



STUDIO SERIES

# S412P

4 - way POWERED SPEAKER SYSTEM

# SERVICE MANUAL



JBL Consumer Products  
250 Crossways Park Dr.  
Woodbury, New York 11797

Rev 0 – 2/2000

## - CONTENTS -

GENERAL SPECIFICATIONS.....	2
AMPLIFIER SPECIFICATIONS.....	3
SET-UP GUIDE.....	4
CONTROLS.....	6
TROUBLESHOOTING.....	7
MECHANICAL PARTS LIST.....	8
CABINET EXPLODED VIEW.....	9
WIRING/PASSIVE SCHEMATIC DIAGRAMS.....	10
AMPLIFIER EXPLODED VIEW.....	11
BLOCK DIAGRAM.....	12
INTEGRATED CIRCUIT DRAWINGS.....	13
ELECTRICAL PARTS LIST.....	14
P. C. BOARDS.....	17
SCHEMATICS.....	19
PACKAGING.....	22

# S412P



## GENERAL ACOUSTIC & ELECTRICAL SPECIFICATIONS

- Nominal Impedance 8 ohms
- Max Amp Power 250 watts\*
- Frequency Response 32Hz – 20kHz
- Sensitivity 91 dB (1 watt @ 1 meter)
- Crossover Frequency 200Hz, 850Hz, 3500Hz
- Subwoofer Amplifier Output 200 watts

### AURAL SWEEP TEST SPECIFICATIONS:

- A. System Aural Sweep Test 6.0V Input 20 Hz to 20 kHz
- B. L.F. Aural Sweep Test 6.0V Input 20 Hz to 500 Hz
- C. M.B.F. Aural Sweep Test 5.0V Input 100 Hz to 1 kHz
- D. M.F. Aural Sweep Test 4.0V Input 500 Hz to 4 kHz
- E. H.F. Aural Sweep Test 2.83V Input 3 kHz to 20 kHz

### PHYSICAL SPECIFICATIONS

**Enclosure dimensions:** 44 x 16 x 13 3/8" (H x W x D)  
1118 x 406 x 340mm

**Weight** 86lbs./39.1kg Each

\*The maximum recommended amplifier power rating will ensure proper system headroom to allow for occasional peaks. We do not recommend sustained operation at these maximum power levels.

Occasional refinements may be made to existing products without notice but will always meet or exceed original specifications, unless otherwise stated.

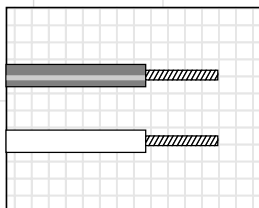
**PRODUCT: JBL S412P**

LINE VOLTAGE	Yes/No	Hi/Lo Line	Nom.	Unit	Notes
US 120vac/60Hz	Yes	108-132	120	Vrms	Normal Operation
EU 230vac/50-60Hz	Yes	207-264	230	Vrms	Normal operation, MOMS required

Parameter	Specification	Unit	QA Test Limits	Conditions	Notes
<b>Amp Section</b>					
Type (Class AB, D, other)	G	n/a	n/a		Class D Preferred...Sink required for Class AB
Load Impedance (speaker)	4	Ohms	n/a	Nominal	Z-curve required
Rated Output Power	150	Watts	130	1 input driven	
THD @ Rated Power	0.1	%	1	22k filter	
THD @ 1 Watt	0.3	%	0.5	22k filter	
DC Offset	10	mV-DC	20	@ Speaker Outputs	
Damping factor	>150	DF	100	Measured at amplifier board	Measured at the speaker connector. 130 Watts @ THD < 0.08 % @ 50 Hz
	>75		50	Measured at speaker cable	
<b>Input Sensitivity</b>					
Input Frequency	30	Hz	30	Nominal Freq.	
LFE input	1.05	Vrms	±2dB	To 140 Watts	
Speaker/Hi Level Input	23.66	Vrms	±2dB	To 140 Watts	
<b>Signal to Noise</b>					
SNR-A-Weighted	100	dBA	90	relative to rated power	A-Weighting filter
SNR-unweighted	70	dBr	70	relative to rated power	22k filter
SNR rel. 1W-unweighted	65	dBr	60	relative to 1W Output	22k filter
Residual Noise Floor	1	mVrms	5	Volume @max, using RMS reading DMM/VOM (or A/P)	
Residual Noise Floor	1.5	mVrms(max)	4	Volume @max, w/ A/P Swept Bandpass Measurement (Line freq.+ harmonics)	
<b>Input Impedance</b>					
Line Input	20k	ohms	n/a	Nominal	
Speaker/Hi Level Input	10k	ohms	n/a	Nominal	
<b>Filters</b>					
Speaker in LP 2nd order fixed	Fixed				See AP curves
Subsonic filter (HPF)					See AP curves
LFE Low pass 2nd order	Fixed			LFE input driven only	See AP curves
<b>Limiter</b>					
THD at Max. Output Power	n/a	n/a	functional	Maximum Output Power	Maximum THD as a result of limiting.
<b>Features</b>					
Auto - On selection switch	YES	--	functional		Refer to ATO section
LED On-Off switch	YES	--	functional		Dual LED indicator
Volume pot Taper (lin/log)	LOG	--	functional		A Taper
<b>Input Configuration</b>					
Line In LFE	YES	--	functional		Single RCA jack
Spkr/Hi Level In	YES	--	functional		
<b>Signal Sensing (ATO)</b>					
Auto-Turn-On (yes/no)	YES		functional	Auto - on selection switch in Auto	
ATO Input test frequency	30	Hz	functional	"	
ATO Level LFE Input	4	mV	functional	"	
ATO Level Speaker in	100	mV	functional	"	
ATO Turn-on time	5	ms	functional	Amp connected and AC on, then input signal applied	
Auto Mute/ Turn-OFF Time	15	minutes	17	T before muting, after signal is removed	Maximum

# SPEAKER CONNECTIONS

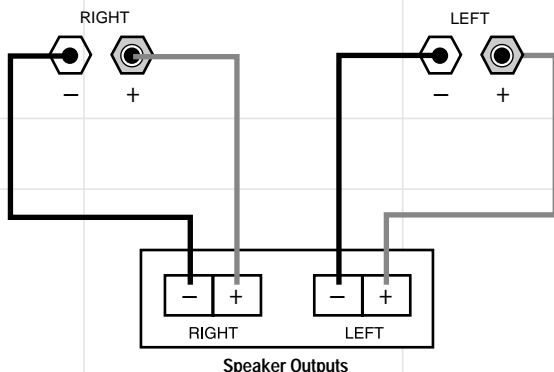
## CONNECTION TIPS



Speakers and electronics terminals have corresponding (+) and (-) terminals. It is important to connect both speakers identically: (+) on the speaker to (+) on the

amplifier and (-) on the speaker to (-) on the amplifier. Wiring "out of phase" results in thin sound, weak bass and a poor stereo image.

## SPEAKER-LEVEL CONNECTIONS

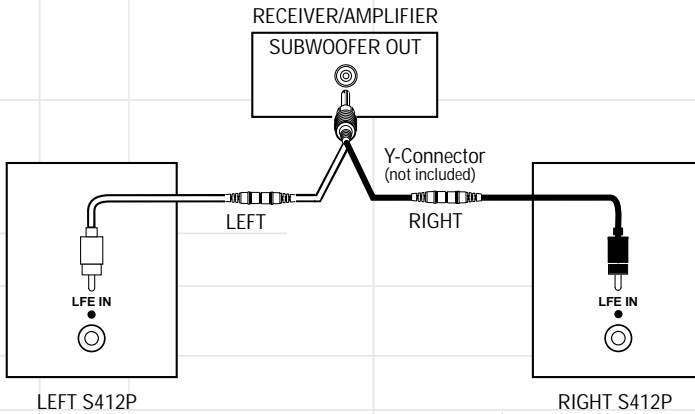


Your S412P speakers should be connected to your receiver in two ways (at speaker level and line level) in order to achieve the best performance, especially when listening to program material recorded in digital 5.1 formats, such as Dolby\*\* Digital and DTS®. Connect the left-front and

right-front speaker terminals on your receiver or amplifier to the 5-way binding posts on the back of each S412P speaker. Remember to maintain the correct polarities ("+" to "+" and "-" to "-"). The S412P uses a red binding post for "+" and black for "-". These connections will provide full-range

sound to all four transducers, and you should ALWAYS make these connections. If your receiver or amplifier does not have a line-level subwoofer output, then you do not need to make any other connections, and you should skip to the section titled "Amplifier Controls."

