marantz

model PM200

Stereophonic Amplifier

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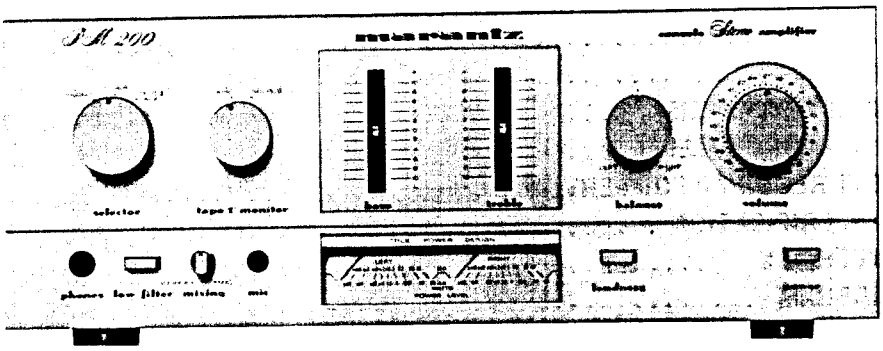


1. INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for the Marantz PM 200 Stereo Console Amplifier. Servicing information and voltage data included in this manual are intended for use by knowledgeable and experienced personnel only. All instructions should be read carefully. No attempt should be made to proceed without a good understanding of circuitry operation.
The parts list furnishes complete ordering information. Most replacement parts should be ordered from the Marantz Company. However, a simple description is included for parts which can be obtained locally.

2. PRE-AMPLIFIER

Signals from the TUNER and AUX terminals are taken to the SELECTOR SWITCH (SV01).
Signals from the PHONO terminals pass through the phono amplifier (Q401, Q403) where they are amplified by 36dB and at the same time undergo RIAA equalization, before going to the SELECTOR SWITCH (SV01).
After being selected by the SELECTOR SWITCH, the incoming signals are taken to the TAPE MONITOR switch and TAPE OUT terminals.
Signals which enter from the TAPE IN terminals are taken to the TAPE MONITOR SWITCH.
Signals which are selected by the TAPE MONITOR SWITCH are taken to the MONO SWITCH BALANCE and VOLUNE potentiometers, and then enter the preamplifier (QE01 and QE03). The preamplifier has a gain of 19dB and also serves as a tone control amplifier, with the frequency response being controlled by the BASS and TREBLE controls.
After passing through the preamplifier, the signals enter the main amplifier.

3. TROUBLESHOOTING ANALYSIS

1. Excessive line consumption
   a. Check for shorted Q806 through Q809.
   b. Check for shorted transistor Q715, through Q718.
   c. Check for open Q709, Q710, R717, R718.
2. No line consumption or zero bias voltage
   a. Check line cord, fuse, check for shorted Q709, Q710, Q717, Q718.
   b. Check for open rectifiers Q806 through Q809 or open L001.
3. High hum and noise level
   a. Check filter capacitors C808, C809, C801, C803, Q801.

4. POWER AMPLIFIER ADJUSTMENT

ADJUSTMENT OF IDLING CURRENT

Connect a DC voltmeter to between emitters Q715 and Q717. Adjust R717 until 11 mV is reached. Likewise, adjust Q716, Q718 and R718.

5. POWER METER ADJUSTMENT

Adjust the Speaker Terminal to @1 kHz at rated OUTPUT (12.6 V). Adjust the RX07 until the meter indicate 20 W. Adjust the RX08 for another channel.

6. TEST EQUIPMENT REQUIRED FOR SERVICING

Table 1 lists the test equipment required for servicing the PM 200 Stereo Console Amplifier. The wattmeter, AC voltmeter, and variable autotransformer may be assembled as a test fixture as shown schematically in Figure 1. The load resistors and AC ammeter may be assembled into a second test fixture as shown in Figure 2.

7. PERFORMANCE VERIFICATION

TEST PROCEDURE

A. TEST EQUIPMENT

Refer to Table 1 for required test equipment.

B. PRELIMINARY PROCEDURES

1. Make the test setup shown in Figure 1 with the instrument controls set in the following positions:

Line Switch	OFF
Variable-line switch	Variable
Wattmeter Switch	ON
Variable Autotransformer	0 V (fully CCW)
Load	8 ohms (0.5 mfd–OFF)
Audio Generator	1 kHz
Output	5 V range
Gain	Minimum
AC Voltmeter	30 V range

2. Make sure that connections between the resistive load and the system terminals of the PM 200 have negligible resistance when compared with the resistance of the load itself. Appreciable resistance in wiring adds to the total load, resulting in inaccurate measurements of output power.
3. Connect amplifier output to load and connect AC cord to line power. Connect shorting plugs to the Phono input jacks of the PM 200.

Table 1. Test Equipment Required for Servicing

Item	Manufacturer and Model No.	Use
Distortion Analyzer Audio Oscillator AC Voltmeter	Sound Technology Model 1700B	Distortion measurements Sinewave and squarewave signal source voltage measurements (AC)
Oscilloscope	Tektronix Model T932 Philips Model 3232	Waveform analysis and trouble shooting and ASO alignment
Circuit Tester		Trouble shooting
DC Voltmeter	Fluke Model 8000 "Digital" Simpson Model 313, Triplet Model 801	Voltage measurements (DC)
AC Wattmeter	Simpson Model 1379	Monitors primary power to amplifier
AC Ammeter	Commercial Grade (1 ~ 10 A)	Monitors amplifier output under short circuit condition
Line Voltmeter	Simpson Model 1359	Monitors potential of primary power to amplifier
Variable Autotransformer	Superior Electronic Co., Powerstet Model 116B-10A	Adjusts level of primary power to amplifier
Shorting Plug	Use phono plug with 600 ohm across center pin and shell	Shorts amplifier input to eliminate noise pickup
Output Load (8 ohms, ±0.5% 100 W)	Commercial Grade	Provides 8-ohm load for amplifier output termination
Output Load (4 ohms, ±0.5% 100 W)	Commercial Grade	Provides 4-ohm load for amplifier output termination
Output Load Capacitor (0.5 mfd)	Mylar	Provides capacitive load for instability checks
AC Power Control Box	Optional Item. Fabricate in accordance with Figure 1	Monitors and controls primary power for amplifier
Amplifier Output Load Box	Optional Item. Fabricate in accordance with Figure 2	Provides various amplifier loads and can monitor shorted output

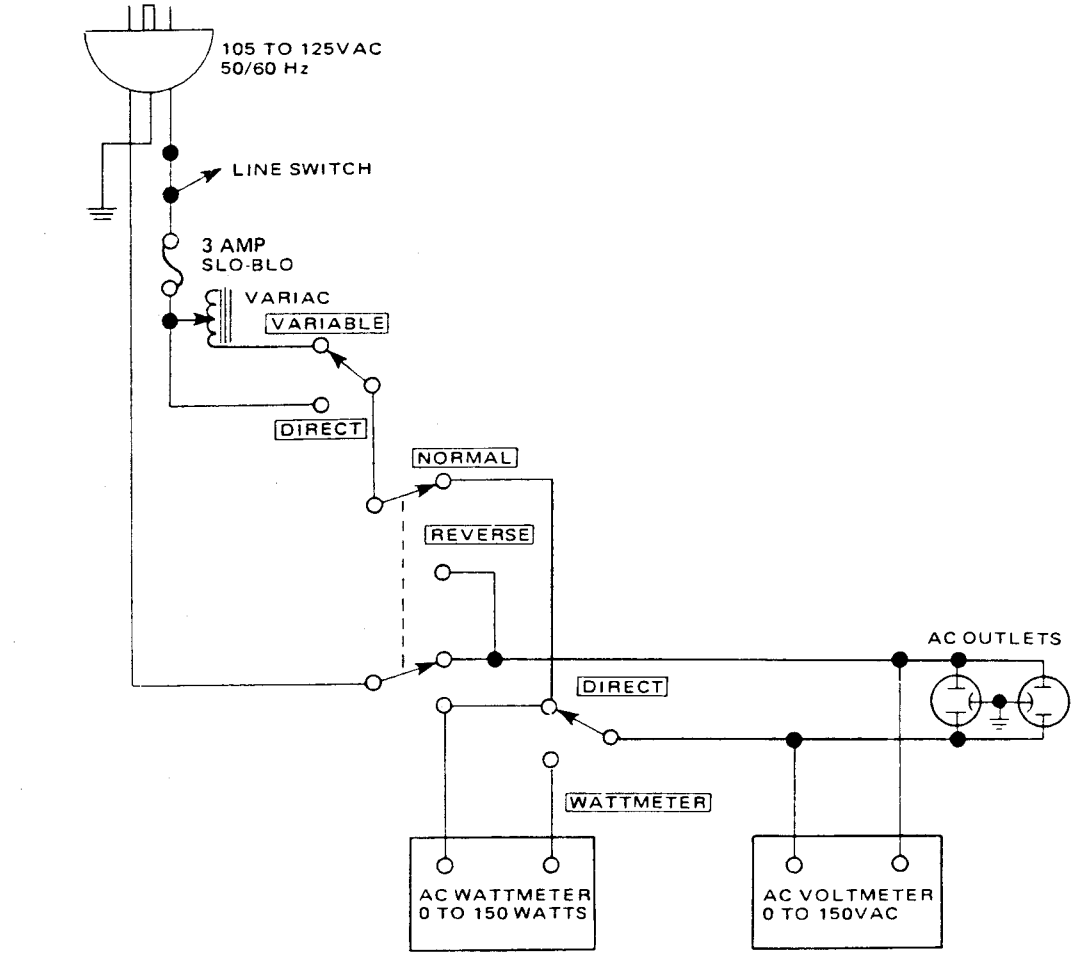


Figure 1. AC Power Control Box Simpligied Schematic

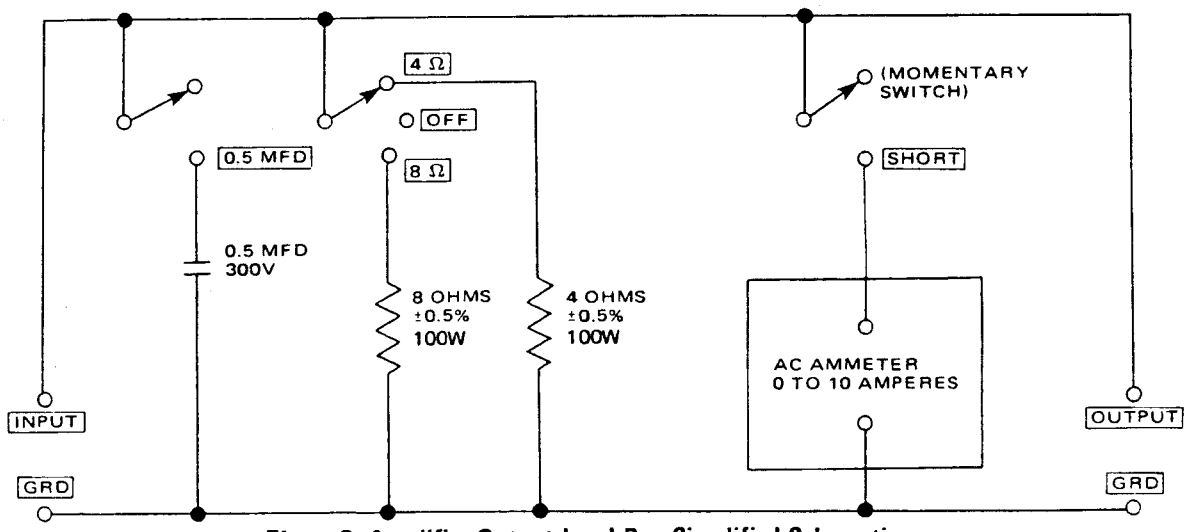


Figure 2. Amplifier Output Load Box Simplified Schematic

C. TOTAL HUM AND NOISE TEST

1. With shorting plugs connected to the Phono input jacks and an 8 ohm resistive load connected across the speaker system output terminals, connect a distortion analyzer across the load.

