

QUASAR ELECTRONICS KIT No. 1130

TELEPHONE «BUG» DETECTOR

General Description

It is very well known to all how important telephone has become in our every day lives. It is also well known how important privacy is in our days of strong competition, and bitter antagonism. It must have happened to almost anyone, at least once, to have a third party intruding in a telephone conversation because of crossed lines in the telephone exchange. Although, most of the times, the intruder is innocent and after explaining the situation leaves the line free, the whole experience leaves the victims with feelings of lack of privacy, of being spied upon, of insecurity. Even worse is the case when somebody tries to tap your telephone line on purpose. It is worse, because in the event of an accidental intrusion there is most of the times some telltale noise on the line, (the other person tries to say something or you can hear another conversation parallel to yours going on etc.) while if the intrusion is done on purpose whoever does it will do his best to keep silent to avoid giving you a warning of his presence.

The usual way to tap a telephone line is by connecting an automatic recording device or a little transmitter to the line itself, which by drawing power from the line will either record or transmit your conversation. The detector, you are about to build, is sensitive enough to distinguish between a clear and a «loaded» telephone line and advice you positively whenever something happens which changes the characteristics of your line.

It draws its power from the telephone line, needs no maintenance whatsoever and advises you by a green light that your line is clear and a by a red one when somebody tries to intrude.

Technical Specifications - Characteristics

Supply voltage: Supplied by the telephone line

Indications: GREEN - Line clear

.....RED - Line «loaded»

Small in size, silent, reliable, discrete.

Simple construction, easy to connect and set up.

It can be left permanently connected on your line.

How it Works

The operation of the circuit is very simple. The two points of the circuit marked (+) and (-) are connected in series with the telephone line. The diode D1 rectifies the telephone line voltage and supplies the circuit with the necessary DC power. The voltage divider consisting of P1 and R2 is adjusted so that on a clear line the green LED goes on when you lift the receiver of the telephone. If now someone tries to tap this line the extra load will cause a slight voltage drop which will cut Q3 OFF and consequently Q2 will go ON lighting the red LED. As the base of Q1 will effectively be connected to ground potential as Q2

conducts the transistor will switch OFF and the green LED will extinguish.

Construction

First of all let us consider a few basics in building electronic circuits on a printed circuit board. The board is made of a thin insulating material clad with a thin layer of conductive copper that is shaped in such a way as to form the necessary conductors between the various components of the circuit. The use of a properly designed printed circuit board is very desirable as it speeds construction up considerably and reduces the possibility of making errors. Quasar Electronics Kit boards also come pre-drilled and with the outline of the components and their identification printed on the component side to make construction easier. To protect the board during storage from oxidation and assure it gets to you in perfect condition the copper is tinned during manufacturing and covered with a special varnish that protects it from getting oxidised and also makes soldering easier. Soldering the components to the board is the only way to build your circuit and from the way you do it depends greatly your success or failure. This work is not very difficult and if you stick to a few rules you should have no problems. The soldering iron that you use must be light and its power should not exceed the 25 Watts. The tip should be fine and must be kept clean at all times. For this purpose come very handy specially made sponges that are kept wet and from time to time you can wipe the hot tip on them to remove all the residues that tend to accumulate on it.

DO NOT file or sandpaper a dirty or worn out tip. If the tip cannot be cleaned, replace it. There are many different types of solder in the market and you should choose a good quality one that contains the necessary flux in its core, to assure a perfect joint every time. DO NOT use soldering flux apart from that which is already included in your solder. Too much flux can cause many problems and is one of the main causes of circuit malfunction. If nevertheless you have to use extra flux, as it is the case when you have to tin copper wires, clean it very thoroughly after you finish your work.

In order to solder a component correctly you should do the following:

- Clean the component leads with a small piece of emery paper.
- Bend them at the correct distance from the component's body and insert the component in its place on the board.
- You may find sometimes a component with heavier gauge leads than usual, that are too thick to enter in the holes of the p.c. board. In this case use a mini drill to enlarge the holes slightly. Do not make the holes too large as this is going to make soldering difficult afterwards.
- Take the hot iron and place its tip on the component lead while holding the end of the solder wire at the point where the lead emerges from the board. The iron tip must touch the lead slightly above the p.c. board.
- When the solder starts to melt and flow, wait till it covers evenly the area around the hole and the flux boils and gets out from underneath the solder. The whole operation should not take more than 5 seconds. Remove the iron and leave the solder to cool naturally without blowing on it or moving the component. If everything was done properly the surface of the joint must have a bright metallic finish and its edges should be smoothly ended on the component lead and the board track. If the solder looks dull, cracked, or has the shape of a blob then you have made a dry joint and you should remove the solder (with a pump, or a solder wick) and redo it.
- Take care not to overheat the tracks as it is very easy to lift them from the board and break them.

