

ULTIMATE HIGH FIDELITY STEREO COMPONENT

**LUXMAN**

**M-1500**

**POWER AMPLIFIER**

**SERVICE MANUAL**

MODEL: M-1500

C I R C U I T   D E S C R I P T I O N

POWER SUPPLY SECTION

The mains input to the M-1500 goes via a power switch to the "C" core transformer which has two secondary windings:

- 1) A 55V center tapped winding provides after full wave rectification the (+) and (-) supplies for the bias of pre-driver stage through constant voltage regulator.
- 2) A 37V center tapped winding also provides after full wave rectification the (+) and (-) supplies for the differential input stage and subsonic filter stage through constant voltage regulator and for the power and driver stage without passing voltage regulator. Tapped a 12V winding for the meter lamps and a 24V winding for the meter amplifier and protection circuit. The constant voltage supply enables to eliminate drift of every stage.

AMPLIFIER SECTION

PNP transistors are used as emitter follower at the top stage: 12dB/oct subsonic filter is added after this stage if in use. NPN metal-can-transistors are used as a differential comparator. NPN metal-can-transistors are also used as active loads for the differential comparator, the one NPN has its collector to ground, the other being the voltage amplifier for the entire output stage, which used a PNP driver and a PNP parallel output in the negative side connected as a darlington emitter follower configuration. And an NPN driver and an NPN parallel output is used in the positive side. These 6 transistors form what is known as a fully complementary symmetry parallel output stage. Their input bases are