Surround Cinema

SUB500

Amplifier/Subwoofer

SERVICE MANUAL

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

Released 2007 Rev0 6/2007
Discontinued XXXX

Note: The SUB500 is part of the SCS500.5 system

Satellite loudspeakers SCS500SAT: order JBL part# SCS500BK SAT-E
Center channel SCS500CEN: order JBL part# SCS500BK CEN-E

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SUB500 BASIC SPECIFICATIONS

Amplifier Output	150 Watts RMS
Frequency Response	30Hz – 120Hz (–6dB)
Woofer	10" (254mm)
Enclosure	Bass-reflex
Dimensions (H x W x D) (including feet)	20" x 13-3/4" x 15-3/4" (508mm x 349mm x 400mm)
Weight	35 lb (15.9kg)

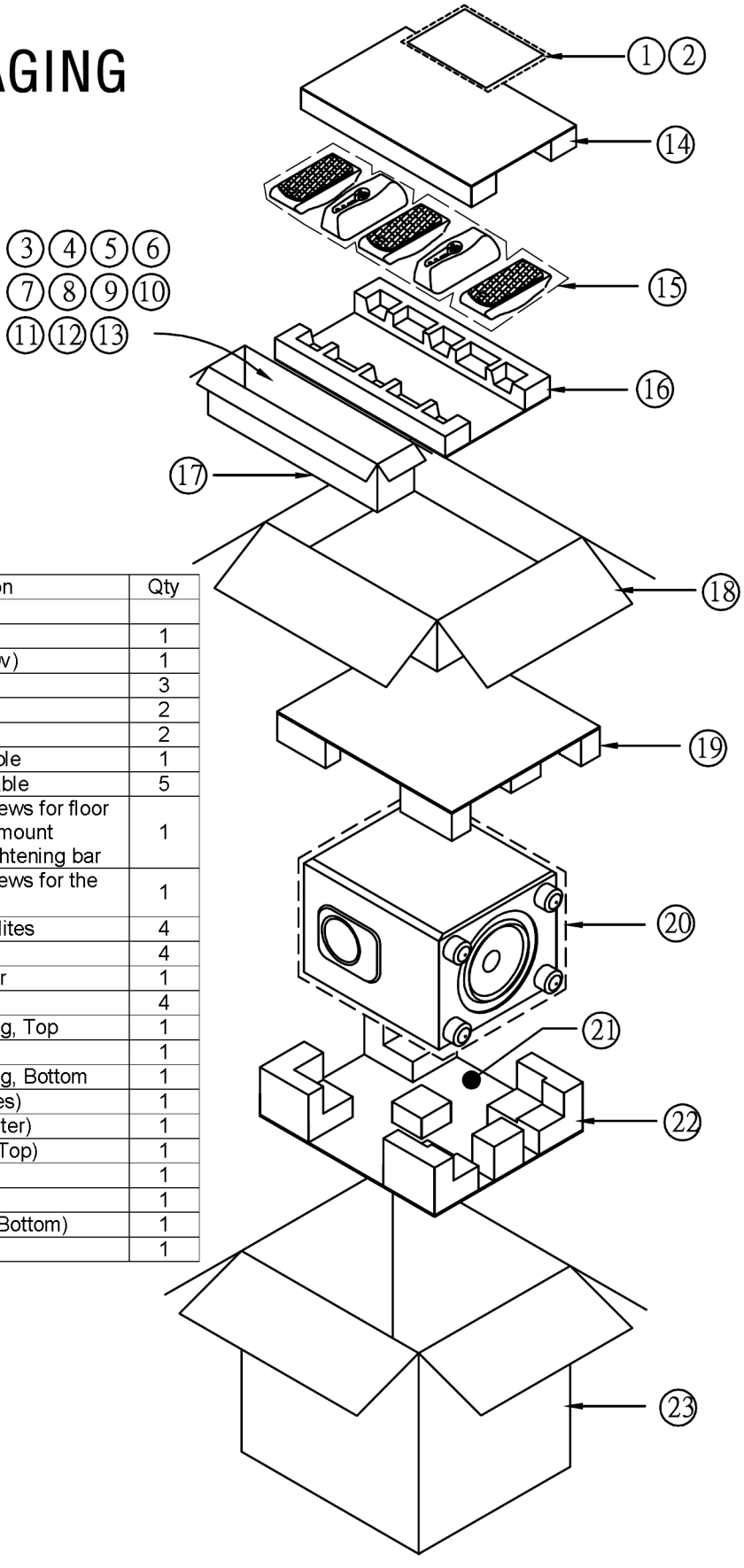
Occasional refinements may be made to existing products without notice but will always meet or exceed original specifications unless otherwise stated

JBL SUB 500 150W Powered Sub/ Plate Amp					
LINE VOLTAGE	**Yes/No**	**Hi/Lo Line**	**Unit**	**Notes**	
US 120VAC/60Hz	Yes	108-132	Vrms	Normal Operation	
Asia 100VAC/50Hz	Yes	90-110	Vrms	Normal Operation	
EU 230VAC/50-60Hz	Yes	207-264	Vrms	Normal Operation	Normal operation, MOMS required
Parameter	**Specification**	**Unit**	**QA Test Limits**	**Conditions**	**Notes**
Amp Section					
Type (Class AB, D, other)	D	D	N/A		
Load Impedance (speaker)	4	Ohms	N/A	Nominal	
Rated Output Power	150	Watts	140	1 input driven	
THD@ Rated Power	0.5	%	1	22KHz filter	
THD @ 1 Watt	0.1	%	0.3	22KHz filter	
DC Offset	10	mV-DC	50	@ Speaker Outputs	
Damping factor	>100	DF	30		Measured at speaker terminals, Output power 140 Watts THD 0.1 %
Input Sensitivity					
Input Frequency	50	Hz	50	Nominal Freq.	1 input driven
Line Input (L&R)	250	mVrms	±2dB	To rated power	1 input driven
LFE Input	145	mVrms	±2dB	To rated power	LFE input driven only
Speaker/Hi Level Input	2.5	Vrms	±2dB	To rated power	(-20 dB below Line In)...1 input driven
Signal to Noise					
SNR-A-Weighted	100	dBA	85	rel. to rated power	A-Weighting filter
SNR-unweighted	90	dBr	80	rel. to rated power	22KHz filter
SNR @ 1W-unweighted	60	dBr	55	rel. to 1W Output	22KHz filter
Residual Noise Floor	1	mVrms	2	Volume @max, using RMS reading DMM/VOM (or A/P)	
Residual Noise Floor	1	mVrms(max)	2	Volume @max, w/ A/P Swept Bandpass Measurement (Line freq.+ harmonics)	
Input Impedance					
Line input L&R , LFE	>10	K ohms	N/A	Nominal	
Speaker/Hi Level Input	4.7	K ohms	N/A	Nominal	
Filters					
Left & Right Low Pass fixed	Hz	--	±2dB		
Slope & Q	4th	dB/Octave	N/A		
LFE Low Pass fixed	Hz	--	±2dB		
Slope & Q	2nd	dB/Octave	N/A		
Subsonic filter (HPF)	Hz	--	±2dB		
Slope & Q	2nd	dB/Octave	N/A		
Limiter (yes/no)	YES	--	N/A		
THD at Max. Output Power	N/A	--	N/A		
Features					
LFE Input	YES		functional		BW Limited to 500 Hz
Volume pot Taper (lin/log)	log	--	functional		
ATO	YES		functional		
Input Configuration					
Line In (L,R)	L ,R	--	functional		RCA inputs: L , R Summed to Mono
Line level in LFE	LFE		functional		
Spkr/Hi Level In (L,R)	L,R	--	functional		L R Summed to Mono
Spkr Out: Level out (L,R)Hi P	L,R		functional		Direct by pass from Speaker in
Signal Sensing (ATO)					
ATO test Frequency	50	Hz	functional		
ATO Line Level	2	mV	functional	2mV@50Hz into Line Input w/ 1 ch. driven	
ATO Speaker level input	50	mV	fucntional	50mV@50Hz into Line Input w/ 1 ch. driven	
ATO Turn-on time	5	ms	functional	Amp connected and AC on, then input signal applied	
Auto Mute/ Turn-OFF Time	15	minutes	functional	T before muting, after signal is removed	Auto turn of time (T) must be 10 > T <15

SUB500 (SCS500.5 Subwoofer)

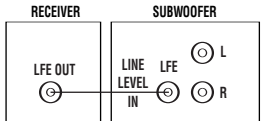
Parameter	Specification	Unit	QA Test Limits	Conditions	Notes
Power on Delay time	3	sec.	functional	AC Power Applied	
Transients/Pops					
ATO Transient	5	mV-peak	10	@ Speaker Outputs	
Turn-on Transient	50	mV-peak	100	@ Speaker Outputs	AC Line cycled from OFF to ON
Turn-off Transient	50	mV-peak	100	@ Speaker Outputs	AC Line cycled from ON to OFF
Efficiency					
Stand-by Input Power	14	Watts	15	@ nom. line voltage	Maximum allowable input power under nominal Input voltage and frequency, HOT or COLD operation.
Power Cons.@rated power	250	Watts	260	@ nom. line voltage	150 Watts @ 4 Ohms nominal line voltage
Protection					
Short Circuit Protection	YES	--	functional	Direct short at output	
Thermal Protection	65 deg. C	--	functional	@1/8 max unclipped Power	Temperature rise should not exceed 35K rise
DC Offset Protection	YES	--	functional	DC present at Speaker Out leads	Relay or crowbar (for driver/fire protection)
Line Fuse Rating					
US Version	2.5	Amps		Type-T or Slo Blo	External fuse with UL/SEMKO rated holder
EU Version	1.6	Amps		Type-T or Slo Blo	External fuse with UL/SEMKO rated holder

SCS500.5 PACKAGING



Item #	Part Number	Description	Qty
1	405-000-05181-E	Warranty Card	1
2	406-000-05677-E	Owner's Manual (120v)	1
3	370-000-05067-E	20 ft. Speaker Cable	3
4	370-000-05069-E	40 ft. Speaker Cable	2
5	166-015F04XX-E	15 ft. Speaker Cable	2
6	370-000-05068-E	15 ft. (4.6m) RCA cable	1
7	326-ABS-05013-0BAE	Wall Bracket, Adjustable	5
8	371-000-05137-E	Hardware Bag B (screws for floor stand adapters, wall-mount brackets, & metal tightening bar	1
9	371-000-05138-E	Hardware Bag A (screws for the shelf stands	1
10	398-ABS-05247-0BAE	Shelf stands for satellites	4
11	325-ABS-00436-0BBE	Floor stand adapter	4
12	398-ABS-05043-0BBE	Shelf stand for Center	1
13	354-GC250703-0BBE	Nut, ¼ x 20 Blk	4
14	431-000-05798-E	Sats + Center Packing, Top	1
15		Cotton Bag	1
16	431-000-05797-E	Sats + Center Packing, Bottom	1
17	401-000-05095-E	Inner Box (accessories)	1
18	401-000-05096-E	Inner Box (sats + center)	1
19	431-000-05799-E	Subwoofer Packing (Top)	1
20		Plastic bag	1
21		Dessicant	1
22	431-000-05800-E	Subwoofer Packing (Bottom)	1
23	402-000-05868-E	Outer Carton (120v)	1

DOLBY® DIGITAL OR DTS® (OR OTHER DIGITAL SURROUND MODE) CONNECTION



Use this installation method for Dolby Digital, DTS or other digital surround processors:

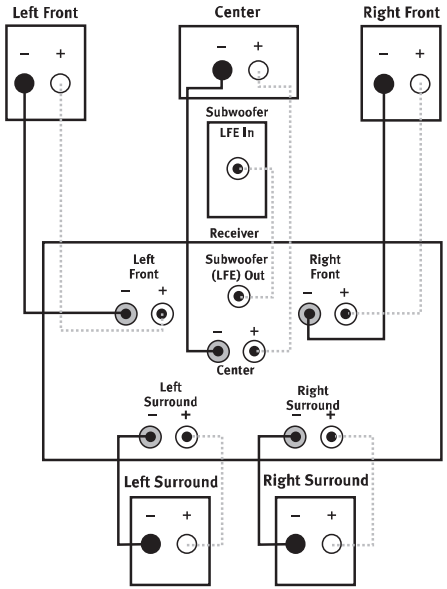
Use the line-level input jack marked "LFE" for the Low-Frequency Effects channel. Connect this jack to the LFE output or subwoofer output on your receiver or amplifier. Connect each speaker to the corresponding speaker terminals on your receiver or amplifier.

