

ONKYO® SERVICE MANUAL

SERVO LOCKED STEREO RECEIVER MODEL TX-1500MKII

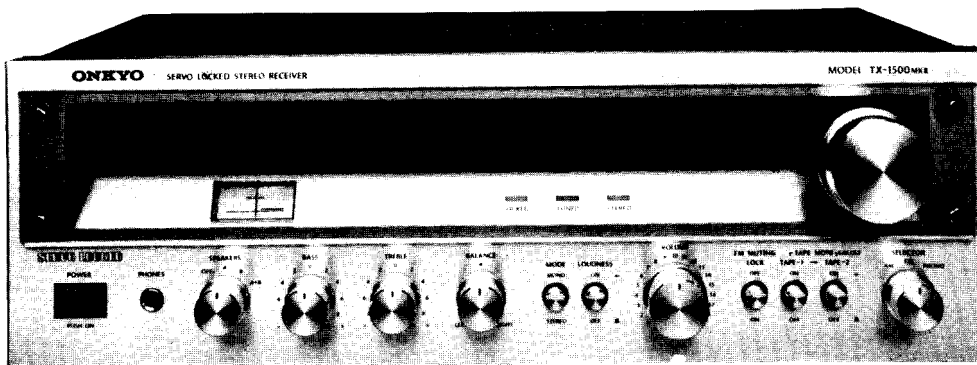


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ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

Amplifier section

Power Output	17 watts per channel, min. RMS, at 8 ohms both channels driven, from 20 Hz to 20 kHz, with no more than 0.3% total harmonic distortion.
Total harmonic distortion	0.3% at rated power
IM Distortion	0.1% at 1 watt output
Damping Factor	30 at 8 ohms
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 3 kohms (PHONO)
Phono Overload	100 mV RMS at 1 kHz 0.3% 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) 85 dB (IHF A network, 10mV input) TAPE: 90 dB (IHF C network) 95 dB (IHF A network)
RIAA Curve deviation	± 0.8 dB 30 Hz – 15 kHz
Loudness (–30 dB)	+9 dB at 40 Hz +6 dB at 20 kHz

Tuner section

Tuning Range	FM: 88–108 MHz AM: 530–1605 kHz
Usable Sensitivity	FM mono: 12.4 dBf, 2.3 μ V FM stereo: 19.2 dBf, 5 μ V AM: 25 μ V

50 dB Quieting Sensitivity	FM mono: 18.3 dBf, 4.5 μ V FM stereo: 39.2 dBf, 50 μ V
Intermediate Frequency	FM: 10.7 MHz AM: 455 kHz
Capture Ratio	FM: 1.5 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 FM stereo: 60 dB AM: 40 dB
Alternate Channel Att.	FM: 60 dB
AM Suppression ratio	FM: 50 dB
Harmonic Distortion	FM mono: 0.25% AM: 0.9%
Frequency Response	FM: 30–15,000 Hz ± 1.5 dB
Stereo Separation	FM: 35 dB at 1 kHz 30 dB 100–10,000 Hz
Muting Level	FM: 3 μ V, 14.7 dBf
Stereo Threshold	FM: 3 μ V, 14.7 dBf
Servo Lock Lamp Level	FM: 3 μ V, 14.7 dBf
Spurious Rejection	FM 1/2 IF: 78 dB
Sub Carrier Suppression	FM: 40 dB
Tuning Meter	Signal strength meter

General

Power Supply Rating	AC 120 V 60 Hz
Dimensions	438(W) x 147(H) x 315(D) mm 17-1/4" x 5-13/16" x 12-3/8"
Weight	7.3 kg. (16.1 lbs.)

Specifications and features are subject to change without notice.

PRECAUTIONS

- FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE AND SAME RATING FUSE.

DESCRIPTION	PARTS NO.	SPECIFICATIONS
AC FUSE	252044	2A (ST-6) UL
SPEAKER PROTECTION FUSE	252025	2.5A-T

- Always disconnect the chassis from power line cord when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors.

SERVICE PROCEDURES

1. REMOVAL OF THE FRONT PANEL

- 1) Remove four screws holding the ampli. cover and side bracket.
- 2) Remove two screws holding the ampli. cover and back panel.
- 3) Pull out the control knobs.
- 4) Remove four screws holding the front panel and the front bracket.

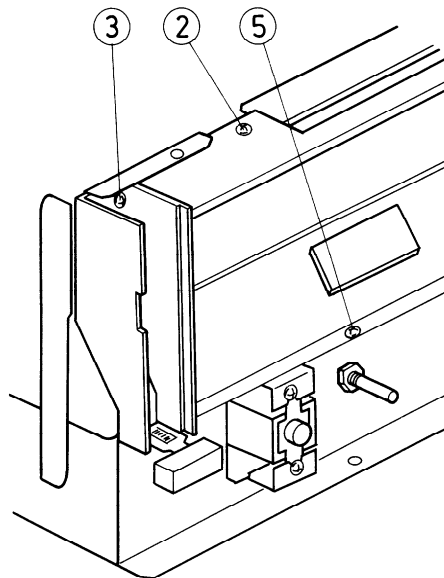
2. REMOVAL OF THE DIAL GLASS

Remove four screws holding the dial glass and the front panel.

NOTE: The dial glass has been mounted by applying an 800 gr torque to the screws. If the dial is removed during repairs, and a torque driver is available, apply 800 gr torque to the screws when replacing. If however, torque driver is not available, simply tighten the screws by hand. When replacing the dial glass, insert all relevant component parts in accordance with the cross sectional diagram.

3. REPLACING THE METER

- 1) Remove the top cover and front panel.
- 2) Remove the two screws securing the illumination bracket and front bracket.
- 3) Remove the two sets of screws securing the left and right dial plate frame and front bracket.
- 4) Remove the dial plate from the drive shaft.
- 5) Remove the three screws securing the front bracket and back plate.
- 6) The top and bottom side of the meter cover the fastened to the back plate by adhesive tape. Remove this tape, taking care not to jar knock the meters.

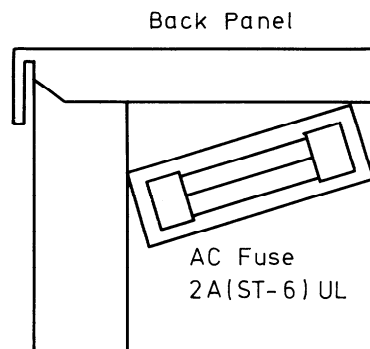


4. SENSOR SWITCH

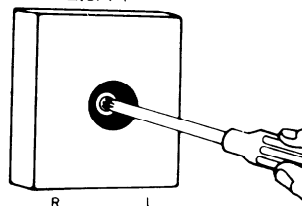
For matching the automatic FM tuning servo locked system to the various operating conditions. Set to LOW initially and switch to HIGH if the TUNED lamp does not turn off as soon as the tuning knob is touched.

