



S E R V I C E M A N U A L

# ARC SUB 8

Discrete Output, High Current  
8" Powered Subwoofer



JBL Consumer Products Inc.  
250 Crossways Park Drive  
Woodbury, N.Y. 11797

H A Harman International Company

1112-ARCSUB8 Rev A 10/98

## This Product is Part of the ARC CINEMA II SYSTEM

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### SPECIFICATIONS

Amplifier Power RMS . . . . .	80 Watts 1 HD
Drivers . . . . .	8" with high-polymer-laminated cone
Inputs . . . . .	Line level and High Level
Outputs . . . . .	High level with High-Pass filter at 180Hz
Crossover frequency . . . . .	50-150Hz
continuously variable	
frequency Response . . . . .	5Hz to 150Hz
determined by crossover setting	
Input Impedance . . . . .	20k ohm
Input Sensitivity . . . . .	220mV

**External Dimensions (Inches)**

Height . . . . .	9
Width . . . . .	11"
Depth . . . . .	12
Weight . . . . .	18 lbs

**External Dimensions (mm)**

Height . . . . .	225 mm
Width . . . . .	275 mm
Depth . . . . .	305 mm
Weight . . . . .	8.1 kg

High-Level speaker outputs are active only if high-level input are used.

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

## WARRANTY

his amplifier is warranted against defects in material and workmanship for a period of 90 days from date of shipment, when installed in accordance with the owner's manual in a clean, dry, interior home environment. HIS AMPLIFIER IS NON-SUITABLE FOR OPERATION OUTSIDE OR IN HARSH ENVIRONMENTS. During the warranty period, the manufacturer will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be properly packed and returned to a service facility designated by the manufacturer. Buyer shall prepay shipping charges to the designated facility and the manufacturer shall pay shipping charges to return the product to buyer. However, Buyer shall pay all shipping charges, duties and taxes for products returned to the manufacturer from another country.

The manufacturer does not warrant that the operation of the product will be uninterrupted or error-free. The Buyer must determine the suitability of the product for his or her purposes.

### LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied interfacing, unauthorized modification or misuse, operation

outside of the environment specifications for the product including inadequate ventilation, or improper site preparation, installation, or maintenance.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. THE MANUFACTURER SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

### EXCLUSIVE REMEDIES

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. THE MANUFACTURER SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, OR, OR ANY OTHER LEGAL THEORY.

## 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.



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.



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

**THIS UNIT DOES NOT HAVE A POWER SWITCH; HAZARDOUS VOLTAGES ARE PRESENT WITHIN THE UNIT WHENEVER IT IS PLUGGED IN.**

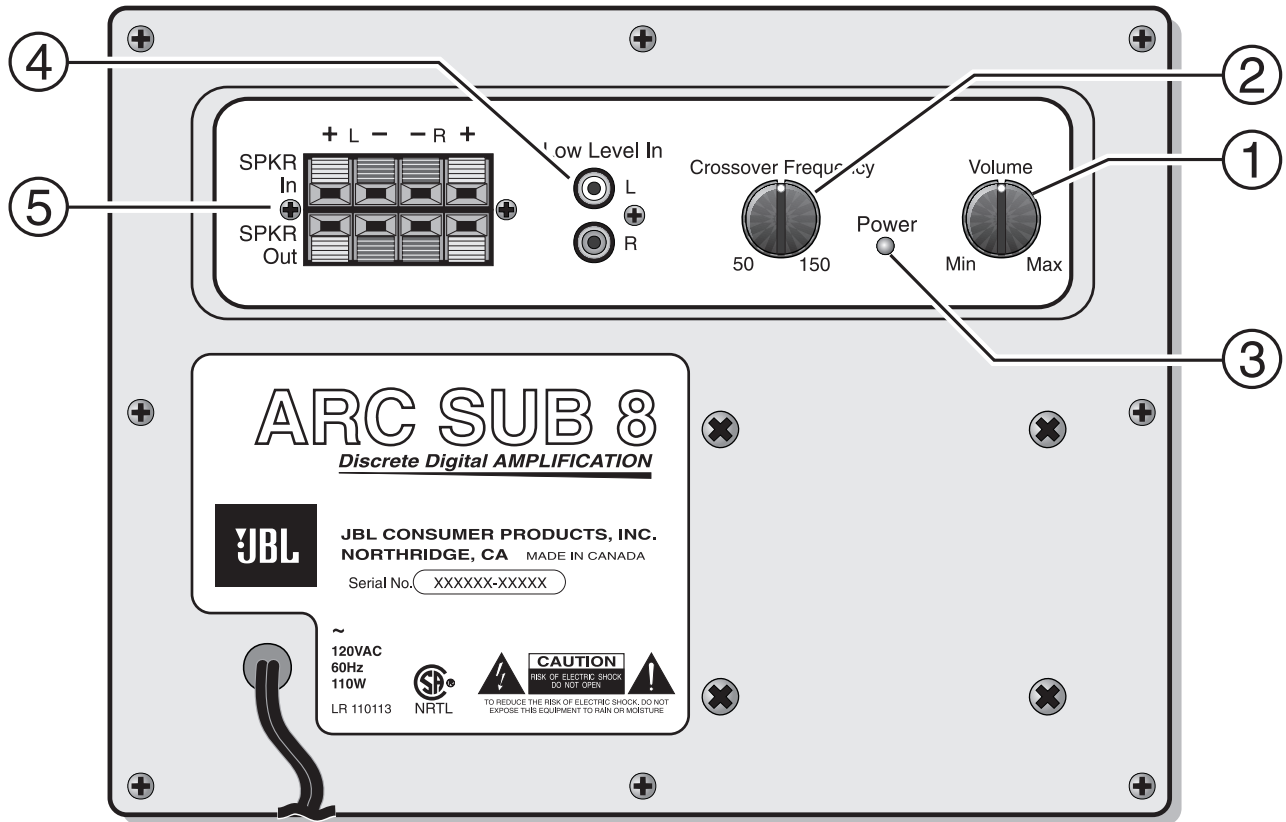
There are voltages and hot components at many points in the amplifier which can, if contacted, cause serious injury. Be



