



Models:
Northridge™ E-Series E250P
Performance Series P12SW
Powered Subwoofers

Service Manual



JBL Consumer Products
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Woodbury, New York 11797

Rev3 4/2006

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E250P, P12SW SPECIFICATIONS

Amplifier Power (RMS):	250 Watts
Peak Dynamic Power *:	E250P: 550 Watts P12SW: 500 Watts
Driver:	12" (305mm) PolyPlas™
Inputs:	Line Level (switchable to LFE) and Speaker Level with 5-way binding posts
Low-Pass Frequency:	Variable from 50Hz to 150Hz
Frequency Response:	25Hz – Low-pass crossover setting
Dimensions (H x W x D):	19-3/4" x 14-3/8" x 16-1/2" (502mm x 365mm x 419mm)
Weight:	43 lb/19.5kg

JBL continually strives to update and improve existing products, as well as create new ones. The specifications and details in this and related JBL publications are therefore subject to change without notice.

* The Peak Dynamic Power is measured by recording the highest center-to-peak voltage measured across the output of a resistive load equal to minimum impedance of the transducer, using a 50Hz sine wave burst, 3 cycles on, 17 cycles off.

SAFETY INFORMATION

Warning

Any person performing service of this unit will be exposed to hazardous voltages and the risk of electric shock. It is assumed that any person who removes the amplifier from this cabinet has been properly trained in protecting against avoidable injury and shock. Therefore, any service procedures are to be performed by qualified service personal ONLY!

Caution

Early revisions of the unit did not have a power switch. Hazardous voltages are resent within the unit whenever it is plugged in.

Before amplifier is plugged in, be sure its rated voltage corresponds to the voltage of the AC power source to be used. Incorrect voltage could cause damage to the amplifier when the AC power cord is plugged in. Do not exceed rated voltage by more than 10%: operation below 90% of rated voltage will cause poor performance or may shut the unit off.

Leakage/Resistance Check

Before returning the unit to the customer, perform a leakage or resistance test as follows:

Leakage Current. Note there is no power switch on early revisions of this unit. When the power plug is plugged in, the unit is live. Connect the unit to its rated power source. Using an ammeter, measure the current between the neutral side of the AC supply and chassis ground of the unit under test. If leakage current exceeds 0.5mA, the unit is defective. Reverse the polarity of the AC supply and repeat.

Resistance. Measure the resistance from either side of the line cord to chassis ground, If it is less than 500k ohms, the unit is defective.

WARNING! DO NOT return the unit to the customer if it fails one of these tests until the problem is located and corrected.

Critical Components



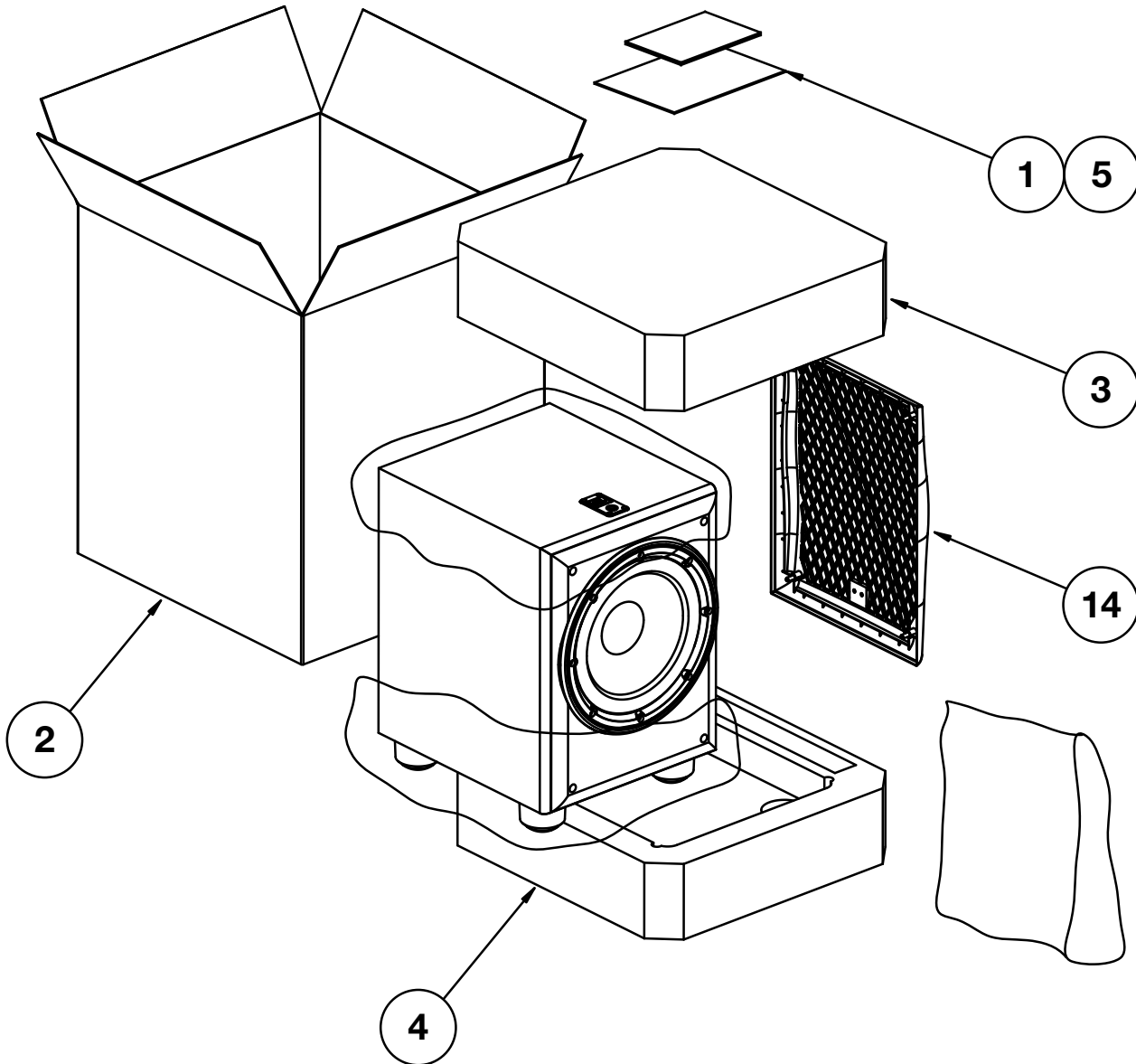
All components identified with the IEC symbol in the parts list and schematic diagram designate components in which safety can be of special significance when replacing identified with. Use only the replacement parts designated in the parts list or parts with the same rating of resistance, wattage or voltage.

List of Safety Components Requiring Exact Replacements

Part Number/ Designator	Description
F1 093-105202-300	Line Fuse Slo Blo 2.0A 5x20mm
083-041802-009	250V UL approved SPT-2 or better with polarized plug, UL approved wired with the hot side to fused side. Use with factory replacement panel strain relief (70305) only.
PT1 042-010053-003	Power Transformer. Use only factory replacement.
BR1 052-400080-000	Bridge diode. Use only factory replacement.
C6,8 034-330780-300	3300uF 80V electrolytic filter caps. Be sure replacement part is at least the same working voltage and capacitance rating. Also the lead spacing is important. Incorrect spacing may cause premature failure due to internal cabinet pressure and vibration.
063-531808-000	Rear Amp Cover Use only factory replacement
Inductor 043-560200-000	L1 - Use only factory replacement
Inductor 043-300101-000	L2 - Use only factory replacement
Inductor 043-700101-000	L3 - Use only factory replacement
Inductor 043-324300-000	L4 - Use only factory replacement



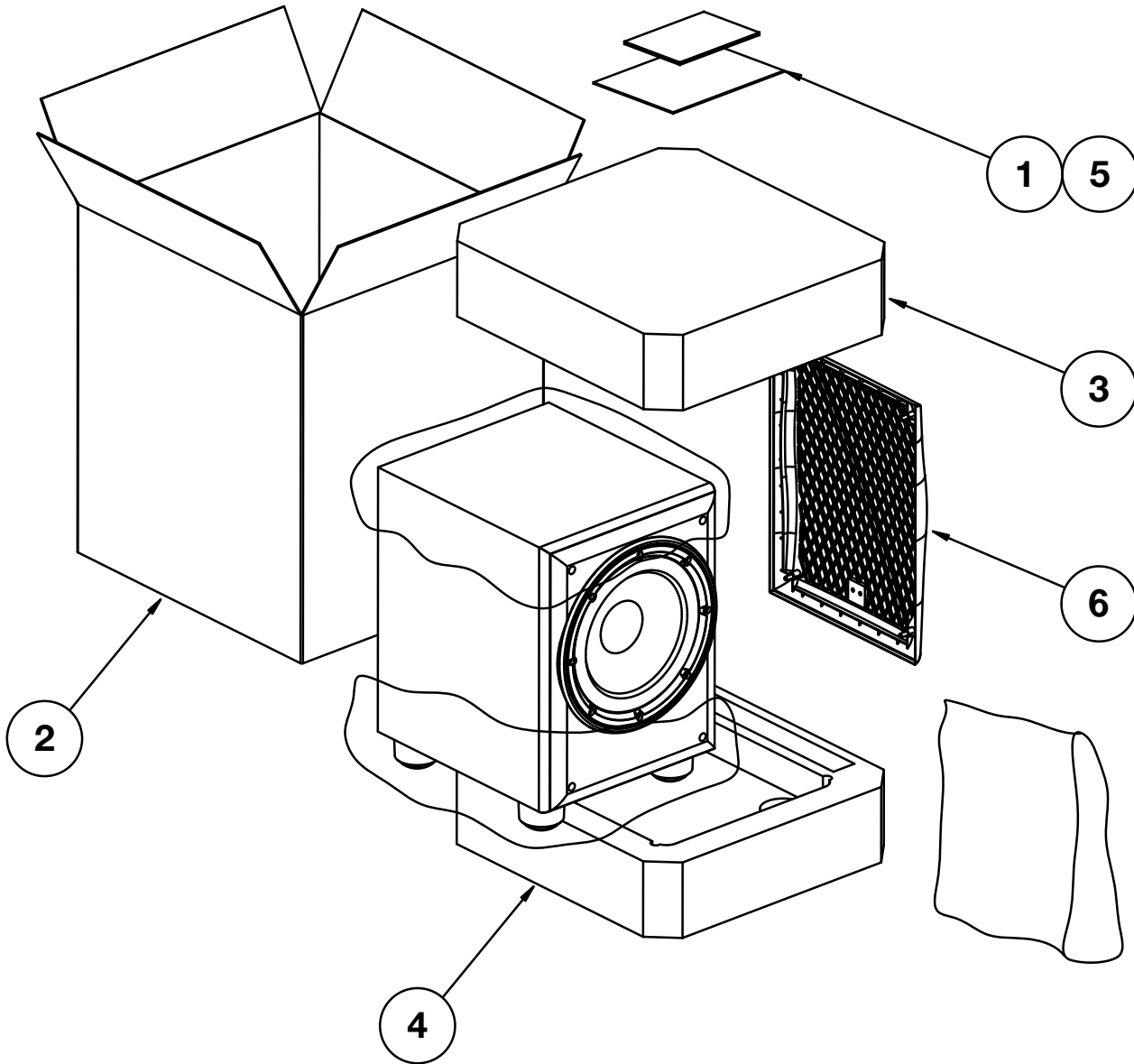
E250P Packaging



Ref#	Part Number	Description	Qty
1	351249-002	MANUAL, OWNER-E250P/E250P	1
2	351249-001	CARTON,MASTER-E250P (BEECH MODEL)	1
	351249-003	CARTON,MASTER-E250P (BLACK MODEL)	1
	350884-003	CARTON,MASTER-E250P (CHERRY MODEL)	1
3	351252-001	PAD,END,TOP-E250P	1
4	351252-002	PAD,END,BOT-E250P	1
5	338381-001	WARRANTY CARD,1/5YR,JBL	1
14	352024-001	ASY, GRILLE, BLK, FRNT	1



P12SW Packaging



Ref#	Part Number	Description	Qty
1	361803-001	P12SW Owner's Manual	1
2	361813-001	P12SW Outer Carton	1
3	351252-001	Packing Foam (Top)	1
4	351252-002	Packing Foam (Bottom)	1
5	338381-001	Warranty Card	1
6	352024-003	Front Grille	1

