

72

SERVICE
MANUAL

PM250/PM400

marantz

model PM250/PM400

Stereophonic Amplifier

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ Company has created the ultimate in stereo sound. Only original MARANTZ parts can insure that your MARANTZ product will continue to perform to the specifications for which it is famous.

Parts for your MARANTZ stereo are generally available within 72 hours throughout the nation via a toll-free line to our National Parts Depot in California. The sales professionals who take your call immediately refer to their own desk top computer terminal and can quickly determine the availability and price information you require. If for some reason, your order should exceed our available stock, we usually can instantly provide an alternate replacement part or current delivery information. When the order is placed and confirmed, the computer simultaneously generates "hard copy" orders at the distribution center. As hard copies come directly from the computer to the national parts depot, your requested stock is assembled and prepared for shipment and placed on the first available carrier for delivery to you.

ORDERING PARTS

Phone orders will eliminate mail delays, and we encourage the use of this method. If you order by mail, use MARANTZ parts order forms which are available from our National Parts Depot located at the following address:

SUPERSCOPE NATIONAL PARTS DEPARTMENT

20525 Nordhoff Street
Chatsworth, California 91311
Phone: 1-800-423-5108
1-213-998-9333

The following information must be supplied to eliminate delays in processing your order:

1. Complete address.
2. Complete part numbers.
3. Complete description of parts.
4. Model number for which part is required (indicate MARANTZ).
5. Account number (for account customers only).

Direct consumers will be provided with the current retail price quotation on available parts in order to advise them of the cost of the parts and shipping.

OVERSEAS PARTS ORDERING

Parts may also be ordered from the following overseas addresses:

CANADA

Superscope Canada, Ltd.
3710 Nashua Drive
Mississauga
Ontario, Canada L4V1M5

AUSTRALIA

Superscope (Australasia) Pty., Ltd.
32 Cross Street (P.O. Box 604)
Brookvale 2100 N.S.W.
Australia

JAPAN

Marantz Japan, Inc.
3622 Kamitsuruma
Sagamihara Shi
Kanagawa, Japan

EUROPE

Superscope Europe, S.A.
Avenue Leopold III, 2
7120 Perennes-Lez-Binche
Belgium

Marantz France
Rue Louis Armand 9
92600 Asnieres
Hauts-de-Seine
France

Marantz Audio U.K. Ltd.
London Road, 203
Staines
Middlesex
England

Superscope GmbH
Max-Planck-Strasse 22
D-6072 Dreieich 1
West Germany

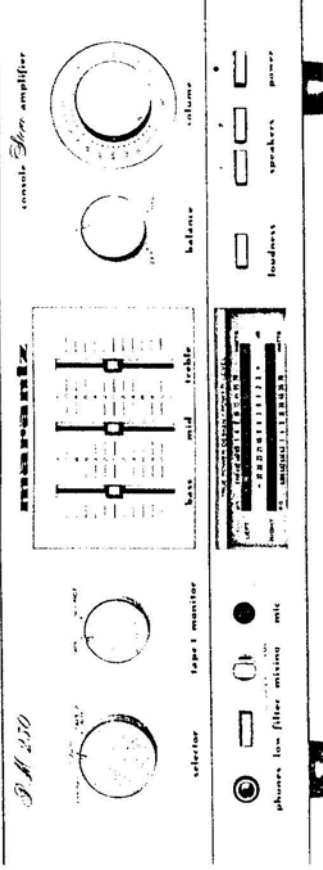
All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please contact the nearest facility for the necessary assistance.

marantz

We sound better.

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1. INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for the Marantz PM250/PM400 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 36 dB and at the same time undergo RIAA equalization, before going to the SELECTOR SWITCH (SV01). (In the case of the PM400, signals coming in from the PHONO 1 and PHONO 2 terminals are selected by means for the SELECTOR SWITCH and then taken the PHONO amplifier).

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 VOLUME potentiometers, and then enter the pre-amplifier (QE01 and QE03). The preamplifier has a gain of 22 dB. The signals from the preamplifier enter TONE AMP (QF01 and QF03) and the frequency-response is controlled by the BASS, MID and TREBLE controls. After passing through the TONE preamplifier, the signals enter the main amplifier.

TROUBLESHOOTING ANALYSIS

- Excessive line consumption
 - Check for shorted Q806 through Q809.
 - Check for shorted transistor Q715, through Q718.
 - Check for open Q709, Q710, R717, R718.
- No line consumption or zero bias voltage
 - Check line cord, fuse, check for shorted Q709, Q710, Q717, Q718.
 - Check for open rectifiers Q806 through Q809 or open L001.
- High hum and noise level
 - 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

Connect the speaker terminal output to the rated output voltage (15.5 V, 1 kHz), and then so adjust by RX07 (LCH) that the POWER METER registers 25W PM250/35W PM400. Adjust in the same manner by RX08 (RCH).

6. TEST EQUIPMENT REQUIRED FOR SERVICING

Table 1 lists the test equipment required for servicing the PM250/PM400 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.

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

7. PERFORMANCE VERIFICATION

TEST PROCEDURE

A. TEST EQUIPMENT

Refer to Table 1 for required test equipment.

B. PRELIMINARY PROCEDURES

- Make the test setup shown in Figure 1 with the instrument controls set in the following positions:
 2. Make sure that connections between the resistive load and the system terminals of the PM250/PM400 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 PM250/PM400.

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

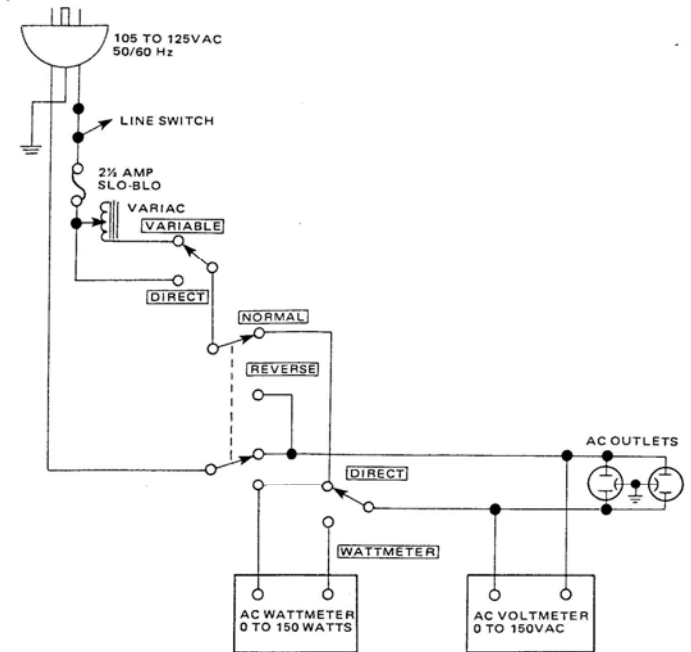


Figure 1. AC Power Control Box Simplified Schematic

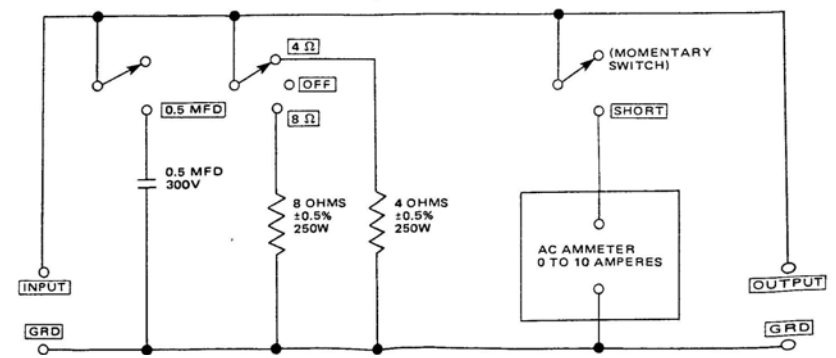


Figure 2. Amplifier Output Load Box Simplified Schematic

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 voltage 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 17 VAC (14.1 VAC For Model PM250 only) 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 17 VAC. (14.1 VAC For Model PM250 only)
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 0.05%.

NOTE:

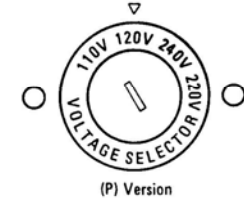
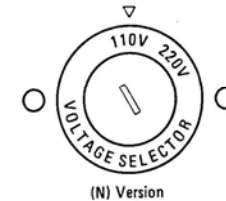
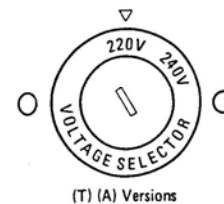
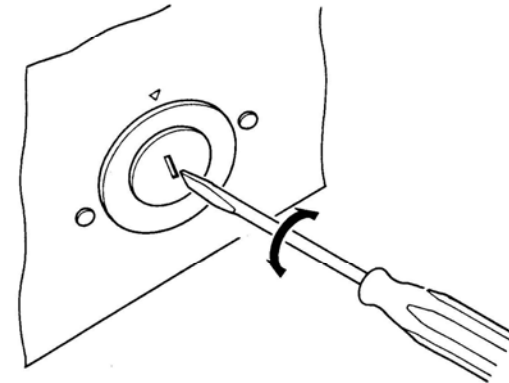
Any parasitic oscillation in the amplifier will be displayed on the oscilloscope when capacitance is switched into the load.