Make sure that you have configured your surround sound processor for "Subwoofer On." Also configure your receiver for 5.1-channel operation, as appropriate. The front left, front right, center and surround speakers should all be set to "Small." If your receiver allows you to set the crossover frequency between the subwoofer and the main speakers, select 100Hz or the setting that is the closest frequency below it.

® (NON-DIGITAL) – LINE LEVEL

Use this installation method for Dolby Pro Logic applications (not Dolby Digital, DTS or other digital processing), where the receiver/processor is equipped with a subwoofer output, or a volume-controlled preamp (line-) level output:

Use RCA-type interconnects to connect the line-level subwoofer outputs on your receiver or amplifier to the line-level inputs on the subwoofer. IMPORTANT: Do not use the LFE input on the subwoofer with Dolby Pro Logic processors.



NOTE: If your receiver or amplifier only has one subwoofer output jack, then you will need to use a Y-connector (not included). Plug the male end of the Y-connector into your receiver or amplifier's subwoofer output jack, and connect each of the two female ends to separate RCA-type interconnects. Finally, plug the RCA-type interconnects into the line-level inputs on the subwoofer.

Connect each speaker to the corresponding speaker terminals on your receiver or amplifier.

Make sure your receiver or processor is correctly configured to indicate that the subwoofer is "On."

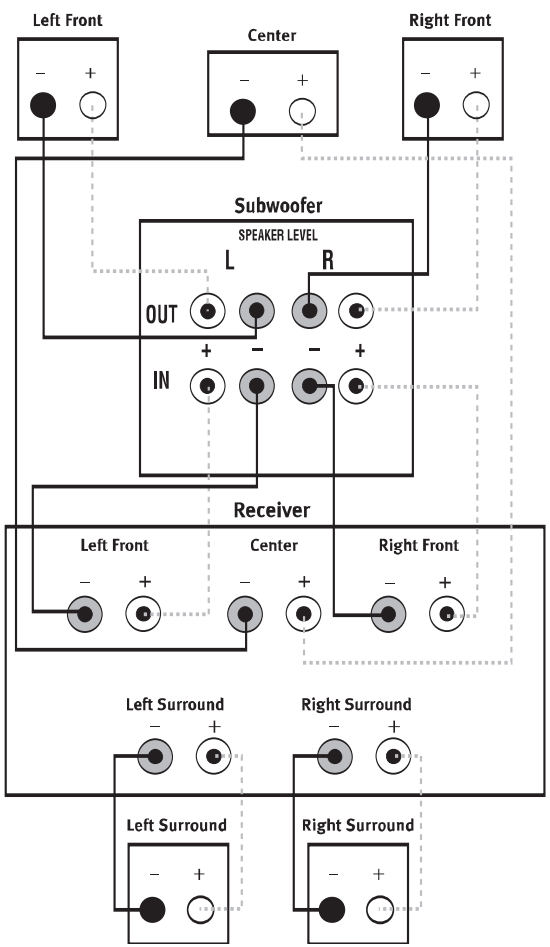
Note for advanced users: If your receiver/processor has a built-in low-pass crossover filter for the subwoofer output, you may use the LFE input to bypass the subwoofer's internal crossover.

DOLBY PRO LOGIC (NON-DIGITAL) – SPEAKER LEVEL

Use this installation method for Dolby Pro Logic applications (not Dolby Digital, DTS or other digital processing), where the receiver/processor does not have a subwoofer output, or a volume-controlled preamp (line-) level output:

Connect your receiver or amplifier's front left and right speaker terminals to the left and right terminals on the subwoofer that are marked "Speaker Level In." Connect the left and right terminals on the subwoofer that are marked "Speaker Level Out" to the corresponding terminals on the back of your front left and right speakers.

Connect your receiver or amplifier's center, surround and surround back speaker terminals to the corresponding terminals on the back of your center and surround speakers.

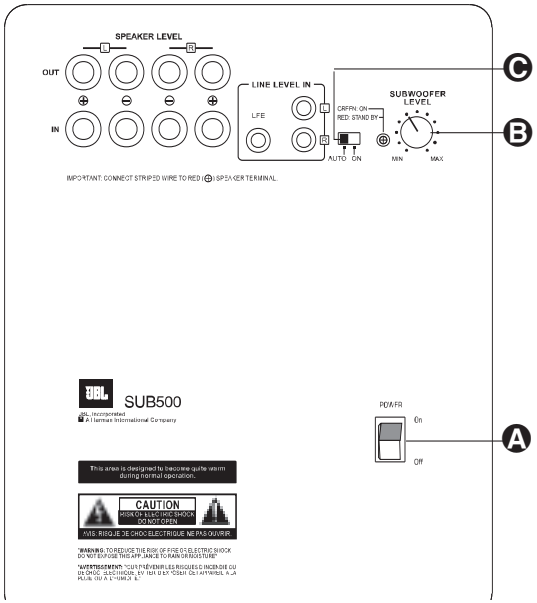


OPERATION

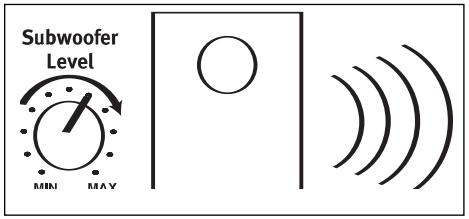
Move the Master Power switch (marked "Power" Ⓐ) to the "•" (On) position to use the subwoofer. The SUB500 subwoofer will automatically turn on or go into standby (sleep) mode when left in the auto mode ("Auto/On" switch Ⓒ in the "Auto" position). When your receiver or amplifier is off, or is not sending program material to the subwoofer, the subwoofer will be in standby mode (LED will be red). When the subwoofer senses an audio signal, it will automatically turn on (LED will be green). If the subwoofer does not sense a signal after approximately 20 minutes, it will automatically go into standby mode.

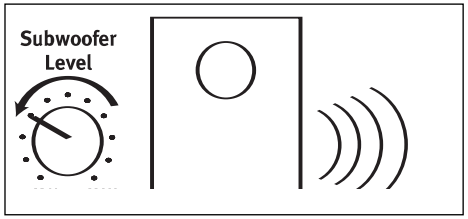
When the "Auto/On" switch Ⓒ is switched to the "On" position, the subwoofer will remain on, whether or not program material is playing.

If you will be away from home for an extended period of time, or if the subwoofer will not be used, switch the Master Power switch Ⓐ to the Off position.



VOLUME





Volume may be adjusted using the Subwoofer Level control Ⓑ as shown.

TROUBLESHOOTING

If there is no sound from any of the speakers:

- Check that receiver/amplifier is on and a source is playing.
- Check that the powered subwoofer is plugged in, and its Power switch Ⓐ is switched on ("•" position).
- 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, or touching each other.
- 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, or touching each other.
- In Dolby Digital or DTS modes, make sure that the receiver/processor is configured so that the speaker in question is enabled.
- Turn off all electronics and switch the speaker in question with one of the other speakers that are working correctly. Turn everything back on, and determine whether the problem has followed the speaker, or has remained in the same channel. If the problem is in the same channel, the source of the problem is most likely with your receiver or amplifier, and you should consult the owner's manual for that product for further information. If the problem has followed the speaker, consult your dealer for further assistance or, if that is not possible, visit www.jbl.com.

If there is no sound from the center speaker:

- Check all wires and connections between receiver/amplifier and speaker. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured, or touching each other.
- If your receiver/processor is set in Dolby Pro Logic mode, make sure the center speaker is not in phantom mode.
- If your receiver/processor is set in one of the Dolby Digital or DTS modes, make sure the receiver/processor is configured so that the center speaker is enabled.

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, or touching each other.
- If more than one pair of main speakers is being used, check the minimum impedance requirements of your receiver/amplifier.

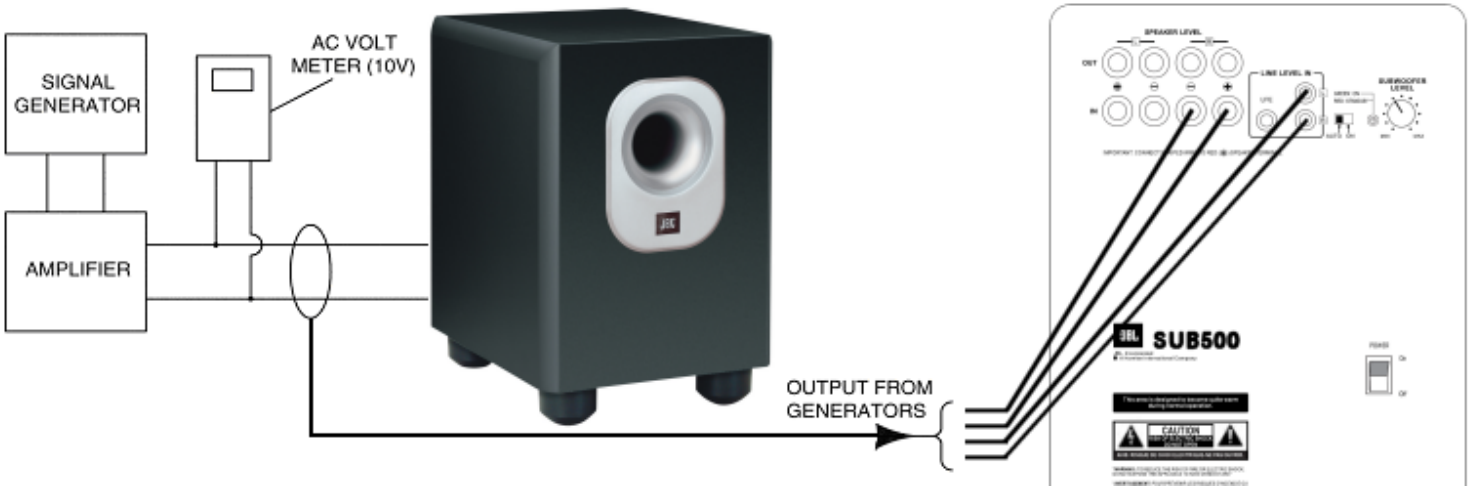
If there is low (or no) bass output:

- Make sure the connections to the left and right "Speaker Inputs" have the correct polarity (+ and –).
- Make sure the subwoofer is plugged into an active electrical outlet, and is turned on (Power switch Ⓐ in the "•" position).
- In Dolby Digital or DTS modes, make sure your receiver/processor is configured so that the subwoofer and LFE output are enabled.

If there is no sound from the surround speakers:

- 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, or touching each other.
- Review proper operation of your receiver/amplifier and its surround sound features.
- Make sure the movie or TV show you are watching is recorded in a surround sound mode. If it is not, check to see whether your receiver/amplifier has other surround modes you may use.
- In Dolby Digital or DTS modes, make sure your receiver/processor is configured so that the surround speakers are enabled.
- Review the operation of your DVD player and the jacket of your DVD to make sure that the DVD features the desired Dolby Digital or DTS mode, and that you have properly selected that mode using both the DVD player's menu and the DVD disc's menu.

