

# **CTT**

## **ACT Coded Temperature Transmitters**



***SONOTRONICS***

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Updated 11/12/2008

## Introduction

CTT temperature sensing tags operate under the control of a small microcomputer which communicates with a smart temperature sensor. In turn, the interval between successive pings of these tags is varied directly proportional to the ambient temperature. This technique greatly simplifies conversion from pulse interval (PI) back to temperature, eliminating the need to produce complex polynomial conversion charts.

Note this manual is specifically designed to cover the temperature aspect of CTT transmitters. Please see the “Understanding ACT Coded Transmitters” document for more general information on working with Sonotronics transmitters.

## Operation

Pulse interval is the time between pings in any Sonotronics transmitter. This value is displayed on the LCD display on manual tracking receivers, is recorded/exported on automated receivers. CTT transmitters generate a standard ACT code (see “Understanding ACT coding” document), followed by eleven pings containing the telemetry information. The telemetry information is encoded via changing the pulse interval in linear fashion according to the following formula:

$$T_c = 45 - \left( \frac{PI - 550}{6} \right)$$

for example, a transmitter at 25.0 degrees Celsius would produce a pulse interval of 670ms, and at 22.0 degrees would produce an interval of 688ms. This would mean that during its eleven telemetry pings, there would be a time between pings of 670ms and 688ms respectively.

Standard transmitters have an accuracy of +/-2° C, and a resolution of .5° C. Greater accuracies than the factory calibration can be obtained by calibrating the transmitter in fixed temperature solutions, and adjusting the equation above.

## Field Measurements

There are several techniques for collecting and processing the temperature data from CTT transmitters.

1. USR08 and USR-96 (firmware version 4.0 and greater) will decode and display the temperature in degrees Celsius by selecting “Tc” as RxMODE while in setup.
2. SUR decoding: The temperature data can be post processed using the “Data Processing Center” included with the SURsoft software package.
3. “Quick Count” technique. Due to the 11 ping sequence during which the telemetry is transmitted, the temperature can be quickly calculated even when Pulse Intervals are out of range. (You can hear transmitters farther away on the audio output than their pulse intervals can be registered on the receivers). This is done by timing how long it takes to go through the eleven pings on a watch or stop watch. Simply start counting on the first ping, and stop on the eleventh ping. Divide the result in milliseconds by 10, and this is the pulse interval. It can then be quickly processed through the formula on the previous page.
4. Decoding from receiver display: Pulse intervals are displayed on the LCD displays of all modern Sonotronics receivers. This number can simply be processed using the formula on the previous page.

***NOTES:***