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.



CONTROLS AND THEIR FUNCTION

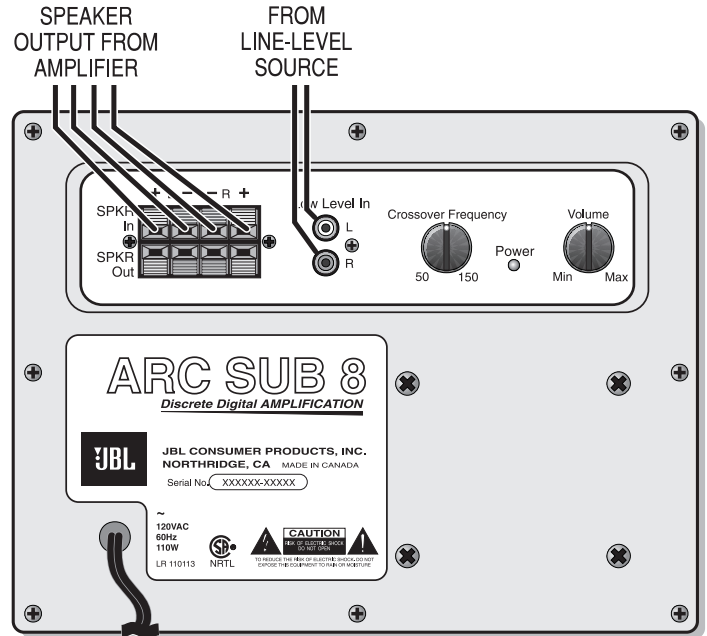
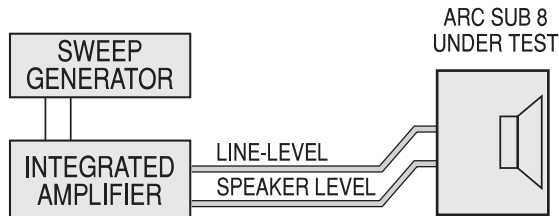


- 1. **Output Level** - The Output Level adjustment determines volume level strength.
- 2. **Crossover Frequency** - The Crossover frequency adjustment determines the highest frequency the ARC SUB 8 will reproduce. It allows a seamless transition from the subwoofer to the satellite speakers.
- 3. **On (LED)** - This LED will light green when the unit is plugged in and is receiving signal. When in standby mode the LED is red.
- 4. **Low Level Input** - These left and right Line Level Inputs are normally used when the receiver/processor has line-level pre-amp out or subwoofer outputs.
- 5. **High Level Inputs** - These High Level Inputs are for receivers that do not have line-level pre-amp out or subwoofer outputs. When a pair of main or satellite speakers are attached to the Output terminals, frequencies below 180 Hz are attenuated by the high-pass filter.

**TEST PROCEDURES**

**EQUIPMENT**

- Function generator/signal generator/sweep generator
- Integrated Amplifier
- Multimeter
- Cables - line level (RCA) and speaker cables



**General Function**

UU Unit Under test

1. Connect both right and left line level inputs (RCA) to signal generator and UU. Use Y-cable if necessary from mono source. VOLUME control should be full counterclockwise.
2. Turn on generator, adjust to **50mV, 50 Hz**.
  - Plug in UU red LED should be ON. Turn VOLUME control full clockwise.
  - LED should turn green immediate bass response should be heard and felt from port tube opening.
5. Turn off generator, turn VOLUME control fully counterclockwise, disconnect RCA cables.
  - Connect one pair of speaker cables to either high level input terminal on UU. 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 2.0V, 50 Hz. Turn VOLUME control full clockwise.
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 100Hz. 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 **3.2 ohms**.
  - 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**.
  - Sweep generator from 20Hz to 1kHz. Listen to driver for any rubbing, buzzing, or other unusual noises.

## CAUTIONS AND WARNINGS

**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.**

### 1. TROUBLE SHOOTING BEFORE OPENING

Check connections, control settings, driver and other possible internal problems. If there is Output, determine if all controls and 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 front port.

Verify AC plug is disconnected. See WARNINGS in section 2.

## 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.

## CAUTION

If line core or strain relief are replaced, it is necessary to seal them completely to panel with an approved conformal coating to prevent air "whistling" through any openings from woofer pressure.

