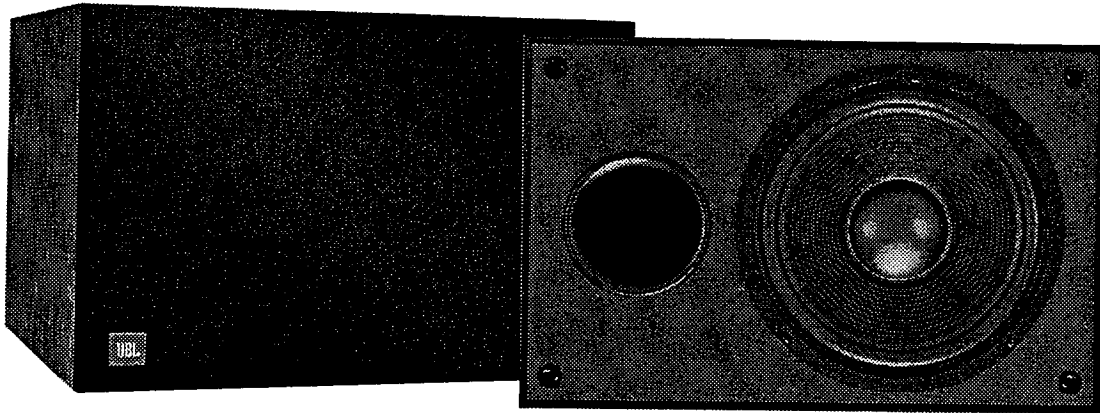


**JBL**

**SERVICE MANUAL**

# **PSW1000**

Powered Subwoofer



**120V & 230V  
Versions**

JBL Consumer Products, Inc.  
80 Crossways Park West  
Woodbury, NY 11797

8500 Balboa Blvd.  
Northridge, CA 91329

**H** A Harman International Company

1112-PSW1000

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## Warranty

The following warranty information is provided with all PSW Series products:



### **1 Year Limited Warranty -- Electronics 5 Year Limited Warranty - Loudspeakers**

***This is an important document. Attach a copy of your bill of sale to this card and keep it in a safe place. Your bill of sale is your warranty.***

The JBL warranty on the electronic components within this loudspeaker system remains in effect for **one year** from the date of the first consumer purchase.

The JBL warranty on loudspeaker components (except enclosures) remains in effect for **five years** from the date of the first consumer purchase. Enclosures are warranted for **two years** from the date of purchase.

#### **WHO IS PROTECTED BY THIS WARRANTY**

The JBL warranty protects the original owner and all subsequent owners providing that the JBL product was purchased from an authorized dealer in the United States or purchased by military personnel from an authorized military outlet. **A copy of the original dated bill of sale must be presented whenever warranty service is required.**

#### **WHAT IS COVERED BY THIS WARRANTY**

Except as specified below, the JBL warranty covers all defects in material and workmanship. The following are **not covered**: Damage caused by accident, misuse, abuse, product modification or

neglect, damage occurring during shipment, damage from failure to follow instructions contained in the instruction manual, damage resulting from the performance of repairs by someone not authorized by JBL, damage caused by installation of parts that do not confirm to JBL specifications, any claims based on misrepresentations by the seller, products sold on an "as-is" or final sale basis, or the cost of installing, removing, or reinstalling the unit. JBL's liability is limited to the repair or replacement, at our option, of any defective product and shall not include incidental or consequential damages. JBL reserves the right to replace a discontinued model with a comparable model. Any replacement unit or parts supplied may be new or rebuilt.

### **TO OBTAIN WARRANTY SERVICE**

If you require warranty service, please return the product to your dealer. If this is not possible, in the United States, please call 1-800-336-4JBL, for information on how to obtain service.

If purchased outside the United States, contact your local dealer for repair or replacement.

### **DO NOT RETURN PRODUCTS TO THE JBL FACTORY WITHOUT AUTHORIZATION**

You are responsible for transporting your product for repair or replacement. JBL will pay reasonable return charges for delivery to any location in the United States if the repair or replacement is covered under the warranty.

Correspondence with JBL should be addressed to: JBL Customer Service, 80 Crossways Park West, Woodbury, NY 11797. Outside the United States, please contact your local distributor.

This warranty gives you specific legal rights. You may also have other rights which vary from state to state. Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above may not apply to you.

JBL Consumer Products  
80 Crossways Park West  
Woodbury, NY 11797

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8500 Balboa Boulevard  
Northridge, CA 91329

### **Specifications PSW1000**

Amplifier Power (RMS)*	100 Watts
Low Frequency Driver	10"
Voice Coil Diameter	2"
Cone Material	High Polymer Laminate
Inputs	Line Level & Speaker Level
Outputs	Full Range Speaker
Crossover Frequency (Continuously Variable)	90-150Hz
Frequency Response (-6db)	30Hz to (90-150Hz)**
External Dimensions (HxWxD)	11-1/2 x 18 x 16-3/4" (292 x 457 x 426mm)
Weight	36 lbs. (16.4 kg)
Shipping Weight	42 lbs. (19 kg)

\* ALC circuit defeated

\*\* Determined by crossover setting

## SAFETY SYMBOLS

The following symbols are used throughout this manual and in the product. Familiarize yourself with each of the symbols and its meaning before servicing this amplifier.



Instruction manual symbol. The product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect the unit against damage.



Indicates dangerous voltages are present. Be extremely careful.

CAUTION

The CAUTION sign denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in damage to or destruction of the amplifier. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

WARNING

The WARNING sign denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

## GENERAL SAFETY CONSIDERATIONS

WARNING

This amplifier has no power switch. Hazardous voltages are present within the unit whenever it is plugged in. This still applies when the overtemperature thermostat opens.

WARNING

There are voltages and hot components at many points in the amplifier which can, if contacted, cause personal injury. Be extremely careful. Any adjustments or service procedures that require operation of the amplifier out of its enclosure should be performed only by trained service personnel.

**CAUTION**

**BEFORE THIS AMPLIFIER IS PLUGGED IN**, make sure its rated voltage corresponds to the voltage of the AC power source to be employed. Failure to use the correct voltage could cause damage to the amplifier when the AC power cable is plugged in. Do not exceed the rated voltage by more than 10%; operation below 90% will degrade performance or cause the unit to shut off.

# SERVICE MANUAL

## 1. Principles of Operation

Basic Bulk DC of  $\pm 50V$  nominal is rectified by bridge D36 from the 70VAC center-tapped winding of T1. The primary of T1 is protected by an embedded, non resetable thermostat, a 2A, 250V fuse (1A for 230V input) F1 (in clips on the PCA), and panel thermostat TM1. Resistors R102 - R107 and zener diodes D25 and D26 provide auxiliary  $\pm 15V$  DC for the low level signal processing circuits.

The pair of low level signal inputs are summed at U5A together with attenuated and inverted (U1A) high level inputs. The feedback gain control, R116, closely approximates a logarithmic characteristic. After phase selection, a third order high pass (U6) removes infrasonic components below 20Hz and provides inverse correction for the woofer's low frequency response with about 5 dB boost at 34 Hz. The adjustable low pass section U5B combines with the fixed section U9B to attenuate high frequencies at an ultimate slope of -36dB/octave to minimize voice content in the sub-woofer. The symmetric active clipper U8 automatically adapts to the varying DC bulk rail voltage (U1B), to control the amplifier peak output level to a point just below hard clipping (the steep low pass filter rapidly attenuates the harmonics to keep distortion to an acceptably low level). The power amplifier includes U9A, class A level shifter Q1-Q4 and complementary Darlington buffer Q5-Q6.

Some versions also contain an "auto mute" circuit which silences the amplifier after a signal absence of about 5.8 minutes. U108 amplifies level inputs by 40db for threshold comparator U10A. U11 is a retriggerable one-shot formed from a 16 stage counter and an oscillator of about 93 HZ which times out about 5.8 minutes after the last signal input is detected by U10A. Some models also contain an LED indicator D31 (showing that the amplifier is enabled) driven by current source Q15. The actual mute switch is J-FET Q17 in the low pass filter section, controlled by the output of U11.

## 2. Trouble shooting before opening

Check connections, control settings, driver and other possible external problems. If there is output, determine if all controls & inputs function properly. Rotate pots over full range while applying lateral and vertical oscillating forces to locate possible intermittent function. High level inputs should be tested individually, both differentially (signal from '-' to '+' with normal output) and in common mode (signal from low level ground to both '+' and '-' shorted together, giving virtually no output). While passing a signal, corner drop the enclosure a few inches to expose possible intermittent problems. Check woofer for rubbing of voice coil or tears in cone or surround. Check cabinet for loose extraneous articles which may have been pushed into the rear port.



## 3. Removing the Amplifier

### WARNING

This amplifier has no power switch. Hazardous voltages are present within the unit whenever it is plugged in. This still applies when the over-temperature thermostat opens.

**WARNING**

There are voltages and hot components at many points in the amplifier which can, if contacted, cause personal injury. Be extremely careful. Any adjustments or service procedures that require operation of the amplifier out of its enclosure should be performed only by trained service personnel. Refer to drawings for locations of hazards & familiarize yourself with their locations before starting.

**WARNING**

The bulk DC electrolytics contain a large amount of stored energy. Wear safety glasses, and remove rings and jewellery when operating the amplifier out of its enclosure. Fully disconnect the AC source and wait one minute for capacitors to discharge before touching circuit. Do not bridge capacitors or bulk DC tracks, or components connected to them. Dangerous fragments of molten metal or shattered components may be ejected.

