

A PORTABLE OBSERVATION TIMER EMITTING DIFFERENTIAL TONES FOR SIGNALLING OBSERVATION AND RECORDING INTERVALS

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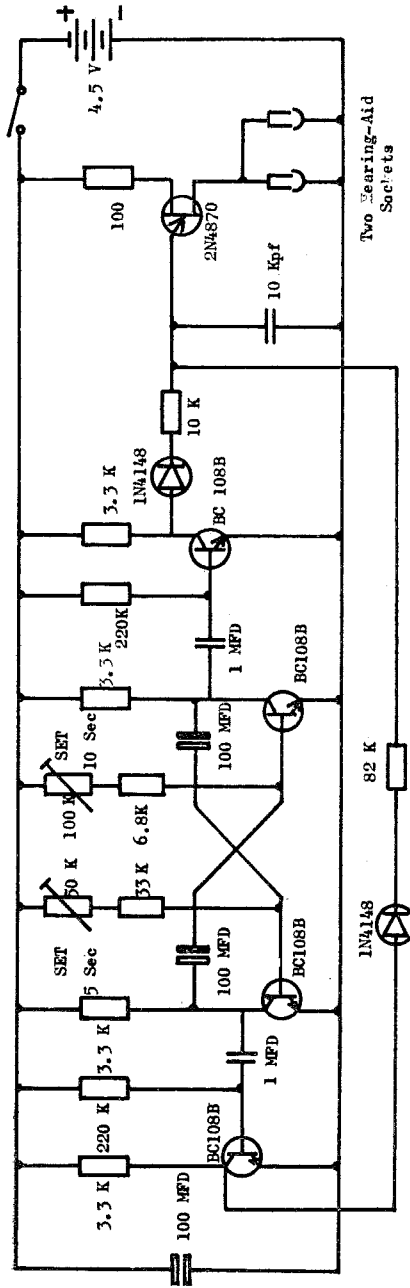
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Two independent observers are frequently required to establish data reliability in behavior modification studies carried out in field settings. Quilitch (1972) has reported the development of a portable programmed audible timer, which obviates the need for observers to shift their gaze from subjects to stopwatch. This timer utilizes an ordinary cassette tape recorder to play tapes on which auditory signals are recorded at 10-second (or other) intervals. Observers could listen to the recording tape through the recorder's speaker or through earphones. This technique for timing observations is dependent on the availability of a tape-recorder. In long-term behavior modification projects (for example, in school or home settings) this could result in a costly tie-up of tape-recorders in a limited number of settings. In addition to facing a shortage of tape-recorders the present authors were faced with the need for a timer which would signal observation intervals (10 seconds) of a different length from the recording intervals (5 seconds). Such a timer would allow for the maximum amount of time in a session to be used in actual observation by keeping recording time to a practical minimum. It was also considered desirable to distinguish the signals at the end of the observation interval from those at the end of the recording interval by using two different tones. In this way, two observers, operating independently, would find it easier to keep their observations synchronized throughout an observation session. With two distinctive tones being emitted, there would be less likelihood of the observers forgetting whether they were beginning an observation or a recording interval.

Hence, a circuit was designed for the repetitive generation of two audible signals, the first after a 10-second interval, the second after a further 5-second interval. A distinguishing tone is heard by two observers through hearing aid earpieces. The initiation of the longer interval is identified by a low, approximate 200 Hz tone while the initiation of the shorter interval is recognised by a higher tone, approximately 3 KHz.

OBSERVATION TIMER CIRCUIT



N.B.

Cabinet made by Fryco Products Ltd.
 Hearing-aid Earpieces from D. J. Reid
 Battery is three size D 1050 cells
 Transistors are BC108B or equivalent

The two intervals are generated by an astable multivibrator (see Diagram) with two adjustable time constants set by two preset resistors together with 100 μ F capacitors as shown. Coupled to each collector of the astable circuit is a delay stage which turns off for approximately 150 milliseconds with each negative transition of the corresponding collector, allowing a current to be gated into the capacitor of the unijunction transistor (U.J.T.) which oscillates in the usual way. The delay stages are isolated from this capacitor by blocking diodes. In series with each blocking diode is a resistor which is selected to determine the charging rate of the capacitor of the U.J.T. oscillator and therefore the tone generated at the end of each period. By gating the charging current to the U.J.T., relaxation oscillator, a 150 millisecond high or low tone burst is generated to identify the timed observation period.

The total circuit drains only 6 mA from three, size D battery cells offering an operating lifetime for intermittent use in excess of 600 hours before replacement.

The change in the timer periods is less than 3% for a supply voltage variation from 4.5 to 3.0 volts. This small change occurs because the base-to-emitter voltage drop is only a small proportion of the total voltage (approximately twice the supply voltage) that is applied across the base resistors of the multivibrator.

A prototype timer was mounted in a small box, measuring 6 inches long, 4 inches wide, and 4 inches deep. Sufficient wiring was provided with the earphone attachments to allow the two observers to be placed up to 24 feet from each other. The timer has been tried out in a classroom setting for a period of six weeks, and has proved highly satisfactory.

REFERENCE

- Quilitch, H. R. A portable programmed, audible timer. *Journal of Applied Behavior Analysis*, 1972, 5, 18.