## WARNING

To reduce the risk of electric shock and/or fire, replace items as marked on schematic with the safety marking only with the exact replacements listed in the safety component list, section . If exact replacements are not available, order them from the factory or an authorized service center.



### 2. REMOVING THE AMPLIFIER.

## 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 PCB drawings for locations of hazards and familiarize yourself with their locations before starting.

- A. Remove the subwoofer grille.
- B. Remove the 1 Black PPH screws attaching the woofer to the cabinet.
- C. Remove the woofer, unplug the two connecting wires.
- D. Remove the 8 screws black pph screws attaching the amplifier assembly to the cabinet.
- E. Remove the amplifier assembly.
- F. For access to the input panel, first remove the three outer screws. Remove knob and nuts from potentiometers. Cut away the sealant securing the cover to the faceplate. The input PCB should now pull out completely.

### 3. TROUBLE SHOOTING AFTER REMOVAL

## WARNING

- A. Check fuse #1. If blown visually check transformer for discoloration, and large capacitors C1, C2 for bulges or venting. Check for shorts with an Ohmmeter, see schematic.
- B. With ohmmeter, verify voice coil of woofer is .2 ohms, 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.
- E. For live power testing, attach a 100 ohm 100 watt resistor to the output wires.
- F. If the LED is not on, check for fuse continuity and then for cold solder joints on CMC1 and bridge diode.
- G. With a signal present at the input, the output to the power amp is at pin 8 of U1. If the signal is not present at pin 8, there is a problem with preamp section. Most likely, a cold solder joint will be the problem. Track back the signal path to locate problem.



- H. If signal present at pin 8, but still no sound, check for cold solder joints on all power resistors, R a and R b and the the power amp module. If C2 is blown, C is not soldered or is defective. Check the signal at R2. On the down signal side, the voltage signal should be very small. If signal is similar on both sides of R2, the amp module is likely defective.
- I. If you hear a mechanical clicking noise from the amp module, this indicates that the short circuit protection has been engaged. Check that , and 5 are soldered correctly. Also check that is not shorted to power amp case.
- J. If you have to replace the power module, be very, very patient with the solder removal from this single sided PCB. **COMPLETELY REMOVE SOLDER BEFORE TRYING TO REMOVE THE MODULE!**
- K. Assembly notes. op side soldering as below

**J5: solder both ends**

**J3: solder both ends**

**J1: solder both ends**

**R48: solder GND end**

**At junction of C7a/C7b: Pin to GND**

**Crossover pot Gnd wire from PDB pad to POT barrel. (Only physical contact required between pot body and faceplate).**

## CAUTION

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.

## WARNING

It is essential that the following safety insulation test be performed prior to returning the Power 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 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 panel edge, driver, panel jacks and controls, and voice coil problems such as rubbing or loose turns. With the crossover "frequency" set to 50H , very little of the voice content should be heard.