JBL E250P/P12SW Powered Sub/ Plate Amp					
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
Amp Section					
Type (Class AB, D, other)	D	n/a	n/a		
Load Impedance (speaker)	5.6	Ohms	n/a	Nominal	
Rated Output Power (120VAC)	150	Watts	140		Domestic version only 120 VAC-60 Hz
Rated Output Power (230VAC)	150	Watts	130		EU Version only 230 VAC-50 Hz
AVG RMS Dynamic Power	250	Watts	225		Average RMS power, 3/20 Cycles 50 Hz, Driven 6dB above its input sensitivity
THD @ Rated Power	0.3	%	1	22k filter	145 Watts
THD @ 1 Watt	0.1	%	0.5	22k filter	
DC Offset	10	mV-DC	30	@ Speaker Outputs	
Damping factor	>50	DF	35	Measured at amplifier board	Measured at the speaker cable. 150 Watts @ THD < 0.1 % @ 50 Hz
Input Sensitivity					
Input Frequency	50	Hz	50	Nominal Freq.	
L&R	240	mVrms	±2dB	To 150 Watts	Single input driven
LFE input	240	mVrms	±2dB	To 150 Watts	Single input driven, LFE switch ON
Speaker/Hi Level Input	2.4	Vrms	±2dB	To 150 Watts	Single input driven
Signal to Noise					
SNR-A-Weighted	90	dBa	70	relative to rated power	A-Weighting filter
SNR-unweighted	85	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	2	Volume @max, using RMS reading DMM/VOM (or A/P) BW=20 Khz.	Line level inputs must be terminated using 1KOHM
Residual Noise Floor	1.5	mVrms(max)	2	Volume @max, w/ A/P Swept Bandpass Measurement (Line freq.+ harmonics) (BW=20 Khz)	Line level inputs must be terminated using 1KOHM
Input Impedance					
Line Input (L, R,LFE)	10K	ohms	n/a	Nominal	
Speaker/Hi Level Input	> 4.7K	ohms	n/a	Nominal	
Filters					
LP filter 4th order fixed	60-180	Hz	± 10		2nd order variable + 2nd order fix-24 db/Octave
Subsonic filter (HPF) 3rd Order	Fixed				
LFE Low pass 2nd order	200>LP<1K	Hz		LFE input driven only	
HP speaker out connector	200	Hz	± 10	Speaker input driven - Speaker out loaded with 4 Ohms	(Applies only to 230V Model)
Note: 120V Models do not have speaker output	100	Hz	± 10	Speaker input driven - Speaker out loaded with 8 Ohms	(Applies only to 230V Model)
Limiter					
THD at Max. Output Power	n/a	n/a	functional	Maximum Output Power	Maximum THD as a result of limiting.
Features					
Volume pot Taper (lin/log)	LOG	--	functional		A Taper
Phase switch	0-180	deg	functional		
LP Filter defeat switch	YES		functional		Disables LP filter, intended for LFE
Input Configuration					
Line In (L,R) & LFE	YES	--	functional		Dual RCA jack
Spkr/Hi Level In	YES	--	functional		Binding post connector L&R
Signal Sensing (ATO)					
Auto-Turn-On (yes/no)	YES		functional		
ATO Input test frequency	50	Hz	functional	"	
ATO Level LFE Input	4	mV	functional	"	Maximum acceptable level.
ATO Level Speaker in	50	mV	functional	"	Maximum acceptable level.
ATO Turn-on time	5	ms	functional	Amp connected and AC on, then input signal applied	
Auto Mute/ Turn-OFF Time	15	minutes	15	T before muting, after signal is removed	Auto turn of time (T) must be 5 > T < 15 Minutes
Power on Delay time					
	3	sec.	4	AC Power Applied	
Transients/Pops					
ATO Transient	5	mV-peak	n/a	@ Speaker Outputs	

E250P/P12SW subwoofers

Parameter	Specification	Unit	QA Test Limits	Conditions	Notes
Turn-on Transient	50	mV-peak	2v-pp	@ Speaker Outputs	AC Line cycled from OFF to ON
Turn-off Transient	50	mV-peak	2v-pp	@ Speaker Outputs	AC Line cycled from ON to OFF
Efficiency					
Efficiency	65	%	64		Nominal Line voltage 120 VAC
Stand-by Input Power	24	Watts	26	@ nom. line voltage	Maximum allowable input power under nominal Input voltage and frequency, HOT or COLD operation.
Power Cons. @ rated power	234	Watts	240	@ nom. line voltage	150 Watts @ 5.6 Ohms nominal line voltage
Protections					
Short Circuit Protection	YES		functional	Direct short at output	Amplifier should resume operation after short circuit condition removal
Thermal Protection	YES		functional	@ 1/8 max unclipped Power at 1.06 times the input voltage	Temperature rise in accessible metal parts should not exceed 35K rise for domestic version or 30K rise for European versions (refer to requirements sheet).
DC Offset Protection	YES		-	DC present at Speaker Out leads	Design must insure no Offset at the speaker output under any operating condition including abnormal operation
Line Fuse Rating					
USA-Domestic	2	Amps	2	Type-T or Slo Blo-250 V	Internal fuse with UL/SEMKO rated holder
EU	1.25	Amps	1.25	Type-T or Slo Blo-250 V, Low Breaking capacity	Internal fuse with UL/SEMKO rated holder
4. ALL SPECS SHOULD BE MEASURED AT NOMINAL LINE VOLTAGE.					

SPEAKER CONNECTION

When we designed the E150P, E250P, P10SW and P12SW powered subwoofers, our goal was to offer the user the best possible performance combined with the most flexible and complete installation options.

Please look over the following three examples to determine which description best matches your system and follow the corresponding hookup instructions.

To use the binding-post speaker terminals with bare wire, unscrew the collar until the hole through the center post is visible under the collar. Insert the bare end of the wire through the hole in the post, then screw the collar back down until the connection is tight. The holes in the center of the collars are intended for banana-type connectors. Speakers and electronics terminals have corresponding positive (+) and negative (-) terminals. It is important to connect both speakers identically: positive (+) on the speaker to positive (+) on the amplifier and negative (-) on the speaker to negative (-) on the amplifier. Wiring "out of phase" results in thin sound, weak bass and a poor stereo image.

NOTE: The speaker-level connection method described on the next page is not a preferred connection and should only be resorted to if your receiver/processor does not have a line-level or subwoofer output. The customer is responsible for proper connections, and any damage to JBL or other equipment due to improper connections will not be covered by your JBL warranty. Consult with your JBL dealer or an audio installation expert if you have any questions about how to connect your subwoofer using the speaker-level inputs.

E250P/P12SW subwoofers

Analog Receiver/Processor – Speaker-Level Connections

Use this installation method *only* with an analog receiver/processor that does not have digital processing or bass management, and also does not have a subwoofer output or a volume-controlled preamp (line-) level output:

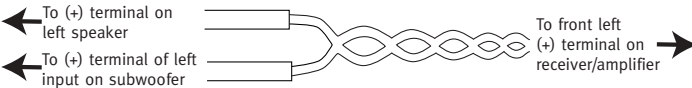
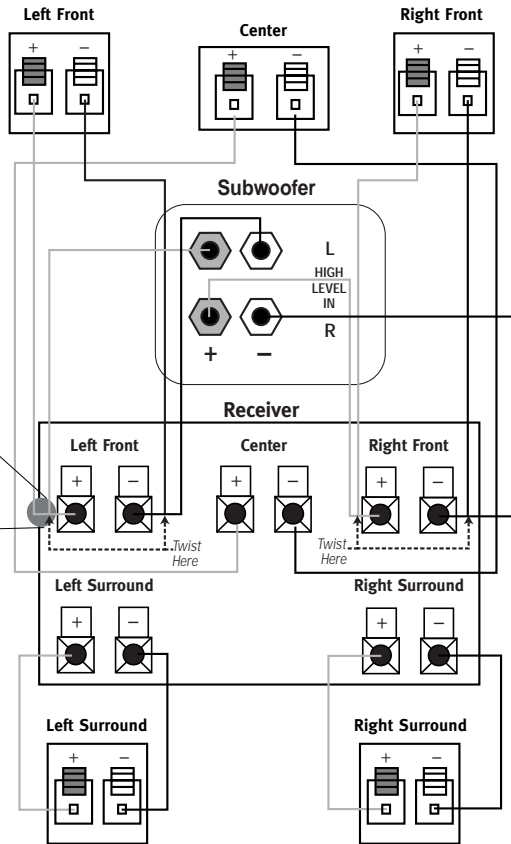
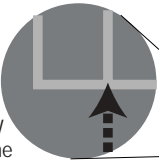
Connect the speaker wires for both your main left and right speakers, and for the subwoofer, to the same speaker terminals on your receiver or amplifier. The wires may be joined by twisting together the bare ends of the two leads that will be connected to each terminal on the receiver/amplifier, as shown in the diagram. This procedure should be done only four times (involving a total of eight bare-wire ends), and only for those wire ends that are being connected to the terminals on your receiver/amplifier. ***It is important that you avoid joining any other wires.*** Do not twist together wire ends that are being inserted into terminals on any speaker or on the subwoofer. Do not twist together wire ends that will be used for any speakers other than the front left and right speakers or the subwoofer. Refer to the connection diagram for guidance.

Twist together the (+) leads at one end of the speaker wires that you have designated for the left front speaker and for

the left high-level inputs on the subwoofer. Insert the joined (twisted) wires into the left front (+) terminal on your receiver/amplifier. Connect the free end of the (+) lead for the left front speaker to the (+) terminal on the back of the speaker. Connect the free end of the (+) lead for the left input on the subwoofer to the left binding-post terminal. Repeat this process for the (-) connections for the left front

speaker and left input on the subwoofer, and then for the (+) and (-) connections for the right front speaker and right high-level inputs on the subwoofer.

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



E250P/P12SW subwoofers

Analog Receiver/Processor – Line-Level Connections

Use this installation method with an analog receiver/processor that does not have digital processing or bass management, and that is equipped with a full-range subwoofer output or a volume-controlled preamp (line-) level output:

Use RCA-type interconnect cables to connect the line-level subwoofer outputs on your receiver or amplifier to the line-level inputs on the subwoofer.

IMPORTANT: Make sure that the LFE toggle switch on the subwoofer is in the “Normal” position. Do not use the “LFE” position with Dolby* Pro Logic*-only processors.

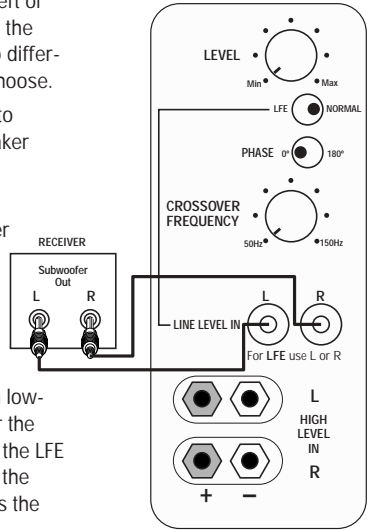
Note: If your receiver or amplifier has only one subwoofer output jack, then you

may connect the subwoofer output on your receiver/pre-amplifier to either the left or right line-level input on the subwoofer. It makes no difference which jack you choose.

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

Make sure your receiver or processor is configured so 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, then the LFE switch should be set to the “LFE” position to bypass the subwoofer’s internal crossover.



Digital Receiver/Processor – LFE Connection

Use this installation method for Dolby Digital, DTS® or other digital surround processors that have bass-management programming, or for analog receivers/processors that have a filtered subwoofer output:

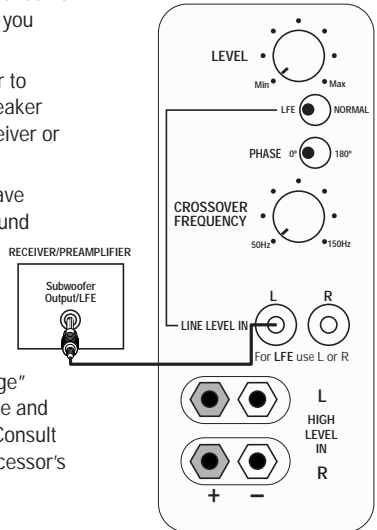
IMPORTANT: Make sure that the LFE toggle switch on the subwoofer is in the “LFE” position. Use the line-level input jacks for the Low-Frequency Effects channel. Connect these jacks to the LFE output or subwoofer output on your receiver or amplifier.

