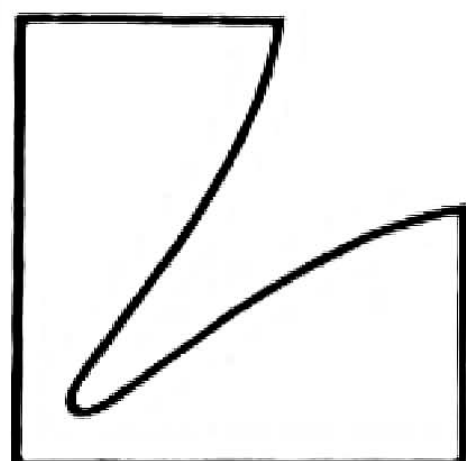
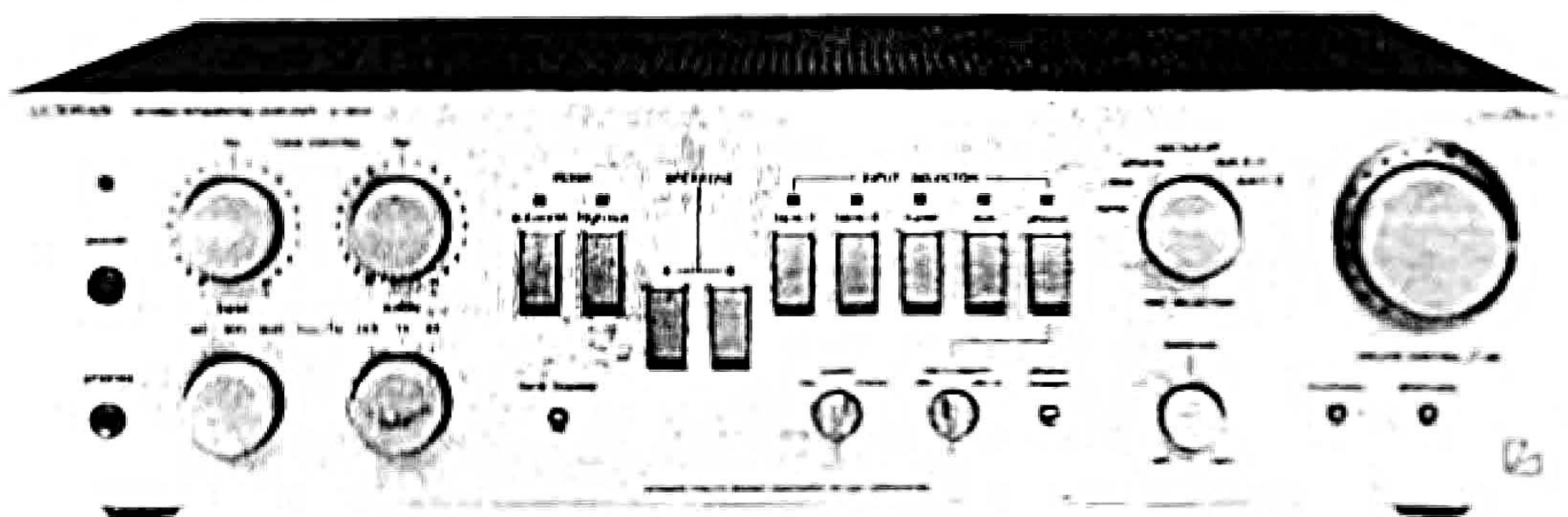


