

DYNAMIC INDUSTRIES CO LTD

UNIT 2205, 22F, 57, HUNG TO RD. KLN. HONG KONG.

TEL :-852-2389-8230

FAX :-852-2790-5521

ENGINEERING DEPARTMENT

ITEM NO:**MODEL NAME:- GULF ALIEN AEROPLANE**FREQUENCY :- **27.145MHZ**

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BY: B.LEE

REV 0

1.3 (CIRCUIT DESCRIPTION)**** IN TRANSMIT MODE.**

WHEN THE CONTROL KNOB IS PRESSED, A CW SIGNAL IS TRANSMITTED. THE CRYSTAL CONTROLLED OSCILLATOR Q2 OUTPUT IS COUPLED THROUGH C6 TO THE BASE OF Q3. FROM Q3 THE SIGNAL IS FED THROUGH T-1. THE LOW PASS FILTER MADE UP OF C10 & T-1 & C12 WHICH ARE CONNECTED TO THE ANTENNA. THE MODULATION IS PROVIDED BY U-1. WHEN SWITCH IS PUSHED, THE MODULATION SIGNAL WILL BE SENT TO THE BASE OF Q1 THAT WILL MODULATE THE RF WAVE DIRECTLY. ENERGY IS SUPPLIED BY 8X1.5V= 12.0 VDC ALKALINE BATTERY.

**** IN RECEIVE MODE**

Q1 IS THE SUPERREGENERATOR & DETECTOR. U2 IS THE SIGNAL PRE-AMPLIFIER & DECODER. U7 & U5-C/D ARE THE PULSED B+ WIDTHS (SPEED CONTROL) PROVIDER FOR Q2/Q7 & U5-A/B. U6-A/B/C/D ARE THE NAND GATE FOR Q3 & Q4 WHICH ARE THE MOTOR DRIVERS. Q5 & Q6 ARE THE MOTOR PHASE INVERTER. U3-A/B & U4-A/B ARE THE MOTORS CURRENT DRIVERS. ENERGY IS SUPPLIED BY EIGHT X1.2V AAA TYPE NICAD BATTERY.

**** ANTENNA AND GROUND CIRCUITRY.**

THIS UNIT MAKES USE OF AN EXTERNAL 39-INCH ANTENNA. THE ANTENNA IS INDUCTIVELY COUPLED. THE UNIT RELIES ON THE GROUND TRACE OF THE PRINTED CIRCUIT BOARD. NO EXTERNAL GROUND IS PROVIDED. ENERGY IS SUPPLIED BY 8X1.5V= 12.0VDC ALKALINE BATTERY.

**** BACKGROUND**

THE DEVICE DESCRIBED HEREIN IS A WIRELESS (RF) TOY GAME AEROPLANE CONTROLLER TRANSMITTER FOR USE WITH THE TOY GAME 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 STEAM 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 ONE POWER AMPLIFIER, & FINALLY, AN ANTENNA. THE MAIN CHARACTERISTICS OF THIS CONFIGURATION ARE SHOWN BELOW :-

** FREQUENCY RANGES	27.145MHZ	
OCCUPIED BANDWIDTH (3DB)	./- 2KHZ	MAX
FREQUENCY STABILITY	./- 20 PPM	MAX
MODULATION METHOD	A M	100%
OUTPUT POWER	80DBUV / M	MAX

**** REFERENCE OSCILLATOR**

A 27.145MHZ CRYSTAL OSCILLATOR IS USED TO GENERATE THE REFERENCE FREQUENCY. IT HAS A STABILITY OF +/- 20 PPM.

**** AMPLIFIER**

THE OSCILLATOR IS FOLLOWED BY ONE AMPLIFIER. THIS ACTS MORE AS BUFFER FOR THE OSCILLATOR THAN AS GAIN STAGE. AND ADD VERY LITTLE POWER TO THE SIGNAL. THE FINAL OUTPUT IS 100DBUV PER METER MAX.

**** ANTENNA**

THE SYSTEM ANTENNA IS A ANTENNA ROD LINKED TO PCB. ANTENNA CAN BE TURNED OUT OR IN PENDING USER'S WISH.

**** MICROCONTROLLER**

- * THE TX SYSTEM IS CONTROLLED BY A SMALL MICROCONTROLLER RUNNING WITH A 128KHZ +/- 20% OSCILLATOR
- * THE RX SYSTEM IS CONTROLLED BY A SMALL MICROCONTROLLER RUNNING WITH A 128KHZ +/- 20% OSCILLATOR