

Active loudspeakers have a lot of advantages concerning simple loudspeakers that use passive components for the elements concretisation of segregation of frequencies. In the case of active loudspeakers we have, proportionally, bigger build cost, because each loudspeaker is led by his own power amplifier. In properly drawn active loudspeaker, the quality of sound is much better and the distortions very low, because it does not use inductors and large capacitors in the road of signal. All capacitors exist in the signal road, they have very small value and they are very good quality. This does not mean that one well drawn passive loudspeaker is not good, perhaps better than one active. On the contrary one active loudspeaker is enough difficult in the manufacture. In the [Fig.1], exist a circuit of 2-way active loudspeaker. As we see also in the Block diagram [Fig.2], exist one classic 2-way crossover with cross frequency $f_c=3100\text{Hz}$ [-24dB/oct]. This frequency was selected, because it is near in the cross frequency of many speakers of trade, it can however change and be adapted in your own speakers choice, it is enough you use the types that give for calculation [Fig.3]. The IC1 makes the input adaptation, the filters round the IC2 creates a high-pass filter of frequencies, for frequencies above $f_c=3100\text{Hz}$, on the contrary the components round the IC3 creates a low-pass filter, for frequencies under 3100Hz. With the trimmer TR1 in the line of high frequencies we can adaptable, if it needs, the level between the two speakers. Usually it will need we lower at 10% the level tweeter concerning woofer. In a lot of points of filter exist capacitors and resistors that are not used, but are there for future changes, in a other cross frequency, as the R6 and R10 that are not used. To the next stage the two outputs of filter are drive to the two power amplifiers, the IC4 for the high frequencies and the IC5 for low. Those of are two hybrid IC by Sanyo, with output power 80W/8ohms, with very good characteristics and sound. It can become change with other type of series as STK4036, STK4038, STK4040, with proportional modification of power supply voltage. The particular line is used in enough active loudspeakers, with very good results. Good it is used type STK4042XI, because it has more modern internal designing, concerning type STK4042II. Filters RLF1-2 in the exit of amplifiers are constituted by resistor R27 or R38 and a inductor wound round this, in three layers. The inductor is made with 25 until 30 coils of cupreous wire, diameter 1mm. In the amplifiers output exist the contacts of relay RL1, who is checked by the protection from DC and delay system. This circuit is found round the IC6 and works as follows: When the circuit is supplied exist a delay 5 sec in the connection speakers above in the amplifiers outputs, so that are not pass the charge capacitors noises. On the contrary when we break the power supply, then RL1 disconnect very fast the speakers from amplifiers, so that is not heard the discharge noise of capacitors. At the same time the circuit protects the speakers from DC voltages, that will be presented for any reason, in the output Of power amplifiers, opening the contacts of RL1 and disconnect, very fast the speakers. The circuit operation of protection/ delay becomes obvious from Led [D20], which should be placed in obvious point in the speakers box. The connections it appears in the Fig. 2. The transformer is toroidal, good quality. The main pcb, the heatsink, the transformer, the rectifier bridge BR1, as also all the components that appear except main pcb, are placed in a aluminium piece of suitable dimensions which is adapted in dimensions of the speakers box and is placed in the back side of box. Two power amplifiers IC4 and IC5 clinched above in the heatsink. The total performance of loudspeaker depends always from the characteristics of units Tweeter and Woofer, that will be used in this, also from the designing and the quality of the box. Older i used in the place tweeter the T33A and woofer the B200G by KEF.

Part List

R1-21-32-25-36-58=1 Kohms
 R2=47 Kohms
 R3-4-5-7-8-9-46=22 Kohms
 R6-10=N.C *See text
 R11.....18=22 Kohms
 R19-20=47 ohms
 R22-33=33 Kohms
 R23-24-34-35=100 ohms
 R26-37=0.22 ohms 5W
 R27-38=10 ohms 3W
 R28-39=6.8 ohms
 R29-40=12 Kohms
 R30-41-53-54=10 Kohms
 R31-45=560 ohms
 R44-45=1 Mohms
 R47=39 Kohms
 R48-50=15 Kohms
 R49-51-52-55=56 Kohms
 R56-57=3.9 Kohms
 R43=470 ohms 1W
 TR1=47 Kohms trimmer horizontal
 C1-22-36-23-37=1uF 63V MKT
 C2=390pF
 C3-4-7-8-14-15=100nF 63V MKT
 C5-6-9-10-11-12=3.3nF 63V MKT* See text
 C13-16-17-18=3.3nF 63V MKT*See text