SERVICE MANUAL



DUO-BETA
INTEGRATED AMPLIFIER

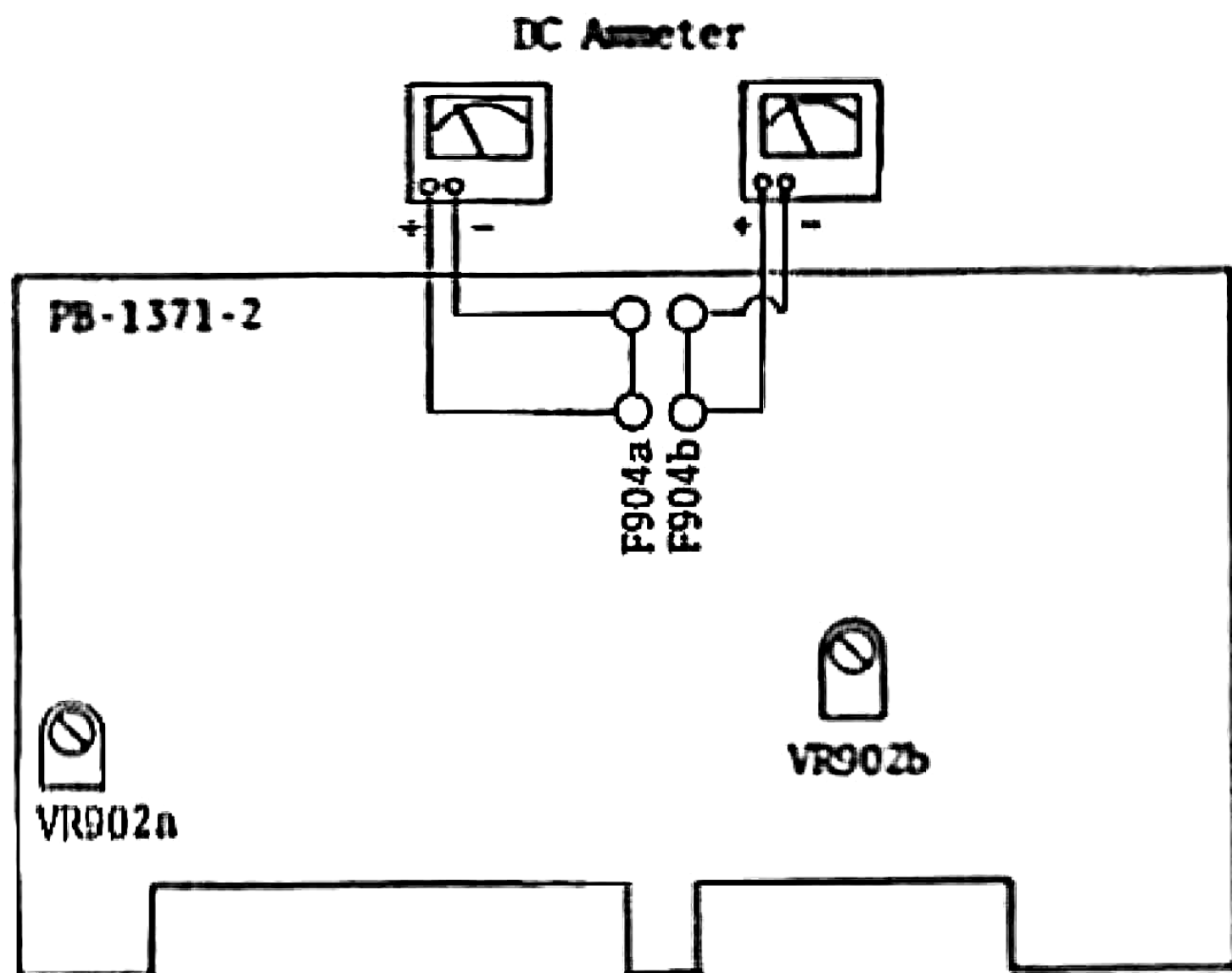
L-120A



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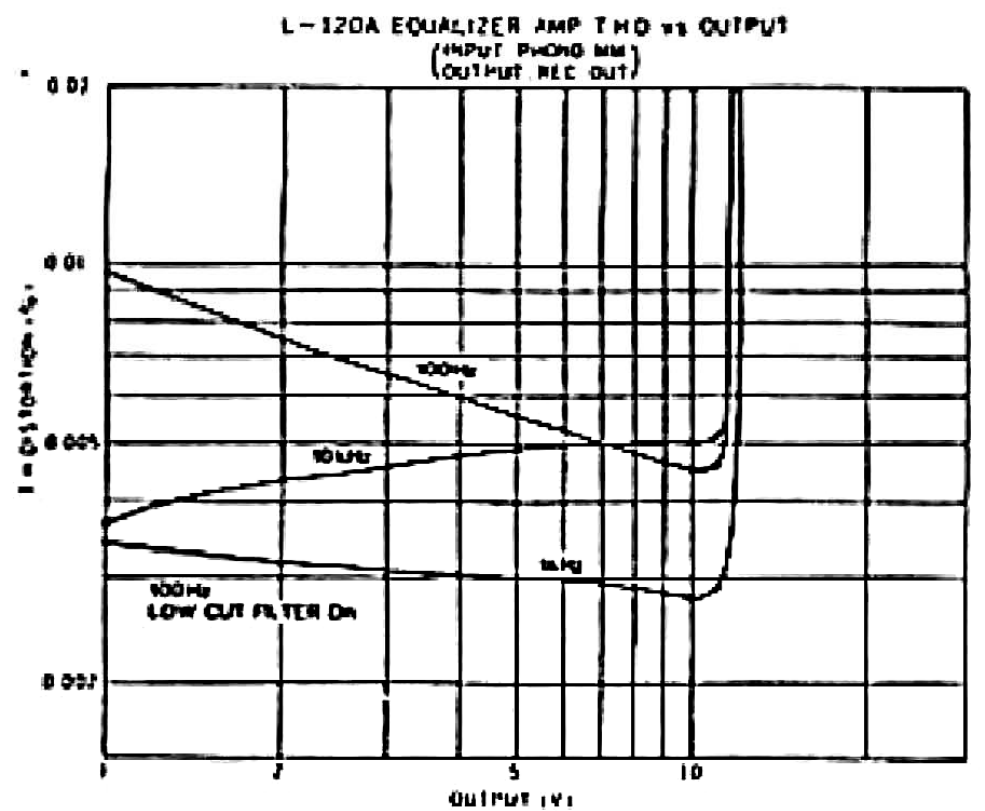
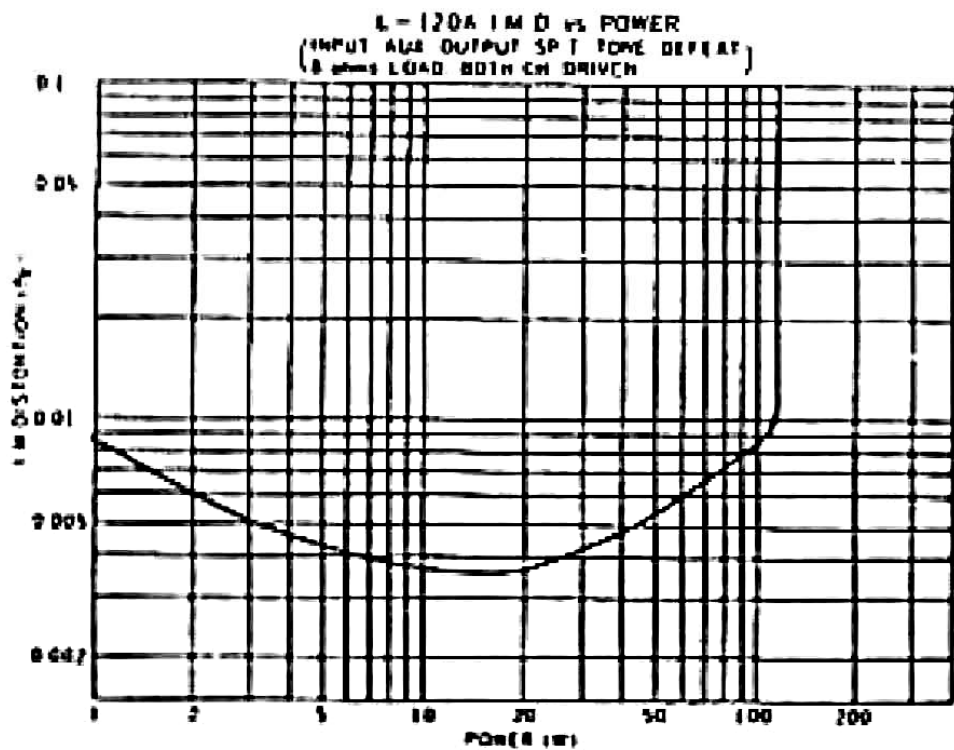
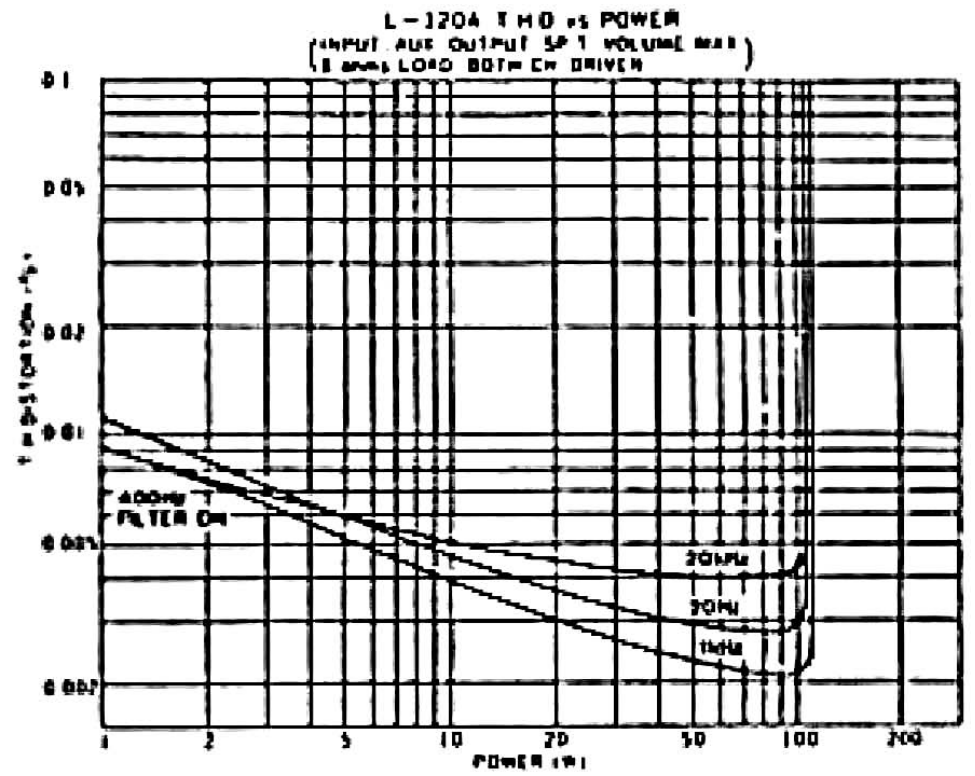
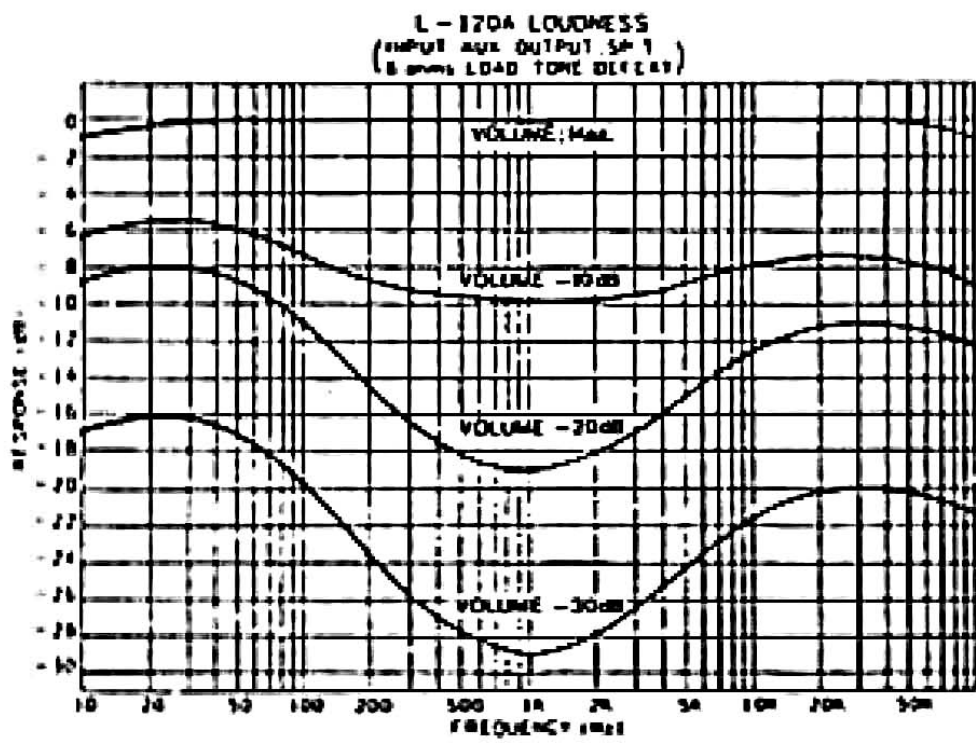
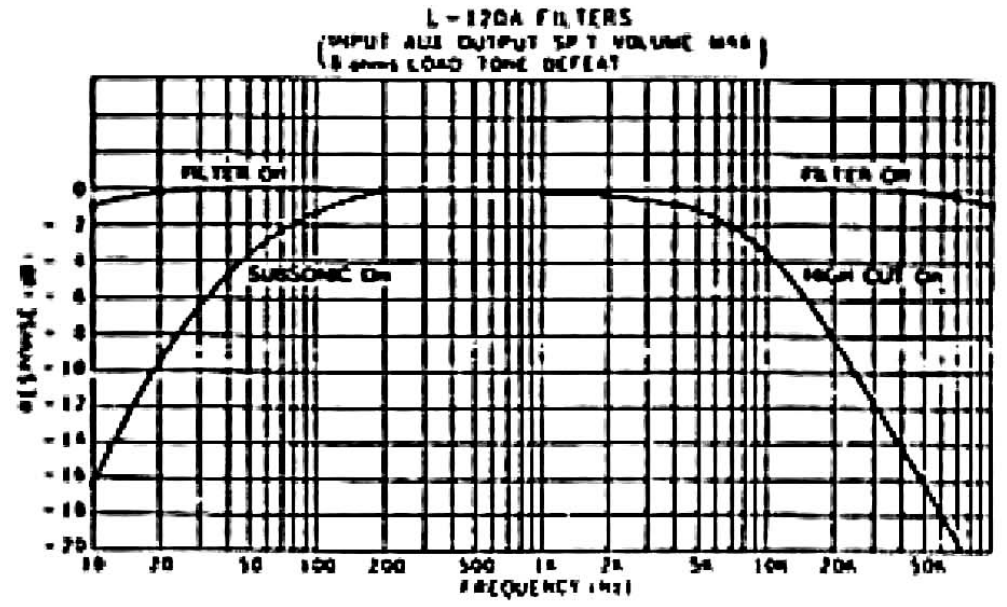
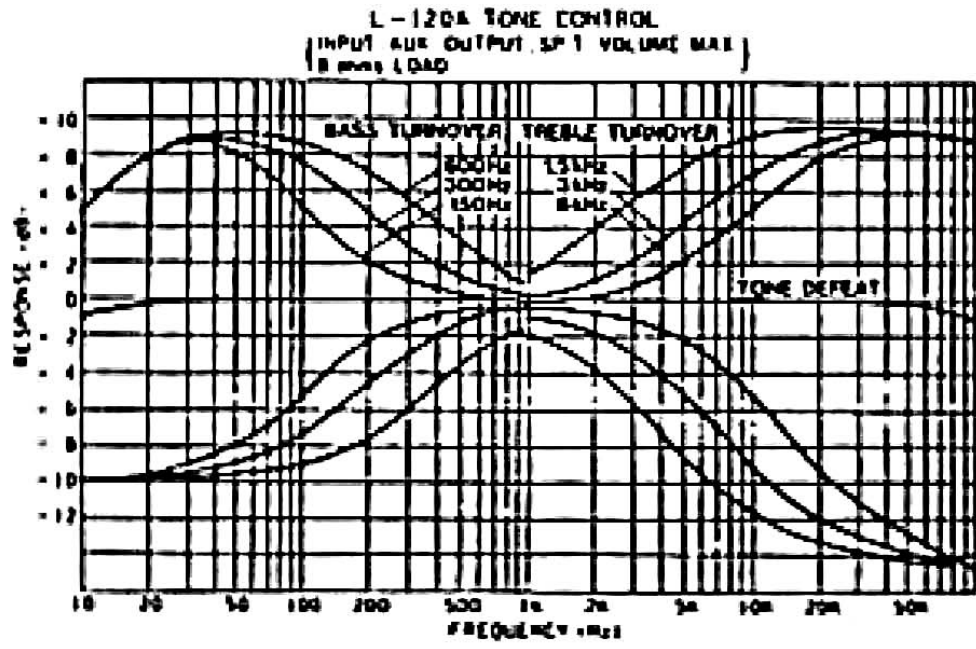
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ADJUSTMENT PROCEDURES

