotive requirement
- Very low profile
- Excellent clamping capability
- Low leakage current
- Very fast response time

Specifications

- VWM: 10.5 V to 37.8 V
- VBR (Bi-directional): 11 V to 36 V
- PPPM: 1500 W

Downloads

Data Sheets

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