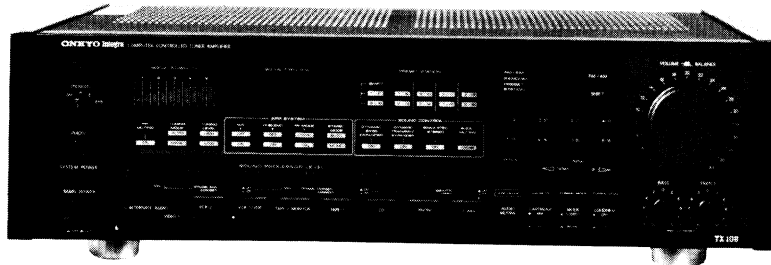


ONKYO SERVICE MANUAL

COMPUTER CONTROLLED TUNER AMPLIFIER MODEL TX-108



BUD, BUDN	120V, AC 60Hz
BUW, BUWX	120/220V, AC 50/60Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ 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.

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ONKYO
AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Power Output:	100 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.02% THD.
Total Harmonic Distortion:	0.02% at rated power
IM Distortion:	0.02% at rated power
Damping Factor:	50 at 8 ohms
Frequency Response:	20 – 30,000 Hz \pm 1dB
RIAA Deviation:	20 – 20,000 Hz \pm 0.5dB
Sensitivity and Impedance:	Phono(MM): 2.5mV/50 kohms Phono(MC): 350 μ V/330 ohms CD/Tape Play: 150mV/50 kohms Tape Rec: 150mV/3.3 kohms
Phono Overload (MM):	180mV RMS at 1kHz, 0.02% THD
Signal-to-Noise Ratio:	Phono (MM): 93dB (at 10mV input, A weighted) 76dB (IHF A-202) Phono (MC): 88dB (at 5mV input, A weighted) 67dB (IHF A-202) CD/Tape: 98dB (A weighted) 80dB (IHF A-202)
Tone Controls:	Bass: \pm 8dB at <u>70Hz</u> Treble: \pm 8dB at <u>20kHz</u>
Loudness (–30dB):	+6dB at 70Hz, +5dB at 20kHz
Muting:	–20dB

TUNER SECTION

FM:	
Tuning Range:	87.9 – 107.9MHz (200kHz steps) and/or 87.5 – 108.0MHz (50kHz steps)
Usable Sensitivity:	Mono: 10.3dBf, 1.8 μ V Stereo: 17.2dBf, 4.0 μ V
50dB Quieting Sensitivity:	Mono: 14.7dBf, 3.0 μ V Stereo: 37.2dBf, 40 μ V
Capture Ratio:	1.3dB
Image Rejection Ratio:	45dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 76dB Stereo: 70dB
Alternate Channel Attenuation:	55dB
AM Suppression Ratio:	55dB
Harmonic Distortion:	Mono: 0.10% Stereo: 0.18%
Frequency Response:	30 – 15,000Hz \pm 1.5dB
Stereo Separation:	45dB at 1kHz/30dB at 100 – 10,000Hz
Tuning Level (Hi/Lo):	27.2dBf, 13 μ V/17.2dBf, 4 μ V

AM:

Tuning Range:	530 – 1620kHz (10kHz steps) and/or 522 – 1611kHz (9kHz steps)
Usable Sensitivity:	30 μ V
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.7%

GENERAL

Power Supply:	
USA & Canadian models	AC 120V, 60Hz
World wide model	AC 120V, 60Hz/AC 220V, 50Hz switchable
Dimensions (W x H x D):	480 x 147 x 460 mm 18-7/8" x 5-2/3" x 18-1/8"
Weight:	15 kg., 33.0 lbs.
Remote Control transmitter RC-108X	
Transmitter:	Infrared
Signal range:	Approx. 5 meters 16ft. 4"
Power supply:	Two "AA" batteries (1.5V x 2)
Dimensions (W x H x D):	55 x 19 x 167 mm 2-1/8" x 3/4" x 6-5/8"
Weight:	120 grams 4.2 oz. (including batteries)

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuse

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

Circuit No.	Part No.	Description
F901	252052	7A (ST-6), Primary fuse
F902	252077	4A-SE-EAK, Primary fuse (Only Worldwide model)

2. Safety-check out

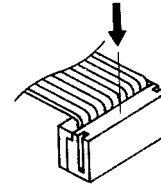
After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Connect the insulating-resistance tester between the plug of power supply cable and terminal GND on the back panel.

Specification: $3.3M\Omega \pm 10\%$ at 500V

3. Removal of jumper wire.

Push the socket in the direction of arrow and pull the jumper wire out.



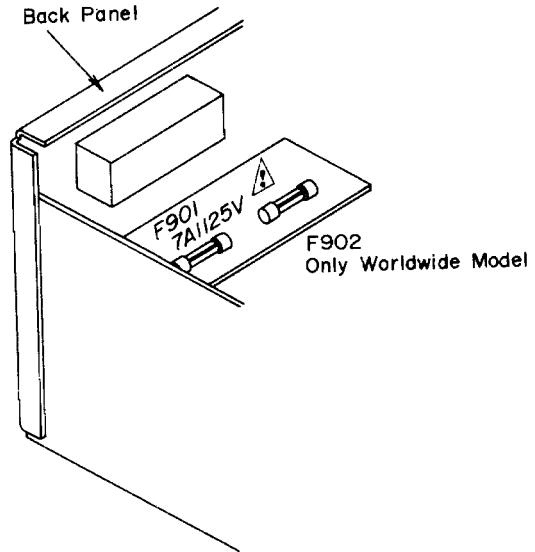
4. Memory Preservation

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 operable. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and the location 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.

