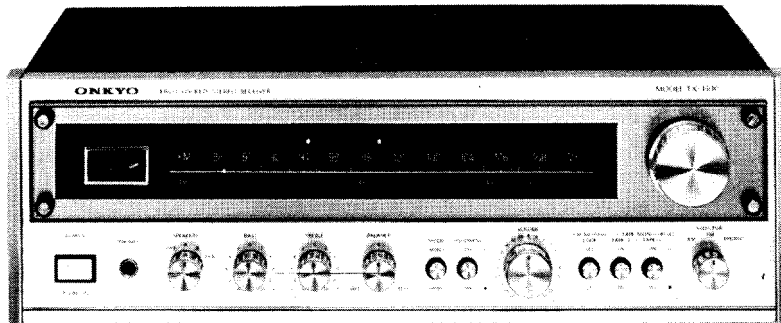


ONKYO® SERVICE MANUAL

SERVO LOCKED FM/AM STEREO RECEIVER Model TX-1500



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ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

U.S.A. Model

Amplifier section

Power Output	15 watts per channel, min. RMS, at 8 ohms or 4 ohms, both channels driven, from 20 Hz to 20 kHz, with no more than 0.5 % total harmonic distortion. 17 watts per channel, min. RMS, at 8 ohms both channels driven, 1 kHz, 0.5 % THD. 20 watts per channel, min. RMS, at 4 ohms both channels driven, 1 kHz, 0.5 % THD.
Total Harmonic Distortion	0.5 % at rated power 0.3 % at 1 watt output
IM Distortion	0.5 % at rated power 0.3 % at 1 watt output
Damping Factor	20 (8 ohms 1 kHz 10 watts)
Frequency Response	20 - 30,000 Hz (± 1 dB)
Sensitivity and Impedance	PHONO: 2.5 mV 50 kohms TAPE PLAY: 150 mV 50 kohms TAPE REC: 150 mV 50 kohms
Phono Overload	100 mV RMS 1 kHz 0.5 % THD
Bass Control	± 12 dB at 100 Hz
Treble Control	± 10 dB at 10 kHz
Signal-to-Noise Ratio	PHONO: 65 dB (IHF C NETWORK) TAPE: 80 dB (IHF C NETWORK)
RIAA Curve Deviation	± 0.8 dB at 30 Hz to 15 kHz

Tuner section

Tuning Range	FM: 88 - 108 MHz AM: 530 - 1605 kHz
Usable Sensitivity	FM mono: 2.3 μ V 12.4 dBf FM stereo: 5 μ V 19.2 dBf AM: 25 μ V
50 dB Quieting Sensitivity	FM mono: 4.5 μ V 18.3 dBf FM stereo: 50 μ V 39.2 dBf
Intermediate Frequency	FM: 10.7 MHz AM: 455 kHz
Capture Ratio	FM: 2 dB
Image Rejection	FM: 45 dB AM: 40 dB
IF Rejection	FM: 80 dB AM: 30 dB
Signal-to-Noise Ratio	FM mono: 65 dB FM stereo: 60 dB AM: 40 dB
Alternate Channel Att.	FM: 60 dB
AM Suppression	FM: 50 dB
Harmonic Distortion	FM mono: 0.25 % AM: 0.9 % FM stereo: 0.5 %
Frequency Response	FM: 30 - 15,000 Hz ± 1.5 dB
Stereo Separation	FM: 35 dB at 1 kHz 30 dB at 100 - 10,000 Hz
Muting Level	FM: 3 μ V (14.7 dBf)
Stereo Lamp Level	FM: 3 μ V (14.7 dBf)
Locking Level	FM: 3 μ V (14.7 dBf)
Tuning Meter	Signal Strength Meter

General

Power Supply	AC 120 V 60 Hz.
Dimensions (W x H x D)	17-5/16" x 5-7/8" x 12-3/16"
Weight	439 x 149 x 310 mm 16.1 lbs. 7.3 kg.

Universal Model

Amplifier section

Power Output	70 watts total at 4 ohms 0.5 % THD. 20 watts per channel, min. RMS, at 4 ohms both channels driven, 0.5 % THD. at 1 kHz 17 watts per channel, min. RMS, at 8 ohms both channels driven, 0.5 % THD. at 1 kHz 15 watts per channel, min. RMS, at 4 ohms or 8 ohms both channels driven, from 20 Hz to 20 kHz, 0.5 % THD.
Dynamic Continuous	0.5 % at rated power 0.3 % at 1 watt output
Total Harmonic Distortion	0.5 % at rated power 0.3 % at 1 watt output
IM Distortion (70 Hz: 7 kHz= 4 : 1)	0.3 % at 1 watt output
Damping Factor	20 (8 ohms 1 kHz)
Frequency Response	20 - 20,000 Hz (± 1 dB)
Sensitivity and Impedance	PHONO: 2.5 mV 50 kohms TAPE PLAY: 150 mV 50 kohms TAPE REC: 150 mV 50 kohms
Phono Overload	100 mV RMS at 1 kHz 0.5 % THD.
Tone Control BASS	± 12 dB at 100 Hz
TREBLE	± 10 dB at 10 kHz
Signal-to-Noise Ratio	PHONO: 65 dB (IHF C NETWORK) TAPE: 80 dB (IHF C NETWORK)
RIAA Curve Deviation	± 0.8 dB at 30 Hz to 15 kHz

Tuner section

Tuning Range	FM: 88 - 108 MHz AM: 530 - 1605 kHz
Usable Sensitivity	FM mono: 2.3 μ V (12.4 dBf) IHF 1.8 μ V (S/N 26 dB, 40 kHz Devi.) DIN FM stereo: 5 μ V (19.2 dBf) IHF 50 μ V (S/N 46 dB, 40 kHz Devi.) DIN AM: 25 μ V
50 dB Quieting Sensitivity	FM mono: 4.5 μ V (18.3 dBf) FM stereo: 50 μ V (39.2 dBf)
Intermediate Frequency	FM: 10.7 MHz AM: 455 kHz
Capture Ratio	FM: 2 dB
Image Rejection Ratio	FM: 45 dB AM: 40 dB
IF Rejection Ratio	FM: 80 dB AM: 30 dB
Signal-to-Noise Ratio	FM mono: 65 dB AM: 40 dB FM stereo: 60 dB
Alternate Channel Att. Selectivity	FM: 60 dB FM: 42 dB DIN (± 300 kHz, 40 kHz Devi.)
AM Suppression Ratio	FM: 50 dB
Harmonic Distortion	FM mono: 0.25 % AM: 0.9 % FM stereo: 0.5 %
Frequency Response	FM: 30 - 15,000 Hz ± 1.5 dB
Deemphasis Switch	FM: 50 μ s/75 μ s
Stereo Separation	FM stereo: 35 dB at 1 kHz 30 dB at 100 - 10,000 Hz
Muting Level	FM: 3 μ V
Stereo Threshold	FM: 3 μ V
Servo Lock Lamp Level	FM: 3 μ V
Spurious Rejection	FM: 78 dB (1/2 IF)
Sub Carrier Suppression	FM: 40 dB
Tuning Meter	Signal strength meter