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 0.05%.
9. Repeat steps 7 and 8, changing frequency to 20 Hz. Distortion should be no more than 0.05%.
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.

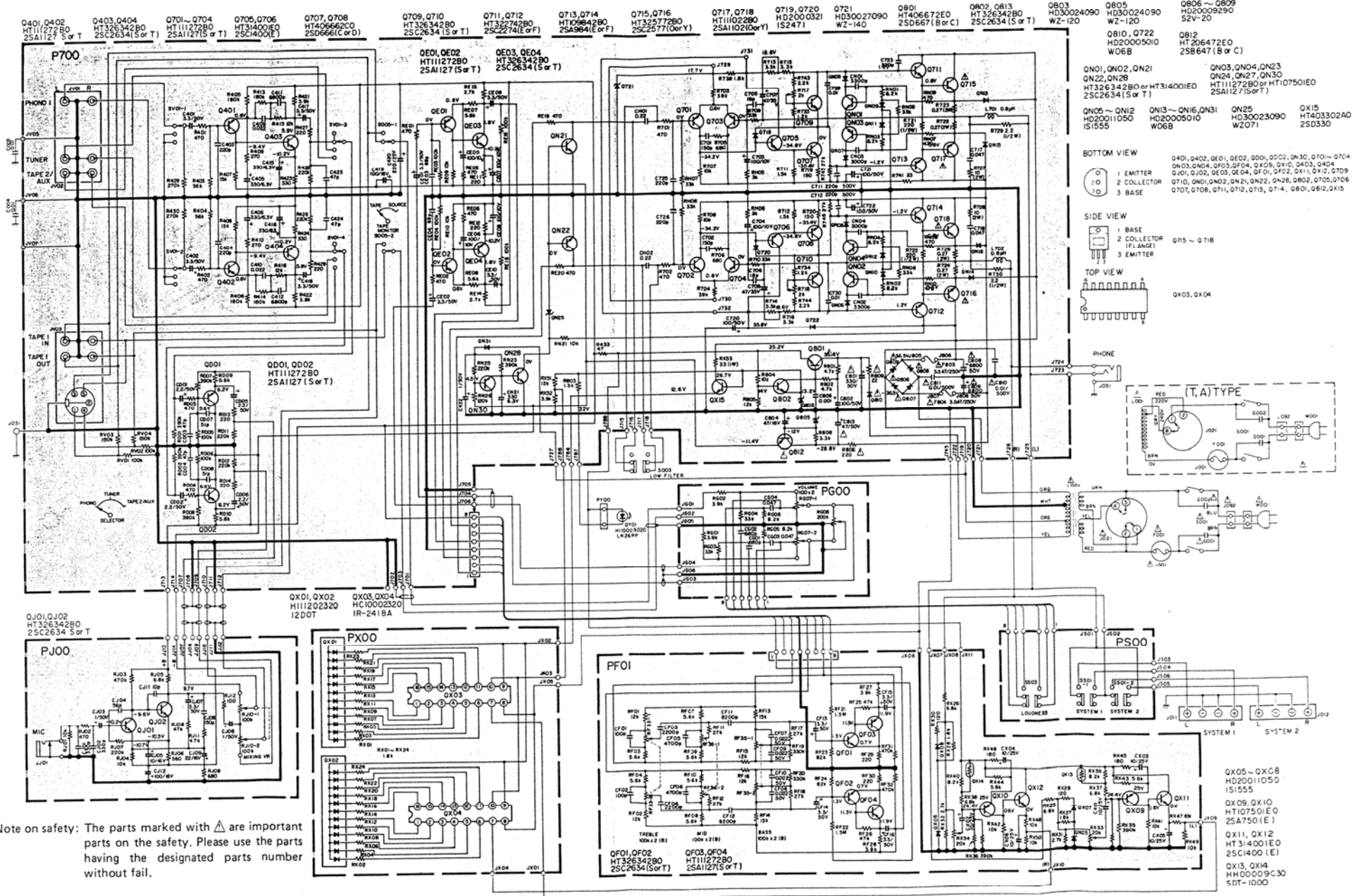
CAUTION: DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE. PLEASE DO NOT DISASSEMBLE THE VOLTAGE SELECTOR ABSOLUTELY.



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

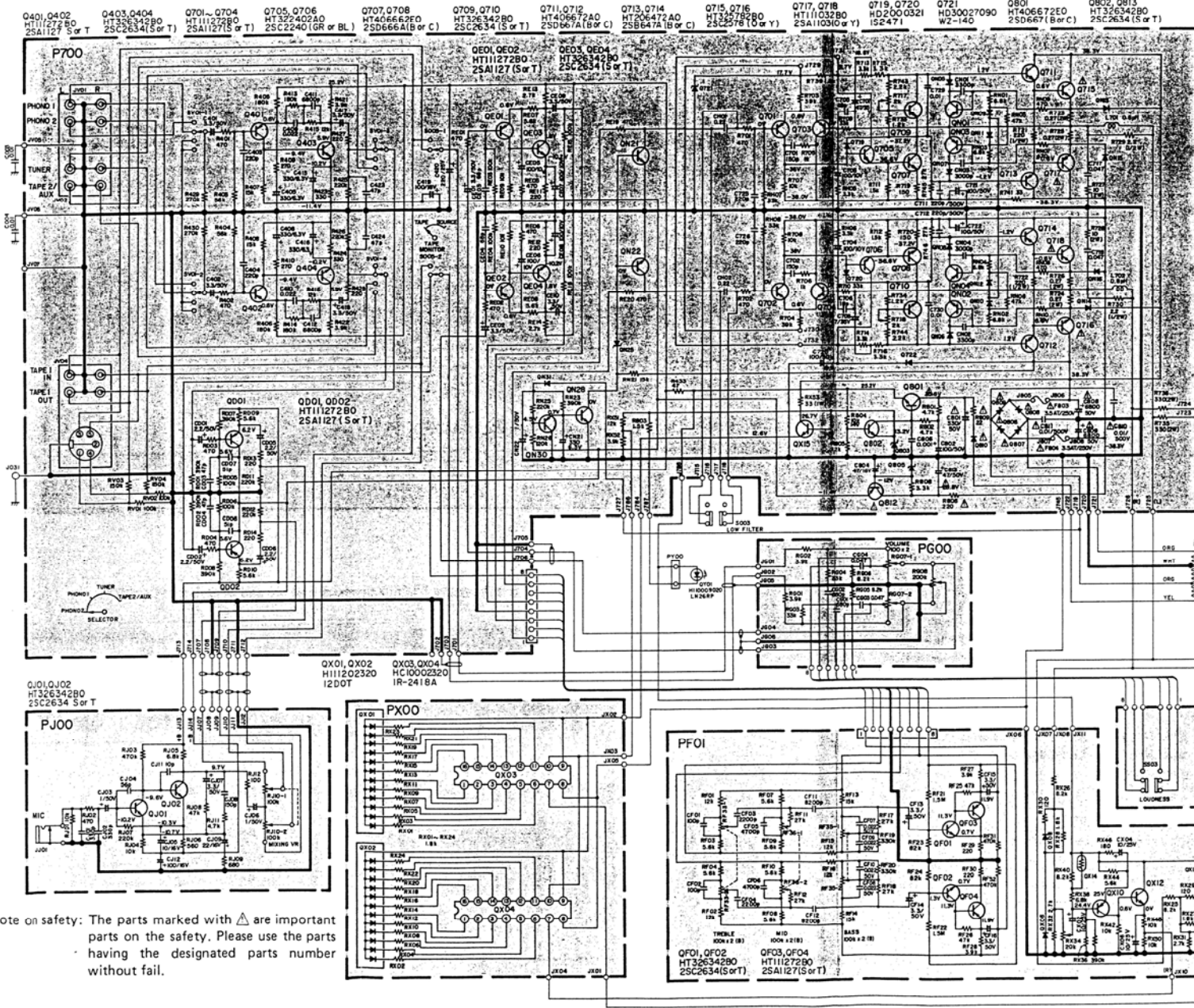
9. SCHEMATIC DIAGRAM (PM250 and PM400)

Model PM250

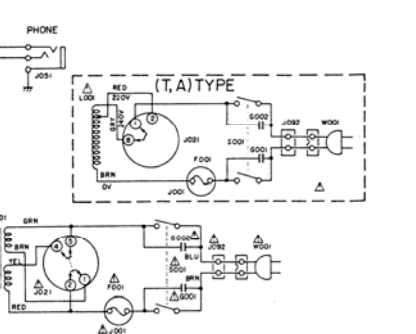
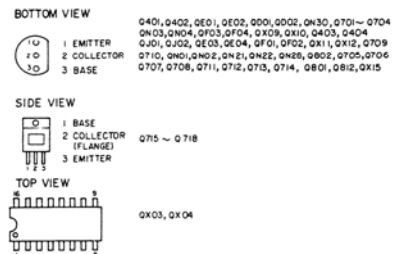


