

**Interactive Toy Concepts (HK) Ltd.**

**TEL:852-2368-8166**

**FAX:852-2368-8155**

**ENGINEERING DEPARTMENT**

**ITEM NO:**

**MODEL NAME:MINI HELICOPTER PLANE**

**FRRQUENCY: 27.1950MHZ**

**DATE: 02-3-2007**

**BY: B.LEE**

**REV: ORIG**

**(CIRCUIT DESCRIPTION)**

**\*\*CIRCUIT DESCRIPTIONS**

**IN TRANSMIT MODE**

WHEN THE CONTROL KNOB IS PRESSED,A CW SIGNAL IS TRANSMITTED.THE CRYSTAL CONTROLLED OSCILLATOR

Q3 OUTPUT IS COUPLED THROUGH C10 TO THE BASE OF Q2. FROM Q2 THE SIGNAL IS FED THROUGH T-2.

Q2 OUPTUT IS COUPLEED THROUGH C13 TO THE BASE OF Q1. FROM Q1 THE SIGNAL IS FED THROUGH T1.

THE LOW PASS FIETER MADE UP OF C14 & T-1 C2 AND C1 WHICH ARE CONNECTED TO THE ANTENNA ROD.

THE MODULATION IS PROVIDED BY IC2, THEN THE D1 DIODE WILL BE FREQUENCY MODULATED THE CRYSTAL FREQUENCY.

OF Q3 THAT WILL MODULATE THE RF TUNNED CIRCUIT DIRECTLY. ENERGRY IS SUPPLIED BY A 9.6VDC 6F22 ALKALINE BATEERY.

**IN RECEIVE MODE**

Q1 IS THE UNTUNED RF AMPLIDIER.

IC1 IS THE SUPERHETERODYNEIC THAT CONTAINS LOCAL OSCILLATOR, MIXER, AND IF AMPLIFIER, AND SIGNAL DETEDETOR

IC2 IS THE SIGNAL DECODER AND CHANNELS SEPERATION IC.

IC4 A/B ARE THE UP-DOWN & BACKWARD-FORWARD POWER MOTORS DRIVER.

IC3 IS THE DC VOLTAGE REGULATOR FOR FRONT END.

ENERGRY IS SUPPLIED BY A 3.7 VDC 200MA/H RECHARGED TYPE LITHUM BATTERY.

**ANTENNA AND GROUND CIRCUITRY.**

THIS UNIT MAKES USE OF AN EXTENAL 12-INCH ANTENNA. THE ANTENNA IS INDUCTIVELY COUPLED.

THE UNIT RELIES ON THE GROUND TRACE OF THE PRINTED CIRCUIT BOARD. NO EXTERNAL GROUND IS PROVIDED.

**\*\*BACKGROUND**

THE DEVICE DESCRIBED HEREIN IS A WIRELES (RF) TOY AEROPLANE CONTROLLER TRANSMITTER FOR USE WITH THE TOY AEROPLANE CONTROLLED RECEIVER. IT HAS ONLY ONE CHANNEL OF OPERATION

WHICH THE USER MAY CHOOSE ONLY. AND IS USED TO SEND BUTTON-STATE DATA FROM THE CONTROLLER TO A WIRELESS RECEIVER CONNECTED WITH MOTORS

### **\*\*TYPICAL OPERATION**

TYPICAL OPERATION WOULD INVOLVE THE USER TURNING ON THE UNIT TO THE TOY GAME WHEN TURNED ON, THE UNIT COMES UP ON THE DEFAULT CHANNEL AND TRANSMITS A CONTINUOUSLY STREAM DATA. THE USER CAN NOT, AT WILL, CHANGE TO ANY OTHER OF THE PREDEFINED CHANNEL.

### **CONFIGURATION**

THE TRANSMITTED RF CIRCUITRY CONSISTS OF A CRYSTAL CONTROLLED OSCILLATOR, FOLLOWED BY TWO RF AMPLIFIER & FINALLY AN ANTENNA. THE MAIN CHARACTERISTICS OF THIS CONFIGURATION ARE SHOWN BELOW:

FREQUENCY RANGES	27.1950MHZ	
OCCUPIED BANDWIDTH (-26DB)	<100KHZ	MAX
FREQUENCY STABILITY	+/-10 PPM	MAX
MODULATION METHOD	F M	5KC DEV. MAX
OUTPUT POWER	80 DBUVM	MAX

### **REFERENCE OSCILLATOR**

A 27.1950MHZ CRYSTAL OSCILLATOR IS USED TO GENERATE THE REFERENCE FREQUENCY. IT HAS A STABILITY OF +/-10 PPM.

### **AMPLIFIER**

THE OSCILLATOR IS FOLLOWED BY TWO AMPLIFIERS THSES ACT MORE AS BUFFER FOR THE OSCILLATOR THAN AS GAIN STAGE. AND ADD VERY LITTLE POWER TO THE SIGNAL. THE FINAL OUTPUT IS 80 DBUV PER METER MAX

### **ANTENNA**

THE SYSTEM ANTENNA IS A COPPER ANTENNA ROD LINKED TO PCB. ANTENNA ROD CAN BE TURNED OUP OR IN PENDNG USER'S WISH.

### **MICROCONTROLLER**

THE TX SYSTEM IS CONTROLLED BY A SMALL MICROCONTROLLER RUNNING WITH A 4MHZ +/-10% OSCILLATOR  
THE RX SYSTEM IS CONTROLLED BY A SMALL MICROCONTROLLER RUNNING WITH A 26.740MHZ +/-10 PPM FOR FIRST LOCAL OSCILLATOR (MIXER IC)