HI-FI À GO-GO LAMPS

Add a new dimension to your hi-fi . . . in color

By DON LANCASTER

WHY BE SATISFIED with just listening to hi-fi programs when for a sawbuck you can have the added enjoyment of seeing what you're hearing, and intriguing all your friends. A pair of ten dollar bills will get you two sets of audio controlled lights to let your stereo system really brighten up the place. For those who want something different, it's quite a conversation piece.

With the *À Go-Go* circuit, the brightness of one or more incandescent lamps is controlled by an audio signal. Its full-range proportional control is capable of bringing the lights from full darkness to full brilliance; the louder the sound, the brighter the lamps. You can use it to control up to 200 watts of light, and with modification and a few dollars more, up to 2000 watts. The unit is about the size of two ice cubes.

How It Works. Sounds fed into *J1* are stepped up by *T1,* rectified by *D1* and filtered by *C2* only to become a control voltage for trigger diode *D3*. (See Fig. 1.) It takes 15 volts to make *D3* conduct. The time required to build up 15 volts on *C3* depends upon the amplitude of the sound and the values of *C3* and *R2*. The louder the sound, the quicker the voltage buildup; the larger the resistor or capacitor, the longer it takes to build up the voltage.

When *D3* fires, it triggers the SCR into conduction only if the SCR anode also has a positive voltage on it. Once the SCR fires, it continues to conduct until the anode voltage drops down to about 0. This happens each time the line voltage waveform goes through zero. The SCR will remain off until another pulse is applied to its gate. The sooner the gate pulse occurs when anode voltage is present determines the amount

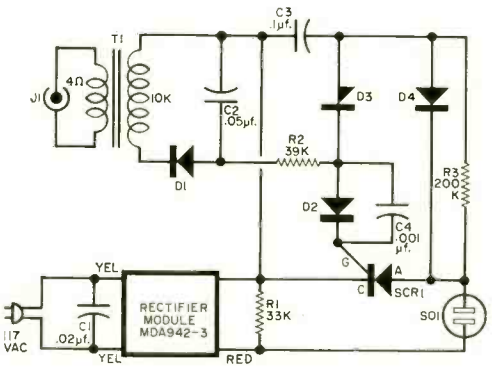

Fig. 1. Ratio of "on time" to "off time" of SCR1 changes in step with music levels, and brightens or darkens different colored bulbs plugged into SO1.

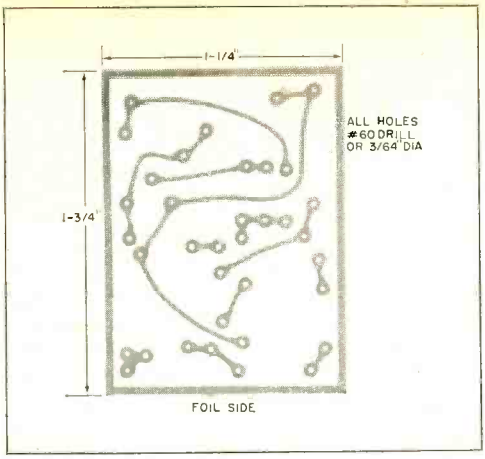

Fig. 2. Printed circuit board is shown actual size to help you make your own. However, almost any suitable chassis or breadboard arrangement can be used.

PARTS LIST

C1—0.02-μf., 200-volt Mylar capacitor
C2—0.05-μf., 200-volt Mylar capacitor
C3—0.1-μf., 200-volt Mylar capacitor
C4—0.001-μf., 600-volt disc capacitor
D1, D2, D4—1N4003 diode
D3—Trigger diode (Texas Instruments T1-42 or equivalent)
J1—Phono jack
R1—33,000-ohm, ½-watt resistor
R2—39,000-ohm, ¼-watt resistor
R3—200,000-ohm, ¼-watt resistor
SCR1—2N3528 silicon-controlled rectifier
SO1—Chassis-mounted a.c. socket (Amphenol 61-F or equivalent)
T1—Output transformer, 4 ohms primary to 10,000 ohms secondary (Thordarson TR-203 or equivalent)
1—Full-wave bridge rectifier module, 1.5 amp., 200 volts (Motorola MDA942-3)
1—Chassis-mounting a.c. plug (Amphenol 61-M or equivalent)
1—Case (Millen 74400 or equivalent)
1—2" square of 1/16" single-sided circuit board
Misc.—Silicon potting compound, hookup wire, solder, pop rivets or screws

of time during each half-wave that current can flow through the lamps plugged into *SO1*.