Model PM400

≈ 410



- Q801, Q802, Q803
HT326342B0
25C2634 (S or T)
- Q804, Q805, Q806, Q807, Q808, Q809, Q810, Q811, Q812, Q813, Q814, Q815, Q816, Q817, Q818, Q819, Q820, Q821, Q822, Q823, Q824, Q825, Q826, Q827, Q828, Q829, Q830, Q831, Q832, Q833, Q834, Q835, Q836, Q837, Q838, Q839, Q840, Q841, Q842, Q843, Q844, Q845, Q846, Q847, Q848, Q849, Q850, Q851, Q852, Q853, Q854, Q855, Q856, Q857, Q858, Q859, Q860, Q861, Q862, Q863, Q864, Q865, Q866, Q867, Q868, Q869, Q870, Q871, Q872, Q873, Q874, Q875, Q876, Q877, Q878, Q879, Q880, Q881, Q882, Q883, Q884, Q885, Q886, Q887, Q888, Q889, Q890, Q891, Q892, Q893, Q894, Q895, Q896, Q897, Q898, Q899, Q900, Q901, Q902, Q903, Q904, Q905, Q906, Q907, Q908, Q909, Q910, Q911, Q912, Q913, Q914, Q915, Q916, Q917, Q918, Q919, Q920, Q921, Q922, Q923, Q924, Q925, Q926, Q927, Q928, Q929, Q930, Q931, Q932, Q933, Q934, Q935, Q936, Q937, Q938, Q939, Q940, Q941, Q942, Q943, Q944, Q945, Q946, Q947, Q948, Q949, Q950, Q951, Q952, Q953, Q954, Q955, Q956, Q957, Q958, Q959, Q960, Q961, Q962, Q963, Q964, Q965, Q966, Q967, Q968, Q969, Q970, Q971, Q972, Q973, Q974, Q975, Q976, Q977, Q978, Q979, Q980, Q981, Q982, Q983, Q984, Q985, Q986, Q987, Q988, Q989, Q990, Q991, Q992, Q993, Q994, Q995, Q996, Q997, Q998, Q999, Q1000

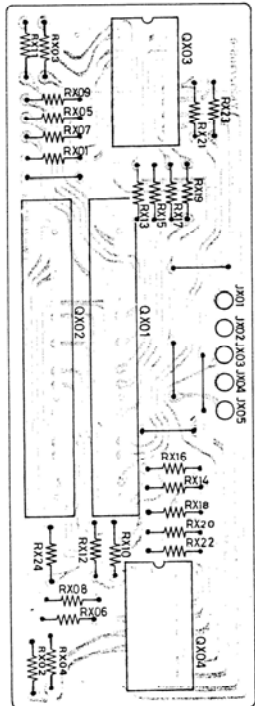
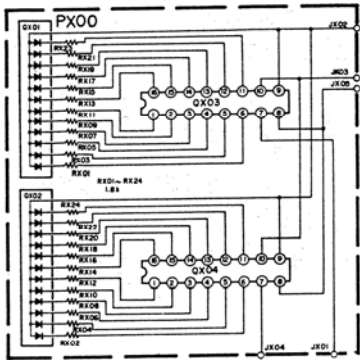


Note on safety: The parts marked with Δ are important parts on the safety. Please use the parts having the designated parts number without fail.

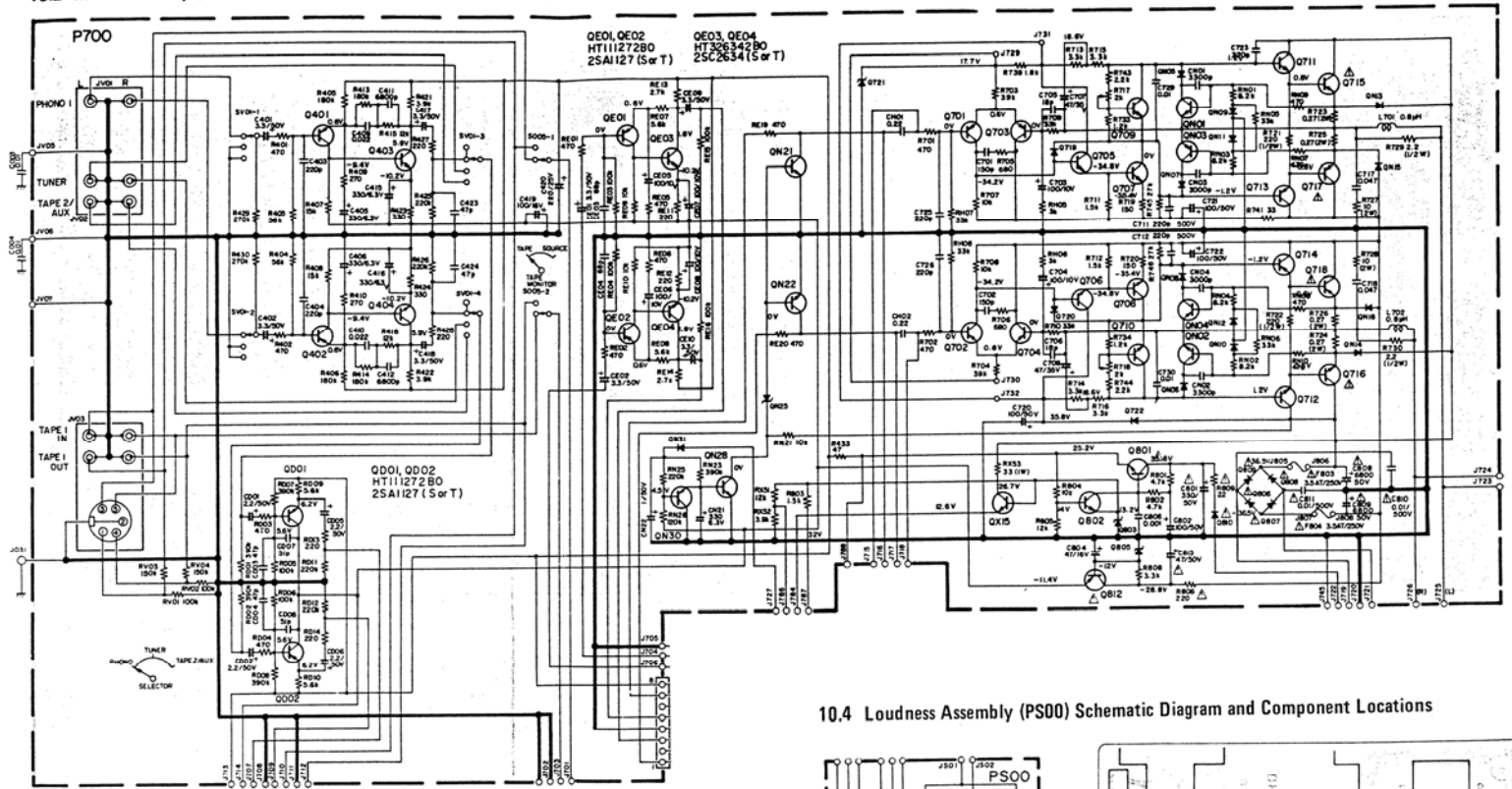
- QX05 ~ QX08
H20001050
IS1555
- QX09, QX10
HT107501E0
25A750 (E)
- QX11, QX12
HT314001E0
25C1400 (E)
- QX13, QX14
H400009030
5D7-1000

10. DIAGRAM AND COMPONENT LOCATIONS

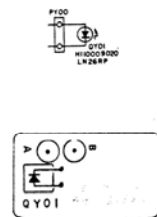
10.1 LED Power Meter Assembly (PX00) Schematic Diagram and Component Locations



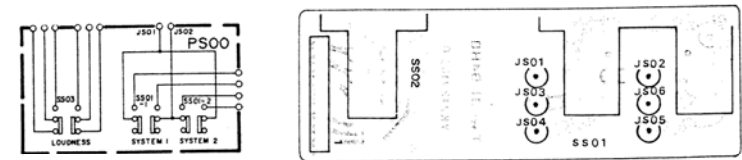
10.2 Main Assembly (P700) Schematic Diagram and Component Locations



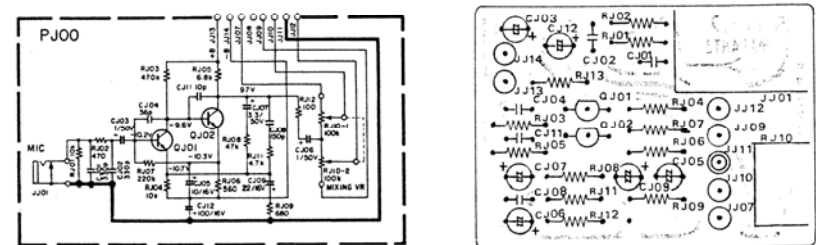
10.3 LED Lamp Assembly (PY00) Schematic Diagram and Component Locations