General

Power Supply Rating	AC 110/120/220/240 volts 50/60 Hz
Controls	POWER SPEAKERS (OFF, A, B, A+B) SELECTOR (AM, FM, PHONO) TAPE MONITOR 1 & 2 TUNING, VOLUME, BALANCE, TREBLE, BASS FM MUTING/SERVO LOCK SWITCH LOUDNESS, MODE
Antennas	FM: 300 ohms balanced AM: built in ferrite core antenna and external terminal
Outputs	SPEAKER A & B, HEADPHONES TAPE REC OUT 1 & 2, DIN REC OUT
Inputs	PHONO, TAPE PLAY 1 & 2, DIN PLAY FM & AM ANTENNA
Dimensions	439 W x 149 H x 310 D mm
Weight	7.3 kg.
Semiconductors	1 FET, 12 Transistors, 7 ICs, 21 Diodes

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. REMOVAL OF DIAL GLASS

- (1) Pull TUNING knob off the TUNING shaft.
- (2) Remove four hex bolts.

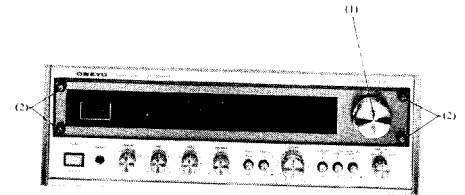


fig-1

2. REMOVAL OF FRONT PANEL

- (1) Pull all knobs off control shafts.
- (2) Remove two hex bolts.
- (2) Remove three screws.

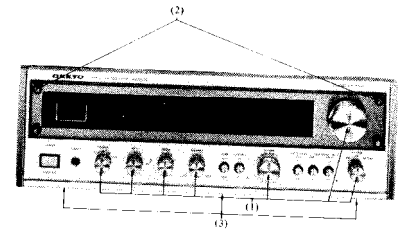


fig-2

3. REPLACING STEREO / LOCKED INDICATOR (L.E.D.)

- (1) Remove four screws which hold the top cover to the chassis and lift off the top cover.
- (2) Remove a screw which hold the PC board to the front bracket.
- (3) There is a cathode mark on the foot of L.E.D.

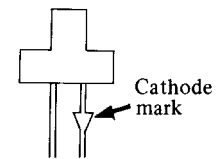


fig-3

4. REPLACING DIAL LAMP

- (1) Remove four screws which hold the top cover to the chassis and lift off the top cover.
- (2) Remove the two screws which hold the lamp case to the front bracket.

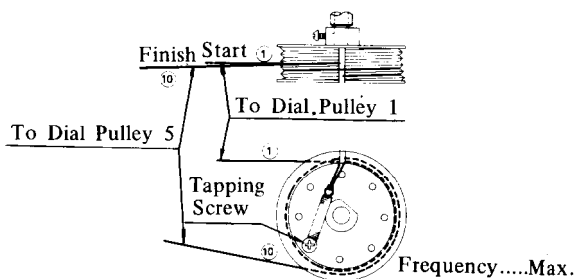
5. REPLACING POWER FUSE (U.S.A. MODEL)

- (1) Remove four screws which hold the top cover to the chassis and lift off the top cover.
- (2) Replace a fuse between a back panel and a power transformer.

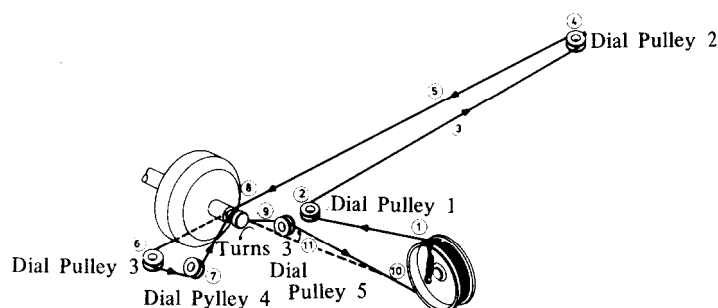
6. REPLACING SPEAKER FUSE

- (1) Remove a screw which hold the fuse cover to the back panel.