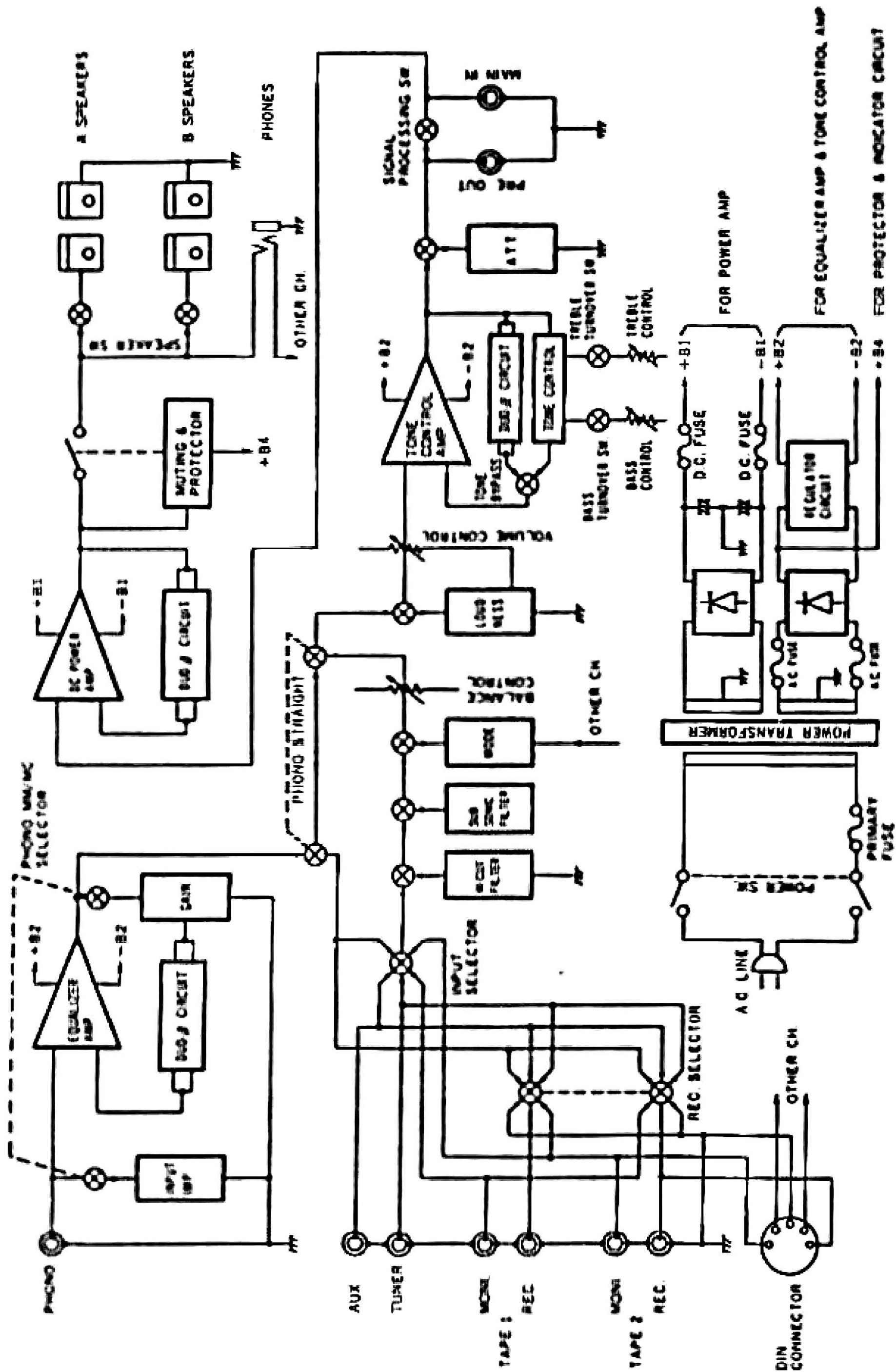


1. Set up unit
 - (1) Volume Control: Minimum
 - (2) Tone Control : Flat Position
 - (3) Speaker : A
2. Turn on the power switch and await a 3 minutes for warming-up.
3. Bias (idle current) adjustment.
 - (1) Take off fuse F904a/left channel, F904b/right channel.
 - (2) Connect DC Ammeter between the both ends of the fuse holder.
 - (3) Adjust on PB-1371-2
 - VR902a left channel
 - VR902b right channelto get $60\text{mA} \pm 5\text{mA}$ by DC Ammeter.