C19-20-52=10uF 25V
 C21-35=470pF
 C22-36=470nF 63V MKT
 C24-25-26-38-39-40=100pF
 C27-41=10pF
 C28-42=100nF 100V MKT
 C29-43=1nF 63V MKT
 C30-34-44-48=100uF 63V
 C31-45=220uF 25V
 C32-33-46-47=10uF 63V
 C49=47uF 25V
 C50-51=100nF 63V MKT
 C53=1uF 25V
 C54=3.3uF 25V
 C55-56-58-59=33uF 63V
 C57-60=22uF 16V
 C61-62=15000uF 63V AXIAL
 C63-64=2200uF 25V AXIAL
 C65-66-67-68=100nF 63V MKT
 Q1=BD679
 Q2-3=BC550
 D1-2-3-4=1N4002
 D5=8.2V 0.5W Zener
 D6=1N4148
 D7.....19=1N4148
 D20=5mm LED [Fig.2]

IC1=TL071
 IC2-3=TL072-NE5532
 IC4-5=STK4042[XI] or [II]*See text
 IC6=4093
 IC7=7812T
 IC8=7815T
 IC9=7915T
 RL1=Relay 12V [G2R2 Omron]
 RLF1-2=*See text
 F1-2-3-4=1.6A FAST 5X20mm
 F5=1A SLOW 5X20mm[Fig.2]
 T1=220V//A=2X30V 250VA

B=2X15V 30VA [Toroidal]
 JF1=3pin male supply jack
 JF2=Female RCA Jack
 J1-3=2pin conn. with 2.54mm pin step
 J2=3pin conn. with 2.54mm pin step
 J4=3pin conn. with 3.96mm pin step
 J5=4pin conn. with 3.96mm pin step
 T=Tweeter 8ohms 50 until 80W
 W=Woofer 8ohms 50 until 100W
 BR1=Bridge rect. 400V 25A [Fig.2]* See text
 BR2=Bridge rect. 100V 1.5A