Note: If your receiver or amplifier has only one subwoofer output jack, you may connect the subwoofer output on your receiver/preamplifier to either

the left or right line-level input on the subwoofer. It makes no difference which jack you choose.

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” or “LFE On.” The front, center and surround speakers should be set to “Small” or “Large” depending on their size and frequency response. Consult your receiver’s or processor’s owner’s manual.



OPERATION

Power

When the unit is plugged in and the power switch is on and no signal is received, the LED on the top of the unit* will turn red. When a signal is present, the LED will turn green.

Note: It will take several minutes for the LED to turn from green to red after the input signal to the subwoofer is removed. Due to JBL's unique high-output, high-efficiency amplifier design, power consumption is minimal when the subwoofer is not receiving a signal. Of course, the subwoofer can be turned off, whenever desired, if you do not wish to leave it in auto (standby) mode.

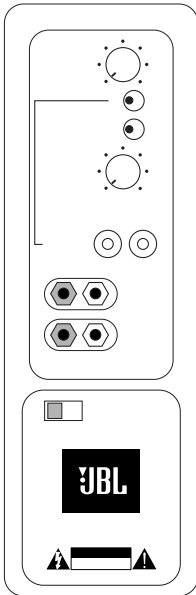
* E250P: LED is on the amplifier faceplate

Level Control

The subwoofer Level Control adjusts the volume of the subwoofer relative to the rest of the system. Proper level adjustment depends on several variables such as room

size, subwoofer placement, type of main speakers and position. Adjust the subwoofer level so that the volume of the bass information is pleasing to you.

Crossover Adjustments



The Crossover Frequency Control determines the highest frequency at which the subwoofer reproduces sounds. If your main speakers can comfortably reproduce some low-frequency sounds, set this control to a lower frequency setting, between 50Hz and 100Hz. This will concentrate the subwoofer's efforts on the ultradeep bass sounds required by today's films and music. If you are using smaller bookshelf speakers that do not extend to the lower bass frequencies, set the low-pass crossover control to a higher setting, between 120Hz and 150Hz. This control is not used when the LFE switch is in the "LFE" position.

Phase Control



The Phase Control determines whether the subwoofer's piston-like action moves in and out in phase with the main speakers or opposite the main speakers. There is no correct or incorrect setting. Proper phase adjustment depends on several variables such as subwoofer placement and listener position. Adjust the phase switch to maximize

bass output at the listening position. Remember, every system, room and listener is different. There are no right or wrong settings; this switch offers the added flexibility to adjust your subwoofer for optimum performance for your specific listening conditions without having to move your speakers.

If at some time in the future you happen to rearrange your listening room and move your speakers, you should experiment with the phase switch in both positions, and leave it in the position that maximizes bass performance.

TROUBLESHOOTING

If you used the high-level (speaker) inputs and there is no sound from any of the speakers:

- Check that the receiver/ amplifier is on and a source is playing.
- Check that the powered subwoofer is plugged into an active electrical outlet and is switched on.
- Check all wires and connections between the receiver/ amplifier and the speakers. Make sure all wires are connected. Make sure none of the speaker wires are frayed, cut or punctured, or touching each other, except for the wires for the front left and right speakers, which may be joined with the wires for the subwoofer at the receiver/ amplifier end only, if you are using the speaker-level connections
- Review proper operation of your receiver/ amplifier.

If there is low (or no) bass output:

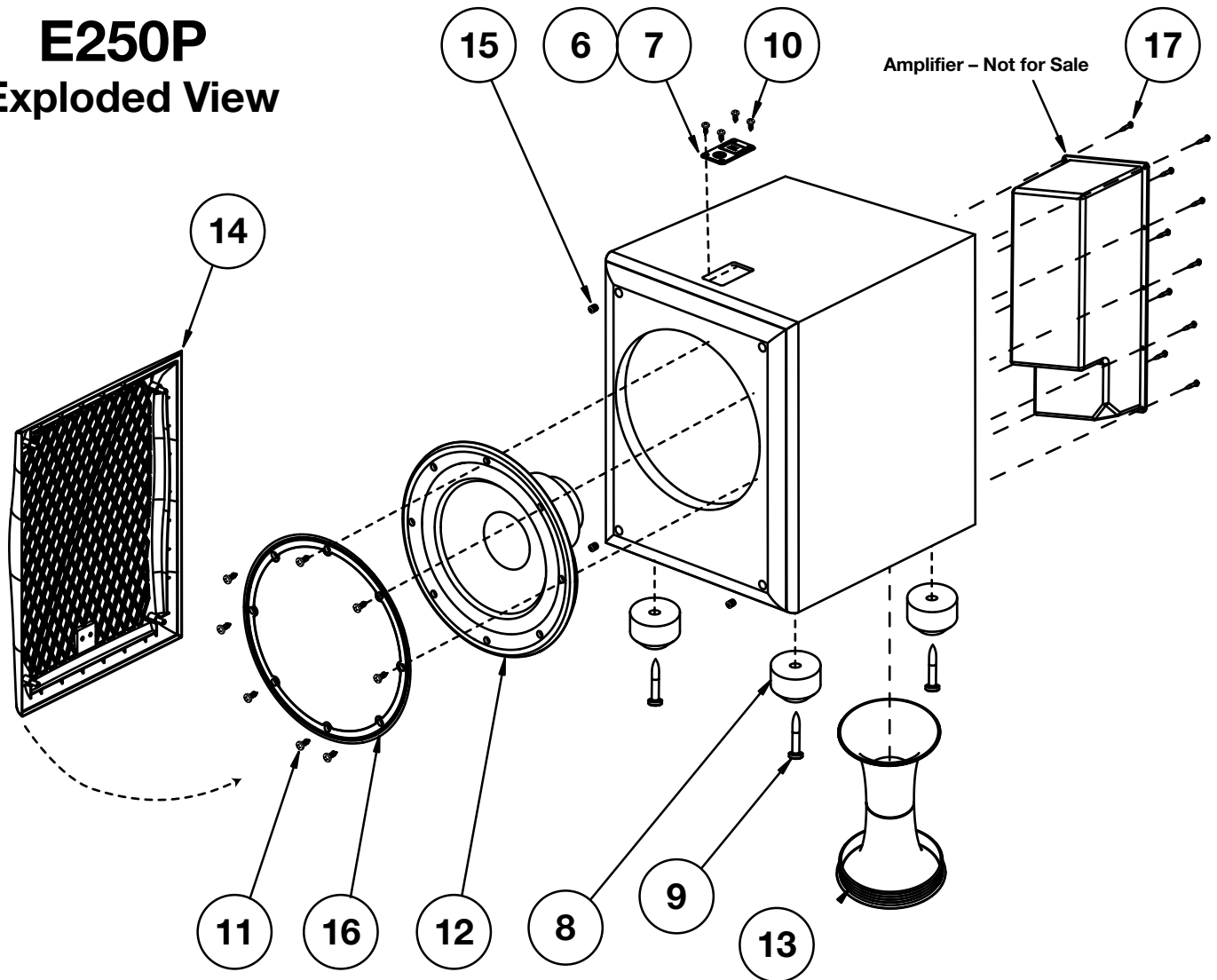
- Make sure the connections to the left and right "Speaker Inputs" have the correct polarity (+ and -).
- Make sure that the subwoofer is plugged into an active electrical outlet and switched on.
- Adjust the crossover point.
- Flip the Phase Control switch to the opposite position.
- If you are using a Dolby Digital/DTS receiver or processor, make sure that the subwoofer adjustments on the receiver/processor are set up correctly.
- Slowly turn the Level Control clockwise until you begin to hear the desired amount of bass.

If you used the line-level inputs and there is no sound from the subwoofer:

- Check that the receiver/ amplifier is on and a source is playing.
- Check that the powered subwoofer is plugged into an active electrical outlet and is switched on.
- Check all wires and connections between the receiver/ amplifier and the subwoofer. Make sure all wires are connected. Make sure none of the wires are frayed, cut or punctured, or touching each other.
- Review proper operation of your receiver/ amplifier.
- Slowly turn the Level Control clockwise until you begin to hear the desired amount of bass.
- Make sure that you have configured your receiver/ processor so that the subwoofer/LFE output is on.

E250P

Exploded View

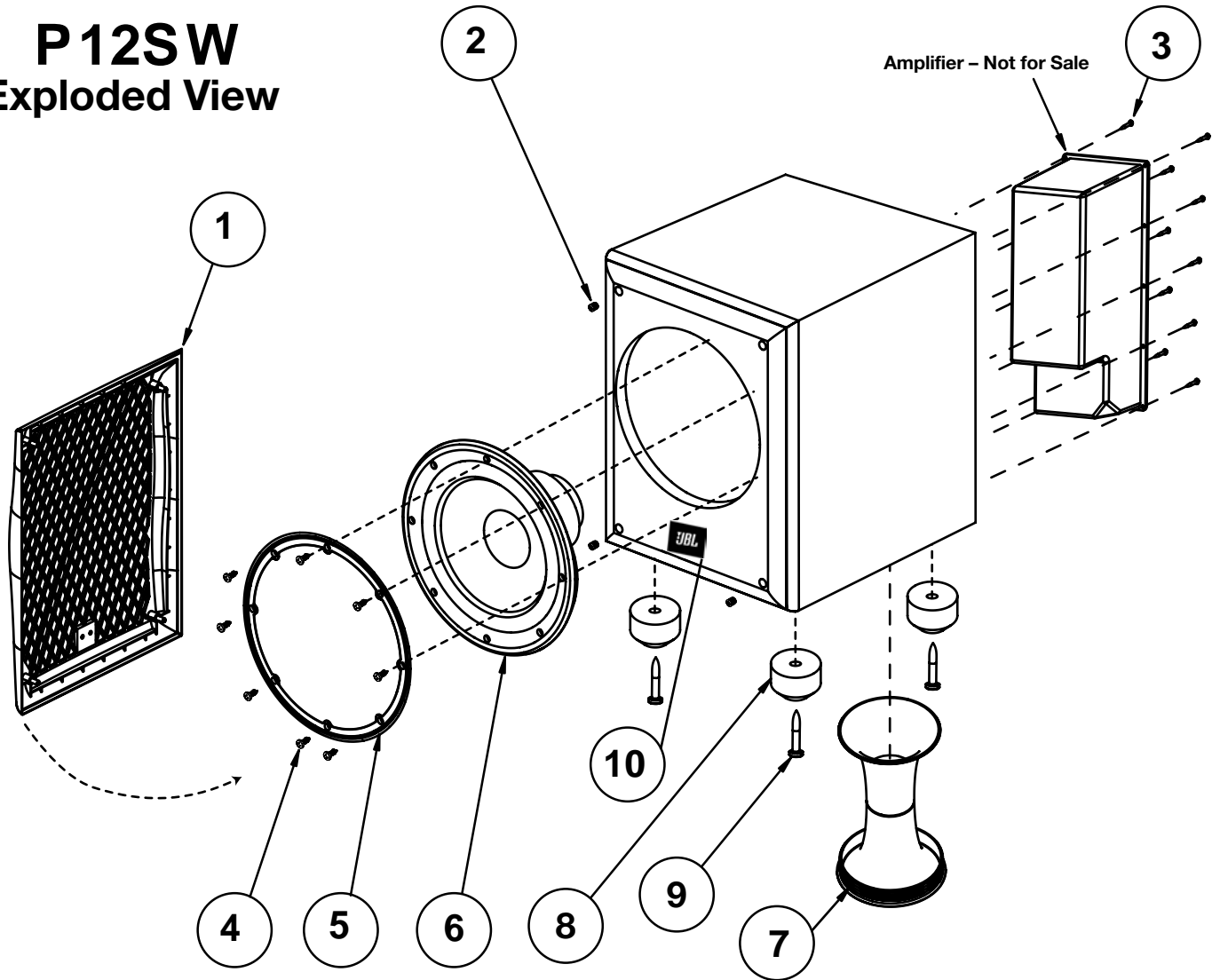


Ref#	Part Number	Description	Qty
6	351348-001	PLATE,LED/LOGO-E250P	1
7	338125-002	ASY,LED-E250P/E250P	1
8	336486-001	ASY,FOOT,PLSTC- E250P	4
9	763-31110-40	SCREW, 8 X 2 1/2,TR,PH,PB,BLK ZINC,LCS (FOOT)	4
10	908302-012	SCREW, PB,HXS,#6x.75,ZINC (LOGO PLATE)	4
11	903802-016	SCREW, PB,HXS,#8x1",ZINC (WOOFER)	8
12	338128-002	ASY, WOOFER,12" DCR 4.8 Ω	1
13	336799-001	ASY, PORT TUBE	1
14	351307-001	GRILLE, BLK, FRNT	1
15	333249-003	CUP,GRILLE,TITANIUM, (BEECH MODEL) (CHERRY MODEL)	4
	333249-001	CUP,GRILLE (BLACK MODEL)	4
16	351243-001	RING,TRIM,12"-E250P	1
17	903401-012	SCREW, 6 X 3/4,PAN,PH,PB,BLK ZINC,LCS (AMPLIFIER)	10



