

QUIZ-GAME ELECTRONICS

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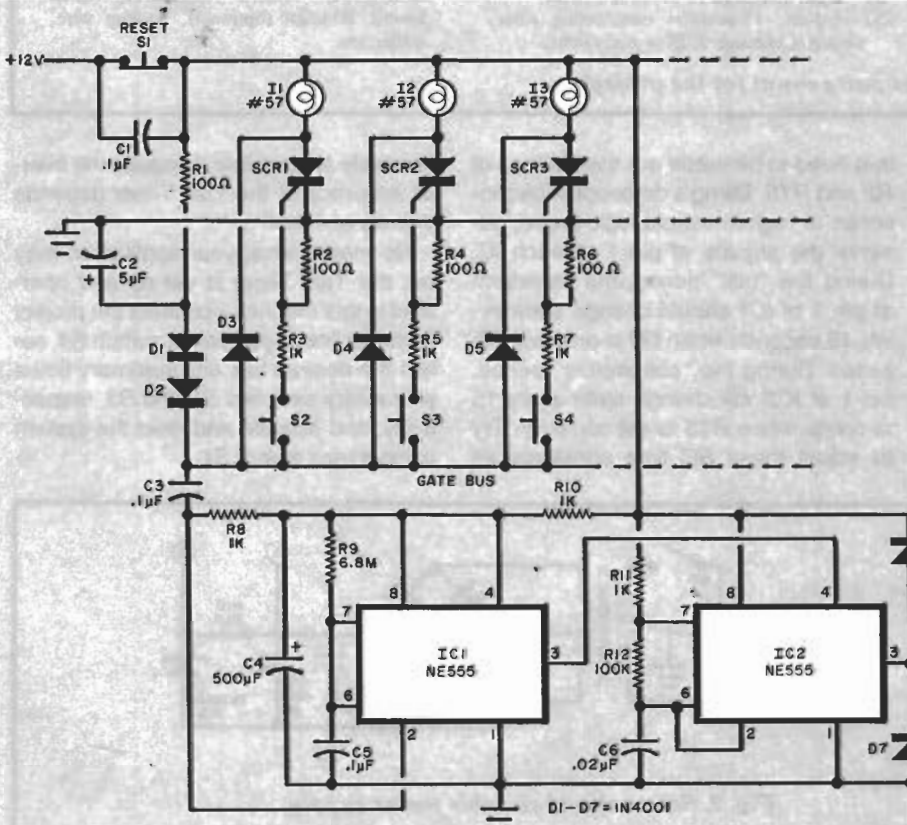


Here's a player-response circuit that will enable you to imitate quiz shows at home or with larger audiences.

POPULAR TV quiz shows use electrical or electronic apparatus to determine which contestant makes the first response, thereby getting first crack at a

question. Here's a simple circuit that will enable high school and college groups to emulate the quiz shows. It can be used for fun at home, too.

The circuit shown will energize a lamp to identify which player pushes his button first, sound an audible alarm, and lock out the buttons of the other players.



PARTS LIST

- C1, C3, C5—0.1- μ F, 50-volt disc ceramic capacitor
- C2—5- μ F, 25-volt electrolytic capacitor
- C4—500- μ F, 25-volt electrolytic capacitor
- C6—0.02- μ F, 50-volt disc ceramic capacitor
- C7—10- μ F, 25-volt electrolytic capacitor
- D1 to D7—1N4001 diode
- I1 to I3—No. 57 pilot lamp
- IC1, IC2—555 IC timer
- R1, R2, R4, R6—100-ohm resistor
- R3, R5, R7, R8, R10, R11—1000-ohm resistor
- R9—6.8-megohm resistor
- R12—100,000-ohm resistor
- S1—Spst normally closed, momentary pushbutton switch
- S2 to S4—Spst normally open, momentary pushbutton switch
- SCR1 to SCR4—HEP R1221 or equivalent
- Misc.—Utility boxes, pc or perforated board, lamp sockets, wire, solder, hardware, etc.

Schematic diagram for the game circuit. By adding SCR networks, the circuit can be expanded to include any number of players.

The solid-state design is inexpensive to build and can be expanded to include any number of players and a combination of alarms could be used.

Circuit Operation. The heart of the system is an inexpensive SCR. When a contestant presses his button, the gate of his particular SCR (one for each player) is connected to the positive gate bus. The SCR turns on and the indicator is lit. Since the voltage across the SCR is nearly zero during conduction, the normally positive gate bus will be pulled down to almost 0 volts through the diode which ties the bus to the SCR's anode. When this happens, the bus will not be able to supply enough gate current to turn any other SCR on. Thus the other players' buttons are locked out until the referee resets the circuit.

This dip in voltage on the bus activates IC1, a 555 unit operating as a one-shot. A one-second pulse from IC1's output activates IC2, a 555 in the astable mode, producing a tone in the speaker for the same length of time. Since the output of IC2 is a square wave, an appreciable inductive "kick" can appear across the speaker coil. Two clipping diodes are connected across the output of IC2 to protect the transis-

tors inside the 555 from excessive voltage spikes.

Once a pulse of current flows into an SCR, it will conduct indefinitely (the player need not keep his button continuously depressed) until the anode current falls below the holding current, I_H . When this happens, the SCR turns off. In this circuit, the indicator lamp will continue to glow and all other pushbuttons will be locked out until the referee pushes the RESET button, S1.