- a) Disconnect amplifier's AC plug. Wait 60 seconds.
- b) Remove 10 large screws within 0.5" of edge of panel; remove top two last while holding panel in place. (DO NOT remove any other screws).
- c) Carefully tip panel with PC board assembly partly out of cabinet, holding by edges of panel only. Disconnect 2 or 4 quick connects near upper center of PC board.

**CAUTION**

Do not pick up or support assembly by PC board or any components on PC assembly. Always support or handle by metal panel.

#### 4. Trouble Shooting After Removal

**WARNING**


Verify AC plug is disconnected See WARNINGS in section 3 above.

**WARNING**

To prevent loose hardware from reducing safety spacings, it is essential that all hardware be replaced in the same manner as it was removed, with lock washers under all nuts, proper torque on screws and thread locking sealer on the transformer nuts.

## WARNING

To reduce the risk of electric shock and/or fire, replace items marked

on schematic with the safety marking  only with the exact replacements listed in the Safety Component List, section 6. If exact replacements are not available, order them from the factory or an authorized service center.

- a) Check fuse F1. If blown visually check transformer for discoloration, and large caps (C64-67 for bulges or venting. Check for shorts in Q3-Q6 with an ohmmeter, or across bulk DC (D36, etc.)(see schematic), or from cases of Q5,Q6 to panel.
- b) With ohmmeter, verify contacts of thermostat are closed, voice coil of woofer is about 4 to 8 ohms (model dependent), and windings of transformer are continuous.
- c) Examine board and wiring for obvious damage, broken or poorly soldered connections, or discoloration.
- d) Repair or replace items identified above. Procedures for replacing power transistors and removing PCA are as follows:

## CAUTION

Use low power, grounded temperature regulated iron with small tip such as Weller PTA7 and ESD control. Use SN63/37 solder 0.032" diameter with "no clean" flux core, Alpha Metals P2 or equal.

- i) Replacing power transistors: Clip all 3 leads near body of transistor. Remove screw and discard device (keep hardware and insulator). Holding each lead in turn with needle nose pliers, gently heat and remove cut lead from slot in edge of PCB.

Supporting the leads where they enter the plastic case, fold up the three leads in the manner of the original without applying stress to the plastic case. Clean insulator and seating area on back of panel. Coat both sides of insulator with zinc oxide (white) thermal compound (unless silicone rubber pads are provided), position it on back of device and place pair over hole in panel. Insert screw from far side, pass shoulder bushing over screw and carefully seat shoulder in hole in tab, add flat washer, lock washer and nut (finger tight). Form leads slightly if necessary, so that they just reach slots in PCB but don't lift transistor away from panel. Tighten screw first then solder all three leads in respective slots with full fillet, being careful not to bridge pads. Use ohmmeter to verify there is no short from tab of transistor to panel, or between pads. See also section (xi) below.

- ii) Removing PC assembly (only if absolutely necessary): Remove two screws in power transistors. Remove pot knobs and panel nuts. Remove seven screws attaching signal jack cluster, high level input and PCA from outside of panel. Carefully lift PCA away from panel, lifting power transistors with small screwdriver if needed.



**CAUTION**

Never operate amplifier with load connected when PC assembly is not attached to panel or when any of output transistors is not properly screwed to panel.

- e) If fuse is not blown, and no obvious faults are identified above, proceed cautiously as follows after reading and understanding instructions as well as warnings above, and identifying hazardous line voltage areas on assembly from component locator drawings (if you are unsure, consult the manufacturer before energizing):
  - i) Connect lab audio oscillator (output level at zero) to left signal input. Set amplifier 'gain' control fully clockwise, 'crossover' to 90Hz. Place unit with panel and knobs down on a clean, convenient area of bench so that it is not necessary to reach across amplifier to access test equipment. Use foam blocks to hold securely and prevent rocking or damage to panel.
  - ii) Connect negative lead of DVM to speaker 'black' tab. Use an insulated, shrouded probe for positive lead. Refer to Component Locator for test point locations to follow, and take care not to short to adjacent points with probe tip.
  - iii) Position a switched 'power bar' with the switch in a convenient location near the edge of the bench well away from the unit so that it can be reached safely to turn AC power ON and OFF to unit without risk of accidental contact with exposed areas of assembly. See Safety Warnings in preface.

With 'bar' switch OFF, plug amplifier cord into this controlled 'power bar'.

- iv) Observing appropriate safety procedures, turn 'bar' ON.

With DVM probe, test following voltages:

+V	+40VDC ±10%
-V	-40VDC ±10%
A+	+12VDC ±10%
A-	-12VDC ±10%

If any of these is incorrect, switch OFF and investigate power supply.

- v) If DC is OK, check:

Speaker 'red' tab	0VDC	±0.03V
collector tab of Q6	≈ 40VDC	(+V)
collector tab of Q5	≈ -40VDC	(-V)

Trouble shoot power amplifier if not correct.


- vi) Turn AC OFF. After 60 seconds connect scope probe tip to speaker 'red' tab and ground clip to speaker 'black' tab. Set for 20V/div. (DC) and 50 msec/div. No load is needed.
- vii) Turn AC ON. Set oscillator for about 90Hz sine wave and raise output level. Observe output of amplifier rise with oscillator level until sine begins to compress at

both positive and negative peaks symmetrically, at about 4 volts inside +V/-V levels.

If there is no output, carefully probe each IC amplifier output in signal flow sequence starting from the input, with scope at about .5V/div., until the location of signal loss is located.

- viii) TURN AC OFF. Wait 60 seconds and move oscillator to Right input. Repeat (vii). Flip 'Phase' switch and confirm no loss of main output. With about 10V output, sweep oscillator frequency to verify filter LP and HP functions.

Raise 'crossover' to '150Hz' and confirm change in LPF corner. 'Operation of 'Phase Reversal switch' should be readily apparent in this mode.

- ix) TURN AC OFF. Wait 60 seconds. In turn, repeat vii) for Left and Right high level inputs, both differentially (normal) and common mode (null output).
- x) Trouble shoot and repair sections found faulty. Refer to schematic and table of values used in different versions. Replace safety items marked  with exact replacement, only. See WARNING at head of this section.
- xi) If output transistors or other major components of power amplifier are replaced, re-commission the unit without load using the following procedure (DO NOT just reapply full AC source).

If a dual, tracking, current-limited DC supply is available (preferable method), attach it to +V,-V and common (WITH AC CORD UNPLUGGED!). Set current limit to about 1A and slowly raise output voltage to  $\pm 40V$ , monitoring output with DC scope (10V/div). Initially, output should stay at about zero volts, then deviate a small amount (< 10 volts) due to offsets and imbalances, and quickly return to zero. In normal start up with fast rising voltages, this doesn't occur.

**CAUTION**

Return supply voltage to zero immediately if output has offset as soon as DC is applied, or if DC supply current exceeds 100 mA (trouble shoot further!)

At  $\pm 40V$ , carefully check following voltages with DMM (to speaker 'black' tab):

tab of Q6	about +40V (approx. +V)
tab of Q5	about -40V (approx. -V)
Voltage across R11	about 0.43V
A+	+12V $\pm 10\%$
A-	-12V $\pm 10\%$
Speaker 'red' tab	less than $\pm 0.03V$

If a DC supply is not available, use variable auto-transformer (VARIAC<sup>TM</sup>, etc) with a series AC Ammeter. Follow the procedure above, observing Safety WARNINGS, as the AC input is slowly raised from zero to about 80% of rated voltage (+V  $\approx 32V$ ).

**CAUTION**

Return AC input to zero immediately if the output voltage immediately deviates from zero as AC is initially raised, or if AC input current exceeds about 0.2A. Further trouble shooting is required.

- xii) After the fault has been corrected, re-test using an  $8\Omega$  100 watt load resistor. Amplifier should deliver about 60W RMS at  $8\Omega$  (about 110W at  $4\Omega$ ) from a stiff source of rated voltage at frequencies within its bandpass. Power is limited by the soft clipper on the skirts of the LP filter. Turn input down and disconnect load. There should be no instability or ringing on any of the output waveforms, unloaded, loaded. If some is observed, check compensation and gain-setting components, by-pass caps and damping networks (especially C10).
- xii) Tack a 100 ohm 1/4w resistor in the R 135 location. Turn unit ON apply input signal. Measure the DC voltage on pin 8 of IC U11 with the amplifier operating. The voltage should be approx. -12 Volts, and the oscillator frequency on pin 1 about 93 Hz. Carefully short pins 6 & 7 and observe the output shuts down within 2 seconds. Remove short and amplifier output should return. Turn OFF and remove R135 resistor to restore full 350 second delay.

## **5. Final Checks**

After repair, inspect for possible safety hazards, including loose hardware, missing lock washers, correct fuse and lead dress of primary wires (these must be held in position with cable ties so that they cannot touch secondary components). With ohmmeter, check that panel is connected to signal ground.

Attach speaker wire(s) with black stripe to 'BLK' tab(s) & others to 'RED' tab(s). Re-install amplifier in cabinet using reverse of procedure in section 3.

### **WARNING**

It is essential that the following safety insulation test be performed prior to returning the Powered Sub-Woofer to the customer, using one of the following methods:

#### a) Insulation Resistance Test

With a 500VDC Insulation Tester, check insulation from the outer metal contact of the RCA jack (chassis) to the line and neutral of AC cord. Resistance should be >100MΩ.

#### b) Hi-Pot Test

If a UL approved Hi-Pot tester is available, test line & neutral of AC cord to outer shell of RCA jack (chassis) at 1100VAC for 2 seconds. Observe all of instrument manufacturer's instructions and safety warnings in performing this test.

