

## 1.0 433 MHz Pendant

The 433 MHz radio solution will use a SiLabs Si4010 transmitter.

The transmitter is a fully integrated crystal-less CMOS SoC RF transmitter with an embedded CIP-51 8051 MCU. The device can operate without requiring an external crystal reference source reducing board area and BOM cost. The device includes an 8 kB non-volatile memory block for programming the user's application along with a 12 kB ROM of embedded support code for use in the user's application.

The Si4010 is designed for low power battery applications with standby currents of less than 10 nA to optimize battery life and features automatic wake on button press support to efficiently move from the standby to active mode state with minimal customer code support. Built-in AES-128 hardware encryption along with a 128-bit EEPROM can be used to create robust data encryption of the transmitted packets. A unique 4-byte serial number is programmed into each device ensuring non-overlapping device identifiers. The RF transmitter features a high efficiency PA and includes an automatic antenna tuning algorithm. This algorithm adjusts the antenna tuning at the start of each packet transmission for optimal output power minimizing the impact of antenna impedance changes due to the remote being held in a user's hand. The device supports OOK modulations and includes automatic output power shaping to reduce spectral spreading and ease regulatory compliance. The output frequency will be fixed at 433.92 MHz.

The Pendant has an on-board loop antenna that will transmit the RF signal. The Pendant will be powered by a lithium coin cell battery. The targeted Pendant size is 40mm diameter maximum and 10mm thick but the size will be adjusted to fit the antenna and battery.

## 2.0 Packets

1. Data Rate = 9.6 Kbps, 104.17  $\mu$ S per bit
2. Modulation = OOK
3. Packet Size = 18 bytes, 8 bits per byte
4. Max Packet on time = 14.99 mS per 100 mS
5. Packet is repeated 8 times at 100 mS intervals
6. Will not repeat until button is pushed again
7. Packet size and duration is the same for 13 hr heartbeat