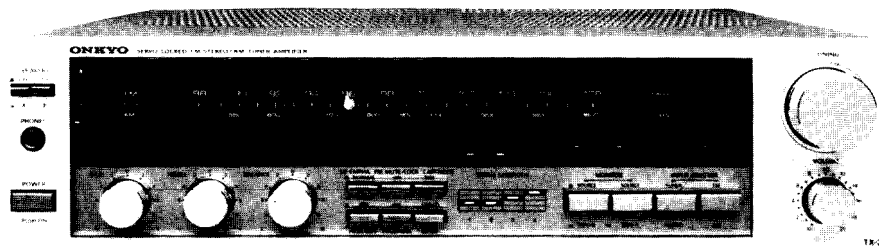


# ONKYO SERVICE MANUAL

## SERVO LOCKED FM/AM STEREO RECEIVER MODEL TX-31



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**ONKYO**  
**AUDIO COMPONENTS**

## SPECIFICATIONS

### AMPLIFIER SECTION

Output Power:	30 watts per channel, min. RMS, at 8 $\Omega$ both channels driven, from 20 Hz to 20,000 Hz, with no more than 0.06% total harmonic distortion.
Total Harmonic Distortion:	0.06% at rated power 0.06% at 1 watt output
IM Distortion:	0.1% at rated power 0.06% at 1 watt output
Damping Factor:	35 at 8 $\Omega$
Frequency Response:	20 Hz – 30,000 Hz ( $\pm 1$ dB)
RIAA Deviation:	20 Hz – 20,000 Hz ( $\pm 0.8$ dB)
Sensitivity & Impedance:	Phono: 2.5 mV, 50 k $\Omega$ Tape Play: 150 mV, 50 k $\Omega$ Tape Rec: 150 mV, 3.5 k $\Omega$ (PH)
Phono Overload:	110 mV R.M.S. at 1 kHz, 0.06% T.H.D.
Signal-to-Noise Ratio:	Phono: 85 dB (at 10 mV input A weighted) 75 dB (IHF A-202) Tape: 95 dB (A weighted) 80 dB (IHF A-202)
Tone Controls:	Bass: $\pm 12$ dB at 100 Hz Treble $\pm 10$ dB at 10 kHz
Loudness (–30 dB):	+9 dB at 40 Hz +5 dB at 20 kHz

### TUNER SECTION

<b>FM:</b>	
Tuning Range:	87.5 – 108 MHz
Usable Sensitivity:	Mono: 12.0 dBf, 2.2 $\mu$ V Stereo: 19.2 dBf, 5 $\mu$ V
50 dB Quieting Sensitivity:	Mono: 18.3 dBf, 4.5 $\mu$ V Stereo: 39.2 dBf, 50 $\mu$ V
Capture Ratio:	1.5 dB
Image Rejection Ratio:	45 dB
Spurious Rejection Ratio:	80 dB
IF Rejection Ratio:	80 dB

Signal-to-Noise Ratio:	Mono: 71 dB Stereo: 66 dB
Alternate Channel Att.:	55 dB
AM Suppression Ratio:	50 dB
Harmonic Distortion:	Mono: 0.2% Stereo: 0.4%
Frequency Response:	30 Hz – 15,000 Hz ( $\pm 1.5$ dB) 40 dB at 1 kHz 30 dB at 100 Hz – 10,000 Hz
Muting Level:	17.2 dBf, 4 $\mu$ V
Stereo Threshold:	17.2 dBf, 4 $\mu$ V
Servo Lock Level:	17.2 dBf, 4 $\mu$ V
<b>AM:</b>	
Tuning Range:	525 – 1,620 kHz
Usable Sensitivity:	30 $\mu$ V
Image Rejection Ratio:	40 dB
IF Rejection Ratio:	30 dB
Harmonic Distortion:	0.8%

### GENERAL

Power Supply:	AC 120V, 60Hz (D model) AC 120/220V, 50/60Hz (W model)
Outputs:	Speaker A & B, Phones, Tape Rec Out 1 & 2, AC Outlet (unswitched x 1, switched x 1) (Only D model)
Inputs:	Phono, Tape Play 1 & 2, FM and AM Antennas
Antennas:	FM: 300 ohms balanced and 75 ohms unbalanced AM: built-in loop antenna and external terminal
Semiconductors:	1 FET, 14 transistors, 10 ICs, 31 diodes
Dimensions (WxHxD):	418 x 112 x 391mm 16-1/2" x 4-1/2" x 15-3/8"
Weight:	8.5kg (18.7lbs.)

## PRECAUTION

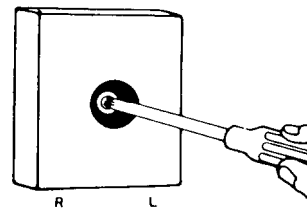
### Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

#### 1 Speaker protection fuse

The speaker protection fuse is located on the back panel. Remove the screw holding the fuse cover and fuse case with the screwdriver.

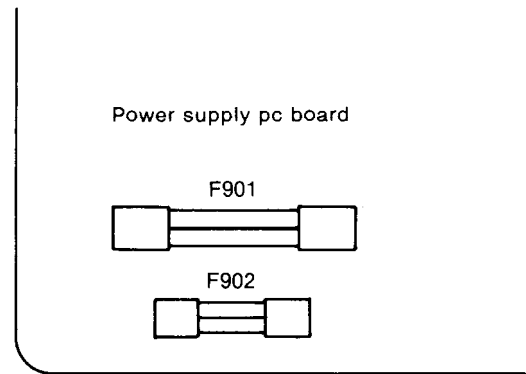
Rating : 4A (SS-2)	P.N. 252059 (D model)
4A-T	P.N. 252014 (W model)



## 2 AC fuse

Remove the top cover. The AC fuse is located on the power supply pc board.

circuit no.	parts no.	description	remarks
F901	252049	4A (ST-6)	D model
F901	252014	4A-T	W model
F902	252074	2A-SE-EAK	W model



## SPECIAL MODES OPERATION

### 1. Sensor Switch (SENSOR)

This switch enables the servo lock system for automatic FM tuning to be matched with the various operating conditions. Set it at LOW initially. Switch to NORM or HIGH if the TUNED lamp does not instantly turn off when you touch the tuning knob.

### 2. De-emphasis switch (Only W model)

The 50  $\mu$ sec/75  $\mu$ sec selector switch employed in the W (120/220V) model is located on the bottom board. When shipped from the factory, this switch is set to the 50  $\mu$ sec position. For use 75  $\mu$ sec regions, switch over to the 75  $\mu$ sec position.

### 3. Voltage Selector (Only W model)

Some models are equipped with a voltage selector to conform with local power supplies.

Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

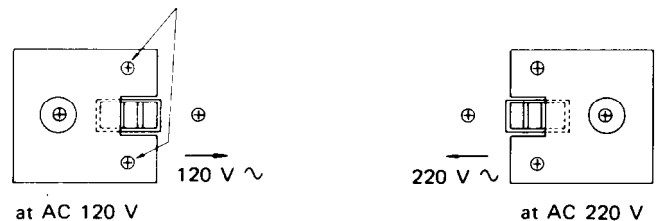
When changing the voltage setting, remove the lock plate covering the switch, then set the voltage to the correct value.