Connect sub-woofer system to a music source. Play at high level while checking for air leaks around driver, and voice coil problems such as rubbing or loose turns. With the crossover "frequency" set to 90Hz, very little of the voice content should be heard.

## **6. List of Safety Components Requiring Exact Replacements**

F1	<u>120VAC input units:</u> Fuse, 2A/250V 1/4 x 1 1/4 NORMAL BLOW, UL & CSA approved. <u>230VAC input units:</u> Fuse, 1A 250V 1/4 x 1 1/4 SLOW BLOW, UL & CSA approved.
TM1	Thermostat, Open on Rise, 60°C, 15°C hysteresis, 10A 240VAC, UL and CSA approved. 230VAC version must also be VDE approved for Class II circuits. SELCO OA-140-QCV or equal for 120VAC, or ELMWOOD for 230VAC.
T1	POWER TRANSFORMER, CLASS B (130°C) INSULATION, UL & CSA approved. Order from factory quoting model number, serial and rated AC voltage. 230VAC version must also meet IEC 65 requirements.
R21, R26	Resistor 3R3, 1/3W, Metal Film, Fusible Philips CR25, P/N 2322 211 *3338 Philips NFR25, P/N 2322 205 *3338
R126	Resistor 220R, 1/3W Metal film, Fusible, Non-Flamable

Philips NFR25, P/N 2322 205 \*3221

Line Cord SPT-2 or better, with polarized plug, UL and CSA marked and approved. Connect 'HOT' side (phase) to fused side, and neutral (wider pin) to 'N' pad on PCB. Use cable ties to dress AC wires so that they cannot touch PCB assembly or parts. A UL/CSA approved panel strain relief, Heyco 1127 (UL/CSA SR-4L-4) or equal, is required. For 230VAC versions, follow electrical code requirement for country of installation.

### **7. Driver Test Procedure**

- A. Using a sine wave generator, volt meter and amplifier, the driver should be swept through the range of 25-100Hz using a voltage of 11 volts. Listen for any abnormal sounds (ticks, buzzes, rattles etc.) that would indicate a defective driver.
  
- B. Using an ohm meter, make sure that the driver's D.C. resistance measures between 2.5 - 3.8 ohms.

## PSW1000 PARTS LIST 120/230V

### AMPLIFIER

PART #	DESCRIPTION	LOCATION
105205	CAP 220uf 25V M AER 8X11	C1
082006	CAP MCER .1uf 50V K X7R	C2
102429	CAP 68pf 100V .2 CPH	C3
081121	CAP .1nf 100V C NPO .2 CPH	C4
081121	CAP .1nf 100V C NPO .2 CPH	C7
105221	CAP MKTER .33uf 63V M .2	C10
101365	CAP MCER .1uf 100V K X7R	C11
101365	CAP MCER .1uf 100V K X7R	C12
081013	CAP .33nf 100V K X7R .2 CPL	C21
082009	CAP MCER .22uf 100V K X7R	C22
081023	CAP 2.2nf 100V K X7R .2 CPL	C29
081023	CAP 2.2nf 100V K X7R .2 CPL	C30
081121	CAP .1nf 100V C NPO .2 CPH	C31
082006	CAP MCER .1uf 50V K X7R	C32
082006	CAP MCER .1uf 50V K X7R	C33
082006	CAP MCER .1uf 50V K X7R	C34
104878	CAP MKTER .15uf 100V K .4	C36
082006	CAP MCER .1uf 50V K X7R	C38
082006	CAP MCER .1uf 50V K X7R	C39
082006	CAP MCER .1uf 50V K X7R	C40
082006	CAP MCER .1uf 50V K X7R	C41
101257	CAP 33nf 100V K X7R	C42
082009	CAP MCER .22uf 100V K X7R	C43
101842	CAP MCER 15nf 50V X7R .2	C44
105221	CAP MKTER .33uf 63V M .2	C45
105205	CAP 220UF 25V M AER 8X11	C46
105206	CAP 100UF 35V M AER 8X11	C47
081013	CAP .33nf 100V K X7R .2 CPL	C48
082009	CAP MCER .22uf 100V K X7R	C49
082000	CAP MCER .1uf 50V M Z5U .2	C58
082000	CAP MCER .1uf 50V M Z5U .2	C59
105199	CAP 4700UF 63V M AER 22X50	C64
105199	CAP 4700UF 63V M AER 22X50	C65
082006	CAP MCER .1uf 50V K	C71
101059	CAP C MONO 22nf	C72
082006	CAP MCER .1uf 50V K	C73
082001	CAP MCER 47nf 50V	C74
082000	CAP MCER .1uf 50V	C75
082000	CAP MCER .1uf 50V	C76
082000	CAP MCER .1uf 50V	C77
082007	CAP MCER 10nf 50V K	C78
082007	CAP MCER 10nf 50V K X7R	C80
014530	ZENER 1N5230B 4V7 W5 DO35	D1
011001	DIODE 1N4005 1A 600V DO41	D2
014530	ZENER 1N5230B 4V7 W5 DO35	D3
011001	DIODE 1N4005 1A 600V DO41	D4
011001	DIODE 1N4005 1A 600V DO41	D10
011001	DIODE 1N4005 1A 600V DO41	D11

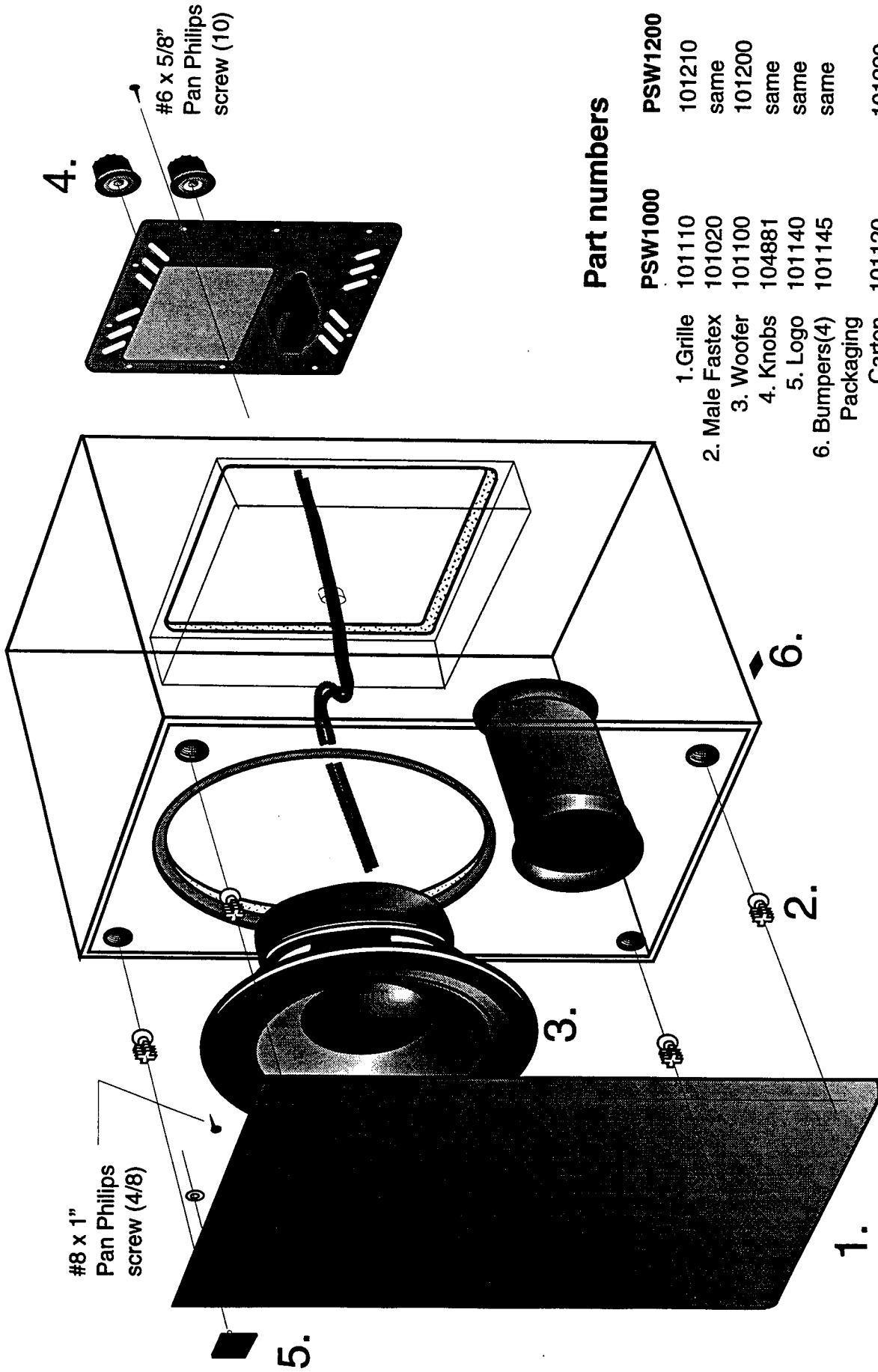
010001	DIODE IN4148 75V DO35	D21
010001	DIODE IN4148 75V DO35	D22
014442	ZENER 1N4742A 12V 1W DO41	D25
014442	ZENER 1N4742A 12V 1W DO41	D26
010001	DIODE IN4148 75V DO35	D29
105387	DIODE LED PCB MNT	D31
014545	ZENER 1N5245B 15V W5 DO35	D33
105202	DIODE BRIDGE PB64 6A 400V	D36
105400	FUSE 1A/250V 'F' TYPE(230V version)	F1
105310	FUSE 1.75A 250V (120V version)	F1
105296	FRONT PLATE/HEAT SINK 120V	FRONT PLATE
105409	FRONT PLATE/HEAT SINK 230V	FRONT PLATE
104924	ASSY HTSINK	HS1
105263	RCA INPUT JACKS	J5
105268	SPEAKER TERM CONNECTOR	J6
105268	SPEAKER TERM CONNECTOR	J7
104881	KNOBS	KNOB
105204	PWR CORD SPT-2 BLK 120V	LINE CORD
105408	POWER CORD VDE 230V 6.2mm DIAMETER C	LINE CORD
105517	POWER CORD VDE 230V 7.6mm DIAMETER C	LINE CORD ALTERNATE
050515	ON-OFF POWER SWITCH(230V ONLY)	PS
105295	PCB G10	PCB
103790	XSTR MPSA06 80V TO92 NPN	Q1
104869	XSTR MPSA56 80V TO92 PNP	Q2
104408	XSTR MJE350	Q3
104868	XSTR MJE340	Q4
104914	<<< XSTR TIP147 100V 218 PNP >>>	Q5 SEE NOTES BELOW !!!!
104913	<<< XSTR TIP142 100V 218 NPN >>>	Q6 SEE NOTES BELOW !!!!
021001	XSTR PN2907A 60V	Q15
105287	XSTR J112 35V	Q16
102203	RES 1.5K` 0W6 1%MF LAQ 1/4	R1
091151	RES 150` 0W3 5% CF LAQ 1/4	R2
091133	RES 13K` 0W3 5% CF LAQ 1/4	R3
093024	RES 39K` 0W6 1%MF LAQ 1/4	R4
091392	RES 3.9K` 0W3 5% CF LAQ 1/4	R5
091392	RES 3.9K` 0W3 5% CF LAQ 1/4	R6
092152	RES 1.5K` 0W5 5% SF LAQ 1/4	R7
092152	RES 1.5K` 0W5 5% SF LAQ 1/4	R8
091331	RES 330` 0W3 5% CF LAQ 1/4	R9
091223	RES 22K` 0W3 5% CF LAQ 1/4	R10
091270	RES 27` 0W3 5% CF LAQ 1/4	R11
091223	RES 22K` 0W3 5% CF LAQ 1/4	R12
092339	RES 3.3` 0W5 5% SF LAQ 1/4	R21
091223	RES 22K` 0W3 5% CF LAQ 1/4	R22
091331	RES 330` 0W3 5% CF LAQ 1/4	R23
091270	RES 27` 0W3 5% CF LAQ 1/4	R24
092339	RES 3.3` 0W5 5% SF LAQ 1/4	R26
092689	RES 6.8` 0W5 5% SF LAQ 1/4	R34
091109	RES 1` 0W3 5% CF LAQ 1/4	R41
091222	RES 2.2K` 0W3 5% CF LAQ 1/4	R51
091474	RES 470K` 0W3 5% CF LAQ 1/4	R52
100036	RES 49.9K` 0W6 1%MF LAQ 1/4	R59

