

**BUSY PHONE INDICATOR**  
CODE 307

LEVEL 1

This circuit has LED to display the result by lighting on when the phone is picked up.

Technical specifications:

- power supply : 3VDC.
- consumption : 10mA.
- PCB dimensions : 1.51 x 0.91 inches.

How to works:

Normally, when there isn't someone lift the handset, at the telephone line will has the voltage approximately 50 volts. When connect this circuit to the telephone line, the voltage at the telephone line is dropped by resistor R2, so the voltage at this point will has the voltage approximately 4.1 volts (this voltage can be calculate from  $((50-0.6) \times 20) / 240$ ). TR1 isn't working. At the collector of TR1 hasn't the voltage, causing TR2 isn't working. LED will be lighted off. But if someone lift the handset, the voltage at the telephone line will decrease approximately 10 volts and the voltage at resistor R2 will has 0.78 volt. But now, the voltage at the base of TR1 is less than the emitter of TR1, causing there is the voltage at the base of TR1 through diode D2 and R2 to ground. When TR1 is working, TR2 will be working together and LED is lighted on.

PCB assembly:

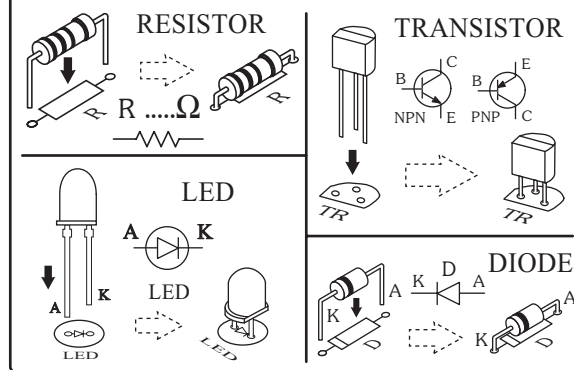
Shown in Figure 3 is the assembled PCB. Starting with the lowest height components first, taking care not to short any tracks or touch the edge connector with solder. Some tracks run under components, and care should be taken not to short out these tracks. If the pins will not enter the holes with ease, use a small drill to slightly enlarge the opening. All components with axial

leads should be carefully bent to fit the position on the PCB and then soldered into place. Make sure that the electrolytic capacitors are inserted the correct way around. Some components are particularly sensitive to heat ( ie: Transistors, IC's, diodes etc.) extra care must be taken to only apply the iron for as little time as possible, using a pair of pliers to grip the leads will help conduct heat away. Trim components leads with wire cutters to prevent excess lengths causing a short circuit. Now check that you really did mount them all the right way round!

Testing:

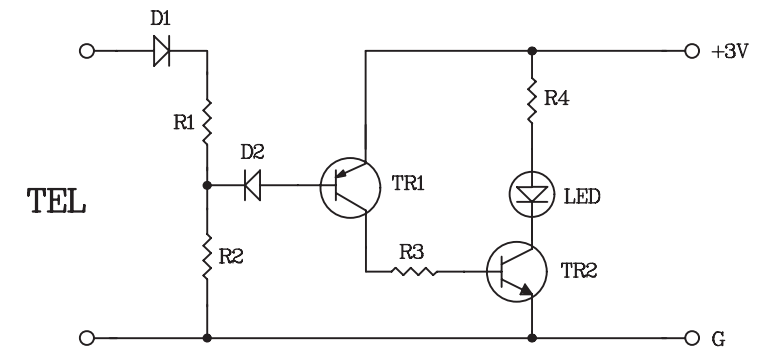
Connect the power supply 3 volts to the circuit. LED will be lighted on. Take the telephone line to "TEL" point. LED will be lighted off. If LED isn't light off, alternate the pole of the telephone line and then lifts the handset, LED will be light on.

**Figure 1. Installing the components**



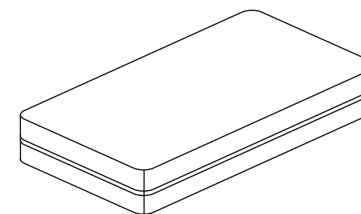
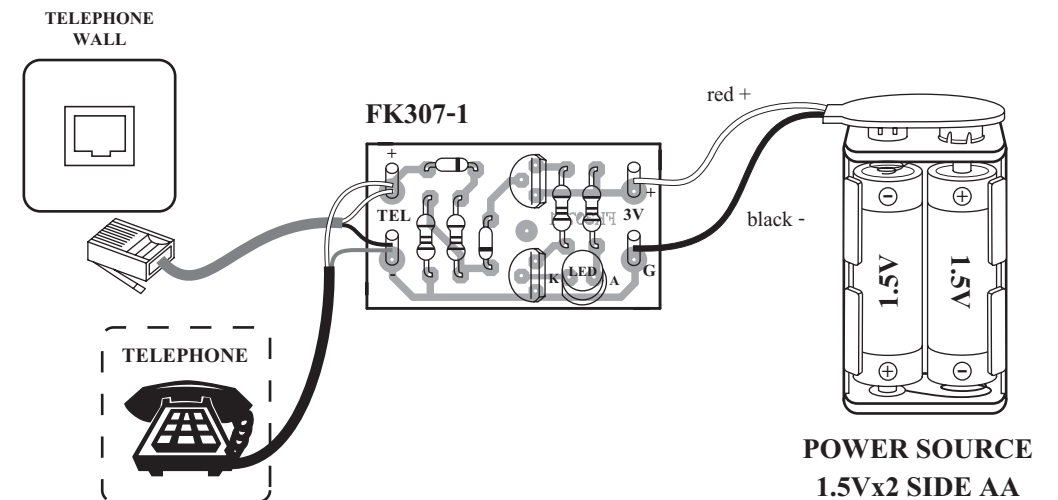
Troubleshooting:

The most problem like the fault soldering. Check all the soldering joint suspicious. If you discover the short track or the short soldering joint, re-solder at that point and check other the soldering joint. Check the position of all component on the PCB. 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.



**Figure 2. The busy phone indicator circuit**

**Figure 3. Connections**



NOTE:

**FUTURE BOX FB17 is suitable for this kit.**

**NEW KIT SET**

CODE FK	DESCRIPTION	POWER
168	NO SMOKING FLASHER 46 LED	9-12VDC.
169	DANCING ROBOT FLASHER 33 LED	9-12VDC.
170	DANGER FLASHER 42 LED	9-12VDC.
171	TWO LAMP FLASHER	3VDC.
172	THREE STEP FLASHER 19 LED	9-12VDC.
173	HALLOWEEN PUMPKIN FLASHER 23 LED	9-12VDC.
174	ANIMATED LED SIGNBOARD (5x7 DOT MATRIX)	3-5VDC.
816	VARIABLE REGULATOR 0-50V. 3A.	50VDC.
817	TRANSFORMERLESS POWER SUPPLY 6-9-12V 50mA	220-240VAC.