## LINE-LEVEL CONNECTIONS



Each S412P speaker is also equipped with a line-level Low-Frequency Effects (LFE/Subwoofer) input for superior performance with digital 5.1 surround formats. The .1 LFE channel contains additional low-frequency information not found in the left- and right-front channels. The LFE input works with the full-range speaker-level input to provide the dynamics and

effects that your favorite filmmakers intended. You will need to use a Y-Connector (not included) with one male connector and two female connectors to connect the line-level subwoofer output on your receiver/amplifier to the LFE/Subwoofer inputs on the S412P speakers. Plug the male connector into the subwoofer output on your receiver or amplifier, and connect each of the

two female connectors to extension RCA patch cords. Then plug each patch cord into the LFE/Subwoofer input of the left and right S412P speakers. **Note:** If your receiver has separate left and right line-level subwoofer (or LFE) output jacks, you do not need to use a Y-Connector.

## AMPLIFIER CONTROLS

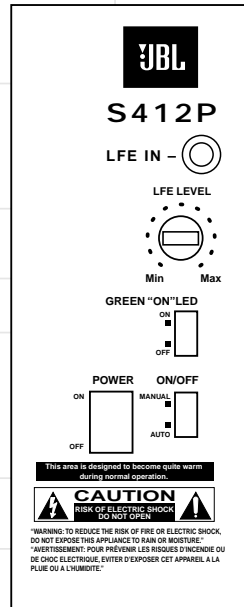
**LFE Level Control:** Allows you to adjust the volume of the low-frequency effects/subwoofer channel to suit your room acoustics or tastes. However, it only affects the LFE signal. If you are not using the LFE input, the LFE level control will not operate.

**Configuring Your Receiver:** You should choose the “Large” or “Wide” option for the left- and right-front speakers so that full low-frequency information will be sent to the S412P speakers. Make sure that you also configure your receiver for “Subwoofer On” or “LFE On.” In this case, the LFE/Subwoofer signal will consist only of the .1 (bass) channel. The LFE signal level can be adjusted by using the LFE level on the S412P amplifier panel. For initial setup, you should set the level controls on both speakers at minimum (full counterclockwise rotation). With 5.1 source material playing, advance the level controls on each speaker slowly until the desired amount of effects channel is present. This is a rather subjective adjustment and should be made using a variety of program materials.

If you choose, you can use the “Small” or “Narrow” setting on your receiver. In this case, all of the information below 80Hz will be fed to the LFE/Subwoofer input on the

S412P. Now the level control operates throughout the entire bass spectrum below 80Hz, not just within the .1 channel portion. This configuration is generally unnecessary but, in certain room-placement conditions, it allows greater bass-level control.

**Power Switches:** The main “Power” switch is simply marked “On” and “Off.” Turn this switch on to commence operation of the powered amplifier after you have plugged the power cord into an AC outlet. The second switch is labeled “On/Off” and has two positions. Placing the switch in the “Auto” position puts the amplifier in Standby mode. In this mode the speaker will be able to automatically sense an incoming signal, which will trigger it to turn fully on. The speaker will also automatically switch itself back into Standby mode after approximately 10 to 15 minutes have passed without its sensing a signal. We recommend that you leave this switch in the “Auto” position for most applications. If you will be away from home or not using your speakers for an extended period of time, you should turn the speakers off by using the main power switch. The Manual position will bypass the auto-sensing feature and leave the amplifier on until turned off with the main switch or returned to



auto sensing by choosing the auto position.

**LED Indicators:** When your speaker is turned on but is not receiving a signal, the LEDs glow red to let you know that your speaker is plugged in. When the speaker is receiving a signal, the LEDs glow green. We have provided a convenient “Green ‘On’ LED” switch on the back panel to allow you to shut off the front LEDs should they interfere with your enjoyment of a movie. This switch has no effect when the LEDs are in red mode.

# TROUBLESHOOTING

## **If there is no sound from any of the speakers:**

- Check that receiver/ amplifier is on and that a source is playing.
- Review proper operation of your receiver/amplifier.

## **If there is no sound coming from one speaker:**

- Check the "Balance" control on your receiver/amplifier.
- Check all wires and connections between receiver/amplifier and speakers.
- Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured.

## **If the system plays at low volumes but shuts off as volume is increased:**

- Check all wires and connections between receiver/amplifier and speakers.
- Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured.
- If more than one pair of main speakers is being used, check the minimum impedance requirements of your receiver/amplifier.

## **If there is no (or low) bass output:**

- Make sure the polarities (+ and -) of the left and right "Speaker Inputs" are connected properly.
- Make sure that the speaker is plugged into an active electrical outlet and switched on, and that the green LEDs are displayed.

## **If you used the LFE input and there is no sound from the subwoofer:**

- Check that receiver/ amplifier is on and that a source is playing.
- Make sure that the speaker is plugged into an active electrical outlet.
- Check all wires and connections between receiver/amplifier and speakers.
- Make sure all wires are connected. Review the "Line-Level Connections" section on page 5 of this manual and make sure that a single RCA patch cord is connected to each loudspeaker from the Y-Connector plugged into the receiver/amplifier's subwoofer output. Make sure none of the speaker wires are frayed, cut or punctured.
- Review proper operation of your receiver/amplifier, including making sure that you have configured your receiver so that the subwoofer output is active.