> **NOTE:**
> If the distortion analyzer does not contain a built-in voltmeter, an AC VTVM may be substituted.

2. Set the distortion analyzer controls for voltge measurements and apply power to the amplifier. Set the volume control fully CCW. Set the SELECTOR switch to PHONO.
3. If the distortion analyzer indicates more than 2.0 mV refer to the trouble analysis section of this manual.
4. Set the volume control fully CW. If the distortion analyzer indicates more than 20 mV, refer to the trouble analysis section of this manual.

D. MAXIMUM POWER OUTPUT

1. Connect the audio oscillator to the AUX input. Set audio oscillator frequency to 1 kHz. Set SELECTOR switch to AUX.
2. With the distortion analyzer connected across the output load (8-ohm), set the analyzer on the 30 VAC scale.
3. Turn the analyzer on and increase the audio oscillator output to 150 mV. The AC VTVM should read 12.6 VAC or more.

E. HARMONIC DISTORTION TEST

1. Set the frequency of the audio oscillator and the distortion analyzer to 20 kHz.
2. Set the controls of the analyzer for voltage measurement on the 30 volt scale.
3. Adjust the audio oscillator output level until the analyzer meter indicates 12.6 VAC.
4. Switch the distortion analyzer to Set Level and adjust SENSITIVITY for full scale reading on 0 ~ 1% scale.
5. Measure the total harmonic distortion with the analyzer and verify it is less than 0.3%.

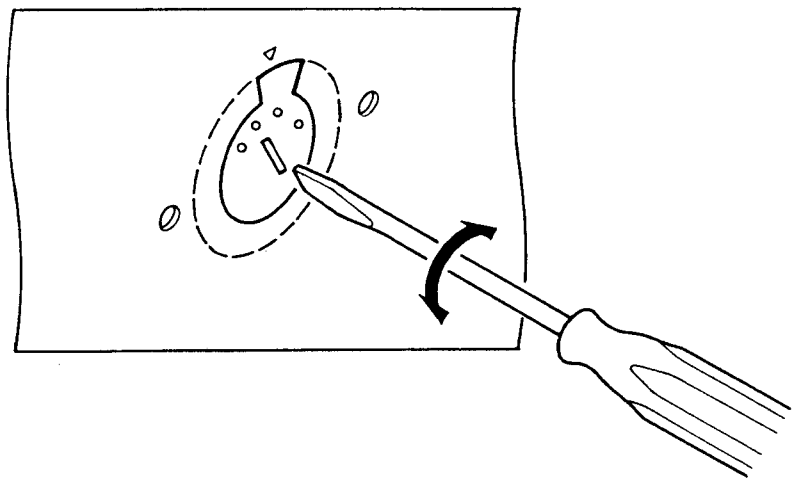
> **NOTE:**
> Any parasitic oscillation in the amplifier will be displayed on the oscilloscope when capacitance is switched into the load.

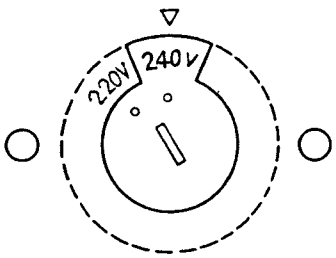
6. Switch the distortion analyzer back to SET LEVEL. (Do not readjust sensitivity of analyzer.)
7. Change the frequency of the audio oscillator and distortion analyzer to 1 kHz. Adjust audio oscillator output for a full scale reading on the 0 ~ 1% scale.
8. Measure the distortion, verifying it is no greater than 0.3%.
9. Repeat steps 7 and 8, changing frequency to 20 Hz. Distortion should be no more than 0.3%.
10. Check for parasitic oscillation; there should be none.

8. VOLTAGE CONVERSION

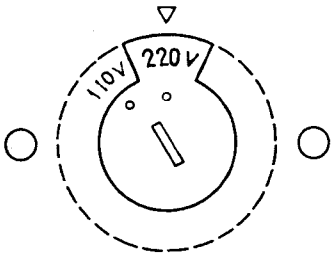
To convert the unit to a different power source voltage, change the position as illustrated in the drawing below.

CAUTION: DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE. PLEASE DO NOT DISASSEMBLE THE VOLTAGE SELECTOR ABSOLUTELY.

