3-Way Active Loudspeaker

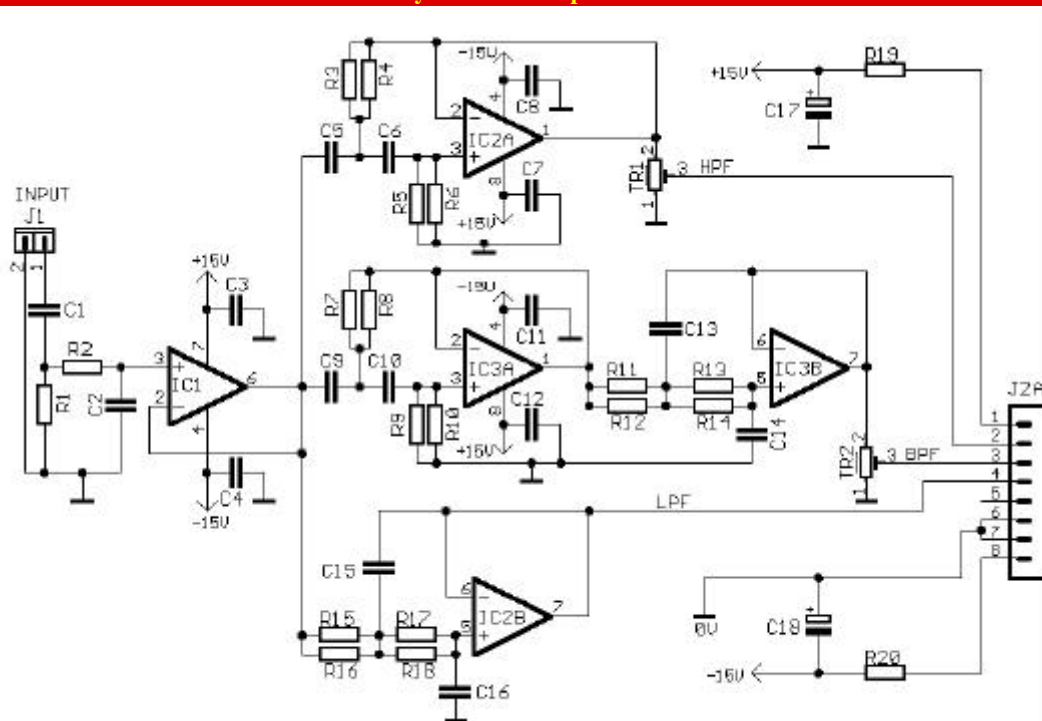Fig.1--3-WAY CROSSOVER   Sam 9/02

After the **2-way active loudspeaker** circuit, give a complete electronic section circuit of one 3-way active loudspeaker. The speaker's choice will become from you, because the particular circuit has the driving possibility all almost trade loudspeakers. The choice that made in the crossover stage, is a 3-way crossover [Butterworth] with cut off -point frequencies 200HZ and 3500HZ, with slope -12dB/oct. These frequencies can change and adapted in your own speaker's choice, using the calculation types of **Fig.5**. Exist the possibility is used other circuit crossover, as the circuit of **3-way active crossover with slope -24dB/oct**. The circuit crossover does not exist above in main PCB, but is contact with this via the plug J2A that is applied above in the J2B. This can become if in the place of J2A it's placed a pinhead with 8 pin and PCB crossover put on above main PCB in form sandwich. It can however be placed in other point and with a flat cable to transport the signals and the voltages from J2A in the J2B. Power supply for ± 15V of the crossover circuits it's found in main PCB. A point that I want to highlight is with regard to various in the calculation values precision and real values of resistors and capacitors. It's good, if the component value does not exist in standard value to select a combination that us will give value near in theoretical and simultaneously to do the same and in the other loudspeaker, in order that the divergence is same. In the drawing exist parallel combinations resistors, and somebody's from these are not used if they do not need. With the TR1-2 we adjust the level of high and mid speakers, if it needs.