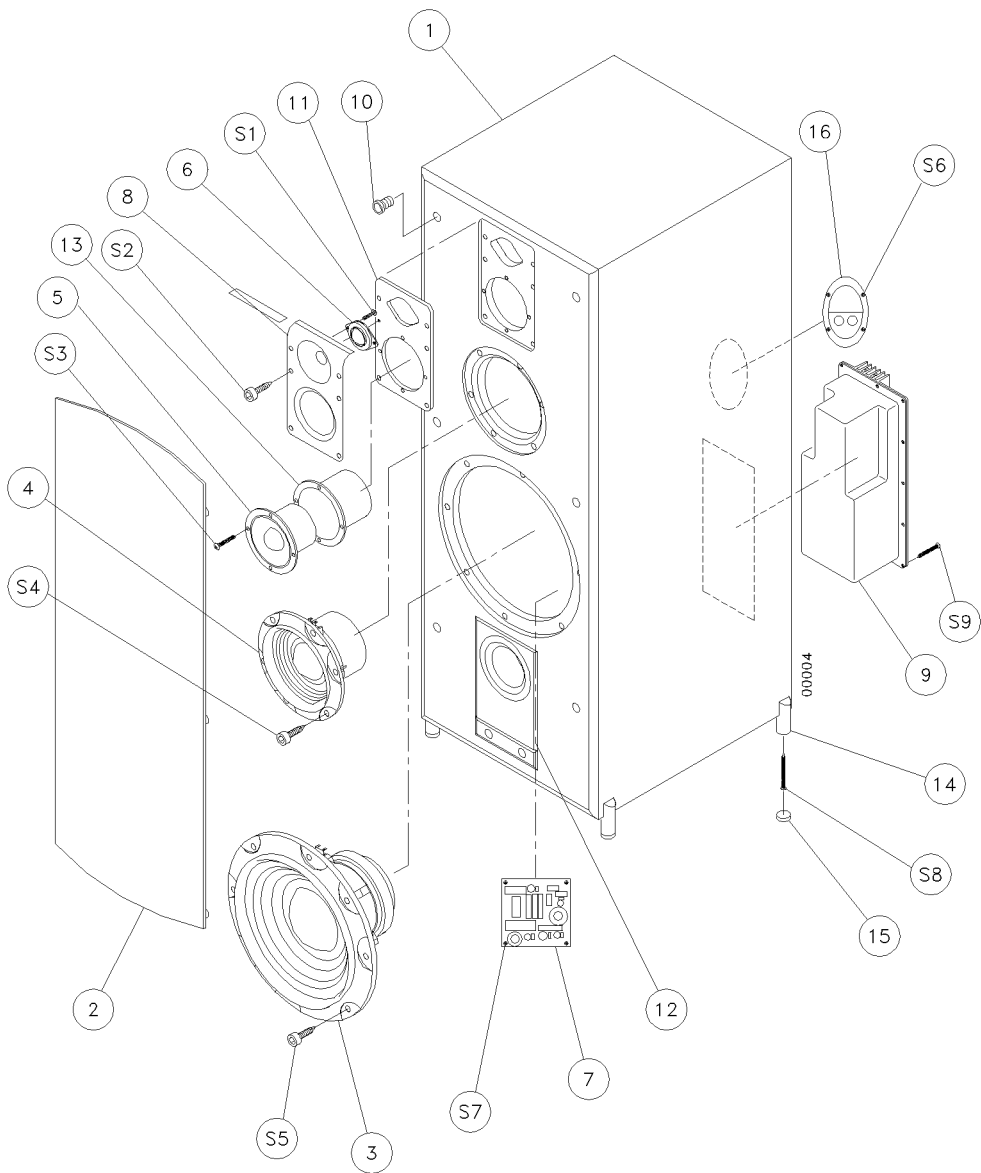
## **If you are using the S412P LFE/Subwoofer input and the bass level decreases (instead of increasing) when you turn the LFE/Subwoofer Level knob clockwise:**

- Recheck to make sure that your receiver or amplifier-speaker outputs are correctly connected to the S412P speaker inputs (gold-plated binding posts), (+) to (+) and (-) to (-). The S412P (+) terminal has a red stripe and is located on the right-hand side, below the letter "L" of the molded JBL logo, when looking directly at the back of the S412P.
- If the wires are connected properly, the confusion may be attributable to the design of your receiver/ amplifier. Your unit may have inverting inputs, which reverse the polarity of the signal between the inputs and outputs of the amplifier. To check if this is the case, reverse the speaker connections for **ALL** S412Ps in your system (and disconnect any other speakers in the system) so that the receiver/amplifier's (+) connector is connected to each S412P's (-) (black stripe) speaker connector. If you do this and the S412Ps function properly (bass increases as you turn your LFE/Subwoofer level-control knobs clockwise), your receiver/amp uses inverting inputs. This is not a problem. Simply connect all of the speakers in your system the same way, with the receiver or amplifier's (+) terminal to the speaker's (-) terminal, and the receiver or amplifier's (-) terminal to the speaker's (+) terminal.

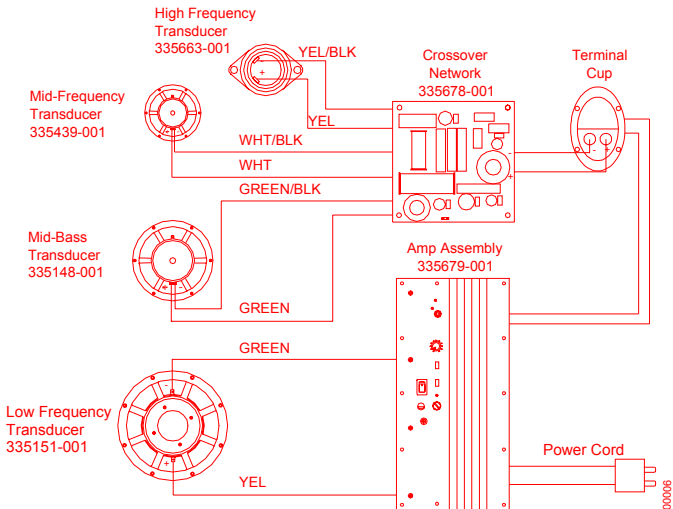


## S412P MECHANICAL PARTS LIST (See following page)

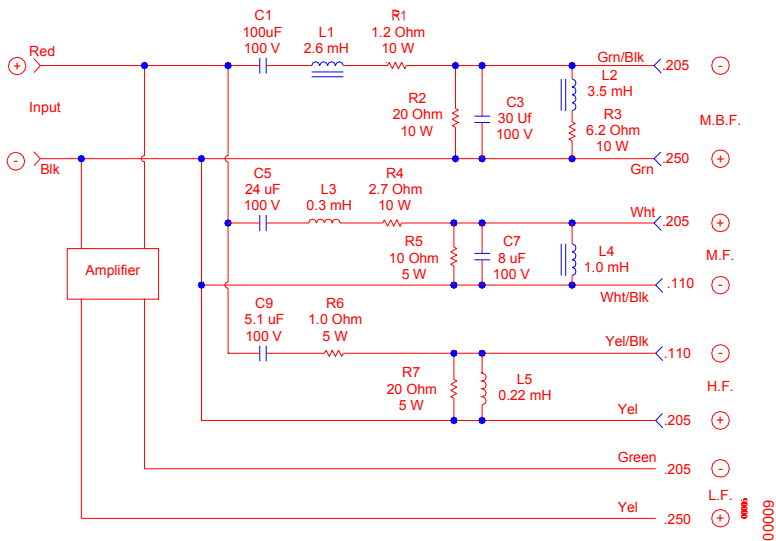
1	Cabinet	S412P (Not for Sale)	
2	Grille		335417-002
3	Low Frequency Transducer	12" PolyPlas™ cone shielded DC Resistance 5.6 ohms ±10%	335151-001
4	Mid-Bass Transducer	6.5" PolyPlas™ cone shielded DC Resistance 4.8 ohms ±10%	335148-001
5	Mid Frequency Transducer	4" Polyplas™ shielded DC Resistance 4.3 ohms ±10%	335439-001
6	High Frequency Transducer	1" Titanium Dome shielded DC Resistance 3.4 ohms ±10%	335663-001
7	Crossover Network		335678-001
8	Faceplate		335157-001
9	Amp assembly		335679-001
10	Grille retainers (6)		333249-001
11	Faceplate gasket		335667-001
12	Port Tube		335155-001
13	Flower pot		334072-001
14	Foot (4)		335429-001
15	Bump-on pads for feet (4)		330104-001
16	Terminal cup		335471-002
S1	Screw (tweeter) (2)	#6 x .375" PPH	903401-006
S2	Screw (faceplate) (6)	#6 x .75" HXS-HD	908302-012
S3	Screw (midrange) (4)	#6 x .75" PPH	61867
S4	Screw (mid-bass) (6)	#8 x .75 HXS-HD	903802-012
S5	Screw (woofer) (8)	#8 x .75 HXS-HD	903802-012
S6	Screw (terminal cup) (4)	#6 x .75" PPH	63563
S7	Screw (network) (4)	#6 x .75" PPH	63563
S8	Screw (feet) (4)	#8 x 1" HXS-HD BLK	72216



