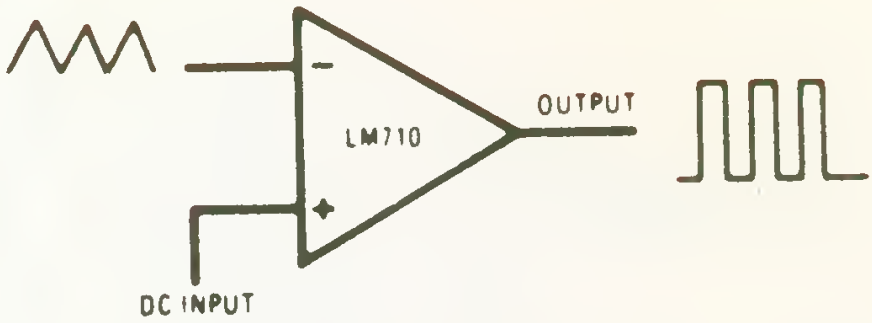


* PIN CONNECTIONS SHOWN ARE FOR METAL CAN.

Fig. 60-1. Pulse width modulator (NS).

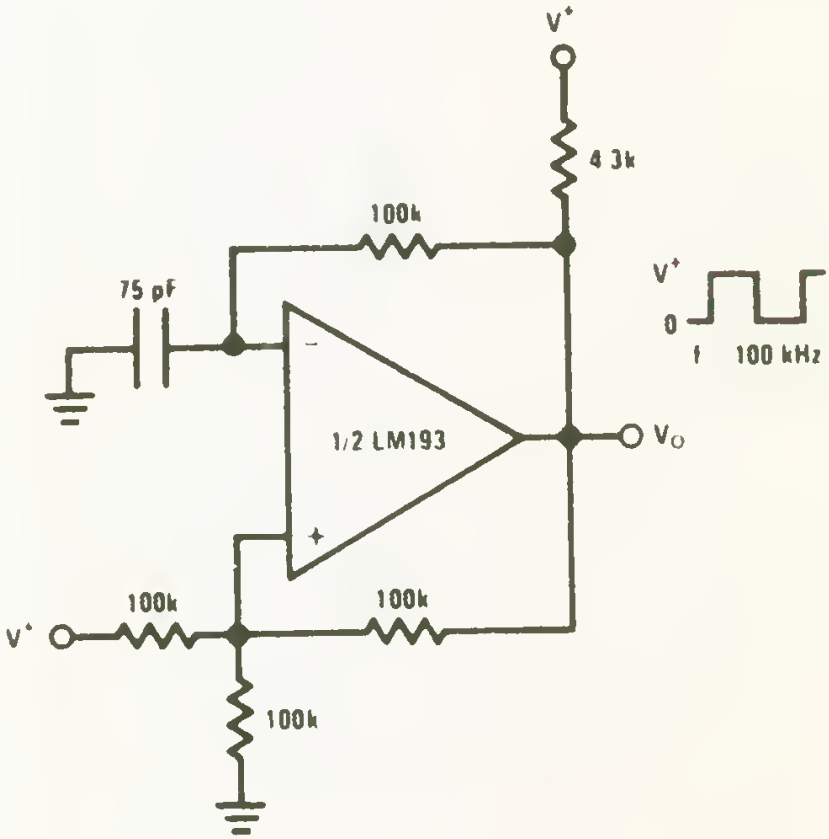


Fig. 60-2. Square wave oscillator (NS).

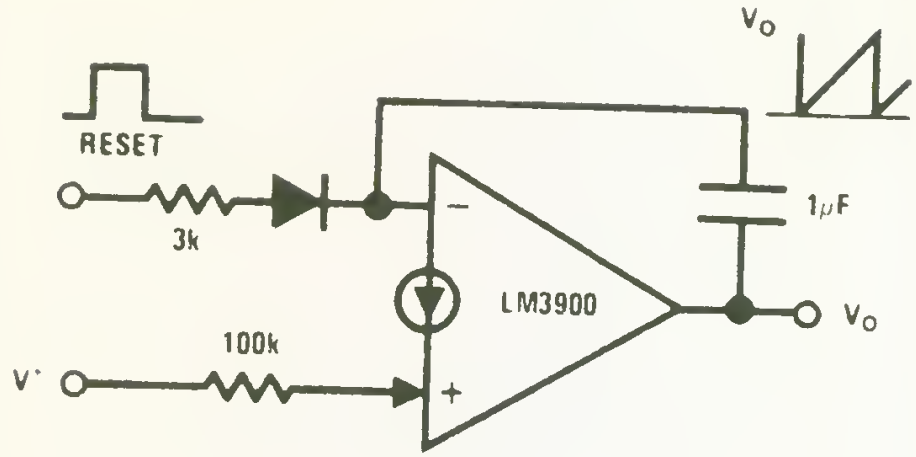


Fig. 60-3. Sawtooth generator (NS).

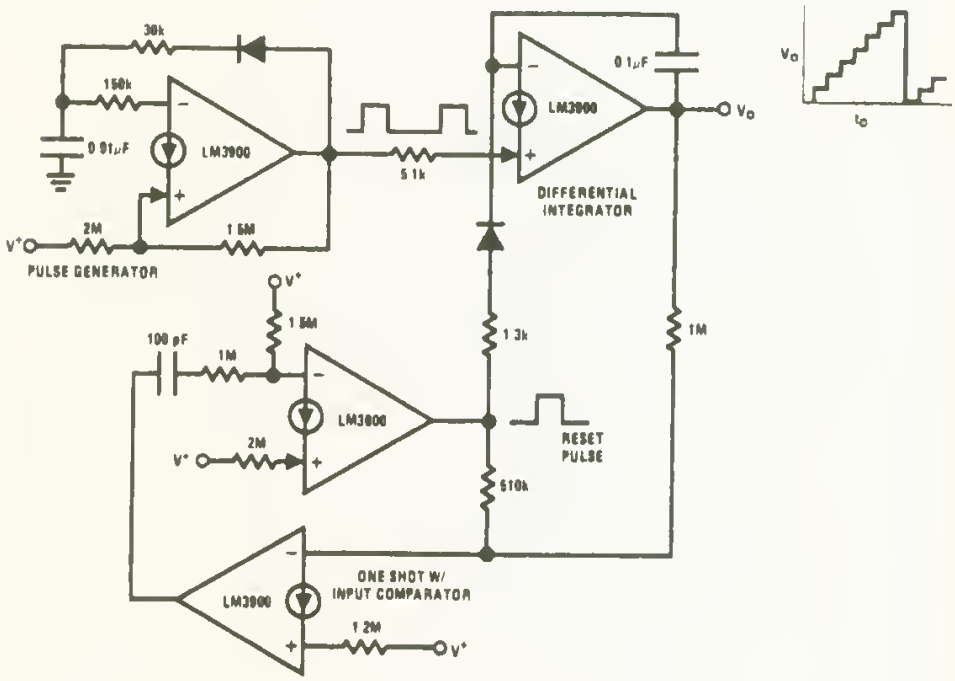


Fig. 60-4. Free-running staircase generator pulse counter (NS).

(V^+ = 15 VDC)

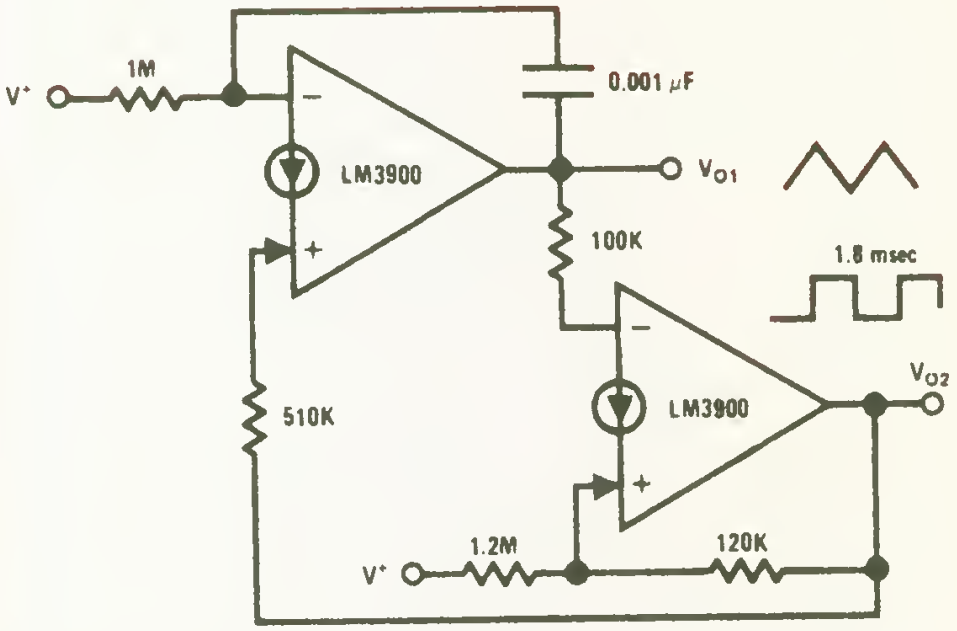
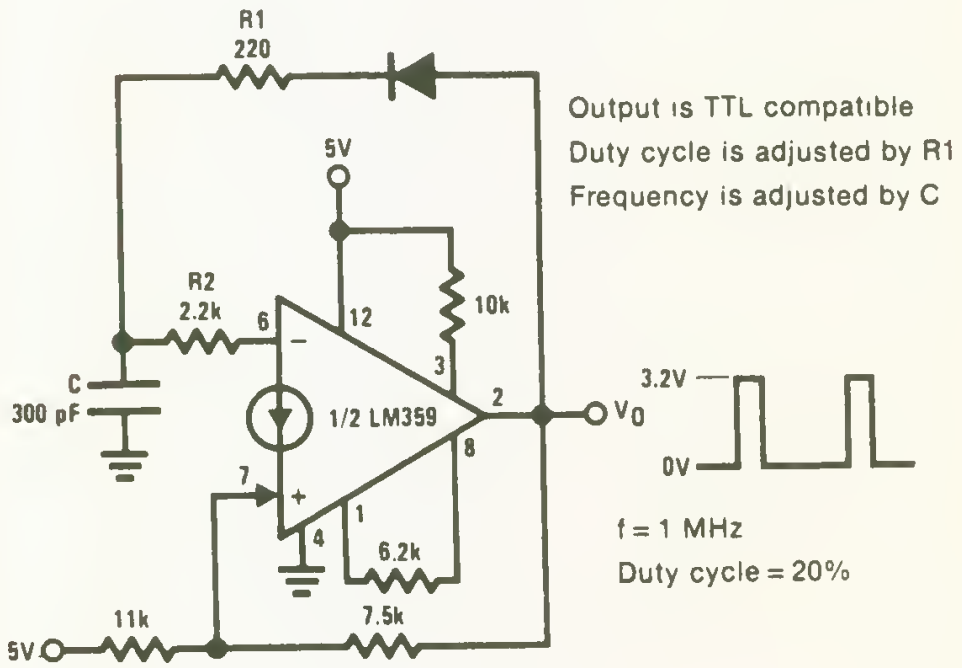


Fig. 60-5. Triangle/square generator (NS).



Output is TTL compatible
Duty cycle is adjusted by R1
Frequency is adjusted by C

f = 1 MHz
Duty cycle = 20%

Fig. 60-6. Pulse generator (NS).

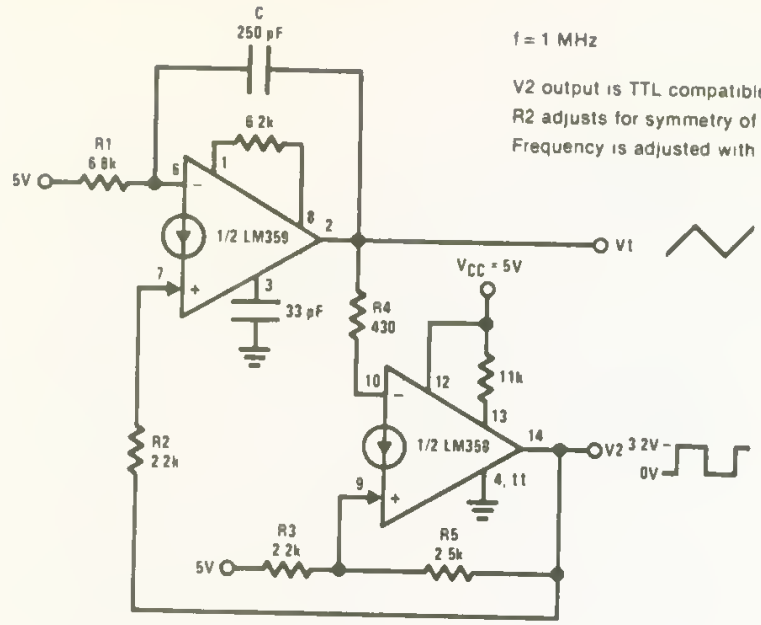


Fig. 60-7. Triangle waveform generator (NS).