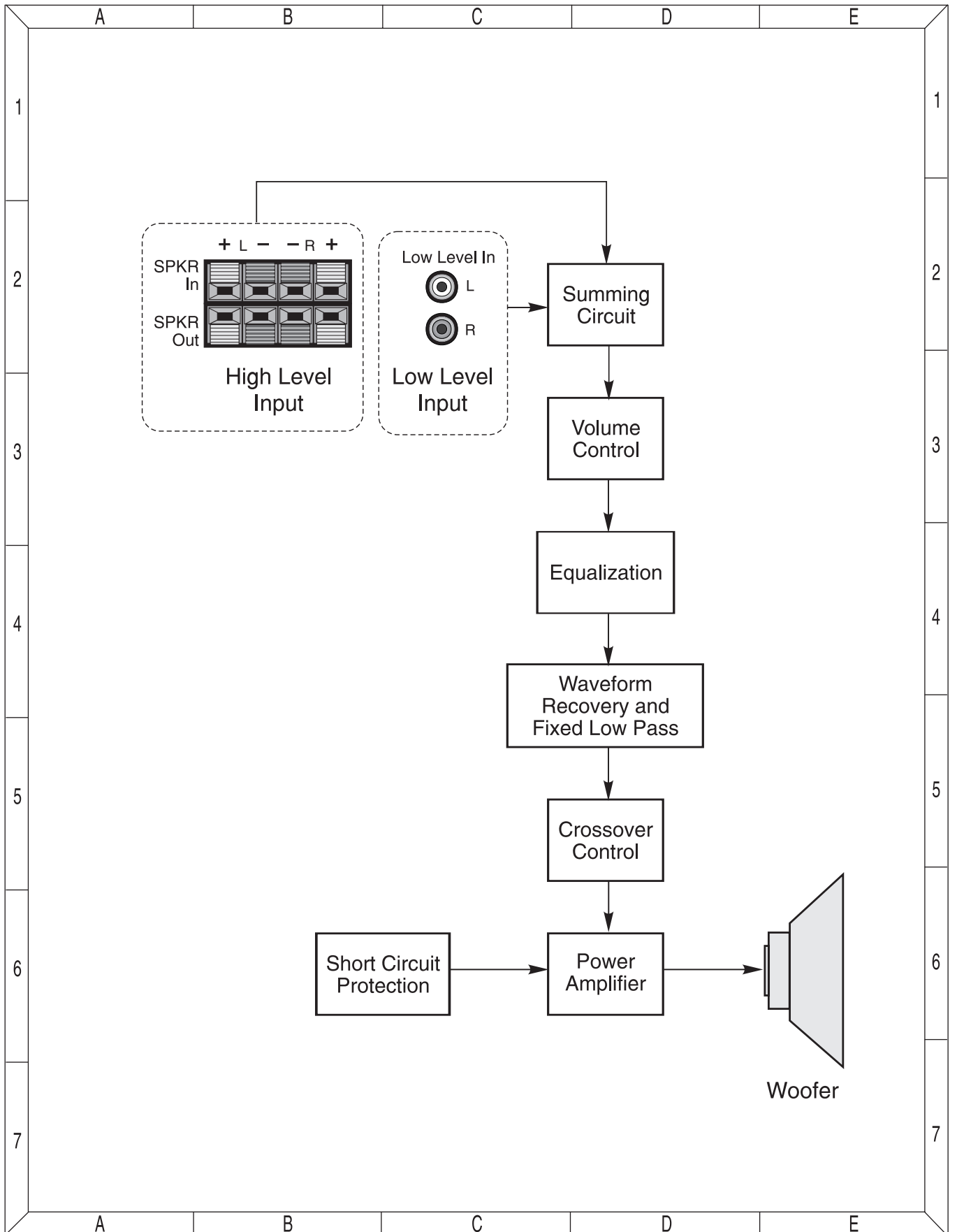
### 4. REASSEMBLY

Follow all disassembly instructions in reverse order. If the input plate has been removed, it must be re-sealed with a small bead of silicon seal or air leaks may result.

### 5. LIST OF SAFETY COMPONENTS REQUIRING EXACT REPLACEMENTS

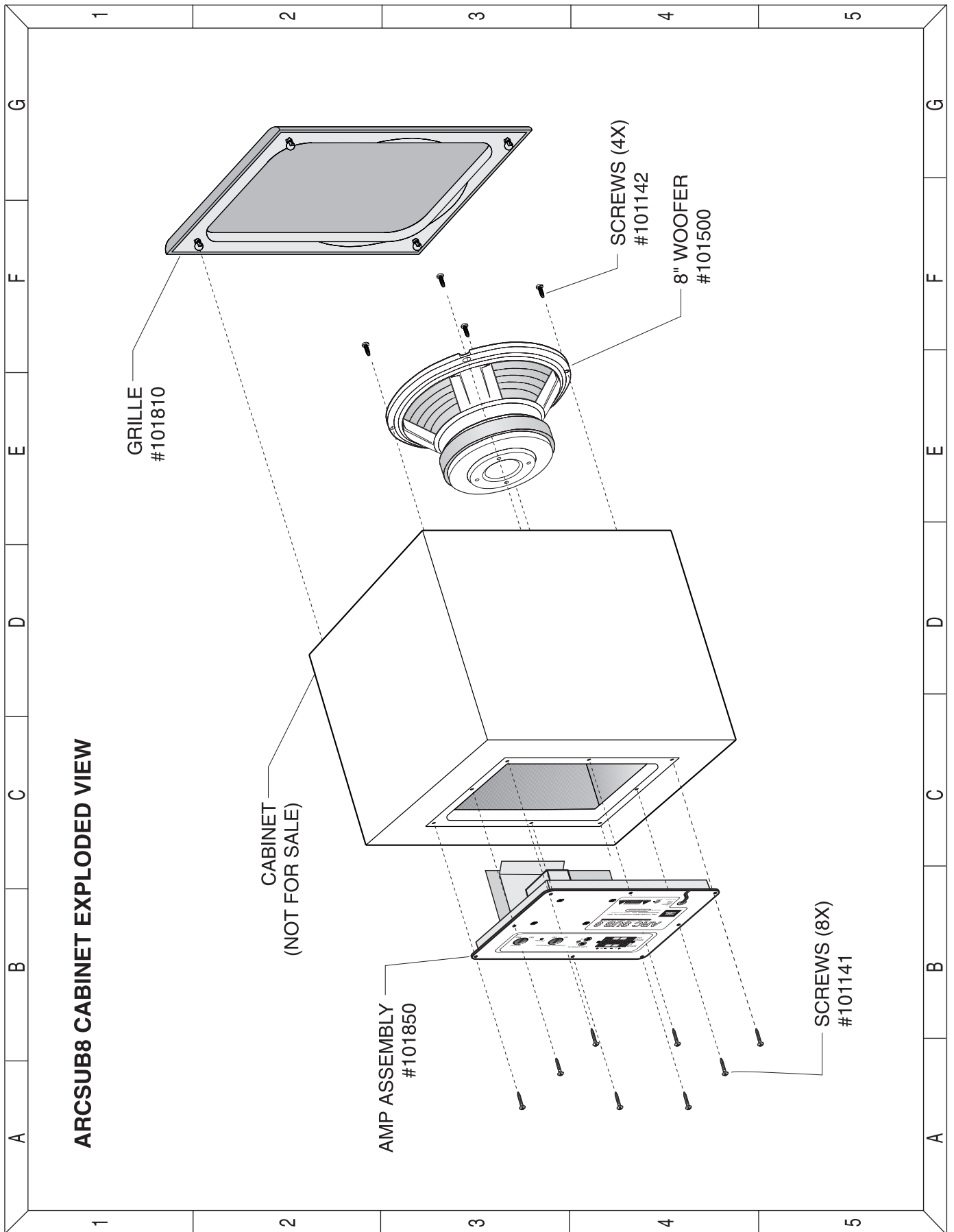
1	use SLOW BLO 0.5A 250v type UL approved
CMC1	mc 8 Neosid 28-52, 2 2.2mH 2 awg 2 2
L1	mc Neosid 2-19 200uH 18SNSR
1	ransformer 00, Use only factory replacement
PWR CORD	SP -2 better with polari ed plug, UL appoved wired with the hot side to fused side. Use with UL approved panel strain relief only.
BDR	Bridge Rect. 200V A Use only factory replacement.
C1, 2	00u , 50V Electrolytic Radial. 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 pressures and vibration.
C	10u 50V Electrolytic Radial.
R29	70Ω 0.25 -1 Metal
S5 AMI	Power Amp Module