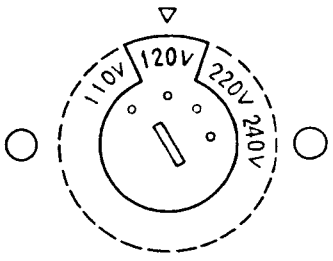




(T) (A) Versions

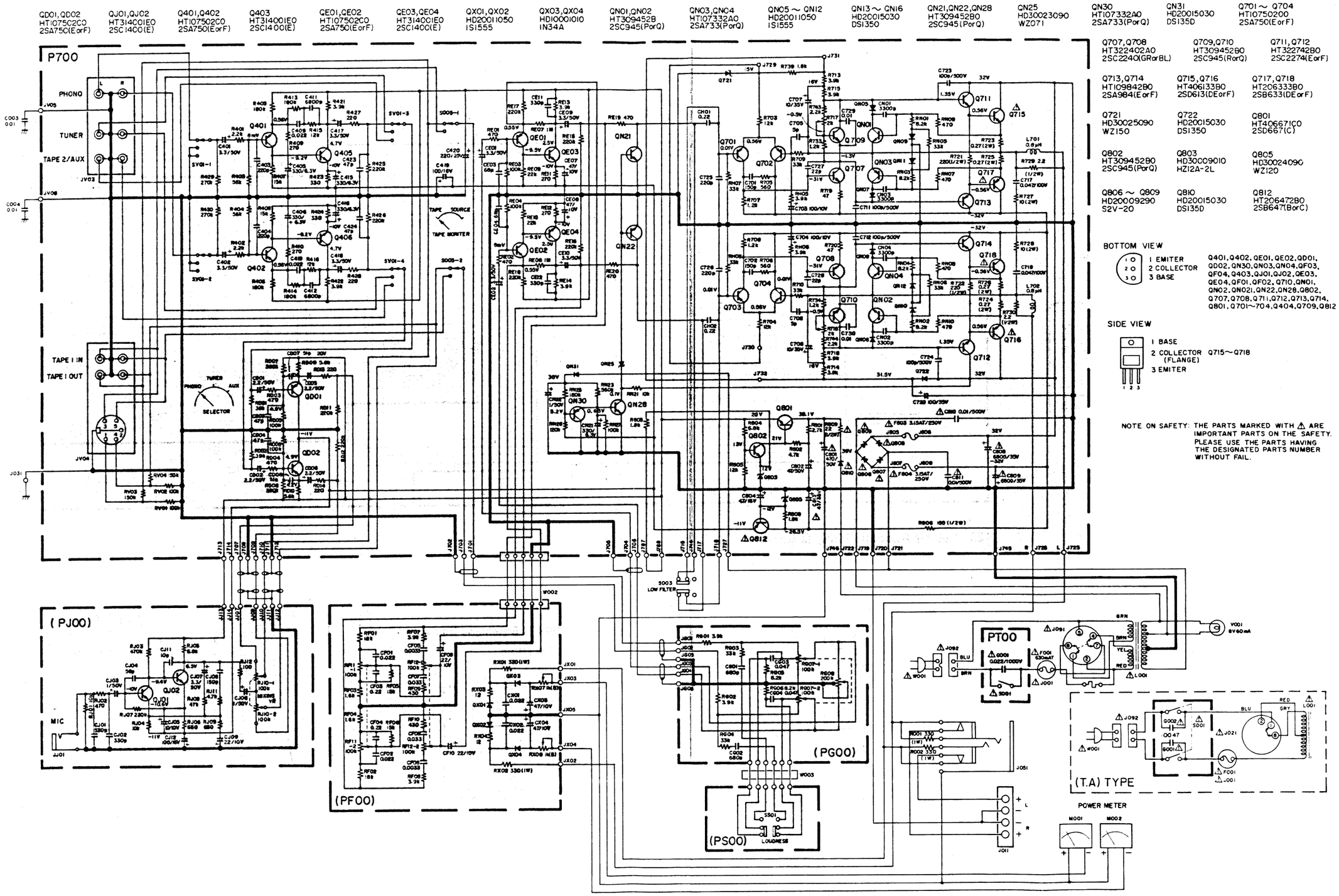


(N) Version



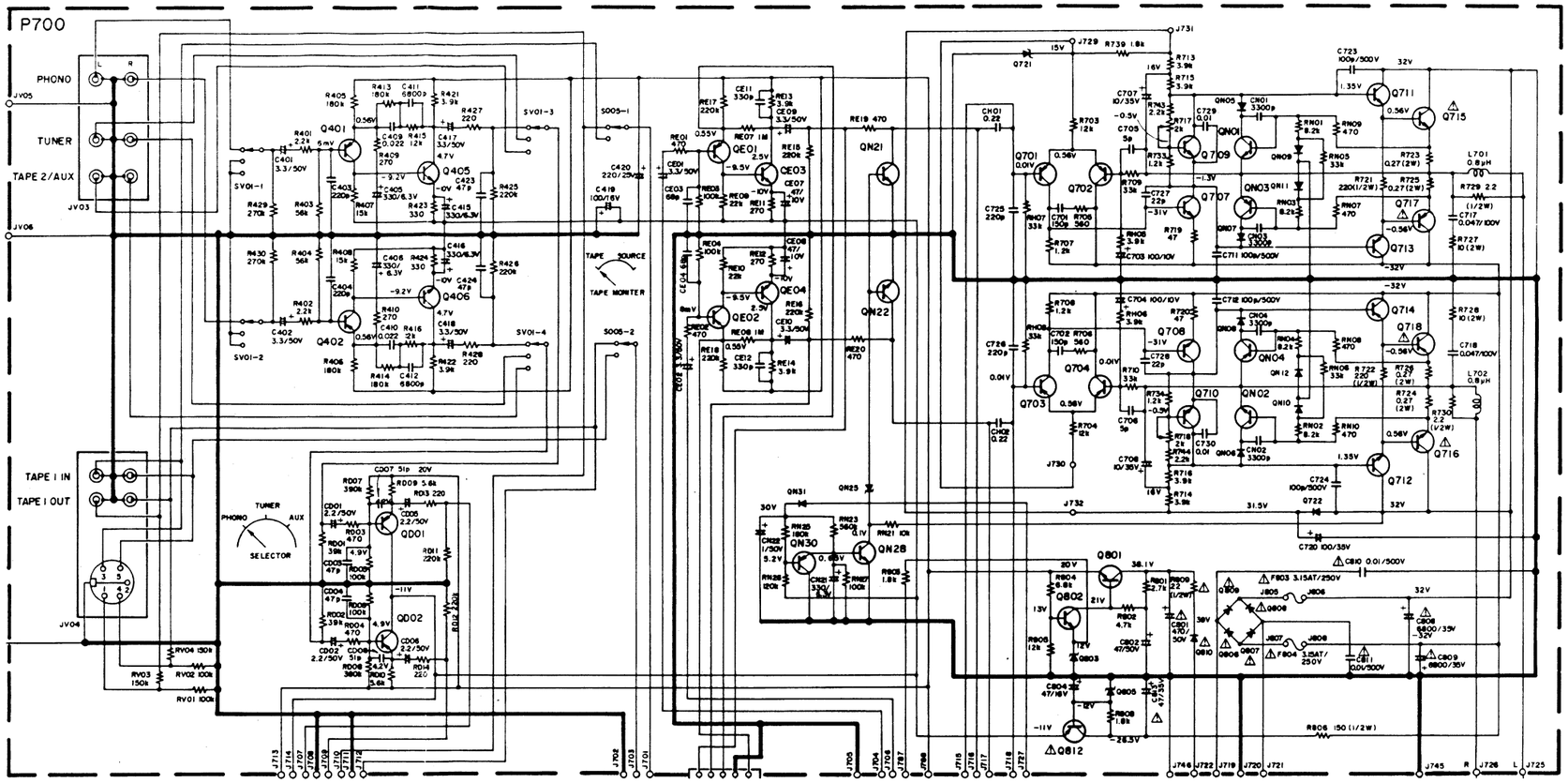
(P) Version

Note on safety: The parts marked with ⚠ are important parts on the safety. Please use the parts having the designated parts number without fail.

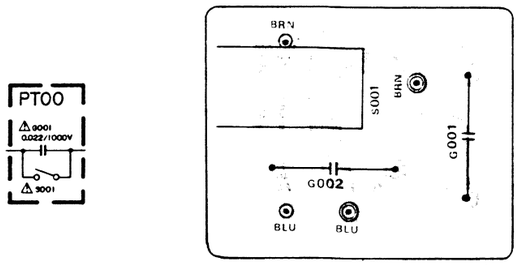

QD01,QD02 HT1075C2C0 2SA755C(EorF)
QJ01,QJ02 HT314C01E0 2SC1400(E)
Q401,Q402 HT107502C0 2SA750(EorF)
Q403 HT314001E0 2SC1400(E)
QE01,QE02 HT107502C0 2SA750(EorF)
QE03,QE04 HT314C01E0 2SC1400(E)
QX01,QX02 HD20011050 IS1555
QX03,QX04 HD1000101O IN34A
QN01,QN02 HT309452B 2SC945(PorQ)
QN03,QN04 HT107332A0 2SA733(PorQ)
QN05 ~ QN12 HD20011050 IS1555
QN13 ~ QN16 HD20015030 DSI350
QN21,QN22,QN28 HT309452B0 2SC945(PorQ)
QN25 HD30023090 WZ071
QN30 HT107332A0 2SA733(PorQ)
QN31 HD20015030 DSI35D
Q701 ~ Q704 HT10750200 2SA750(EorF)
P700
PHONO
TUNER
TAPE 2/AUX
TAPE 1 IN
TAPE 1 OUT
TAPE SOURCE
TAPE MONITER
SELECTOR
PHONO TUNER AUX
(PJ00)
MIC
(PF00)
(PG00)
(PS00)
LOUDNESS
3003 LOW FILTER
PT00
(T.A) TYPE
POWER METER
M001 M002
Q707,Q708 HT322402A0 2SC2240(GRorBL)
Q709,Q710 HT309452B0 2SC945(RorQ)
Q711,Q712 HT322742B0 2SC2274(EorF)
Q713,Q714 HT109842B0 2SA984(EorF)
Q715,Q716 HT406133B0 2SD613(DEorF)
Q717,Q718 HT206333B0 2SB633(DEorF)
Q721 HD30025090 WZ150
Q722 HD20015030 DSI350
Q801 HT406671C0 2SD667(C)
Q802 HT309452B0 2SC945(PorQ)
Q803 HD30009010 HZI2A-2L
Q805 HD30024090 WZ120
Q806 ~ Q809 HD20009290 S2V-20
Q810 HD20015030 DSI35D
Q812 HT206472B0 2SB647(BorC)
BOTTOM VIEW
1 EMITTER
2 COLLECTOR
3 BASE
Q401,Q402,QE01,QE02,QD01, QD02,QN30,QN03,QN04,QF03, QF04,Q403,QJ01,QJ02,QE03, QE04,QF01,QF02,Q710,QN01, QN02,QN021,QN22,QN28,Q802, Q707,Q708,Q711,Q712,Q713,Q714, Q801,Q701~704,Q404,Q709,Q812
SIDE VIEW
1 BASE
2 COLLECTOR (FLANGE)
3 EMITER
Q715~Q718
NOTE ON SAFETY: THE PARTS MARKED WITH ⚠ ARE IMPORTANT PARTS ON THE SAFETY. PLEASE USE THE PARTS HAVING THE DESIGNATED PARTS NUMBER WITHOUT FAIL.

10. DIAGRAM AND COMPONENT LOCATIONS

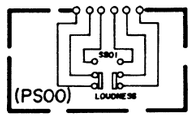
10.1 Main Assembly (P700) Schematic Diagram and Component Locations

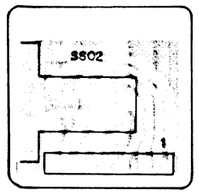


10.2 Microphone Amp. Assembly (PJ00) Schematic Diagram and Component Locations

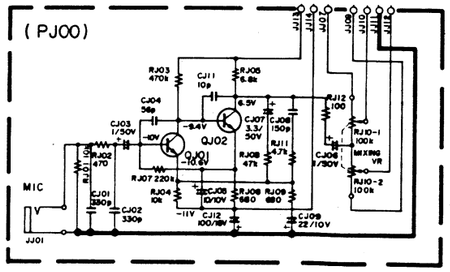


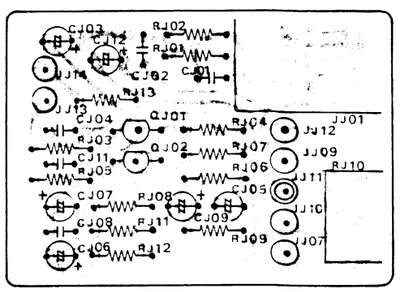
10.3 Loudness Assembly (PS00) Schematic Diagram and Component Locations



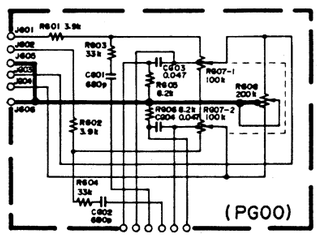


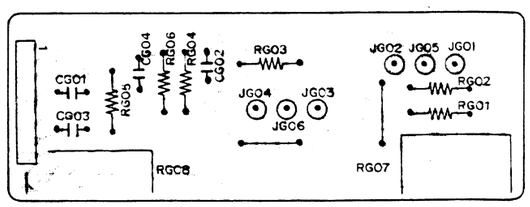
10.4 Switch Assembly (PT00) Schematic Diagram and Component Locations



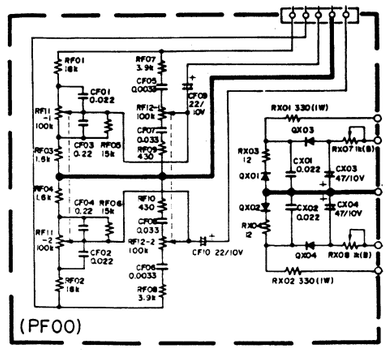


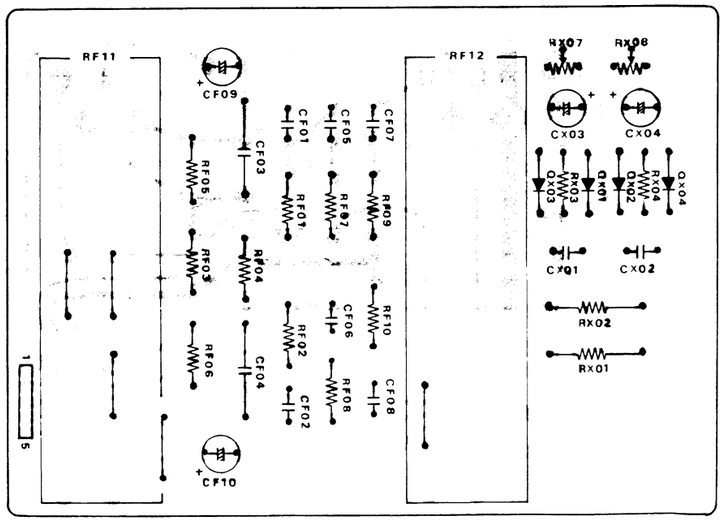
10.5 Volume Assembly (PG00) Schematic Diagram and Component Locations