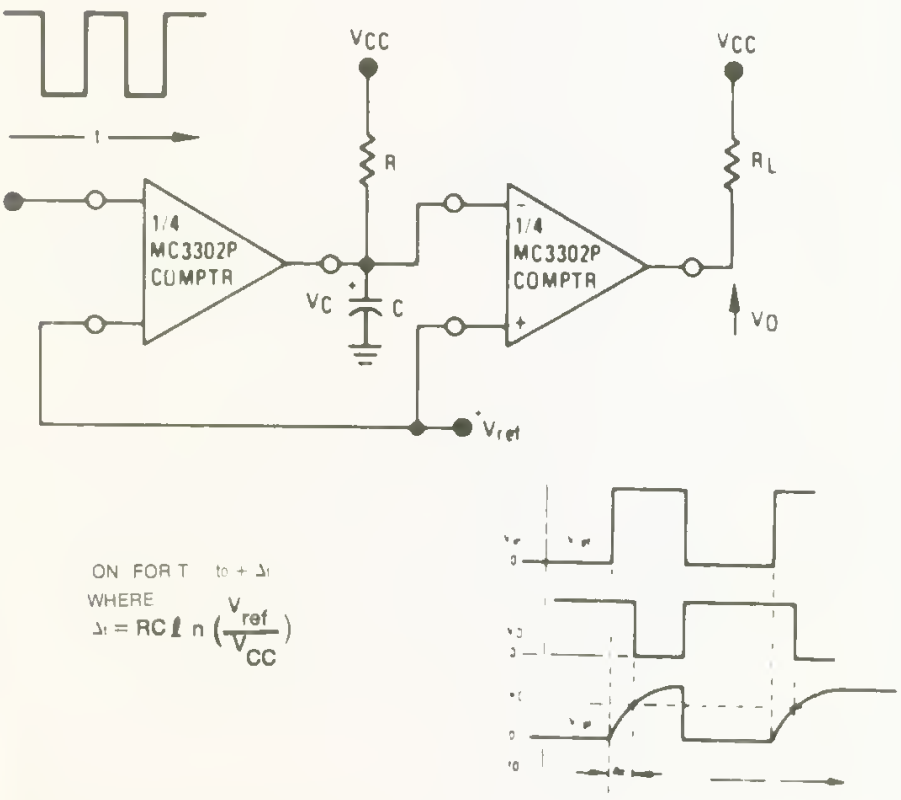
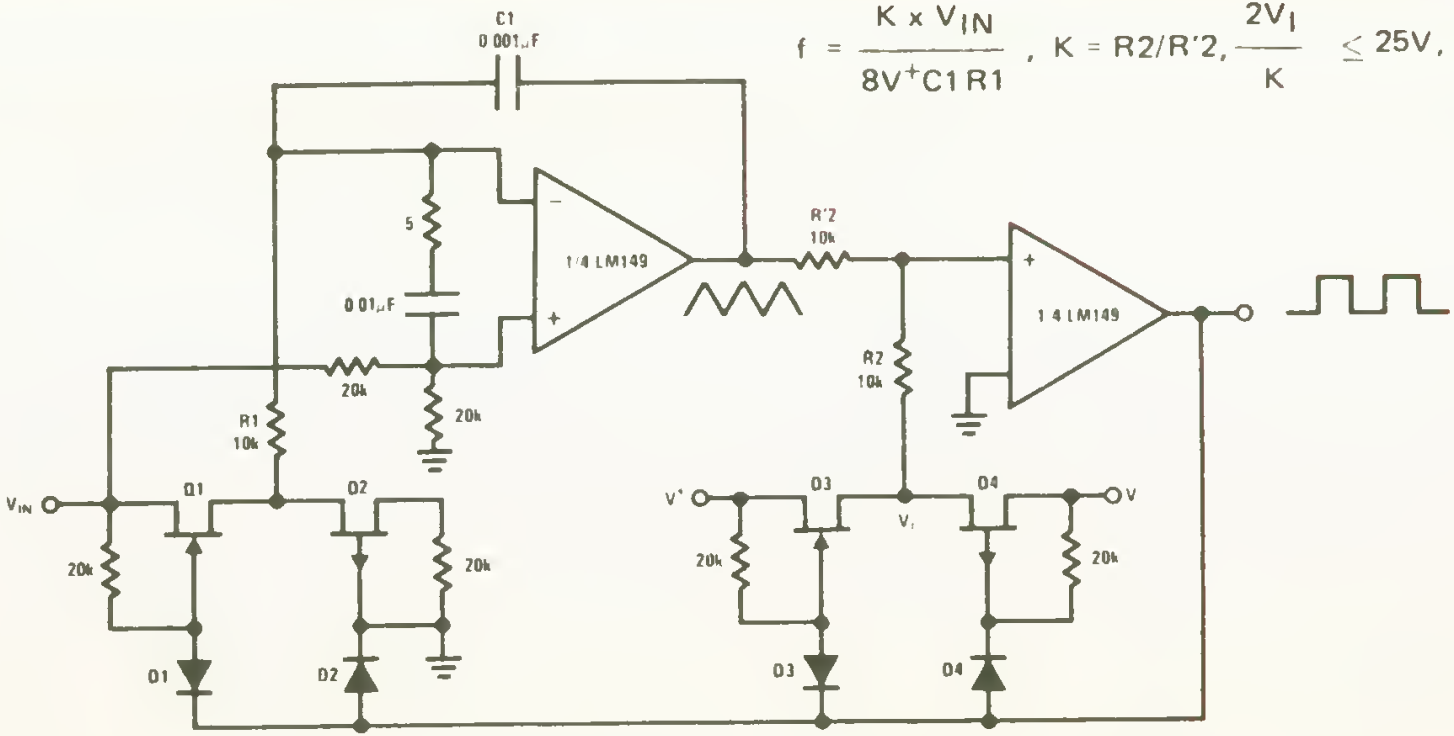


Fig. 60-8. Time delay generator (M).



$$f = \frac{K \times V_{IN}}{8V^{+}C1\,R1},\ K = R2/R'2,\ \frac{2V_I}{K} \leq 25V,\ V^{+} = V^{-},\ V_S = \pm 15V$$

Use LM125 for ±15V supply

The circuit can be used as a low frequency V/F for process control.

Q1, Q3: KE4393, Q2, Q4: P1087E, D1–D4 = 1N914

Fig. 60-9. Triangular, squarewave generator (NS).

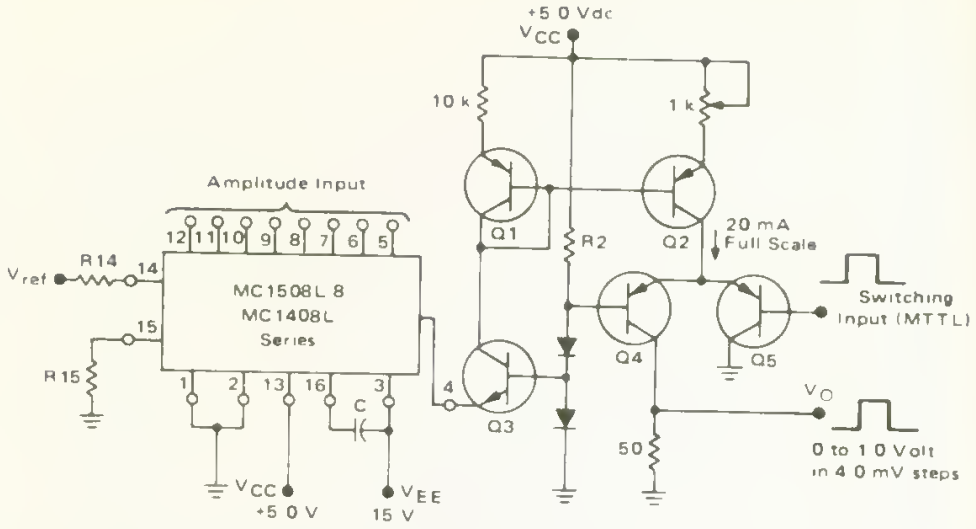
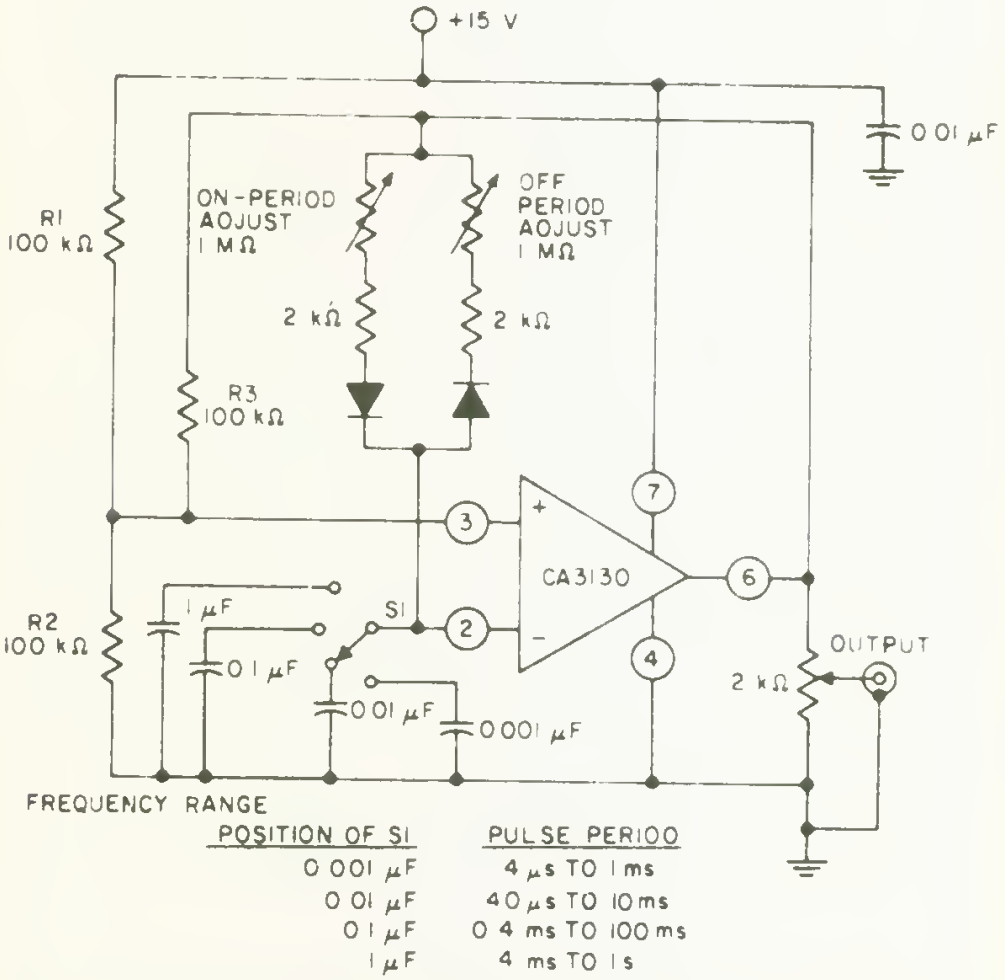


Fig. 60-10. Programmable Pulse generator (M).



POSITION OF SI	PULSE PERIOD
0 001 μF	4 μs TO 1 ms
0 01 μF	40 μs TO 10 ms
0 1 μF	0 4 ms TO 100 ms
1 μF	4 ms TO 1 s

Fig. 60-11. Pulse generator (astable multivibrator) with provisions for independent control of "ON" and "OFF" periods (RCA).

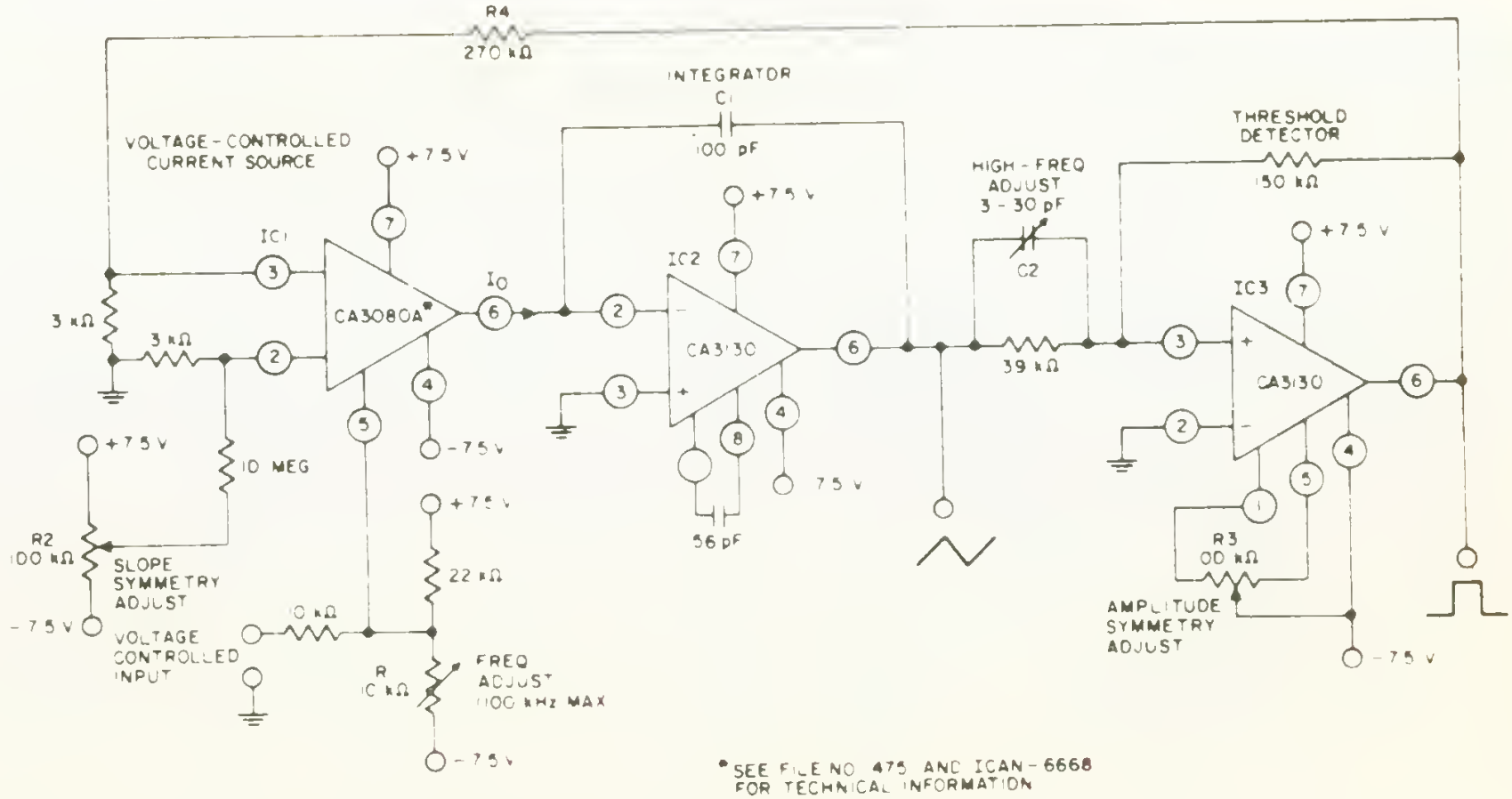


Fig. 60-12. Function generator—(frequency can be varied 1,000,000/1 with a single control) (RCA).

