

Second Guessing The Heathkit IG-72

HOW TO GET A ZEROBEAT

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IF YOU OWN a Heathkit Model IG-72 audio generator, you already have an excellent piece of equipment. But you might not be able to zerobeat the IG-72 with a signal from another source. This is because the IG-72 has a switch-selectable discrete frequency output. However, for less than \$5, you can modify your IG-72 to provide zerobeat capability with continuously variable or the original discrete-frequency output. The modification is easy to perform and requires very little time. (The Heath Company engineers agree with the modification described in this article and point out that this idea is an integral part of their updated Model IG-18 and IG-18W solid-state sine-square-wave audio generator.)

The output frequency of the IG-72 is determined by a bridge-T network in a feed-

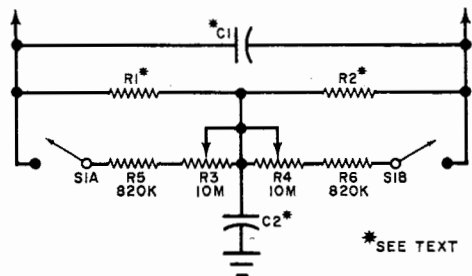


Fig. 1. Modification components to be added to IG-72 circuit are S1 and R3 through R6.

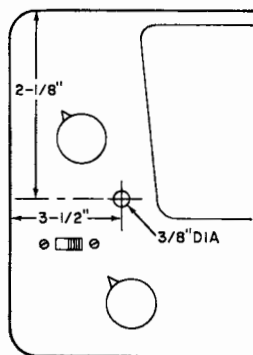


Fig. 2. Before drilling R3/R4 mounting hole, check for adequate behind-panel clearance.

back circuit as shown in Fig. 1. The multiplier (1, 10, 100 and 1000) is determined by the values of capacitors $C1$ and $C2$. The significant figures are selected by the "cycles" switches on the front panel of the instrument. These switches change the resistances of $R1$ and $R2$. For the "tens" range, the values of $R1$ and $R2$ are determined by parallel-connected resistors, effectively 100,000 ohms per step. The "units" range values are set by 1-megohm parallel-connected resistors, each of which is selected in discrete increments. Hence, a 4700-Hz signal setting would be the equivalent of four 100,000-ohm and seven 1-megohm resistors in parallel, with a multiplier setting of 100.

Now, the modification in the IG-72 allows you to obtain a continuously variable frequency output by adding a variable resistance in parallel with the resistance selected by the "cycles" switches. With the values given in Fig. 1, a range of 10.82 megohms to 820,000 ohms is available. This has the effect of providing a variable third significant figure that is continuously adjustable between 4709 and 4920 Hz.

The overlap of ranges is required for two reasons: First, it allows for the variation in tolerances of component values to insure full coverage. The second reason is due to the nature of available potentiometers; the ideal would be a pot with values that range continuously from infinity to 1 megohm, but 10 megohms is the best that can be had for the high end. This prevents attainment of zero with the third significant figure unless the switch is thrown to remove the added resistors from the circuit.

To increase the overlap range, the values of $R5$ and $R6$ can be reduced. Using 680,000-ohm values provides the variable function over a range of 0.094 to 1.45. The use of 500,000-ohm values extends the high end to 2.0 for an overlap of one full step in the units range.

The details for making the modification installment in your IG-72 are shown in Fig. 2. Switch section $S1$ and pot sections $R3$ and

R4 must be wired to provide a dpst-switched 10-megohm dual-pot arrangement. (This is a single part consisting of a dual-put with an add-on dpst switch attachment.) The dual-pot is then mounted through a $3\frac{1}{8}$ "-diameter hole previously drilled in the front panel at the location shown. (Note: Be sure to check for proper clearance behind the panel before you drill this hole.)

When installing the modification components, bear in mind that *C1*, *C2*, *R1* and *R2* represent a simplified version of the original bridge-T network in the IG-72 generator. You will be adding the modification components to the circuit without breaking any of the original circuit's lines. Hence, only three short lengths of hookup wire from the new circuit will complete wiring.

To operate the new circuit, just turn the control knob clockwise past the click, varying the setting as required to obtain zero-beat. Turning the control knob counter-clockwise past the click restores the circuit to normal operation.

The rated frequency accuracy of the IG-72 is 5%, although most generators operate within tighter tolerances. This means that if you select a 2500-Hz output, it could be as low as 2375 Hz or as high as 2625 Hz and still meet the rated specification. So you can see that calibration of the newly installed control would serve no useful purpose since, by calibrating it, you might know that you have added, say, 0.6 times the third significant figure in Hertz without knowing the absolute frequency of the output signal. -30-
