Retriggerable one-shot prevents false triggering of PLL tone detector

By adding a retriggerable one-shot multivibrator and a transistor to a phase-locked-loop tone detector, you can prevent false triggering by radio noise.

The circuit of Fig. 1 discriminates between noise and the input tone by measuring the interval of time that the tone is present at the input of the detector. Since in-band frequency components of radio noise are shorter than the duration of a tone command signal, the circuit can be made insensitive to triggering by radio noise.

The 5-V logic level at the tone-detector output, point A, keeps transistor Q_1 in saturation. But when a tone is detected, point A switches to ground potential, thereby triggering one-shot MM_1. The triggering of MM_1 raises the one-shot output, point B, from ground to 5 V. The 5-V level at point B keeps transistor Q_1 saturated until the one-shot times out. Point B then returns to ground potential.

If the tone is still present after point B returns to ground—as occurs for a valid signal—both points A and B will be at ground potential. Transistor Q_1 is thus cut off, providing a logic ONE at the output.

If the tone is no longer present—as when the detector is triggered by noise—point A will be at 5 V and point B at ground. Transistor Q_1 stays saturated, and the output remains at ZERO.

Resistor R_1 and capacitor C_1 control the timing (Fig. 2) of MM_1. The R_1C_1 time constant should be chosen to be about five times longer than the longest noise component expected on the particular transmission channel. About 100 ms is adequate in the hf spectrum.

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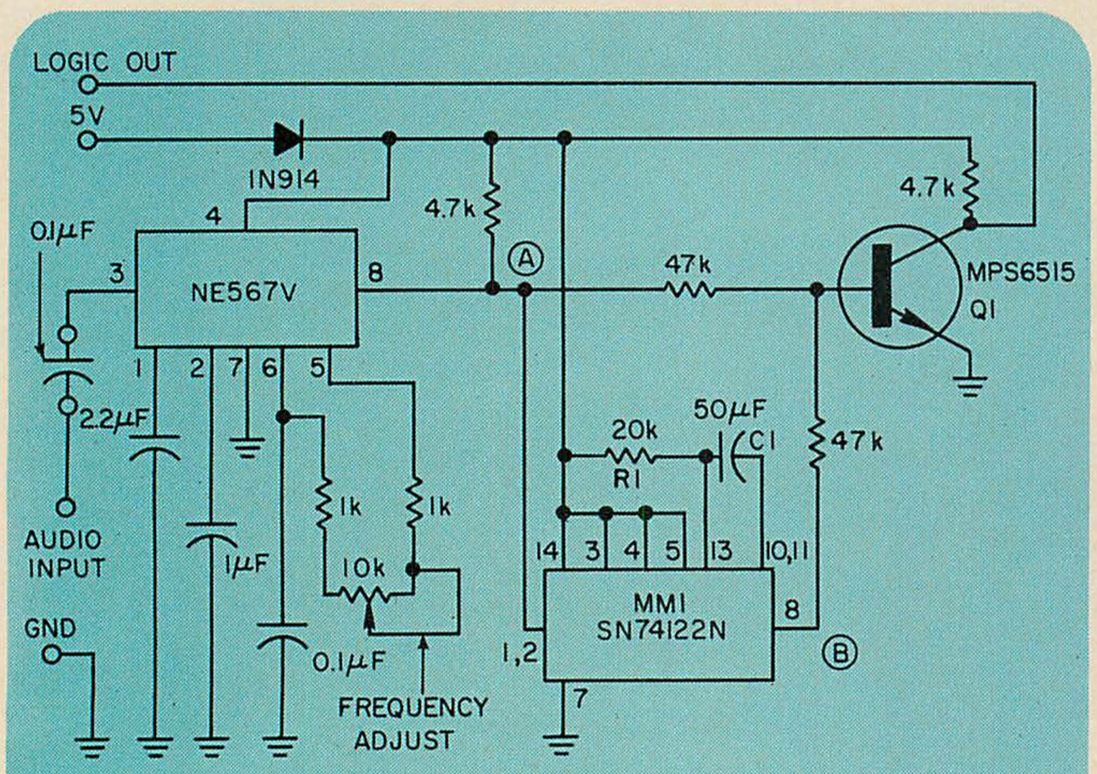
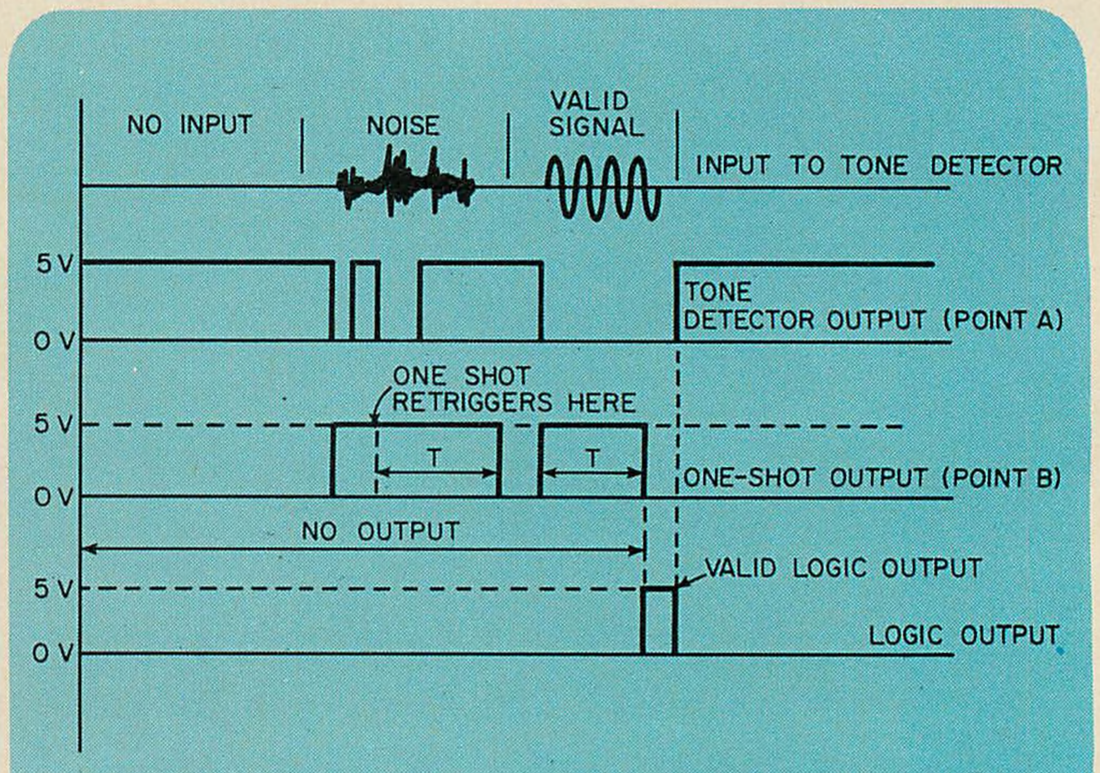


1. **One-shot MM_1 and transistor Q_1 prevent** radio noise from falsely triggering the NE 657V tone detector.



2. **False triggering of the tone detector** or one-shot does not produce a logic output, as indicated by the three output waveforms.

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