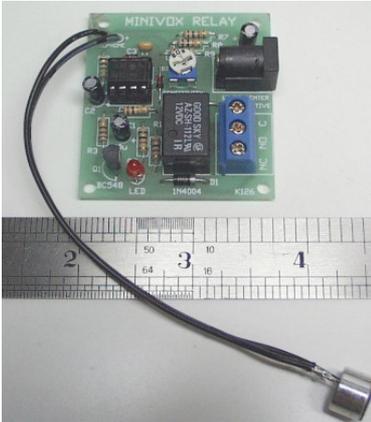


# Voice / Sound Activated Relay Switch



This mini-VOX - voice operated relay - is based on a circuit published in *Silicon Chip*, 9/1994, p31. We have improved it by putting an on-board Koa potentiometer in order to adjust the sensitivity. The idea behind a VOX is that instead of the user pressing a switch to activate a relay, the sound of the users voice itself activates the relay. This gives hands-free control over devices like lights and tape recorders. Relay stays on for 1 or 5 seconds (depending on components used) then shuts off. Different time values can be realized by using different value components (read [k126.pdf](#) for more information).

## Specifications:

- L: 2-1/4" W: 1-1/4" H: 5/8"
- Requires 12 VDC Power Supply
- Current drain when off is 5-7mA and 35mA when activated
- Relay output rated at 12VDC/10A or 240VAC/5A
- Microphone can be connected on leads up to 2 feet away from the PCB.
- Off time delay adjustable by changing component values.

# QUASAR PROJECT KIT # 3126 - MINI-VOX & RELAY

This mini-VOX - voice operated relay - is based on a circuit published in *Silicon Chip*, 9/1994, p31. We have improved it by putting an on-board Koa potentiometer in order to adjust the sensitivity. The idea being a VOX is that instead of the user pressing a switch to activate a relay, the sound of the users voice itself activates the relay. This gives hands-free control over devices like tape recorders.

**Assembly.** Check of the Components against the Listing. Follow the overlay. Note that the microphone should be located on two wires (not supplied) some distance away (like 1ft to 2 ft) from the PCB. It should **not** be mounted on the PCB otherwise vibration from the relay could trigger it continuously. Note one component is located under the IC so the IC socket has to be used.

**Operation.** Audio is picked up by the microphone and fed to the opamp IC1a. This is connected as a non-inverting amplifier with a gain of 151 or +43.6dB. The 100pF capacitor across the 150K feedback resistor rolls off the high frequency response above 10kHz to eliminate RF. The output at pin 1 feeds two diodes, D2 and D3 which function as a half-wave voltage doubler. These rectify the audio signal to produce a DC voltage across the 2.2uF cap, C2 which is directly proportional to the input audio sound level.

This DC voltage is fed to pin 5 the second opamp IC1b. This is connected as a comparator. A resistive voltage divider applied about 2V to pin 6. Once the DC voltage across the 2.2u cap rises above the voltage at pin 6, pin 7 pulls high. This turns on transistor Q1 which activates the relay and turns on the LED. Q1 remains on while the DC voltage at pin 5 is above that at pin 6. Because of the high opamp gain of IC1a, and with the voltage doubler gain the circuit has a fast response time. However, the release time takes about 3 seconds determined by the time constant of C2, R5 (the 1M resistor) and the pin 6 threshold voltage.