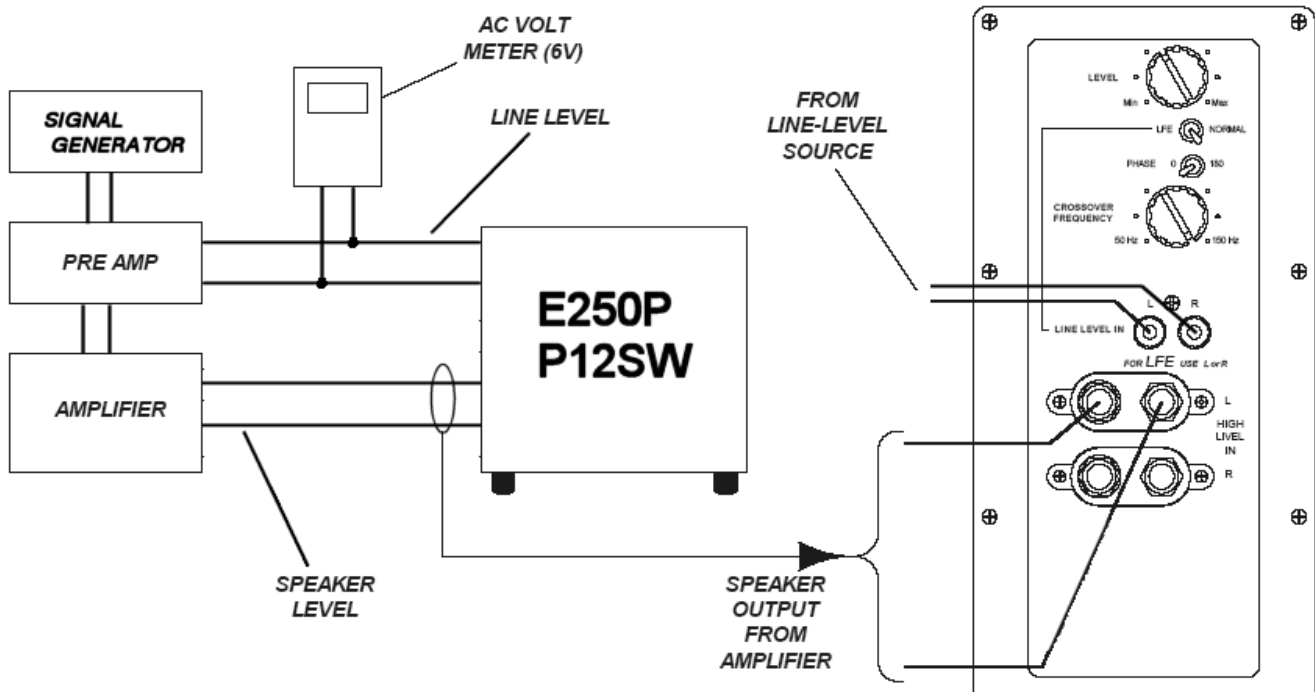
P12SW

Exploded View



Ref#	Part Number	Description	Qty
1	352024-003	ASY, GRILLE, BLK, FRNT	1
2	333249-001	CUP,GRILLE	4
3	882-41110-12	SCREW, 6 X 3/4,PAN,PH,PB,BLK ZINC,LCS (AMPLIFIER)	10
4	903802-016	SCREW, PB,HXS,#8x1",ZINC (WOOFER)	8
5	351243-001	RING,TRIM,12"	1
6	338128-002	ASY, WOOFER,12" DCR 4.8 Ω	1
7	336799-001	ASY, PORT TUBE	1
8	336486-001	ASY,FOOT,PLSTC	4
9	883-31110-40	SCREW, 8 X 2 1/2,TR,PH,PB,BLK ZINC,LCS (FOOT)	4
10	361872-001	JBL LOGO	1

TEST SET-UP AND PROCEDURE



General Function

UUT = Unit Under Test

- 1) Connect a pair of level input cables (RCA) from signal generator to either Right or Left Level input on UUT. LEVEL control should be full counterclockwise (MIN). Make sure the LFE/Normal switch is in the NORMAL position.
- 2) Turn on generator, adjust to **100mV, 50Hz**.
- 3) Plug in UUT; Turn Main Power switch ON. LED may be either Red or Green. Turn LEVEL control full clockwise (MAX). Low Pass control should be set fully clockwise (150Hz).
- 4) LED should turn Green; immediately bass response should be heard and felt from port tube opening.
- 5) Turn off generator, turn LEVEL control fully counterclockwise (MIN), disconnect RCA cables.
- 6) Connect one pair of speaker cables to either high level input terminal on UUT. Cables should be connected to an integrated amplifier fed by the signal generator.
- 7) Turn on generator and adjust so that speaker level output is **1.0V, 50Hz**. Turn LEVEL control full clockwise (MAX).
- 8) Green LED should light, immediate bass response should be heard and felt from the port tube opening.

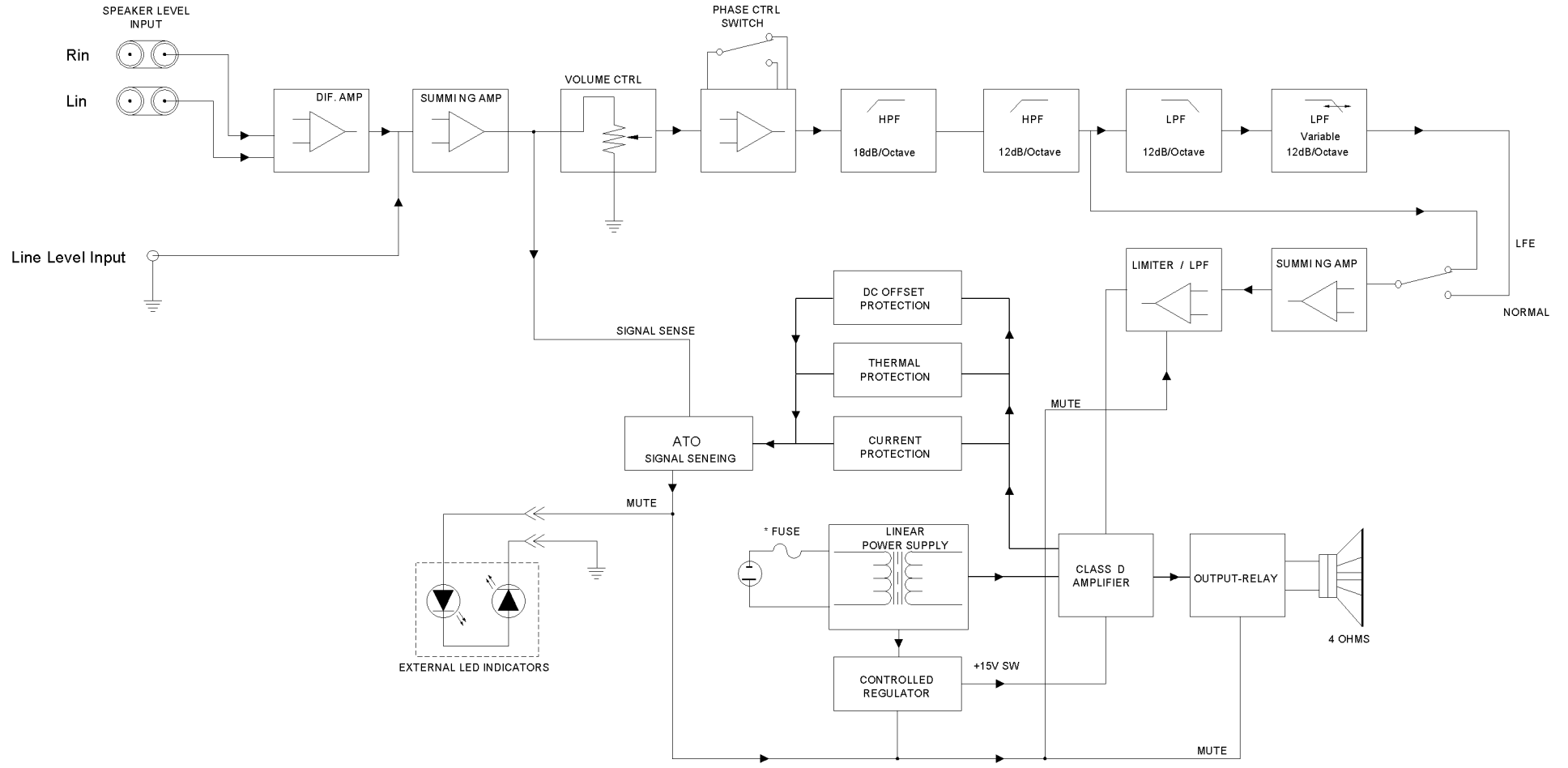
Sweep Function

- 1) Follow steps 1-4 above, using a sweep generator as a signal source.
- 2) Sweep generator from 20Hz to 300Hz. Listen to the cabinet and drivers for any rattles, clicks, buzzes or any other noises. If any unusual noises are heard, remove driver and test.

Driver Function

- 1) Remove driver from cabinet; detach + and - wire clips.
- 2) Check DC resistance of driver; it should be **4.8 ohms**.
- 3) Connect a pair of speaker cables to driver terminals. Cables should be connected to an integrated amplifier fed by a signal 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.

E250P/P12SW subwoofers



FUSE RATING :
 E150P & P10SW
 120 VAC T1.25A-250V
 230 VAC T0.8A-250V
 E250P & P12SW
 120 VAC T2A-250V
 230 VAC T1.25A-250V

Designed by	Checked by	Approved by	Model No.	Issue No.
			E150P/250P	2003/08/08
			Edition No.	
			01	
			Sheet No.	
			OF 7	



Service Bulletin

Service bulletin # JBL2005-01 December 2005

Warranty labor rate: MINOR repair

To: All JBL Service Centers

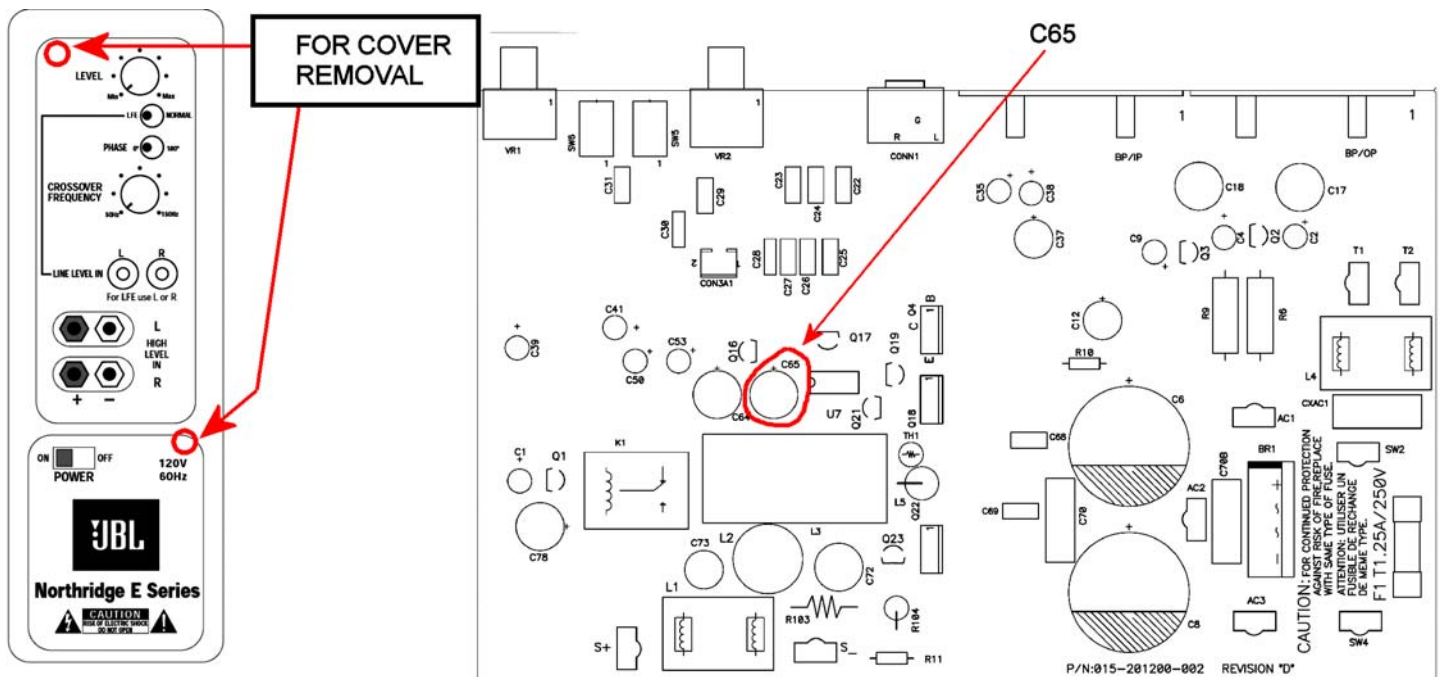
Model: E150P, E250P Subwoofers

Subject: "Chirp" Noise on Power-Up

In the event you receive an E150P or E250P with the complaint: "the subwoofer make a slight "chirp" noise when it becomes active from the stand-by mode", perform the following modification.

