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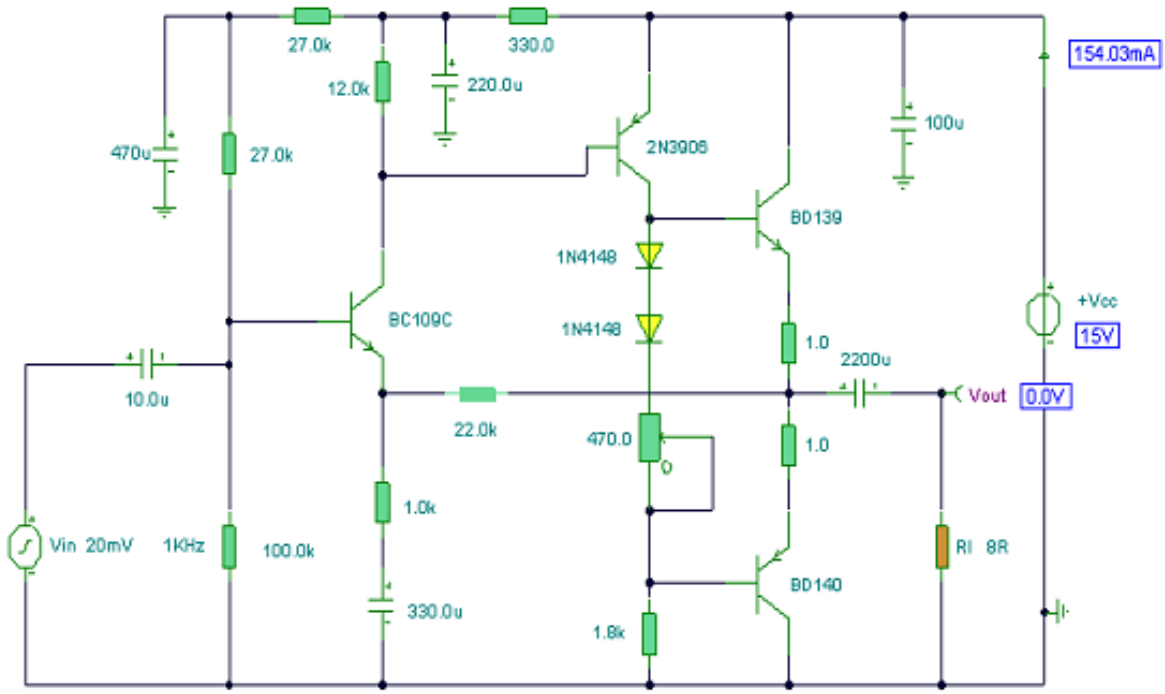
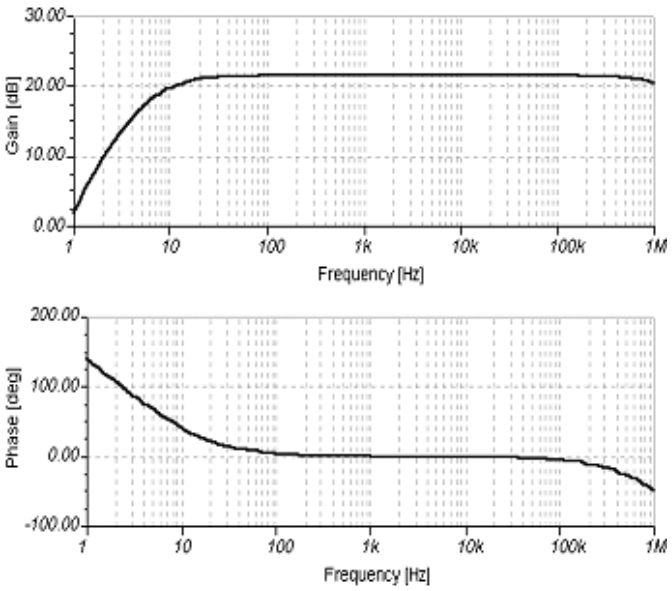


Circuit Description

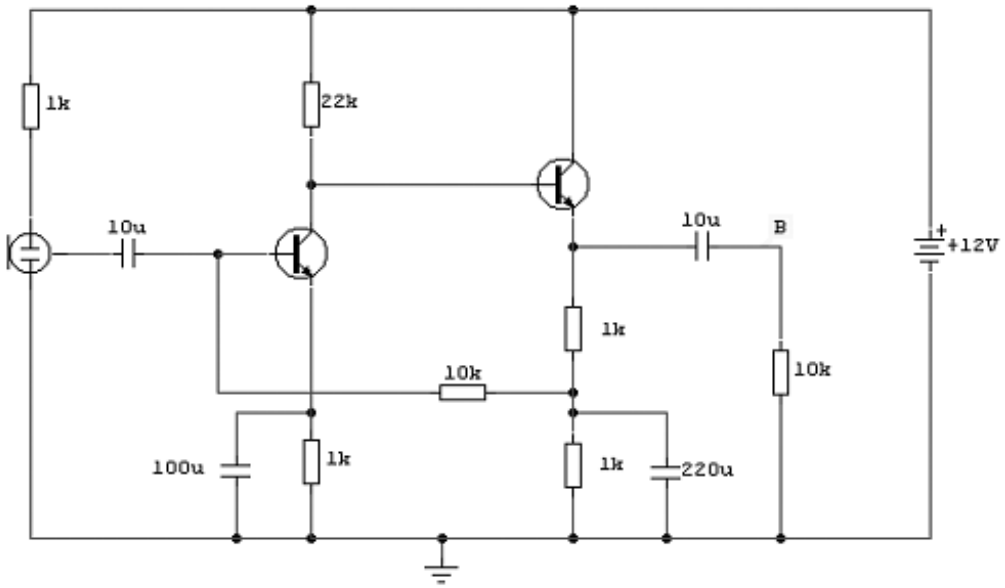
The amplifier operates in Class AB mode; the single 470R preset resistor controls the quiescent current flowing through the BD139/140 complimentary output transistors. Adjustment here, is a trade-off between low distortion and low quiescent current. Typically, under quiescent conditions, standby current may be 15 mA rising to 150 mA with a 50 mV input signal. A simulated frequency response is shown below:



The circuit is DC biased so that the emitters of the BD139 and BD140 are at approximately half supply voltage, to allow for a maximum output voltage swing. All four transistors are direct coupled which ensures:-
(i) A good low frequency response
(ii) Temperature and bias change stability.
The BC109C and 2N3906 operate in common emitter. This alone will provide a very high open loop gain. The output BD139/140 pair operate in emitter follower, meeting the requirements to drive low impedance speakers.

Overall gain is provided by the ratio of the 22k and 1k resistor. A heat sink on the BD139/140 pair is recommended but not essential, though the transistors will run "hot" to the touch.

2-ECM Mic Preamplifier دائرة تكبير لدخل الصوت



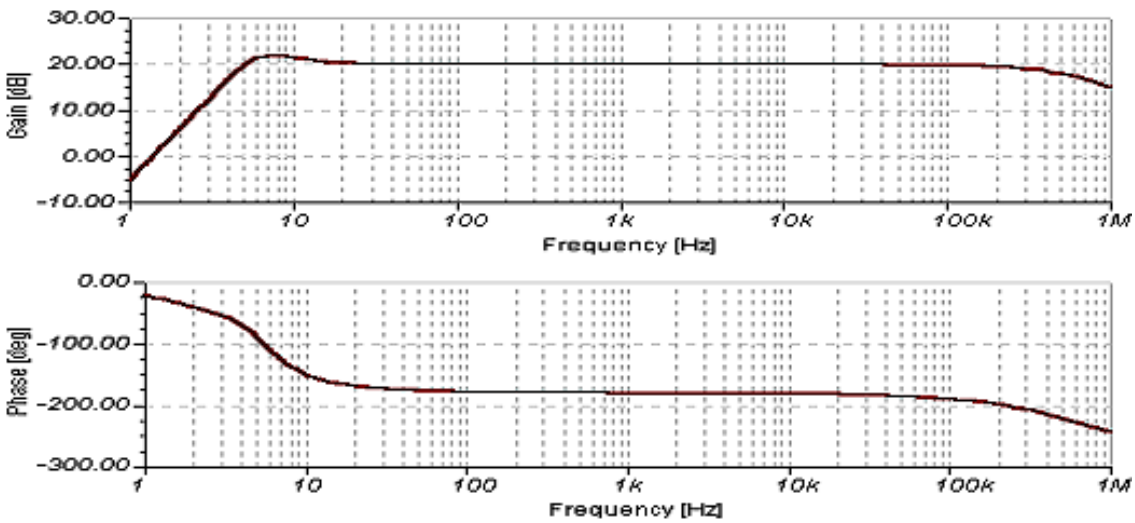
كلا من الترانزيستور الأول والثاني لابد أن يكونا من النوعية التي لا ينتج عنها تشويش على الإشارة فمن الممكن أن نستخدم الترانزيستور BC109C وهذه الدائرة تعطي أفضل خرج لها عند منتصف قيمة جهد الدخل عند طرف مشع الترانزيستور الأخير

Notes:

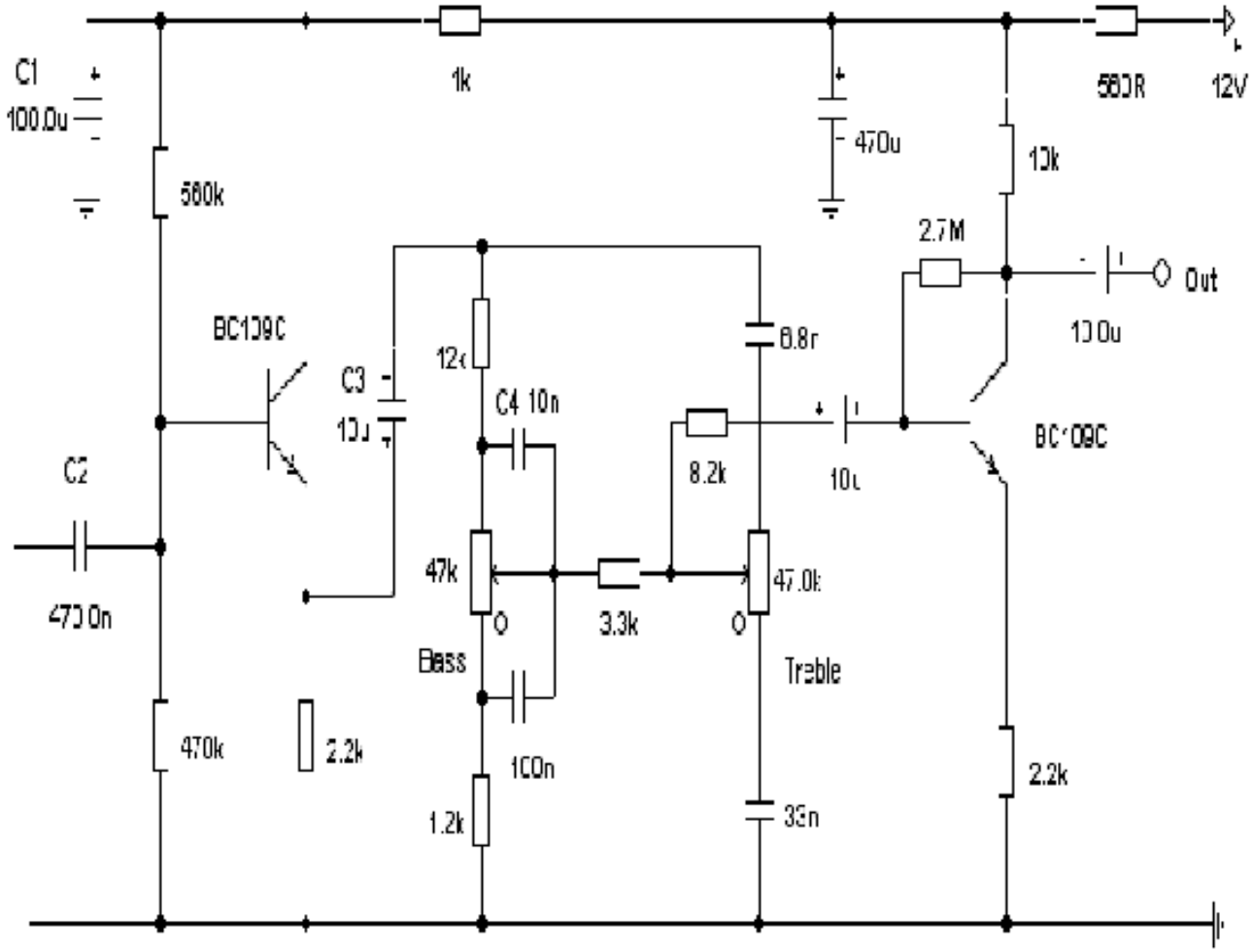
Both transistors are low noise types. In the original circuit, I used BC650C which is an ultra low noise device. These transistors are now hard to find but BC109C are a good replacement. The circuit is very device tolerant and will set its quiescent point at roughly half the supply voltage at the emitter of the last transistor.

The electret condenser microphone (ECM) contains a very sensitive microphone element and an internal FET preamp, a power supply in the range 2 to 10 volts DC is therefore necessary. Suitable ECM's may be obtained from Maplin Electronics. The 1k resistor limits the current to the mic. The output impedance is very lo and well suited to driving cables over distances up to 50 meters. Screened cable therefore is not necessary.

