

398KHZ Beacon Transmitter

January 21, 2000

Theory of operation

Block D,E

This block comprises a crystal oscillator operating at 6.368MHz. The oscillator signal drives a digital divider which divides the oscillator frequency by 16. The oscillator is gated on and off by the duty cycle timer (Block A). The output frequency of 398KHz drives a 2 stage amplifier switch transistors (Block E). The transistors drive a high Q parallel resonant tank circuit where the fundamental frequency sine wave of 398KHz is produced in the antenna.

Block F,G

A 12VDC source is applied to trickle charge a 1.2V Nicad Battery. The 12VDC source is coupled to a diode bridge to allow no restriction on polarity of connection. The Nicad battery provides a DC voltage source to a DC to DC convertor where a 3VDC nominal voltage is generated. This source supplies power to the circuitry (Block G).

Block A,B,C

When the 12VDC input is removed the Duty cycle timer is enabled along with the short and long interval timers. The Duty cycle timer operates as a multivibrator with a period of 1.2 seconds and a duty cycle of 30%. The output of the duty cycle timer gates the oscillator on for the 30% time of the period. The output of the duty cycle timer is used as a clock for the short and long interval timers. The timers count the number of times the duty cycle timer output has switched. When enabled the short interval timer output disables the duty cycle timer when approximately 3 hours of time has elapsed. When enabled the long interval timer output disables the duty cycle timer when approximately 11 hours of time has elapsed. The 12VDC source has to be re-applied and removed to start the transmitter sequence.