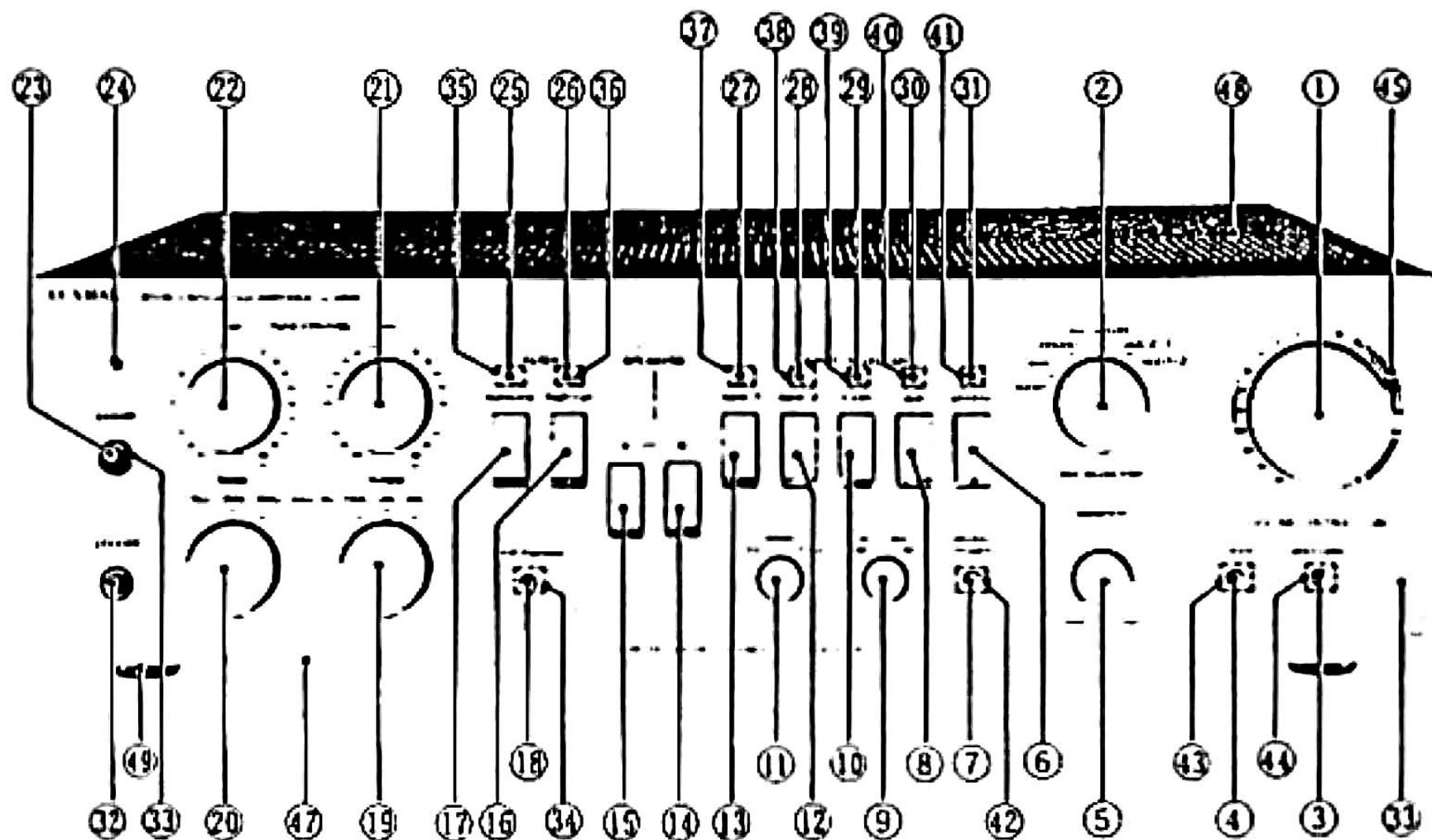
STANDARD CURVES



BLOCK DIAGRAM



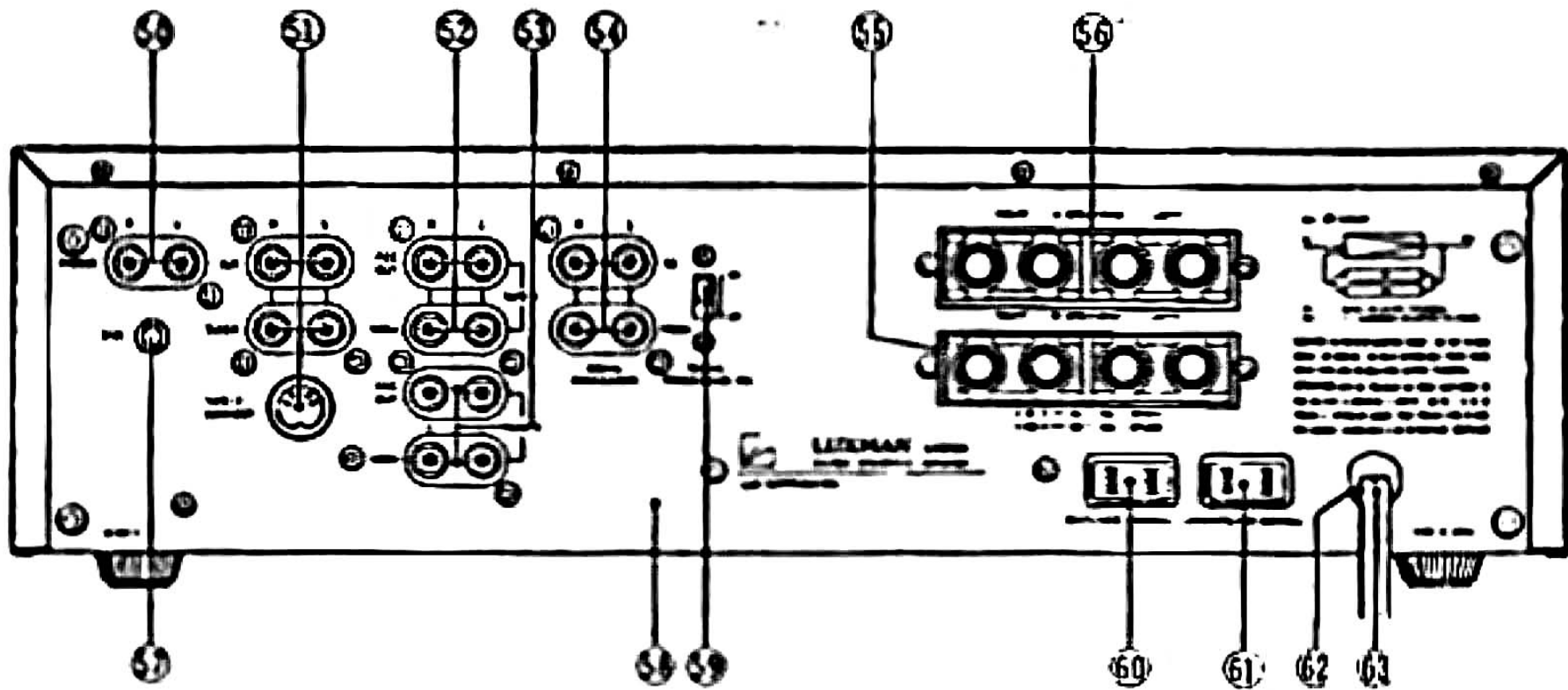
FRONT VIEW PARTS LIST



Symbol No.	Stock No.	Description
(Knob)		
1	WH1105	Volume Control
2	WH1106	Rec Selector
3	WJ1145	Attenuator
4	WJ1145	Loudness
5	WH1118	Balance Control
6	WJ1142P	Phono
7	WJ1127	Phono Straight
8	WJ1142P	Aux
9	WJ1153	Phono MC-MM Selector
10	WJ1142P	Tuner
11	WJ1153	Mode
12	WJ1142P	Tape-2
13	WJ1142P	Tape-1
14	WJ1142P	Speaker B
15	WJ1142P	Speaker A
16	WJ1142P	High Cut
17	WJ1142P	Subsonic
18	WJ1145	Tone Bypass
19	WH1106	Treble Turnover
20	WH1106	Bass Turnover
21	WH1106	Treble Control
22	WH1106	Bass Control
23	WJ1133	Power
(LED)		
24	TD0196	Pilot, SLR-30UF
25	TD0223	SEL1710A, Subsonic

Symbol No.	Stock No.	Description
26	TD0223	SEL1710A, High Cut
27	TD0222	SEL1910K, Tape-1
28	TD0222	SEL1010K, Tape-2
29	TD0222	SEL1010K, Tuner
30	TD0222	SEL1910K, Aux
31	TD0222	SEL1910K, Phono
(Head Phono Jack)		
32	AJ0014	LJ264-1-7
(Front Panel Ass'y)		
33	WA1229	Front Panel 1229
34	WE1089	Protector 1089
35	WE10951	Protector 1095 1/2
36	WE1097	Protector 1097
37	WE1097	Protector 1097
38	WE1097	Protector 1097
39	WE1097	Protector 1097
40	WE1097	Protector 1097
41	WE1097	Protector 1097
42	WE1097	Protector 1097
43	WE10951	Protector 1095 1/2
44	WE10951	Protector 1095 1/2
45	WE10951	Protector 1095 1/2
46	WL1107	Name Plate 1107
(Case Ass'y)		
47	UE1113	Bottom Plate 1113
48	UG1033	Bonnet 1033
49	WN0007	Foot

REAR VIEW PARTS LIST



Symbol No.	Stock No.	Description
(Terminal)		
50	AT0120	Input 2P, Phono
51	AT0137	Input 4P, Aux Tuner With DIN
52	AT0078	Input 4P, Tape-1
53	AT0078	Input eP, Tape-2
54	AT0078	4P, Signal Processing
55	AT0110	Speaker B
56	AT0110	Speaker A
57	AG0010	GND
(Rear Panel)		
*58	UC12011	Rear Panel 1201-1 (S)
	UC12012	Rear Panel 1201-2 (E)

Symbol No.	Stock No.	Description
(Switch)		
59	SS0135	Slide, SSB04202
(Extra AC Outlet) E Only		
*60	AC0010	MD-40, Switched (E)
*61	AC0010	MD-40, Un Switched (E)
(Bushing)		
*62	BU0033	SR-4N-4 (SK,EK,EZ)
	BU0039	SR-5N-4 (SG,EG)
(Power Cord)		
*63	BK0018	A-18BF (EZ)
	BK0022	C-2-461-B (SK,EK)
	BK0023	SAA mini (SG,EG)

Remarks

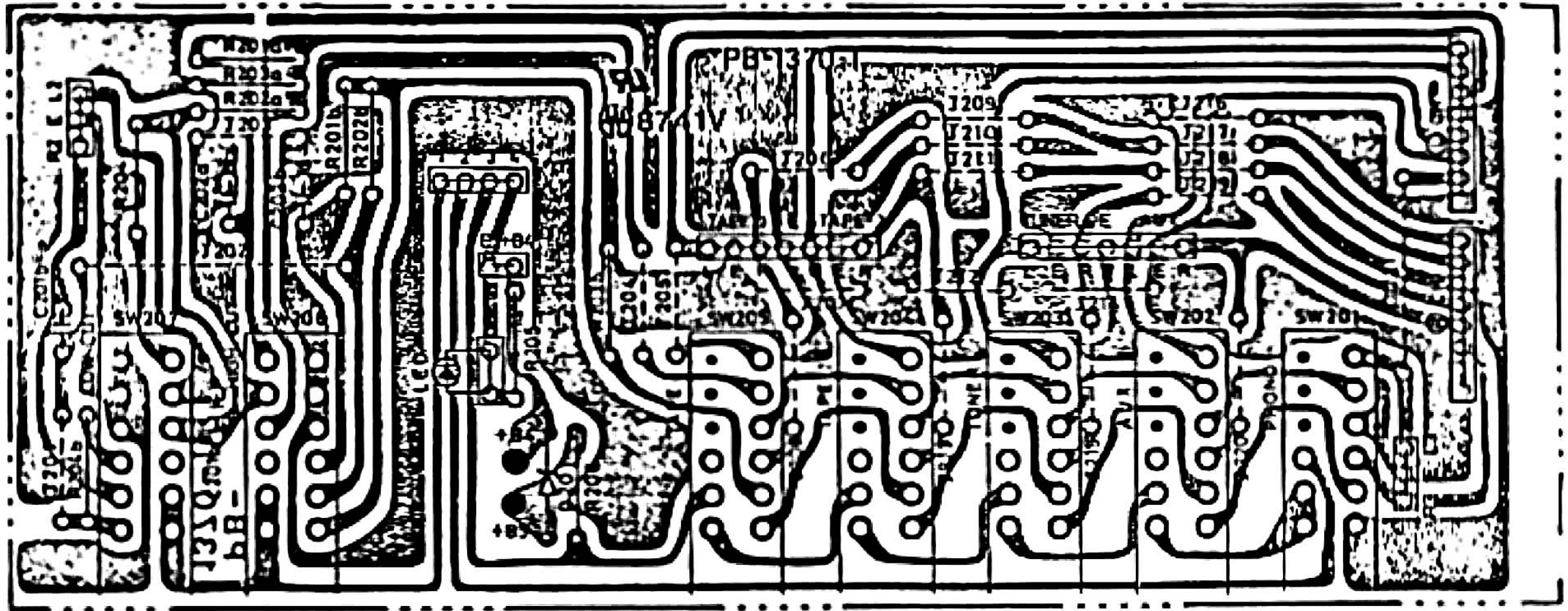
In this manual the parts, which differs depending on destination and mains voltage, are classified indicated as follows:

- EZ: 120V For North America, South East Asia, Middle East Asia, Middle South America
- E — EK: 220V For Europe, South Asia, East Asia, Middle East Asia, Middle South America
- EG: 240V For England, Australia, New Zealand
- S — SK: 220V For Europe, South East Asia, South America
- SG: 240V For England, Oceania

* E Type all with line voltage selector

PB1370-1 PARTS LIST

INPUT SELECTOR, FILTER

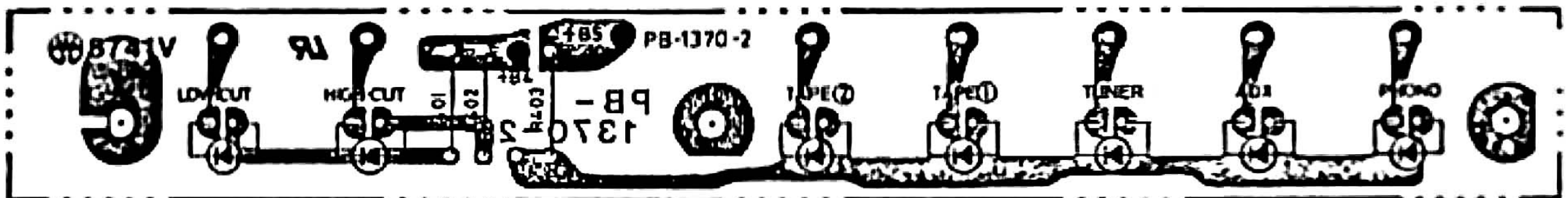


Symbol No.	Stock No.	Description
(Switch)		
SW201-207	SP0184	SUF-73
(Zener Diode)		
D201	TD0060	WZ061 6.1V
(Capacitor)		
C201a,b	CQ1327	0.15uF 50V My
C202a,b	CQ1311	5600pF 50V My