The frequency response measured across a 10k load resistor is plotted below:



3-Tone Control Circuit دائرة تحكم في النغمات

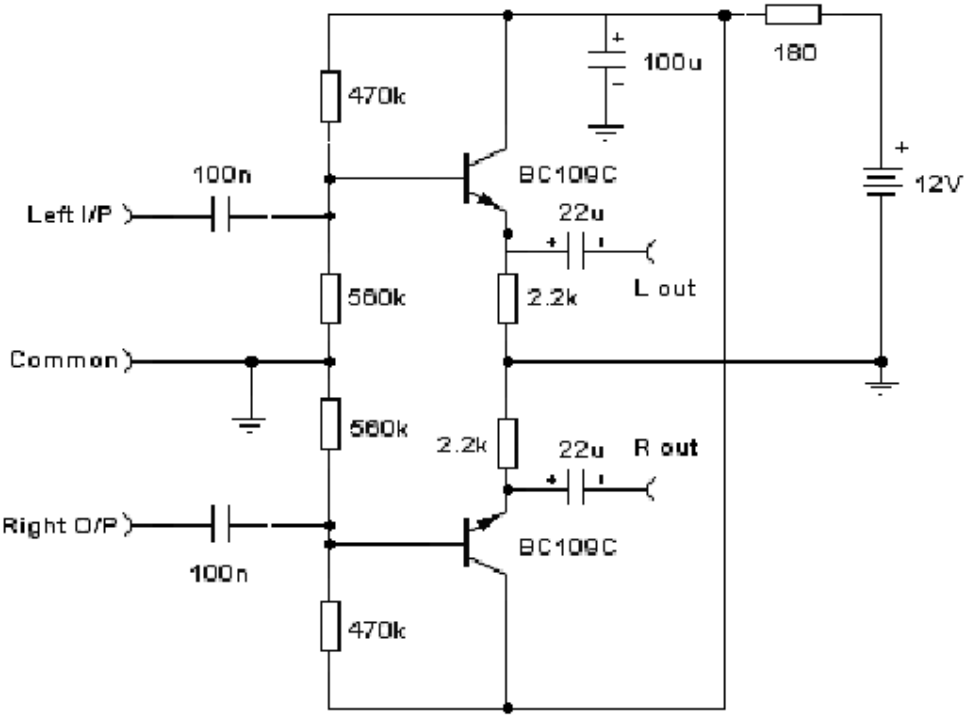


هذه الدائرة تعطي تكبيرقدرة 10db عند 10k و 50HZ وحيث أن معاملات التحكم سالبة فأن الترانزيستور الأخير يعطي معدل تقوية أقل من الترانزيستور الأول وهذه الدائرة مصممة لتغذية مكبر ذو مقاومة دخل من 10k إلى 250k .

Notes:

Based on the classic Baxendall tone control circuit, this provides a maximum cut and boost of around 10dB at 10K and 50Hz. As the controls are passive, the last transistor provides a slight boost. The output is designed to feed an amplifier with input impedance of 10k to 250k.

4-Audio Line Driver دائرة تكبير تستخدم لتطويل كبلات الصوت



هذه الدائرة لها مقاومة خرج صغيرة ومصممه لتعمل مع الكبلات الطويلة للاستماع للموسيقي من مصدر بعيد دون الحاجة إلى شراء الكبلات غالية الثمن حيث أن مقاومة الخرج التي تبلغ ١٦ اوم عند تردد 1k تمكننا من استخدام كبلات التليفون العادية ولابد من وضع الدائرة بجانب مصدر الصوت .

Notes:

This preamplifier has a low output impedance, and is designed to drive long cables, allowing you to listen to a remote music source without having to buy expensive screened cables. The very low output impedance of around 16 ohms at 1KHz, makes it possible to use ordinary bell wire, loudspeaker or alarm cable for connection. The preamplifier must be placed near the remote music source, for example a CD player. The cable is then run to a remote location where you want to listen. The output of this preamp has a gain of slightly less than one, so an external amplifier must be used to drive loudspeakers.

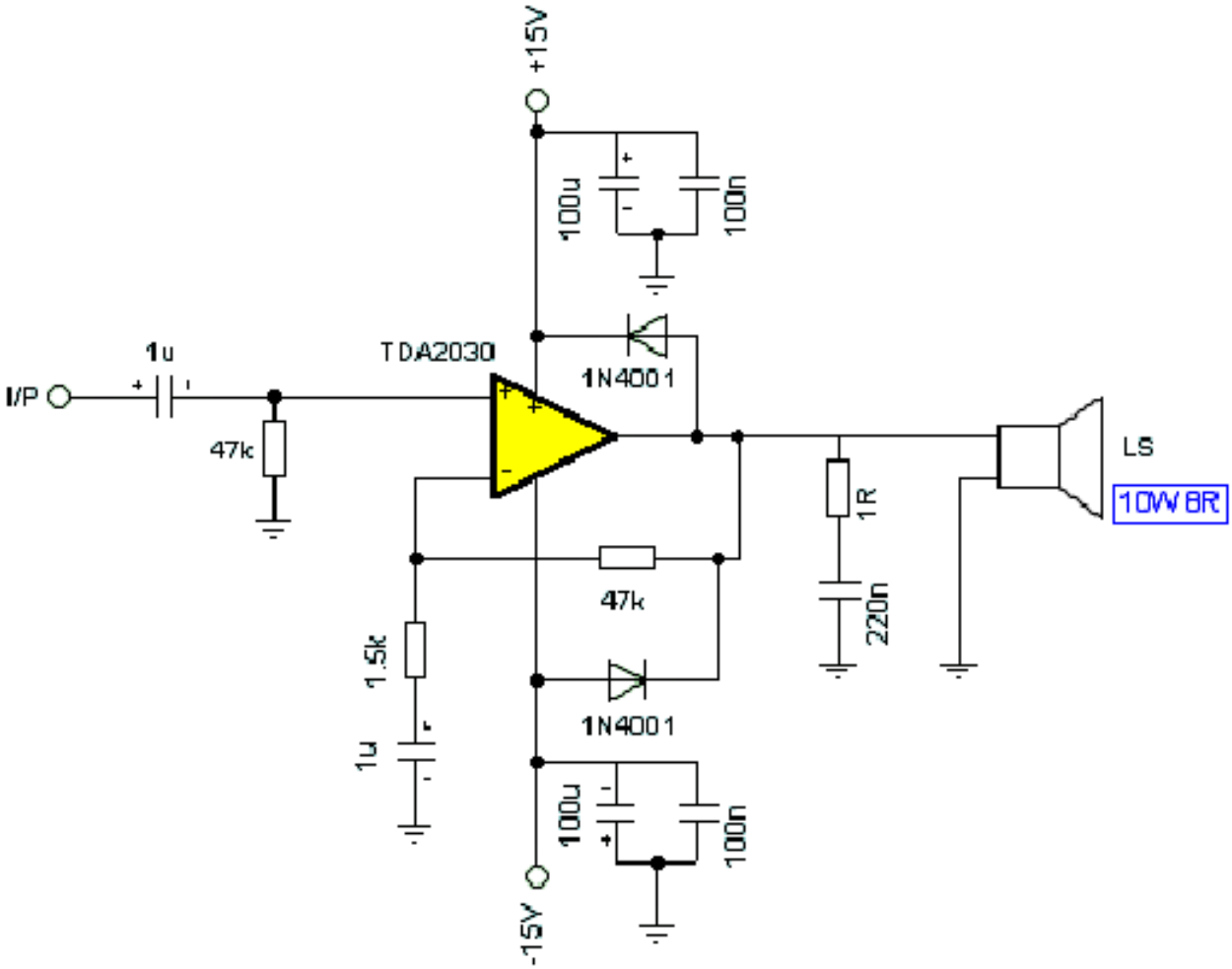
5- Tda2030 8 Watt Amplifier

دائرة مكبر ٨ وات

Notes:

بالرغم من أن الدائرة المتكاملة TDA2030 تعطي ٢٠ وات لكننا نقلل من هذا الخرج إلى ٨ وات لتشغيل سماعات ١٠ وات .و حساسية الدخل للدائرة ٠,٢ فولت . إذا كان الدخل أعلى سوف يعطي خرج أفضل وبدون تشويش ويحدد معامل التكبير عن طريق المقاومات 1.5K و 47K .

Although the TDA2030 can deliver 20 watts of output power, I deliberately reduced the output power to about 8 watts to supply 10 watt speakers. Input sensitivity is 200mV. Higher input levels naturally will give greater output, but no distortion should be heard. The gain is set by the 47k and 1.5k resistors. The TDA2030 IC is affordable and makes a good replacement amplifier for low to medium audio power systems. Incidentally, it is speaker efficiency that determines how "loud" your music is. Speaker efficiency or sound pressure level (SPL) is usually quoted in dB/meter. A speaker with an SPL of 97dB/m will sound louder than a speaker with an SPL of 95dB/m.

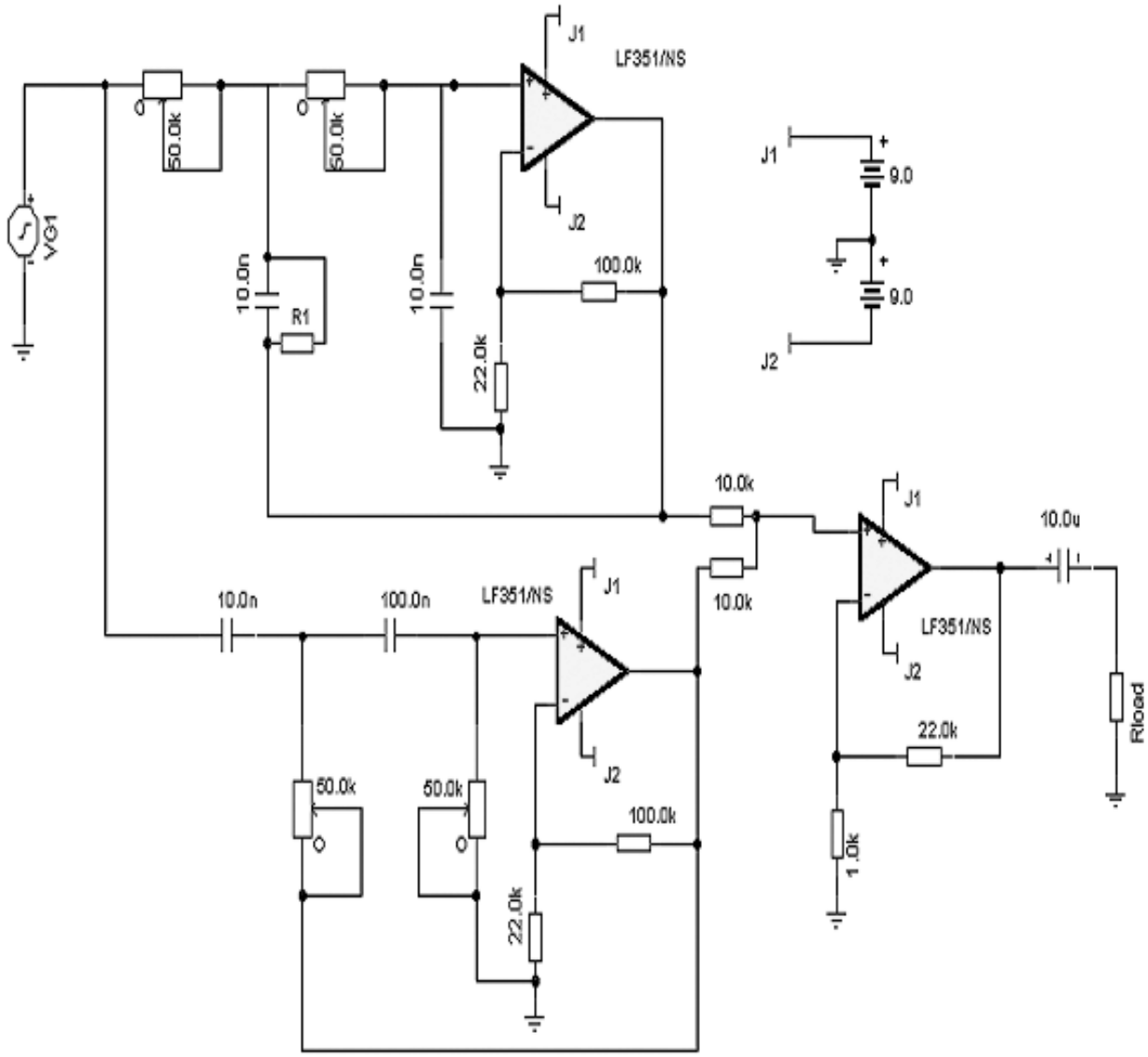


6- Audio Notch Filter For Audio Frequencies 100hz – 10khz دائرة منقي للإشارة الصوت

للوهلة الأولى تبدو الدائرة معقدة لكن إذا قمنا بتقسيمها نجد إنها عبارة مجموعة من دوائر الترشيح للترددات المرتفعة والمنخفضة متبوعة بمكبر لمجموعها له معامل تكبير ٢٠ مرة . ومن الممكن ضبط المقاومات المتغيرة بحيث تمرر أو تمنع هذه المرشحات مستوى معين من الترددات .

Notes

At first glance this circuit looks fairly complex, but when broken down, can be divided into high pass and low pass filter sections followed by a summing amplifier with a gain of around 20 times. Supply rail voltage is +/- 9V DC. The controls may also be adjusted for use as a band stop (notch) filter or band pass filter.

