SANYO

Desk-Top, 3-component Stereo

MODEL DS-20PH

MODEL DS-20PK

SERVICE MANUAL

SANYO ELECTRIC CO., LTD.
INTERNATIONAL DIVISION : SANYO ELECTRIC TRADING CO., LTD.
OSAKA, JAPAN

SPECIFICATIONS

DS-20PH

Circuitry ……5 tubes, 1 diode
Type ……3-unit design. 3-band radio with stereo phonograph, 2-separate speaker boxes.
Tubes ……12BE6×1, 12BA6×1, 12AX7×1. 30A5×2
Diode ……1S188×1
Silicon rectifier ……1S559×1
Frequency range ……MW 535–1,605 KC
SW1 2.3– 7.0 MC
SW2 8.0–21.0 MC
Intermediate frequency…455 kc
Output power ……Max. 3 watt per channel
Frequency response ……50–20,000 cycles
Speakers ……6½″ (16cm) PD×2
Crosstalk ……40 db (at 1000 cycles)
Motor ……2-pole induction type
Turntable ……7″ (17cm) dia.
Pick-up system ……Ceramic stereo cartridge with sapphire stylus
Stylus pressure ……8g
Power source ……AC 100, 117, 130, 200, 220, 240 Volts 50/60 cycles 6-position voltage selector
Power consumption……36 watts
Dimensions ……Center unit: 15¼″(width)×9 11/16″(depth)×8 3/16″(height) (386mm×245mm×206mm)
Speaker cabinet:
9 11/16″(width)×9 11/16″(depth)×8 3/16″(height)
(245mm×245mm×206mm)
Weight ……Center unit 13 lbs (6.2kg)
Speaker cabinet 3.9 lbs (1.8kg)×2

DS-20PK

Circuitry ……7 tubes 2 diodes
Type ……3-unit design. 2-band radio with stereo phonograph, 2-separate speaker boxes.
Tubes ……17EW8×1,12BA6×2,12BE6×1,12AX7×1, 30A5×2
Diodes……1S188×2
Silicon rectifier ……1S559×1
Frequency range ……AM 535–1,605KC
FM 88– 108MC
Intermediate frequency…AM 455KC
FM 10.7MC
Output power ……Max. 3 watt per channel
Frequency response ……50–20,000 cycles
Speakers ……6½″ (16cm) PD×2
Crosstalk ……40 db (at 1000 cycles)
Motor ……2-pole induction type
Turntable ……7″ (17cm) dia.
Pick-up system ……Ceramic stereo cartridge with sapphire stylus
Stylus pressure ……8g
Power source ……AC 100, 117, 130, 200, 220, 240 Volts 50/60 cycles 6-position voltage selector
Power consumption……38 watts
Dimensions ……Center unit: 15¼″(width) × 9 11/16″ (depth) ×8 3/16(height) (386mm×245mm×206mm)
Speaker cabinet:
9 11/16″(width)×9 11/16′ (depth)×9 3/16″(height)
(245mm×245mm×206mm)
Weight ……Center unit 14 lbs (6.3kg)
Speaker cabinet 3.9 lbs (1.8kg)×2

PARTS LIST

KEY No.	DESCRIPTION	Q'TY
***RESISTOR* (DS-20PH)**		
R313	Carbon L type 1 K ohm 〃 2W	1
R309	〃 75 ohm 〃 1W	1
R102, R103	Solid 60 ohm ±20% ½W	2
R104	〃 1 K ohm 〃 〃	1
R310	〃 10 K ohm 〃 〃	1
R101	〃 20 K ohm 〃 〃	1
R106	〃 50 K ohm 〃 〃	1
R301, R302	〃 100 K ohm 〃 〃	2
R107, R305, R306	〃 250 K ohm 〃 〃	3
R307, R308	〃 500 K ohm 〃 〃	2
R105, R303, R304	〃 2 M ohm 〃 〃	3
R401, R402	〃 2 M ohm 〃 〃	2
***CAPACITORS* (DS-20PH)**		
C311	Electrolytic capacitor, tubular 50μF, +100—10% 15WV	1
C312, C116	〃 5μF 〃 150WV	2
C305, C306, C307 C308, C309, C310 (C317), C318, C319 C320	Paper 0.01μF ±20% 400WV	9+(1)
C110, C313	〃 0.047μF 〃 〃	2
C303, C304	Mylar, vertical 0.0047μF ±20% 50WV	2
C115	〃 0.01μF 〃 〃	1
C104, C301, C302	Titanium, tubular 100PF ±20% 250WV	3
C101, C105	〃 disk 20PF 〃 〃	2
C107	〃 5PF ±10% 〃	1
C112	〃 0.002μF ±20% 〃	1
C103	〃 0.005μF 〃 〃	1
C114	〃 200PF 〃 〃	1
C113	〃 300PF 〃 〃	1
C109	Styrol, tubular 5100PF ±10% 〃	1
C108	〃 vertical 360PF 〃 〃	1
C106	〃 1500PF 〃 〃	1
C111	Titanium, disk 0.05μF, +100—10% 50WV	1
C402, C403	〃 tubular 100PF ±20% 250WV	2
C401	Paper, tubular 0.047μF 〃 400WV	1
C404	〃 0.003μF 〃 〃	1
***RESISTORS* (DS-20PK)**		
R311	Carbon L type 5 ohm ±10% 1W	1
R309	〃 75 ohm 〃 〃	1
R312	〃 100 ohm 〃 2W	1
R313	〃 1K ohm 〃 〃	1
R202	Solid 33 ohm 〃 ½W	1
R205, R212	〃 68 ohm 〃 〃	2
R203, R206, R210, R211	〃 1K ohm 〃 〃	4
R310	〃 10K ohm 〃 〃	1
R201	〃 22K ohm ±20% 〃	1
R207	〃 50K ohm 〃 〃	1
R216	〃 68K ohm ±10% 〃	1
R208	〃 180K ohm ±20% 〃	1
R305, R306	〃 250K ohm 〃 〃	2
R307, R308	〃 500K ohm 〃 〃	2
R204, R303, R304	〃 2M ohm 〃 〃	3
R301, R302	〃 100K ohm 〃 〃	2
R316, R209	〃 5.6K ohm 〃 〃	2
R315	Carbon L type 12K ohm ±10% 1W	1
R401, R402	Solid 2M ohm ±20% ½W	2
***CAPACITORS* (DS-20PK)**		
C311	Electrolytic capacitor, tubular 50μF, +100—10% 15WV	1
C205, C312	〃 5μF 〃 150WV	2
C217	〃 5μF 〃 50WV	1
C305, C306, C307, C308 C309, C310, (C317) C318, C319, C320	Paper 0.01μF ±20% 400WV	9+(1)
C313	〃 0.047μF 〃 〃	1
C303, C304	Mylar, vertical 0.0047μF ±20% 50WV	2
C203	Titanium, tubular 50PF 〃 250WV	1
C301, S302	〃 100PF 〃 〃	2
C220, C221, C212	〃 disk 0.002μF 〃 〃	3
C201, C204, C207, C209, C219	〃 0.005μF 〃 〃	5
C208, C213	〃 0.01μF 〃 〃	2
C206	〃 0.05μF, +100—10% 50WV	1