100036	RES 49.9K` 0W6 1%MF LAQ 1/4	R60
100036	RES 49.9K` 0W6 1%MF LAQ 1/4	R61
104976	RES 24.9K` 0W6 1%MF LAQ 1/4	R62
102084	RES 7.15K` 0W6 1%MF LAQ 1/4	R63
093016	RES 100K` 0W6 1%MF LAQ 1/4	R64
093016	RES 100K` 0W6 1%MF LAQ 1/4	R65
093016	RES 100K` 0W6 1%MF LAQ 1/4	R66
093016	RES 100K` 0W6 1%MF LAQ 1/4	R67
102084	RES 7.15K` 0W6 1%MF LAQ 1/4	R68
100036	RES 49.9K` 0W6 1%MF LAQ 1/4	R69
104976	RES 24.9K` 0W6 1%MF LAQ 1/4	R70
091225	RES 2.2M` 0W3 5% CF LAQ 1/4	R71
091333	RES 33K` 0W3 5% CF LAQ 1/4	R72
091114	RES 110K` 0W3 5% CF LAQ 1/4	R73
091473	RES 47K` 0W3 5% CF LAQ 1/4	R74
091683	RES 68K` 0W3 5% CF LAQ 1/4	R75
091393	RES 39K` 0W3 5% CF LAQ 1/4	R76
091274	RES 270K` 0W3 5% CF LAQ 1/4	R77
091153	RES 15K` 0W3 5% CF LAQ 1/4	R78
091103	RES 10K` 0W3 5% CF LAQ 1/4	R81
091104	RES 100K` 0W3 5% CF LAQ 1/4	R82
091222	RES 2.2K` 0W3 5% CF LAQ 1/4	R85
091470	RES 47` 0W3 5% CF LAQ 1/4	R87
091622	RES 6.2K` 0W3 5% CF LAQ 1/4	R88
105099	POT 10K` LIN PANEL MNT BLK	R89
091332	RES 3.3k` 0W3 5% CF LAQ 1/4	R90
104874	RES 13.3K` 0W6 1%MF LAQ 1/4	R91
104874	RES 13.3K` 0W6 1%MF LAQ 1/4	R92
104874	RES 13.3K` 0W6 1%MF LAQ 1/4	R93
093020	RES 10K` 0W6 1%MF LAQ 1/4	R94
093020	RES 10K` 0W6 1%MF LAQ 1/4	R95
091220	RES 22` 0W3 5% CF LAQ 1/4	R96
091225	RES 2.2M` 0W3 5% CF LAQ 1/4	R97
101754	RES 6.81K` 0W6 1%MF LAQ 1/4	R98 DO NOT REPLACE. SEE NOTES BELOW !
091431	RES 430` 0W3 5% CF LAQ 1/4	R99
104875	RES 665` 0W6 1%MF LAQ 1/4	R100
091753	RES 75K` 0W3 5% CF LAQ 1/4	R101
099039	RES 1K` 1W6/2W 5%MF SIL	R102
103870	RES 1.2K` 1W6/2W 5%MF SIL	R103
099039	RES 1K` 1W6/2W 5%MF SIL	R104
099039	RES 1K` 1W6/2W 5%MF SIL	R105
103870	RES 1.2K` 1W6/2W 5%MF SIL	R106
099039	RES 1K` 1W6/2W 5%MF SIL	R107
091222	RES 2.2K` 0W3 5% CF LAQ 1/4	R108
091474	RES 470K` 0W3 5% CF LAQ 1/4	R109
105100	POT 100K` LIN PANEL MNT BLK	R116
105297	RES 11.8K` 0W6 1%MF LAQ 1/4	R118 DO NOT REPLACE. SEE NOTES BELOW
091392	RES 3.9K` 0W3 5% CF	R121
091394	RES 390K` 0W3 5%	R122
091223	RES 22K` 0W3 5% CF	R123
091330	RES 33` 0W3 5% CF	R124
091104	RES 100K` 0W3 5%	R125





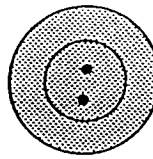
# PSW Series Subwoofers



## Part numbers

PSW1000	PSW1200
1. Grille	101110
2. Male Fastener	101020
3. Woofer	101100
4. Knobs	104881
5. Logo	101140
6. Bumpers(4)	101145
Packaging	
Carton	101120
Owner's Manual	101130
Styrocorners(8)	101125