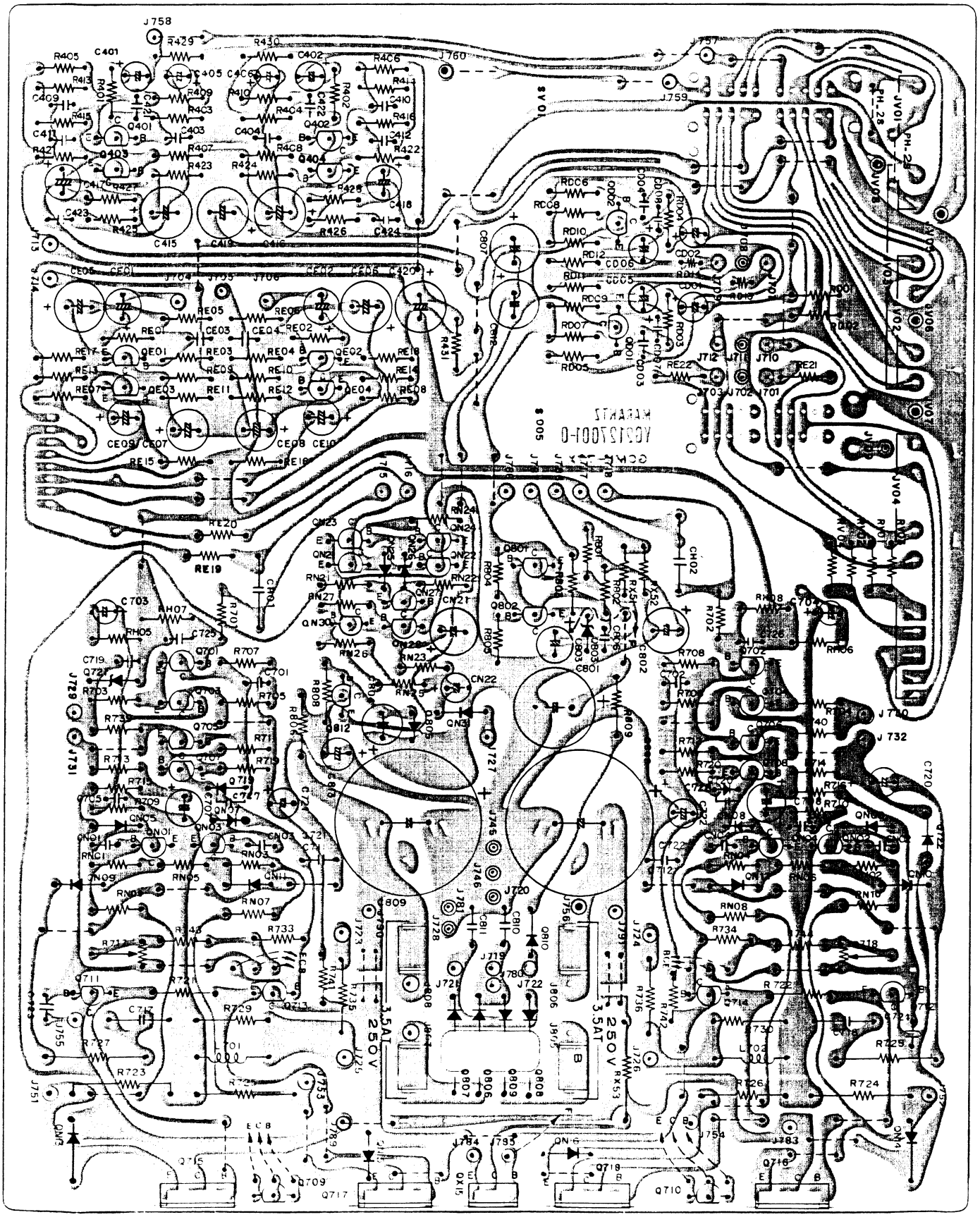




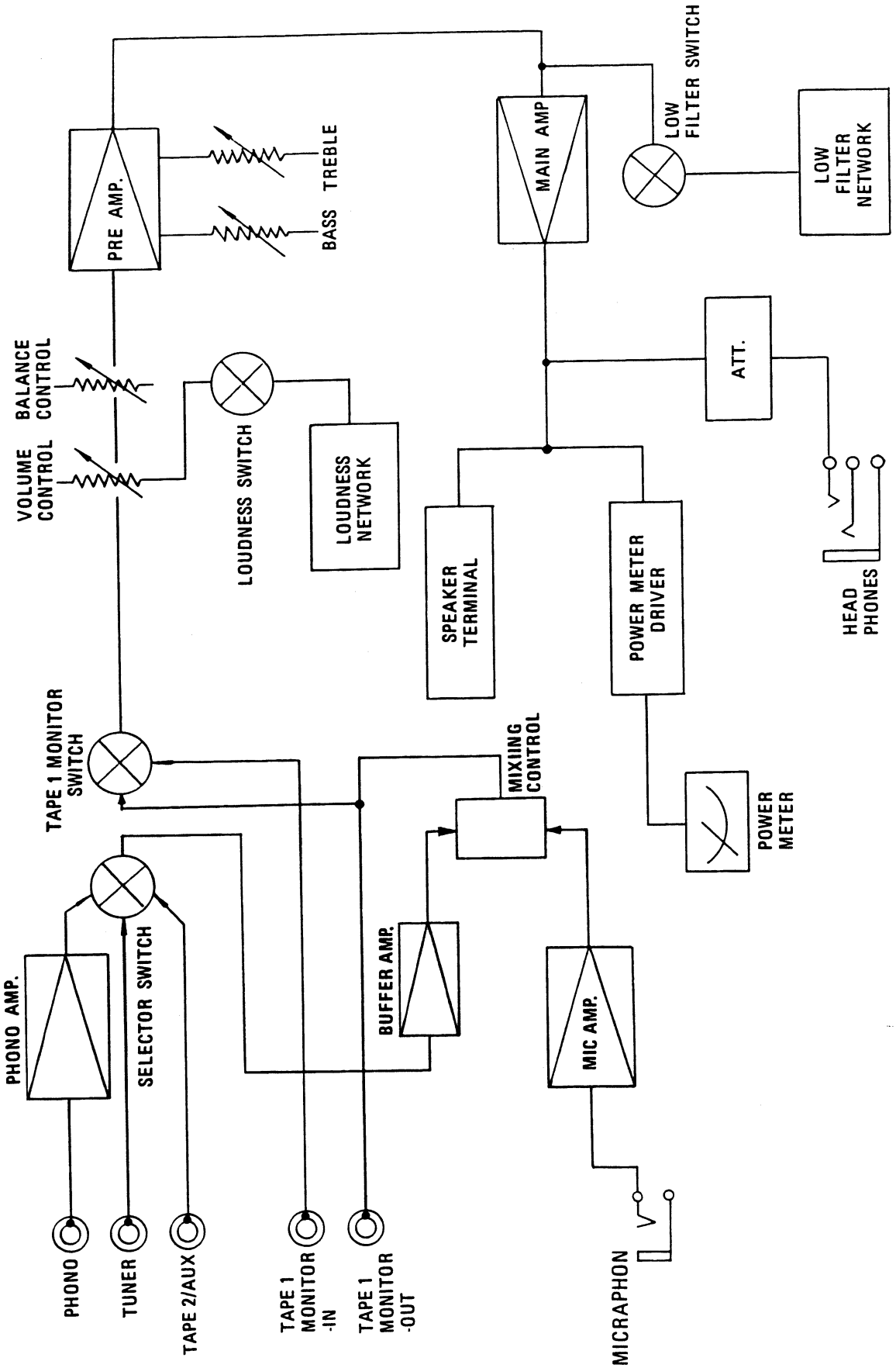
10.6 Tone Assembly (PF00) Schematic Diagram and Component Locations





