CIRCUIT DESCRIPTION

Model: GH9456

1 Base

a. RF Transmitter Section – RF Board

Compressed audio signal is frequency modulated through the varactor diode D3, D4. Diode D3, D4, L4 and Q5 the external components formed the voltage controlled oscillator circuit for the transmitter part. This circuit generates the TX VCO frequency. A portion of this signal is fed back to the PLL IC's pin1 (FIN1) for phase comparison. Once the phase of oscillation stabilized, the PLL circuit generates the error voltage necessary for the VCO to oscillate at the desired transmitter's RF frequency. The VCO circuit impedance is matched with the succeeding circuit through the transistor Q2 that also acts as the buffer amplifier. RF amplifier Q7 boosts the signal for transmission. This amplified RF signal is trimmed to the desired frequency band by BPF2403 so as not to interfere with the receiver circuit. The transmitter RF signal is then propagated through the antenna.

b. RF Receiver Section - RF Board

The Base Unit antenna receives RF signal. Band Pass Filter BPF2475 trims the signal to the desirable frequency band. Transistor Q6 & Q3 is a low noise amplifier that boosts the RF signal to a specific level for mixing. PLL IC1 (KB8825B) is used as a Universal Phase Lock Loop circuit. The frequency from the Voltage Controlled Oscillator (VCO) D1, L5 and Q4, is fed back to the PLL IC through pin 16 (FIN2) for phase comparison. During channel scanning or turning the unit on, once the phase of oscillation stabilized (locked), the PLL circuit generates the first local oscillator frequency for down-converting the received RF signal into the first IF frequency 10.7MHz. This process is accomplished through the IF mixer circuit Q1. Q1 is used for matching the impedance of the mixer circuit with the succeeding circuits. The resulting IF signal is kept constant by the IF Filter FL1 to 10.7MHz which is then mixed with the second local oscillator frequency 11.150MHz (derived from X1 & C47) to produced a much lower IF frequency. This lower IF frequency if further filtered by IF Filter FL4 to produce a more stable signal of 450AKHz. Quadrature signal detection is accomplished internally by the Narrow-band Detector IC2 (KA3361) with the IF coil L7. The recovered audio frequency can be taken from IC2 audio output pin9. Double conversion of received signal is utilized to improve the image frequency rejection of the unit.

c. Transmitter Audio Section – Main Board

Audio Frequency signal from the telephone line is compressed through the compressor part of IC4 to minimize the transmission noise. The degree of compression depends on the external RC combinations. AGC is also utilized by IC4 to avoid shock noise caused by abrupt change of audio levels. The compressed audio is filtered and amplified for better acoustical performance.

d. Receiver Audio Section – Main Board

The compressed Audio Frequency signal is passed through passive RC filters for acoustic compliance. The filtered audio is then fed to the Compander IC4 for expansion thus retrieving the original Audio signal with noise filtered out. Q5 is used as buffer circuit. Bridge rectifier D12-D15 isolates the high-voltage telephone line to the rest of the circuit. D12-D15 is also act as a hybrid transformer to create a two-way path for audio transmission to and reception from the telephone line.

2 Handset

a. RF Transmitter Section – RF Board

Refer to portion 1.b for this section. All circuit performance is the same except that Band Pass Filter BPF2403 is changed to BPF2475 for the handset transmission.

b. RF Receiver Section – RF Board

Refer to portion 1.b for this section. All circuit performance is the same except that Band Pass Filter BPF2475 is changed to BPF2403 for the handset reception.

c. Transmitter Audio Section – Main Board

Audio Frequency signal from the handset or from the headset microphone is compressed through the compressor part of IC1 to minimize the transmission noise. The degree of compression depends on the external RC combinations. AGC is also utilized by IC1 to avoid shock noise caused by abrupt change of audio levels. The compressed audio is filtered and amplified for better acoustical performance. Q3 is a switching transistor that controls the power supply for the TX RF part.

d. Receiver Audio Section – Main Board

The compressed Audio Frequency signal is passed through passive RC filters for acoustic compliance. The filtered audio is then fed to the Compander IC1 for expansion thus retrieving the original audio signal with noise filtered out. Q2 & Q10 act as audio amplifier to sufficiently drive the handset speaker. Q7 and Q8 are switching transistors that control the power supply for the RF part, the Compander part and the AF amplifier respectively. An earphone jack is provided for an optional headset unit for handsfree conversation on the handset.

3 OTHERS (Handset):

a. Charging and Reset Controls

Recharging the handset battery is accomplished by putting the handset on the cradle. IC5 detects this action and sends a command to the CPU for proper exchange of security code.

b. Ring Detection

When the handset receives the ring command from the base unit, the CPU will send buzzer signal to the ringer amplifier Q5 and Q6 that drives the Buzzer.

