NEW HORIZON
COLLEGE OF ENGINEERING
New Horizon Knowledge Park, Ring Road, Marathalli
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade, Accredited by NBA

VOLTAGE LEVEL DETECTOR CIRCUIT

A MINI PROJECT REPORT

Submitted by

UJJAWAL PRAKASH (1NH18EC756)

In partial fulfillment for the award of the degree of

BACHELOR OF

ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE

- Certified that the mini project work entitled "**Voltage level detector**" carried out by Ujjawal (1NH18EC756) bonafide students of Electronics and Communication Department , New Horizon College of Engineering, Bangalore.

The mini project report has been approved as it satisfies the academic requirements in respect of mini project work prescribed for the said degree.

Project Guide HOD ECE

Mr.Karthik Sanjeev Sharma

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External Viva

Name of Examiner **Signature with Date**

1.

2.

ACKNOWLEDGEMENT

The satisfaction that accompany the successful completion of any task would be, but impossible without the mention of the people who made it possible, whose constant guidance and encouragement helped us succeed.

We thank **Dr. Mohan Manghnani**, Chairman of **New Horizon Educational Institution**, for providing necessary infrastructure and creating good environment.

We also record here the constant encouragement and facilities extended to us by **Dr.Manjunatha**, Principal, NHCE and **Dr. Sanjeev Sharma**, head of the department of Electronics and Communication Engineering. We extend sincere gratitude to them.

We sincerely acknowledge the encouragement, timely help and guidance to us by our beloved guide karthik to complete the project within stipulated time successfully.

Finally, a note of thanks to the teaching and non-teaching staff of electronics and communication department for their co-operation extended to us, who helped us directly or indirectly in this successful completion of mini project.

Ujjawal (1NH18EC756)

ABSTRACT

Sometimes we would want to realize when a voltage exceeds a sure level. We should use a voltmeter, but we won't want to have a look at the Meter all of the time. The answer could be a circuit that would alert us by way of a LED or the Lamp, whilst voltages exceed sure tiers.

Here's a circuit that does just that. We can figure out how this Project works via looking on the schematic. "When the 2 long wires are linked to a voltage much less than 2 volts, nothing will appear. But whilst a voltage of overt 2 volts is implemented, LED 1 will mild up.

This is because the voltage is excessive sufficient to conquer the resistance of the 1K resistor related in series with LED 1. When the voltage rises to from everywhere 1 to 9volts, the Relay will function and the Lamp will come on.

We made this Project to make certain battery voltages are above positive stages. It also can be used to warn when voltages in a circuit have become too excessive. We can’t use this circuit to measure voltages above 3 zero volts better voltages would possibly cause damage to the parts used inside the Project, we observe some few conditions where a circuit like this might be used? (An electric powered electricity producing facility is one instances)

CHAPTER-1

INTRODUCTION

The design came from the interest of finding a new technique of analog to virtual conversion. The kind of ADC (Analog to Digital Converter) that stimulated us inside the improvement of this circuit are Flash Type ADC and Successive Approximation Type ADC.

The Flash Type ADC is the fastest ADC available within the market (highest sampling charge one hundred twenty MSPS) however it uses a big variety of OP-AMPS. On the other hand Successive Approximation Type ADC that uses fewer components but its pace is dependent upon the clock frequency provided to it. We changed into looking for a method that provide the trade-off among this two, the result of this circuit.

CHAPTER-2

LITERATURE SURVEY:

In our technologically pushed society, we should make sure that what powers our homes and our manner of lifestyles is accurately controlled. Unfortunately, existence threatening incidences related to stray voltage resources happen extra frequently than they should. Though there are ways to discover these electrified assets, they're confined in their use and maximum devices available require bodily touch with the object. With this task, we hoped to bridge the distance between the handheld devices that require direct touch with the sources and the large, widespread region gadgets. Our aim changed into to develop an without difficulty transportable, hand-held tool that may come across stray voltage resources of 120V, 60Hz, from a distance of a few meters.

As our undertaking is a continuation of a preceding stray voltage venture, we desired to deal with the problems that remained unresolved. First, the previous yr.'s assignment wasn't a handheld tool. Second, it didn't clear up the problem of the capacitive coupling impact between the device and its surroundings. As our device is hand held, and thus has a "floating ground," capacitive coupling to numerous electric noise assets has an impact on our ground reference factor. To better understand how we ought to remedy this issue, we determined to begin at the beginning through a few preliminary experiments.

CHAPTER-3

PROPOSED METHODOLOGY:

- ❖ Collecting components
- ❖ Understand the function of each component
- ❖ Construction of the circuit
- ❖ Observation of result and verification

