

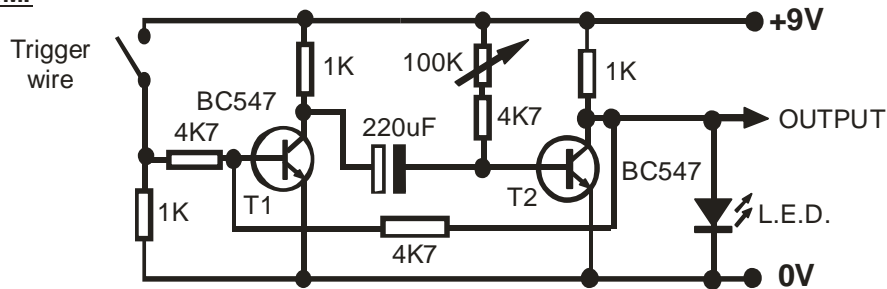
SIR-KIT ELECTRONICS

KIT 2a TRANSISTOR MONOSTABLE

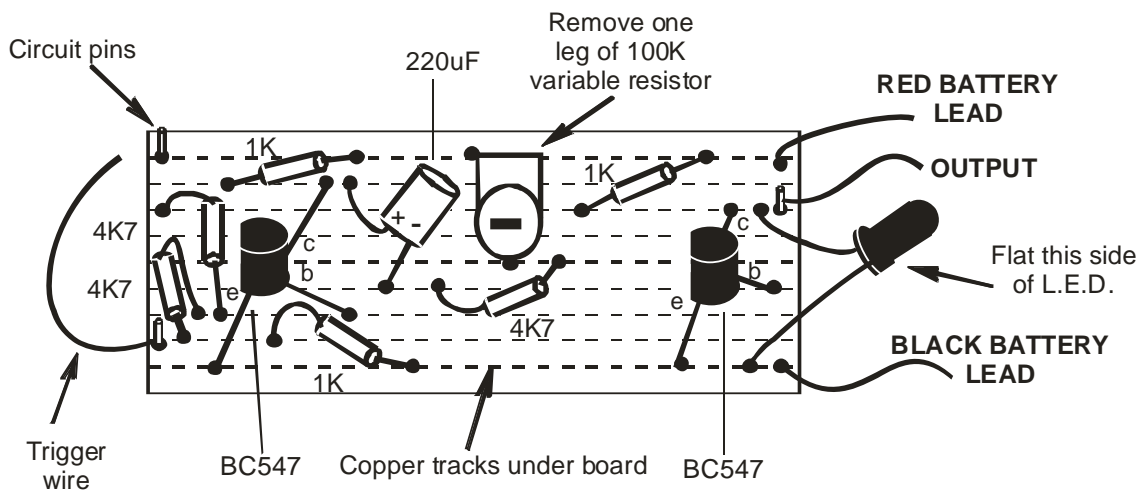
CONTENTS:

2 Transistors BC 547	1 variable resistor 100K
3 Resistors 4K7 (4700 ohms)	3 resistors 1K
1 Piece of stripboard	1 capacitor 220 uF
3 Circuit pins	1 red L.E.D.
1 PP3 battery connector	Wire and solder

CIRCUIT DIAGRAM:



SUGGESTED LAYOUT:



HOW THE CIRCUIT WORKS:

The trigger input is held low by the 1K resistor to the 0V rail, so T1 is OFF, and its collector voltage is 9V. T2 is held ON by current flowing through the variable resistor, so its collector voltage is 0V (approximately). When you touch the trigger wire to the 9V rail T1 turns ON, its collector voltage drops to near 0V taking the base of T2 down to about -9V (voltage across C cannot change abruptly!). Now the capacitor charges through the variable resistor until T2 turns on again. This takes about $0.7RC$ seconds. The feedback resistor makes a fast switch action and holds T1 on during the timing period even if the trigger input is removed. Our circuit gives a maximum time delay of about 15 to 20 seconds approximately (the tolerance of capacitors is very wide!).

USING THIS KIT:

Uses include entry and exit delays for alarms (use Kit 1n to give a set time OFF), limiting the ringing time of a doorbell and photographic timers. Kit 1z can be used to interface the monostable to other low voltage devices or an astable such as Kit 2e or Kit 2f can be controlled directly.