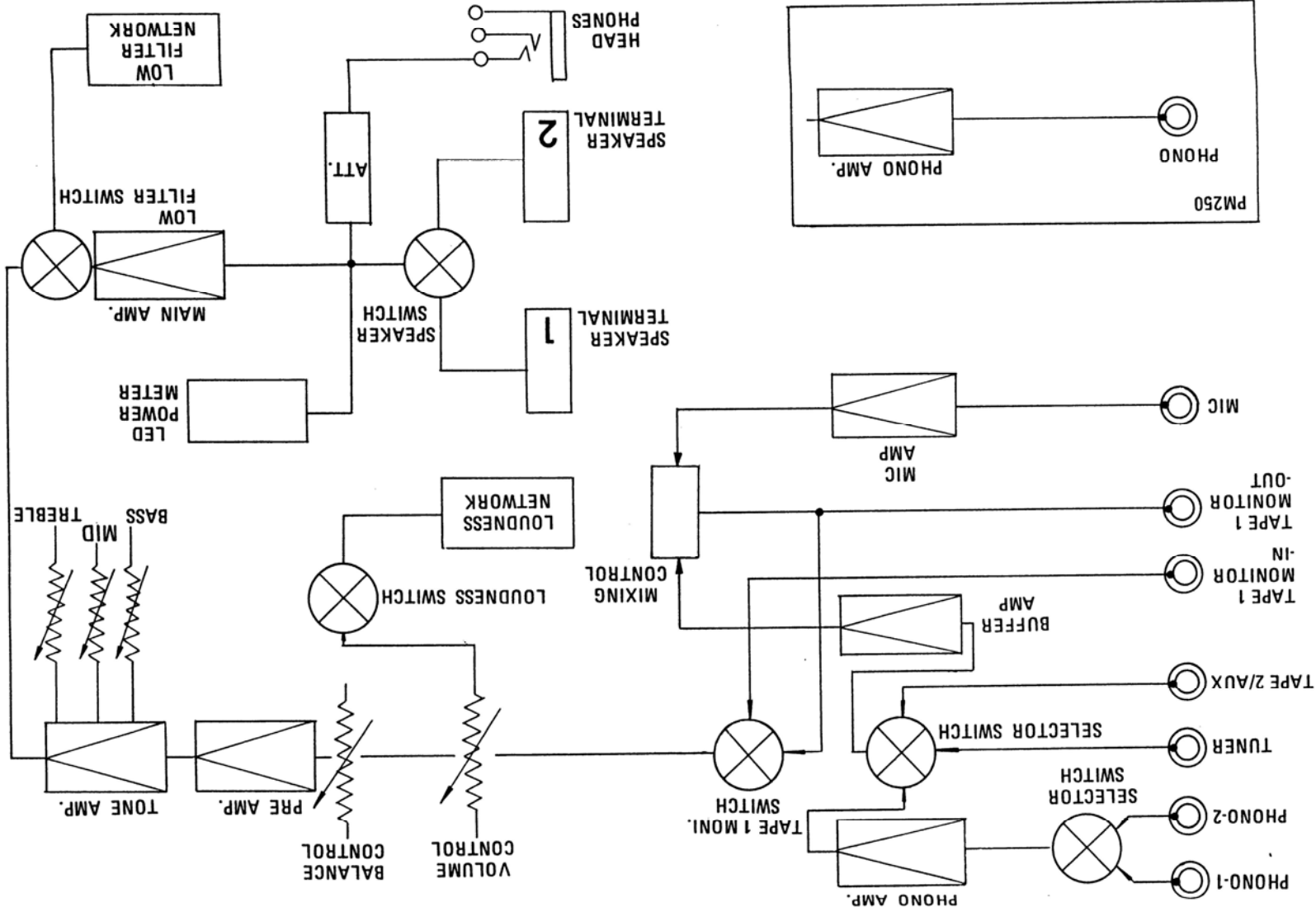
10.4 Loudness Assembly (PS00) Schematic Diagram and Component Locations



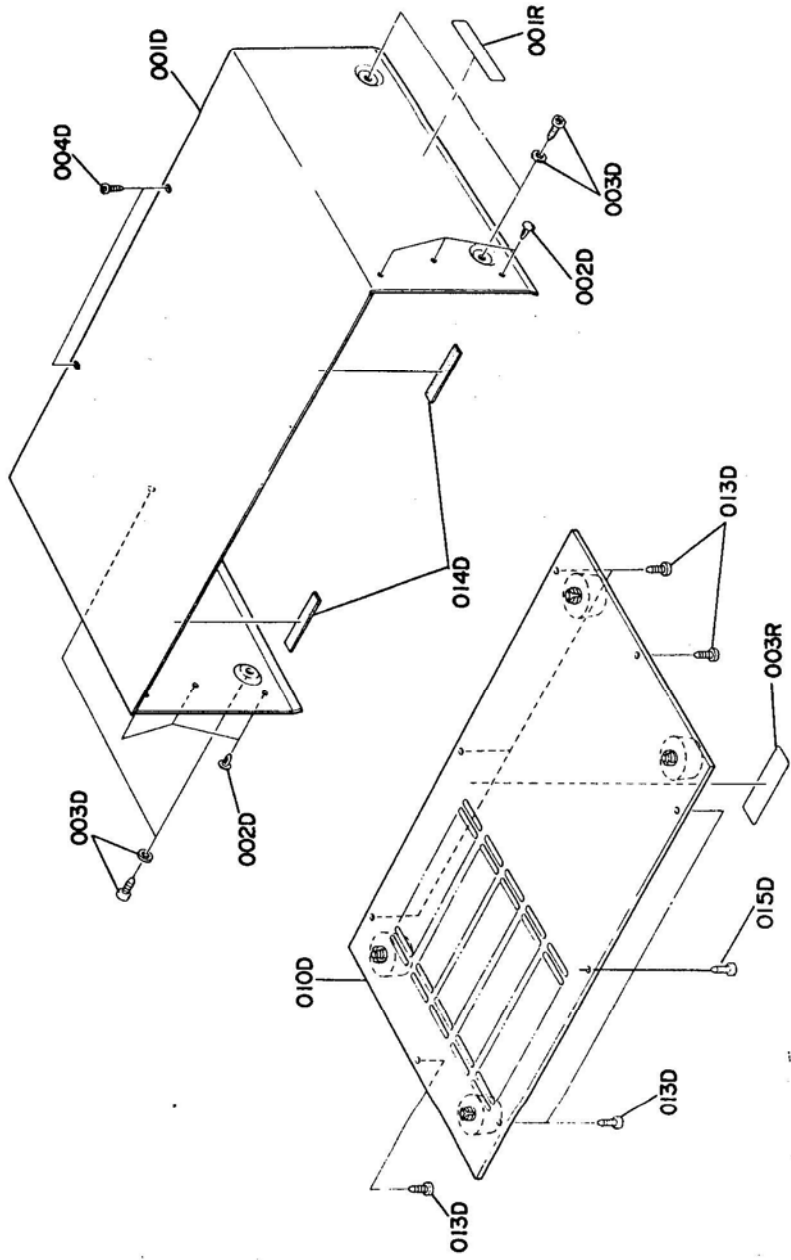
10.5 Microphone Amp. Assembly (PJ00) Schematic Diagram and Component Locations



11. BLOCK DIAGRAM



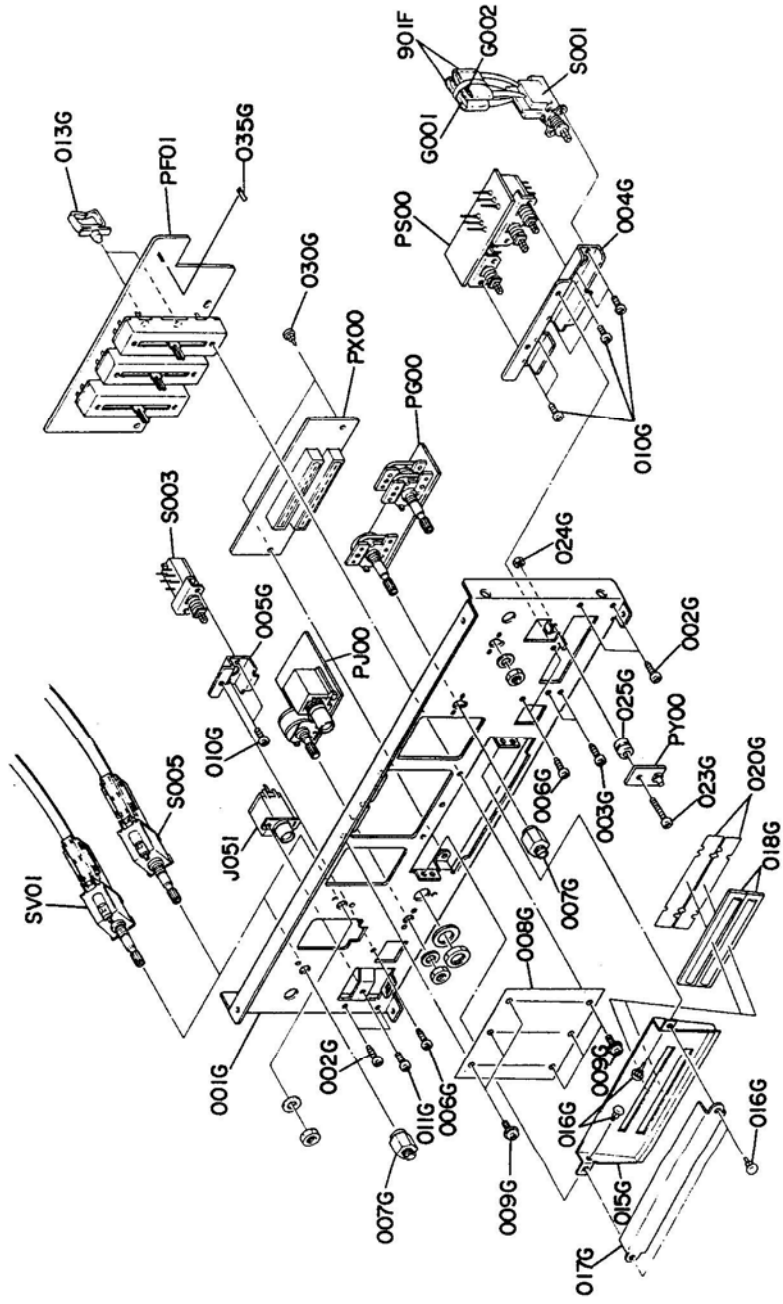
[C02-99] Top cover



REF. DESIG.	QTY		PART NO.	DESCRIPTION
		N		
001D	1		2128257010	Lid, Top Cover
002D	6		2991259010	Bushing
003D	4		51260408U0	F. Washer Screw F4 x 8
004D	2		51280308U0	B.H. Tapped Screw B3 x 8