Voltage is changed by sliding the groove in the switch with a screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

If there is no voltage selector switch on the unit you have purchased, it can only be used in areas where the power supply voltage is the same as that of the unit.

Voltage Selector Lock Plate

Remove these two screws to take off the voltage selector lock plate.



## ALIGNMENT PROCEDURES

### INSTRUMENTS REQUIRED

1. DC Voltmeter
2. AM Sweep Generator
3. AM/FM Signal Generator
4. AC VTVM
5. Oscilloscope
6. Monitorscope
7. Distortion Analyzer
8. Stereo Modulator
9. Frequency Counter

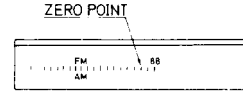
### GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400 Hz 30% (AM), 1 kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO).
3. Standard knob position
 

SPEAKERS	.....	A
BASS, TREBLE & BALANCE	.....	Center
MODE	.....	STEREO
LOUDNESS	.....	OFF
TAPE 1, 2	.....	OFF (SOURCE)

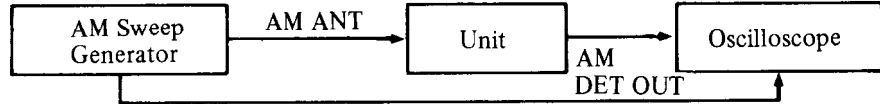
**(1) Attachment of dial pointer**

1. Close the variable capacitor completely.
2. Set the radio dial pointer to zero point on dial scale and secure the stringing and pointer with the bond.



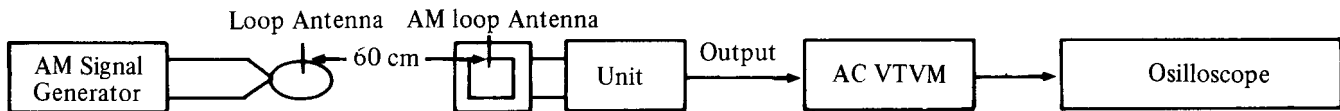
**(2) AM IF ALIGNMENT**

1. Set SELECTOR switch to AM.
2. Set radio dial to quiet point.



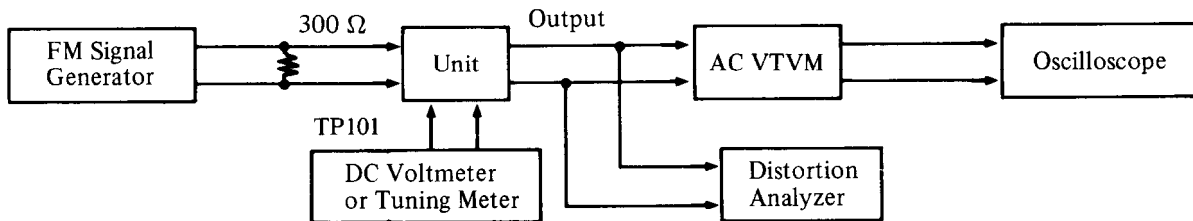
Set signal	Adjust	Oscilloscope	Remarks
455 kHz	X151	Maximum Symmetrical Response	Usually not necessary to adjust

**(3) AM RF ALIGNMENT**



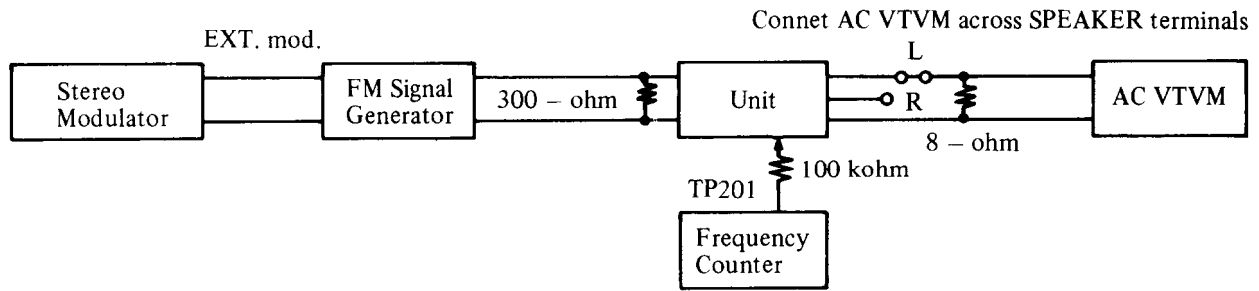
Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks
1	515 kHz 400 Hz 30%	Lower end (515 kHz)	L152	Maximum	Repeat steps 1 and 2 as necessary
2	1680 kHz 400 Hz 30%	Upper end (1680 kHz)	TC4	Maximum	
3	600 kHz 400 Hz 30%	600 kHz	L151	Maximum	Repeat steps 3 and 4 as necessary
4	1400 kHz 400 Hz 30%	1400 kHz	TC2	Maximum	

**(4) FM ALIGNMENT**

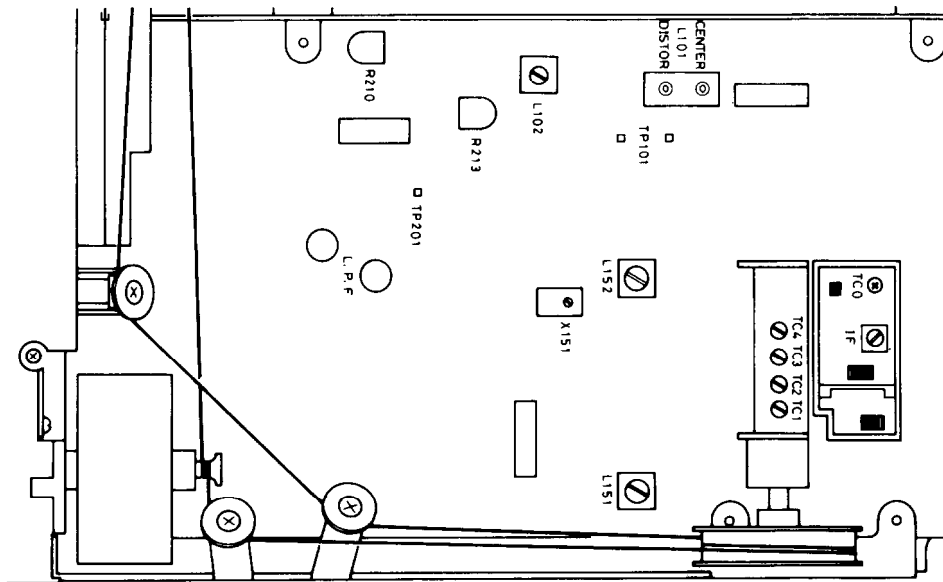


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	No signal	Quiet Point	L101 Back side	Voltage or Tuning Indicator	Center	Repeat Steps 1 and 2 as necessary
2	98 MHz 65 dBf 1 kHz 75 kHz devi.	98 MHz	L101 Front side	Distortion Analyzer	Minimum	
3	104 MHz 1 kHz 75 kHz devi.	104 MHz	TC0 TC1 TC3	AC VTVM	Maximum	
4	98 MHz, 65 dBf 1 kHz 75 kHz devi.	98 MHz	IF	Distortion Analyzer	Minimum	

