

DJ-X11 CIRCUIT DESCRIPTION

Receiver

1. Receiver system :

Main band System	Triple-conversion super heterodyne (AM/SSB/CW/FM)	
	Double-conversion super heterodyne (WFM)	
Sub band System	Double-conversion super heterodyne (AM/FM)	
Main band IF		
(AM/SSB/CW/FM)	1st	243.95MHz
	2nd	45.055MHz
	3rd	455kHz
(WFM)	2nd	10.7MHz
Sub band IF		
(AM/FM)	1st	51.65MHz
	2nd	450kHz

2. Front end

Main band

[0.050-1.62MHz]

The incoming signal from the bar antenna passes through a low-pass filter and goes to the first amplifier (Q108), then the signal goes to the common mixer (IC104).

[0.050-49.99995MHz]

The incoming signal from the antenna goes to band switch circuitry (D142). The signal passes through the low-pass filter, then it is amplified at RF amplifier (Q131). The amplified signal goes to the common mixer (IC104).

[50-117.99995MHz]

The incoming signal from the antenna goes to band switch circuitry (D137). The signal passes through the low-pass filter, then it is amplified at RF amplifier (Q130). The amplified signal goes to the common mixer (IC104).

[118-170.99995MHz]

The incoming signal from the antenna goes to band switch circuitry (D124). The signal passes through the band-pass filter, then it is amplified at two RF amplifiers (Q114·Q121). The amplified signal through again the band-pass filter, then it is goes to the common mixer (IC104).

[171-274.99995MHz]

The incoming signal from the antenna goes to band switch circuitry (D132). The signal passes

through the band-pass filter, then it is amplified at RF amplifier (Q122). The amplified signal goes to the common mixer (IC104).

[275-469.99995MHz]

The incoming signal from the antenna goes to band switch circuitry (D150). The signal passes through the band-pass filter, then it is amplified at two RF amplifiers (Q136·Q148). The amplified signal through again the band-pass filter, then it is goes to the common mixer (IC104).

[470-869.99995MHz]

The incoming signal from the antenna goes to band switch circuitry (D160). The signal passes through the band-pass filter, then it is amplified at RF amplifier (Q157). The amplified signal goes to the common mixer (IC104).

Note that the cellular-phone band block system is mentioned on the separated sheet for the T-version.

[870-1299.99995MHz]

The incoming signal from the antenna goes to band switch circuitry (D161). The signal passes through the band-pass filter, then it is amplified at RF amplifier (Q158). The amplified signal goes to the common mixer (IC104).

Sub band

[118-170.995MHz]

The incoming signal from the antenna goes to band switch circuitry (D124). The signal passes through the band-pass filter, then it is amplified at two RF amplifiers (Q114·Q115). The amplified signal through again the band-pass filter, then it is goes to the common mixer (IC104).

[336-469.995MHz]

The incoming signal from the antenna goes to band switch circuitry (D151). The signal passes through the band-pass filter, then it is amplified at two RF amplifiers (Q136·Q137). The amplified signal through again the band-pass filter, then it is goes to the common mixer (IC104).

3. Mixer

Main band

[The 1st Mixer]

The 1st local oscillator signal for the 1st mixer is supplied from the VCO.

The incoming signal to the 1st mixer (IC104) and the 1st local signal are added or subtracted at mixer (IC104), and the SAW filter (FL101) selects the signal of 243.95MHz, then it goes to

the 2nd mixer (IC105) after the adjacent signal is eliminated.

[The 2nd Mixer]

The 2nd local oscillator signal for the 2nd mixer is supplied from the VCO.

{FM/AM/SSB/CW}

In FM/AM/SSB/CW mode, the signal heterodowned to the 2nd IF of 45.055MHz by the mixer passes through a crystal filter (XL101) and unwanted signal components are eliminated.

The resulting signal is amplified by the 2nd IF amplifier (Q110) and goes to the IFIC (IC107).

{WFM}

In WFM mode, the signal heterodowned to the 2nd IF of 10.7MHz by the mixer passes through a ceramic filter (FL102) and unwanted signal components are eliminated.

The resulting signal is amplified by the IF amplifier (Q112) and goes to the IFIC (IC107).

[The 3rd Mixer]

The 3rd local oscillator signal for the 3rd mixer is 455kHz signal that is produced by multiplying the 44.6MHz (X103) .

Sub band

[The 1st Mixer]

The 1st local oscillator signal for the 1st mixer is supplied from the VCO.

The incoming signal to the 1st mixer (IC111) and the 1st local signal are added or subtracted at mixer (IC111), and the crystal filter (XL102) selects the signal of 51.65MHz. The resulting signal is amplified by the 2nd IF amplifier (Q147) and goes to the IFIC (IC113).

[The 2nd Mixer]

The 2nd local oscillator signal for the 2nd mixer is 450kHz signal that is produced by multiplying the frequency 51.2MHz that is multiplied 12.8MHz (X101) by 3 at (Q160).

4. IF

Main band

[FM]

In FM mode, the signal passes through an external ceramic filter (FL103) and switch (D143·D146), and goes back to the IF IC (IC107).