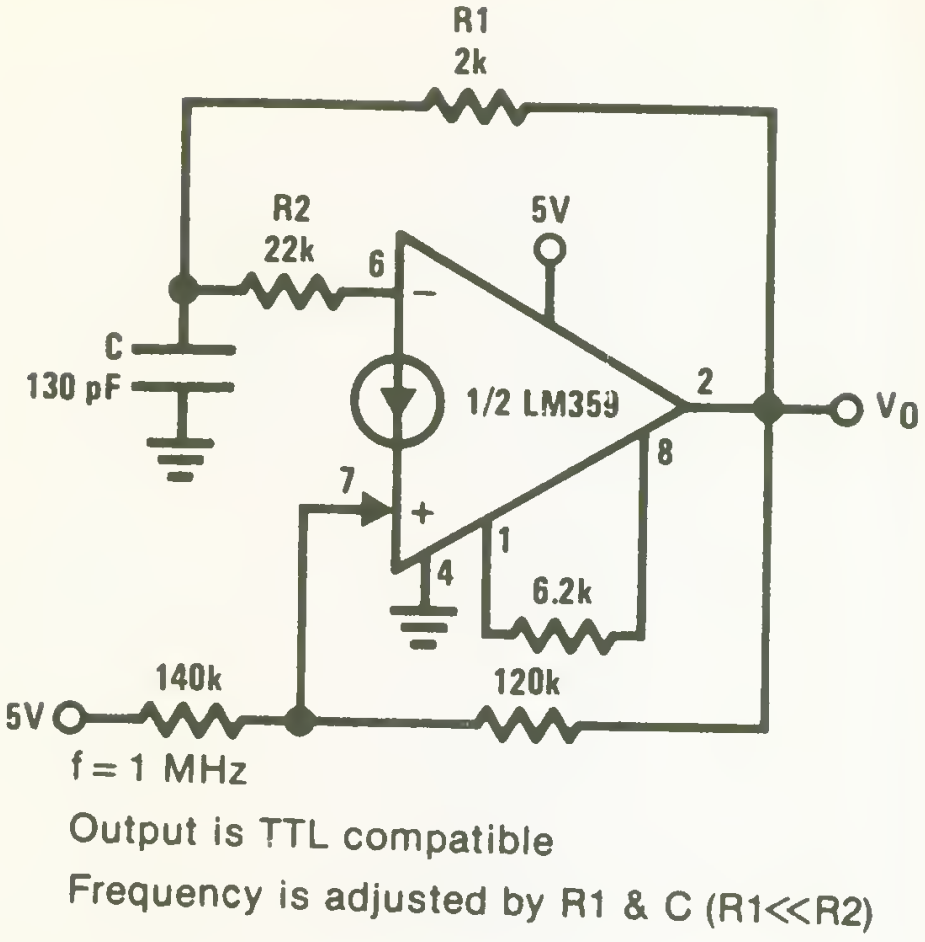


Fig. 60-13. Squarewave generator (NS).

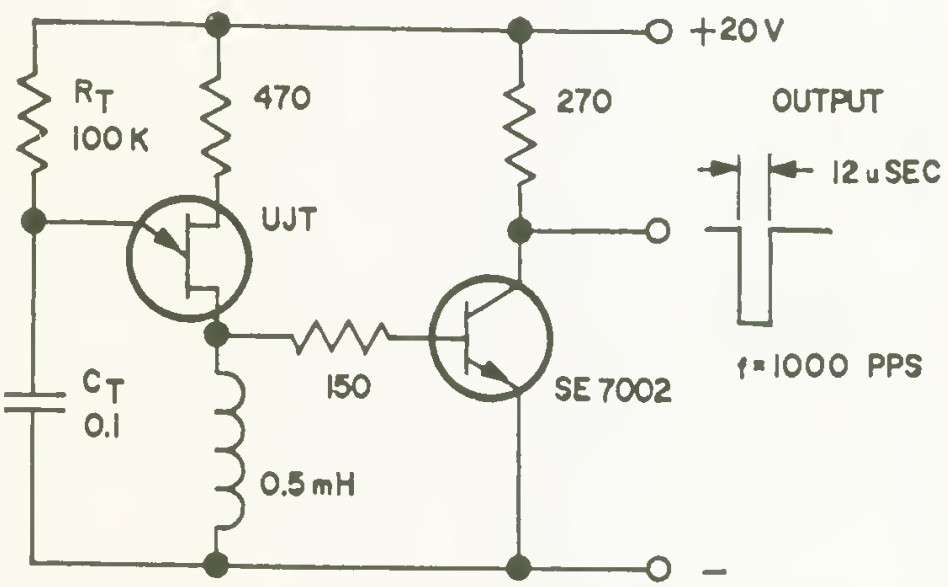


Fig. 60-14. Pulse generator uses unijunction. Pulse width is determined by base 2 inductance. Rise and fall times will be 2-5% of pulse width.

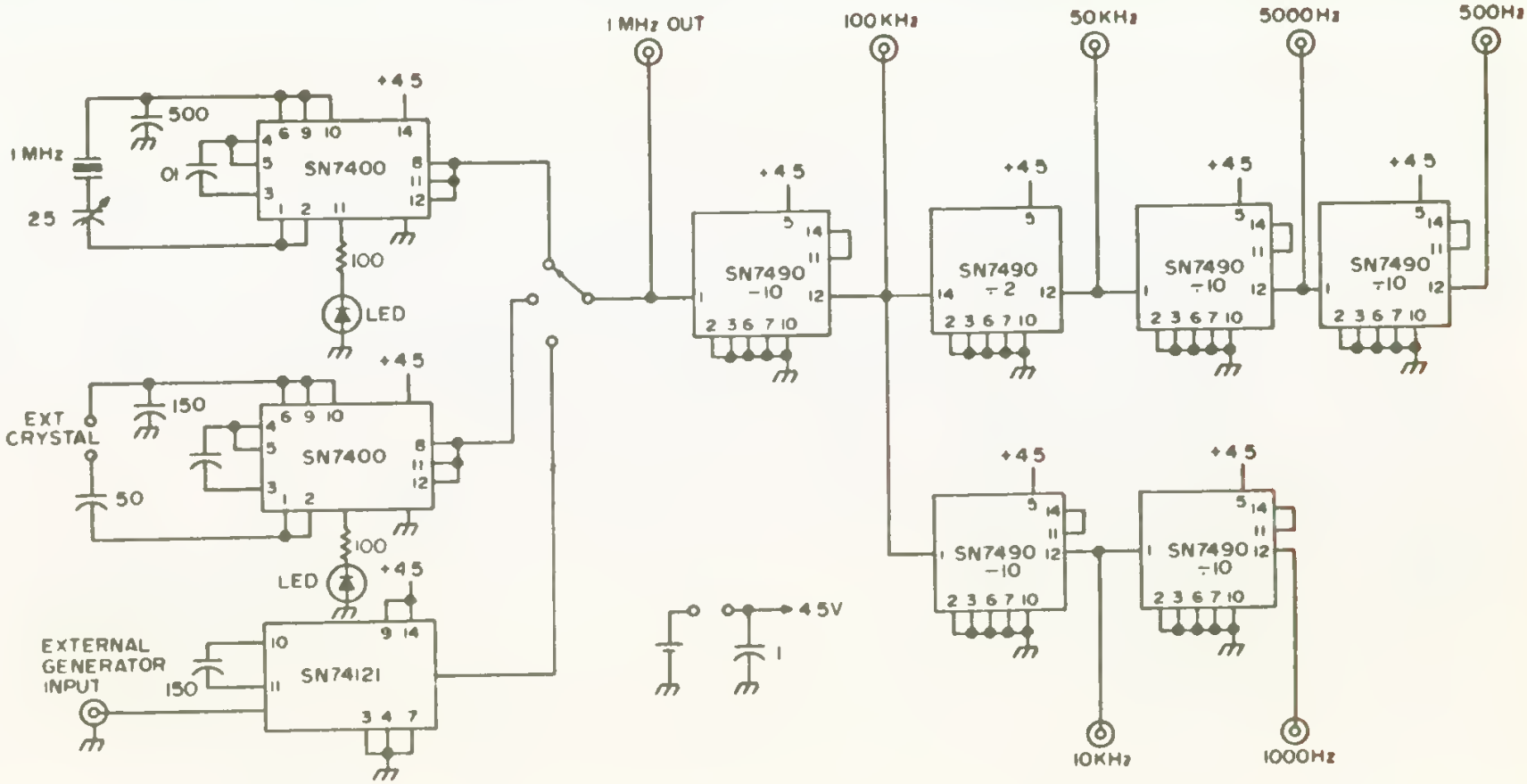
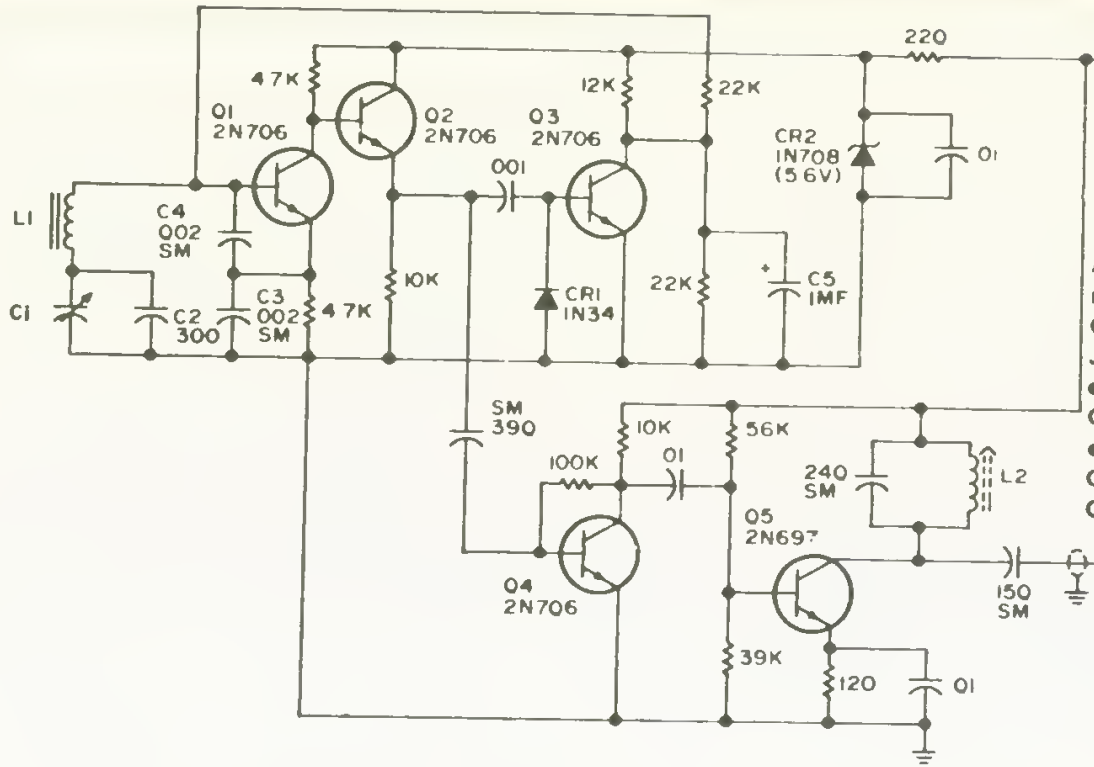


Fig. 60-15. Universal frequency generator divides input signal (1 MHz master oscillator, crystal oscillator, or any external sine-wave source) by factor of 10 or 2. Note gates driving LEDs, which light to indicate crystal is oscillating. (Output frequencies shown are for 1 MHz oscillator.)



Schematic Diagram Notes

L1 – toroid coil 1/2" od 'E" materiel core. Amidon associated core T-50-2. Winding 45 turns number 28 enamel wire spaced over entire core.

C1 – 100 pF meximum variebie capacitor. Johnson type S 148-6 or equivelent. Remove pletes es required to provide desired bendspread.

C2 – Silver mice – epproximately 300 pF. Adjust exact value to set lower tuning renge to 3.5 MHz.

C3, C4 – Silver mice 2000 pF.

C5 – Miniature electrolytic 1 μF et 10 VDDW.

L2 – 40 turns number 28 enamel wire on 3/8 diameter slug tuned form.

CR2 Zener diode, 1N708 – 5.6 volts. (Motorola HEP-103 useable)

BA1 9 volt transistor battery

J1 Miniature jack

P1 Two prong plug with stenderd .486 pin spacing for crystal sockets or other to match companion transmitter.

Q1, Q2, Q3, Q4 2N706

Q5 2N697

Fig. 60-16. Variable-frequency oscillator operates over 75-80 meter range (about 3.5 MHz).