biased with constant current circuit using SV-02, PNP transistor and SV-03, SV-02, a bias trimpot for the idling current adjust (70mA). The junction of the emitter resistor is as a feed point for the differential comparator and at the same time goes via a protection circuit to the speaker selector switch and meter amplifier.

METER AMPLIFIER SECTION

The popular general purpose 709 Op-amp forms the heart of this circuit, it is used as an A.C. signal amp with two diodes in its feed back path to form a logarithmic amplifier, the I.C. has sufficient drive capabilities to drive an transformer with a center tapped secondary to provide full wave peak detecting via two silicon diodes. The D.C. component is then converted by a "current mirror" transistor into a constant current drive for the meter. The biasing network also provides thermal compensation. A trim pot is used to zero-set the meter.

PROTECTION CIRCUIT SECTION

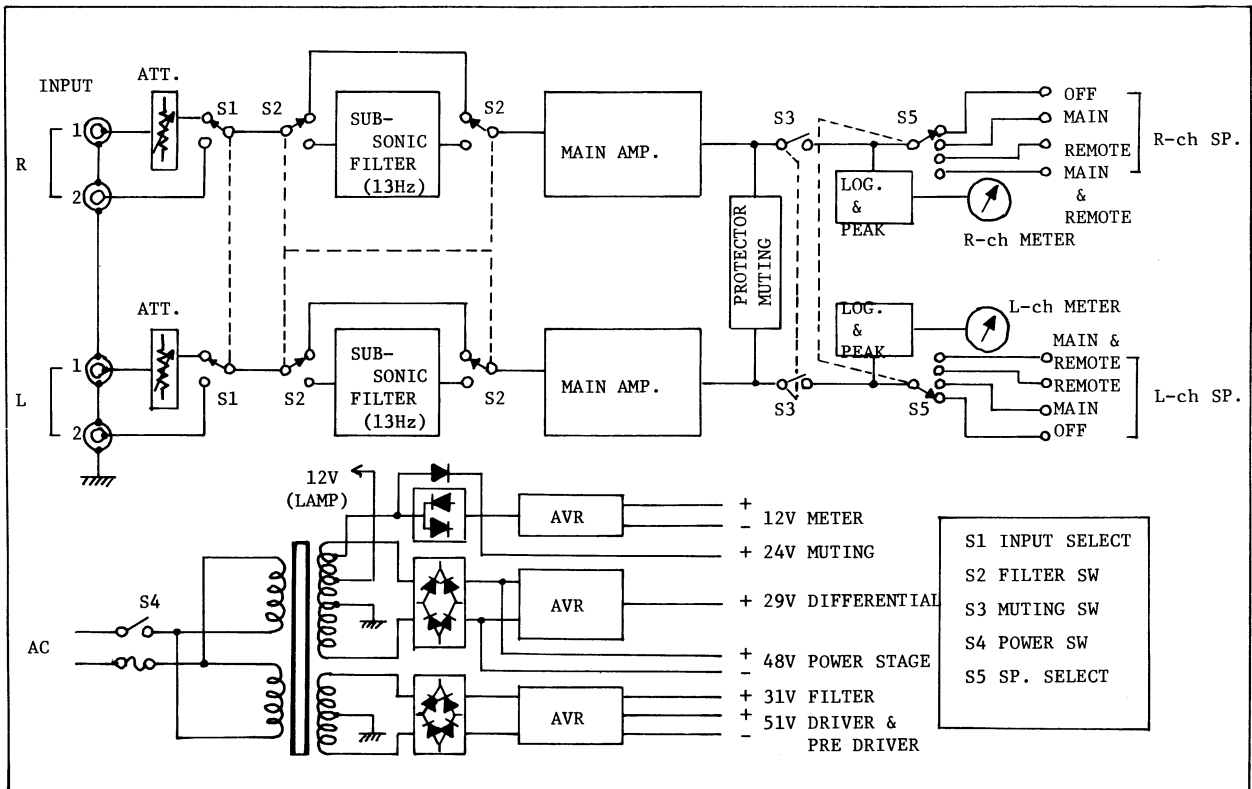
Signal sensing from both the Left and Right speaker terminals is used to disconnect the loudspeakers in the event of amplifier failure. The signal passes through a Low pass resistor condensor network to derive a D.C. fault condition signal, which is fed to Q401 & 402 serving as positive and negative detectors with their collectors coupled as an "OR" circuit with Q403 as an emitter follower, to remove bias from the relay "darlington pair" driver, thereby opening the speaker lines. The relay driver also serves as a "switch on" muting circuit with a 100uF condenser from base to ground charged by a 56-Kohm resistor. This gives a delay of about 5 seconds at turn on.