KEY No.	DESCRIPTION	Q'TY
***CAPACITORS* (DS-20PK)**		
C202	Titanium 10PF ±10% 50WV	1
C210	〃 200PF ±20% 250WV	1
C211	〃 300PF 〃 〃	1
C218	〃 1500PF 〃 〃	1
C402, C403	〃 tubular 100PF 〃 〃	2
C401	Paper 0.047μF 〃 400VW	1
C404	〃 0.003μF 〃 〃	1

STOCK No. DS-20PH	STOCK No. DS-20PK	DESCRIPTION	Q'TY
SPEAKER BOX S			
GS-46345		Speaker box	2
GS-46346		Baffling board	2
GS-42642		Back board	2
		Net	2
GS-36148		Sash	4
GS-36149		〃	4
GS-44041		Door stopper rubber	8
GS-S8542		Badge complete	2
GS-27041		Badge metal	2
GS-32083		Badge base	2
GS-S6110		Speaker 8 ohm	2
GS-S1097		2P plug	2

7-20130 Printed in Japan

ALIGNMENT

A) AM (DS-20PK) MW, SW1 and SW2 (DS-20PH)

Set the LOUDNESS control to maximum position and the TONE control to High.

For Input: Set the test oscillator to 400 c/s 30% modulation.

For Output: Set the secondary terminal (dummy load 8 ohms) of the output transformer to 50mW.

STEP	CIRCUIT TO BE ADJUSTED	INPUT CONNECTION	INPUT FREQUENCY	DIAL POSITION	ADJUSTMENT POINT	V.T.V.M. (LOW FREQUENY)
IF Alignment	Position of band selector: AM (DS-20PK) MW (DS-20PH)					
	IF Circuit	Connect the above INPUT to 12BE6 G3 through 0.01μf	455Kc	455Kc	DS-20PK GS-WU011 GS-W5U012 DS-20PH GS-W5U009 GS-W5U010 adjust both lower and upper core of the above IFT.	Maximum
MW RF Alignment	Position of band selector: AM (DS-20PK) MW (DS-20PH)					
1	Oscillator and antenna circuit	Connect to bar antenna through loop antenna	600Kc	600Kc (19.3mm from cardinal point on scale)	MW: Oscillator coil MW: Antenna coil	Maximum
2			1,400Kc	1,400Kc (87.5mm from cardinal point on scale)	MW: Oscillator trimmer MW: Antenna trimmer	Maximum

Caution: It is required to repeat steps 1 and 2.

SW1 RF Alignment. Position of band selector: SW1

1	Oscillatior and antenna circuit	Connect to bar antenna through loop antenna	2.5MC	2.5MC (17.9mm from cardinal point on scale	SW1: Oscillator Coil SW1: Antenna Coil	Maximum
2			7MC	7MC (100,3mm from cardinal point on scale)	SW1: Oscillator trimmer SW1: Antenna trimmer	Maximum

Caution: It is required to repeat steps 1 and 2.

SW2 RF Alignment. Position of band selector: SW2

1	Oscillator and antenna circuit	Connect to antenna terminal and earth lead wire, through dummy antenna	8MC	8MC (10mm from cardinal point on scale)	SW2: Oscillator coil SW2: Antenna coil	Maximum
2			21MC	21MC (100.9mm from cardinal point on scale)	SW2: Oscillator trimmer SW2: Antenna trimmer	Maximum

Caution: It is required to repeat steps 1 and 2.

B) FM (DS-20PK only)

IF Alignment. Position of band selector: FM

Input: Non-modulation from oscillator.

1	Ratio detector circuit.	V4 12BA6 G1	10.7MC		GS-W5F003 Upper coil	Maximum. Connect to test point TP2.
2					GS-W5F003 Lower coil	VTVM set to zero and connect to test point TP3.
3	IF circuit	V3 12BA6 G1	10.7MC	Cardinal point on scale	GS-W5U014 Upper and lower coil	Maximum. Connect to test point TP2.
4		Test point TP1			GS-W5U013 Upper and lower coil.	

Caution: It is required to repeat steps 1 and 2.

RF Alignment

Set the LOUDNESS control to maximum position and the TONE control to High.

For Input: Set the signal generator to 400 c/s 30% modulation.

For Output: Set the secondary terminal (dummy load) of the output transformer to 500mW.

Position of selector switch: FM

1	Oscillator and tuner circuit	FM antenna	88MC	88MC (6.6mm from cardinal point to scale)	L2, L4	Maximum
2			108MC	108MC (94.5mm from cardinal point on scale)	TC1, TC2	Maximum

Cantion: It is required to repeat steps 1 and 2.

ADJUSTMENT REST SWITCH

a) When the phono-motor fails to stop even though the tone arm is placed on the rest switch, loosen the screw on the arm stopper and then twist the arm stopper slightly anticlockwise (viewed from upward) till the rest switch shows OFF function when the tone arm is rested on the Rest Switch.

b) When the phono-motor fails to run even though the pick-up is set on the record, do the opposite adjustment mentioned in above item a). Twist the arm stopper slightly clockwise till the rest switch is in ON position when the tone arm is set on the record. After both adjustments tighten the screw on the arm stopper.

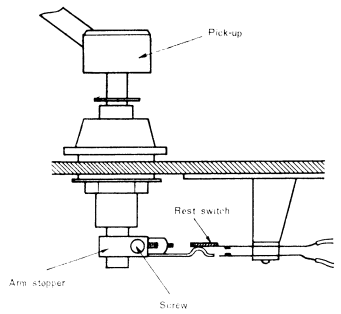


Fig. 1

HOW TO CHANGE TO DIFFERENT AC CYCLES (The set has to be adjusted to the correct AC cycles.)

a) Take off the turntable, setting the speed selector to position OFF, and then exchange the pulley which is fixed to the motor shaft by a screw. The pulley for either 60 or 50 cycle is classified by colour as illustrated in Fig. 2 When exchanging the pulley, caution should be taken neither to bend, scratch nor apply oil to the pulley. This would cause rumbling or wow.

b) Phono-motor wire.