### ARC SUB 8 AMPLIFIER BLOCK DIAGRAM





CABINET EXPLODED VIEW



**ARC SUB 8 ELECTRICAL PARTS LISTS**

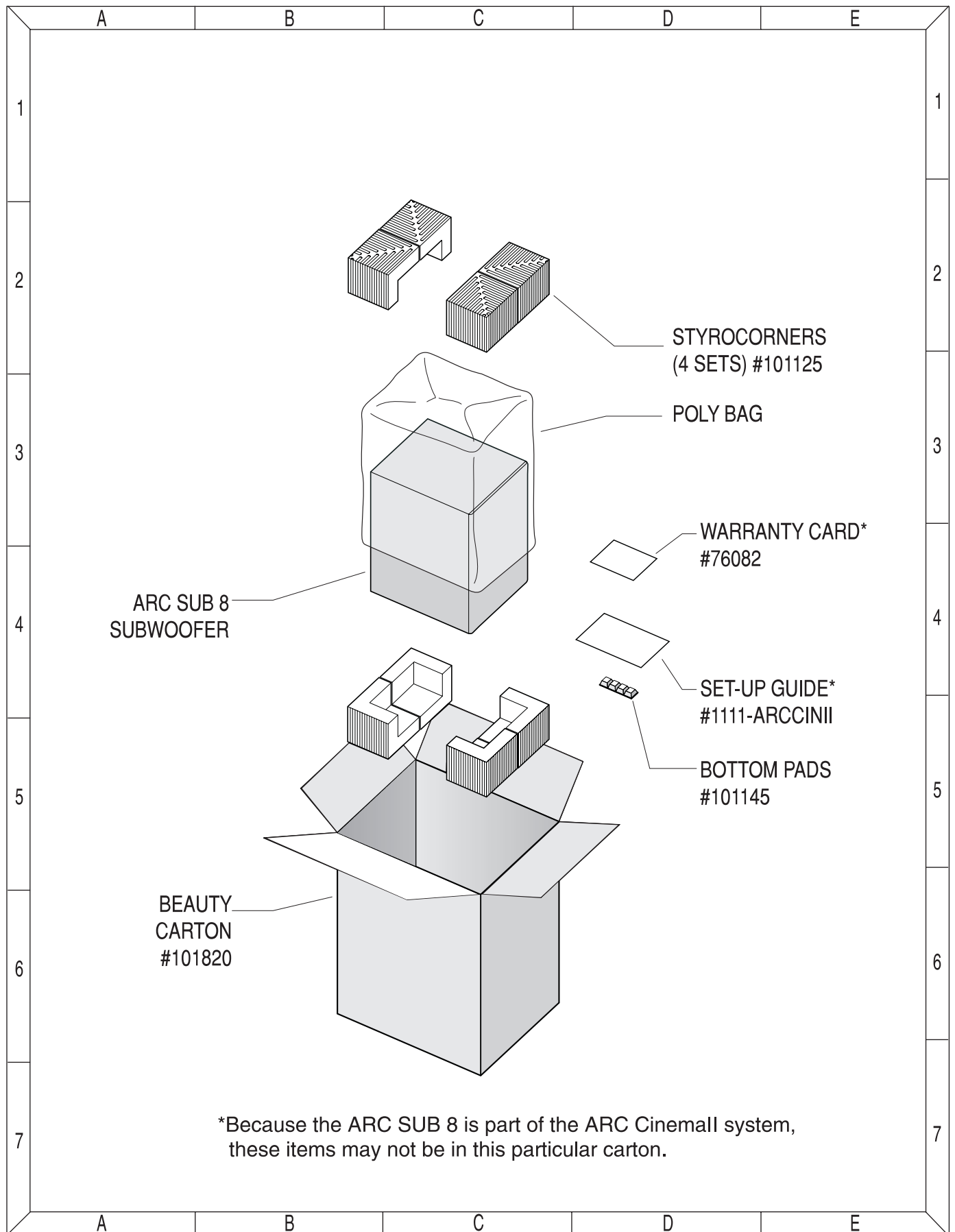
R				R			
				R14, 20	40405	4.7KΩ 1/4W +/-5% CARBON FILM	2
<b>C</b>				R16, 17	40101	820Ω 2W +/-5% CARBON FILM	2
C1, 2	30701	3300μF 50V +/-20% ELECTROLYTIC RADIAL	2	R18	40407	220KΩ 1/4W +/-5% CARBON FILM	1
C3	30501	.1μF 50V +/-20% MONO-CERAMIC AXIAL	1	R22	40410	3.3K 1/4W +/-5% CARBON FILM	1
C4, 5, 9, 17, 24	30502	.1μF 50V +/-20% BIPOLAR MONO-CERAMIC	5	R26, 49	40701	1 Meg ohm 1/4W +/-5% CARBON FILM	2
C6	30705	10μF 50V +/-20% BIPOLAR ELECTROLYTIC RADIAL	1	R27	40411	24.9KΩ 1/4W +/-1% METAL FILM	1
C7, 25	30503	.0022μF 50V +/-10% MONO-CERAMIC	2	R29	40103	470KΩ 1/4W +/-1% METAL	1
C7A, 7B	30505	.1μF 100V +/-20% METAL POLYESTER RADIAL	2	R30	40413	274KΩ 1/4W +/-1% METAL FILM	1
C8, 10, 14, 18, 19, 20	30504	.1μF 50V +/-10% MONO-CERAMIC	6	R31	40414	49.9KΩ 1/4W +/-1% METAL FILM	1
C11	30702	100μF 35V +/-20% ELECTROLYTIC RADIAL	1	R32	40415	470KΩ 1/4W +/-5% CARBON FILM	1
C12	30703	4.7μF 35V +/-20% ELECTROLYTIC RADIAL	1	R35	40416	221KΩ 1/4W +/-1% METAL FILM	1
C13	30506	.001μF 50V +/-10% MONO-CERAMIC	1	R37	40417	47KΩ 1/4W +/-5% CARBON FILM	1
C15, 16	30704	200.μF 50V +/-20% ELECTROLYTIC RADIAL BIPOLAR	2	R39	40418	22KΩ 1/4W +/-5% CARBON FILM	1
C21	30508	.01μF 50V +/-10% MONO-CERAMIC	1	R40	1-114-154-24	150KΩ 1/4W +/-5%	1