5. Replacing the lamp

This unit uses the lamp listed below.

Circuit no.	Part no.	Description
PL701	210064A	PL 6.3V, 250mA, Power indicator lamp



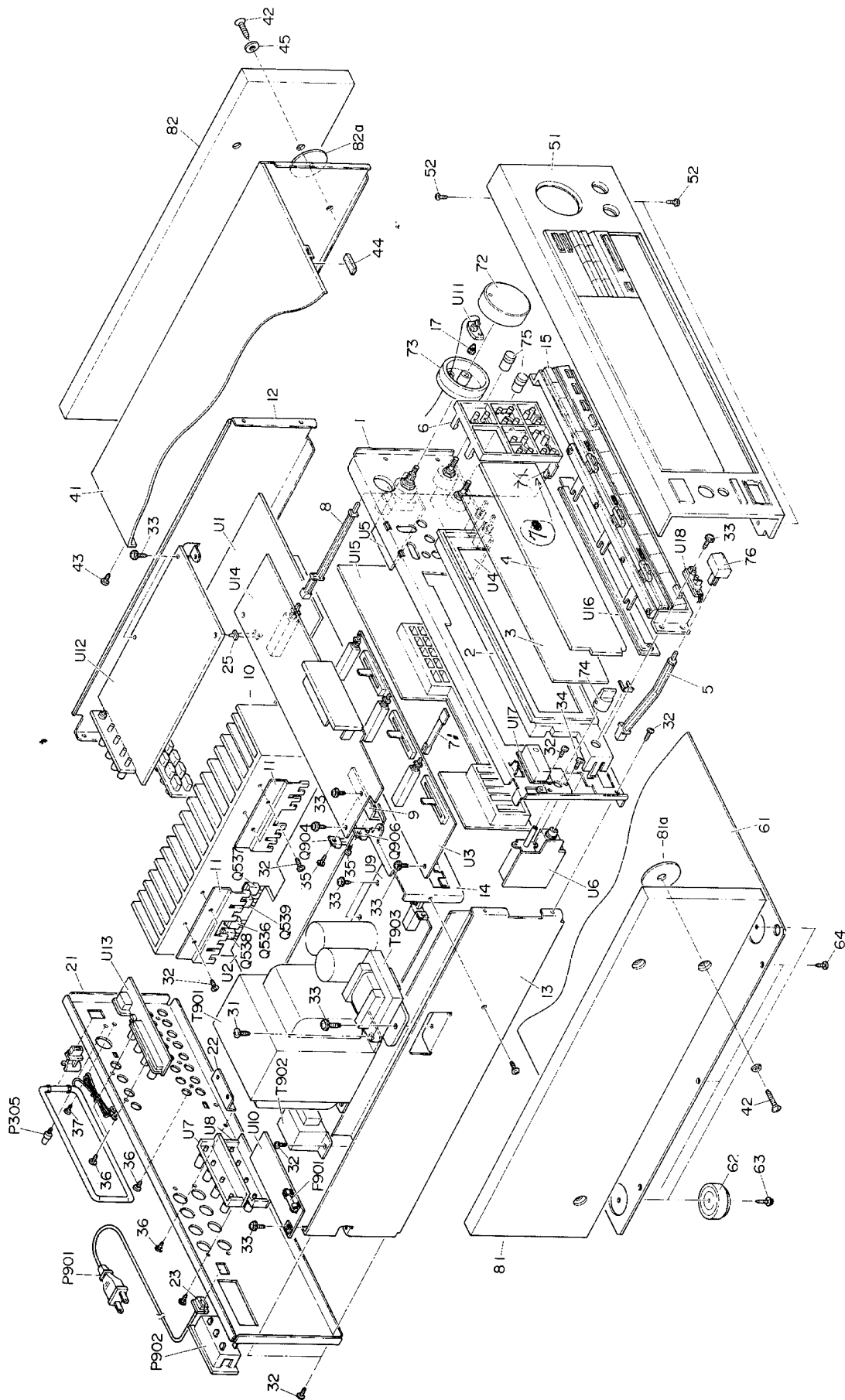
6. Remote Control Operator Batteries

The remote control operator is powered by two batteries. Before using this unit for the first time, insert the two batteries (included). The remote control operator has no on/off switch. Average battery life is one year. This period may be shorter depending on the frequency of use and environment (temperature and humidity) in which the remote control operator is used. If the remote control does not operate even through front panel controls function normally, the batteries should be replaced. Used only batteries listed in the following chart.