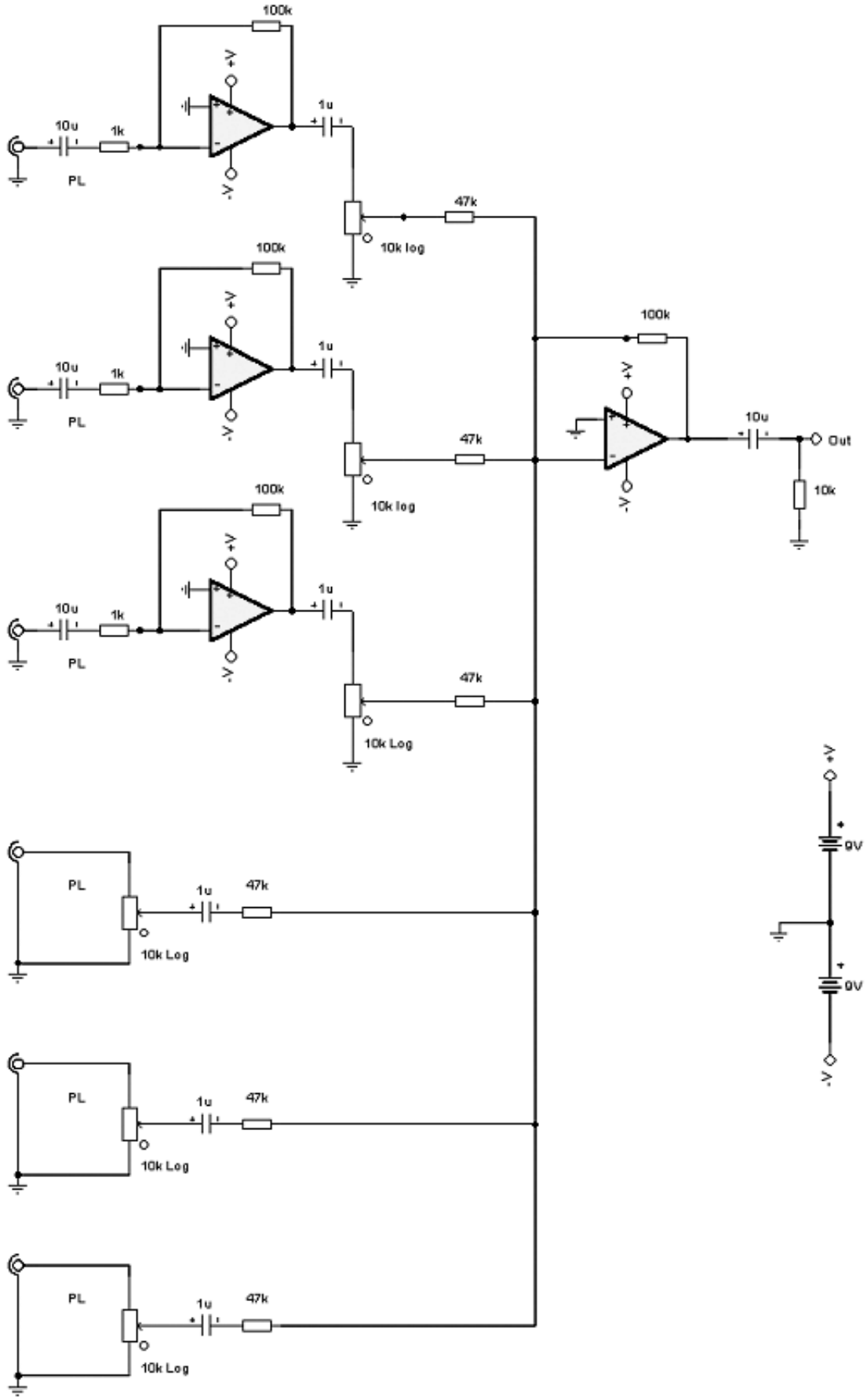


7- 6 Input Mixer دائرة ميكسر ٦ قنوات

الميكسر التالي له ثلاثة خطوط دخل وثلاثة ميكروفونات دخل . تستخدم ميكروفونات الدخل للمقاومات الصغيرة من ٢٠٠ إلي ١٠٠٠ اوم تجمع على مكبر تجميع معامل التكبير له من 2db إلى 6db . الدخل عند خطوط الدخل لابد أن يكون حولي 0.2 فولت . والدخل عند الميكرفونات يتم تكبيرة ١٠٠ مرة او حوالي 40db .ويكون معامل التكبير النهائي للمكسر حوالي 46db . دخل الميكرفونات مصمم للميكرفونات التي لها خرج ٠,٠٠٢ فولت على بعد ١ متر .

Notes:

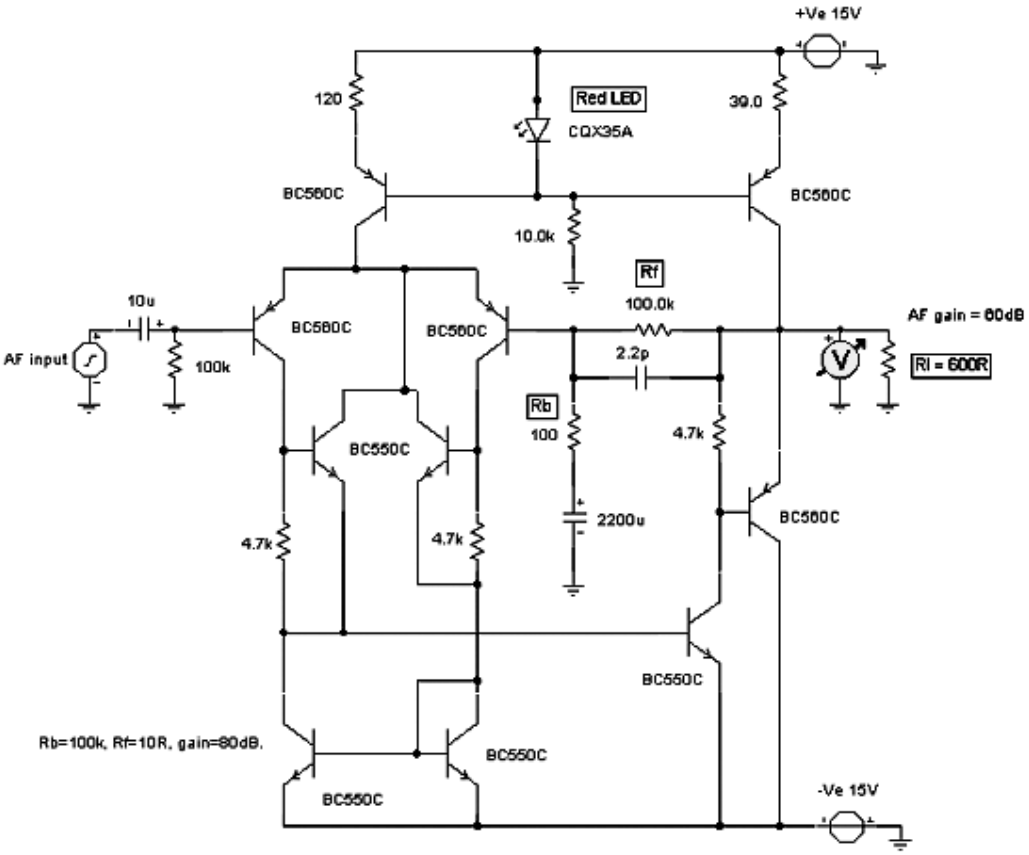
The mixer circuit below has 3 line inputs and 3 mic inputs. The mic inputs are suitable for low impedance 200-1000R dynamic microphones. An ECM or condenser mic can also be used, but must have bias applied via a series resistor. As with any mixer circuit, a slight loss is always introduced. The final summing amplifier has a gain of 2 or 6dB to overcome this. The Input line level should be around 200mV RMS. The mic inputs are amplified about 100 times or by 40dB, the total gain with the mixer is 46dB. The mic input is designed for microphones with outputs of about 2mV RMS at 1 meter. Most microphones meet this standard.

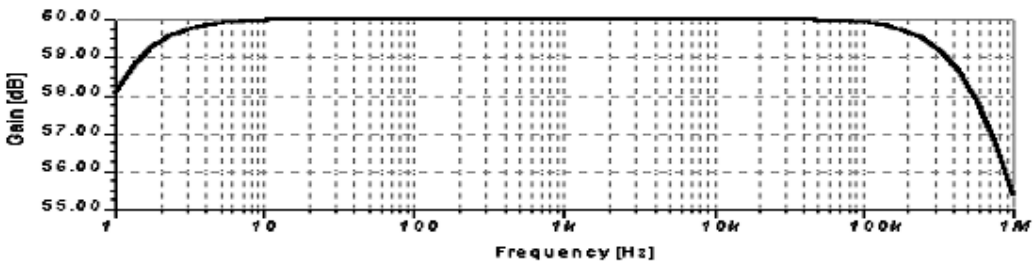

100k
+V
-V
10u
1k
PL
1u
47k
10k log
100k
+V
-V
10u
1k
PL
1u
47k
10k log
100k
+V
-V
10u
1k
PL
1u
47k
10k Log
100k
+V
-V
10u
Out
10k
PL
1u
47k
10k Log
PL
1u
47k
10k Log
PL
1u
47k
10k Log
+V
9V
9V
-V

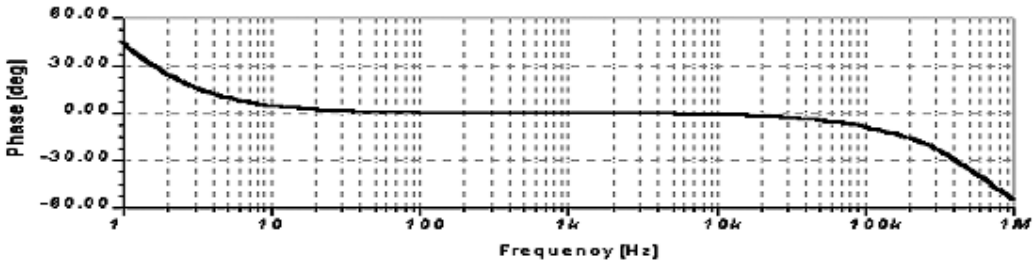
8- Hi-Fi Premplifier دائرة مكبر صوت هاي / فاي

دائرة تكبير لها معامل تكبير من ٥٠ الى ٦٠ ديسيبل للتردددات من 1HZ إلى 1MHZ ولكن التشويش يزداد كلما زاد التردد .

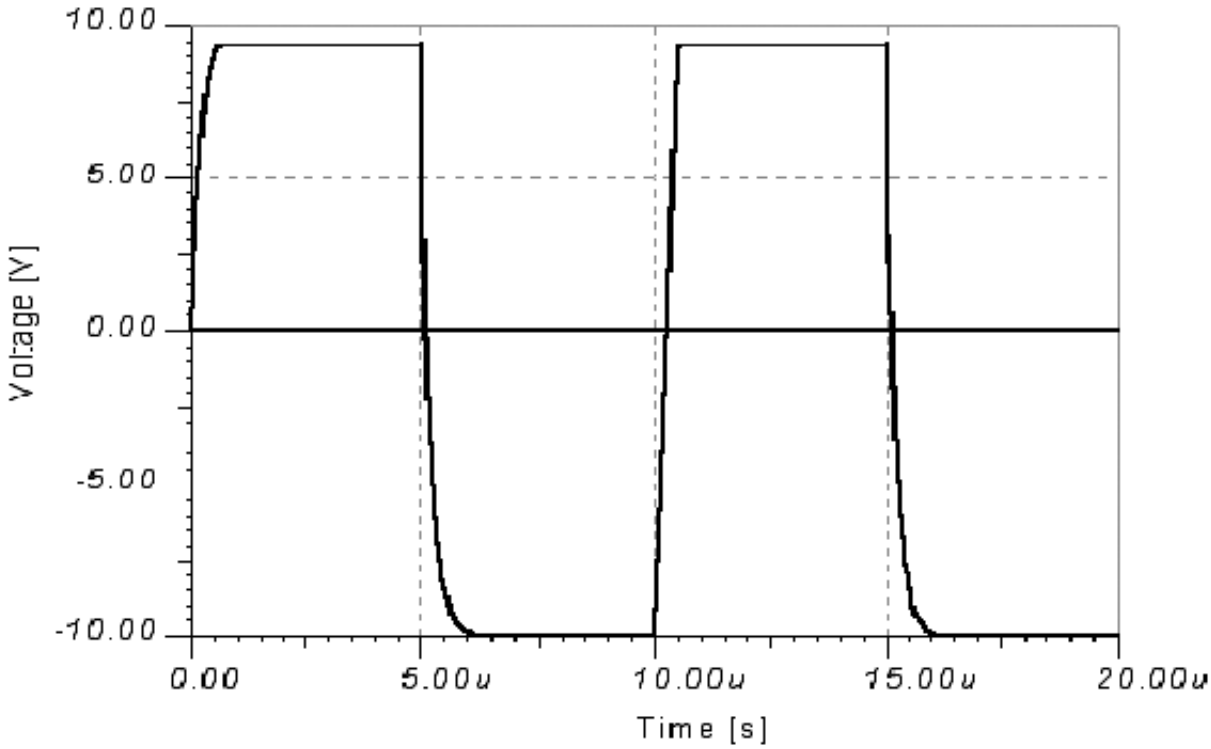
It has an exceptionally fast high frequency response, as demonstrated by applying an 100kHz square wave to the input. All graphs were produced using Tina Pro.