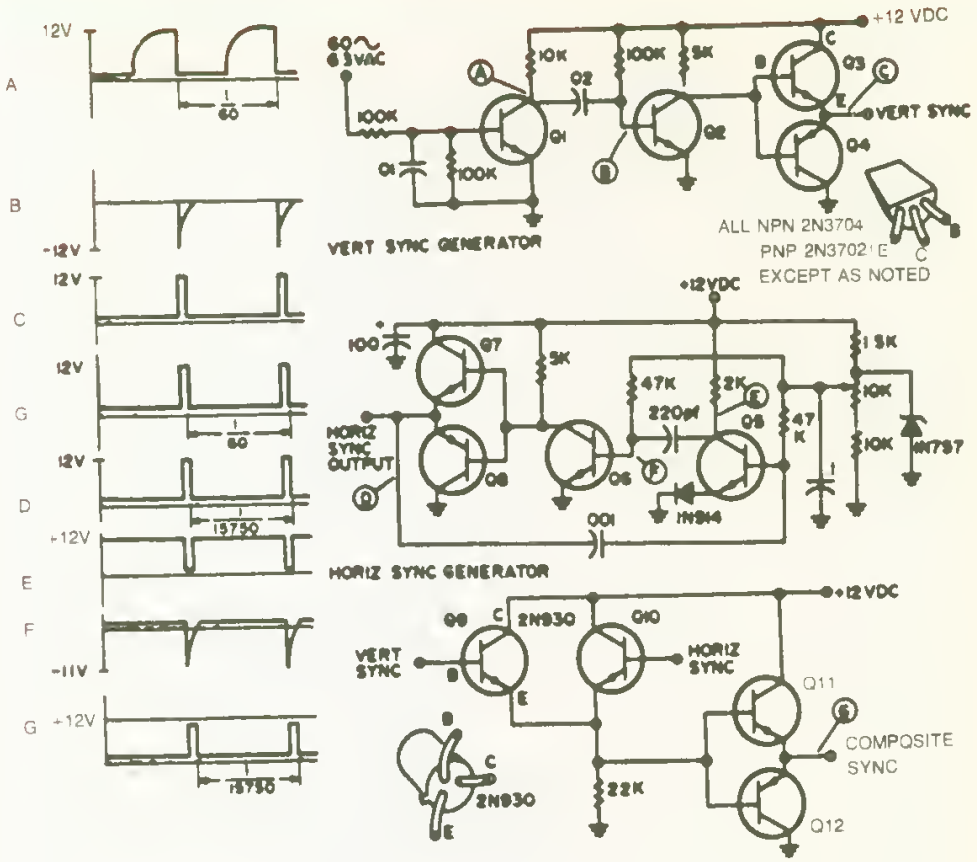


Fig. 60-17. Sync generator circuit with waveforms at representative test points.

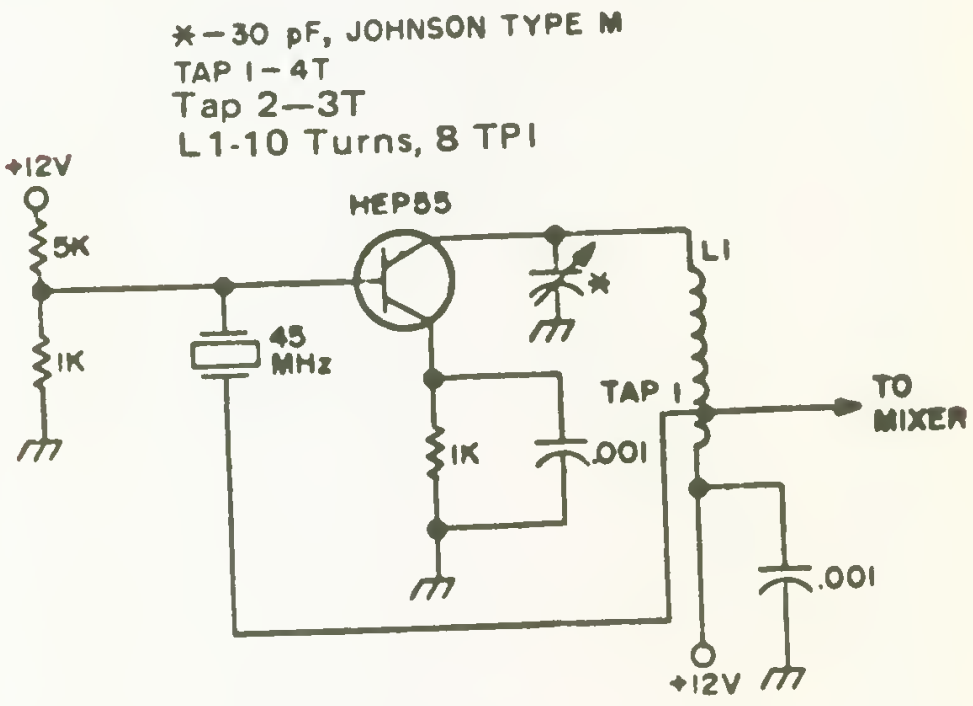


Fig. 60-18. Crystal oscillator for 45 MHz.

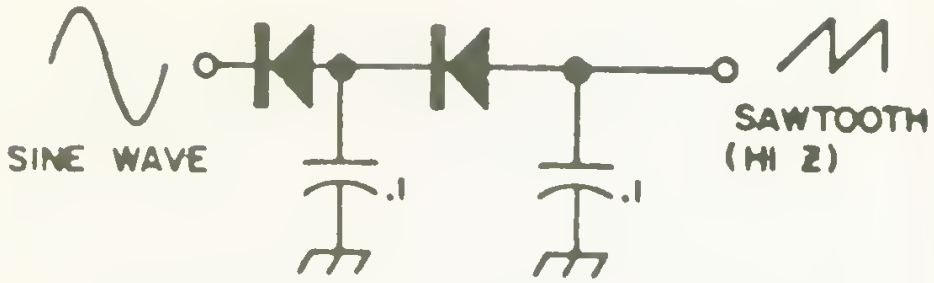


Fig. 60-19. This simple sawtooth generator could be added to a monitor oscilloscope.

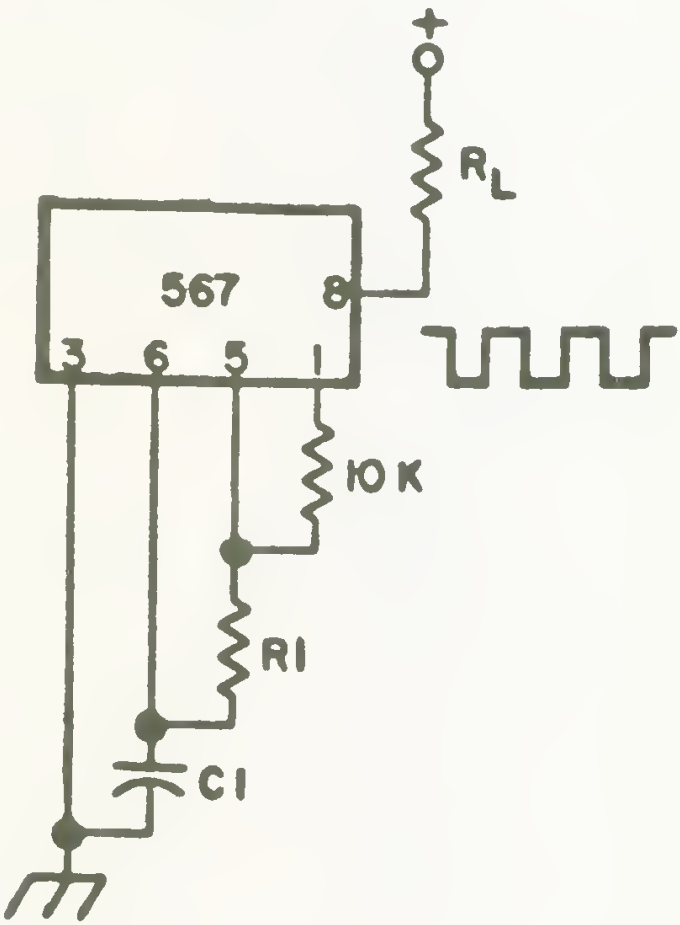


Fig. 60-20. Pulse generator with 25% duty cycle.

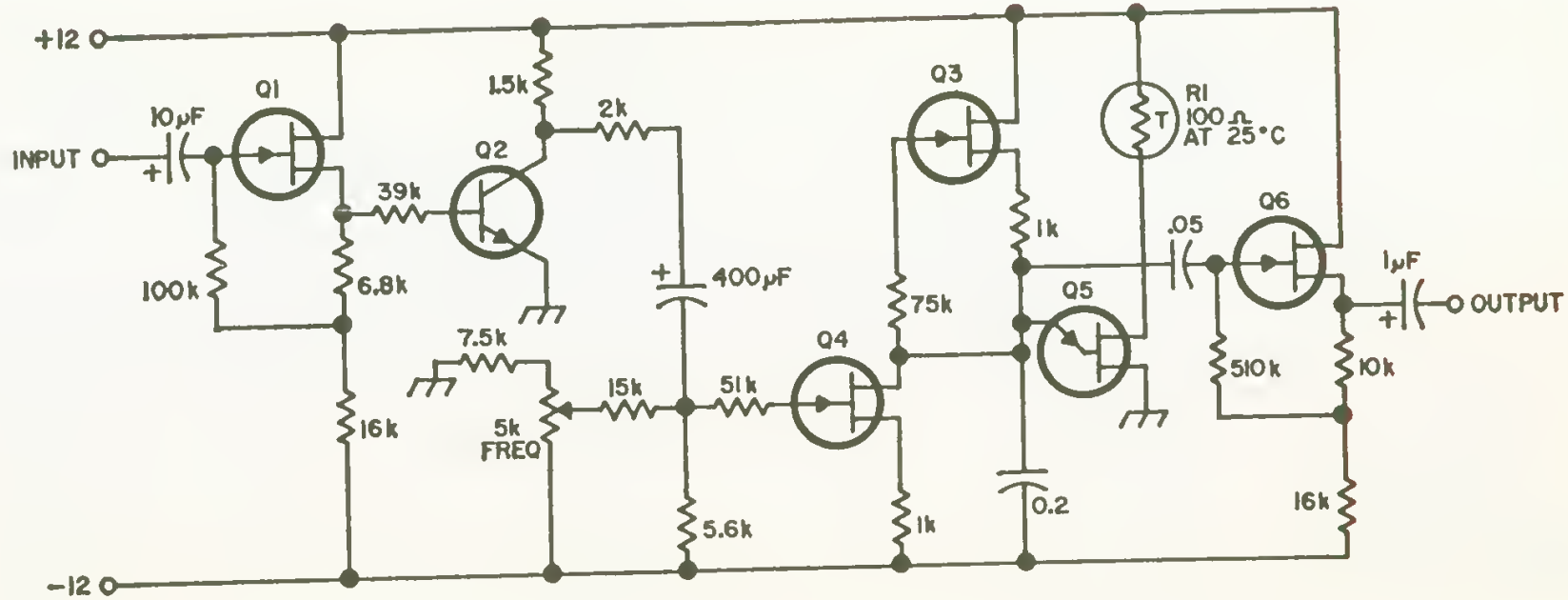


Fig. 60-21. This simple sawtooth generator is linear within 2% and may be adjusted from 1 kHz to 3 kHz with the center frequency control. Q1, Q3, Q4 and Q6 are FETs such as the 2N3819, 2N3820, T1S34, MPF105 or HEP 801; Q2 is a 2N388, 2N2926, 2N3391, SK3011 or HEP 54; Q5 is a 2N1671, 2N2160, 2N2646, 2N3480, or HEP 310.

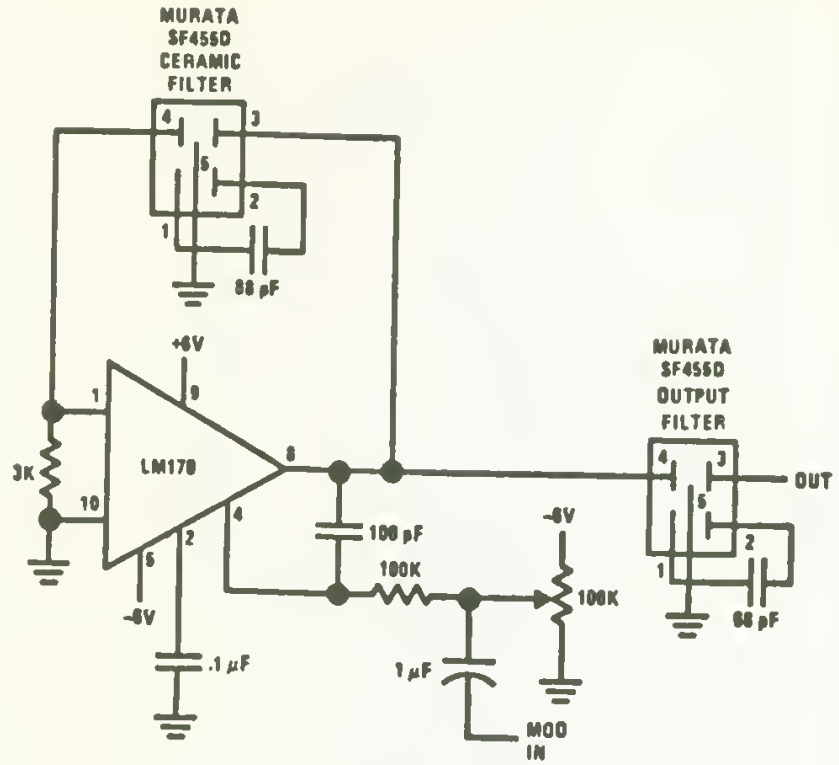


Fig. 60-22. A 455 kHz modulated, regulated output signal generator.