5. REPLACING THE AC FUSE

- 1) Remove the bottom board.
- 2) Replace the AC fuse with same type and same rating fuse.



SPEAKER FUSE
2.5A-T



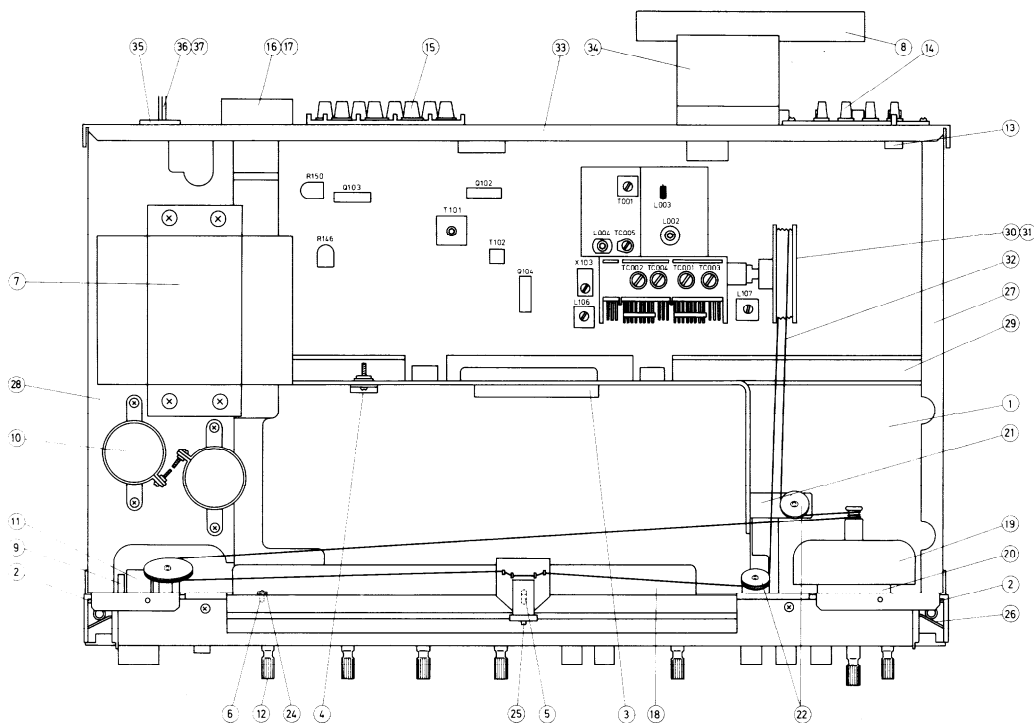
6. REPLACING THE SPEAKER PROTECTION FUSE

- 1) Remove a screw holding the cover and back panel and the cover.
- 2) Replace the fuse with same type and same rating fuse.

7. REPLACING THE INDICATOR LAMPS

All indicator lamps are linked to their respective lamp covers. So when replacing remove the defective lamp from the front bracket with its cover in place.

