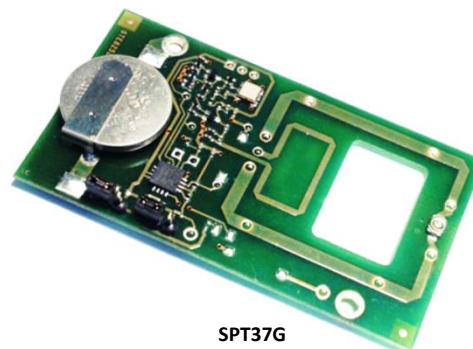


"microSP" Wireless Beacon/Tag

SPT37G 433,92 MHz

A wireless "microSP" Technology
"IoT" Transmitter



SPT37G

1. Description

The SPT37x module is an active RFID transmitters, Beacon or Tag, based on the STE proprietary and patented "microSP" Technology. The pulse position modulation (PPM) data transmission allows to realize compact modules powered by a small battery able to transmit an "ID" code (plus optional alarms or data commands) continuously for up to 20 years. The RF pulse stream generation as well as the Op-Mode of the module (D2 "SW") is programmed into a Texas MSP430 microcontroller optimized for "ultralow" consumption. The transmitter module employs a compact "Loop" magnetic antenna to obtain the max feasible RF "e.r.p." (effective radiated power) despite the very small antenna dimension.

RF performance data

Tx frequency	433,92 MHz
RF peak power	20 mW
ERP (peak)	2mW
ERP power density (10 kHz)	<-13dBm
Emission BW	>500kHz
Pulse width	2 μ s

General

Supply voltage	nom. = 3 VDC (min.2,4V – max.3,6V)
Current	1,8 – 4 μ A (depending upon the Tx time - Table 1)
Operating temperature	-40 +85°C
PCB dimensions	60X34 mm

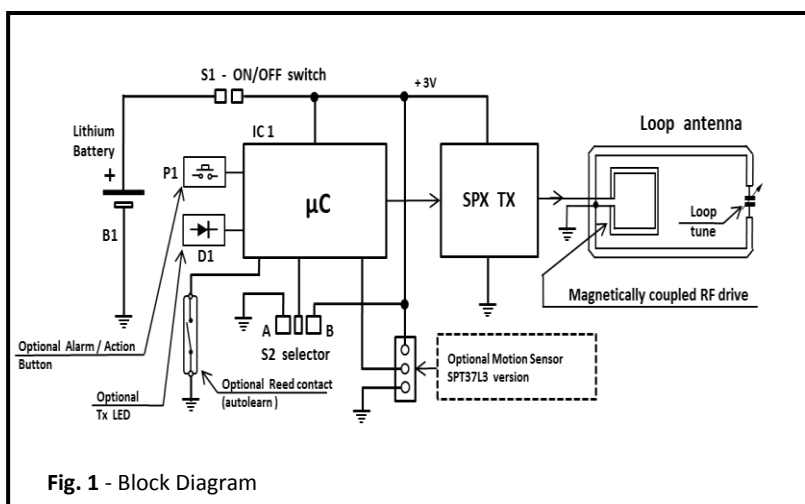


Fig. 1 - Block Diagram

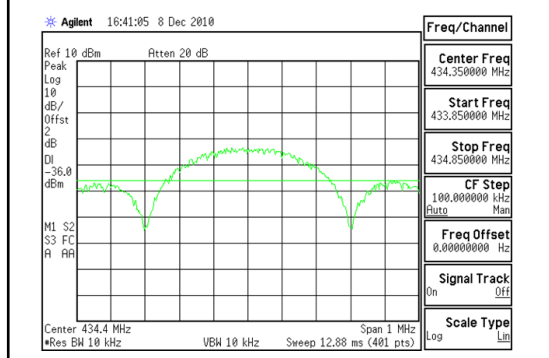
Table 1 - Tx repetition rate , absorbed current and relative life expectancy (CR1632 , 137 mA/h battery) .