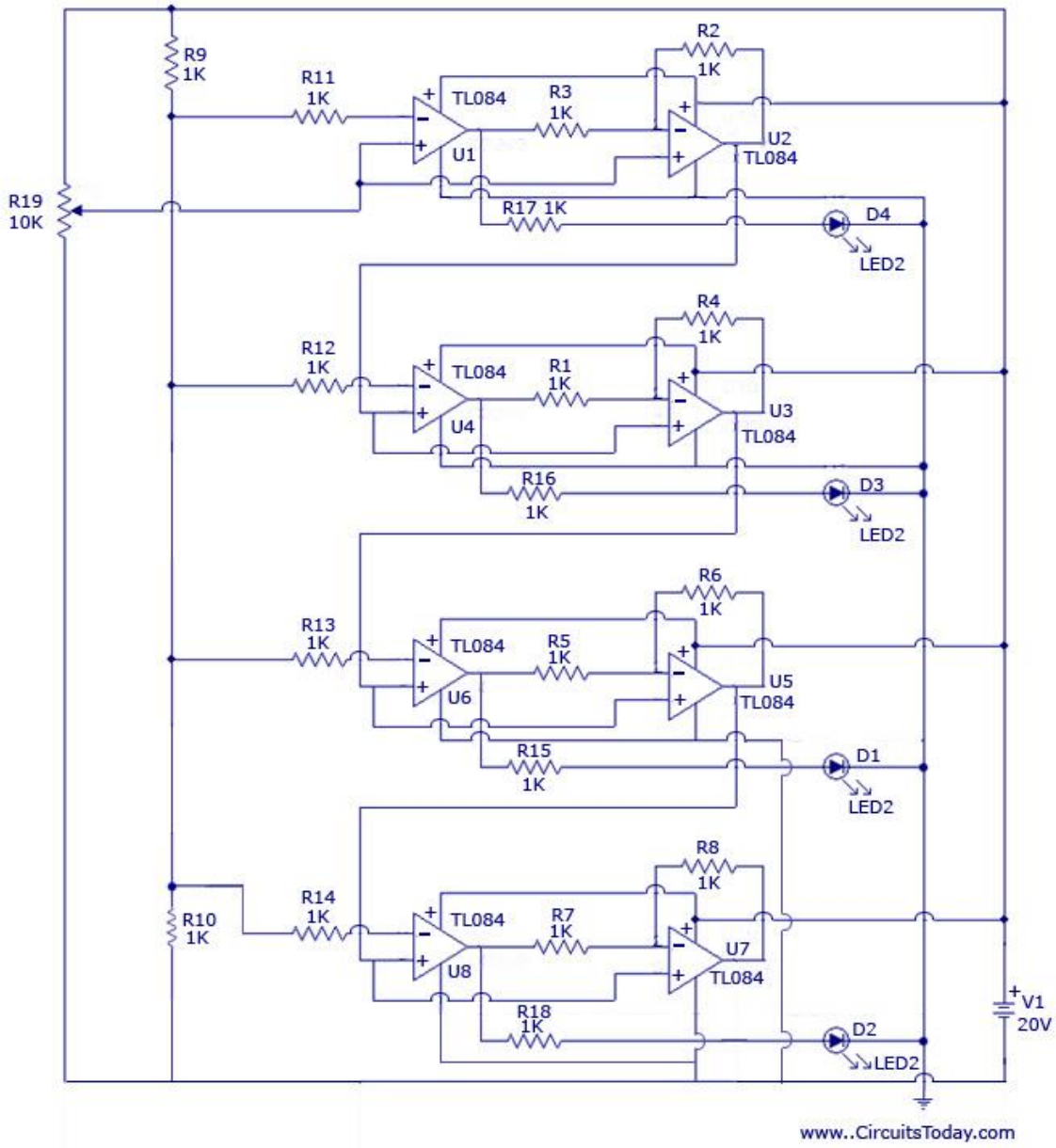
CHAPTER-4

PROJECT DESCRIPTION:

The circuit is built around with two IC-TL084, ONE VARIABLE resist, 18-1k resistors.

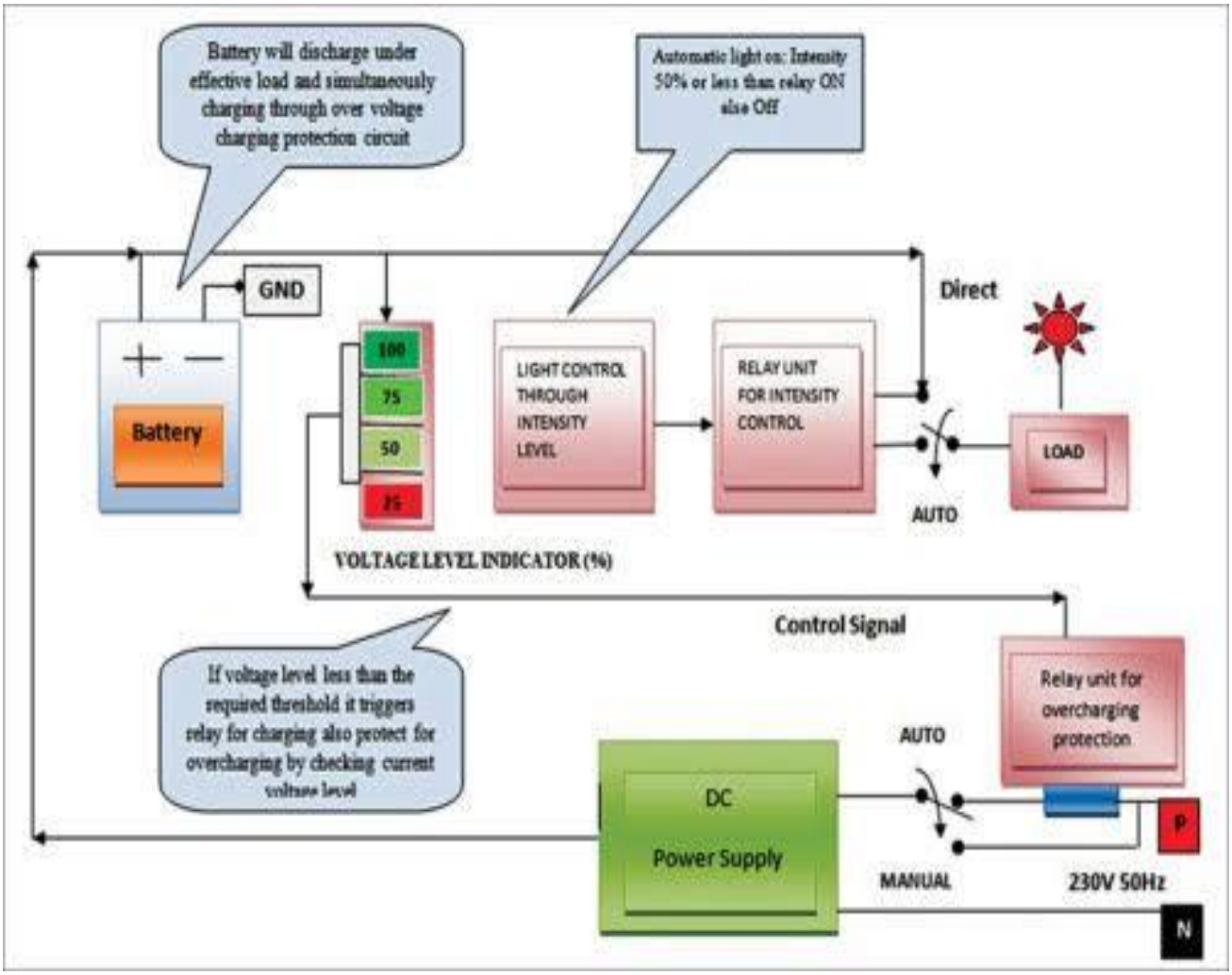
It is a quad IC.

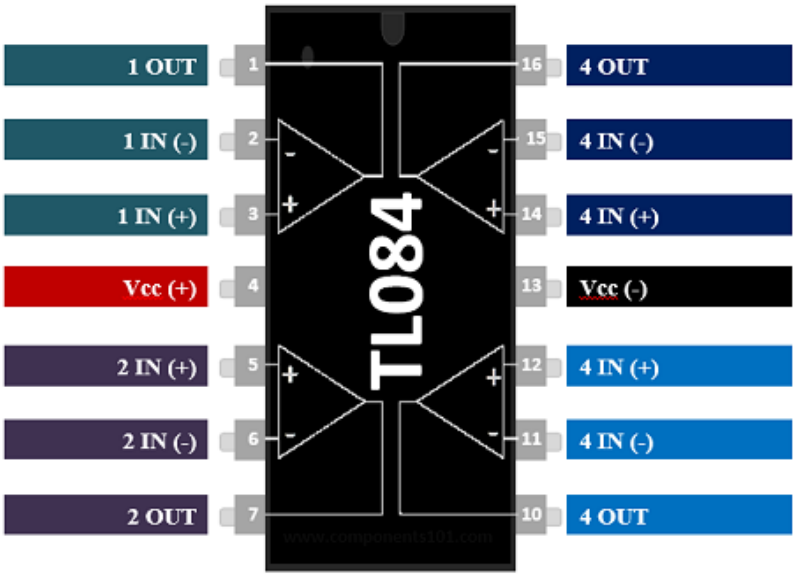
The operating of this circuit is much like that of decimal fraction to binary fraction conversion. For this reason, the circuit amplifies a sign and compares it to a reference voltage. The circuit can be divided into some of degrees. Number of tiers can be extended or decreased according to need. Each stage include OP-AMPs (TL084). One of them (OP-AMP at the left side) is used for comparison reason. The other (OP-AMP at the right side) is used as a non-inverting amplifier with a fixed benefit (EXACTLY 2). The input voltage is attached to the non-inverting pin/terminal of each OP-AMP. The virtual output is obtained from the output of the evaluating OP-AMP and the output of the amplifier OP-AMP is fed to the input of the following level. To acquire a reference voltage, resistors are used.