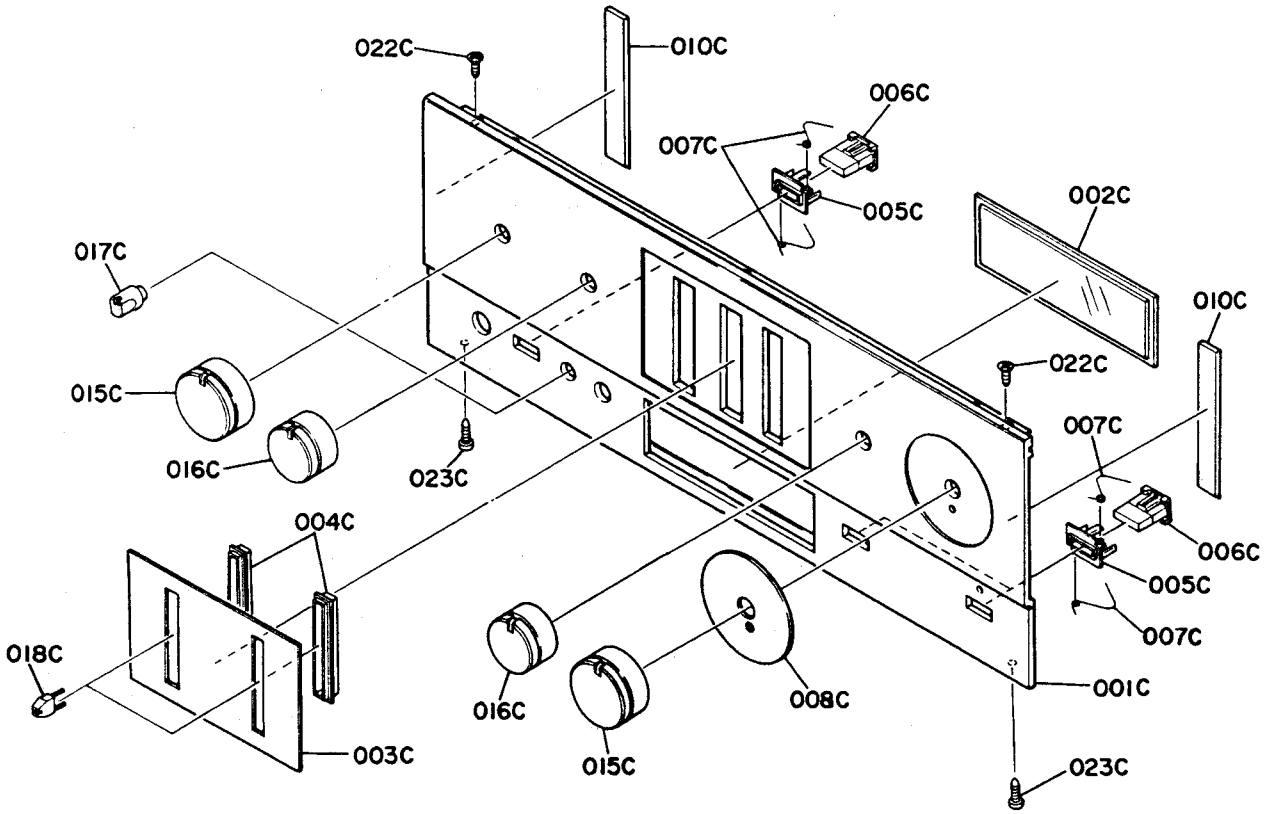


11. BLOCK DIAGRAM



12. EXPLOCED VIEW AND PARTS LIST

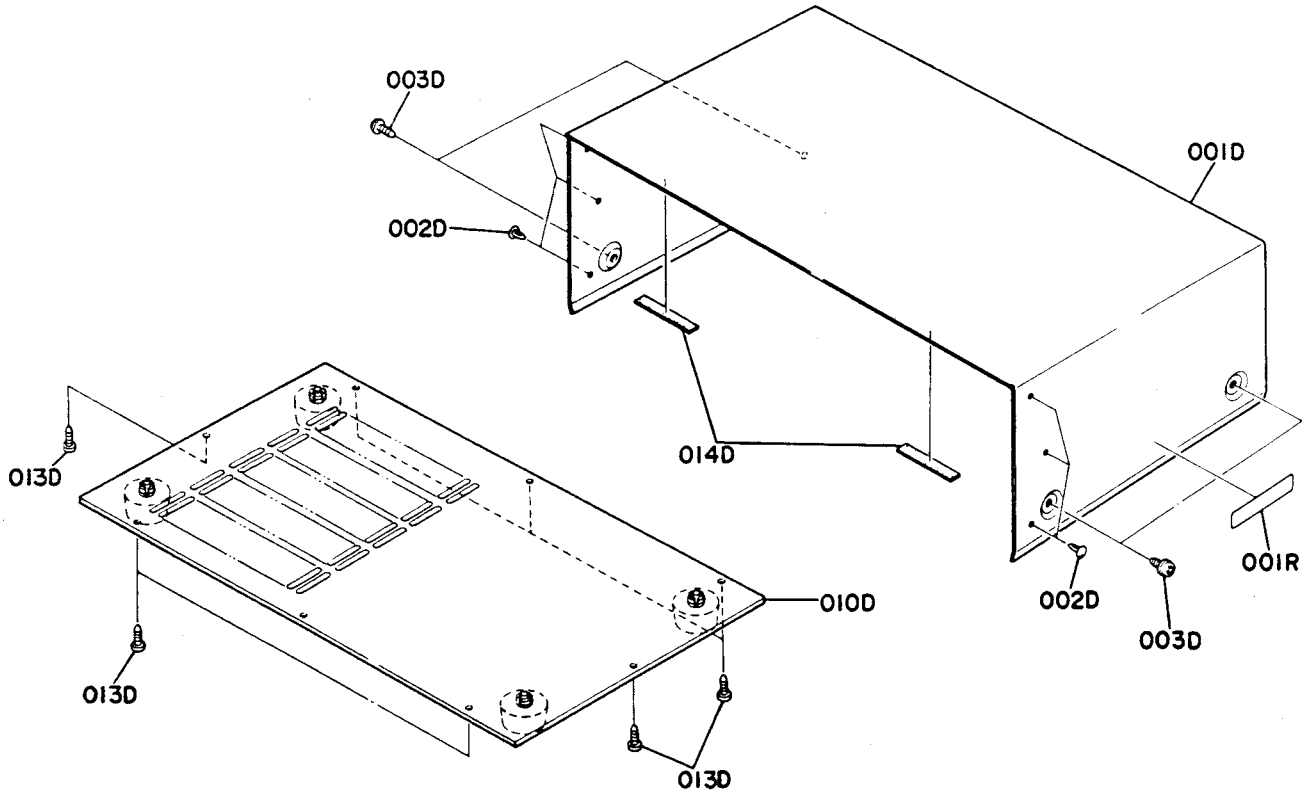
[C01-99] Front Panel



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
A	1	2126063400	Front Panel Assembly
001C	1	2126063012	Escutcheon
002C	1	2129158020	Window
003C	1	2126063020	Escutcheon
004C	2	2129259023	Bushing
005C	3	2127259010	Bushing
008C	1	2129063030	Escutcheon
010C	2	2128118010	Spacer

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
006C	3	2127154010	Knob
007C	6	2127115010	Spring
015C	2	2129154010	Knob
016C	2	2129154020	Knob
017C	1	4276154010	Knob
018C	2	2129154040	Knob
022C	2	51340308A0	F.H. Tapped Screw F3 x 8
023C	2	51280308B0	B.H. Tapped Screw B3 x 8

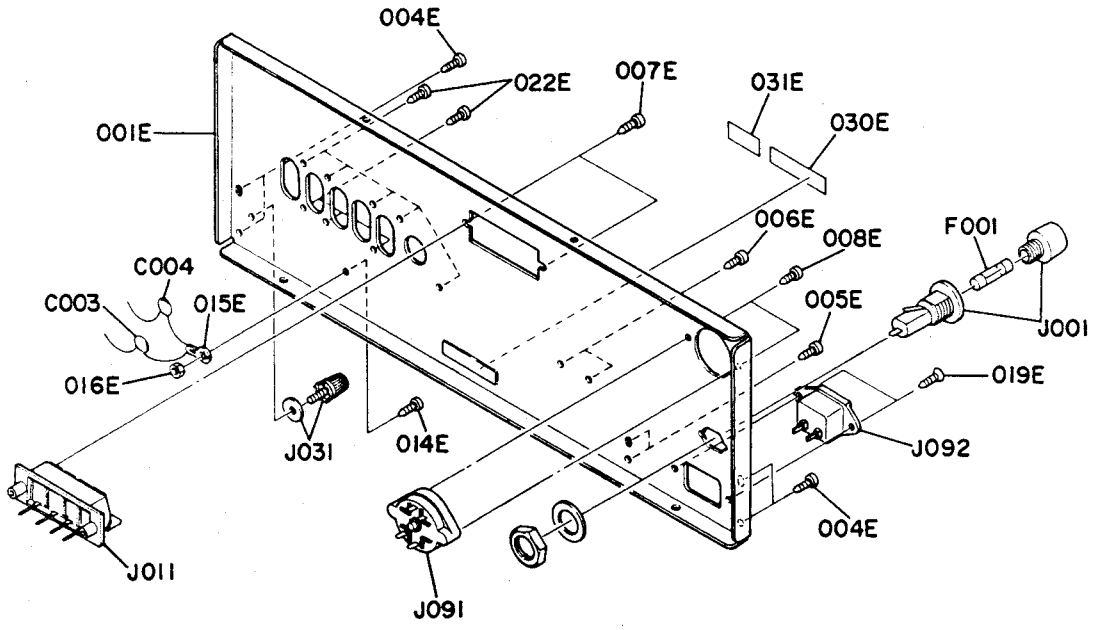
[C02-99] Top Cover



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001D	1	2128257012	Lid, Top Cover
002D	6	2991259010	Bushing
003D	4	51260408U0	F. Washer Screw F4 x 8

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
010D	1	2128257500	Lid, Bottom Cover Assembly
013D	7	51280410U0	B.H. Tapped Screw B4 x 10
014D	2	2965118010	Spacer
001R	1	2932861012	Label

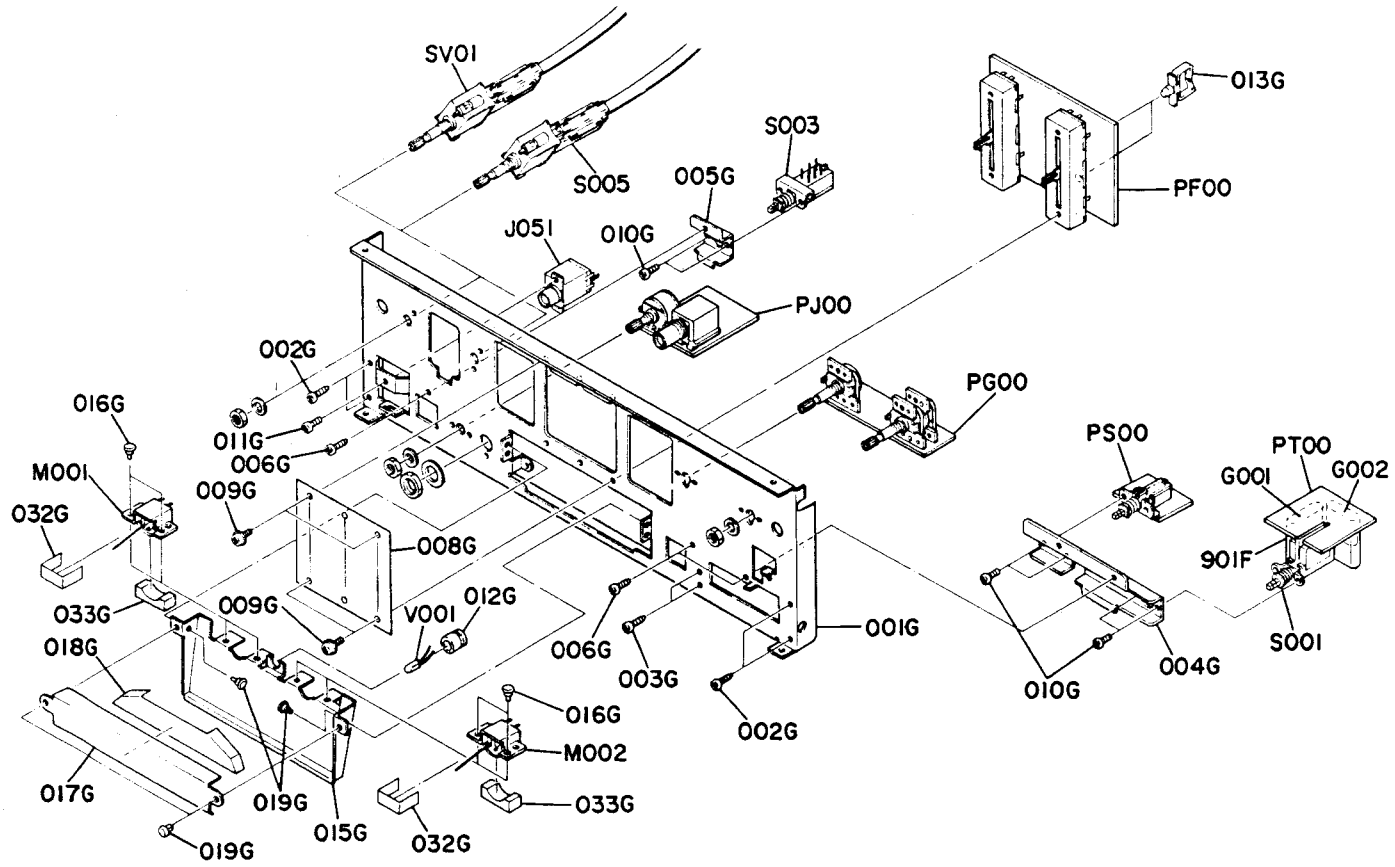
[C03-99] Rear Panel



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001E	1	2126160212	Bracket, Rear Panel
004E	4	51280308U0	B.H. Tapped Screw B3 x 8
005E	2	51280308U0	B.H. Tapped Screw B3 x 8
006E	2	51280308U0	B.H. Tapped Screw B3 x 8
007E	2	51280308U0	B.H. Tapped Screw B3 x 8
008E	2	51280310U0	B.H. Tapped Screw B3 x 10
014E	1	5110030659	B.H.M. Screw B3 x 6
015E	1	62030049W0	Lug
016E	1	53110303A9	Hexagon Nut
019E	2	51420308T0	O.C.H. Tapped Screw 3 x 8
022E	8	51280308U0	B.H. Tapped Screw B3 x 8
030E	1	2112265010	Indicator
031E	1	4581861010	Label

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
C003	1	DK18103310	Ceramic Cap. 0.01μF +80% −20%
C004	1	DK18103310	Ceramic Cap. 0.01μF +80% −20%
⚠ F001	1	FS10063800	Fuse 630mAT
⚠ J001	1	YJ08000290	Jack, Fuse Holder
J011	1	YT03040170	Terminal, Speaker
J031	1	YL03010240	Terminal, Ground
⚠ J091	1	BY05060012	Voltage Selector (110/220)
⚠ J092	1	YP04000590	Plug, A.C. Inlet