REF. DESIG.	QTY		PART NO.	DESCRIPTION
		N		
010D	1		2128257500	Lid, Bottom Cover Assembly
013D	7		51280410U0	B.H. Tapped Screw B4 x 10
014D	2		2965118010	Spacer
015D	1		51280408U0	B.H. Tapped Screw B4 x 8

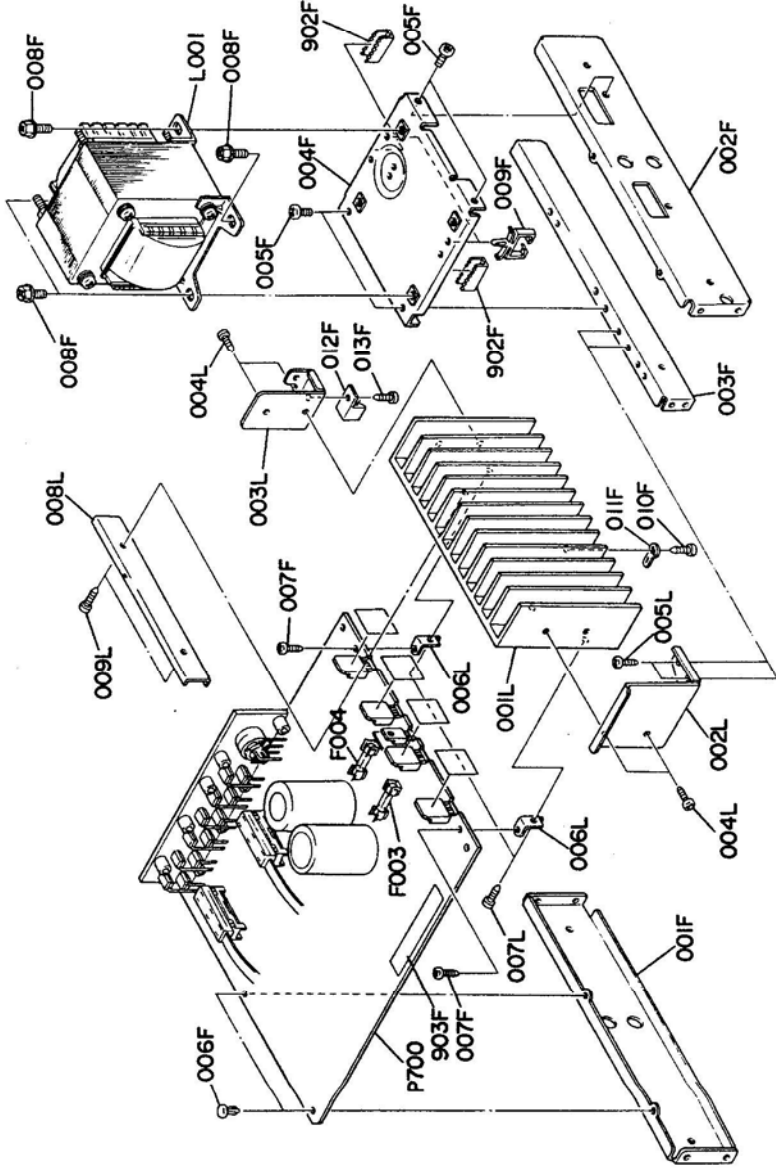
• [P01-99] Chassis and General parts



REF. DESIG.	QTY		PART NO.	DESCRIPTION
	N			
001G	1		2129160010	Bracket, Front Chassis
002G	4		51280308B0	B.H. Tapped Screw B3 x 8
003G	2		51280308B0	B.H. Tapped Screw B3 x 8
004G	1		2129160020	Bracket
005G	1		2129160030	B.H. Tapped Screw B3 x 8
006G	3		51280308B0	Stopper
007G	2		2129114010	Mask
008G	1		2129303020	F. Washer Screw F3 x 6
009G	6		51480306S9	B.H.M. Screw B3 x 6
010G	8		51100306A9	B.H.M. Screw B3 x 6
011G	1		51100306A9	B.H.M. Screw B3 x 6
013G	2		2129005010	Clamper
015G	1		2129302010	Dial, (PM400, ONLY)
015G	1		2127302010	Dial, (PM250, ONLY)
016G	4		2912259020	Bushing
017G	1		2129303010	Mask
018G	2		2127355010	Lens
020G	2		2129303030	Mask
023G	1		51570315B0	P. Taprite Screw B3 x 15
024G	1		53110303A9	Hexagon Nut
025G	1		4367259020	Bushing
030G	2		2276005050	Clamper
035G	1		2884053020	Cover

REF. DESIG.	QTY		PART NO.	DESCRIPTION
	N			
901F	2		2926120010	Insulator
△G001	1		DF17223800	Film Cap. 0.022μF ±20%
△G002	1		DF17223800	Film Cap. 0.022μF ±20%
J051	1		YJ01001200	Jack, Headphone
△S001	1		SP02010440	Push Switch, Power
S003	1		SP02010260	Push Switch, Low Filter
S005	1		SR04020180	Rotary Switch
SV01	1		SR04040170	Rotary Switch, (PM400, ONLY)
SV01	1		SR04030250	Rotary Switch, (PM250, ONLY)

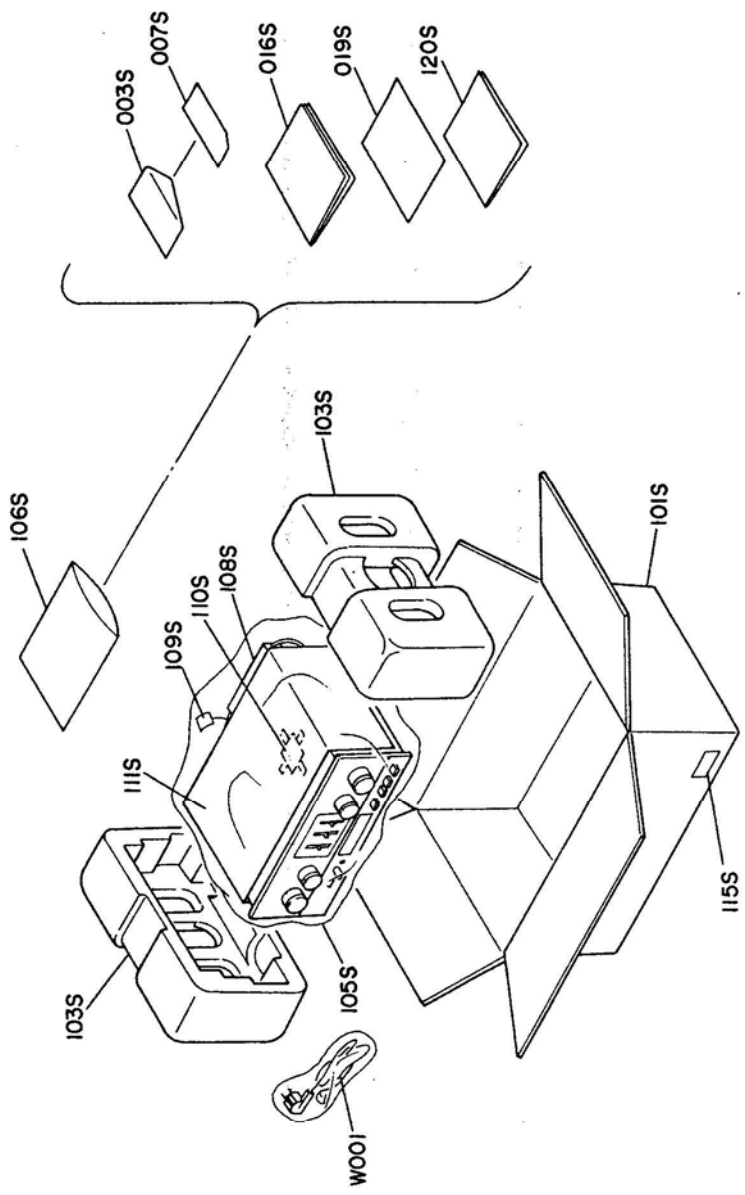
• [P02-99] Main P.W. Board and General parts (PM400 ONLY)



REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
		N		
001F	1		2258126010	(MP400, ONLY)
002F	1		2258126022	Stay, (L)
003F	1		2258126033	Stay, (R)
004F	1		2127160010	Stay, Center
005F	4		5128040880	Bracket
006F	1		2276005050	B.H. Tapped Screw
007F	2		5128030880	Clamper
008F	2		52040510A0	F. Washer Screw
009F	4		2886005030	H. Head Bolt, S.F
010F	1		5128030880	Clamper
011F	1		62030049W0	B.H. Tapped Screw
012F	1		2887005012	Lug
013F	1		5128030880	Clamper
902F	2		2218259020	B.H. Tapped Screw
903F	1		2205861010	Bushing
				Label