R9
1K
R11
1K
R2
1K
R3
1K
TL084
U1
U2
TL084
R19
10K
R17 1K
D4
LED2
R4
1K
R12
1K
R1
1K
TL084
U3
TL084
U4
R16
1K
D3
LED2
R6
1K
R13
1K
R5
1K
TL084
U5
TL084
U6
R15
1K
D1
LED2
R8
1K
R10
1K
R14
1K
R7
1K
TL084
U7
TL084
U8
R18
1K
D2
LED2
V1
20V
www..CircuitsToday.com

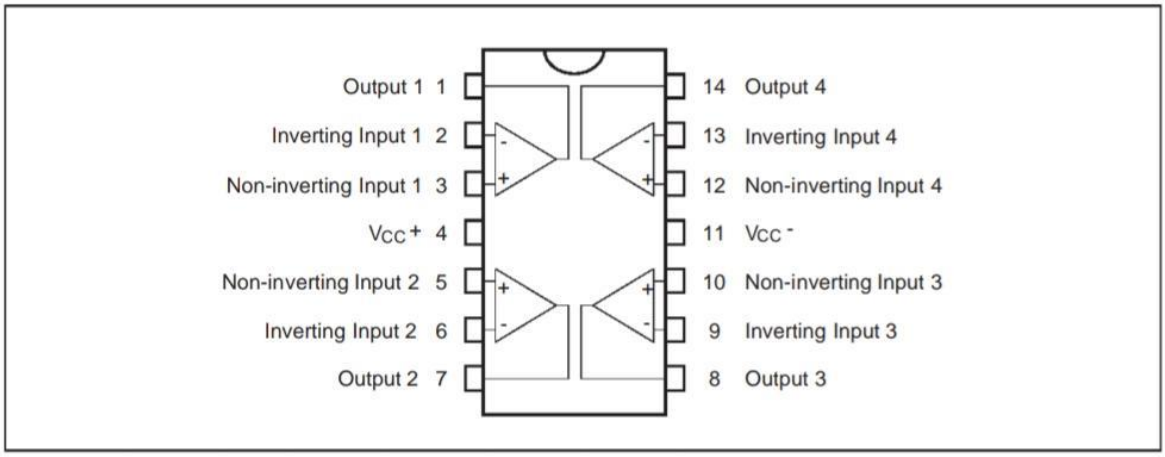
Count	Label-Value	PACKAGE	Designation
4	LED	SIP2	D1,D2,D3,D4
18	1k	AXIAL0.	R1 to R18
1	10k var	SIP3	R19
2	TL084	DIP14	U1,U3
1	20V or 9v		V1

BLOCK DIAGRAM:


Battery will discharge under effective load and simultaneously charging through over voltage charging protection circuit
Automatic light on: Intensity 50% or less than relay ON also Off
GND
Direct
Battery
100
75
50
25
LIGHT CONTROL THROUGH INTENSITY LEVEL
RELAY UNIT FOR INTENSITY CONTROL
LOAD
AUTO
VOLTAGE LEVEL INDICATOR (%)
Control Signal
If voltage level less than the required threshold it triggers relay for charging also protect for overcharging by checking current voltage level
Relay unit for overcharging protection
AUTO
DC
Power Supply
P
MANUAL
230V 50Hz
N



PIN CONNECTIONS (top view)



GENERAL PURPOSE JFET QUAD OPERATIONAL AMPLIFIERS: [TL084A-TL084B]

.WIDE COMMON-MODE (UP TO VCC+) AND

DIFFERENTIAL VOLTAGE RANGE

. LOW INPUT BIAS AND OFFSET CURRENT

. OUTPUT SHORT-CIRCUIT PROTECTION

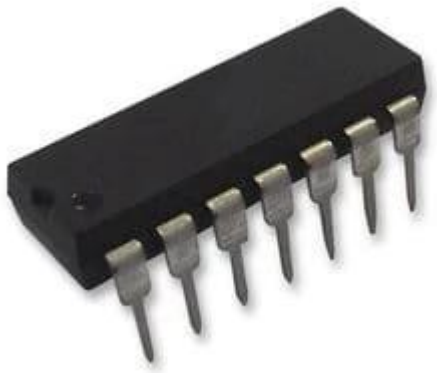
. HIGH INPUT IMPEDANCE J–FET INPUT

STAGE

.INTERNAL FREQUENCY COMPENSATION

. LATCH UP FREE OPERATION

. HIGH SLEW RATE: 16V/µs (type)

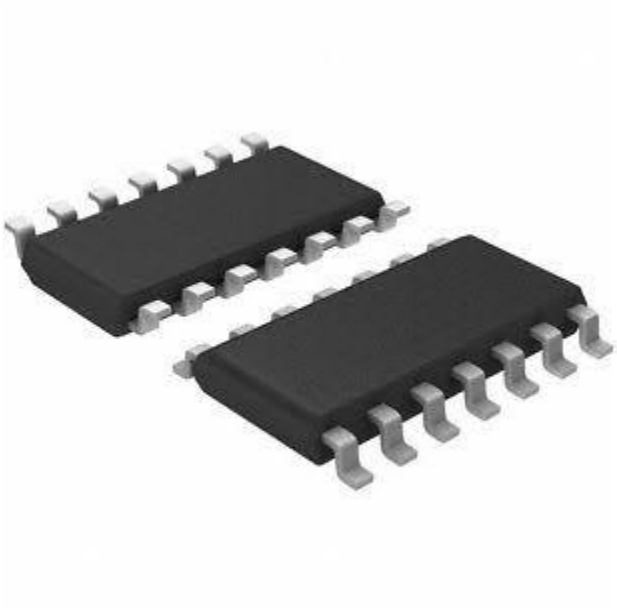


N-DIP14

(Plastic package)

D-SO14

Plastic Micro package



P-TSSOP14

(Thin shrink small outline package)

DESCRIPTION:

The TL084, TL084A and TL084B are high pace

J–FET input quad operational amplifiers incorporating

Well matched excessive voltage J–FET and bipolar transistor in a monolithic integrated circuit.

