

Message protocol, timing and duty cycle calculation.

The CFS8DLLYNXREN-2 uses the new TM3 message protocol. The TM3 protocol has two (2) unique modes: Master-Slave mode, and Enhanced Message mode.

MASTER-SLAVE Mode:

Only terminal type units such as the LYNXREN-2 transmit in the Master-Slave mode. The purpose of the Master-Slave mode is to cause remote receivers to 'wake up'. This is done by transmitting the following Manchester Phase Encoded message:

----- SEE EXHIBIT 3-2 (PICTURE OF BIT STREAM) -----

This message is 8.8 mSec. long and it is transmitted once every 21 Seconds (on alternating antenna). Since the data is phase encoded Manchester, the actual TX ON time is 4.4 mSec. Therefore; 4.4 mSec. X 2.857 times per Minute X 60 Minutes per Hour = 754.3 mSec. per Hour. Total TX ON Time. This is within the FCC Requirement that such Transmissions not exceed 2 Seconds per Hour as per Part 15.231 sect a. paragraph 3

ENHANCED MESSAGE MODE:

The Enhanced Message Mode control messages may also contain data, as per Part 15.231 The new TM3 message is phase-encoded Manchester that has inherent 50% duty cycle and consists of 120 bits per word

----- SEE EXHIBIT 3-3 (PICTURE OF BIT STREAM) -----

A supervision transmission is five identical words separated by (start to start) by nominal 125mSec (100 mSec min, 150 mSec max). Each message has a nominal data rate of 4.0 kb/s (no range, it is crystal controlled).

Therefore the duty cycle is calculation is as follows:

The word format consists of 120 bits,

The duration of each bit is 250.0 uSec max.

The duty cycle over a 100 mSec(worst case) measuring period is calculated as follows:

Duty cycle = Actual RF transmission ON time / 100 mSec

Actual transmission ON time = 120 bits X 50% X 250.0 uSec = 15 mSec

Therefore duty cycle = 15 / 100 mSec = .15 = 15%, and peak to average field strength is 20 db.

Total on-air time for a supervision transmission is:

$(120 \times 250.0 \text{ uSec}) \times 5 + (4 \times 100 \text{ mSec}) = 0.550 \text{ seconds}$

In the case of an alarm transmission, the group of five transmissions is repeated twice, with the second group delayed from the first by a max time of 1 seconds.

The worst case on-air time is $2 \times (\text{supervision time}) + 1 = 2.10 \text{ seconds}$

The worst case Duty cycle is : 15%