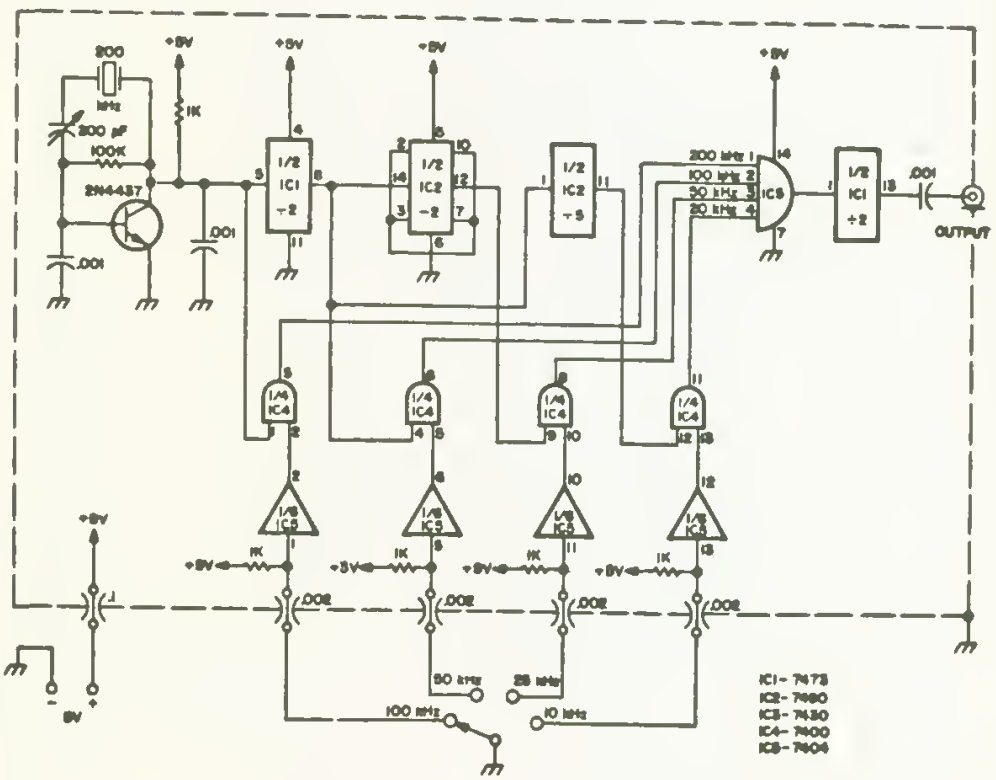
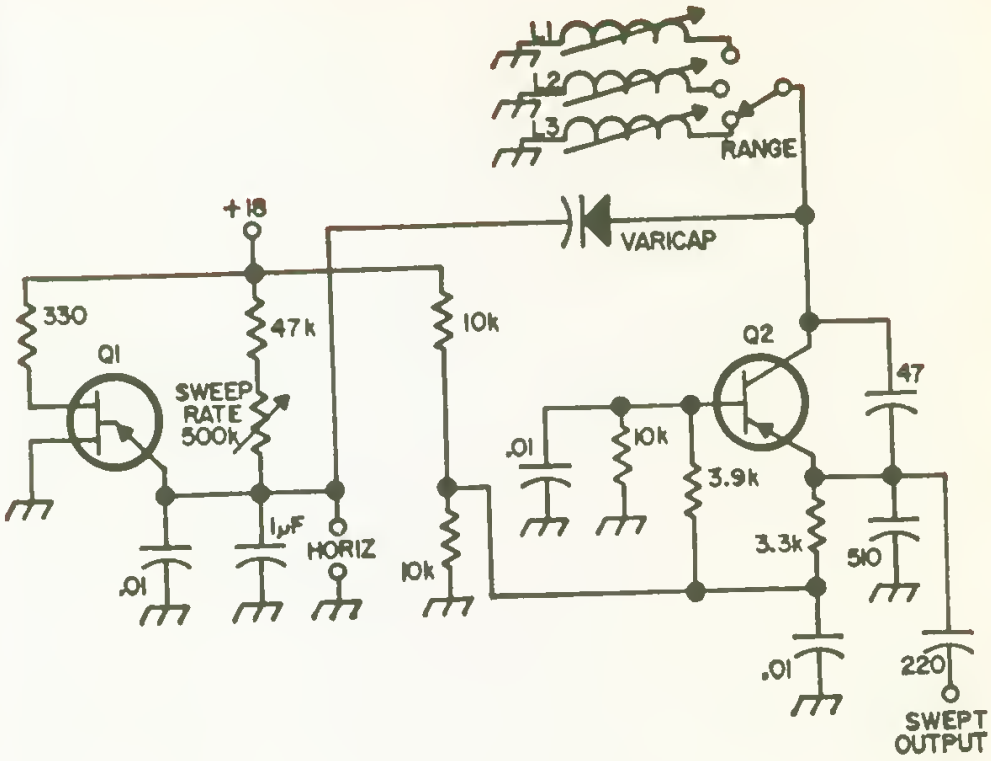


Fig. 60-23. Crystal calibrator. This circuit gives symmetrical square waves out on 100, 50 25, and 10 kHz. The frequency switch may be any distance from the totally shielded calibrator, as the lines have only dc levels.



COILS

Frequency	Miller No.
65 kHz—140 kHz	9007
95 kHz—190 kHz	9006
150 kHz—300 kHz	9005
190 kHz—550 kHz	9004
380 kHz—1000 kHz	9003
700 kHz—1.8 MHz	9002
1.4 MHz—3.7 MHz	9001
3.7 MHz—4.7 MHz	4508
4.7 MHz—5.9 MHz	4507
5.9 MHz—7.5 MHz	4506
7.5 MHz—10 MHz	4505
10 MHz—14 MHz	4504
14 MHz—18 MHz	4503
18 MHz—23 MHz	4502
23 MHz—29 MHz	4304
29 MHz—36 MHz	4303
36 MHz—45 MHz	4302
45 MHz—60 MHz	4301

Fig. 60-24. A sweep frequency generator is a very handy gadget, but many times the commercial units are more complicated than required. This simple sweeper may be used at any spot frequency between 100 kHz and 60 MHz. By using a three-position range switch, the three most popular frequencies may be used, such as 455 kHz, 1600 kHz, and 10.7 MHz. Q1 is a 2N1671, 2N2160, 2N2646, 2N3480, or HEP 310; Q2 is a 2N741, 2N1747, 2N2188, GE-9 or HEP 2. The varactor is a 56 pF capicitance diode such as the 1N955 or TRW V56.

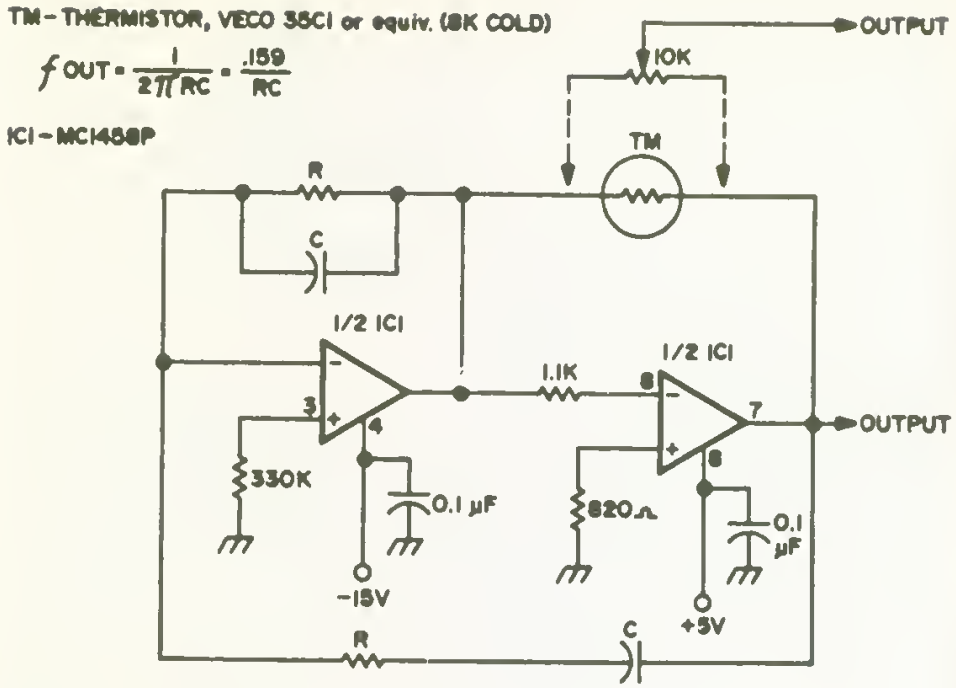


Fig. 60-25. A simple sine-wave generator.

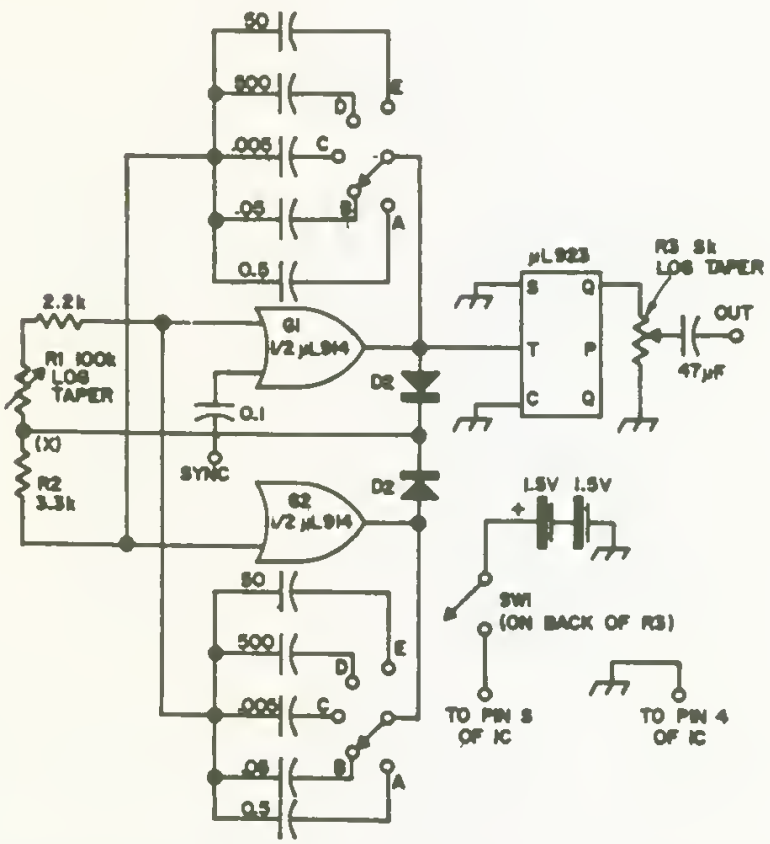


Fig. 60-26. Complete square-wave generator. Bandswitching capacitors are 10% or tolerances. Resistors are ¼ watt.

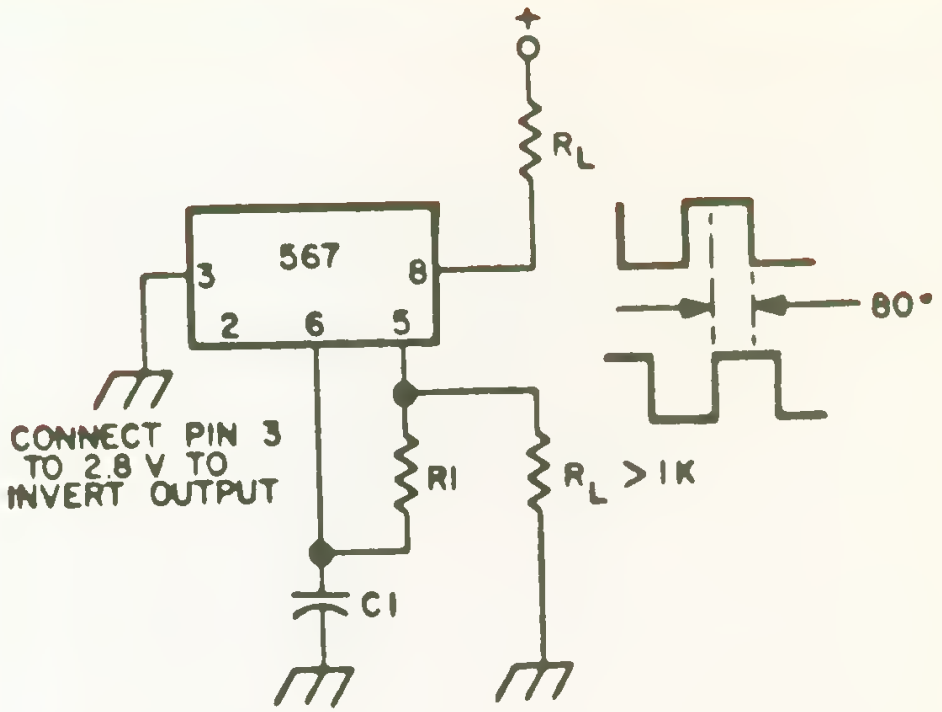


Fig. 60-27. 567 IC makes simple dual square-wave source. Note 80° phase shift between waves.