Neither the eye nor the lamps can follow the 120-cycle unfiltered pulsating voltage out of the rectifier module, but the lamps do respond in a proportional manner. The brilliance of the lamps is a function of the ratio of "on" time to "off" time; or the louder the music, the brighter the lights.

Capacitor *C1* serves as a filter to prevent the switching transients in the *A Go-Go* from getting back into the power line and causing AM-type radio interference. The other components optimize the circuit to prevent premature turn-on of the SCR and allow more accurate proportional control by discharging *C3* before a new "on" cycle begins.

As the audio is used for bias only, little audio power is consumed. The *A Go-Go* has high sensitivity and very little volume is needed to drive it.

Construction. Start construction by laying out and etching the printed circuit board shown in Fig. 2. Drill holes and mount components as shown in Fig. 3. Watch the polarity—one wrong connection can destroy all the semiconductors.

After you've finished the wiring, connect an a.c. socket and plug to the board and test the *A Go-Go* with a 25-watt bulb. The bulb should glow slightly with no audio. A fairly low level audio signal should drive the lamp to full brilliance. If this test checks out okay, test the board using the lamps and audio source

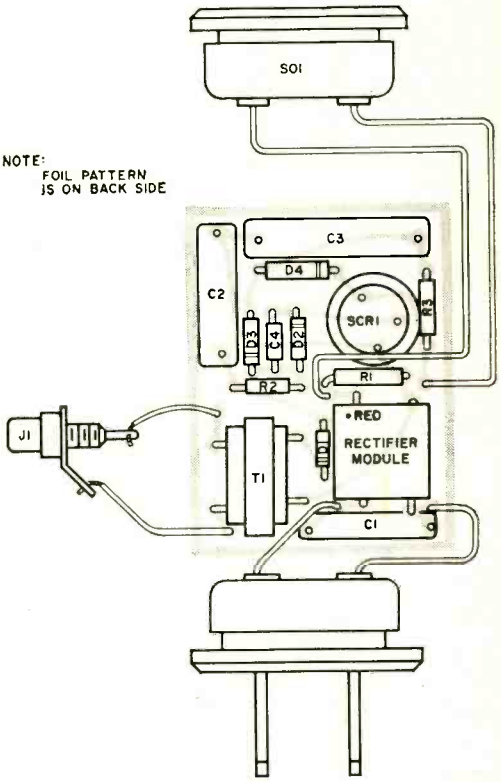

Fig. 3. Mount the jack and sockets in the case before connecting them to the circuit. If space is not a factor you can add more features. See text.

you plan to have in the permanent installation.

For best appearance and greatest sensitivity, the display lamps should barely light with no audio input. A different background level can be obtained by changing the value of *R2*; increasing its value will decrease the background light level. You might also experiment with *C2*—use too small a value, and you'll have a choppy response; too large, and the response will become mushy.

The components are mounted inside a modified Millen octal base and shield. Cut the shield to about 1¾″ long (see Fig. 4), and drill or punch 1 9/64″ keyed or 1 5/32″ round holes in both top and bottom for the plug and socket. Drill a 17/64″ hole in one side for the audio jack. Screws or rivets can be used to fasten the two parts of the case.

Once you've wired the board, socket, and audio jack, you can pot the circuit in silicon rubber. To do this, turn the *A Go-Go* upside down and place small bits of tape over the inside openings of *J1* and *S1*. Then pour in about half an inch of rubber and let it set. The printed circuit board is then positioned in place and another half inch of rubber added. Complete the assembly by connecting the plug.

Modifications. The *A Go-Go* operates on 117-volt, 60-cycle lines and utilizes incandescent lamps only. For the unmodified unit, you can use a total of 200 watts maximum, but for cooler operation and longer life, 100 watts or less is advisable.

If you plan to use a bigger package than the modified Millen shield, you might add a 250-ohm potentiometer in the input circuit as a sensitivity control, and replace *R2* with a 250,000-ohm potentiometer to serve as a variable background control. A selector switch with several capacitors (0.02 μf., 0.05 μf. and 0.1 μf.) to replace *C2* will give you control over lamp response.