As illustrated in Fig. 3 connect the lead wire to the right cycle terminal.

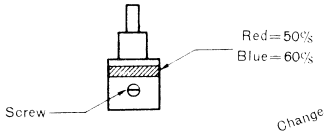


Fig. 2

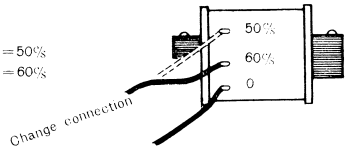


Fig. 3

HOW TO ADJUST THE VOLTAGE

Current input to the unit can be adjusted to 6 different voltages. Before use, ensure the unit is adjusted the right local voltage. The voltage selector is located at the rear of the cabinet.

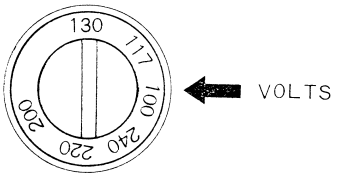


Fig. 4

HOW TO TAKE THE CHASSIS OUT OF THE CABINET

a) To remove the rear cover from the cabinet, loosen the 4 screws (Fig. 5. ①).

b) Pull off the 5 control knobs front panel.

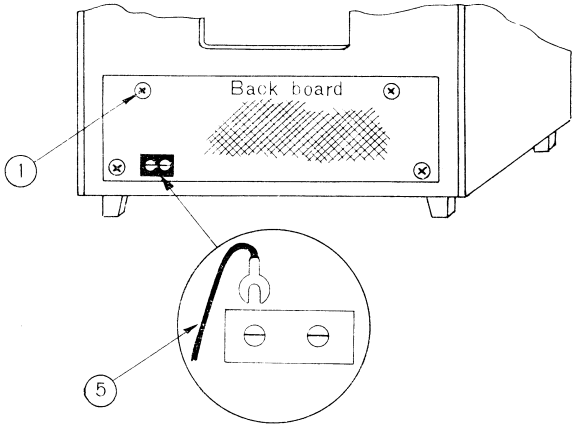
c) Pull the player board upwards, removing the 2 screws (Fig. 5 ②) that fix the player board to the cabinet.

d) Remove the player board, disconnecting the pick-up lead wire and motor lead wire from the chassis.

e) Remove the 4 screws at the bottom of cabinet. (Fig. 5. ④)

f) Pull the chassis out of the rear of the cabinet.

Caution: In case of DS-20PK, disconnect the FM antenna (Fig. 5⑤), before pulling out the chassis.



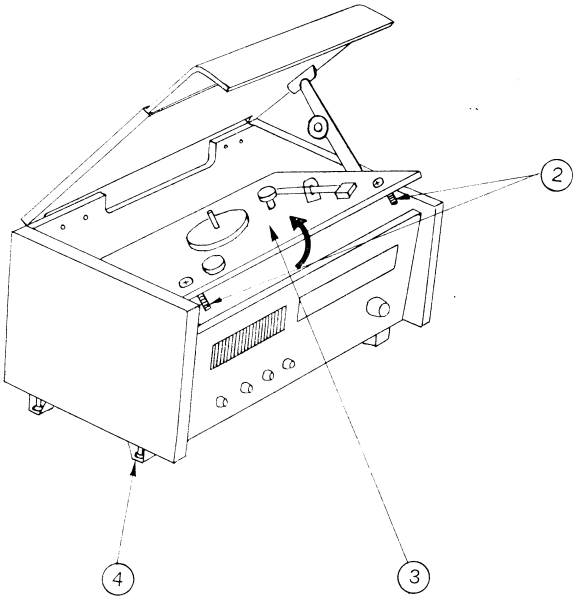


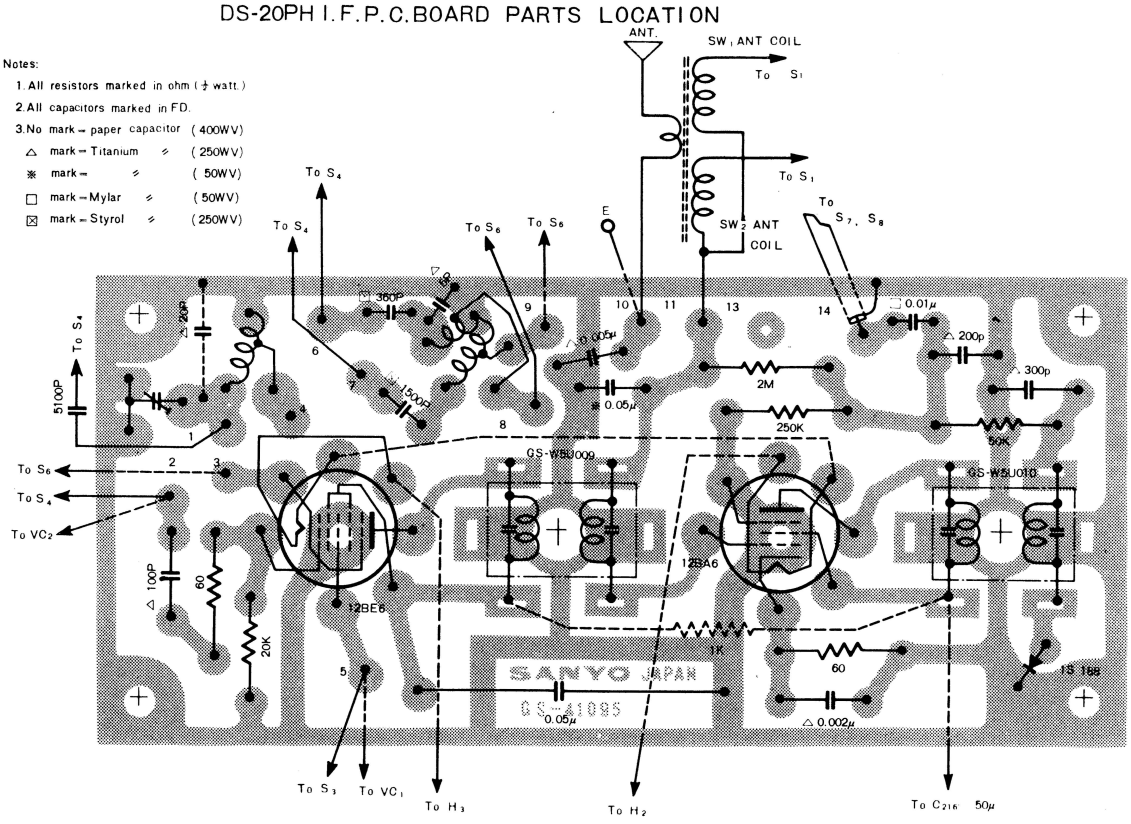
Fig. 5

IF P.C BOARD PARTS LOCATION

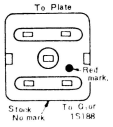
DS-20PH I.F.P.C.BOARD PARTS LOCATION

Notes:

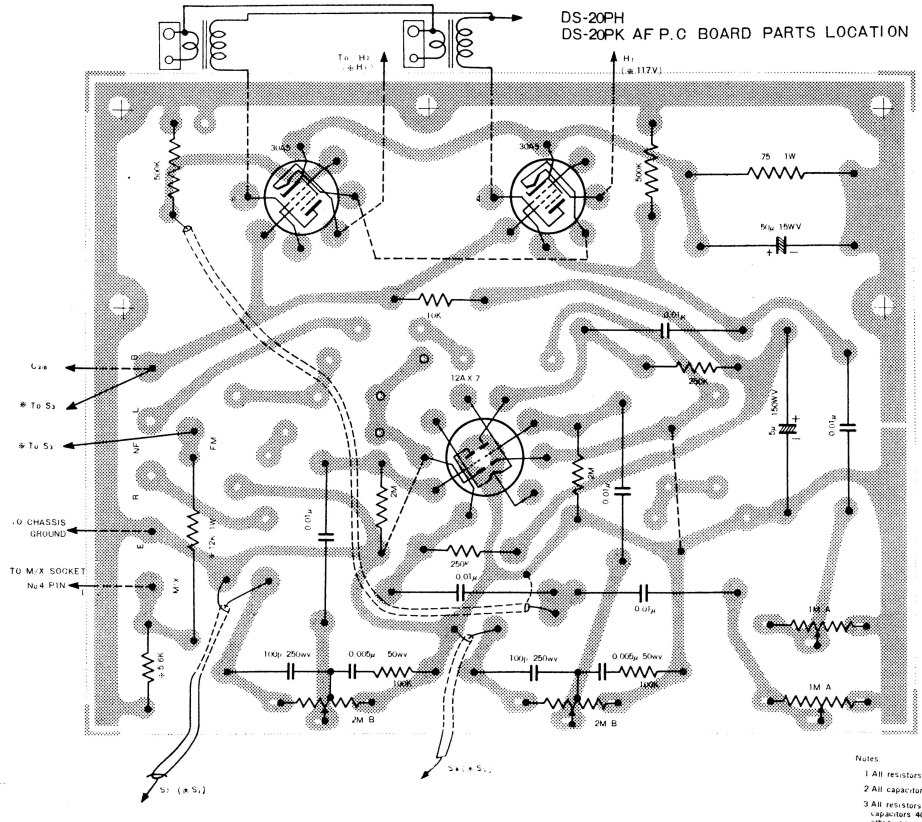
1. All resistors marked in ohm (½ watt.)
2. All capacitors marked in FD.
3. No mark = paper capacitor (400WV)
   △ mark = Titanium 〃 (250WV)
   ✱ mark = 〃 (50WV)
   □ mark = Mylar 〃 (50WV)
   ⊠ mark = Styrol 〃 (250WV)



IFT bottom view



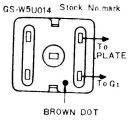
DS-20PH
DS-20PK AF P.C BOARD PARTS LOCATION



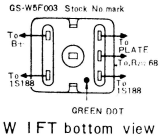
Notes

1. All resistors marked in ohm.
2. All capacitors marked in FD
3. All resistors ½ watt and all capacitors 400WV unless otherwise noted
4. ✱ mark = Show DS-20PK only.