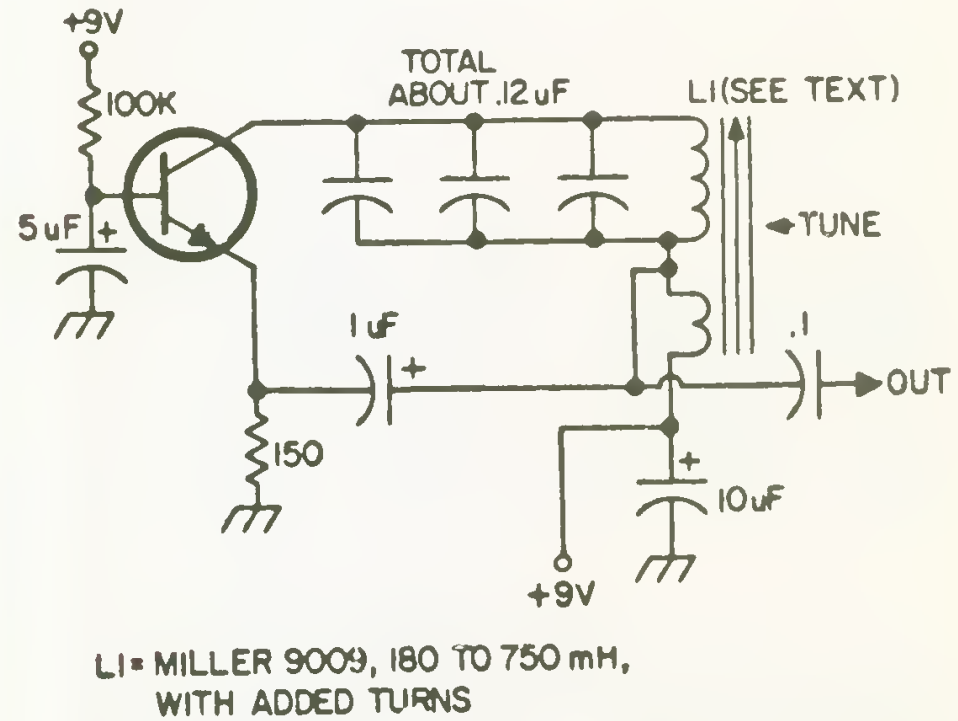


Fig. 60-28. A 2000 Hz test oscillator. L1 is commercial 180 mH coil with about 80 added turns.

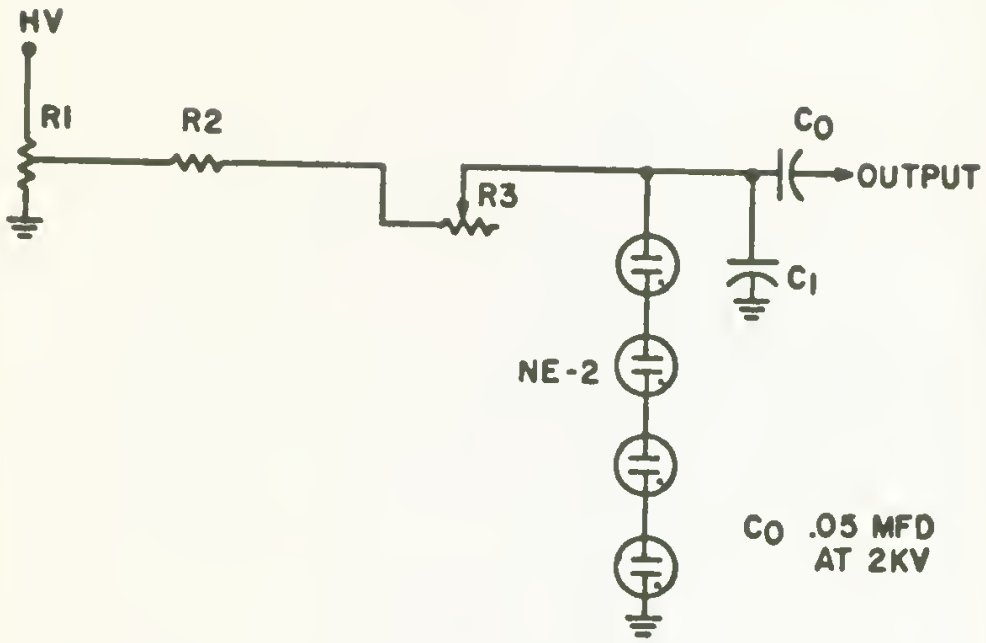


Fig. 60-29. Simple sweep generator for monitor scopes provides 30 Hz sawtooth from NE2 neons.

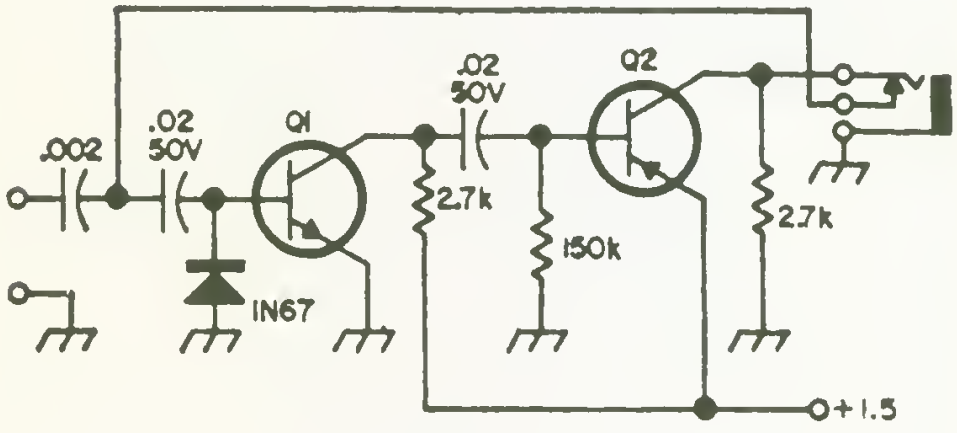


Fig. 60-30. This signal injector/tracer switches from the injection mode to a signal tracer by simply plugging in a pair of high-impedance magnetic earphones. As a tracer, it works from audio up to 432 MHz. Transistor Q1 is a 2N170, 2N388A, 2N1605, SK3011, or GE-7; Q2 is a 2N188A, 2N404, 2N2953, SK3004 or HEP 253.

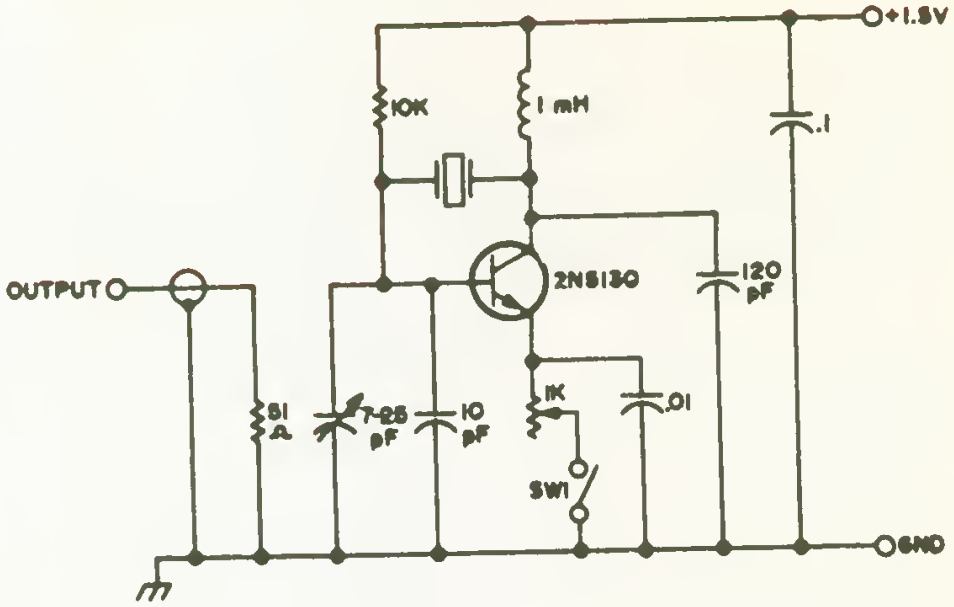


Fig. 60-31. Extremely stable signal generator provides output in range from 1.8 to 450 MHz at impedance of 50 ohms; output is adjustable from 80 nV to more than 50 mV rf.

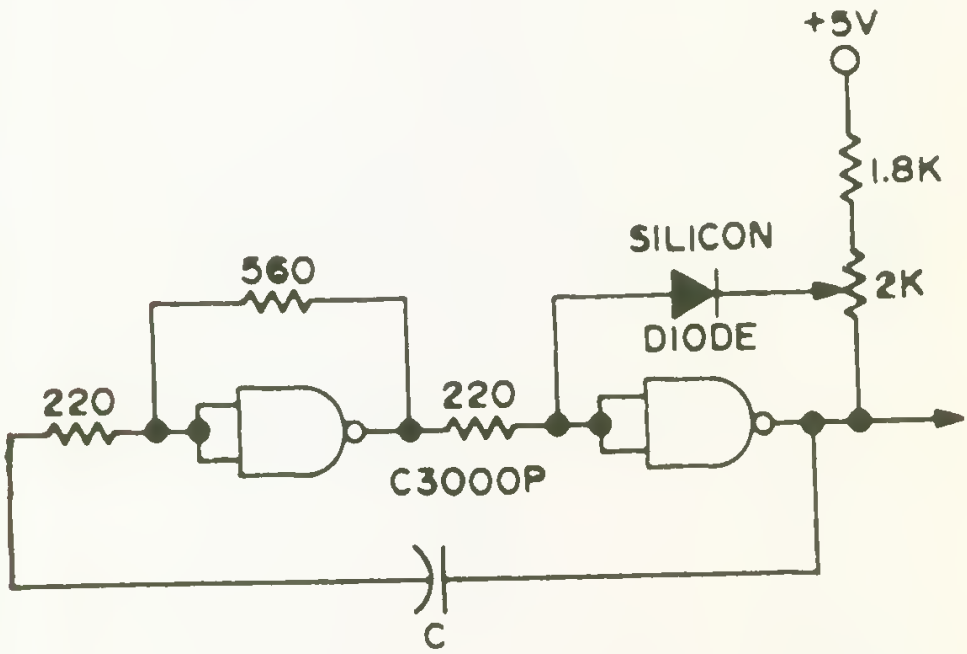
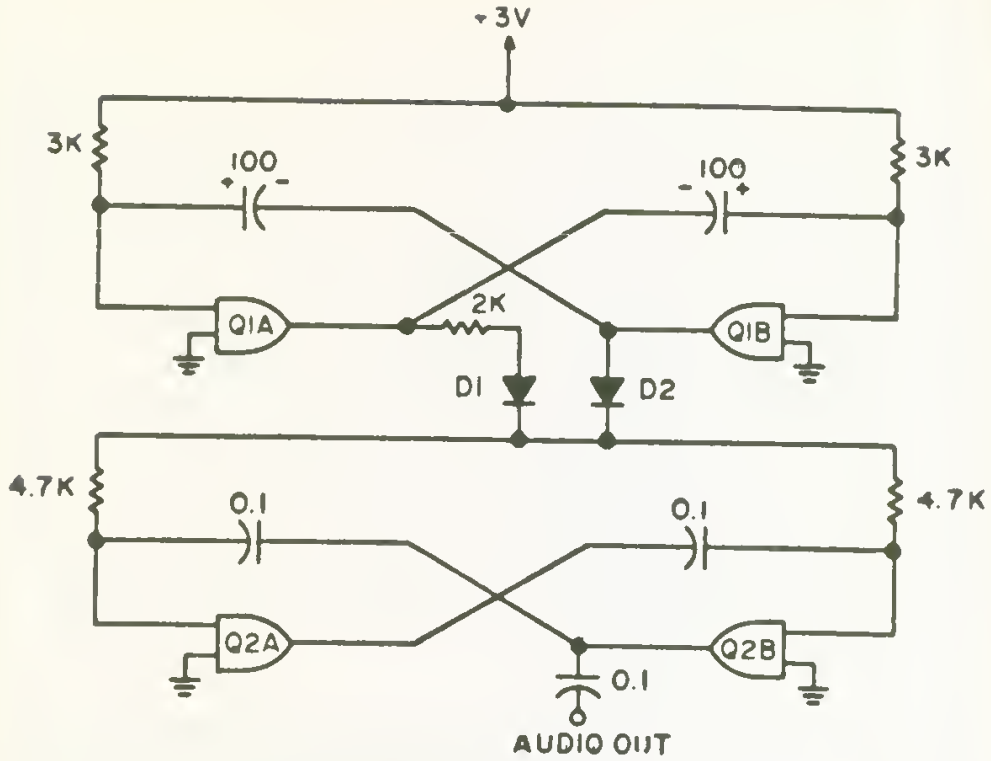


Fig. 60-32. Square-wave generator will operate over a wide frequency range from audio to rf. Capacitor and pot control frequency.



D1,D2 = 1N34 or other germanium.
Q1,Q2 = μL914 or equivalent.

Fig. 60-33. Circuit shown above provides a square-wave output from Q2 whose audio frequency is changed alternately by action of multivibrator Q1. The resulting warbling note provides an excellent burglar alarm.

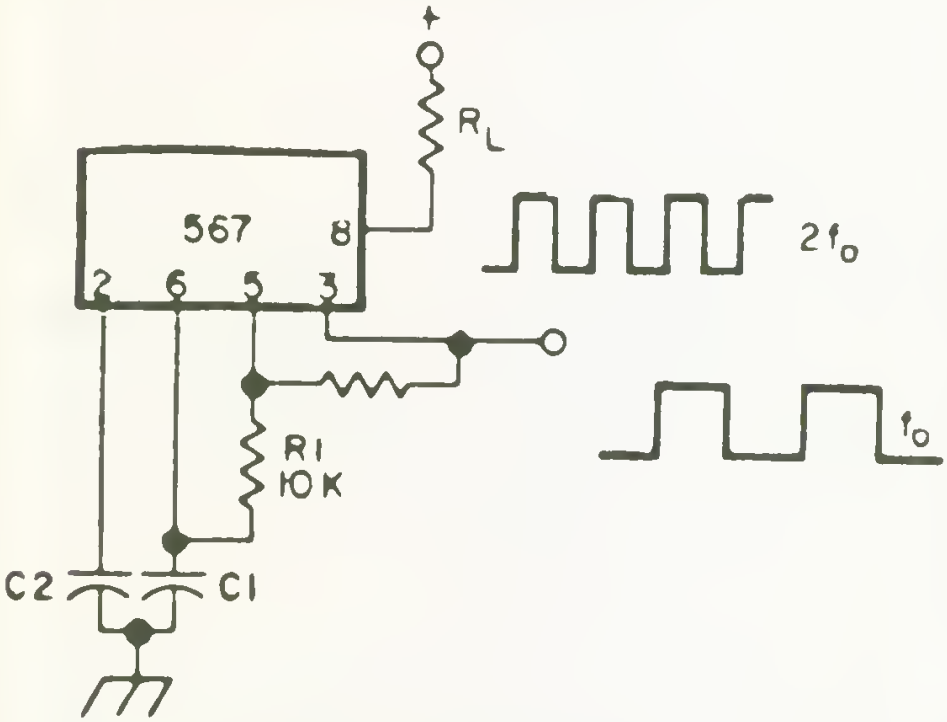


Fig. 60-34. Oscillator with double frequency output.