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
		N		
001L	1		2274267012	Heatsink
002L	1		2127160020	Bracket
003L	1		2258160050	Bracket
004L	4		5128030880	B.H. Tapped Screw
005L	2		5128030880	B.H. Tapped Screw
006L	2		2231160040	Bracket
007L	2		5128030880	B.H. Tapped Screw
008L	1		2258005013	Clamper
009L	2		5128031480	B.H. Tapped Screw
ΔL001	1		TS18613010	Power Transformer
P700	1		YG21270010	P.W. Board, Main
	1		ZZ21277010	P.W. Board Assembly
ΔF003	1		FS10350800	Fuse
ΔF004	1		FS10350800	Fuse

• [H01-99] Packing Materials



REF. DESIG.	QTY		PART NO.	DESCRIPTION
		N		
003S	1		2818813010	Envelope
007S	1		9630000180	Guarantee Card
016S	1		2127851310	Instructions
019S	1		2129851030	Instructions (PM400, ONLY)
019S	1		2127851030	Instructions (PM250, ONLY)
101S	1		2129801010	Packing Case (PM400, ONLY)
101S	1		2127801010	Packing Case (PM250, ONLY)
103S	2		4214809013	Cushion
105S	1		9014335330	Polyethy Bag
106S	1		9013025010	Polyethy Bag

REF. DESIG.	QTY		PART NO.	DESCRIPTION
		N		
108S	1		2864804010	Sleeve
109S	1		9560000043	Hang Tag
110S	1		2731821010	Silicagel Sheet
111S	1		2918107160	Serial NO. Card
115S	3		9526019060	Circuit Diagram (PM400, ONLY)
120S	1		2129856010	Circuit Diagram (PM250, ONLY)
120S	1		2127856010	Circuit Diagram (PM250, ONLY)
ΔW001	1		ZC01805020	A.C. Power Cord

13. ELECTRICAL PARTS LIST

REF. DESIG.	QTY N	PART NO.	DESCRIPTION	REF. DESIG.	QTY N	PART NO.	DESCRIPTION
P700	1	YG21270010	P700-MAIN CIRCUIT BOARD P.W. Board, Main (PM400, ONLY)	C701	1	DD15151370	Ceramic 150pF ±5%
	1	ZZ21277010	P.W. Board Assembly (PM250, ONLY)	C702	1	DD15151370	Ceramic 150pF ±5%
	1	ZZ21278010	P.W. Board Assembly	C703	1	EA10701030	Elect 100μF
CD01	1	EA22505090	P700-CAPACITORS	C704	1	EA10701030	Elect 100μF
CD02	1	EA22505090	Elect 2.2μF	C705	1	DD15180370	Ceramic 18pF ±5%
CD03	1	DD15470370	Ceramic 47pF ±5%	C706	1	DD15180370	Ceramic 18pF ±5%
CD04	1	DD15470370	Ceramic 47pF ±5%	C707	1	EA47603590	Elect 47μF
CD05	1	EA22505090	Elect 2.2μF	C708	1	EA47603590	Elect 47μF
CD06	1	EA22505090	Elect 2.2μF	C711	1	DK16221510	Ceramic 220pF ±10%
CD07	1	DD15510310	Ceramic 51pF ±5%	C712	1	DK16221510	Ceramic 220pF ±10%
CD08	1	DD15510310	Ceramic 51pF ±5%	C717	1	DF16473540	Film 0.047μF ±10%
CE01	1	EA33505030	Elect 3.3μF	C718	1	DF16473540	Film 0.047μF ±10%
CE02	1	EA33505030	Elect 3.3μF	C720	1	EA10705090	Elect 100μF
CE03	1	DD15221370	Ceramic 220pF ±5%	C721	1	EA10705090	Elect 100μF
CE04	1	DD15221370	Ceramic 220pF ±5%	C722	1	EA10705090	Elect 100μF
CE05	1	EA10701030	Elect 100μF	C801	1	EA477705090	Elect 470μF
CE06	1	EA10701030	Elect 100μF	C802	1	EA10701630	Elect 100μF
CE08	1	EA10701030	Elect 100μF	C804	1	EA47601630	Elect 47μF
CE09	1	EA33505030	Elect 3.3μF	C805	1	EA33505030	Elect 3.3μF
CE10	1	EA33505030	Elect 3.3μF	C806	1	DF17102350	Film 0.001μF ±20%
CH01	1	DF16224350	Film 0.22μF ±10%	C807	1	EA47603590	Elect 47μF
CH02	1	DF16224350	Film 0.22μF ±10%	C808	1	EB68805020	Elect 6800μF
CN01	1	DF16323350	Film 3300pF ±10%	ΔC809	1	EB68805020	Elect 6800μF
CN02	1	DF16323350	Film 3300pF ±10%	ΔC810	1	DK18103510	Ceramic 0.01μF
CN03	1	DF16323350	Film 3300pF ±10%	ΔC811	1	DK18103510	Ceramic 0.01μF
CN04	1	DF16323350	Film 3300pF ±10%	C812	1	EA10701630	Elect 100μF
CN21	1	EA33700690	Elect 330μF	C813	1	EA47605090	Elect 47μF
CN22	1	EA10505030	Elect 1μF	C803	1	EA22601630	(PM250, ONLY) Elect 22μF
C401	1	EA33505030	Elect 3.3μF	RD01	1	GD05393140	39KΩ
C402	1	EA33505030	Elect 3.3μF	RD02	1	GD05393140	39KΩ
C403	1	DD15820370	Ceramic 82pF ±5%	RD03	1	GD05471140	470Ω
C404	1	DD15820370	Ceramic 82pF ±5%	RD04	1	GD05471140	470Ω
C405	1	EA33700690	Elect 330μF	RD05	1	GD05104140	100KΩ
C406	1	EA33700690	Elect 330μF	RD06	1	GD05104140	100KΩ
C409	1	DF15223350	Film 0.022μF ±5%	RD07	1	GD05364140	360KΩ
C410	1	DF15223350	Film 0.022μF ±5%	RD08	1	GD05364140	360KΩ
C411	1	DF15562350	Film 5600pF ±5%	RD09	1	GD05562140	5.6KΩ
C412	1	DF15562350	Film 5600pF ±5%	RD10	1	GD05562140	5.6KΩ
C415	1	EA33700690	Elect 330μF	RD11	1	GD05224140	220KΩ
C416	1	EA33700690	Elect 330μF	RD12	1	GD05224140	220KΩ
C417	1	EA33505030	Elect 3.3μF	RD13	1	GD05221140	220Ω
C418	1	EA33505030	Elect 3.3μF	RD14	1	GD05221140	220Ω
C419	1	EA10701630	Elect 100μF	RE01	1	GD05471140	470Ω
C420	1	EA10703590	Elect 100μF	RE02	1	GD05471140	470Ω
C421	1	DD15560370	Ceramic 56pF ±5%	RE03	1	GD05104140	100KΩ
C422	1	DD15560370	Ceramic 56pF ±5%	RE04	1	GD05104140	100KΩ
C423	1	DK16392300	Ceramic 3900pF ±10%	RE05	1	GD05471140	470Ω
C424	1	DK16392300	Ceramic 3900pF ±10%	RE06	1	GD05471140	470Ω
C729	1	DK18103300	Seramic 0.01μF				
C730	1	DK18103300	Seramic 0.01μF				

