

Theory of Operation

The interface with the meter comprises a magnet mounted on a shaft extended from the meter and two reed switches mounted on the board of the unit. This battery operated device is maintained most of the time on stand-by and wakes up to accept and count pulses from the meter interface.

Once every pre-programmed number of hours the device wakes up and generates air message containing information on the meter reading. The air message is a burst DS SPSP transmission in one of number of pre-defined channels.

These messages are collected by network of base stations that covers the area of service.

The base station decodes the upcoming messages and sends them via a backbone connection to a central computer, the Data Operation Center (DOC).

Signal Description

Operation frequency band - 904.6 MHz (channel 5) to 925.4 MHz (channel 57).

Channel spacing - 0.4 MHz.

Modulation technique - BPSK, Direct Sequence Spread Spectrum.

Chip rate - 1 Mchip/Sec.

Spreading sequence - 255 Maximal Length sequence.

Raw data rate –3921 Bit/Sec.

Preamble length –300 bits.

Raw data length –320 bits.

Error correction code –Convolution code, $R=1/2$, $K=5$.

Interleaver depth –20 bits.

Message duration –158mSec.

Signal Generation

The transmitter is a direct conversation burst transmitter. The transmitter comprises synthesized local oscillator, that works with 15 MHz crystal reference and generates carrier in the 902 - 928 MHz band with channel spacing of

0.4 MHz, printed modulator that receives carrier signal from the synthesized local oscillator and base-band signal from the signal spreading module and generates direct sequence spread spectrum signal, and power amplifier module that amplifies and feeds a printed antenna with 29dBm signal.