The Glidophone, a Really Out-of-Sight EMI

By FRED B. MAYNARD

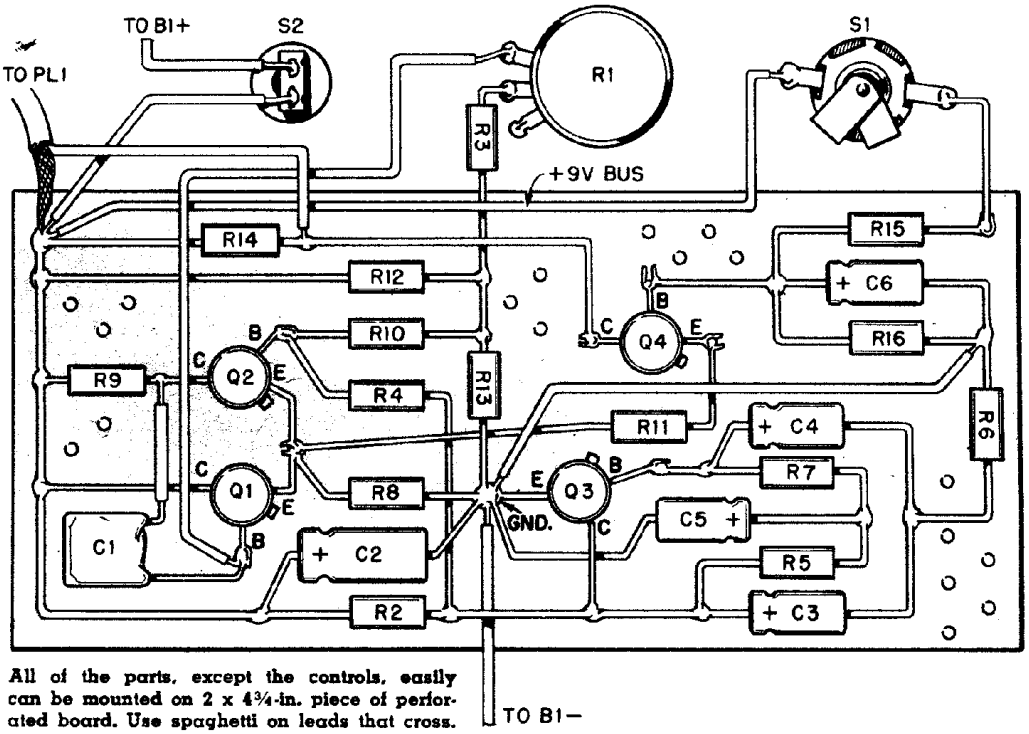
THE balmy beaches of Hawaii and the soft sound of guitar music. What better dreams could one have on cold winter nights. Now there's something very different about the sound of that Hawaiian guitar. Have you ever noticed it? It's a gliding or slurring sound produced in going from one note to another. The player plucks the string with the slider bar at a position a little higher or lower than the note he wants. He then slides or glides into the correct note.

Thanks to electronics, it isn't necessary to even have a guitar to produce this sound. The Glidophone will do it. This EMI (electronic musical instrument) will make people sit up and take notice of you.

Although the circuit is a fairly simple four-transistor configuration, it produces some sophisticated musical effects such as vibrato, sustain and controlled gliding.

How it Works. Transistors Q1 and Q2 form a tone oscillator which is resistance tuned, has about a two-octave range and can be easily frequency modulated (vibrato). The modulating signal is generated by a second R-C oscillator, Q3. This oscillator produces a 6-cps sine-wave signal. This signal, fed to the base of transistor Q2, causes the oscillator (Q1, Q2) frequency to vary at the rate of 6 cps. This imparts musical liveness to the otherwise dead, dull sound of the tone oscillator.