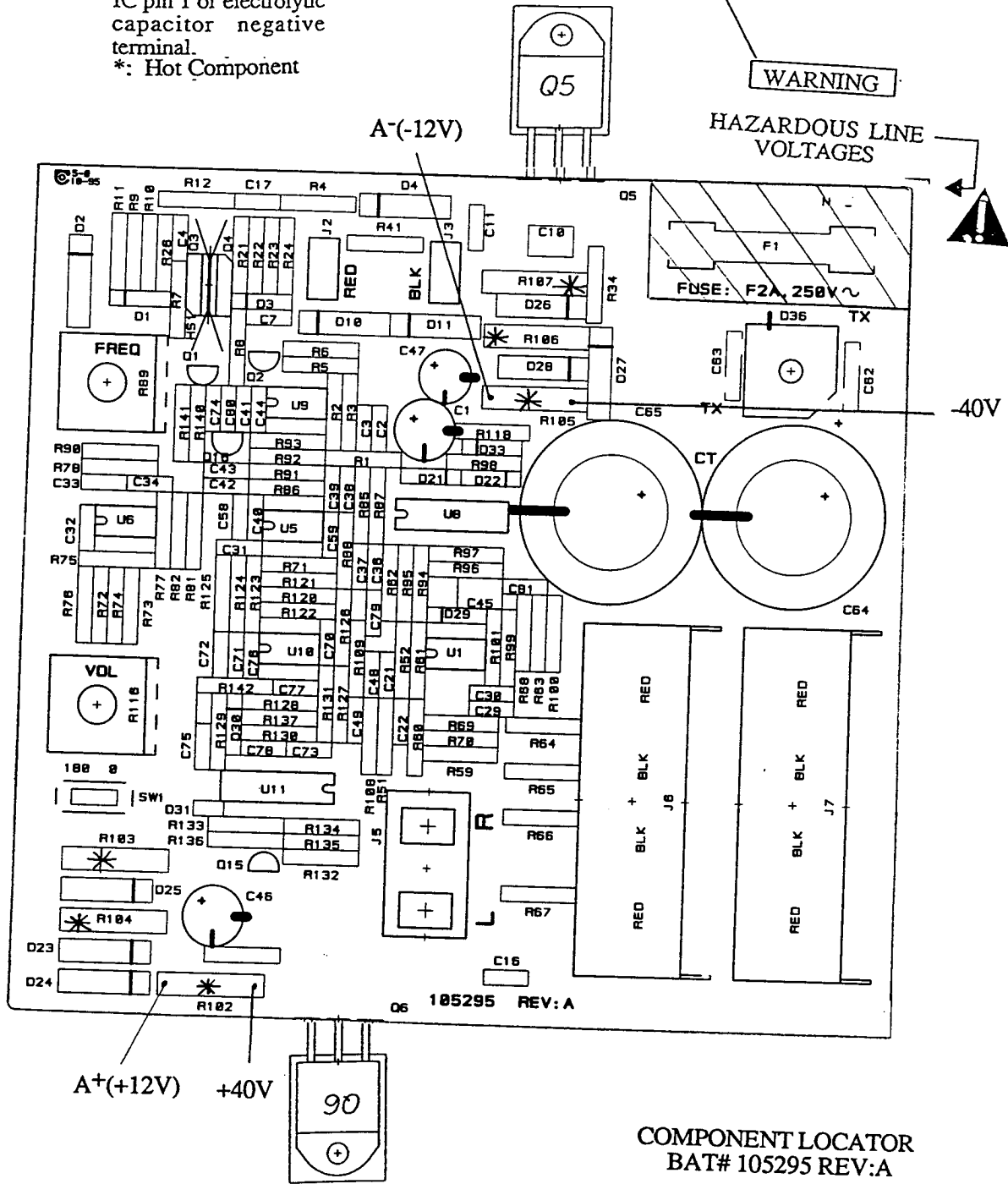
Thermostat



Note Square pad denotes diode cathode, IC pin 1 or electrolytic capacitor negative terminal.  
\*: Hot Component

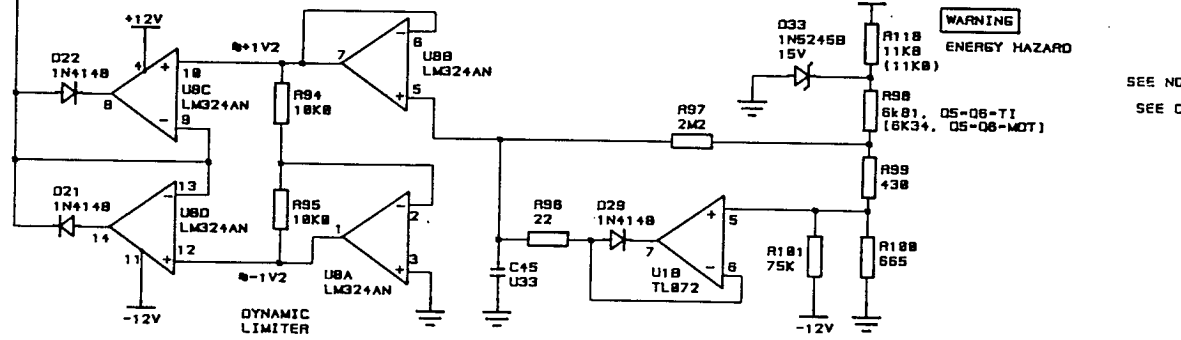
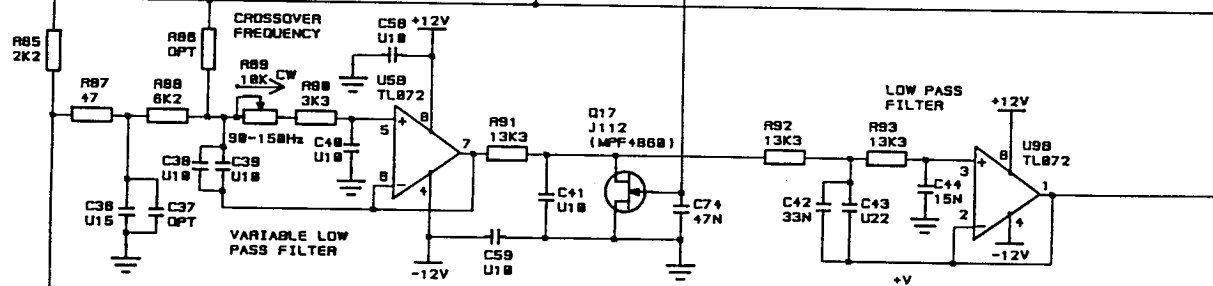
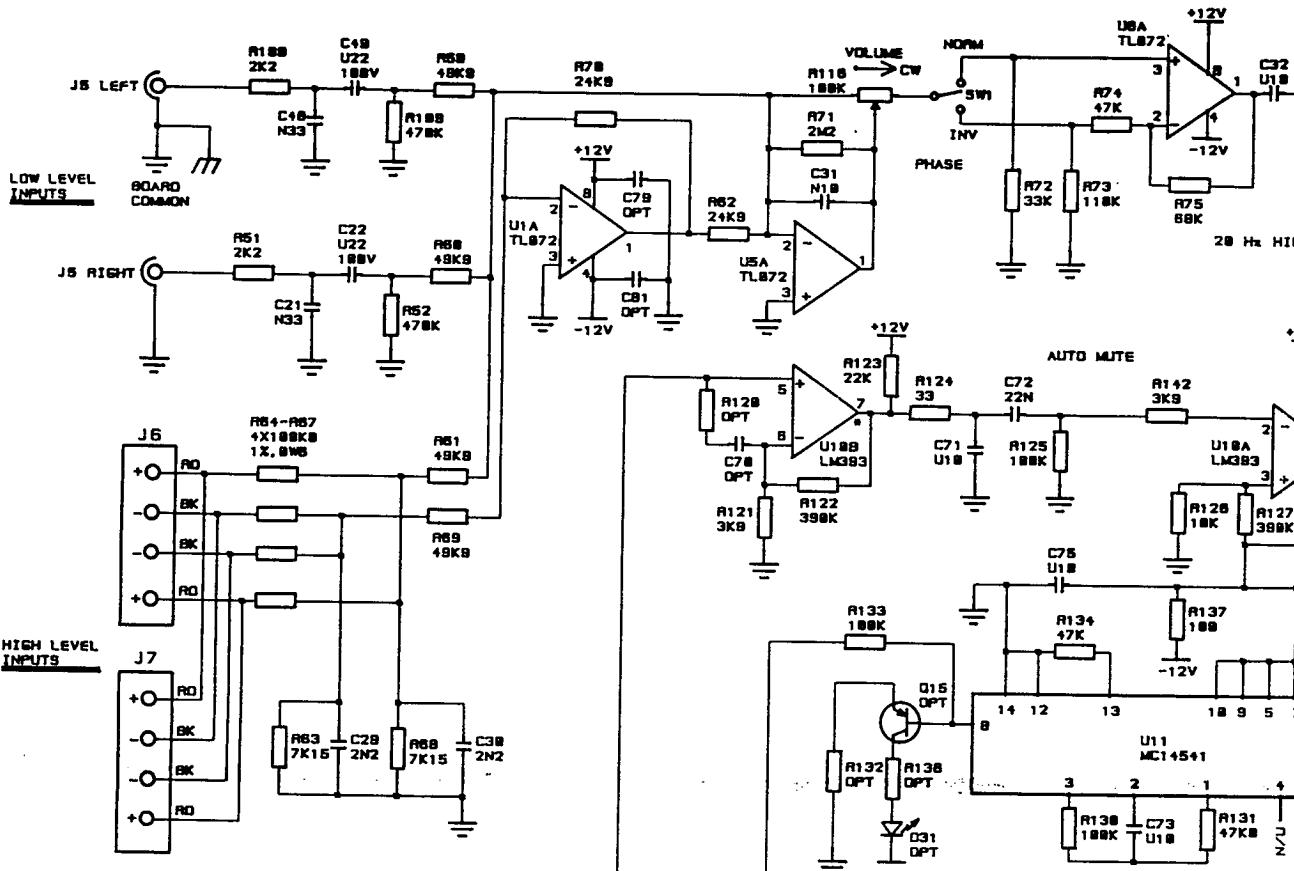
WARNING

HAZARDOUS LINE VOLTAGES



WARNING

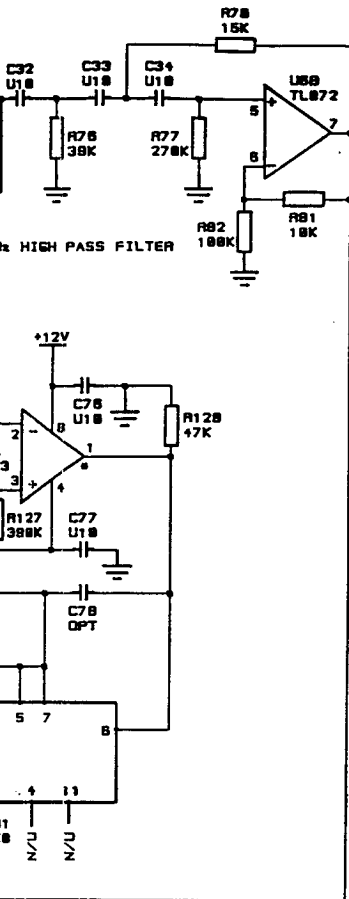
There are voltages and hot components at many parts in the amplifier which can, if contacted, cause personal injury. Any adjustments or service procedures that require operation of the amplifier out of its enclosure should be performed only by trained service personnel. Read service manual before opening.



SEE NOT  
SEE CO

REVISIONS

REV.	DESCRIPTION	ECO	DATE	DRAWN	CHKD
A	PRODUCTION RELEASE				



① (SUBWOOFER AMP. SHEET 2)

WARNING

SEE NOTES AND WARNINGS ON SHEET 2.  
SEE COPYRIGHT NOTICE ON SHEET 2.