GS-W5U014 Stock No mark

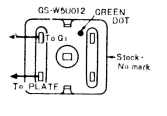


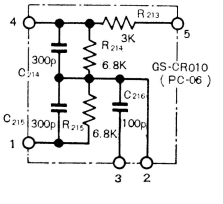
GS-W5F003 Stock No mark



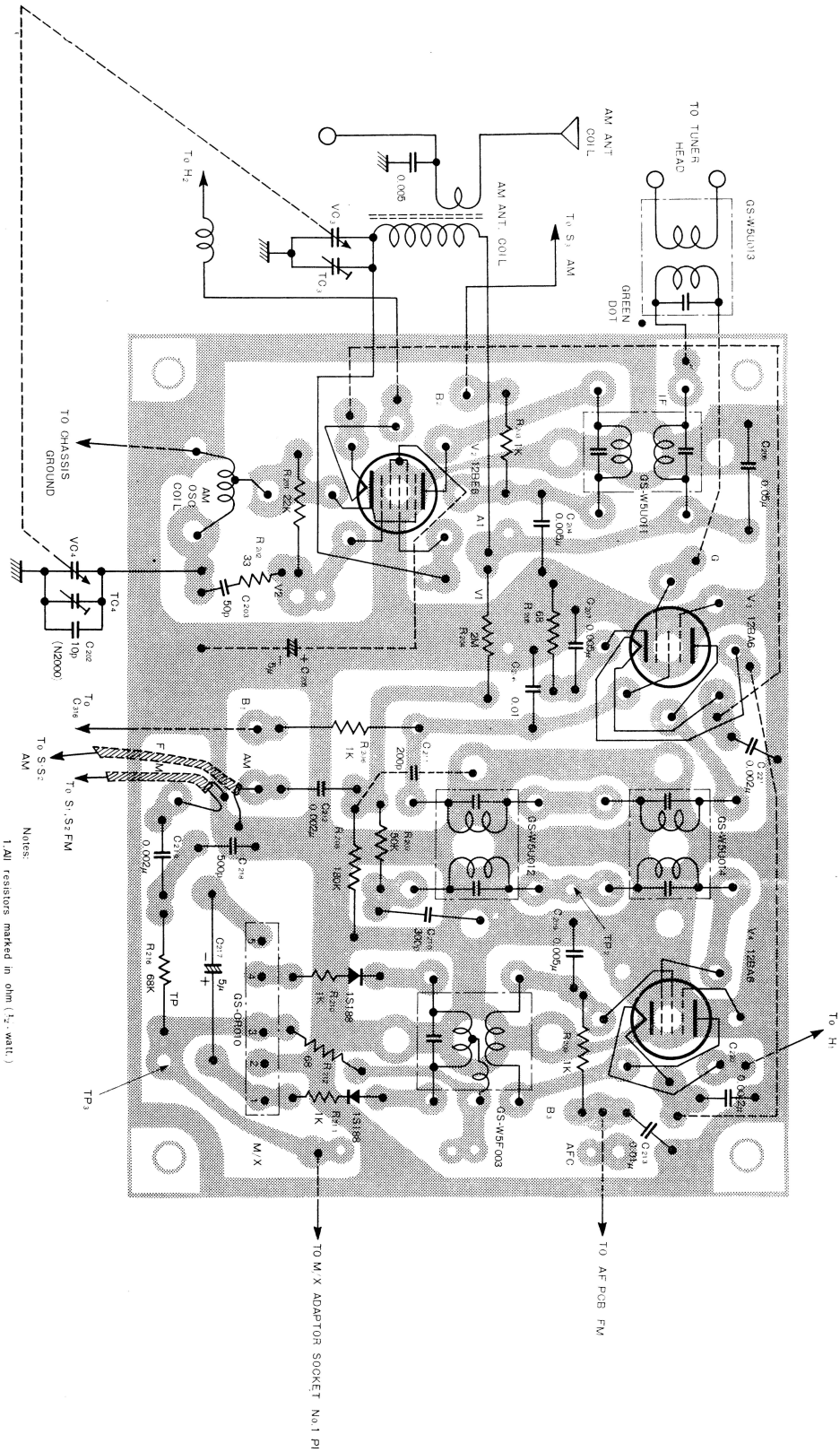
W IFT bottom view

GS-W5U011
GS-W5U012 GREEN DOT

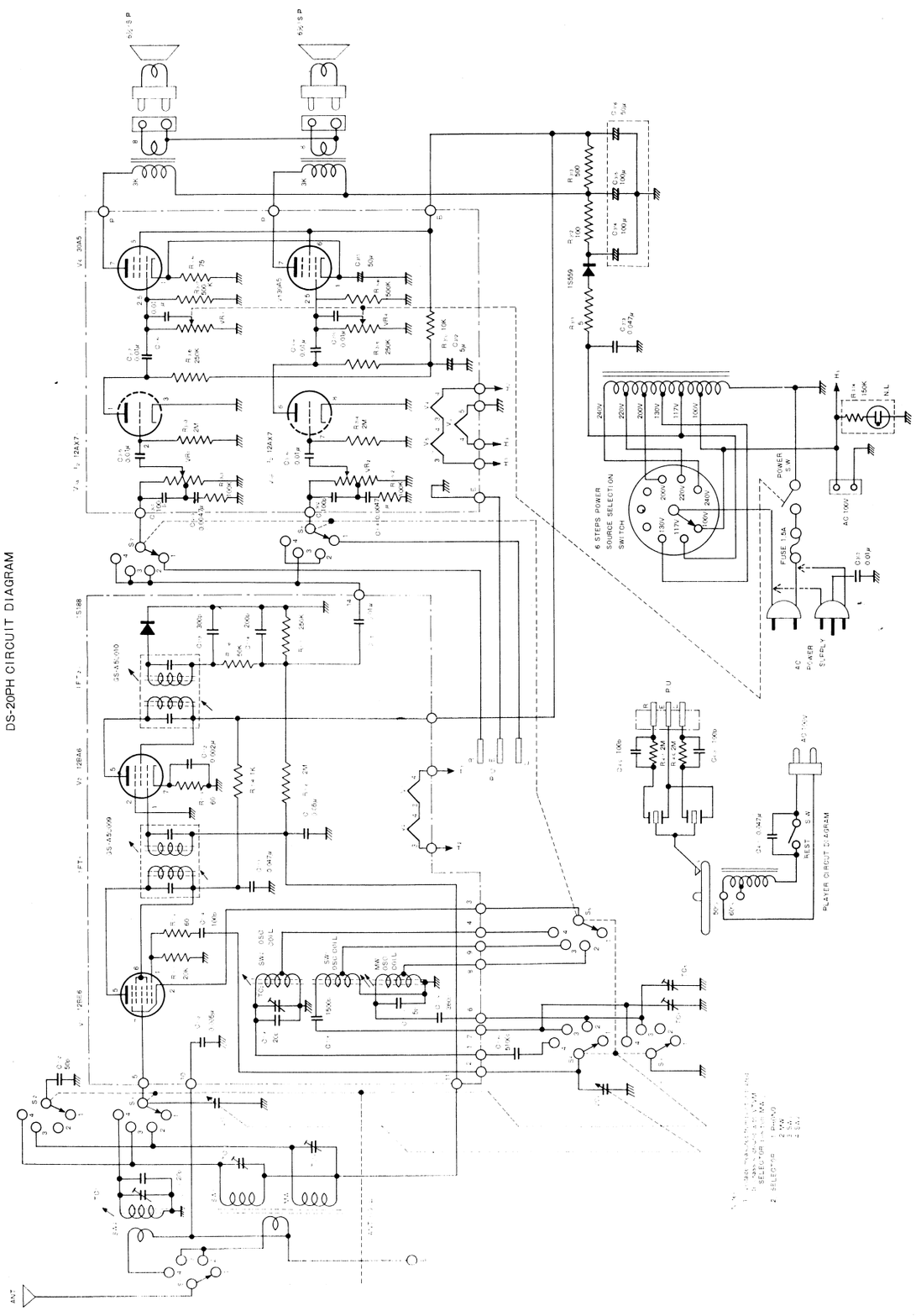




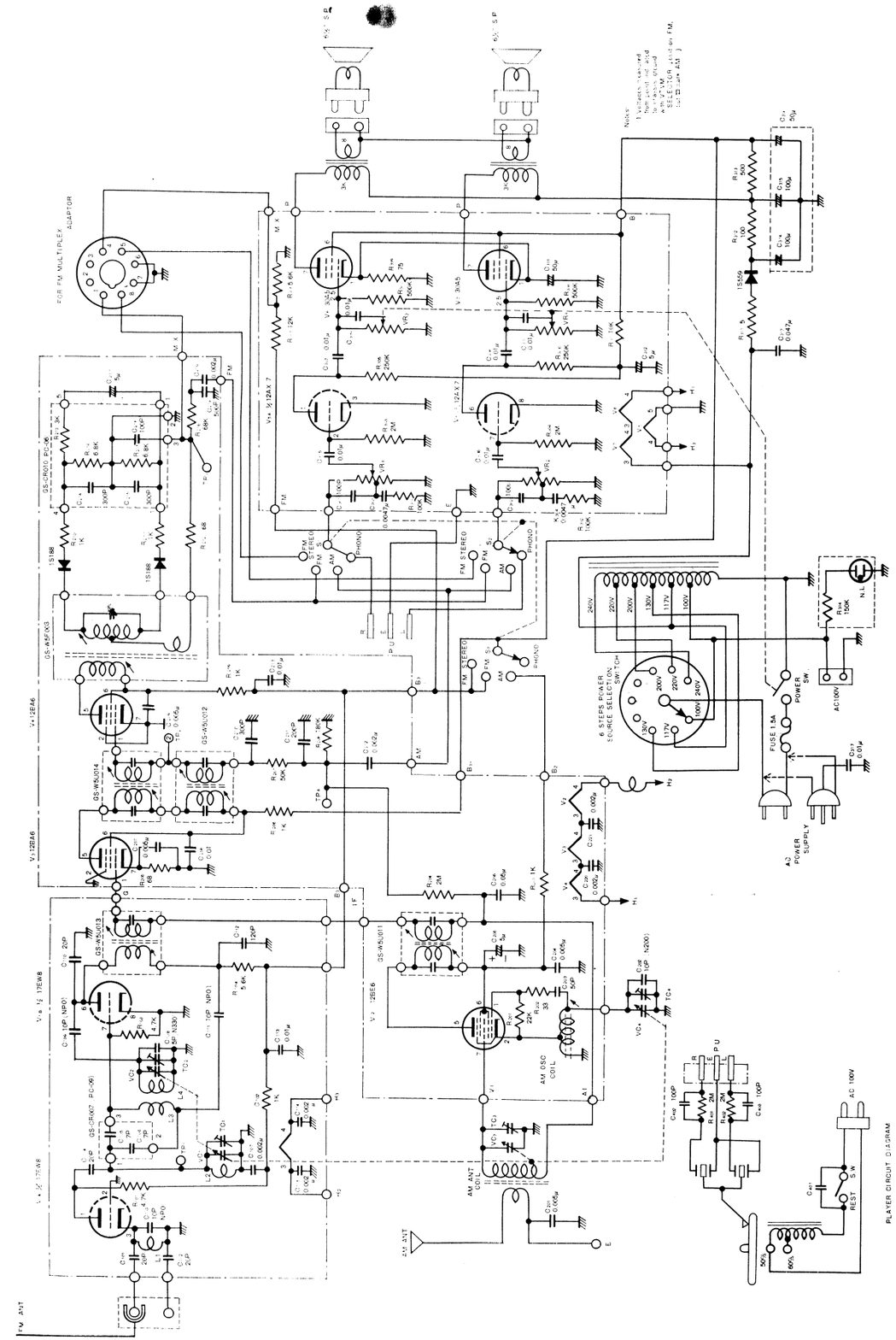
AF P.C. BOARD PARTS LOCATION



CIRCUIT DIAGRAM

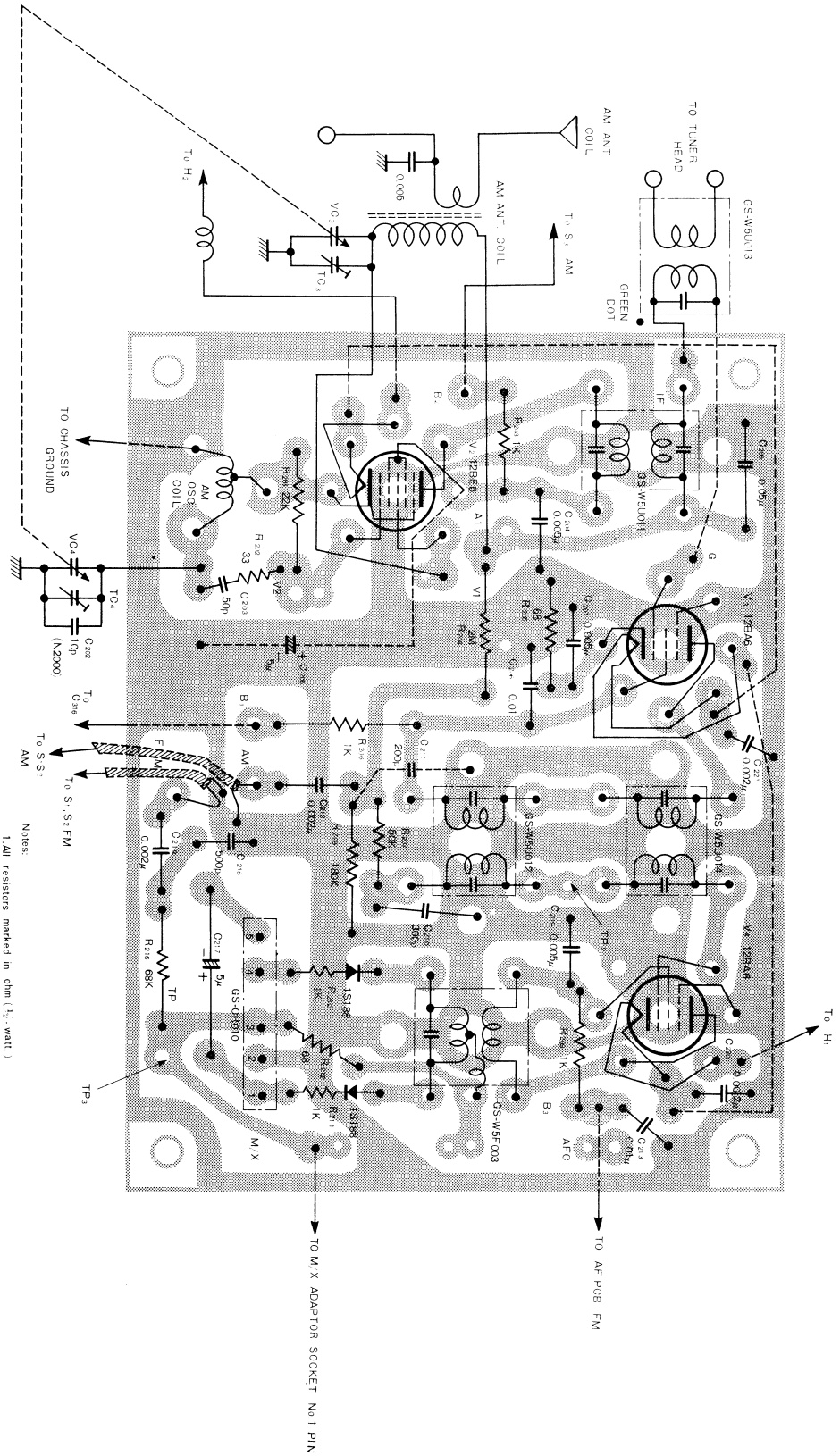


DS-20PH CIRCUIT DIAGRAM

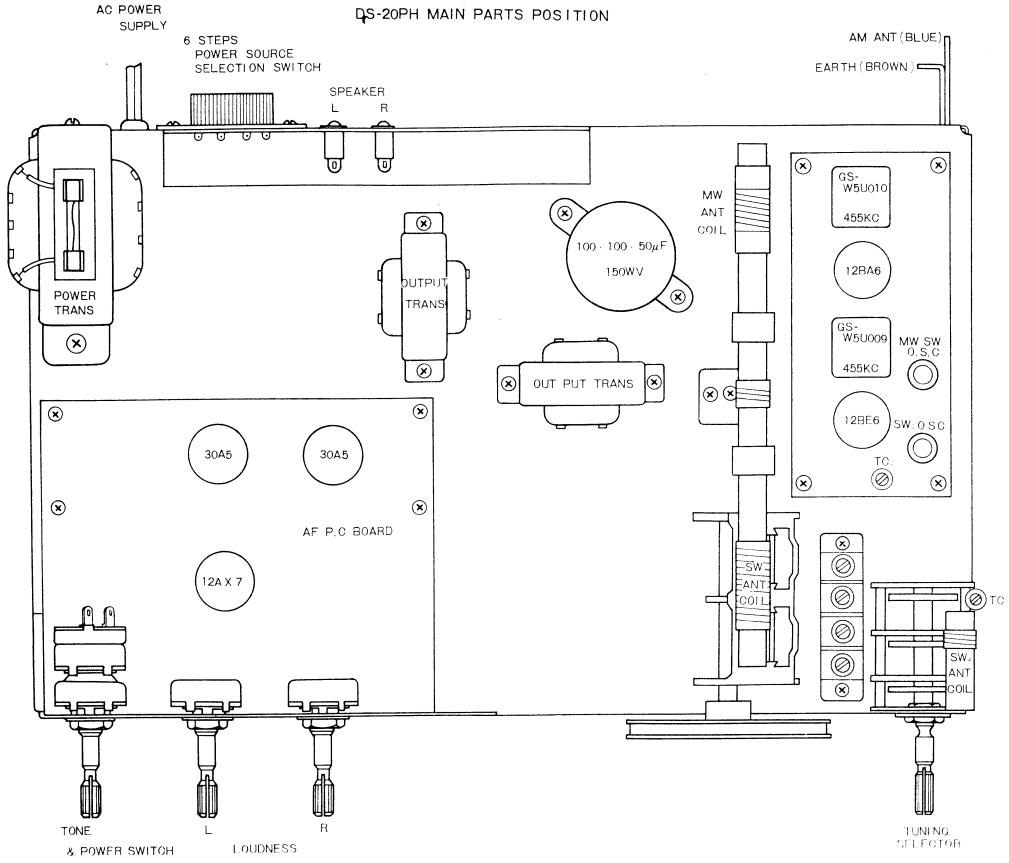


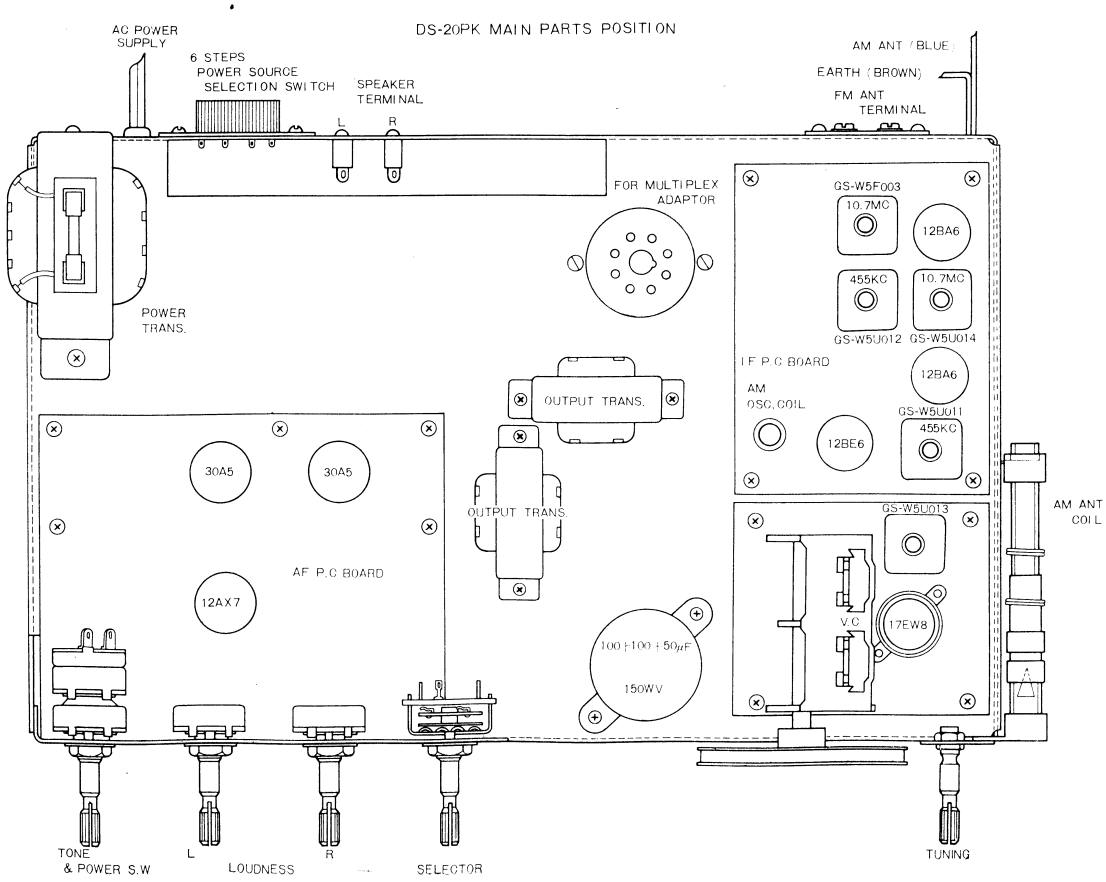
DS-20PK CIRCUIT DIAGRAM

AF P.C. BOARD PARTS LOCATION



MAIN PARTS POSITION





PARTS LIST

STOCK No. DS-20PH	STOCK No. DS-20KD	DESCRIPTION	Q'TY
CABINET			
GS-46342		Cabinet	1
GS-36126		Sash	1
GS-S8590		Lid complete	1
GS-46343		—Lid	1
GS-38054		—Lid decoration	1
GS-36127		—Lid sash	1
GS-44077		—Lid cushion rubber	1
GS-42363		Print mark	1
GS-S8664	GS-S8666	Dress panel complete	1
GS-26304	GS-26305	—Dress panel	1
GS-42733	GS-42660	—Panel board	1
GS-36128		—Sash	2
GS-38067	GS-38060	—Dial plate	1
GS-26242		—Badge	1
GS-S8592		Hinge complete	2
GS-111002		—Hinge metal	2
GS-111003		— 〃	2
GS-15196		—Hinge shaft	2
GS-S8515		Knob complete	4