(5) MULTIPLEX ALIGNMENT

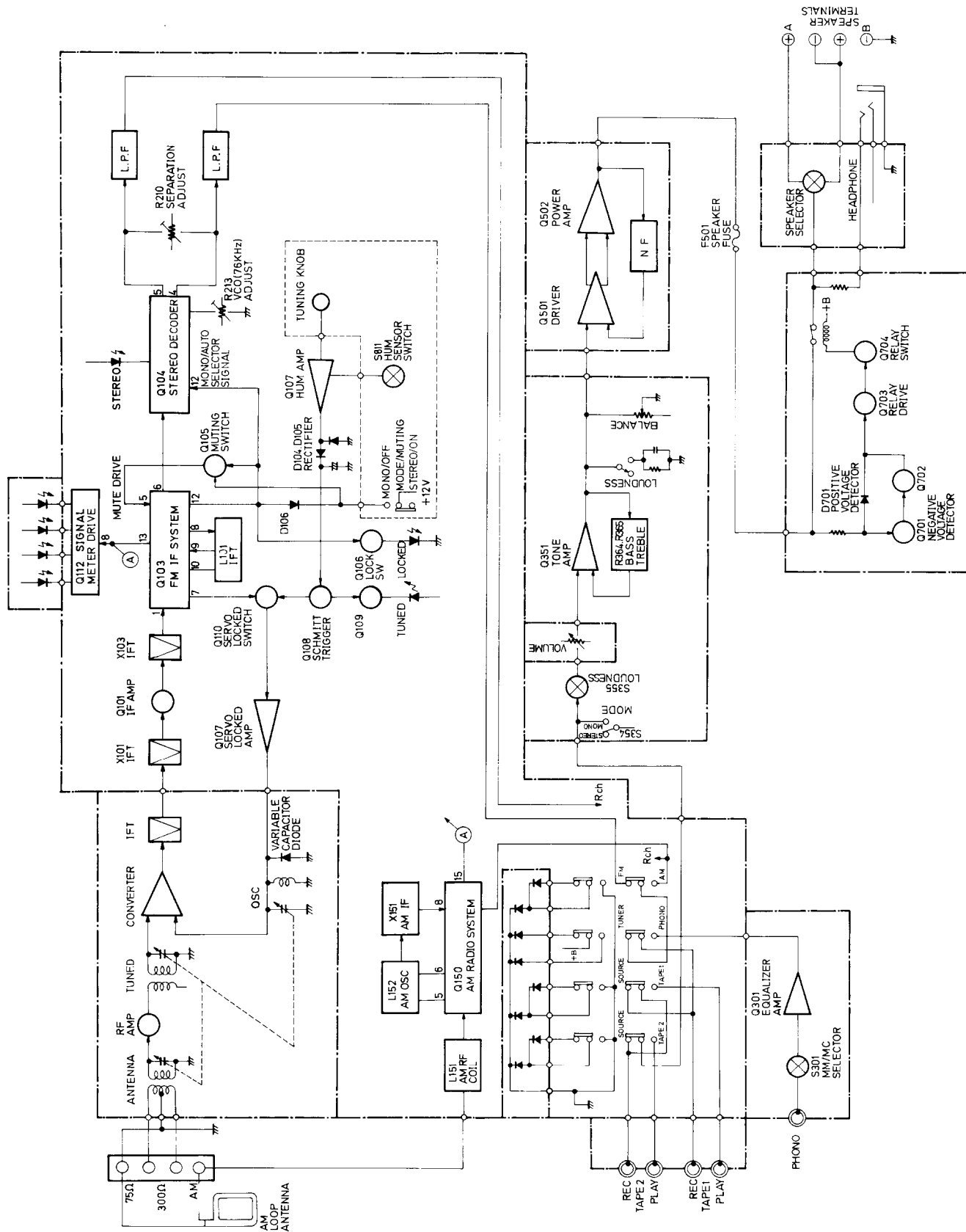


Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	98 MHz no mod. 65 dBf	—	98 MHz	R213	Frequency Counter	76,000±76Hz	
2	STEREO INDICATOR should light up when stereo program is being received.						
3	98 MHz EXT. Mod. 65 dBf	Pilot Sig. 9% Main & Sub Sig. 1 kHz Lch 91%	98 MHz	R210	AC VTVM Right ch.	Minimum	Repeat Steps 3 & 4 as necessary same separation
4	Same as above	Pilot Sig. 9% Main & Sub Sig. 1 kHz Rch 91%	98 MHz		AC VTVM Left ch.	Minimum	

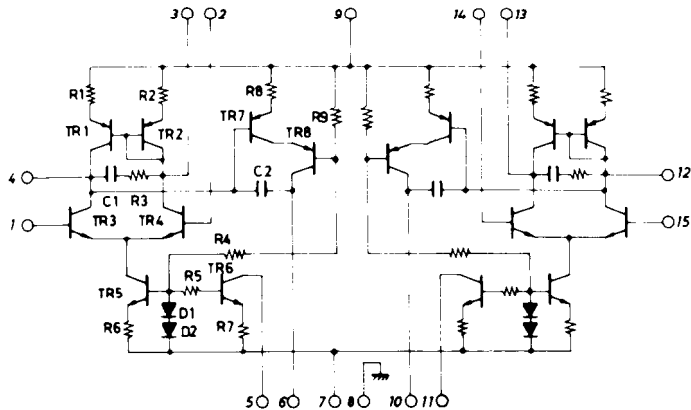


Adjustment points

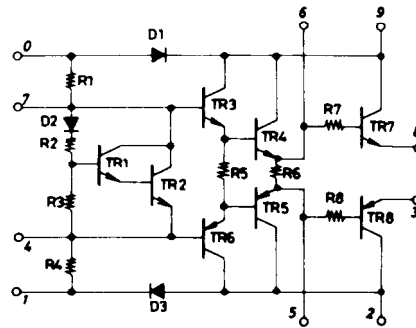
BLOCK DIAGRAM



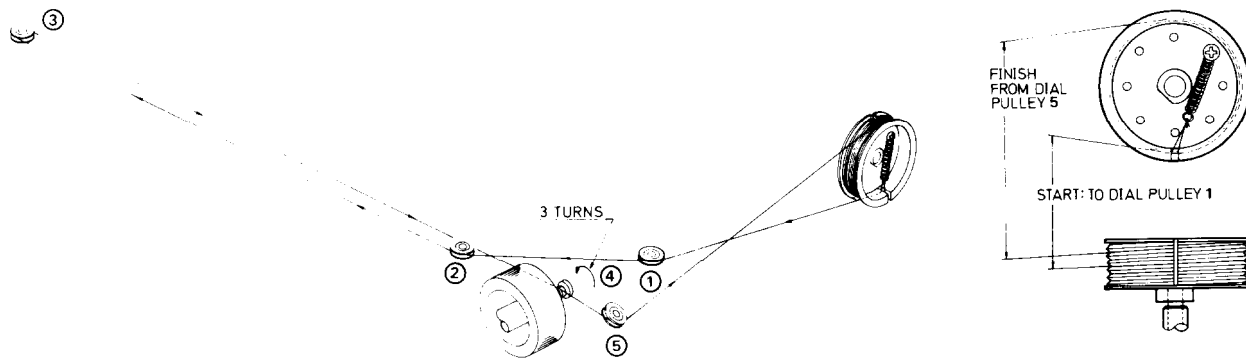
## STK-3062 (Differential and drive ampli.)