SUB500 TEST PROCEDURE



SYSTEM AURAL SWEEP TEST

Equipment needed:
- Function/signal generator/sweep generator
- Integrated Amplifier
- Multimeter
- Speaker cables

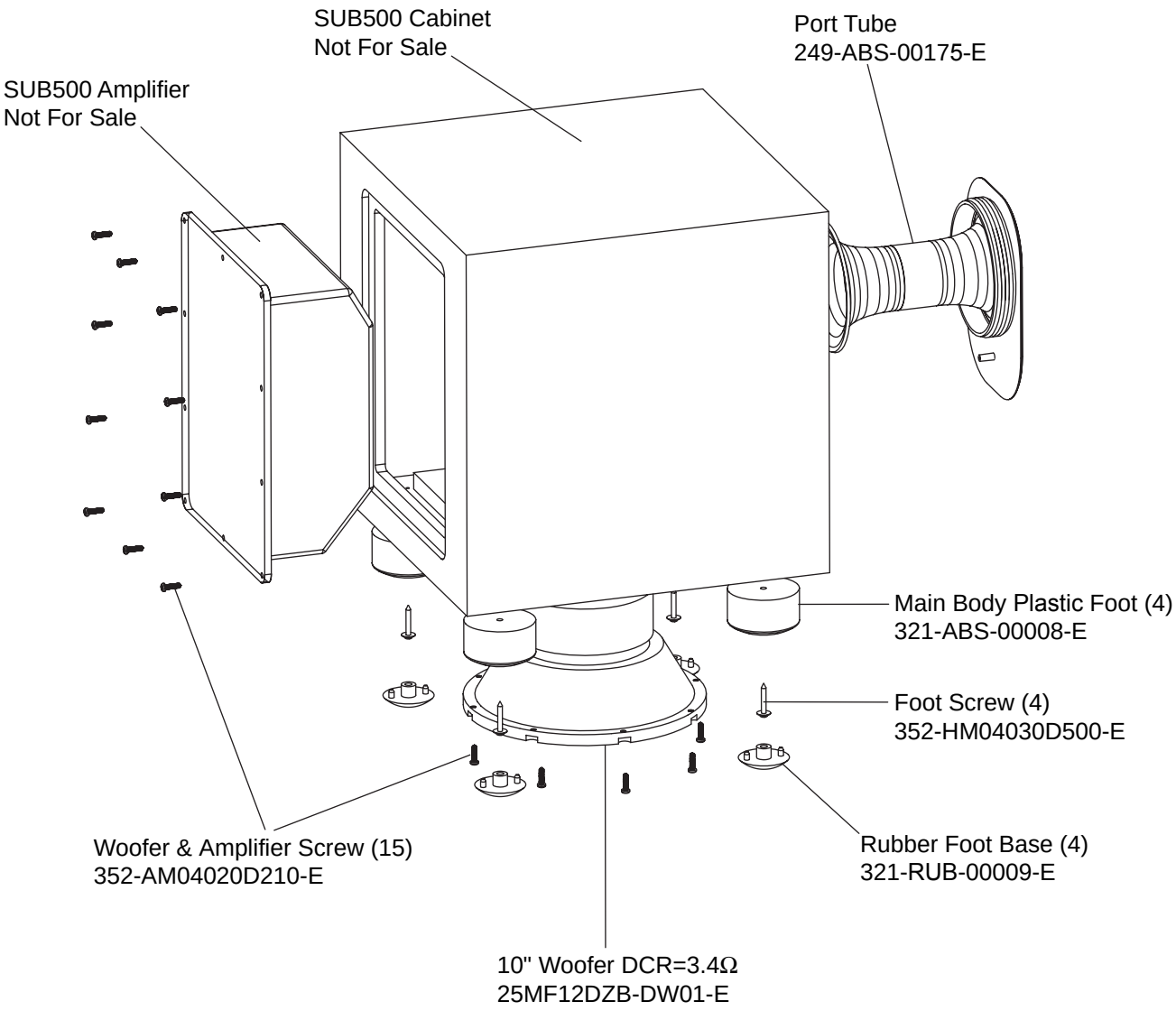
General Unit Function (UUT = Unit Under Test)
Auto-On switch – either position

1) From the signal generator, Connect both right and left line level inputs (RCA) to signal generator and UUT. Use Y-cable if necessary from mono source. Do not use the LFE jack.
2) On the front of the unit, turn the LEVEL control full counterclockwise (MIN).
3) Turn on generator, adjust to **100mV, 50 Hz**.
4) Plug in UUT; turn the power switch ON. Turn LEVEL control full clockwise (MAX)
5) LED should now be Green; immediate bass response should be heard and felt from port tube opening.
6) Turn off generator, turn LEVEL control fully counterclockwise (MIN), disconnect RCA cable.
7) Connect one pair of speaker cables to one pair Speaker Level input terminals on UUT. Cables should be connected to an integrated amplifier fed by the signal generator.
8) Turn on generator and adjust so that speaker level input at the amplifier is **2.0V, 50 Hz**.
9) Turn LEVEL control full clockwise (MAX)
10) Green LED should light, immediate bass response should be heard and felt from the port tube opening.

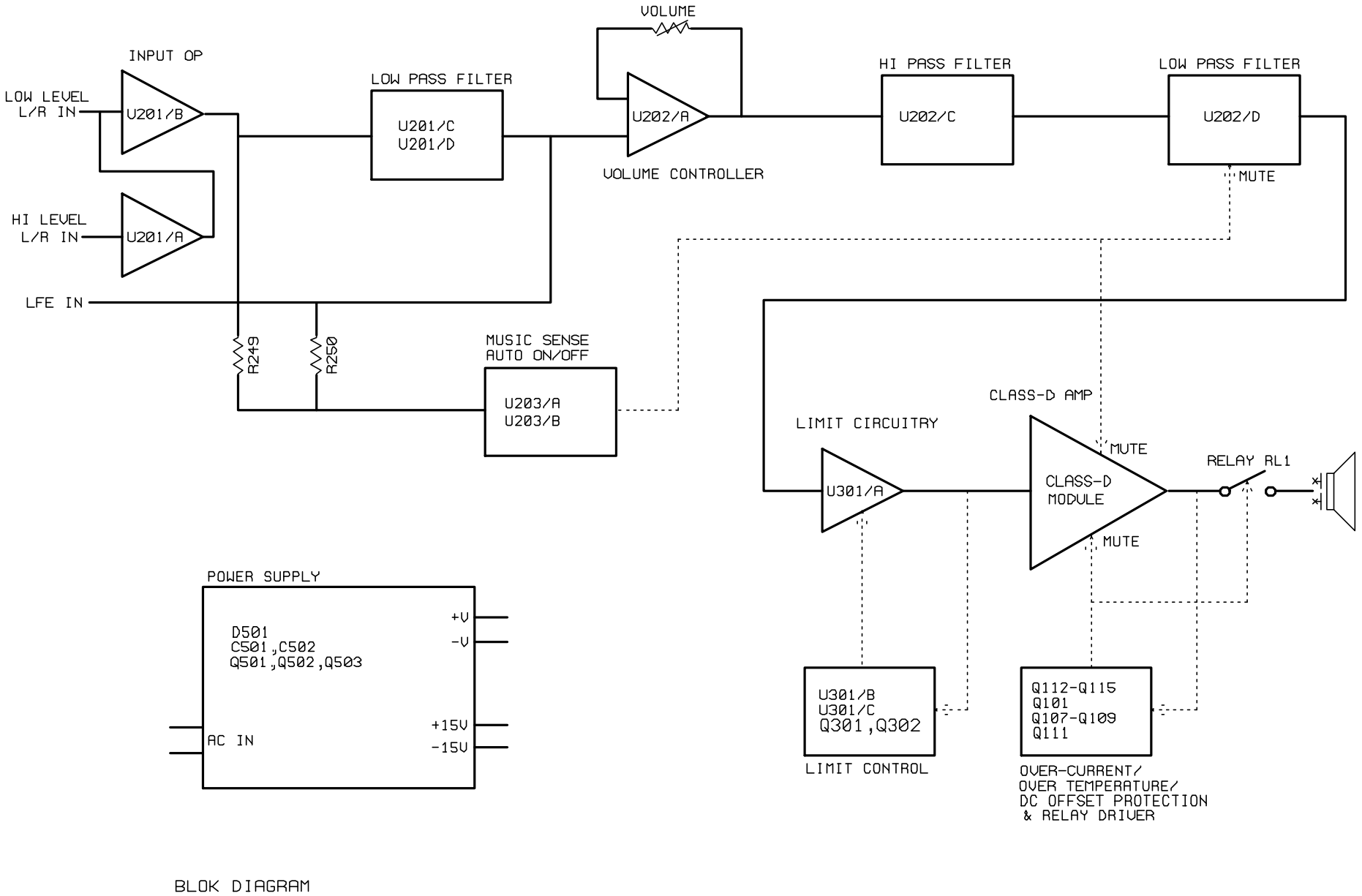
Sweep Function
1) Follow steps 7-10 above, using a sweep generator as a signal source.
2) Sweep generator from 20Hz to 1kHz. Listen to the cabinet and drivers for any rattles, clicks, buzzes or any other noises. If any unusual noises are heard, remove woofer and test.

Driver Function (Woofer)
1) Remove woofer from cabinet; detach + and - wire clips.
2) Check DC resistance of woofer; it should be **3.4 ohms**±10%.
3) Connect a pair of speaker cables to driver terminals. Cables should be connected to an integrated amplifier fed by a signal generator. Turn on generator and adjust so that speaker level output is 5.0V.
4) Sweep generator from 20Hz to 1kHz. Listen to driver for any rubbing, buzzing, or other unusual noises.