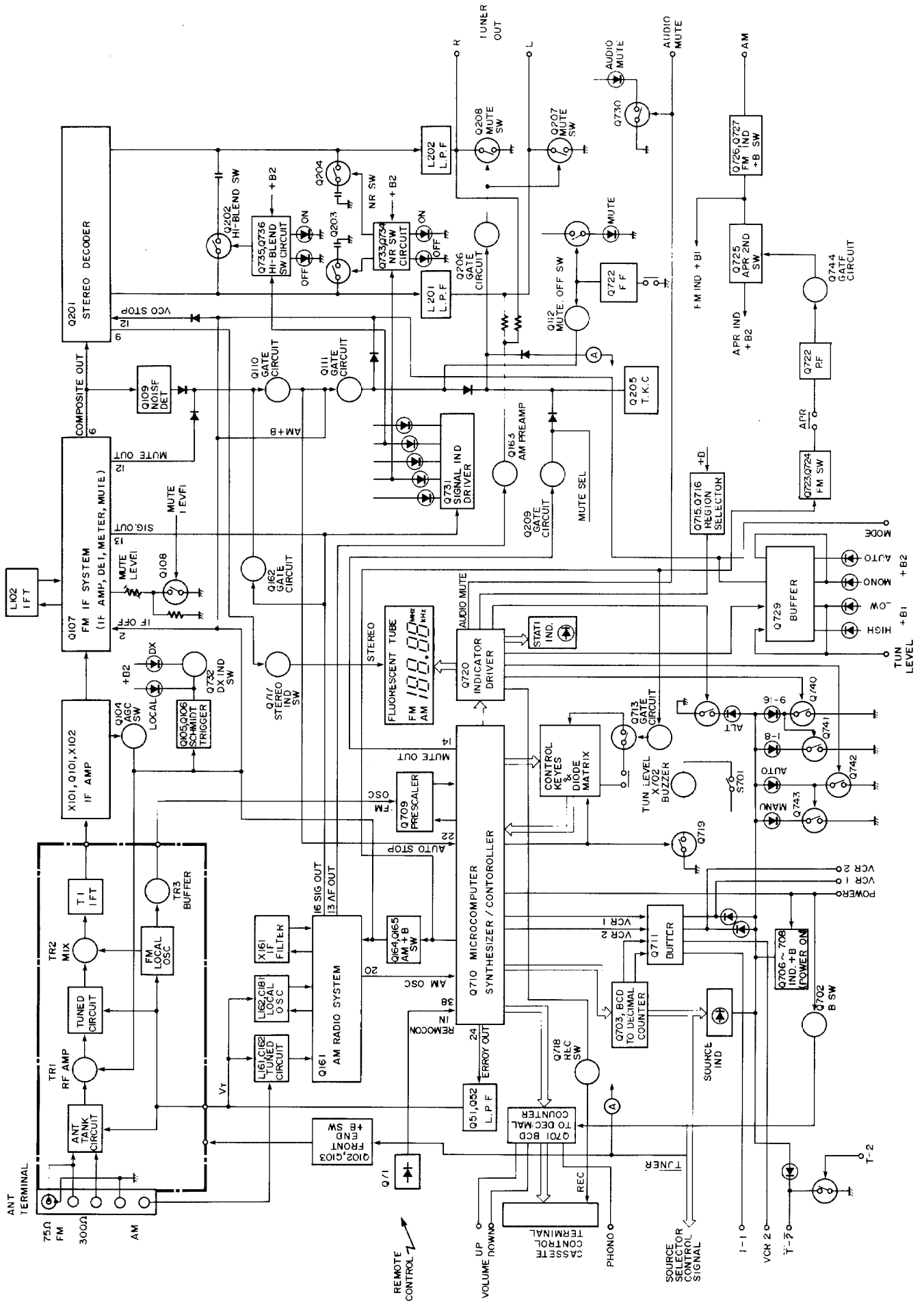
Type	Voltage	ANSI	NEDA	Eveready	Mallory
Manganese	1.5V	AA	15P	815	M15P
			15P	915	M15F
			15	1015	M150F
			15D	1215	M1504

Ray-O-Vac	Bright Star	Burgess	RCA	Sears	IEC
710	59P	920	VS734	8950	R6
7AA	59	910	VS034A		
15	0199	930	VS334		
5AA					

