OP-AMP CIRCUITS

Op-amp

CircuitsToday.com is listing some of the best op-amp circuits present in our sites. There are more than 20 circuits which show the different applications of the op-amp. We are listing the links of our best 15 circuits with detailed descriptions and circuit diagrams. Do not forget to go through the comments section for each post, from where you will get ideas about how to modify the circuit. Also if you have any doubts, feel free to ask them through comments.

Before going into detail about the different op-amp application circuits, it is important to know about the basics of op-amp, and the small applications of the IC. To learn about it click on the link – **Operational Amplifiers (Op-amps)**

The above linked article contains all the basics of op-amps, with the basic op-amp circuit with two transistors. The different advantages of op-amps are also specified, along with links to different basic op-amp circuits like Comparator Circuit, Schmitt Trigger Circuit, Astable Multivibrator, Monostable Multivibrator, Zero-crossing detector, voltage splitter and so on. The article also contains information about the 741 IC, its packaging style, the use of op-amp as an inverting and non-inverting circuit, and so on. The different pin assignments of the 741 IC are also explained with neat figures.

Given below are some links to some of the best op-amp based circuits designed by us. Most of them are simple and easy to make a home. We have given a very detailed description and circuit diagram for every one of the.

1. **Sensitive Intruder Alarm Circuit**

In this circuit, apart from the 741 op-amp IC, a Light Dependent Resistor (LDR) is also used. The main use of the LDR is to sense the presence of a person through his shadow falling on the sensor. As soon as the shadow falls on it, the resistance of the device begins to increase. A **555 timer IC** is also used to be triggered by a transistor and thus to drive the alarm load. Read more about the working of the circuit from the link above.

2. Transistor Amplifier Circuit-12 Watts

This circuit is very simple and inexpensive. Only one uA741 op-amp and four transistors are required for the working of this circuit. The op-amp produces the gain required and the transistors are connected to work as the speaker driver. The circuit is highly stable and is also known to produce a reasonable output of 12 Watts on a 4 Ohm speaker.

3. Sound Operated Flip Flop

This circuit is used to toggle the output pins status of a flip-flop IC, using a sound. The op-amp used here is the IC LM324. Two op-amps from the chip are selected and are used to amplify the sound picked by the condenser microphone. The third op-amp inside the IC is used as a level detector. The flip-flop IC used here is the IC CD4027.

4. Sound Pressure Meter

The op-amp used here is called CA 3140. The op-amp is connected as a non-inverting amplifier, and can be easily setup as a sound level checker at homes and theatres. You will find it very useful in checking the sound pressure of each channel on different positions of the room.

5. Infrared Motion Detector Circuit

This circuit is used to produce an alarm as soon as an intruder walks across the infrared rays produced by an IR diode. A 555 timer IC is also used here to work as an astable multivibrator. The beams produced by the IR diode are received by a photo-transistor. When an intruder walks by, the LM 1458 op-amp senses the difference in phase and automatically goes high.

6. Passive Tone Control Circuit

The circuit uses op-amp as the only active element, whereas all the other components are passive elements. Thus, the circuit got its name as Passive Tone Control Circuit. The circuit is divided into two parts – the op-amp based pre-amplifier and the Baxandall tone control circuitry. The op-amp used here is the TL072 IC. The Baxandall circuit principles and the whole circuit is explained in detail in the original article. This circuit does have some disadvantages like energy wastage, and high distortion.

7. Active Crossover Circuit

This circuit can be considered just the opposite of the passive tone control circuit. All the drawbacks that the passive circuit has is rectified by this circuit. They are known to be more suitable for HiFi audio systems. The circuit divides the complex audio signal into two bands, one being the low frequency signal, and the other being the low frequency signal. These two signals are further amplified separately and is bi-amped to its corresponding low frequency and high frequency bands. The op-amp used here is the LM833 IC, which is basically a dual op-amp that is designed for audio purposes.

8. Car Subwoofer Filter

This circuit finds a lot of applications in the use of automobile subwoofers. The circuit is basically a low pass filter whose pass frequency lies between 60 hertz and 160 hertz. The op-amp used in this circuit is called the TL072 dual BIFET op-amp IC. The chip has two op-amps. One of them is connected as a buffer, and the other is connected as a low-pass filter.

9. Low-pass Filter for Subwoofer

The IC used here is the TL062 IC. It is basically a dual high input impedance JFET op-amp. It is known for its good audio characteristics. The circuit description and diagram is available in the main article. **3-Input Microphone Preamplifier**

The op-amp used here is the IC LM348, due to its unique properties like high gain, internally compensated quad-operational amplifier with a class AB output stage, low input supply drain current, and so on. The IC is to be powered with the help of a dual power supply. Four of them are used in this circuit.

10. 3-Way Active Crossover Network

This circuit finds wide applications in audio amplifier systems. The op-amp used here is called LF353 IC, which was developed by National Semiconductors. The IC is a dual **JFET** op-amp internally compensated input offset voltage. The op-amp is also known for its low offset currents, high bandwidth, and low input bias currents due to the JFET based input stage. Two of them are used in this circuit. One of them is used to buffer the input audio signal, and the other is used to handle the three bands of the audio namely bass, mid-range, and treble. To know more about the circuit, click on the link above.

11. Audio Line Driver

In this circuit, an op-amp called TSH22 IC, developed by ST Microelectronics is used. At a high level of modulation, and with a bandwidth of 25 Mega Hertz, the IC is known to drive medium impedance loads with low distortion and high output current.

12. Subwoofer Filter

The circuit diagram of a subwoofer filter with the help of op-amps is given in the article above along with a detailed description. The circuit consists of 10 op-amps. The circuit needs a low pass filter with a cut-off frequency of 200 hertz, as the audio frequencies below the value are known to be in the subwoofer range. The circuit may look a little complex, but after reading the working of the circuit, you will find that it is quite simple. A **potentiometer** is also required to couple one of the inverting inputs of the op-amp. You can use an **LED** if needed, and it is optional.

13**. Preamplifier for Dynamic Microphones**

This circuit is known to be a low noise pre-amplifier suitable for dynamic microphones. The op-amp used here is called uA739, manufactured by Fairchild Semiconductors. Such an op-amp is known to be famous for its high gain and excellent stability. The IC package contains two op-amps, but only one of them is used for the circuit.

A capacitor is also used in the circuit to provide DC de-coupling. The audio signals from the microphone are coupled to the non-inverting input of the op-amp. A resistor-capacitor network is also connected in the circuit. This network helps in bypassing the unwanted high frequency signals that comes from the microphone. This circuit is highly applicable in **audio circuits** as it can handle a wide range of signals. To learn more about the circuit, click on the link above.

14. 3 Input Mic Mixer Circuit

In this circuit, 4 op-amp 741 IC's are used. Out of them three of them are designed to work as pre-amplifiers and the fourth is connected as a summing amplifier, which adds the signals from the output of the three pre-amplifiers. The three pre-amplifiers produce a gain of about 40dB to the individual input signals. The summing amplifier produces a gain of about 5dB to the final output signal. Thus the total gain of the circuit comes around 45dB.

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