

8. Circuit Description

A microcontroller operates in a cyclic powerup/powerdown mode. About once per second it wakes up, operates a magnetometer to determine the ambient field, and goes back to sleep. If the ambient field changes, for instance because a car drives by close to the sensor, the microcontroller sends a signal. A 24-bit on-off keyed PPM message is sent at intervals of about 110 milliseconds. The total “keyed-on” time of the message is less than 10 milliseconds, so the duty factor is less than 10 percent.

The transmitter is a 314.5 MHz radiating Pierce oscillator, whose frequency is stabilized by the presence of a surface-acoustic-wave (SAW) resonator in the feedback loop. The transmitter is keyed by applying forward bias to the emitter-base junction.