NOTE: a PP3 9 Volt battery should be used.

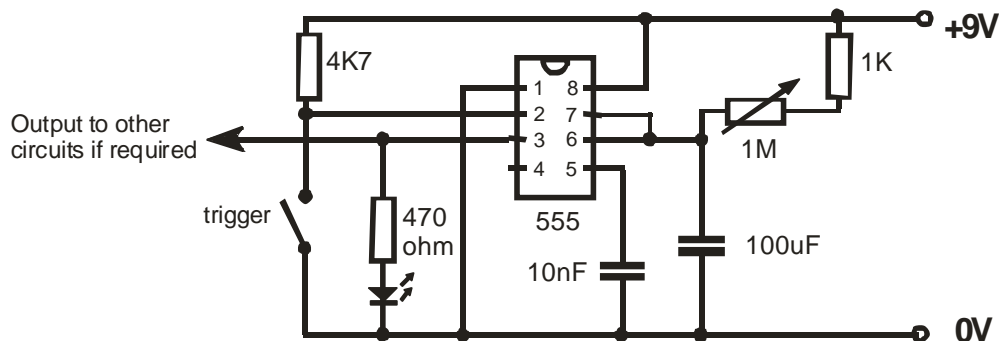
SIR-KIT ELECTRONICS

KIT 2b INTEGRATED CIRCUIT MONOSTABLE

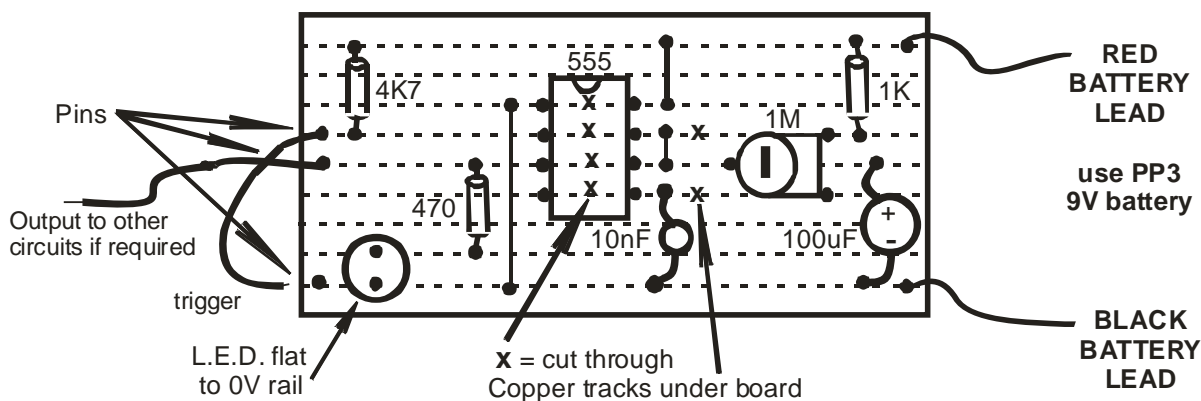
CONTENTS:

1 555 integrated circuit	1 4K7 (4700 ohms) resistor
1 1K (1000 ohm) resistor	1 resistor 470 ohm
1 variable resistor 1M	1 red L.E.D.
1 capacitor 10nF	1 capacitor 100uF
1 battery connector	1 Piece of stripboard
3 Circuit pins	wire and solder

CIRCUIT DIAGRAM:



SUGGESTED LAYOUT:



HOW THE CIRCUIT WORKS:

The 555 integrated circuit may be considered as a "black box". In this application it is triggered by connecting pin 2 to 0V. The output on pin 3 goes high for a time which is determined by the 1M variable resistor and the 100uF capacitor. The time is given by $1.1RC$ (approximately because capacitors have a wide tolerance). In this circuit the maximum time is about 110 seconds.

USING THIS KIT:

Uses include entry and exit delays for alarms (use Kit 1n to give a set time OFF), limiting the ringing time of a doorbell and photographic timers. Kit 1z can be used to interface the monostable to other low voltage devices or an astable such as Kit 2e or Kit 2f can be controlled directly.