## STK-0050II (Power ampli.)



## STRINGING DIAGRAM



1. Close the variable capacitor complete and tie the stringing to the spring of the drum.
2. Thread the stringing in the direction of arrow from 1 to 3 and wind the stringing three turns around the tuning shaft counter clockwise.
3. Thread the stringing to 5.
4. Wind the stringing  $1\frac{1}{2}$  turns around the dial drum.

## DISASSEMBLING PROCEDURES

## 1. Top Cover

- Remove the four screws holding the top cover and side bracket.
- Remove a screws holding the top cover and back panel.

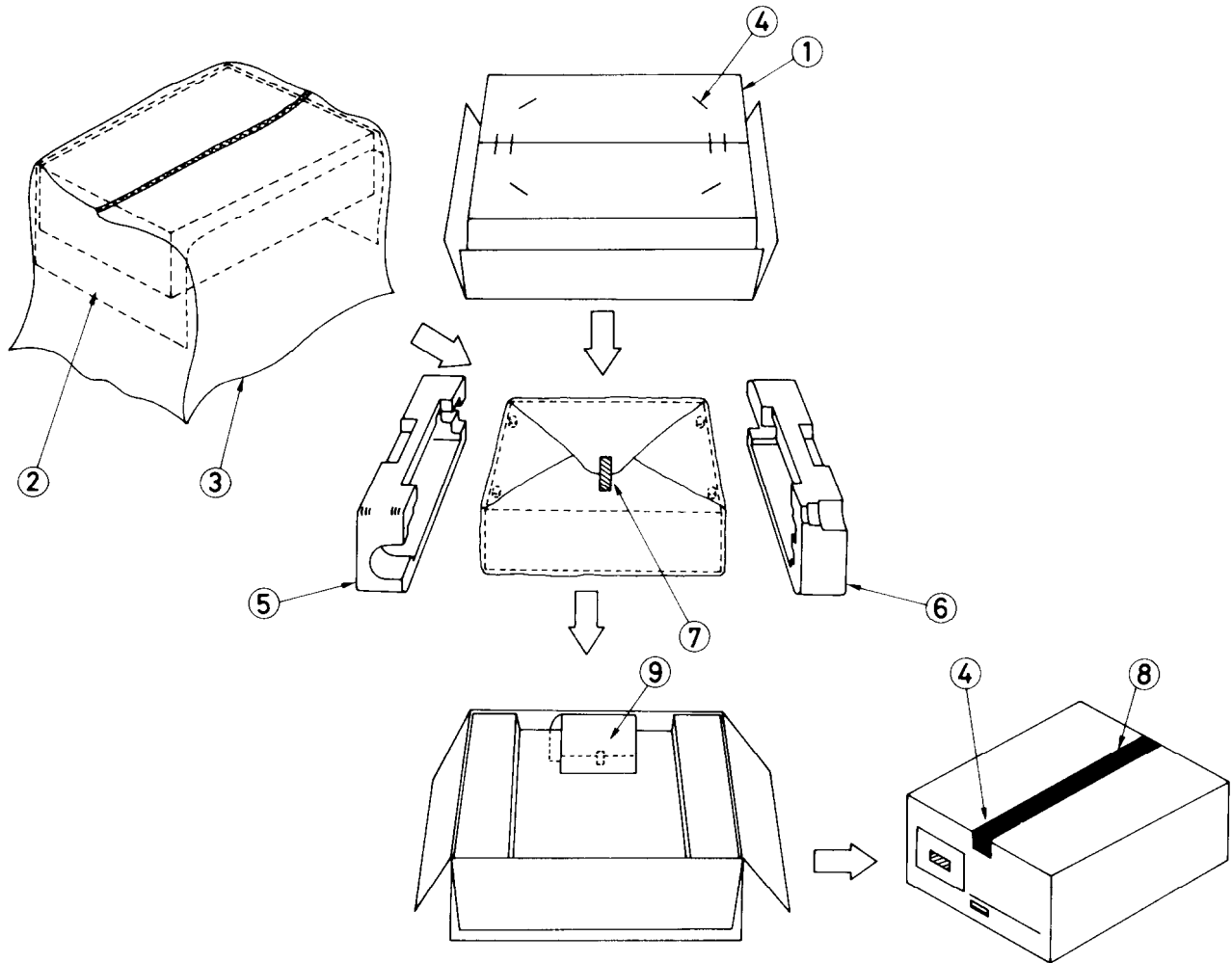
## 2. Front Panel

- Remove the top cover.
- Remove the Bass and Treble knobs.
- Remove the five screws holding the front panel and front bracket.
- Remove the signal indicator lamp pc board from lamp holder.

## 3. Tone control indicator lamp

- Remove the top cover and front panel.
- Remove the five screws holding the holder and front bracket. (see Page 9)

## PACKING VIEW

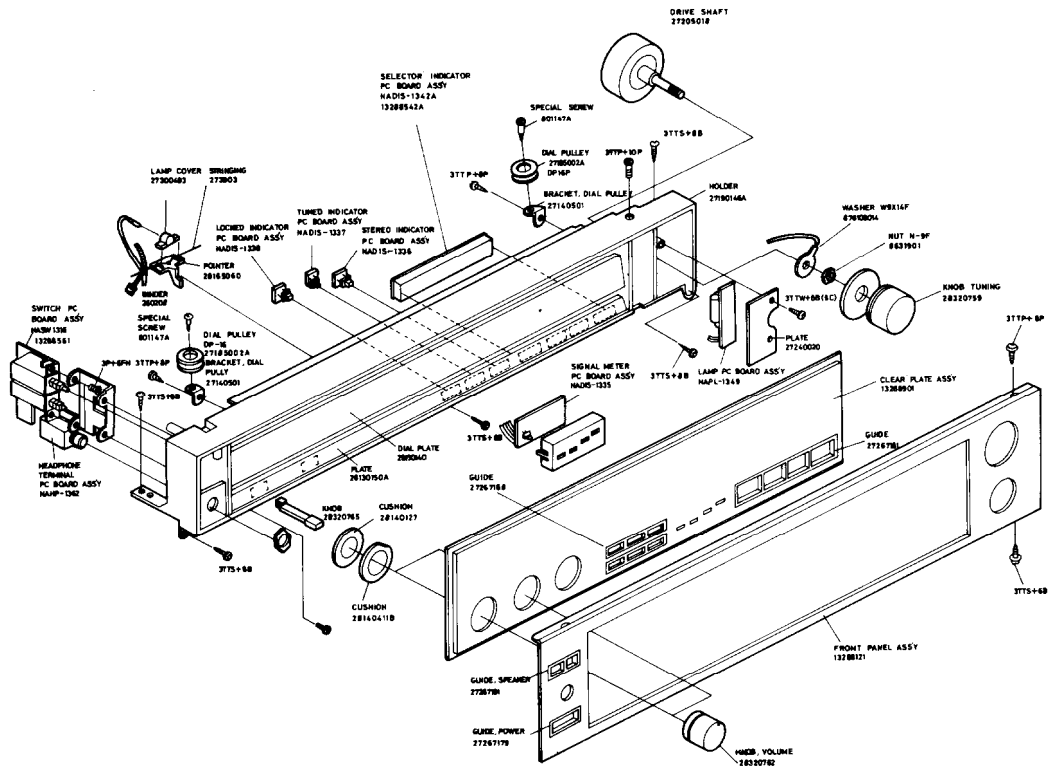


REF. NO.	PARTS NO.	DESCRIPTION
1	29050554	Master carton box
2	29095012-1	500x800mm, Protection sheet
3	29100034	850x650mm, Poly-vinyl bag
4	282301	Sealing hook
5	29090693	Pad, right side
6	29090692A	Pad, left side
7	261504	30x50mm, Adhesive tape
8	260012	Damplon tape
9		Accessory bag ass'y
<b>(U.S.A. model)</b>		
	29340599	Instruction manual
	292064A	FM antenna
	29365006-2	Warranty card
	29358002	Service station list
	29100006	250x350mm, Poly-vinyl bag
	252059	4A (SS-2), Fuse

