

**DYNAMIC INDUSTRIES CO LTD**

UNIT 2205, 22F, 57, HUNG TO RD.KLN .HONG KONG.  
TEL :-852-2389-8230  
FAX :-852-2790-5521

**ITEM NO:**

**MODEL NAME: RC AIR SURFER**  
**FREQUENCY :- 49.860MHZ.**  
**DATE :- 10TH APRIL 2002**  
**BY: B.LEE**  
**REV ORIG**

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**ENGINEERING DEPARTMENT  
(CIRCUIT DESCRIPTION )**

**CIRCUIT DESCRIPTION :-**

**IN TRANSMIT MODE.**

WHEN THE UNIT IS TURNED ON, A CW SIGNAL IS TRANSMITTED. THE CRYSTAL CONTROLLED OSCILLATOR Q4 OUTPUT IS COUPLED THROUGH C2 TO THE BASE OF Q2. FROM Q2 THE SIGNAL IS FED THROUGH T2. FROM T2 SECONDARY, THE SIGNAL IS COUPLED THROUGH BASE OF Q1. THE LOW PASS FILTER MADE UP OF C10, T1, & C12 WHICH IS CONNECTED TO THE ANTENNA. THE MODULATION IS PROVIDED BY IC1. PILOT TONE SIGNAL IS TO BE SENT FIRST WHEN POWER IS ON. WHEN ONE OF THE CONTROL SWITCH IS PUSHED, THE MODULATION CONTROL SIGNAL WILL BE SENT TO THE BASE OF Q3 THAT WILL MODULATE Q2 RF WAVE DIRECTLY. ENERGY IS SUPPLIED BY A 9.V ALKALINE BATTERY.

**IN RECEIVE MODE**

Q1 IS THE SUPERREGENERATOR & DETECTOR. Q2, Q3 & Q4 ARE THE SIGNAL STAGE AMPLIFIERS. IC-1 IS THE SIGNAL DECODER. Q5 & Q6 ARE THE MOTOR DRIVERS. U1 & U2 ARE THE CURRENT DRIVER OF THE TWO MOTORS ENERGY IS SUPPLIED BY A 7.2V (400-600MA) RECHARGEABLE NICAB BATTERY.

**ANTENNA AND GROUND CIRCUITRY.**

THIS UNIT MAKES USE OF AN **EXTENAL** 40-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 A 9.V ALKALINE BATTERY.

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**(CIRCUIT DESCRIPTION )****BACKGROUND**

THE DEVICE DESCRIBED HEREIN IS A WIRELES (RF) TOY GAME **AIR SURFER TRANSMITTER** FOR USE WITH THE TOY GAME **AIR SURFER 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 AND WITH PROPPELLER(S)

**TYPICAL OPERATION**

**TYPICAL** OPERATION WOULD INVOLVE THE USER TURNING ON THE TX 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 TRANSMITTER 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	49.860MHZ.
OCCUPIED BANDWIDTH (3DB)	./+ 2KHZ
FREQUENCY STABILITY	./+ 20 PPM
MODULATION METHOD	AM
OUTPUT POWER	80DBUV / M

**REFERENCE OSCILLATOR**

A 49.860MHZ. 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 80 DBUV PER METER MAX

**ANTENNA**

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

**MICROCONTROLLER**

THE SYSTEM IS CONTROLLED BY A SMALL MICROCONTROLLER RUNNING

- A) WITH A 76KHZ LOCAL OSCILLATOR FOR TX
- B) WITH A 38KHZ LOCAL OSCILLATOR FOR RX