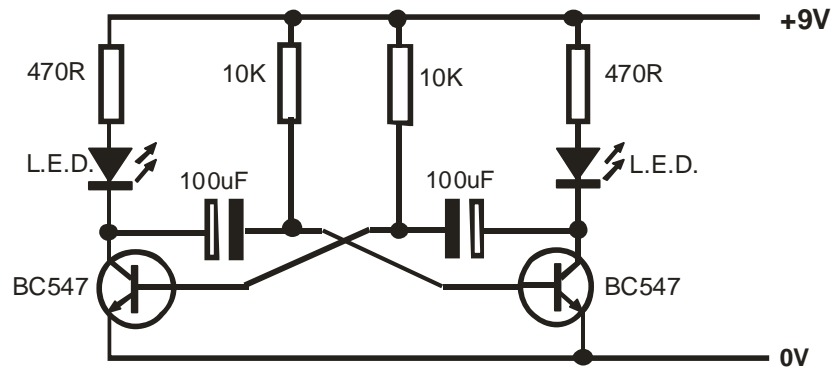
SIR-KIT ELECTRONICS

KIT 2c SLOW TRANSISTOR ASTABLE

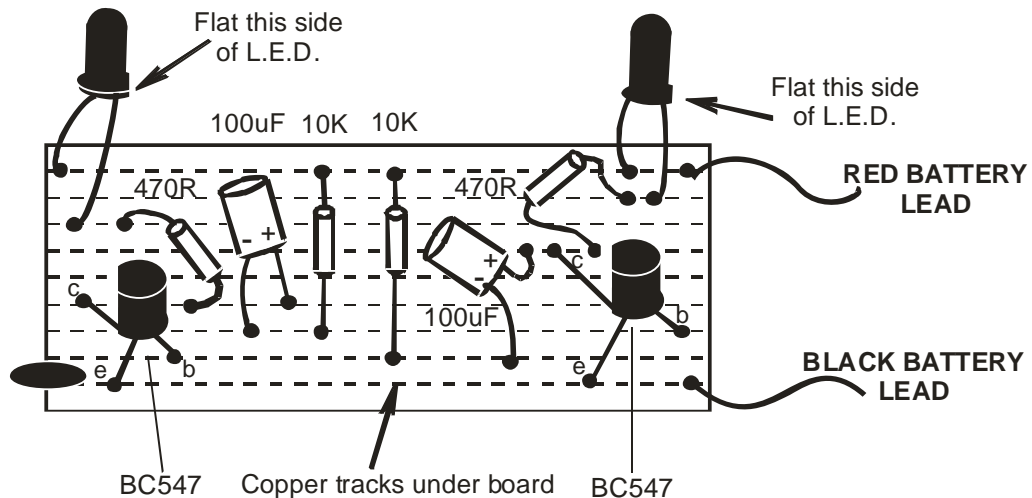
CONTENTS:

- | | |
|-------------------------|---------------------|
| 2 Transistors BC 547 | 2 red L.E.D.s |
| 2 Resistors 470 ohms | 2 resistors 10K |
| 1 Piece of stripboard | 2 capacitors 100 uF |
| 1 PP3 battery connector | Wire and solder |

CIRCUIT DIAGRAM:



SUGGESTED LAYOUT:



HOW THE CIRCUIT WORKS:

An astable multivibrator can be considered as two transistor switches (as in kit 1a) with a timing circuit (as in kit 1e) on the base of each, wired so that it switches its own transistor on and the other off, and also starts the other timing circuit. The ON time for each L.E.D. is given by the formula $t = 0.7RC$.

With the values in our circuit each L.E.D. is on for approximately 0.7 seconds, giving a frequency of just under 1 Hertz.

USING THIS KIT:

This kit can be used as a visual output for the light, temperature and moisture sensors of our series one kits. A flashing light is more noticeable than a steady light.

