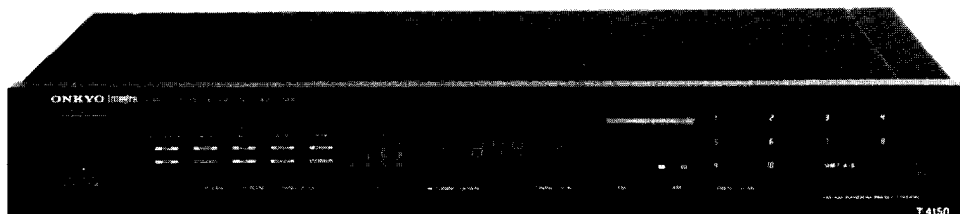


# ONKYO SERVICE MANUAL

## SYNTHESIZED FM STEREO/AM TUNER MODEL T-4150



### Black model

BUD, BUDN	120V AC, 60Hz
BUG	220V AC, 50Hz
BUW	120V/220V AC, 50/60Hz
BUQA	240V AC, 50Hz

### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  $\Delta$  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

## TABLE OF CONTENTS

Specifications . . . . .	2
Service procedures . . . . .	2
Block diagram . . . . .	3
Exploded view . . . . .	4
Parts list . . . . .	5
Circuit description . . . . .	6
Block diagram of IC . . . . .	8
Adjustment procedures . . . . .	11
Schematic diagram . . . . .	13
220V/240V models . . . . .	13
120V model . . . . .	17
Worldwide model . . . . .	21
Pc board view . . . . .	15
Main circuit . . . . .	15
Display/Operation switch . . . . .	23
Pc board-parts list . . . . .	19
Packing view . . . . .	24

**ONKYO**  
**AUDIO COMPONENTS**

## SPECIFICATIONS

<b>FM:</b>	120V model	Other models
Tuning Range:	87.9-107.9MHz(200kHz steps)	87.5-108.0MHz(50kHz steps)
Usable Sensitivity:	Mono: 10.3dBf, 0.9 $\mu$ V,IHF(75ohm)	10.3 dBf, 0.9 $\mu$ V, IHF, 0.8 $\mu$ V, 75ohms DIN
	Stereo: 17.2dBf, 2.0 $\mu$ V(75ohm)	2.0 $\mu$ V 75ohm
50dB Quieting Sensitivity:	Mono: 16.1dBf, 1.7 $\mu$ V(75ohm)	1.7 $\mu$ V 75ohm
	Stereo: 36.1dBf, 17 $\mu$ V(75ohm)	17 $\mu$ V 75ohm
Capture Ratio:	1.3dB	1.3dB (Wide)
Image Rejection Ratio:	70dB	70dB
IF Rejection Ratio:	90dB	90dB
Signal-to-Noise Ratio:	Mono: 75dB	Mono: 75dB
	Stereo: 73dB	Stereo: 73dB
ACA:	80dB IHF( $\pm$ 400kHz) (Narrow)	
Selectivity:		60dB DIN( $\pm$ 300kHz, 40kHz devi.)
AM Suppression Ratio:	50dB	50dB
Total Harmonic Distortion:	Mono: 0.1% (Wide)	Mono: 0.1% (Wide)
	Stereo: 0.2% (Wide)	Stereo: 0.2% (Wide)
Frequency Response:	30-15,000Hz (+0.5 $\sim$ -1.0dB)	30-15,000Hz (+0.5 $\sim$ -1.0dB)
Stereo Separation:	45dB at 1kHz (Wide)	45dB at 1kHz (Wide)
	30dB at 70-10,000Hz (Wide)	30dB at 70-10,000Hz (Wide)
Output voltage:	600mV	800mV
Muting level:	17.2dBf, 2.0 $\mu$ V (75ohm)	2 $\mu$ V, 75ohm
<b>AM:</b>		
Tuning Range:	530-1,620kHz(10kHz steps)	522-1,611kHz(9kHz steps)
Usable Sensitivity:	25 $\mu$ V	25 $\mu$ V
Image Rejection Ratio:	40dB	40dB
IF Rejection Ratio:	30dB	30dB
Signal-to-Noise Ratio:	40dB	40dB
Total Harmonic Distortion:	0.8%	0.8%
Output voltage:	150mV	150mV
<b>GENERAL:</b>		
Dimensions(W $\times$ H $\times$ D):	435 $\times$ 72 $\times$ 368mm	
	17-1/8" $\times$ 2- 3/4 " $\times$ 14-1/2 "	
Weight:	3.7kg., 8.2lbs.	

Specifications and features are subject to change without notice.

## SERVICE PROCEDURES

### 1. Safety-check out

(Only U.S.A. model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer.

Connect the insulating-resistance tester between the plug of power supply cord and chassis.

Specifications: 3.3Mohm  $\pm$ 10% at 500V.

### 2. Memory preservation

This unit does not require memory preservation batteries.

A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit.

On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

### 3. Change of FM/AM band step.

— 120V model —

This model is not located the band selector switch.

If the FM band step is changed from 200kHz to 50kHz, add two diodes (1SS133) to D707 and D708 on the main PC board.

If the AM band step is changed from 10kHz to 9kHz, add a diode (1SS133) to D710 on the main PC board.

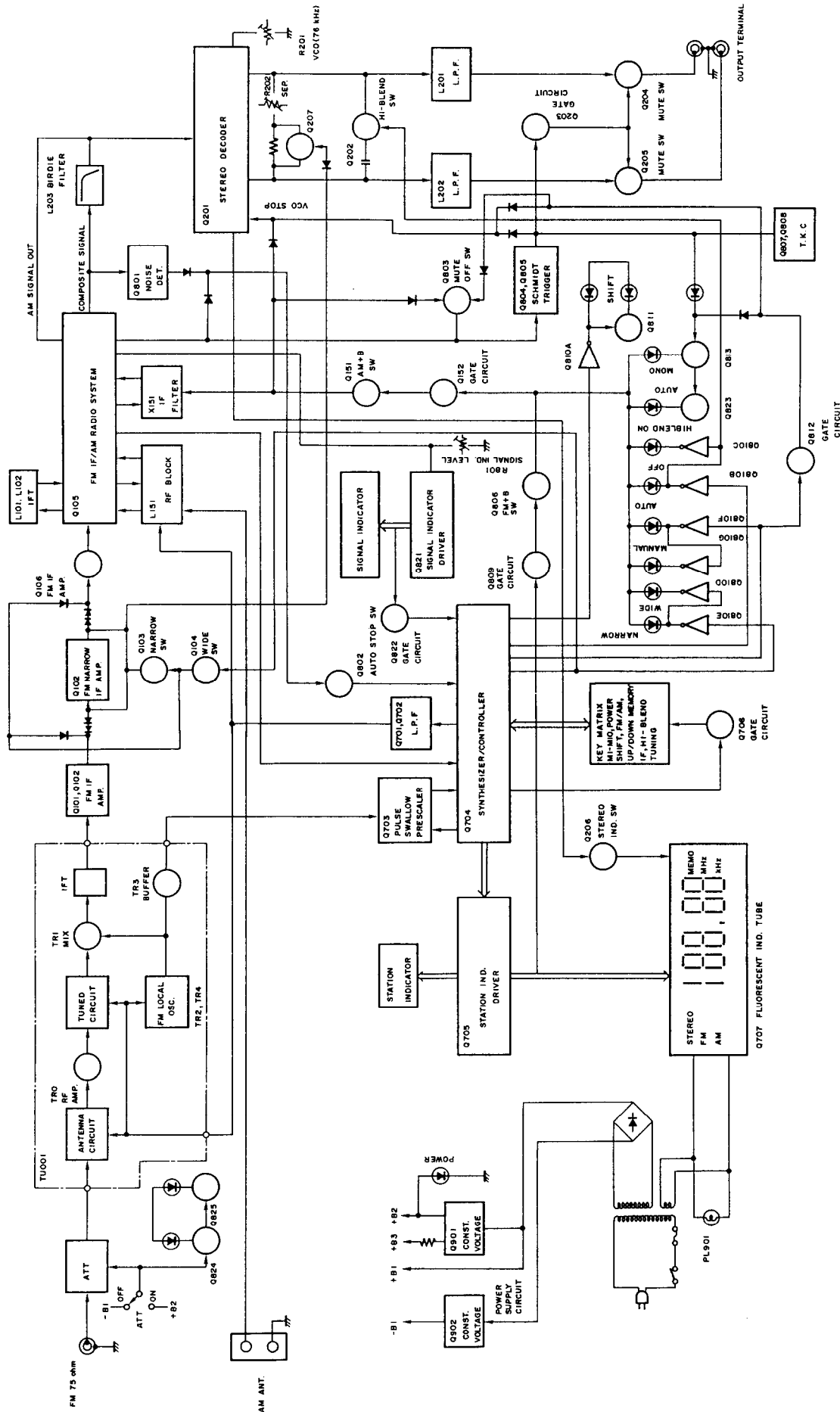
—220V model —

This model is not located the band selector switch.

