

Rudolf F. Graf

Encyclopedia of

ELECTRONIC CIRCUITS

Volume 3

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To Sheryl Melissa,
a budding scholar
From Popsi

Preface

Volume III of *The Encyclopedia of Electronic Circuits* adds about 1,000 new circuits to the ready-to-use files that were established by the publication of volumes I and II of this set of circuits encyclopedias.

These three volumes now offer an invaluable storehouse of about 3,000 carefully arranged and categorized, easy-to-access circuits. Volume IV is scheduled for publication in 1992.

Once again it gives me great pleasure to extend my gratitude to William Sheets for his comments and contributions, and to Mrs. Stella Dillon for her virtuoso performance on the word processor.

1

Active Antennas

The sources of the following circuits are contained in the Sources section beginning on page 782. The figure number contained in the box of each circuit correlates to the sources entry in the Sources section.

Active Antenna
Active Antenna

ACTIVE ANTENNA

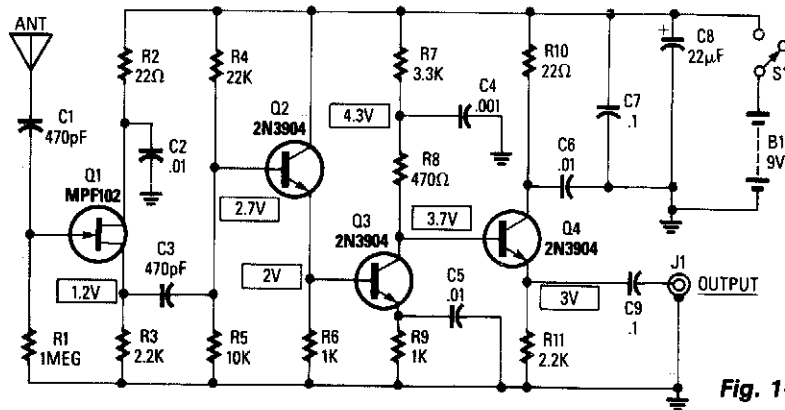


Fig. 1-1

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Antennas that are much shorter than $\frac{1}{4}$ wavelength present a very small and highly relative impedance that is dependent on the received frequency. It is difficult to match impedances over a decade of frequency coverage. Instead, input stage Q1 is an FET source-follower. A high-impedance input successfully bridges antenna characteristics at any frequency.

Transistor Q2 is used as an emitter-follower to provide a high-impedance load for Q1, but more importantly, it provides a low-drive impedance for common-emitter amplifier Q3, which provides all of the amplifier's voltage gain. Transistor Q4 transforms Q3's moderate output impedance into low impedance, thereby providing sufficient drive for a receiver's 50-Ω, antenna-input impedance.

ACTIVE ANTENNA

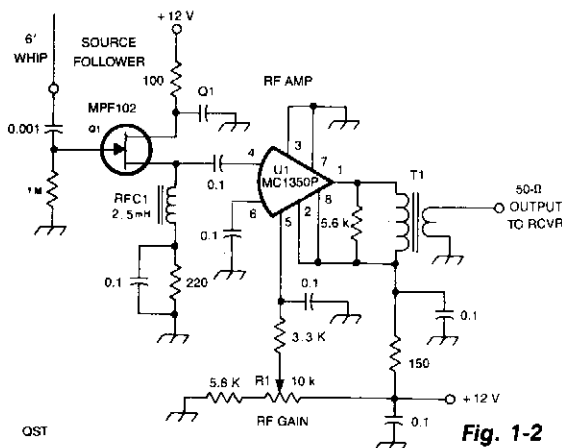


Fig. 1-2

All capacitors in this circuit are disc ceramic. Fixed-value resistors are $\frac{1}{4}$ - or $\frac{1}{2}$ -W carbon. R1 controls the gain of U1. RFC1 is a miniature 2.5-mH rf choke. T1 has 30 primary turns of #28 enamel wire on an Amidon FT50-43 ferrite toroid core, and the secondary has four turns of #28 wire.