# WIRING DIAGRAM

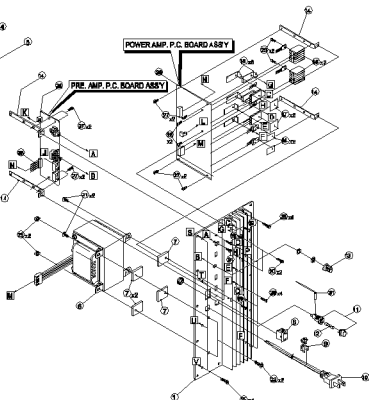
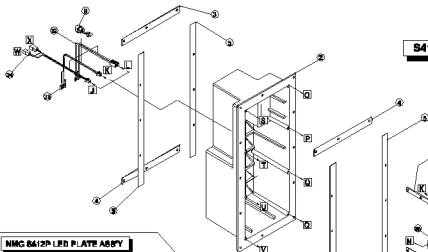


# S412P PASSIVE SCHEMATIC DIAGRAM

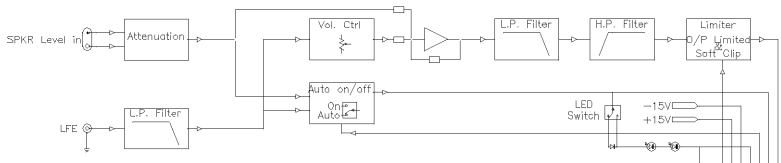


### S412P SUB-WOOFER AMP.

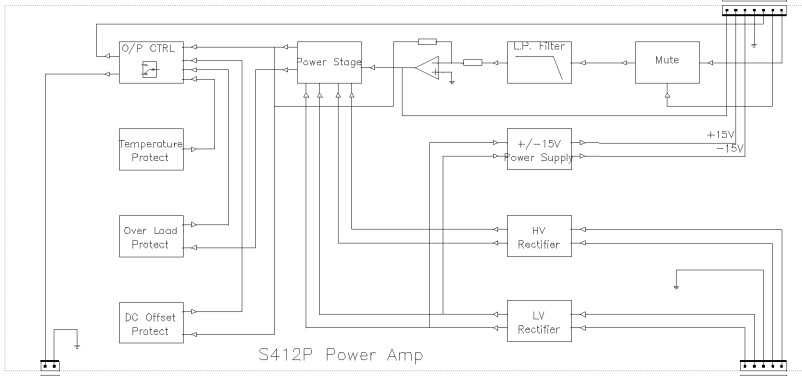
#### NMG 8412P LED PLATE ASSY



REF. NO.	PARTS No.	DESCRIPTION	QTY	REF NO.	PARTS No.	DESCRIPTION	QTY	REF. NO.	PARTS No.	DESCRIPTION	QTY
1	640rp412	Alum. panel 152.4x330.2Lx2.5T Silver/Gray color	1	16	19J2m3613	Mico sheet TO-220 18x13mm	2	31	16210092007	WIRE RED 18AWG 80 mm	1
2	700rc10	Back cover 151.4Wx329.2Lx3Tx102H ABS80V-0	1	17	19J33m2522	Mico sheet TO-3P2 25x22mm	2	32	16210905001	CABLE ASS'Y FOR SPKR OUTPUT OF S412P	1
3	723btD	EVA gasket 150.7mmx14.2mmx1t	2	18	650h128	IC HOLDER	6	33	16210809002	CABLE ASS'Y FOR LED OF S412P	1
4	723ctD	EVA gasket 150.7mmx14.2mmx1t	2	19	06-m3065004	Machine Screw M3.0x6xP0.5	4	34	16250607001	CABLE ASS'Y FOR H-LEVEL INPUT OF S412P	1
5	723ctD	EVA gasket 300mmx14.2mmx1t	4	20	06-m3125003	Machine Screw M3.0x12mm	6	35	16250129001	CABLE ASS'Y 120mA/WG2B WHI	1
6	150e9965502	Transformer EI-96 TT0969980307A	1	21	06-m41013	Machine Screw M4.0x10mm	2	36	703011412	LED Decoration 140.8x24.7x2.6x17.6H	1
7	725at26	Rubber gasket 25 x 21 x 4t W/Tape	4	22	06-m4165009	Machine Screw M4.0x16	2	37	19910336egw	LED 336EGW	2
8	180pbf12ct1s	Power switch PUSH BR12CT1S	1	23	06-n4hw01	Machine Nut M4	2	38	7136p3000	LED HOLDER \M+2A7P\H+2BDE8:PP BLACK	2
9	707ac800	Cable Wire Tie 4K-4 NO-BB	2	24	06-13165007	Machine Screw M3.0x10mm	1	39	156h020030	Heat Shrinking Tube 20mmx30mm	4
10	152us22015	Power Cord 12FT 2PIN Both/Insulation 40/6mm	1	25	06-14165016	Wood Screw 4x16	8	40	16210169001	CABLE ASS'Y 160mm AWG26 WHI/BLK(S412P)	2
11	1555z2020	Fuse Holder R3-11	1	26	10105412p	PCB ASS'Y AMP	1				
12	154v400640	Fuse T50 4.0A 250V 20mm VDE	1	27	06-m30809	Machine Screw M3.0x6xP0.5	8				
13	700ab800	Plastics knob 4x877-W \M+2836E\M+28DE8 P.V.C.	1	28	06-130804	Self Screw 3x8	4				
14	650ab240	PCB Holder L TYPE t=1.6mm S.P.C.C.	4	29	115h104al	Horizontal Resistance 100KA	1				
15	653he10	Heat sink 23.5Wx160x25L Anodize Black	2	30	1740rb242vl	JACK RCA RCB-242V-1	1				



S412P Pre Amp

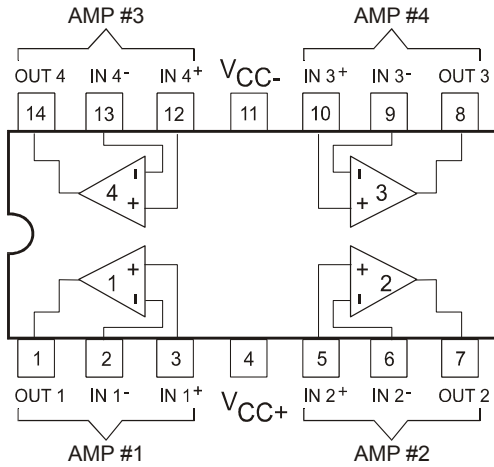


S412P Power Amp



# Integrated Circuit Drawings

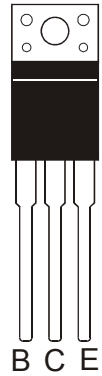
U201,202 (TL074) QUAD OP-AMP



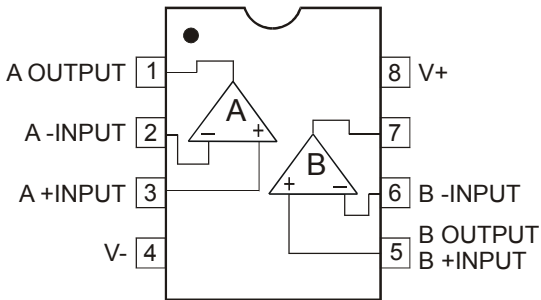
2SC 1815  
2SC 2235  
2SA 1015  
2SA 965



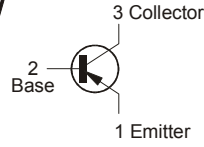
TIP 41C  
TIP 42C



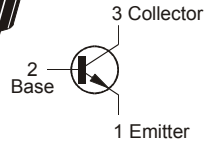
IC101 (4558D) Dual Op Amp  
Dual In-Line Package (top view)