Symbol No.	Stock No.	Description
(Resistor)		
R201a,b	RD0430	1M 1/3W Rd
R202a,b	RD0461	2.7K 1/3W Rd
R203		
R204a,b	RD0430	1M 1/3W Rd
R205	RD0462	2.2K 1/3W Rd
R206	RD0129	1.2K 1/3W Rd

PB1370-2 PARTS LIST

INPUT INDICATOR

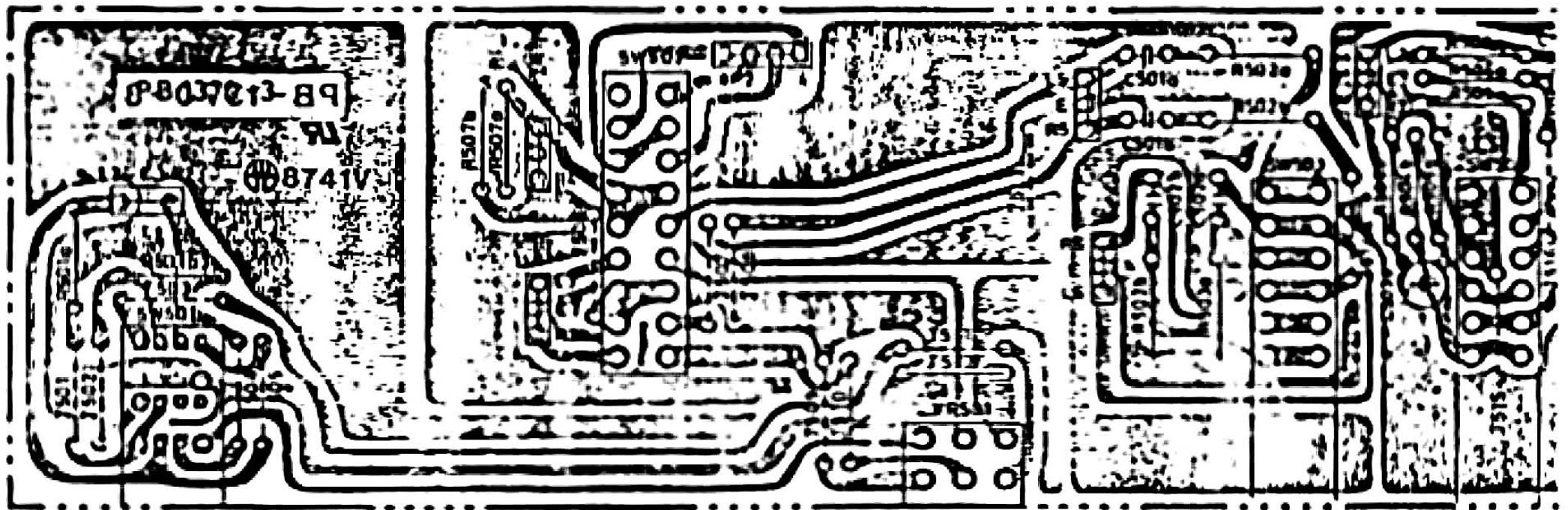


Symbol No.	Stock No.	Description
(LED)		
LED401	TD0222	SEL1710K Yel
LED402	TD0222	SEL1710K Yel
LED403	TD0222	SEL1710K Yel
LED404	TD0222	SEL1710K Yel
LED405	TD0222	SEL1710K Yel

Symbol No.	Stock No.	Description
LED406	TD0223	SEL1910A Org
LED407	TD0223	SEL1910A Org
(Resistor)		
R401	RD0462	2.2K 1/3W Rd
R402	RD0462	2.2K 1/3W Rd
R403	RD0469	560 1/3W Rd

PB1370-3 PARTS LIST

BALANCE CONTROL, ATTENUATE, PHONO STRAIGHT, LOUDNESS

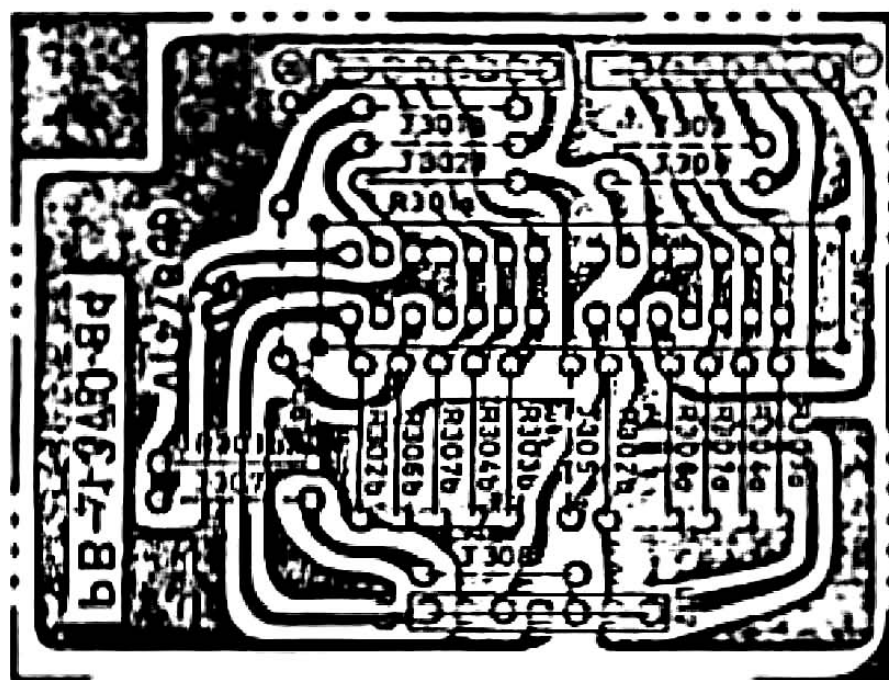


Symbol No.	Stock No.	Description
(Switch)		
SW501	SR0155	Rotary, SUR2043N
SW502	SP0187	Push, SUF12 6-2
SW503-504	SP0186	Push, SUF21
(Capacitor)		
C501a,b	CQ1301	1000pF 50V My
C502a,b	CQ1323	0.068uF 50V My
C503a,b	CE0787	2.2uF LR 50V E1

Symbol No.	Stock No.	Description
(Resistor)		
R501a,b	RD0456	6.8K 1/3W Rd
R502a,b	RD0452	15K 1/3W Rd
R503a,b	RD0457	5.6K 1/3W Rd
R504a,b	RD0460	3.3K 1/3W Rd
R505a,b	RD0449	27K 1/3W Rd
R506a,b	RD0438	220K 1/3W Rd
R507a,b	RD0430	1M 1/3W Rd

PB1370-4 PARTS LIST

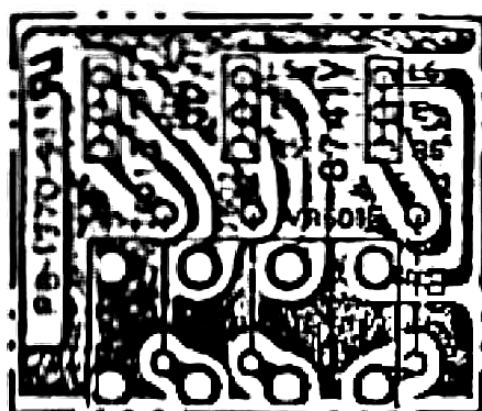
REC SELECTOR



Symbol No.	Stock No.	Description
(Switch)		
SW301	SR0152	Rotary, SRW16N
(Resistor)		
R301a,b	RD0430	1M 1/3W Rd
R302a,b	RD0430	1M 1/3W Rd
R303a,b	RD0430	1M 1/3W Rd
R304a,b	RD0430	1M 1/3W Rd
R305a,b	RD0430	1M 1/3W Rd
R306a,b	RD0430	1M 1/3W Rd
R307a,b	RD0430	1M 1/3W Rd