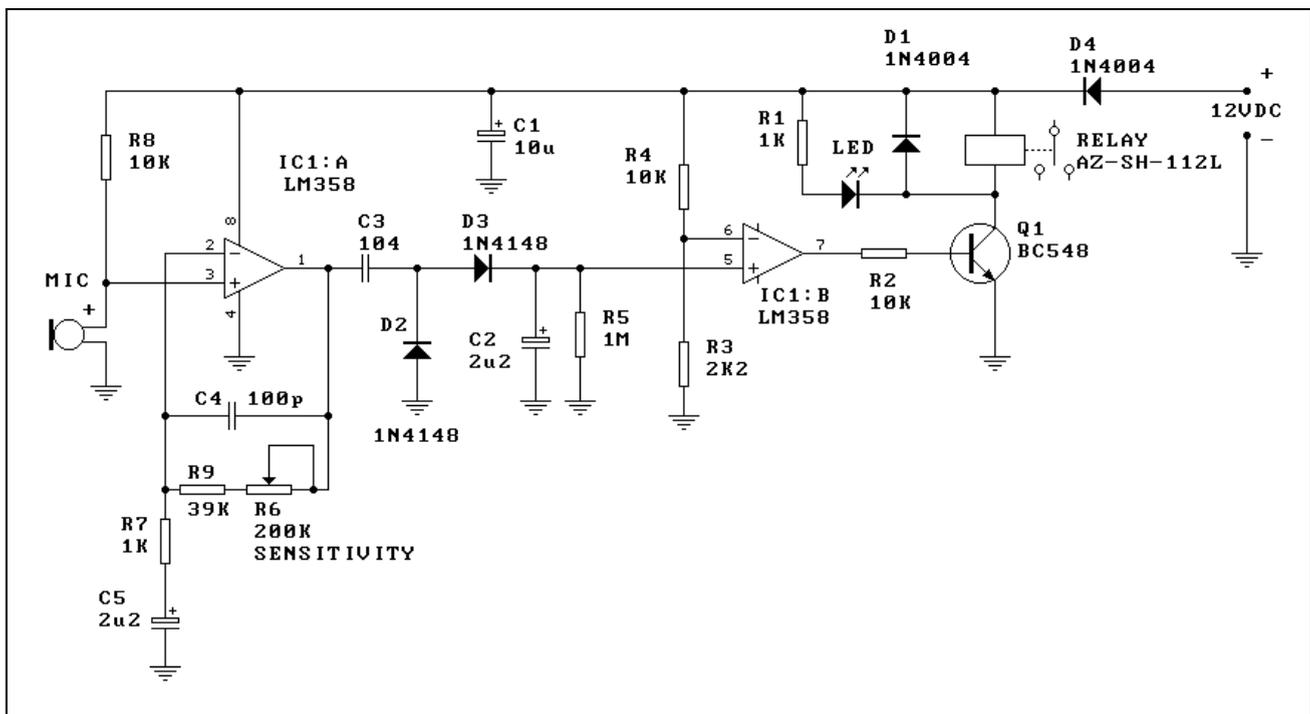
D1 is connected across the relay to protect Q1 when the relay turns off (back-emf.)

Connect the microphone on leads up to 8 feet away from the PCB. Connect the negative of the microphone (the pin connected to the microphone case) to the -ve on the PCB microphone position.

Battery 12V power may be used. D4 acts as protection for the circuit in case power is connected the wrong way. Current drain when off is 5-7mA. It is about 35mA when activated. Sensitivity may be varied with the 200K Koa potentiometer. A good working VOX level is about R6+R9 of 150K. The off delay time may be adjusted by varying R3 and R4. Reducing R3 will result in a longer release time.

You could change the release time constant (C2 & R5) to say 30 seconds and use the VOX as a light switch with this delay time before turning off. Increase C2 to say 10u and R3 to 3M3.

Email [sales@quasarelectronics.com](mailto:sales@quasarelectronics.com) if you have any questions. See our kit range at <http://www.quasarelectronics.com>



## QUASAR PROJECT KIT # 3126 - MINI-VOX & RELAY

### COMPONENTS

Resistors 5%, 1/4W:	
1K brown black red R1 R7	2
2K2 red red red R3	1
10K brown black orange R2 R4 R8	3
39K orange white orange R9	1
1M brown black green R5	1
200K 204 Koa potentiometer R6	1
1N4004 D1 D4	2
1N4148 D2 D3	2
2u2 mini ecap C2 C5	2
10u mini ecap C1	1
100pF 101 mono C4	1
.1uF 104 mono C3	1
BC548 Q1	1
LM358 IC1	1
8 pin IC socket	1
Relay AX-SH-112L	1
3 pole terminal block	1
Power jack	1
3mm LED	1
Electret microphone	1
3126 PCB	1