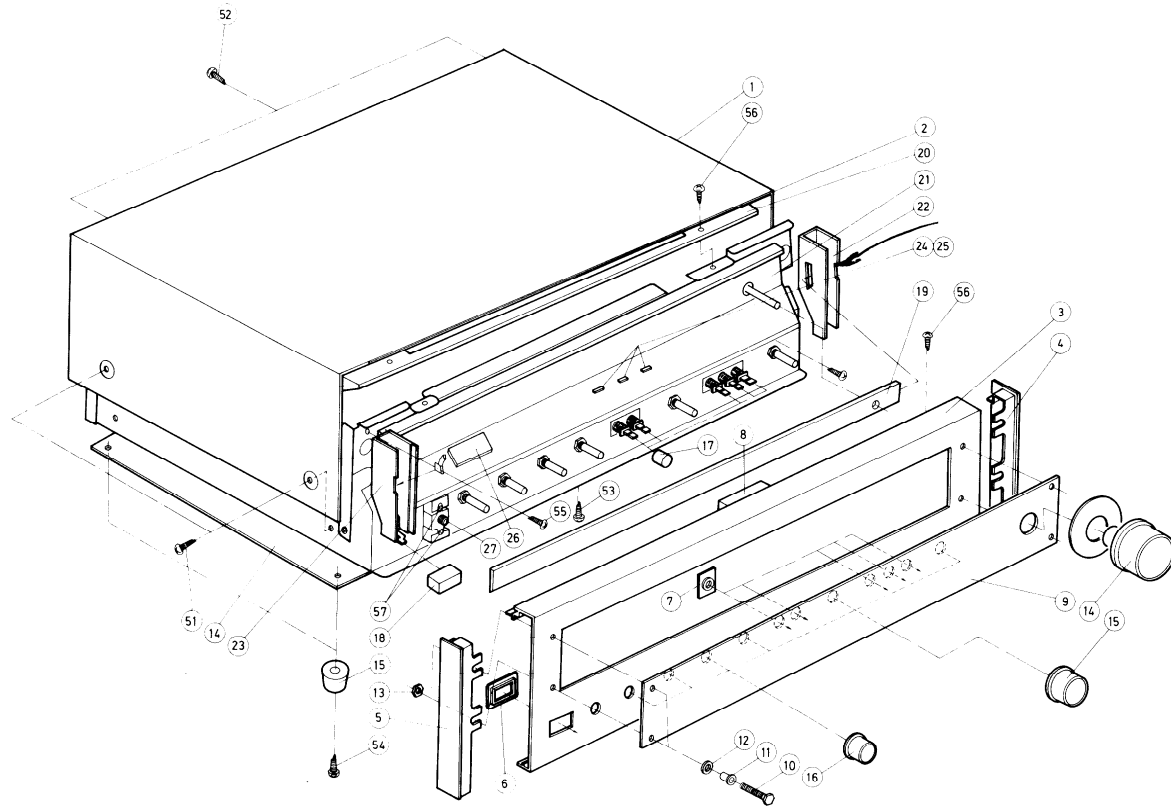
COMPONENT LOCATION



COMPONENT LOCATION – PARTS LIST

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1.	U1	13679507	NAAR-507, Tuner and ampli. p.c.b.
2.	U2	13719574	NAPL-474, Dial illumination p.c.b.
3.	Q501	222016	STK-459, Power ampli. IC
4.	Q901	2200113 or 2200020	2SD234(O) or (Y), Lipple filter transistor
5.	PL801	210044	PL8V 0.05AW-3, Pointer lamp
6.	PL802	210041	PL8V0.15AW-2, Meter illumination lamp
7.	T901	230251	NPT-644D, Power transformer
8.	L105	232063	NMA-1008, AM bar antenna
	L105	232067	NMA-1011, AM bar antenna
9.	C901	3504012	0.01 μ F, 125V, UL capacitor
10.	C902, C903	3504081	4,700 μ F, 35V, Elect. capacitor
11.	S901	25035047	NPS-111-L12P, Power switch
12.	S809	25030074	NRS-144-30Y, Speaker selector switch
13.	S807	250142	NSS-2225, Hum sensor switch
14.	P805	25060035	NTM-4PRMC06, Antenna terminal
15.	P806, P807	25060026	NTM-4PRMN03, Speaker terminal
16.	F501a, F601a	25050004	Fuse holder with cover
17.	F501, F601	252025	2.5A-T, Speaker protection fuse
18.	A001	27110062	Front bracket
19.	A002	27205014	Drive shaft
20.	A003	27300071	Bearing
21.	A004	27140218	Bracket for dial pulley
22.	A006	27185002	DP-16N, Dial pulley
23.	A005	27185001	DP-26N, Dial pulley
24.	A008	27300114	Lamp cover
25.		13679701	Pointer
26.	A018	27140203	Spring
27.	A034	27115018B	Side bracket
28.	A035	27130104A	Bracket for power transformer
29.	A036	27160041A	Radiator
30.	A041	27200019	Dial drum
31.	A042	273803	SP-14A, Dial drum spring
32.	A043	273903	Stringing
33.	A048	27120124A	Back panel
34.	A049	27190024	Antenna holder
35.	P901	25050032	S-I6444-01, AC outlet
36.	W901	253099	AS-UC3, Power supply cord
37.		270025	SP-3P-4, Strainrelief
	F901a	250143	FF-1S4, Fuseholder
	F901	252044	2A(ST-6)UL, AC fuse

EXPLODED VIEW



EXPLODED VIEW – PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
1.	28184042	Top cover
2.	28140024	Cushion
3.	13679121	Front panel ass'y
4.	28125052	End cap (R)
5.	28125053	End cap (L)
6.	27267030	Guide for power switch
7.	27267026	Guide for push switch
8.	28140105	Cushion
9.	28191028	Dial glass
10.	84334015	M4X15(Cr), Hexagone volt
11.	27270017A	Spacer
12.	870059	Washer
13.	863140	N-4F-N, Nut
14.	28320247	Tuning knob
15.	28320238	Volume control knob
16.	28320237	Tone control knob
17.	28320239	Push switch knob
18.	28320171A	Power switch knob
19.	28130068A	Dial Plate
20.	27240017A	Dial illumination bracket
21.	28133010	Back plate
22.	27215036	Dial frame (R)
23.	27215037	Dial frame (L)
24.	28198512	Facet
25.	210040A	PL12V0.03AW-3, LOCKED/TUNED/STEREO indicator lamp
26.	243090	NIND-0500S90, Signal strength meter
27.	25045018	LJ-100-H, Stereo headphone jack
28.	27170045	Bottom board
29.	27175009	T-C, Leg
51.	838440109	4TTB+10C(BC)
52.	834430102	3STS+10BQ(BC)
53.	831130062	3STW+6BQ
54.	831130122	3STW+12BQ
55.	831130082	3STW+8BQ
56.	834130062	3STS+6BQ
57.	801105	8W3P+6FN

ALIGNMENT PROCEDURES

INSTRUMENTS REQUIRED

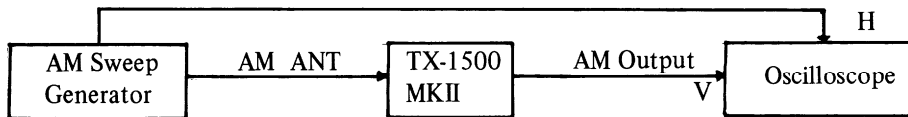
1. AM Sweep Generator
2. AM and FM Signal Generator
3. Vacume Tube Voltage Meter (VTVM) AC, DC
4. Oscilloscope
5. Distortion Analyzer
6. Stereo Modulator
7. Frequency Counter

GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400Hz 30% (AM), 1 kHz 100% (FM MONO) pilot 9% sub and main 91% (FM STEREO).
3. Standar knob position
 SPEAKER A
 BASS, TREBLE & BALANCE . . . Center
 MODE Stereo
 LOUDNESS, MUTING LOCK OFF
 TAPE 1, 2 OFF (source)

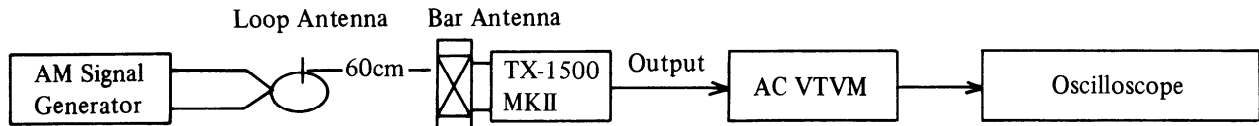
(1) AM IF ALIGNMENT

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



Set signal	Adjust	Oscilloscope	Remarks
455 kHz	X103	Maximum Symmetrical Response	Usually not necessary to adjust

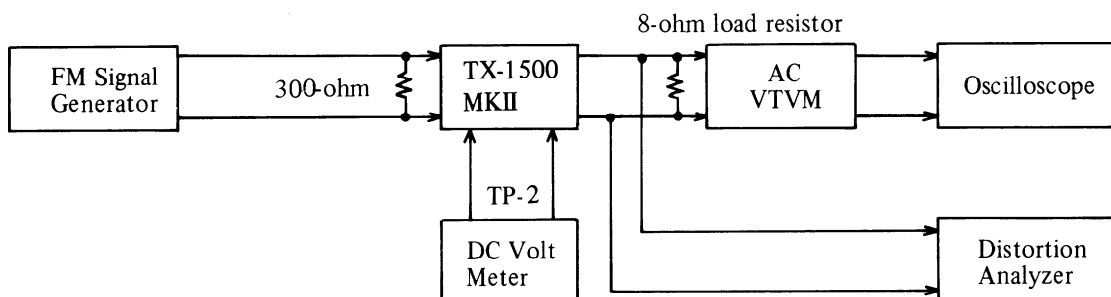
(2) AM RF ALIGNMENT



Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks
1	515 kHz 400 Hz 30 %	Lower end (515 kHz)	L106	Maximum	Repeat steps 1 and 2 as necessary
2	1680 kHz 400 Hz 30%	Upper end (1680 kHz)	TC002	Maximum	
3	600 kHz 400 Hz 30%	600 kHz	L105 or L107	Maximum	Adjust with L105 when L107 is not used. Repeat steps 3 and 4 as necessary
4	1400 kHz 400 Hz 30 %	1400 kHz	TC001	Maximum	

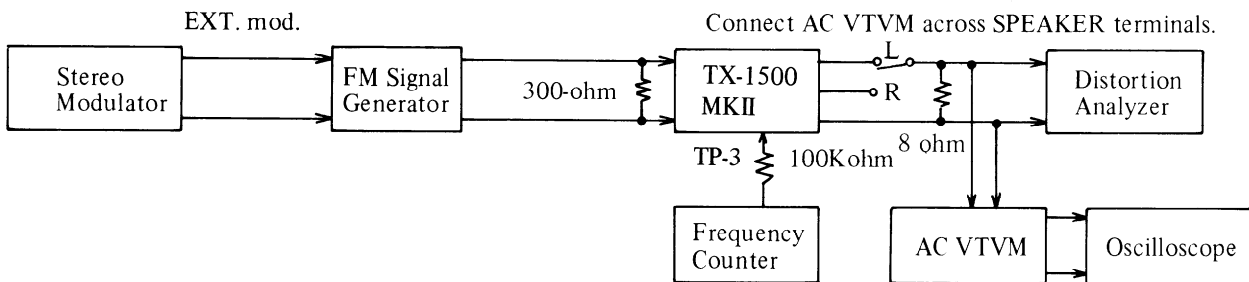
(3) FM FRONT END ALIGNMENT

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-2 terminals.