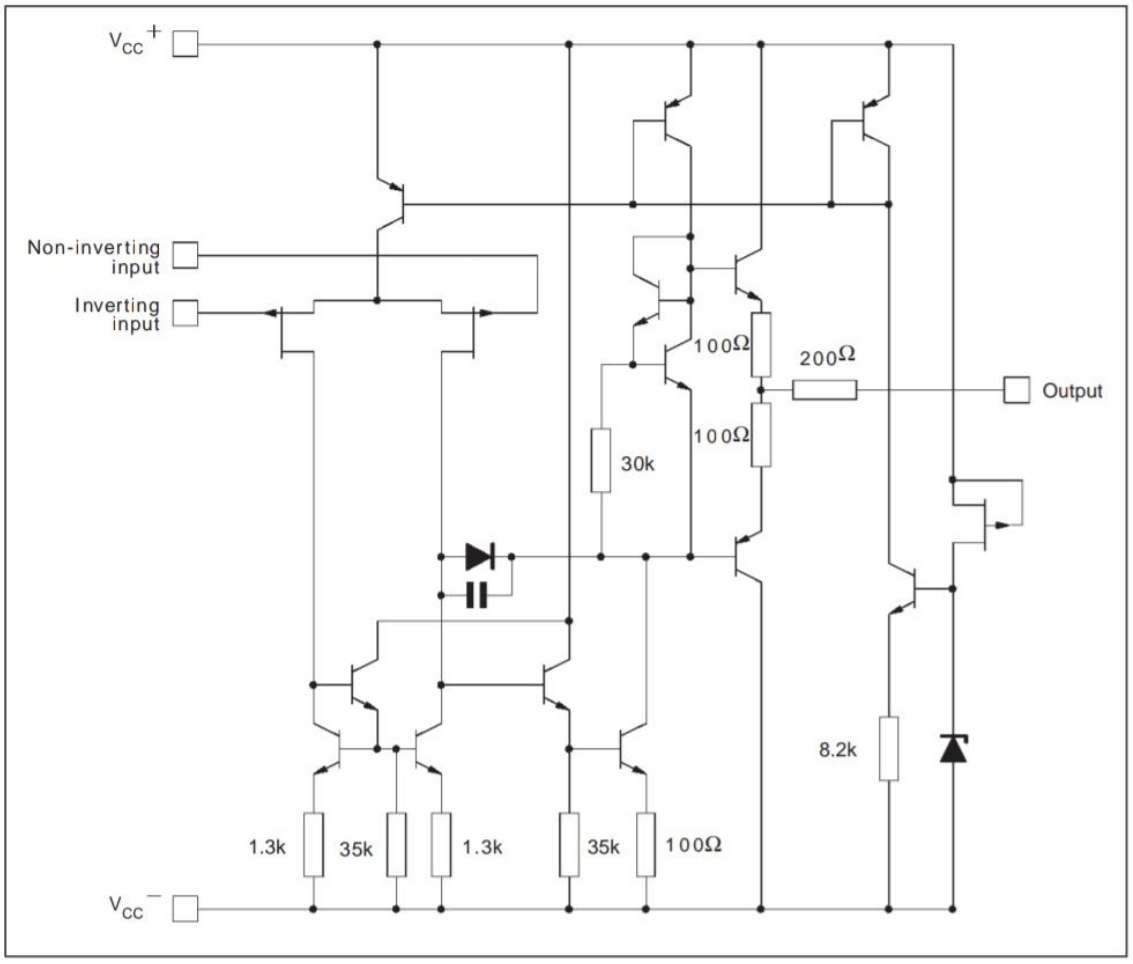
The devices feature high slew rates low input bias and

Offset currents, and coffee offset voltage temperature co-efficient.

ORDER CODES

Part Number	Temperature Range	Package		
		N	D	P
TL084M/AM/BM	–55°C, +125°C	•	•	•
TL084I/AI/BI	–40°C, +105°C	•	•	•
TL084C/AC/BC	0°C, +70°C	•	•	•
Examples : TL084CN, TL084CD				

SCHEMATIC DIAGRAM (each amplifier)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{CC}	Supply Voltage - (note 1)		±18	V
V_i	Input Voltage - (note 3)		±15	V
V_{id}	Differential Input Voltage - (note 2)		±30	V
P_{tot}	Power Dissipation		680	mW
	Output Short-circuit Duration - (note 4)		Infinite	
T_{oper}	Operating Free Air Temperature Range	TL084C,AC,BC TL084I,AI,BI TL084M,AM,BM	0 to 70 –40 to 105 –55 to 125	°C
T_{stg}	Storage Temperature Range		–65 to 150	°C

Notes :
1. All voltage values, except differential voltage, are with respect to the zero reference level (ground) of the supply voltages where the zero reference level is the midpoint between V_{CC}^+ and V_{CC}^-.
2. Differential voltages are at the non-inverting input terminal with respect to the inverting input terminal.
3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 volts, whichever is less.
4. The output may be shorted to ground or to either supply. Temperature and /or supply voltages must be limited to ensure that the dissipation rating is not exceeded.

ELECTRICAL CHARACTERISTICS

V_{CC} = ±15V, T_{amb} = 25°C (unless otherwise specified)

Symbol	Parameter		TL084I,M,AC,AI, AM,BC,BI,BM			TL084C			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
V_{io}	Input Offset Voltage (R_S = 50Ω) T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$	TL084 TL084A TL084B TL084 TL084A TL084B		3 3 1	10 6 3 13 7 5		3	10 13	mV
DV_{io}	Input Offset Voltage Drift			10			10		µV/°C
I_{io}	Input Offset Current * T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$			5	100 4		5	100 4	pA nA
I_{ib}	Input Bias Current * T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$			20	200 20		30	400 20	pA nA
A_{vd}	Large Signal Voltage Gain (R_L = 2kΩ, V_O = ±10V) T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$		50 25	200		25 15	200		V/mV
SVR	Supply Voltage Rejection Ratio (R_S = 50Ω) T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$		80 80	86		70 70	86		dB
I_{CC}	Supply Current, per Amp, no Load T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$			1.4	2.5 2.5		1.4	2.5 2.5	mA
V_{icm}	Input Common Mode Voltage Range		±11	+15 -12		±11	+15 -12		V
CMR	Common Mode Rejection Ratio (R_S = 50Ω) T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$		80 80	86		70 70	86		dB
Ios	Output Short-circuit Current T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$		10 10	40	60 60	10 10	40	60 60	mA
$\pm V_{OPP}$	Output Voltage Swing T_{amb} = 25°C $T_{min.} \le T_{amb} \le T_{max.}$	R_L = 2kΩ R_L = 10kΩ R_L = 2kΩ R_L = 10kΩ	10 12 10 12	12 13.5		10 12 10 12	12 13.5		V
SR	Slew Rate (V_{in} = 10V, R_L = 2kΩ, C_L = 100pF, T_{amb} = 25°C, unity gain)		8	16		8	16		V/µs
t_r	Rise Time (V_{in} = 20mV, R_L = 2kΩ, C_L = 100pF, T_{amb} = 25°C, unity gain)			0.1			0.1		µs
K_{OV}	Overshoot (V_{in} = 20mV, R_L = 2kΩ, C_L = 100pF, T_{amb} = 25°C, unity gain)			10			10		%
GBP	Gain Bandwidth Product (f = 100kHz, T_{amb} = 25°C, V_{in} = 10mV, R_L = 2kΩ, C_L = 100pF)		2.5	4		2.5	4		MHz
R_i	Input Resistance			10^{12}			10^{12}		Ω
THD	Total Harmonic Distortion (f = 1kHz, A_V = 20dB, R_L = 2kΩ, C_L = 100pF, T_{amb} = 25°C, V_O = $2V_{PP}$)			0.01			0.01		%
e_n	Equivalent Input Noise Voltage (f = 1kHz, R_s = 100Ω)			15			15		$\frac{nV}{\sqrt{Hz}}$
Øm	Phase Margin			45			45		Degrees
V_{O1}/V_{O2}	Channel Separation (A_v = 100)			120			120		dB