R1=47K	R19-20=47R	C17-18=47uF 25V
R2=1K	C1=2.2uF 63V MKT	TR1-2=47K trimmer
R3=4K7	C2=220pF	IC1=**TL071**
R4-11-13-15-17=NC	C3-4-11-12=100nF 63V MKT	IC2-3=**TL072**-**NE5532**
R5-6=12K	C5-6-9-10=10nF 63V MKT	J1=2pin conn. 2.54mm pin step
R7-8=120K	C13=6.8nF 63V MKT	J2A=8pin conn. 2.54mm pin step
R9-10=220K	C14=3.3nF 63V MKT	or 8 pinhead 2.54mm pin step*
R12-14=10K	C15=33nF 63V MKT	
R6-18=33K	C16=18nF 63V MKT	All Resistors is 1/4W 1%

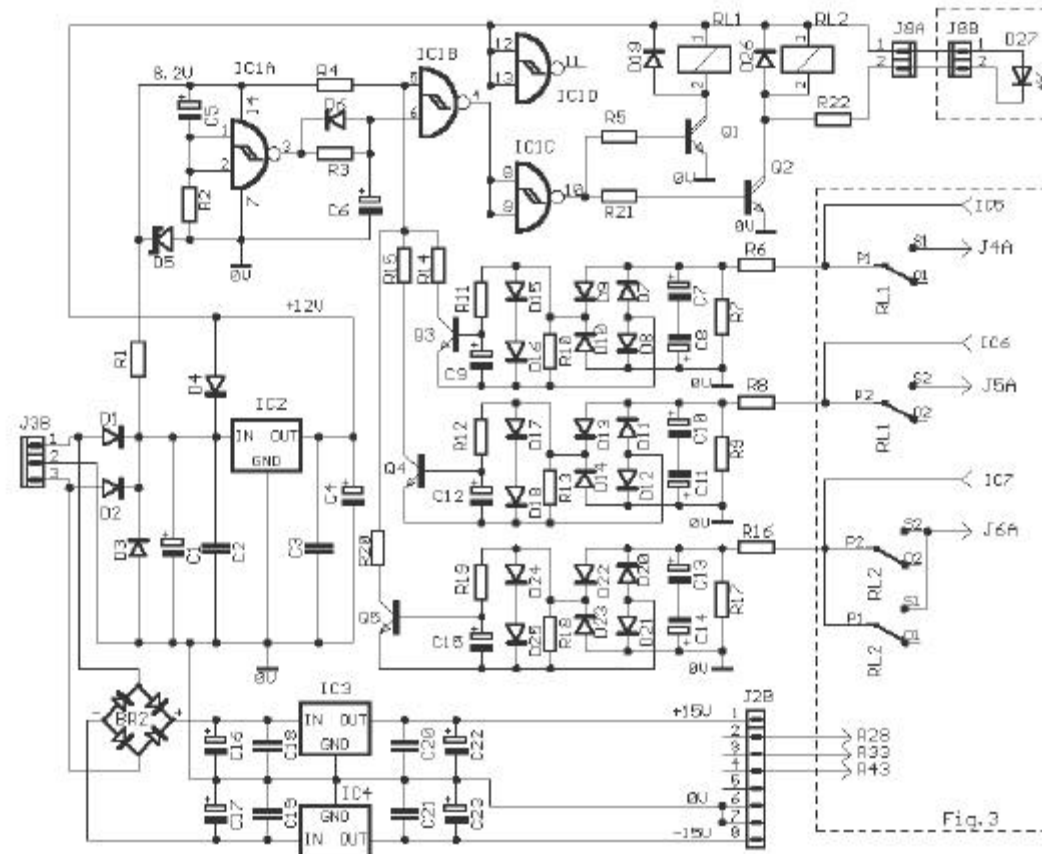| Typical specifications	
Input sensitivity	1Vrms
Input impedance	47K
High Pass filter	20HZ-:-200HZ
Band Pass filter	200HZ-:-3500HZ
Low Pass filter	3500HZ-:-20KHZ
Slope	-12dB/oct