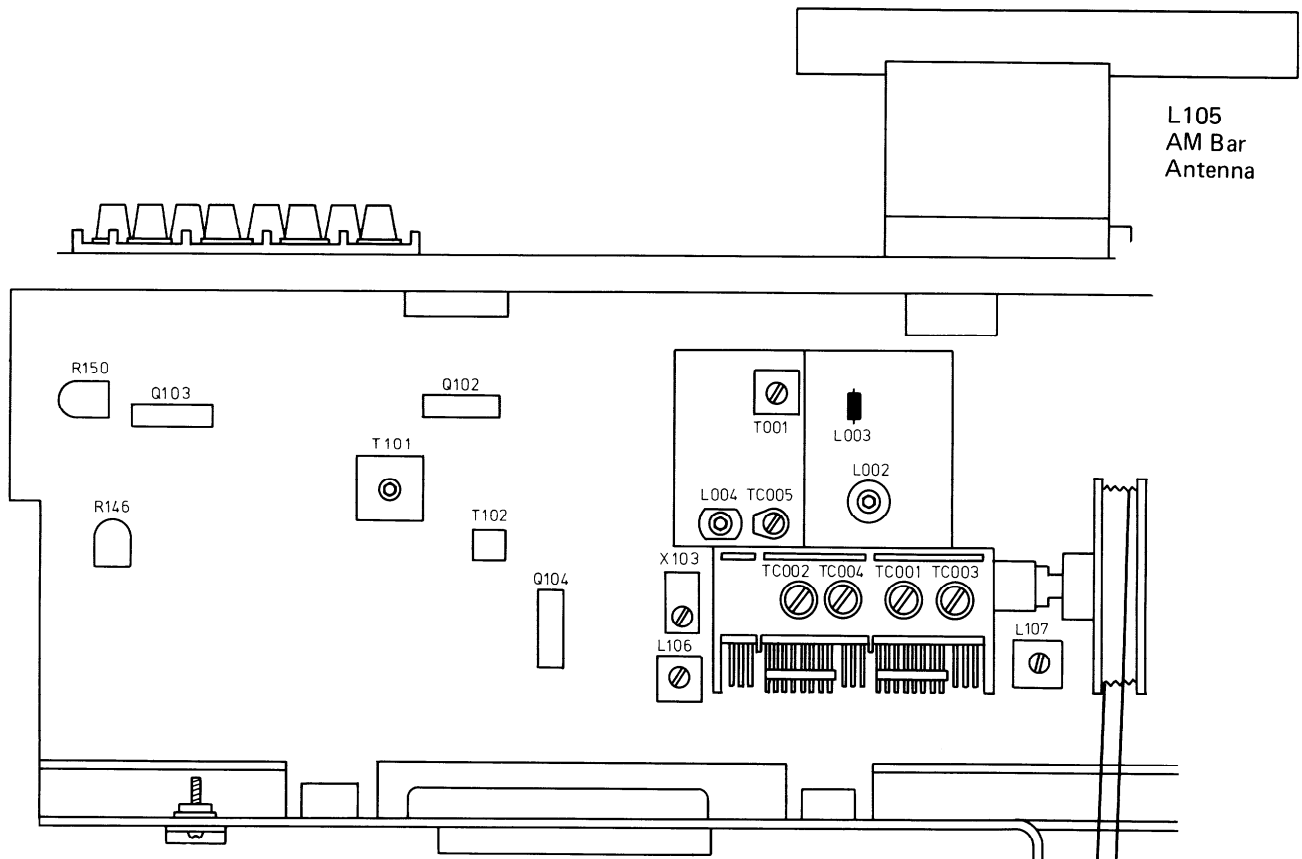


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	No signal	Quiet Point	T101 Bottom	DC Voltmeter	0V	Repeat Steps 1 and 2 as necessary
2	98MHz 65dBf(60dB) 1kHz 75kHz devi.	98MHz	T101 Top	Distortion Analyzer	Minimum	
3	90MHz 65dBf(60dB) 1kHz 75kHz devi.	90MHz	L004	DC Voltmeter	0V	Repeat Steps 3 and 4 as necessary
4	106MHz 65dBf(60dB) 1kHz 75kHz devi.	106MHz	TC005			
5	90MHz 20dBf(15dB) 1kHz 75kHz devi.	90MHz	L001 L002	AC VTVM or Oscilloscope	Maximum	Repeat Steps 5 and 6 as necessary
6	106MHz 20dBf(15dB) 1kHz 75kHz devi.	106MHz	TC003 TC004		Maximum	
7	98MHz 65dBf(60dB) 1kHz 75kHz devi.	98MHz	T001	Distortion Analyzer	Minimum	