* The input bias currents are junction leakage currents which approximately double for every 10°C increase in the junction temperature.

TL084 is a JFET input Op-Amp with high enter impedance and occasional offset contemporary and offset voltage making it best of amplifier applications. The Op-Amp could be very much like TL074 but has excessive noise immunity and better offset traits.

FEATURES:

JFET Input Op-Amp Quad Package

Typical Operating Voltage: +18V to -18V

Minimum Operating Voltage: 7V

Input Bias Current: 20pA

Input Offset Voltage: 3mV

Common mode Rejection Ratio CMRR: 86dB

Gain: 200 V/mV

Bandwidth: 4MHz

Output Short circuit protection

Available in 14-pin PDIP, SO-14, TSSOP programs

Where to use TL084 Op Amp?

The TL084 is a Quad Package Operational Amplifier, meaning it has four Op-Amps interior it and every Op-Amp may be used independently.

The fundamental distinguishing feature of the TL084 Op-Amp is they contain excessive-voltage JFET and bipolar transistors which enables the transistor to have very high input impedance and low bias contemporary. Also this Op-Amp has low noise and harmonic distortion making it a

perfect preference for audio pre-amplifiers. So in case you are looking for an Op-Amp IC with Quad package deal and JFET pushed then this IC might be the right desire for you.

PIN CONFIGURATION:

Pin Number	Pin Name	Description
1,7,10,16	Op-Amp Output Pins	These are the output pins of the four Op-Amps
2,6,11,15	Input Inverting Pins	These are the input inverting pins of the four Op-Amps
3,5,12,14	Input Non-Inverting Pins	These are the input non-inverting pins of the four Op-Amps
4	Vcc (+)	Positive Supply Rail of the Op-Amp
13	Vcc (-)	Negative Supply Rail of the Op-Amp

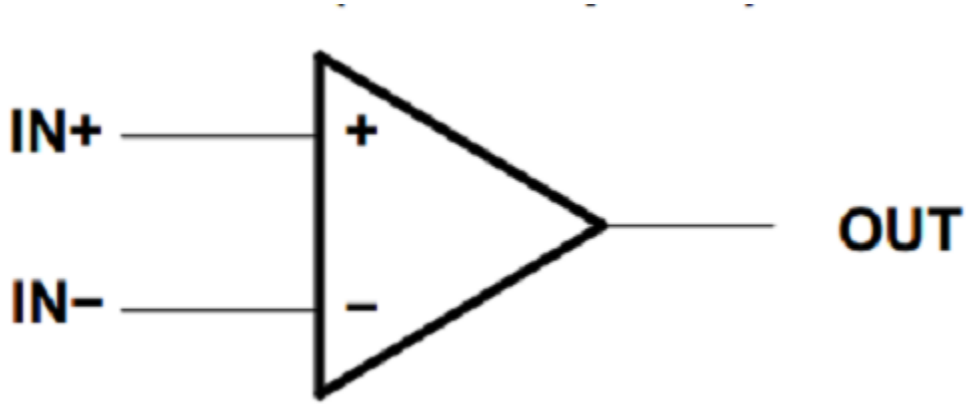
HOW TO USE TL-084 OP-AMP:

TL084 Op amp could be very similar to the LM324 Op-Amp, they both have four Op-Amps inner them and have the exact equal pinouts. The TL084 however isn't always intended for common 5V operation because it calls for not less than 7V to function. So Unlike LM324 or other op-amps, in case you are using the Op-Amp in unmarried supply mode, ensure you offer not less than 7V for the Op-Amp to function generally.

If you're curious to learn about few basic application circuits of this IC then you can examine thru how LM324 is used since each the IC shares the identical programs

OP-AMP DESIGN CONSIDERATION:

The Op-Amps were recognize as work horse for most electronics circuit designs. There are a plethora of software circuits for Op-Amp each having its traits and significance in its own manner. But every Op-Amp designs can have some commonplace design considerations or tips which can be common amongst them and we are able to discuss the equal similarly.



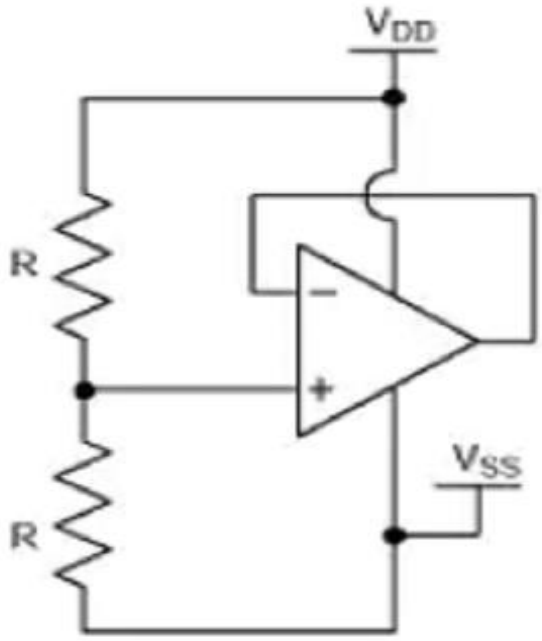
Inputs: Op-Amps are known for its high input impedance, that means it will not draw any current (or disturb) the sign this is being given to the Input pin. The enter degree of an Op-Amp is in most cases complicated since it entails many degrees. The Input not unusual-mode range fee ought to be considered even as providing voltage alerts due to the fact the input voltage

need to by no means exceed the rail voltage else it will create a latch-up condition which in go back will create a brief circuit of the deliver voltage and for this reason negative the circuit completely. Also the distinction among the voltage values of the Inverting and the Non-Inverting pin need to not be more than the Differential Input Voltage Rating.