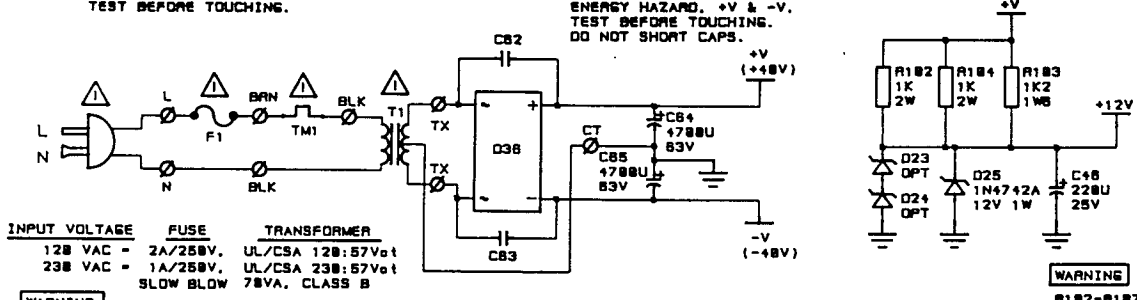
UNLESS OTHERWISE STATED ALL DIMS. IN INCHES	.X ± .020	DWN. BY	28 APR	TITLE	PSW1000 Schematic 110v Version
	.XX ± .010	GJCHAN	1995		
TOL	.XXX ± .005	ENG.	28/APR/95	DRAWING No. 105247-004	REV A
MATERIAL		MFG.	28/APR/95		
FINISH		QUALITY	28/APR/95	SCALE	B
				SHT 1 OF 2	

**WARNING**

HAZARDOUS VOLTAGES!  
DISCONNECT AC PLUS BEFORE SERVICING.  
TEST BEFORE TOUCHING.

**WARNING**

ENERGY HAZARD. +V & -V.  
TEST BEFORE TOUCHING.  
DO NOT SHORT CAPS.



INPUT VOLTAGE	FUSE	TRANSFORMER
120 VAC	2A/250V, UL/CSA 120:57Vot	
230 VAC	1A/250V, UL/CSA 230:57Vot	
		SLOW BLOW 75VA, CLASS B

**WARNING**

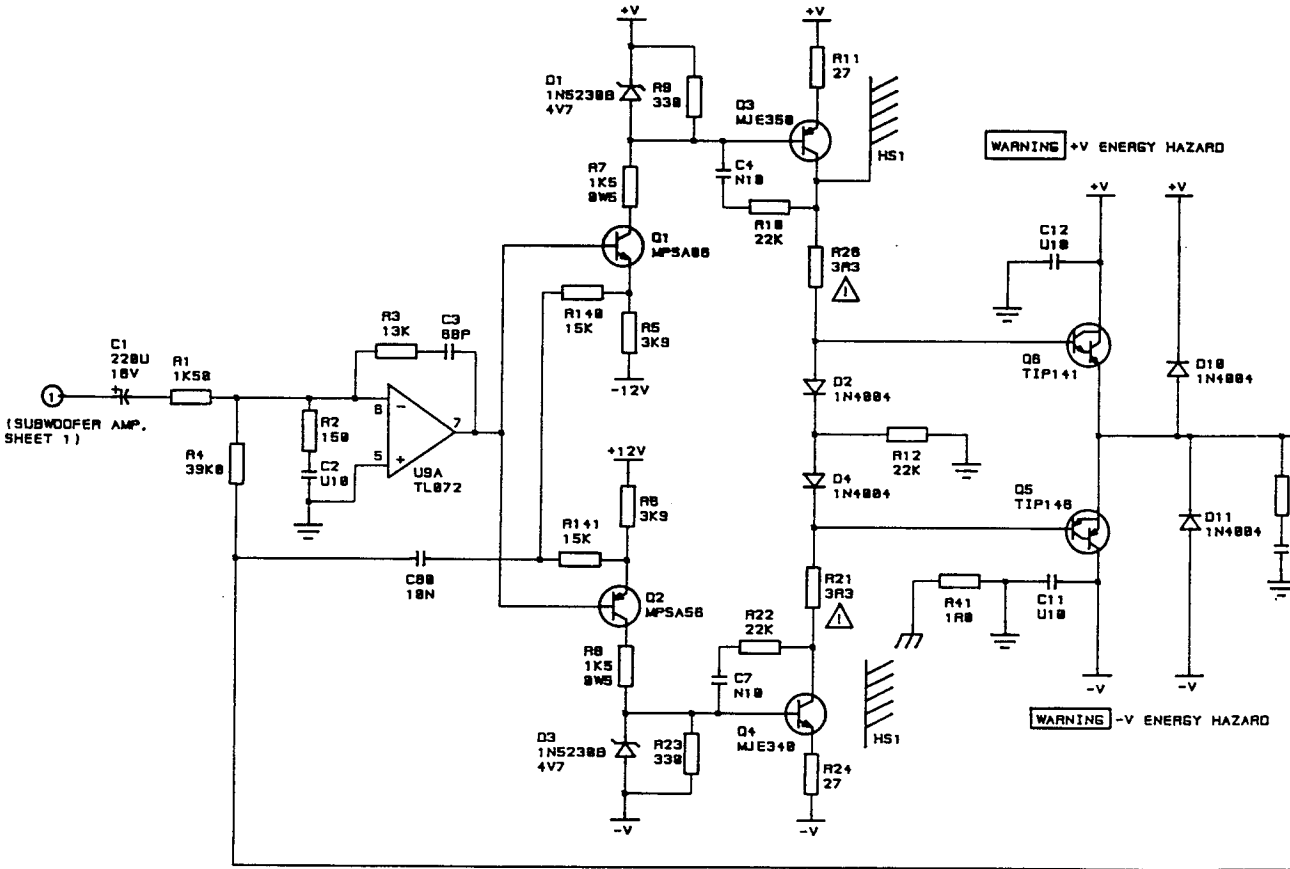
TO REDUCE THE RISK OF FIRE, REPLACE FUSE WITH  
CSA AND UL APPROVED ONE OF THE SAME TYPE AND RATINGS.

**WARNING**

R102-R107 ARE HOT

**WARNING**

HEATSINK (HS1) FOR Q3 & Q4  
MAY BE HOT.  
TEST BEFORE TOUCHING.



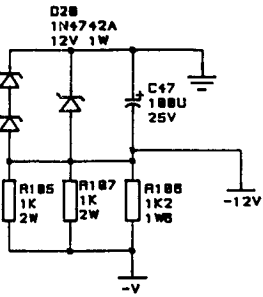
**WARNING** +V ENERGY HAZARD

**WARNING** -V ENERGY HAZARD

(SUBWOOFER AMP.  
SHEET 1)

REVISIONS

REV.	DESCRIPTION	ECO	DATE	DRAWN	CHKD
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**WARNING**

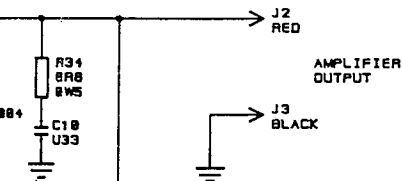
THIS AMPLIFIER HAS NO POWER SWITCH. HAZARDOUS VOLTAGES ARE PRESENT WITHIN THE UNIT WHENEVER IT IS PLUGGED IN. THIS STILL APPLIES WHEN THE OVER TEMPERATURE THERMOSTAT OPENS. UNPLUG AND WAIT 60 SECONDS BEFORE SERVICING. ALWAYS TEST BEFORE TOUCHING POINTS WHICH MAY OFFER A HAZARD.

**WARNING**

THERE ARE VOLTAGES AND HOT COMPONENTS AT MANY POINTS IN THE AMPLIFIER WHICH CAN, IF CONTACTED, CAUSE PERSONAL INJURY. ANY ADJUSTMENTS OR SERVICE PROCEDURES THAT REQUIRE OPERATION OF THE AMPLIFIER OUT OF ITS ENCLOSURE, SHOULD BE PERFORMED ONLY BY TRAINED SERVICE PERSONNEL.

**WARNING**

- BEFORE OPENING OR SERVICING A UNIT, READ AND UNDERSTAND THE SERVICE MANUAL, ESPECIALLY WARNINGS AND CAUTIONS.
- ITEMS MARKED  $\Delta$  MUST BE REPLACED WITH THE EXACT COMPONENT SPECIFIED IN THE SERVICE MANUAL, TO REDUCE THE RISK OF FIRE AND / OR ELECTRICAL SHOCK.
- THE MANUFACTURER RESERVES THE RIGHT TO MAKE CHANGES TO ANY COMPONENTS OR THE DESIGN ITSELF. PLEASE CONTACT THE FACTORY FOR THE LATEST SERVICE MANUAL, QUOTING THE DATE CODE, SERIAL NUMBER, MODEL NUMBER AND RATED VOLTAGE.
- THE CIRCUIT DESIGN, SCHEMATIC DRAWINGS (2 SHEETS), PRINTED CIRCUIT BOARD LAYOUT AND SERVICE MANUAL ARE © 1994 BY BAT INC., AND MAY NOT BE REPRODUCED IN WHOLE OR IN PART, OR USED FOR ANY PURPOSE OTHER THAN THE SERVICE AND REPAIR OF THE PRODUCT, WITHOUT THE PRIOR WRITTEN CONSENT OF BAT INC..