PB1370-9 PARTS LIST

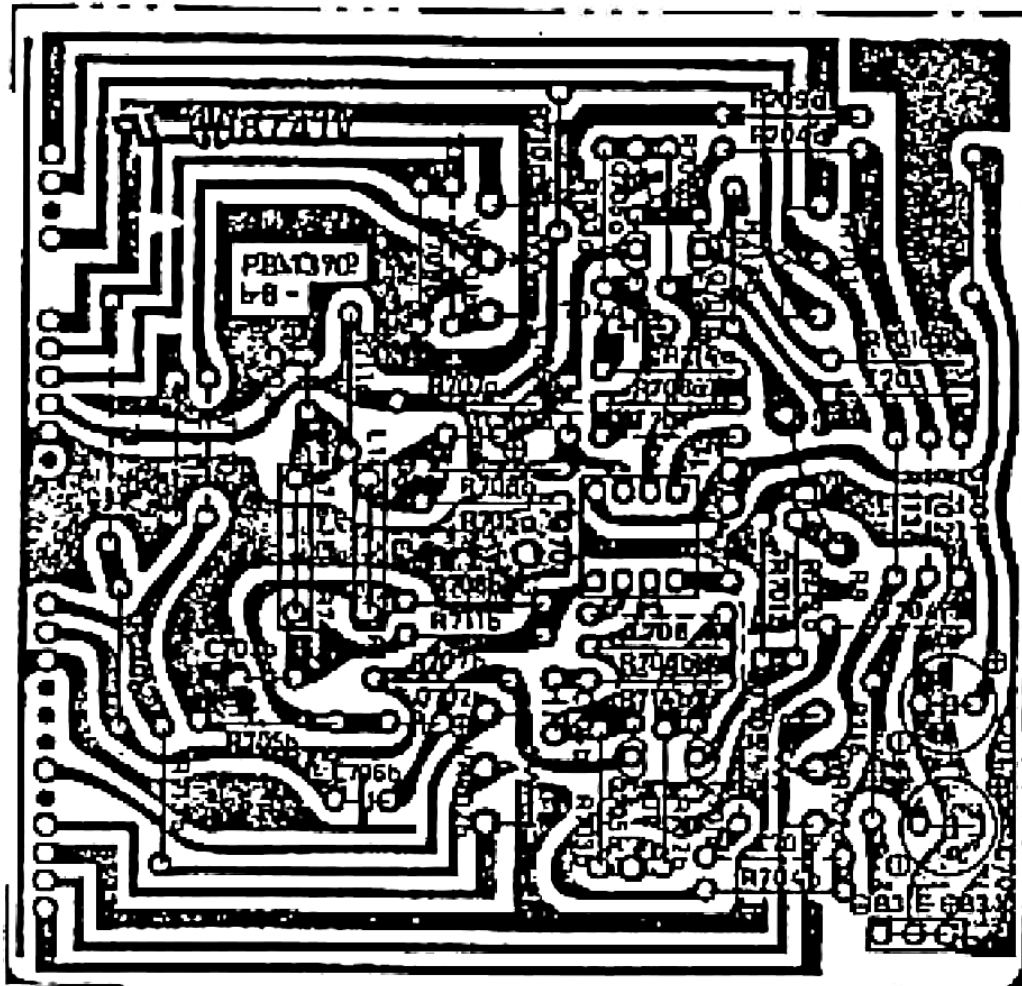
VOLUME CONTROL



Symbol No.	Stock No.	Description
(Variable Resistor)		
VR601	RV0277	100KBx2

PB1370-5 PARTS LIST

TONÉ CONTROL

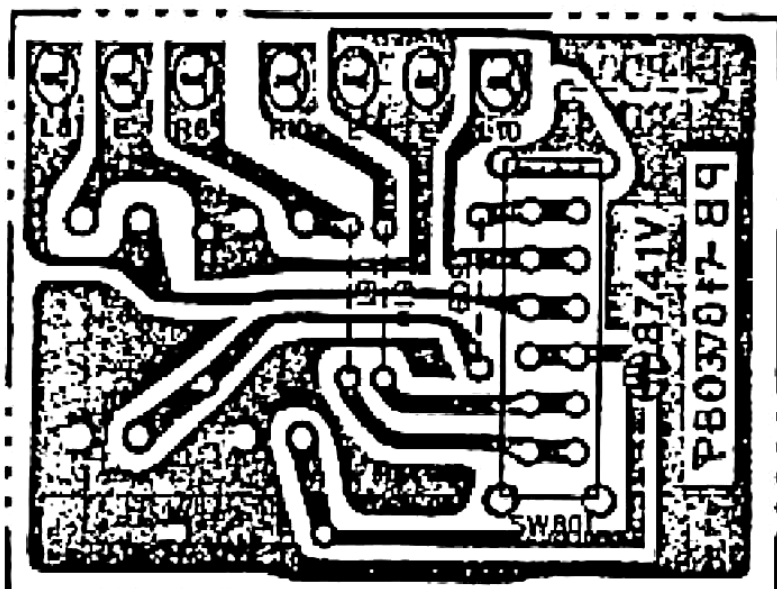


Symbol No.	Stock No.	Description	
(Semi-Fixed Resistor)			
VR701a,b	RV0278	50KCx2	
VR702a,b	RV0278	50KCx2	
(Capacitor)			
C701	CE1731	47uF	25V E1
C702a,b	CE1977	4.7uF	50V E1
C703a,b	CQ1340	1800pF	50V My
C704a,b	CC0011	470pF	50V Ce
C705	CE1731	4.7uF	50V E1
C706a,b	CC0034	47pF	50V Ce
(Resistor)			
R701a,b	RD0438	220K	1/3W Rd
R702a,b	RD0460	3.3K	1/3W Rd
R703a,b	RD0460	3.3K	1/3W Rd
R704a,b	RD0460	3.3K	1/3W Rd
R705a,b	RD0458	4.7K	1/3W Rd
R706a,b	RD0469	560	1/3W Rd
R707a,b	RD0430	1M	1/3W Rd
R708a,b	RD0449	27K	1/3W Rd
R709a,b	RD0465	1.2K	1/3W Rd
R710a,b	RD0465	6.8K	1/3W Rd
R711a,b	RD0473	270	1/3W Rd
R712a,b	RD0486	22	1/3W Rd
R713a,b	RD0471	390	1/3W Rd
R714	RS1433	15	1/3W
R714a,b	RD0472	330	1/3W Rd
R715	RS1433	15	1/3W Rd
	RD0436	330K	1/3W Rd

Symbol No.	Stock No.	Description
(IC, FET)		
Q701a,b	TF0028	2SK170 BL
Q702a,b	TF0028	2SK170 BL
Q703a,b	TC0188	IC, 4560

PB1370-7 PARTS LIST

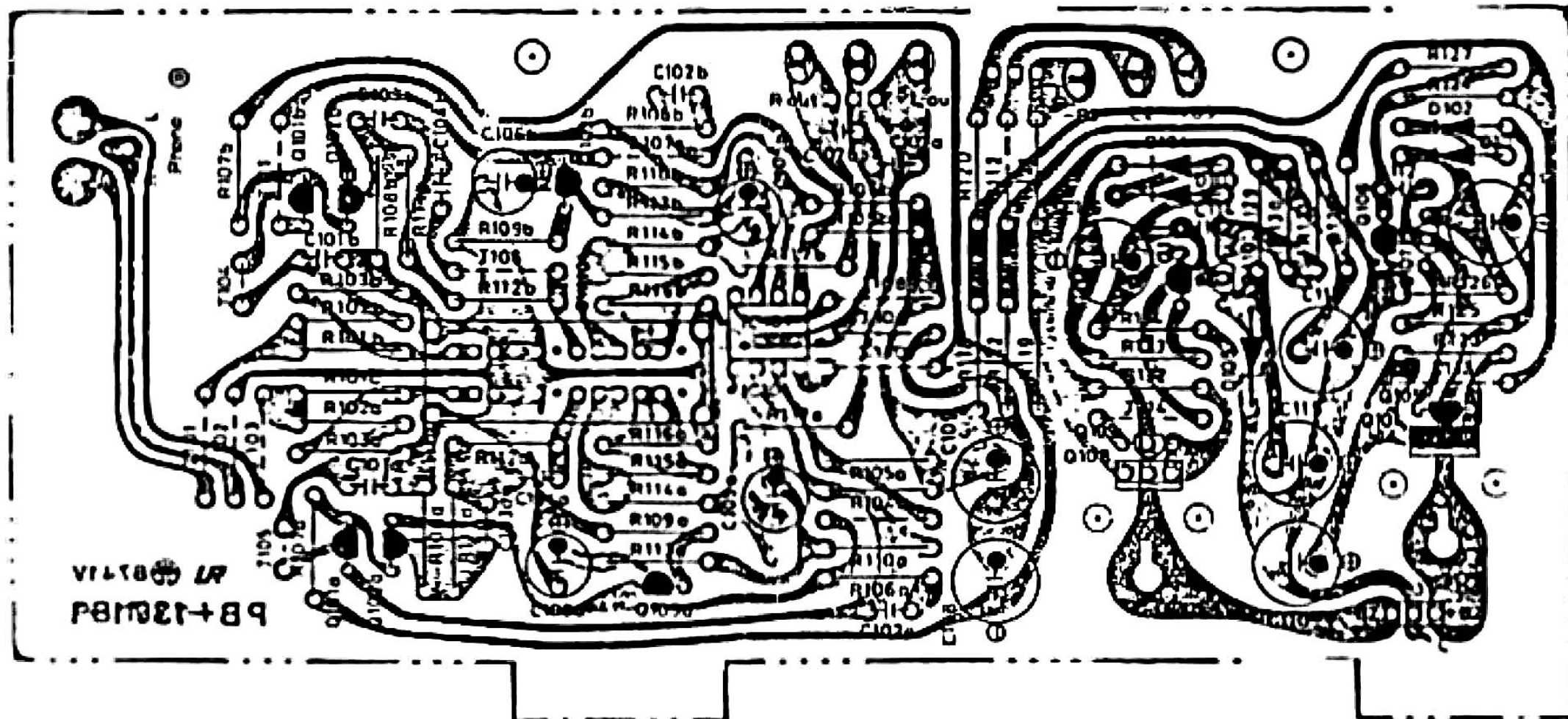
SIGNAL PROCESSING



Symbol No.	Stock No.	Description	
(Terminal)			
	AT0078	Pre Out, Main In	
(Switch)			
SW801	SS0135	Slide, SSB042C2	
(Resistor)			
R801a,b	RD0446	47K	1/3W