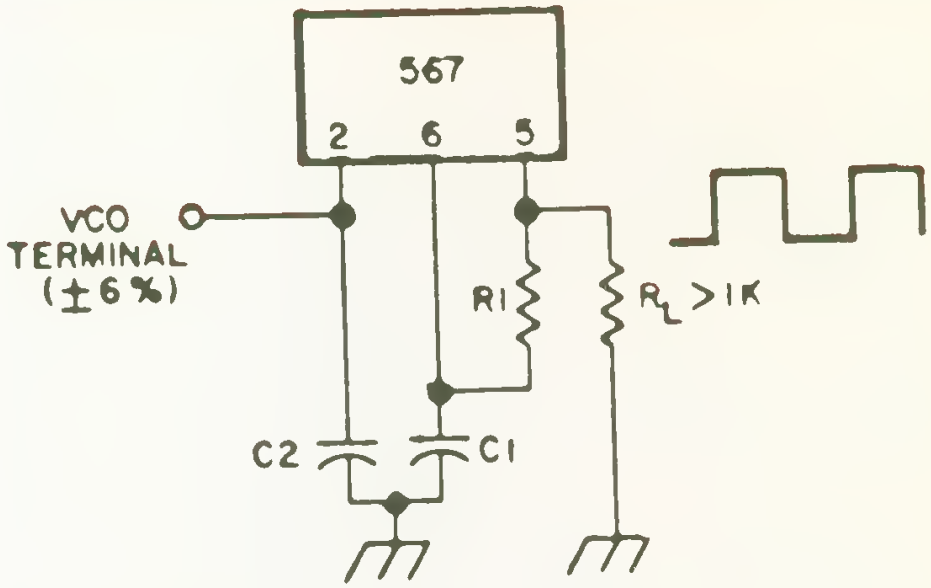


Fig. 60-35. Precision oscillator with 20 nsec switching.

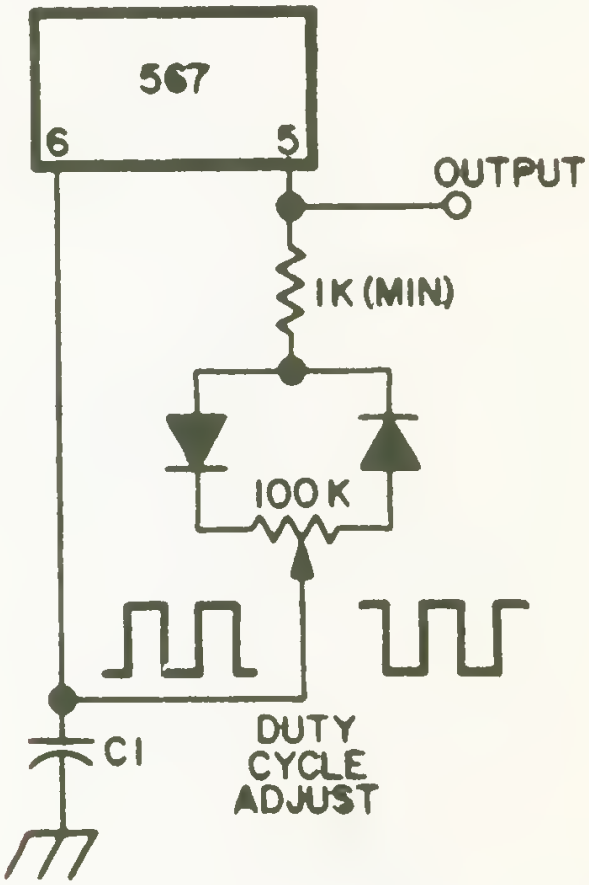


Fig. 60-36. Pulse generator (S).

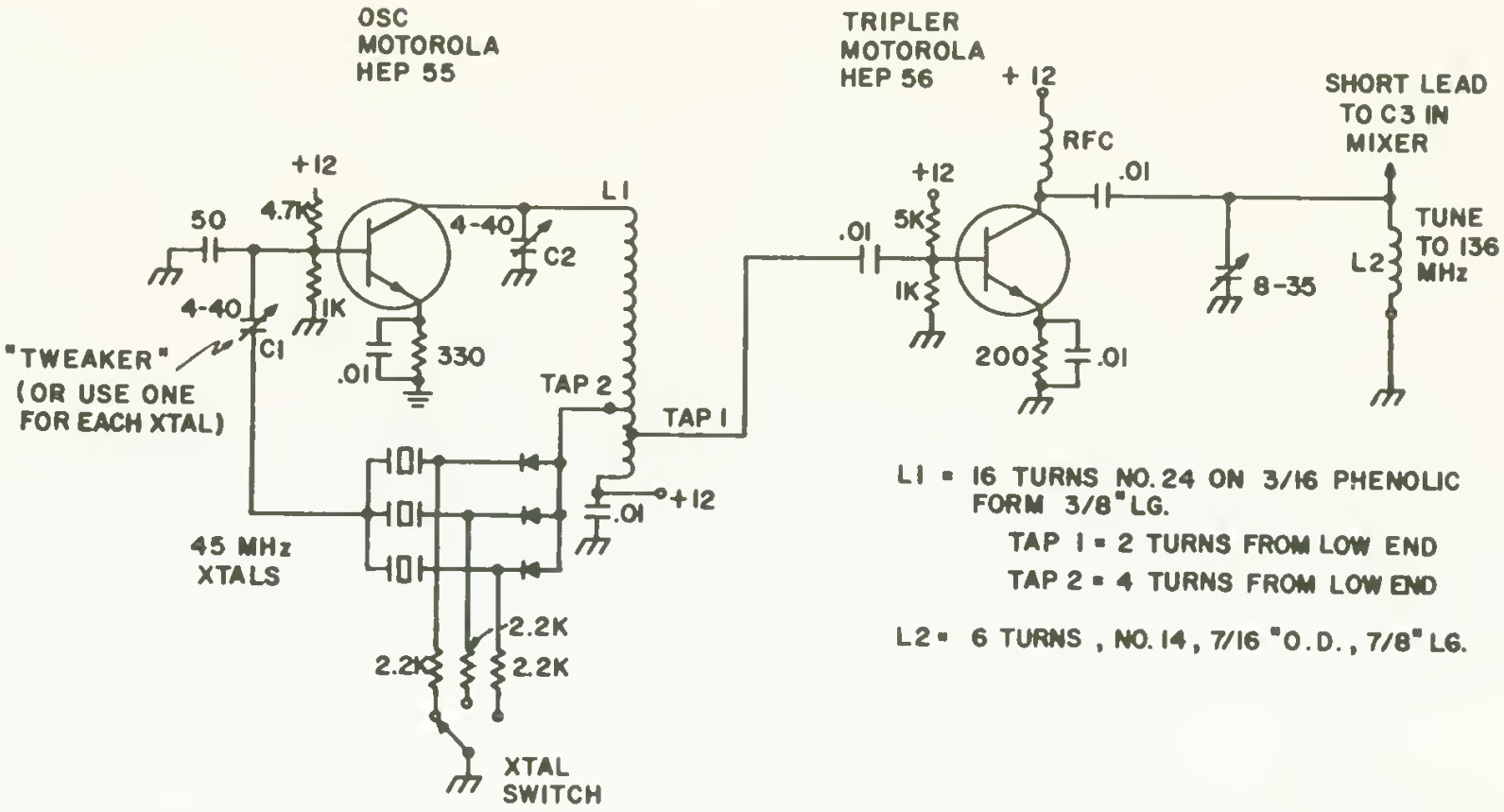


Fig. 60-37. A 45 MHz oscillator and tripler section.

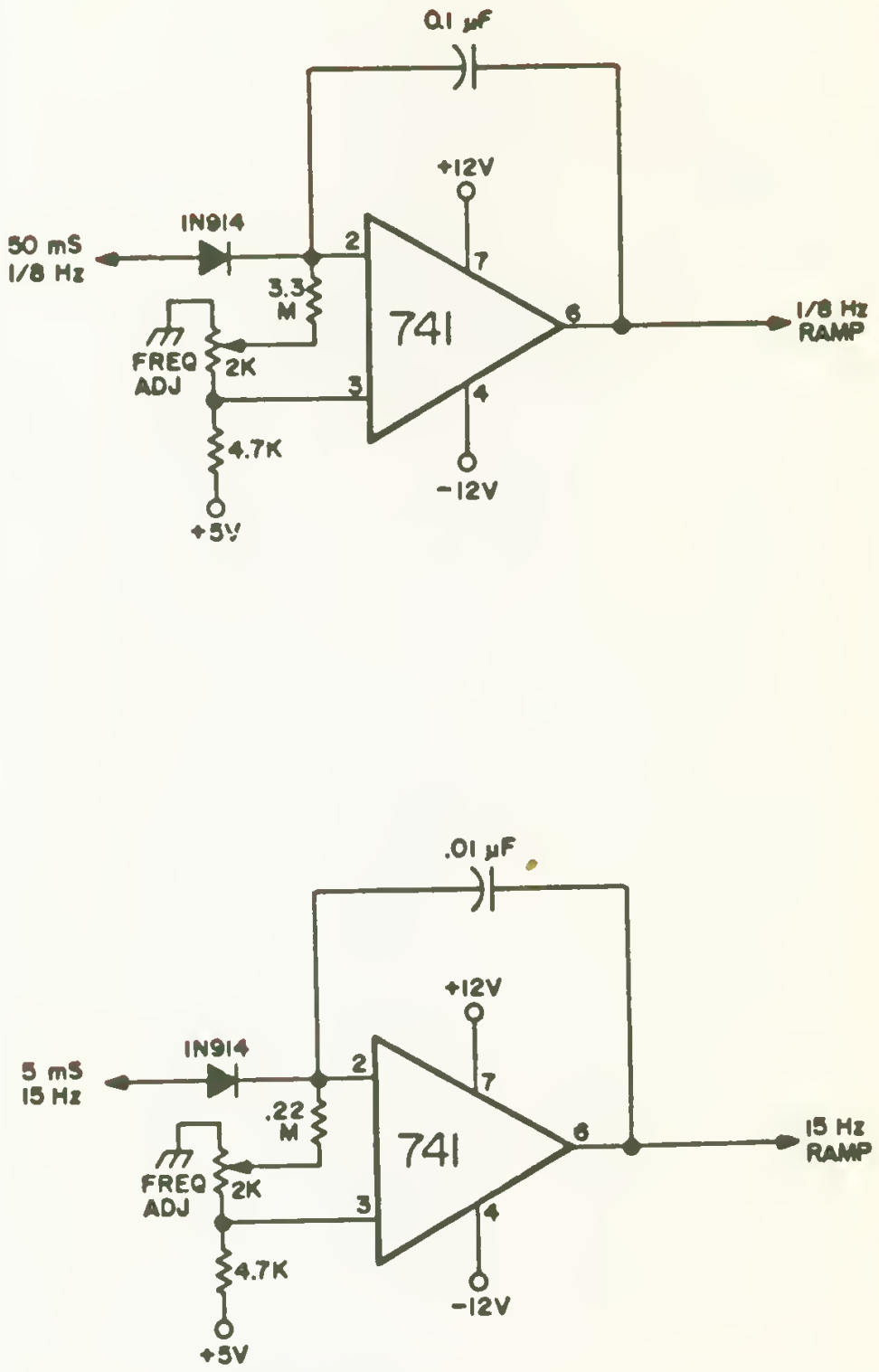


Fig. 60-38. SSTV ramp generators. This circuit will give an extremely linear ramp for SSTV monitors, cameras, and flying spot scanners. The voltage varies from ≈ −10 to +10V. A positive going pulse of +2 to +5V amplitude resets the ramp for the next sweep.