C28	30507	.01μF 50V +/-20% MONO-CERAMIC	1	R46	40104	4.7Ω 1/4W +/-5% CARBON FILM	1
				R48	40419	6.04KΩ 1/4W +/-1% METAL FILM	1
DBR	50100	BRIDGE RECT 200W 4A	1	R53, 54, 55, 56	40106	100Ω 2W +/-5% CARBON FILM	4
D1	50101	1N5256B 30V +/-5% 1/2W	1	VR1	40401	100KΩ 1/4W +/-10% SINGLE LOG POT, FRQ POT	1
D3	50102	1N4749A 24V +/-5% 1W	1	VR2	40402	5KΩ 1/4W +/-10% SINGLE LINEAR POT, VOL LEVEL POT	1
D6	50103	1N5234B 6.2V +/-5% 1/2W	1				
D7, 8	50104	1N4148 100V +/-5% 0.1A	2				
D9, 10	50105	1N4744A 15V +/-5% 1W	2				
				<b>C</b>			
<b>R</b>				U1	60100	LM324 QUAD OP-AMP +/-15	1
R1	40403	2.2 Meg ohm 1/4W +/-5% CARBON FILM	1				
R2	40408	8.45KΩ 1/4W +/-1% METAL FILM	1	Q1	60151	MPS A13 30 NPN(Darl)	1
R3	40412	33.2KΩ 1/4W +/-1% METAL FILM	1	Q2	60152	2N3906 40 PNP	1
R4A, 4B	40105	0.1Ω 1/2W +/-5%	2	Q3	60153	2N3904 40 NPN	1
R5, 6, 19	40420	1KΩ 1/4W +/-5% CARBON FILM	3	Q4, 5	60154	MPS A56 80 PNP	2
R7, 21, 44, 45	40409	10KΩ 1/4w +/-5% CARBON FILM	4	CMC1	80100	mc4438 Neosid 28-52, 2x2.2mH #23awg @ 2X 24	1
R8, 15, 34, 36, 38, 42, 43, 57	40406	100KΩ 1/4W +/-5% CARBON FILM	8	L1	80101	mc4436 Neosid 32-19 200uH #18SNSR @ 36	1
R9	40421	3.9KΩ 5W +/-5% 3W CAN BE USED	1	L2	80102	BL02RN2-R62 FERRITE BEAD	2
R11, 12	40100	330Ω 1/2W +/-5% CARBON FILM	2	LED1	50106	DUAL CIR LED (2 LEGGED)	1
R10, 13	40404	1KΩ 2W +/-5% CARBON FILM	2	T1	80104	TRANSFORMER #4300	1
				U2	60301	S53AMI POWER AMP MODULE	1