(4) MULTIPLEX ALIGNMENT

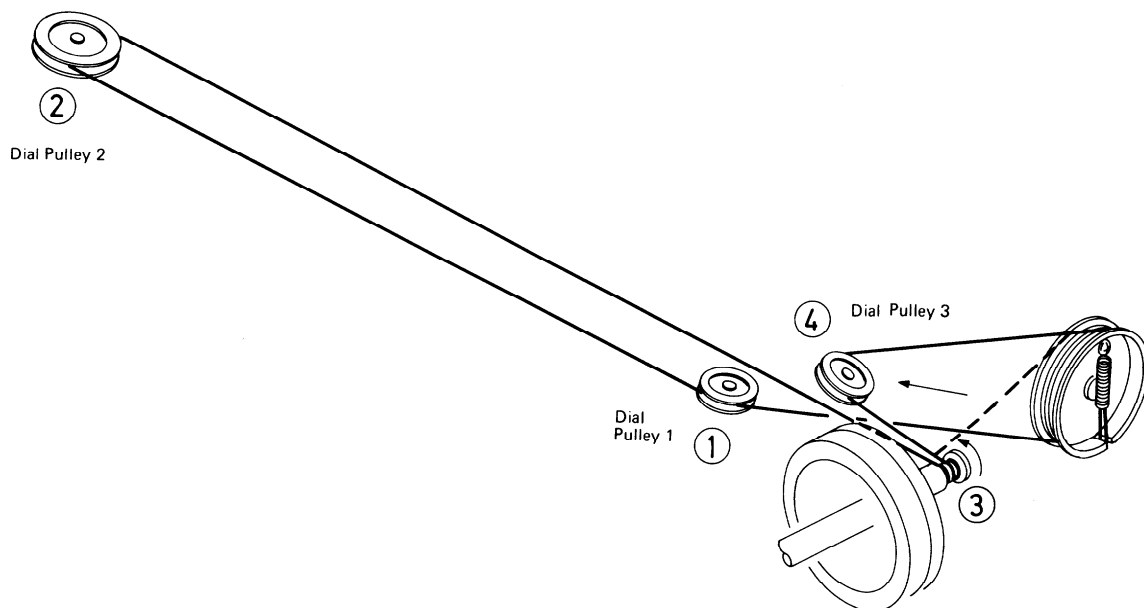


Align-ment	Step	FM Signal Generator	Stereo Modulator	Dial to Set	Adjust	Output Indicator	Adjust for	Remark
V.C.O.	1	98 MHz no mod. 60 dBf (60dB)	—	98 MHz	R146	Frequency Counter	19000±19 Hz	
	2	STEREO INDICATOR should light up when stereo program is being received.						
Separa-tion	1	98 MHz EXT. Mod. 65 dBf (60dB)	Pilot Sig. 9% Main & Sub Sig. 1 kHz Lch 91%	98 MHz	R150	AC VTVM Right ch.	Minimum	Repeat steps 1 & 2 as necessary
	2	Same as above	Pilot Sig. 9% Main & Sub Sig. 1 kHz Rch 91%	98 MHz	R150	AC VTVM Left ch.	Minimum	



STRINGING DIAGRAM

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



PRINTED CIRCUIT BOARD (NAAR-507) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
		ICs			Capacitors
Q102	222455	LA1230	VC001	3050004	NVC2-327SA, Variable
Q103	222449	LA3350	TC005	3060003	NTC-10P02, Trimmer
Q104	222497	LA1240	C106	352741001	10 μ F, 16V, Elect.
Q301,Q401	222451	TA7129P(ONK)	C107	352780331	3.3 μ F, 50V, Elect.
Q501	222016	STK-459	C110	352784791	0.47 μ F, 50V, Elect.
		Transistors	C113	352741001	10 μ F, 16V, Elect.
Q001	2210374	2SK19GR(O-1)	C115	352721011	100 μ F, 6.3V, Elect.
Q002	2210380	2SC785(O-1)	C116	352780101	1 μ F, 50V, Elect.
Q003	2210393	2SC394(O)	C142	352741001	10 μ F, 16V, Elect.
Q101	2210123	2SC380(O)	C143	352780101	1 μ F, 50V, Elect.
	2210124	2SC380(Y) or	C145	372321525	1,500pF \pm 10%, 50V, ST
Q105~Q108	2210943	2SC1317(R) or	C146	392884797	0.47 μ F, 50V, LL
	2211182	2SC1740(Q) or	C147	392882297	0.22 μ F, 50V, LL
Q109	2210942	2SC1317(Q) or	C148	392883397	0.33 μ F, 50V, LL
	2210244	2SC735(Y) or	C151,C152	392882297	0.22 μ F, 50V, LL
Q201,Q202	2211184	2SC1740(S) or	C165	372323614	360pF \pm 5%, 50V, ST
	2210086	2SC733(BL) or	C168	352741001	10 μ F, 16V, Elect.
Q302,Q402	2210975	2SC1344(E) or	C169	352741011	100 μ F, 16V, Elect.
	2210137	2SC1312(G) or	C171	374124737	0.047 μ F \pm 20%, 50V, DE
Q701,Q702	2211184	2SC1740(S) or	C172	352780331	3.3 μ F, 50V, Elect.
	2210086	2SC733(BL) or	C174	352780101	1 μ F, 50V, Elect.
Q901	2200113	2SD234(O) or	C201	352780101	1 μ F, 50V, Elect.
	2200020	2SD234(Y) or	C203	352761011	100 μ F, 35V, Elect.
Q902	2210747	2SC945A(Q1) or	C205	352784791	0.47 μ F, 50V, Elect.
	2210744	2SC945L(Q) or	C207	352734701	47 μ F, 10V, Eject.
		Diodes	C208	352780101	1 μ F, 50V, Elect.
D001	223110	1S2687	C209	352732201	22 μ F, 10V, Elect.
D101,D102			C302,C402	352750471	4.7 μ F, 25V, Elect.
D104,D105	223105	1S1555	C303,C403	352721011	100 μ F, 6.3V, Elect.
D108			C308,C408	352784791	0.47 μ F, 50V, Elect.
D106	224011	YZ-047	C309,C409	392883397	0.33 μ F, 50V, LL
	223943	RD4.7EB or	C310	352762211	220 μ F, 35V, Elect.
D107	4000022	VD1212	C332,C432	374124735	0.047 μ F \pm 10%, 50V, DE
D201,D202	223103	1N60	C333,C433	392880227	2.2 μ F, 50V, LL
D701,D905	223858	GP08D	C335,C435	352742211	220 μ F, 16V, Elect.
D906	223806	1S1886 or	C336,C436	352780331	3.3 μ F, 50V, Elect.
D702,D703	223106	1S1554	C337,C437		
D901~D904	223842	GP-15B	C501,C601	392880107	1 μ F, 50V, LL
D907	223915	WZ-150	C502,C602	352733301	33 μ F, 10V, Elect.
	223967	RD15EB or	C503,C603	352784701	47 μ F, 50V, Elect.
		Coils	C504	352761011	100 μ F, 35V, Elect.
L001	223106	NFA-3009	C505,C605	352741011	100 μ F, 16V, Elect.
	233088	NFA-3001 or	C507	352780331	3.3 μ F, 50V, Elect.
L002	233103	NFRF-3005	C701	352780471	4.7 μ F, 50V, Elect.
L003	233037	NFT-1501	C702	352762211	220 μ F, 35V, Elwct.
L004	233090	NFO-3003	C703	352762201	22 μ F, 35V, Elect.
L101	233105	NCH-1005	C904	352784711	470 μ F, 50V, Elect.
	233024	NCCH-1501 or	C905	352763311	330 μ F, 35V, Elect.
L102	233074	NCCH-1506	C906,C907	352741011	100 μ F, 16V, Elect.
L103,L104	233107	NMC-5002			
	233021	NMC-8-5 or	Resistors		
L106	232073	NMO-2008	R146	5225056	N10HR5KBC, Variable
L107	232057	NMA2523	R150	5225018	N10HR1KBC, Variable
		Transformers	R336,R436	5148024	N16RGL250KBT30, Volume
T001	233085	NIT-0518	R343	5104046	N16RL100KW30, Balance
T101	233083	NIT-3516	R344,R444	5148014	N16RGM100KB30, Treble
	233101	NFIF-6003 or	R350,R450	5148014	N16RGM100KB30, Bass
T102	232041	NIT-0509	R508	451623394	0.33 Ω , 1W, Metal
			R608	451623394	0.33 Ω , 1W, Metal
			R701	441721224	1.2k Ω , 2W, MOF
			R902	441621814	180 Ω , 1W, MOF
			R903	441624714	470 Ω , 1W, MOF
			R507		
		Ceramic filters			Switches
X101,X102	3010003	SFE-10.7MA	S801	25030075	NRS-143-30ZV, Selector
X103	3010004	CFZ455C	S802	25035081	NPS-322-L46, TAPE