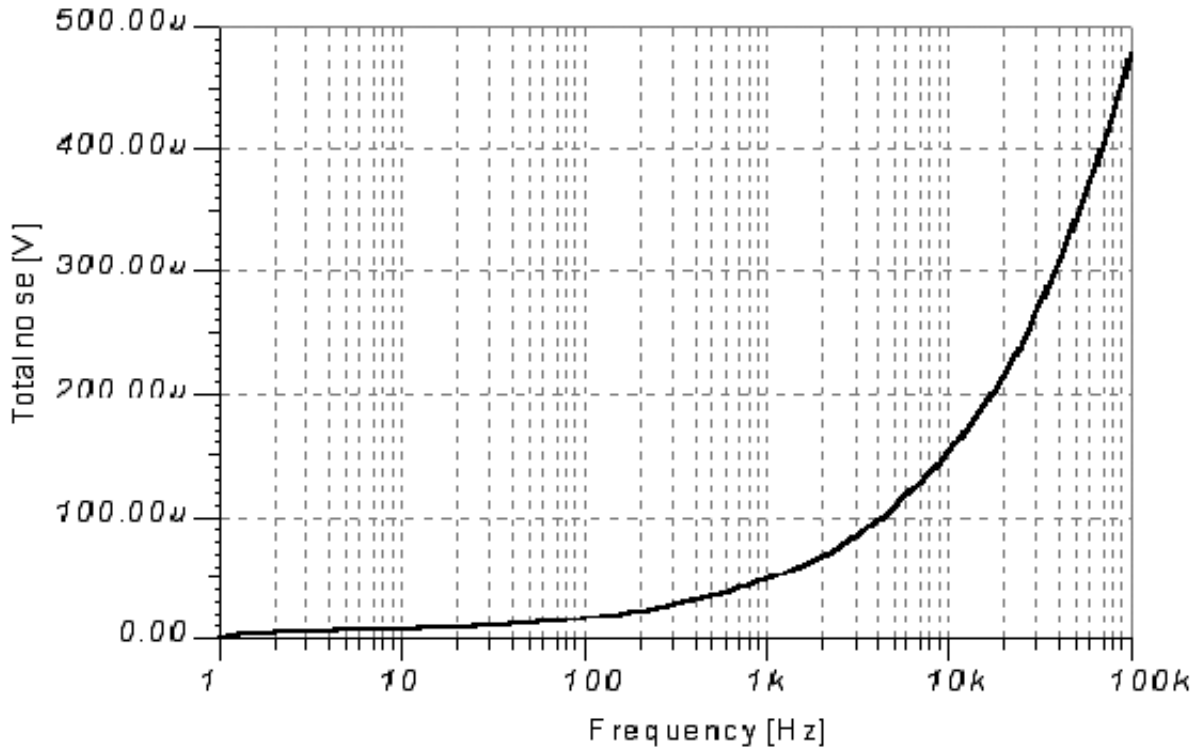




The Preamp's Bode Response

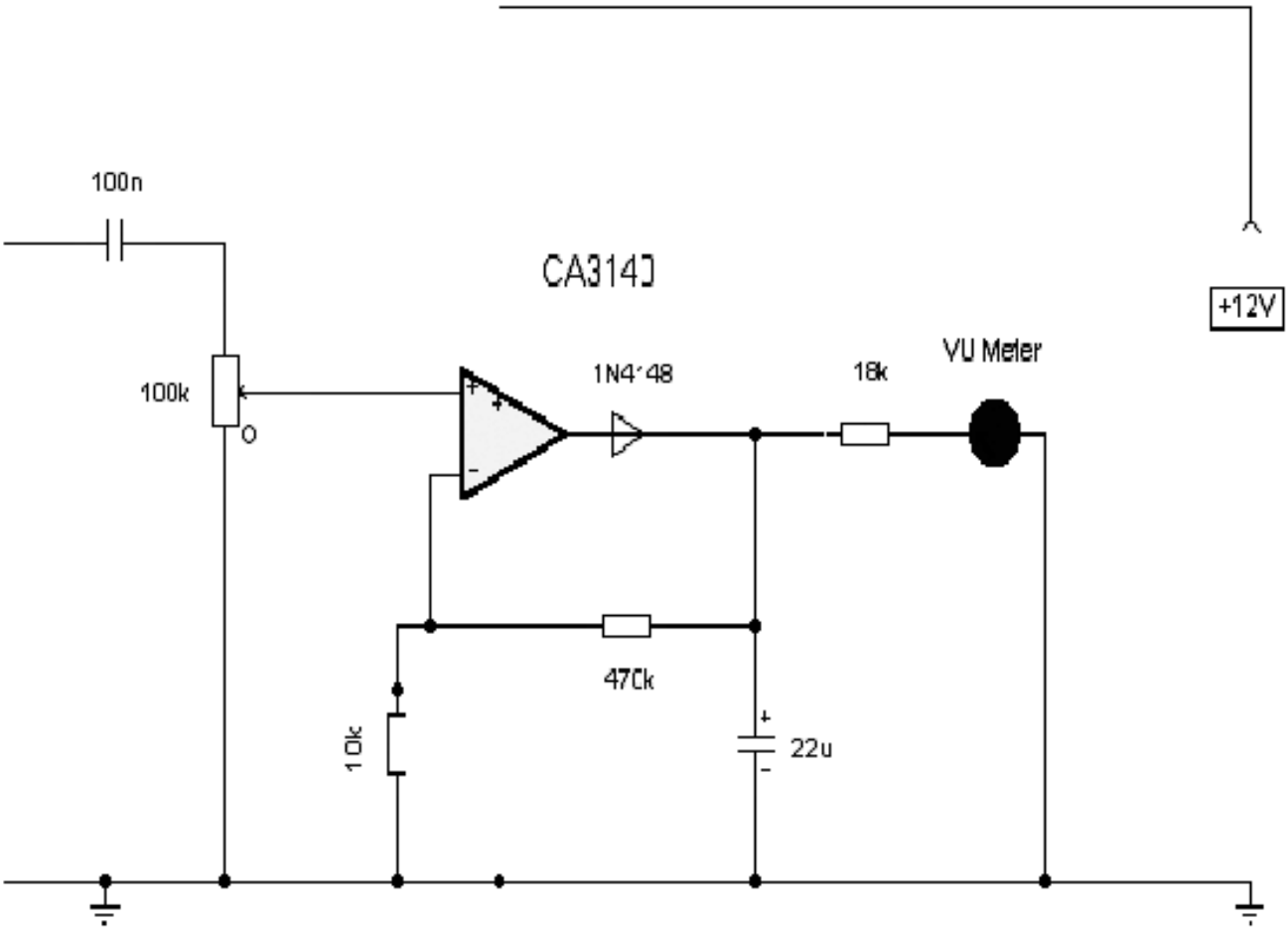


Square wave Response with 100kHz Input Signal Applied



Total Noise at Output Measured with 600R Load

9- Peak Reading Audio Level Meter دائرة قياس اعلى مستوى لخرج الصوت



باستخدام اقل عدد من المكونات الإلكترونية فأن هذه الدائرة البسيطة سوف تشير إلى الاستجابة السمعية القصوى لجهاز قياس تناظري . هذه الدائرة تستخدم ال **OP-AMP** كمكبر غير عاكس مع إضافة الدايود في دائرة التغذية العكسية و للدائرة تأخر زمني (**time delay**) صغير لقراءة القيمة العظمى . و الدايود **1N4148** يحدث توحيد نصف موجة في إشارة الدخل والتيار المستمر الناتج يقوم المكثف **22u** بتنعيمه وسوف يشحن المكثف بالقيمة العظمى للإشارة الدخل وبعد ذلك يقوم بالتفريغ من خلال جهاز القياس والمقاومة ال **18k** .

Application Notes:

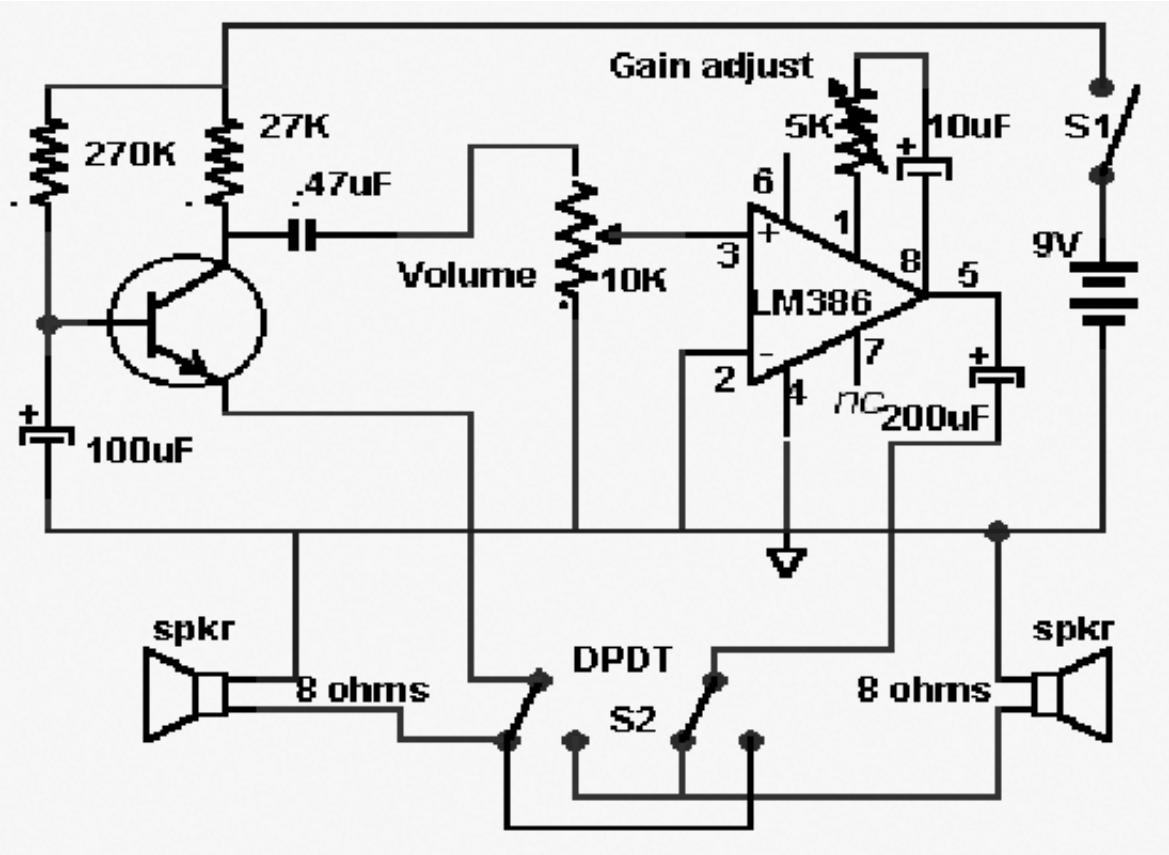
Using minimum component count; this simple circuit will indicate peak audio response on an analogue meter, similar to a tape recorders meter. The circuit uses an opamp as a non inverting amplifier, but with one addition - a diode in the feedback loop. The circuit has a fast response time and slow decay time to indicate peak readings. The 1N4148 diode provides half wave rectification of the input signal, the dc output being smoothed by the 22u capacitor. the capacitor will charge to the peak value of the input waveform, and then discharge via the meter and 18k resistor. I used a meter with a FSD of 150uA, but any meter with a FSD in the range 50-250uA may be used. The discharge time is around a quarter of a second. Increase the 22uF cap for a longer discharge time, or omit altogether to make an instantaneous reading level meter.

This circuit will only work with a MOSFET type opamp, bipolar types i.e. 741 and J-FET opamps such as LF351 will not work in this circuit.

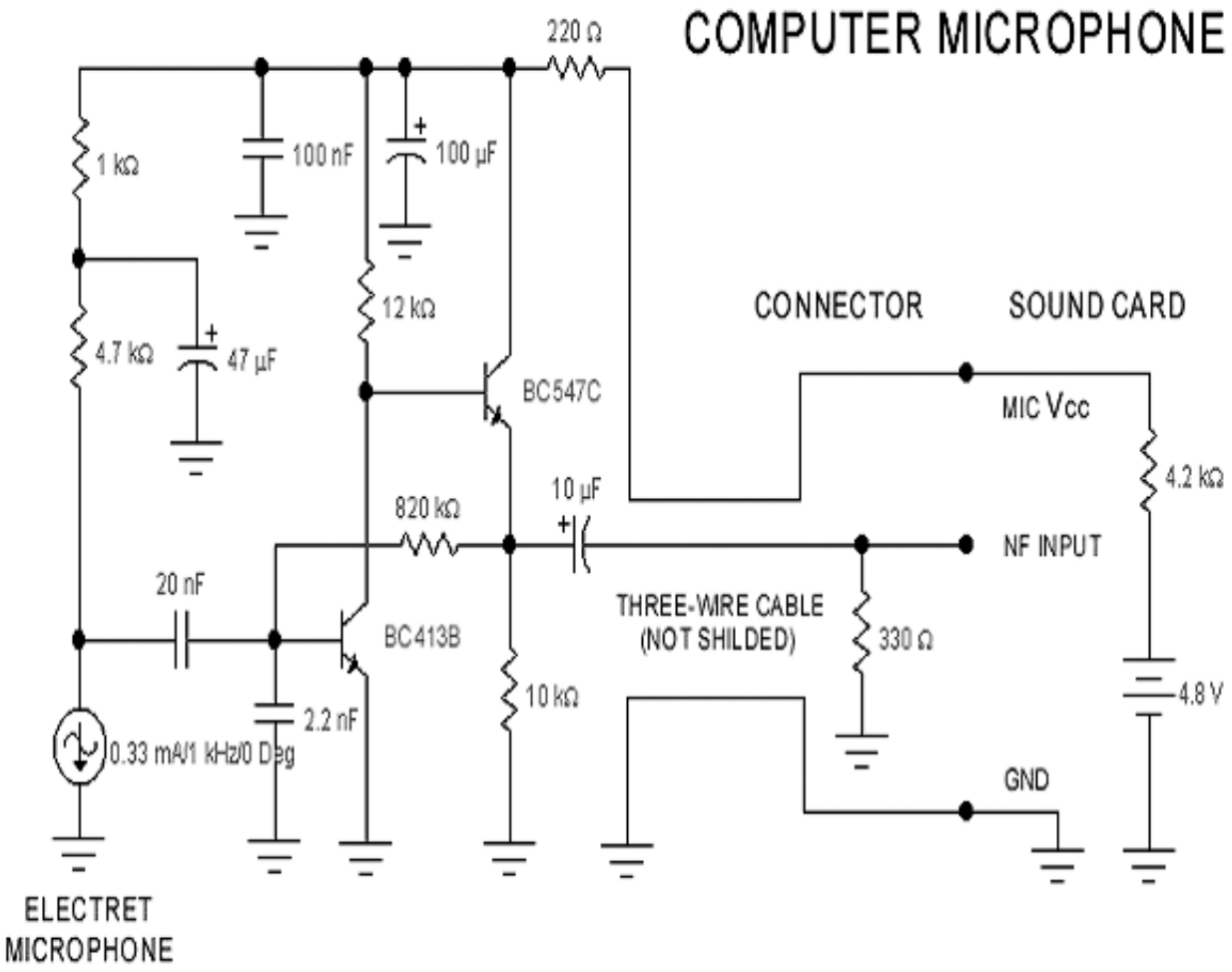
11- Doorphone Intercom دائرة انتركوم للباب