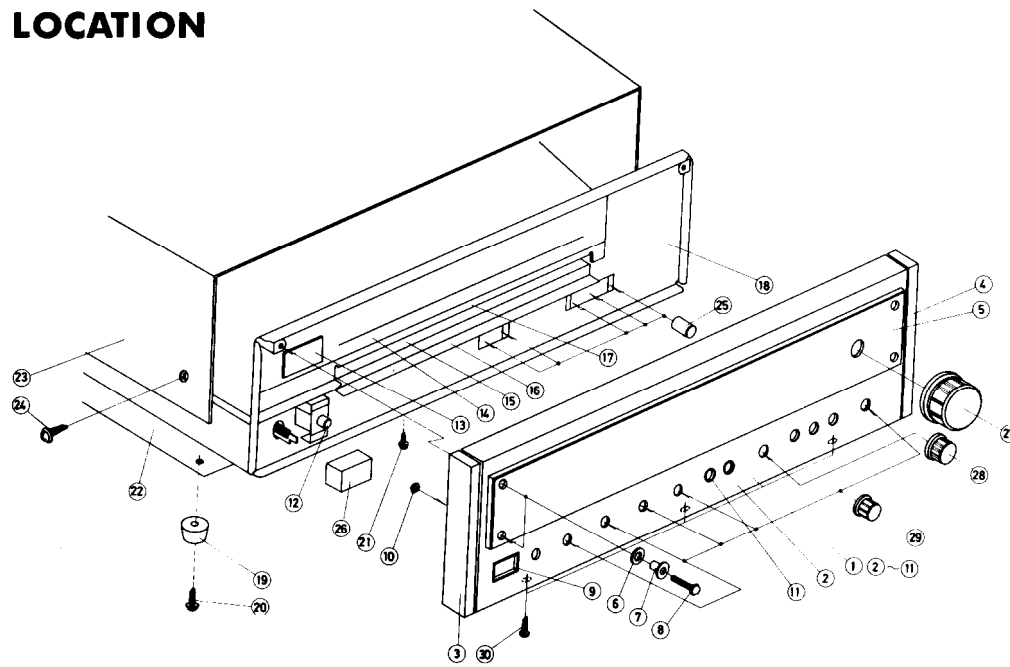
STRINGING DIAGRAM



1. Open the variable capacitor complete and tie dial cord to the spring of the drum.
2. Thread dial cord in the direction of arrow from ① to ⑧ and wind dial cord three turns around the tuning shaft counter-clockwise.
3. Thread dial cord in the direction of arrow from ⑨ to ⑩.
4. Thread dial cord to the dial pulley 5.



COMPONENT LOCATION



PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1	13779121	Front Panel Ass'y	16	27300036	Pointer Rail
2	27210067	Front Panel	17	28165031	Pointer
3	28125039A	End Cap, Left	18	27110037	Front Bracket
4	28125040A	End Cap, Right	19	280379	Leg
5	28191016A	Dial Glass	20	831130162	3STW+16BQ
6	870054	Washer	21	831130062	3STW+6BQ
7	27270017A	Spacer	22	27170024	Bottom Board
8	84334015	M4x15 Hex Volt	23	28184023A	Amp. Cover (U.S.A. Model)
9	27267026	Power Switch Guide		28184024	Amp. Cover (Universal Model)
10	863140	N-4F-N Nut	24	838440109	4TTB+10C (BC)
11	27267010	Push Switch Guide	25	28320133	Push Button A
12	25045018	LJ-100-H Stereo Headphone Jack	26	28320171A	POWER Knob
13	243069	NIND-0500S69 Strength Meter	27	28320170	TUNING Knob
14	28130048A	Dial Plate	28	2830132	VOLUME Knob
15	27240011	Bracket, Dial Plate	29	28320131	TONE Knob
			30	834130062	3STS+6BQ

PC BOARD PARTS LIST

NAAR-395 PC. BOARD-PARTS LIST

CIRCUIT NO.	DESCRIPTION	STOCK NO.	CIRCUIT NO.	DESCRIPTION	STOCK NO.
	TRANSISTORS			ICS	
Q001	2SC380(O) or FM RF. Amp.	2210123	Q102	LA1230, Quadrature Det.	222455
		2210124	Q103	LA3350, MPX.	222449
Q002	2SC785(O-1), Mixer	2210380	Q104	HA-1151, AM	222418
Q003	2SC394(O), FM OSC.	2210393	Q301, Q401	TA7129(ONK), EQ. Amp.	222451
Q101	2SC380(O) or FM IF Amp.	2210123	Q501, Q502	STK-075, Power Amp.	222010
		2210124			
Q105	2SC1317(R) or Locked Lamp Switch	2210943		DIODES	
		2211182	D001	1S2687, Variable Capacitor	223110
Q106	2SC1317(Q) or Mono-ST. Switch	2210942	D101, D102		
		2210244	D105, D108	1S1555	223105
Q107	2SC945(K) or Muting	2210741	D702-D704		
		2211184	D106	VD1212, Varistor	4000022
Q108	2SC1740(S), Locked Lamp Switch	2211184	D109	1N60	223103
Q302, Q402	2SC1312(G) or Tone Amp.	2210137	D701	1S1554	223106
		2210975	D901, D903		
Q701, Q702	2SC733(BL) or Transient Killer	2210086	D905, D907	GP-15B	223842
		2211184	D909, D910	10D2	223805
Q703	2SC1318(R) or Rectifier	2211043	D911	1S1886	223806
		2211044	D912	BZ-130	223929
			D913	WZ-150	223915

