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Transceiver CW Filter and Monitor

An inexpensive and simple transistorized accessory unit for improving the CW performance of any transceiver.

Just about every transceiver on the market still lacks adequate built-in provisions for CW work—that is, a CW keying monitor and sharper IF or audio selectivity for CW. The author previously built* a tube-type accessory unit that could be used with almost any transceiver to provide these functions. However, being an "outboard" unit it was not suited for use in mobile or portable applications. What was needed was a minaturized version which could be tucked away inside a transceiver case.

Circuit

After some experimentation, the author came up with the circuit shown in **Fig. 1.** Transistors Q1, Q2 and Q3 comprise a so-called "active" audio filter which allows a good deal of selectivity to be obtained by only RC circuitry. Essentially Q1, and the network in its base circuit make up a low-pass audio filter while Q3 with its network comprise a high-pass filter. The combination of the two circuits produces the selectivity characteristics shown in **Fig. 2.** The filter can be used between any two low-level, moderate to high impedance points in a receiver audio circuit.

The dashed line in **Fig. 2** indicates the ideal if selectivity which a 2 kHz mechanical filter might provide. As can be seen the audio selectivity provided by the three stage "active" filter is a considerable improvement, at moderate attenuation levels, for CW work. If the graph were expanded to cover higher attenuations than 25 dB, it would be seen that the skirts of the active filter flare out beyond those of the mechanical filter. So, while the active filter will by no means pro-