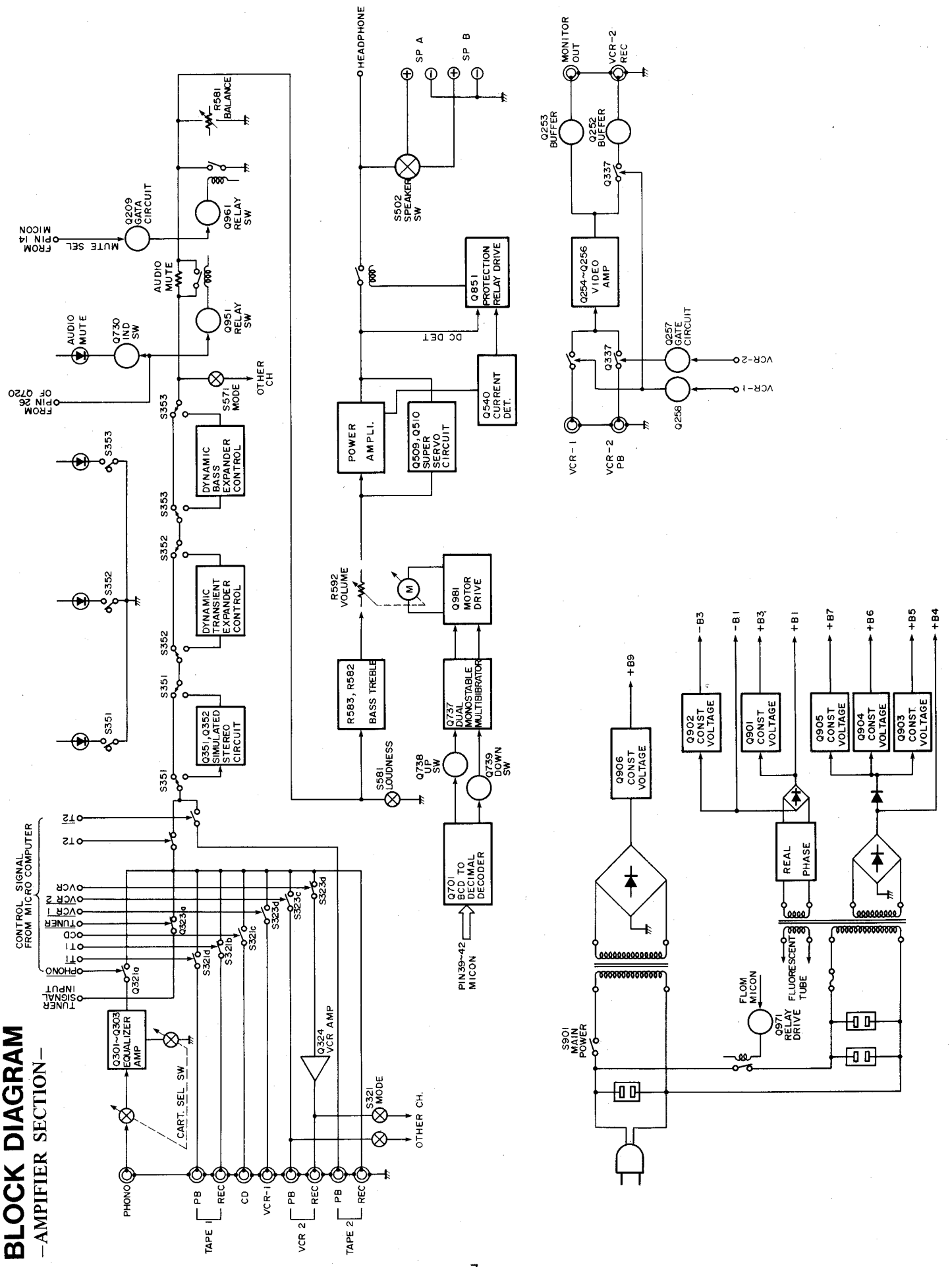
EXPLODED VIEW



BLOCK DIAGRAM -TUNER SECTION-



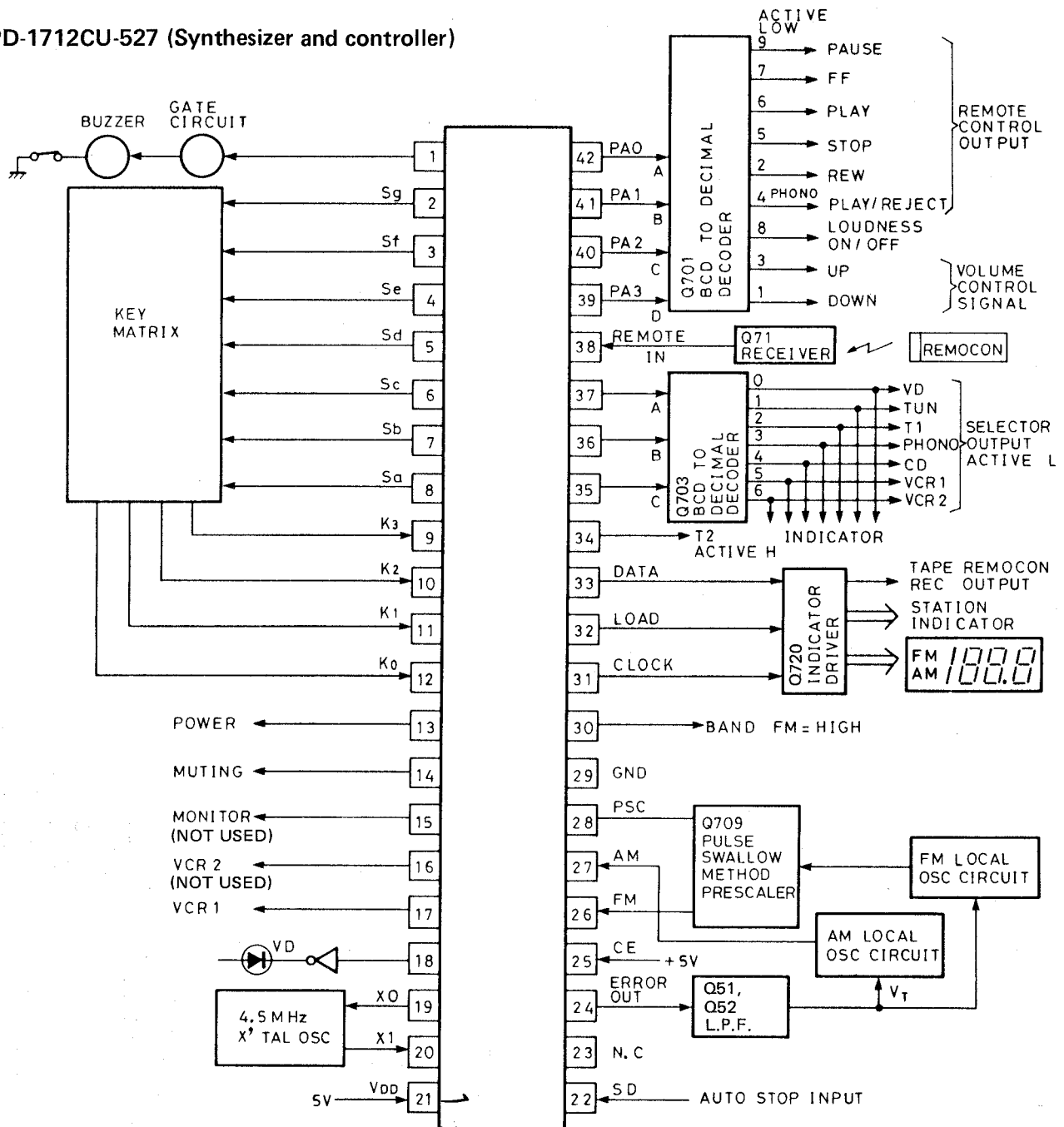
BLOCK DIAGRAM -AMPLIFIER SECTION-



BLOCK DIAGRAM OF IC

Microcomputer operation

μ PD-1712CU-527 (Synthesizer and controller)



