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Revision	A
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40-5029 Wireless Stereo Speakers Circuit Description

Transmitter Section:

1. BASE BAND BOARD

1) Operating Voltage

Two regulated DC voltage levels can be found within the TX PCB. Both DC 8V and 5V are regulated from the DC jack that is connected to a 12VDC adapter.

2) The operation of MCU

There is one 3 channels selection switch used to tell the MCU which channel the user is going to select. By proper programming the PLL IC by the MCU, the RF carrier can be controlled.

3) Audio circuit

The Audio signal should be input from two on-board RCA connectors, with signal level of 500mVrms. Before feeding the audio signal to the RF module for FM modulation, the base band signal will pass through the compander ICs U1 and U2 (KA8512 / GL6552) for better ultimate audio signal-to-noise ratio. The modulation depth will be controlled by two variable resistors VR1 and VR2.

2. RF BOARD

The RF module consists of two VCOs operating at the frequency band 902 to 928MHz. The core resonating elements of each VCO are L406 and L404. By changing the inductance of L406 and L404, the center frequency of each VCO can be varied. The voltage control elements of the VCOs are realized by two varactor diodes VD401 and VD402. The RF channels are pre-selected from 911.4 to 918.4MHz. The VCO is phase locked to a crystal oscillator generated from the PLL chip U401. The accuracy of the transmission frequency is same as the reference 16MHz crystal X401. The output frequency of RF transmission can be accurately trimmed by the tweaking variable capacitor VC401. The two VCO output are then buffered by two RF amplifiers. The amplified output would be combined before feeding to the antenna.

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40-5029 Wireless Stereo Speakers Alignment Procedures:

Transmitter Section:

1. BASE BAND BOARD

1) Operating Voltage

Two regulated DC voltage levels can be found within the TX PCB. Both DC 8V and 5V are regulated from the DC jack that is connected to a 12VDC adapter.

Equipment: DVM

I) Connect a DC source to the adapter input .
II) Connect a Audio source with 1KHz 500V rms to the RCA audio jack.
III) Measure the output voltage at TP6 : 7.8 +/- 0.2V, at TP13 : 5 +/- 0.2V, at TP9 : 3.6 +/- 0.2V

2) The operation of MCU

There is a channel selection switch used to tell the MCU which channel the user is going to select. By proper programming the PLL IC by the MCU, the RF carrier can be controlled.

Equipment : CRO

I) Connect a DC source to the adapter input.
II) Connect a Audio source with 1KHz 500V rms to the RCA audio jack.
III) Measure the signal at TP5 in CRO if it is a series of 3.5V pules when selecting the channel selection switch.

3) Audio circuit

The Audio signal should be input from two on-board RCA connectors, with signal level of 500mVrms. Before feeding the audio signal to the RF module for FM modulation, the base band signal will pass through the compander ICs U1 and U2 (KA8512 / GL6552) for better ultimate audio signal-to-noise ratio. The modulation depth will be controlled by two variable resistors VR1 and VR2.

Equipment Audio signal generator, CRO

I) Power on the unit and connect the audio signal generator with a signal of frequency 1KHz level 500mV rms to JK1 and JK2.
II) Measure the signal at TP12 in CRO if its amplitude is variable with the adjustment of VR1.
III) Measure the signal at TP11 in CRO if its amplitude is variable with the adjustment of VR2.
IV) Solder the two shielding cases.

2. **RF BOARD**

The RF module consists of two VCOs operating at the frequency band 902 to 928MHz. The core resonating elements of each VCO are L406 and L404. By changing the inductance of L406 and L404, the center frequency of each VCO can be varied. The voltage control elements of the VCOs are realized by two varactor diodes VD401 and VD402. The RF channels are pre-selected from 911.4 to 918.4MHz. The VCO is phase locked to a crystal oscillator generated from the PLL chip U401. The accuracy of the transmission frequency is same as the reference 16MHz crystal X401. The output frequency of RF transmission can be accurately trimmed by the tweaking variable capacitor VC401. The two VCO output are then buffered by two RF amplifiers. The amplified output would be combined before feeding to the antenna.

1) Two VCO adjustments

Equipment: Spectrum analyzer, DVM

I) TX RF module should be soldered to the good main board with CH1 setting
II) Power on the unit and measure the voltage at TP6 of the base band board if it is 7.6 +/- 0.4V and the voltage at TP9 of the base band if it is 3.6 +/-0.2V.
III) Connect the spectrum analyzer to the antenna feed point
IV) Set the spectrum analyzer to 915.6MHz , span = 20kHz
V) Use a DVM to measure the voltage at TP1 of the RF board.
VI) Adjust the 4T air coil L406 inductance, such that the VCO voltage at VT1 of the RF board is 1.8V+/- 0.2V
VII) Adjust VC401, until the RF frequency is 915.6MHz +/-400Hz at 25C
VIII) Change the spectrum analyzer to 911.4MHz
IX) Measure the VCO voltage at VT2
X) Adjust the inductance of air coil 4T L204, until the VCO voltage at VT2 of the RF board is 1.8V +/- 0.2V
XI) Solder the three shielding cases and re-test, RF frequency : 915.6MHz +/- 500Hz at 25C, VCO voltage at TP1,TP2 : from 0.5 to 3.0V.

2) Audio input circuit on TX unit

The Audio signal should be input from two on-board RCA connectors, with signal level of 500mVrms. Before feeding the audio signal to the RF module for FM modulation, the base band signal will pass through the compander ICs U1 and U2 (KA8512 / GL6552) for better ultimate audio signal-to-noise ratio. The modulation depth will be controlled by two variable resistors VR1 and VR2. With 1kHz audio frequency of level 500mV rms, the RF carrier FM deviation should be 30kHz.

Equipment: Modulation analyzer, Audio signal analyzer

I) Connect the TX board to the modulation analyzer
II) Connect the Audio signal generator to WHITE RCA connector
III) Audio signal generator settings: 1KHz output, 500mV rms
IV) Modulation analyzer settings: Center at 911.4MHz, Frequency filter at 300Hz to 3KHz
V) Adjust VR1 until FM deviation = 30 +/- 0.2kHz
VI) Connect the Audio signal generator to RED RCA connector
VII) Modulation analyzer settings: Center at 915.6MHz
VIII) Adjust VR2 until FM deviation = 30 +/- 0.2KHz