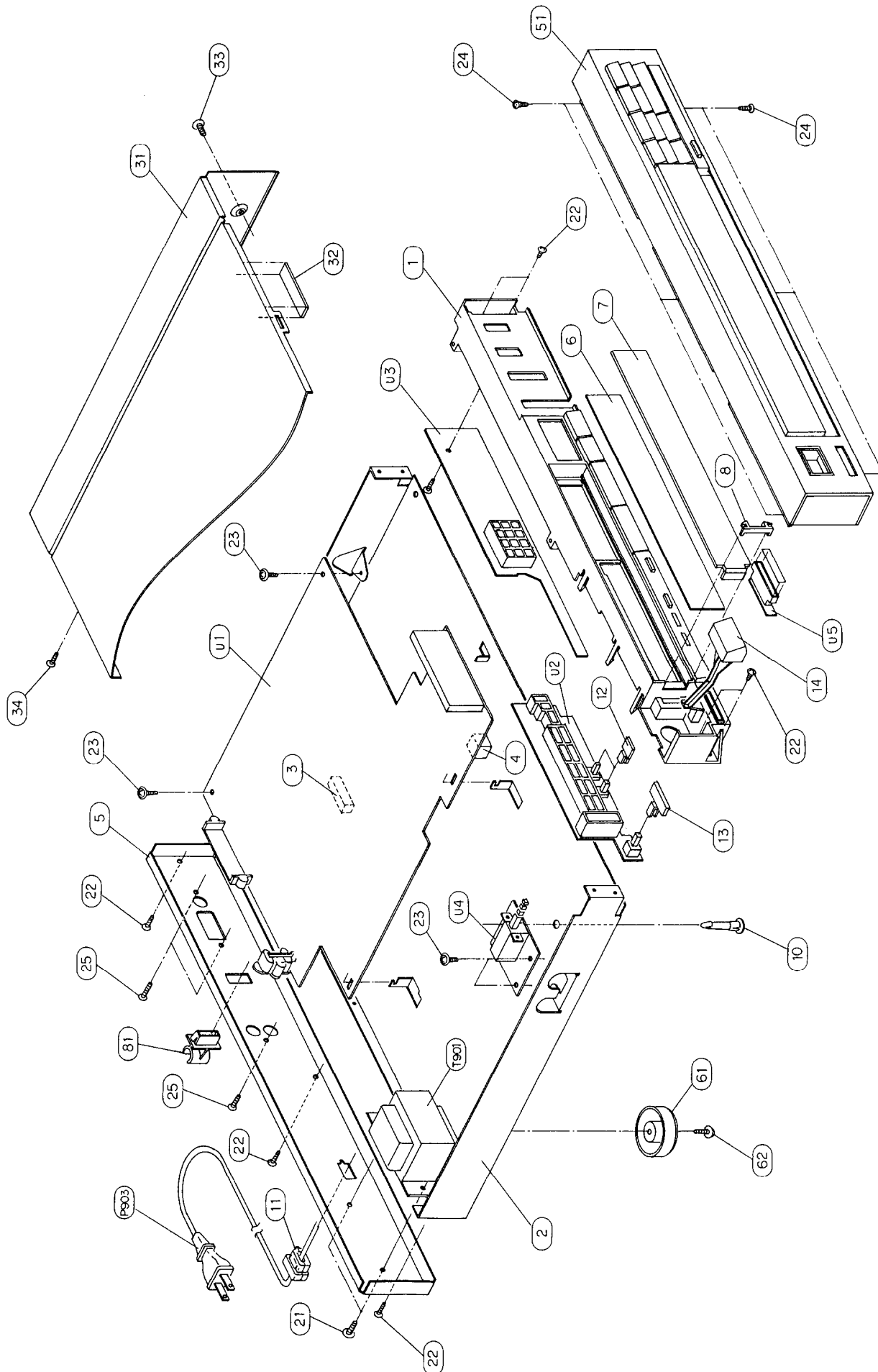
If the FM band step is changed from 50kHz to 200kHz, remove two diodes (1SS133) to D707 and D708 on the main PC board.

If the AM band step is changed from 9kHz to 10kHz, remove a diode (1SS133) to D710 on the main PC board.

# BLOCK DIAGRAM



**EXPLODED VIEW**



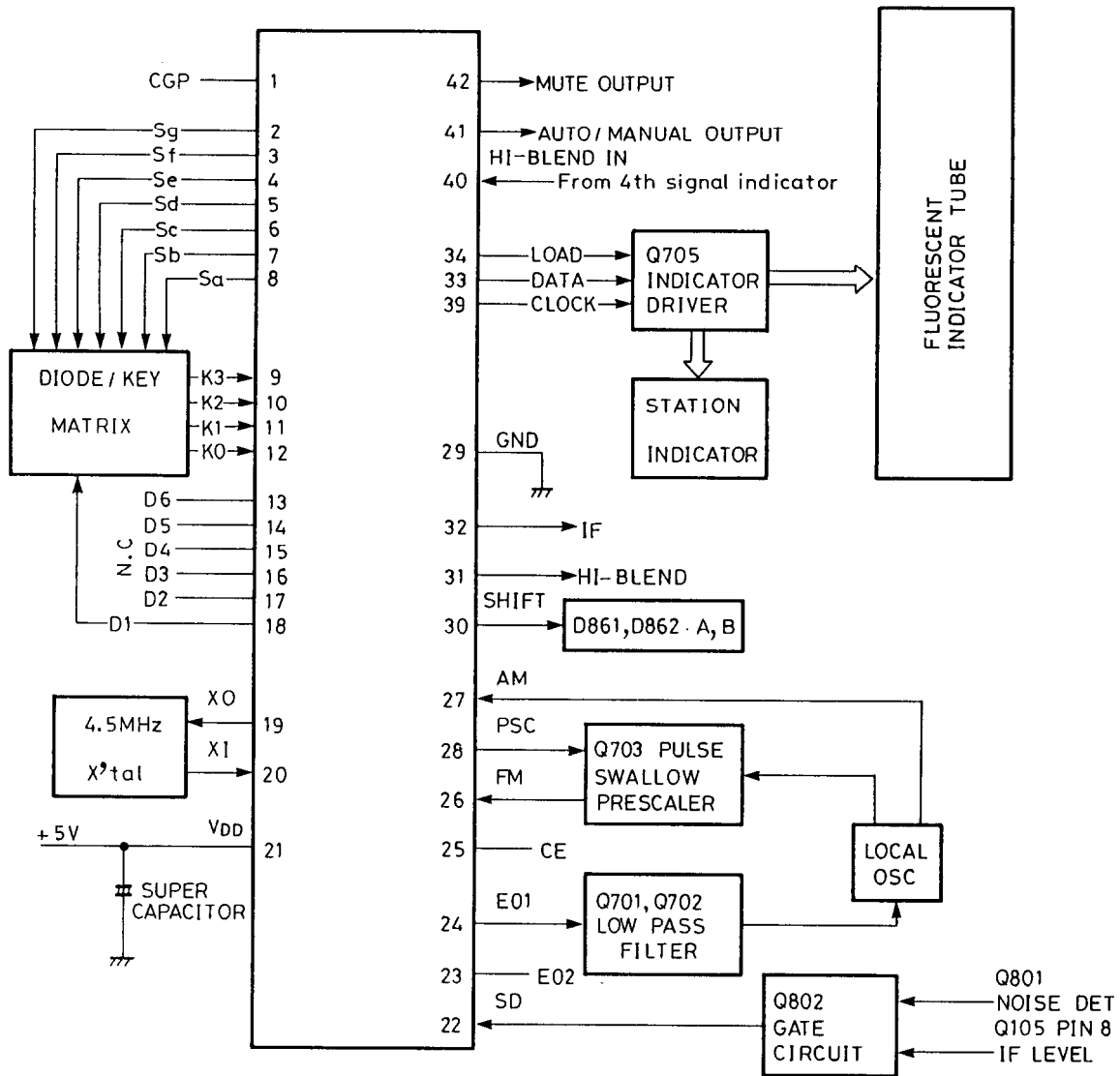
# PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
1	27110357A	Front bracket ass'y		2300242	▲ NPT-937Q, Power transformer <Q>
2	27100129A	Chassis	U1	1A038562-1	NARF-2962-1, Main circuit pc board ass'y <D>
3	28140553	Cushion		1A038562-1A	NARF-2962-1A, Main circuit pc board ass'y <G/Q>
4	28140492	Cushion		1A037562-1B	NARF-2962-1B, Main circuit pc board ass'y <W>
5	27121024	Back panel <D>		1A038563-1	NASW-2963-1, Operation switch pc board ass'y
	27121024	Back panel <G>		1A038564-1	NADIS-2964-1, Display circuit pc board ass'y
	27120983	Back panel <W>		1A038565-1	NASW-2965-1, Power switch pc board ass'y <D>
	27121023	Back panel <Q>		1A038565-1A	NASW-2965-1A, Power switch pc board ass'y <G/W/Q>
6	28133181	Back plate	U2	1A038566-1	NADIS-2966-1, Power indicator pc board ass'y
7	28130246	Dial plate		1A037567-1	NASW-2967-1, Band selector switch pc board ass'y <W>
8	27190501	Holder, dial plate	U3		
10	27190428	Holder	U4		
11	27300750	▲ Strainrelief			
12	28322754	Knob, push			
13	28322755B	Knob, timer			
14	28322756A	Knob, power			
21	838440089	4TTB+8C(BC), Tapping screw			
22	834430088	3TTS+8B(BC), Tapping screw	U5		
23	831130088	3TTW+8B, Tapping screw			
24	833430080	3TTP+8B(BC), Tapping screw	U6		
25	834430108	3TTS+10B(BC), Tapping screw			
31	28184336	Top cover			
32	28140020	Cushion			
33	838440089	4TTB+8C(BC), Tapping screw			
34	834430088	3TTS+8B(BC), Tapping screw			
51	1A037121	Front panel ass'y			
61	27175152	Leg			
62	831430088	3TTW+8B(BC), Tapping screw			
81	27190105	Holder, antenna			
P903	253142 or 253142A	▲ AS-UC-7 #18, Power supply cord			
	253128B or 253130A	▲ AS-CEE, Power supply cord <G/W>			
	253118	▲ AS-SAA, Power supply cord <Q>			
S902	25065123	▲ NPS-1258P, Voltage selector switch <W>			
T901	2300215	▲ NPT-937D, Power transformer <D>			
	2300216	▲ NPT-937G, Power transformer <G>			
	2300217	▲ NPT-937DG, Power transformer <W>			

