

## SENTRY II MODES OF OPERATION

### RECEIVER/CONTROLLER:

The receiver has four PWM soft start motor driver output channels. Drivers control start, stop, direction and have over current detection. Motor drivers can be controlled by three separate input methods or modes.

- User Interface Push Buttons on case assembly.
- High Priority Interface (HPI) Input. (Alarm Inputs)
- Remote RF control link using Keeloq (Rolling Code) security decoding at 433.92 Mhz. Using a Radiotronics Inc. receiver P/N RCR-433-HP.

### REMOTE /TRANSMITTER:

Transmitter is a Radiotronics Inc. P/N RCT-433-AS, at 433.92 Mhz. using (OOK Modulation) user activated.

- Battery operated 3 – AAA Alkaline cells regulated to 3.0 VDC.
- Transmitter using Keeloq (Rolling Code) for encoding and security.
- Transmitter antenna is an etched copper trace on the PCB.
- Remote can encode up to nine window / skylight receiver units.

### PCB POWER/GROUND PLANES:

Receiver/Controller has separate ground and power layers and two signal layers and the Remote /Transmitter PCB has a separate ground layer, power and signal are on a common layer.

- **Designed for Short-Range Remote Control Applications**
- **Works with OOK/ASK Receivers**
- **>600 foot operating range when used with RCR-433-HP receiver**
- **4800 Baud Data Rate**

The RCT-433-AS is ideal for remote control applications where low-cost and longer range are required. The transmitter operates from a 1.5-12V supply, making it ideal for battery powered applications.

The transmitter employs a SAW-stabilized oscillator, ensuring accurate frequency control for best range performance. Output power and harmonic emissions are easy to control, making FCC and ETSI compliance easy.

The manufacturing-friendly SMT style package and low-cost make the RCT-433-AS suitable for high volume applications.

**Suface Mount  
433.92 MHz  
SAW-Stabilized  
OOK Transmitter**



### APPLICATIONS

- *Remote Keyless Entry (RKE)*
- *Remote Lighting Controls*
- *On-Site Paging*
- *Asset Tracking*
- *Wireless Alarm and Security Systems*
- *Long Range RFID*

### KEY FEATURES

- *Low-Cost*
- *1.5-12V operation*
- *5mA current consumption at 3V*
- *0dBm output power at 3V*
- *Small size: .25" x .4"*
- *4800 baud operation*

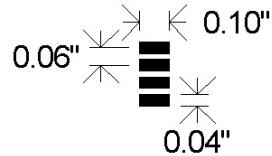
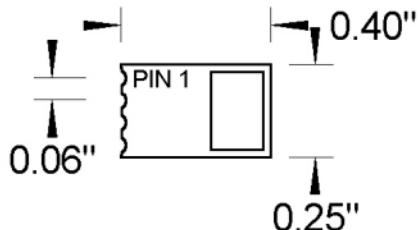


Figure 1. Mechanical Drawing

Figure 2. Suggested Pad Layout

## Absolute Maximum Ratings

Rating	Value	Units
Power Supply and All Input Pins	-0.3 to +15	VDC
Storage Temperature	-50 to +100	°C
Soldering Temperature (10 sec) <sup>1</sup>	350	°C

## Electrical Characteristics

Characteristic	Symbol	Min	Typ	Max	Units	Notes
Operating Voltage	$V_{cc}$	1.5	3.0	12	VDC	none
Operating Current - DATA=VCC	$I_{cc}$	---	4.5	---	mA	@ 3V
Operating Current - DATA=GND	$I_{cc}$	---	1.5	---	uA	@ 3V
Frequency Accuracy	$TOL_{fc}$	-75	0	+75	kHz	@ 3V
Center Frequency	$F_c$	--	433.92	---	MHz	none
Output Power	none	---	0	---	dBm	@ 3V
Baud Rate - NRZ	none	DC	---	4800	BPS	none
Operating Temperature Range	$T_{op}$	-20	---	+70	°C	TBD

**Notes:** 1). Hand solder only. The transmitter is not suitable for reflow soldering.

## Pin Description

Pin	Name	Description
1	ANT	50 ohm antenna output. The antenna port impedance affects output power and harmonic emissions. An L-C low-pass filter may be needed to sufficiently filter harmonic emissions.
2	GND	Transmitter ground. Connect to ground plane.
3	DATA	Digital data input. This input is CMOS compatible and should be driven with CMOS level inputs.
4	VCC	Pins 4 provides operating voltage for the transmitter. VCC should be bypassed with a .01uF ceramic capacitor and filtered with a 4.7uF tantalum capacitor. Noise on the power supply will degrade transmitter noise performance.

## Theory of Operation

### OOK Modulation

OOK modulation is a binary form of amplitude modulation. When a logical 0 is being sent, the carrier is fully suppressed. When a logical 1 is being sent, the carrier is fully on.

OOK is the modulation method of choice for remote control applications where power consumption and cost are the primary factors.

Because OOK transmitters draw no power when they transmit a 0, they exhibit significantly better power consumption than FSK transmitters.

OOK data rate is limited by the start-up time of the oscillator. High-Q oscillators which have very stable center frequencies take longer to start-up than low-Q oscillators. The start-up time of the oscillator determines the maximum data rate that the transmitter can send.

### SAW stabilized

The transmitter is basically a negative resistance LC oscillator whose center frequency is tightly controlled by a SAW resonator.

SAW (Surface Acoustic Wave) resonators are fundamental frequency devices that resonate at frequencies much higher than crystals.

### Data Rate

The oscillator start-up time is on the order of 40uSec, which limits the maximum data rate to 4.8 kbit/sec.

### Power Supply

The RCT-433-AS is designed to operate from a 1.5-12V power supply. It is crucial that this power supply be very quiet. The power supply should be bypassed using a 0.01uF low-ESR ceramic capacitor and a 4.7uF tantalum capacitor. These capacitors should be placed as close to the power pins as possible.

### Antenna Output

Pin 1 is a 50 ohm antenna output. It will support most antenna types, including printed antennas integrated directly onto the PCB.

The performance of the different antennas varies. Please refer to the applications note "Antennas 101" for more information on antennas. This applications note also includes information on microstrip transmission lines. Any time a trace is longer than 1/8th the wavelength of the frequency it is carrying, it should be a 50 ohm microstrip.

Regardless of the antenna type chosen, the VSWR at the antenna port should be <2:1. Ideally, the impedance at the antenna port would be 50 ohms resistive.

The impedance at the antenna port affects the VSWR, power output, and harmonic output of the transmitter.

In some cases, the output of the transmitter may need a low-pass LC filter to reduce harmonic emissions. Check with our technical support department for more information.

## Radiotronix, Inc.

**1141 SE Grand Suite 118  
Oklahoma City OK 73129**

**405-604-3093**