THE ADJUSTMENT OF LOGARITHMIC PEAK LEVEL METER

- 1) Set each semi-fixed pot (VR601, 604) on PB706 at approx. center position.
- 2) Feed the signal (1KHz, 24.5V RMS sine-wave) to the input of meter amp and adjust the semi-fixed pot (VR604) to read the meter swing at 0dB.
- 3) Decrease the input signal to -30dB and adjust the semi-fixed pot (VR601) to read the meter swing at -30dB.
- 4) Repeat 2) and 3) procedure.
- 5) Confirm the meter swing should be at -12, -20, -40dB in accordance with input signal level set at 6.15V, 2.45V, 0.245V respectively.  
The deviation between a meter needle and a meter scale should be within  $\pm 2$ mm.
- 6) Feed the signal (6.15V, -12dB) to the input and confirm the meter deviation should be within  $\pm 2$ mm at both of 100Hz and 10KHz of signal input.
- 7) The meter deviation between L-ch and R-ch should be within  $\pm 1$ mm at every point of -20, -30, -40, -50dB.
- 8) Feed the signal (1KHz, 24.5V, 0dB) to the input and cut the signal, and confirm that the meter's returning speed should be same at both of L- and R-channel.

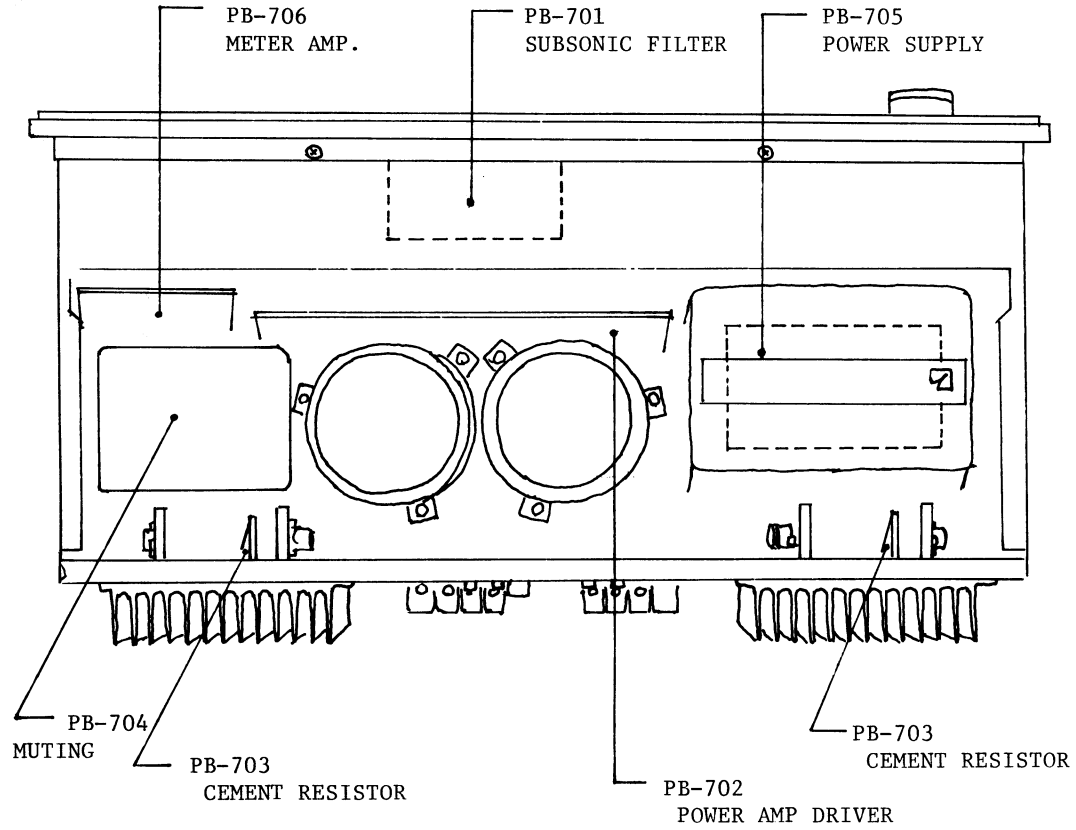
MODEL: M-1500

BLOCK DIAGRAM

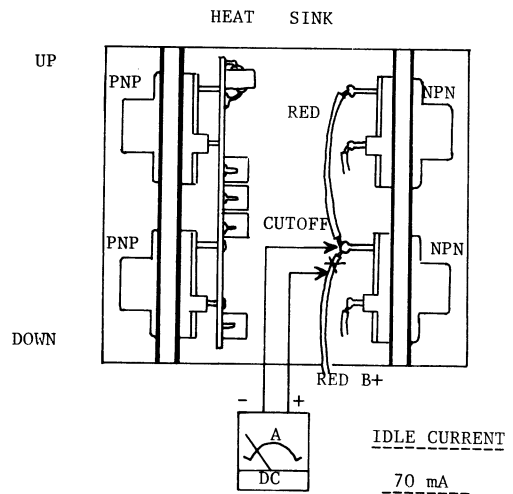
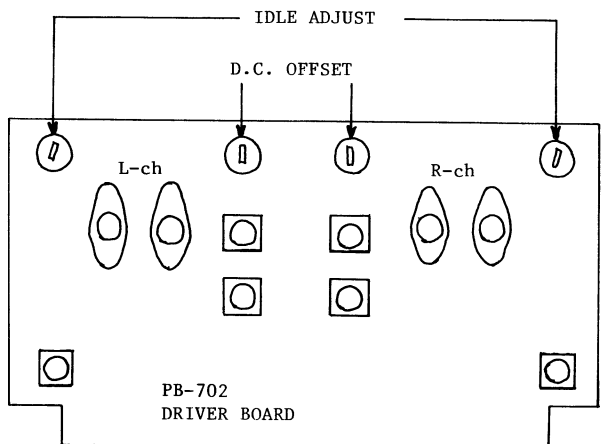