DIAL ILLUMINATION LAMP PC BOARD (NAPL-474) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S805	25035080	NPS-222-L45, Selector

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	210039A	300mA, 8V, Dial illumination lamp

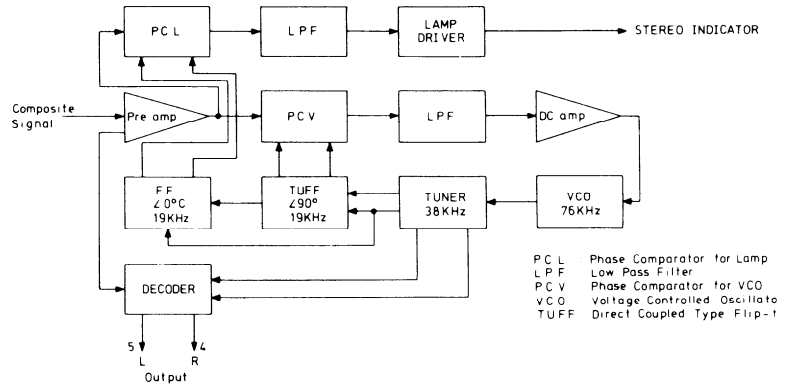
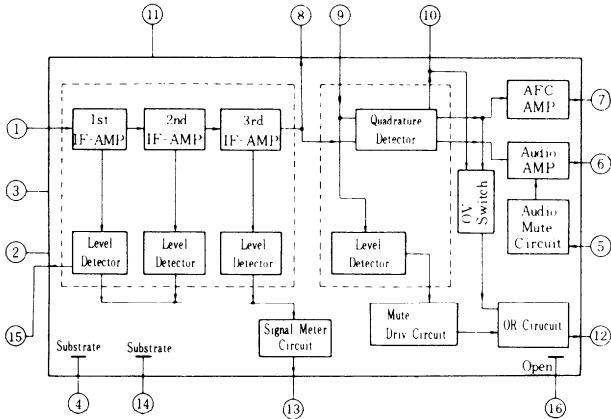
Terminals		
P801	25045041	NPJ-6RDBU8
P802	25045020	NPJ-4PDBL11
Relay		
RL101	25065026	L-13
Shielded case		
	27150056A	Front end
	27150057	Front end bottom

- NOTES:
- Capacitors
 - LL: Low leakage current type electrolytic capacitor
 - DE: Non-inductive polyester film capacitor
 - ST: Polystyren film capacitor
 - Resistors
 - MOF: Metal oxide film resistor
 - MO: Metal oxide resistor

BLOCK DIAGRAM

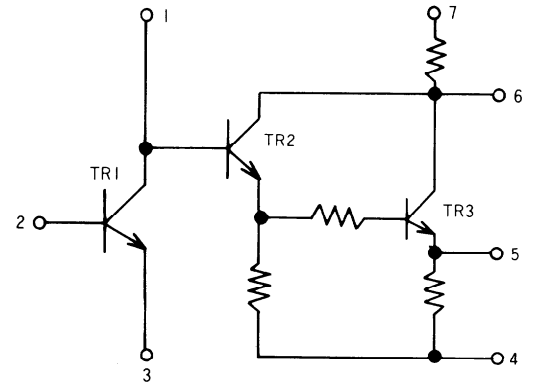
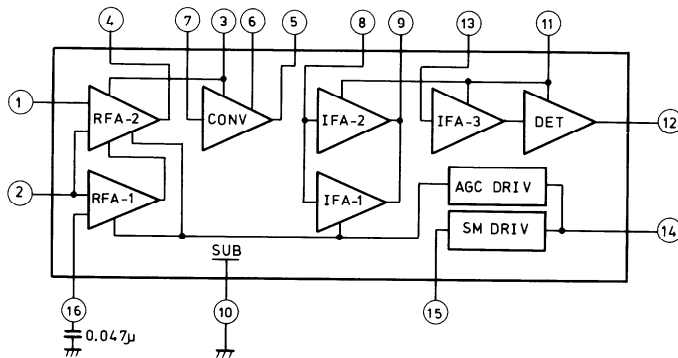
LA1230 (QUADRATURE DETECTOR AND FM IF IC)

LA3350 (PLL MULTIPLEX DECODER IC)

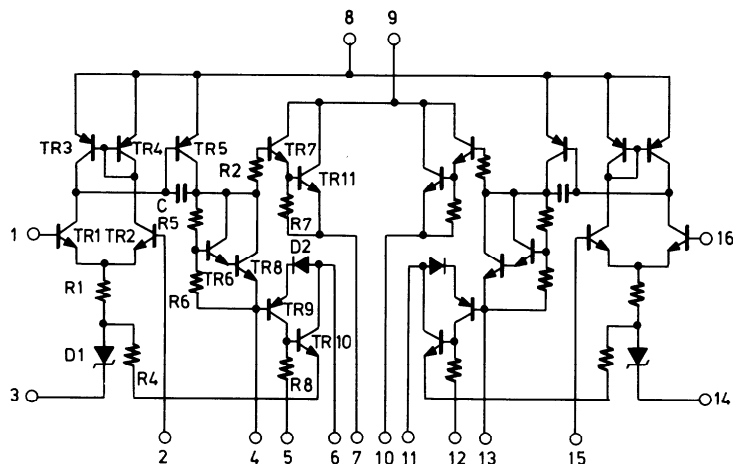


LA1240 (AM IC)