## ARC SUB 8 MECHANICAL PARTS LISTS

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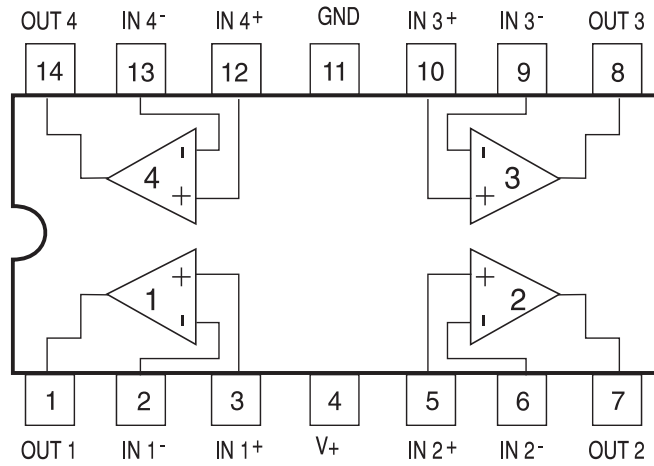
SCREWS	70170	#4x0.5 SCREWS TO SECURE INPUT ACKS	2
MACHINE SCREWS	70170	#10x1 BOLTS FOR TRANSFORMER	4
NUTS	70172	#10 KEPS NUTS FOR TRANSFORMER	4
SCREWS	70173	#6x.5 SCREWS FOR FUSE PCB	2
SHIELD	A70301	METAL BRACKET MOUNTED ON TRANSFORMER.	1
KNOBS	A70302	KNOBS FOR CONTROLS	2
F1	80104	250V, 0.50A, T TYPE SLO BLO FUSE	1
POWER CORD	80105	POWER CORD, 2 CONDUCTOR	1
STRAIN RELIEF	70305	POWER CORD STRAIN RELIEF	1
FUSE PCB	80106	PCB COMPLETE WITH CONNECTORS	1
FACEPLATE	70303	FACEPLATE WITH LABELS	1
COVER	A70304	HERMETIC COVER	1
SPEAKER TERMINALS	108115	HIGH LEVEL INPUT AND OUTPUT TERMINALS	1
INPUT ACKS	108320	DUAL RCA INPUT ACKS	1
WOOFER	101500	A8AMI WOOFER 8	1
GRILLE	101810	COMPLETE GRILLE	1
CARTON	101820	SHIPPING CARTON	1
MANUAL	1111-ARCCINII	OWNER S MANUAL	1
AMPLIFIER	101850	COMPLETE AMPLIFIER	1