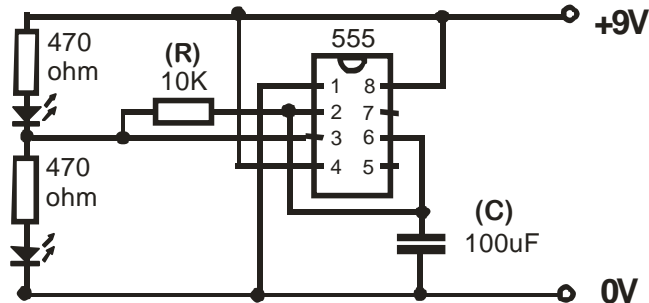
SIR-KIT ELECTRONICS

KIT 2d SLOW INTEGRATED CIRCUIT ASTABLE

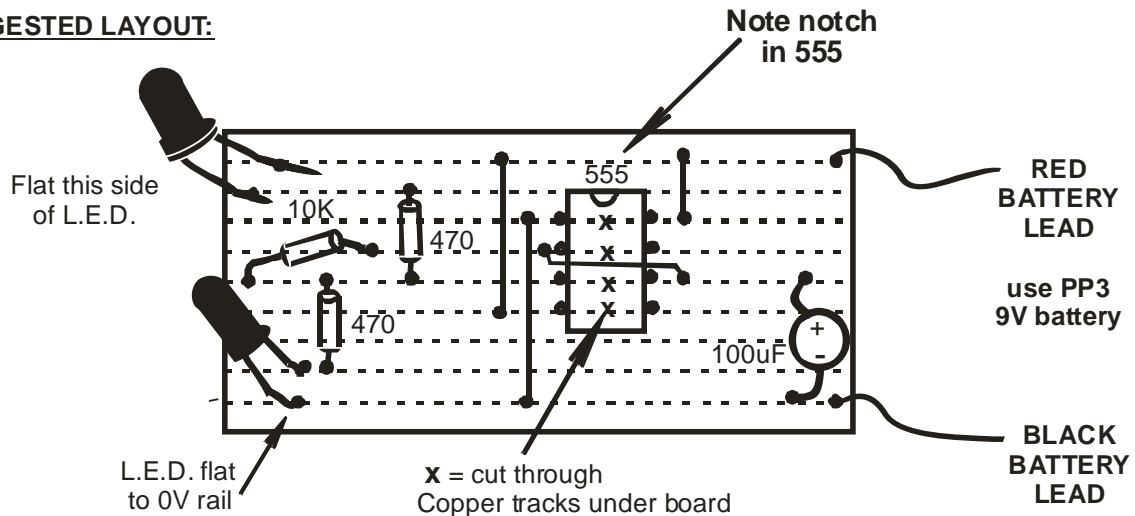
CONTENTS:

- | | |
|--------------------------|---------------------|
| 1 555 integrated circuit | 1 resistor 10K |
| 2 resistors 470 ohm | 2 red L.E.D.'s |
| 1 capacitor 100uF | 1 battery connector |
| 1 Piece of stripboard | wire and solder |

CIRCUIT DIAGRAM:



SUGGESTED LAYOUT:



HOW THE CIRCUIT WORKS:

The 555 integrated circuit may be considered as a "black box". In this application it switches current on and off. The speed of switching (frequency) is set by external components. Frequency is given approximately by the formula $f = \frac{1}{1.4CR}$ Hertz. The output on pin 3 goes alternately to 0V and 9V (a square wave), and pin 3 can sink or source current, flashing the L.E.D.s alternately..

USING THIS KIT:

This circuit can be used in many projects where a flashing light output is required. For example in alarm circuits. Used with our series one kits you can design light beam alarms, frost warning alarms, fridge/freezer failure alarms, rain alarms etc.

SIR-KIT ELECTRONICS

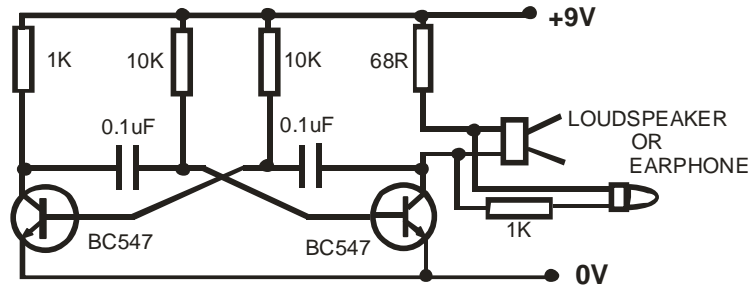
KIT 2e FAST TRANSISTOR ASTABLE

CONTENTS:

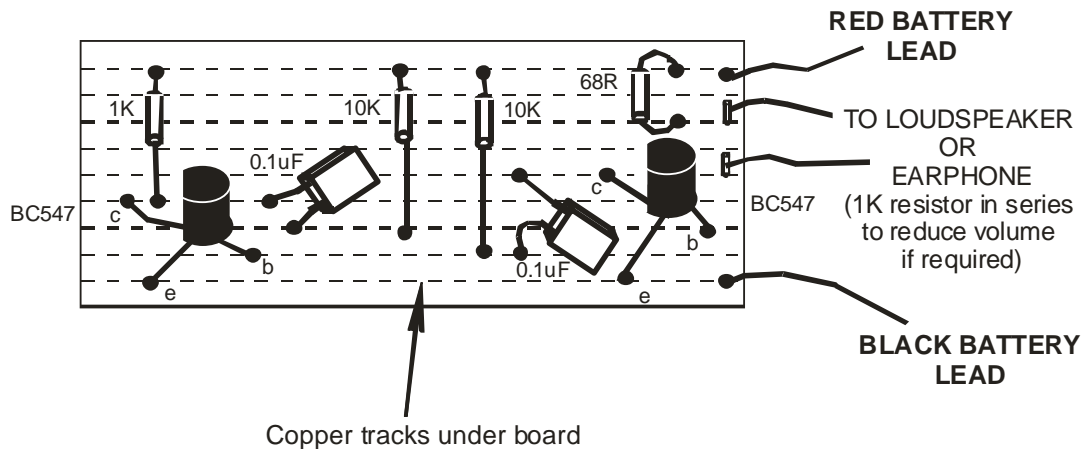
- | | |
|-----------------------|-------------------------|
| 2 Transistors BC 547 | 1 resistor 68 ohm |
| 2 Resistors 10K | 2 resistors 1K |
| 1 Piece of stripboard | 2 capacitors 0.1 uF |
| 2 Circuit pins | 1 PP3 battery connector |

Wire and solder

CIRCUIT DIAGRAM:



SUGGESTED LAYOUT:



HOW THE CIRCUIT WORKS:

An astable multivibrator can be considered as two transistor switches (as in Kit 1a) with a timing circuit (as in Kit 1e) on the input of each, wired so that it switches its own transistor on and the other off, and also starts the other timing circuit. The ON time for each half circuit is given by the formula $t=0.7RC$. With the values in our circuit this gives a frequency of about 1300 Hz.

USING THIS KIT:

This type of circuit is useful in alarms and musical applications. It can be combined with series one kits to make audible light/dark, wet/dry, or hot/cold sensors or alarms. With a timing circuit (1e or 2a or 2b) it can make a kitchen or darkroom timer.

NOTE: a PP3 9 Volt battery should be used.