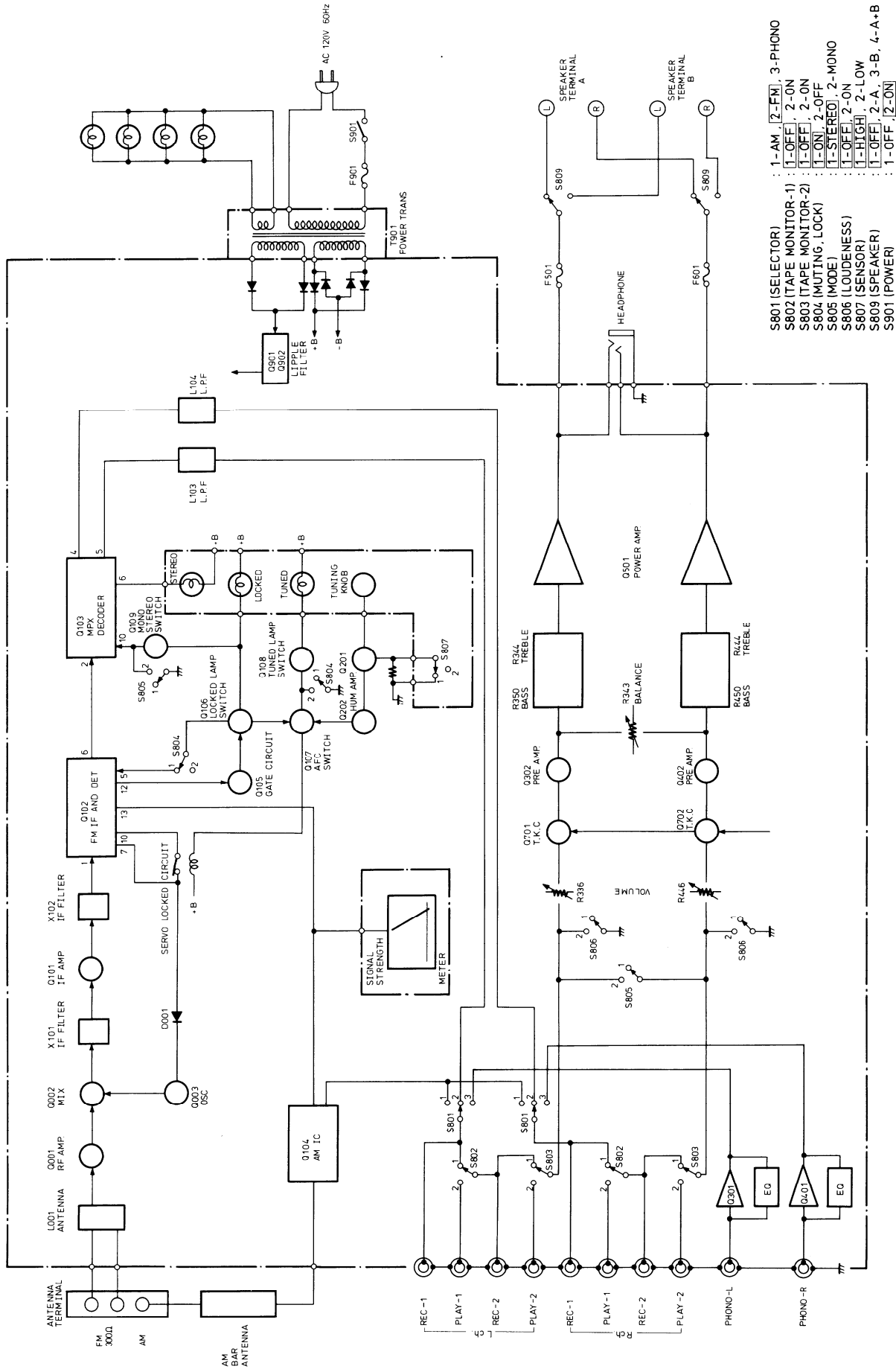
TA-7129P (ONK) (EQUALIZER AMPLI. IC)



STK-459 (POWER AMPLI. IC)

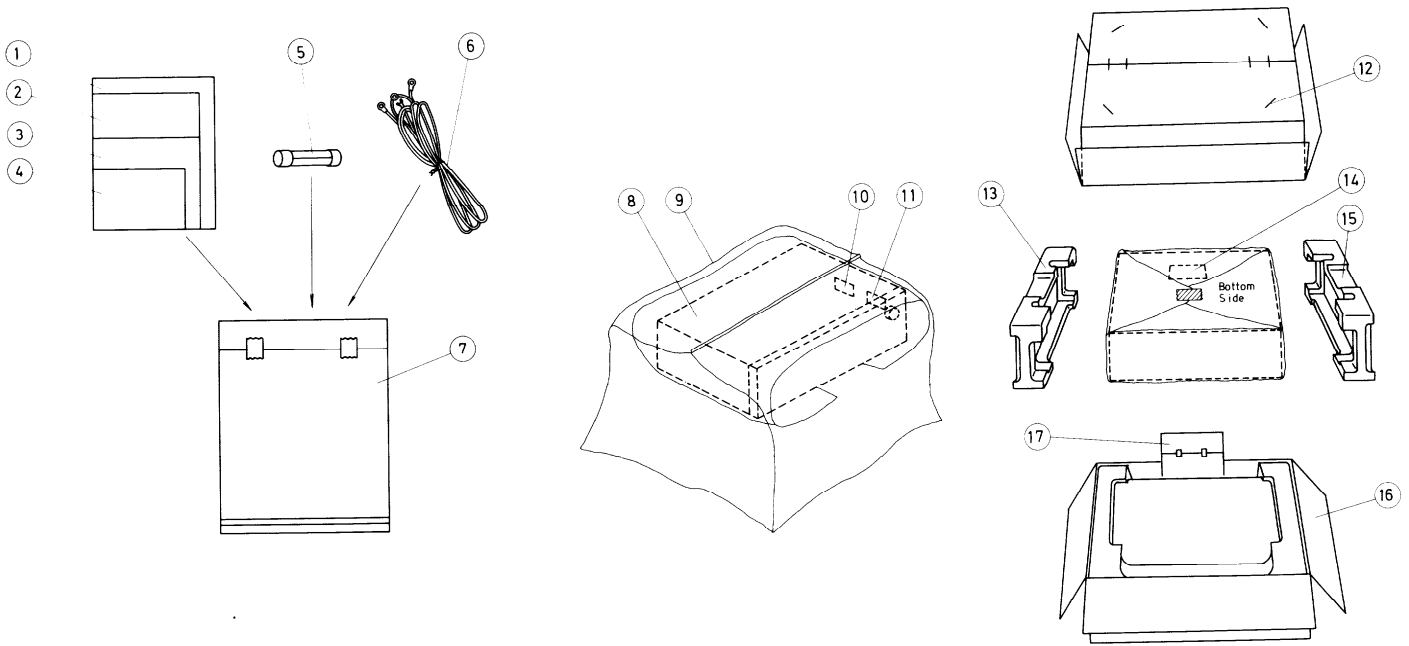


BLOCK DIAGRAM



- S801 (SELECTOR) : 1-AM, 2-FM, 3-PHONO
- S802 (TAPE MONITOR-1) : 1-OFF, 2-ON
- S803 (TAPE MONITOR-2) : 1-OFF, 2-ON
- S804 (MUTING, LOCK) : 1-ON, 2-OFF
- S805 (MODE) : 1-STEREO, 2-MONO
- S806 (LOUDNESS) : 1-OFF, 2-ON
- S807 (SENSOR) : 1-HIGH, 2-LOW
- S808 (SPEAKER) : 1-OFF, 2-A, 3-B, 4-A+B
- S809 (POWER) : 1-OFF, 2-ON