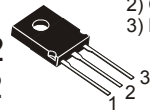
2N 5401



2N5551

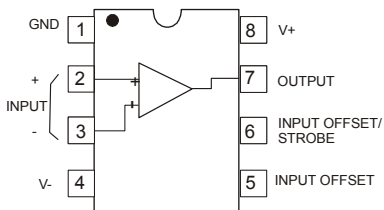


2SD 669  
2SB 649  
KSD 882  
KSB 772

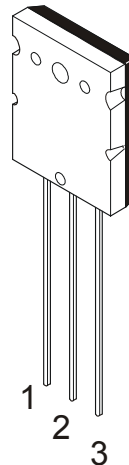


1) Emitter  
2) Collector  
3) Base

IC102 LM311 COMPARATOR



2SC5200  
2SA1943



1. BASE  
2. COLLECTOR (HEAT SINK)  
3. EMMITTER

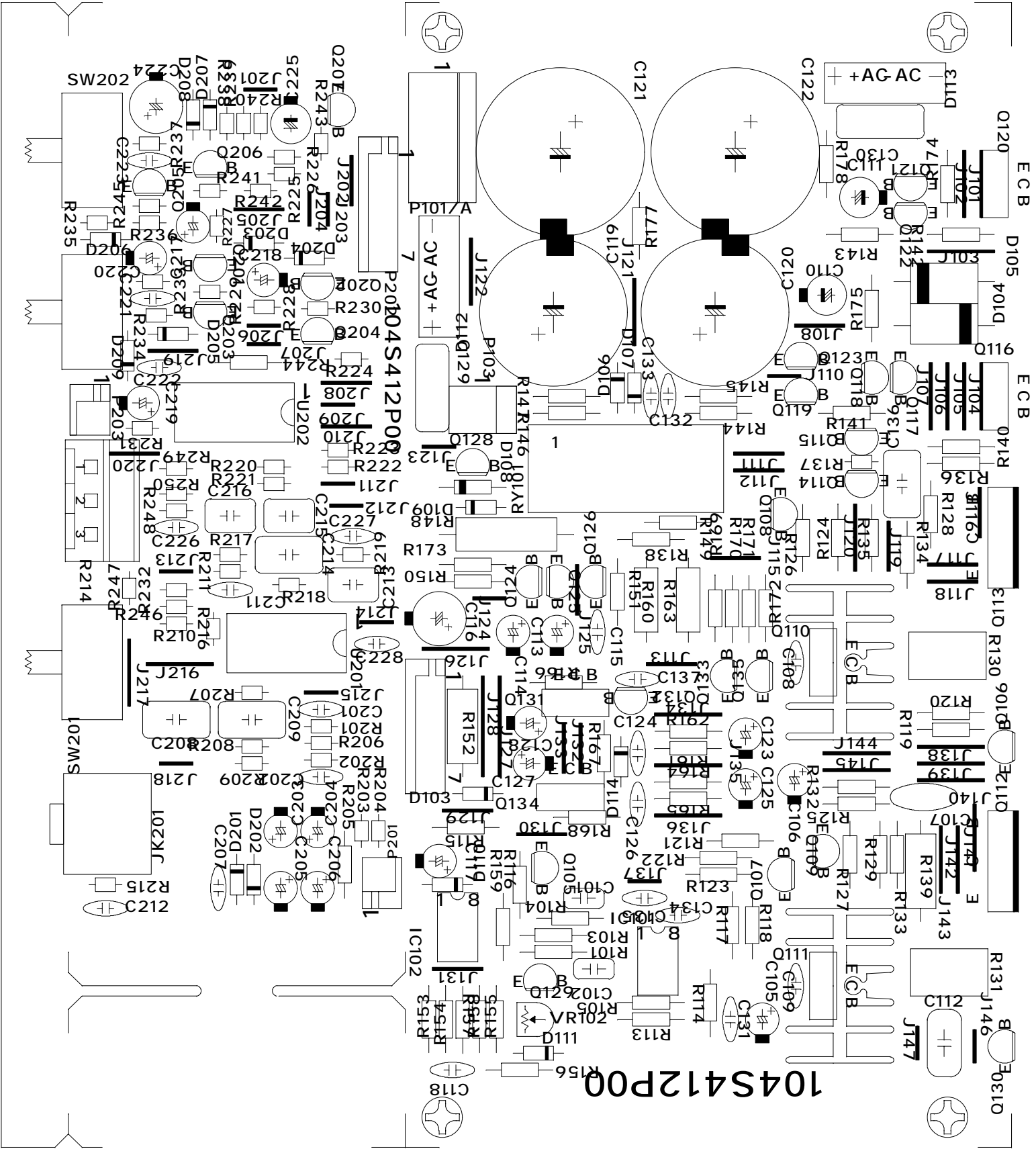
# JBL S412P Amplifier PARTS LIST

Part Number	Description	Q'ty	Designator
<b>Resistors</b>			
11012100j52	resistor 10 ohms 1/2W,+/-5% 52	1	R139
11012182j52	resistor 1.8K 1/2W,+/-5% CF 52	1	R152
11012221j52	resistor 220 ohms,1/2W,+/-5% C	2	R160,163
11014101j26	resistor 100 ohms 1/4W,+/-5% CF	1	R133
11014102j26	resistor 1K 1/4W,+/-5% CF	4	R135,170,171,244
11014103j26	resistor 10K 1/4W,+/-5% CF	3	R105,116,205
11014104j26	resistor 100K 1/4W, +/-5% CF	2	R144,145
11010105j26	resistor 1M 1/4W, +/-5% CF	1	R159
11014151j26	resistor 150 ohms, 1/4W CF	2	R126,127
11014152j26	resistor 1.5K 1/4W,+/-5% CF	2	R113,134
11014153j26	resistor 15k 1/4W,+/-5% CF	3	R121,166,168
11014182j26	resistor 1.8k 1/4W,+/-5% CF 27r	1	R167
11014220j26	resistor 22 ohms 1/4W,+/-5% CF	2	R128,129
11014222j26	resistor 2.2k 1/4W,+/-5% CF 27r	3	R161,164,173
11014223j26	resistor 22k 1/4W,+/-5% CF 28m	5	R103,104,115,141,143
11014271j26	resistor 270 ohms 1/4W,+/-5% C	2	R162,165
11014332j26	resistor 3.3K 1/4W,+/-5% CF	3	R117,118,136
11014333j26	resistor 33K 1/4W,+/-5% CF	1	R101
11014392j26	resistor 3.9K 1/4W,+/-5% CF	2	R122,123
11014470j26	resistor 47 ohms 1/4W,+/-5% CF	2	R124,125
11014471j26	resistor 47 ohms 1/4W,+/-5% CF	1	R147
11014472j26	resistor 4.7K 1/4W,+/-5% CF	5	R140,142,151,156,157
11014473j26	resistor 47K 1/4W,+/-5% CF	4	R138,149,150,158
11014510j26	resistor 51 ohms 1/4W,+/-5% CF	1	R132
11014512j26	resistor 5.1K 1/4W,+/-5% CF	1	R120
11014562j26	resistor 5.6K 1/4W,+/-5% CF	1	R155
11014682j26	resistor 6.8K 1/4W,+/-5% CF	3	R119,146,153
11014683j26	resistor 68K 1/4W,+/-5% CF	3	R114,169,172
11014911j26	resistor 910 ohms 1/4W,+/-5% C	1	R154
11016100j26	resistor 10 ohms 1/6W,+/-5% CF	1	R224
11016102j26	resistor 1K 1/6W,+/-5% CF	1	R236
11016103j26	resistor 10K 1/6W,+/-5% CF	9	R206,210,216,219,222,239,246,247,248
11016104j26	resistor 100K 1/6W,+/-5% CF	4	R203,204,227,228
11016105j26	resistor 1M 1/6W,+/-5% CF	1	R242
11016151j26	resistor 150 ohms 1/6W,+/-5% C	1	R235
11016154j26	resistor 150K 1/6W,+/-5% CF	1	R234
11016183j26	resistor 18K 1/6W,+/-5% CF	1	R240
11016221j26	resistor 220 ohms 1/6W,+/-5% C	2	R229,230
11016223j26	resistor 22K 1/6W,+/-5% CF	3	R237,243,245
11016224j26	resistor 220K 1/6W,+/-5% CF	1	R215
11016271j26	resistor 270 ohms 1/6W,+/-5% C	1	R226
11016275j26	resistor 2.7M 1/6W,+/-5% CF	1	R238
11016332j26	resistor 3.3K 1/6W,+/-5% CF	2	R223,225
11016333j26	resistor 33K 1/6W,+/-5% CF	1	R137
11016363j26	resistor 36K 1/6W,+/-5% CF	1	R221
11016432j26	resistor 4.3K 1/6W,+/-5% CF	4	R201,202,217,218
11016472j26	resistor 4.7K 1/6W,+/-5% CF	1	R241
11016473j26	resistor 47K 1/6W,+/-5% CF	3	R231,232,233
11016512j26	resistor 5.1K 1/6W,+/-5% CF	1	R211
11016563j26	resistor 56K 1/6W,+/-5% CF	1	R207
11016912j26	resistor 9.1K 1/6W,+/-5% CF	1	R220
11010331j20	resistor 330 ohms 1W, +/-5% 20	1	R148
11350r10j20	ceramic resistor 0.1 ohms 5W,+/-	2	R130,131
11403302m0	trimmer resistor 3K 0.3W +/-20%	1	VR102
115h104a1	variable resistor 100K	1	R214
<b>Capacitors</b>			
129a184j633	plastic capacitor .18U 63V +/-5%	2	C213,214
129a394j633	plastic capacitor .39uF 63V +/-5%	2	C215,216
1302b101k503	disk capacitor 100P 50V +/-10%	2	C108,109

