Explanation of Circuit of DJ-V5T

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Reception

System: Double super heterodyne 1st IF: FM 39.15MHz
WFM 13.35MHz
2nd IF: 450KHz

2. Front-End:
VHF: Incoming signal from the antenna passes through duplexer FL301 and low-pass filter, then changed by band-switch D317, amplified by RF amplifier Q312. The signal goes into band-pass filter, band-switch D314 and finally added to the mixer IC306.

WFM radio: Incoming signal from the antenna passes through duplexer FL301 and low-pass filter, then changed by band-switch D317, amplified by RF amplifier Q318. Then same circuit as above the signal goes to IC306.

UHF: Incoming signal passes same circuit as above, changed by band-switch D321, RF amplifier Q321, band-pass filter FL303, band-switch D322 and finally to mixer IC306.

3. Mixer
The sum and difference of input signal and first local signal is made in mixer IC306, separated FM and WFM signal at FM switch D319.
FM: FM reception is obtained by selecting 39.15MHz at crystal filter XF301, eliminating adjacent signals then amplified by first IF amplifier Q320.

WFM: WFM is obtained by band-pass filter, selecting 39.15MHz, eliminating adjacent signals.

First local signal passes VCO output, cushion amplifier Q202, then goes into the local input terminal of mixer IC306. The upper-side local is used for VHF and WFM, lower-side local for UHF.

4. IF
FM: Amplified signal at first IF amplifier Q320 goes into 16th pin on IC307. Added signal and IC302's standard-buffer output picks up 12.9MHz signal and triple it with Q322, then with the signal that added to IC307's 1st pin, IC307's internal mixer

circuit obtains 450KHz 2nd IF signal. This 2nd IF signal comes out of the 3rd pin of IC307, filtered adjacent signal by ceramic-filter FL302, then goes into IC307's 5th pin. This signal is detected by limit amp and quadretcher circuit inside the IC, then goes out from the 10th pin as an audio signal.

WFM: WFM signal goes into IC310's 16th pin. Added signal and IC302's standard-buffer signal 12,9MHz is doubled at Q322, then signal that added to IC310's 2nd pin is mixed at IC310's internal mixer circuit and converted to 13.35MHz 2nd IF signal. This signal comes out of IC310's 4th pin, goes into ceramic-filter FL304 and filtered adjacent signal, then returns to IC310 through the 7th pin. Then this signal passes through limit amp and quadretcher detection circuit inside the IC then comes out of IC310's 9th pin as an audio signal.

5. Squelch

FM: IC307's 10th pin AF output signal goes into IC307's 11th pin. This signal passes through noise-amp and filter circuit inside and goes out of IC307's 13th pin. This signal is added to microprocessor IC1's A/D port, and AF output is controlled on and off by IC1.

WFM: IC310's 10th pin outputs S-meter signal. This signal is added to IC1's A/D port and then controlled by IC1.

6. Audio

FM/WFM: the selection of audio output signal is made by IC308 for FM, IC312 for WFM. Then AF output signal passes through active band-pass filter Q329, AF switch Q330 then adjusted the volume level by VR601. Adjusted signal goes into audio power amplifier IC8's 2nd pin, comes out of 6th pin then goes to speaker.

7. VCO

VHF/FM radio

VHF and FM radio bands' VCO is consist of Colpitts oscillator. D202, D204, L202, and L203 determine the frequency, by oscillating it at transistor Q201.
Oscillated signal goes into cushion amp Q202, Q304 then PLL-IC302's 19th pin.

UHF: Colpitts oscillator is also used. D206,D208,L204 determine the frequency and oscillated by Q203. The signal goes into Q202, Q304 then PLL-IC302's 2nd pin.

8. PLL

To control VCO's oscillating signal PLL-IC302 is used. IC1 microprocessor transmits serial controlling signal to IC302. IC302's standard frequency 12.9MHz is oscillated by crystal X301 internally.

VHF/FM radio: IC302 compares phase of IC1's control signal that is added to the 19th pin of IC302 and standard 12.9MHz signal inside IC302; as a result if the difference is detected, IC302's 13th pin charge-pump outputs pulse signal, convert it to DC voltage by active-filter, then added to VCO's D202 and D204's cathode to eliminate the difference, to obtain stable oscillation for the selected frequency.

UHF: IC302 compares phase of IC1's control signal that is added to the 2nd pin of IC302 and standard 12.9MHz signal inside IC302; as a result if the difference is detected, IC302's 8th pin charge-pump outputs pulse signal, convert it to DC voltage by active-filter, then added to VCO's D206 and D208's cathode to eliminate the difference.

Transmission

1. Microphone Amplifier

MIC-Amp IC314 has 2 Op-Amp. Voice is converted to electronic signal by the microphone, then added to IC314. The output signal is amplified and pre-emphasized.

VHF: output signal from the Mic-amp is adjusted for the MAX freq.deviation by VR302, and by added to VCO's D205 cathode, controls capacitance of oscillation circuit to obtain FM modulation.

UHF: same as above, but VR301 for Max deviation adjustment and D207 for VCO.

2. Power Amplifier

The signal oscillated by VCO goes into Q202, IC301, Q308 then power amplifier Q306. Amplified signal is filtered with low-pass filter and duplexer to eliminate harmonics, then connected to the antenna.