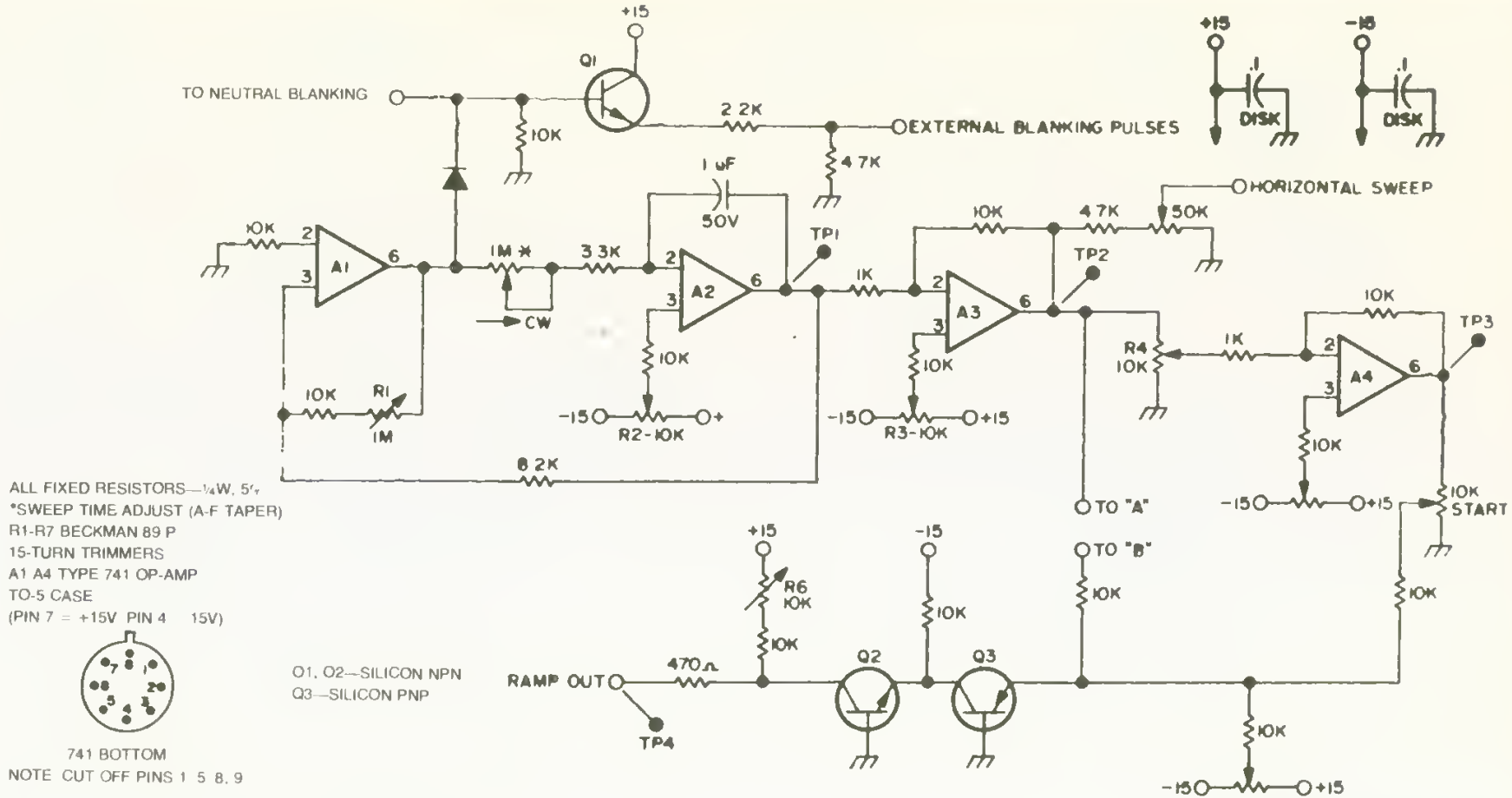


Fig. 60-39. Schematic of the ramp generator circuit.

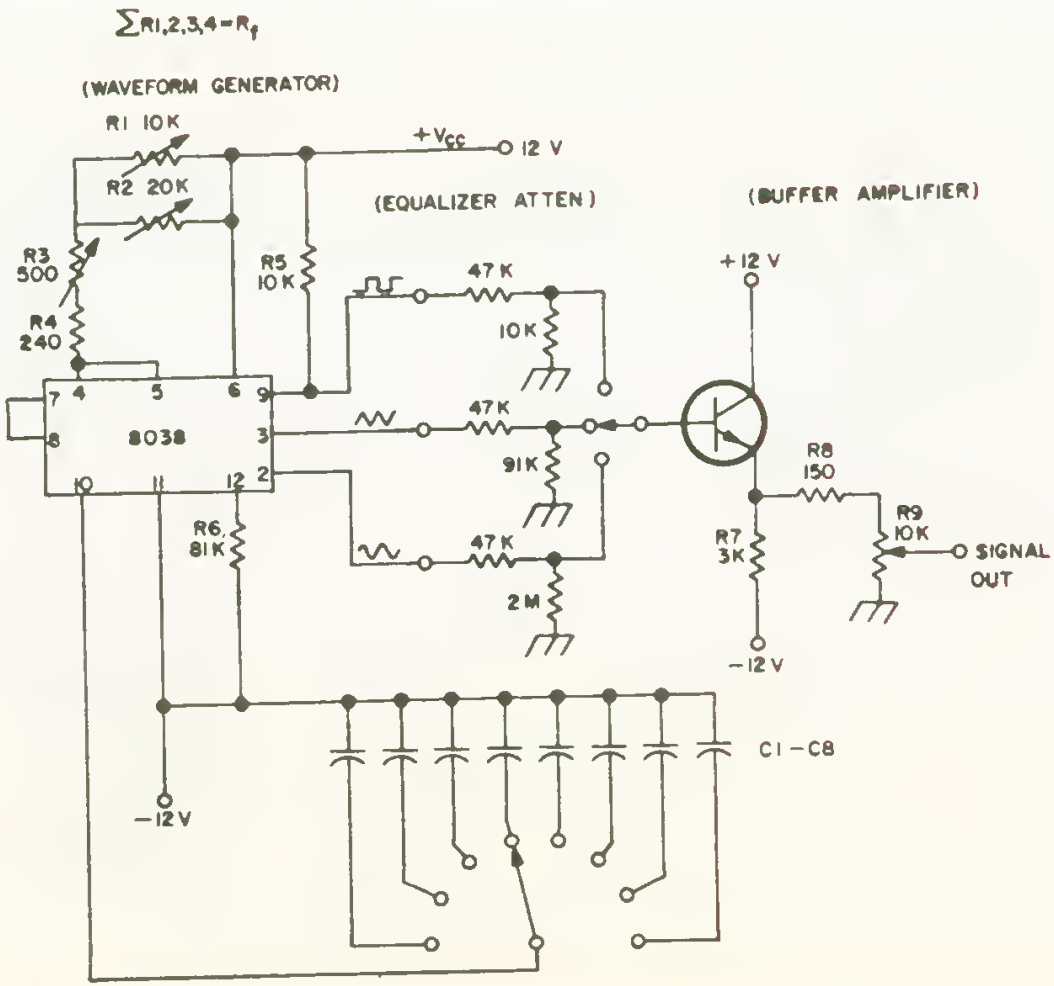


Fig. 60-40. Schematic of the triple-wave output signal generator.

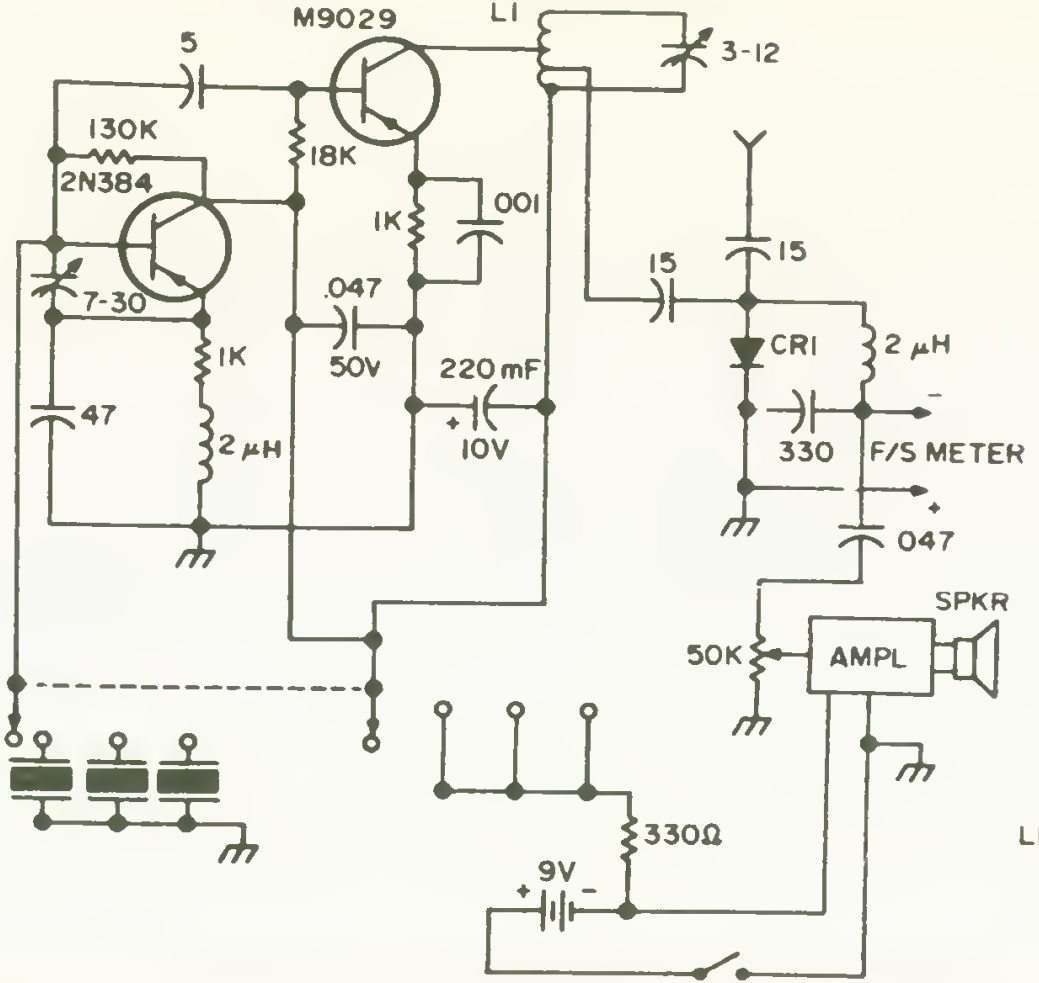
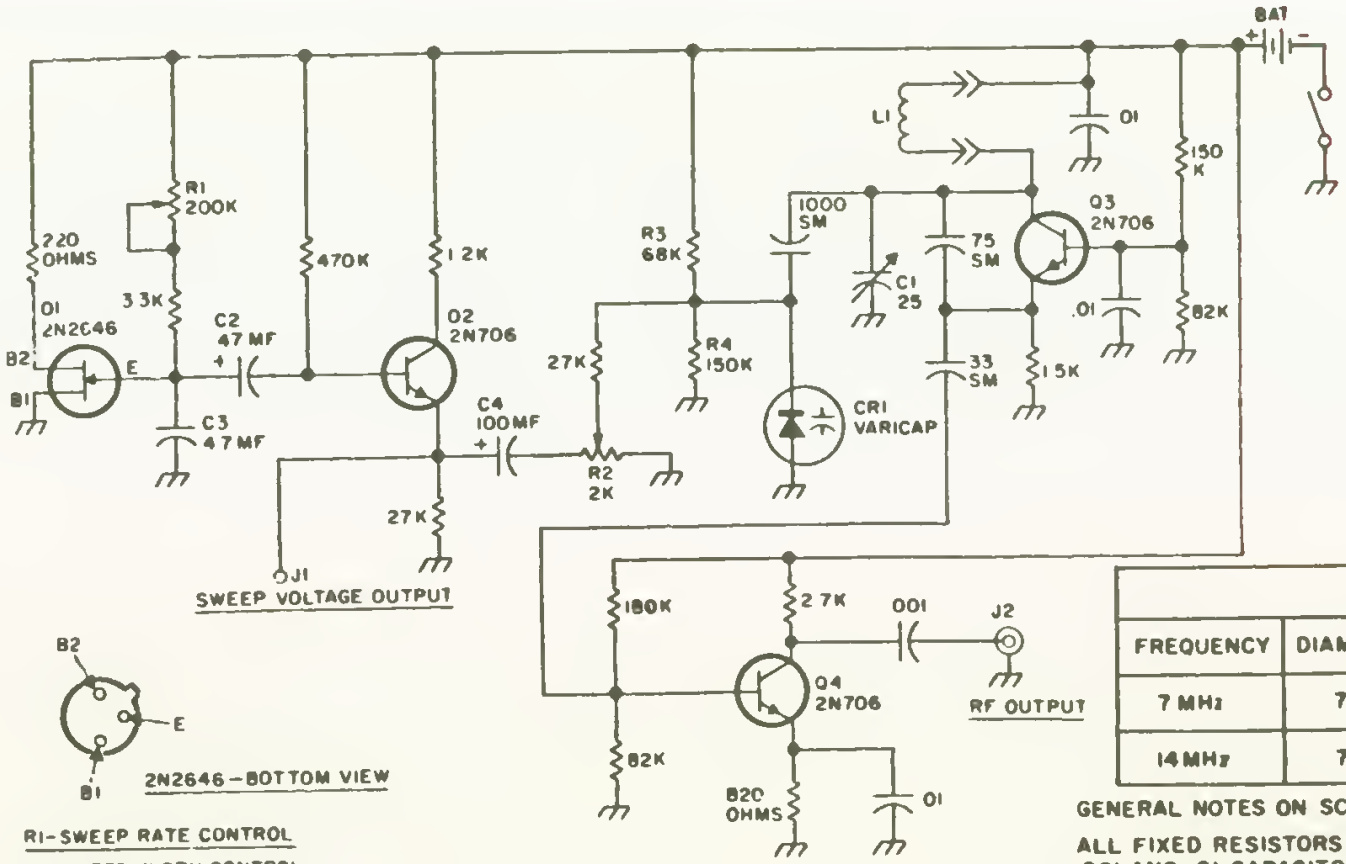


Fig. 60-41. Signal generator/amplifier.

L1 = 5T #16, 3/8 in DIA
CENTERTAPPED
OUTPUT TAP, 1 TURN UP
FROM COLD END



COIL TABLE		
FREQUENCY	DIAMETER	WINDING
7 MHz	7/8"	26 TURNS – 1 1/8" LONG
14 MHz	7/8"	7 TURNS – 1/2" LONG

GENERAL NOTES ON SCHEMATIC – FIG 3

ALL FIXED RESISTORS ARE 1/4 WATT COMPOSITION
.001 AND .01 CAPACITORS ARE DISC CERAMIC
CAPACITORS MARKED "SM" ARE SILVER MICA R1
AND R2 STANDARD CARBON ELEMENT POTENTIOMETERS
C2, C3, AND C4 ARE ELECTROLYTICS – 25WVDC OR MORE

Fig. 60-42. Sweep oscillator circuit.