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	N			
RE07	1		GD05562140	5.6KΩ
RE08	1		GD05562140	5.6KΩ (PM400, ONLY)
RE09	1		GD05103140	10KΩ (PM400, ONLY)
RE10	1		GD05103140	10KΩ
RE11	1		GD05221140	220Ω
RE12	1		GD05221140	220Ω
RE13	1		GD05221140	220Ω
RE14	1		GD05272140	2.7KΩ
RE15	1		GD05104140	100KΩ
RE16	1		GD05104140	100KΩ
RH05	1		GD05302140	3KΩ
RH06	1		GD05302140	3KΩ
RH07	1		GD05333140	33KΩ
RH08	1		GD05333140	33KΩ
RN01	1		GD05682140	(PM400, ONLY)
RN02	1		GD05682140	6.8KΩ
RN03	1		GD05682140	6.8KΩ
RN04	1		GD05682140	6.8KΩ
RN05	1		GD05473140	47KΩ
RN06	1		GD05473140	47KΩ
RN07	1		GD05822140	(PM250, ONLY)
RN08	1		GD05822140	8.2KΩ
RN09	1		GD05822140	8.2KΩ
RN10	1		GD05822140	8.2KΩ
RN11	1		GD05822140	8.2KΩ
RN12	1		GD05333140	33KΩ
RN13	1		GD05333140	33KΩ
RN14	1		GD05471140	470Ω
RN15	1		GD05471140	470Ω
RN16	1		GD05471140	470Ω
RN17	1		GD05153140	15KΩ
RN18	1		GD05103140	10KΩ
RN19	1		GD05682140	6.8KΩ
RN20	1		GD05394140	390KΩ
RN21	1		GD05224140	220KΩ
RN22	1		GD05224140	220KΩ
RN23	1		GD05224140	220KΩ
RN24	1		GD05224140	220KΩ
RN25	1		GD05124140	120KΩ
RN26	1		GD05124140	120KΩ
RV01	1		GD05104140	100KΩ
RV02	1		GD05104140	100KΩ
RV03	1		GD05154140	150KΩ
RV04	1		GD05154140	150KΩ
RX51	1		GD05123140	12KΩ
RX52	1		GD05272140	2.7KΩ
RX53	1		GA05330010	33Ω 1W
R401	1		GD05471140	470Ω
R402	1		GD05471140	470Ω
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		GD05154140	150KΩ
R414	1		GD05154140	150KΩ
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		PART NO.	DESCRIPTION
	N			
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
R431	1		GG05201140	220Ω
R432	1		75061001P0	Jumper
R701	1		GD05471140	470Ω
R702	1		GD05471140	470Ω
R703	1		GD05393140	39KΩ
R704	1		GD05393140	39KΩ
R705	1		GD05102140	1KΩ
R706	1		GD05102140	1KΩ
R707	1		GD05103140	10KΩ
R708	1		GD05103140	10KΩ
R709	1		GD05333140	33KΩ
R710	1		GD05333140	33KΩ
R711	1		GG05152140	1.5KΩ
R712	1		GG05152140	1.5KΩ
R713	1		GG05332140	3.3KΩ
R714	1		GG05332140	3.3KΩ
R715	1		GG05332140	3.3KΩ
R716	1		GG05332140	3.3KΩ
R717	1		RA02020180	2KΩ (B) Trimming
R718	1		RA02020180	2KΩ (B) Trimming
R719	1		GG05151140	150Ω
R720	1		GG05151140	150Ω
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
R735	1		GA05331020	330Ω 2W (PM400, ONLY)
R736	1		GA05331020	330Ω 2W (PM400, ONLY)
R739	1		GG05182140	1.8KΩ
R741	1		GG05330140	330Ω
R742	1		GG05330140	330Ω
R743	1		GD05222140	2.2KΩ ½W
R744	1		GD05222140	2.2KΩ
R801	1		GG05472140	4.7KΩ
R802	1		GG05472140	4.7KΩ
R803	1		GG05152120	1.5KΩ
R804	1		GD05103140	10KΩ
R805	1		GD05123140	12KΩ
R806	1		RF05221140	220Ω Fusible
R808	1		GG05332120	3.3KΩ ½W
R809	1		RF05220120	22Ω Fusible
R745	1		GD05273140	27KΩ ½W
R746	1		GD05273140	27KΩ ½W

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
QD01	1	HT111272B0	P700-SEMICONDUCTORS Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Diode 1S1555 Diode 1S1555 Diode 1S1555 Diode 1S1555 Diode 1S1555 Diode 1S1555 Diode 1S1555 Diode W06B Diode W06B Diode W06B Transistor 2SC2634(S or T) Transistor 2SC2634(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Zener WZ071 Zener WZ071 Transistor 2SA1127(S or T) Transistor 2SC2634(S or T) Diode 1S2473 (PM400, ONLY) Jumper (PM250, ONLY) Transistor 2SA1127(S or T) Diode W06B Transistor 2SD330 Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SC2634(S or T) Transistor 2SC2634(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SA1127(S or T) Transistor 2SC2634(S or T) Diode 1S2471 Diode 1S2471 Zener WZ-177 Diode W06B Note: * are exchangeable. Transistor 2SC1400 Transistor 2SC1400 Transistor 2SC1400 Transistor 2SC1400 Transistor 2SC1400 Transistor 2SA750 Transistor 2SA750 Transistor 2SA750 Transistor 2SA750	Q705	1	HT322402A0	(PM400, ONLY) Transistor 2SC2240(GR or BL) Transistor 2SC2240(GR or BL) Transistor 2SD666A(B or C) Transistor 2SD666A(B or C) Transistor 2SD667A(B or C) Transistor 2SD667A(B or C) Transistor 2SB647A(B or C) Transistor 2SB647A(B or C) Transistor 2SC2578(O or Y) Transistor 2SC2578(O or Y) Transistor 2SA1103(O or Y) Transistor 2SA1103(O or Y)
QD02	1	HT111272B0		Q706	1	HT322402A0	
QE01	1	HT111272B0		Q707	1	HT406662E0	
QE02	1	HT111272B0		Q708	1	HT406662E0	
QE03	1	HT326342B0		Q711	1	HT406672A0	
QE04	1	HT326342B0		Q712	1	HT406672A0	
QN01*	1	HT326342B0		Q713	1	HT206472A0	
QN02*	1	HT326342B0		Q714	1	HT206472A0	
QN03*	1	HT111272B0		ΔQ715	1	HT325782B0	
QN04*	1	HT111272B0		ΔQ716	1	HT325782B0	
QN05	1	HD20001050		ΔQ717	1	HT111032B0	
QN06	1	HD20001050		ΔQ718	1	HT111032B0	
QN07	1	HD20001050		Q705	1	HT314001E0	(PM250, ONLY) Transistor 2SC1400(E) Transistor 2SC1400(E)
QN08	1	HD20001050		Q706	1	HT314001E0	
QN09	1	HD20001050		Q707	1	HT406662C0	Transistor 2SD666(C or D) Transistor 2SD666(C or D)
QN10	1	HD20001050		Q708	1	HT322742B0	Transistor 2SC2274(E or F) Transistor 2SC2274(E or F)
QN11	1	HD20001050	Q711	1	HT322742B0	Transistor 2SC2274(E or F) Transistor 2SC2274(E or F)	
QN12	1	HD20001050	Q712	1	HT109842B0	Transistor 2SA984(E or F) Transistor 2SA984(E or F)	
QN13	1	HD20005010	Q713	1	HT109842B0	Transistor 2SA984(E or F) Transistor 2SA984(E or F)	
QN14	1	HD20005010	Q714	1	HT109842B0	Transistor 2SA984(E or F) Transistor 2SA984(E or F)	
QN15	1	HD20005010	ΔQ715	1	HT325772B0	Transistor 2SC2577(O or Y) Transistor 2SC2577(O or Y)	
QN16	1	HD20005010	ΔQ716	1	HT325772B0	Transistor 2SC2577(O or Y) Transistor 2SC2577(O or Y)	
QN21*	1	HT326342B0	ΔQ717	1	HT111022B0	Transistor 2SA1102(O or Y) Transistor 2SA1102(O or Y)	
QN22*	1	HT326342B0	ΔQ718	1	HT111022B0	Transistor 2SA1102(O or Y) Transistor 2SA1102(O or Y)	
QN23*	1	HT111272B0	Q801	1	HT406672E0	Transistor 2SD667(B or C) Transistor 2SC2634(S or T)	
QN24*	1	HT111272B0	Q802	1	HT326342B0	Zener WZ-120 Diode W06B	
QN25	1	HD300023090	Q803	1	HD30009010	Transistor 2SB647(B or C) Transistor 2SC2634(S or T)	
QN26	1	HD300023090	Q806	1	HD20011290	(PM400, ONLY) Zener Low Noise	
QN27	1	HT111272B0	Q807	1	HD20011290	Diode	
QN28*	1	HT326342B0	Q808	1	HD20011290	Diode	
QN29	1	HD20001210	Q809	1	HD20011290	Diode	
QN29	1	75060501P0	Q803	1	HD30024090	Zener WZ-120	
QN30*	1	HT111272B0	ΔQ806	1	HD20009290	Diode S2V-20	
QN31	1	HD20005010	ΔQ807	1	HD20009290	Diode S2V-20	
QX15	1	HT403302A0	ΔQ808	1	HD20009290	Diode S2V-20	
Q401	1	HT111272B0	ΔQ809	1	HD20009290	Diode S2V-20	
Q402	1	HT111272B0	JV01	1	YTO2040280	P700-MISCELLANEOUS Terminal (PM400, ONLY)	
Q403	1	HT326342B0	JV02	1	YTO2040280	Terminal (PM400, ONLY)	
Q404	1	HT326342B0	JV03	1	YTO2060140	Terminal (PM250, ONLY)	
Q701	1	HT111272B0	JV04	1	YTO2050010	Terminal	
Q702	1	HT111272B0	J805	1	YJ08000270	Jack, Fuse Holder	
Q703	1	HT111272B0	J806	1	YJ08000270	Jack, Fuse Holder	
Q704	1	HT111272B0	J807	1	YJ08000270	Jack, Fuse Holder	
Q709	1	HT326342B0	J808	1	YJ08000270	Jack, Fuse Holder	
Q710	1	HT326342B0	L701	1	LL23915120	Choke Coil	
Q719	1	HD20003210	L702	1	LL23915120	Choke Coil	
Q720	1	HD20003210	S005	1	SR04020180	Rotary Switch (PM400, ONLY)	
Q721	1	HD300030090	SV01	1	SR04040170	Rotary Switch (PM400, ONLY)	
Q722	1	HD20005010	SV01	1	SR04030250	Rotary Switch (PM250, ONLY)	
QN01	1	HT314001E0					
QN02	1	HT314001E0					
QN21	1	HT314001E0					
QN22	1	HT314001E0					
QN28	1	HT314001E0					
QN03	1	HT107501E0					
QN04	1	HT107501E0					
QN23	1	HT107501E0					
QN24	1	HT107501E0					
QN30	1	HT107501E0					