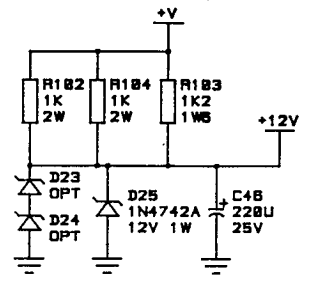
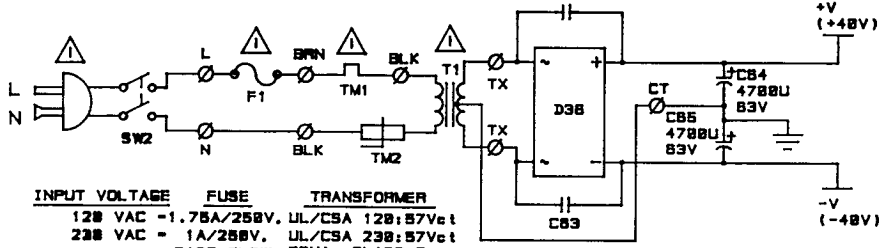
UNLESS OTHERWISE STATED ALL DIMS. IN INCHES					
TOL	.X ± .020 .XX ± .010 .XXX ± .005	DWN. BY <i>GJCHAN</i>	28 APR 1995		
MATERIAL	<i>/</i>	ENG. <i>Z. Losh</i>	28/APR/95	TITLE PSW1000 Schematic 110v Version	
FINISH	<i>/</i>	MFG. <i>[Signature]</i>	28/APR/95	DRAWING No. 105247-004	
		QUALITY <i>[Signature]</i>	28/APR/95	SCALE <i>/</i>	REV A
				<b>B</b>	SHT 2 OF 2

**WARNING**

HAZARDOUS VOLTAGES!  
DISCONNECT AC PLUG BEFORE SERVICING.  
TEST BEFORE TOUCHING.

**WARNING**

ENERGY HAZARD, +V & -V.  
TEST BEFORE TOUCHING.  
DO NOT SHORT CAPS.



**WARNING**

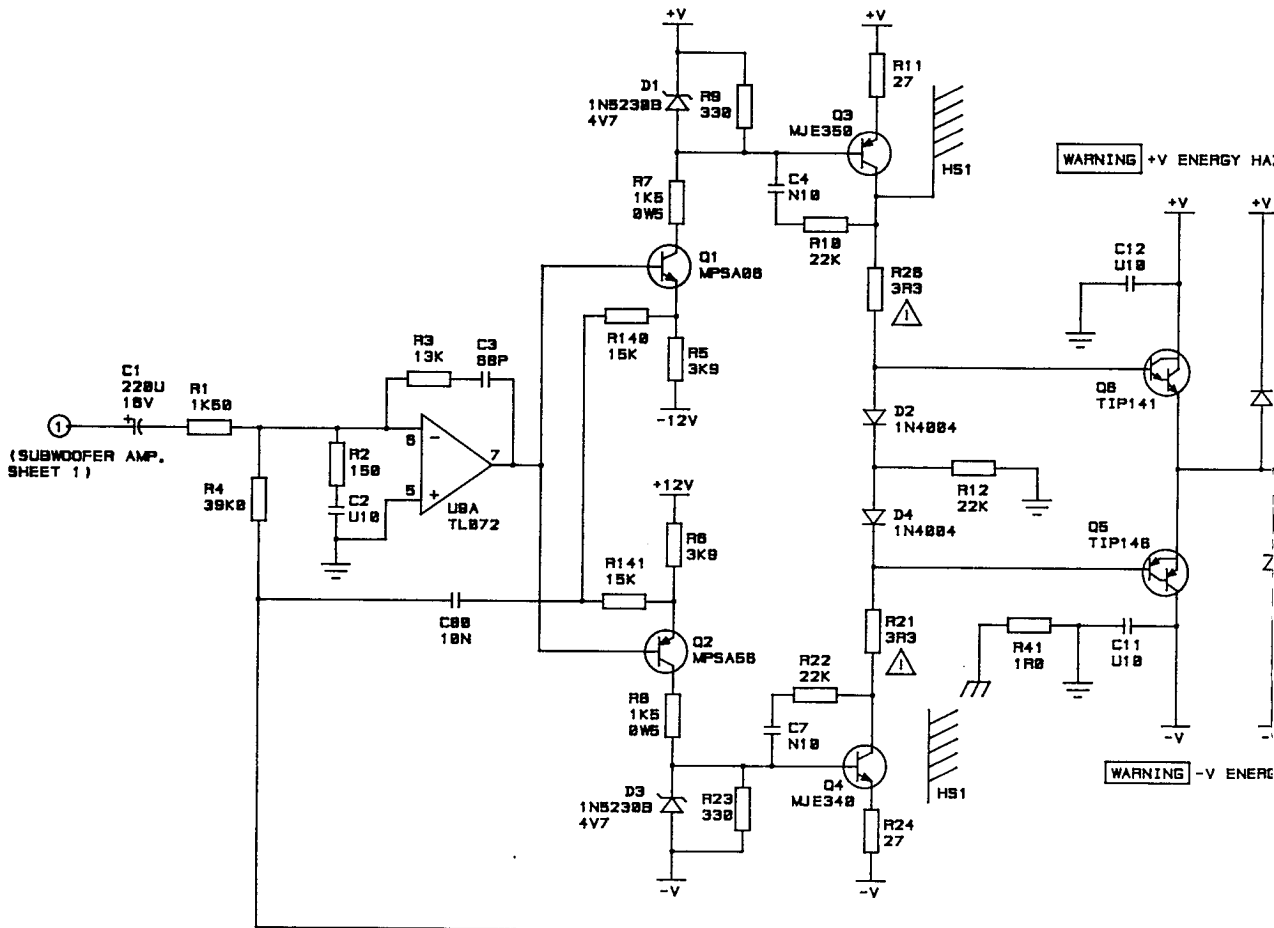
R182-R187 ARE

**WARNING**

TO REDUCE THE RISK OF FIRE, REPLACE FUSE WITH  
CSA AND UL APPROVED ONE OF THE SAME TYPE AND RATING.

**WARNING**

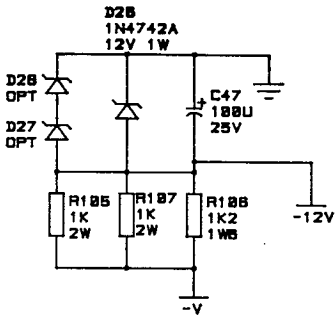
HEATSINK (HS1) FOR Q3 & Q4  
MAY BE HOT.  
TEST BEFORE TOUCHING.





REVISIONS

REV.	DESCRIPTION	ECO	DATE	DRAWN	CHKD
A	INITIAL RELEASE		01.96.	<i>[Signature]</i>	<i>[Signature]</i>



7 ARE HOT

**WARNING**

THIS AMPLIFIER HAS NO POWER SWITCH. HAZARDOUS VOLTAGES ARE PRESENT WITHIN THE UNIT WHENEVER IT IS PLUGGED IN. THIS STILL APPLIES WHEN THE OVER TEMPERATURE THERMOSTAT OPENS. UNPLUG AND WAIT 80 SECONDS BEFORE SERVICING. ALWAYS TEST BEFORE TOUCHING POINTS WHICH MAY OFFER A HAZARD.

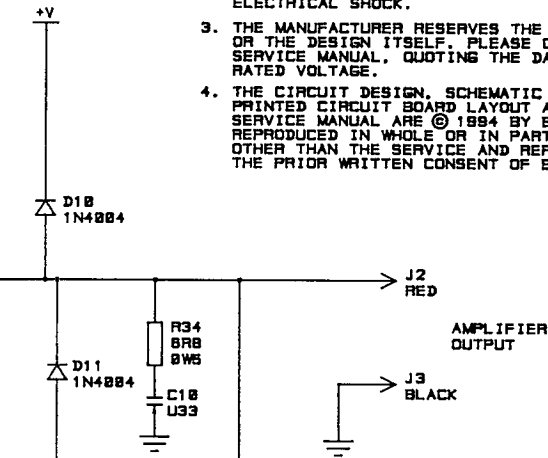
**WARNING**

THERE ARE VOLTAGES AND HOT COMPONENTS AT MANY POINTS IN THE AMPLIFIER WHICH CAN, IF CONTACTED, CAUSE PERSONAL INJURY. ANY ADJUSTMENTS OR SERVICE PROCEDURES THAT REQUIRE OPERATION OF THE AMPLIFIER OUT OF ITS ENCLOSURE, SHOULD BE PERFORMED ONLY BY TRAINED SERVICE PERSONNEL.

**WARNING**

1. BEFORE OPENING OR SERVICING A UNIT, READ AND UNDERSTAND THE SERVICE MANUAL, ESPECIALLY WARNINGS AND CAUTIONS.
2. ITEMS MARKED  $\Delta$  MUST BE REPLACED WITH THE EXACT COMPONENT SPECIFIED IN THE SERVICE MANUAL, TO REDUCE THE RISK OF FIRE AND / OR ELECTRICAL SHOCK.
3. THE MANUFACTURER RESERVES THE RIGHT TO MAKE CHANGES TO ANY COMPONENTS OR THE DESIGN ITSELF. PLEASE CONTACT THE FACTORY FOR THE LATEST SERVICE MANUAL, QUOTING THE DATE CODE, SERIAL NUMBER, MODEL NUMBER AND RATED VOLTAGE.
4. THE CIRCUIT DESIGN, SCHEMATIC DRAWINGS (2 SHEETS), PRINTED CIRCUIT BOARD LAYOUT AND SERVICE MANUAL ARE © 1994 BY BAT INC., AND MAY NOT BE REPRODUCED IN WHOLE OR IN PART, OR USED FOR ANY PURPOSE OTHER THAN THE SERVICE AND REPAIR OF THE PRODUCT, WITHOUT THE PRIOR WRITTEN CONSENT OF BAT INC..