GS-33110		—Knob	4
GS-26208		—Knob decoration	4
GS-S8514	GS-S8593	Tuning knob complete	1
GS-33110	GS-32098	—Tuning knob	1
GS-26207	GS-26262	—Tuning knob decoration	1
GS-44084		Cabinet leg rubber	4
GS-11254		Plate nut	2
GS-42734		Back board	1
GS-S8342		Stay complete	1
GS-11658		—Arm E1	1
GS-11663		—Arm E2	1
GS-24215		—Shaft (A)	1
GS-24216		— 〃 (B)	1
GS-11067		—Arm fixing metal (A)	1
GS-11068		— 〃 (B)	1
		—Washer (A) 7.0φ×4.2φ×0.5t vinyl	3
		— 〃 (B) 7.0φ×5.2φ×0.5t 〃	3
GS-26279		Shield plate	1
PLAYER			
GS-46344		Motor board	1
GS-34022		Spacer	3
GS-34023		Arm Rest	1
GS-15136		45 EP adaptor pin	1
GS-33113		45 EP adaptor	1
GS-44085		Turntable rubber seat	1
GS-26264		— 〃 name plate	1
GS-44053		Cushion rubber	2
GS-11525		Back board fixing metal	2
GS-11704		Arm stopper	1
GS-12069		Reinforcement board	1
GS-12070		Shield metal plate	1
GS-S8625		Speed selector knob complete	1
GS-39071		— 〃 knob	1
GS-26277		— 〃 knob decoration	1
GS-26278		Speed indicate plate	1
CHASSIS			
GS-111109	GS-111117	Chassis	1
GS-111110		Sub chassis	1
GS-111005		Chassis leg	4
GS-111111	GS-111006	Holding metal	1
GS-111007		〃	1
GS-S8655	GS-S8595	Dial shaft complete	1