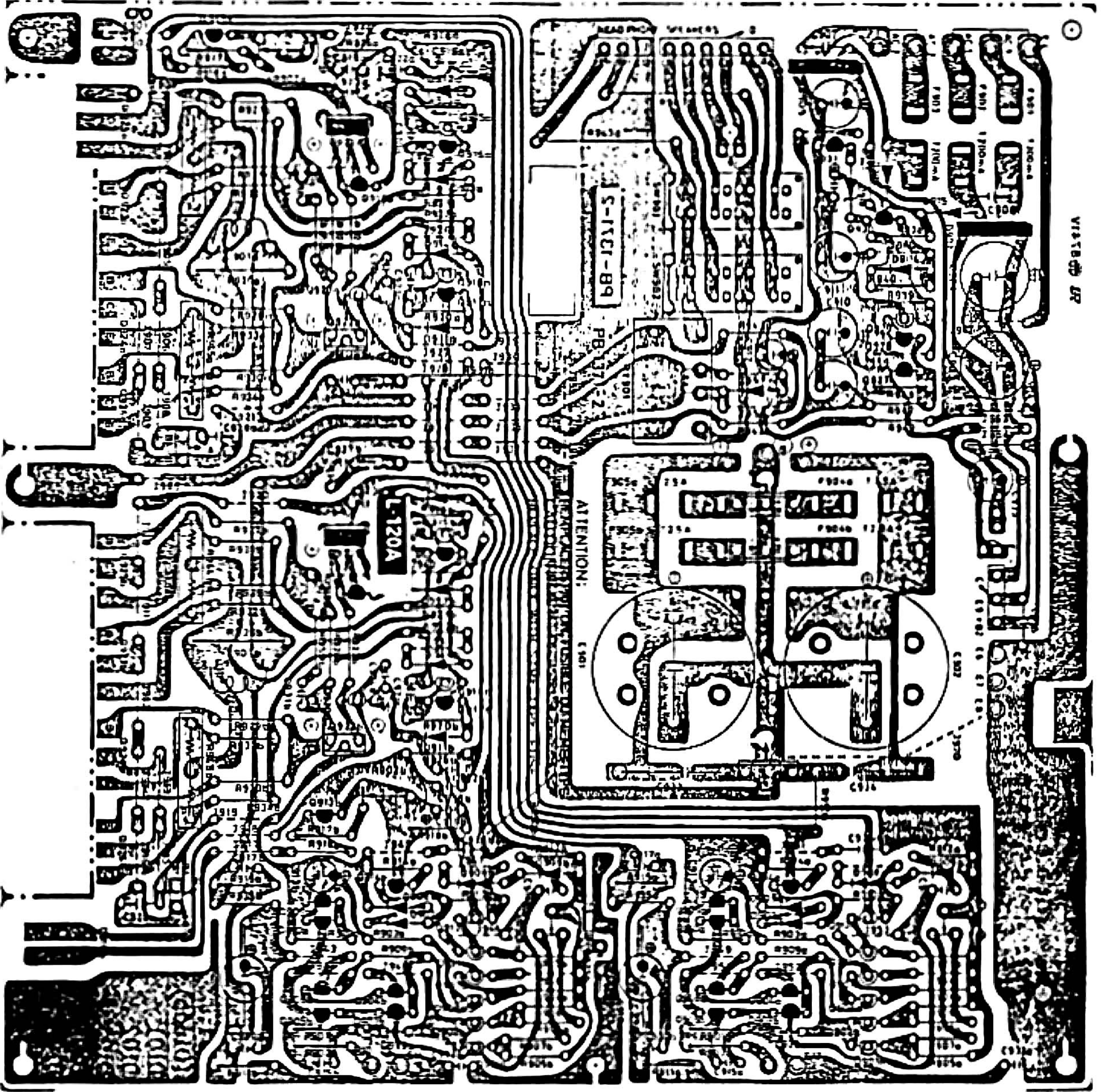
PB1371-1 PARTS LIST

EQUALIZER, REGULATOR



Symbol No.	Stock No.	Description
(IC, FET, Transistor)		
IC101	TC0187	4556
Q101-2	TF0032	2SK-146-BL DUAL
Q103	TF0028	2SK-170-BL PAIR
Q104	TR0177	2SD-525
Q105	TR0029	2SC-945
Q106	TR0029	2SC-945
Q107	TR0320	2SA-992
Q108	TR0176	2SB-505
Q109	TR0320	2SA-992
Q110	TR0320	2SA-992
Q111	TR0029	2SC0945
(Diode)		
D101	TD0053	1S-2473
D102	TD0053	1S-2473
D103	TD0053	1S-2473
D104	TD0053	1S-2473
D105	TD0027	WZ-120
(Capacitor)		
C102a,b	CK0121	4700pF 50WV Ce
C103a,b	CQ1952	0.02uF 50WV My
C104a,b	CQ1954	0.068uF 50WV My
C105a,b	CQ2010	2.2uF 125WV Fi
C106a,b	CE1717	10uF 16WV E1
C107a,b	CQ1400	180pF 50WV St
C108	CE1733	220uF 25WV E1
C109	CE1733	220uF 25WV E1
C110	CE1734	330uF 25WV E1
C111	CE1734	330uF 25WV E1
C112	CC0008	150pF 50WV Ce
C113	CE1702	100uF 6.3WV E1
C114	CC0008	150pF 50WV Ce

Symbol No.	Stock No.	Description
C115	CE1722	22uF 16WV E1
C116	CE1702	100uF 6.3WV E1
(Resistor) Unit:		
R101a,b	RD0478	100 1/3W Rd
R103a,b	RD0446	47K 1/3W Rd
R104a,b	RD0446	1K 1/3W Rd
R105a,b	RD0467	820 1/3W Rd
R106a,b	RD0482	47 1/3W Rd
R107a,b	RD0466	1K 1/3W Rd
R108a,b	RD0479	82 1/3W Rd
R109a,b	RD0473	270 1/3W Rd
R110a,b	RD0432	680K 1/3W Rd
R111a,b	RD0459	3.9K 1/3W Rd
R112a,b	RD0446	47K 1/3W Rd
R113a,b	RD0430	1M 1/3W Rd
R115a,b	RD0466	1K 1/3W Rd
R116a,b	RD0480	68 1/3W Rd
R117a,b	RD0476	150 1/3W Rd
R120	RS1433	15 1/3W
R121	RS1433	15 1/3W
R123	RS1470	470 1/3W
R124	RD0452	15K 1/3W Rd
R125	RD0470	470 1/3W Rd
R126	RD0452	15K 1/3W Rd
R127	RD0465	1.2K 1/3W Rd
R128	RD0452	15K 1/3W Rd
R129	RD0468	680 1/3W Rd
R130	RD0460	3.3K 1/3W Rd
R131	RD0453	12K 1/3W Rd
R132	RS1470	470 1/3W
R133	RD0470	470 1/3W Rd
R134	RD0452	15K 1/3W Rd



Symbol No.	Stock No.	Description
10	CE1703	220uF 6.3WV E1
11	CE1719	33uF 16WV E1
12	CE1751	2.2uF 100WV E1
13a,b	CE1710	47uF 10WV E1
14a,b	CK0117	2200pF 50WV Ce
15a,b	CC0008	150pF 50WV Ce
16a,b	CE1751	2.2uF 50WV E1
17a,b	CC0039	65pF 50WV Ce
18a,b	CC0007	100pF 50WV Ce
19a,b	CC0011	470pF 50WV Ce
20a,b	CK0117	2200pF 50WV Ce
21a,b	CK0117	2200pF 50WV Ce
22a,b	OQ1350	0.1uF 50WV My
23a,b	CC0131	56pF 500WV Ce
24a,b	CC0131	56pF 500WV Ce
27a,b	OQ1954	0.068uF 50WV My
28a,b	CK0203	0.01uF 50WV Ce
33	OQ0295	680pF 125WV St
34	OQ0295	680pF 125WV St
35	CE1743	100uF 35WV E1

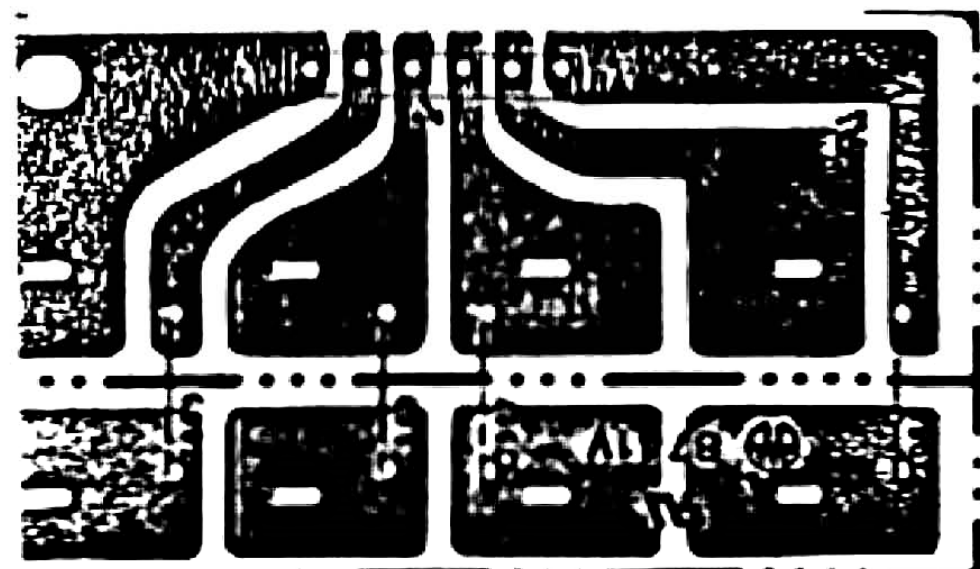
Resistor) Unit:

11a,b	RD0430	1M 1/3W Rd
12a,b	RD0478	100 1/3W Rd
13a,b	RD2624	56K 1/2W Rd
14a,b	RD0466	1K 1/3W Rd
15a,b	RD0481	56 1/3W Rd
16a,b	RD0481	56 1/3W Rd
19a,b	RD0452	15K 1/3W Rd
20a,b	RS1455	120 1/3W Ro
21a,b	RD2550	47 1/2W Rd
22a,b	RD0482	47 1/3W Rd
24a,b	RS1455	120 1/3W Ro
25a,b	RD2586	1.5K 1/2W Rd

Symbol No.	Stock No.	Description
R916a,b	RD0464	1.5K 1/3W Rd
R917a,b	RD0469	560 1/3W Rd
R918a,b	RS1453	100 1/3W Ro
R919a,b	RD0456	6.8K 1/3W Rd
R920a,b	RD0456	6.8K 1/3W Rd
R921a,b	RD0454	10K 1/3W Rd
R922a,b	RD0454	10K 1/3W Rd
R923a,b	RS2528	2.2K 1/2W Ro
R924a,b	RS2521	560 1/2W Ro
R925a,b	RD0489	10 1/3W Rd
R927a,b	RS2501L	10 1/2W Ro
R928a,b	RS2501L	10 1/2W Ro
R929a,b	RS2501L	10 1/2W Ro
R930a,b	RS2501L	10 1/2W Ro
R931a,b	RS1459	180 1/3W Ro
R932a,b	RS1459	180 1/3W Ro
R933a,b	RS1459	180 1/3W Ro
R934a,b	RS1459	180 1/3W Ro
R935a,b	RD0430	1M 1/3W Rd
R936a,b	RS3180	6.8 1W
R937a,b	RS2870	10 3W
R938	RD0466	1K 1/3W Rd
R939	RD0454	10K 1/3W Rd
R940	RD0440	150K 1/3W Rd
R941	RD0462	2.2K 1/3W Rd
R942a,b	RD0453	12K 1/3W Rd
R943a,b	RS3160	470 3W
R944a,b	RG0600	0.22 5W Rc
R945a,b	RG0600	0.22 5W Rc
R947	RD0469	560 1/3W Rd
R948	RD0466	1K 1/3W Rd
R950	RD0440	150K 1/3W Rd
R951	RD0484	33 1/3W Rd