- When you are soldering a sensitive component it is good practice to hold the lead from the component side of the board with a pair of long-nose pliers to divert any heat that could possibly damage the component.
- Make sure that you do not use more solder than it is necessary as you are running the risk of short-circuiting adjacent tracks on the board, especially if they are very close together.
- When you finish your work cut off the excess of the component leads and clean the board thoroughly with a suitable solvent to remove all flux residues that may still remain on it.

The components for this project are very few which makes construction very simple. Everything has been clearly marked on the printed circuit board and the only thing you should be careful about is to avoid overheating the semiconductors during soldering. To ensure that this doesn't happen solder first of all the pins, then do the same with the resistors and the trimmer and finally solder the diode, the LED's and the transistors making sure that you do not swap the red with the green LED.

At this point you can make the final inspection of your work even in the simplest project there is a possibility of making a mistake - and if everything looks all right you can then proceed with the testing and adjusting of your «bug» detector. As you can see from the relevant diagram the device is connected in series with the telephone line so that it starts working as soon as you lift the phone's receiver. (If there are more than one telephones in parallel on the same line you should connect the device BEFORE any branches installed so that no matter which telephone you are using the detector is on line).

As you can see the two pins on the printed circuit board are marked (+) and (-) and you will find that the circuit will only work if it is connected the right way round to the line. So the first step in testing the detector is to connect it in series with your telephone and lift the receiver. If nothing happens try turning the trimmer to the right or left and if you still do not get any response from the LED's reverse the circuit's connections.

Provided there are no other mistakes one of the two LED's should glow as soon as you lift the receiver. Adjust the trimmer to the point where the green LED just turns ON and the red one has just extinguished completely. If you connect some tapping device to the telephone line the green LED should immediately turn OFF and the red one should turn itself ON. If you do not have such a device you can simulate its effect by connecting in parallel with the telephone line the 1 K— 1/4 W which is included in the KIT. As soon as you connect it in parallel with the line the red LED will replace the green one giving you a positive indication that the line has been «bugged».

Adjustments

This kit does not need any adjustments, if you follow the building instructions.

Warning

Quasar Electronics kits are sold as stand alone training kits.

If they are used as part of a larger assembly and any damage is caused, our company bears no responsibility.

While using electrical parts, handle power supply and equipment with great care, following safety standards as described by international specs and regulations.

CAUTION

The telephone exchange belongs to the state or some public utility monopoly and in order to ensure its smooth operation there are certain limitations regarding what you can connect to your telephone line. Please enquire locally to make certain that you are not breaking any regulations before using this device.

Quasar Electronics Kit shall not be held responsible for any illicit use of any devices supplied.

If it does not work

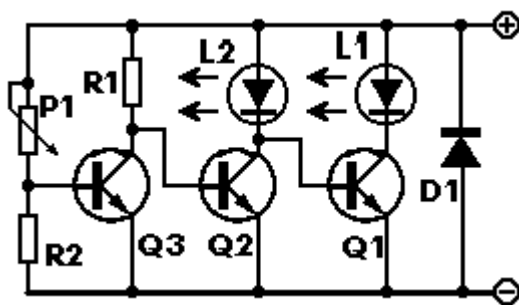
Check your work for possible dry joints, bridges across adjacent tracks or soldering flux residues that usually cause problems.

Check again all the external connections to and from the circuit to see if there is a mistake there.

- See that there are no components missing or inserted in the wrong places.
- Make sure that all the polarised components have been soldered the right way round. - Make sure the supply has the correct voltage and is connected the right way round to your circuit.
- Check your project for faulty or damaged components.

If everything checks out and your project still fails to work, please contact us for information on our Get-You-Going service.

Electronic Diagram



Parts List

All components including printed circuit board, assembly instructions including schematics and detailed parts list are supplied when you purchase the kit.

Ordering

For pricing info and online ordering please visit:

<http://www.quasarelectronics.com/1130.htm>

For further info please contact us by e-mail:

[mailto: sales@QuasarElectronics.com](mailto:sales@QuasarElectronics.com)

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