GS-24366	GS-24341	Dial shaft	1
GS-24265		Shaft mounting metal	1
GS-24242		Shaft fixing nut	1
		E type ring	1
GS-24342		Dial pointer	1
GS-35024		Pulley	4
	GS-35024	〃	3
GS-24007		Pulley shaft	4
	GS-24007	〃	3
GS-S8559		Drum complete	1
GS-32087		Drum	1
GS-28019		Insert boss	1
GS-15001		Tube clamper	2

STOCK No. DS-20PH	STOCK No. DS-20PK	DESCRIPTION	Q'TY
CHASSIS			
GS-31004		Cord stopper	1
		String	1
		String spring	1
GS-111112	GS-111119	Back plate	1
GS-111113	GS-111009	Antenna angle	1
GS-44009		V.C. rubber	2
	GS-44059	Pilot lamp holder	4
	GS-14076	Pulley shaft	4
	GS-47236	Insulator	1
ELECTRICAL PARTS			
	GS-S0010	FM Tuner head complete 17EW8	1
		Tube 12BE6	1
		〃 12BA6 (DS-20PH)	1
		〃 12BA6 (DS-20PK)	2
		〃 12AX7 (low nois)	1
		〃 30A5	2
		Silicon 1S559	1
		Diode 1S188 (DS-20PH)	1
		〃 1S188 (DS-20PK)	2
GS-W3039		MW SW1 oscillator coil	1
GS-W3040		SW2 oscillator coil	1
	GS-W3024	Oscillator coil	1
GS-W2033		MW SW1 antenna coil	1
GS-W2048		SW2 antenna coil	1
	GS-W2044	Antenna coil	1
GS-C1013		Variable capacitor	1
GS-S4100	GS-S4064	Rotary SW.	1
GS-R1104		Variable resistor 2M ohm × 1B	2
GS-R1105		〃 1M ohm × 2A	1
GS-W5U009	GS-W5U011	I.F.T. 455 Kc	1