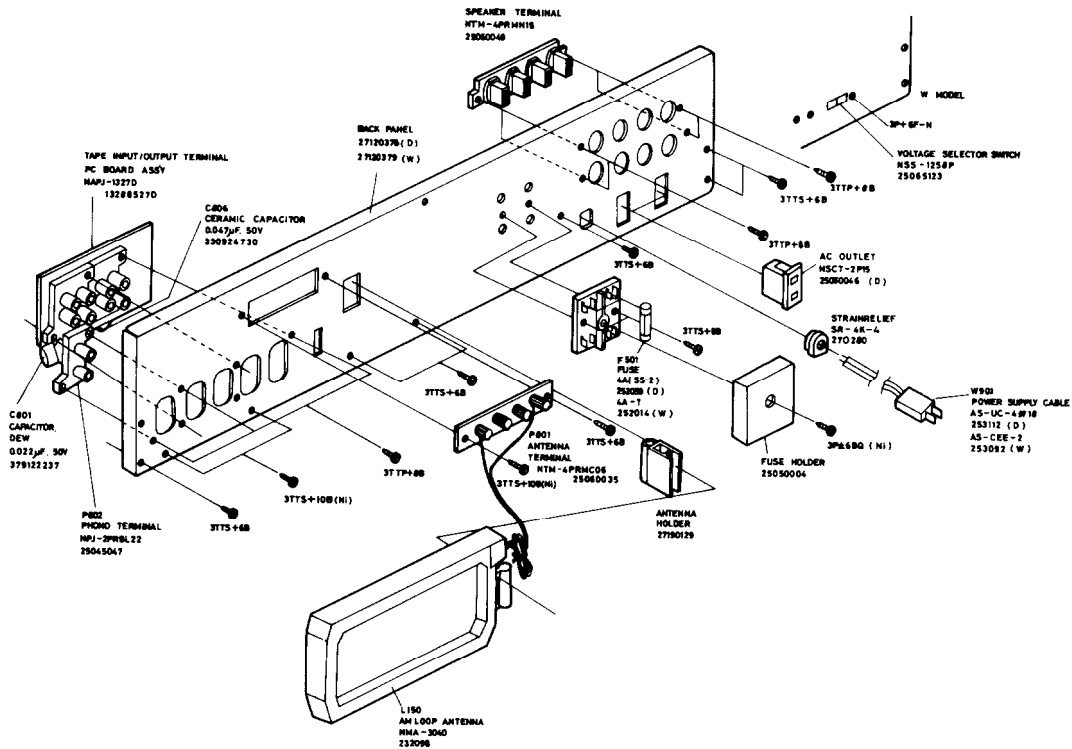
REF. NO.	PARTS NO.	DESCRIPTION
<b>(120V model)</b>		
	29340599	Instruction manual
	292064A	FM antenna
	29100006	250x350mm, Poly-vinyl bag
	252059	4A (SS-2), Fuse
<b>(120/220V model)</b>		
	29340599	Instruction manual
	292064A	FM antenna
	25055040	CV-K-2, Conversion plug
	252014	4A-T, Fuse
	29355045	Sensor tag