NOTE:  
 <D>:Only 120V model  
 <G>:Only 220V model  
 <W>:Only Worldwide model  
 <Q>:Only 240V model  
 <PX>:Only PX model

NOTE: THE COMPONENTS IDENTIFIED BY MARK ▲ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

# CIRCUIT DESCRIPTION



Pin No.	Symbol	Terminal	Description
1	CGP		Output terminal for sound "PEE".
2 - 8	Sa - Sg	Segment outputs	Display tube signal terminal output and key return signal source terminals; active high. Since these terminals can handle 30V, they are connected directly to the segment terminals of the fluorescent display tube.
9 - 12	K0 - K3	Key return signal inputs	Terminals for input of the key return signals from external matrix circuit.
13 - 18	D1 - D6	Digit outputs	Display tube digit output signal terminals; active low.(Not used) D1 is used the key return signal source to diode matrix.
19, 20	X0, X1	X'tal	Connect to the 4.5MHz crystal oscillator.
21	V <sub>DD</sub>	Power source input	Device power source terminal; supplies 5V during normal operation and 2.5V from the super capacitor C711 for memory preservation.

Pin No.	Symbol	Terminal	Description
22	SD	Station detector signal input	Input terminal for detecting whether or not a broadcast signal is being received during auto-tuning. Stopped by the high level.
23, 24	E01, E02	Error outputs	Charge pump output of the phase detector with constitutes the PLL. High level is output when the divided oscillation frequency is higher than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies match. The output is applied to the variable capacitor diode in the front end through the low pass filter Q701 and Q702. The output from both terminals is same, but only E01 is used.
25	CE	Chip enable	Device selection signal in put terminal. High level . . . Normal operation Low level . . . Memory preservation
26	FM	FM local oscillator signal input	Input terminal for FM local oscillator is divided by 1/16 or 1/17 by prescaler Q703.
27	AM	AM local oscillator signal input	Terminal for input of the AM local oscillator signal.
28	PSC	Pulse swallow control output	This terminal outputs a signal that switches the prescaler division ratio of Q703 to 1/16 or 1/17 when the pulse swallow method is used for division. (FM only)
29	GND	Ground	
30	SHIFT	Preset reverse indication output	Terminal for indication output whether M1-M8 or M9-M16 the preset key. M1-M8: Low level M9-M16: High level
31	HI-BLEND	HI-BLEND output	Output to switch the hi-blend filter. Active low.
32	IF	IF band output	IF band selector output. Wide position at the low level.
33	DATA	DATA output	DATA/LOAD/CLOCK outputs to indicator driver IC $\mu$ PD6320G.
34	LOAD	LOAD output	
39	CLOCK	CLOCK output	
38	INT		Not used.
40	HI-BLEND	HI-BLEND	Hi-blend input terminal. Hi-blend turns off when this terminal becomes high level.
41	AUTO/ MANUAL	Auto/Manual indication output	Terminal for indication output whether or auto the tuning mode. This terminal becomes high during auto mode and low during manual mode.
42	MUTE	Muting output	Output terminal which mutes the shock noise occurring when the PLL is released; active high. The muting signal is output as shown below. UP/DOWN of manual/auto mode, preset memory is recalled, band switching and preset scan.

**Control key and diode matrix connections**

	K3(9)	K2(10)	K1(11)	K0(12)
Sg(2)	M4/M14	M3/M13	M2/M12	M1/M11
Sf(3)	M8/M18	M7/M17	M6/M16	M5/M15
Se(4)		PRESET SCAN	M10/M20	M3/M19
Sd(5)	SHIFT	LW	MW	FM
Sc(6)	AUTO MANUAL	MEMORY	DOWN	UP
Sb(7)	HI-BLEND	DISPLAY	PROGRAM	WIDE/ NARROW
Sa(8)	*10/9kHz	*LW2	*LW1	*AM
D1(18)	*BAND 0	*BAND 1	*10/8	STATIC/ DYNA

\*Diode matrix table 1

BAND0, BAND1 ..... FM band settings. See table 2.  
 10/9kHz ..... AM band settings. See table 3.

BAND0	BAND1	REGION	FREQUENCY RANGE	CHANNEL SPACE
D708	D707			
0	0	U.S.A.	87.9-107.9MHz	200kHz
1	1	Europe	87.50-108.00MHz	50kHz

0: Open 1: Connect the diode (1SS133). table 2

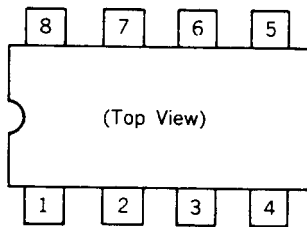
AM	10kHz/9kHz	FREQUENCY RANGE	CHANNEL SPACE
	D710		
0	0	530-1620kHz	10kHz
0	1	522-1611kHz	9kHz
1	0	531-1602kHz	9kHz

0: Open 1: Connect the diode (1SS133). table 3

**BLOCK DIAGRAM OF IC**

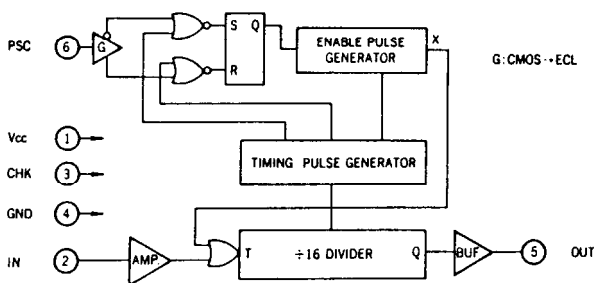
$\mu$ PB553AC (Prescaler)

**Pin Connection**

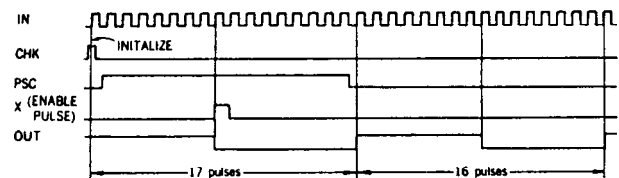


1. Pin 1 (Vcc) ..... +5 volts Supply
2. Pin 2 (IN) ..... FM local oscillator signal input
3. Pin 3 (CHK) ..... Check terminal
4. Pin 4 (GND) ..... Ground terminal
5. Pin 5 (OUT) ..... Prescaler terminal
6. Pin 6 (PSC) ..... Prescaler control terminal
7. Pin 7, 8 ..... Not connected

