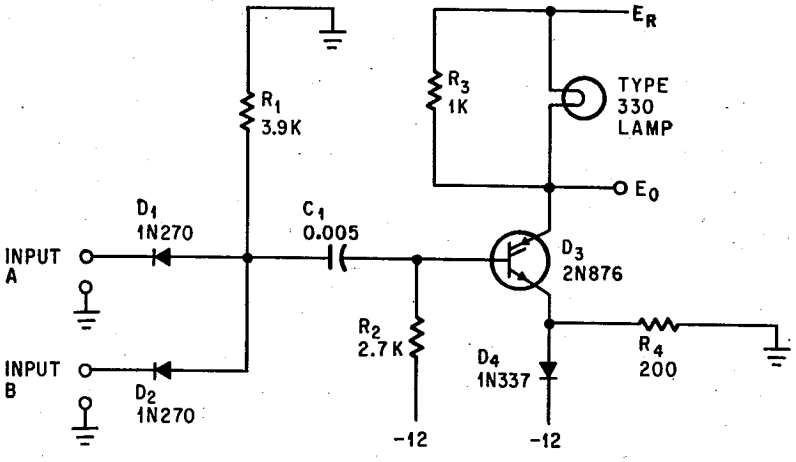
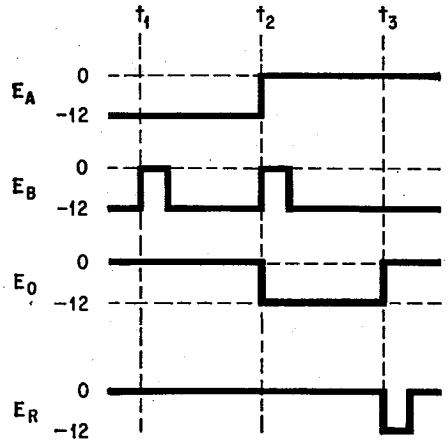
Designer's casebook

Designer's casebook is a regular feature in Electronics. Readers are invited to submit novel circuit ideas, packaging schemes, or other unusual solutions to design problems. Descriptions should be short. We'll pay $50 for each item published.





Register setting is held until circuit is reset by application of E_R. Waveforms depict input, output and reset voltages (right).

Displaying the contents of a computer register

By James J. Collins

Kollsman Instrument Corp., Elmhurst, N.Y.

An indicator circuit was needed that would sample the contents of registers in small special-purpose computers, then display the information by visual means. A silicon controlled rectifier, used as a combination register and lamp driver, provides the solution.

The computer register to be sampled is connected to input A, and input B is supplied with a 10-microsecond, 12-volt positive pulse. The state of the register is indicated by the lamp.

If the signal applied by the register at A is at its low level (—12 volts), D_1 will conduct. However, D_2 will not operate because the trigger voltage applied at B will make its cathode more positive than its anode. The negative voltage at the junction of the diodes will maintain the rectifier in the nonconducting state and the lamp will not light.

If the signal applied by the register at A is positive (actually at ground potential), the positive trigger pulse introduced at B results in a coincident positive voltage (an AND circuit gate voltage) being applied to the base of the silicon controlled rectifier. This causes the silicon controlled rectifier to conduct. The voltage placed across the incandescent lamp turns it on.

The level of the voltage triggering the scr is determined by R_1 and R_2, which act as a voltage divider.

Because the output of this circuit also was used to drive a digital-to-analog converter, resistor R_3 was placed in parallel with the lamp as a precaution against its failure.

The circuit is reset by reverse-biasing the anode of the silicon controlled rectifier. The output lead, normally clamped to ground, is switched to —12 volts for 50 microseconds. Since the scr cathode is at —11 volts, this provides enough reverse bias for reliable resetting.

In the waveform diagram shown, the register is negatively set when sampled at time t_1 and positively set when sampled at t_2. Resetting occurs at t_3.

Added transistor decreases multivibrator reset time

By Steven A. Bell

Bennett Respiration Products, Santa Monica, Calif.

Adding a low-cost conventional transistor to a free-running multivibrator circuit allows rapid resetting of the multivibrator and eliminates the need for a more expensive device, such as a unijunction transistor. In the circuit shown, the addition of Q_3 reduces by a factor of about 30 the time required to recharge capacitor C_1.

Transistor Q_2 is saturated by the negative supply voltage applied through R_3 to its base. With Q_2 conducting and C_1 charged as indicated on the circuit diagram, the negative side of C_1 is clamped to ground through diode D_1 and Q_2. Transistor Q_3