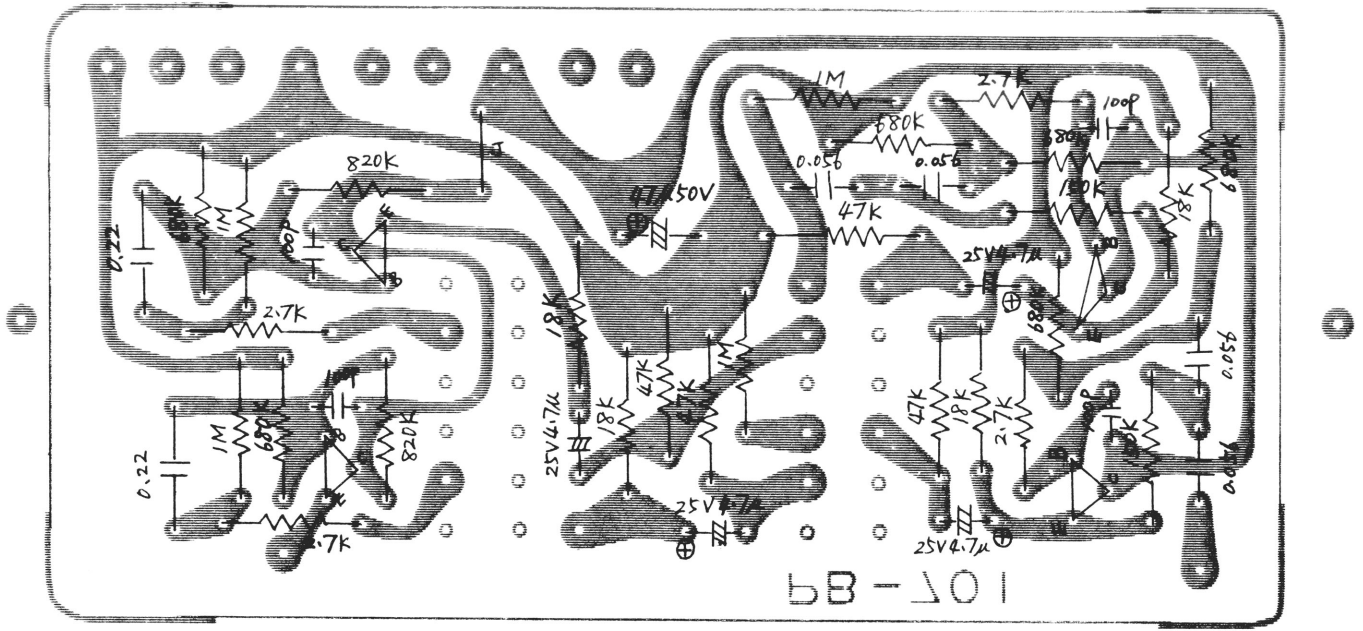
MODEL: M-1500

P.B. LOCATION

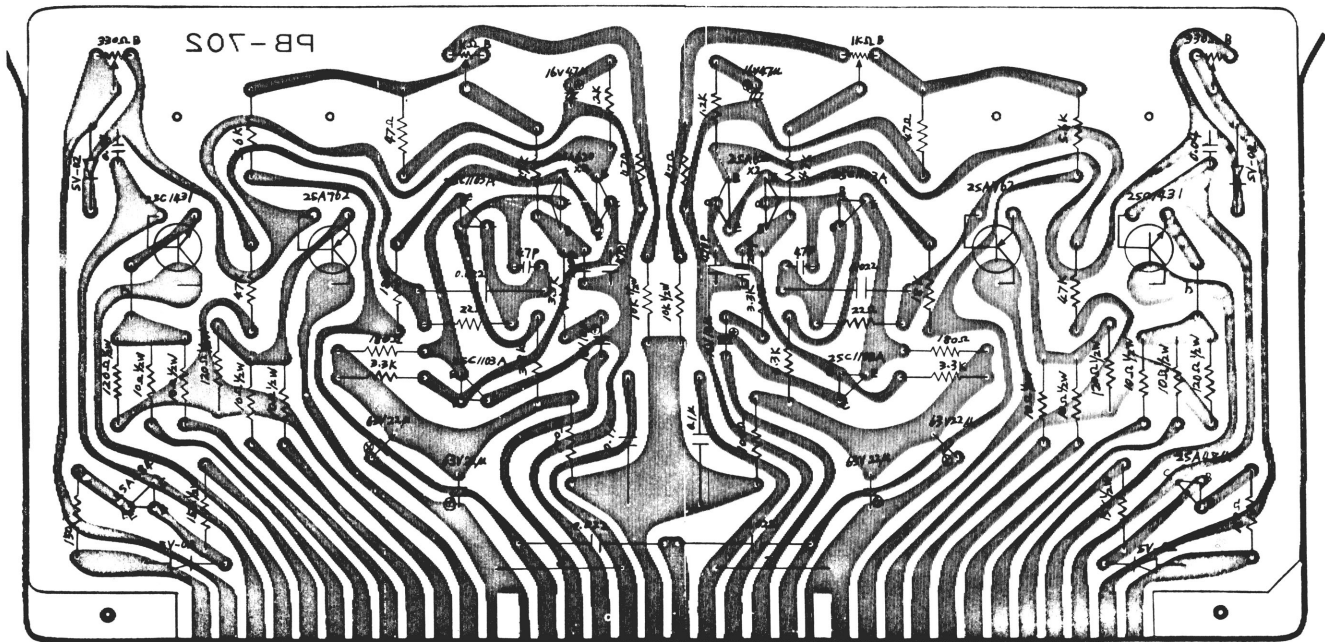


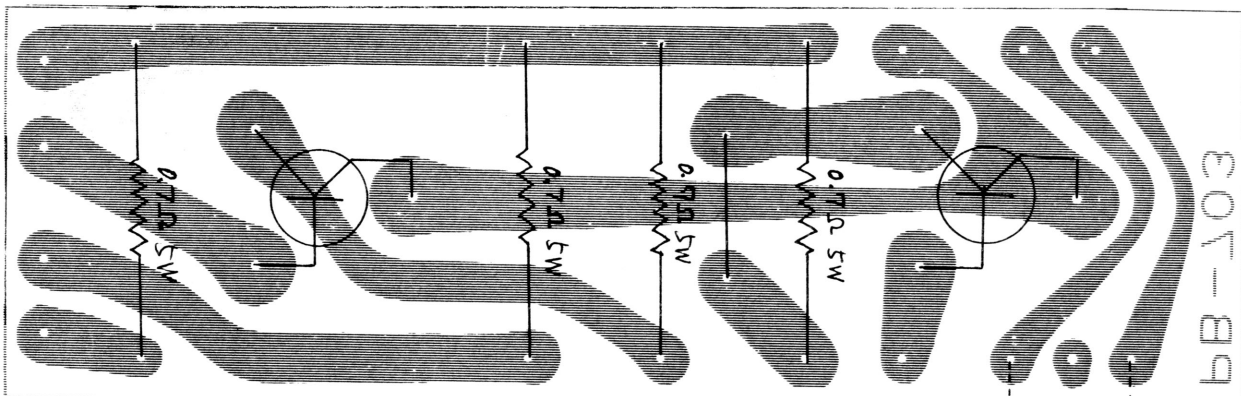
MODEL: M-1500



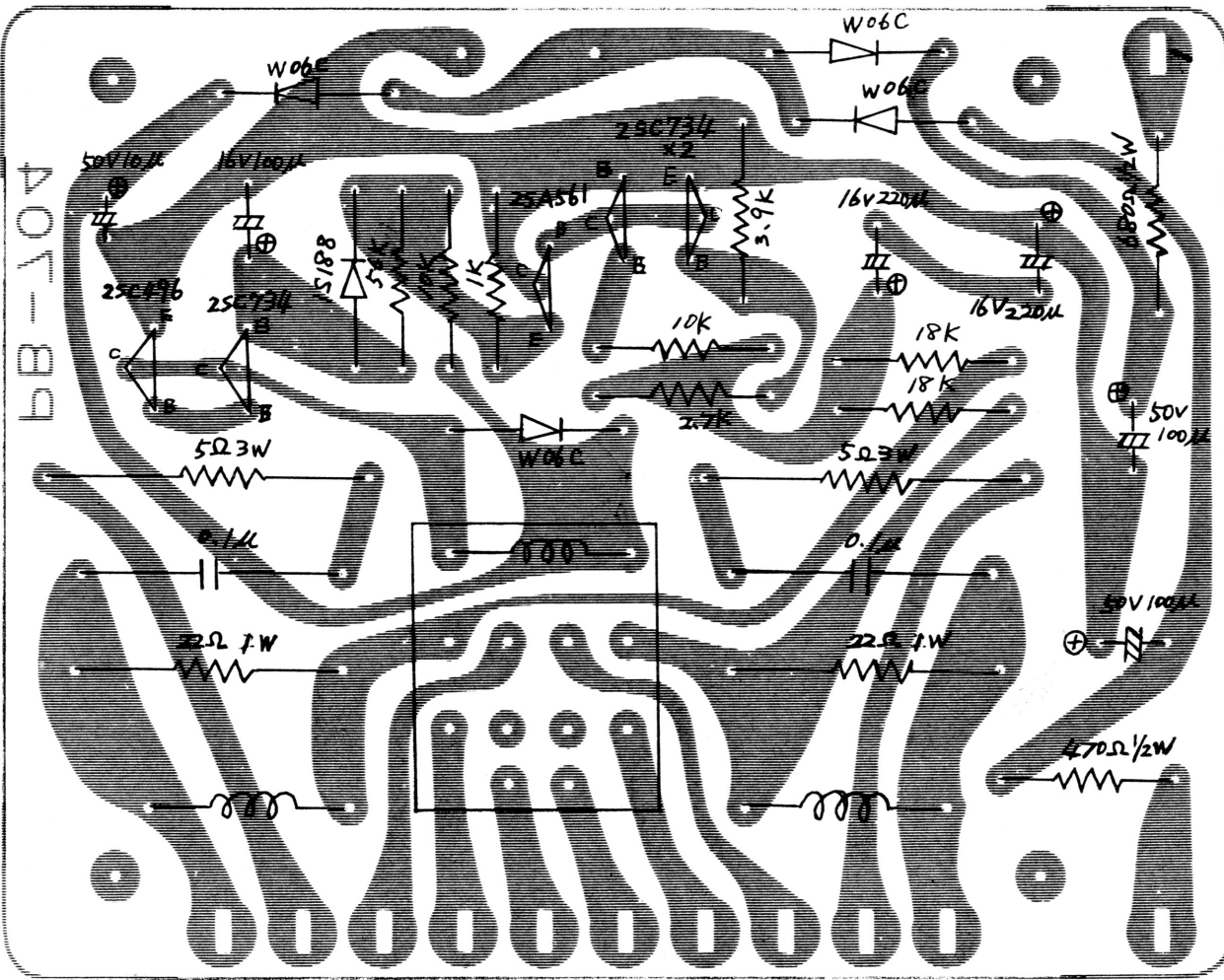


NOTE: 1. All transistors are 2SC1222  
 2. J is for Jumper-wire





3-15  
5V-03





M-1500 REPLACEMENT PARTS LIST

MAIN CHASSIS

SYMBOL NO. (RESISTORS)			Q'TY	SYMBOL NO. (CAPACITORS)			Q'TY
R701, R702	5.6Kohms	2W	2	C703, C704	15000uF	63V electrolytic	2

SYMBOL NO. (MISCELLANEOUS)				Q'TY				