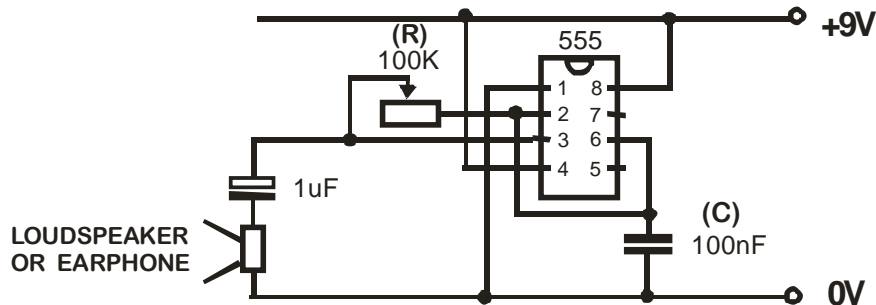
SIR-KIT ELECTRONICS

KIT 2f FAST INTEGRATED CIRCUIT ASTABLE

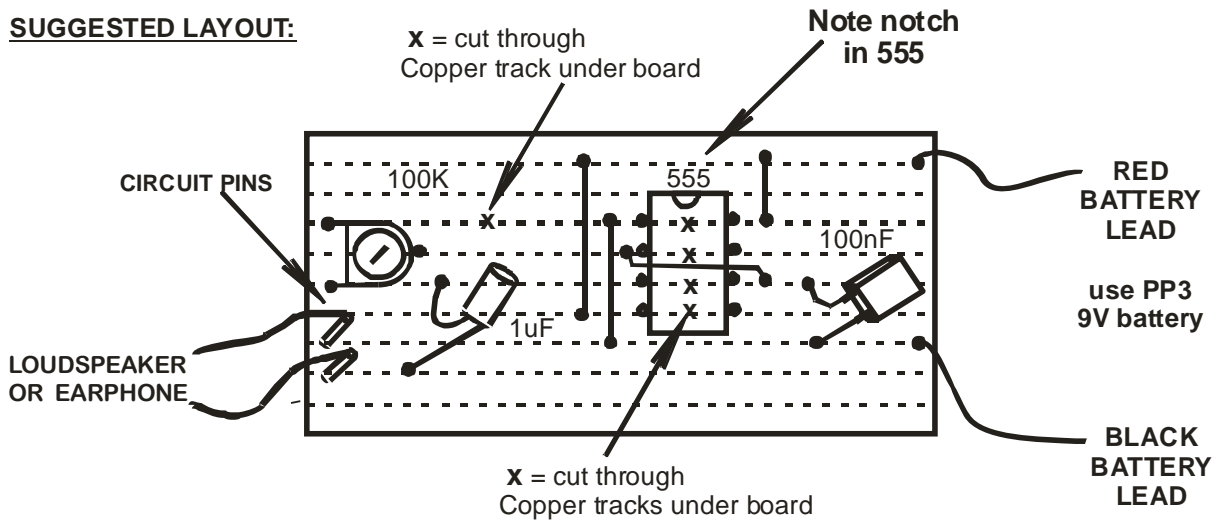
CONTENTS:

1 555 integrated circuit	1 variable resistor 100K
1 capacitor 100 nF	2 circuit pins
1 capacitor 1uF	1 battery connector
1 Piece of stripboard	wire and solder

CIRCUIT DIAGRAM:



SUGGESTED LAYOUT:



HOW THE CIRCUIT WORKS:

The 555 integrated circuit may be considered as a "black box". In this application it switches current on and off. The speed of switching (frequency) is set by external components. Frequency is given approximately by the formula $f = \frac{1}{1.4CR}$ Hertz. The output on pin 3 goes alternately to 0V and 9V (a

square wave), and pin 3 can sink or source current. In our design the variable resistor gives a wide range of audible frequencies. Use a small screwdriver to adjust it.

USING THIS KIT:

This circuit can be used in many projects where a sound output is required. For example in alarm circuits and musical toys. Used with our series one kits you can design light beam alarms, frost warning alarms, fridge/freezer failure alarms, rain alarms etc.