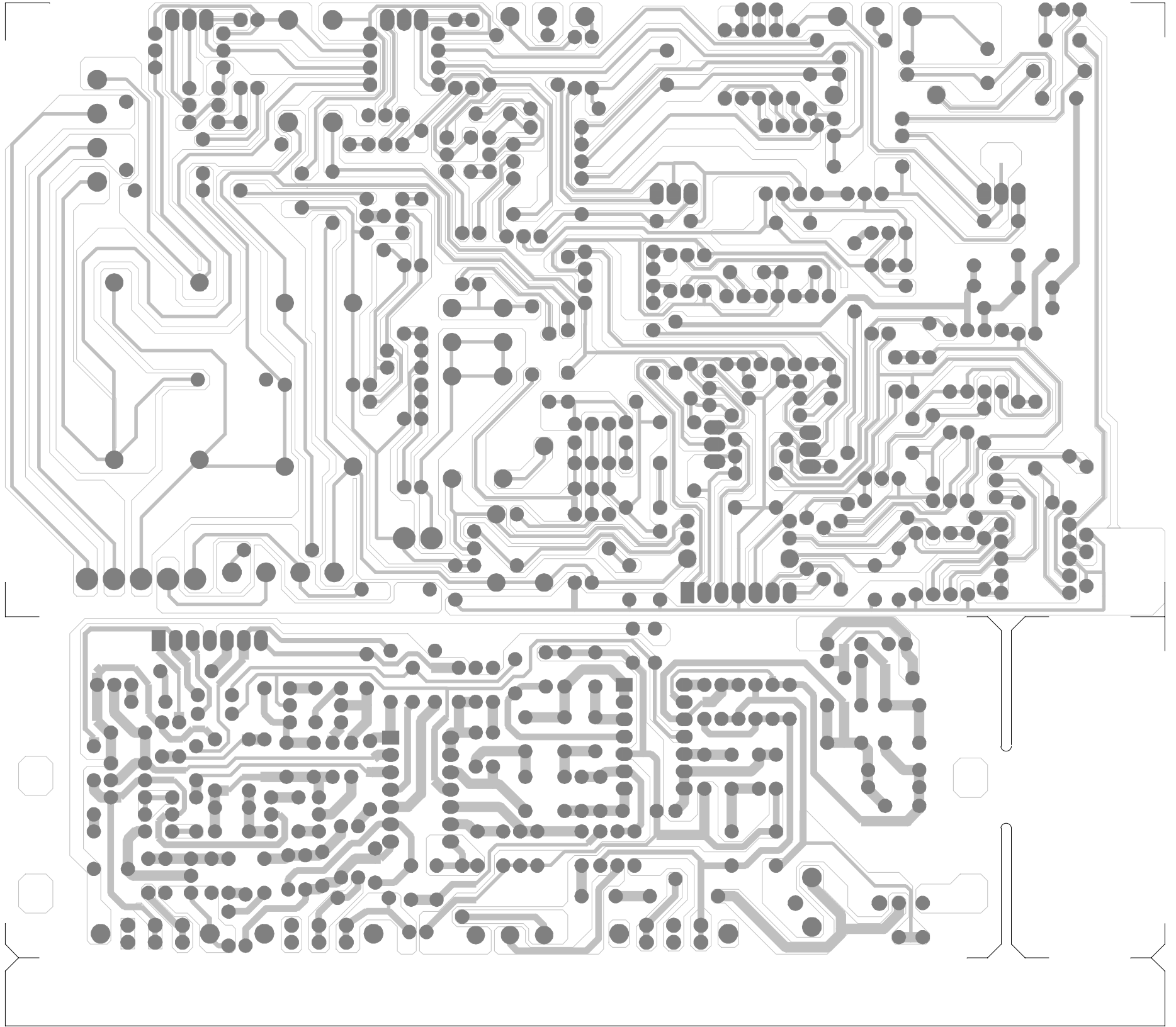
Part Number	Description	Q'ty	Designator
1302g472md00	disk capacitor 4700P 400V +/-20	1	C001
1302b221k503	disk capacitor 220P 50V +/-10%	5	C131,201,202,211,221
1302f104m503	disk capacitor 0.1U 50V +/-20%	1	C107
1302f104z503	disk capacitor 0.1U 50V +80/-20	10	C118,124,126,132,133,134,135,223, 227,228
1303f102k503	disk capacitor 0.001U 50V +/-10	2	C137,207
1303f473m503	disk capacitor 0.047U 50V +/-20	1	C212
130s1470k503	disk capacitor 47P 50V +/-10% @	1	C222
132102j503	mylar capacitor 0.001U 50V +/-5	1	C102
132104j503	mylar capacitor 0.1U 50V +/-5%	2	C112,136
132222j503	mylar capacitor 0.0022U 50V +/-	1	C101
132683j503	mylar capacitor 0.068U 50V +/-5	2	C226,229
1353105m50	electrolytic capacitor 1U 50V+/-2	2	C106,219
1353106m50	electrolytic capacitor 10U 50V+/-	5	C204,205,217,218,220
1353107m16	electrolytic capacitor 100uF 16V-	5	C115,117,127,128,225
1353107m50	electrolytic capacitor 100U 50V+	2	C110,111
1353227m16	electrolytic capacitor 220U 16V+	2	C116,224
1353476m25	electrolytic capacitor 47U 25 V+/-	5	C105,113,114,123,125
132223kb50	mylar capacitor 0.022uF 250V,+/-	2	C129,130
1354478m50	electrolytic capacitor 4700uF 50V	2	C119,120
1354478m63	electrolytic capacitor 4700uF 63V	2	C121,122
	<b>Transistors</b>		
192027c1815gr	transistor 2sc1815gr @0.50	13	Q105,107,122,124,125,126,128,132, 133,201,203,205,206,207,
192027c2235y	transistor 2sc2235y	1	Q117
192028a1015gr	transistor 2sa1015gr @0.51	5	Q118,129,135,202,204
192028a965y	transistor 2sa965y	1	Q121
1921672n5551	transistor 2n5551	3	Q108,114,119
1921682n5401	transistor 2n5401 Ai-pnp 350V 5	3	Q109,115,123
192021c1815gr	transistor 2sc1815gr	2	Q106,130
192021c5200o	transistor 2sc5200o	1	Q113
192021d669a	transistor 2sd669a	1	Q111
192022a1943o	transistor 2sa1943o	1	Q112
192022b649a	transistor 2sb649a	1	Q110
192161tip41c	transistor tip41c NPN SGS	1	Q120
192162tip42c	transistor tip42c PNP SGS	1	Q116
192201d882y	transistor ksd882y	1	Q131
192202b772y	transistor ksb772y	1	Q134
	<b>Integrated Circuits</b>		
19006m4558d	I.C. 4558D Dual Op-Amp	1	IC101
19016m311n	I.C. LM311 Comparator	1	IC102
19016t1074cn	I.C. TL074CN Quad Op-Amp	2	U201,202
	<b>Diodes</b>		
197131n4148	diode 1n4148	13	D103,106,107,109,111,201,202,203, 204,206,207,208,209
19915000333	zener diode 3.3V 1/2W	1	C205
19915000623	zener diode 6.2V 1/2W	1	D110
19915001503	zener diode 15V 1/2W	1	D114
19700kb1405	bridge diode 4A 500V KBL405	2	D112,113
197101n4002	diode 1N4002 @0.24	1	D108
197101n5402	diode 1N5402 @0.18	2	D104,105
	<b>Misc.</b>		
156b010010	isolating tube for light bulb	2	Q106,30
16250129001	cable assembly 120mm AWG28	1	
171ugs2121	relay MI-SH-212L @22	1	RY101
06-m3085004	machine screw M3*8*P0.5	4	<b>R/P to BRKT-4</b>
06-m3125003		6	<b>R/P to IC/H-6</b>
06-m41013	machine screw M3*10	2	<b>x'former-2</b>
06-m4165009	machine screw M4*16	2	<b>x'former-2</b>
06-n4hw01	machine nut M4	2	<b>x'former-2</b>