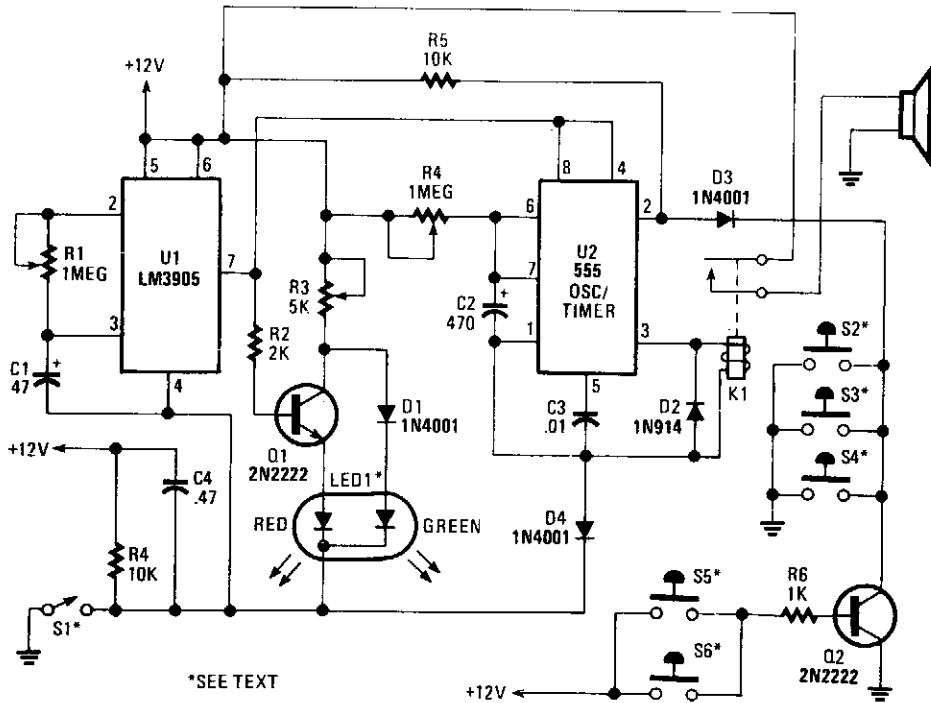
2

Alarm and Security Circuits

The sources of the following circuits are contained in the Sources section beginning on page 782. The figure number contained in the box of each circuit correlates to the sources entry in the Sources section.

Auto Alarm
One-Chip Burglar Alarm
Semiconductor Fail-Safe Alarm
Single-IC Auto Alarm
Burglar Alarm
Burglar Alarm

AUTO ALARM



POPULAR ELECTRONICS

Fig. 2-1

In operation, the alarm circuit allows a 0–47 second time delay, as determined by the R1/C1 combination, after the switch is armed to allow the vehicle's motion sensor to settle down. This allows you time to get a bag of groceries out of the trunk and not have the hassle of juggling the groceries and the key switch at once.

During the time delay, half of LED1, which is actually a single, bi-colored, three-legged common cathode device, lights green. At the same time, pins 8 and 4 of U2 (a 555 oscillator/timer) are held low by U1 (a 3905 oscillator/timer), causing the alarm to remain silent. Once the delay is over, LED1 turns red, indicating that the circuit is armed.

At that point, a ground at pin 2 of U2 forces pin 3 of U2 high, closing the contacts of K1 and sounding the siren for a time duration determined by R4 and C2. Once the time has elapsed, pin 3 is pulled low, K1 opens, and the circuit is again ready to go. The circuit can be manually reset by the simple expedient of opening and closing the key switch. Potentiometer R3 controls the LED's illumination intensity. Diode D1 ensures that the green segment of LED1 is fully extinguished when Q1 is turned on—which turns the LED to red. Resistors R4 and R5 must be connected to the +V bus, not to pin 7 of U1, otherwise U2 will mysteriously trigger itself each time the initial delay ends.

