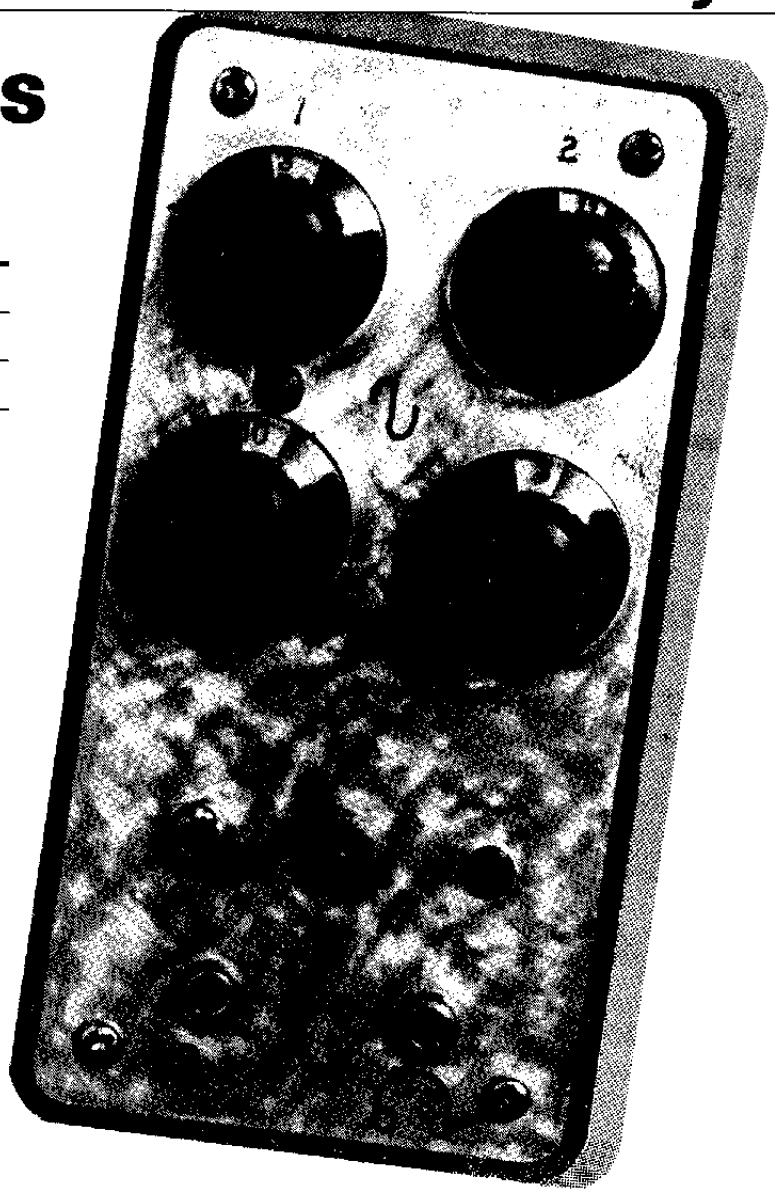
Sound Effects Project

A miniature but versatile sound effects unit for recording or just driving the cat crazy.



WITH experimentation the unit described is capable of producing an almost infinite variety of sound effects. Sci-fi, animal, musical, engine and mechanical sounds can be generated by adjusting the four control oscillators. Each control has a calibrated scale which allows the settings to be repeated. However, a very small adjustment of the controls can cause major changes in the nature of the sound produced, and with this is mind it is better to record your effect on tape for future use.

The Circuit

Figure 1 shows the circuit of the unit. Four separate collector-coupled free-running multivibrators are the source of the tones. Each multivibrator is individually adjustable over a different band of audio frequencies, as shown in the following table:

Q1,2..... .3Hz-5Hz
Q3,4..... 80Hz-300Hz
Q5,6..... 1Khz-3KHz
Q7,8..... 2KHz-7.5KHz

