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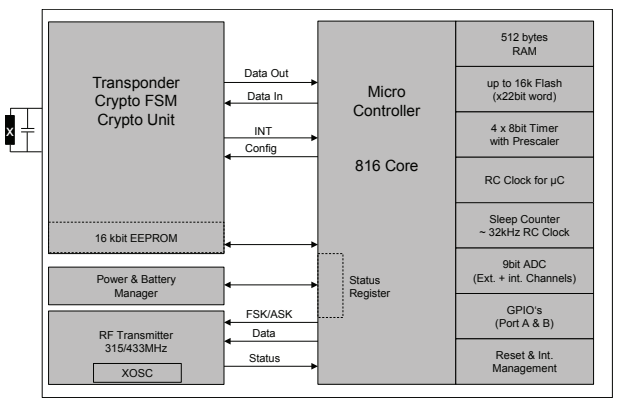
TAGMICRO-Tx

Ultra Low Power 8-bit Microcontroller and RF Transmitter

The TAGMICRO-Tx is designed for battery operated immobilizer and remote keyless entry applications. The transponder part is protocol and instruction-set compatible with the existing SMARTRAC stand-alone transponder and works even without a battery. Additional commands for microcontroller communication are also implemented. A powerful UHF- transmitter circuit is built in enabling a single chip application.

The mircocontroller offers brownout, power-check & glitch detection functions to ensure reliable operation at under voltage conditions. Each of the 16 I/Os are freely programmable. A trimmed RC oscillator of up to 10MHz frequency allows stable operation without need for external resonator. Featuring an 8-bit RISC architecture specially designed for very low power consumption, TAGMICRO-Tx executes up to 5 MIPS without compromising battery-lifetime. The battery management feature allows batteries to be recharged by a 125 kHz magnetic field.



Overview

Size / Package
Small package MLF32
5 x 5 mm

LF Frequency Band
125 kHz

UHF Frequency Bands
315/434/868/915 MHz

Operating Temperature
-40°C to +85°C

Tools & Service

- Easy to use DoC functions, full peripheral integration, C-Compiler
- Windows-based software programs with engineering support

Applications

- Car immobilizers
- Remote keyless entry (RKE)
- Passive keyless entry (PKE)
- Keyless Go (PKG)

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Key Features - Microcontroller	
Wide supply voltage range 1.8 V – 3.6 V	
True low current	▸ 500 µA typ. active mode ▸ 200 nA typ. power-down mode
Memory size	▸ 4k x 22 bit Flash ▸ 16k Bit EEPROM ▸ 256 bytes RAM
Up to 5 MIPS @ 10MHz	
"Run by field" capability	
8-level Supply Voltage Level Detection (SVLD)	
Adjustable battery charging circuit	
16 fully configurable I/Os (8x IRQ, pull-up/down, open drain)	
Timer Capture / Output Compare / PWM	
4 high currents outputs (e.g. for LED driving)	
Dual Mode RC oscillator (1 MHz or 10 MHz)	
Built-in 32kHz XTAL oscillator	
8-bit CoolRISC architecture 16 registers 200 ns instruction cycle time 2 clocks per instruction	
POR, BO-Reset, Watchdog & OSC Fail detection	
Internal and external interrupt	
Frequency generator	
8/16-bit Timer	
9-bit, 2+2 channel A/D converter	
Analog Watchdog	

UHF Transmitter	
Fast wake-up from standby mode	
Programmable output power, 32 steps (–60dBm to 10 dBm)	
Programmable output load capacitance	
Quartz XTAL fine-tuning feature	▸ temperature compensation ▸ improved oscillator stability
Single device concept for all frequencies ASK & FSK	
Up to 100 kBps data rate (ASK Manchester)	
Manchester/Biphase/NRZ/Miller data encoder	
Transponder & EEPROM	
125 kHz Crypto Transponder functionality (battery-less)	
Multiple on-chip crypto-algorithms (AES, TagCoder family)	
Challenge-Response Mode and Rolling Code Mode	
3 different Secret Keys (96/128 bit each)	▸ Secret-Key 1 and 2 for Challenge/Response Mode, AES Mutual Mode & Rolling Code Mode ▸ Secret-Key 3 for Memory Protection
32 bit unique Device Identification number	
~15 kbit of free User Memory (UM)	
Lock-Bits to inhibit programming	
Power Check for EEPROM write operation	
Transmission rate 4 kBaud	
Parallel interface for EEPROM & crypto access via microcontroller	

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