### PACKAGING EXPLODED VIEW

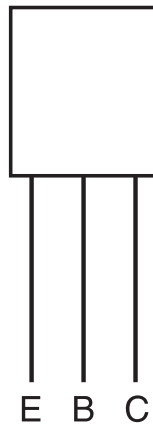


INTEGRATED CIRCUIT DIAGRAM

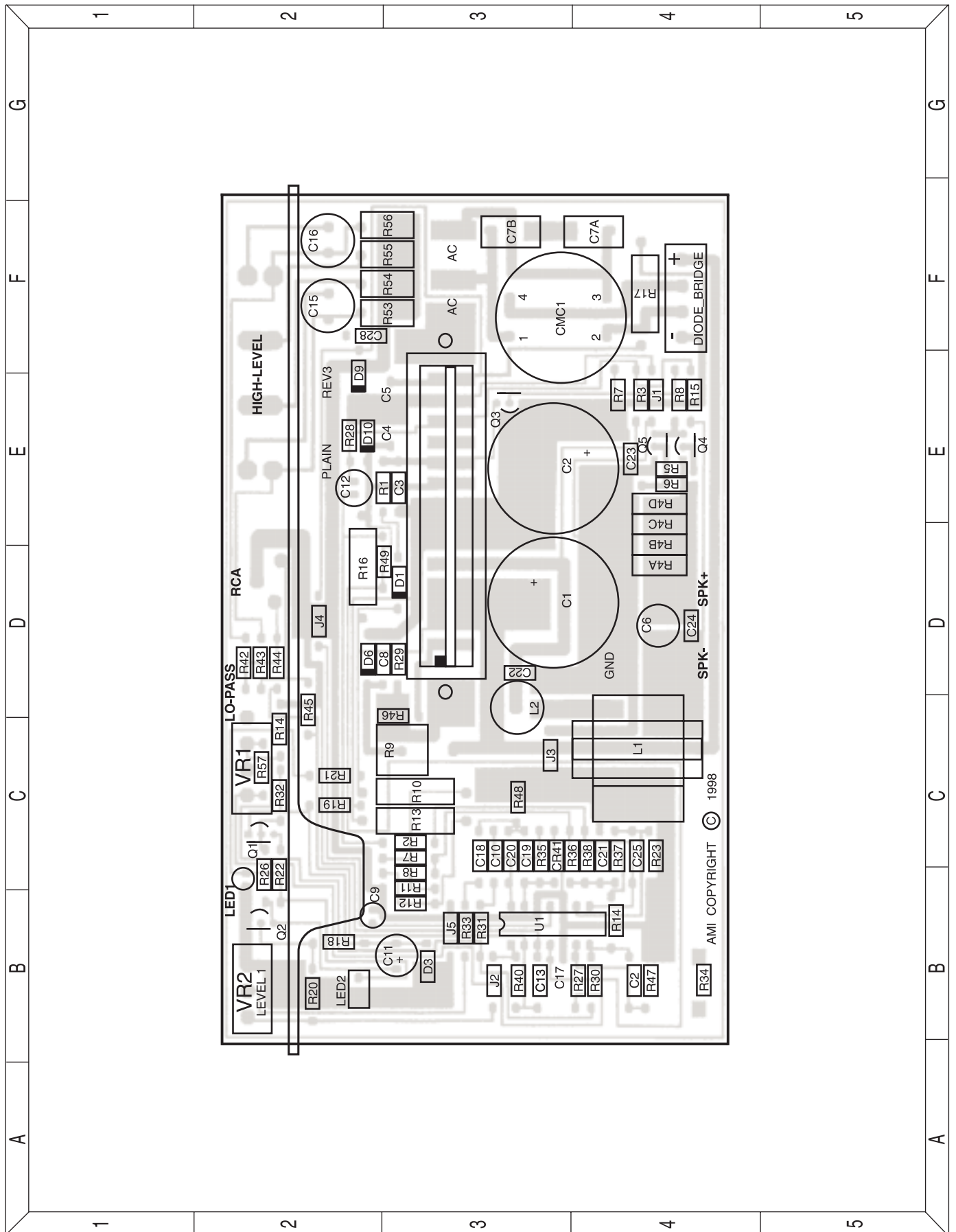
U1 - LM324 Quad Op Amp



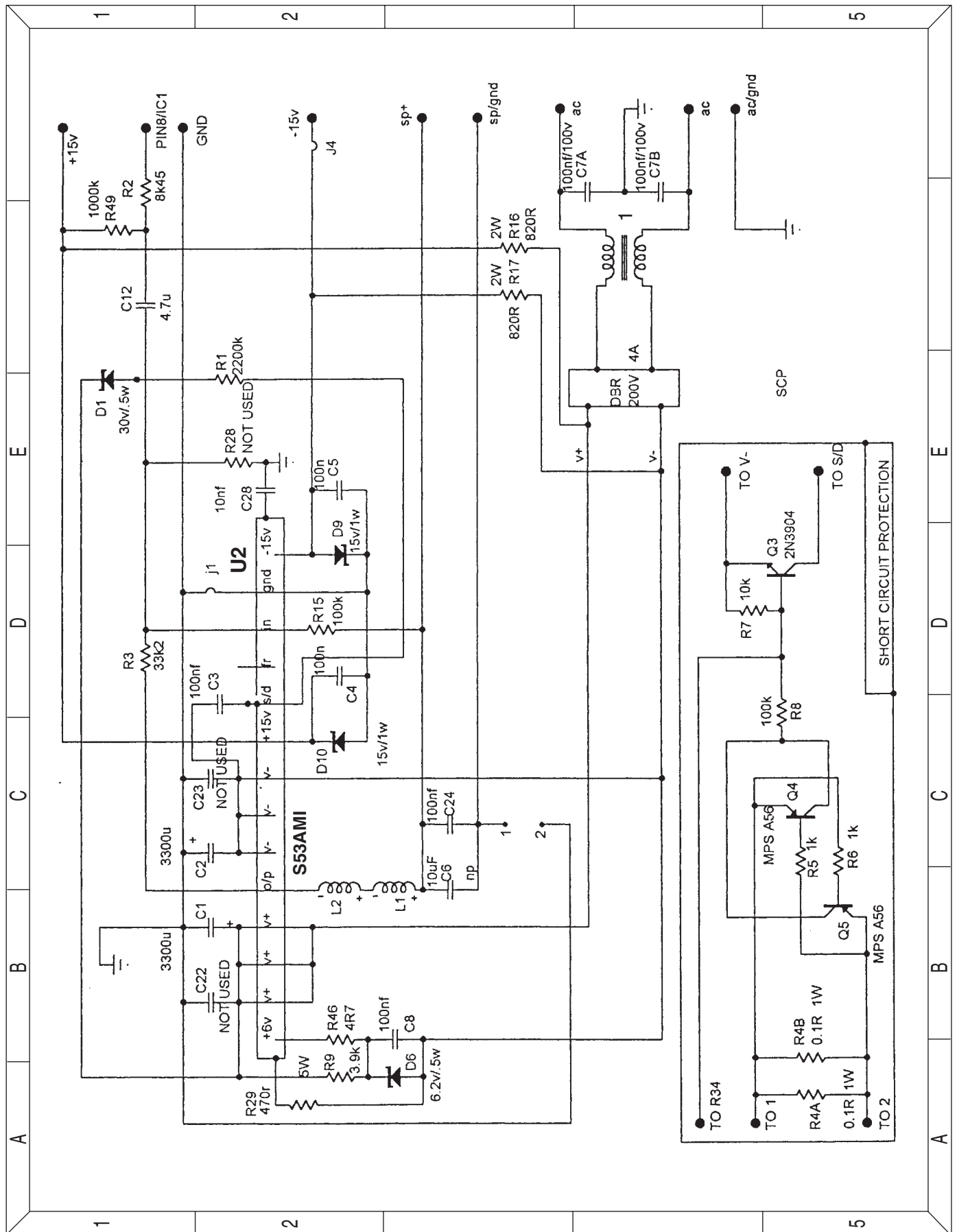
MPS A13  
 2N3904  
 2N3906  
 MPS A56



PRINTED CIRCUIT BOARD (TOP VIEW)



SCHEMATIC DIAGRAM 1



SCHEMATIC DIAGRAM 2