Output: The TL084 isn't a rail to rail Op-Amp hence the output voltage will now not attain the most tremendous or maximum negative voltage when saturated. It will usually be ~2V less than the supply voltage, this voltage drop happens because of the VCE voltage drop of the transistors gift within the Op-Amp. Also take into account that a saturated Op-Amp will relatively draw more contemporary and as a result outcomes in strength loss.

Gain/Feedback: Op-Amps are known for his or her very big Open-Loop Gain, however unfortunately this gain is accompanied by way of noise therefore most of the circuits are designed the usage of Closed-Loop. A Closed-Loop device offers comments to the enter this restricting the gain fee of the Op-Amp and the noise associated with it. A Negative feedback is generally favored because it has predictable nature and has strong operation.

TERMINATING UNUSED OP-AMP PINS:



For ICs like TL084 that has a Quad Op-Amp style bundle, frequently there is a great threat that the design does now not utilize all of the available 4 Op-Amps. In that case it is very vital to terminate the unused Op-Amp well. Else, the unused pins will develop some live capacitance which may choose up noise and affect the performance, additionally non terminated Op-Amps will eat greater power thus lowering the performance of the design. There are many ways to terminate an Op-Amp based to your layout, but the maximum commonplace used technique is proven.

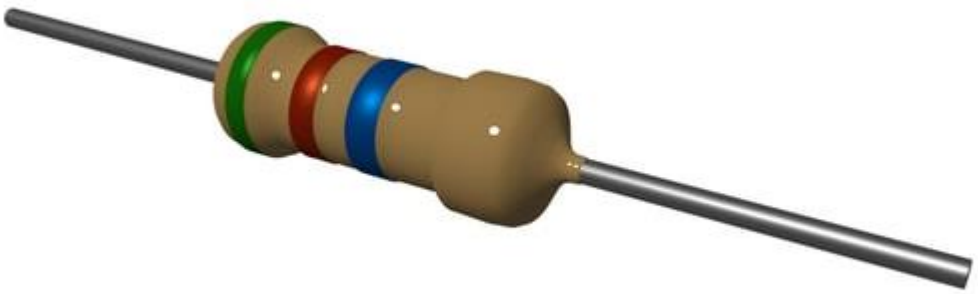
RESISTOR:

A resistor is a passive -terminal electrical thing that implements electrical resistance as a circuit detail. In electronic circuits, resistors are used to lessen current go with the flow, modify sign ranges, to divide voltages, bias lively factors, and terminate transmission traces, among other uses. High-electricity resistors which can dissipate many watts of electrical electricity as warmness, may be used as part of motor controls, in energy distribution systems, or as check loads for mills. Fixed resistors have resistances that handiest alternate slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit

elements (along with a quantity control or a lamp dimmer), or as sensing gadgets for heat, mild, humidity, pressure, or chemical interest.

Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in digital equipment. Practical resistors as discrete additives can be composed of diverse compounds and paperwork. Resistors also are carried out within included circuits.

The electric feature of a resistor is certain by way of its resistance: common business resistors are manufactured over a range of greater than 9 orders of significance. The nominal price of the resistance falls in the manufacturing tolerance, indicated at the issue.



Resistors won't display the fee outs debut resistor color pattern via their resistance

Can be calculated. PTH (plated-thru-hollow) resistors use a color coding machine (which without a doubt provides some flair to circuits), and SMD (floor-mount device) resistors have their personal price-marking system.

Following is a table with color code of resistors

Colour	Value
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Grey	8
White	9
Gold	-
Silver	-
No band	-

[Listing 1]

APPLICATIONS OF RESISTOR

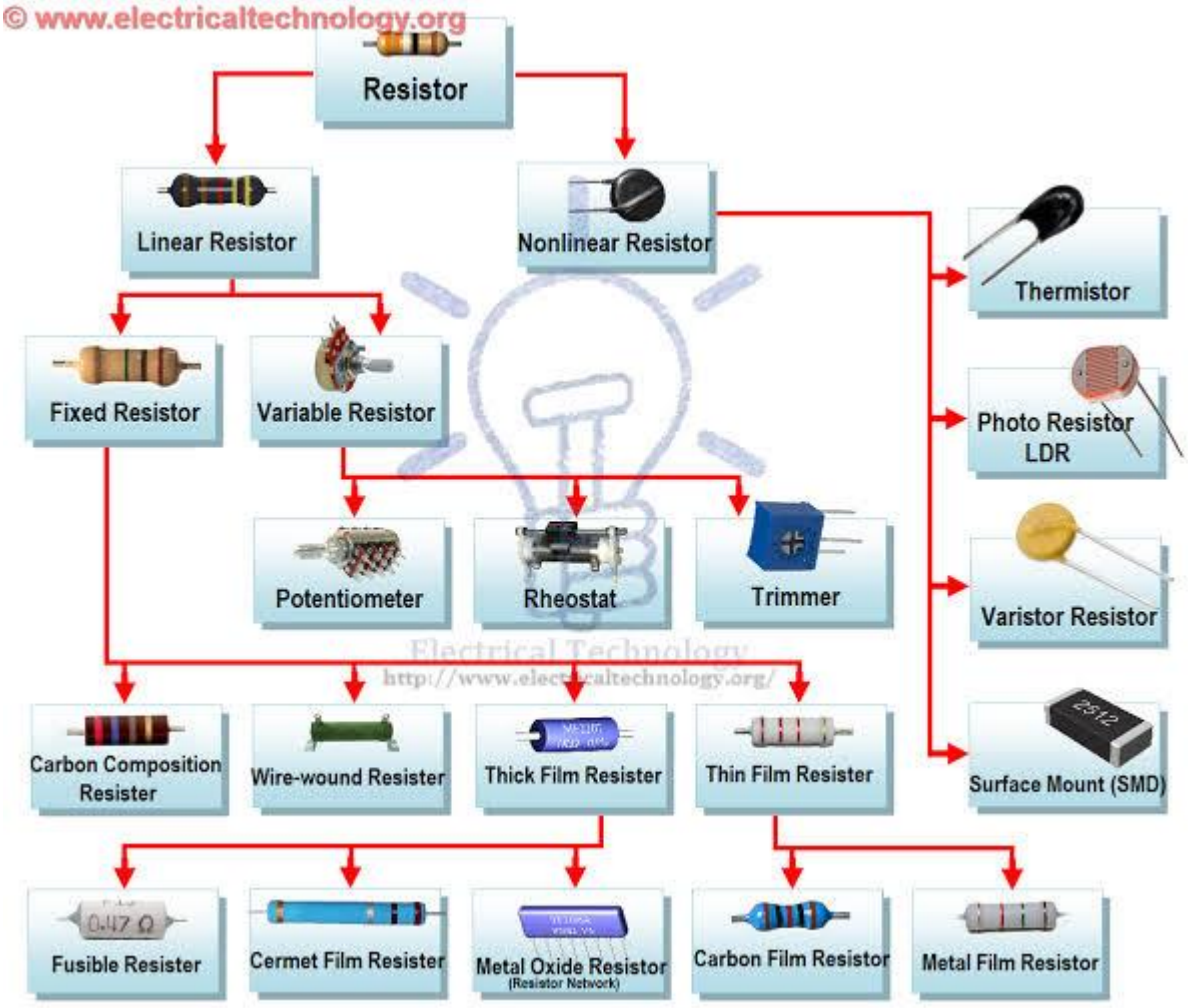
• Wire wound resistors discover software in which balanced contemporary manage, high Sensitivity and accurate size are required like in shunt with ampere meter.