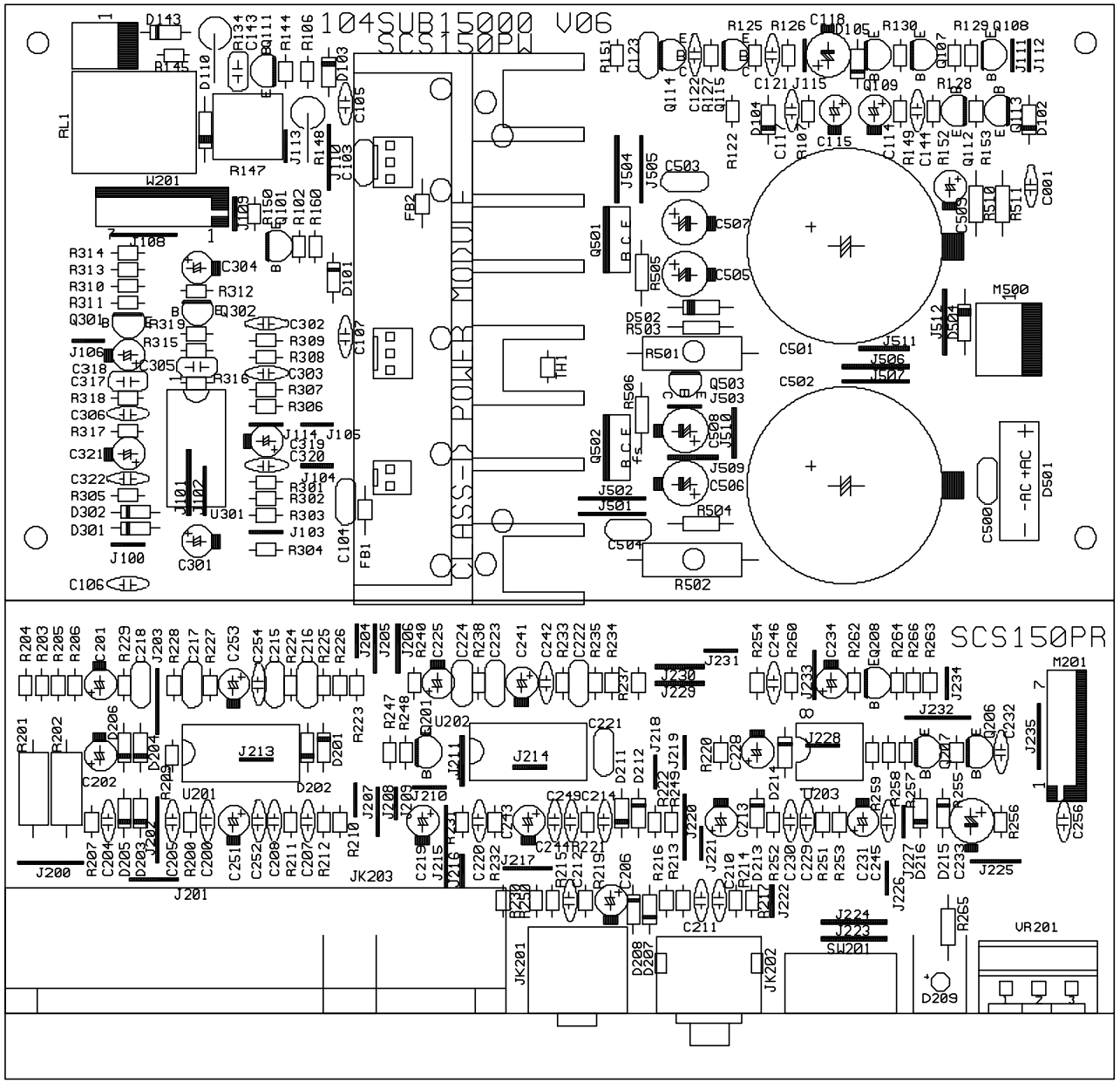
SUB500
Exploded View

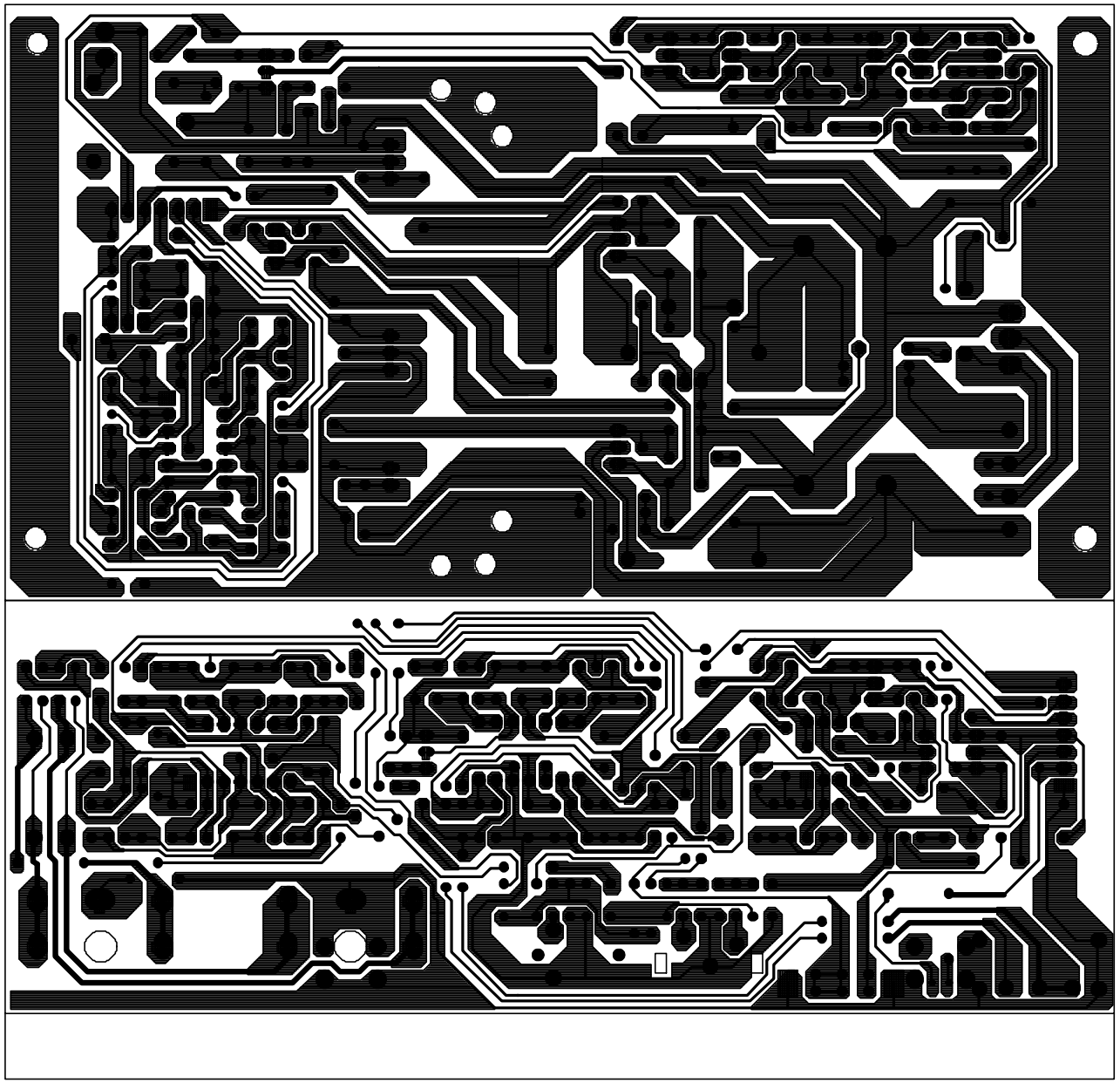


SUB500 (SCS500.5 Subwoofer)



BLOK DIAGRAM


104SUB15000 V06
SCS150PW
CLASS-D POWER MODULE
SCS150PR



SUB500 120v Electrical parts List			
Part Number	Description	Qty	Reference Designator
Input/Main PCBs			
Resistors			
110-14103j26	resistor 10K 1/4W ± 5% CF 26mm	3	R503,504,10
110-14222j26	resistor 2.2K 1/4W ± 5% CF 26mm	1	R511
110-14432j26	resistor 4.3K 1/4W ± 5% CF 26mm	1	R506
110-14472j26	resistor 4.7K 1/4W ± 5% CF 26mm	1	R505
110-16102j26	resistor 1K 1/6W ± 5% CF 26mm	5	R153,213,214,215,254
110-16103j26	resistor 10K 1/6W ± 5% CF 26mm	28	R128,13,0149,150,209,212,216,217,220,221,222,225,226, 227,228,229,230,232,240,248,260,305,306,308,311,314, 319,325
110-16104j26	resistor 100K 1/6W ± 5% CF 26mm	6	R122,126,231,263,266,307
110-16105j26	resistor 1M 1/6W ± 5% CF 26mm	1	R259
110-16122j26	resistor 1.2K 1/6W ± 5% CF 26mm	1	R265
110-16124j26	resistor 120K 1/6W ± 5% CF 26mm	1	R233
110-16151j26	resistor 150Ω 1/6W ± 5% CF 26mm	1	R253
110-16153j26	resistor 15K 1/6W ± 5% CF 26mm	2	R107,234
110-16154j26	resistor 150K 1/6W ± 5% CF 26mm	1	R252
110-16182j26	resistor 1.8K 1/6W ± 5% CF 26mm	1	R145
110-16183j26	resistor 18K 1/6W ± 5% CF 26mm	1	R262
110-16203j26	resistor 20K 1/6W ± 5% CF 26mm	1	R309
110-16205j26	resistor 2M 1/6W ± 5% CF 26mm	1	R257
110-16221j26	resistor 220Ω 1/6W ± 5% CF 26mm	1	R144
110-16222j26	resistor 2.2K 1/6W ± 5% CF 26mm	1	R102
110-16223j26	resistor 22K 1/6W ± 5% CF 26mm	5	R238,247,255,256,316
110-16273j26	resistor 27K 1/6W ± 5% CF 26mm	2	R223,237
110-16333j26	resistor 33K 1/6W ± 5% CF 26mm	1	R310
110-16393j26	resistor 39K 1/6W ± 5% CF 26mm	1	R151
110-16472j26	resistor 4.7K 1/6W ± 5% CF 26mm	3	R200,207,58
110-16473j26	resistor 47K 1/6W ± 5% CF 26mm	7	R106,129,219,249,250,251,264
110-16474j26	resistor 470K 1/6W ± 5% CF 26mm	2	R127,312
110-16512j26	resistor 5.1K 1/6W ± 5% CF 26mm	2	R210,211
110-16513j26	resistor 51K 1/6W ± 5% CF 26mm	1	R224
110-16562j26	resistor 5.6K 1/6W ± 5% CF 26mm	1	R152
110-16621j26	resistor 620Ω 1/6W ± 5% CF 26mm	1	R160
110-16751j26	resistor 750Ω 1/6W ± 5% CF 26mm	1	R315
110-16755j26	resistor 7.5M 1/6W ± 5% CF 26mm	1	R313
110-16913j26	resistor 91K 1/6W ± 5% CF 26mm	4	R203,204,205,206
116-161002f26	metal film resistor 10K 1/6W ± 1% MF 26mm	2	R301,303
116-161102f26	metal film resistor 11.0Ω 1/6W ± 1% MF 26mm	1	R302
116-162200f26	metal film resistor 220Ω 1/6W ± 1% MF 26mm	1	R317
116-162202f26	metal film resistor 22.0K 1/6W ± 1% MF 26mm	1	R318
110-12472j52	resistor 4.7K 1/2W ± 5% CF 52mm	2	R201,202
110-20332jk2	resistor 3.3K 2W ± 5% CF 7.5mm	1	R134
113-50s68j00	cement resistor 0.068Ω 5W ± 5% 7.5mm	1	R147
115-h503a102	variable resistor RV16AE-20B2 -A54-104 LEVEL	1	VR201
116-201001jk3x	metal film resistor 1.00K ± 5% 2W 7.5mm	1	R148
116-304700jk2x	metal film resistor 470Ω ± 5% 3W 10mm	2	R501,502
Capacitors			
129-a154j633	metallize capacitor 0.15U 63V ± 5% MSC	2	C221,222
130-2b221k503	disc capacitor 220P 50V ± 10%	12	C200,204,205,207,208,210,211,212,214,220,230,249
130-2b470k503	disc capacitor 47P 50V ± 10%	1	C229
130-2f104z503	disc capacitor 0.1U 50V +80/-20%	14	C17,117,122,144,232,242,244,245,246,252,254,256,320, 322
130-sl101k503	disc capacitor 100P 50V SL ± 10%	3	C302,303,306
132-103j503	mylar capacitor 0.01U 50V ± 5%	4	C223,224,305,317
132-103ja03	mylar capacitor 0.01uF 100V ± 5%	2	C103,104
132-104ja03	mylar capacitor 0.1uF 100V ± 5%	4	C123,218,503,504
132-223ja03	mylar capacitor 0.022uF 100V ± 5%	1	C215
132-273ja03	mylar capacitor 0.027uF 100V ± 5%	1	C143
132-473ja03	mylar capacitor 0.047uF 100V ± 5%	2	C216,217
135-3105m50	electrolytic 1U 50V ± 20%	1	C228
135-3106m50	electrolytic 10uF 50V ± 20%	12	C201.202.206.213.219.231.241.243.251.253.319.321
135-3107m10	electrolytic 100U 10V ± 20%	2	C114,115