S5	Toggle Switch	LD-1	POWER	1		Heat Sink	1002	
S1, S2	Rotary Switch	Y244		1		P.C.B. connector	143-036-08	1
VR701, VR702	Push Switch	S1VB	3200SJ	1		P.C.B. connector	143-010-18	1
	Variable Resistor	100K-B		2		Cord Fixer	BU-4801	3
	Input Terminal	SQ3259		2	C701	AC pass cond.	250V 0.47uF	1
	Output Terminal	SQ2450		2	C702	AC pass cond.	250V 0.22uF	1
	AC Input Connector	S16405		1		P.C.B. Fixer	SE5785	8
	Fuse Holder	SN2052		1		Fuse	5A	1
	AC outlet	S16412		1		Pilot Lamp	12V 1.5W	4
	Voltage Selector	PO613		1		Pilot Lamp socket	No.2505	4
	Voltage Selector	M1600		1				
	VU Meter	R-65		2				

PB-705

SYMBOL NO. (TRANSISTORS)			Q'TY	SYMBOL NO. (DIODES)		
Q501	2SD382		1	D501 - 504	S3G-2	4
502	2SB537		1	D505	WO-4	1
503	2SC734		1	D506, D507	WZ290	2
504	2SC983		1			
505	2SA661		1			

SYMBOL NO. (CAPACITORS)				Q'TY
C501, C502	electrolytic	80V	220uF	80T220 2
509	electrolytic	35V	330uF	35T330 1
507, C508	electrolytic	63V	22uF	63T33 2
505, C506	electrolytic	63V	22uF	63VBSN22 2
503, C504	film	50V	0.1uF	2