• Photo resistors locate utility in flame detectors, burglar alarm, in photographic devices and so forth.

• Resistors are used for controlling temperature and voltmeter.

• Resistors are utilized in virtual multi-meter, amplifiers, telecommunication, and oscillators.

• They also are used in modulators, demodulators, and transmitters.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Resistor
Linear Resistor
Nonlinear Resistor
Thermistor
Fixed Resistor
Variable Resistor
Photo Resistor
LDR
Potentiometer
Rheostat
Trimmer
Varistor Resistor
Electrical Technology
http://www.electricaltechnology.org/
Carbon Composition
Resister
Wire-wound Resister
Thick Film Resister
Thin Film Resister
Surface Mount (SMD)
2512
0.47 Ω
Fusible Resister
Cermet Film Resister
Metal Oxide Resistor
(Resistor Network)
Carbon Film Resistor
Metal Film Resistor

LED:

A mild-emitting diode (LED) is a semiconductor mild supply that emits light when current flows via it. Electrons inside the semiconductor recombine with electron holes, freeing power in the form of photons. The color of the light (corresponding to the electricity of the photons) is decided through the electricity required for electrons to go the band hole of the semiconductor. White light is acquired by using more than one semiconductors or a layer of mild-emitting phosphor at the semiconductor device.

Appearing as practical electronic additives in 1962, the earliest LEDs emitted low-intensity infrared light. Infrared LEDs are utilized in far flung-control circuits, such as the ones used with a huge form of purchaser electronics. The first seen-mild LEDs have been of low intensity and restricted to crimson. Modern LEDs are to be had across the visible, ultraviolet, and infrared wavelengths, with excessive mild output.

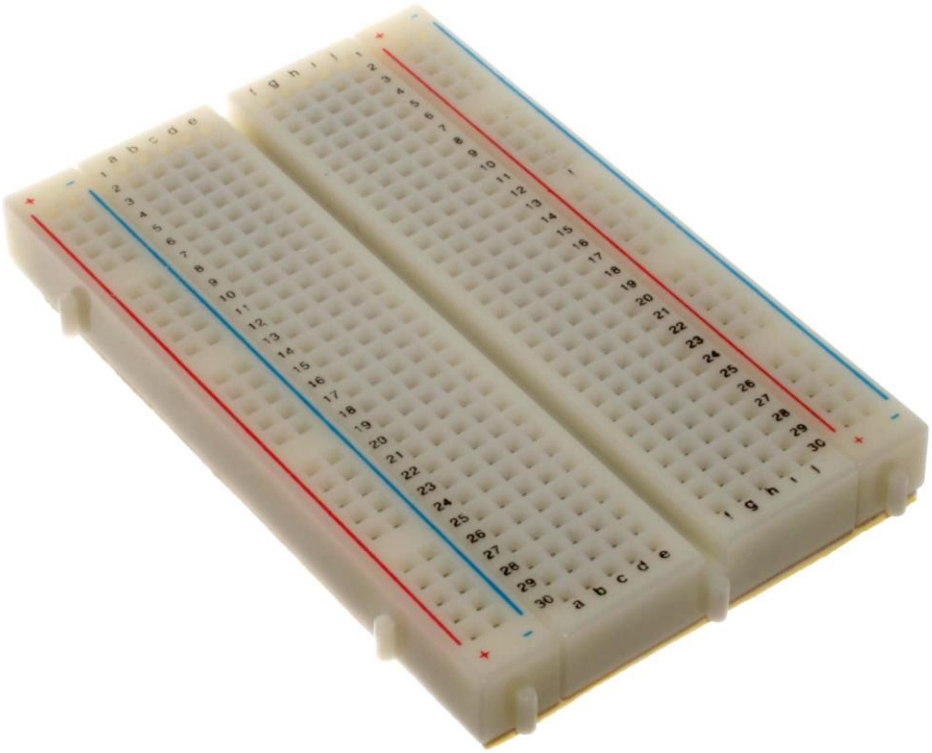
Early LEDs were often used as indicator lamps, changing small incandescent bulbs, and in seven-phase displays. Recent trends have produced excessive-output white mild LEDs suitable for

room and outdoor area lights. LEDs have brought about new shows and sensors, even as their high switching charges are useful in advanced communications era.

LEDs have many benefits over incandescent light assets, consisting of lower energy intake, longer lifetime, stepped forward bodily robustness, smaller size, and faster switching. LEDs are utilized in programs as numerous as aviation lighting, automotive headlamps, advertising and marketing, general lighting, visitor alerts, camera flashes, lighted wallpaper, plant growing light, and scientific gadgets.

Unlike a laser, the mild emitted from an LED is neither spectrally coherent nor even incredibly monochromatic. However its spectrum is satisfactorily slender that it seems to the human eye as a natural (saturated) coloration. Nor, in contrast to most lasers, is its radiation spatially coherent, so that it cannot method the very high brightness function of lasers.

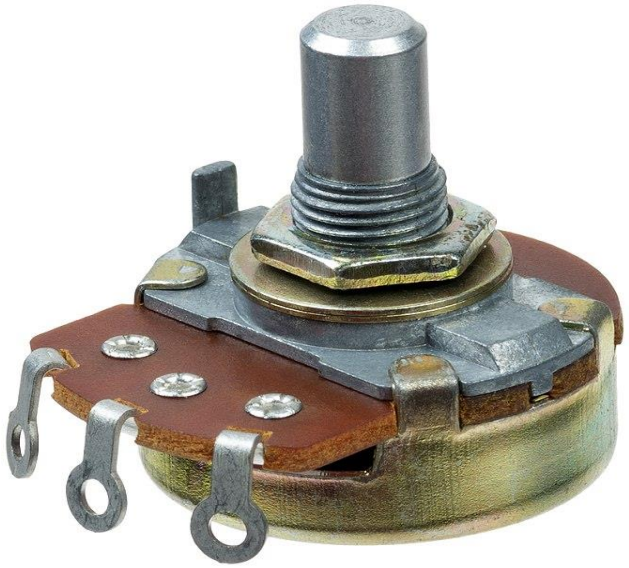
BREAD BOARD:



A breadboard is a construction base for prototyping of electronics. Originally the word referred to a literal bread board, a polished piece of wooden used for reducing bread.[1] In the Nineteen Seventies the solderless breadboard (K.A. Plug board, a terminal array board) became available and these days the term "breadboard" is normally used to consult these.

