VERSA WIRELESS
MICRA-D

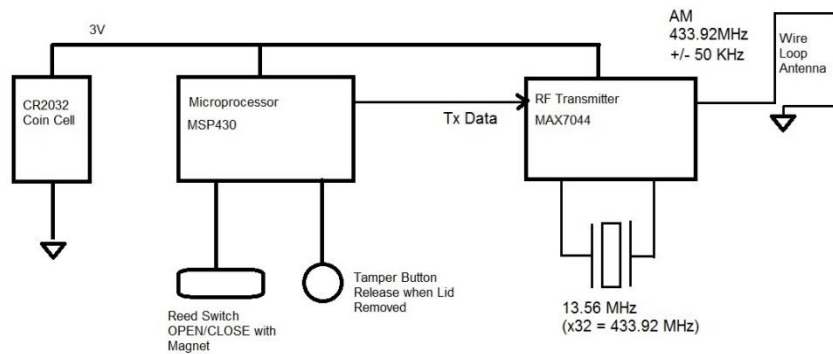**Block Diagram**

Versa-D Block Diagram
Sensor with RF Transmitter

Versa Wireless

Operational Description:

1. Overview

The device is a security sensor for windows. When the window is opened, a magnet is separated from the reed switch on the sensor, which triggers a change of state on the sensor's microprocessor. The microprocessor then powers up the RF transmitter (Pulse Width Modulated OOK) and sends a series of 4 identical packets that flag the change of state to a receiver. The 4 packets are sent with a random delay between them of 100 mS to 800 mS.

When there is no change of state occurring, the device goes into a very low-power mode, and wakes up 4x a second to check and see if there is a change of state on the reed switch. The sensor times out every 72 minutes and transmits a "heartbeat" message to allow the receiver to know it is still operational. Further, a battery level indicator (ok, or low) is sent with every message packet allowing a service technician to change the battery when it gets low.

2. Battery Section

The battery is a Lithium Coin cell (CR2032) size, and is replaceable in the package (clips are J2 & J3). The device operates in three modes, Idle, Monitor, and Transmit. The majority of the time the device is in the "Idle" state, and this is the major contributor to battery life, which is expected to be greater than 7 years typical. C23 provides filtering on the input voltage

3. Microprocessor Section

The microprocessor is a TI MSP430G2231 (U1) with onboard Flash and RAM. U1 has a startup delay provided by R1 & C1. The microprocessor samples the Reed Switch (S2) and Tamper Switch (S3) 4x per second and in the event of a change of state will transmit its packets to report this change.

When a change of state is detected, or a "heartbeat timeout" occurs, the microprocessor modulates the Tx data line (U1-p7) which powers up and modulates the output of the Max7044 (U2) transmitter.

4. RF Transmitter

The RF transmitter is a single frequency OOK transmitter, and R2, R9, C11, C12, C20, C21, & C22 provide filtering to the RF transmitter chip U2 (Max7044).

U1 uses a fixed Phase Locked Loop on chip to generate the transmit frequency from a crystal reference (Y1) by x32. C6 & C18 are 0ohm pass through resistors, and C4 is used with the crystal Y1 to set the fixed transmit frequency. L2, C3, L1, C9, C15, C17, C13 & C19 are used to match to the Loop Antenna. R11, R13 & C2 are not populated.

Modulation Type is Amplitude Shift Keyed – On/Off keyed   (ASK-OOK)

The carrier is modulated directly by the data coming from the microprocessor. The protocol uses a form of return-to-zero coding in which the carrier is turned on for the second half of a one-bit, and not turned on at all for a zero bit.

Peak frequency deviation is not applicable to ASK

The transmission rate is 2 Kbits/sec.

The rated output power into the antenna is 13dBm or 20milliWatts.

Note:
There is provision for the same pcb to be used for a different product (not included in this FCC submission), and that is why there are some additional parts shown on the schematic, and noted by Do Not Populate in boxes.