The duration and pitch of the tone may be adjusted by changing the values of the timing components associated with IC1 and IC2. For example, changing R9 from 6.8 megohms to 1 megohm will shorten the duration to about 0.2 seconds, while substituting a 10-megohm resistor will extend the interval to about two seconds. Replacing the 100,000-ohm R12 with a 500,000-ohm resistor will raise the frequency of the tone from 350 Hz to about 1000 Hz. Since tastes vary, you might install potentiometers in place of these two fixed resistances, and adjust them to produce the desired pitch/duration combination.

Any small 8-ohm speaker will be sufficient for this application. Power can be obtained from any source capable of producing 500 mA at 9 to 12 volts dc. A

lantern battery or a small full-wave power supply will work fine.

Construction. The system can be constructed in several different configurations. One of the most versatile arrangements is to mount each contestant's pushbutton, indicator lamp, and SCR network in a small utility box, which is placed before him. All of the boxes are connected together by a three-conductor cable. The tone generator, RESET button, and power supply can then be installed in a utility box mounted at the referee's position.

An alternative arrangement is to mount all of the circuitry behind a panel on which the indicator lamps are installed. Twisted-pair or zip cord can be used to connect the circuitry to pushbuttons at the contestants' and referee's positions. Other configurations might be suggested by your own particular situation.

Parts placement is not critical, so the circuitry can be assembled on a printed circuit board or a piece of perforated board, mounted in any small, convenient utility box.

All you need now to use the system are contestants, brain teasers and prizes to be won! ◇

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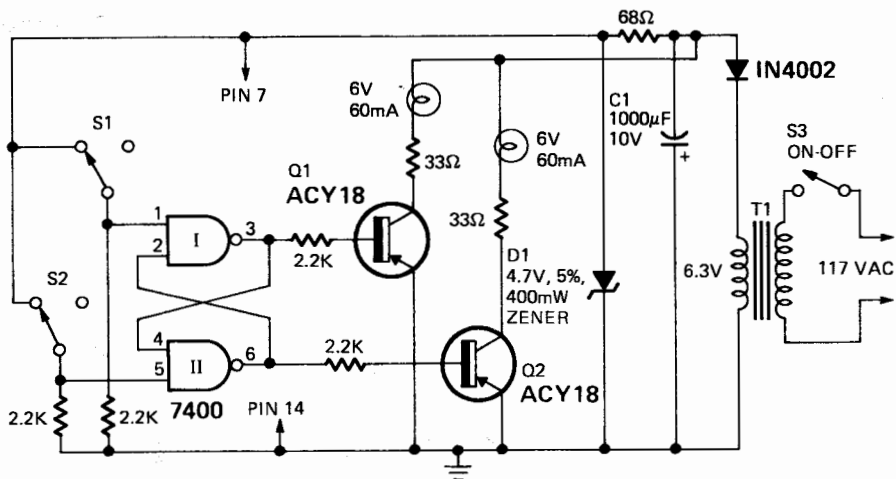


FIG. 3—PRECEDENT DETECTOR uses a flip-flop to determine which switch is opened first.

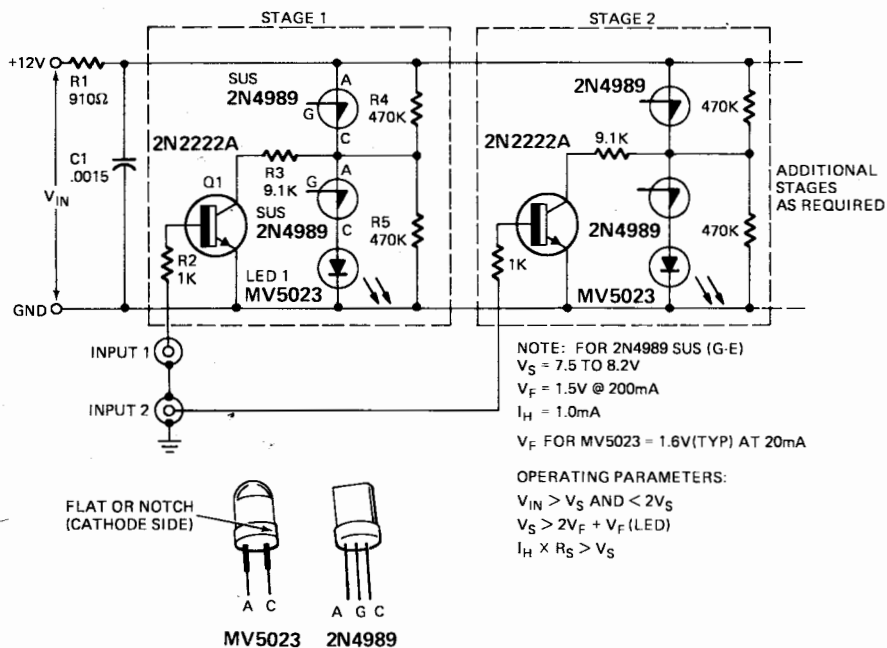


FIG. 4—PRECEDENT DETECTOR uses two SUS devices in each stage to control the LED indicator.