NAAR-395 PC. BOARD-PARTS LIST

CIRCUIT NO.	DESCRIPTION	STOCK NO.	CIRCUIT NO.	DESCRIPTION	STOCK NO.
COILS					
L001	NFA 3001 NFA-3009 or FM RF.	233088-1 233106	C701	4.7 μ F50V, Elect.	352780471
L002	NFRF-3005, FM RF.	233103	C702	220 μ F16V, Elect.	352742211
L003	NFT-1501, FM RF.	233037	C705	22 μ F35V, Elect.	352762201
L004	NFO-3003, FM OSC.	233090	C706	220 μ F35V, Elect.	352762211
L101	NCCH-1501 NCCH-1005 or 3.3 μ H	233024 233105	C914	470 μ F50V, Elect.	352784711
L102	NCCH-1506 18 μ H	233074	C915	470 μ F35V, Elect.	352764711
L103, L104	NMC-8-5, L.P.F.	233021	C916	100 μ F16V, Elect.	352741011
L106	NMO-2503, AM OSC.	232013	VARIABLE RESISTORS		
TRANSFORMERS					
T001	NIT-0518, FM IF.	233085	R149	N10HR1KBC, Separation Adjust.	5225018
T101	NIT-3516 NFIIF-6003 or FM Det.	233083 233101	R152	N10HR5KBC, 19 kHz Adjustment	5225056
T102	NIT-0519, AM Det.	232041	R336, R436	N24RGP250KBT30-41C, Volume	5172042
CERAMIC FILTERS					
X101, X102	SFE-10.7MA, FM IF.	3010003	R342	N16RL100KW30, Balance	5104046
X103	CFZ-455C, AM IF.	3010004	R345, R351 R445, R451	N16RGM100KB30, Tone	5148014
CAPACITORS					
VC001- VC005	NVC2-327SA, Variable	3050004	RESISTORS		
TC005	NTC-10P02, Trimmer	3060003	R701	1.2k Ω 2W, Oxide Film	441721224
C107	4.7 μ F, 25V, Elect.	35275047	R709	620 Ω 1W, Oxide Film	431626214
C106	22 μ F10V, Elect.	35273220	R904	100 Ω 2W, Oxide Film	441721014
C110, C142	10 μ F16V, Elect.	352741001	R905	220 Ω 2W, Oxide Film	441722214
C143	1 μ F50V, Elect.	352780101	R157	560 Ω 1W, Oxide Film	431625614
C144, C145	0.22 μ F \pm 20% 50V, LL	392882297	SWITCHES		
C153	150pF \pm 10% 50V, Polystyren	372321525	S801	NRS-143-30ZV, Source Selector	25030075
C154	0.47 μ F \pm 20% 50V, LL	392884797	S802- S804	NPS-122X3LA, Mut. Tape-1, 2	25035032
C155	0.22 μ F \pm 20% 50V, LL	392882297	S805, S806	NPS-222-L14A, Loudness, Mode	25035049
C156	0.33 μ F \pm 20% 50V, LL	392883397	TERMINALS		
C158	220 μ F16V, Elect.	352742211	P801	NPJ-2PDBL10, Phono Input	25045034
C160	47 μ F10V, Elect.	352734711	P802, P803	NPJ-4PDBL11, Tape	25045020
C166	360pF \pm 5% 50V, Polystyren	372323614	SHIELDED PLATES		
C170	1 μ F50V, Elect.	352780101	Front End Top		27150056A
C173	3.3 μ F50V, Elect.	352780331	FM OSC.		27150057
C175	0.039 μ F \pm 20% 50V, DE	374123937	The Universal type adds from the USA model at the following parts.		
C176	10 μ F16V, Elect.	352741001	S807	NSS-2225, De Emphasis Selector Switch	250142
C177	100 μ F16V, Elect.	352741011	P804	S-13316, DIN Socket	250199
C178	100 μ F6.3V, Elect.	352721011	PILOT LAMP PC. BOARD-PARTS LIST		
C302, C402	4.7 μ F25V, Elect.	352750471	CIRCUIT NO.	DESCRIPTION	STOCK NO.
C303, C304	100 μ F, 6.3V, Elect.	352721011	PILOT LAMPS		
C308, C408	0.47 μ F50V, Elect.	352784791	PL801- PL803	250mA, 6.3V, Dial Illumination	210026
C309, C409	0.33 μ F \pm 20% 50V, LL	392883397	Fuse Holder, SN5051		
C311	330 μ F35V, Elect.	352763311	<i>PL804</i> <i>DIAL POINTER LAMP</i> <i>210015A</i>		
C332, C432	0.047 μ F \pm 10% 50V, DE	374124735	L.E.D.PC. BOARD-PARTS LIST		
C333, C433	2.2 μ F \pm 20% 50V, LL	392880227	CIRCUIT NO.	DESCRIPTION	STOCK NO.
C335, C435	220 μ F16V, Elect.	352742211	D801, D802	SE1103R, L.E.D.	225010
C336, C436	3.3 μ F50V, Elect.	352780331	POWER FUSE PC. BOARD-PARTS LIST		
C337, C437	3.3 μ F50V, Elect.	352780331	(Only U.S.A. Model)		
C501, C601	1 μ F \pm 20% 50V, LL	392880107	F901	2A(ST-2), Fuse	252044
C502, C602	33 μ F10V, Elect.	352733301	Fuse Holder, SN5051		
C506, C606	100 μ F16V, Elect.	352741011			
C507, C607	47 μ F50V, Elect.	352780471			
C508, C608	4.7 μ F50V, Elect.	352780471			
C511, C611	4.7 μ F50V, Elect.	352780471			

ALIGNMENT PROCEDURES

INSTRUMENTS REQUIRED

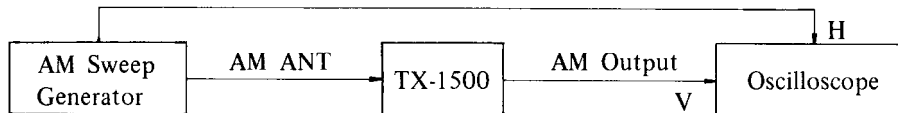
1. AM Sweep Generator
2. AM and FM Signal Generator
3. Vacume Tube Voltage Meter (VTVM) AC, DC
4. Oscilloscope
5. Distortion Analyzer
6. Stereo Modulator
7. Frequency Counter

GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400Hz 30% (AM), 400Hz 100% (FM MONO) pilot 10% sub and main 90% (FM STEREO).

(1) AM IF ALIGNMENT

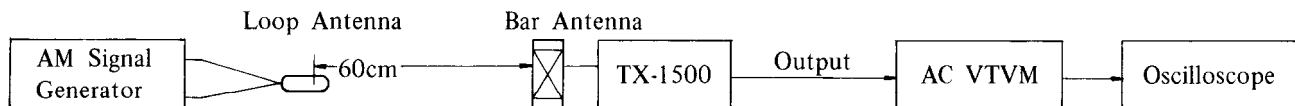
1. Set SELECTOR switch to AM.
2. Set radio dial to quiet point.



Set signal	Adjust	Oscilloscope	Remarks
455 KHz	X103 (CFZ-455C)	Maximum Symmetrical Response	Usually not necessary to adjust

(2) AM RF ALIGNMENT

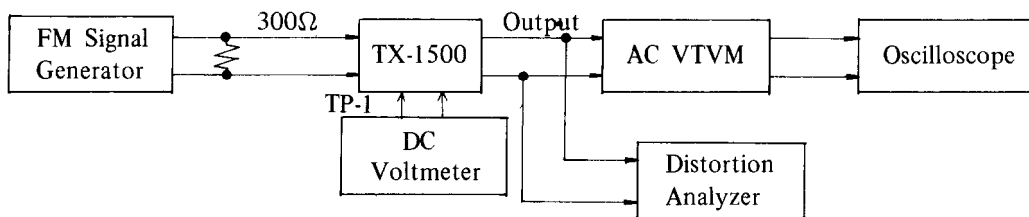
1. Remove a screw on the AM antenna cover.



Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks
1	515 KHz 400 Hz 30 %	Lower end (515 KHz)	L103 NMO-2503	Maximum	Repeat step 1 and 2 as necessary
2	1680 KHz 400 Hz 30 %	Upper end (1680 KHz)	TC-002	Maximum	
3	600 KHz 400 Hz 30 %	600 KHz	L005 NMA-1008	Maximum	Repeat step 3 and 4 as necessary
4	1400 KHz 400 Hz 30 %	1400 KHz	TC-001	Maximum	

(3) FM FRONT END ALIGNMENT

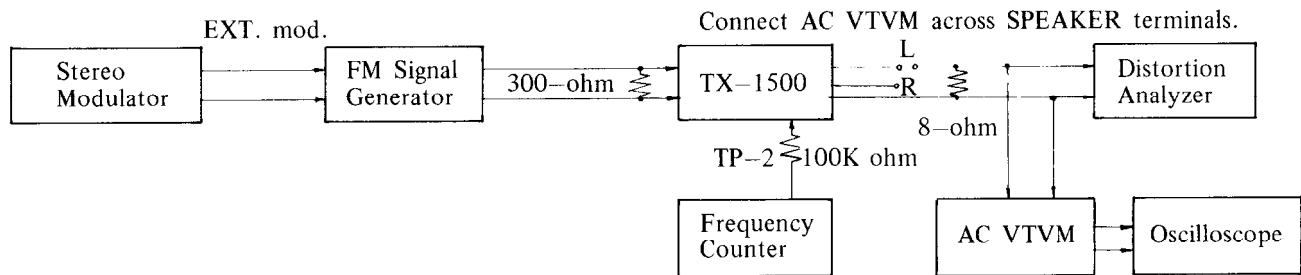
1. Set SELECTOR switch to FM.
2. Push MUTING switch to off.
3. Connect FM Signal Generator to 300-ohm antenna terminals.
4. Connect DC Voltmeter to TP-1 terminals.



Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	No signal	Quiet Point	T101 Bottom	DC Voltmeter	OV	Repeat step 1 and 2 as necessary.
2	98 MHz 60 dB 400 Hz 100% mod.	98 MHz	T101 Top	Distortion Analyzer	Minimum	
3	90 MHz 60 dB 400 Hz 100% mod.	90 MHz	L004 OSC Coil NFO-3003	AC VTVM or Oscilloscope	Maximum	Repeat step 3 and 4 as necessary.
4	106 MHz 400 Hz 60 dB 100% mod.	106 MHz	TC005		Maximum	
5	90 MHz 400 Hz 100% mod.	90 MHz	L001, L002		Maximum	Repeat step 5 and 6 as necessary.
6	106 MHz 400 Hz 100% mod.	106 MHz	TC003 TC004		Maximum	
7	98 MHz 400 Hz 100% mod.	98 MHz	T001 NIT-0518		Maximum	

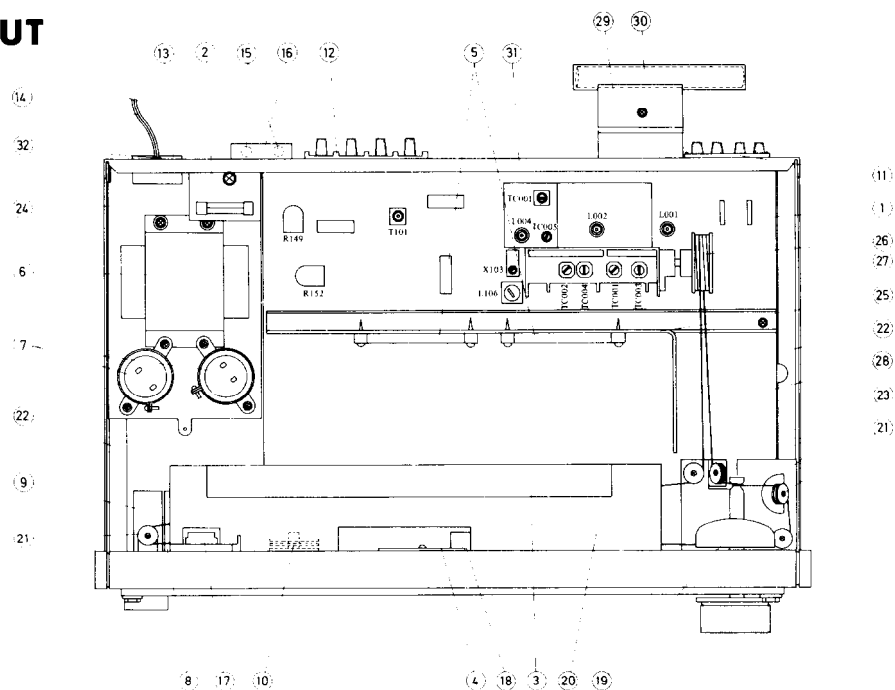
NOTES: When adjust step 5 and 6, set FM Signal Generator level as low as possible.

(4) FM MONO DISTORTION AND MULTIPLEX ALIGNMENT



Alignment	Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
Mono Distortion		98 MHz 400 Hz 100% mod. 60 dB	—————	98 MHz	T101 Bottom	Distortion Analyzer	Minimum	
19 KHz	1	98 MHz 400 Hz no mod. 60 dB	—————	98 MHz	R152	Frequency Counter	19000±19 Hz	
	2	STEREO INDICATOR should light up when stereo program is being received.						
Multiplex	1	98 MHz EXT. Mod.	Pilot Sig. 10% Main & Sub Sig. 1 KHz Lch 90%	98 MHz	R149	AC VTVM Right ch.	Minimum	Repeat step 1 & 2 as necessary
	2	Same as above	Pilot Sig. 10% Main & Sub Sig. 1 KHz Rch 90%	98 MHz	R149	AC VTVM Left ch.	Minimum	

CHASSIS LAYOUT



PARTS LIST U.S.A. Model

REF. NO.	PARTS NO.	DESCRIPTION
1	13779595	NAAR-395 Tuner and Pre/Main Amp. P.C.B.
2	13779596	NAFU-396 Power Fuse P.C.B.
3	13779597	NAPL-397 Dial Illumination Lamp P.C.B.
4	13779599	NAPL-399 STEREO/LOCKED Indicator P.C.B.
5	222010	STK-075 Power Amp. IC
6	230185	NPT-616D Power Transformer
7	3504081	4700 μ F35V Elect. Capacitor
8	3504012	0.01 μ F \pm 20% 125V UL Capacitor
9	25035047	NPS-111-L12P Power Switch
10	25030074	NRS-144-30Y Speaker Selector Switch
11	25060003	NTM-4PUN1-L Antenna Terminal
12	25060001A	NTM-4WPUN1 Speaker Terminal
13	25050008A	S-16432 AC Outlet
14	253072	AS-UC AC Cord
15	252025	2.5A-T Speaker Fuse
16	25050004	Fuse Holder with Cover
17	243069	NIND-0500S69 Strength Meter
18	27110037	Front Bracket
19	27205006	Drive Shaft Ass'y
20	27250011A	Lamp Case
21	27185003	Dial Pulley
22	27115018	Side Bracket
23	27140144	Bracket, Dial Pulley
24	27130098	Bracket, Power Transformer
25	27160024	Heat Sink
26	27200019	Dial Drum
27	273803	Dial Drum Spring
28	273903	Dial Cord
29	27190024	AM Antenna Case
30	232063	NMA-1008 AM Bar Antenna
31	27120065A	Back Panel
32	270025	SP-3P-4 Strainrelief