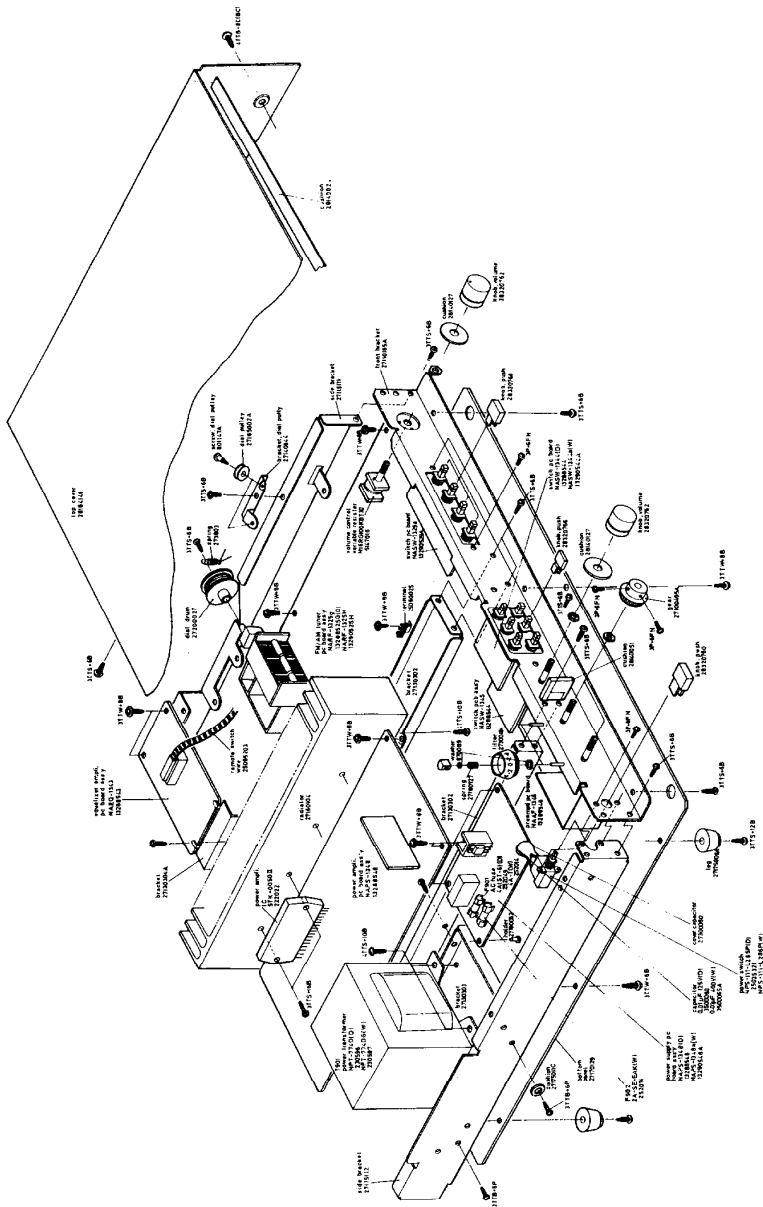
# EXPLODED VIEW



front panel view



back panel view



chassis view

REF. NO.	PARTS NO.	DESCRIPTION
U12	13288547	NAMS-1347, Power amplifier pc board ass'y
U13	13288548	NAPS-1348, Power supply pc board ass'y
U14	1329048A	NAPS-1348a, Power supply pc board ass'y
U15	13288549	NAPL-1349, Dial illumination lamp pc board ass'y
U16	13288561	NASW-1361, Switch pc board ass'y
U17	13288562	NAHP-1362, Headphone terminal ass'y
OS02, Q602	13288529A	NASW-1329a, Switch pc board ass'y
T901	222022	SKT-005011, Power amplifier IC
L150	230596	NPT-774D, Power transformer (D)
L150a	230597	NPT-774DG, Power transformer (W)
C931	232098	NMA-3040, AM loop antenna
C801, C803	3500665A	Antenna holder
C805, C806	3500665A	0.01uF, 125V, Capacitor CS (D)
R931	37912237	0.01uF, 400V, Capacitor IS (W)
R356, R436	30922730	0.022uF, 50V, capacitor DEW
S901	431523355	3.3MD, 1/2W, Solid resistor (D)
S902	5147016	N16RG100KB130, Volume control variable resistor
W901	2503521 or 25035135	NPS-111-L283P or NPS-111-L100P, Power switch (D)
W901a	25035322 or 25035176	NPS-111-L286P or NPS-111-L140P, Power switch (W)
F901, P902	25065123	NSS-1258P, Voltage selector switch (W)
F901	283112	AS-UC-4, Power supply cable (D)
F901	253092	AS-CEE, Power supply cable (W)
F901	270280	SR-4K-4, Strainrelief
F901, P902	25050046	NSCT-2P15, AC outlet
F901	252049	4A (ST-6), AC fuse (D)
F902	252014	4A-T, AC fuse
F905, P806	252074	2A-SE-EAK, AC fuse (W)
F501, F601	25060049	NTM-4PRN18, Speaker terminal (D)
F501, F601	252059	4A (SS-2), Speaker protection fuse (D)
F501, F601	252014	4A-T, Speaker protection fuse (W)
P807	25050004	Fuse holder with cover
P802	25045047	NPL-2PRBL22, Phono input terminal
P801	25060035	NTM-4PRMC06, Antenna terminal
	260208	SKB-1, Binder
	25065203	Wire, binder

REF. NO.	PARTS NO.	DESCRIPTION
(screws)		
3TTB+6B	83130068	Bind
3TTS+6B	83130068	Tapping
3P+6FN	82113006	Pen head
3TTW+8B	801143	Panel head
3TTS+8B	831130088	Tapping
3TTP+8P	83130080	Tapping
3TTS+10B (Ni)	834230108	Tapping
4TTB+8C (BC)	834130168	Tapping
4TTS+10B	834140108	Tapping
3TTW+6B	831130068	Tapping
3TTS+12B	834130128	Tapping

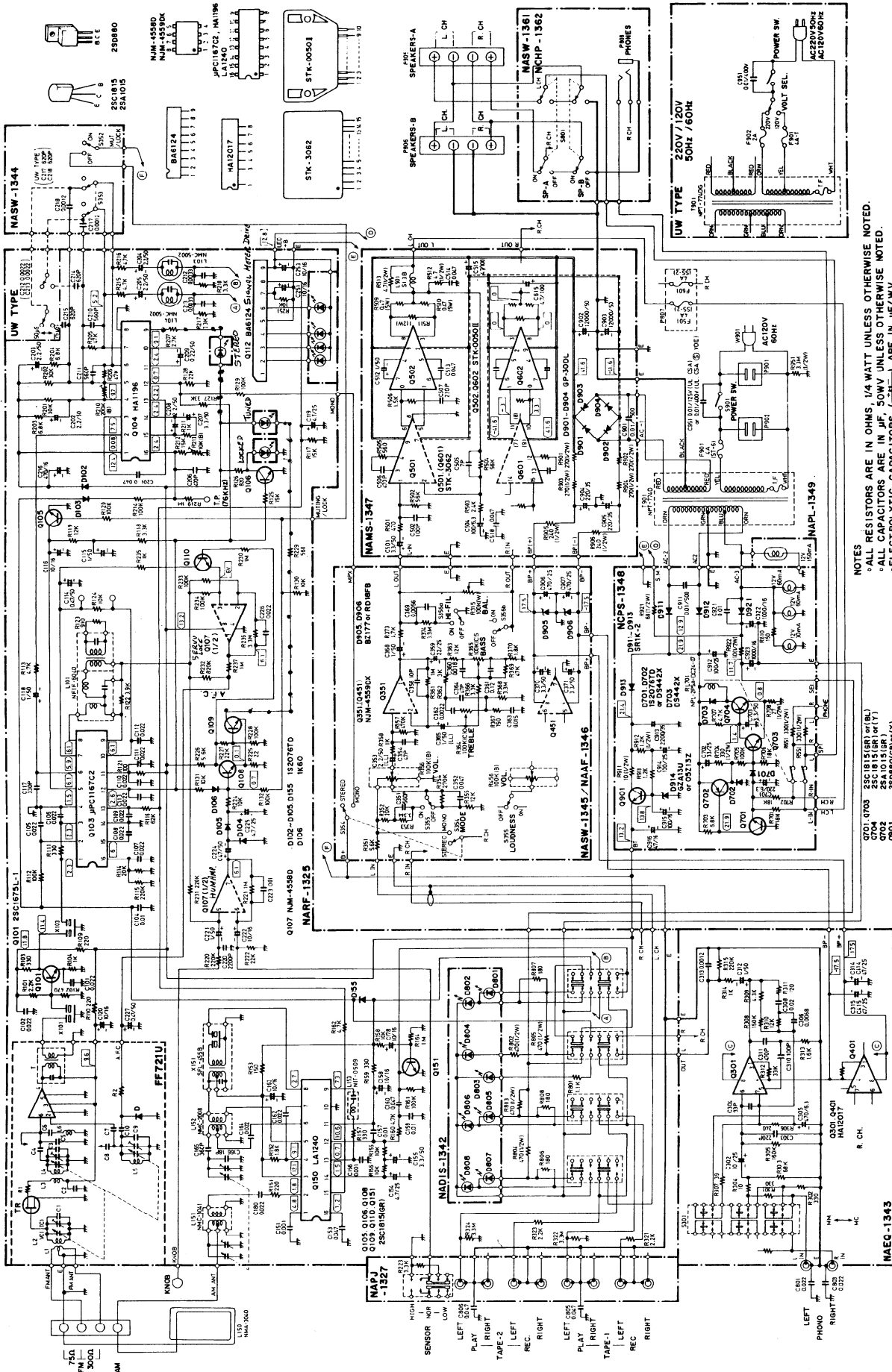
Note D : Only 120V model  
W : Only 120/220V model

REF. NO.	PARTS NO.	DESCRIPTION
A803	28320765	Knob
A804	28320762	Knob, volume
A805	28320766	Knob, push
U1	13288525G	NARF-1325g, FM/AM tuner pc board ass'y
U2	13290525H	NARF-1325f, FM/AM tuner pc board ass'y
U3	13298535	NADIS-1335, Signal meter pc board ass'y
U4	13288527D	NAPJ-1327d, Tape input/output terminal pc board ass'y
U5	13318536	NADIS-1336, Stereo indicator pc board ass'y
U6	13318537	NADIS-1337, Tuned indicator pc board ass'y
U7	13298538	NADIS-1338, Locked indicator pc board ass'y
U8	13288542A	NADIS-1342a, Source indicator pc board ass'y
U9	13288543	NAEQ-1341, Equalizer amplifier pc board ass'y
U10	13298544	NASW-1344, Switch pc board ass'y
U11	13288545	NASW-1344a, Switch pc board ass'y
	13288546	NAAF-1346, Preamp/iter pc board ass'y