S2 selector	Tx time	Current	Exp. Life
S2 = A (1)	2 s	4 μ A	3,5 years
S2 = open	4 s	2,2 μ A	6 years
S2 = B	6 s	1,8 μ A	7 years (2)

Note 1 : Transmission mode with "S2" selector in "A" position is mainly and exclusively intended for test and system set-up purpose. Limitations are posed by the normatives on the band occupancy . Also important and relevant anti-collision criteria must be accurately considered.

Note 2 : 15 years with a CR2032 (235 mA/h) Lithium battery .

Fig. 2 – The RF emission spectrum



The SPT37xx TX module is part of the "SPnet" wireless remote "ultra low power" sensors, alarm and RF Beacon data communication network. Primary goal is to implement a "Cloud" of compact, cheap and battery operated data/alarm transmitters capable of operate continuously for more than 10/20 years.

Transmission protocol and data frame structure (48 bit String format)

The 48 bit data message is pulse modulated in a 3,5 ms transmission time. The message starts with the emission of two "Preamble" pulses followed by a 2 bit "Header", a 4 bit Device/Manufacturer "Code" and a 22 bit unique "ID". Two bit (four voltage levels) are used for the battery "charge" status while other two bit are reserved for the optional digital "Alarm" or "Command" inputs.

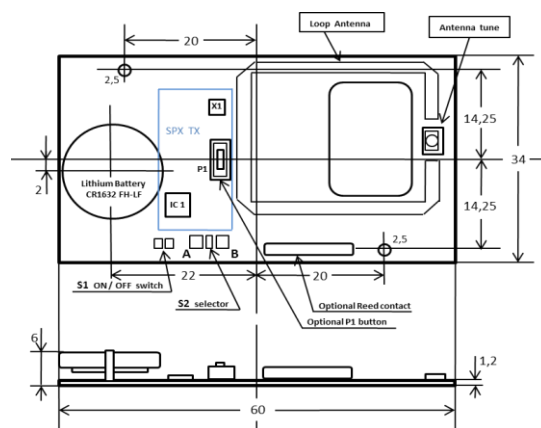


Fig.3 — SPT37G Mechanical dimensions

• The "SPnet" ultra low power wireless communication protocol

The **SPT37** module is part of the "SPnet" wireless remote "Ultra-low power" Tag, Sensors, Alarm and RF Beacon data communication network. The "SP.net" is an RF Spread Spectrum "PPM" modulated data transmission protocol optimized to decode and manage data collected from a "cloud" of remote "micro.SP" technology transmitters. Primary goal is a wireless network of compact, cheap, ultra-low current consumption transmitter modules powered by a small button lithium battery or energy harvester and capable to operate continuously and autonomously for 10/20 years

The receiver module SPR27S3-D2

The SPR27S3 module, "D2" software programmed, receives and decodes the 48 bit string and, after check-sum control, transmits the string from the UART serial port (38400,n,8,1) in two formats :

- A) - an "Hex" string as shown below (SPR27S3 Receiver S1 selector in "A" position – pin n°16 "high")
- B) - a "Clear" format (ASCII characters, SPR27S3 Receiver S1 selector in "B" position - pin n°16 "Low")

SPT37 Active RFID - HEX Format string - (SPR27S3 Receiver S1 selector in "A" position)

"STX"	II	H	M	CCCCC	D	AAA	B	NNN	SSS	"ETX"
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"STX" = 0x02
 II = Message Type(01) - 8 bit
 H = Header (0) - 2 bit
 M = Device "ID" (1) - 4 bit
 CCCCC = Unique "ID" code - 22 bit
 D = Digital inputs - 2 bit
 B = Battery level - 2 bit
 NNN = RSSI Noise - 10 bit
 SSS = RSSI Frame - 10 bit
 "ETX" = 0x03

Batt. Level	
0	= ≤ 2 V
1	= ≤ 2,5 V
2	= ≤ 2,9 V
3	= ≥ 3 V

Clear Format ("ASCII" characters)

S1 Selector in ."B" position

Hyperterminal or Teraterm Terminal Emulator

Header = 0
 Device ID = 1
 ID Code = 123400
 Digital In = 1
 Battery ≥= 3,0V
 RSSI Noise mV = 103
 RSSI Frame mV = 1384