Pin No.	Symbol	Description
1	CPG	Clock pulse output for buzzer when pressed the operation keies and auto-tuning.
2	Sg	Key return signal source output terminals.
3	Sf	
4	Se	
5	Sd	
6	Sc	
7	Sb	
8	Sa	

PRINTED CIRCUIT BOARD PARTS LIST

FM/AM tuner pc board (NARF-2681-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240070	TFFG1U113X
	ICs	
Q107	222680	LA1235, FM IF system
Q161	222701	LA1245, AM radio system
Q201	222593	HA12016, Stereo decoder
	Transistors	
Q51	2212294 or 2211293	2SK108 (D) or 2SK68 (M), FET
Q52	2211255	2SC1815 (GR)
Q101	2211722 or 2211723	2SC1923 (R) or 2SC1923 (O)
Q102, Q104	2211255,	2SC1815 (GR),
Q105, Q106	2210746 or	2SC945A (P) or
Q108-Q112	2212485	JC501 (Q)
Q103, Q163	2211256	2SC1815 (BL)
Q162, Q164	2211255,	2SC1815 (GR),
Q165, Q205	2210746 or	2SC945A (P) or
Q209	2212485	JC501 (Q)
Q202, Q203	2212304 or	2SK381 (D) or
Q204	2211945	2SK246 (GR), FFT
Q206	2211454 or 2212494	2SA1015 (Y) or JA101 (P)
Q207, Q208	2211705, 2211706 or 2212794	2SD655 (E), 2SD655 (F) or 2SD1468 (R)
	Diodes	
D101, D102	223132	1K60
D103	2241291	RD3. 3EB1
D104	223163	1SS133
D105	4000068	VD1222
D106-D114	223163	1SS133
D161, D162	223157	KV1236Z
D163	4000068	VD1222
D164-D166	223163	1SS133
D201-D209	223163	1SS133
	Coils	
L101	233105	NCH-1005
L103	233031	NMC-9-1
L161	232113	NMA-3049, AM ant.
L162	232110	NMO-4027, AM osc
L201, L202	233291	NMC-5039, LPF
	Transformer	
L102	233274	NFIF-6041
	Ceramic filters	
X101, X102	3010006	SFF10.7MA8 (RED)
X161	3010075	SFL450B3
X162	3010076	BFU450C
	Capacitors	
C52	395160227	2.2 μ F, 35V, Tantal
C53	392884797	0.47 μ F, 50V, LL
C103	354741019	100 μ F, 16V, Elect.
C104	354721019	100 μ F, 6.3V, Elect.
C105	354780229	2.2 μ F, 50V, Elect.
C107	354742209	22 μ F, 16V, Elect.
C108	354780229	2.2 μ F, 50V, Elect.
C109	354741009	10 μ F, 16V, Elect.
C114	354780229	2.2 μ F, 50V, Elect.
C115	354741009	10 μ F, 16V, Elect.
C121, C126	354784799	0.47 μ F, 50V, Elect.
C128	354780229	2.2 μ F, 50V, Elect.
C129	354741009	10 μ F, 16V, Elect.
C130	354780109	1 μ F, 50V, Elect.
C162, C181	3060010	NTC-20P09, Trimmer

CIRCUIT NO.	PART NO.	DESCRIPTION
C168	354741009	10 μ F, 16V, Elect.
C171	354744709	47 μ F, 16V, Elect.
C173	354780109	1 μ F, 50V, Elect.
C175	354750479	4.7 μ F, 25V, Elect.
C176	354741009	10 μ F, 16V, Elect.
C179	370135114	510pF \pm 5%, 100V, APS
C184	354781099	0.1 μ F, 50V, Elect.
C185	354721019	100 μ F, 6.3V, Elect.
C186	354780339	3.3 μ F, 50V, Elect.
C189	354744709	47 μ F, 16V, Elect.
C201	354780109	1 μ F, 50V, Elect.
C202	354744719	470 μ F, 16V, Elect.
C203, C204	354721019	100 μ F, 6.3V, Elect.
C207, C208	370138214	820pF \pm 5%, 100V, APS <W>
C209	354780339	3.3 μ F, 50V, Elect.
C210	354750479	4.7 μ F, 25V, Elect.
C211	354780109	1 μ F, 50V, Elect.
C212	354780339	3.3 μ F, 50V, Elect.
C213	370131024	1,000pF \pm 5%, 100V, APS
C218, C219	354741009	10 μ F, 16V, Elect.
C220	354750479	4.7 μ F, 25V, Elect.
C221	354744719	470 μ F, 16V, Elect.
	Resistors	
R127	5210066	N06HR22KBD, Semi-fixed
R132	5210068	N06HR47KBD, Semi-fixed
R209	5210070	N06HR100KBD, Semi-fixed
R214	5210061	N06HR3.3KBD, Semi-fixed
	Terminals	
	25060091	NTM-5PDMN32, Antenna
	Sockets	
	25050267	NSCT-3P95, Jumper
	25050270	NSCT-6P98, Jumper
	25050273	NSCT-9P101, Jumper
	Bracket	
	27141059	Ground