More power is a snap, but it will cost extra and you'll probably need a bigger

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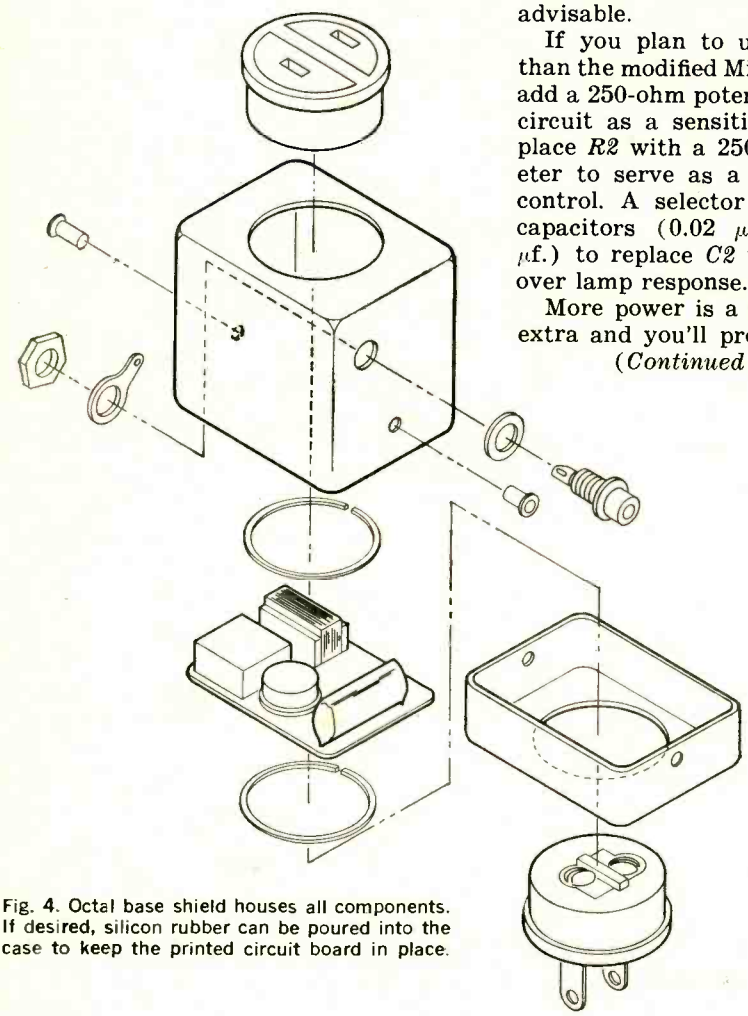

Fig. 4. Octal base shield houses all components. If desired, silicon rubber can be poured into the case to keep the printed circuit board in place.

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container. All you have to do is replace the rectifier module and SCR with models rated to handle the increased wattage. The accompanying table lists components needed for 200, 600, 1000, and 2000 watts. Parts cost for 200 and 400 watts runs a little over four bucks. But for 1000 watts it jumps up to about $7, and for 2000 watts, $8.50.

MODIFICATION TABLE FOR MORE POWER

Power Level (watts)	Rectifier Module	Heat Sink?	SCR1	Heat Sink?
200	1.5 amp. Motorola MDA942-3	No	2.0 amp. RCA 2N3528	No
600	6.0 amp. Motorola MR1032B (4 req'd.)	No	5.0 amp. RCA 2N3228	Yes
1000	10 amp. Motorola MDA962-3	No	8.0 amp. Motorola MCR1305-4	Yes
2000	18 amp. Varo Inc. 1N4436	Yes	18 amp. Motorola MCR808-4	Yes

How To Use It. There are many ways in which you might use the *À Go-Go* lamps. For instance to make stereo listening fun to watch, you can install an *À Go-Go* in each channel. In the right channel use four red and two green 25-watt bulbs; in the left channel use four yellow and two green ones. Arrange all the lamps in a row in a reflective enclosure (crumbled aluminum foil will do) or behind a translucent screen. The green lamps should be in the middle, the red on the right, and the green on the left.

Audio signals for the *À Go-Go* can be taken directly from the speaker leads. If the sound is too loud for the amount of light you want, try a lower impedance tap on the amplifier or add a few ohms resistance between the amplifier and the speaker. —30—