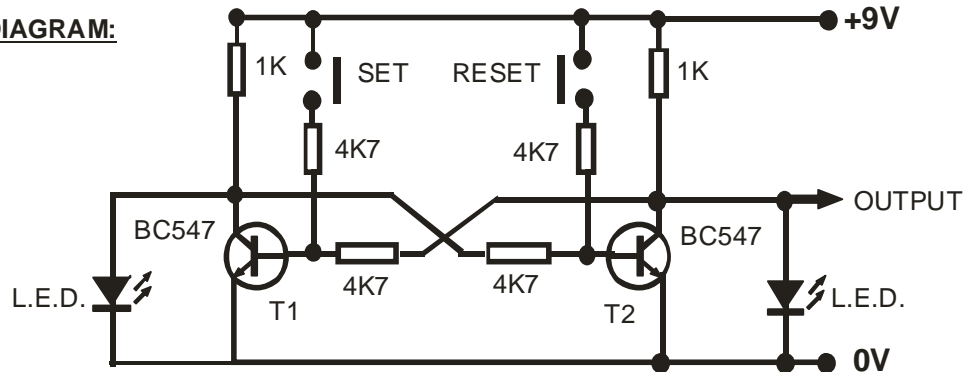
SIR-KIT ELECTRONICS

KIT 2g TRANSISTOR BISTABLE LATCH

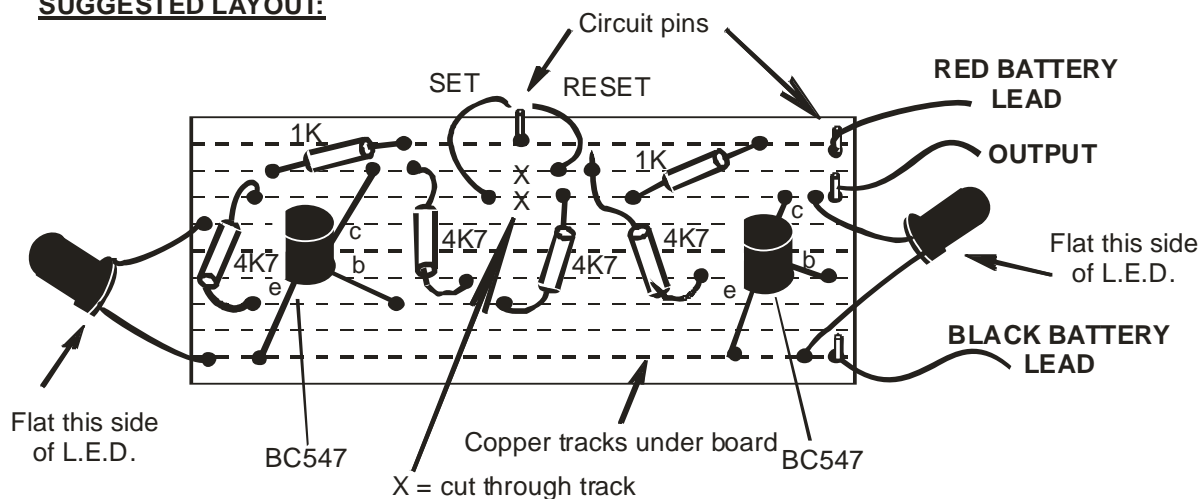
CONTENTS:

- | | |
|-------------------------|-----------------------------|
| 2 Transistors BC 547 | 4 Resistors 4K7 (4700 ohms) |
| 2 resistors 1K | 2 red L.E.D.s |
| 1 Piece of stripboard | 4 Circuit pins |
| 1 PP3 battery connector | Wire and solder |

CIRCUIT DIAGRAM:



SUGGESTED LAYOUT:



HOW THE CIRCUIT WORKS:

When the set wire is taken high (that is touched momentarily to the + rail) the base of T1 goes high and T1 turns ON. This also takes the base of T2 low (through T1) so T2 turns OFF at the same time. Due to the symmetry of the circuit the reverse happens when the reset wire is taken high. The circuit remains in a given state until it is SET or RESET. It is said to be LATCHED. It has two STABLE states.

(In computers the BISTABLE is the basic unit of MEMORY.)

USING THIS KIT:

Uses include latches for alarms, where the set wire is a door or window switch and the reset wire is a push switch to turn off the alarm. Devices or an astable such as Kit 2e or Kit 2f can be controlled directly. Build two light sensors using kits 1c and 1g and you can use them to set and reset this circuit to operate a stop clock or timer to time a moving object between two light beams. Kit 2g can be used to latch a steady hand game - use kit 2e or 2f to produce the sound output.

NOTE: a PP3 9 Volt battery should be used.