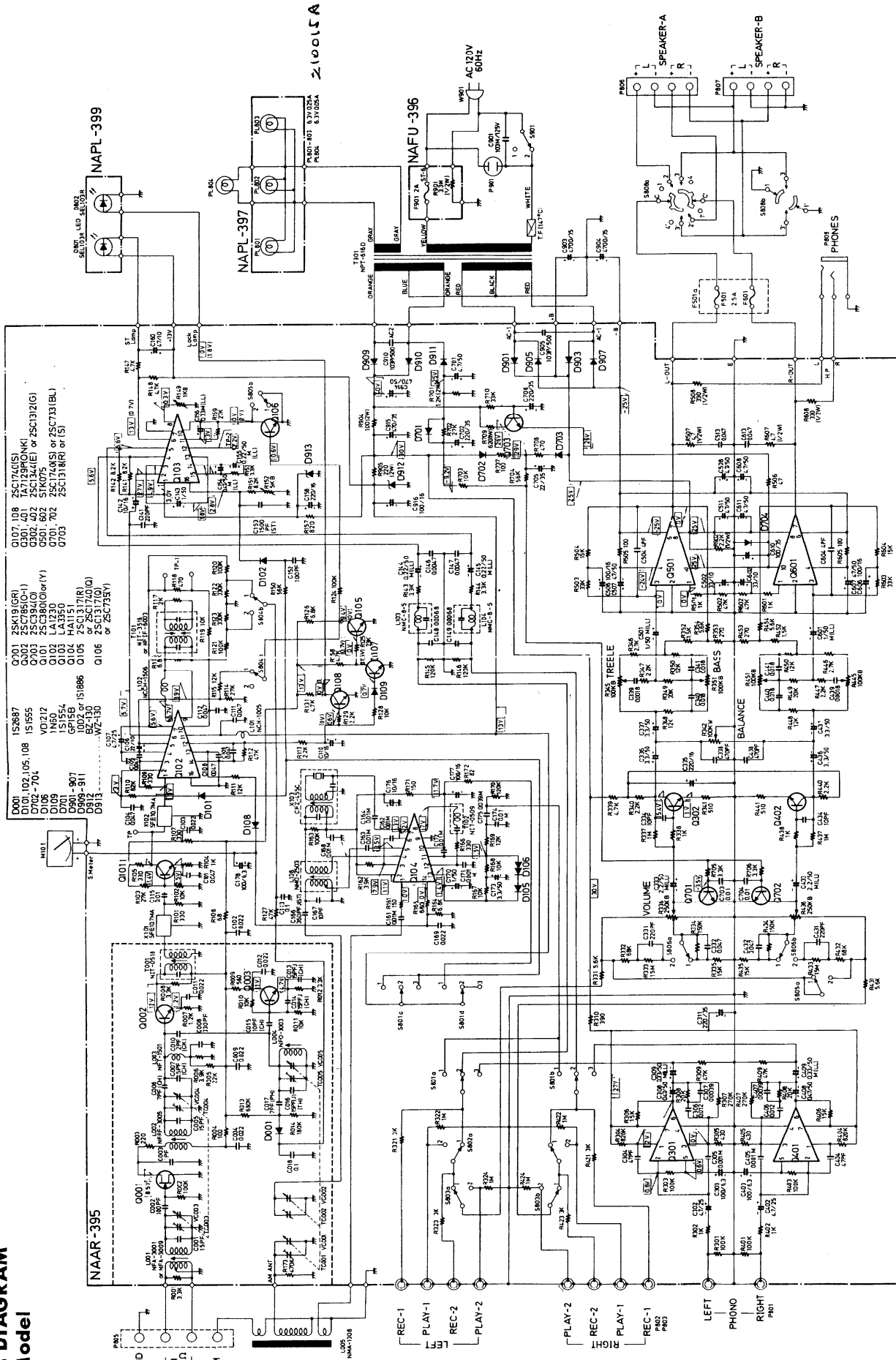
Universal Model

REF. NO.	PARTS NO.	DESCRIPTION
1	13780595A	NAAR-395a Tuner and Pre/Main Amp. P.C.B.
2	None	
3	13779597	NAPL-397 Dial Illumination Lamp P.C.B.
4	13779599	NAPL-399 STEREO/LOCKED Indicator P.C.B.
5	222010	STK-075 Power Amp. IC
6	230186	NPT-616ADGQ Power Transformer
7	3504081	4700 μ F35V Elect. Capacitor
8	3500052	PME271Y510CEE IS Capacitor
9	25035034	NPS-121-L Power Switch
10	25030074	NRS-144-30Y Speaker Selector Switch
11	25060003	NTM-4PUN1-L Antenna Terminal
12	25060001A	NTM-4WPUN1 Speaker Terminal
13	None	
14	None	
15	252025	2.5A-T Speaker Fuse
16	25050004	Fuse Holder with Cover
17	243069	NIND-0500S69 Strength Meter
18	27110037	Front Bracket
19	27205006	Drive Shaft Ass'y
20	27250011A	Lamp Case
21	27185003	Dial Pulley
22	27115018	Side Bracket
23	27140144	Bracket, Dial Pulley
24	27130098	Bracket, Power Transformer
25	27160024	Heat Sink
26	27200019	Dial Drum
27	273803	Dial Drum Spring
28	273903	Dial Cord
29	27190024	AM Antenna Case
30	232063	NMA-1008 AM Bar Antenna
31	27120066	Back Panel
32	None	

The Universal Model adds from the U.S.A. Model at the following parts.