**Block Diagram**

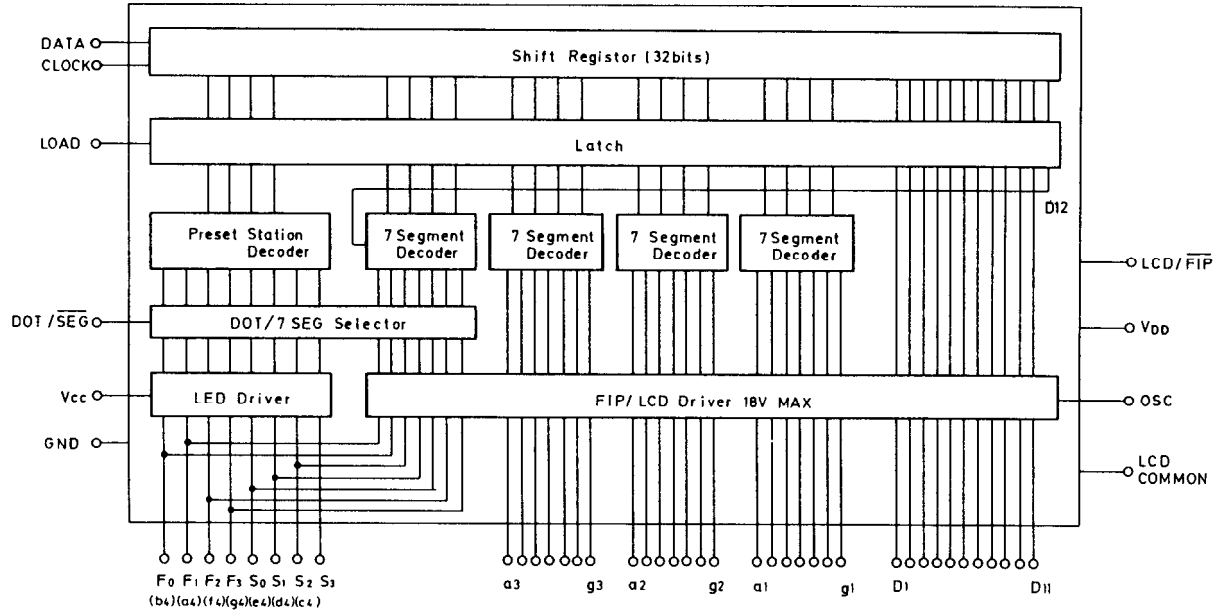


**Timing Chart**

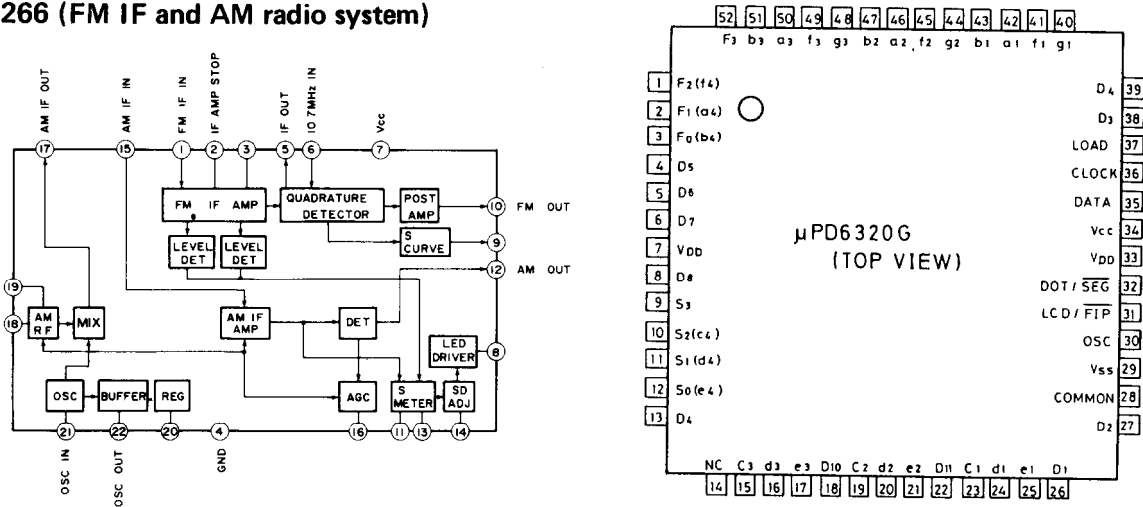




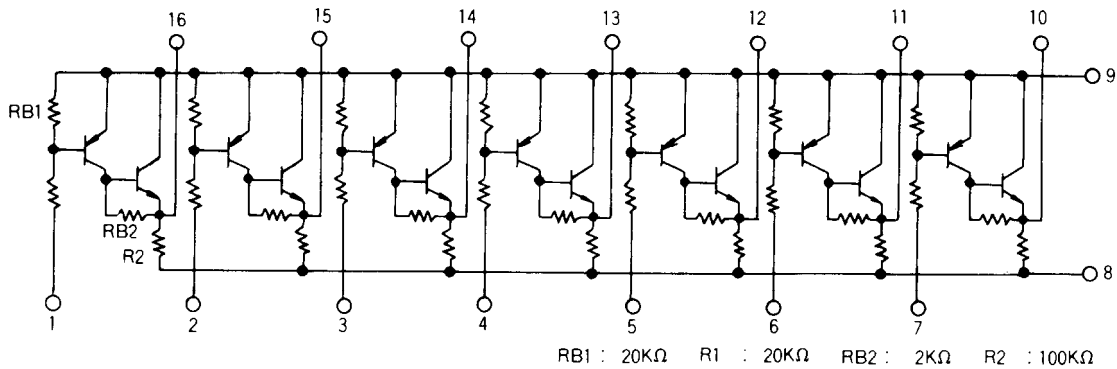
**μPD6320G (Indicator Driver)**



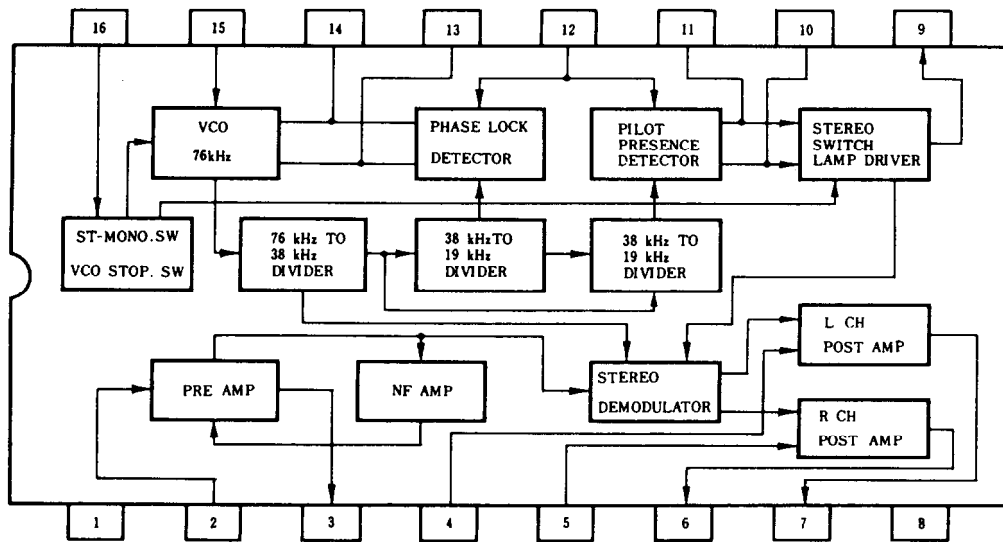
**LA1266 (FM IF and AM radio system)**



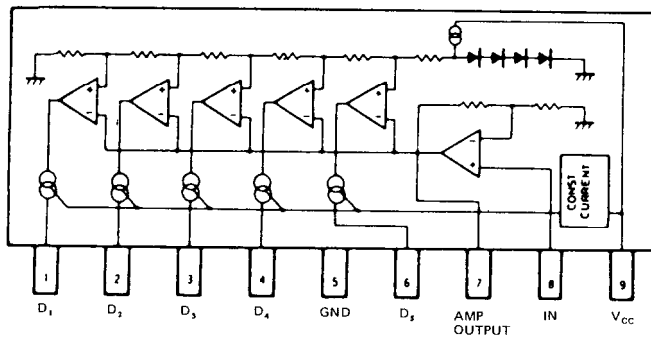
**μPA81C (Buffer)**



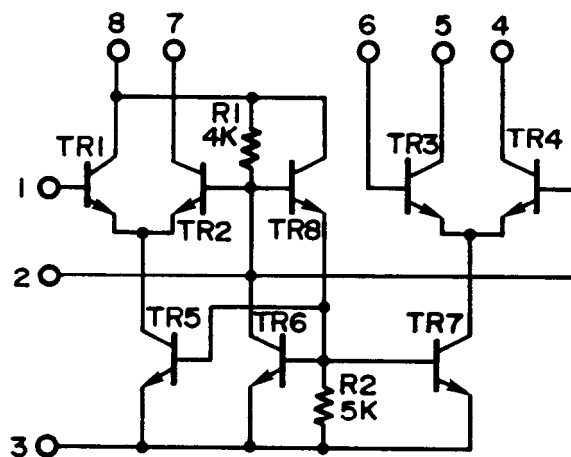
$\mu$ PC1235 (Stereo decoder)



LB1403 (Signal meter driver)

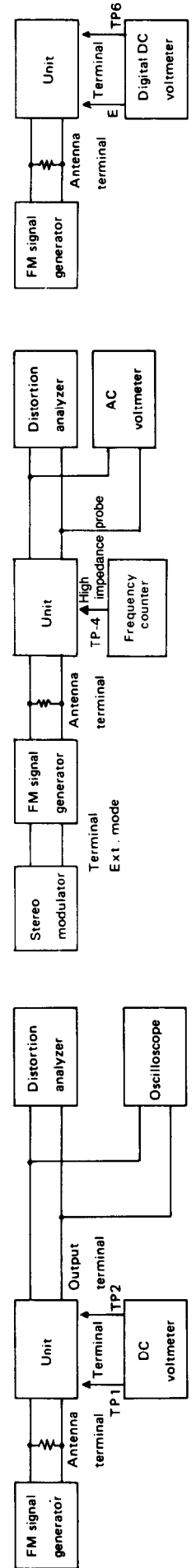


LA1222 (FM IF Amp)



