Alarm D.I.Y. Kit

Part Number: KIT-ABRA-101

Level: Beginner

- *Master your situational awareness with the Abra Alarm Kit.*
- *Assemble your very own Alarm Kit and be warned of any opening door or window.*
- *High intensity piezoelectric alarm.*
- *Can be controlled locally or remotely by wiring the switch away from the alarm.*
- *Learn how a Silicon Controlled Rectifier works.*
- *Battery powered for reliability.*

ABRA

www.abra-electronics.com

1. Description:

This is the upgraded version of our popular Alarm Kit with a well thought-out PCB layout with ENIG gold-plated pads and blue soldermask on both sides. It uses a high intensity piezo buzzer, panel mount arm/disarm switch, normally open magnetic switch and terminal blocks. It also features mounting holes for your convenience.

The alarm can be triggered when the "arm/disarm" switch (S1) is pressed in and the magnetic switch is opened by separating the magnet from the base (in situations such as opening a door, closet, window, etc.)

This is a D.I.Y. kit that requires soldering through-hole components on the double-sided printed circuit board. Users with minimal soldering tools can easily assemble this module.

2. Specifications:

- **Operating Voltage Range:** 3 – 12VDC (9VDC recommended)
- **PCB Dimensions:** 72 x 41 x 1.2 mm / 2.83 x 1.61 x 0.05 "

3. Advantages:

- Master your situational awareness with the Abra Alarm Kit.
- Assemble your very own Alarm Kit and be warned of any opening door or window.
- High intensity piezoelectric alarm.
- Can be controlled locally or remotely by wiring the switch away from the alarm.
- Learn how a Silicon Controlled Rectifier works.
- Battery powered for reliability

4. Bill of Materials

Component	Label	Value / Type	ABRA Part Number	Quantity
Resistors	**R1**	**1/4 Watt 4-band 47KΩ ±5%**	**R1/4-47K**	**1**
	R2	**1/4 Watt 4-band 470Ω ±5%**	**R1/4-470**	**1**
Capacitor	**C1**	**`104 (1µF)**	**CD104**	**1**
Diodes	**D1, D2**	**1N4001 Silicone Diode**	**1N4001**	**2**
	LED	**5mm Red Light-Emitting Diode**	**LED-5R**	**1**
SCR	**Q1**	**C106B Silicone Controlled Rectifier**	**C106B**	**1**
Buzzer	**BUZZER**	**PCB Mount Piezoelectric Sound Buzzer**	**PKB8-4A0**	**1**
Switches	**S1**	**Latching ON/OFF Push Button Switch**	**PBS-L-R**	**1**
	Alarm Trigger	**Normally Open Magnetic Switch**	**SEC-100**	**1**
Connectors	**J1, J2**	**2-pin Terminal Blocks**	**TB-132**	**2**
	----	**9V Battery Connector**	**29-130**	**1**
PCB	**----**	**Double-sided Printed Circuit Board**	**KIT-ABRA-101-BRD**	**1**
Misc.	**----**	**Wires**	**----**	**----**

5. Assembly:

1) In order to assemble the module, you need the following tools:

Must Have

Soldering Station

60/40 or 63/37 Tin-Lead Solder

Flush Cutters

Tweezers/Pliers

Wire Stripper

Vice

Recommended

Isopropyl Alcohol

Rosin Flux/Pen

Soldering Brush

Lint Free Wipers

***It is recommended to have some isopropyl alcohol and a fine soldering brush handy to clean off the excess flux on the circuit board when the soldering is done.**

***ATTENTION* DO NOT USE RUBBING ALCOHOL, IT WILL DAMAGE THE COMPONENTS.**

2) Open the package and verify the components. (refer to section **4. Bill of Materials** on **page 2**)
3) Lay down all the components on your workbench and proceed to the next step.
4) Prepare your soldering tools.
   a) Use an appropriate tip for the application. Also, make sure the soldering tip is clean. Gently use a brass wool or a brush to clean the tip when needed. Another way of cleaning the soldering tip by using a wet sponge.

b) The soldering iron temperature depends on the type of solder used. If you are using a typical **60/40 lead solder**, depending on the thickness the temperature should be set anywhere between **370 to 500 °F (187 to 260 °C)**. If you are using a lead-free solder, increase above temperatures **by 40 to 70 °F (5 to 20 °C)**.

