9. CIRCUIT DESCRIPTION

1) Transmitter section

FM modulated output from the **VCO** which is transmitting frequency is fed to an 3-stage amplifier followed by the antenna matching circuit and Low Pass Filter and transferred to Antenna.

1.1 To turn the PA (Power Amp.) on, Press and Hold on the **PTT** (Push-To-Talk) switch.

CPU controls **Q501** (VCO power supply switching transistor) and **Q503-PA** amplifier (**Q311, Q321, Q331**) and diode (**D331, D211**) bias switching transistor. The PA's is a broadband 3-stage transistor amplifier. **D204** is for temperature compensation of **Q331**.

1.2 **MIC Amp. Pre-emphasis and Audio limiter**.

U701-A is MIC amplifier which has 14.5 dB gain and Pre-emphasis Amp (6 dB/oct, 300 Hz ~ 2.5 kHz). **U701-B** is audio limiter to protect over-deviation (max deviation : 2.5 MHz).

1.3 **Low Pass Filter** (3 kHz ~ 20 kHz).

U801-D is Low Pass Filter with 20 dB/oct slope at 2.7 kHz ~ 20 kHz. This is for eliminating the unwanted high audio frequency (3 kHz ~ 20 kHz) modulation to meet the occupied band width.

1.4 CTCSS Band Rejection Filter (**HPF**)

This filter is for rejecting CTCSS band (67 Hz ~ 250 Hz) from MIC amplifier. Otherwise CTCSS tone will be mixed with voice and fed to **VCO** modulation input. Then, the receiving set has a trouble in decoding CTCSS tone from the signal mixed with voice.

CTCSS tone is generated at CPU using digital to analog converter method and fed to modulator via **LPF**(Low Pass Filter : 3 kHz ~ 20 kHz).

2) Receiver Section

2.1 Signal from Antenna is amplified via **Q211** and filtered **F211** (Saw. 465 MHz).

2.2 The amplified signal is mixed with 1st LOCAL driven by **VCO-1** (FRS 443 M).

2.3 **1st IF 21.7 MHz** is filtered by X-tal filter and amplified for 2nd mixer.

2.4 **2nd mixer** output is 450 kHz. The 2nd LOCAL is driven by PLL X-tal oscillator via inner buffer

Amp.

2.5 **M201 IF IC** demodulates audio. The High Frequency Audio Band is amplified by built-in OP-Amp in **U201** and rectified to **PC** (0.7 ~ 1 V) to control scan control in **M801**. This is for detecting receiving signal. Scan control output is fed to CPU to turn speaker On/Off.

2.6 The audio also amplified by **U801-A** filtered by **M701-C** (LPF 250 MHz, CTCSS) and is shaped digital signal and delivered to CPU.

2.7 The amplified audio by **M801-A** is filtered by HPF **M801-B**, **M801-C** to eliminate CTCSS tone to speaker.

Finally, received signal is filtered by **U801-D** (3 kHz ~ 20 kHz) and drive speaker Amp (**U602**).