# ADJUSTMENT PROCEDURES

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuned frequency	Output indicator	Adjustment point	Adjust for	Remarks
IF	1	Fig. 1	99.1MHz 1kHz, 75kHz devi. 65dBf(60dB)		99.1MHz	DC millivoltmeter	L101	0V±20mV	Set the antenna attenuator switch to OFF. Set the mode switch to MONO. Repeat the steps 1 and 2 until no further adjustment is necessary.
	Distortion analyzer					L102	Minimum		
Muting level		Fig. 1	99.1MHz 1kHz, 75kHz devi. 20.2dBf(15dB)		99.1MHz	Oscilloscope	R101	Signal output	Set the IF band switch to NARROW. Set the mode switch to AUTO.
VCO		Fig. 2	99.1MHz 1kHz, 75kHz devi. 65dBf(60dB)		99.1MHz	Frequency counter	R201	19kHz±10Hz	Set the IF band switch to WIDE.
Stereo distortion		Fig. 2	99.1MHz Ext. modulation 65dBf(60dB)	L + R 1kHz 67.5kHz devi.	99.1MHz	Distortion analyzer	IFT on the front end (TU001)	Minimum	Maximum and same separation.
				Lch. 1kHz Rch. 1kHz				R202	
Stereo separation	1	Fig. 2	99.1MHz Ext. modulation 65dBf(60dB)	Lch. 1kHz Rch. 1kHz	99.1MHz	Rch. AC voltmeter	R202	Minimum	Maximum and same separation.
	2							Lch. AC voltmeter	
Hi-blend level		Fig. 2	99.1MHz 1kHz, 75kHz devi. 35dBf(30dB)		99.1MHz	Hi-blend indicator	R801	Light off	
Tuned voltage	1	Fig. 3			87.50MHz 87.9MHz	Digital DC voltmeter		1.6±0.5V 1.7±0.5V	
	2							107.9MHz	



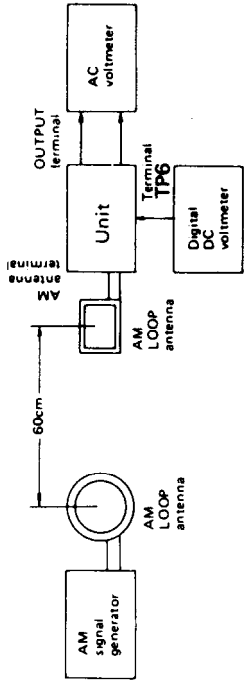
<Fig.1>

<Fig.2>

<Fig.3>

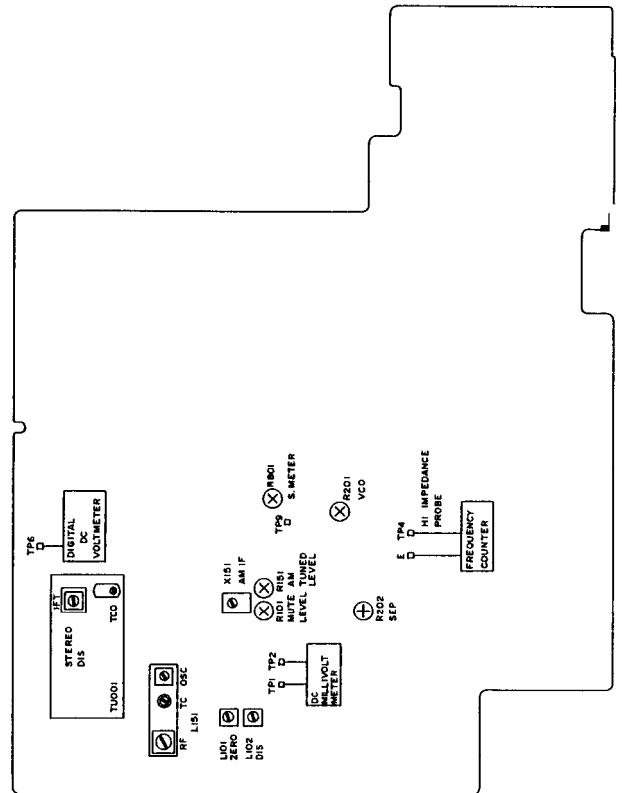
### AM section

Step	AM SG output	Tuned frequency	Output indicator	Adjustment point	Adjust for	Remarks
1		530kHz [522kHz] (531kHz)	Digital DC voltmeter	OSC on RF block (L151)	1.4V ± 0.1V	
2		1620kHz (1611kHz)	Digital DC voltmeter		7.9±0.2V (8.0 ± 0.2V)	
3	600kHz(603kHz) 400Hz 30% mod. 60dB/m	600kHz (603kHz)	AC voltmeter	RF on RF block (L151)	Maximum	Repeat the steps 3 and 4 until no further adjustment is necessary.
4	1400kHz (1404kHz) 400Hz 30% mod. 60dB/m	1400kHz (1404kHz)	AC voltmeter	TC on RF block (L151)	Maximum	
5	1000kHz (999kHz) 400Hz 30% mod. 60dB/m	1000kHz (999kHz)	AC voltmeter	X151	Maximum	
6	Same as above	1000kHz (999kHz)	First signal indicator	R151	Light on	



(Fig.4)

- [ ] : G/Q models
- < > : W model
- ( ) : 9kHz step model



# PRINTED CIRCUIT BOARD—PARTS LIST

## MAIN CIRCUIT PC BOARD (NARF-2962-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	<b>Front end</b>			<b>Transformers</b>	
TU001	240074	FE407-G	L001	233312	NFA-3051 <G>
	<b>ICs</b>		L101	233374	NFIF-4060
Q102	222577	LA1222	L102	233375	NFIF-4061
Q105	22240039	LA1266		<b>Coils</b>	
Q201	22240042	$\mu$ PC1235	L103	233304	NCH-2091
Q703	222619	$\mu$ PB553AC	L201, L202	233355A	NMC-4059
Q704	22240026	$\mu$ PD1711CU-524	L203	233236	NMC-6027
Q705	222770	$\mu$ PD6320G	L801	231081	NCH-2129
Q810	222807	$\mu$ PA81C		<b>RF block</b>	
Q901	222780122	78M12	L151	232135	NMRF-7045
	<b>Transistors</b>			<b>Ceramic filters</b>	
Q101, Q106	2210746	2SC945A(P)	X101, X104	3010043	SFE10.7MM(RED)
Q103, Q104	2211255,	2SC1815(GR),	X102, X103	3010087	SFE10.7MJA
Q151, Q152	2210746 or	2SC945A(P) or	X151	3010075	SFL450B3
	2212485	JC501(Q)	X152	3010076	BFU450C
Q202, Q207	2211945	2SK246(GR)		<b>X'tal</b>	
Q203, Q206	2211455 or	2SA1015(GR) or	X701	3010091	XTL-4.5M
Q706, Q809	2212495	JA101(Q)		<b>Capacitors</b>	
Q701	2211255 or	2SC1815(GR) or		C008	3.3 $\mu$ F, 50V, Elect.
	2210746	2SC945A(P)	C008	354780339	1 $\mu$ F, 50V, Elect.
Q204, Q205	2211705 or	2SD655(E) or	C114	354780109	47 $\mu$ F, 16V, Elect.
	2211706	2SD655(F)	C118, C160	354744709	0.22 $\mu$ F, 50V, Elect.
Q702	2212294	2SK108(D)	C151	354782299	3.3 $\mu$ F, 50V, Elect.
Q801	2211255	2SC1815(GR)	C154	354780339	10 $\mu$ F, 16V, Elect.
Q802-Q808	2211255,	2SC1815(GR),	C155, C157	354741009	4.7 $\mu$ F, 50V, Elect.
Q811-Q813	2210746 or	2SC945A(P) or	C156, C202	354780479	470 $\mu$ F, 16V, Elect.
	2212485	JC501(Q)	C201	354744719	10 $\mu$ F, 16V, Elect.
Q902	2211455	2SA1015(GR)	C207, C208	354741009	0.22 $\mu$ F, 50V, Elect.
	<b>Diodes</b>		C210	354782299	3.3 $\mu$ F, 50V, Elect.
D001	223165 or	BA282 or	C211	354780339	1 $\mu$ F, 50V, Elect.
	223149	1SS85	C212	354780109	470pF $\pm$ 5%, 100V, APS
D002, D003	223163	1SS133	C213	370134714	10 $\mu$ F, 16V, Elect.
D101-D105	223163	1SS133	C221, C222	354741009	0.47 $\mu$ F, 50V, Elect.
D107-D109	223163	1SS133	C224	354784799	1 $\mu$ F, 35V, Tantal
D201, D202	223163	1SS133	C702	395160107	47 $\mu$ F, 16V, Elect.
D203, D717	223150,	US1040,	C705	354744709	220 $\mu$ F, 6.3V, Elect.
D719, D721	223145 or	1S2076TD or	C707, C709	354722219	0.47 $\mu$ F, 50V, Elect.
	223124	1S2473	C710	354784799	0.047F, 5.5V, Super
D204, D205	223163	1SS133	C711	3000050 or	
D701-D706	223163	1SS133		3000051	
D707, D708	223163	1SS133 <G>	C715-C721	3020024	B8XC0116-32N
D710	223163	1SS133 <G>	C722	354743319	330 $\mu$ F, 16V, Elect.
D711-D716	223163	1SS133	C803	354784799	0.47 $\mu$ F, 50V, Elect.
D718, D720	223163	1SS133	C804	354780229	2.2 $\mu$ F, 50V, Elect.
D722-D726	223163	1SS133	C805, C807	354741009	10 $\mu$ F, 16V, Elect.
D801-D814	223163	1SS133	C806	354744709	47 $\mu$ F, 16V, Elect.
D901	223862 or	WL01 or	C808	354744719	470 $\mu$ F, 16V, Elect.
	223890	W01RL	C809	354741009	10 $\mu$ F, 16V, Elect.
D902, D908	2239532,	RD7.5EB2,	C901	354751029	1000 $\mu$ F, 25V, Elect.
	2243182 or	MTZ7.5B or	C902	354741019	100 $\mu$ F, 16V, Elect.
	2241011	GZA7.5X	C903, C904	354762209	22 $\mu$ F, 35V, Elect.
D903, D904	223880	GP101N4003	C908	354741019	100 $\mu$ F, 16V, Elect.
D905	2239472,	RD5.6EB2,	C909	354781019	100 $\mu$ F, 50V, Elect.
	2243152 or	MTZ5.6B or	C912	354764719	470 $\mu$ F, 35V, Elect.
	2240951	GZA5.6X	C913	354741019	100 $\mu$ F, 16V, Elect.
.D906	2239652,	RD13EB2,		<b>Resistors</b>	
	2243242 or	MTZ13B or	R001	431521055	1Mohm, 1/2W, Solid <D/W>
	2241131	GZA13X	R101	5210067	N06HR33KBD, Semi-fixed
D907	2241291	RD3.3EB1	R151	5210064	N06HR10KBD, Semi-fixed
	<b>Fluorescent tube</b>		R201	5210062	N06HR4.7KBD, Semi-fixed
Q707	212023	FIP7F8S	R202	5210072	N06HR220KBD, Semi-fixed