***ATTENTION* HIGHER TEMPERATURES WILL DAMAGE THE COMPONENTS AND THE PRINTED CIRCUIT BOARD.**

***ATTENTION* DO NOT TOUCH THE SOLDERING IRON WHEN IT IS HOT.**

c) It is recommended that you clean the board with a fine brush, isopropyl alcohol and lint-free cloth to get rid of any pre-existing residue, glue or dirt. This way the solder will create a better joint with the pad surface.

d) Have your flush cutter, needle nose plier or tweezers handy.

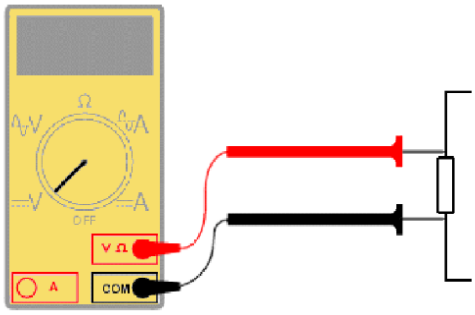
e) Having a roll of paper tape helps you to keep the components in place when soldering on the bottom side of the board.

f) Have a rosin flux pen or paste handy. Adding flux to the pads before soldering the components makes the wetting process easier by letting the melted solder flow better on the pad and create a better joint.

***ATTENTION* SOLDERING SHOULD BE DONE IN A VENTILATED AREA. BREATHING SOLDER FUMES WILL HARM YOU.**

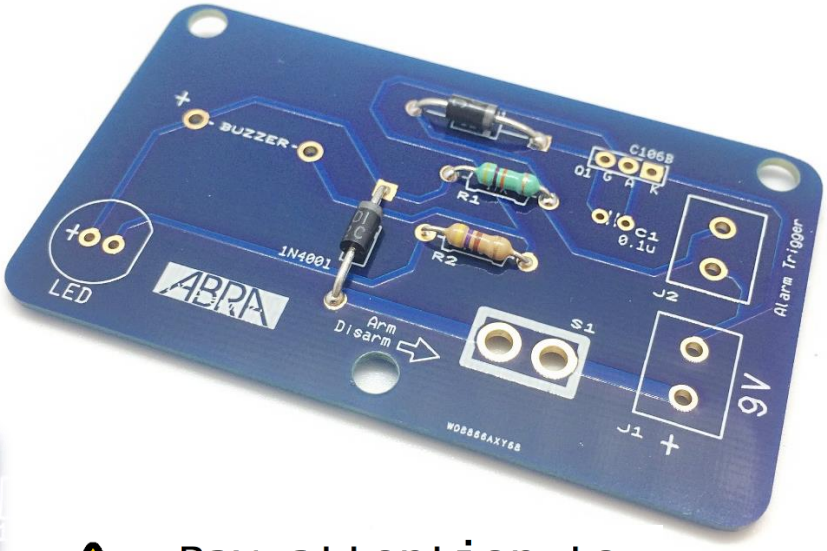
g) Always cut the excess leads with a flush cutter once a component is soldered on the PCB. At least 1mm of the lead should stick out from the solder joints.