All resistors is 0.5W 1% metal film except for announce differently

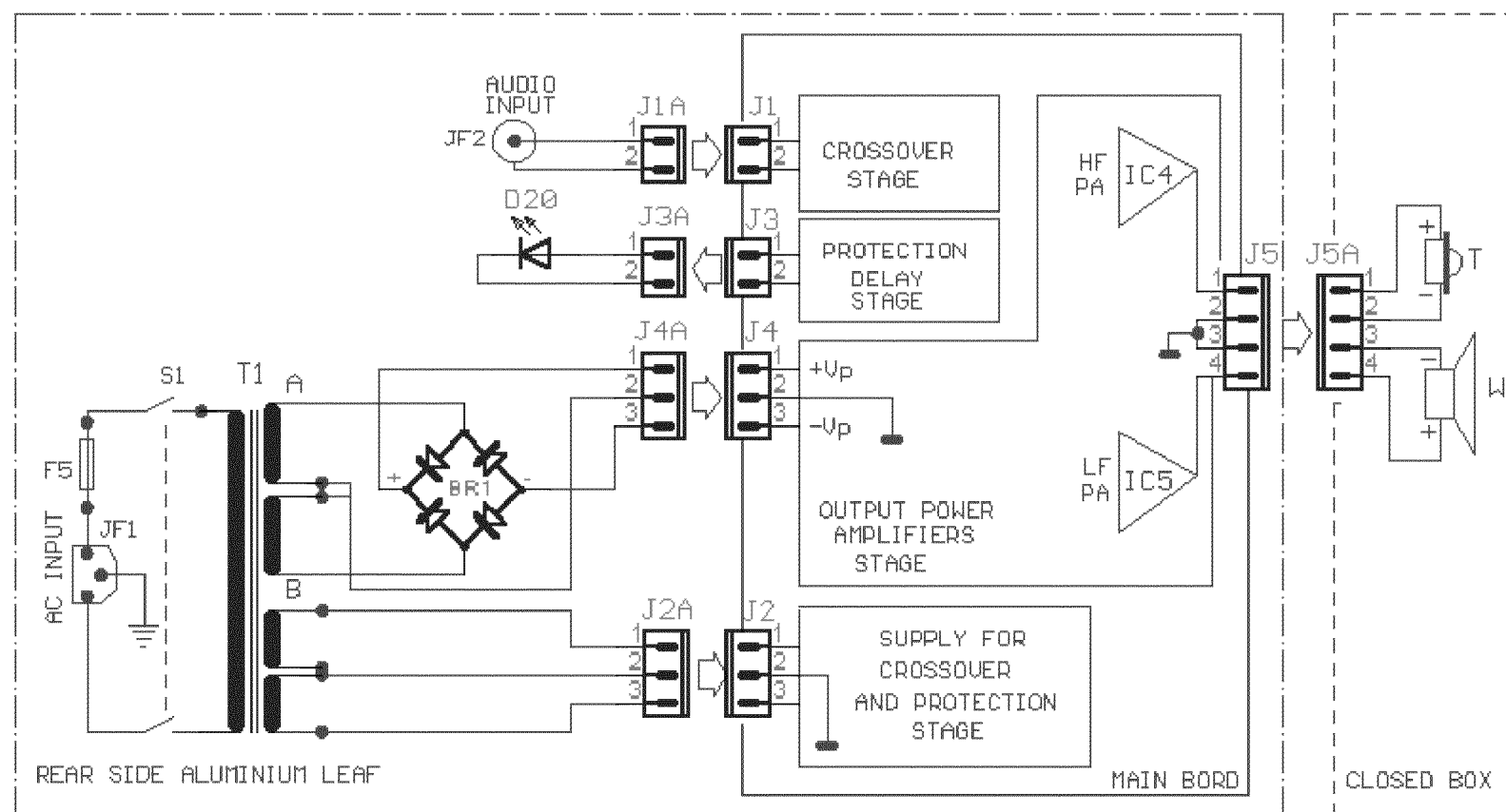


Fig.2--POWER SUPPLY AND BLOCK DIAGRAM FOR 2-WAY ACTIVE LOUDSPEAKER

SPECIFICATIONS

Input sensitivity	1.1Vrms
Input impedance	47K
Output Power (0.1% THD)	150W total
Frequency crossover	3100HZ
slope	-24dB/oct

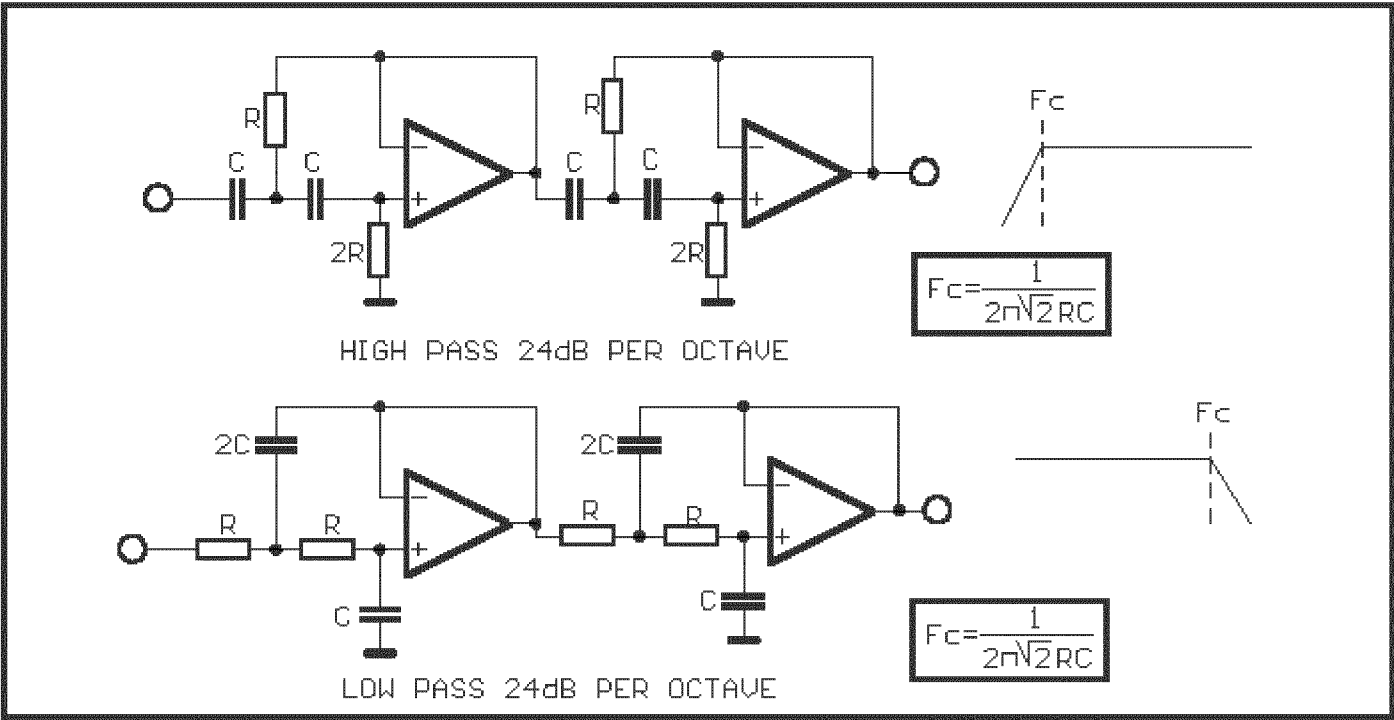


Fig.3--Crossover calculation