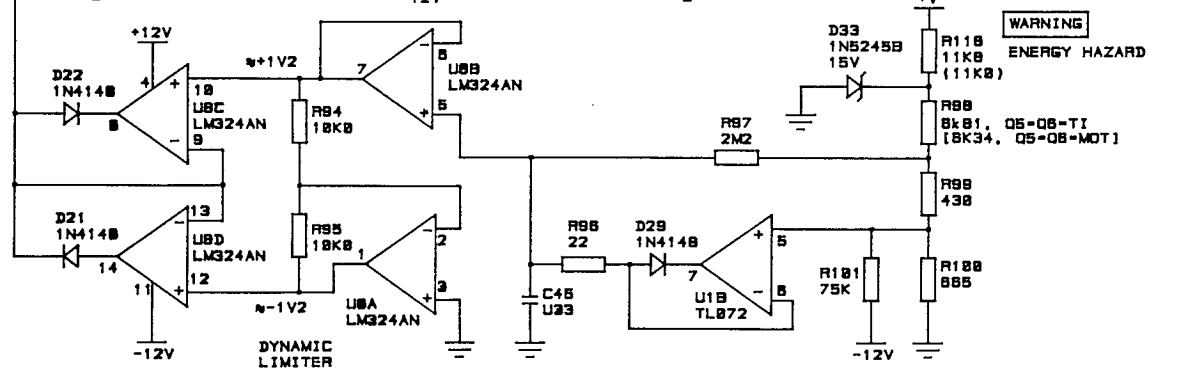
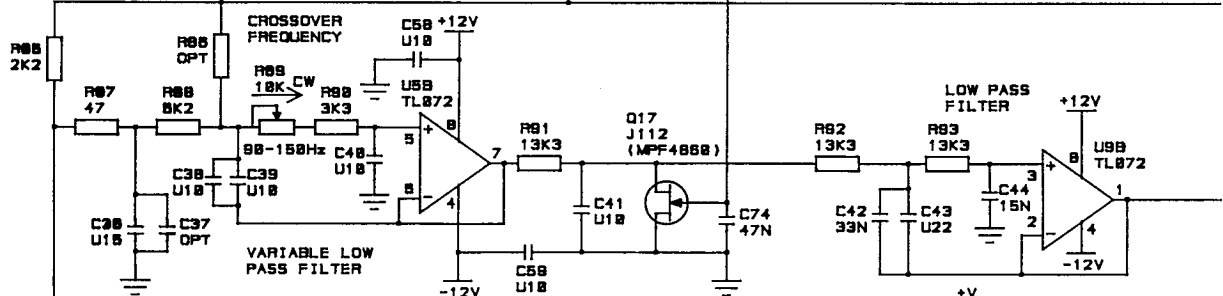
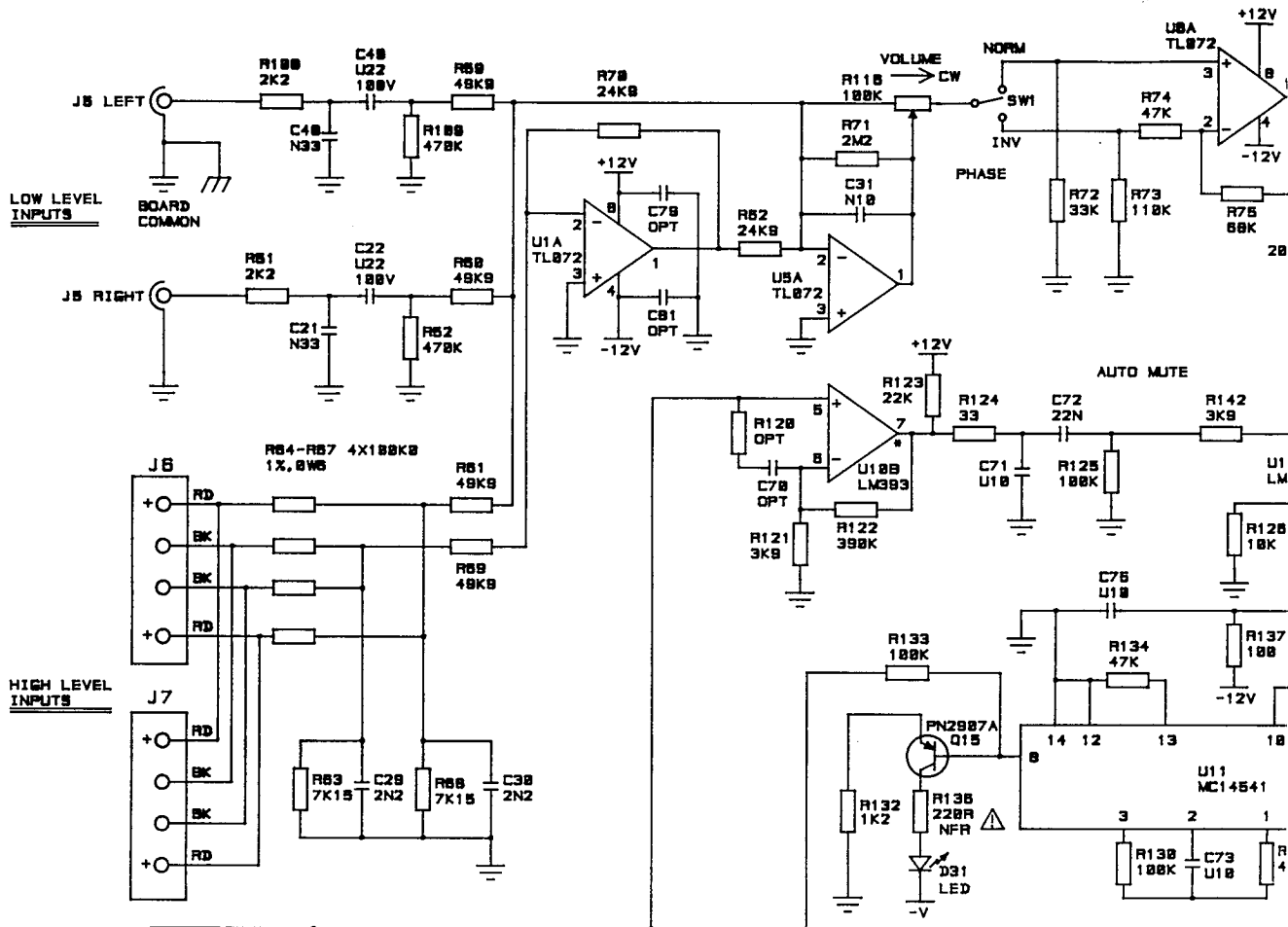
ENERGY HAZARD



ENERGY HAZARD

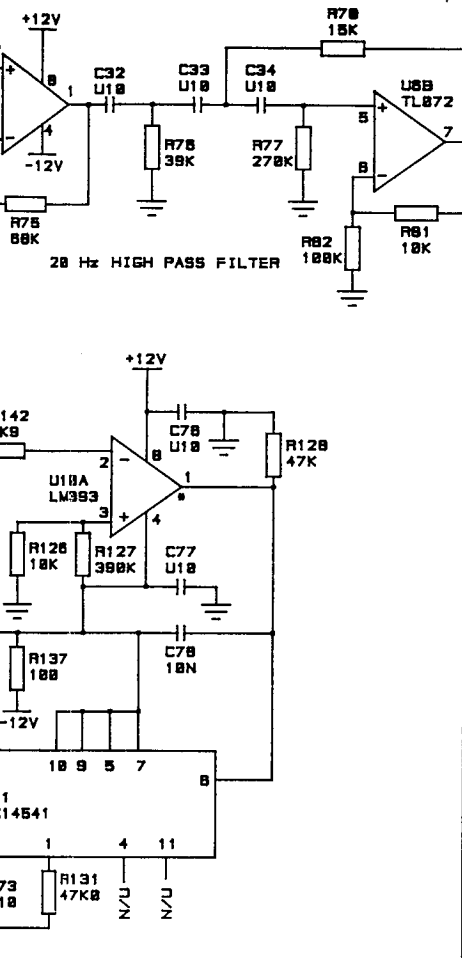
REV: A

UNLESS OTHERWISE STATED ALL DIMS. IN INCHES TOL .X ± .020 .XX ± .010 .XXX ± .005 MATERIAL FINISH	DWN. BY	02. JAN. 1996.	TITLE	PSW1000 Schematic 230v Version	
	ENG.	02/ JAN /96			
	MFG.		DRAWING No.	105410-004	REV A
	QUALITY		SCALE	NONE	<b>B</b> SHT 1 OF 2



REVISIONS

REV.	DESCRIPTION	ECO	DATE	DRAWN	CHKD
A	INITIAL RELEASE		01.'96	<i>[Signature]</i>	<i>[Signature]</i>



REV: A

① (SUBWOOFER AMP. SHEET 2)

WARNING

SEE NOTES AND WARNINGS ON SHEET 2.  
SEE COPYRIGHT NOTICE ON SHEET 2.

UNLESS OTHERWISE STATED ALL DIMS. IN INCHES	TOL	.X ± .020 .XX ± .010 .XXX ± .005	DWN BY <i>[Signature]</i>	02. JAN. 1996.	TITLE PSW1000 Schematic 230v Version
	MATERIAL	FINISH	ENG. <i>[Signature]</i>	02/ JAN/96	
			MFG.		DRAWING No. 105410-004
			QUALITY		REV A
				SCALE NONE	<b>B</b> SHT 2 OF 2