ION DIGITAL LLP
5800 MICRA

Duty Cycle Correction factor

On a change of state, 6 identical packets are transmitted at random intervals. The time interval between each packet is no less than 100mS and averages 125 mS. Each packet is 64 bits (16 bits preamble, 48 bit data) transmitted as PWM-ASK modulation.

Bits are Phase Encoded (Manchester) at baseband, so the duty cycle is exactly 50%. Each bit cell interval is 0.27mS, so the total on time per packet is:

On Time = 64 bits * 0.5 on/bit * 0.27mSec = 8.64 mSec

Thus, for every 100 ms, we are transmitting for 8.64 ms of that time period. Therefore our duty cycle correction factor (in the worst case 100mSec period) is:

DUTY CYCLE CORRECTION FACTOR (dB) = 20*Log(0.0864) = -21.3 dB

Transmission Time Duration from Trigger Point to End of Transmission

The processor samples the reed switch approximately once per second. After detecting a change of state, it constructs the packet (1mS), then enables the VCO on the transmitter to power up (10mS), but does not transmit during that time. Then 4 packets (29 mS each) are sent, with a random timeout between them (100mS – 800mS). Therefore the total duration time from when the device is triggered, to when transmission is completed and turned off (worst case) is 3.527 seconds.

0.000s	Trigger Point
2.000s	Microprocessor sample time (on close of reed switch worst case)
0.002s	Microprocessor setup time for packet construction and transmitter warmup (worst case)
0.645s	Sextet Packet Transmission (1st group of 6 packets)
1.305s	worst case delay between sextet#1 and sextet #2
0.770s	Sextet Packet Transmission (2nd group of 6 packets)
4.722s	Total worst case duration from when device is triggered to transmission completed/off.

Timing plots are given below.

Figure 1 Transmitted (1st Sextet) Data Packets, 100ms/div

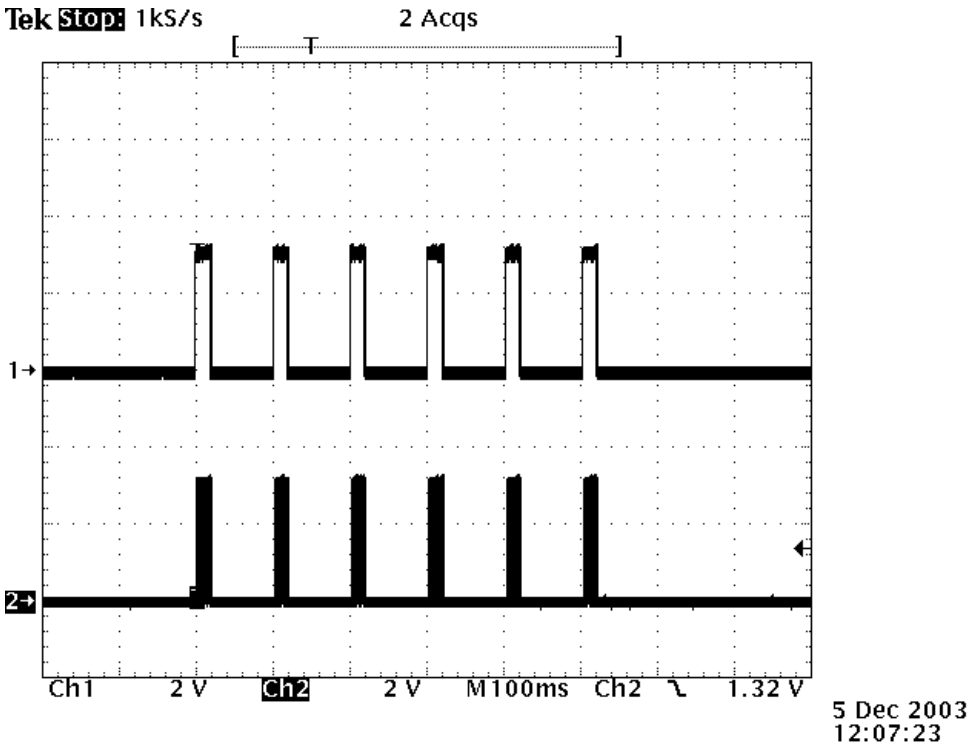

Figure 2 Transmitted Data Packet, 2.0 ms/div

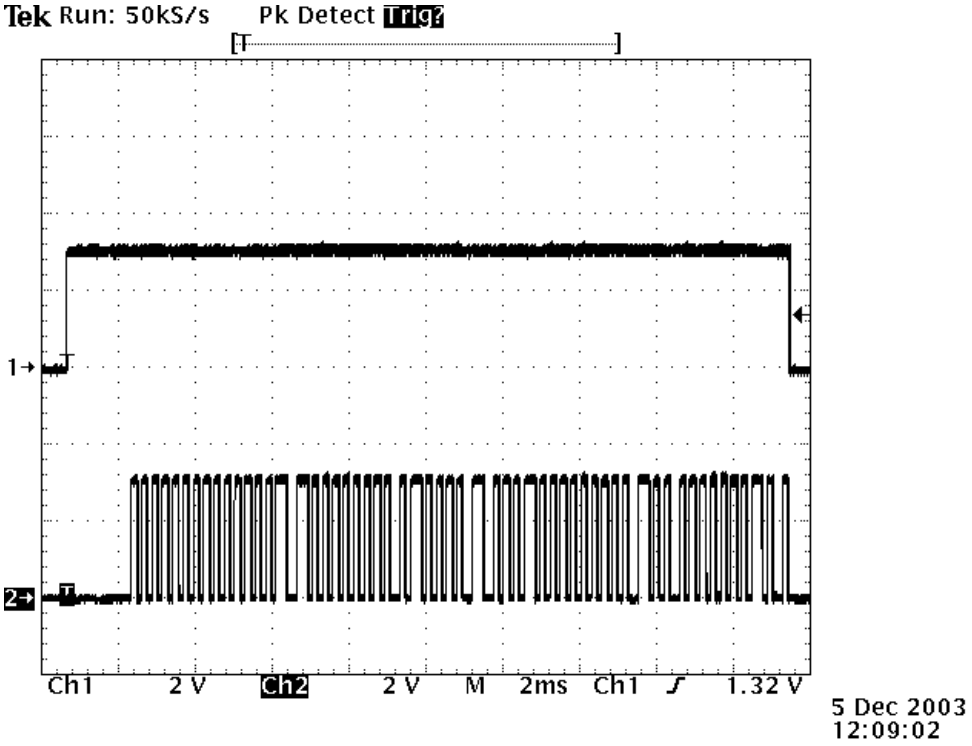

Figure 3 Transmitted Data Packet, 0.5 ms/div