The signal is amplified by the internal IF amplifier is demodulated by the quadrature FM demodulation circuit using a ceramic discriminator (X104) and output as an AF signal.

[AM]

In AM mode, the signal passes through an external ceramic filter (FL103) and switch (D143·

D146), and goes back to the IF IC (IC107). The 2nd IF amplifier (Q110) is controlled by reverse AGC at AGC amplifier (Q116) to get better audio output even though the input is changed, and the gain is controlled.

[SSB/CW]

In SSB mode, the signal passes through two external ceramic filters (FL103·FL104) and switch (D143·D146), and goes back to the IF IC (IC107). The 2nd IF amplifier (Q110) is controlled by reverse AGC at AGC amplifier (Q116) to get better audio output even though the input is changed, and the gain is controlled.

The amplified signal is mixed with the oscillator signal for the silicon oscillator (IC501) from the Demodulate (IC505) to AF signal.

[WFM]

In WFM mode, the signal of 10.7MHz passes through WFM switch (D149) and goes to the IF IC (IC107).

The signal is amplified by the internal IF amplifier is demodulated by the quadrature FM demodulation circuit using a ceramic discriminator (X102) and output as an AF signal.

Sub band

[FM]

In FM mode, the signal passes through an external ceramic filter (FL105) and goes back to the IF IC (IC113).

The signal is amplified by the internal IF amplifier is demodulated by the quadrature FM demodulation circuit using a ceramic discriminator (X106) and output as an AF signal.

[AM]

In AM mode, the signal passes through an external ceramic filter (FL105) and goes back to the IF IC (IC113). The 2nd IF amplifier (Q147) is controlled by reverse AGC at AGC amplifier (Q155) to get better audio output even though the input is changed, and the gain is controlled.

5. Squelch

Main band

The AF signal got from pin 12 of IF IC (IC107) is fed to pin 19 of IF IC (IC107). The input signal is output from pin 21 of IF IC (IC107) passing through the noise filter amplifier and rectifier circuits inside of IF IC (IC107). The rectified signal is added to the A/D port of the microcomputer (IC511). Judging the signal, the microcomputer controls ON/OFF of the audio output.

Sub band

The AF signal got from pin 12 of IF IC (IC113) is fed to pin 19 of IF IC (IC113). The input signal is output from pin 21 of IF IC (IC113) passing through the noise filter amplifier and rectifier circuits inside of IF IC (IC113). The rectified signal is added to the A/D port of the microcomputer (IC511). Judging the signal, the microcomputer controls ON/OFF of the audio output.

6. Audio

Main band

[FM/AM/SSB/CW]

The AF signal goes to the switching IC (IC108· IC514). The switched signal passes through the electronic volume (IC512) and goes to active filter (Q514).

The adjusted signal goes to the AUDIO IC (IC515) and drives a speaker, etc.

[WFM]

The AF signal goes to the switching IC (IC108· IC514). The switched signal passes through the electronic volume (IC512).

The adjusted signal goes to the AUDIO IC (IC515) and drives a speaker, etc.

Sub band

[FM/AM]

The AF signal goes to the switching IC (IC510). The switched signal passes through active filter (Q514) and goes to the electronic volume (IC512).

The adjusted signal goes to the AUDIO IC (IC515) and drives a speaker, etc.

7. VCO

Main band

[The 1st Local]

The VCO for the 1st local consists of the Colpitts oscillator. (D107, D114) and (L105) determine the frequency, and they are oscillated at the transistor (Q102). The oscillated signal passes through the buffer amplifiers (Q103, Q104) and goes to the PLL-IC (IC106).

[The 2nd Local]

The VCO for the 1st local consists of the Colpitts oscillator. (D123, D126) and (L121) determine the frequency, and they are oscillated at the transistor (Q111). The oscillated signal passes through the butter amplifier (Q113) and goes to the PLL-IC (IC106).

Sub band

[The UHF Local]

The VCO for the 1st local consists of the Colpitts oscillator. D164, D165 and L180 determine the frequency, and they are oscillated at the transistor Q162. The oscillated signal passes through the buffer amplifiers (Q161) and goes to the PLL-IC (IC101).

[The VHF Local]

The VCO for the 1st local consists of the Colpitts oscillator. D166, D167 and L181 determine the frequency, and they are oscillated at the transistor Q163. The oscillated signal passes through the buffer amplifiers (Q161) and goes to the PLL-IC (IC101).

8. PLL

Main band

PLL-IC (IC106) is used to control the oscillation frequency of VCO. The microcomputer (IC511) sends the signal with serial data to PLL-IC (IC106). The 12.9MHz reference frequency of PLL-IC (IC106) oscillates the crystal oscillator (X101).

Sub band

PLL-IC (IC101) is used to control the oscillation frequency of VCO. The microcomputer (IC511) sends the signal with serial data to PLL-IC (IC101). The 12.9MHz reference frequency of PLL-IC (IC101) oscillates the crystal oscillator (X101).