SYMBOL NO. (RESISTORS)				Q'TY	SYMBOL NO. (MISCELLANEOUS)			
R505	1.8K	1/2W	R50 AGJ	1		Heat Sink	1003	2
501, R502	150	1/2W	R1/2AGJ	2		P.C. Board	PB705	1
508, R509	4.7K	1/4W	R1/4AGJ	2		Terminal	S5T701	13
503, R504								
511, R513	6.8K	1/4W	"	5				
506, R507	8.2K	1/4W	"	2				
V501, V502	Semifixed Pot.							
	1K-B,	CR-19	1K-B	2				

PB702, PB703

SYMBOL NO. (TRANSISTORS)			Q'TY	SYMBOL NO. (DIODES)		
Q201, Q203	2SA620		4	D201, D203	SV-02	4
205, Q207	2SC1103A		4	D701	SV-03	2
209	2SA484		2			
305, Q307	2SA679		4			
301, Q303	2SC1709		4			
211	2SC1431		2			
213	2SA762		2			

SYMBOL NO. (CAPACITORS)				Q'TY
C207	electrolytic	16V	47uF	16VBSN47 2
215, C217	electrolytic	63V	22uF	63VBSN22 4
219	ceramic	50V	0.04uF	SC120YG403Z 2
203	ceramic	50V	220pF	FC50SL221K 2
211	ceramic	50V	47pF	FC60SL470K 2
209	ceramic	50V	470pF	SCP50YP471M 2
221	film	100V	0.1uF	PSMH1003-104 2
205, C213	film	100V	0.022uF	MXT1003-223 4
201	tantalum	16V	10uF	SSG16V-10 2



PB701

SYMBOL NO. (TRANSISTORS) Q'TY

Q101, Q103	2SC1222	4
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SYMBOL NO. (CAPACITORS)

Q'TY

C115	electrolytic	35V	47uF	35VBSN47	1
C101	film	50V	0.22uF	50V0.22	2
C107, C109	film	50V	0.056uF	YM9250V0.056	4
C105, C113	tantalum	25V	4.7uF	25V4R7	4
C103, C111	ceramic	50V	100pF		4

SYMBOL NO. (RESISTORS)

Q'TY

R101, R213	1/4W	2.7K	R1/4	J2.7K	4
R109, R215	"	18K	"	18K	4
R111, R217	"	47K	"	47K	4
R105, 117, 119	"	680K	"	680K	6
R211	"	150K	"	150K	2
R107	"	820K	"	820K	2
R103, 113, 115	"	1M	"	1M	6

SYMBOL NO. (MISCELLANEOUS)

Q'TY

P.C. Board	PB701	1
Connector		9

PB706

SYMBOL NO. (IC &amp; TRANSISTORS)

Q'TY

Q601	CuA709C	2
Q603	2SC735	2

SYMBOL NO. (DIODES)

Q'TY

SYMBOL NO. (CAPACITORS)

Q'TY

D607, D609	1S1555	silicon	4	C607, C609			
D601, D603	1S1586	silicon	4	C611, C612	electrolytic	16V47uF	6
D611	WZ100	si-zener	1	C613	tantalum	25V 0.1uF	2
D605, D606	BZ120	si-zener	2	C601	film	50V 0.22uF	2
D612	KB265	varistor	2	C605	ceramic	50V 330pF	2
				C603	ceramic	50V 22pF	2

SYMBOL NO. (RESISTORS)

VR601	semifixed pot.	330-B	SR19330B	2
VR604	semifixed pot.	22K-B	SR2922KB	2
R613	1/4W	68	R1/4AGK	2
R607, R623	1/4W	100	"	4
R625, R627	"	220	"	4
R633	"	270	"	1
R609	"	470	"	2
R615	"	1.5K	"	2
R639	"	2.2K	"	2
R621, R629				
R631, R635	"	3.3K	"	8
R637	"	3.9K	"	2
R611, R619	"	47K	"	4
R617	"	470K	"	2
R603	"	100K	+1% -1% CRA1/4FX	2
R601	"	3.9K	"	2
R605	"	680	"	2

SYMBOL NO. (MISCELLANEOUS)