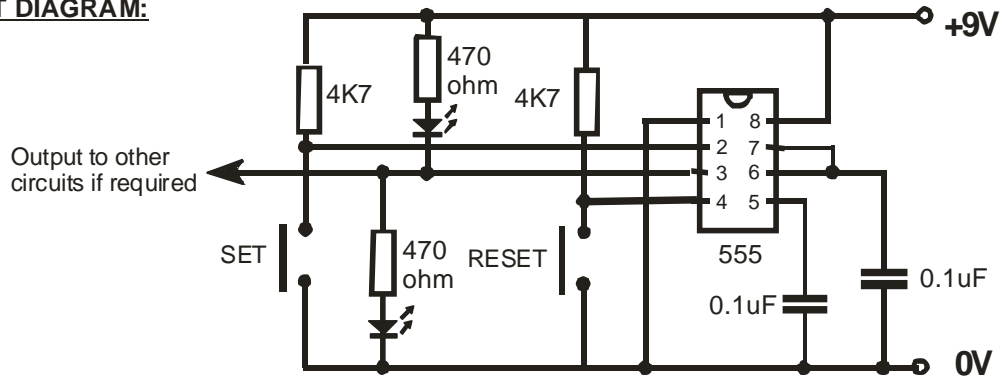
SIR-KIT ELECTRONICS

KIT 2h INTEGRATED CIRCUIT BISTABLE LATCH

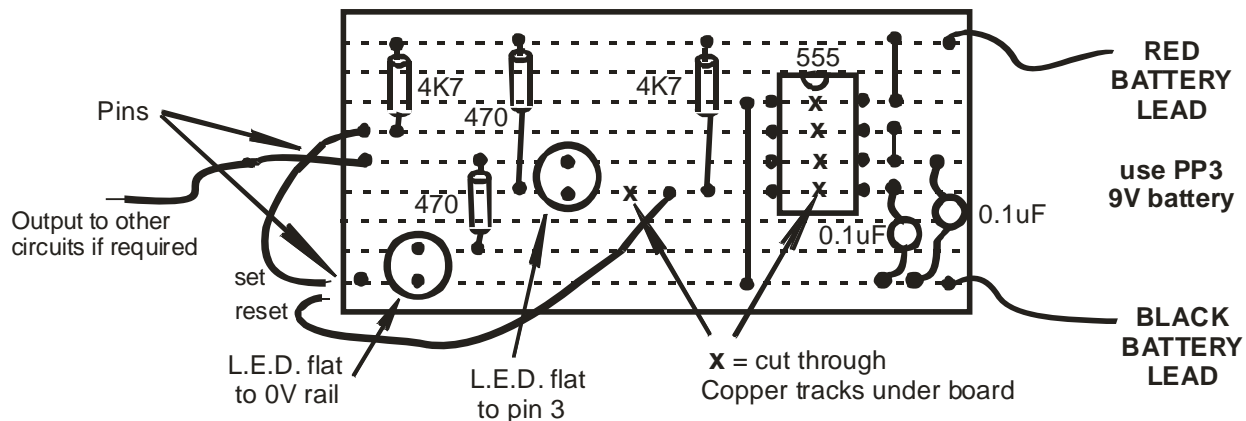
CONTENTS:

- | | |
|--------------------------|-----------------------------|
| 1 555 integrated circuit | 2 4K7 (4700 ohms) resistors |
| 2 resistors 470 ohm | 2 red L.E.D. |
| 2 capacitors 0.1uF | 1 battery connector |
| 1 Piece of stripboard | 2 Circuit pins |
| wire and solder | |

CIRCUIT DIAGRAM:



SUGGESTED LAYOUT:



HOW THE CIRCUIT WORKS:

The 555 integrated circuit may be considered as a "black box". In this application it is set by touching pin 2 wire to 0V. The output on pin 3 goes high and stays high until it is reset by touching pin 4 wire to 0V. One LED indicates pin 3 (output) is high and the other indicates it is low. These are the two stable states of the BISTABLE.

(In computers the BISTABLE is the basic unit of MEMORY.)

USING THIS KIT:

Uses include latches for alarms, where the set wire is a door or window switch and the reset wire is a push switch to turn off the alarm. Devices or an astable such as Kit 2e or Kit 2f can be controlled directly. Build two light sensors using kits 1c and 1g and you can use them to set and reset this circuit to operate a stop clock or timer to time a moving object between two light beams. Kit 2h can be used to latch a steady hand game - use kit 2e or 2f to produce the sound output.

NOTE: a PP3 9 Volt battery should be used.

Uses for Series 2 Kits

kit 2a and 2b

Uses include entry and exit delays for alarms (use Kit 1n to give a set time OFF), limiting the ringing time of a doorbell and photographic timers. Kit 1z can be used to interface the monostable to other low voltage devices or an astable such as Kit 2e or Kit 2f can be controlled directly.

kit 2c and 2d

These kits can be used as a visual output for the light, temperature and moisture sensors of our series one kits. A flashing light is more noticeable than a steady light. These circuits can be used in many projects where a flashing light output is required. For example in alarm circuits. Used with our series one kits you can design light beam alarms, frost warning alarms, fridge/freezer failure alarms, rain alarms etc.

kit 2e and 2f

This type of circuit is useful in alarms and musical applications. It can be combined with series one kits to make audible light/dark, wet/dry, or hot/cold sensors or alarms. With a timing circuit (1e or 2a or 2b) it can make a kitchen or darkroom timer.

Kit 2g and 2h

Uses include latches for alarms, where the set wire is a door or window switch and the reset wire is a push switch to turn off the alarm. Devices or an astable such as Kit 2e or Kit 2f can be controlled directly. Build two light sensors using kits 1c and 1g and you can use them to set and reset this circuit to operate a stop clock or timer to time a moving object between two light beams. Kits 2g and h can be used to latch a steady hand game - use kit 2e or 2f to produce the sound output.