PACKING PROCEDURES



PACKING PROCEDURES – PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
1.	29340276	Instruction manual
2.	29358001	Service station list
3.	29355046	Caution card for 4
4.	29365003	Warranty card
5.	252025	2.5A-T, Fuse
6.	292064	FM antenna
7.	29100006	350 x 250mm, Poly bag
8.	29095026	330 x 900mm, Protection sheet
9.	29100018	650 x 750mm, Poly bag
10.	282969	Caution card A
11.	29360197	Cabinet composite label
12.	282301	Sealing hook
13.	29090187	Pad (R)
14.	293041	Caution label
15.	29090188	Pad (L)
16.	29050198	Carton box
17.	13679119	Accessory bag

ONKYO CORPORATION

International Division: No. 24 Mori Bldg., 23-5, 3-chome, Nishi-Shinbashi, Minato-ku, Tokyo, Japan
 Telex: 2423551 ONKYO J. Phone: 03-432-6981

ONKYO U.S.A. CORPORATION

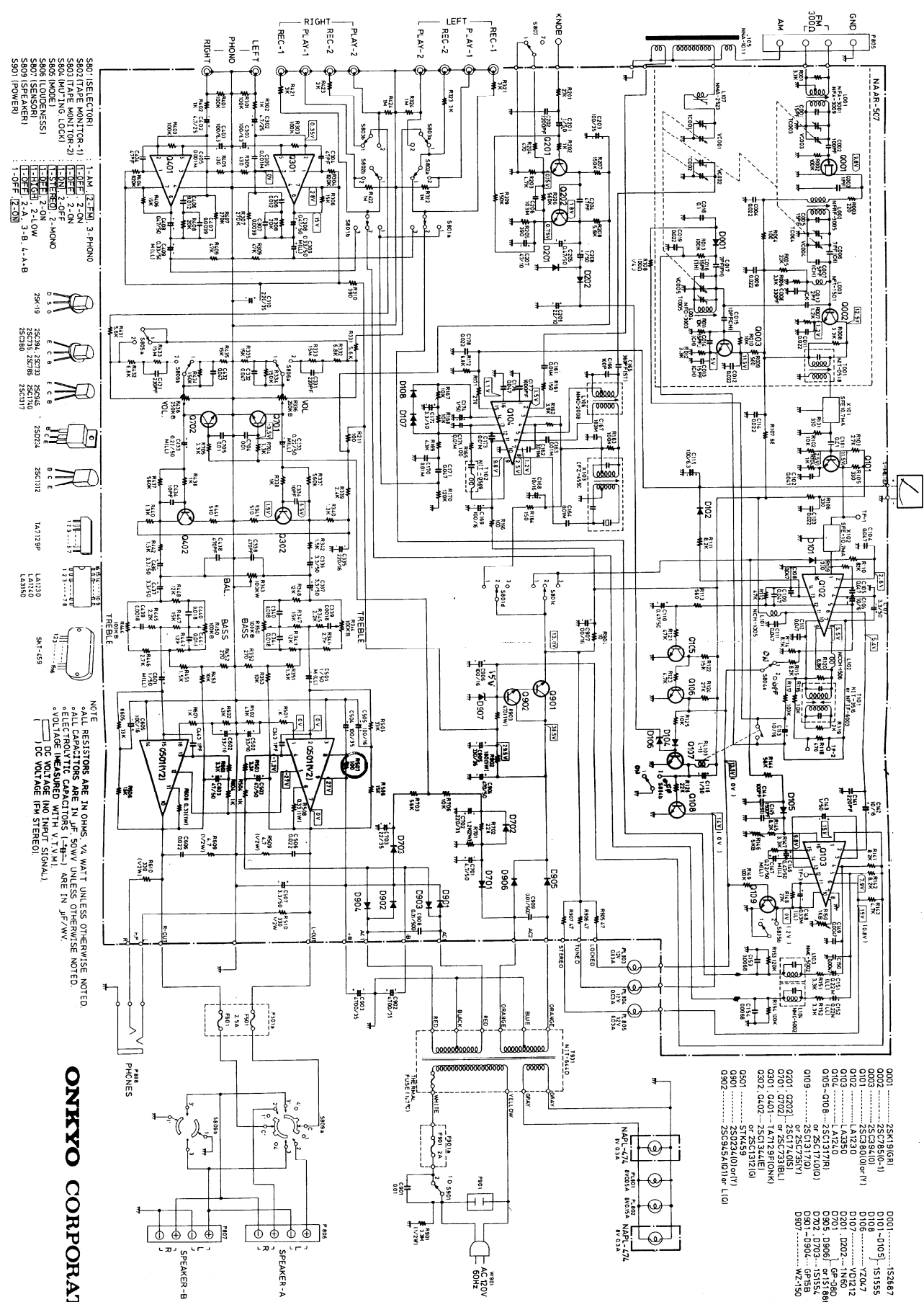
Eastern Office
 42-07 20th Avenue, Long Island City, New York 11105, U.S.A. Phone: (212) 728-4639
 Midwest Office
 935 Sivert Drive, Wooddale, Illinois 60191, U.S.A. Phone: (312) 595-2970

ONKYO DEUTSCHLAND GMBH, ELECTRONICS

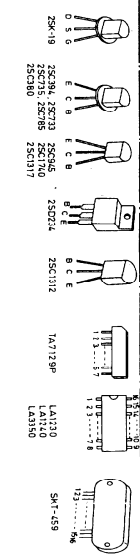
8034 München-Germering, Industriestrasse 18, West Germany. Telex: 521726 Telefon: (089)-84-5041

SCHEMATIC DIAGRAM

MODEL TX-1500MKII



- 5801 (SELECTOR) 1-AM (2-7) 3-PHONO
- 5802 (TUNING) 1-AM (2-7) 3-PHONO
- 5803 (TUNE MONITOR) 1-AM (2-7) 3-PHONO
- 5804 (MUTING LOCK) 1-AM (2-7) 3-PHONO
- 5805 (MODE) 1-AM (2-7) 3-PHONO
- 5806 (LOUDNESS) 1-AM (2-7) 3-PHONO
- 5807 (SPEAKER) 1-AM (2-7) 3-PHONO
- 5808 (SPEAKER) 1-AM (2-7) 3-PHONO
- 5809 (POWER) 1-AM (2-7) 3-PHONO



NOTE: ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED. ALL CAPACITORS ARE IN μF, 50V UNLESS OTHERWISE NOTED. ELECTROLYTIC CAPACITORS (E) ARE IN μF/WV. DC VOLTAGE (IN VOLTAGE) IS INDICATED BY DC VOLTAGE (IN STEREO).

ONKYO CORPORATION

0001	25K191GRI	152687
0002	25C78510-1	151555
0003	25C78510-1	151555
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0096	25C78510-1	151555
0097	25C78510-1	151555
0098	25C78510-1	151555
0099	25C78510-1	151555
0100	25C78510-1	151555