25050018	PA-125, 3P Inlet
252015	1.5A-T Power Fuse
250227	SFO40A3 PS Plug
253083	AS-CEE AC Cord
250186	SI-7205-7 VS Socket

SCHEMATIC DIAGRAM U.S.A. Model

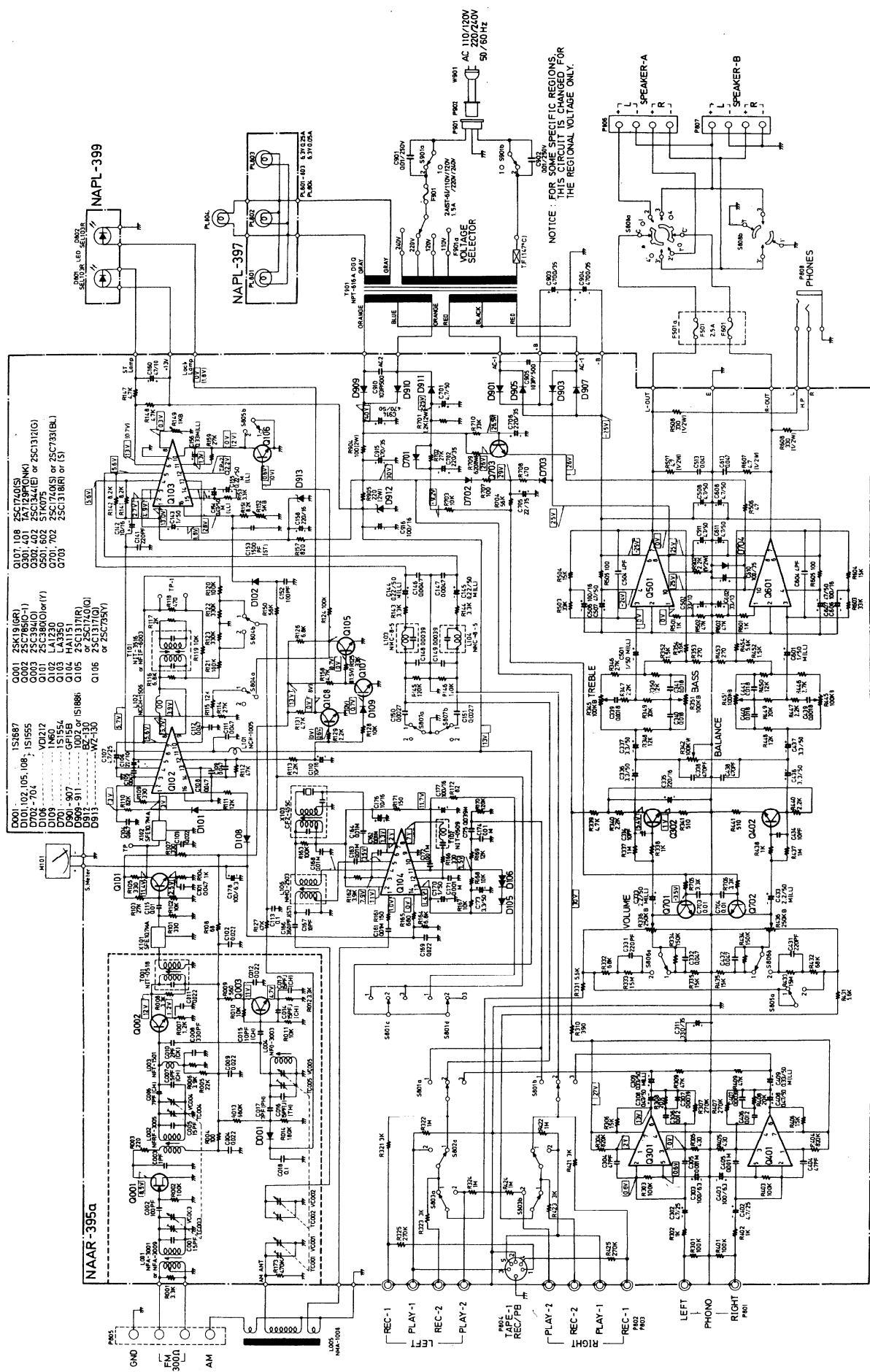


- Q107 108 25C174(S)
 Q301 401 25C174(S)
 Q302 402 25C1312(G)
 Q501 602 5K075
 Q701 702 25C1312(R) or (S)
 Q703 704 25C1312(R) or (S)
 Q101 25K19(GR)
 Q302 25C785(O-H)
 Q101 25C394(O)
 Q102 25C394(O)
 Q103 LA1350
 Q104 HA1151
 Q105 25C1317(R)
 Q106 25C1317(O)
 Q107 25C1317(O)
 Q108 25C1317(O)
 Q109 25C1317(O)
 Q110 25C1317(O)
 Q111 25C1317(O)
 Q112 25C1317(O)
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 Q196 25C1317(O)
 Q197 25C1317(O)
 Q198 25C1317(O)
 Q199 25C1317(O)
 Q200 25C1317(O)

NOTES:
 ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.
 ALL CAPACITORS ARE IN P.F. UNLESS OTHERWISE NOTED.
 ELECTROLYTIC CAPACITORS ARE IN μ F/70V.
 VOLTAGE (MEASURED WITH V.T.V. METER).
 V DC VOLTAGE (NO INPUT SIGNAL).
 V AC VOLTAGE (FM STEREO)

- SWITCH (SELECTOR)
 S800 (TAPE MONITOR - 1)
 S801 (TAPE MONITOR - 2)
 S802 (MUTING LOCK)
 S803 (MODE)
 S804 (LOUDNESS)
 S805 (PUSHERS)
 S806 (PUSHERS)
 S807 (PUSHERS)
 S808 (PUSHERS)
 S809 (PUSHERS)
 S810 (PUSHERS)
 S811 (PUSHERS)
 S812 (PUSHERS)
 S813 (PUSHERS)
 S814 (PUSHERS)
 S815 (PUSHERS)
 S816 (PUSHERS)
 S817 (PUSHERS)
 S818 (PUSHERS)
 S819 (PUSHERS)
 S820 (PUSHERS)
 S821 (PUSHERS)
 S822 (PUSHERS)
 S823 (PUSHERS)
 S824 (PUSHERS)
 S825 (PUSHERS)
 S826 (PUSHERS)
 S827 (PUSHERS)
 S828 (PUSHERS)
 S829 (PUSHERS)
 S830 (PUSHERS)
 S831 (PUSHERS)
 S832 (PUSHERS)
 S833 (PUSHERS)
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 S836 (PUSHERS)
 S837 (PUSHERS)
 S838 (PUSHERS)
 S839 (PUSHERS)
 S840 (PUSHERS)
 S841 (PUSHERS)
 S842 (PUSHERS)
 S843 (PUSHERS)
 S844 (PUSHERS)
 S845 (PUSHERS)
 S846 (PUSHERS)
 S847 (PUSHERS)
 S848 (PUSHERS)
 S849 (PUSHERS)
 S850 (PUSHERS)