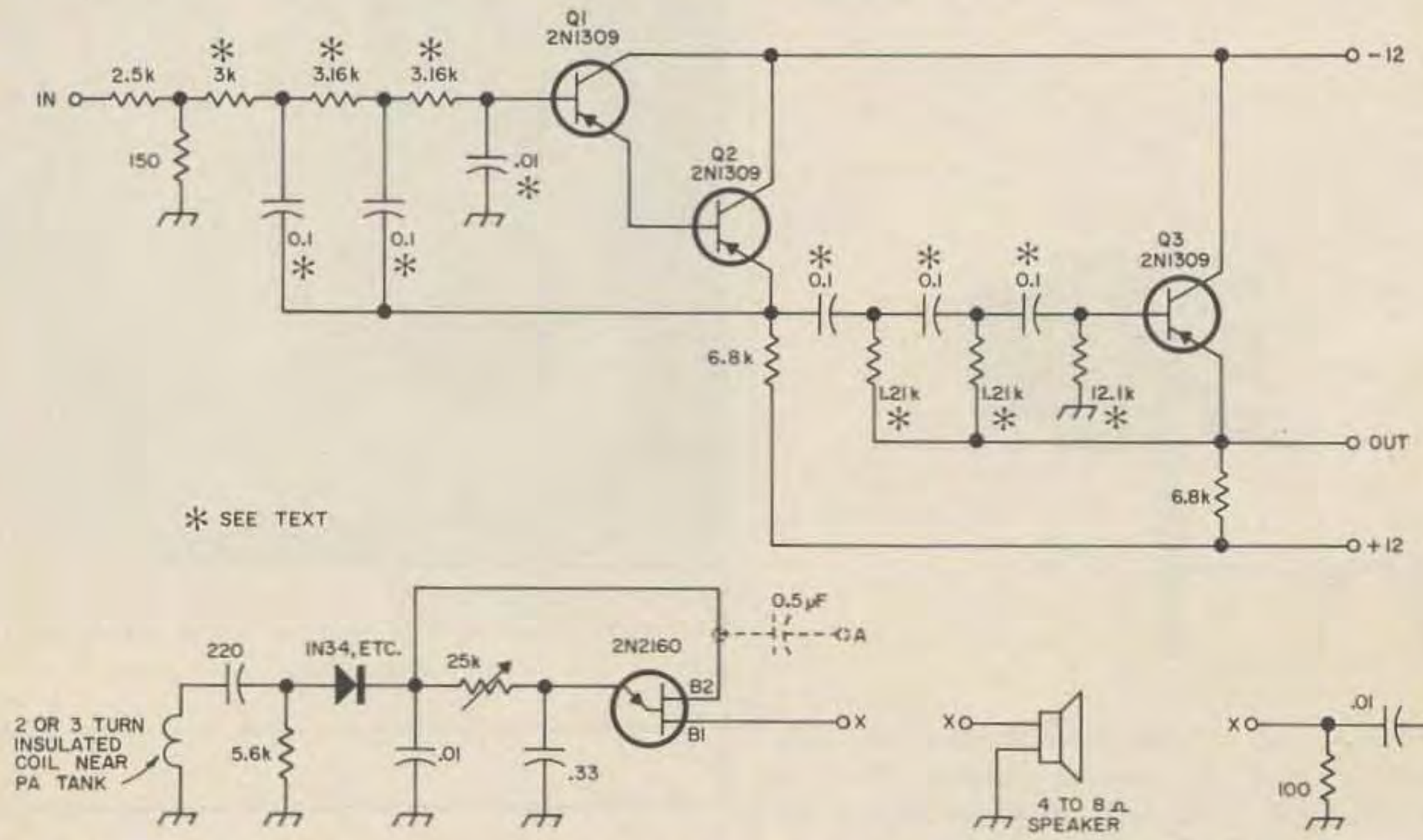

Fig. 1. Filter and monitor circuit which may be used with an SSB transceiver for excellent CW hamming. The —12 and +12 voltages may be obtained from any well-filtered point in the transceiver.

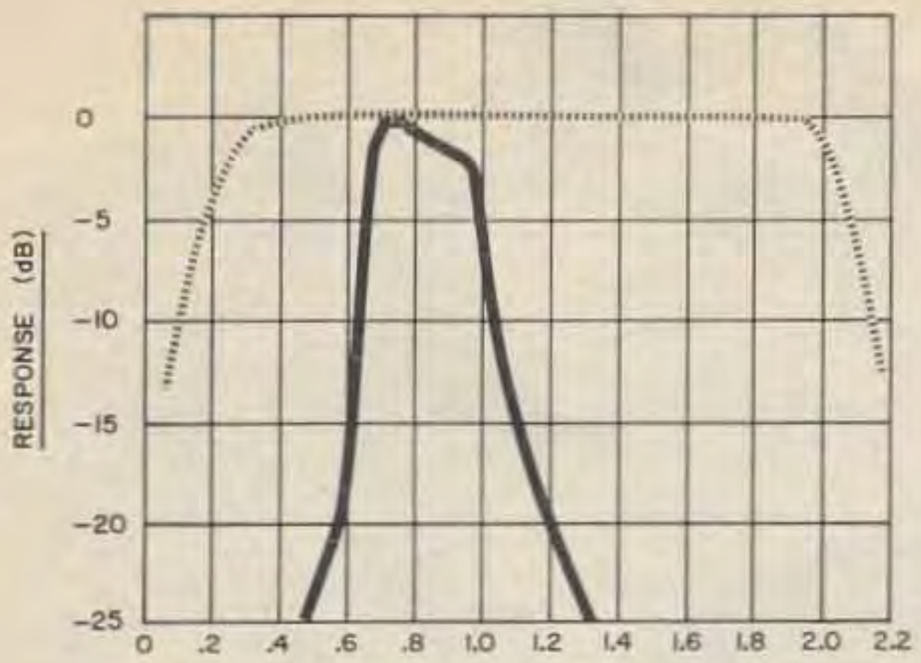

Fig. 2. Approximate frequency response of the filter shown in Fig. 1.

vide the same steep skirted selectivity of a narrow crystal lattice or mechanical filter, it does provide enough selectivity, in a very simple form, for effective CW work.

The CW monitor is rf actuated and uses a unijunction transistor in a relaxation type oscillator circuit. The 25 k potentiometer is used as a tone control. A 10 k fixed resistor could be substituted for further simplicity. Output for headphones can be taken from either points A or B. If the outputs from the filter and monitor are parallel to be used with a pair of headphones, some experimentation will be necessary with the coupling condensers at points A or B to find a value which gives sufficient output level without loading the filter unduly (depending on headphone impedance).

The tone from the monitor, like any relaxation oscillator, is hardly very easy on the ears but satisfactory for the occasional CW user. The CW monitor shown in **Fig. 3** is suggested if a smoother note is desired. The 12 volts necessary to power the circuit could be obtained from a RF pickup coil and rectifier, as with the unijunction type monitor, or from some point in the transmitter which provides 9 to 12 volts under key-down condition (across the cathode resistor of a rf stage in a grid-block keyed transmitter, for instance.)