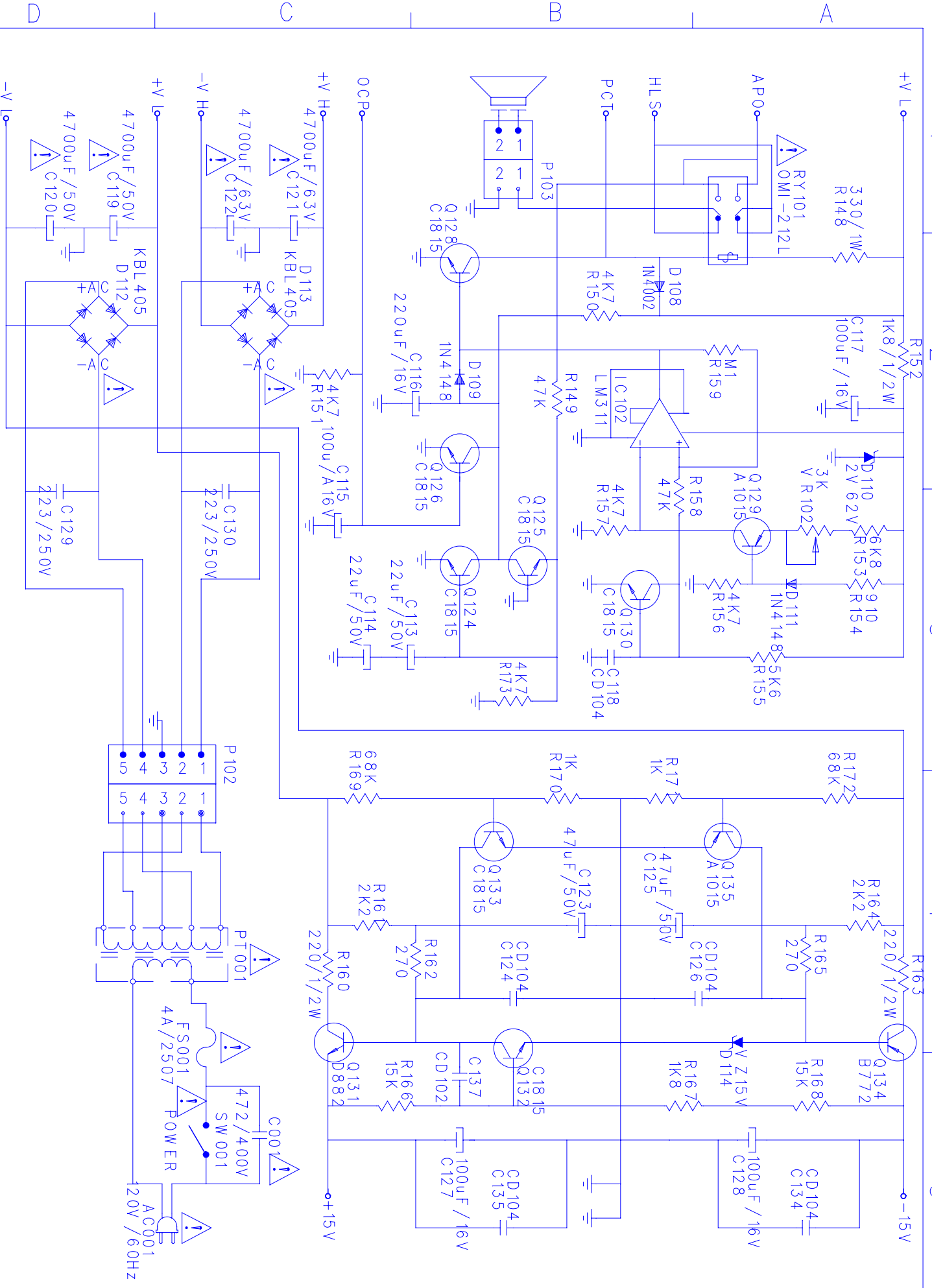


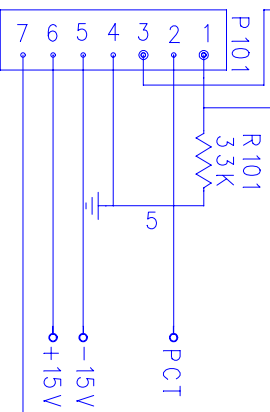
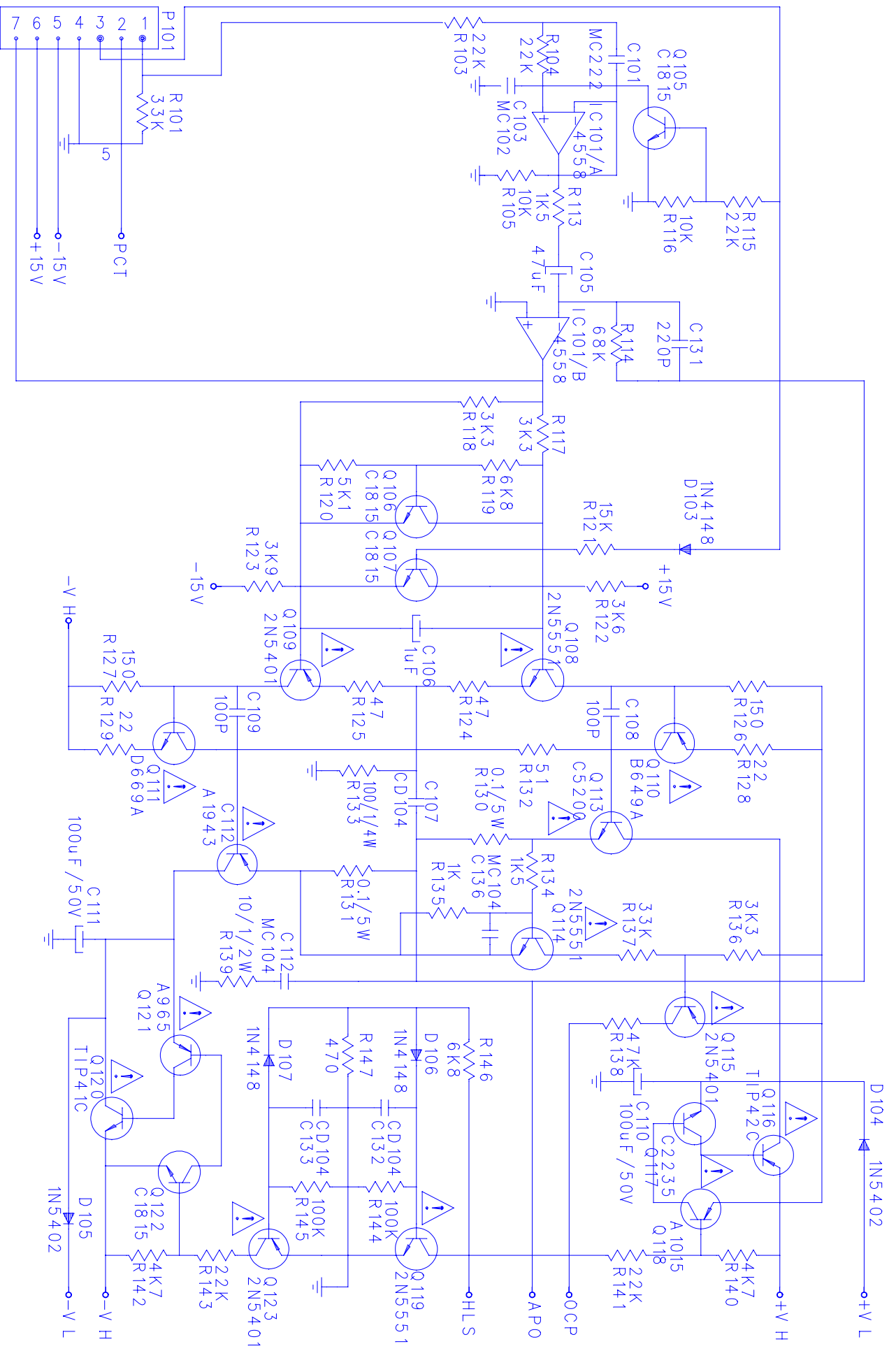
Part Number	Description	Q'ty	Designator
06-t3105007	screw M3*10	1	<b>R/P to RCA jack-1</b>
06-t4165016	screw 4*16	8	<b>R/P to R/C-8</b>
1010S412P	PCB ass'y	1	
06-m30809	machine screw M3*8*P0.5	8	<b>PCB to Brkt-8</b>
06-t30804	screw 3*8	4	<b>IC to H/S-2, PCB to H/S-2</b>
101AS412P	AI Ass'y	1	
1740rcb242v1	jack RCA RCB-242V-1	1	JK201
1751c02v01	connector 2pin 2.5mm pitch	2	P201,3
1751c07v01	connector 7pin 2.5mm pitch	1	P101
1751d02v01	connector 2pin 3.96mm pitch	1	P103
1751d05v01	connector 5pin 2.5mm pitch	1	P102
180tms7210v	switch slide 6pin MS7210V	2	SW202,3
650sub240	PCB holder L-type 1.6mm S.P.C	4	
653hs10	heat sink 23.5*16*25	2	Q110,1
150e0965502	transformer EI-96 TT096980307	1	PT001
152ua22015	wire connector 12ft 2pin, blk, 40/	1	
154v40006t0	fuse TSD 4.0A,250V 20mm VDE	1	FS001
155520020	fuse holder R3-11	1	
16210082007	wire red 18 AWG 80mm, #1015	1	