The signal from the tone oscillator (Q1, Q2) is fed to sustain gate Q4 through R11; the output is taken from Q4's collector. Con-



All of the parts, except the controls, easily can be mounted on 2 x 4¾-in. piece of perforated board. Use spaghetti on leads that cross.

nected to the base of Q4 is a charge-storage capacitor (C6) and discharge resistor R16.

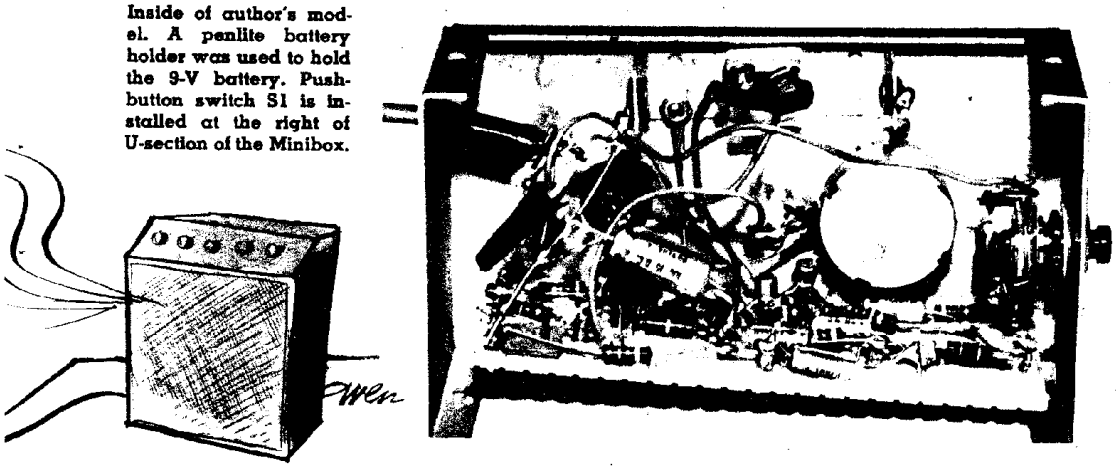
Q4 is normally cut off and does not allow a signal to get from its emitter to collector. When S1 is closed, C6 rapidly charges, opens the gate and lets the signal through. When S1 is opened the charge tends to hold the gate open, but the charge leaks off to ground through R16. The gate gradually closes and the tone decreases in intensity.

You play the Glidophone with S1 and R1. Potentiometer R1 tunes the tone oscillator over a range of about two octaves. There are, of course, precise settings of R1 which correspond to specific musical notes in this range. These positions can be marked on a dial under R1's knob.

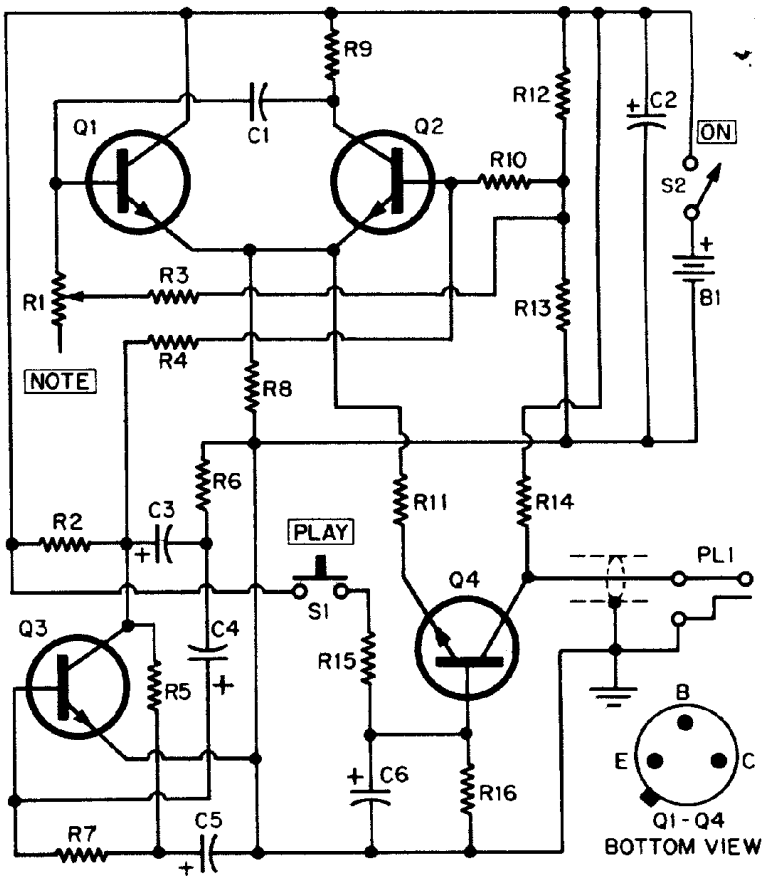
The Glidophone has its own 9-V battery and has a cable for patching into a PA amplifier or musical-instrument amplifier.