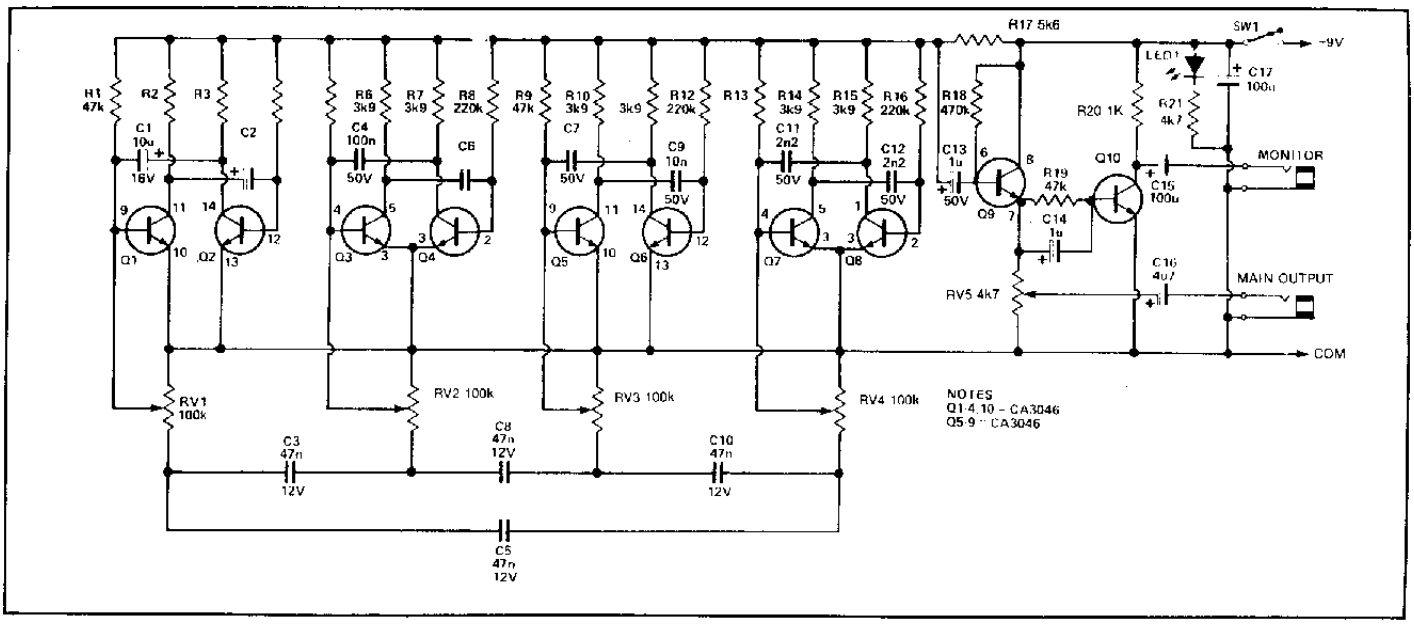


Fig. 1. The schematic of the sound effects circuits.

Each oscillator shares a common load resistor, R17. This causes the multivibrators to mix and synchronize according to their respective frequencies. RV1-4 set the frequency. Further effects are achieved by coupling the oscillator bases via C3, C5, C8 and C10 at the counterclockwise low frequency end of the controls. Individual oscillators can be muted by setting the controls fully clockwise.

The combined output is fed through C13 to Q5 to act as a buffer stage. RV5 enables the 100mV peak to peak signal to be set up before emerging through C16 to the 3.5mm output jack. Q10 amplifies the signal sufficiently to drive an earpiece or headphones, allowing monitoring via the other jack.

The unit is powered from an internal 9V battery, drawing a steady 5mA of current switched by SW1.

Two CA3046 transistor arrays are used to provide the ten transistors used in the circuit.

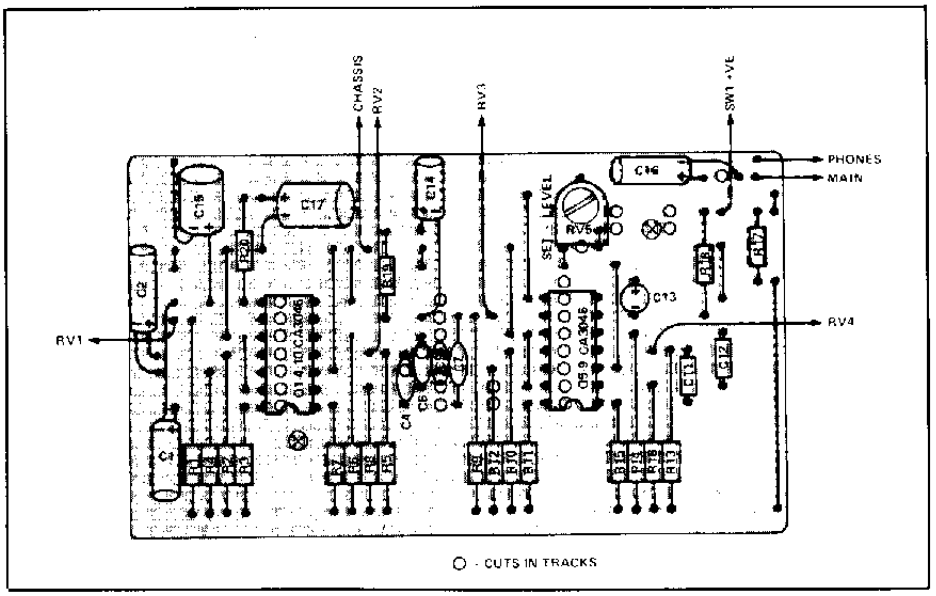


Fig. 2. The parts location on the Veroboard.