16210605001	cable ass'y for speaker output	1	
16210609002	cable ass'y for LED	1	
16250602001	cable ass'y for HI-Level input	1	
176wjce1	close end terminal CE-1	1	
180pbr12c11s	power switch push BR12C11s	1	SW001
1932m1813	mica isolator To-220 18*13mm	2	Q116,20
1933m2520	mica isolator To-3P 25*22mm	2	Q112,3
640rp412	aluminum back panel 152.4*330	1	
650ih125	IC holder	6	IC-6
700kb800	plastic knob 46077-W PVC	1	
700rc10	housing 151.4*329.2*102 ABS90	1	
723a10	EVA gasket 300*14.2*1	4	
723b10	EVA gasket 150.7*14.2*1	2	
723c10	EVA gasket 150.7*14.2*1	2	
725a125	rubber gasket 25*21*4	4	for XFORMER-4
<b>S412P LED Plate Ass'y</b>			1 set
156h020030	isolating tube 20mm*30mm	4	
16210169001	cable ass'y 160mm awg26 wht/bl	2	
19510336egw	Bipolar LED light 336EGW	2	
700lt412	LED plate 140.8*24.7*2.6*17.6 s	1	
713bp3000	LED holder, PP/blk	2	



104S412P00

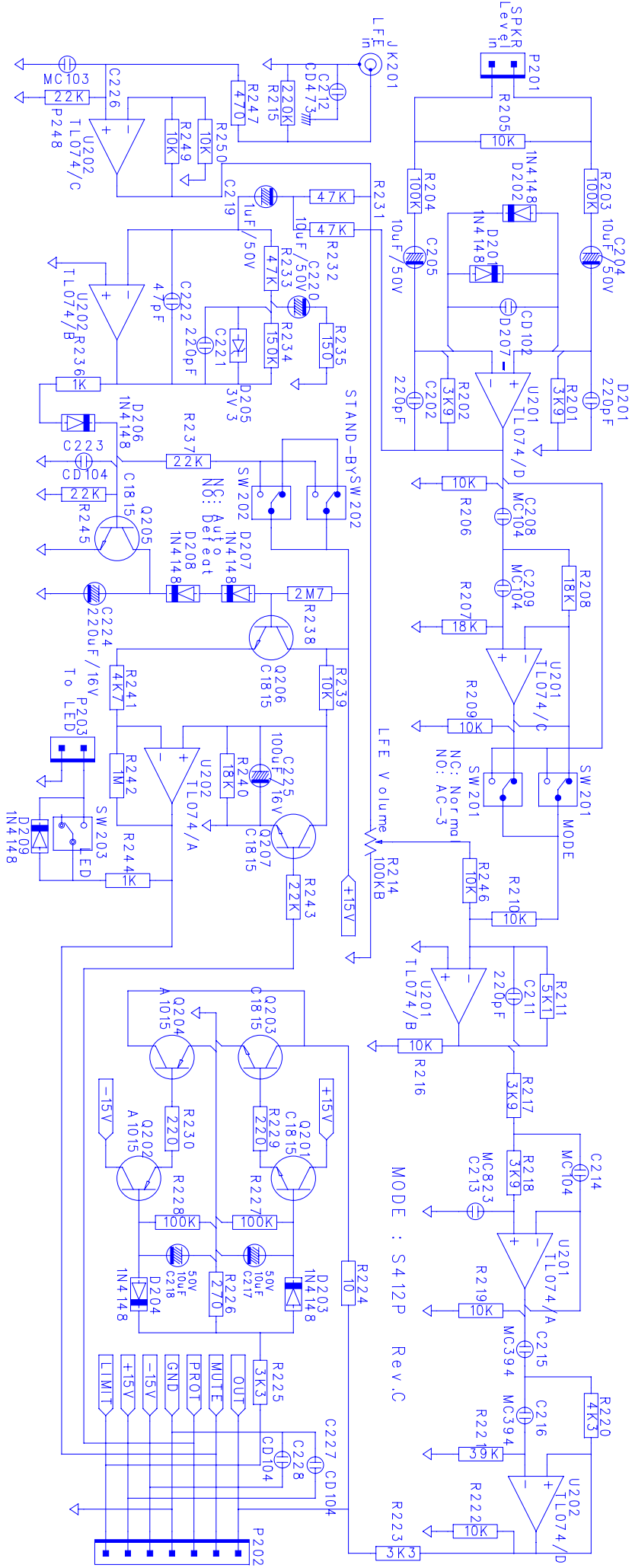






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MODE : S412P Rev.C