Synopsis: Change C65 PE capacitor from 470 μ f to 47 μ f.

- 1) Remove the amplifier from the enclosure.
- 2) Remove the cover.
- 3) Change C65 Electrolytic capacitor from 470 μ f,16V to 47 μ f,16V, JBL part# 034-470515-200. Observe polarity.
- 4) Replace cover, replace amplifier in enclosure, test subwoofer.





TECH TIPS

Troubleshooting tips and solutions to common service problems

For models: E150P,E250P
P10SW, P12SW
PB10,PB12 (Revision 2) *

TIP# JBLTT2003-04 Rev2

Subject: Replacing MOSFETS Q18, Q22

In the event you need to replace MOSFET transistors Q18 or Q22 as part of a repair, it is important to use **ONLY**:

- JBL part# 051-640001-000
- Or JBL part# FE106401110
- Or only the brands: International Rectifier, or Fairchild.

Replace both Q18 and Q22 MOSFET's in the circuit, even if only one seems to be damaged. Do NOT mix & match these components from different manufacturers, or batches. They should be identical.

* Late version PB10 or PB12 subwoofers (Revision 2 in the service manual) can be identified by:

- Amplifier serial number starts with "HA"
- Output transistors in the open, on a large black heatsink
- Large plastic cup enclosing the rear of the amp assembly
- Main PCB, bottom, solder-side contains all SMD devices

DETAILED TROUBLESHOOTING

A. Power Amp Section

Resistance Check	Resistance from S+ (SPK O/P) to GND should be $>1M \Omega$ (NO LOAD)
	Resistance from V+ (C6 P+) to V- (C8 P-) gradually Fully CHARGED should read $>10k \Omega$
	Resistance from V+ (C6 P+) to S+ (SPK O/P) should read $>1M\Omega$
	Resistance from V- (C8 P-) to S+ (SPK O/P) should read $>1M \Omega$

2. Power Up LED RED

With a 5mV signal to Low level input, LED should change to GREEN

-Voltage measurements (DVM)

LED	OP AMP	
	P-U4(1)	P-U4(7)
RED	0Vrms	11.84VDC
GREEN	7.13Vrms	-12.93VDC

3. D.C. Operation

-Voltage measurements (DVM) on CLASS D POWER AMP

Between	V+	Q4(E)	Q1(C)	Q10(C)	U7(1)	U7(2)	U7(4)	U7(6)	U7(7)	U7(8)
And This Point	GND	V-	GND	GND	GND	GND	GND	GND	GND	GND
Get this Reading	71.7V	0V	-71.7V	0V	-71.7V	-71.5V	-71.2V	0V	0V	4.65V

4. Check Switching Frequency

- Oscilloscope - **USE THE PROBE TIP TO U6(7) TO GND**
- Reading 100kHz +/-10%,24Vp-p

B. Pre Amp Section

Line Level Input Sensitivity

-Set up

Turn level, X'OVER FREQ POT Fully CW and LFE switch off
Generator Set at 200mV@50Hz
Signal to Line level input

DETAILED TROUBLESHOOTING (CONT'D)

- Voltage measurements

OP AMP									SPEAKER
U2(1)	U2(14)	U2(8)	U3(7)	U3(1)	U3(14)	U3(8)	U5(7)	U5(1)	O/P
306.9mV	461mV	460mV	658mV	628mV	598mV	2.326V	2.02V	3.57V	23.33V

2. High Level Input Sensitivity

-Set up Turn level, X'OVER FREQ POT Fully CW and LFE switch off
 Set Generator at 1.3V@50Hz
 Signal to High level input

-Voltage measurements 15.3V at speaker output

3. Low-Pass

-Set up Set Generator at 200 mV@100Hz
 Signal to Line level input
 Measure voltage at S+ speaker output

-Voltage measurement

X'OVER FREQ. Setting	Output
CW	14.03V
CCW	4.8V

4. LFE

-Set up Set Generator at 200mV@200Hz
 Signal to Line level input
 Measure voltage at S+ speaker output

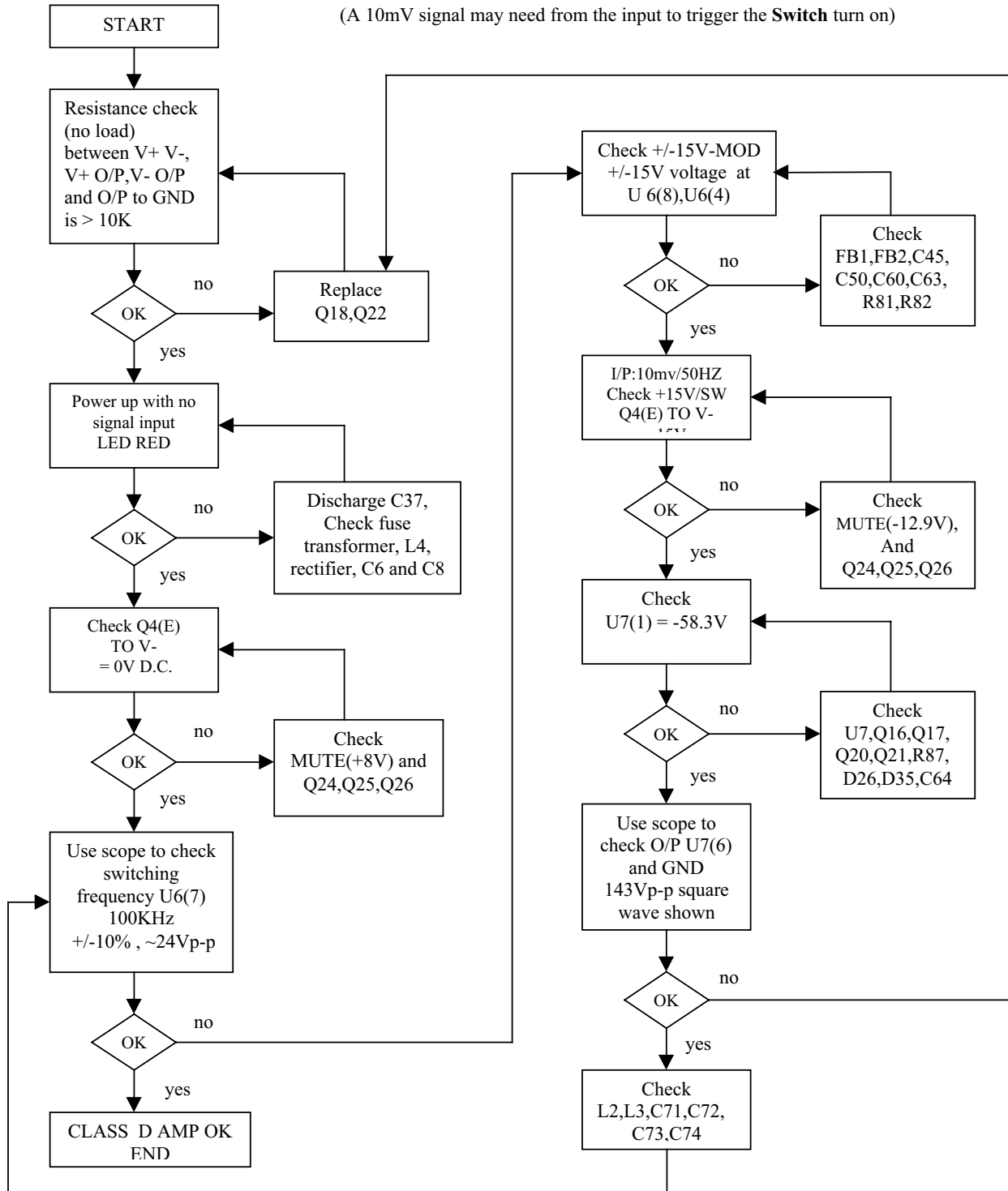
LFE switch Setting	Output
Normal	6V
LFE	18.32V

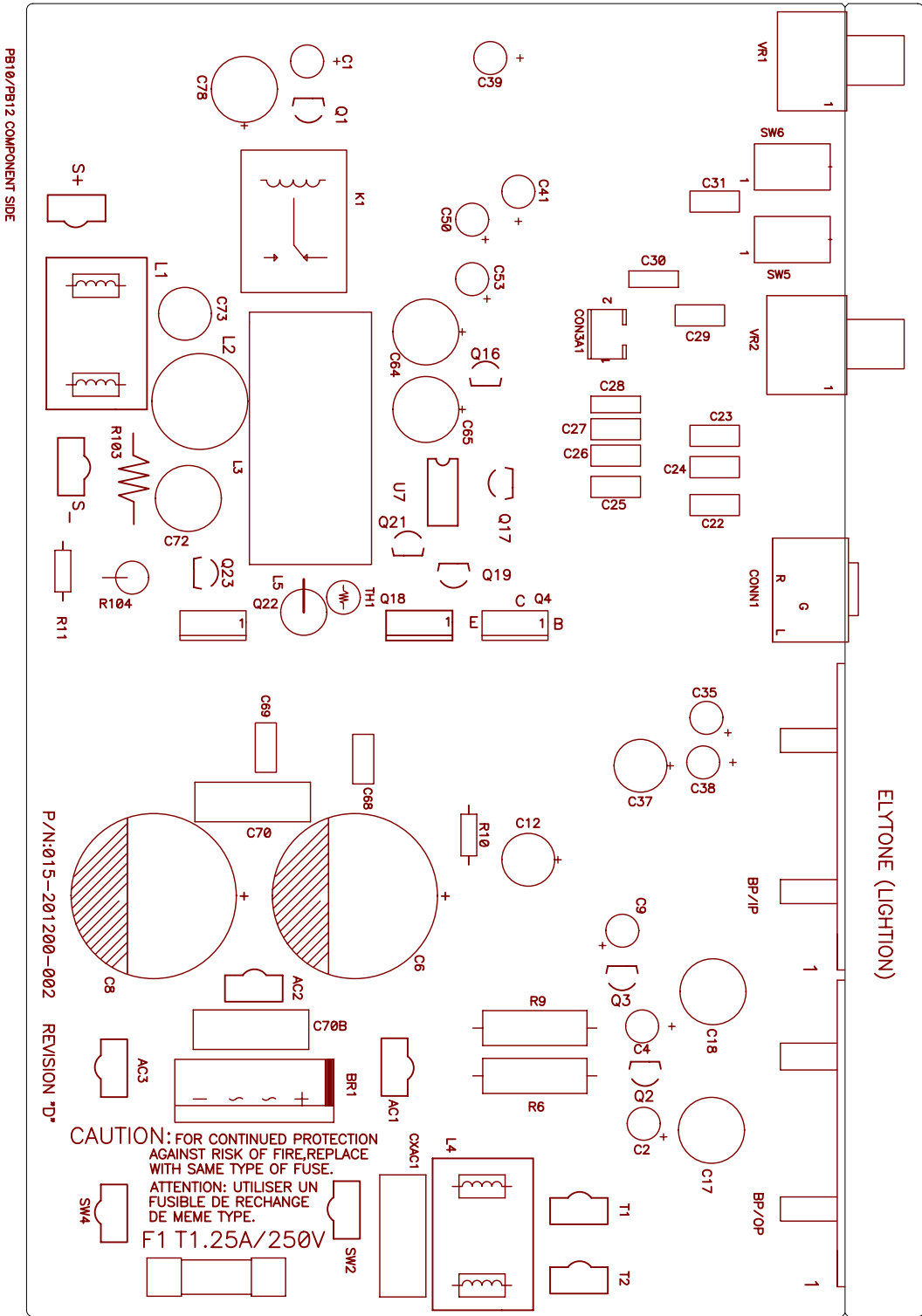
See flow chart next page for diagnostics.

