HONOR TONE LTD.

Circuit Description

BABY MONITOR

Model : 2745

1. Product Description

2745 is a baby monitor. consists of the nursery unit and the parent unit. It is for transmits the baby's sound to the Parent unit.

2745 have two main versions operating at difference frequency band.

Operating frequency band:

Frequency band from 49.83MHz to 49.875MHz.

Channel A: 49.83MHz Channel X: 49.845MHz

Channel B: 49.86MHz Channel Y: 49.875MHz

Power supply:

Transmit - Adaptor with 9VDC 100mA output

Receive - Adaptor with 9VDC 100mA output or 4 X 1.5V AAA battery

2. Design/development

2.1 The outline for design/development is as follow:

a) Operating frequency

The baby monitor is a 2 channels FM microphone. The channel is selected by setting the switches (Channel A ,B & Channel X ,Y).

b) Spurious radiation control

The output frequency of the crystal oscillator is directed as the transmission frequency, a LC filter is inserted in the antenna circuit and transmission circuit to
control the unnecessary radiation from the antenna.

c) Modulation control

(LM324) forms a audio amplifier and a low pass filter that limit the
alteration of modulation frequency under +/- 3.5 kHz and the high frequency.

2.2 In designing the equipment, the following are considered for the use and environment of the equipment.

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a) Considerations for environment

The following tests are performed to verify the equipment operates correctly under the practical using environment and satisfies the technical conditions. The part selection and circuit design is done the conditions that they endure the environment shown below, and specifications are prepared to ensure reliability.

- Temperature test: -5°C to 50°C
- Humidity test: Leave the equipment in the environment of 85%, 38°C for 4 hours
- Shock test: drop the equipment three times on the hardwood floor from the height of 1m
- voltage change test: +/- 10%

3 Circuit Description

The operations of each part are described below, based on the schematics:

3.1 The Transmit unit

a) Oscillator

X1 is a crystal oscillator. It forms a oscillator circuit with the other components L101,Q108 etc. and generate the 3rd overtone for the carried frequency channel A and channel B or Channel X and Y. Turning L101 for adjusting the TX frequency accuracy.

c) Transmission Part

The microphone picks up the baby‘s sound. The audio signal then pass through U101D, U101C. It amplifies the signal and inputs to the transmitter circuit, the audio signal and the carried frequency is mixed at the point of D101 varicap diode. The modulation frequency then inputs to the RF amplifier. The RF amplifier consists of the transmission amplifier Q108 & Q109, and transmission output power adjusted by L102 and L103. The TX frequency pass through a LC filter. LC filter with the other components L104, L105 etc, is for rejecting the harmonic signal radiation, and then radiation signal radiates at the antenna.

d) Power supply

The nursery unit is powered by adaptor with 9VDC 100mA output. Q110, R19, C131 and Z101 form a regulator circuit. It provides 4.7V power to the circuit.

3.2 The Receiver unit

a) Oscillator

X101 form a crystal oscillator. It provides a local frequency input to 1st mixer and 2nd mixer the receiver. The RX channel is setting by selecting the channel switch SW202.

b) Receiver

The RF signal is received from the antenna and pass through a LC circuit for rejecting the unwanted signal. Q201, L204 turning coils as LNA amplifier with filter. It amplifies the incoming RF signal and then inputs to the 1st mixer circuit, Q202 and L205 as mixer amplifier, to amplify the mixer 1st IF(intermediate frequency) signal and then inputs to the 2nd IF--receiver IC. U201 is a lower power narrowband FM receiver. Its low voltage design provides low power drain, excellent sensitivity, and good image rejection in narrowband voice and data link applications. This part combines a mixer, an IF limiter with a logarithmic response signal strength indicator, a quarture detector, an active filter and a squelch trigger circuit. The 2nd mixer amplifier converts an RF input signal to a 455kHz IF signal. Passing through an external CF201, the IF signal is fed into a limiting amplifier and detection circuit where the audio signal is recovered. A conventional quadrature detector L210 is used.

c) Led level meter

Q207 ~ Q211 is a led meter driver. It drives a group of LEDs which indicate the sound level.

d) Speaker amplifier

U202 LM386 is low voltage audio power amplifier. It amplifies the audio signal and drives the speaker, Can select the volume level high or low by adjusting the volume VR.

e) Power supply

The parent unit is powered by 4 X 1.5V AAA battery or an adaptor with 9VDC