CIRCUIT DESCRIPTION

Frequency configuration

The receiver utilizes double conversion. The first IF is 10.695MHz and the second IF is 455kHz. The first local oscillator signal is supplied from the PLL circuit.
The PLL circuit in the transmitter generates the necessary frequencies. Fig. 1 shows the frequencies.

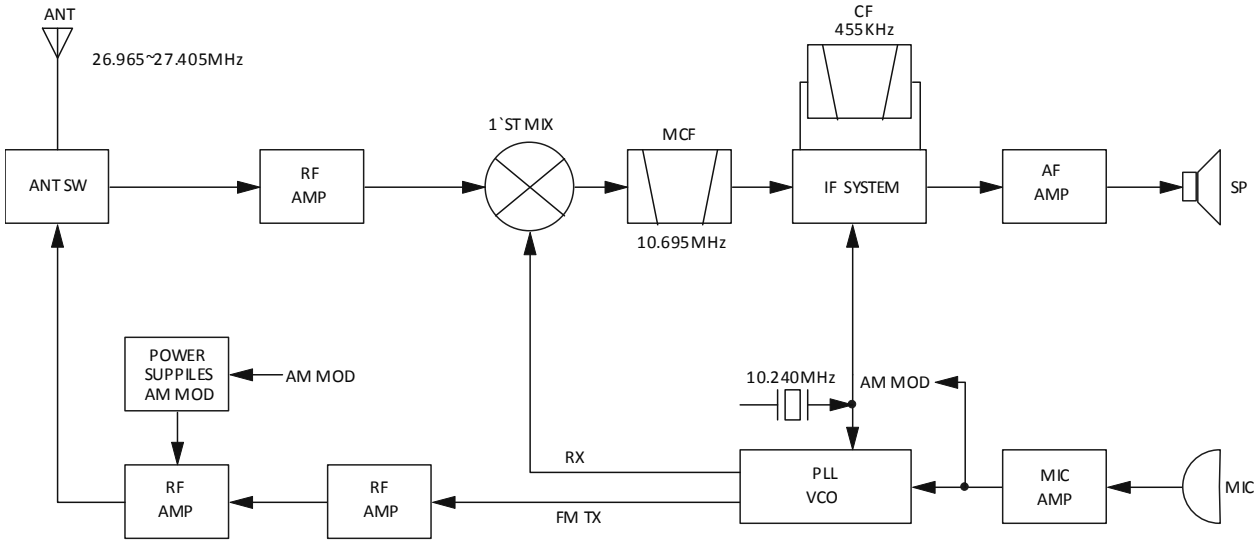

Fig. 1 Frequency configuration

Receiver

The frequency configuration of the receiver is shown in Fig. 2.

■ Front - end RF amplifier

An incoming signal from the antenna is applied to an RF amplifier (Q1) after passing through a transmit/receive switch circuit (D1,and D23 are off) and a band pass filter (L7 and L8). After the signal is amplified (Q1), the signal is filtered through a band pass filter (L10 and L11) to eliminate unwanted signals before it is passed to the first mixer.

■ First Mixer

The signal from the RF amplifier is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer (Q3) to create a 10.695MHz first intermediate frequency (1st IF) signal. The first IF signal is then fed through two monolithic crystal filters (MCFs : CB1/CB2) to further remove spurious signals.

■ IF amplifier

The first IF signal is amplified by Q12, and then enters U1 (FM processing IC). The signal is heterodyned again with a second local oscillator signal within U1 to create a 455kHz second IF signal. The second IF signal is then fed through a 455kHz ceramic filter (CF1) to further eliminate unwanted signals before it is amplified and FM detected in U1.

CIRCUIT DESCRIPTION

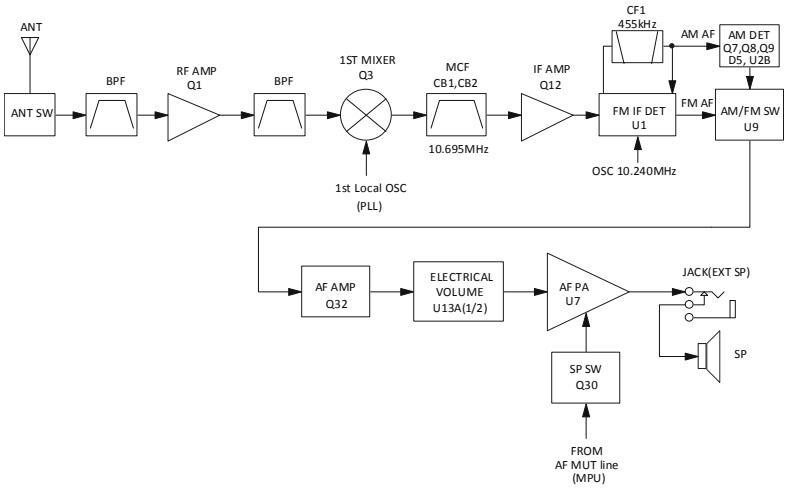

Fig. 2 Receiver section configuration

■ **AF amplifier**

The FM IC output the FM AF passes through the electrical switch (U9) or The AM AF demodulated signal from FM IC (U1) through the Q7,Q8,Q9,D5 and U2B, AM/FM switch (U9),AF amplifier (Q32),electrical Volume(U13A 1/2). After goes to AF power amplifier IC (U6). Is routed to an audio power amplifier (U6) where it is amplified and output to the speaker. To output sounds from the speaker, U12 sends a high signal to the AF MUT line the turns Q30.

■ **Squelch**

A squelch circuit is provided to prevent no-signal noise or weak signals from outputting to a speaker during transmission.