CIRCUIT NO.	PART NO.	DESCRIPTION
R712-R715	49121104404	100kohm X4, 1/8W, Network
R717-R723	49121104407	100kohm X7, 1/8W, Network
R724-R728	49121103405	10kohmX5, 1/8W, Network
R801	5210068	N06HR47KBD, Semi-fixed
R901	441621014	100ohm, 1W, Metal oxide film
R903	441621004	10ohm, 1W, Metal oxide film
<b>Terminals</b>		
P901	25060087	NTM-2PDMN31, Antenna
P902	25045141	NPJ-2PDBL54, Output
<b>Radiator</b>		
	27160179	RAD-57
<b>Bracket</b>		
	27141039	Fluorescent tube

**OPERATION SWITCH PC BOARD (NASW-2963-1)**

CIRCUIT NO.	PART NO.	DESCRIPTION
<b>Lamp</b>		
PL901	210064A	PL6.3V250mA
<b>IC</b>		
Q821	222666	LB1403
<b>Transistors</b>		
Q822	2211455 or 2212495	2SA1015(GR) or JA101(Q)
Q823, Q824	2211255, 2210746 or 2212485	2SC1815(GR), 2SC945A(P) or JC501(Q)
Q825	2211255 or 2210746	2SC1815(GR) or 2SC945A(P)
<b>Diode</b>		
D821	223163	1SS133
<b>L.E.Ds</b>		
D822-D825	225137CG,	SEL2413ECG,
D827, D828	225137DG or	SEL2413EDG or
D829, D831	225137DY	SEL2413EDY
D826, D830	225142	SEL2913K
D832, D833	225142	SEL2913K
D834, D835	225137CG, 225137DG or 225137DY	SEL2413ECG, SEL2413EDG or SEL2413EDY
D836	225142	SEL2913K
<b>Capacitor</b>		
C821	354741009	10 $\mu$ F, 16V, Elect.
<b>Resistor</b>		
R855	442521014	100ohm, 1/2W, Metal oxide film
<b>Switches</b>		
S821	25035523	NPS-122-L485, RF
S822, S823	25035543	NPS-122-S505, IF/Hi-blend
S824, S825	25035389	NPS-111-S353, Tuning/Memory
<b>Holders</b>		
	27190497	L.E.D
	27190500	Lamp

**DISPLAY CIRCUIT PC BOARD (NADIS-2964-1)**

CIRCUIT NO.	PART NO.	DESCRIPTION
D851-D862	225142	SEL2913K, L.E.Ds
S851-S866	25035389 27190486	NPS-111-S353, Push switches Holder, L.E.D

**POWER SWITCH PC BOARD (NASW-2965-1/1A)**

CIRCUIT NO.	PART NO.	DESCRIPTION
C951	3500065A	$\Delta$ 0.01 $\mu$ F, AC125/400V, Capacitor IS
C951 A	27300601	$\Delta$ SB1925, Cover for C951 <G/W>
R951	431523355	$\Delta$ 3.3Mohm, 1/2W, Solid resistor <D>
S901	25035558	$\Delta$ NPS-111-L520P, Power switch

**POWER INDICATOR PC BOARD (NADIS-2966-1)**

CIRCUIT NO.	PART NO.	DESCRIPTION
D841, D842	225142 27190499A	SEL2913K, L.E.Ds Holder, L.E.D

(Only Worldwide model)

**BAND SELECTOR SWITCH PC BOARD (NASW-2967-1)**

(Only Worldwide model)

CIRCUIT NO.	PART NO.	DESCRIPTION
D781-D783	223163	1SS133, Diodes
S781	25065240	NSS-42102, Slide switch

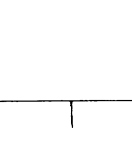
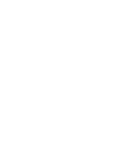
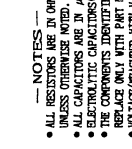
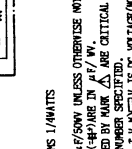
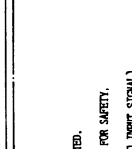
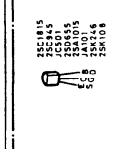
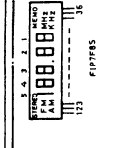
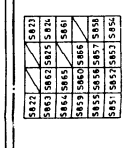
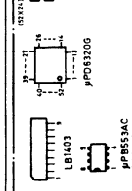
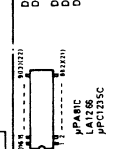
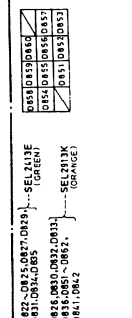
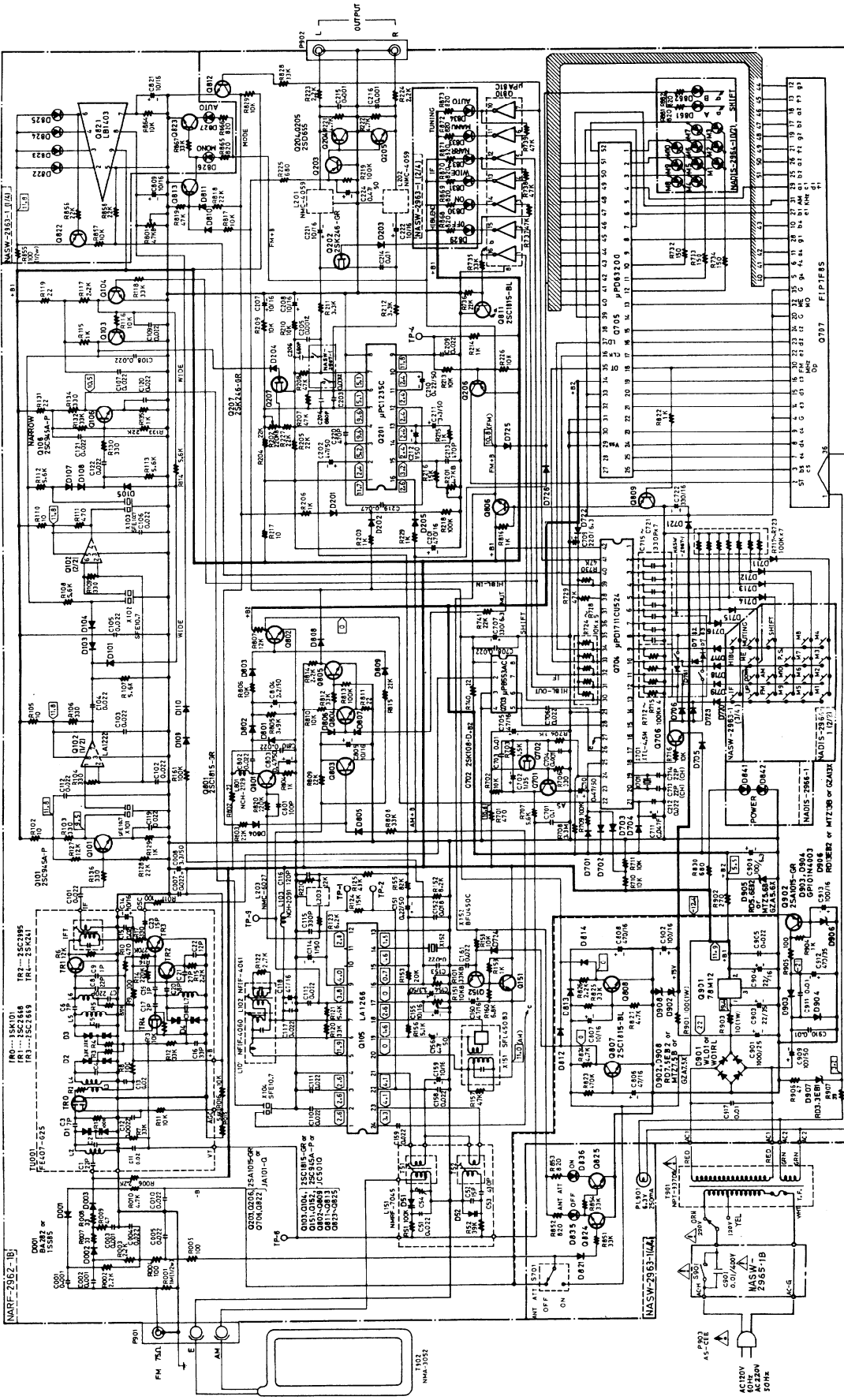
NOTE:&lt;D&gt;:Only 120V model