P.C. Board	PB706	1
Connector	SE-8806	2

PB702, PB703

SYMBOL NO. (RESISTORS)				Q'TY
VR201	Semifixed pot.	1K-B	CR19-1K-B	2
VR203	Semifixed pot.	330-B	CR19-330-B	2
R237, R239				
R241, R243	1/2W	10	R50AGJ	8
R231, R233	1/2W	120	"	4
R207	1/2W	10K	"	2
R223	1/2W	15K	"	2
R229	1/4W	22	R1/4AGJ	2
R203, R205	1/4W	47	"	4
R235	"	100	"	2
R227	"	150	"	2
R211	"	180	"	2
R219	"	1.2K	"	2
R201, 215, 217	"	3.3K	"	6
R209	"	5.6K	"	2
R213	"	18K	"	2
R211, R225	"	47K	"	4
R301, R303				
R305, R307	5W	0.7	RGB5-0.7	8

SYMBOL NO. (MISCELLANEOUS)		Q'TY
Heat Sink		6
Transistor Pad		6
P.C. Board PB702		1
P.C. Board PB703		2
Transistor Socket	S2-110B	8
Spring	SE6261	2

PB704

SYMBOL NO. (TRANSISTORS)		Q'TY	SYMBOL NO. (DIODES)		Q'TY
Q401, 402, 404	2SC734	3	D402 - D405	W06C silicon	4
Q405	2SC496	1	D401	1S188MPX germanium	1
Q403	2SA561	1			

SYMBOL NO. (CAPACITORS)				Q'TY	
C403, C404	electrolytic	16V	220uF	16VBSN220	2
C405	electrolytic	16V	100uF	16VBSN100	1
C407, C408	electrolytic	50V	100uF	50VBSN100	2
C406, C409	electrolytic	50V	10uF	50VBSN10	2
C401, C402	film	100V	0.1uF	PSM-H1003.104	2

SYMBOL NO. (MISCELLANEOUS)		Q'TY
Relay	MAT4B-C	1
Choke Coil	2uH	2
P.C. Board	PB704	1
Connector	SJT701	14

SYMBOL NO. (RESISTORS)				
R403, R404	2W	5	2	
R401, R402	1W	22	R-1AGJ	2
R414	1/2W	470	R-50AGJ	1
R413	1/2W	680	"	1
R410	1/4W	1K	R-1/4AGJ	1
R409	"	2.7K	"	1
R408	"	10K	"	2
R412	"	56K	"	1
R407	"	3.9K	"	1
R405	"	18K	"	2

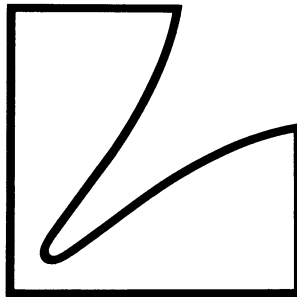
COMPLETE ASSEMBLIES

Panel	1
Mold Knob	2
Function Switch Knob	1
Dicast Escutcheon	1
Escutcheon	2
Class Protector	1
Plastic Protector	2
Slit Cover B	1
Lever Switch Knob	1
Front Decoration Plate	1
Spacer	4
Upper Plate	1
Bottom Plate	1
Cover	1
Wooden Case	1
Collard Rubber Leg 20 type	4
Side Panel (left)	1
Side Panel (right)	1
Chassis	1
Back Panel	1
Shadow Mask (1002)	1
Shadow Mask (1003)	1
Shadow Mask (1004)	1
P.C.B. Stand	4
P.C.B. Stand (big)	4
Sub Panel	1
Fixing Plate (1024)	1
Fixing Plate (1025)	1
Stand (1010)	1
Protector (1009)	2
Setting Knob	2
Protector (1002)	1
Wiring Clamper	4
GND Terminal	1

SPECIFICATION

Power Output:	75 watts minimum continuous per channel, into 8-ohm loads, both channels driven, from 20Hz to 20,000Hz with no more than 0.05% total harmonic distortion.
Frequency Response:	7 - 100,000Hz ( $\pm 1$ dB)
Damping Factor:	50 (8-ohm)
Rated I.M.:	no more than 0.05% (8-ohm, 75W/ch, 60 : 7KHz = 4 : 1)
Residual Hum & Noise:	-86dB
Input Sensitivity:	800mV
Other Features:	Peak Indicating logarithmic VU meter, 2-channel speaker selector, etc.

Specification and appearance design subject to possible change without notice.



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