SCHEMATIC DIAGRAM Universal Model



- D001... 1S1687
- D002... 25C740(S)
- D003... 25C740(S)
- D004... 25C740(S)
- D005... 25C740(S)
- D006... 25C740(S)
- D007... 25C740(S)
- D008... 25C740(S)
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- D100... 25C740(S)

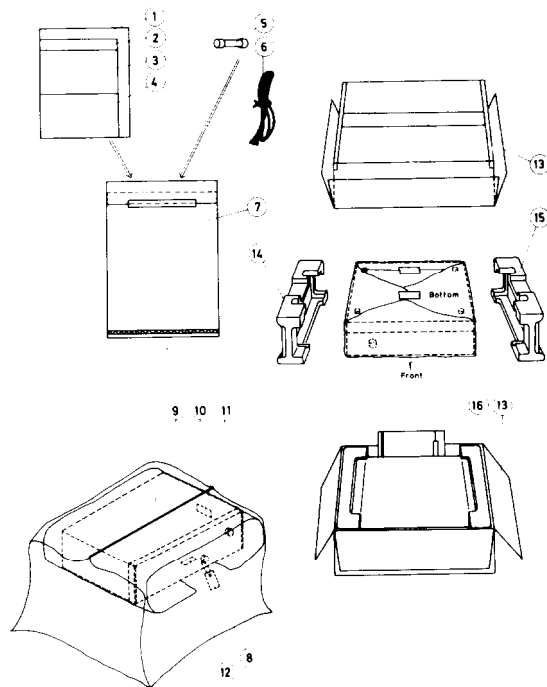
NOTES:
 1. ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.
 2. ALL CAPACITORS ARE IN μF, 50MV UNLESS OTHERWISE NOTED.
 3. ALL CAPACITORS ARE IN P.P.M. UNLESS OTHERWISE NOTED.
 4. VOLTAGE MEASUREMENTS WITH V.T.M.
 5. DC VOLTAGE (NO INPUT SIGNAL).
 6. V DC VOLTAGE (FM STEREO).

SWITCH
 S001 (SELECTOR) 1 - 1-AM, 2 - FM, 3 - PHONO
 S002 (TUNING) 1 - ON, 2 - OFF
 S003 (TAPE MONITOR) 1 - ON, 2 - OFF
 S004 (MUTING LOCK) 1 - ON, 2 - OFF
 S005 (MODE) 1 - STEREO, 2 - MONO
 S006 (CLOCK) 1 - OFF, 2 - ON, 50 SEC
 S007 (CLOCK) 1 - OFF, 2 - ON, 3 - B, 4 - A-B
 S008 (SPEAKERS) 1 - OFF, 2 - ON
 S009 (POWER)

NOTICE FOR SOME SPECIFIC REGIONS,
 THIS CIRCUIT IS CHANGED FOR
 THE REGIONAL VOLTAGE ONLY.

PACKING PROCEDURES

U.S.A. Model

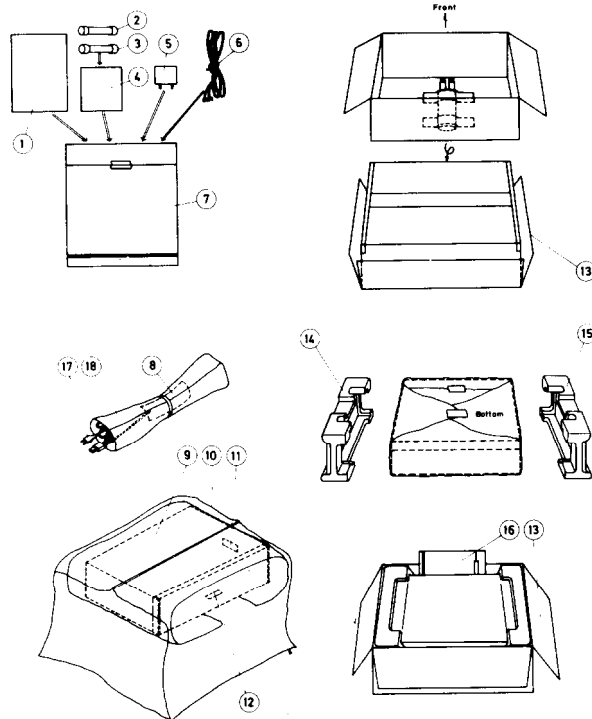


1. All printed material and accessory items are placed in a poly bag.
2. The AC Cord is wrapped in paper and wound a rubber band.
3. The cabinet composite tag is attached to the volume control.

PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
1	29340191	Instruction Manual
2	29358001	Service Station List
3	29355046	Caution Card for Warranty Card
4	29365003	Warranty Card
5	292025	Fuse
6	292064	FM Antenna
7	29100006A	Poly Bag
8	29380024	Tag, Cabinet Composite
9	29095027	Sheet 330x1100(m/m)
10	29100018	Poly Bag 650x750(m/m)
11	282969	Caution Label A
12	293041	Caution Label
13	29050111	Carton Box
14	29090187	Pad, Right
15	29090188	Pad, Left
16		Accessory Bag Complete

Universal Model



1. All printed material and accessory items are placed in a poly bag.
2. The Voltage Tag is attached to the plug of AC Cord.
3. The AC Cord is wrapped in paper and wound a rubber band.

PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
1	29340210	Instruction Manual
2	252044	Fuse 2A(ST-6)
3	292025	Fuse
4	29100002	Poly Bag 80x150(m/m)
5	25055018	Conversion Plug CV-K-1
6	292064	FM Antenna
7	29100002	Poly Bag
8	293268	Voltage Tag
9	29095027	Sheet 330x1100(m/m)
10	29100018	Poly Bag 650x750(m/m)
11	282969	Caution Label A
12	293041	Caution Label
13	29050111	Carton Box
14	29090187	Pad, Right
15	29090188	Pad, Left
16	13780119	Accessory Bag Complete
17	13876801	AC Cord
18	290076	AC Cord Wrapper

The Germany type differs from the Universal model at the following points.

1	29340211	Instruction Manual
3.5	None	
16	13782119	Accessory Bag Complete
17	253089	AC Cord AS-VDE-C
	29365001-1	Warranty Card (Addition)