Fig.2--DC PROTECTION-DELAY TIME AND SUPPLY FOR 3-W LSP   Sam 9/02

The protection circuit from DC voltages [**Fig.2**] and delay connection the speakers is the same with what exist in **2-way active loudspeaker** where exists and the relative description. They exist certain various, as has been added a detection stage of continuous voltages and a relay [RL2]. The contacts of RL1 connect the speakers the high and mid frequencies, the two contacts of RL2 are connected at the parallel and connect the speaker of low frequencies in the exit of IC7. Here exist also the stage of ± 15V supply for the crossover and suffices for each choice of crossover circuit.

|		
R1=470R 1W	C4=10uF 25V	IC1=**4093**
R2-3=1M	C5=1uF 25V	IC2=**7812**
R4=22K	C6=4.7uF 25V	IC3=**7815**
R5-21=33K	C7-8-10-11-13-14=33uF 63V	IC4=**7915**
R6-8-16=15K	C9-12-15=22uF 16V	Q1-2=**BD678**
R7-9-17=56K	C16-17=2200uF 25V	Q3-4-5=**BC550C**
R10-23-18=56K	C22-23=10uF 25V	RL1-2=12V RELAY G2R2 [OMRON]
R11-12-19=10K	D1-2-3-4=1N4002	J2B=8pin conn. 2.54mm pin step
R14-15-20=3K9	D5=8.2V 1W Zener	J3B=3pin conn. 2.54mm pin step
R22=1K	D6-7.....26=1N4148	J8A-B=2pin conn. 2.54mm pin step male-female
C1=100uF 25V	D27=Led 5mm	
C2-3-18-19-20-21=100nF 63V MKT	BR2=BRIDGE RECT. 80V 1.5A	All Resistors is 1/4W 1-5%
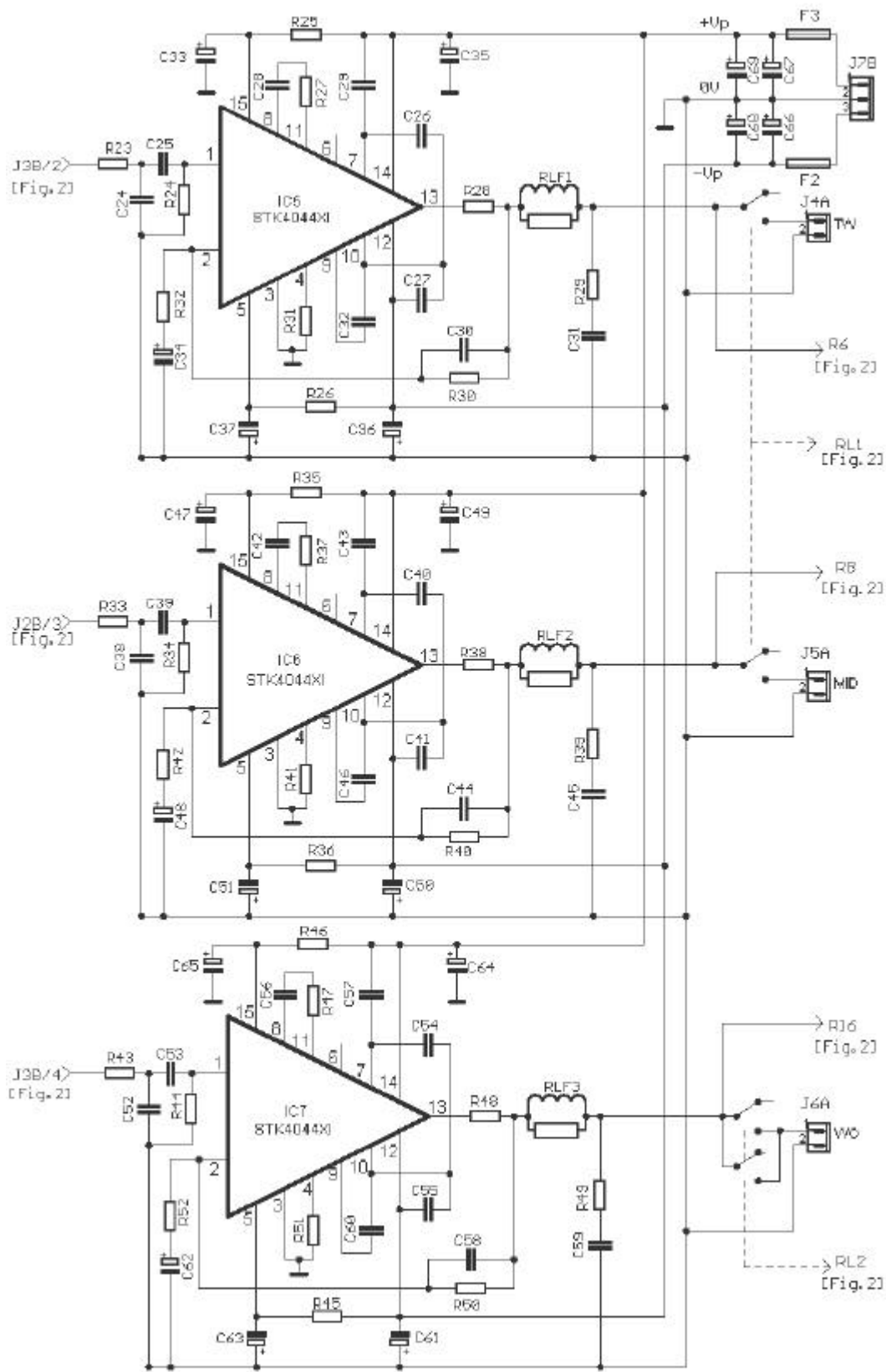
Fig. 3—POWER BLOCK FOR 3-WAY ACTIVE LOUDSPEAKER   Sam 9/02