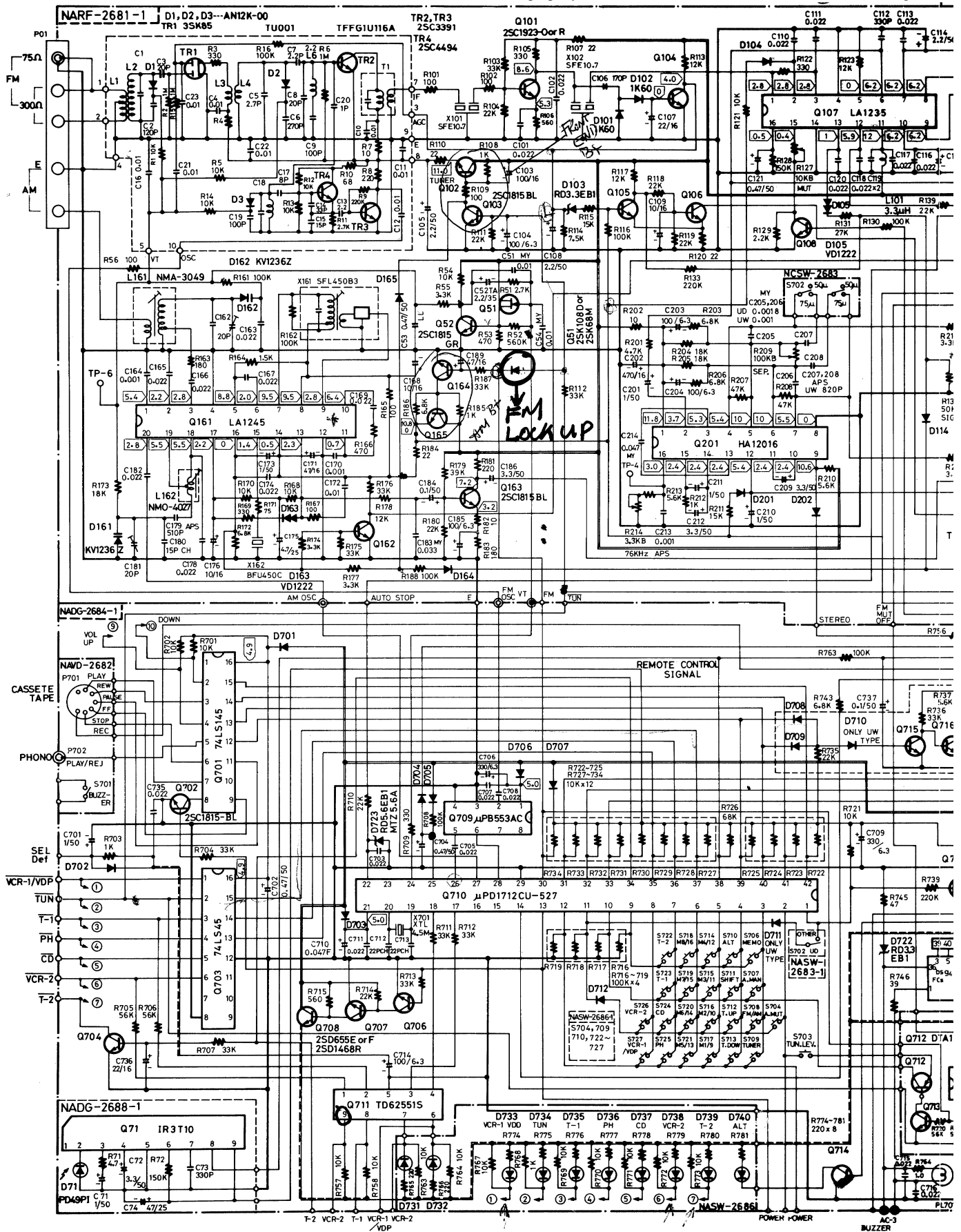
Video circuit pc board (NAVD-2682-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q251	222840661	4066B, Analog switch
	Transistors	
Q252, Q253	2211255	2SC1815 (GR)
Q254	2211454 or 2212494	2SA1015 (Y) or JA101 (P)
Q255, Q256	2211255	2SC1815 (GR)
Q257, Q258	2211255, 2210746 or 2212485	2SC1815 (GR), 2SC945A (P) or JC501 (Q)
	Capacitors	
C251, C253	354741009	10 μ F, 16V, Elect.
C252, C254	354724719	470 μ F, 6.3V, Elect.
C256	354744709	47 μ F, 16V, Elect.
C258	354741009	10 μ F, 16V, Elect.
	Switch	
S701	25065286	NSS-22112, Slide, Buzzer
	Sockets	
P701	25050294	NSCT-8P121, Remote control, Tape
	25050267	NSCT-3P-95, Jumper
	25050273	NSCT-9P-101, Jumper
	Terminals	
	25045192	NPJ-4PDBL76, Video
P702	25045204	HSJ0847-01-010, Remote control Phono

SCHEMATIC DIAGRAM

-TUNER SECTION-

Diode in circle may cause FM to lock up. This diode is mounted on the solder side of the PCB.
 In order for Q710 to work properly, Pin 28 of Q710 should receive a constant AM OSC signal.

