**Technical Description of The COX 'ICON' Transmitter Product M45054064**

The COX ICON transmitter is a frequency shift modulated digital proportional design intended for use in the 72MHz model radio control band. Under previously established rules of operation, it is intended for controlling model aircraft only. It is designed for use on any of the fixed 50 channels within the 72.0MHz to 73.0MHz band.

The transmitter circuitry consists of four primary sections. These include the MCU digital encoder, the FSK modulator, the RF section, and the antenna matching and harmonic trap circuitry. The antenna for the unit is a collapsible 7-section type, 1.1 meter in length. Eight 1.5V AA alkaline batteries for a total of 12 volts power the transmitter circuitry. A 5-volt regulator maintains voltage stability for all circuitry with the exception of the RF power amplifier. In production, the oscillator crystal is permanently affixed and not removable per FCC regulations.

All circuitry is mounted to a single-sided printed circuit board which is mounted inside a hand-held molded plastic housing. The removable antenna is mounted to, and extends through an opening molded into the top of the molded plastic housing.

A two-axis gimbaled control stick is mounted to the right of center of the face of the molded housing. The control stick provides user input commands to the MCU encoder with the rotation of two potentiometers. A third control input potentiometer is located in the back of the molded housed to the left of center. These locations are chosen for best ergonomic control inputs from the model flyer.

Three battery condition LEDs are located near the center and top of the face of the molded housing. The ON/OFF switch is located near the center and bottom face of the housing. The non-removable crystal, and three function slide switches are mounted in the back of the housing near the bottom. The removable battery holder installs from the bottom of the housing and is held in place using a molded latch.

The COX 'ICON' transmitter is a 3-Channel unit, offering three different control functions for the model flyer to control his aircraft. The three are typically elevator, ailerons, and throttle. In operation, the control input potentiometers vary the spacing between four information modulation pulses. The nominal spacing for all three channels is designed to range from 1.0ms to 2.0ms, with 1.5ms as the neutral position. A microprocessor with a crystal-controlled clock maintains accuracy for the pulses. The four information pulses are a nominal 300us in width, and are passed to the FSK modulator.

The FSK modulator varies the forward voltage of a varicap diode. The varicap diode in turn varies the oscillation frequency of the RF oscillator circuitry by 3kHz. A fundamental crystal is the active component that provides the basic frequency. To achieve the final 72MHz frequency at the RF power amplifier, this frequency is multiplied by five. The RF power amplifier increases output power to be input to the antenna matching circuit. This circuit also provides harmonic trapping. The RF level is then fed to a base-loaded 1.1 meter long collapsible antenna.