&lt;G&gt;:Only 220/240V models

&lt;W&gt;:Only Worldwide model

NOTE: THE COMPONENTS IDENTIFIED BY MARK  $\Delta$  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

**SCHEMATIC DIAGRAM**  
— Worldwide Model —

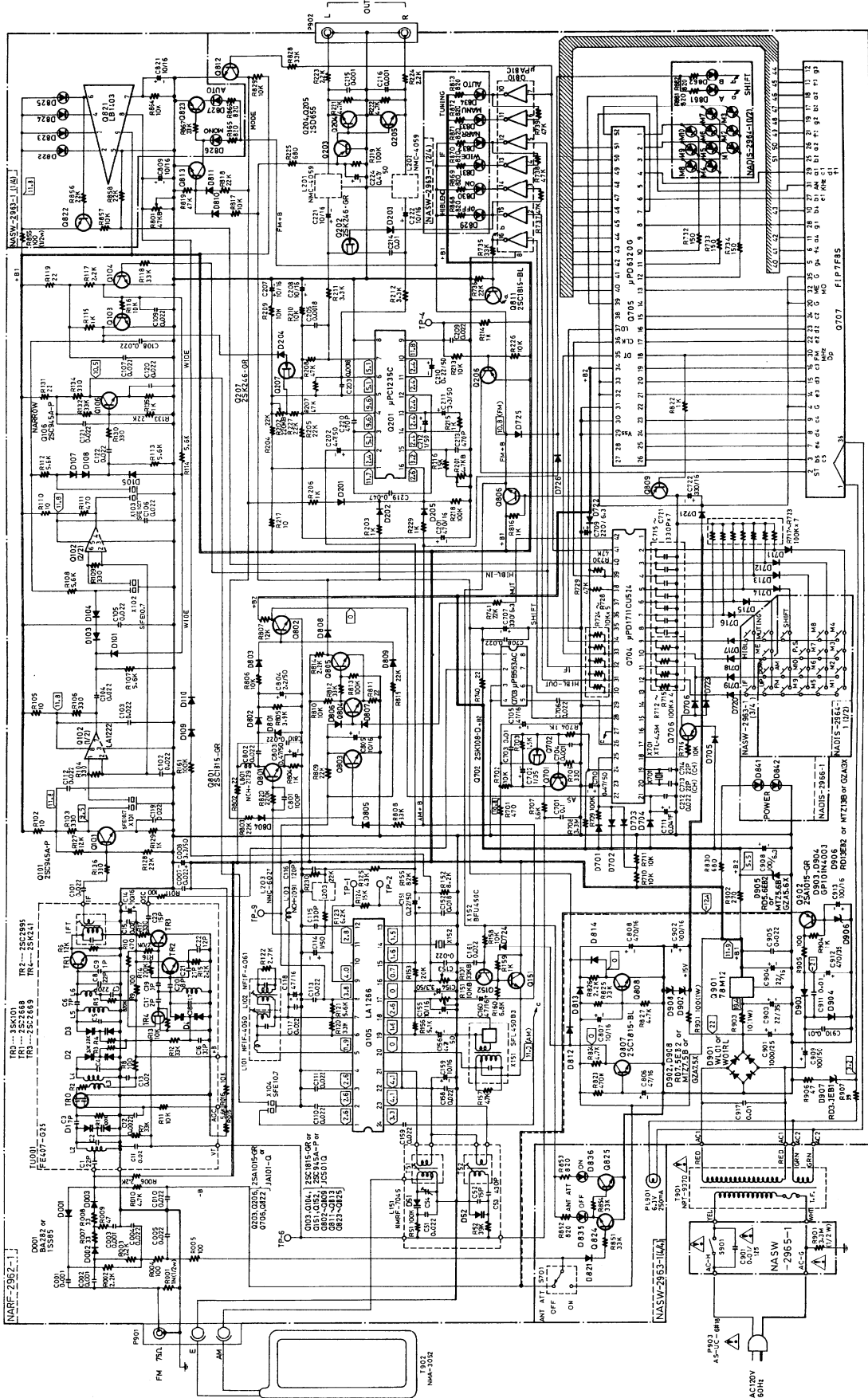


**NOTES —**  
 • ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.  
 • ALL CAPACITORS ARE IN MF UNLESS OTHERWISE NOTED.  
 • ELECTROLYTIC CAPACITORS (EP) ARE IN  $\mu$ F UNLESS OTHERWISE NOTED.  
 • THE COMPONENTS IDENTIFIED BY PART NO. ARE CRITICAL FOR SAFETY.  
 • VOLTAGE MEASURED WITH V.T.M. IS D.C. VOLTAGE (NO INPUT SIGNAL).  
 • ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