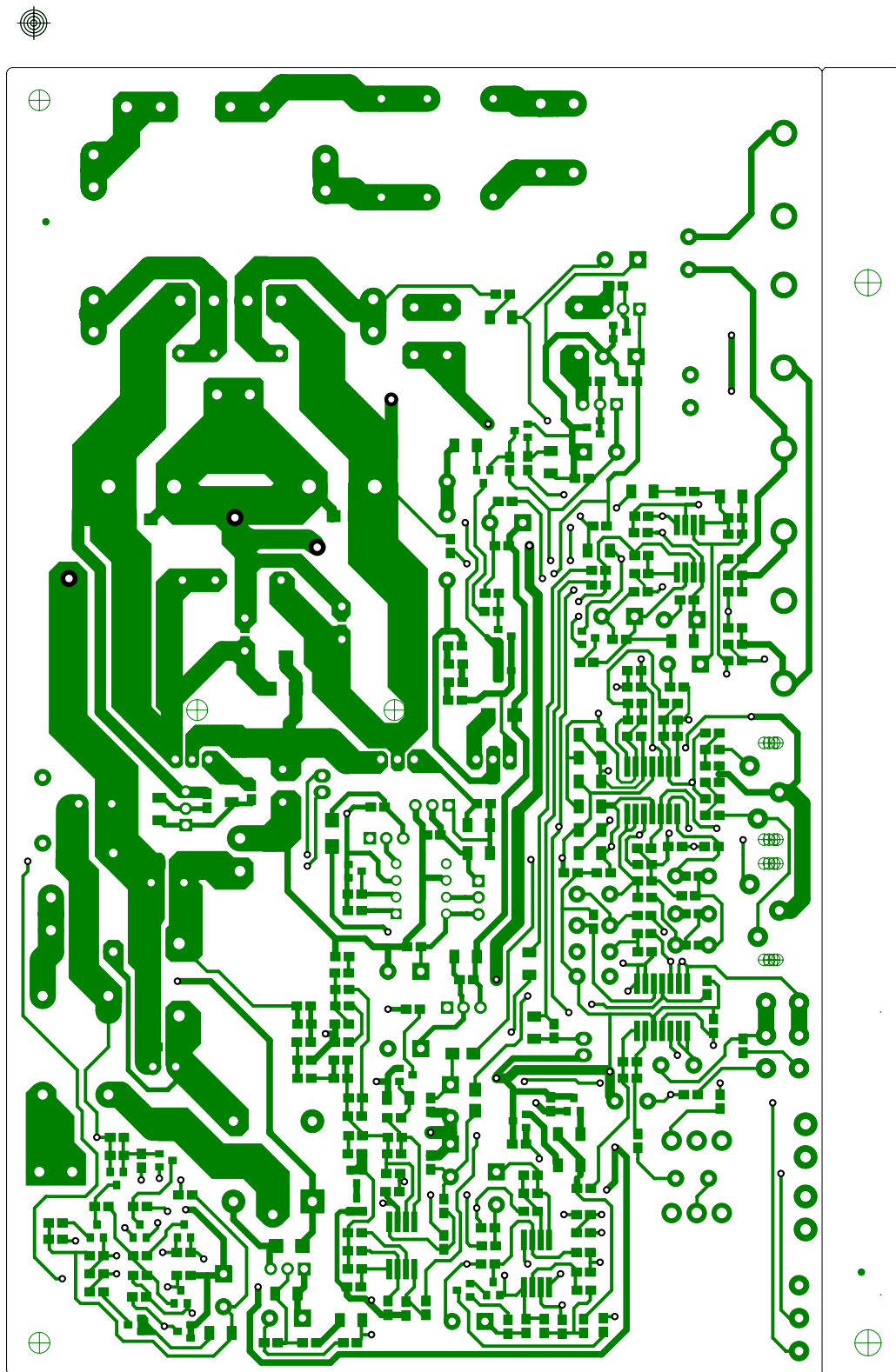
DETAILED TROUBLESHOOTING (CONT'D)

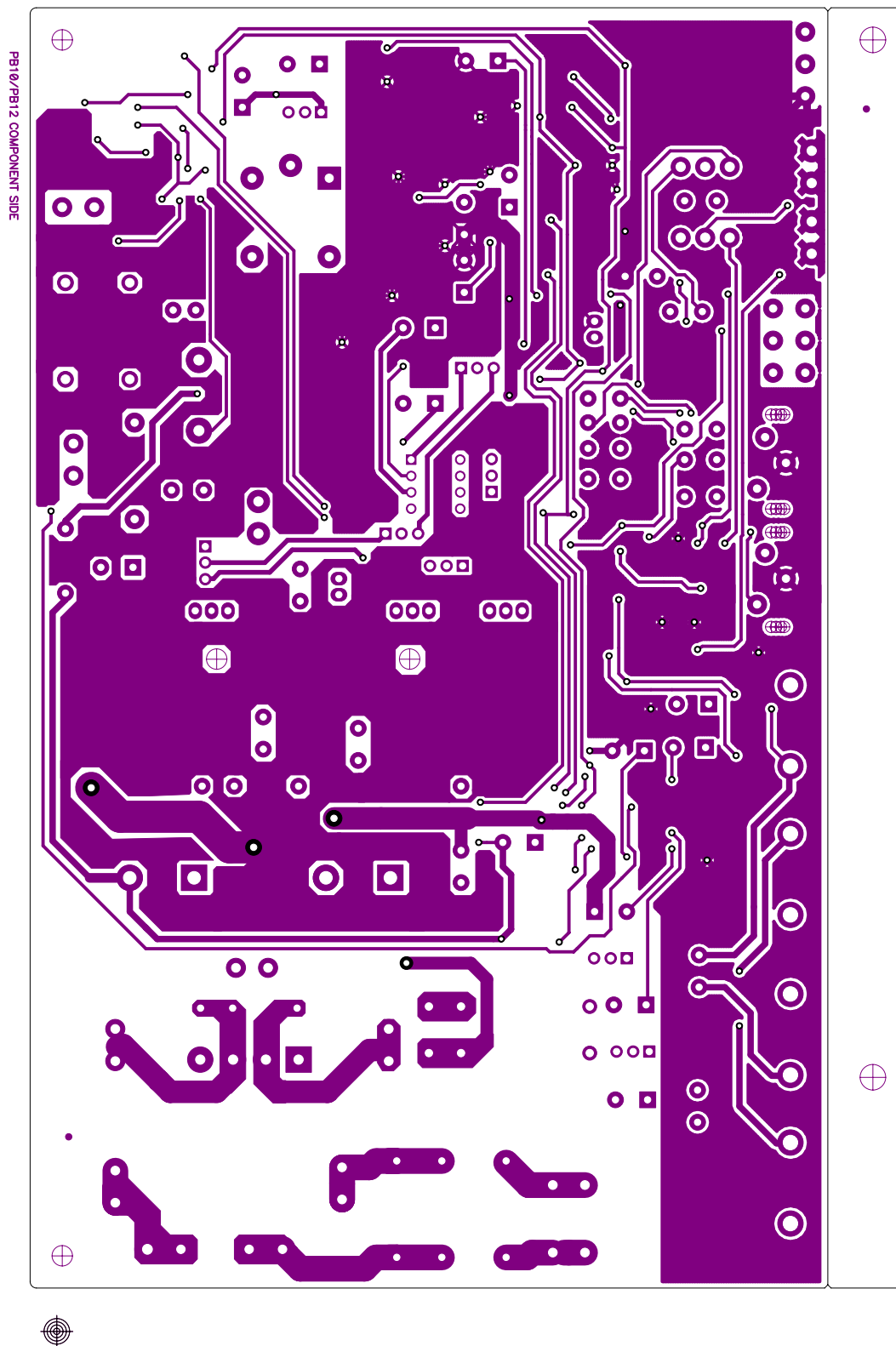
FLOW CHART

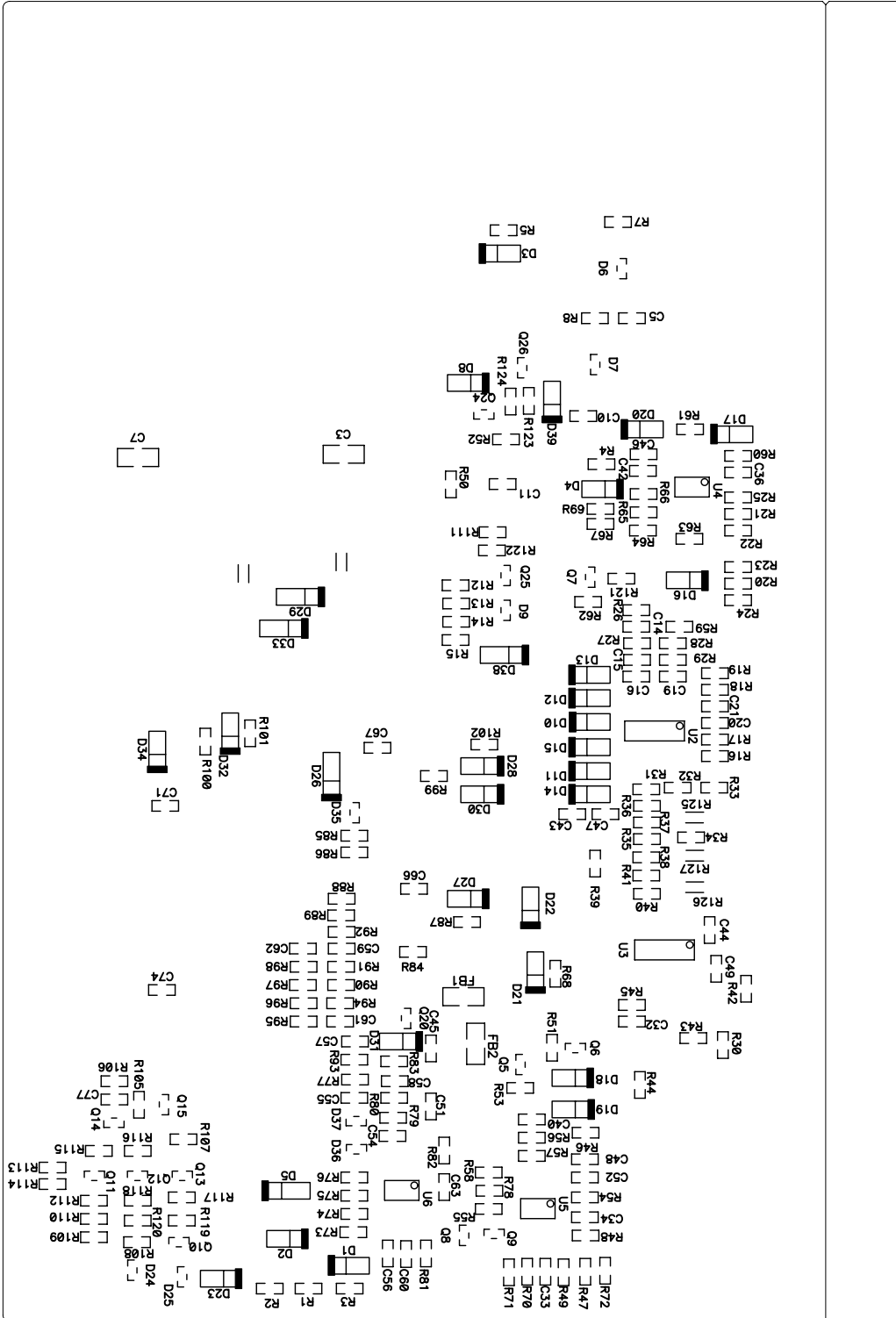
CAUTION : SPEAKER OUTPUT IS FLOATING AND IS **NOT** PROTECTED AGAINST A SHORT TO GROUND. ALL TEST INSTRUMENTS CONNECTED TO THE OUTPUT **MUST** BE FLOATING. ATTACH THE SCOPE PROBE TIP TO S - and REFERENCE LEAD TO S+.