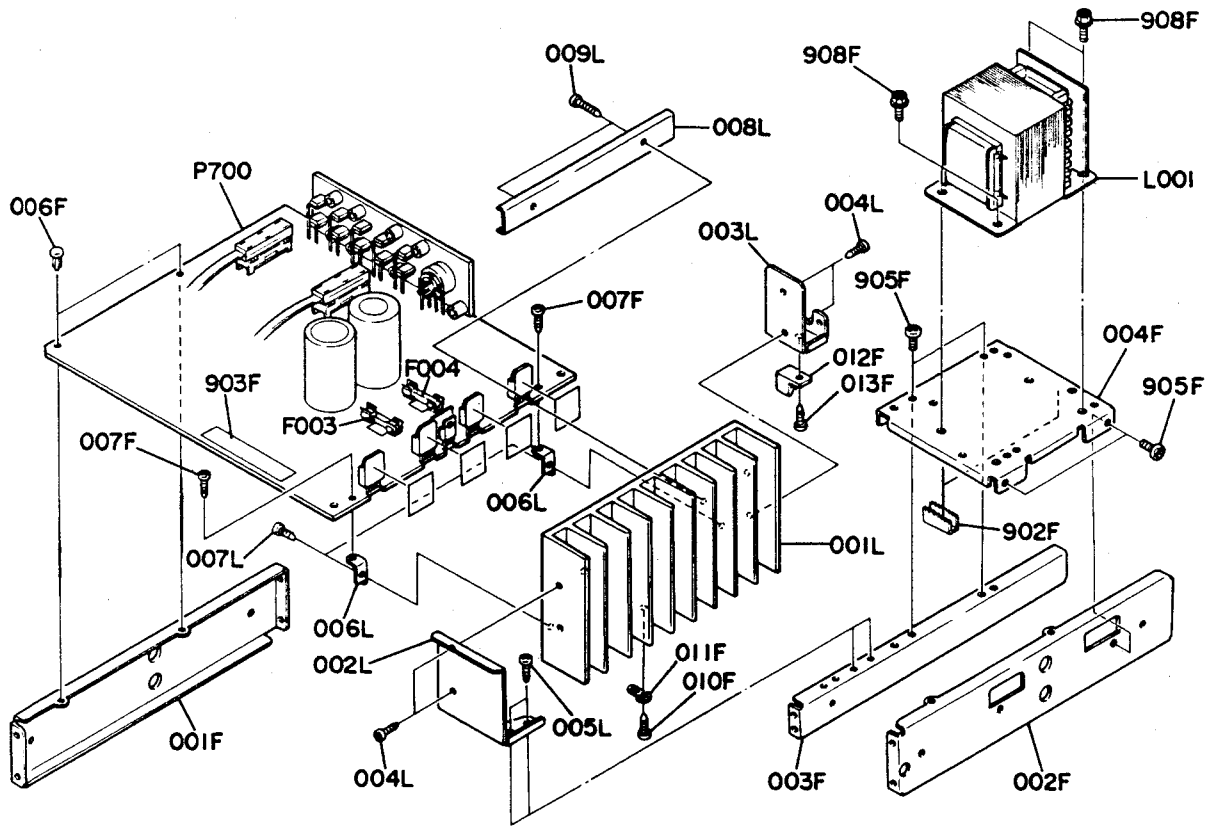
[P01-99] Front Chassis and General Parts



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001G	1	2129160015	Bracket, Front Chassis
002G	4	5128030880	B.H. Tapped Screw B3 x 8
003G	2	5128030880	B.H. Tapped Screw B3 x 8
004G	1	2129160023	Bracket
005G	1	2129160032	Bracket
006G	3	5128030880	B.H. Tapped Screw B3 x 8
008G	1	2129303022	Mask
009G	4	5148030659	F. Washer Screw F3 x 6
010G	6	5110030659	B.H.M. Screw B3 x 6
011G	1	5110030659	B.H.M. Screw B3 x 6
012G	1	2417259010	Bushing
013G	2	2129005010	Clamper
015G	1	2126302014	Dial
016G	4	2276005050	Clamper
017G	1	2128303010	Mask
018G	1	2128274013	Reflector
019G	4	2912259020	Bushing
032G	2	2112053010	Cover
033G	2	2112053030	Cover

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
⚠ S001	1	SP02010440	Push Switch, Power
M001	1	IM11000020	D.C. Meter
M002	1	IM11000020	D.C. Meter
V001	1	IN10030500	Lamp 60mA 8V
SV01	1	SR04030250	Rotary Switch
J051	1	YJ01001200	Jack, Headphone
S003	1	SP02010260	Push Switch, Low Filter
S005	1	SR04020180	Rotary Switch
G001	1	DF17223800	Film Cap. 0.022μF ±20%
G002	1	DF17223800	Film Cap. 0.022μF ±20%
901F	2	2219120010	Insulator

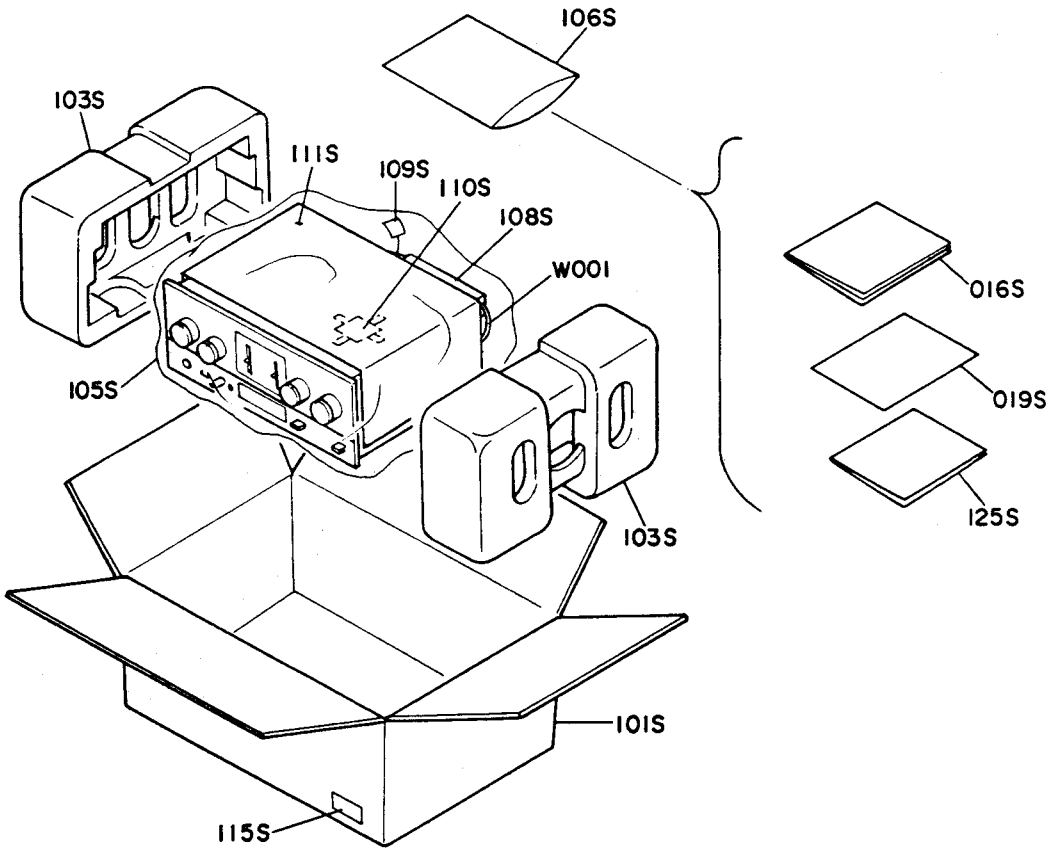
[P02-99] Main P.W. Board and General Parts



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001F	1	2258126010	Stay, (L)
002F	1	2258126024	Stay, (R)
003F	1	2258126035	Stay, Center
004F	1	2127160013	Bracket
006F	2	2276005050	Clamper
007F	2	51260308B0	F. Washer Screw F3 x 8
010F	1	51280306B0	B.H. Tapped Screw B3 x 6
011F	1	62030049W0	Lug
012F	1	2887005012	Clamper
013F	1	51280308B0	B.H. Tapped Screw B3 x 8
902F	2	2218259020	Bushing
903F	1	2205861010	Label
905F	4	51280408B0	B.H. Tapped Screw B4 x 8
908F	4	52040410A0	H. Head Bolt, S.F H4 x 10

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
001L	1	2126267010	Heatsink
002L	1	2127160020	Bracket
003L	1	2258160050	Bracket
004L	4	51280308B0	B.H. Tapped Screw B3 x 8
005L	2	51280308B0	B.H. Tapped Screw B3 x 8
006L	2	2231160040	Bracket
007L	2	51280308B0	B.H. Tapped Screw B3 x 8
008L	1	2258005013	Clamper
009L	2	51280314B0	B.H. Tapped Screw B3 x 14
⚠ L001	1	TS16620010	Power Transformer
P700	1	YG21270010	P.W. Board, Main
	1	ZZ21268010	P.W. Board Assembly
⚠ F003	1	FS10315800	Fuse 3.15AT
⚠ F004	1	FS10315800	Fuse 3.15AT

[H01-99] Packing Materials



REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
016S	1	2127851310	Instructions
019S	1	2126851030	Instructions
101S	1	2126801012	Packing Case
103S	2	4214809014	Cushion
105S	1	9014335330	Polyethy Bag
106S	1	9013025010	Polyethy Bag

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
108S	1	2864804010	Sleeve
109S	1	9560000043	Hang Tag
110S	1	2731821012	Silicagel
111S	1	2918107160	Sheet
115S	3	9526019060	Serial NO. Card
125S	1	2126856010	Circuit Diagram
⚠ W001	1	ZC01805020	A.C. Power Cord