**ONKYO CORPORATION**

# SCHEMATIC DIAGRAM

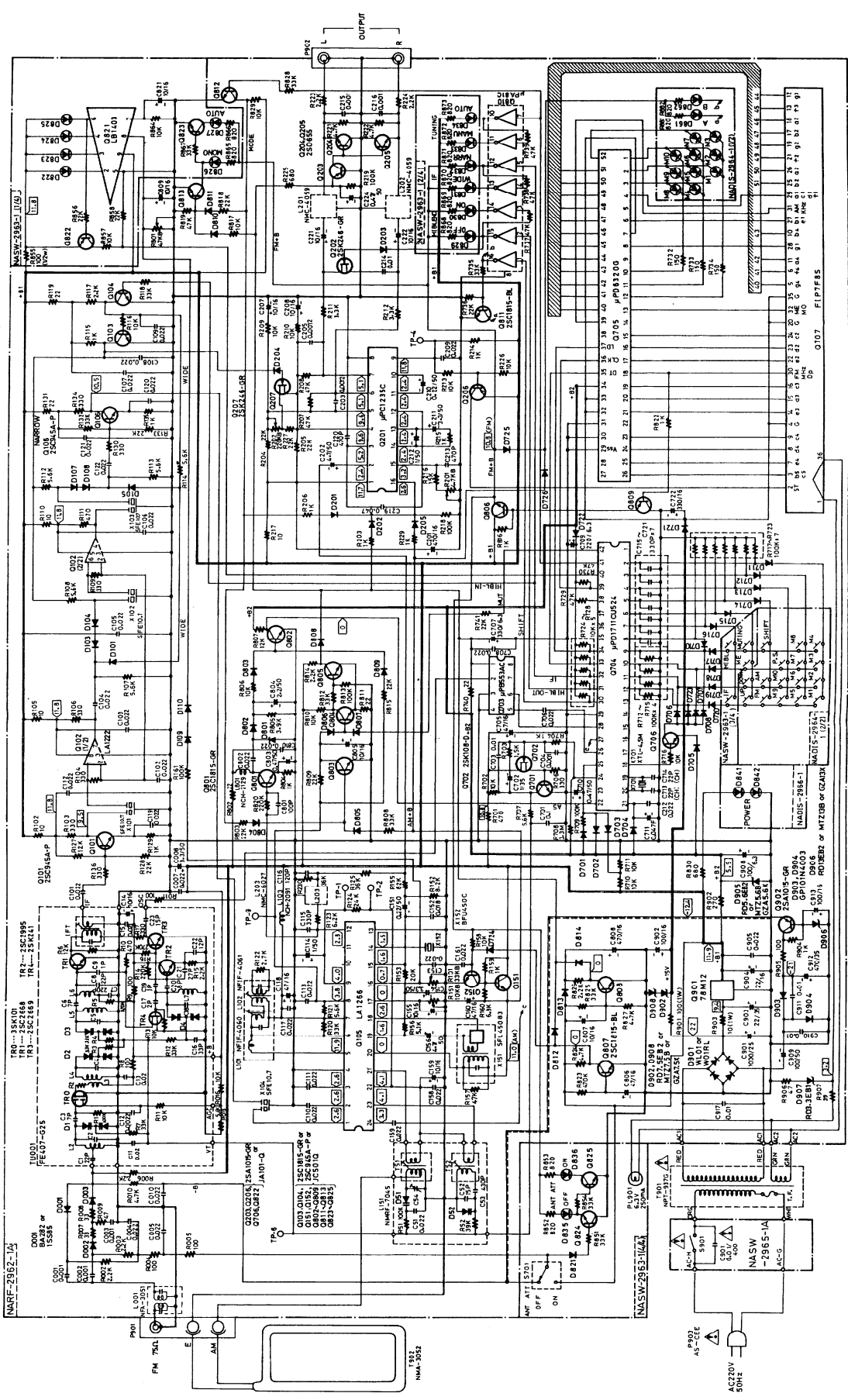
— 120V Model —



- NOTES —**
- ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.
  - ALL CAPACITORS ARE IN  $\mu$ F UNLESS OTHERWISE NOTED.
  - ELECTROLYTIC CAPACITORS ARE SHOWN WITH POLARITY.
  - THE COMPONENTS IDENTIFIED BY MARK ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
  - VOLTAGE MEASURED WITH V.T.V.  $\approx$  V IS DC VOLTAGE (NO INPUT SIGNAL).
  - ALL DIMENES ARE IN INCHES UNLESS OTHERWISE NOTED.
- COMPONENT LIST:**
- RESISTORS: R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117, R118, R119.
  - CAPACITORS: C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113, C114, C115, C116, C117, C118, C119.
  - TRANSISTORS: Q1, Q2, Q3, Q4, Q5.
  - DIODES: D1, D2, D3, D4.
  - RELAYS: R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117, R118, R119, R120.
  - ICs: IC1, IC2, IC3, IC4, IC5, IC6, IC7, IC8, IC9, IC10, IC11.



**SCHEMATIC DIAGRAM**  
**- 220V/240V Models -**



0818	0819	0820	0821	0822	0823
0824	0825	0826	0827	0828	0829
0830	0831	0832	0833	0834	0835
0836	0837	0838	0839	0840	0841
0842	0843	0844	0845	0846	0847
0848	0849	0850	0851	0852	0853

0854	0855	0856	0857	0858	0859
0860	0861	0862	0863	0864	0865
0866	0867	0868	0869	0870	0871
0872	0873	0874	0875	0876	0877
0878	0879	0880	0881	0882	0883
0884	0885	0886	0887	0888	0889

0890	0891	0892	0893	0894	0895
0896	0897	0898	0899	0900	0901
0902	0903	0904	0905	0906	0907
0908	0909	0910	0911	0912	0913
0914	0915	0916	0917	0918	0919
0920	0921	0922	0923	0924	0925

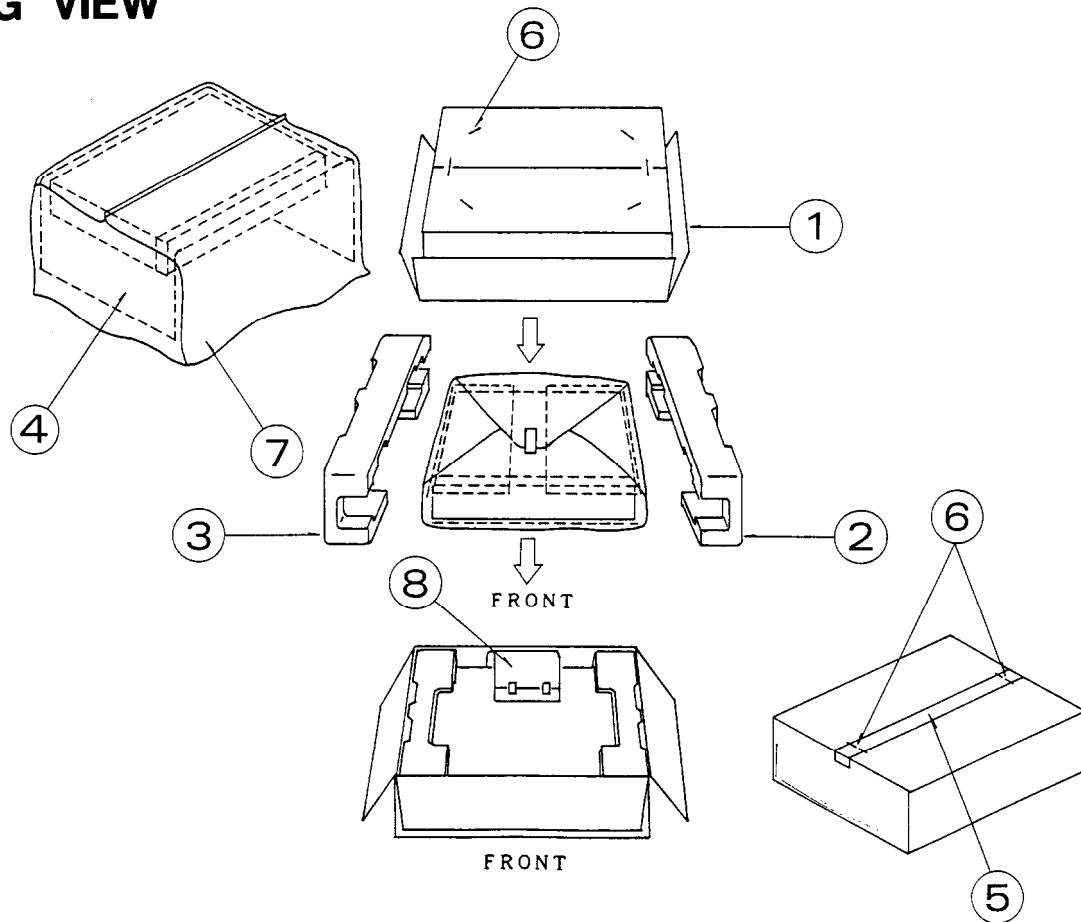
0926	0927	0928	0929	0930	0931
0932	0933	0934	0935	0936	0937
0938	0939	0940	0941	0942	0943
0944	0945	0946	0947	0948	0949
0950	0951	0952	0953	0954	0955
0956	0957	0958	0959	0960	0961

0962	0963	0964	0965	0966	0967
0968	0969	0970	0971	0972	0973
0974	0975	0976	0977	0978	0979
0980	0981	0982	0983	0984	0985
0986	0987	0988	0989	0990	0991
0992	0993	0994	0995	0996	0997

0998	0999	1000	1001	1002	1003
1004	1005	1006	1007	1008	1009
1010	1011	1012	1013	1014	1015
1016	1017	1018	1019	1020	1021
1022	1023	1024	1025	1026	1027
1028	1029	1030	1031	1032	1033

- NOTES**
- ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.
  - ALL CAPACITORS ARE IN  $\mu$ F UNLESS OTHERWISE NOTED.
  - ELECTROLYTIC CAPACITORS HAVE IN  $\mu$ F/V.
  - PARTS WITH PART NUMBER SUFFIXES ARE CRITICAL FOR SAFETY.
  - REPLACE ONLY WITH PART NUMBER SPECIFIED.
  - VOLTAGE MEASURED WITH V.T.V.M. IN DC VOLTAGE (NO INVERT SIGNAL).
  - ALL DIODES ARE 52A73 or 1S2076 or 1S5133 UNLESS OTHERWISE NOTED.

# PACKING VIEW



REF. NO.	PART NO.	DESCRIPTION		
1	29051513	Master carton box	29365019	Warranty card (Only U.S.A. model)
2	29091135A	Pad L		
3	29091137A	Pad R	29358002E	Service station list (Only U.S.A. model)
4	29095012-1	Protection sheet		
5	260012	Damplon tape	220V/240V/Worldwide models	
6	282301	Sealing hook	292092	FM antenna
7	29100036A	Poly-vinyl bag	29341143	Instruction manual
8	Accessory bag ass'y		2010098 or 2010098A	Connection cord
	120V model		232119	NMA-3052, AM loop antenna
	292092	FM antenna	29341173	Instruction manual, Italian
	29341142	Instruction manual	29100006A	Poly-vinyl bag
	2010098 or 2010098A	Connection cord	25055018	CV-K-1, Conversion plug (Only Worldwide model)
	232119	NMA-3052, AM loop antenna		
	25060088	FM adaptor		
	29100006A	Poly-vinyl bag		

## ONKYO CORPORATION

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