في هذه الدائرة تستخدم السماعة ٨ اوم كميكرفون وسماعة في نفس الوقت . الترانزيستور BC109C متصل بالدائرة common base ولذلك يعطي معامل تكبير مرتفع للجهد كما يعطي مقاومة خرج صغيرة تتناسب مع مقاومة السماعة.
توصل الدائرة المتكاملة LM386 بالطريقة غير العكسية لتدعم تكبير الجهد كما تقوم بتشغيل السماعة ا. والمقاومة المتغيرة 10K تقوم بعملية التحكم في مستوى الصوت.

In this door phone circuit, an 8 ohm speaker is used both as a microphone and also an output device. The BC109C stage amplifies in common base mode, giving good voltage gain , whilst providing a low impedance input to match the speaker. Self DC bias is used allowing for variations in transistor current gain. An LM386 is used in non-inverting mode as a power amplifier to boost voltage gain and drive the 8 ohm speaker. The 10k potentiometer acts as the volume control, and overall gain may be adjusted using the 5k preset. The double pole double throw switch, reverses the loudspeaker positions, so that one is used to talk and the other to listen. Manually operating the switch (from inside the house) allows two way communication.



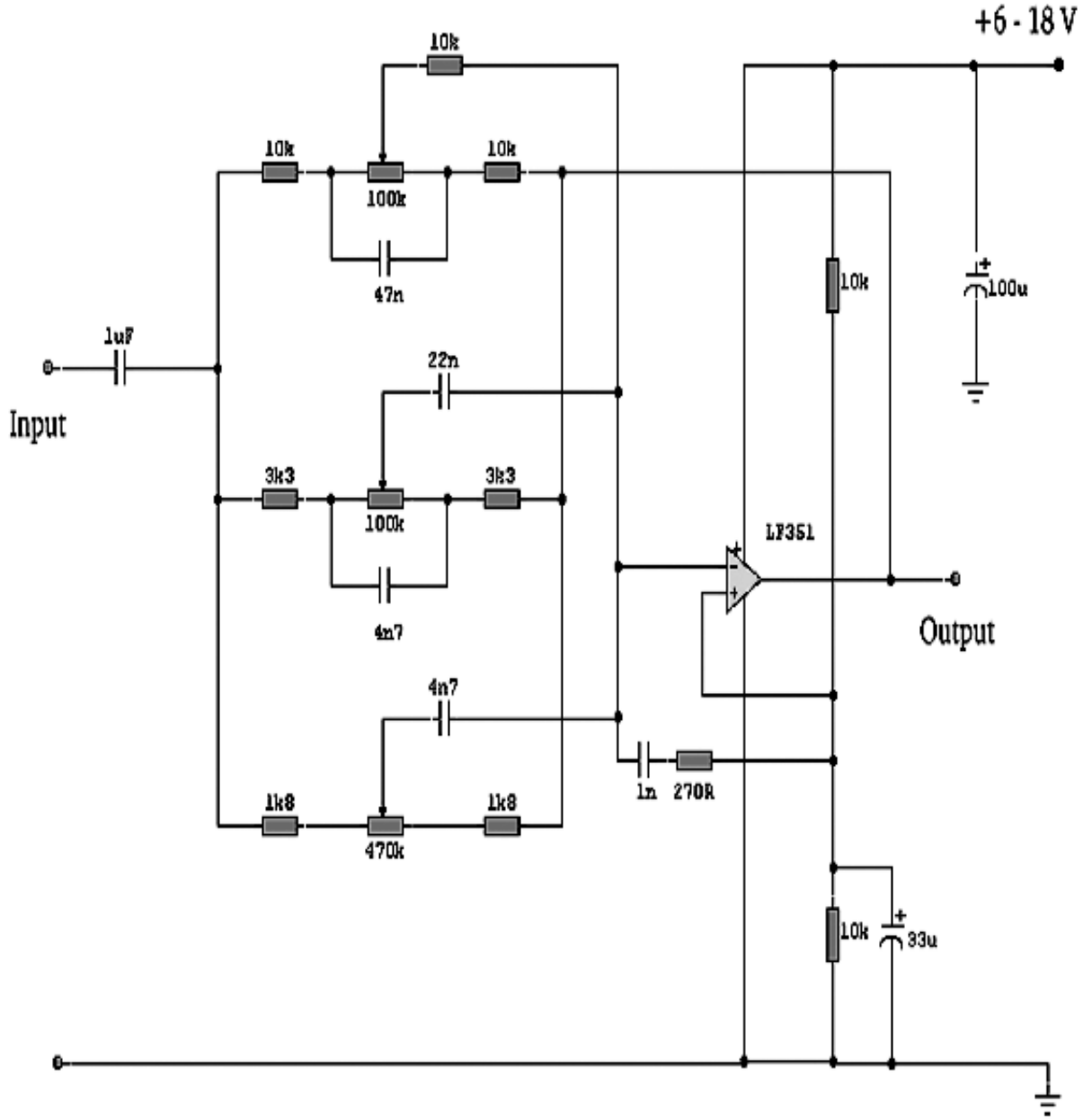
12- Computer Microphone دائرة لاستخدم ميكروفون عادي مع كارت الصوت الخاص بالكمبيوتر



كارت الصوت الخاص بالكمبيوتر يكون له دخل ميكروفون ولكن هذا الدخل مصمم للميكرفونات الديناميكية التي لها مقاومة من ٢٠٠ اوم إلى ٦٠٠ اوم ولكي نستخدمه مع الميكرفونات العادية لابد من موائمة المقاومة لتناسب هذه الميكرفونات باستخدام هذه الدائرة.

The sound card for a PC generally has a microphone input, speaker output and sometimes line inputs and outputs. The mic input is designed for dynamic microphones only in impedance range of 200 to 600 ohms. Lazar has adapted the sound card to use a common electret microphone using this circuit. He has made a composite amplifier using two transistors. The BC413B operates in common emitter to give a slight boost to the mic signal. This is followed by an emitter follower stage using the BC547C. This is necessary as the mic and circuit and battery will be some distance from the sound card, the low output impedance of the circuit and screened cable ensuring a clean signal with minimum noise pickup.

13-3 Band graphic equalizer. دائرة ايكواليزار ٣ باند ديسيبل



باستخدام الOP-AMP يكون من السهل عمل دائرة Equalizer لها ثلاثة نطاقات من الترددات وهي التردد المنخفض و التردد المتوسط و التردد المرتفع. و مع قيم المكونات الموضحة تكون قيمة التكبير ٢٠ ديسيبل .

Notes

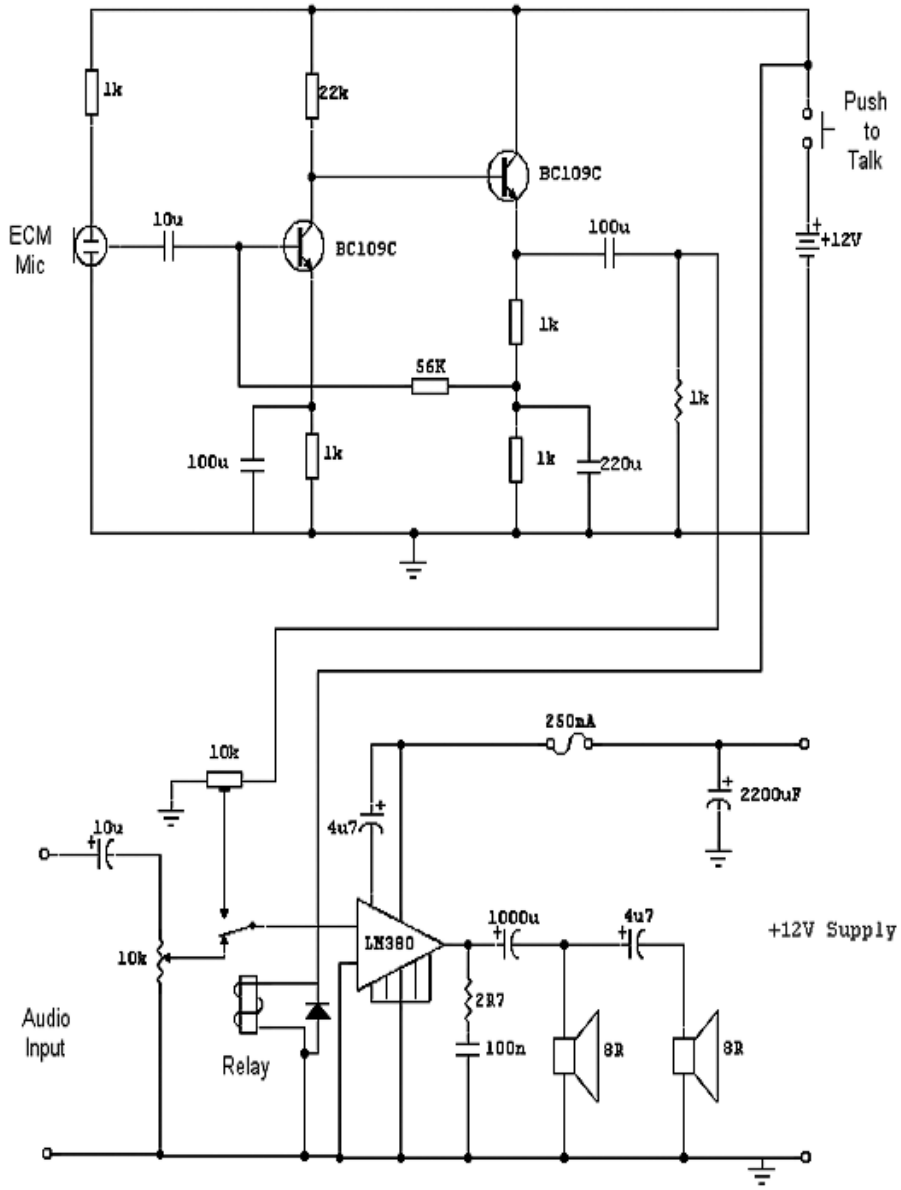
Using a single op-amp this easy to make equalizer offers three ranges, low frequency, mid frequency, and high. With component values shown there is approximately +/-20dB of boost or cut at frequencies of 50Hz, 1kHz and 10kHz. Supply voltage may be anything from 6 to 30 Volts. Maximum boost 20dB is only realized with maximum supply voltage.

14-Voice-Over Circuit دائرة تحميل صوت باستخدام ميكروفون على إشارة خرج مكبر صوت

في ابسط صورة فأن تحميل الصوت على إشارة مكبر عبارة عن ميكرفون و مفتاح متغير يغذيان دائرة تكبير ويكون للميكروفون الأولوية على المكبر عند الضغط على مفتاح **push to talk** . في هذه الدائرة فأن المكبر الابتدائي يتبع مباشرة الميكرفون و يكون مصمم للاستخدام على مسافة من المكبر الرئيسي . المفتاح المتغير ليس سوى **relay** له وصلة تغيير واحدة (contact) .