Part Number	Description	Qty	Reference Designator
Input/Main PCBs			
135-3107m16	electrolytic 100uF 16V ± 20%	1	C234
135-3107m35	electrolytic 100U 35V ± 20%	2	C507,508
135-3225m50	electrolytic 2.2U 50V ± 20%	1	C509
135-3226m16	electrolytic 22U 16V ± 20%	1	C304
135-3226m50	electrolytic 22U 50V ± 20%	3	C225,505,506
135-3227m16	electrolytic 220U 16V ± 20%	2	C118,233
135-3476m16	electrolytic 47U 16V ± 20%	1	C318
132-103kb00	mylar capacitor 0.01uF 200V ± 10%	1	C500
135-4478m63	electrolytic cap 4700uF 63V ± 20%	2	C501,502
Semiconductors			
192-027c1815gr	transistor 2SC1815GR NPN	9	Q108,109,113,201,206,207,208,301,302
192-027c2235y	transistor 2SC2235Y NPN	1	Q111
192-028a1015gr	transistor 2SA1015GR PNP	3	Q101,107,112
192-1672n5551	transistor 2N5551 NPN	2	Q114,115
192-1682n5401	transistor 2N5401 AI-PNP 350V 500mA TO-92	1	Q503
197-031n4148	diode 100mA 75V SIGNAL 1N4148 ROHM	20	D102,103,104,105,143,201,202,203,204,205,206,207,208, 211,212,214,215,216,302,302
199-15000335	zener diode 3.3V 1/2W 52mm	1	D213
199-15000625	zener diode 6.2V 1/2W 52mm	1	D101
199-15001605	zener diode 16V 1/2W 52mm	1	D502
190-06m4558d	IC OPA 4558D DUAL OP-AMP	1	U203
190-16t1074cn	IC TL074CN ST QUAD OP-AMP	3	U201,202,301
192-161tip31c	transistor TIP31C SGS NPN	1	Q501
192-162tip32c	transistor TIP32C SGS PNP	1	Q502
195-10204hgw	LED 204HGW	1	D209
197-00kbu606g	diode 6A 800V KBU606G	1	D501
197-141n4004	diode 1N4004	2	D110,504
Miscellaneous			
109-1ttc802j0	thermister TTC-802(JS) NTC	1	TH1
120-1000003	inductor 10W AI YT-C3104-005 1CRHW 354708LTB	2	FB1,2
162-10060003	wire 60mm S412P	1	J104 TO W2
162-50129001	wire cable ass'y 120mm AWG28 WHT	1	W201
171-urwh124d	relay RWH-SH-124D (1600ohm)	1	RL1
174-0rca108gv	jack RCA-108GV JK203	1	JK201
174-0rcb202vg	jack RCA JK RCB-202VD(G) A=WHIT/B=RED	1	JK202
174-20810360g	jack spk JK BP 8PIN SH0810360G US1.35	1	JK203
175-1c07v01	wire connector 7PIN PITCH=2.5mm	1	M201
180-tms7210v	switch slide 6PIN MS7210V	1	SW201
CLASS D ASS'Y DS-150 PCB (Replacment of entire module is recommended, part# 012-7500-00022)			
Resistors			
118-12061001j	SMD resistor 1.00K 1206 5%	4	R2,11,29,30
118-12061002j	SMD resistor 10.0K 1206 5%	3	R7,9,25
118-120610r0j	SMD resistor 10.0Ω1206 5%	2	R22,23
118-12061201j	SMD resistor 1.20K1206 5%	16	R31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46
118-12062002j	SMD resistor 20.0K1206 5%	1	R26
118-12062201j	SMD resistor 2.20K 1206 5%	3	R6,13,16
118-12062701j	SMD resistor 2.70K 1206 5%	1	R10
118-12063000j	SMD resistor 300.0Ω 1206 5%	1	R24
118-12063301j	SMD resistor 3.30K 1206 5%	4	R14,15,27,28
118-12063902j	SMD resistor 39.0K 1206 5%	1	R3
118-12064700j	SMD resistor 470Ω 1206 5%	1	R8
118-12064701j	SMD resistor 4.70K 1206 5%	3	R1,5,12
118-12064702j	SMD resistor 47.0K 1206 5%	1	R17
118-12064704j	SMD resistor 4.70M 1206 5%	1	R4
118-120647r0j	SMD resistor 47.0Ω 1206 5%	2	R20,21
Capacitors			
141-c0101k50	SMD capacitor 100pF 50V 10% 1206 NP0	1	C4
141-c0220k50	SMD capacitor 22pF 50V 10% 1206 SMT NP0	1	C5

Part Number	Description	Qty	Reference Designator
CLASS D ASS'Y DS-150 PCB (Replacment of entire module is recommended, part# 012-7500-00022)			
141-c0561k50	SMD capacitor 560pF 50V 10% 1206 NP0	1	C6
141-c5104m50	SMD capacitor 1206 Y5V 0.1uF 50V ± 20%	8	C2,3,7,8,9,10,11,15
141-c7223k50	SMD capacitor 0.022uF 50V 10% 1206 X7R	1	C13
141-d7104ka0	SMD capacitor 0.1uF 100V 10% 1206 X7R	2	C12,14
141-d7104ka5	SMD capacitor 0.1uF 250V 10% 1210 X7R	4	C1,18,19,20
128-e106ma01	non-polar 10uF 100V 20%	2	C16,17
Semiconductors			
190-16tl072dts	SMD I.C TL072CDT SGS DUAL OP-AMP	1	IC1
192-09124126qs	SMD transistor 2SC2412K-T146Q/R ROHM	3	Q1,4,5
192-09139066rs	SMD transistor 2SC3906K-T146R ROHM	2	Q2,8
192-09210376qd	SMD transistor 2SA1037K-T146Q/R ROHM	2	Q7,9
192-09215146rs	SMD transistor 2SA1514K-T146R ROHM	2	Q3,6
197-03rls4148s	SMD diode RLS4148-TE11 ROHM	6	D1,2,3,4,5,6
199-15000563s	SMD zener diode 5.6V 5% PHILIPS BZX84-C5V6	2	Z1,2
199-15001203s	SMD zener diode 12V 5% PHILIPS BZX84-C12	2	Z5,6
199-15001503s	SMD zener diode 15V 5% PHILIPS BZX84-C15	2	Z3,4
192-232irf9640	transistor FET IRF9640 IR P-CH TO220	1	Q10
192-233irf640	transistor FET IRF640 IR P-CH TO220	1	Q11
Miscellaneous			
122-14121m4191	inductor ferrite core LS-A6206-ST EFD-30	1	L1
122-14350j4180	inductor 35uH ferrite core 25 milliohm	1	L2
175-9f40hr2	wire connector 40PIN PITCH=2.54mm HR2*40		
MISCELLANEOUS			
130-2f104z503	disc capacitor 0.1U 50V +80/-20% TAP	1	C110
150-r4055900	power transformer I/P: 120V/60Hz TT0900008720	1	T501
152-u602015	line cord SVT FT-26FT	1	
154-k31505t0	fuse 3.15A 250V 30mm UL/CSA/PSE	1	F501
155-63032i	fuse holder HTB-32I 30mm UL/CSA	1	for 501
162-10082007	wire RED 18AWG 8mm#1015	1	
162-a040d001	wire #1515 400mm 9911110-00	1	
176-wjce1	wire connector pin CE-1	1	
180-pbr12c11s	switch PUSH BR12C11S	1	SW501
193-201815t2	insulator	1	
302-AL-05115-0LAE	Aluminum Faceplate	1	
306-ABS-00004	Rear cover	1	
311-ABS-00028	Plastic switch	1	
317-000-00037	Terminal	1	
323-AL-00056	Heat sink	1	
333-EVA-00096	EVA (Gasket)	2	
333-EVA-00097	EVA (Gasket)	2	
333-EVA-00132	EVA (Gasket)	2	
333-EVA-00133	EVA (Gasket)	2	
333-EVA-00188	EVA (Gasket)	1	
333-EVA-00219	EVA (Gasket)	1	
333-EVA-00220	EVA (Gasket)	1	
335-NYL-00002	Cable sheet	2	
350-EM04012D024	Screw	4	
351-AM03008A078	Screw	4	
351-AM03008A079	Screw	2	
352-AM03008D040	Screw	2	
352-AM03008D041	Screw	2	
352-AM03040D065	Screw	4	
352-HM03012D086	Screw	1	
362-FE-00013	PCB holder	2	

SUB500 230v Electrical parts List

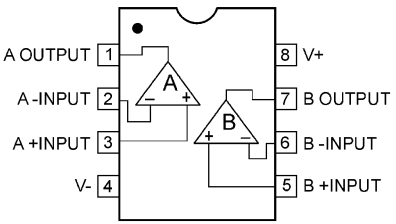
Part Number	Description	Qty	Reference Designator
Input/Main PCBs			
Resistors			
110-14103j26	Resistor 10K 1/4W ± 5% CF 26mm TAP	3	R503,504,510
110-14222j26	Resistor 2.2K 1/4W ± 5% CF 26mm TAP	1	R511
110-14432j26	Resistor 4.3K 1/4W ± 5% CF 26mm TAP	1	R506
110-14472j26	Resistor 4.7K 1/4W ± 5% CF 26mm TAP	1	R505
110-16102j26	Resistor 1K 1/6W ± 5% CF 26mm TAP	5	R153,213,214,215,254
110-16103j26	Resistor 10K 1/6W ± 5% CF 26mm TAP	28	R128,130,149,150,209,212,216,217,220,221,222,225,226, 227,228,229,230,232,235,240,248,260,305,306,308,311, 314,319
110-16104j26	Resistor 100K 1/6W ± 5% CF 26mm TAP	6	R122,126,231,263,266,307
110-16105j26	Resistor 1M 1/6W ± 5% CF 26mm TAP	1	R259
110-16122j26	Resistor 1.2K 1/6W ± 5% CF 26mm TAP	1	R265
110-16124j26	Resistor 120K 1/6W ± 5% CF 26mm TAP	1	R233
110-16151j26	Resistor 150Ω 1/6W ± 5% CF 26mm TAP	1	R253
110-16153j26	Resistor 15K 1/6W ± 5% CF 26mm TAP	2	R107,234
110-16154j26	Resistor 150K 1/6W ± 5% CF 26mm TAP	1	R252
110-16182j26	Resistor 1.8K 1/6W ± 5% CF 26mm TAP	1	R145
110-16183j26	Resistor 18K 1/6W ± 5% CF 26mm TAP	1	R262
110-16203j26	Resistor 20K 1/6W ± 5% CF 26mm TAP	1	R309
110-16205j26	Resistor 2M 1/6W ± 5% CF 26mm TAP	1	R257
110-16221j26	Resistor 220Ω 1/6W ± 5% CF 26mm TAP	1	R144
110-16222j26	Resistor 2.2K 1/6W ± 5% CF 26mm TAP	1	R102
110-16223j26	Resistor 22K 1/6W ± 5% CF 26mm TAP	5	R238,247,255,256,316
110-16273j26	Resistor 27K 1/6W ± 5% CF 26mm TAP	2	R223,237
110-16333j26	Resistor 33K 1/6W ± 5% CF 26mm TAP	1	R310
110-16393j26	Resistor 39K 1/6W ± 5% CF 26mm TAP	1	R151
110-16472j26	Resistor 4.7K 1/6W ± 5% CF 26mm TAP	3	R200,207,258
110-16473j26	Resistor 47K 1/6W ± 5% CF 26mm TAP	7	R106,129,219,249,250,251,264
110-16474j26	Resistor 470K 1/6W ± 5% CF 26mm TAP	2	R127,312
110-16512j26	Resistor 5.1K 1/6W ± 5% CF 26mm TAP	2	R210,211
110-16513j26	Resistor 51K 1/6W ± 5% CF 26mm TAP	1	R224
110-16562j26	Resistor 5.6K 1/6W ± 5% CF 26mm TAP	1	R152
110-16621j26	Resistor 620Ω 1/6W ± 5% CF 26mm TAP	1	R160
110-16751j26	Resistor 750Ω 1/6W ± 5% CF 26mm TAP	1	R315
110-16755j26	Resistor 7.5M 1/6W ± 5% CF 26mm TAP	1	R313
110-16913j26	Resistor 91K 1/6W ± 5% CF 26mm TAP	4	R203,204,205,206
116-161002f26	metal film Resistor 10K 1/6W ± 1% MF 26mm TAP	2	R301,303
116-161102f26	metal film Resistor 11.0K 1/6W ± 1% MF 26mm TAP	1	R302
116-162200f26	metal film Resistor 220Ω 1/6W ± 1% MF 26mm TAP	1	R317
116-162202f26	metal film Resistor 22.0K 1/6W ± 1% MF 26mm TAP	1	R318
110-12472j26	Resistor 4.7K 1/2W ± 5% CF 52mm TAP	2	R201,202
110-20332jk3	Resistor 3.3K 2W ± 5% 7.5mm	1	R134
113-50s68j00	cement Resistor 0.068Ω 5W ± 5%	1	R147
115-h503a102	variable Resistor RV16AE-20B2 -A54-104(A50K)	1	VR201
116-201001jk3x	metal film Resistor 1.00K 2W± 5% 7.5mm	1	R148
116-304700jk2x	metal film Resistor 470Ω 3W± 5% 10mm	2	R501,502
Capacitors			
129-a154j633	metallize capacitor 0.15U 63V ± 5% MSC TAP	2	C221,222
130-2b221k503	disc capacitor 220P 50V ± 10% TAP	12	C200,204,205,207,208,210,211,212,214,220,230,249
130-2b470k503	disc capacitor 47P 50V ± 10% TAP	1	C229
130-3f104z503	disc capacitor 0.1U 50V +80/-20% TAP	14	C107,117,122,144,232,242,244,245,246,252,254,256,320, 322
130-sl101k503	disc capacitor 100P 50V SL ± 10% TAP	3	C302,303,306
132-103j503	Mylar capacitor 0.01UF 50V ± 5% TAP	4	C223,224,305,317
132-104ja03	Mylar capacitor 0.1uF 100V ± 5% TAP	4	C123,218,503,504
132-223ja03	Mylar capacitor 0.022uF 100V ± 5% TAP	1	C215