3012 MOTOR S1:R9N\01R9

E250P/P12SW (120v) Electrical Parts List				
Part Number		Description	Reference Designator	Qty
<i>Resistors</i>				
020-220497-120	Carbon Film	2K2 1/4W J	R11	1
021-100401-120	MOF Resistor	1K 1W J	R103	1
021-120403-020	MOF Resistor	1K2 3WS J 8x20	R9	1
021-120405-020	MOF Resistor	1K2 5WS J 8x25	R6	1
021-220202-120	MOF Resistor	22R 2W(S) J MB TYPE 15x8	R10	1
022-500003-020	KNP Resistor	0R05 3WS J FK TYPE	R104	1
024-000098-120	SMD Resistor	0R 1/8W J 0805	R125,126	2
024-100298-120	SMD Resistor	10R 1/8W J 0805	R81,82	2
024-100398-120	SMD Resistor	100R 1/8W J 0805	R62	1
024-100498-120	SMD Resistor	1K 1/8W J 0805	R79,83,92,95,96,105,108,127,65	9
024-100598-120	SMD Resistor	10K 1/8W J 0805	R2,17,19,37,54,58,63,71,	8
024-100698-120	SMD Resistor	100K 1/8W J 0805	R3,112,22-25	6
024-110598-100	SMD Resistor	11K 1/8W F 0805	R98	1
024-120698-120	SMD Resistor	120K 1/8W J 0805	R39	1
024-121598-100	SMD Resistor	12K1 1/8W F 0805	R38	1
024-137698-100	SMD Resistor	137K 1/8W F 0805	R32	1
024-150498-120	SMD Resistor	1K5 1/8W J 0805	R67,68	2
024-180598-120	SMD Resistor	18K 1/8W J 0805	R29	1
024-187698-100	SMD Resistor	187K 1/8W F 0805	R45	1
024-200598-120	SMD Resistor	20K 1/8W J 0805	R94	1
024-220398-120	SMD Resistor	220R 1/8W J 0805	R90	1
024-220498-121	SMD Resistor	2K2 1/8W J 0805	R1,87,61	3
024-220598-120	SMD Resistor	22K 1/8W J 0805	R118	1
024-220798-120	SMD Resistor	2M2 1/8W J 0805	R80,121	2
024-237598-120	SMD Resistor	23K7 1/8W F 0805	R48	1
024-243698-100	SMD Resistor	243K 1/8W F 0805	R36	1
024-270498-120	SMD Resistor	2K7 1/8W J 0805	R73,64	2
024-300398-120	SMD Resistor	300R 1/8W J 0805	R55	1
024-300598-120	SMD Resistor	30K 1/8W J 0805	R56	1
024-330498-120	SMD Resistor	3K3 1/8W J 0805	R7,8,12-15,59	7
024-330598-120	SMD Resistor	33K 1/8W J 0805	R4,5	2
024-332498-100	SMD Resistor	3K32 1/8W F 0805	R26,27,	2
024-360498-120	SMD Resistor	3K6 1/8W J 0805	R28	1
024-390498-120	SMD Resistor	3K9 1/8W J 0805	R93	1
024-390598-120	SMD Resistor	39K 1/8W J 0805	R77	1
024-430498-100	SMD Resistor	4K3 1/8W F 0805	R78	1
024-453598-100	SMD Resistor	45K3 1/8W F 0805	R30	1
024-470298-120	SMD Resistor	47R 1/8W J 0805	R101,102	2
024-470398-120	SMD Resistor	470R 1/8W J 0805	R76,99,100	3
024-470498-120	SMD Resistor	4K7 1/8W J 0805	R85,86	2
024-470598-120	SMD Resistor	47K 1/8W J 0805	R44,47,49,107	4

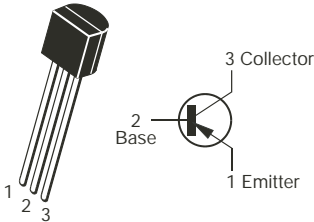
Part Number		Description	Reference Designator	Qty
024-470698-120	SMD Resistor	470K 1/8W J 0805	R70	1
024-470798-120	SMD Resistor	4M7 1/8W J 0805	R60	1
024-487498-100	SMD Resistor	4K87 1/8W F 0805	R51,53	2
024-510398-120	SMD Resistor	510R 1/8W J 0805	R57	1
024-560598-120	SMD Resistor	56K 1/8W J 0805	R122	1
024-620398-100	SMD Resistor	620R 1/8W F 0805	R16,18	2
024-680498-120	SMD Resistor	6K8 1/8W J 0805	R46,91,40,41,43,42	6
024-680598-120	SMD Resistor	68K 1/8W J 0805	R33,34,31,50,52,66	6
024-820598-120	SMD Resistor	82K 1/8W J 0805	R69	1
025-010300-000	Thermister	TSE-103 K L:50mm		1
026-200595-269	Freq Pot 20K	PN:RD163121R03D-20KBx2(EJ)	VR2	1
026-500495-252	Level Pot 5K	PN:RK163111R52B-5KA (EJ)	VR1	1
<i>Capacitors</i>				
031-100244-100	Ceramic Capacitor	0u01/50V K 0805 X7R	C33,45,51,66,67,5,10	7
031-100343-100	SMD Capacitor	100pF/50V J 0805 NPO	C36,58,16	3
031-100344-100	SMD Capacitor	0u1/50V K 0805 X7R	C11,42-44,46-49,52,54,55,60,63,71,74,77	16
031-100384-100R	SMD Capacitor	0u1/250V K 1206 X7R	C3,7	2
031-220344-100	SMD Capacitor	220pF/50V J 0805 NPO	C20,21,19,14,15	5
031-330444-300	SMD Capacitor	3300pF/50V K 0805 X7R	C40,34	2
031-470244-102	SMD Capacitor	0u047/50V K 0805 X7R	C62,59	2
031-560243-100	SMD Capacitor	56pF/50V J 0805 NPO	C57,61	2
031-560343-102	SMD Capacitor	560pF/50V J 0805 NPO	C56	1
032-100484-200	Mylar Capacitor	1uF/250V K P:15	C70,C70B	2
033-470444-270	NPE Capacitor	4u7/50V K10 (R)8x13 SBE	C73	1
033-680464-270	NPE Capacitor	6u8/100V K10 (R)1020 GNE	C72	1
034-100525-300	Electrolytic Capacitor	10uF/25V M (R)0511 P:5	C35	1
034-100625-300	Electrolytic Capacitor	100uF/25V M (R)6.3x11 P:5	C64	1
034-220525-301	Electrolytic Capacitor	22uF/25V M (R)5x11 P:5	C4,9,41,39,50,53	6
034-220615-301	Electrolytic Capacitor	220uF/16V M (R)0611 P:5	C37	1
034-330525-300	Electrolytic Capacitor	33uF/25V M (R)0511 P:5	C1	1
034-330615-300	Electrolytic Capacitor	330uF/16V M (R)0812 P:5	C12,78	2
034-330780-300	Electrolytic Capacitor	3300uF/80V M (R)22x48	C6,8	2
034-470415-301	Electrolytic Capacitor	4u7/50V M (R)0511 P:5	C2	1
034-470615-301	Electrolytic Capacitor	470uF/16V M (R)0812 P:5	C65 (See service bulletin)	1
038-100363-300	MPE Capacitor	0u1/100V J	C68,69,26,27,28,29,30	7
038-150393-300	MPE Capacitor	0u15/63V J	C25	1
038-330393-300	MPE Capacitor	0u33/63V J	C31	1
039-100384-100	Safety Capacitor	HQX0.1K275VACx2 18x6x12mm	CXAC1	1
<i>Semiconductors</i>				
051-000600-100	NPN Transistor	PN:MPSW06RLRA TO-92 (ON)	Q2,Q16	2
051-003100-000	NPN Transistor	PN:TIP 31C TO-220 (MOSPEC)	Q4	1

Part Number		Description	Reference Designator	Qty
051-005600-100	PNP Transistor	PN:MPSW56RLRA TO-92 (ON)	Q3	1
051-222200-100	NPN Transistor	PN:MPS2222ARLRA TO-92	Q21	1
051-290700-100	PNP Transistor	PN:MPS2907A RLRA TO-92	Q19,23	2
051-540101-000	PNP Transistor	PN:2N5401 TO-92	Q1	1
051-555100-000	NPN Transistor	PN:2N5551 TO-92	Q17	1
051-640001-000	MOSFET N-Channel	PN:IRF640N TO-220 (IR)	Q18,22	2
052-400080-000	Bridge Regulator	PN:RS804 400V,8A	BR1	1
053-211100-000	IC;DIP,Driver	PN:IR2111 Half-Bridge Driver	U7	1
054-000100-100	SMD Diode	PN:ES1D 200V 1A	D5,26,29,33,38	5
054-001002-100	SMD Zener Diode	PN:BZX84C10 10V SOT-23	D35	1
054-001501-100	SMD Zener Diode	PN:BZX84C15 15V SOT-23	D6,7,9	3
054-007200-100	SMD IC; (Dual OP-Amp)	PN:TL072CDR SO-8 (TI)	U5,6	2
054-007400-100	SMD IC;(Quad OP-Amp)	PN:TL074CDR (TI)	U2,3	2
054-011400-100	SMD Transistor	PN:DTC114TKA SMT3	Q7	1
054-033904-100	SMD Transistor	PN:MMBT3904LT1 SOT23	Q11,14,13,5,8,9	6
054-033906-100	SMD Transistor	PN:MMBT3906LT1 SOT23	Q6,10,12,15	4
054-045580-100	SMD IC; (Dual OP=Amp)	PN:NJM4558M-TE3 DMP-8	U4	1
054-050601-100	SMD ZENER DIODE	PN:BZX84C5V6 5.6V SOT-23	D24,36,37	3
054-414803-100	SMD DIODE	PN:LL4148 (Wishay)	D1-4,8,10-23,27,28,	21
054-540100-100	SMD Zener Diode	PN:MMBT5401 LT1 SOT-23	Q20,24,26	3
054-555100-100	SMD Zener Diode	PN:MMBT5551 LT1	Q25	1
050-505200-001	LED	PN:LT-2402-21	D1B	1
<i>Miscellaneous</i>				
065-050400-000	Sleeve	φ3.5mm BLK F32 (125 °C)		
065-100200-000	UL Sleeve	φ2.5 F32-2.5(blk) 125 °C		
082-022640-000	Wire Set #26 UL1007	L=400mm blk/wht 2P Hsing +5TT		
091-000182-000	LED Holder	PN:LED5-2A		
044-100100-000	SMD Ferrite Bead	PN:321611 600R/100MHz 1206		
041-115001-000	Bead Coil	YT-10911	L5	1
042-010053-003	Transformer	YT-10615-4	PT1	1
043-300101-000	Inductor	30uH YT-10033	L2	1
043-324300-000	Inductor	324uH YT-10778	L4	1
043-560200-000	Inductor	56uH YT-10779	L1	1
043-700101-000	Toroidal Inductor	70uH YT-10682	L3	1
008-061215-000	Gasket C4305	12x15 t=5mm CR		
008-062002-002	Gasket	L-32 200x20mm t=5mm PORON		
008-062002-012	Gasket (PB10/12)	200x20mm t=2mm CR4305		
008-063208-000	Gasket C4305	321x8 t=1mm CR		
008-069304-000	Gasket C4305	93x4 t=1mm CR		
061-020000-000	Knob ABS	φ20x15m/m UL94V-0 BLK		
061-314002-000	Strain Relief	P/N SB4F-2		
061-400014-000	Rubber Foot	ID:6.2 OD:11.5 t=2mm blk		
061-700044-000	Mylar	13x18mm TO-220		