Because the solderless breadboard does no longer require soldering, it is reusable. This makes it smooth to apply for growing temporary prototypes and experimenting with circuit design. For this purpose, solderless breadboards are also famous with students and in technological training. Older breadboard types did not have this belongings. A stripboard (Vero board) and similar prototyping printed circuit forums, which are used to construct semi-permanent soldered prototypes or one-offs, cannot without problems be reused. A kind of electronic structures can be prototyped by using the use of breadboards, from small analog and digital circuits to finish crucial processing units (CPUs).

VARIABLE RESISTER



A potentiometer is a three-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider. If best terminals are used, one cease and the wiper, it acts as a variable resistor or rheostat.

The measuring instrument referred to as a potentiometer is essentially a voltage divider used for measuring electric ability (voltage); the factor is an implementation of the equal principle, consequently its name.

Potentiometers are usually used to govern electric devices which include volume controls on audio system. Potentiometers operated by a mechanism can be used as role transducers, as an example, in a joystick. Potentiometers are rarely used to without delay control sizeable strength (greater than a watt), since the energy dissipated inside the potentiometer might be similar to the strength inside the managed load.

BATTERY:

A regulated strength supply is an embedded circuit; it converts unregulated AC (Alternating Current) right into a constant DC. With the assist of a rectifier it converts AC supply into DC. Its function is to supply a solid voltage (or much less regularly modern-day), to a circuit or tool that have to be operated inside certain power supply limits. The output from the regulated strength supply can be alternating or unidirectional, however is sort of constantly DC (Direct Current)

The form of stabilization used can be constrained to making sure that the output remains within certain limits beneath diverse load d conditions, or it is able to also include reimbursement for version in its very own supplies. The latter is a great deal more not

Unusable now a days.


DC REGULATED POWER SUPPLY 0-12V / 1A + FIXED AC 12V
OFF
ON
V
A
COARSE
FINE

WIRES:


SUPERWORM

A **wire** is a single, usually cylindrical, flexible strand or rod of metal. Wires are used to bear mechanical loads or electricity and telecommunications signals. Wire is commonly formed by drawing the metal through a hole in a die or draw plate. Wire gauges come in various standard sizes, as expressed in terms of a gauge number. The term 'wire' is also used more loosely to refer to a bundle of such strands, as in "multi-stranded wire", which is more correctly termed a wire rope in mechanics, or a cable in electricity.

Wire comes in solid core, stranded, or braided forms. Although usually circular in cross-section, wire can be made in square, hexagonal, flattened rectangular, or other cross-sections, either for decorative purposes, or for technical purposes such as high-efficiency voice coils in loudspeakers. Edge-wound coil springs, such as the Slinky toy, are made of special flattened wire.

TESTING:

To see if the circuit is working or not, use a potentiometer. Fix it to the end of 2 pole of the battery, join the wiper to the first degree of the circuit. Now as the potentiometer is swiped across its variety depend can be located represented by way of the four LED’s. It will be a binary remember upward or downward.

CHAPTER-5

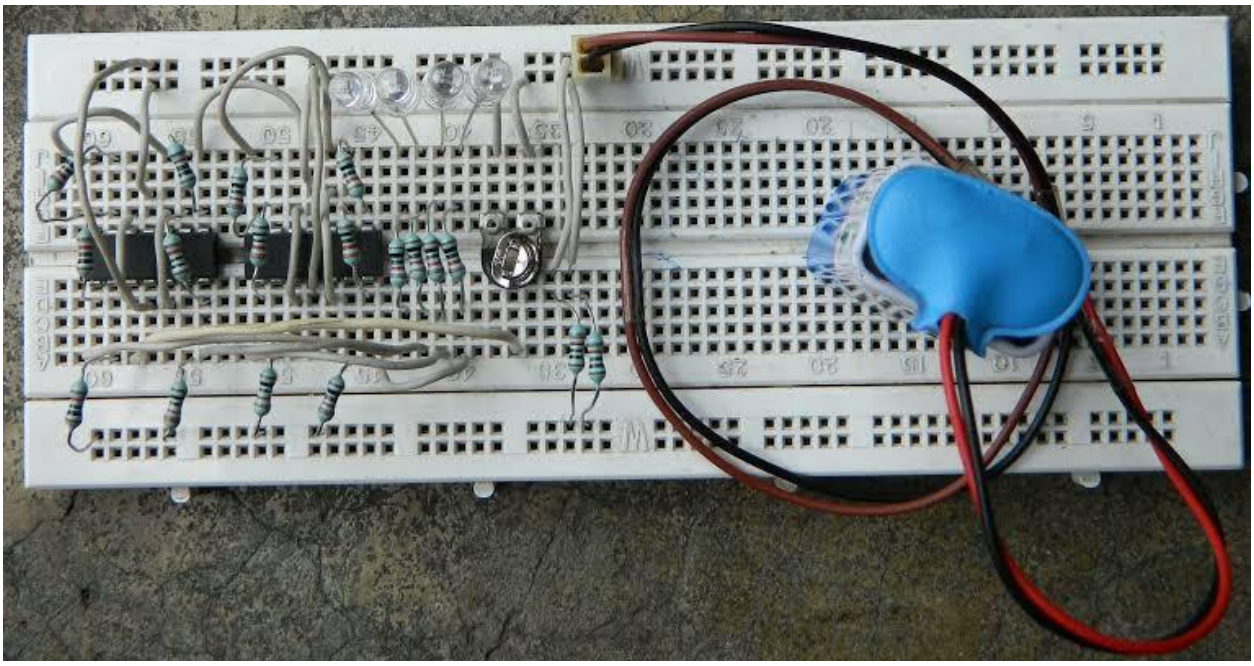
RESULT AND DISCUSSION:

In input we will give DC voltage.

By operating 10k variable resistor we will give certain voltage.

By using the variable resistor we can give values from 1 to 9v.

In led lights we can see that when we change it will decrease or increase we will see that led will change and indicates the voltage level that we had given to the circuit in the binary values



CHAPTER-6

CONCLUSION AND FUTURE SCOPE:

Digital Voltmeter presentations the voltage readings of a circuit numerically. Initially analog voltmeters were used to take the readings of the voltage wherein in a pointer or indicator actions across a scale in percentage to the voltage of the circuit and later, virtual voltmeters have been delivered which gives the numerical display of voltage with accuracy. This article will speak what is Digital Voltmeter, how does it paintings including little by little features, its kinds, applications, benefits and drawbacks.