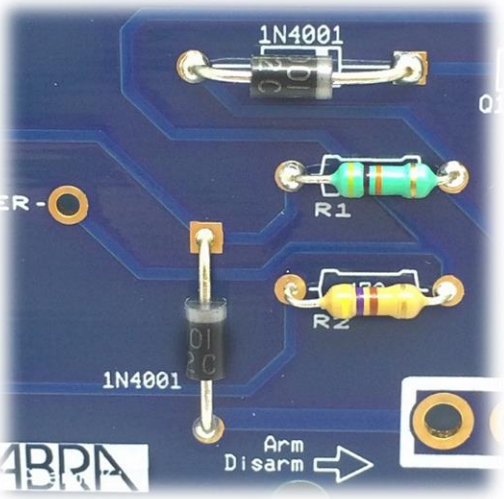
Optional
Use a digital multimeter to measure the resistor values



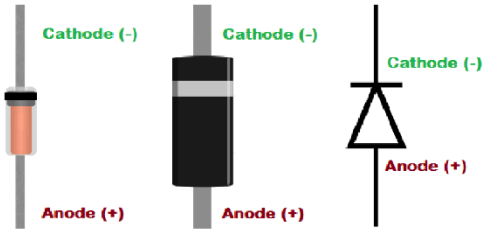
Step 1:

Insert the resistors (R1 and R2) along with the diodes (D1 and D2) onto the board and solder them from the bottom.



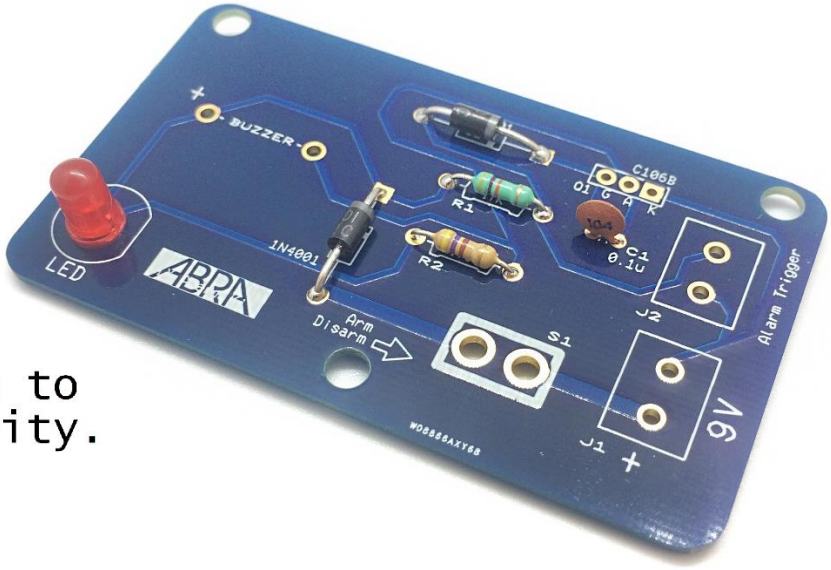


Pay attention to the polarity of the diodes.

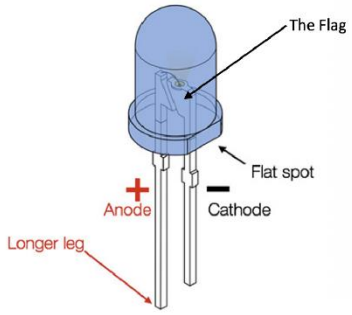


Step 2:

Insert the ceramic capacitor (C1) and the LED onto the board and solder them as you did in the previous step.

