Operational Description Kiln Data Transmitter

Circuit functions:

The Kiln Data Transmitter determines physical properties present in dry kilns for wood. Several models are available of the device. They differ in the type and configuration of external sensors that are connected to it via short cables.

Sensors:

#1. Wood or other natural materials:
The device measures the electrical resistance between two electrodes connected to wood or other natural materials.

#2. Thermistor:
The device measures the electrical resistance of a thermistor. This sensor can either be installed internally or connected externally to the device.

Available models:

a. Sensors #1 and #2 (sensor #2 connected externally): Model MCT&WT-TX
b. Sensors #1 and #2 (sensor #2 installed internally): Model MCT-TX
c. Sensor #2 only (connected externally): Model WT-TX

Description of circuitry:

The device is powered by one Lithium metal battery. The microcontroller monitors the voltage level of the battery.
Normally the microcontroller is in “Sleep”-mode (oscillator off) and doesn’t do anything.
An internal wake-up feature of the microcontroller activates the device in constant time intervals.
Approximately every 40sec the microcontroller controls the measuring circuitry and interprets the measuring signals to determine new readings.
Approximately every 20sec the microcontroller configures the transmitter circuitry for 916.5MHz and on-off keyed modulation (OOK) mode and sends the digital values serially to the transmitter circuitry at 2400Bd (6 bytes total).
Every byte consists of 14 bits: Start and Stop bit, 8 data bits and 4 balance bits. Individually for every byte, the balance bits are determined by the microcontroller to achieve a duty cycle of 50%.
In the worst case, when all data bits of all bytes are high, the duty cycle of the transmitter chip operated in OOK will be less than 67%.
Operating frequency of the transmitter chip is 916.5MHz at a typical peak output power of 0.54mW.
A permanently attached ¼-wave length stub is used as antenna.