REF. DESIG.	QTY	PART NO.	DESCRIPTION
PF01	1	YK21271610	PF01-TONE AMP. CIRCUIT BOARD
	1	ZZ21278610	P.W. Board, Tone Amp. P.W. Board Assembly
CF01	1	DD15101300	PF01-CAPACITORS
CF02	1	DD15101300	Ceramic 100pF ±5%
CF03	1	DF16222350	Ceramic 100pF ±5%
CF04	1	DF16222350	Film 2200pF ±10%
CF05	1	DF16472350	Film 2200pF ±10%
CF06	1	DF16472350	Film 4700pF ±10%
CF07	1	DF16222350	Film 4700pF ±10%
CF08	1	DF16222350	Film 0.022μF ±10%
CF09	1	DF16222350	Film 0.022μF ±10%
CF10	1	DF16222350	Film 0.022μF ±10%
CF11	1	DF16822350	Film 8200pF ±10%
CF12	1	DF16822350	Film 8200pF ±10%
CF13	1	EA33505030	Elect 3.3μF
CF14	1	EA33505030	Elect 3.3μF
CF15	1	EA33505030	Elect 3.3μF
CF16	1	EA33505030	Elect 3.3μF
CX01	1	EA10602590	Elect 10μF
CX02	1	EA10602590	Elect 10μF
CX03	1	EA10602590	Elect 10μF
CX04	1	EA10602590	Elect 10μF
CX05	1	EA10602590	Elect 10μF
CX06	1	EA10602590	Elect 10μF
RF01	1	GD05123140	PF01-RESISTORS
RF02	1	GD05123140	(All Resistors are ±5% and 1/4W)
RF03	1	GD05562140	12KΩ
RF04	1	GD05562140	12KΩ
RF05	1	GD05562140	5.6KΩ
RF06	1	GD05334140	5.6KΩ
RF07	1	GD05334140	330KΩ
RF08	1	GD05562140	330KΩ
RF09	1	GD05562140	5.6KΩ
RF10	1	GD05562140	5.6KΩ
RF11	1	GD05273140	27KΩ
RF12	1	GD05273140	27KΩ
RF13	1	GD05153140	15KΩ
RF14	1	GD05153140	15KΩ
RF15	1	GD05123140	12KΩ
RF16	1	GD05123140	12KΩ
RF17	1	GD05273140	27KΩ
RF18	1	GD05273140	27KΩ
RF19	1	GD05334140	330KΩ
RF20	1	GD05334140	330KΩ
RF21	1	GD05155140	1.5MΩ
RF22	1	GD05155140	1.5MΩ
RF23	1	GD05683140	68KΩ
RF24	1	GD05683140	68KΩ
RF25	1	GD05473140	47KΩ
RF26	1	GD05473140	47KΩ
RF27	1	GD05472140	4.7KΩ
RF28	1	GD05472140	4.7KΩ
RF29	1	GD05221140	220Ω
RF30	1	GD05221140	220Ω

REF. DESIG.	QTY	PART NO.	DESCRIPTION
RF31	1	GD05474140	470KΩ
RF32	1	GD05474140	470KΩ
RF33	1	RS01040130	100KΩ(B) x 2 Variable
RF34	1	RS01040130	100KΩ(B) x 2 Variable
RF35	1	RS01040130	100KΩ(B) x 2 Variable
RX25	1	GD05822140	8.2KΩ
RX26	1	GD05822140	8.2KΩ
RX27	1	GD05182140	1.8KΩ
RX28	1	GD05182140	1.8KΩ
RX29	1	GD05121140	120Ω
RX30	1	GD05121140	120Ω
RX31	1	GD05272140	2.7KΩ
RX32	1	GD05272140	2.7KΩ
RX33	1	RA02030140	20KΩ(B) Trimming
RX34	1	RA02030140	20KΩ(B) Trimming
RX35	1	GD05394140	390KΩ
RX36	1	GD05394140	390KΩ
RX37	1	GD05682140	6.8KΩ
RX38	1	GD05682140	6.8KΩ
RX39	1	GD05822140	8.2KΩ
RX40	1	GD05822140	8.2KΩ
RX41	1	GD05103140	10KΩ
RX42	1	GD05103140	10KΩ
RX43	1	GD05562140	5.6KΩ
RX44	1	GD05562140	5.6KΩ
RX45	1	GD05181140	180Ω
RX46	1	GD05181140	180Ω
RX47	1	GD05103140	10KΩ
RX48	1	GD05103140	10KΩ
RX49	1	GD05103140	10KΩ
RX50	1	GD05103140	10KΩ
QF01	1	HT32634280	PX00-SEMICONDUCTORS
QF02	1	HT32634280	Transistor 2SC2634(S or T)
QF03	1	HT1127280	Transistor 2SC2634(S or T)
QF04	1	HT1127280	Transistor 2SA1127(S or T)
QF04	1	HT1127280	Transistor 2SA1127(S or T)
QX05	1	HD20011050	Diode 1S1555
QX06	1	HD20011050	Diode 1S1555
QX07	1	HD20011050	Diode 1S1555
QX08	1	HD20011050	Diode 1S1555
QX09	1	HT107501E0	Transistor 2SA750(E)
QX10	1	HT107501E0	Transistor 2SA750(E)
QX11	1	HT314001E0	Transistor 2SC1400(E)
QX12	1	HT314001E0	Transistor 2SC1400(E)
QX13	1	HH00009030	Thermistor SDT-1000
QX14	1	HH00009030	Thermistor SDT-1000
PG00	1	YK21271620	PG00-VOLUME CONTROL
	1	ZZ21278620	CIRCUIT BOARD
			P.W. Board, Volume Control
			P.W. Board Assembly
CG01	1	DK16681300	PG00-CAPACITORS
CG02	1	DK16681300	Ceramic 680pF ±10%
CG03	1	DF16473350	Ceramic 680pF ±10%
CG04	1	DF16473350	Film 0.047μF ±10%
			Film 0.047μF ±10%

14. TECHNICAL SPECIFICATIONS

MODEL PM250

AUDIO SECTION

POWER OUTPUT, DIN, 4 OHM, PER CHANNEL	50W
POWER OUTPUT, FTC AMERICAN STANDARDS, 4 OHM, PER CHANNEL	32W
TOTAL HARMONIC DISTORTION AT RATED POWER OUTPUT	0.1%
I.M. DISTORTION AT RATED POWER OUTPUT (250 Hz AND 8 kHz MIXED, AMPLITUDE RATIO 4:1)	0.1%
POWER OUTPUT, DIN, 8 OHM, PER CHANNEL	39W
POWER OUTPUT, FTC AMERICAN STANDARDS, 8 OHM, PER CHANNEL	25W
TOTAL HARMONIC DISTORTION AT RATED POWER OUTPUT	0.05%
I.M. DISTORTION AT RATED POWER OUTPUT (250 Hz AND 8 kHz MIXED, AMPLITUDE RATIO 4:1)	0.05%
POWER BANDWIDTH	20 Hz ~ 50 kHz
DAMPING FACTOR 8 OHM	100

Frequency Response

Phono (RIAA)	±0.5 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 Sensitivity	150 mV

Phono Equivalent Input Noise

Phono Dynamic Range (Ratio of input overload to equivalent input noise)	0.5 µV
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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

Intersource Crosstalk (Worst Point), 1 kHz	62 dB
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Output Voltage, 1 kHz

Tape Out	415 mV
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Output Impedance, 1 kHz

Tape Out	220 ohms
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GENERAL

Power Requirements	220 V AC, 50 Hz
Power Consumption at Rated Output, both Channels Driven	(E and N versions are featuring an external voltage selector for use on 110 V.)
Idle Power	140 ± 20W
Semiconductor Complement	18W ± 5W
Transistors	47
Diodes	29
Integrated Circuits	2
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	6.5 kg (14.3 lbs)
Packed for Shipment	8.0 kg (17.6 lbs)

AUDIO SECTION

POWER OUTPUT, DIN, 4 OHM, PER CHANNEL	66W
POWER OUTPUT, FTC AMERICAN STANDARDS, 4 OHM, PER CHANNEL	45W
TOTAL HARMONIC DISTORTION AT RATED POWER OUTPUT	0.1%
I.M. DISTORTION AT RATED POWER OUTPUT (250 Hz AND 8 kHz MIXED, AMPLITUDE RATIO 4:1)	0.1%
POWER OUTPUT, DIN, 8 OHM, PER CHANNEL	54W
POWER OUTPUT, FTC AMERICAN STANDARDS, 8 OHM, PER CHANNEL	36W
TOTAL HARMONIC DISTORTION AT RATED POWER OUTPUT	0.05%
I.M. DISTORTION AT RATED POWER OUTPUT (250 Hz AND 8 kHz MIXED, AMPLITUDE RATIO 4:1)	0.05%
POWER BANDWIDTH	15 Hz ~ 60 kHz
DAMPING FACTOR 8 OHM	100

Frequency Response

Phono (RIAA)	±0.5 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 Sensitivity	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 Crosstalk (Worst Point), 1 kHz	62 dB
Output Voltage, 1 kHz	55 dB
Tape Out	415 mV
Output Impedance, 1 kHz	
Tape Out	220 ohms

GENERAL

Power Requirements	220 V AC, 50 Hz
Power Consumption at Rated Output, both Channels Driven	(E and N versions are featuring an external voltage selector for use on 110 V.)
Idle Power	160W ± 20W
Semiconductor Complement	14W ± 5W
Transistors	47
Diodes	29
Integrated Circuits	2
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	7.0 kg (15.4 lbs)
Packed for Shipment	8.5 kg (18.7 lbs)