Part Number	Description	Qty	Reference Designator
Input/Main PCBs			
132-273ja03	Mylar capacitor 0.027uF 100V ± 5% TAP	1	C143
132-473ja03	Mylar capacitor 0.047uF 100V ± 5% TAP	2	C216,217
135-3105m50	electrolytic 1U 50V ± 20% TAP	1	C228
135-3106m50	electrolytic 10uF 50V ± 20% TAP	12	C201.202.206.213.219.231.241.243.251.253.319.321
135-3107m10	electrolytic 100U 10V ± 20% TAP	2	C114,115
135-3107m16	electrolytic 100uF 16V ± 20% TAP	1	C234
135-3107m35	electrolytic 100U 35V ± 20% TAP	2	C507,508
135-3225m50	electrolytic 2.2U 50V ± 20% TAP	1	C509
135-3226m16	electrolytic 22U 16V ± 20% TAP	1	C304
135-3226m50	electrolytic 22U 50V ± 20% TAP	3	C225,505,506
135-3227m16	electrolytic 220U 16V ± 20% TAP	2	C118,233
135-3476m16	electrolytic 47U 16V ± 20% TAP	1	C318
129-a105ja04	metallize capacitor 1U 100V	2	C103,104
132-103kb00	Mylar capacitor 0.01uF 200V ± 10% TAP	1	C500
135-4478m63	electrolytic cap 4700uF 63V ± 20%	2	C501,502
Semiconductors			
192-027c1815gr	transistor 2SC1815GR NPN	9	Q108,109,113,201,206,207,208,301,302
192-027c2235y	transistor 2SC2235Y NPN	1	Q111
192-028a1015gr	transistor 2SA1015GR PNP	3	Q101,107,112
192-1572n5551	transistor 2N5551 NPN	2	Q114,115
192-1582n5401	transistor 2N5401 AI-PNP 350V 500mA TO-92	1	Q503
197-031n4148	diode 100mA 75V SIGNAL 1N4148 ROHM TAP	20	D102,103,104,105,143,201,202,203,204,205,206,207,208, 211,212,214,215,216,301,302
199-15000335	zener diode 3.3V 1/2W 52mm TAP	1	D213
199-15000625	zener diode 6.2V 1/2W 52mm TAP	1	D101
199-15001605	zener diode 16V 1/2W 52mm TAP	1	D502
190-06m4558d	IC OPA 4558D DUAL OP-AMP	1	U203
190-16t1074cn	IC TL074CN ST QUAD OP-AMP	3	U201,202,301
192-161tip31c	transistor TIP31C SGS NPN	1	Q501
192-162tip32c	transistor TIP32C SGS PNP	1	Q502
195-10204hgw	LED 204HGW	1	D209
197-00kbu606g	diode 6A 800V KBU606G	1	D501
197-141n4004	diode 1N4004	2	D110,504
Miscellaneous			
109-1ttc802j0	thermister TTC-802(JS) NTC	1	TH1
162-10060003	wire 60mm S412P	1	J104
162-50129001	wire cable ass'y 120mm AWG28 WHT	1	W201
171-urwh124d	relay RWH-SH-124D (1600ohm)	1	RL1
174-0rca108gv	jack RCA-108GV JK203	1	JK201
174-0rcb202ag	jack RCA JKCA-209	1	JK202
174-20810360gx	jack spk JK BP 8PIN SH0810360GX	1	JK203
175-1c07v01	wire connector 7PIN PITCH=2.5mm	1	M201
175-1d02v01	wire connector 2PIN PITCH=3.96mm	1	M100
175-1d03v01	wire connector 3PIN PITCH=3.96mm JST-VH	1	M500
180-tms7210v	switch slide 6PIN MS7210V	1	SW201
120-1000003	inductor 10W AI YT-C3104-005 1CRHW 354708LTB	2	FB1,2
CLASS D ASS'Y DS-150 PCB (Replacment of entire module is recommended, part# 012-7500-00022)			
Resistors			
118-12061001j	SMD Resistor 1.00K 1206 5%	4	R2,11,29,30
118-12061002j	SMD Resistor 10.0K 1206 5%	3	R7,9,25
118-120610r0j	SMD Resistor 10.0Ω1206 5%	2	R22,23
118-12061201j	SMD Resistor 1.20K1206 5%	16	R31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46
118-12062002j	SMD Resistor 20.0K1206 5%	1	R26
118-12062201j	SMD Resistor 2.20K 1206 5%	3	R6,13,16

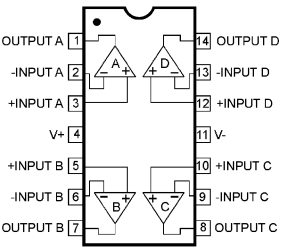
Part Number	Description	Qty	Reference Designator
CLASS D ASS'Y DS-150 PCB (Replacment of entire module is recommended, part# 012-7500-00022)			
118-12062701j	SMD Resistor 2.70K 1206 5%	1	R10
118-12063000j	SMD Resistor 300.0Ω 1206 5%	1	R24
118-12063301j	SMD Resistor 3.30K 1206 5%	4	R14,15,27,28
118-12063902j	SMD Resistor 39.0K 1206 5%	1	R3
118-12064700j	SMD Resistor 470Ω 1206 5%	1	R8
118-12064701j	SMD Resistor 4.70K 1206 5%	3	R1,5,12
118-12064702j	SMD Resistor 47.0K 1206 5%	1	R17
118-12064704j	SMD Resistor 4.70M 1206 5%	1	R4
118-120647r0j	SMD Resistor 47.0Ω 1206 5%	2	R20,21
Capacitors			
141-c0101k50	SMD capacitor 100pF 50V 10% 1206 NP0	1	C4
141-c0220k50	SMD capacitor 22pF 50V 10% 1206 SMT NP0	1	C5
141-c0561k50	SMD capacitor 560pF 50V 10% 1206 NP0	1	C6
141-c5104m50	SMD capacitor 1206 Y5V 0.1uF 50V ± 20%	8	C2,3,7,8,9,10,11,15
141-c7223k50	SMD capacitor 0.022uF 50V 10% 1206 X7R	1	C13
141-d7104ka0	SMD capacitor 0.1uF 100V 10% 1210 X7R	2	C12,14
141-d7104ka5	SMD capacitor 0.1uF 250V 10% 1210 X7R	4	C1,18,19,20
128-e106ma01	non-polar 10uF 100V 20%	2	C16,17
Semiconductors			
190-16tl072dts	SMD I.C TL072CDT SGS DUAL OP-AMP	1	IC1
192-09124126qs	SMD transistor 2SC2412K-T146Q/R ROHM	3	Q1,4,5
192-09139066rs	SMD transistor 2SC3906K-T146R ROHM	2	Q2,8
192-09210376qd	SMD transistor 2SA1037K-T146Q/R ROHM	2	Q7,9
192-09215146rs	SMD transistor 2SA1514K-T146R ROHM	2	Q3,6
197-03rls4148s	SMD diode RLS4148-TE11 ROHM	6	**D1,2,3,4,5,6**
199-15000563s	SMD zener diode 5.6V 5% PHILIPS BZX84-C5V6	2	Z1,2
199-15001203s	SMD zener diode 12V 5% PHILIPS BZX84-C12	2	Z5,6
199-15001503s	SMD zener diode 15V 5% PHILIPS BZX84-C15	2	Z3,4
192-232irf9640	transistor FET IRF9640 IR P-CH TO220	1	Q10
192-233f640	transistor FET IRF640 IR P-CH TO220	1	Q11
Miscellaneous			
175-9f40hr2	wire connector 40PIN PITCH=2.54mm HR2*40	0.2	
122-14121m4191	inductor ferrite core LS-A6206-ST EFD-30	1	L1
122-14350j4180	inductor 35uH ferrite core 25 milliohm	1	L2
FILTER PCB ASS'Y			
122-14103m4200	inductor RT251510*103N 10mH	2	L501
132-104kb70	mylar capacitor 0.1uF 275V ± 10% VDE	1	C499
132-224kb70	mylar capacitor 0.22uF 275V ± 10%	1	C498
MISCELLANEOUS			
130-3f104z503	disc capacitor 0.1U 50V +80/-20% TAF	1	C110
150-r4055901	230v power transformer	1	T501
152-v60202603	line cord 6FT SPO21A H03VVH2-F	1	
154-k16006t0	fuse 1.6A 250V VBS UTE-TYPE UL/BSI/VDE	1	F501
155-620001	fuse holder HTB-32M UL/CSA/VDE	1	for F501
162-10121002	wire UL1617 120mm BRN 20#	1	
162-10126001	wire UL1617 120mm BLU 20#	1	
162-10152001	wire UL1617 AGW22 150mm RED 6:6	1	
162-a040d001	wire #1015 400mm 991110-00	1	M100
180-prf1003d	switch ROCK RF-1003-BB4-O POWER	1	
193-201815t2	insulator	1	

Integrated Circuit Diagrams

TLO72, 4558 Dual Op Amp
IC1, U203



OPAMP, QUAD 14P DIL TL074
U201, 202, 301



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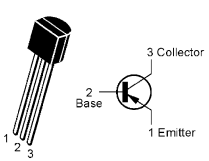
Q503



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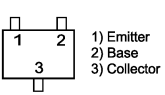
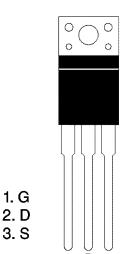
2SC3906K
2SA1037K
2SA1514K

