

# AUTOMATIC AMPLIFIER SWITCH

CONVENIENT ACCESSORY FOR YOUR AUDIO SYSTEM

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**I**F YOU have put together a hi-fi system using separate components, the chances are that you may already have been bugged by the nuisance of having to switch on the main amplifier each time you want to operate the turntable, the tape recorder, or the FM tuner (or whatever you have). Also, if you are as absent-minded as most of us, you have probably forgotten more than once to switch off the amplifier after the last record—finding the amplifier still on a day or two later.

Here is a simple device you can add to your hi-fi system to control the power to the main amplifier automatically whenever one of the "front end" components (such as the turntable) is switched on or off. The automatic amplifier switch, whose schematic is shown in the diagram, can be built in one evening from a handful of components. The cost should be only about \$7.

**Circuit Operation.** Diodes *D1* through *D4* are connected in series with sockets *SO1* through *SO4* to the ac line. A load connected to either of these sockets will cause a voltage drop across *D1* and *D2* or *D3* and *D4*, depending on the instantaneous polarity of the power line. This voltage is applied through *R1* to the gate of triac *Q1*, causing full line voltage to be applied to controlled socket *SO5* where the main amplifier is connected.

The circuit operates reliably for any load of 5 watts or more connected to any one of sockets *SO1* through *SO4*. With a smaller load, the limited triggering current available to *Q1* will retard its firing angle so that full power is not delivered to *SO5*.

Note that any suppression capacitors larger than about 0.01 microfarad installed across the power switches of equipment plugged into the controlling sockets may have to be removed if they supply enough reactive current to trigger *Q1*. Such capacitors are sometimes found in turntables to suppress the noise generated when the motor is switched off; but they are not indispensable.

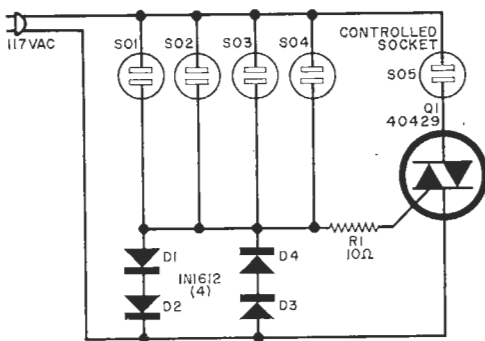
The effect of reactive current can also

be minimized by using a triac that requires relatively high gate current for triggering. To find out easily whether or not you will have a problem with reactive current, plug the turntable or other device into *SO1* and attach a 40-to-100-watt lamp to *SO5*. If the lamp glows when the turntable is switched off, check for suppressors across the power switch.

Putting fuses in the circuit is optional. An overload or short circuit applied to *SO1* through *SO4* could ruin one or more of the diodes; but neither *Q1* nor the load connected to *SO5* would be harmed. Conversely, an overload at *SO5* would damage *Q1*; but none of the diodes nor the units connected to the input sockets would be affected.

**Component Selection.** Diodes *D1* through *D4* are power rectifiers with sufficient current ratings to carry the maximum current of all the controlling devices connected to *SO1* through *SO4* simultaneously, in case

Simple circuit has 4 diodes and triac.



## PARTS LIST

*D1-D4*—50-PIV, 5-ampere silicon diode (1N1612 or similar)

*Q1*—200-volt, 6-ampere triac (RCA40429, SK3506)

*R1*—10-ohm, 1/2-watt resistor

Misc.—Chassis-mounted ac receptacle (5), mounting bracket, mounting hardware, suitable chassis, line cord, grommets, etc.

they are all turned on at one time. Since the diodes are connected in series and back-to-back, they never receive more than a couple of volts in the reverse direction. Therefore, silicon diodes (or silicon power transistors connected as rectifiers) with the lowest PIV rating can be used. Be sure the rectifiers are silicon or the forward voltage drop won't be enough to trigger *Q1*. Triac *Q1* must have a current rating only high enough to handle the main amplifier load connected to the controlled socket.

**Construction.** Since the amount of wiring and components required is small, a wide variety of construction methods is possible. If only one controlling socket is needed, the unit can be built inside a standard wall outlet box. Another technique would be to use a multiple power outlet box.

The prototype was constructed in a 4" ×

2½" × 1½" box, which is about the minimum size for handling four controlling input sockets. Use insulated mounting hardware for the diodes and triac and check carefully for leakage to the chassis to make sure there is no shock hazard. Use an ohmmeter to check for leakage. Make sure bare leads or terminals can't come in contact with the chassis.

Test the circuit by connecting a 100-watt lamp to *SO5*. With a small load applied to one of the controlling sockets (*SO1* through *SO4*), the lamp should turn on to full brightness. If the lamp is dim, it might indicate a defective triac, which is firing only on alternate half cycles; in which case you will need an oscilloscope for further troubleshooting. With a little imagination, you can probably think of several more applications for this automatic switch in the ham shack or around the house. ♦

### THIN FILM LASER SWITCH

A new light switch for use with lasers has been devised by Bell Labs. It may be useful in future tiny optical circuits for putting phone calls and other information on a laser beam. Main components of the switch are a

magnetic thin film of single crystal garnet in which the light is guided and a serpentine-like electric circuit which is used to impose the required information on the light beam by changing the beam's path.