In the **Fig.3**, exist the circuit of power amplifiers that drive the corresponding speakers. The choice are also here the **STK4044XI** of SANYO with output power roughly 100W each one, power that consider that is very good for the drive the majority of speakers of trade, in high levels. The sound quality that produces is very good. The type choice with clue **XI** became because it has better and more modern internal designing, as regards types II and V. It can used also other types [**B** and **V**] without exists some problem. Filters RLF1...3 are made by a resistor 10R 3W that to around her we wrap roughly 30 coils in three layer, wire from cupreous insulated with diameter 1mm. The capacitors C66.... 69 are placed above in main PCB and near in the power amplifiers.

R23-33-43-32-42-52=1K	RLF1…3=FILTER* See text	C32-46-50=1nF 63V MKT
R24-34-44=47K	C24-38-52=330pF	C33-37-47-51-63-65=100uF 63V
R25-26-35-36-45-46=100R	C25-39-26-40-54=1uF 63V MKT	C34-48-62=220uF 25V
R27-37-47=1K	C53=2.2uF 63V MKT	C35-36-49-50-61-64=10uF 63V
R28-38-48=0.22R 5W	C27-28-42-56-41-55=100pF	C66-67-68-69=15000uF 63V
R29-39-49=4R7 1W	C29-43-57=100pF	IC5-6-7=**STK4044XI** * See text
R30-40-50=56K	C30-44-48=15pF	F2-3=Fuse 5A Fast 5X20mm+PCB case
R31-41-51=10K	C31-45-59=100nF 100V MKT	J4A-5A-6A=2pin conn. 3.96mm pin step

