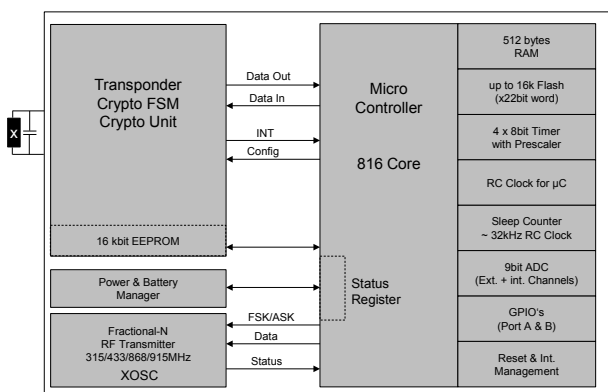


TAGMICRO-TxFN

Ultra Low Power 8-bit Microcontroller and Fractional-N RF Transmitter

The TagMicro-TxFN is designed for immobilizer and battery operated remote keyless entry (RKE) applications. The transponder part is protocol and instruction-set compatible with the existing Smartrac products and works even without a battery. Additional commands for microcontroller communication are also implemented. A powerful fractional-N based UHF-transmitter circuit is built in enabling a single chip application.

The microcontroller 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-TxFN 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 × 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 Start/Go (PKG)

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Key Features – Microcontroller	
Wide supply voltage range 1.8 V – 3.6 V	
True low current	<ul style="list-style-type: none"> ▶ 500 µA typ. active mode ▶ 200 nA typ. power-down mode
Memory size	<ul style="list-style-type: none"> ▶ 4k/8k 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 (8× 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)	
8-bit CoolRISC architecture	
16 registers	
200 ns instruction cycle time	
2 clocks per instruction	
POR, BO-Reset, OSC Fail detection	
Internal and external interrupt	
Frequency generator	
8/16-bit Timer	
9-bit, 2+3 channel A/D converter	
40 Bit Sleep Counter (>1 year)	
Analog and digital watchdog	

UHF Transmitter
Fractional N based architecture
Programmable output power, 32 steps (~ -60dBm to +13dBm)
Programmable output load capacitance
Quartz XTAL fine-tuning feature <ul style="list-style-type: none"> ▶ 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 <ul style="list-style-type: none"> ▶ 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
Mileage counter (increment only)

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