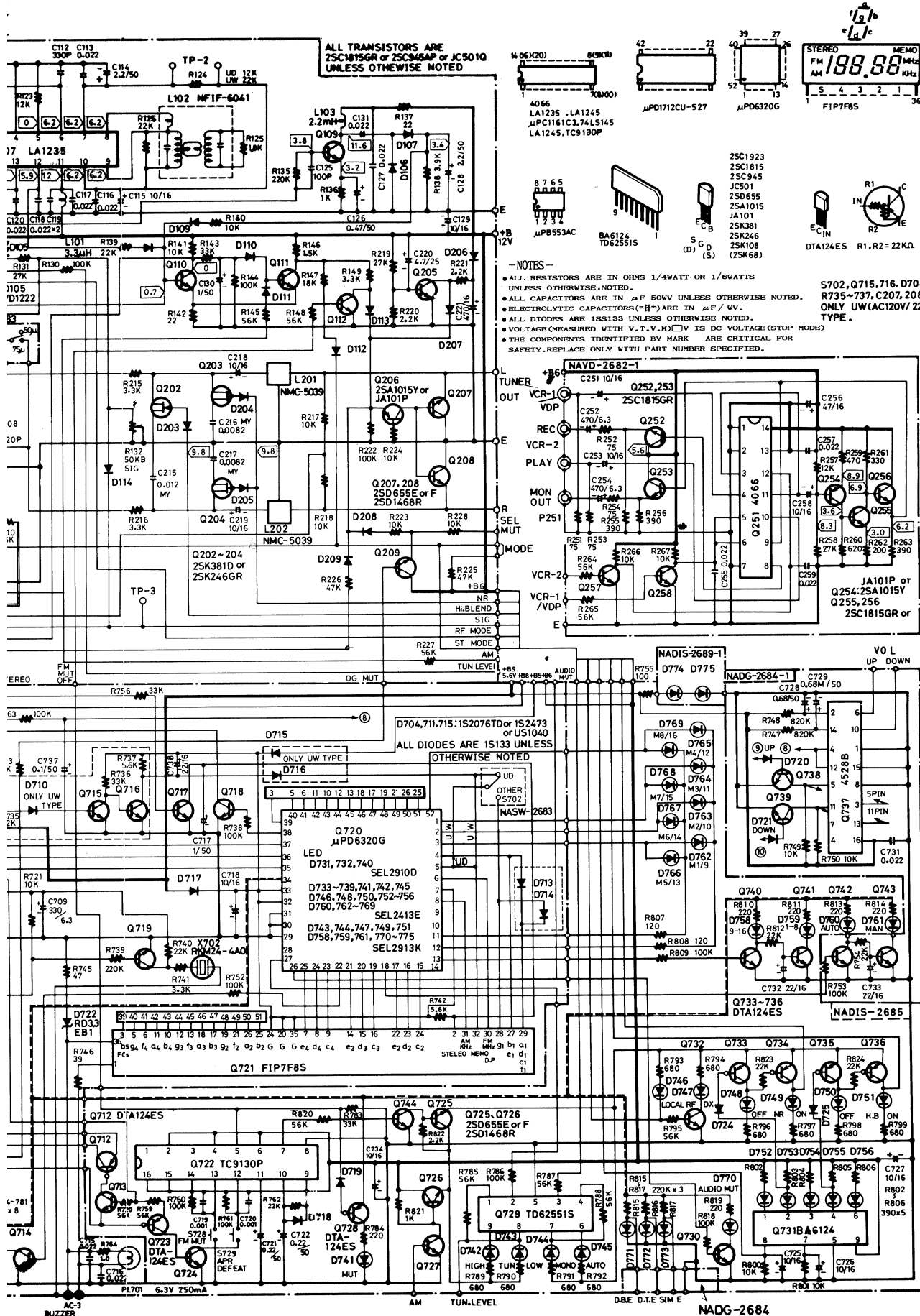


D

E

F

G



PRINTED CIRCUIT BOARD-PARTS LIST

Main amplifier pc board (NAMA-2666-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
					Capacitors
			C537, C538	354790479	4.7 μ F, 100V, Elect.
			C637, C638	354790479	4.7 μ F, 100V, Elect.
			C852	354722219	220 μ F, 6.3V, Elect.
			C854	354742219	220 μ F, 16V, Elect.
			C855	354784799	0.47 μ F, 50V, Elect.
			C857	354742209	22 μ F, 16V, Elect.
			C915	352766809	68 μ F, 35V, Elect.
			C916	354752229	2,200 μ F, 25V, Elect.
			C917	354764709	47 μ F, 35V, Elect.
			C918, C920	354741009	10 μ F, 16V, Elect.
			C919, C921	354761019	100 μ F, 35V, Elect.
			C922, C923	354722219	220 μ F, 6.3V, Elect.
					Resistors
			R534, R634	5210062	N06HR4.7KBD, Semi-fixed
			R535, R635	442524724	4.7kohm, 1/2W, Metal oxide film
			R536, R636	442521024	1kohm, 1/2W, Metal oxide film
			R537, R637	442521014	100ohm, 1/2W, Metal oxide film
			R538-R541	442520224	2.2ohm, 1/2W, Metal oxide film
			R638-R641	442520224	2.2ohm, 1/2W, Metal oxide film
			R542, R543	4000063	0.47ohm, 2W, Metal plate
			R642, R643	4000063	0.47ohm, 2W, Metal plate
			R544, R644	441620104	1ohm, 1W, Metal oxide film
			R545, R546	4000063	0.47ohm, 2W, Metal plate
			R645, R646	4000063	0.47ohm, 2W, Metal plate
			R547, R647	441620104	1ohm, 1W, Metal oxide film
			R550, R551	4000061	0.33ohm, 2W, Metal plate
			R650, R651	4000061	0.33ohm, 2W, Metal plate
			R554, R555	441621604	16ohm, 1W, Metal oxide film
			R654, R655	441621604	16ohm, 1W, Metal oxide film
			R910	441520104	1ohm, 1/2W, Metal oxide film
			R911	441621024	1kohm, 1W, Metal oxide film
			R912	441521004	10ohm, 1/2W, Metal oxide film
			R913	441620474	4.7ohm, 1W, Metal oxide film
			R914	441622204	22ohm, 1W, Metal oxide film
					Relay
			RL851	25065237	NRL-4P3A-DC24-26
					Coils
			L531, L631	231015	S-0.8C
					ICs
Q851	222584	TA7317P			
Q903	222780153	78L15			
					Transistors
Q531, Q631	2211255	2SC1815 (GR)			
Q532, Q632	2211633 or 2211634	2SC2229 (O) or 2SC2229 (Y) #			
Q533, Q633	2211353 or 2211354	2SA949 (O) or 2SA949 (Y) #			
Q534, Q634	2201643 or 2201644	2SC3298 (O) or 2SC3298 (Y) #			
Q535, Q635	2201633 or 2201634	2SA1306 (O) or 2SA1306 (Y) #			
Q536, Q538 Q636, Q638	2201533, 2201534 or 2201535	2SC2837 (O), 2SC2837 (Y) or 2SC2837 (P) #			
Q537, Q539 Q637, Q639	2201523, 2201524 or 2201525	2SA1186 (Y) or 2SA1186 (P) #			
Q540, Q640	2211732 or 2211733	2SC1845 (F) or 2SC1845 (E)			
					Diodes
D531, D631	223150,	U51040,			
D852, D854	223124 or 223145	1S2473 or 1S2076TD			
D532, D632	<u>4000068</u>	VD1222			
D851	2243213 or 2239593	MTZ10C or RD10EB3			
D853	2243232 or 2239632	MTZ12B or RD12FB2			
D901	223898	RB602			
D902, D903	223897	P300DL			
D906	223890 or 223862	W01RL or WL01			
D907	223896 or 223880	1N4003F or GP101N4003			
D908	2243151 or 2239471	MTZ5.6A or RD5.6EB1			