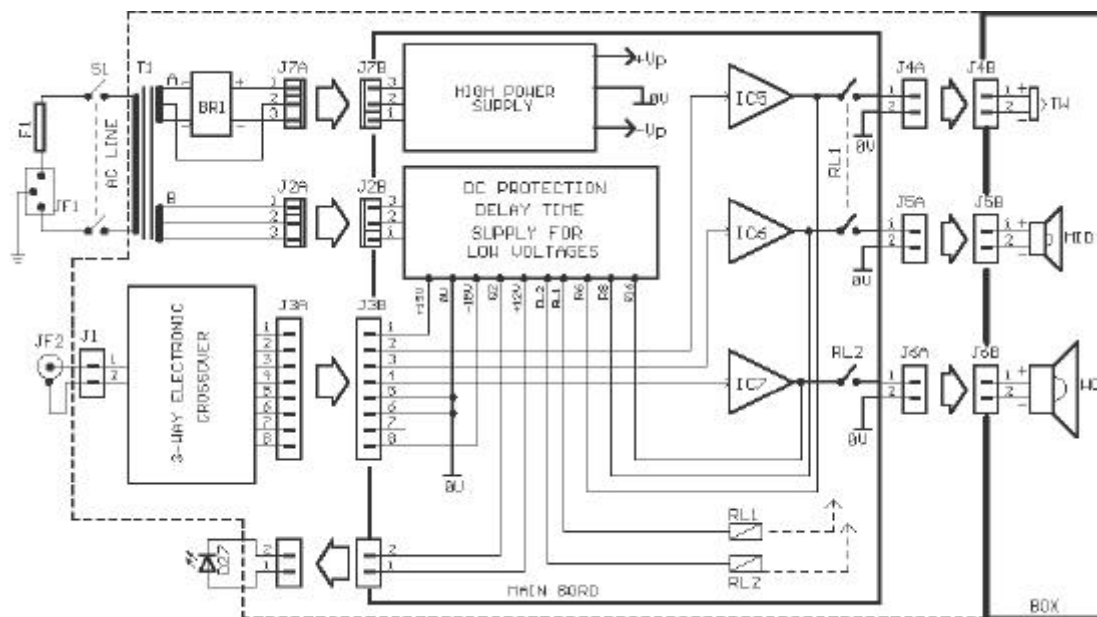| Typical specifications	
Input sensitivity	1Vrms
Input impedance	47K
Output Power (0.1% THD)	100W/8R per Band
Power Supply	±53V

Fig. 4--3WAY ACTIVE LSP BLOCK DIAGRAM

In the **Fig.4**, appear a big part of various stages and connections between them. As it appears the speakers are placed in suitable wooden box. In his rear part of box and on a leaf of aluminum are placed the power transformer T1, the power bridge rectifier BR1, the switch S1, the main power plug JF1, fuse F1, the RCA plug JF2 and the indicative led D27. Transformer T1 has two outputs **A**=2X38Volts and **B**=2X15Volts. Bridge BR1 clinching above in aluminum so that it's frozen. On a big heatsink clinching the IC5-6-7. In plug JF2 enter the acoustic low level signal from the preamplifier exit. Good it's the crossover PCB it's found far by the T1 transformer.

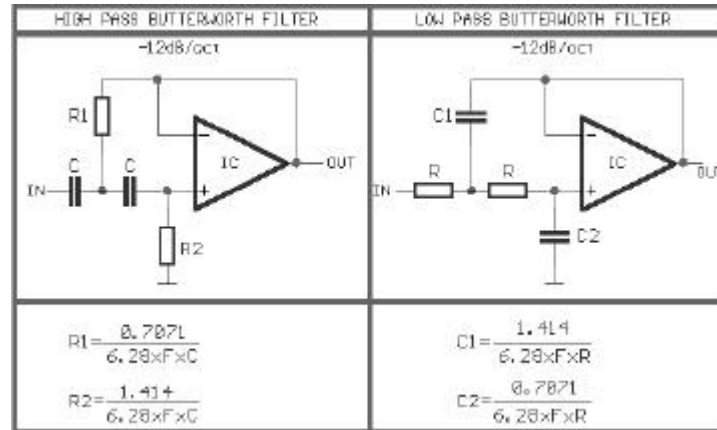|		
T1=110-230Vac||A=2X38V >350VA	JF2=Female RCA Jack	MID=MIDRANGE 8R
B=2X15V 30VA	F1=FUSE 1.2A SLOW+CASE	WOO=WOOFER 8R
BR1=BRIDGE RECTIFIER 400V 35A	S1=2XON-OFF 15A Switch	
JF1=3pin male supply jack	TW=TWEETER 8R	

Fig.5--Crossover calculation

- **3-Way Active Loudspeaker - Main PCB**   [88kb]
- **3-Way electronic crossover -12dB/oct - PCB**   [24kb]
- **3-Way Active Loudspeaker** **in Greek**