Construction

Construction is simple and inexpensive. No adjustments, other than the tone control, are necessary.

How compactly the unit can be constructed depends solely upon the builder's ability to compact components on a perforated circuit board. Except, of course, for the rf pickup

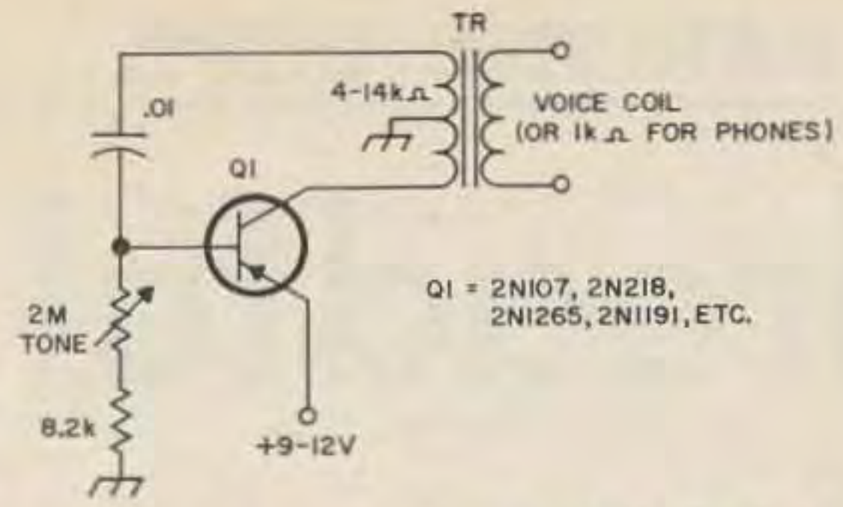

Fig. 3. Another tone oscillator which may be substituted for the one shown in Fig. 1.

coil which must be placed by the PA tank coil, the unit will fit on a 2" x 2" perforated board.

All the transistors used are of the $1 variety. The only components that are critical are the resistors and condensers starred in **Fig. 1.** If the selectivity characteristics of the filter are to be attained, the resistors must be of the 1% tolerance variety. The condensers must also be matched as closely as possible using, for example, a capacitance bridge or meter. If "off-the-shelf" 10% tolerance resistors and capacitors are used, performance will likely prove disappointing.

A great many, if not almost all, of the components necessary can be obtained by buying several of the computer boards available at three or four per dollar from various supply houses.

Usage

The unit can be wired into a transceiver so that it can be switched in and out of audio chain in the receiver. A still simpler, "no-holes" approach for those who only use headphones on CW and who have a medium or high impedance headphone jack on their transceiver is to replace the headphones jack with a multiple circuit unit, such as shown in **Fig. 4.** Plugging the headphones in the jack disables the loudspeaker and the filter and monitor are in the circuit ready for CW operation.

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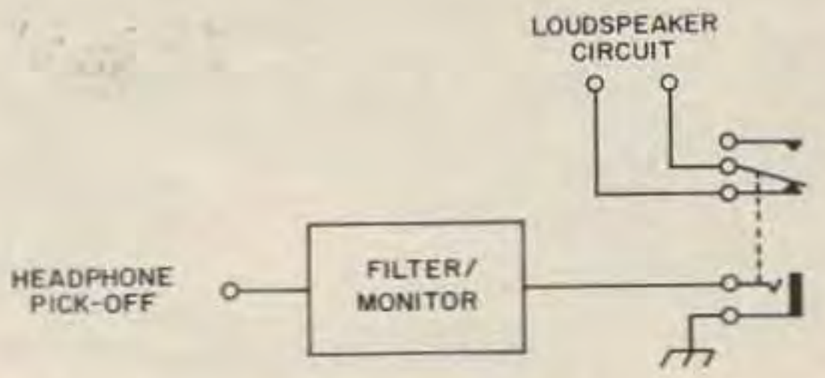

Fig. 4. A phone jack with additional switching circuit may be substituted for the regular phone jack.