Application Notes:

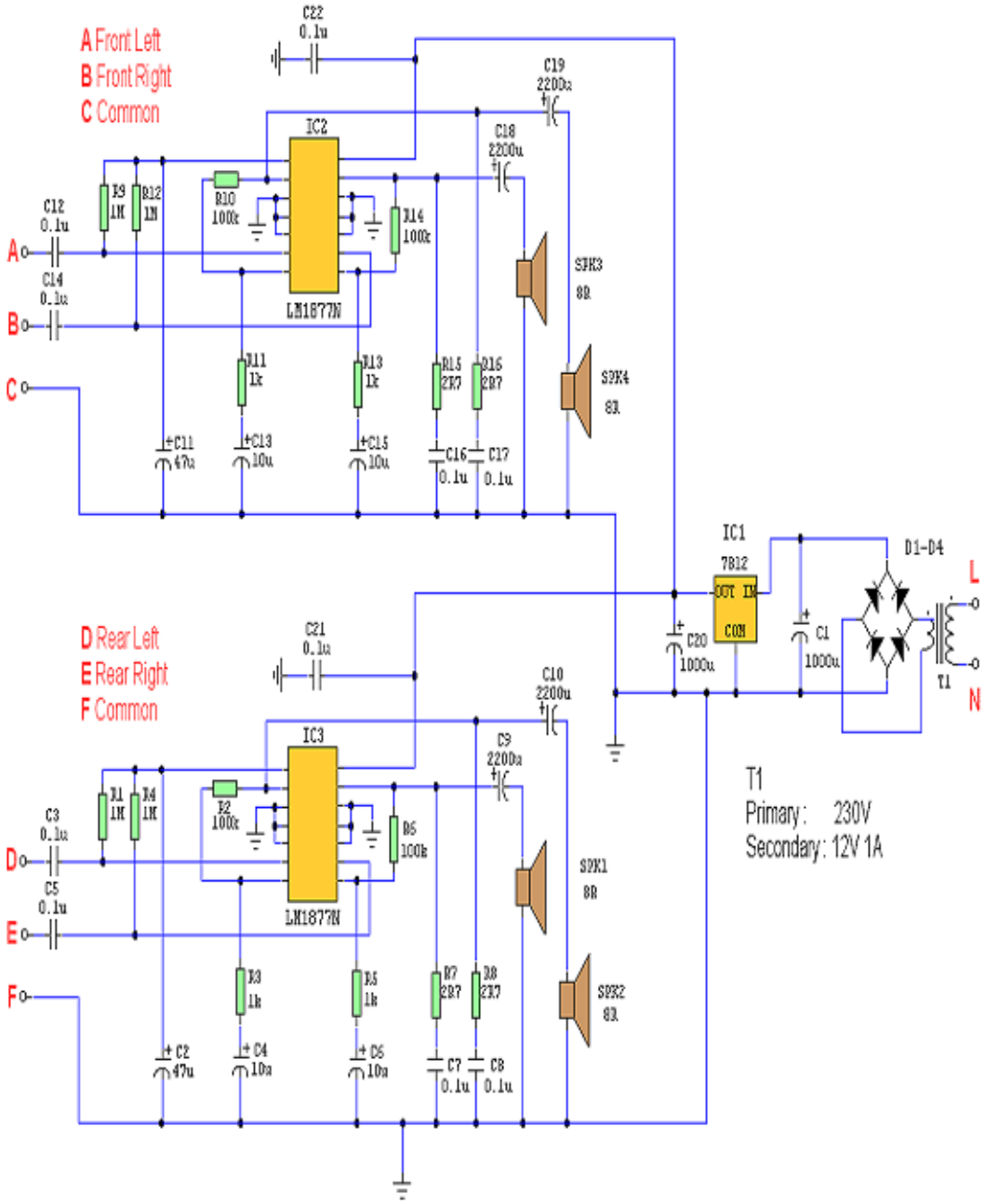
In its simplest form, a voice-over unit is just a microphone and change-over switch feeding an amplifier, the output from the microphone having priority over the amplifiers audio signal when the "push-to-talk" switch is pressed. In this circuit, a preamplifier immediately follows the microphone and is designed to be used some distance away from the main amplifier. The changeover switch is nothing more than a relay with a single changeover contact. For completion, an amplifier based on the LM380 is shown. Three wires are needed to connect the remote microphone unit to the amplifier and switching unit.



Circuit Notes:

With reference to the above schematic, the two BC109C transistors are used to make a microphone preamplifier. The left hand BC109C operates in common emitter mode, the right hand emitter follower. The combination form a high gain, low output impedance amplifier, capable of driving a long audio cable. Screened cable is not required as the output impedance from the microphone pre-amp is very low, and will be immune to mains hum and background noise. The input is shown as a three wire Electret Condenser Microphone though two wire ECM's may also be used. The output of the pre-amp is via a 100uF capacitor and 1k resistor. The 1k resistor here plays an important role, eliminating the dc component of the audio output. A cable of three or more wires is wired to the remote amplifier. The amplifier shown here is based on the National Semiconductor LM380. The input signal is passed via the normally closed contact of a changeover relay, the 10k potentiometer being the volume control for the audio input source. The 10k preset at the normally open contact allows volume control of the voice input, note that this signal has by-passed the normal volume control. At the remote end, when the push-to-talk switch is pressed, the relay will operate and the "voice" signal will be heard in the speaker. There will be no "thump" or "thud" on voice-over as direct current has been eliminated as already mentioned. A suitable application for this circuit would be for use in a remote location such as a workshop or shed.

15-Quadraphonic Amplifier مكبر صوت لأربع قنوات دخل



دائرة المكبر رباعي الدخل تستخدم مع الأجهزة التي لها أربعة ميكرفونات كدخل ولا يوجد مكونات للتحكم في مستوى الصوت ويتم التحكم الصوت مباشرة من كارت الصوت.

Description:

This is a four channel amplifier ideally suited for use with quadraphonic equipment such as a Sound Blaster Live card. There is no volume control, audio levels being directly controlled from the sound card itself.

Parts List: مكونات الدائرة

D1-D4: 1N4001 (4)
C1,C20: 1000u CAP (2)
C2,C11: 47u CAP (2)
C3,C5,C7,C8,C12,C14,C16,C17,C21,C22: 0.1u CAP (10)
C4,C6,C13,C15: 10u CAP (4)

C9,C10,C18,C19: 2200u CAP (4)
R1,R4,R9,R12: 1M RESISTOR (4)
R2,R6,R10,R14: 100k RESISTOR (4)
R3,R5,R11,R13: 1k RESISTOR (4)
R7,R8,R15,R16: 2R7 RESISTOR (4)
IC1: 7812 (1)
IC2,IC3: LM1778N (2)
SPK1,SPK2,SPK3,SPK4: 8R 2 Watt speakers (4)

Notes:

Construction is straight forward and is suitable for Verobaord. Overall gain is controlled by the ratio R14/R13 and R6/R5. Used with small hifi speakers the volume was too loud for my room so I reduced R14 and R6 to 33k. The zobel network formed by R7,C7,R8,C8,R15,C16,R16,C17 prevents instability which can happen with long speaker wires. The input impedance is high, 1M and if very long input cables are present could pick up noise. Screened cable should be used, in my case I used 10k resistors between points A & C, B & C, D & F, E & F. This provides a DC path to ground and higher noise immunity. If instability does occur, then you will notice sound distortion and the LM1877N will become hot to touch.

Connections:

The back of a sound blaster live card has colour coded 3.5mm stereo jacks. The image below shows a close up of the rear of my Sound Blaster Live card. As well as colour coding, each connector has an appropriate marking, for easy connectivity.

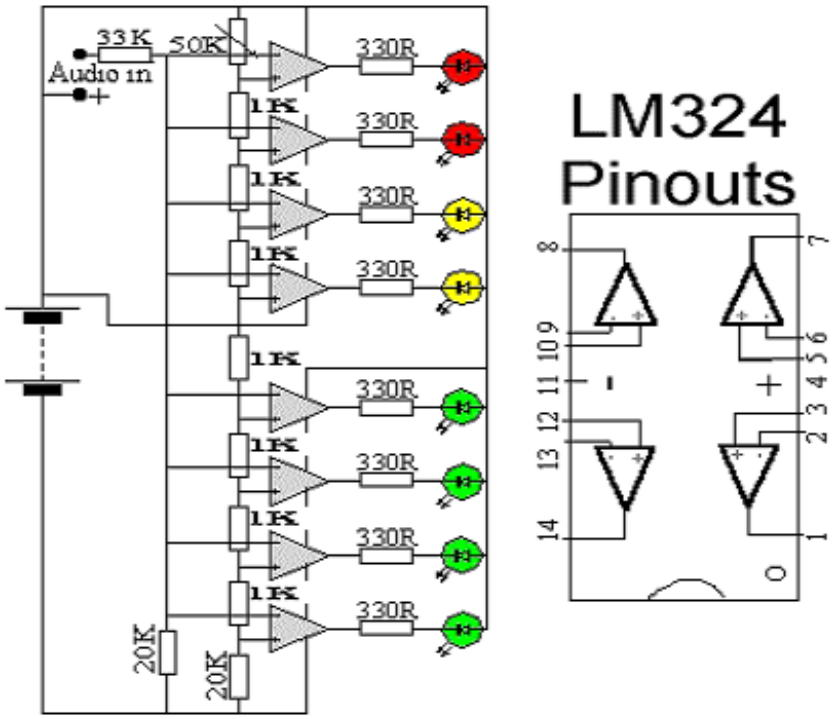
The normal output connector is green and the rear speaker connector is black. Creative provide utilities and sound mixer for use with Windows. Under Linux the utility { HYPERLINK "http://www.mitedu.freeserve.co.uk/JPGS/gamix.jpg" } can be used, which allows independent volume control for all channels.

16-Audio VU Meter 8LEDS دائرة قياس مستوي الصوت باستخدام

نستخدم في هذه الدائرة عدد اثنين op-amp لنكون جهاز قياس صوتي باستخدام عدد ثمانية LEDS . المقاومات 1K ضرورية لأنها هي التي تجعل ال LEDS تضئ عند مستويات الصوت المختلفة . كما يمكن زيادة عدد ال LEDS بإضافة op-amp .

Description:

This circuit uses two quad op-amps to form an eight LED audio level meter. The op-amp used in this particular circuit is the LM324. It is a popular IC and should be available from many parts stores.



Notes:

The 1K resistors in the circuit are essential so that the LED's turn on at different audio levels. There is no reason why you can't change these resistors, although anything above 5K may cause some of the LED's to never switch on. This circuit is easily expandable with more op-amps, and is not limited to use with the LM324. Pretty much any op-amp will work as long as you look up the pinouts and make sure everything is properly connected.

The 33K resistor on the schematic is to keep the signal input to the circuit at a low level. It is unlikely you will find a 33K resistor, so the closest you can get should do. The value of this resistor may need to be changed, so it is best you breadboard this circuit before actually constructing it on PCB. The circuit in it's current form will accept line level inputs from sources such as the aux out on a Hi-Fi, all though could be easily modified to accept speaker inputs.

The audio + is connected to the main positive rail, while the audio - is used for signal input. The 50k pot can be used to vary the sensitivity of the circuit.

17-Amp with Tone Controls & Soft Switching دائرة تكبير مع التحكم فى النغمة

تحتوي الدائرة المتكاملة **LM380** علي دوائر تحكم في النغمة و دوائر فتح وغلق تضمن زيادة القدرة بطريقة منتظمة و تمنع مخاطر التيار المستمر .

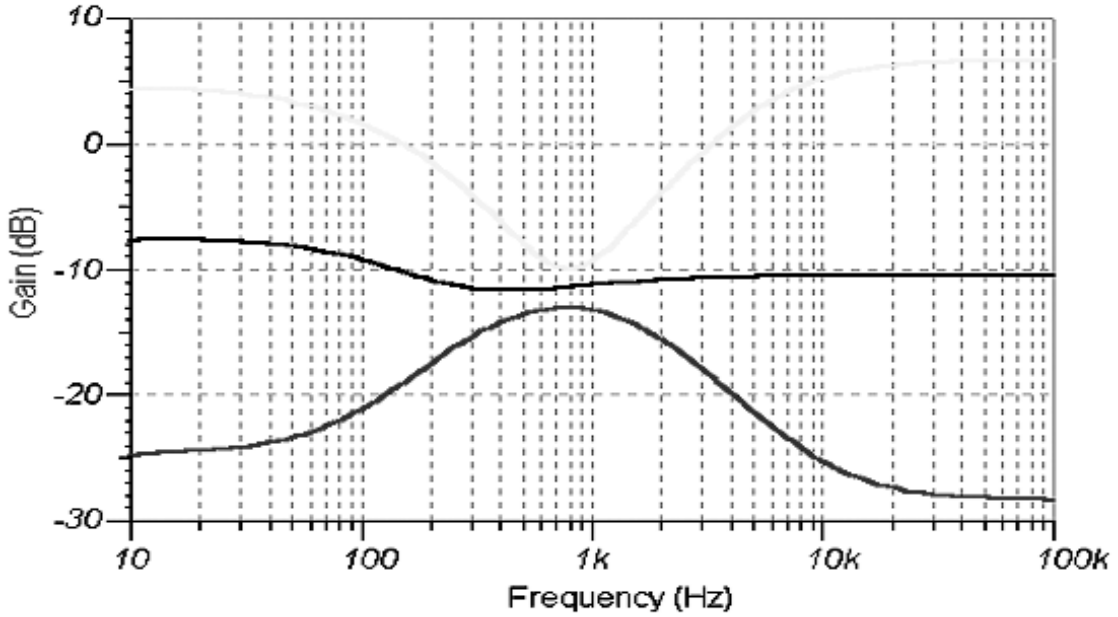
Description:

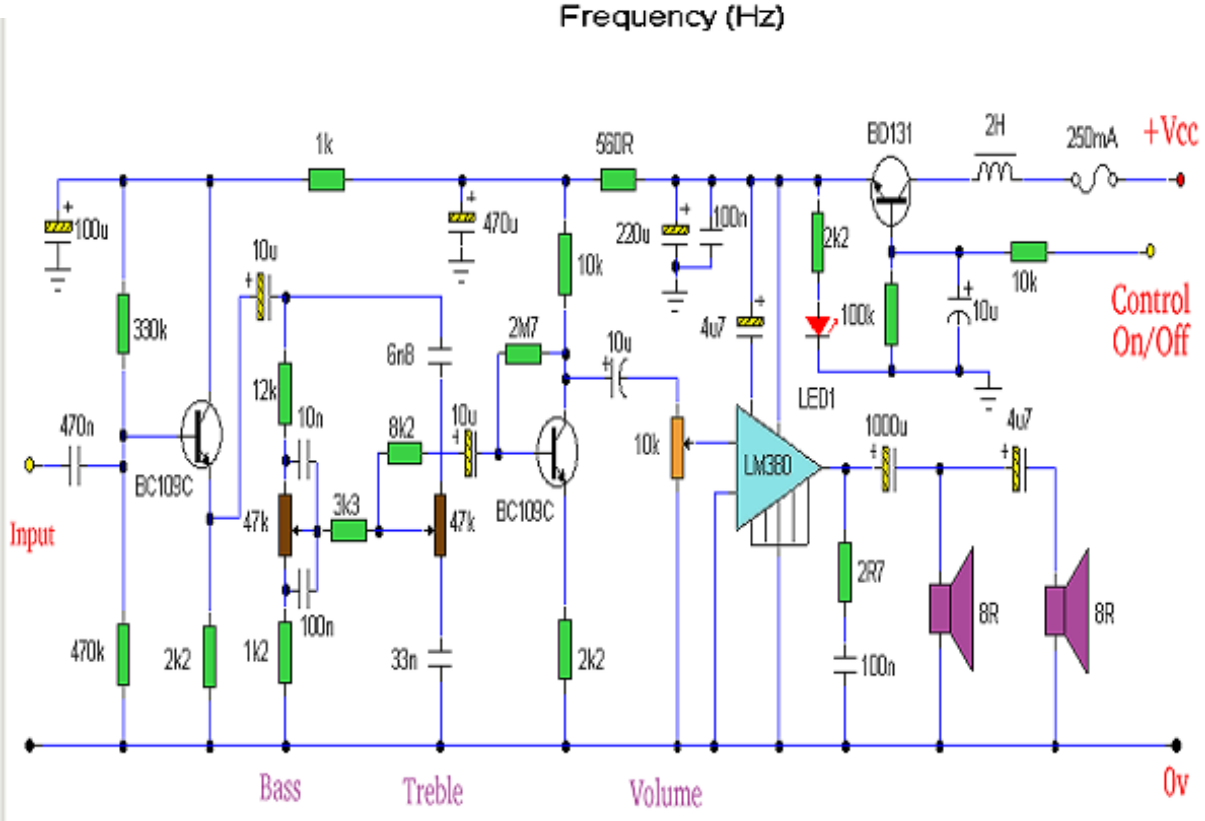
Built around an LM380, this amplifier includes tone controls and electronic "soft switching". The soft switching circuitry ensures power is built up gradually eliminating the dc thump.

Tone Controls:

The input of this is amplifier is via a tone control based on the baxendall design. The first BC109C serves as a buffer, offering a high input impedance. The output signal fed via a 10u capacitors reaches the tone control network. This passive network of resistors and capacitors attenuates high and low frequencies. The bass control is centered on 100Hz and treble control 10kHz. The second BC109C amplifies the losses from the tone control, overall the tone control provides roughly +6dB boost and -20dB cut. See the bode plot below:

The traces show maximum lift, maximum cut and the response with tone controls in the center position. There may be difficulty in obtaining BC109C transistors, but BC108C transistors will make an ideal replacement.





Notes:

The soft switching is enabled by a BD131 transistor wired as a switch in emitter follower configuration. The collector is wired to a permanent supply voltage, the 2H series inductor serves only to filter out power supply hum. This inductor is not too important and may be omitted if the DC supply is adequately smoothed. The control voltage is applied to the BD131 base terminal, the 10u capacitor and 10k

resistor having a dual purpose:-
i) a gradual charge of the 10u capacitor ensures that the transistor will switch linearly from 0 volts to full supply, and
ii) serves as a hum filter ensuring a very smooth dc supply to the amplifier and tone controls.
LED1 will light when the amplifier is on. The control voltage should ideally be 0 volts when the amplifier is off and full supply voltage when on. The LM380 is shown driving two 8 ohm loudspeakers, the load is therefore 4 ohms. The 4u7 capacitor acts as a crude crossover, lower frequencies are impeded and so this loudspeaker may be a "tweeter" type.

18-Audio Level Meter دائرة قياس لمستوى الصوت

دائرة لتوضيح معدل الصوت . لها نطاق ترددي من ٢٠ هيرتز إلى ٥٠ كيلوهيرتز . حساسية الدخل ١٠٠ ملي فولت وتقوم فكرة عملها علي دائرتي مكبر (COMMON EMITTER) .

Description:

Audio levels can be monitored using a small panel meter with this circuit built from discrete components.

Notes:

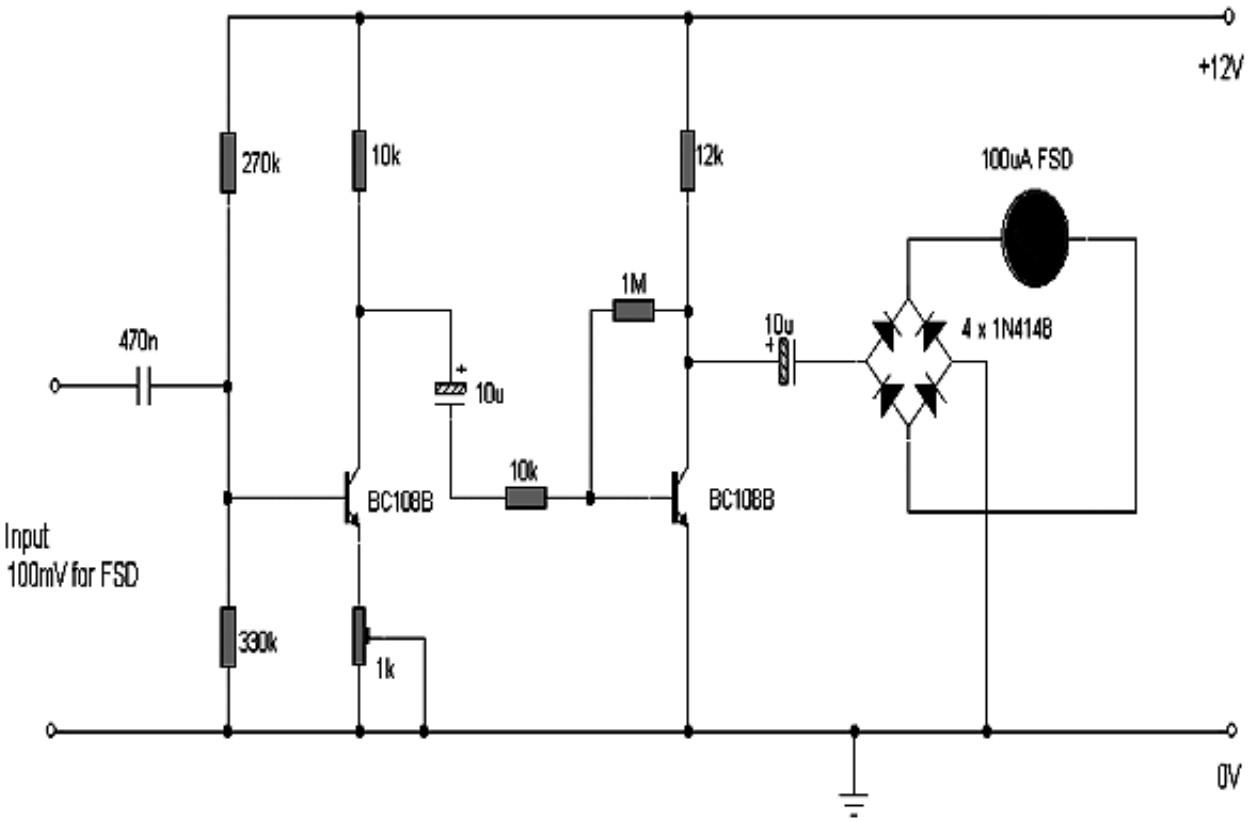
The circuit has a flat frequency response from about 20Hz to well over 50Khz. Input sensitivity is 100mV for a full scale deflection on a 100uA meter. Built on two common emitter amplifiers, the first stage has a preset resistor which may be adjusted for a FSD. The last stage is biased to operate at roughly half the supply voltage for maximum ac voltage swing. Audio frequencies are passed through the 10u dc blocking capacitor and the full wave bridge rectifier converts the signal to a varying dc voltage. Note that the meter reading is instantaneous and will not provide a "peak" reading.

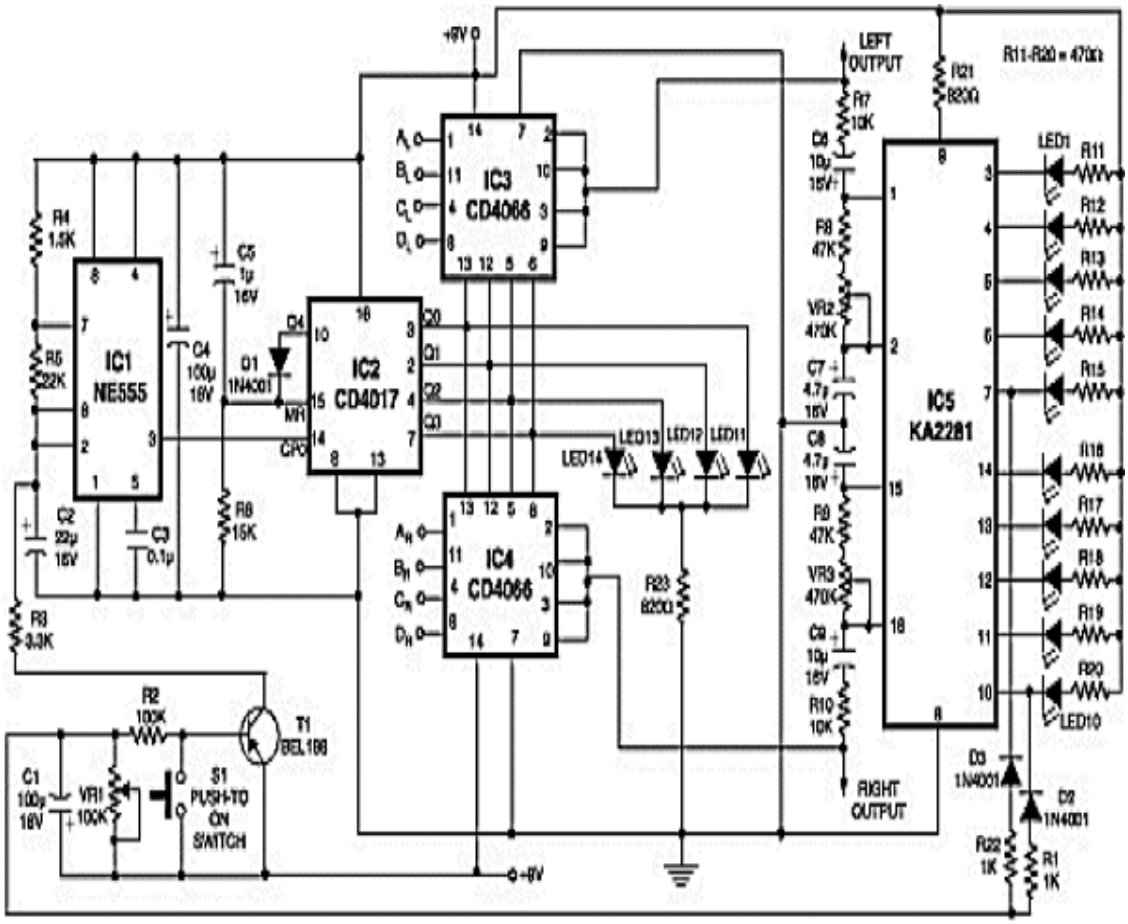
19- Stereo Channel Selector دائرة اختيار بين عدد من إشارات الاستريو

تقوم هذه الدائرة باختيار واحدة من أربعة إشارات استريو متصلة بها في الداخل لتعمل في وقت واحد ثم اختيار إشارة أخرى و هكذا. عند بداية تشغيل مصدر الجهد تقوم الدائرة بتشغيل القناة A فأن لم تكن هناك إشارة مسموعة على هذه القناة تنتظر الدائرة لفترة زمنية ثم تنتقل إلى القناة B . وعملية الاختيار هذه تستمر إلى أن يتم التقاط أي إشارة مسموعة من أي قناة . والوقت الذي تنتظره الدائرة لتغير القناة يمكن ضبطه عن طريق VR1 . وإذا أردنا اختيار زمن أطول نقوم بتغيير المكثف C1 بمكثف له قيمة اكبر.

The add-on circuit presented here is useful for stereo systems. This circuit has provision for connecting stereo outputs from four different sources/channels as inputs and only one of them is selected/connected to the output at any one time. When power supply is turned 'on', channel A (AR and AL) is selected. If no audio is present in channel A, the circuit waits for some time and then selects the next channel (channel B). This search operation continues until it detects audio signal in one of the channels. The inter-channel wait or delay time can be adjusted with the help of preset VR1. If still longer time is needed, one may replace capacitor C1 with a capacitor of higher value.

Suppose channel A is connected to a tape recorder and channel B is connected to a radio receiver. If initially channel A is selected, the audio from the tape recorder will be present at the output. After the tape is played completely, or if there is sufficient pause between consecutive recordings, the circuit automatically switches over to the output from the radio receiver. To manually skip over from one (selected) active channel to another (non-selected) active channel, simply push the skip switch (S1) momentarily once or more, until the desired channel input gets selected. The selected channel (A, B, C, or D) is indicated by the glowing of corresponding LED (LED11, LED12, LED13, or LED14 respectively).