REF. NO.	PARTS NO.	DESCRIPTION
A34	27300494	Filter
A36	27300495A	Gear
A37	27180127	Spring
A42	27120378	Back panel (D)
A54	27120379	Back panel (W)
A57	2715011C	Cushion
A351	27190062	Holder
A354	28184146	Top cover
A356	28175055	Insulator plate
A357	27267179	Front panel ass'y
A358	27267191	Guide, power
A359	13288902	Guide, speaker
A360	27267181	Gear plate ass'y
A361	27267188	Guide, switch
A362	28140127	Guide, switch
A365	28140127	Cushion
A601	2814011B	0-5x390x10, Cushion
A602	28140024	Bottom board
A801	27175009A	Leg
A802	28320759	Tuning knob
A802	28320760	Knob, power

REF. NO.	PARTS NO.	DESCRIPTION
A1	27110165A	Front bracket
A3	28130140	Dial plate
A4	28130150A	Dial plate S
A5	13288901	Holder ass'y
A6	27240020	Plate
A8	27205018	Drive shaft
A9	27140644	Bracket, dial pulley
A10	27140501	Bracket, dial pulley
A13	28140051	8x28x10mm, Cushion
A14	28140254	18x45x5, Cushion
A15	27115111	Bracket, right side
A16	27115112	Bracket, left side
A17	27110304A	Bracket, pc board
A18	27185002A	DP-16A, dial pulley
A21	27115113	Bracket, center side
A22	27160104	Radiator
A23	27130302	Bracket, power transformer
A24	27130303	Dial drum
A27	27200027	SP-14A, Spring
A28	273803	Stringing
A29	273903	Pointer
A31	28165060	Lamp cover
A32	27300493	

SCHEMATIC DIAGRAM



- NOTES
- ° ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.
  - ° ALL CAPACITORS ARE IN JUF, 50WV UNLESS OTHERWISE NOTED.
  - ° ELECTROLYTIC CAPACITORS (—) ARE IN JUF/W.V.
  - ° VOLTAGE (MEASURED WITH V.T.V.M.) NO INPUT SIGNAL.
  - ° CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

- 0701, 0703 2SC1615 (GR) (1)
- 0704 2SC1615 (SR) (1)
- 0702 2SA1015 (GR) (1)
- 0901 2SD680 (GR) (1)

## PRINTED CIRCUIT BOARD-PARTS LIST

### FM/AM TUNER PC BOARD (NARF-1325g/h)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
		<b>ICs</b>
Q103	222608	$\mu$ PC1167C2, FM IF
Q104	222453	HA-1196, Stereo decoder
Q107	222465	NJM-4558D, Servo lock amplifier
Q112	222670	BA6124, Signal meter driver
Q150	222497	LA1240, AM radio system
		<b>Front end</b>
	240051	FF721U
		<b>Transistors</b>
Q101	2210823	2SC1675 (L1)
Q105, Q106	2211255	2SC1815 (GR)
Q108-Q110	2211255	2SC1815 (GR)
Q151	2211255	2SC1815 (GR)
		<b>Diodes</b>
D102-D105	223145	1S2076TD
D106	223132	1K60
D155	223145	1S2076TD
		<b>Coils</b>
L103, L104	233107	NMC-5002
L151	232099	NMA-3041
L152	232073	NMO-2008
		<b>Transformers</b>
L101	233270	NFIF-6040
L153	232041	NIT-0509
		<b>Ceramic filters</b>
X101, X103	3010003	SFE-10.7MA8
X151	3010053	SFL-455B

CIRCUIT NO.	PARTS NO.	DESCRIPTION
		<b>Capacitors</b>
C114	352784799	0.47 $\mu$ F, 50 V, Elect.
C115	352780109	1 $\mu$ F, 50 V, Elect.
C116	352741009	10 $\mu$ F, 16 V, Elect.
C118	352780109	1 $\mu$ F, 50 V, Elect.
C119	352750479	4.7 $\mu$ F, 25 V, Elect.
C120	352741009	10 $\mu$ F, 16 V, Elect.
C154	352750479	4.7 $\mu$ F, 25 V, Elect.
C155	352780339	3.3 $\mu$ F, 50 V, Elect.
C158, C163	352741009	10 $\mu$ F, 16 V, Elect.
C165	370133614	360pF+5%, 100 V, APS
C178	352741009	10 $\mu$ F, 16V, Elect.
C202-C205	352780229	2.2 $\mu$ F, 50 V, Elect.
C206	372524714	470pF+5%, 50 V, St
C207	352780339	3.3 $\mu$ F, 50 V, Elect.
C208	352780229	2.2 $\mu$ F, 50 V, Elect.
C209	352782299	0.22 $\mu$ F, 50 V, Elect.
C216	352744719	470 $\mu$ F, 16 V, Elect.
C221	352780109	1 $\mu$ F, 50 V, Elect.
C222	352742209	22 $\mu$ F, 16 V, Elect.
C224	352784799	0.47 $\mu$ F, 50 V, Elect.
C225	352750479	4.7 $\mu$ F, 25 V, Elect.
C227	352784799	0.47 $\mu$ F, 50 V, Elect.
C251, C253	352741009	10 $\mu$ F, 16 V, Elect.
		<b>Resistors</b>
R210	5215048	N08HR200KBC, Semi-fixed
R213	5215045	N08HR10KBC, Semi-fixed
R803-R805	442524714	470 $\Omega$ , 1/2W, Metal oxide film
		<b>Switches</b>
S805-S808	25035305	NPS-442-L269, Source selector
S809	25065126	NSS-2259, De-emphasis switch (W)

tape input/output terminal pc board

Note: W: Only 120/220V model

### TAPE INPUT/OUTPUT TERMINAL PC BOARD (NAPJ-1327d)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	25045074	NPJ-4PDBL37, TAPE 1/2 terminal
	25065128	NSS-2260, Sensor switch

### SIGNAL METER PC BOARD (NADIS-1335)

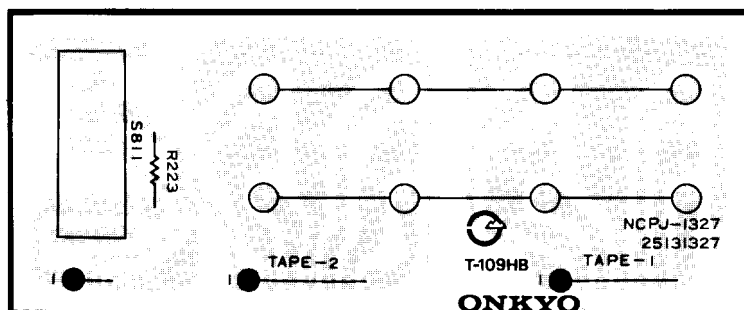
CIRCUIT NO.	PARTS NO.	DESCRIPTION
D110-D113	225047	SLP-251B, L.E.D.
	27190147	Holder, L.E.D.