Construction

The prototype was built in an ordinary experimenter box which was 13 x 6.7 x 4 cm. A single Veroboard, 22 strips by 37 holes long contains most of the circuit, and the balance is to be found on the aluminum front panel.

The CA3046 transistor arrays are connected through 14-pin DIP sockets. This is advisable if easy replacement is necessary in the event of, say, one transistor failing. If you wish to reconfigure the array, be sure to connect the substrate to the chassis common (the substrate is connected to IC pin 13, one of the transistor emitters).

Two spacers support the Veroboard off the front panel. A piece of insulating

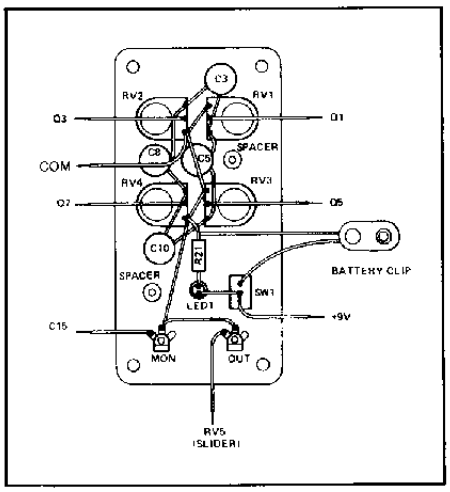


Fig. 3. Front panel wiring.

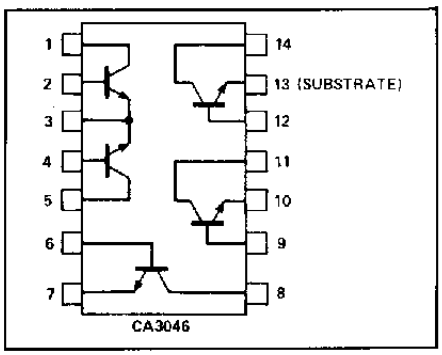


Fig. 4. Diagram of the CA3046.

card or similar should be positioned between the circuit board and the metal body of the battery to prevent shorts. This can be attached via the mounting screw holding the Vero to the spacer.

No calibration is required aside from positioning the knobs to read across the same range of numbers. RV5 can be set by trial and error depending on the type of equipment it is required to feed.

Operation

The large variety of sounds available from the box makes it difficult to be precise as to the settings of the controls. It is best to have the four controls turned fully clockwise (off) to begin with. Rotate one control at a time, listening through the monitor jack to get the range, and then return to the off position. Try mixing the same single tones with RV1. Notice the cyclic sounds produced. Finally, gradually introduce several combinations, taking note of the effects.

After a little experience, it is possible to create animal and human cries by swinging the tones against one another so that a library of sounds can be created. ■

PARTS LIST

Resistors
(All ¼W 2% unless stated)
R1,5,9,13,19 ..... 47k
R2,3,6,7,10,11,14,15 ..... 3k9
R4,5,9,13,19 ..... 220k
R17 ..... 5k6
R18 ..... 470k
R20 ..... 1k0
R21 ..... 4k7

Potentiometers
RV1,2,3,4 ..... 100k linear
RV5 ..... 4k7 horiz preset

Capacitors
C1,2 ..... 10uf 16V radial electro
C3,5,8,10 ..... 47nf 12V disc
C4,6 ..... 0u1 50V mylar
C7,9 ..... 10n 50V mylar
C11,12 ..... 2n2 50V mylar
C13,14 ..... 1u 50V axial electro
C15,17 ..... 100u 10V axial electro
C16 ..... 4u7 35V axial electro

Semiconductors
Q1 - 10 ..... two CA3046 transistor array

Miscellaneous
LED1 ..... red LED
SW1 ..... SPST toggle switch
SK1 ..... 3.5mm jack socket

Knobs; LED mounting clip; 9V battery connector; experimenter box 8R earpiece or headphones with 3.5mm jack; Veroboard 23 tracks by 37 holes wide; wire, solder, etc.