GS-W5U010	GS-W5U012	I.F.T. 455 Kc	1
	GS-W5U014	I.F.T. 10.7 Mc	1
	GS-W5F003	Detector transformer 10.7 Mc	1
GS-C9028		Electrolytic capacitor 100μF + 100μF	1
		+50μF 150WV	1
GS-W7050		Power transformer	1
		Power cord	1
		Fuse 1.5A	1
GS-S8456		Sign decoration	1
GS-S1051		Neon lamp	1
GS-S2024		MT socket with center pin	2
	GS-S2024	〃	3
GS-S2025		MT socket without center pin	2
GS-S2029		MT socket (9 pin) with center pin	1
GS-C0010		Ceramic trimmer	2
GS-C0003		4 motions trimmer	1
GS-S2043		2P socket	2
GS-S3009		2P cord connector socket	1
GS-S1055		Cord tip plug	1
GS-S3121		1-5P lug board	1
GS-W6035		O.P.T.	2
GS-41095	GS-91061	Printed circuit board	1
GS-41096		〃	1
	GS-CR1010	C.R. packed	1
	GS-W1003	Heater coil	1
	GS-S3093	Antenna terminal	1
	GS-S1013	US type socket	1
GS-S4097		Voltage selector switch	1
GS-S1050		Fuse holder	1
	GS-S3021	1-5P lug board	2
	GS-S3009	1-2P lug board	1
	GS-23010	Lead terminal	1
GS-S6111A		Pickup	1
GS-W9018		Cartridge	1
GS-S1056		2P cord connector plug	1
GS-S4053		Rest switch	1
GS-3082		1-4P special lug board	1
GS-S5030		Motor	1

KEY No.	DESCRIPTION	Q'TY
RESISTORS (**DS-20PH**)		
R311	Carbon L type 5 ohm ±10% 1W	1
R312	〃 100 ohm 〃 2W	1