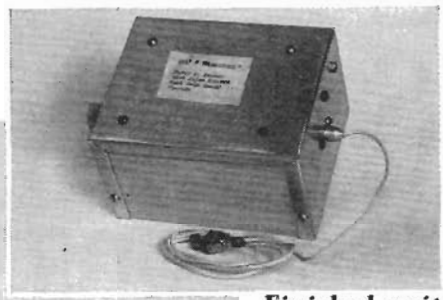
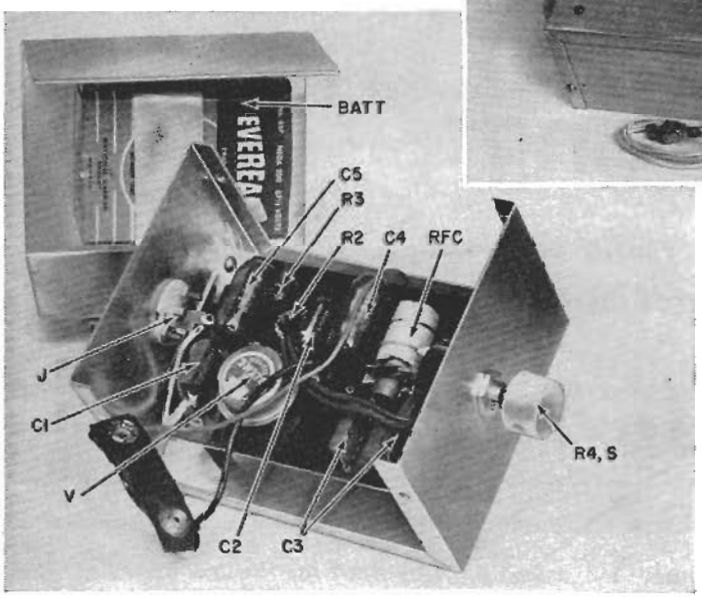
TRANSITONE LOCATES HIDDEN WIRING

Conduit imbedded in a concrete wall or buried underground can be traced easily with this simple instrument

By HARRY D. PARKER



Finished unit forms neat package.



Parts arrangement inside aluminum case.

MANY times a service technician has to know where wiring conduit is located. This is especially true when installing electronic equipment (sound systems, intercoms, fire and burglar alarms, etc.) in hotels, apartments, warehouses, factories, etc. The little transistor Transitone will find the conduit for you.

The unit consists of a tone-modulated transmitter and any portable broadcast radio. Here in the South, as in many other places, building regulations state that wiring conduit and plumbing must be buried in the concrete walls and floors. So when future installations or repairs have to be made, it is convenient to know where the conduit is. Just clip the Transitone's antenna to the case of an outlet box or a water pipe and with a transistor radio tuned to the transmitter frequency you can trace the tubing through the building. Chalk lines on the walls or flooring to indicate the tubing's position. Many other uses are obvious; such as locating buried wiring in outdoor stadiums, from house to garage and so on.

Circuit description

The transmitter consists of a simple rf oscillator and is self-modulated by the blocking action of C4 and R1 (see schematic). Varying C4's value changes the transmitted tone and the power output. R2 and R3 are base-bias resistors and C2 is the base rf bypass. Capacitor C3 is the feedback capacitor that starts and maintains oscillation. If it is too small, the circuit won't oscillate; if too large, you can't get the frequency high enough. Coil L and C1 act as a ringing circuit and determine the frequency. Changing either L or C1, or varying the value of R3 shifts the frequency. A small pot (R4) (about 25,000 ohms) may be used as a fine frequency control instead of L's adjustable core. Varying the supply voltage will also shift the frequency slightly. Capacitor C5 is an rf bypass across the power supply. The rf choke is a horizontal oscillator coil for a TV set and is part of the audio blocking network that includes C4 and R1.

A toggle or slide switch is inserted in one battery lead. If you use a control for R3, a switch could be included with it.

Notice the battery voltage. It is 67.5 volts. This may confuse you as most transistors are operated at 6 or 12 volts. This unit will oscillate at a lower voltage but it will not be tone-modulated. The Delco 2N278 transistor has a 50-volt collector rating, so with proper biasing the voltage may be raised to any level as long as the collector-to-emitter voltage does not exceed 50 and the collector power rating is not exceeded. The low current drawn by the unit (about 4 ma) is so slight that the transistor does not need any heat sink.

All components are mounted on a 3 x 4-inch phenolic board, and wiring is straightforward.

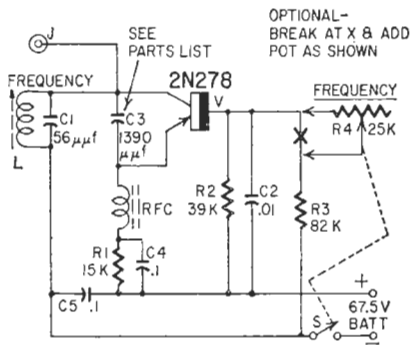
A 3 x 4 x 5-inch case houses the unit. A phono plug and jack with a clip lead is used for the output connection. Brass spacers ½ inch long are used to mount the phenolic chassis to the cabinet. A metal strap holds the battery in place and a standard snap-on battery terminal connects the battery into the circuit.

Now use it

The unit is tuned with L's slug or with R3. Use the slug to center the frequency on a quiet spot in the AM band and fine-tune with the pot. Don't vary R3 too much as it affects the base bias and may make the circuit stop oscillating.

The receiver is only a means of detection and any home portable set may be used or you may make one just for this purpose.

The transmitter, when connected to a pipe line, does not radiate very far into the surrounding air, only a few feet at best. So, no matter how much power is used, you are not breaking FCC requirements. But don't let this fool you either as the signal may be picked up several blocks away on the pipe line. It has proved ideal in large motels when we wanted to know where existing wiring was so as not to cut into it when cutting through walls during a TV antenna installation. END



Circuit of 1-transistor transmitter.

R1—15,000 ohms
R2—39,000 ohms
R3—82,000 ohms
R4—optional pot, 25,000 ohms with switch
All resistors ½-watt 10%
C1—56 μμf mica
C2—.01 μf, ceramic
C3—1390 μμf, .001 μf and 390 μμf in parallel
C4, 5—0.1 μf
BATT—67.5 volts
J—phono jack
L—ferrite antenna for broadcast band
RFC—horizontal oscillator coil, Thordarson HS-30 or equivalent
S—spst on R4 or separate toggle
V—2N278
Case—3 x 4 x 5 inches
Miscellaneous hardware