

CIRCUIT DESCRIPTION FOR MODEL SBC SC767

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1. BABY UNIT

[1.1] TRANSMITTER SECTION

RF Frequency Oscillator

L8, L9, VD1, C30 and built in IC U6 circuit functions as a VCO oscillator for receiver or oscillation for transmitter. The frequency is determining by L8, L9, VD1 and C30. X1 or X2 for transmitter (X3 or X4 for receiver) function as the reference oscillation that will compare with the divided frequency of VCO oscillation in PLL circuit in IC U6 to obtain the stability frequency. Pin 24 of IC U6 is used to select transmitter mode or receiver mode oscillation

RF Amplifier and Power Amplifier

RF pre-amplifier and power driver is located built in IC U6. Q39 is RF power amplifier.

Transmitter and receiver switch

D2 and D3 function as the transfer switch for transmitting mode to reception mode each other.

Circuits for Suppression of Spurious Radiation

RF power output from IC U6 is fed to Q39. The output of Q39 coupled to the antenna through triple 'LC' and 'PI' network (C64-C66, C31, C34, L7-L8) which serves both to match and reduce harmonic to adequate level. The RF maximum power is 500mV/m at 3meter.

Circuits for Limiting Power

During alignment, R31 is selected to provide about 500mV/m output power.

Modulation and Response

Q3 and Q4 is the MIC amplifier. The amplified audio signal from Q4 output is fed to VD2 for making F3E type modulation. C6, R51 and R52 are used to determine the transmit response.

Circuit for limiting Modulation

Q5 and Q15 give the auto MIC control circuit. When the modulating voltage is excessive, the DC voltage will be obtained which turns by Q15 and fed to Q5. This feedback system keeps the maximum modulation.

Hidden Tone Oscillator and Modulation

Q36, C92-C95, R72-R74 and VR7 combines hidden tone oscillator that the frequency is about 19Khz. VR7 is used to alignment the hidden tone frequency. The hidden tone output signal from the output of Q36 fed VD2 to modulate through the buffer Q29.

Voice Control Hidden Tone Oscillator

Q19, Q20 and Q30 functions as the voice control hidden circuit. When there is the voice which the sound level is larger than one reference level, the emitter of Q19 will appear DC voltage which is over 0.6V. So Q19 goes to ON that make the pin 4 of U3B obtain the high level. This high level voltage fed to Q37 base, then the hidden oscillator goes to ON. When no voice or the voice is less than one reference level, Q19 goes to OFF. U3B, R98, R99, D4 and C106 functions as one oscillator which make the hidden tone goes to ON per five second for confirming both baby and parent connected.

Battery Low detection and Indication

LED1 functions as the power indicator. When the power goes to ON by switch SW2 or SW3 or SW4, LED2 light. LED2, R96, R97, Q26 and U3A function as the battery low detection circuit. When the battery is down to some level, Q26 goes to OFF, the oscillation U3A will make LED LED2 flashing. In the normal status, LED LED2 is OFF.

Power Supply

SW3 (Volume control switch) is power supply switch only for receiver part by receiver power circuit Q24, Q33, Q38 and Q23.

SW2(ON/OFF) and SW4(TALK) are power supply switch for transmitter part by the transmitter power circuit Q25, Q34, Q22 and Q27.

U1 is a regulator that the out DC voltage is 3.3V. This stable output is used to feed to IC U6, power amplifier, RF amplifier and mixer.

Q21, Q32 and Q31 function as the voltage controlled regulator to powered other circuit.

[1.2] RECEIVER SECTION

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The receiver part is a conversion superheterodyne with the local oscillator at frequency higher the received frequency to produce the IF 10.7Mhz.

Local Oscillator

IC U6 functions as a local oscillation.

RF amplifier

RF signal from antenna is fed to the base of Q7. Q11 is second stages RF amplifier. The output from the collector of Q11 is given to the base of Q13 for the mixing.

Mixer Circuit

Q13 functions as a mixer.

IF amplifier

Q12, CF1 and built in IC U5 functions as the IF amplifier that which the IF signal output is fed to demodulation circuit built I IC U5.

Demodulation

XT1 is discriminator which and the built circuit of IC U5 function as the demodulation circuit.

Audio Power Amplifier and Volume Control

The audio amplifier is built in IC U5. Pin 24 of U5 is the input pin of audio amplifier. The Audio output from pin27 of U5 fed to speaker. VR3 is the volume control.

PLL Tone Detector

IC U4, R79, R10, C100 and VR8 consist of the PLL tone detector.. When the desired tone signal is received and fed to pin 3 of U4, it will provide control signal to the transistor of Q17 and Q2.

U2A and U2B function as the tone band amplifier which select the tone signal to fed the PLL tone detector.

Auto Squelch

When there is the desired tone signal is fed to pin 3 of U4, pin 8 of U4 give the low level which make the transistor Q17 to OFF. The demodulated audio from pin 23 of U5 fed to pin 24 of U5 through the buffer Q1. The unit goes out the mute status and sound the voice. When there is no desired tone signal is fed to pin 3 of U4, the level of pin 8 of U4 go to high level which make the transistor Q7 to ON. So Q1 goes to OFF. The demodulated audio from pin 23 of U5 can't feed to pin 24 of U5. So the unit entry the mute status.