### INDICATOR PC BOARDS (NADIS-1336/1337/1338)

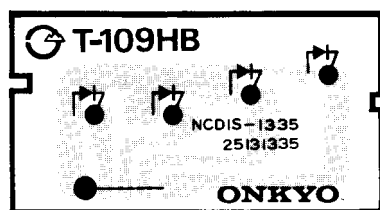
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	225082	SLP-155B-01, L.E.D., red
	225110	SLP-255B, L.E.D., green

### DIAL ILLUMINATION LAMP PC BOARD (NAPL-1349)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL802	210091	PL12V, 150mA



signal meter indicator pc board



**SOURCE INDICATOR PC BOARD (NADIS-1342a)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
D801, D803	225112	GL-9HY84, L.E.D
D805, D807		
D802, D804	225111	GL-9PG54, L.E.D
D806, D808		
	27190148	Holder
	28140343	Cushion

**EQUALIZER AMPLIFIER PC BOARD (NAEQ-1343)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
		<b>ICs</b>
Q301, Q401	222594	HA-12017
		<b>Capacitors</b>
C302, C402	352751009	10 $\mu$ F, 25V, Elect.
C305, C405	352724719	470 $\mu$ F, 6.3V, Elect.
C312, C412	352780109	1 $\mu$ F, 50V, Elect.
C314, C315	352754709	47 $\mu$ F, 25V, Elect.
C414, C415		
		<b>Switch</b>
S301, S401	25065151	NSS-6268, MM/MC selector

**SWITCH PC BOARD (NASW-1344) (D model)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S352, S353	25035310	NPS-100-222-L274, Push switch
S453		

**SWITCH PC BOARD (NASW-1344a) (W model)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
C217, C218	372526214	620pF $\pm$ 5%, 50V, St. capacitor
S352, S353	25035310	NPS-100-222-L274, Push switch
S453		

**SWITCH PC BOARD (NASW-1345)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S354-S356	25035311	NPS-322-L275, Push switch
	27140652	Bracket, push
	82113006	3P + 6FN, Pan head screw

**PRE. AMPLIFIER PC BOARD (NAAF-1346)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>ICs</b>		
Q351, Q451	222534	NJM-4559DX
<b>Diodes</b>		
D905, D906	224072 or 224000	BZ177 or RD18FB
<b>Capacitors</b>		
C353, C453	392880227	2.2 $\mu$ F, 50V, LL
C359, C459	352752209	22 $\mu$ F, 25V, Elect.
C365, C465	392880107	1 $\mu$ F, 50V, LL
C368, C468	352780109	1 $\mu$ F, 50V, Elect.
C370, C371	352780339	3.3 $\mu$ F, 50V, Elect.
C906, C907	352754719	470 $\mu$ F, 25V, Elect.
<b>Resistors</b>		
R364, R464	5148078	N16RGM11C100KC030, Treble control variable
R365, R465	5149079	N16RGM11C100KCS30, Bass control variable
	Shielded plate 27150153	
	Insulator plate 28175055	

**SWITCH PC BOARD (NASW-1361)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S801	25035312	NPS-222-L276, Push switch
	27130306	Bracket, speaker
	82113006	3P + 6FN, Pan head screw

**HEADPHONE TERMINAL PC BOARD (NAHP-1362)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
P808	25045105	HLJ0307-01-020, Headphone jack

**SWITCH PC BOARD (NASW-1329a)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
R802	442524714	470 $\Omega$ , 1/2W, Metal oxide film

## POWER SUPPLY PC BOARD

## POWER SUPPLY PC BOARD (NAPS-1348)

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>Transistors</b>			<b>Relay</b>	
Q701, Q703	2211255 or 2211256	2SC1815 (GR) or 2SC1815 (BL)	RL701	25065134	NPL-2P-5A-DC24V-07
Q702	2211455	2SA1015 (GR)		<b>Fuseholder</b>	
Q704	2211254 or 2211255	2SC1815 (Y) or 2SC1815 (GR)	F901a F902a	250113 25050065	SN5051 YSH403T (W)
Q901	2201075 or 2201074	2SD880 (GR) or 2SD880 (Y)		<b>Fuses</b>	
	<b>Diodes</b>		F901 F901 F902	252049 252014 252074	4A (ST-6),(D) 4A-T, (W) 2A-SE-EAK, (W)
D701, D702	223145 or 223133	1S2076TD or DS442X		<b>Lamps</b>	
D703	223133	DS442X	PL802, PL803 PL801	210082 210050A	PL12V60mA-W2, Tone indicator PL12V0.03A-W4, Pointer in- dicator
D911-D913	223804	SR1K-2		<b>Holder</b>	
D914	224114 or 224191	GZA13U or 05Z13Z		27190149	Lamp
D921	223804	SR1K-2		<b>Radiator</b>	
	<b>Capacitors</b>			27160029	
C701	352722219	220 $\mu$ F, 6.3V, Elect.		<b>Screws</b>	
C702	352753309	33 $\mu$ F, 25V, Elect.		82113008	3P + 8FN, Pan head
C703	352780339	3.3 $\mu$ F, 50V, Elect.			
C912	352751019	100 $\mu$ F, 25V, Elect.			
C913	352752229	2,200 $\mu$ F, 25V, Elect.			
C914	352751019	100 $\mu$ F, 25V Elect.			
C915	352741019	100 $\mu$ F, 16V, Elect.			
C916	352744709	47 $\mu$ F, 16V, Elect.			
C922, C923	352741029	1,000 $\mu$ F, 16V, Elect.			
	<b>Resistors</b>				
R704	442523314	330 $\Omega$ , 1/2W, Metal oxide film			
R708	442522704	27 $\Omega$ , 1/2W, Metal oxide film			
R911	441521004	10 $\Omega$ , 1/2W, Metal oxide film			
R912	441521224	1.2k $\Omega$ , 1/2W, Metal oxide film			
R551, R651	441623314	330 $\Omega$ , 1W, Metal oxide film			
R921	442526804	68 $\Omega$ , 1/2W, Metal oxide film			
R922	442521004	10 $\Omega$ , 1/2W, Metal oxide film			

**POWER AMPLIFIER PC BOARD (NAMS-1347)**

CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>ICs</b>		
Q501, Q601	222023	STK-3062
Q502, Q602	222022	STK-0050II
<b>Diodes</b>		
D901-D904	223863	GP30DL
<b>Coils</b>		
L501, L601	231001	S1.3B
<b>Capacitors</b>		
C501, C601	352780339	3.3 $\mu$ F, 50V, Elect.
C504, C604	352721019	100 $\mu$ F, 6.3V, Elect.
C512, C612	352780109	1 $\mu$ F, 50V, Elect.
C515, C615	352790479	4.7 $\mu$ F, 100V, Elect.
C902, C903	3504158	12,000 $\mu$ F, 50V, Elect.
C904, C905	352762219	220 $\mu$ F, 35V, Elect.
<b>Resistors</b>		
R509, R609	4000080	$\mu$ PC74-5WK0.47, Metal plate
R510, R610	4000080	$\mu$ PC74-5WK0.47, Metal plate
R511, R611	441720104	1 $\Omega$ , 2W, Metal oxide film
R512, R612	441520474	4.7 $\Omega$ , 1/2W, Metal oxide film
R513, R613	441520474	4.7 $\Omega$ , 1/2W, Metal oxide film
R901-R904	441522714	270 $\Omega$ , 1/2W, Metal oxide film
R905, R906	441522414	240 $\Omega$ , 1/2W, Metal oxide film