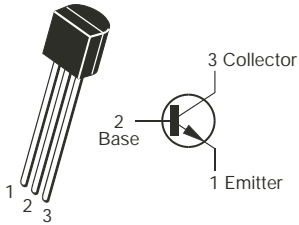
Part Number		Description	Reference Designator	Qty
063-010012-000	Brckt for pwr transistor	P/N:TRK-1		
063-321100-001	E250P Faceplate	322x105.7x15mm BLK (94V0)ABS	E250P	
063-321101-000ZR	P12SW Faceplate	322x105.7x15mm BLK (94V0)ABS	P12SW	
063-531808-000	Bucket	322x105.7x146.5mm blk (94VO)		
071-100608-100	Fiber Washer	OD=8mm ID=3.2 t=1 (red)		
071-100851-000	Washer	ID=5.1 OD=12 t=1m/m		
072-010007-000	RCA Jack	SCJ-1020 2P(G) wht, red		
072-040039-000	Terminal	PC205 (t=0.8m/m) T205MA		
072-040064-000	Terminal	PC250(t=0.8),T250MA		
072-040096-000	Terminal T187MA	(t=0.8mm) PC187(0.8)	AC1,AC3,T1,T2,AC2,SW2,SW4	
072-040169-000	Connector	2 PIN JS-1001-2 P:2.5mm		
072-060170-000	B.P.	W / Accessory Parts		
073-032315-601	Black Anodized	70x58x20mm		
073-050001-000	Fuse Clip	P/N:CFFH1206		
074-020018-000	Rocker SW	PN:RF1003-BB4-0		
074-030002-000	Toggle SW	PN:L101-T2B4QE	SW5,SW6	2
074-300018-000	Relay	PN:943-1C-48D	K1	1
082-022241-001	Wire set #22 UL1007	L=410mm blk/wht		
083-041802-009	Power Cable	SPT-2 blk T187		
093-105202-300	Fuse	FUSE:2A,250V,5*20mm	F1	1
181-911600-161	Wire #16AWG UL1007	blk L=610mm		
181-911655-135	Wire #16AWG UL1007	green L=610mm		
181-921600-000	blk wire #16 UL1015	T187 L:140mm		
181-921699-000	wht wire #16 UL1015	T187 L:160mm		

Semiconductor Pinout Diagrams

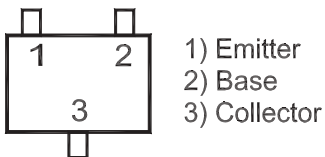
2N5401
Q1



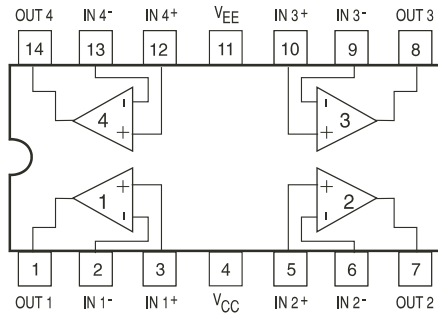
MPSW06RLRA,
MPSW56RLRAMPQ,
MPS2222ARLRA,
2N2907A, 2N5551,
Q2, 16, 3, 21, 19, 23, 17



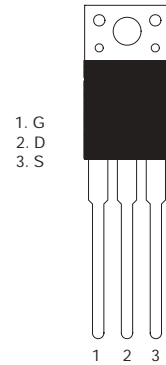
MMBT3904LTI SOT23,
MMBT3906LTI SOT23,
DTC114EK SMT3,
MMBT5401 LTI,
MMBT5551 LTI
Q11, 14, 13, 5, 8, 9, 6, 10,
12, 15, 7, 20, 24, 26, 25



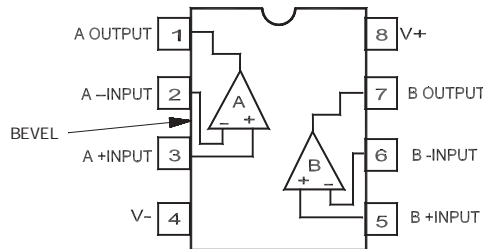
OPAMP, QUAD
TL074CDR
U2, 3



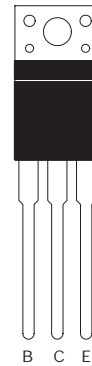
MOSFET IRF640
Q18, 22



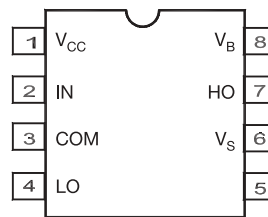
OPAMP, DUAL
TL072CDR SO-8,
NJM4558M-TE3
U5, 6, 4



TIP31C
Q4



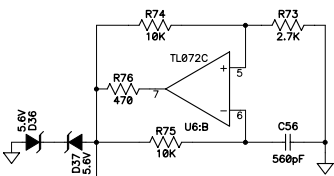
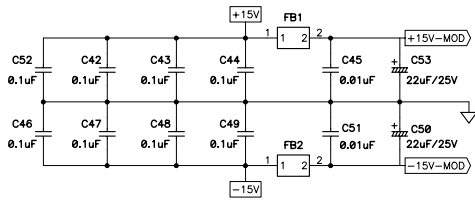
IR2111 HALF-BRIDGE
DRIVER
U7



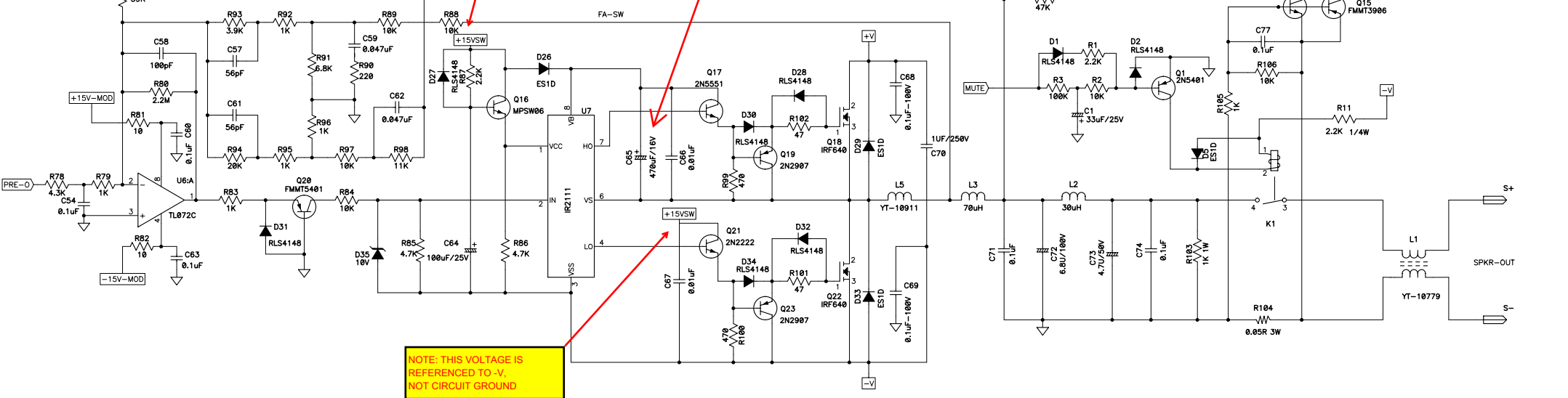
E250P/P12SW subwoofers



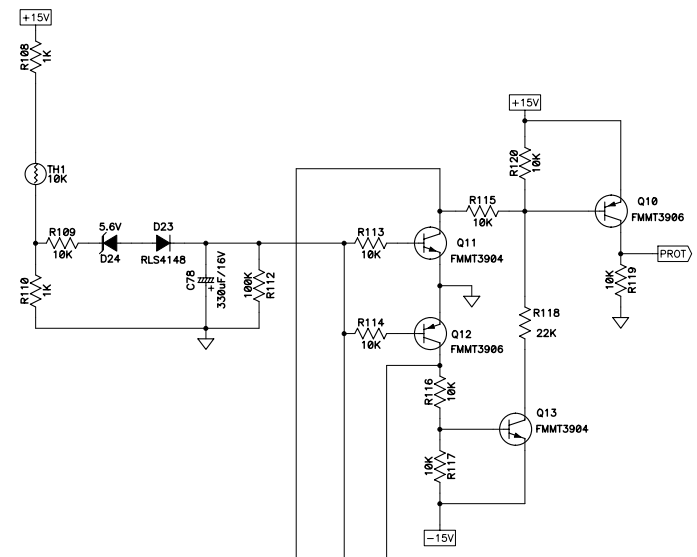
SCHEMATICS



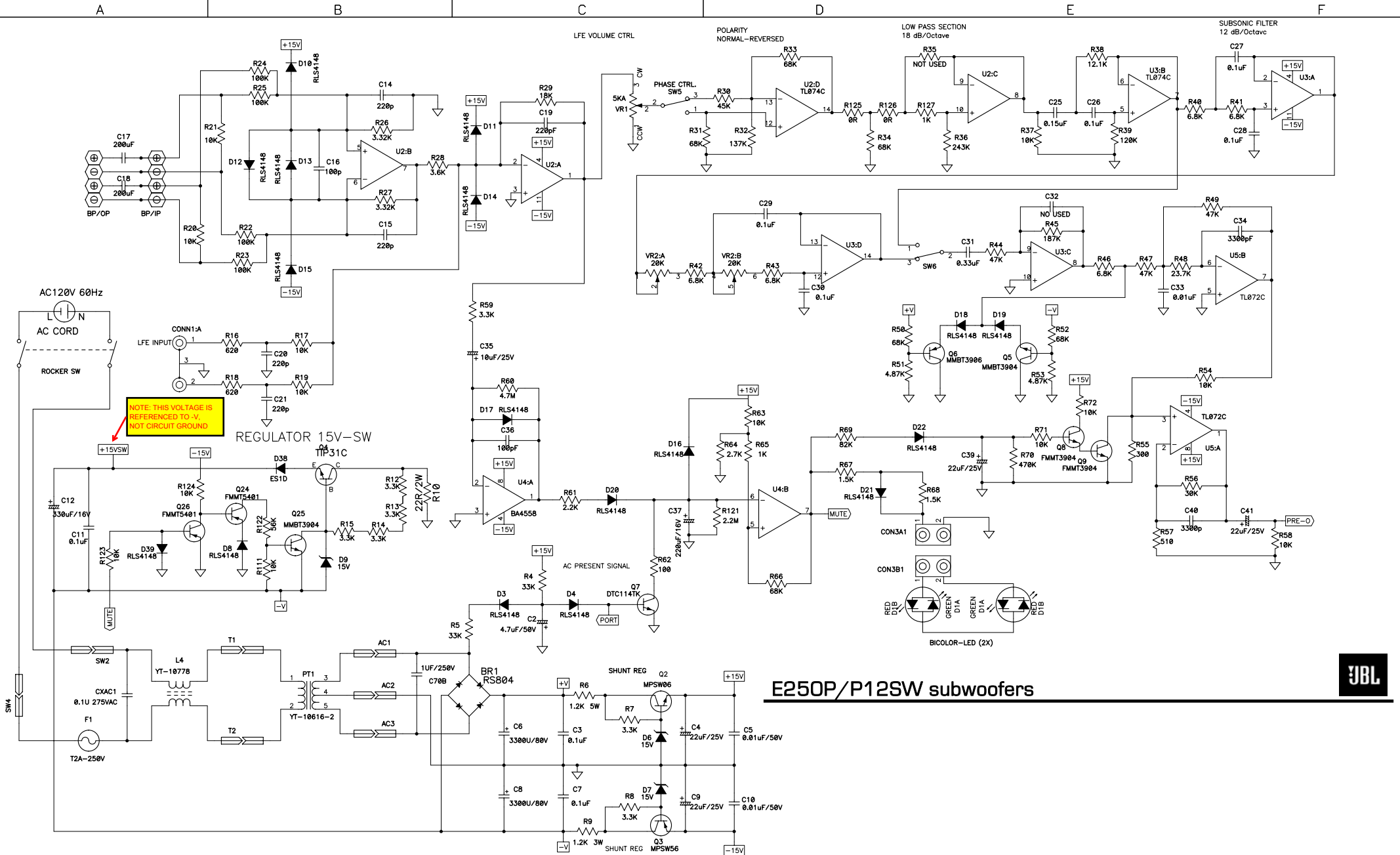
NOTE: THIS VOLTAGE IS REFERENCED TO -V, NOT CIRCUIT GROUND



NOTE: THIS VOLTAGE IS REFERENCED TO -V, NOT CIRCUIT GROUND



JBL	
Model no:	E250P 120V
Sch name	POWER AMP PCB
Issue no:	
Date:	2003/02/25
Sheet:	Rev: P1A
	Author: VITA



E250P/P12SW subwoofers



JBL	
Model no:	E250P 120V
Sch name	PRE AMP PCB
Issue no:	
Date:	2003/02/25
Sheet: 16	Rev: P1A
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