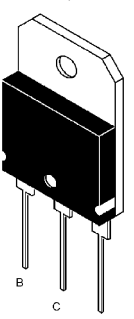
Q1 - Q9



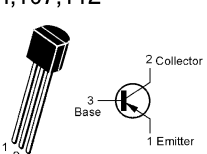
MOSFET
IRF640,
9640
Q10,11



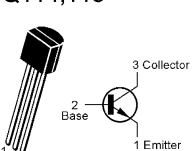
TIP 31C, 32C
Q501,502



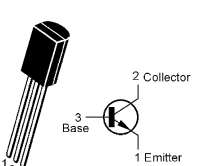
2SA1015
Q101,107,112



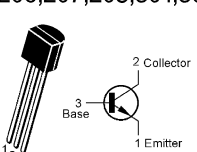
2N5551
Q114,115



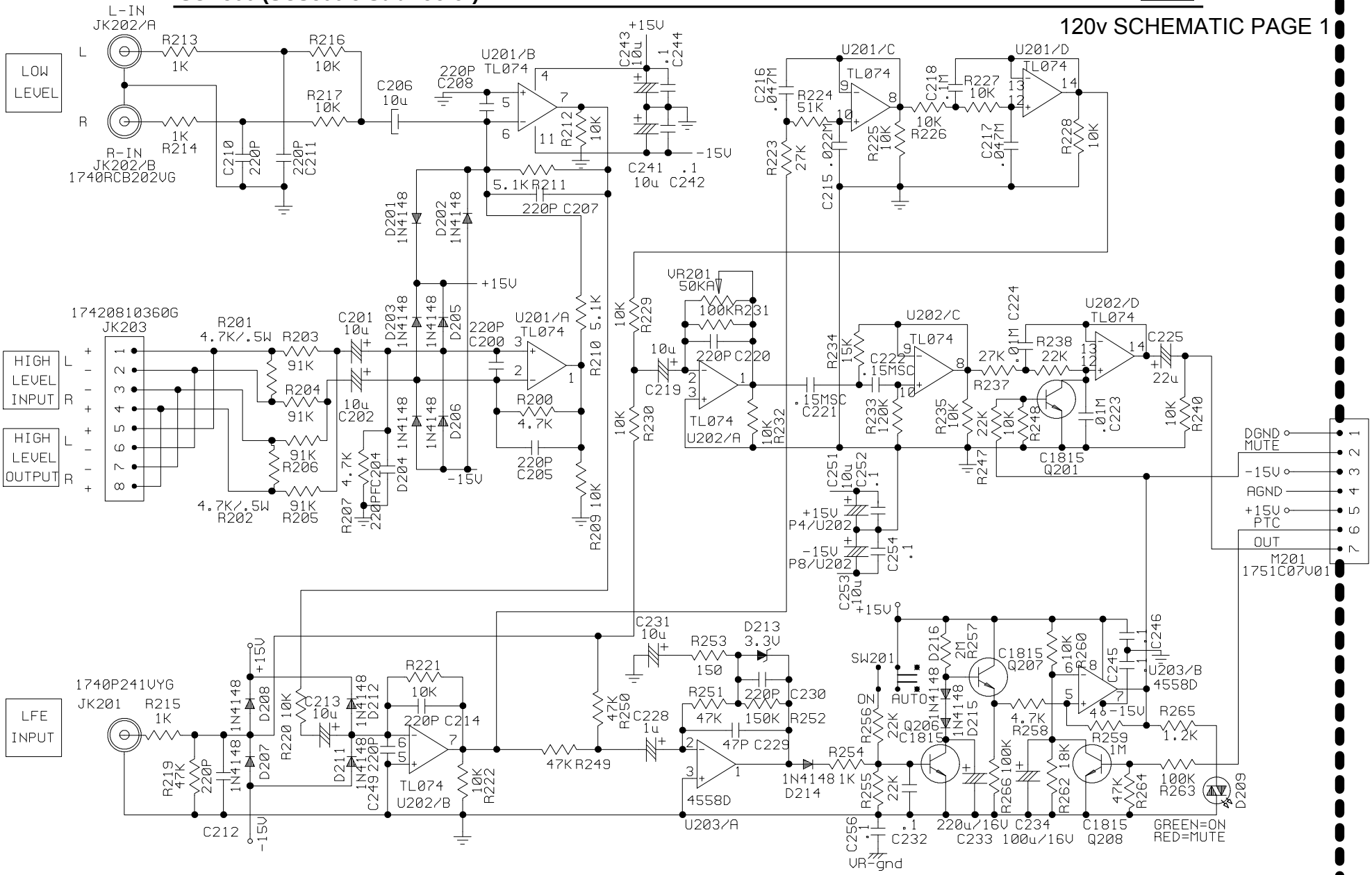
2SC2235Y
Q111



2SC1815
Q108,109,113,201,
206,207,208,301,302



120v SCHEMATIC PAGE 1

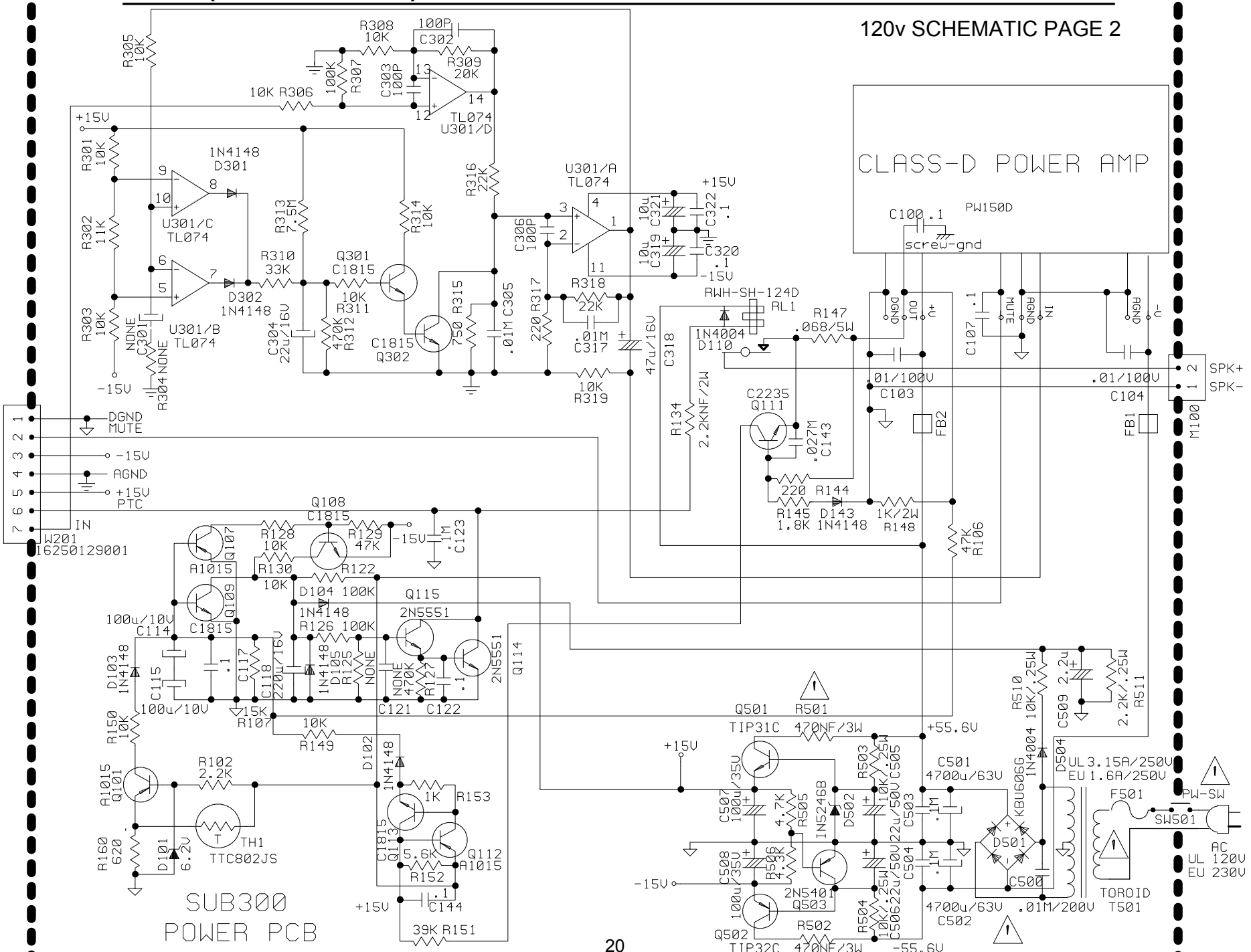


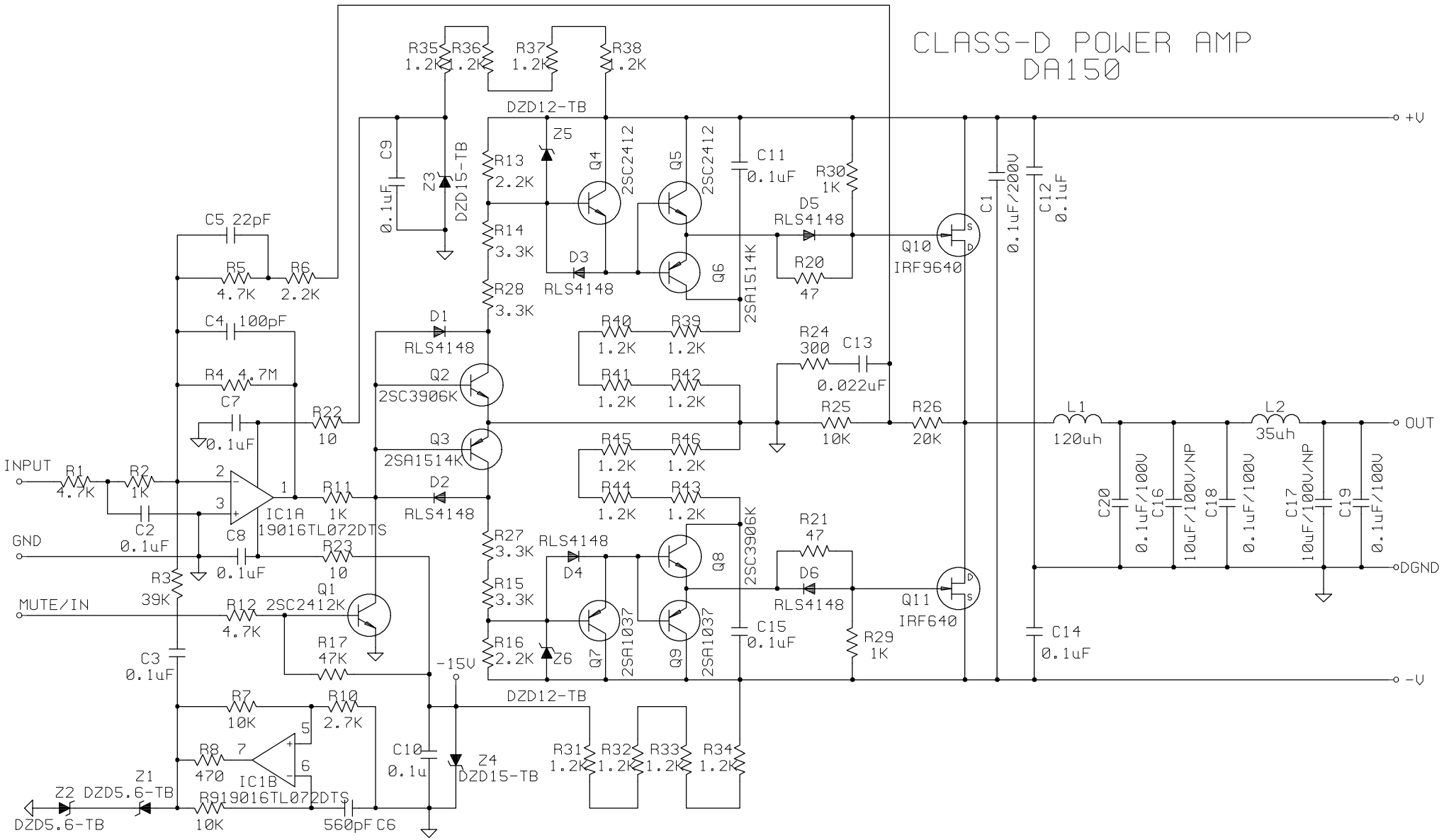
SUB300:
JACK PANEL PCB

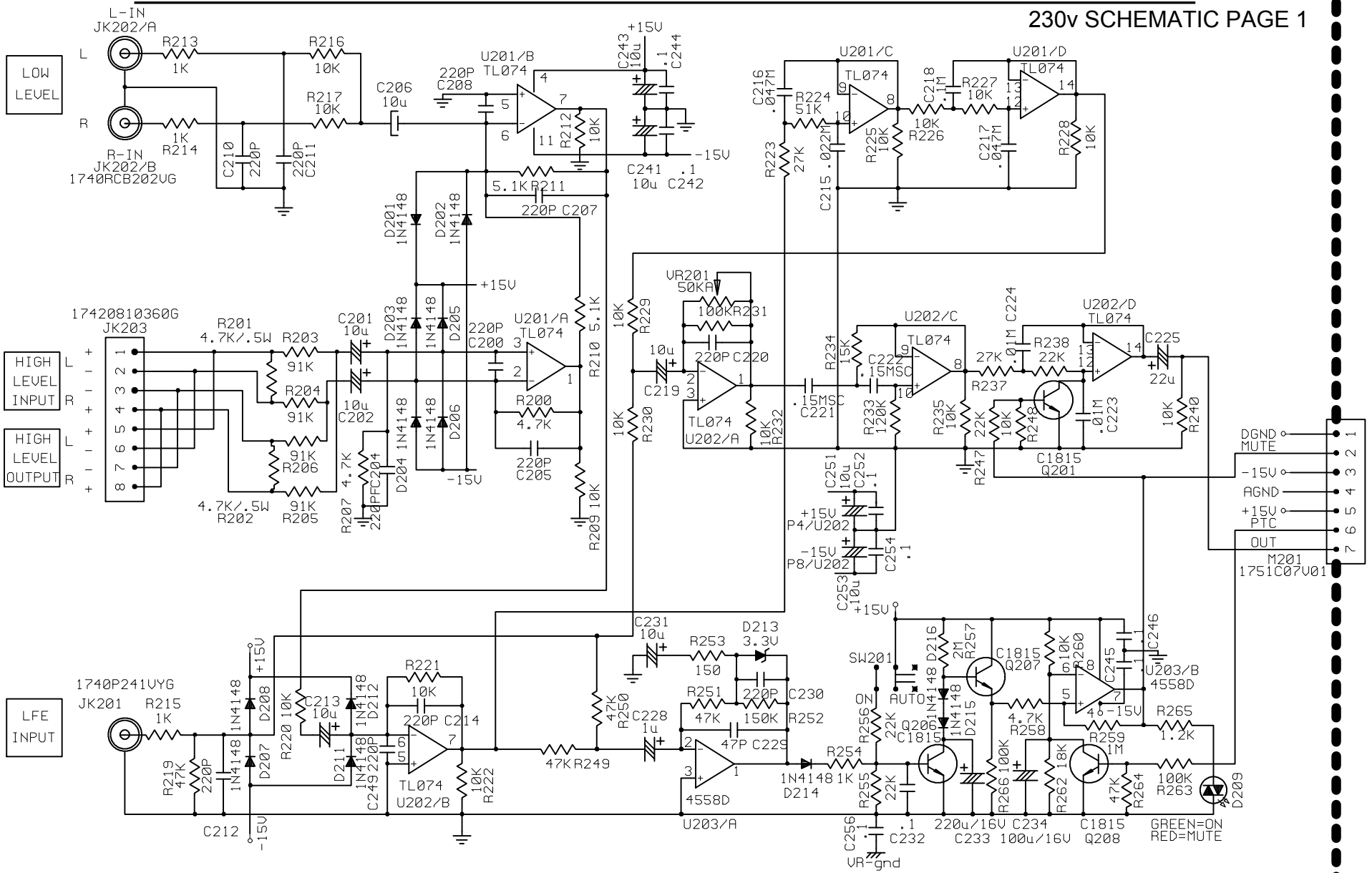
DRAW.	DSGN.	APVD.

FILENAME : SUB300U.SCH	REVISION : 0
MODEL NO. SUB300	1
DWN BY : C.S.WANG	2
DATE : 2003-07-02	3

120v SCHEMATIC PAGE 2

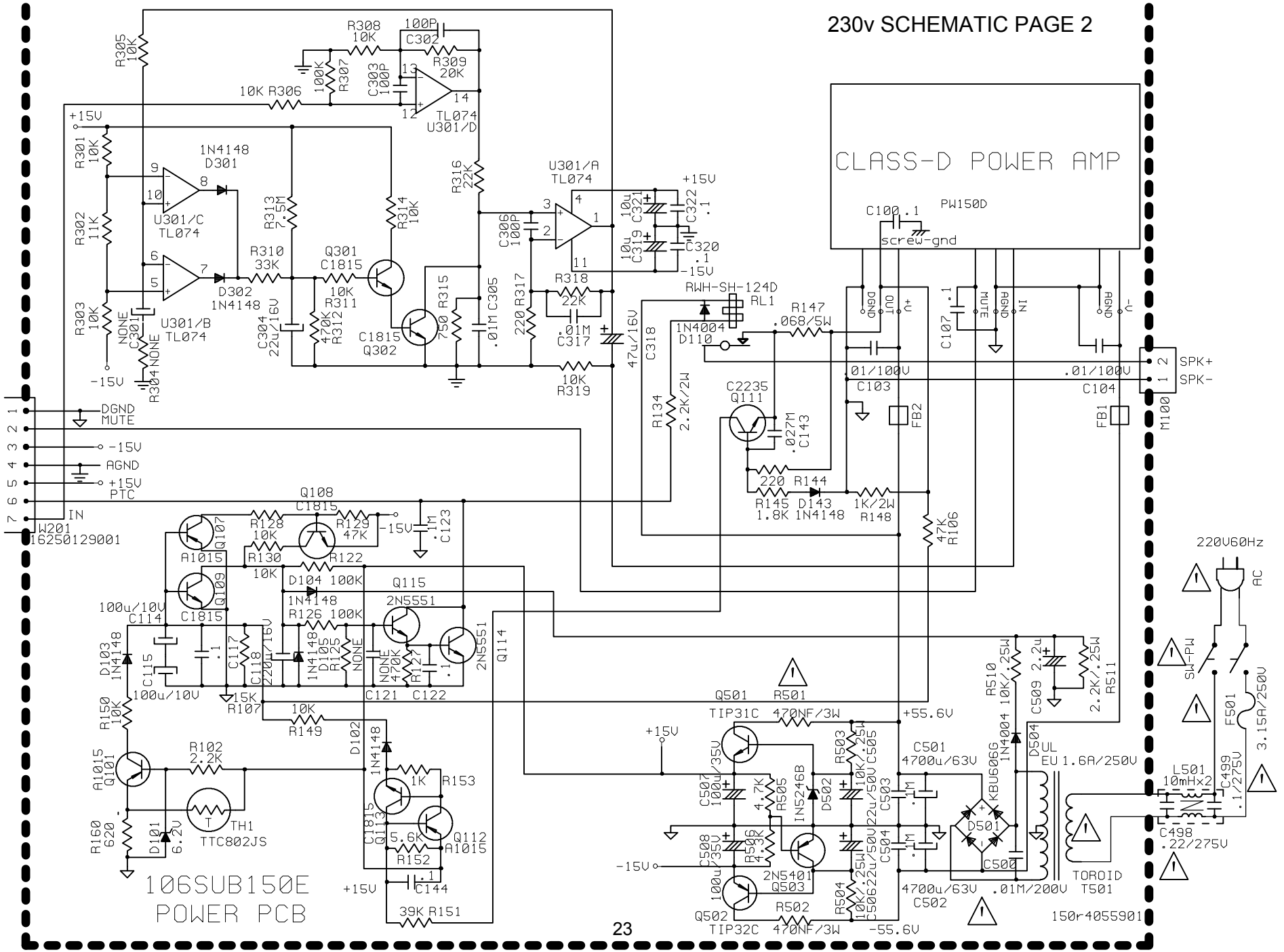



CLASS-D POWER AMP
DA150
+V
-V
OUT
DGND
INPUT
GND
MUTE/IN
-15V
IC1A 19016TL072DTS
IC1B 19016TL072DTS
DZD12-TB
DZD15-TB
DZD5.6-TB
RLS4148
2SC2412
2SA1514K
2SC3906K
2SA1037
IRF9640
IRF640
R1 4.7K
R2 1K
R3 39K
R4 4.7M
R5 4.7K
R6 2.2K
R7 10K
R8 470
R9 10K
R10 2.7K
R11 1K
R12 2SC2412K 4.7K
R13 2.2K
R14 3.3K
R15 3.3K
R16 2.2K
R17 47K
R20 47
R21 47
R22 10
R23 10
R24 300
R25 10K
R26 20K
R27 3.3K
R28 3.3K
R29 1K
R30 1K
R31 1.2K
R32 1.2K
R33 1.2K
R34 1.2K
