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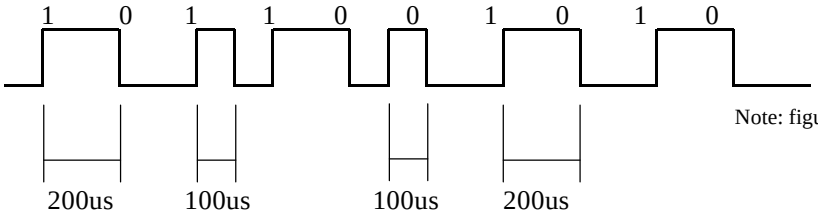
eng/vol1/wireless/gendocs/protocol/RF_5kbps_tx_info.doc

General RF Alarm Devices Information for 5kbps

1. Data Modulation

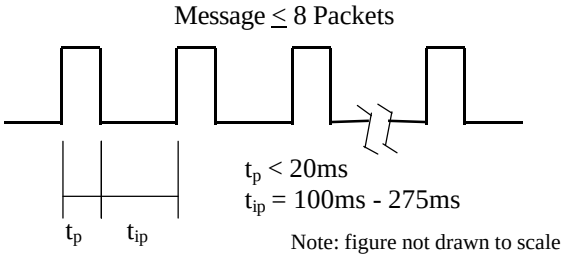
The data is modulated using the Manchester on/off keyed encoding scheme with 50% duty cycle shown below. The on-air format is defined with a '1' bit which is carrier turning on at the bit center and a '0' bit which is carrier turning off at the bit center.



Note: figure not drawn to scale

2. Message, Packet and Inter-Packet

A packet consists of all on-air bits that are transmitted to provide the system with the current status of a transmitter. A single message is composed of up to 8 packets of the same data. The time between packets is defined as a pseudo-random time length between 100 milliseconds and 275 milliseconds.



Note: figure not drawn to scale

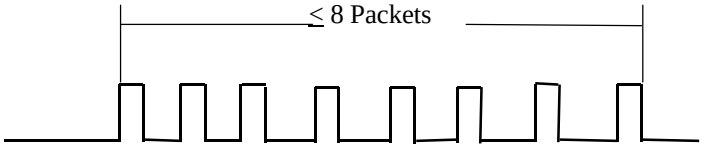
Note:
Packet width of ≤ 20ms with 50% duty cycle Manchester modulation makes the on-air time ≤ 10ms. Therefore, no transmission has more than 10ms of on time out of 100ms.

3. Transmission

A message will be transmitted when a control signal has changed, a system integrity test takes place or the supervisory time has expired.

Control Signal / Recognition Code

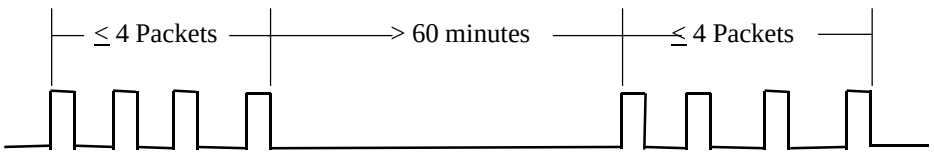
A single message, of up to 8 packets, will be transmitted when the control signal changes in a transmitter or a repeater. Up to 8 packets of recognition code will also be transmitted by the repeaters to ensure system integrity.



Note: figure not drawn to scale

Supervisory

To verify system integrity, the state of the inputs will be transmitted periodically. These transmissions consist of not more than 4 packets and will occur not less than every 60 minutes.



Note: figure not drawn to scale

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General Technical Information of **SEFD1**

SEFD1 is powered by two AAA batteries and is designed to detect an actual *"fall down"* event that might be encountered by people who might be inclined to fall. The usage environment could include established health care facilities and institutions as well as in-home use. The included transmitter will communicate with a nearby receiver to notify a caregiver that a *"fall"* event has occurred.

The main oscillator is a surface acoustic wave (SAW) operating at 304.0 MHz. The frequency is tuned in a matching network and is buffered by a one transistor stage buffer amplifier to prevent antenna loading effects that otherwise might effect the RF frequency or amplitude. The RF transmission occurs in response to a burst of pulses from a microprocessor. Each pulse packet is used to AM (on/off) modulate the output amplifier stage operating at 304 MHz. The transmission of data packets is automatically terminated in less than 5 seconds.

Frequency Control Devices Used:

1. An internal 4.0 MHz RC oscillator the clock of microcontroller U3.
2. An external 32.768 KHz crystal resonator for microcontroller U2.
3. One 304 MHz SAW resonator used for the oscillator of the RF transmitter

The transmitters send multiple RF data bursts as the following:

- 8 packet panic signal whenever "alarm" button is pressed.
- 2 packet "auto-tracking" signal transmitted every 7 seconds for total of 15 minutes after an "alarm" transmission has been generated.

Special Software Function for Agency Tests and Its Operation:
A special software is designed for the convenience of agency tests of SEFD1 transmitter. Whenever you press "alarm" button of a testing unit the RF transmitter will transmit about 5 minute RF signal and then stop. Repeating above action activates another 5 minute transmission. The RF data and packet format of the testing transmitter is same as those of production units except that the testing unit repeats the packets for ease of testing.

Duty cycle correction factor calculation:

Each packet contains 76 data bits and the packet transmission time with 5KHz data rate is 15.2 ms. Our **50% duty cycle Manchester coding** of the transmission ensures a **50% ON-AIR time** for every packet which is 7.6 ms. The minimum quiet time between packets is 100 ms.

Packet time = 15.2 milliseconds.
Quiet time between packets = 100 milliseconds.
ON-AIR time = (Packet time)x50% = 7.6 milliseconds, in 115.2 milliseconds.
Factor = 20 LOG(ON-AIR time/100ms) = 20 LOG(0.076) = **-22.38 dB**