13. ELECTRICAL PARTS LIST

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			P700-MAIN CIRCUIT BOARD
P700	1	YG21270010	P.W. Board, Main
	1	ZZ21268010	P.W. Board Assembly
			P700-CAPACITORS
CD01	1	EA22505090	Elect 2.2μF 50V
CD02	1	EA22505090	Elect 2.2μF 50V
CD03	1	DD15470370	Ceramic 47pF ±5%
CD04	1	DD15470370	Ceramic 47pF ±5%
CD05	1	EE22505040	Elect 2.2μF 50V
CD06	1	EE22505040	Elect 2.2μF 50V
CD07	1	DD15510310	Ceramic 51pF ±5%
CD08	1	DD15510310	Ceramic 51pF ±5%
CE01	1	EA33505030	Elect 3.3μF 50V
CE02	1	EA33505030	Elect 3.3μF 50V
CE03	1	DD15680370	Ceramic 68pF ±5%
CE04	1	DD15680370	Ceramic 68pF ±5%
CE07	1	EA47601030	Elect 47μF 10V
CE08	1	EA47601030	Elect 47μF 10V
CE09	1	EA33505030	Elect 3.3μF 50V
CE10	1	EA33505030	Elect 3.3μF 50V
CE11	1	DD15331370	Ceramic 330pF ±5%
CE12	1	DD15331370	Ceramic 330pF ±5%
CH01	1	DF17224050	Film 0.22μF ±20%
CH02	1	DF17224050	Film 0.22μF ±20%
CN01	1	DF17332350	Film 3300pF ±20%
CN02	1	DF17332350	Film 3300pF ±20%
CN03	1	DF17332350	Film 3300pF ±20%
CN04	1	DF17332350	Film 3300pF ±20%
CN21	1	EA33700690	Elect 330μF 6.3V
CN22	1	EA10505030	Elect 1μF 50V
C401	1	EA33505030	Elect 3.3μF 50V
C402	1	EA33505030	Elect 3.3μF 50V
C403	1	DD15221370	Ceramic 220pF ±5%
C404	1	DD15221370	Ceramic 220pF ±5%
C405	1	EA33700690	Elect 330μF 6.3V
C406	1	EA33700690	Elect 330μF 6.3V
C409	1	DF15223350	Film 0.022μF ±5%
C410	1	DF15223350	Film 0.022μF ±5%
C411	1	DF15682350	Film 6800pF ±5%
C412	1	DF15682350	Film 6800pF ±5%
C415	1	EA33700690	Elect 330μF 6.3V
C416	1	EA33700690	Elect 330μF 6.3V
C417	1	EA33505030	Elect 3.3μF 50V
C418	1	EA33505030	Elect 3.3μF 50V
C419	1	EA10701630	Elect 100μF 16V
C420	1	EA22702530	Elect 220μF 25V
C423	1	DD15470370	Ceramic 47pF ±5%
C424	1	DD15470370	Ceramic 47pF ±5%

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
C701	1	DD15151370	Ceramic 150pF ±5%
C702	1	DD15151370	Ceramic 150pF ±5%
C703	1	EA10701030	Elect 100μF 10V
C704	1	EA10701030	Elect 100μF 10V
C705	1	DD11050370	Ceramic 5pF ±0.5pF
C706	1	DD11050370	Ceramic 5pF ±0.5pF
C707	1	EA10605030	Elect 10μF 50V
C708	1	EA10605030	Elect 10μF 50V
C711	1	DK16101500	Ceramic 100pF ±10%
C712	1	DK16101500	Ceramic 100pF ±10%
C717	1	DF16473540	Film 0.047μF ±10%
C718	1	DF16473540	Film 0.047μF ±10%
⚠C720	1	EA10703590	Elect 100μF 35V
C723	1	DK16101500	Ceramic 100pF
C724	1	DK16101500	Ceramic 100pF
C725	1	DK16221300	Ceramic 220pF ±10%
C726	1	DK16221300	Ceramic 220pF ±10%
C727	1	DK15220370	Ceramic 22pF ±5%
C728	1	DK15220370	Ceramic 22pF ±5%
C729	1	DK17103300	Ceramic 0.01μF ±20%
C730	1	DK17103300	Ceramic 0.01μF ±20%
C801	1	EA47705090	Elect 470μF 50V
C802	1	EA47605090	Elect 47μF 50V
C804	1	EA47601630	Elect 47μF 16V
C806	1	DK16102300	Ceramic 1000pF ±10%
⚠C808	1	EB68803520	Elect 6800μF 35V
⚠C809	1	EB68803520	Elect 6800μF 35V
⚠C810	1	DK18103510	Ceramic 0.01μF
⚠C811	1	DK18103510	Ceramic 0.01μF
C813	1	EA47603590	Elect 47μF 35V
			P700-RESISTORS (All Resistors are ±5% and ¼W)
RD01	1	GD05393140	39KΩ
RD02	1	GD05393140	39KΩ
RD03	1	GD05471140	470Ω
RD04	1	GD05471140	470Ω
RD05	1	GD05104140	100KΩ
RD06	1	GD05104140	100KΩ
RD07	1	GD05394140	390KΩ
RD08	1	GD05394140	390KΩ
RD09	1	GD05562140	5.6KΩ
RD10	1	GD05562140	5.6KΩ
RD11	1	GD05224140	220KΩ
RD12	1	GD05224140	220KΩ
RD13	1	GD05221140	220Ω
RD14	1	GD05221140	220Ω
RE01	1	GD05471140	470Ω
RE02	1	GD05471140	470Ω
RE03	1	GD05104140	100KΩ
RE04	1	GD05104140	100KΩ
RE07	1	GD05105140	1MΩ
RE08	1	GD05105140	1MΩ

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
RE09	1	GD05223140	22KΩ
RE10	1	GD05223140	22KΩ
RE11	1	GD05221140	220Ω
RE12	1	GD05221140	220Ω
RE13	1	GD05392140	3.9KΩ
RE14	1	GD05392140	3.9KΩ
RE15	1	GD05224140	220KΩ
RE16	1	GD05224140	220KΩ
RE17	1	GD05224140	220KΩ
RE18	1	GD05224140	220KΩ
RE19	1	GD05471140	470Ω
RE20	1	GD05471140	470Ω
RH05	1	GD05392140	3.9KΩ
RH06	1	GD05392140	3.9KΩ
RH07	1	GD05333140	33KΩ
RH08	1	GD05333140	33KΩ
RN01	1	GD05822140	8.2KΩ
RN02	1	GD05822140	8.2KΩ
RN03	1	GD05822140	8.2KΩ
RN04	1	GD05822140	8.2KΩ
RN05	1	GD05333140	33KΩ
RN06	1	GD05333140	33KΩ
RN07	1	GG05471140	470Ω
RN08	1	GG05471140	470Ω
RN09	1	GG05471140	470Ω
RN10	1	GG05471140	470Ω
RN21	1	GD05103140	10KΩ
RN23	1	GD05564140	560KΩ
RN25	1	GD05184140	180KΩ
RN26	1	GD05124140	120KΩ
RN27	1	GD05104140	100KΩ
RV01	1	GD05104140	100KΩ
RV02	1	GD05104140	100KΩ
RV03	1	GD05154140	150KΩ
RV04	1	GD05154140	150KΩ
R401	1	GD05222140	2.2KΩ
R402	1	GD05222140	2.2KΩ
R403	1	GD05563140	56KΩ
R404	1	GD05563140	56KΩ
R405	1	GD05184140	180KΩ
R406	1	GD05184140	180KΩ
R407	1	GD05153140	15KΩ
R408	1	GD05153140	15KΩ
R409	1	GD05271140	270Ω
R410	1	GD05271140	270Ω
R413	1	GD05184140	180KΩ
R414	1	GD05184140	180KΩ
R415	1	GD05123140	12KΩ
R416	1	GD05123140	12KΩ
R421	1	GD05392140	3.9KΩ
R422	1	GD05392140	3.9KΩ
R423	1	GD05331140	330Ω

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
R424	1	GD05331140	330Ω
R425	1	GD05224140	220KΩ
R426	1	GD05224140	220KΩ
R427	1	GD05221140	220Ω
R428	1	GD05221140	220Ω
R429	1	GD05274140	270KΩ
R430	1	GD05274140	270KΩ
R703	1	GD05123140	12KΩ
R704	1	GD05123140	12KΩ
R705	1	GD05561140	560Ω
R706	1	GD05561140	560Ω
R707	1	GD05122140	1.2KΩ
R708	1	GD05122140	1.2KΩ
R709	1	GD05333140	33KΩ
R710	1	GD05333140	33KΩ
R713	1	GG05392140	3.9KΩ
R714	1	GG05392140	3.9KΩ
R715	1	GG05392140	3.9KΩ
R716	1	GG05392140	3.9KΩ
R717	1	RA02020180	2KΩ (B) Trimming
R718	1	RA02020180	2KΩ (B) Trimming
R719	1	GG05470140	47Ω
R720	1	GG05470140	47Ω
R721	1	GG05221120	220Ω
R722	1	GG05221120	220Ω
R723	1	GB05272020	0.27Ω 2W
R724	1	GB05272020	0.27Ω 2W
R725	1	GB05272020	0.27Ω 2W
R726	1	GB05272020	0.27Ω 2W
R727	1	GA05100020	10Ω 2W
R728	1	GA05100020	10Ω 2W
R729	1	RC10022120	2.2Ω ±10% ½W
R730	1	RC10022120	2.2Ω ±10% ½W
R733	1	GD05122140	1.2KΩ
R734	1	GD05122140	1.2KΩ
R739	1	GG05182140	1.8KΩ
R743	1	GD05222140	2.2KΩ
R744	1	GD05222140	2.2KΩ
R801	1	GG05272140	2.7KΩ
R802	1	GG05472140	4.7KΩ
R803	1	GG05182140	1.8KΩ
R804	1	GD05682140	6.8KΩ
R805	1	GD05123140	12KΩ
R806	1	RF05151140	150Ω Fusible
R808	1	GG05182120	1.8KΩ ½W
R809	1	RF05220120	22Ω ½W Fusible

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			P700-SEMICONDUCTORS
QD01	1	HT107502C0	Transistor 2SA750(E or F)
QD02	1	HT107502C0	Transistor 2SA750(E or F)
QE01	1	HT107502C0	Transistor 2SA750(E or F)
QE02	1	HT107502C0	Transistor 2SA750(E or F)
QE03	1	HT314001E0	Transistor 2SC1400(E)
QE04	1	HT314001E0	Transistor 2SC1400(E)
QN01	1	HT309452B0	Transistor 2SC945(P or Q)
QN02	1	HT309452B0	Transistor 2SC945(P or Q)
QN03	1	HT107332A0	Transistor 2SA733(P or Q)
QN04	1	HT107332A0	Transistor 2SA733(P or Q)
QN05	1	HD20011050	Diode 1S1555
QN06	1	HD20011050	Diode 1S1555
QN07	1	HD20011050	Diode 1S1555
QN08	1	HD20011050	Diode 1S1555
QN09	1	HD20011050	Diode 1S1555
QN10	1	HD20011050	Diode 1S1555
QN11	1	HD20011050	Diode 1S1555
QN12	1	HD20011050	Diode 1S1555
QN13	1	HD20015030	Diode DS135D
QN14	1	HD20015030	Diode DS135D
QN15	1	HD20015030	Diode DS135D
QN16	1	HD20015030	Diode DS135D
QN21	1	HT309452B0	Transistor 2SC945(P or Q)
QN22	1	HT309452B0	Transistor 2SC945(P or Q)
QN25	1	HD30023090	Zener WZ071
QN28	1	HT309452B0	Transistor 2SC945(P or Q)
QN30	1	HT107332A0	Transistor 2SA733(P or Q)
QN31	1	HD20015030	Diode DS135D
Q401	1	HT107502C0	Transistor 2SA750(E or S)
Q402	1	HT107502C0	Transistor 2SA750(E or S)
Q403	1	HT314001E0	Transistor 2SC1400(E)
Q404	1	HT314001E0	Transistor 2SC1400(E)
Q701	1	HT107502C0	Transistor 2SA750(E or F)
Q702	1	HT107502C0	Transistor 2SA750(E or F)
Q703	1	HT107502C0	Transistor 2SA750(E or F)
Q704	1	HT107502C0	Transistor 2SA750(E or F)
Q707	1	HT322402A0	Transistor 2SC2240(GR or BL)
Q708	1	HT322402A0	Transistor 2SC2240(GR or BL)
Q709	1	HT309452B0	Transistor 2SC945(P or Q)
Q710	1	HT309452B0	Transistor 2SC945(P or Q)
Q721	1	HD30025090	Zener WZ155
Q722	1	HD20015030	Diode DS135D
Q711	1	HT322742B0	Transistor 2SC2274(E or F)
Q712	1	HT322742B0	Transistor 2SC2274(E or F)
Q713	1	HT109842B0	Transistor 2SA984(E or F)
Q714	1	HT109842B0	Transistor 2SA984(E or F)
⚠ Q715	1	HT406133B0	Transistor 2SD613(D,E or F)
⚠ Q716	1	HT406133B0	Transistor 2SD613(D,E or F)
⚠ Q717	1	HT206333B0	Transistor 2SB633(D,E or F)
⚠ Q718	1	HT206333B0	Transistor 2SB633(D,E or F)