R35 1.2K
R36 1.2K
R37 1.2K
R38 1.2K
R39 1.2K
R40 1.2K
R41 1.2K
R42 1.2K
R43 1.2K
R44 1.2K
R45 1.2K
R46 1.2K
C1 0.1uF/200V
C2 0.1uF
C3 0.1uF
C4 100pF
C5 22pF
C6 560pF
C7 0.1uF
C8 0.1uF
C9 0.1uF
C10 0.1u
C11 0.1uF
C12 0.1uF
C13 0.022uF
C14 0.1uF
C15 0.1uF
C16 10uF/100V/NP
C17 10uF/100V/NP
C18 0.1uF/100V
C19 0.1uF/100V
C20 0.1uF/100V
L1 120uh
L2 35uh
D1 RLS4148
D2 RLS4148
D3 RLS4148
D4 RLS4148
D5 RLS4148
D6 RLS4148
Q1 2SC2412K
Q2 2SC3906K
Q3 2SA1514K
Q4 2SC2412
Q5 2SC2412
Q6 2SA1514K
Q7 2SA1037
Q8 2SC3906K
Q9 2SA1037
Q10 IRF9640
Q11 IRF640
Z1 DZD5.6-TB
Z2 DZD5.6-TB
Z3 DZD15-TB
Z4 DZD15-TB
Z5 DZD12-TB
Z6 DZD12-TB



106SUB150E:
JACK PANEL PCB

DRAW.		DSGN.		APVD.		FILENAME : SUB150E.SCH	REVISION :1
						MODEL NO.010-AA15-00024	1
						DWN BY : C.S.WANG	2
						DATE :2003/2/24	3


230v SCHEMATIC PAGE 2
CLASS-D POWER AMP
PW150D
106SUB150E
POWER PCB
TL074
U301/D
U301/A
U301/C
U301/B
1N4148
D301
D302
Q301
C1815
Q302
Q108
Q115
2N5551
Q114
Q501
TIP31C
Q502
TIP32C
Q503
2N5401
D501
KBU606G
TOROIDAL T501
RWH-SH-124D
RL1
1N4004
D110
C2235
Q111
TH1
TTC802JS
SPK+
SPK-
DGND
MUTE
AGND
PTC
IN
W201
16250129001
220V60Hz
AC
SW-PW
F501
3.15A/250V
L501
10mHx2
C498
.22/275V
C499
.1/275V
150r4055901
+15V
-15V
+55.6V
-55.6V