IC CD4066 contains four analogue switches. These switches are connected to four separate channels. For stereo operation, two similar CD4066 ICs are used as shown in the circuit. These analogue switches are controlled by IC CD4017 outputs. CD4017 is a 10-bit ring counter IC. Since only one of its outputs is high at any instant, only one switch will be closed at a time. IC CD4017 is configured as a 4-bit ring counter by connecting the fifth output Q4 (pin 10) to the reset pin. Capacitor C5 in conjunction with resistor R6 forms a power-on-reset circuit for IC2, so that on initial switching 'on' of the power supply, output Q0 (pin 3) is always 'high'. The clock signal to CD4017 is provided by IC1 (NE555) which acts as an astable multi-vibrator when transistor T1 is in cut- off state.

IC5 (KA2281) is used here for not only indicating the audio levels of the selected stereo channel, but also for forward biasing transistor T1. As soon as a specific threshold audio level is detected in a selected channel, pin 7 and/or pin 10 of IC5 goes 'low'. This low level is coupled to the base of transistor T1, through diode-resistor combination of D2-R1/D3-R22. As a result, transistor T1 conducts and causes output of IC1 to remain 'low' (disabled) as long as the selected channel output exceeds the preset audio threshold level.

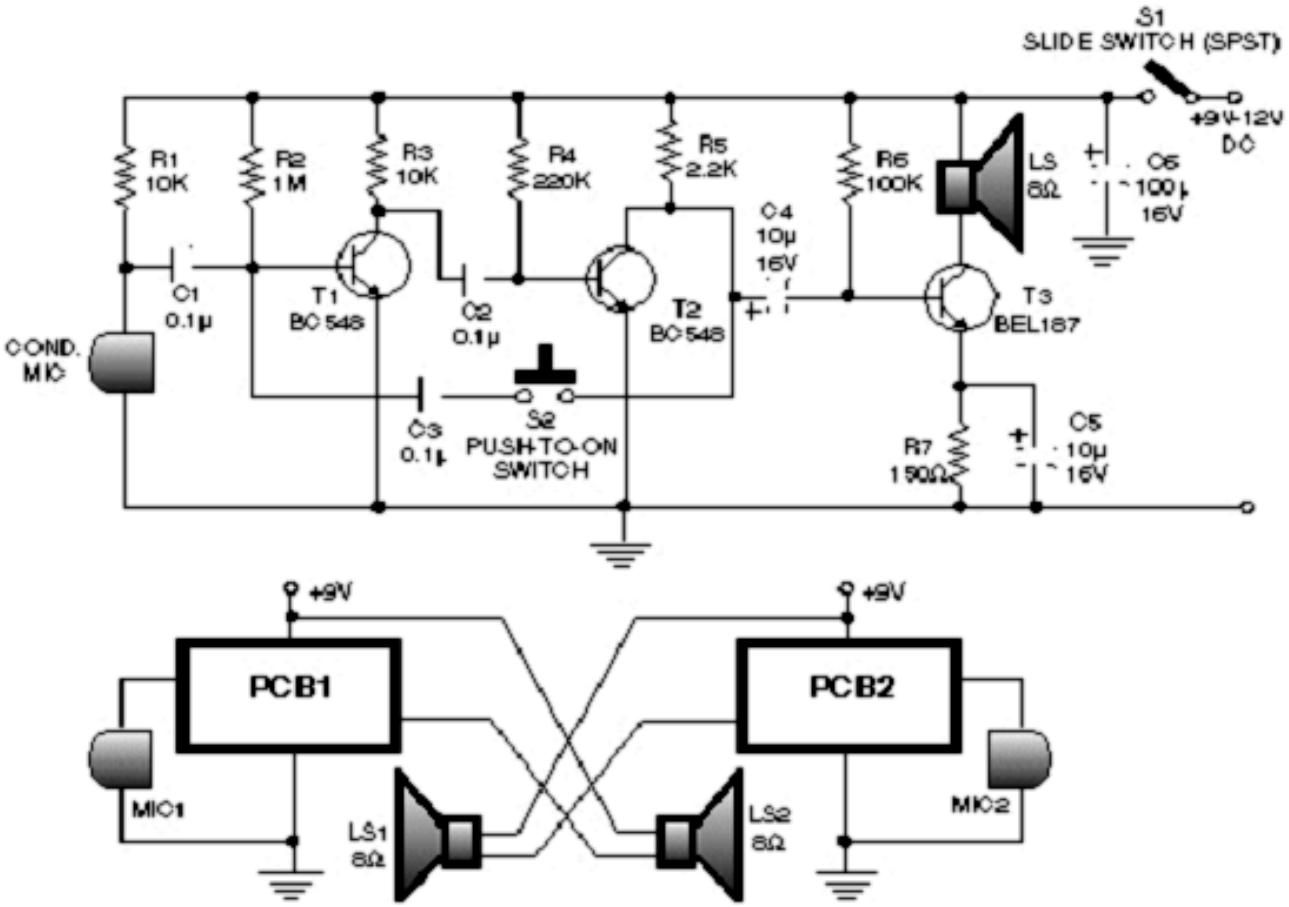
Presets VR2 and VR3 have been included for adjustment of individual audio threshold levels of left and right stereo channels, as desired. Once the multi-vibrator action of IC1 is disabled, output of IC2 does not change further. Hence, searching through the channels continues until it receives an audio signal exceeding the preset threshold value. The skip switch S1 is used to skip a

channel even if audio is present in the selected channel. The number of channels can be easily extended up to ten, by using additional 4066 ICs

20- Low cost intercom using transistors دائرة انتركم

عند الضغط على المفتاح S2 تتكون دائرة تكبير عن طريق T1 و T2 واللذان يولدان اشارة الجرس التي يتم تكبيرها بالترانزيستور T3 الذي يقوم بتشغيل دائرة المتحدث.

The circuit comprises a 3-stage resistor-capacitor coupled amplifier. When ring button S2 is pressed, the amplifier circuit formed around transistors T1 and T2 gets converted into an asymmetrical astable multi-vibrator generating ring signals. These ring signals are amplified by transistor T3 to drive the speaker of earpiece.
Current consumption of this intercom is 10 to 15 mA only. Thus a 9-volt PP3 battery would have a long life, when used in this circuit.
For making a two-way intercom, two identical units, as shown in figure, are required to be used. Output of one amplifier unit goes to speaker of the other unit, and vice versa. For single-battery operation, join corresponding supply and ground terminals of both the units together.
The complete circuit, along with microphone and earpiece etc, can be housed inside the plastic body of a cell phone toy, which is easily available in the market. Suggested cell phone cabinet is shown



21- Infrared Head Phones

باستعمال هذه الدائرة رخيصة الثمن يمكن الاستماع إلى التليفزيون دون إزعاج الآخرين . وبدون أية وصلات بين التليفزيون و سماعات الأذن. فبدلا من استخدام الأسلاك نستخدم الأشعة تحت الحمراء غير المرئية لنقل الإشارة بين التليفزيون وسماعات الأذن . ويكن المدى ٦ متر بدون استخدام عدسات . ويتكون مسل الأشعة تحت الحمراء من مكبر مرحلتين T1 و T2 لتكبير الإشارة السمعية الناتجة من التليفزيون وتغذية دائرة تشغيل ال IR LEDs . وتتكون دائرة استقبال الأشعة تحت الحمراء من مكبر ثلاثة مراحل T4 و T5 لتكبير الإشارة السمعية و T6 لتشغيل سماعات الأذن.

Using this low-cost project one can reproduce audio from TV without disturbing others. It does not use any wire connection between TV and headphones. In place of a pair of wires, it uses invisible infrared light to transmit audio signals from TV to headphones. Without using any lens, a range of up to 6 metres is possible. Range can be extended by using lenses and reflectors with IR sensors comprising transmitters and receivers.

IR transmitter uses two-stage transistor amplifier to drive two series-connected IR LEDs. An audio output transformer is used (in reverse) to couple audio output from TV to the IR transmitter. Transistors T1 and T2 amplify the audio signals received from TV through the audio transformer. Low-impedance output windings (lower gauge or thicker wires) are used for connection to TV side while high-impedance windings are connected to IR transmitter. This IR transmitter can be powered from a 9-volt mains adapter or battery. Red LED1 in transmitter circuit functions as a zener diode (0.65V) as well as supply-on indicator.

IR receiver uses 3-stage transistor amplifier. The first two transistors (T4 and T5) form audio signal amplifier while the third transistor T6 is used to drive a headphone. Adjust potmeter VR2 for max. clarity.

Direct photo-transistor towards IR LEDs of transmitter for max. range. A 9-volt battery can be used with receiver for portable operation.

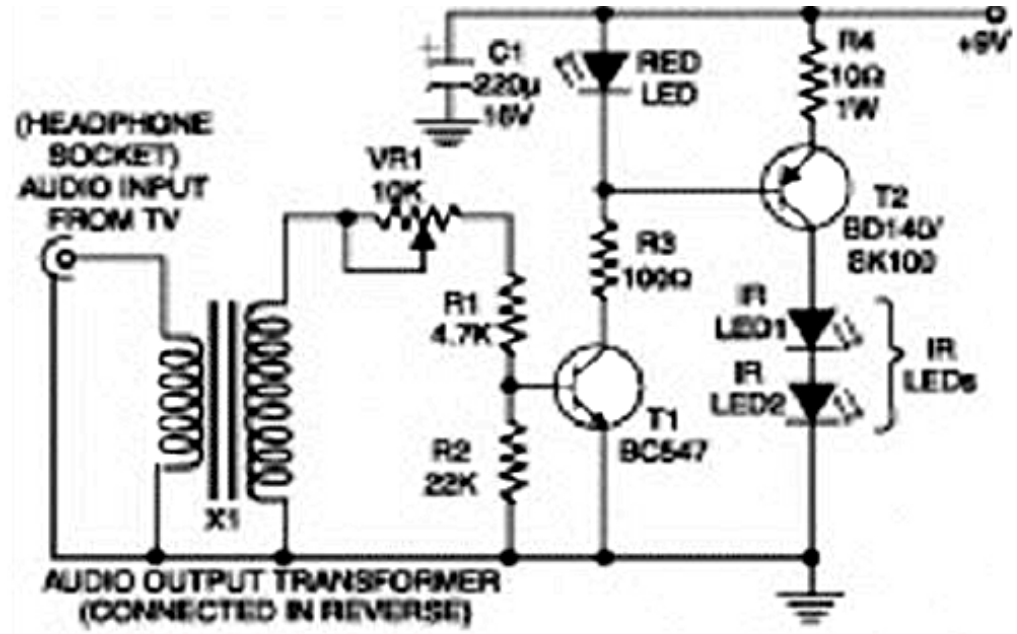


FIG.1: IR Audio Transmitter

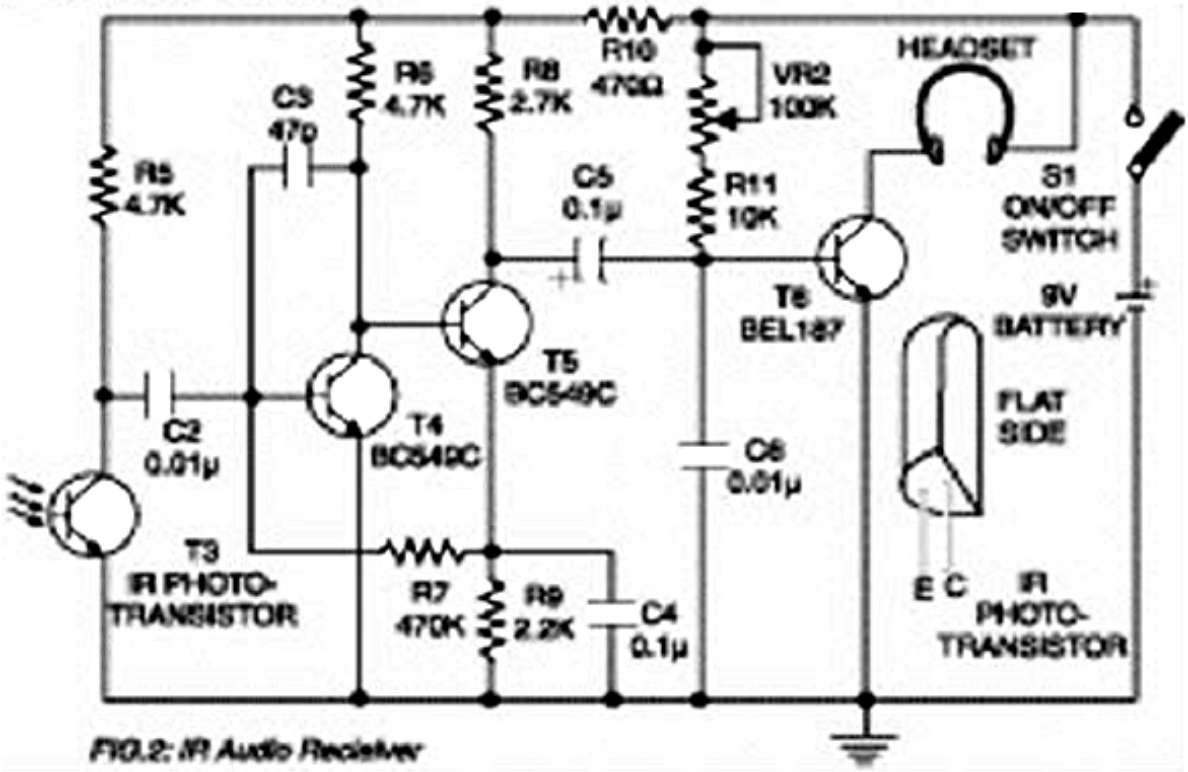


FIG.2: IR Audio Receiver