

CIRCUIT DESCRIPTION For Model TFY-6536-USA

To: Joyce

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Transmitter Unit

RF Frequency Oscillator(VCO)

Q3 functions as a voltage control clap oscillator (VCO). The frequency is determined by Q3, C16, C18, L3, C21, VD1. The RF output of VCO is fed to Q3 and output from the Collector of Q4 (Q4 is the Osc. Amp.). Then fed to PLL IC1(KA8825).

PLL CIRCUIT

IC1(KA8825) on RF PBC is a phase locked loop (PLL) IC. The output of the oscillator Xout (20.95MHz) is input to the programmable reference divider. The oscillator frequency 452.9/453.2MHz is divided to 12.5KHz as the reference frequency built in the PLL IC. The phase difference between the reference frequency and the divided frequency by the prescaler will output to the RC filter(R12, C23, R13, C24 & C15) for locking the frequency. The DC voltage by filtering from the tracking filter is fed to the variator diode to control the VCO oscillator frequency until the VCO frequency is locked. The local oscillator frequency is 452.9/453.2MHz.

RF Amplifier and Power Amplifier

In the transmitter mode, RF signal from the oscillator Q3 is fed to the base of Q1. The Collector of Q3 and the microstrip form the Frequency selection net, the selected frequency is 905.8/906.4MHz (Q1 is RF amplifier, The coupled frequency is 905.8/906.4MHz).

Circuits for Suppression of Spurious Radiation

In addition to inter stage filtering the out of final Q1 coupled to the antenna through C3, Filter CF1 C2 & C56 which server both to match and reduce harmonic to adequate level. The Antenna coupling maximum power is -3dBm.

Modulation and Response

IC3 is Audio amplifier. The amplified audio signal from pin7 of IC3 is fed to VD1 for making F3E modulation.

Circuit for Limiting Modulation

Q6 & Q5 will control the maximum frequency deviation output, They are the Automatic Gain Controller.

MCU Controller

IC4 on is a MCU controller. It is used to control the channel selection and PLL IC. SW 2 is the channel selection control switch.

Power Supply

IC2 is regulator that the output DC voltage is 3V. This stable output is used to feed to VCO circuit, transmitter part and PLL part. SW1 is used to control the power supply ON/OFF.

Receiver Unit

When the receiver received the frequency 905.8/906.4MHz, it will produce the IF 10.7MHz with the coupled local oscillator 916.5/917.1MHz. Then goes to the IC1 to be amplified and demodulated.

Local Oscillator

When the unit is in the receiving mode, MCU control PLL circuit to make the VCO frequency is locked at 1/2 of desired carrier frequency. This VCO output is used as the first local oscillator that feeds the mixer (Pin4 of Q3).

RF Amplifier

RF signal from antenna is fed to the base of Q12, and output from the collector of it. Then feed to the base of Q1 through CF1 (Bandpass filter), and the feed to pin3 of Q3 for the first mixing.

Mixer Circuit

Q3 functions as the first mixer. It produces the IF frequency 10.7MHz.

IF Amplifier

Q4 functions as the first IF amplifier, which the first IF signal is fed from the first mixer Q3 through C15, and output from the collector of Q4, then the second IF output (Q5) is fed to IC1 (TA31161).

Demodulation

The built circuit of IC1 (TA31136) functions as the demodulation circuit.

Audio Power Amplifier

IC4 (KA8602) is an audio amplifier. The gain of amplifier determines by R30, R28. VR2 is the Volume controller.

Auto Squelch

When there is a signal, PIN10 of IC7 will output high DC voltage and feed to Q6, which is fed to MCU. MCU outputs the low level that making Pin 2.1 of IC7 goes high. The LED1 is green. Otherwise it is red.

Battery Low Voltage Indicator

When the Batt. Vol. Level is under 3.5-3.75V, The collector of Q15 will produce a high level voltage, then feed to Pin1.1 of IC1 which feeds to MCU, Pin2.2 of IC7 outputs high, The LED2 is red, otherwise it is green.