

The ProxiPen is a battery powered datacollection system which reads 125kHz RFID TAGs and stores the information together with the actual time in an EEPROM.

It consists of following circuit blocks:

1. DC/DC Converter:

It utilizes a step up switched mode supply regulator with external switch and rectifier running on a frequency of approximately 100kHz. It delivers 5V in the „ON“-State and 3V on the „OFF“ State.

2. Powermanagement:

The Powermanagement controls the supply voltage which is generated by the DCDC Converter controls the supply voltages of the circuit blocks.

The microcontroller, the proximity transceiver and the serial EEPROM are only supplied in “ON” state, all other parts are supplied all the time.

It is switched into “ON”-state when the TAG-Detector recognizes a TAG, or the AM-Demodulator receives a serial Datainformation (from the DTU) or if the Alarm of the RTC occurs.

It is switched into “OFF” State by the microcontroller.

3. Microcontroller:

ProxiPen uses a 80C51 single chip flash microcontroller which runs with a 8 MHz ceramic resonator and is powered with 5V.

It decodes the Data received from the Proximity Transiver or AM- Demodulator and uses the serial EEPROM to store the Time/Date and Data.

It uses the Proximity transiver to read the RFID Tags and to send a serial Datastream to the DTU.

The reception of the serial Datastream is done by the AM-Demodulator.

4. AM-Demodulator:

Compares the amplitude of the voltage on the aerial with a fixed level to decode the AM-modulated 125kHz Signal transmitted from the DTU.

5. Proximity Transceiver:

The Proximity Transiver is clocked with the Microcontroller-clock and divides it down to 125kHz.

When a tag is read the proximity transiver sources a 125 kHz square wave over a serial capacitor on the aerial, which acts with its parallel capacitors as parallel resonant circuit with a centre frequency of 125kHz.

The Amplitude of the aerial voltage is modulated by the RFID-Tag which is exposed to the 125kHz field.

The Proximity transceiver has an demodulation circuit, which detect the very small changes of the amplitude and forms it to a TTL-signal. This TTL-signal is decoded by the microcontroller.

In the case of serial Data transmission the 125kHz square wave output is modulated with the serial datastream of the microcontroller.

6. TAG Detector:

The TAG detector is turned on 8 times /sec for 500 us.

It consists of a oscillator which runs on the resonant frequency of the aerial-resonant circuit (typ. 125kHz).

It measures the amplitude of the oscillation and turns the powermanagement ON if the amplitude of the actual oscillation is lower than the previous.

7. RTC

The RTC is a single chip real time clock which runs with an integrated 32kHz crystal.

8. EEPROM

Is used to store the data.