Construction. The circuitry, exclusive of R1, S1 and S2 was built on a 2 x 4¾-in. piece of perforated circuit board. It can only be this small, however, if you use miniature electrolytic capacitors, such as Sprague Type TE *Littl-Lytic*, for C2 through C6. A 5¼ x

Inside of author's model. A penlite battery holder was used to hold the 9-V battery. Push-button switch S1 is installed at the right of U-section of the Minibox.



The Glidophone



Glidophone schematic. Transistors Q1 and Q2 comprise tone oscillator. Q3 is vibrato oscillator; its output is fed to base of Q2 where it frequency-modulates tone. Signal is then fed via R11 to emitter of sustain gate Q4. When S1 is pressed, voltage applied to Q4's base opens gate and permits signal to pass to output plug PL1. When S1 is released, charge on C6 keeps gate open. Output dies away slowly as charge on capacitor C6 is dissipated through R16.

PARTS LIST

B1—9 V battery
C1—.05 μf, 75 V or higher ceramic disc capacitor
C2—100 μf, 15 V electrolytic capacitor
C3,C4—1 μf, 50 V electrolytic capacitor
C5—2 μf, 25 V electrolytic capacitor
C6—5 μf, 25 V electrolytic capacitor
PL1—Phono plug
Q1-Q4—HEP-50 transistor (Motorola)
Resistors: ½ watt, 10% unless otherwise indicated
R1—20,000 ohm, linear-taper potentiometer
R2—6,800 ohms
R3—1,500 ohms
R4,R16—220,000 ohms
R5,R7—47,000 ohms
R6—1,800 ohms
R8—1,200 ohms
R9,R10—2,200 ohms
R11—100,000 ohms
R12,R13—3,300 ohms
R14—10,000 ohms
R15—4,700 ohms
S1—Normally-open push-button switch
S2—SPST toggle or slide switch
Misc.—5¼ x 3 x 2⅛-in. Minibox, shielded cable, perforated board, flea clips, battery holder

3 x 2⅛-in. Minibox was used to house the Glidophone. Everything is mounted in the main section of the box.

Modifications. The sustain time depends on the resistance of R16; with the value shown the time should be about 1½ to 2 seconds. A 500,000-ohm pot could be substituted for R16 to permit changes.

Resistor R4 controls the vibrato depth. A 500,000-ohm pot at this point would make the depth variable. Resistor R6 controls the vibrato speed which is now about 6 cps. A 2,500-ohm pot would allow adjustment.

Playing The Glidophone. The lowest note on our model is F below Middle C. The pot's dial can be calibrated in the corresponding notes, C, D, E, etc., by tuning up with a piano or other instrument.

The Glidophone should be played by grasping the box from the back with your left-hand thumb and last three fingers. Curl your index finger up over the top to push S1. In this way you can turn the pot to any position easily. You will have to depend on your ear, like a singer or whistler does, to play exactly in tune.