1371-3 PARTS LIST

AKER



Symbol No.	Stock No.	Description
(Terminal)		
A-SP	AT0110	T-5131
A-SP	AT0110	T-5131

PB1371-2 PARTS LIST

POWER AMP, POWER SUPPLY

Symbol No.	Stock No.	Description
(Fuse, Fuse holder)		
*F901	BF0202	5x20 200mA(T) (S)
	BF0306	MF51NR-1A (E)
	AH0028	23165102-C
*F902	BF0202	5x20 200mA(T) (S)
	BF0306	MF51NR-1A
	AH0028	23165102-C
*F903	BF0211	5x20 2.5A(T) (S)
	BF0302	MF51NR-4A (E)
	AH0028	23165102-C
*F904	BF0211	5x20 2.5A(T) (S)
	BF0302	MF51NR-4A (E)
	AH0028	23165102-C
*F905	BF0211	5x20 2.5A(T) (S)
	BF0302	MF51NR-4A (E)
	AH0028	23165102-C
*F906	BF0211	5x20 2.5A(T) (S)
	BF0302	MF51NR-4A (E)
	AH0028	23165102-C
(Switch)		
SW901	SS0141	Slide SSR24357D
SW902	SS0141	Slide SSR24357D
(Choke Coil Relay)		
L901a,b	LA1020	LUX-1020
RY901	AY1017	G27-222P-US DC-24V
(Diode)		
D901	TD0137	S1VB-20
D902	TD0137	S1VB-20
ZD901	TD0027	WZ-120 ZENER 12V
D904	TD0053	1S-2475
D905	TD0002	1N-4002
D906a,b	TD0053	1S-2473
D907a,b	TD0053	1S-2473
D908a,b	TV0030	KB-265C
D909a,b	TD0053	1S-2473
D910a,b	TV0020	STV-3H
D911a,b	TD0053	1S-2473
D912a,b	TD0053	1S-2473
D913a,b	TD0053	1S-2473
D914a,b	TD0053	1S-2473
D915	TD0002	1N-4002

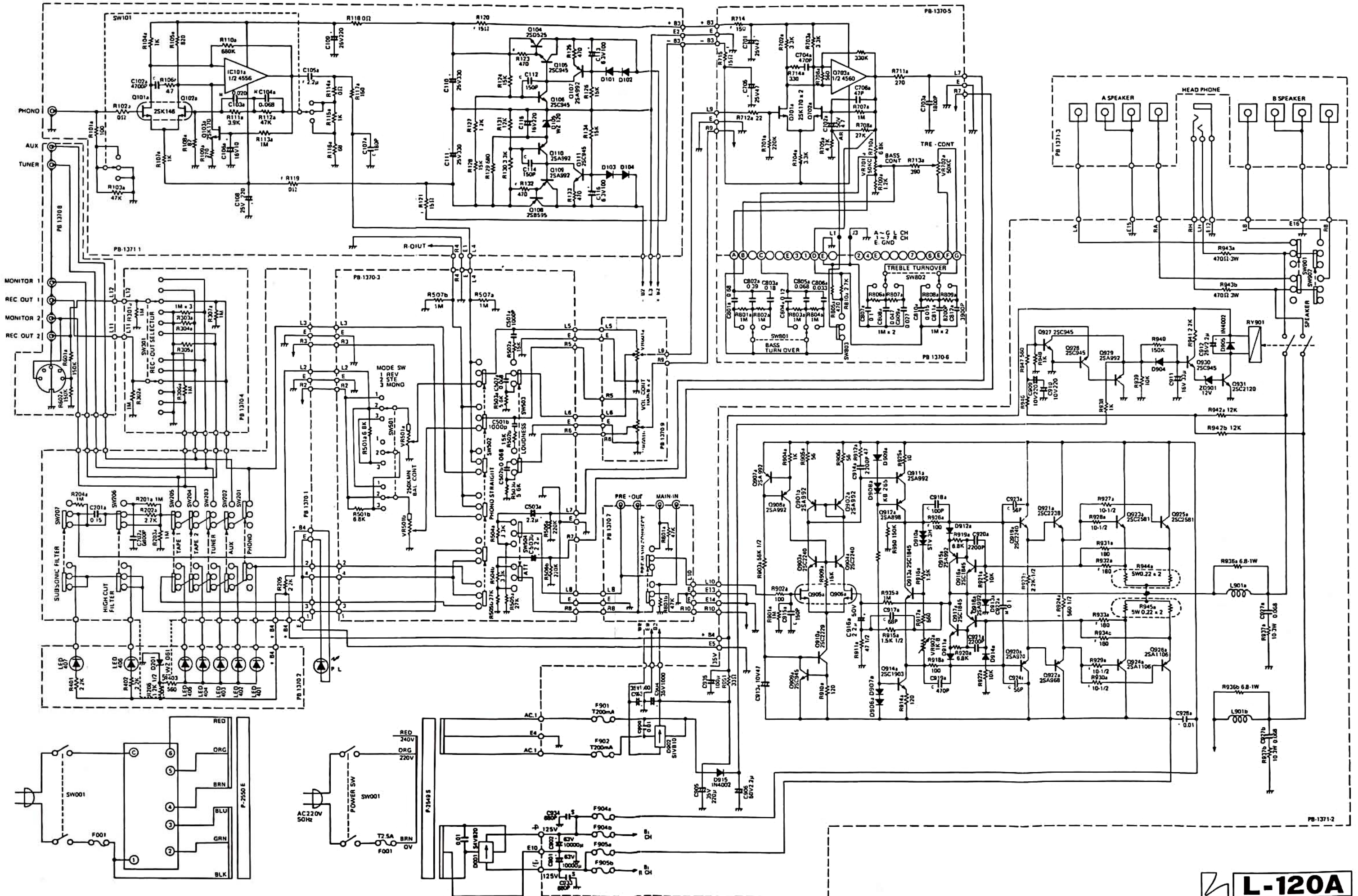
Symbol No.	Stock No.	Description
(Transistor)		
Q901a,b	TR0320	2SA-992
Q902a,b	TR0320	2SA-992
Q903a,b	TR5004	2SC-2240
Q904a,b	TR5004	2SC-2240
Q905a,b	TF0014	2SK-129A
Q906a,b	TF0014	2SK-129A
Q907a,b	TR0320	2SA-992
Q908a,b	TR0320	2SA-992
Q909a,b	TR0029	2SC-945
Q910a,b	TR0236	2SC-2229
Q911a,b	TF0320	2SA-992
Q912a,b	TR0333	2SA-898-V
Q913a,b	TR0323	2SC-1845
Q914a,b	TR0334	2SC-1903-V
Q915a,b	TR0320	2SA-992
Q916a,b	TR0323	2SC-1845
Q917a,b	TR0323	2SC-1845
Q918a,b	TR0320	2SA-992
Q919a,b	TR5004	2SC-2240
Q920a,b	TR5005	2SA-970
Q921a,b	TR0209	2SC-2238
Q922a,b	TR0210	2SA-968
Q923a,b	TR0295	2SC-2581
Q924a,b	TR0294	2SA-1106
Q925a,b	TR0295	2SC-2581
Q926a,b	TR0294	2SA-1106
Q927	TR0029	2SC-945
Q928	TR0029	2SC-945
Q929	TR0320	2SA-992
Q930	TR0029	2SC-945
Q931	TR0259	2SC-2120
(Capacitor)		
C901	CE1026	10000uF 65kV
C902	CE1026	10000uF 65kV
C903	CE1747	1000uF 55kV
C904	CE1747	1000uF 55kV
C906	CE1751	2.2uF 50kV
C907	CK0203	0.01uF 50kV
C908	CK0203	0.01uF 50kV

SPECIFICATIONS

Power Output:	110W minimum continuous per channel both channels driven into 8 ohms with no more than 0.01% total harmonic distortion.		
Rated I.M. :	no more than 0.01% (8 ohms, 100W/ch, 60Hz:7kHz=4:1)		
Frequency Response:	20 Hz-20 kHz (± 0.3 dB) -PHONO		
Input Sensitivity & Input Impedance:	PHONO(MC-2)	120 μ V	100 ohms
	PHONO(MM)	2.0mV	47k ohms
	TUNER	130mV	33k ohms
	AUX	130mV	33k ohms
	TAPE-1	130mV	33k ohms
	TAPE-2	130mV	33k ohms
Signal-to-Noise Ratio: (input short-circuited)	PHONO(MM)	better than 102 dB (IHF-A weighted, 10mV)	
	TUNER	better than 106 dB (IHF-A weighted)	
	AUX	better than 106 dB (IHF-A weighted)	
	TAPE-1,2	better than 106 dB (IHF-A weighted)	
Residual Noise	no more than 0.5mV		
Tone Control:	Bass	$+9$ dB at 100 Hz (600Hz position)	
	Treble	$+9$ dB at 10 kHz (1.5kHz position)	
Filter:	High Cut	7 kHz (-6 dB/oct.)	
	Subsonic	30 Hz (-6 dB/oct.)	
Dimensions:	438(W) x 417(D) x 127(H) mm (17.5" x 16.7" x 5.1")		
Weight:	Net	14.0 kgs (30.8 lbs.)	
	Gross	15.5 kgs (34.1 lbs.)	

Specifications and appearance design subject to change without notice.

SCHEMATIC DIAGRAM



L-120A