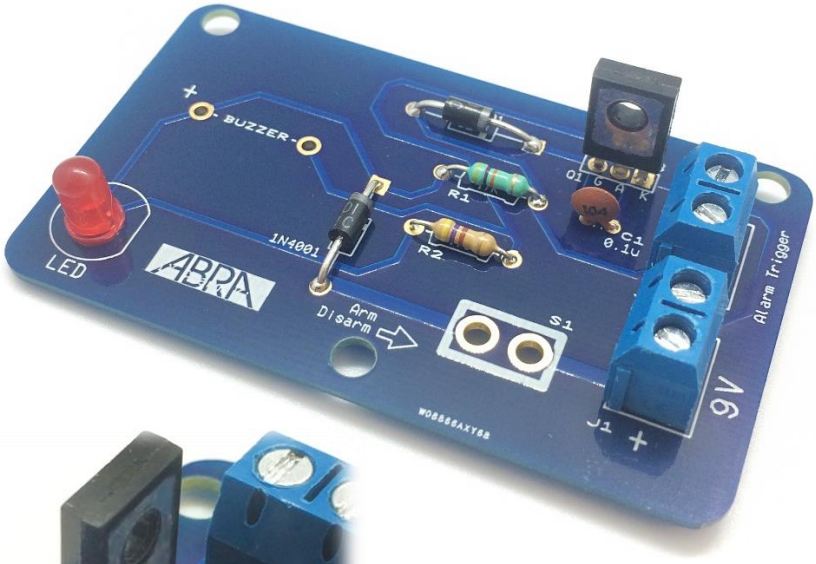


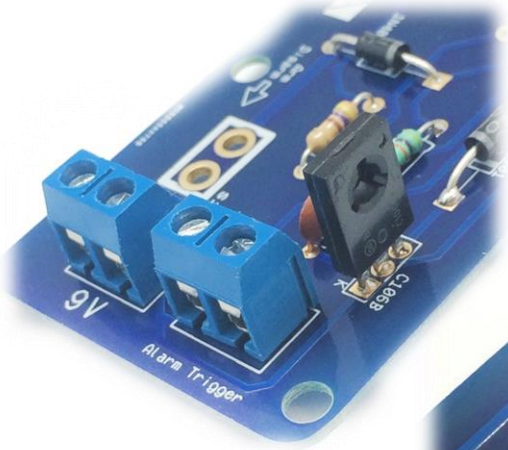
Pay attention to the LED polarity.

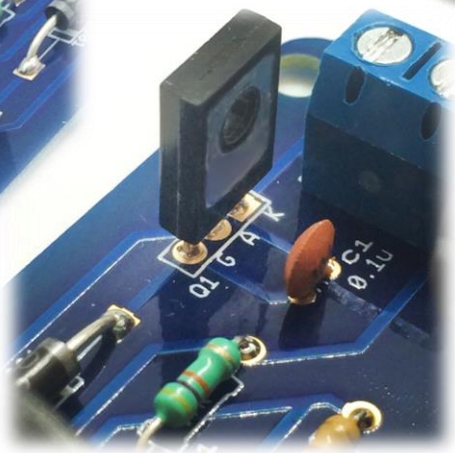


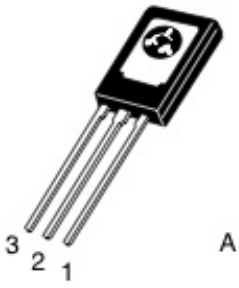
Step 3:

Solder the SCR (Q1) and the terminal blocks (J1 and J2). Refer the pictures below for the correct orientation.





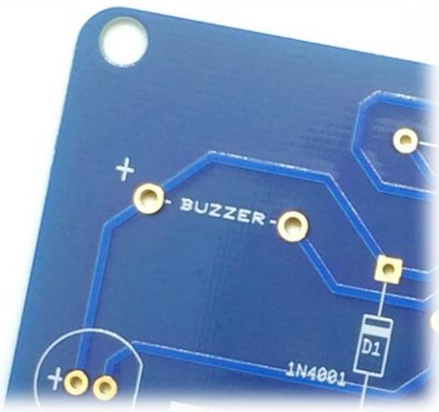




1. Cathode
2. Anode
3. Gate

Step 4:

Insert the piezo buzzer onto the board by bending its leads inward. The (+) pin of the buzzer should face the outside edge of the board as indicated on the silkscreen.



Step 5:

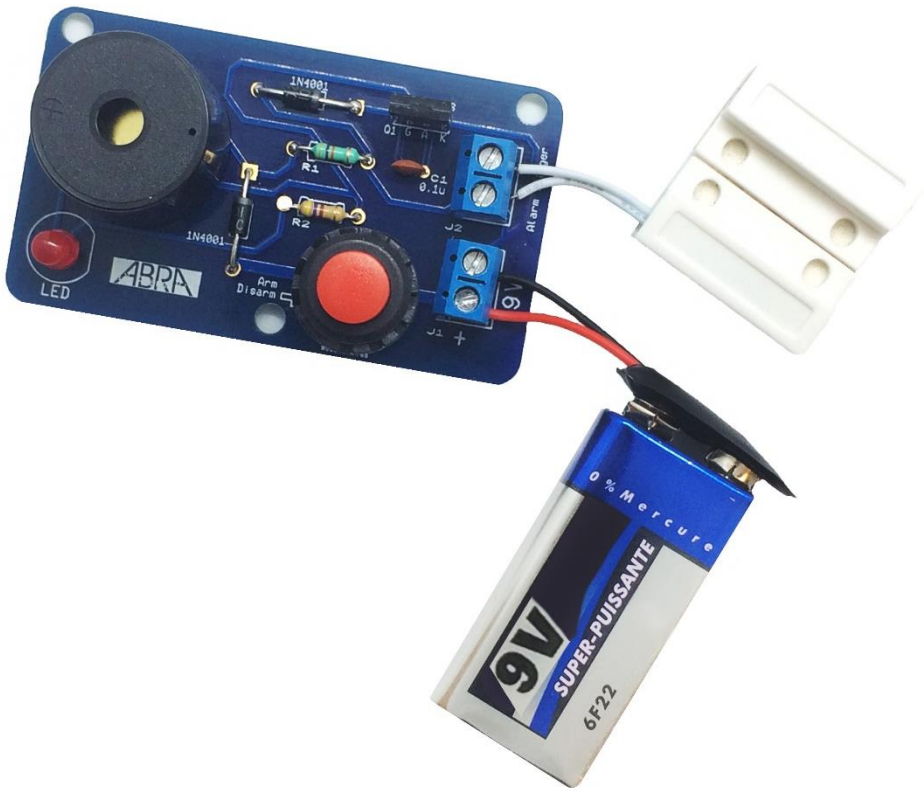
The kit provides a single panel mount switch that can either be directly soldered onto the board (as shown) or can be remotely connected with the provided wires. Another option is to purchase an extra 2-pin terminal block (part number: TB-132) to make the remote switch connection easier.

Step 6:

This is the final step of assembling your alarm module.

Insert the magnetic switch wires into the J2 terminal block then insert the 9V battery connector wires by attaching the red positive (+) wire to the (+) pin on the J1 terminal block and the black negative (-) wire to the other pin.

Your module is now ready to be used.



In order to verify the quality of your soldering, you can refer to the adjacent picture:

Assembly Check out:

- Before installing the 9V battery it is highly recommended to inspect the PCB carefully.
- Check for proper placement of components.
- Check that the LED, the buzzer, the SCR and the diodes are installed in the correct directions.
- Check that all connections are soldered with a shiny appearance.
- Redo any solder connection that is dull looking or in a ball.
- Check that there are no solder bridges touching adjacent connections together.

Operation:

- Install a 9V battery into the battery connector. (Battery is not included in this kit)
- Install the magnetic switch onto your selected door/window frame in a way that when the door/window is closed the magnets sit right next to each other.
- Arm the alarm by pushing the S1 switch IN.
- Now, open the door/window. The alarm should go off and the LED should light up.
- Disarm the alarm by pushing the S1 switch again. The alarm should turn OFF.

What Is A Silicon Controlled Rectifier (SCR) and How Does It Work?

- The Silicon Controlled Rectifier (SCR) acts like a latching switch and turns the alarm ON once S1 is closed (the alarm is armed) and the magnetic switch (Alarm trigger) is opened.
- The SCR has three pins, an Anode (A), a Cathode (C) and a Gate (G).
- When the SCR is triggered by driving the gate positive, it conducts current from its cathode to its anode.
- When S1 is closed and the magnetic switch (Alarm Trigger) is opened, a positive voltage is provided to the SCR's gate which turns the alarm ON.
- Once the SCR starts to conduct current to the buzzer and the LED from the gate pin, closing the magnetic switch will not affect it until the main power is interrupted by opening the S1 switch (disarming the alarm). This is a very good feature that makes this module useful in different situations.