2. PARENT UNIT

[2.1] TRANSMITTER SECTION

RF Frequency Oscillator

L8, L9, VD1, C30 and built in IC U4 circuit functions as a VCO oscillator for receiver or oscillation for transmitter. The frequency is determining by L8, L9, VD1 and C30. X1 or X2 for transmitter (X3 or X4 for receiver) function as the reference oscillation that will compare with the divided frequency of VCO oscillation in PLL circuit in IC U6 to obtain the stability frequency. Pin 24 of IC U4 is used to select transmitter mode or receiver mode oscillation

RF Amplifier and Power Amplifier

RF pre-amplifier and power driver is located built in IC U4. Q37 is RF power amplifier.

Transmitter and receiver switch

D2 and D3 function as the transfer switch for transmitting mode to reception mode each other.

Circuits for Suppression of Spurious Radiation

RF power output from IC U4 is fed to Q37. The output of Q37 coupled to the antenna through triple 'LC' and 'PI' network (C64-C66, C31, C34, L7-L8) which serves both to match and reduce harmonic to adequate level. The RF maximum power is 500mV/m at 3meter.

Circuits for Limiting Power

During alignment, R31 is selected to provide about 500mV/m output power.

Modulation and Response

Q3 and Q4 is the MIC amplifier. The amplified audio signal from Q4 output is fed to VD2 for making F3E type modulation. C6, R137 and R138 are used to determine the transmit response.

Circuit for limiting Modulation

Q5 and Q15 give the auto MIC control circuit. When the modulating voltage is excessive, the DC voltage will be obtained which turns by Q15 and fed to Q5. This feedback system keeps the maximum modulation.

Hidden Tone Oscillator and Modulation

Q36, C92-C95, R72-R74 and VR7 combines hidden tone oscillator that the frequency is about 19Khz. VR7 is used to align the hidden tone frequency. The hidden tone output signal from the output of Q36 fed VD1 to modulate through the buffer Q27.

Battery Low detection and Indication

LED1 functions as the power indicator. When the power goes to ON by press switch SW4 ON, LED1 light. LED1, R96, R97, Q40 and U3D function as the battery low detection circuit. When the battery is down to some level, Q40 goes to OFF, the oscillation U3D will make LED1 flashing. In the normal status, LED1 is OFF.

Power Supply

SW5 (volume control switch) is power supply switch only for receiver part by receiver power circuit Q21 and Q26.

SW4 (TALK) are power supply switch for transmitter part by the transmitter power circuit Q18 and Q25.

U6 is a regulator that the output DC voltage is 3.3V. This stable output is used to feed to IC U4, power amplifier, RF amplifier and mixer.

Q19, Q23 and Q24 function as the voltage controlled regulator to power others circuit.

[2.2] RECEIVER SECTION

The receiver part is a conversion superheterodyne with the local oscillator at frequency higher the received frequency to produce the IF 10.7Mhz.

Local Oscillator

IC U4 functions as a local oscillation.

RF amplifier

RF signal from antenna is fed to the base of Q7. Q11 is second stages RF amplifier. The output from the collector of Q11 is given to the base of Q13 for the mixing.

Mixer Circuit

Q13 functions as a mixer.

IF amplifier

Q12, CF1 and built in IC U5 functions as the IF amplifier that which the IF signal output is fed to demodulation circuit built I IC U5.

Demodulation

XT1 is discriminator which and the built circuit of IC U5 function as the demodulation circuit.

Audio Power Amplifier and Volume Control

The audio amplifier is built in IC U8. Pin 24 of U8 is the input pin of audio amplifier. The Audio output from pin27 of U8 fed to speaker. Volume VR4 is the volume control.

PLL Tone Detector

IC U7, R79, R10, C100 and VR2 consist of the PLL tone detector.. When the desired tone signal is received and fed to pin 3 of U7, it will provide control signal to the transistor of Q35 and Q2.

U2A and U2B function as the tone band amplifier which select the tone signal to fed the PLL tone detector.

Auto Squelch

When there is the desired tone signal is fed to pin 3 of U7, pin 8 of U7 give the low level which make the transistor Q35 to OFF. The demodulated audio from pin 23 of U8 fed to pin 24 of U8 through the buffer Q1. The unit goes out the mute status and sound the voice. When there is no desired tone signal is fed to pin 3 of U7, the level of pin 8 of U7 go to high level which make the transistor Q2 to ON. So Q1 goes to OFF. The demodulated audio from pin 23 of U8 can't feed to pin 24 of U5. So the unit entry the mute status.

RF Level Indication

IC U5 (KIA6966) and LD2 to LD5 function as RF received level indication.

Connection Confirmation

Q30 and LED2 (green) function as the connection confirmation indication. When PLL tone detector U7 received the tone signal, Q35 goes to the high level which feed to pin 1 & 2 of U3A. Pin4 of U3B obtain the high level which make the connection confirmation LD5 lights.

IF there is no tone signal is received, pin 3 of U3A goes to high level after about 30 seconds. pin 4 of U3B output the square wave by the oscillator consisted of U3B, R98 and C116. So, the connection confirmation LED2 flash. The output of pin 10 of U3C gives the alarm signal to feed to the audio power amplifier. SW1 is used to switch to alarm sound ON or OFF.

Charging Circuit

Charging Circuit combines two transistors of TR1 & TR2 and their associated components to provide constant current charging requirement. LED LD5 is used to provide charging indication when the RX is docked onto the base.