PLL frequency synthesizer

The PLL circuit generates the first local oscillator signal for reception and the RF signal for transmission.

■ **PLL**

The frequency step of the PLL circuit is 5kHz.

A 10.24MHz reference oscillator signal is divided at U4 by a fixed counter to produce an oscillator (VCO) output signal which is buffer amplified by Q20 then divided in U4 by a programmable counter. The divided signal is compared in phase with the 5kHz reference signal from the phase comparator in U4 The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency.

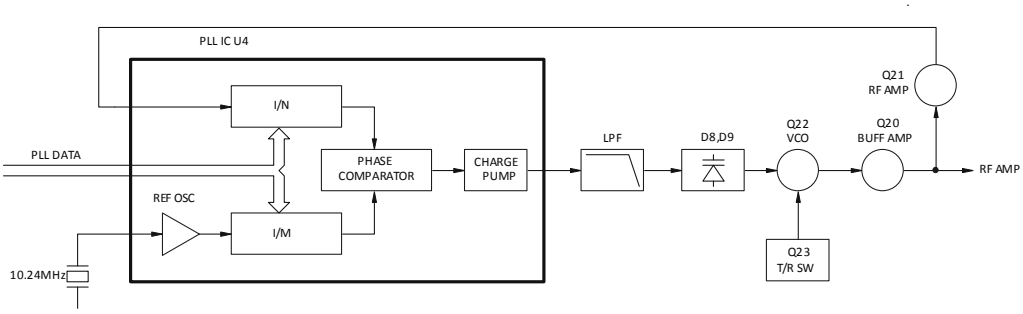

Fig. 3 PLL circuit

CIRCUIT DESCRIPTION

■ **VCO**

The frequency is created by Q22 at Transmit/Receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtain from the phase comparator. to the varactor diodes (D8 and D9). The VCO EN pin is set low (Receive: high) in transmit mode causing Q23 to turn off. The outputs from Q22 is amplified by Q20 and sent to the buffer amplifiers.

Transmitter

■ **Transmit audio**

The audio signal from the microphone passes through the MIC switch (U8). The signal goes to the low-pass filter. The signal then passes through low-pass filter (splatter filter) (U15) and cuts 3kHz and higher frequencies, and resulting signal goes to the VCO through the VCO modulation terminal for direct FM modulation. The AM modulation signal enter into RF amplifier after passing through power supplies Q28, Q46,Q34 and Q35.

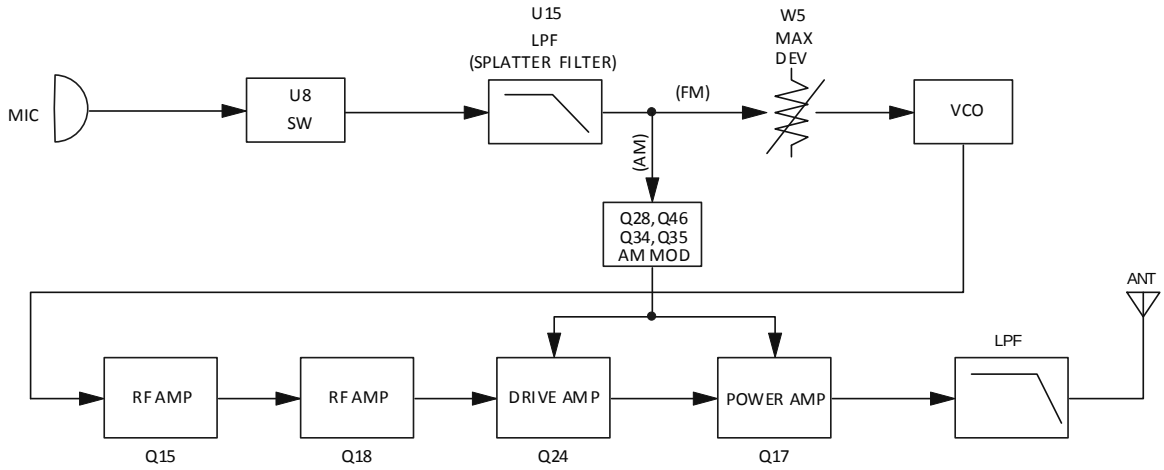

Fig. 5 Transmit circuit

■ **Power Amplifier Circuit**

The transmit output signal from the VCO passes through the buffer amplified (Q20) and amplified by Q15, Q18 and Q24. The amplified signal goes to the final amplifier (Q17) through a low-pass filter. The lowpass filter removes unwanted high-frequency harmonic components, and the resulting signal is transmitted through the antenna terminal.

Power Supply

The power supply voltage is maintained to 5.0V by the series regulator (U11). It is used as MPU power 5M. 5M for microprocessor is always output while the power is on. The 8V, 5R, 8T and 5V voltages are regulated by the power switch U7.

8V is a common 8V.

5R is 5V for reception and output during reception.

8T is 8V for transmission and output during transmission.

5V is a common 5V.

CIRCUIT DESCRIPTION

Control Circuit

■ **MPU**

The microprocessor (U12) operates at a clock of 19.200MHz.

The control circuit consists of a microprocessor (U12) and its peripheral circuits. It controls the TX-RX unit. U12 mainly performs the following:

1) Switching between transmission and reception by the PTT signal input.
2) Sending frequency program data to the PLL.
3) Controlling squelch on/off by the DC voltage from the squelch circuit.
4) Controls the second MPU.
5) Controls the compander unit.
6) Controls the power supply unit.

Display Circuit

The second MPU (U800) controls the display LCD(J800) and LEDs. The LCD(J800) and second MPU (U800) communicate through the CS, RESET, RS,WR,RD lines. The dimmer function is controlled by the switch Q800 and Q801.