

## 11. CIRCUIT DESCRIPTION

### 11.1 New IF system principle

Fig.11-1 (a) shows the conventional IF system which band is wide position, and Fig.11-1 (b) shows the new IF system.

Vertical line indicates the time variable of desired signal.

The line at right side of desired signal indicates undesired signal.

Mountainous curve shows the amplitude characteristic of IF filter.

In the case of conventional system, signal pass through the filter without generate the distortion so that filter is wide. At this time, the system is affected by undesired signal.

In the case of new system, signal pass through directly so that narrow filter follow the signal. Besides, the system is not affected by undesired signal.

This system's filter is controlled by feedforward control, therefore, stability is very high and not oscillation.

This system organize the equivalent follow type filter so that input FM signal frequency controlled for center of the filter at any time. (At conventional system, filter is followed the input signal.)

Fig.11-2 shows the block diagram. System is consists of the control block and filter block. Control block is consists of band pass filter (BPF1), FM detector (DET1) and low pass filter (LPF).

The band pass filter (BPF1) has the same characteristic as conventional tuner's narrow filter, and this filter has selective characteristic sufficiently.

When FM signal is inputted, FM signal is detected by FM detector (DET1) after pass through the band-pass filter (BPF1). And then, output signal of FM detector (DET1) is cut the useless high frequency elements by low pass filter (LPF).

Filter block is consists of two mixer (MIX1 and 2), band-pass filter (BPF2) and VCO.

Mixer 1 (MIX1) perform frequency change so that multiply input FM signal by VCO output.

F-91 introduce the secondary IF frequency as 13.45 MHz.

Band-pass filter (BPF2) has the same narrow bandwidth characteristic as the band pass filter (BPF1).

This filter (BPF2) cut the obstruction wave including input signal.

Input signal of passed through the band pass filter (BPF2) is multiplied by VCO output at mixer (MIX2) again, then change to the original frequency.

Original signal is detected by FM detector (DET2), then audio output is obtained.

In this way, in spite of use the filter of fixed the center frequency, F-91 operate to the variable filter so that center frequency follow the input signal as equivalent.

If desired signal (S) and undesired signal (U) apply to input as shown in Fig.11-2, first, these signals are applied to control block, and cut the undesired signal (U) by BPF1. At this time, desired signal is distorted by BPF1.

This desired signal without undesired signal is detected by FM detector (DET1), then changed the FM waveform by VCO again.

Output signal of VCO is sum of the desired signal (S) and the distortion element (D).

This distortion element (D) not only include generated distortion at filter (BPF1) but also include generated distortion-at detector and VCO.

On the other hand, desired signal (S) and undesired signal (U) apply to the filter block, then mix with the VCO output. Direction of desired signal's modulation is same way as input signal.

The differential element is took out from mixer 1 (MIX1)'s output by BPF2. At this time, desired signal (S) is vanished and undesired signal (U) is eliminated by BPF2.

Therefore, only distortion element (D) pass through the BPF2.

When distortion element (D) pass through the BPF2, element (D) hardly distort so that frequency deviation of the distortion element (D) is just a little.

And signal is mixed with VCO output by mixer 2 (MIX2) and pick up the differential element again. Then, desired signal (S) is obtained to not distortion. At this time, undesired signal (U) has eliminated.

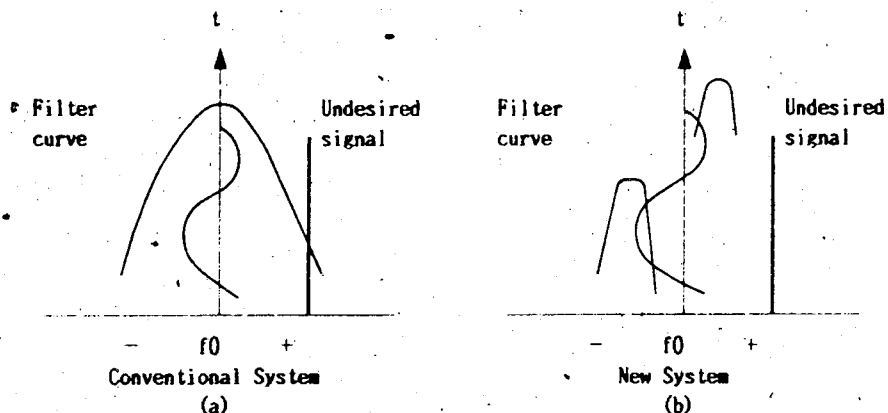


Fig.11-1 Signal tracing characteristics

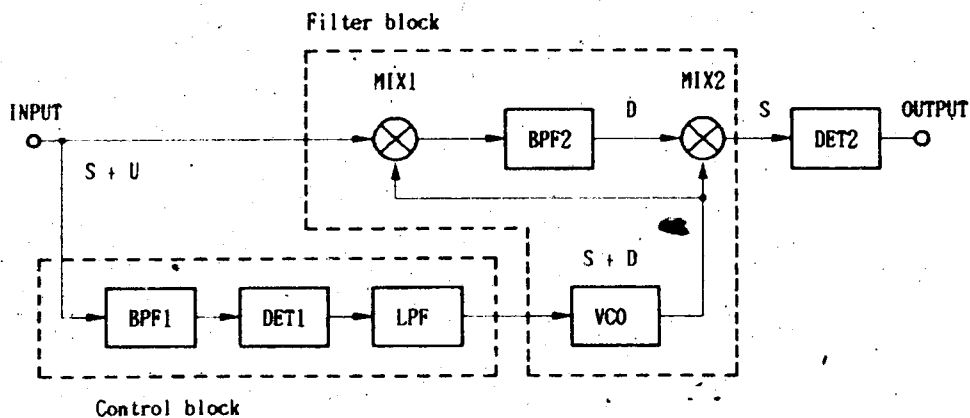


Fig.11-1 Blockdiagram of Active Real-time Tracing System