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
Q801	1	HT406671C0	Transistor 2SD667(C)
Q802	1	HT309452B0	Transistor 2SC945(P or Q)
Q803	1	HD30009010	Zener HZ12A-2L
Q805	1	HD30024090	Zener WZ120
⚠ Q806	1	HD20009290	Diode S2V-20
⚠ Q807	1	HD20009290	Diode S2V-20
⚠ Q808	1	HD20009290	Diode S2V-20
⚠ Q809	1	HD20009290	Diode S2V-20
Q810	1	HD20015030	Diode DS135D
Q812	1	HT206472B0	Transistor 2SB647(B or C)
			P700-MISCELLANEOUS
JV03	1	YT02060140	Terminal
JV04	1	YT02050010	Terminal
J805	1	YJ08000270	Jack, Fuse Holder
J806	1	YJ08000270	Jack, Fuse Holder
J807	1	YJ08000270	Jack, Fuse Holder
J808	1	YJ08000270	Jack, Fuse Holder
L701	1	LL23915120	Choke Coil
L702	1	LL23915120	Choke Coil
S005	1	SR04020180	Rotary Switch
SV01	1	SR04030250	Rotary Switch
			PF00-TONE AMP. CIRCUIT BOARD
PF00	1	YK21261510	P.W. Board, Tone Amp.
	1	ZZ21268510	P.W. Board Assembly
			PF00-CAPACITORS
CF01	1	DF16223350	Film 0.022μF ±10%
CF02	1	DF16223350	Film 0.022μF ±10%
CF03	1	DF16224350	Film 0.22μF ±10%
CF04	1	DF16224350	Film 0.22μF ±10%
CF05	1	DF16332350	Film 0.0033μF ±10%
CF06	1	DF16332350	Film 0.0033μF ±10%
CF07	1	DF16333350	Film 0.033μF ±10%
CF08	1	DF16333350	Film 0.033μF ±10%
CF09	1	EA22601090	Elect 22μF 10V
CF10	1	EA22601090	Elect 22μF 10V
CX01	1	DK18223320	Ceramic 0.022μF
CX02	1	DK18223320	Ceramic 0.022μF
CX03	1	EA47601030	Elect 47μF 10V
CX04	1	EA47601030	Elect 47μF 10V

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			PF00-RESISTORS (All Resistors are ±5% and ¼W)
RF01	1	GD05183140	18KΩ
RF02	1	GD05183140	18KΩ
RF03	1	GD05152140	1.5KΩ
RF04	1	GD05152140	1.5KΩ
RF05	1	GD05153140	15KΩ
RF06	1	GD05153140	15KΩ
RF07	1	GD05392140	3.9KΩ
RF08	1	GD05392140	3.9KΩ
RF09	1	GD05471140	470Ω
RF10	1	GD05471140	470Ω
RF11	1	RS01040140	100KΩ (C) x 2 Variable
RF12	1	RS01040140	100KΩ (C) x 2 Variable
RX01	1	GA05331010	330Ω 1W
RX02	1	GA05331010	330Ω 1W
RX03	1	GD05120140	12Ω
RX04	1	GD05120140	12Ω
RX07	1	RA01020300	1KΩ (B) Trimming
RX08	1	RA01020300	1KΩ (B) Trimming
			PF00-DIODE
QX01	1	HD20011050	Diode 1S1555
QX02	1	HD20011050	Diode 1S1555
QX03	1	HD10001010	Diode 1N34A
QX04	1	HD10001010	Diode 1N34A
			PG00-VOLUME CONTROL CIRCUIT BOARD
PG00	1	YK21261520	P.W. Board, Volume Control
	1	ZZ21268520	P.W. Board Assembly
			PG00-CAPACITORS
CG01	1	DK16681300	Ceramic 680pF ±10%
CG02	1	DK16681300	Ceramic 680pF ±10%
CG03	1	DF16473300	Film 0.047μF ±10%
CG04	1	DF16473300	Film 0.047μF ±10%
			PG00-RESISTORS (All Resistors are ±5% and ¼W)
RG01	1	GD05392140	3.9KΩ
RG02	1	GD05392140	3.9KΩ
RG03	1	GD05333140	33KΩ
RG04	1	GD05333140	33KΩ
RG05	1	GD05822140	8.2KΩ
RG06	1	GD05822140	8.2KΩ
RG07	1	RM01040270	100KΩ (B) Variable
RG08	1	RM02040080	200KΩ (B) Variable
			PJ00-MIC AMP. CIRCUIT BOARD
PJ00	1	YK21261540	P.W. Board, Mic Amp.
	1	ZZ21268540	P.W. Board Assembly
			PJ00-CAPACITORS
CJ01	1	DD15331370	Ceramic 330pF ±5%
CJ02	1	DD15331370	Ceramic 330pF ±5%
CJ03	1	EA10505090	Elect 1μF 50V
CJ04	1	DD15560370	Ceramic 56pF ±5%
CJ05	1	EA10601630	Elect 10μF 16V
CJ06	1	EA33505030	Elect 3.3μF 50V
CJ07	1	EA33505030	Elect 3.3μF 50V
CJ08	1	DD15151370	Ceramic 150pF ±5%
CJ09	1	EA22601690	Elect 22μF 16V
CJ11	1	DD11100370	Ceramic 10pF ±0.5pF
CJ12	1	EA10701630	Elect 100μF 16V

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			PJ00-RESISTORS (All Resistors are ±5% and ¼W)
RJ01	1	GD05103140	10KΩ
RJ02	1	GD05471140	470Ω
RJ03	1	GD05474140	470KΩ
RJ04	1	GD05103140	10KΩ
RJ05	1	GD05682140	6.8KΩ
RJ06	1	GD05561140	560Ω
RJ07	1	GD05224140	220KΩ
RJ08	1	GD05473140	47KΩ
RJ09	1	GD05681140	680KΩ
RJ10	1	RM01040280	100KΩ (B) x 2 Variable
RJ11	1	GD05472140	4.7KΩ
RJ12	1	GD05101140	100Ω
RJ13	1	75061001P0	Jumper
			PJ00-SEMICONDUCTORS
QJ01	1	HT314001E0	Transistor 2SC1400(E)
QJ02	1	HT314001E0	Transistor 2SC1400(E)
			PJ00-JACK
JJ01	1	YJ01001340	Jack, Mic
			PS00-LOUDNESS CIRCUIT BOARD
PS00	1	YK21261530	P.W. Board, Loudness
	1	ZZ21268530	P.W. Board Assembly
			PS00-SWITCHES
SS01	1	SP02010260	Push Switch, Loudness
			PT00-POWER SWITCH CIRCUIT BOARD
PT00	1	YK21261550	P.W. Board, Power Switch
	1	ZZ21268550	P.W. Board Assembly
⚠G001	1	DF17223800	Film Cap. 0.022μF ±20%
⚠G002	1	DF17223800	Film Cap. 0.022μF ±20%
⚠S001	1	SP02010440	Puch Switch, Power
901F	2	3926120010	Insulator

(W01-99)	**Assembly and Wiring**
(T01-99)	**Adjustment**
(X01-00)	**Correction**

14. TECHNICAL SPECIFICATIONS

AUDIO SECTION

POWER OUTPUT, DIN, 4 OHM, PER CHANNEL **35W**
POWER OUTPUT, FTC AMERICAN STANDARDS, 4 OHM, PER CHANNEL **26W**
TOTAL HARMONIC DISTORTION AT RATED POWER OUTPUT **0.6%**
I.M. DISTORTION AT RATED POWER OUTPUT
(250 Hz AND 8 kHz MIXED, AMPLITUDE RATIO 4:1) **0.6%**

POWER OUTPUT, DIN, 8 OHM, PER CHANNEL **30W**
POWER OUTPUT, FTC AMERICAN STANDARDS, 8 OHM, PER CHANNEL **20W**
TOTAL HARMONIC DISTORTION AT RATED POWER OUTPUT **0.3%**
I.M. DISTORTION AT RATED POWER OUTPUT
(250 Hz AND 8 kHz MIXED, AMPLITUDE RATIO 4:1) **0.3%**
POWER BANDWIDTH ..... **20 Hz ~ 50 kHz**
DAMPING FACTOR 8 OHM **70**

Frequency Response
Phono (RIAA) ..... ±1.0 dB
Aux (±1 dB) ..... 20 Hz ~ 50 kHz
Input Terminals
Phono: Input Impedance ..... 47 k ohms
Input Capacitance ..... 250 pF
Input Sensitivity ..... 2.8 mV
Overload Margin ..... 35 dB
Aux: Input Impedance ..... 25 k ohms
Input Sencitivity ..... 150 mV
Phono Equivalent Input Noise ..... 0.5 μV
Phono Dynamic Range (Ratio of input overload to equivalent input noise) ..... 109 dB
Channel Balance (0 to −40 dB/40 Hz ~ 16 kHz)
Phono ..... 3.0 dB
Aux ..... 3.0 dB
Interchannel Crosstalk
Phono, 1 kHz ..... 47 dB
Aux, 1 kHz ..... 62 dB
Tape, 1 kHz ..... 62 dB
Intersource Crossatlk (Worst Point), 1 kHz ..... 55 dB
Output Voltage, 1 kHz
Tape Out ..... 415 mV
Output Impedance, 1 kHz
Tape Out ..... 220 ohms

GENERAL

Power Requirements ..... 220 V AC, 50 Hz
(E and N versions are featuring an external voltage selector for use on 110V. Other versions can be converted by a qualified technician to operate on 240V.)
Power Consumption at Rated Output, both Channels Driven ..... 110W ± 20W
Idling Power ..... 16W ± 5W
Semiconductor Complement
Transistors 42
Diodes 28
Dimensions
Panel Width ..... 416 mm (16-3/ 8 inches)
Panel Height ..... 146 mm (5-3/ 4 inches)
Depth ..... 243 mm (9-9/16 inches)
Weight
Unit Alone ..... 6.0 kg (13.2 lbs)
Packed for Shipment ..... 7.5 kg (16.5 lbs)