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ENGINEERING **D**EPARTMENT

ITEM NO:
MODEL NANE:- BOYSTER RC CAR
FREQUENCY :- **27.145MHZ**
DATE :- 12TH AUG 2005
BY: B.LEE
REV 0

** (CIRCUIT DESCRIPTION)

** IN TRANSMIT MODE.

WHEN THE CONTROL KNOB IS PRESSED, A CW SIGNAL IS TRANSMITTED. THE CRYSTAL CONTROLLED OSCILLATOR **Q1** OUTPUT IS COUPLED THROUGH C9 TO THE BASE OF **Q3.** FROM **Q3** THE SIGNAL IS FED THROUGH **T-1 .** THE LOW PASS FILTER MADE UP OF **C11 & T-1 & C12/C13 L-4/L5 & C14** WHICH ARE CONNECTED TO THE ANTENNA. THE 'MODULATION IS PROVIDED BY **IC-1 .** WHEN SWITCH IS PUSHED, THE MODULATION SIGNAL WILL BE SENT TO THE BASE OF **Q2** THAT WILL MODULATE **THE** RF WAVE DIRECTLY. ENERGRY IS SUPPLIED BY 9.6 VDC ALKALINE BATTERY.

** IN RECEIVE MODE

Q2 IS THE SUPERREGENERATOR & DETECTOR. Q3/Q4/Q5/ARE THE SIGNAL AMPLIFIER
U2 IS THE SIGNAL PRE-AMPLIFIER & DECODER.
Q7/Q11 ARE THE MOTOR DRIVERS FOR STEERING.
Q8/9/Q11/Q12 ARE THE MOTOR CURRENT AMPLIFIER FOR STEERING
Q19/Q20 ARE THE THROTTLE MOTOR DRIVER,AND THE Q17/Q18 ARE THE PHASE INVERTER.
Q13/Q14/Q15/Q16 ARE THE MOTORS CURRENT DRIVERS
Q21/Q22 ARE THE MONO STABLE OSCILLATOR THAT WILL INCREASE THE DC VOLTAGE TO 12VDC
ENERGRY IS SUPPLIED BY **SIX X 1.2V (7.2VDC)** UM-2 NICAB BATTERY.

** ANTENNA AND GROUND CIRCUITRY.

THIS UNIT MAKES USE OF AN **EXTENAL** 31 -INCH ANTENNA. THE ANTENNA IS INDUCTIVELY COUPLED.
THE UNIT RELIES ON THE GROUND TRACE OF THE PRINTED CIRCUIT BOARD. NO EXTERNAL GROUND IS PROVIDED.
ENERGRY IS SUPPLIED BY 8X1.5V= 12.VDC ALKALINE BATTERY.

** BACKGROUND

THE DEVICE DESCRIBED HEREIN IS A WIRELES (RF) TOY GAME RC CAR CONTROLLER TRANSMITTER FOR USE WITH THE TOY GAME RC CAR CONTROLLED RECEIVER. IT HAS ONLY ONE CHANNEL OF OPERATION WHICH THE USER MAY CHOOSE ONLY ,(BUT 3 ID CAN BE PRE-SET BY USER)
, 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	**80.0DBUV / 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 IS80.0DBUV 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 **4M**HZ +/- 20% OSCILLATOR
* THE RX SYSTEM IS CONTROLLED BY A SMALL MICROCONTROLLER RUNNING WITH A **4M**HZ +/- 20% OSCILLATOR