4 OTHERS (Base):

a. Hook Switching and Dialing

Hook switching and the transistor Q6 that is controlled by the CPU accomplishes pulse dialing. DTMF signal from the ladder circuit internal to the CPU is filtered and amplified by Q5.

b. Over-voltage Protection

Fuse1 and varistor Z1 act as high current and high voltage protectors for the telephone line interface. In case of presence of voltage surge across the telephone line, Fuse1 decreases its resistance and dumps the line voltage to a safe level. Fuse1 opens when excessive current is present on the line thus protecting both the user and the line interface.

c. Battery Charging & Code Setting

Battery charging commences when resistor R74 detects the presence of the handset on cradle. Q4 form the reset circuit in conjunction with the charge detects circuit to command the CPU to change the security code. When the reset circuit is activated, the CPU will send a new security code to the handset selecting among 65536 combinations.

d. Ring Detection

The operational amplifier IC2D detects incoming ring signal. The CPU checks the frequency of the ring signal, and when valid, sends the ringing command to the speaker or to the Handset.

e. Power Supplies

Diode D10 ensures uniform polarity for the entire circuit. IC5 regulates the voltage to +5Vdc for the rest of the circuit. Transistor Q3 controls the power supplied to the TX part of the RF circuits.

f. Squelch Detection

In conjunction with the 3361 IC (IC2 of the Base RF), R23 sets the level of signal detection and 1C4A acts as the comparator circuit whose composite output is the RSSI signal for the CPU.

g. Caller ID Detection

FSK Caller ID data is processed through the FSK detector IC3 for input to the CPU. The signal levels and signal frequency spectrum is filtered by IC1A & IC1B. The CPU controls the call state signal detection whether it is a normal caller ID or a caller ID on call waiting.

h. RX Data

Commands from the Handset is filtered and re-constructed by the Schmitt trigger circuit IC2B. The composite output is the RX Data that is input to the CPU for validation and processing

- END -

Test Mode Procedure for GH9456

Note: The default channel frequency is CH25 for both the Base Unit (B/U) and the Handset (H/S). Refer to the Frequency Table for proper frequency allocations.

Base

Basic Test Mode:

Insert the 12Vdc plug into the B/U DC jack while pressing the **"Page"** key. Both RX and TX will be activated and basic testing can be done. Press the "Page" key to scan the channel frequency one at a time.

Handset:

Insert the battery into the H/S battery socket while pressing the **"*"** key. Both RX and TX will be activated and basic testing can be done. Press the **"*"** key to scan the channel frequency one at a time.

2.4GHz GH9456 FREQUENCY CHART

BASE			HANDSET		BASE			HANDSET	
CH	TX	RX	TX	RX	CH	TX	RX	TX	RX
1	**2400.592**	2472.215	**2472.215**	2400.592	**26**	**2403.002**	2474.625	**2474.625**	2403.002
2	**2400.688**	2472.312	**2472.312**	2400.688	**27**	**2403.098**	2474.722	**2474.722**	2403.098
3	**2400.785**	2472.408	**2472.408**	2400.785	**28**	**2403.195**	2474.818	**2474.818**	2403.195
4	**2400.881**	2472.504	**2472.504**	2400.881	**29**	**2403.291**	2474.914	**2474.914**	2403.291
5	**2400.977**	2472.601	**2472.601**	2400.977	**30**	**2403.387**	2475.011	**2475.011**	2403.387
6	**2401.074**	2472.697	**2472.697**	2401.074	**31**	**2403.484**	2475.107	**2475.107**	2403.484
7	**2401.170**	2472.794	**2472.794**	2401.170	**32**	**2403.580**	2475.204	**2475.204**	2403.580
8	**2401.267**	2472.890	**2472.890**	2401.267	**33**	**2403.677**	2475.300	**2475.300**	2403.677
9	**2401.363**	2472.986	**2472.986**	2401.363	**34**	**2403.773**	2475.396	**2475.396**	2403.773
10	**2401.459**	2473.083	**2473.083**	2401.459	**35**	**2403.869**	2475.493	**2475.493**	2403.869
11	**2401.556**	2473.179	**2473.179**	2401.556	**36**	**2403.966**	2475.589	**2475.589**	2403.966
12	**2401.652**	2473.276	**2473.276**	2401.652	**37**	**2404.062**	2475.686	**2475.686**	2404.062
13	**2401.749**	2473.372	**2473.372**	2401.749	**38**	**2404.159**	2475.782	**2475.782**	2404.159
14	**2401.845**	2473.468	**2473.468**	2401.845	**39**	**2404.255**	2475.878	**2475.878**	2404.255
15	**2401.941**	2473.565	**2473.565**	2401.941	**40**	**2404.351**	2475.975	**2475.975**	2404.351
16	**2402.038**	2473.661	**2473.661**	2402.038	**41**	**2404.448**	2476.071	**2476.071**	2404.448
17	**2402.134**	2473.758	**2473.758**	2402.134	**42**	**2404.544**	2476.168	**2476.168**	2404.544
18	**2402.231**	2473.854	**2473.854**	2402.231	**43**	**2404.640**	2476.264	**2476.264**	2404.640
19	**2402.327**	2473.950	**2473.950**	2402.327	**44**	**2404.737**	2476.360	**2476.360**	2404.737
20	**2402.423**	2474.047	**2474.047**	2402.423	**45**	**2404.833**	2476.457	**2476.457**	2404.833
21	**2402.520**	2474.143	**2474.143**	2402.520	**46**	**2404.930**	2476.553	**2476.553**	2404.930
22	**2402.616**	2474.240	**2474.240**	2402.616	**47**	**2405.026**	2476.650	**2476.650**	2405.026
23	**2402.713**	2474.336	**2474.336**	2402.713	**48**	**2405.122**	2476.746	**2476.746**	2405.122
24	**2402.809**	2474.432	**2474.432**	2402.809	**49**	**2405.219**	2476.842	**2476.842**	2405.219
25	**2402.905**	2474.529	**2474.529**	2402.905	**50**	**2405.315**	2476.939	**2476.939**	2405.315