A

B

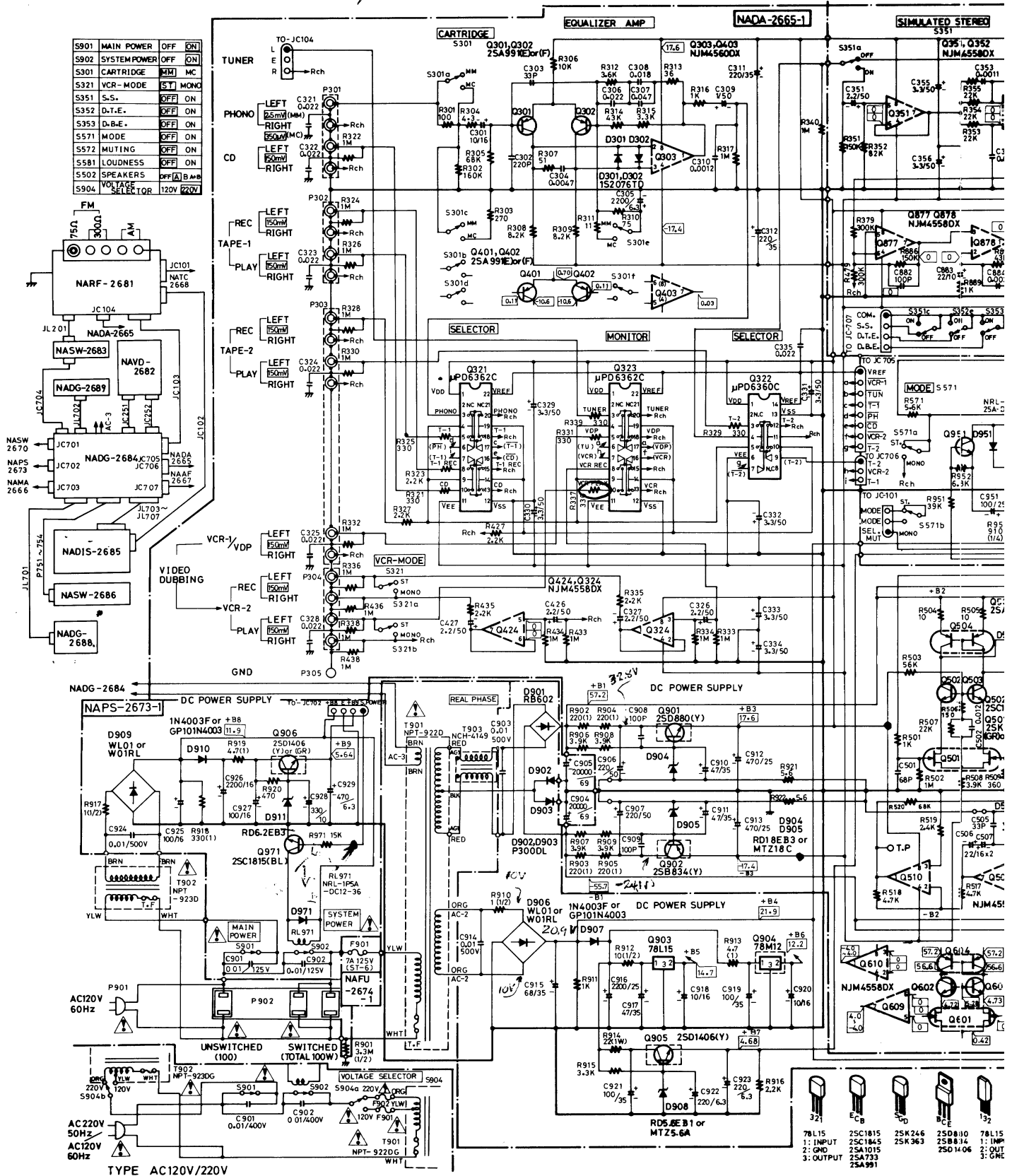
C

D

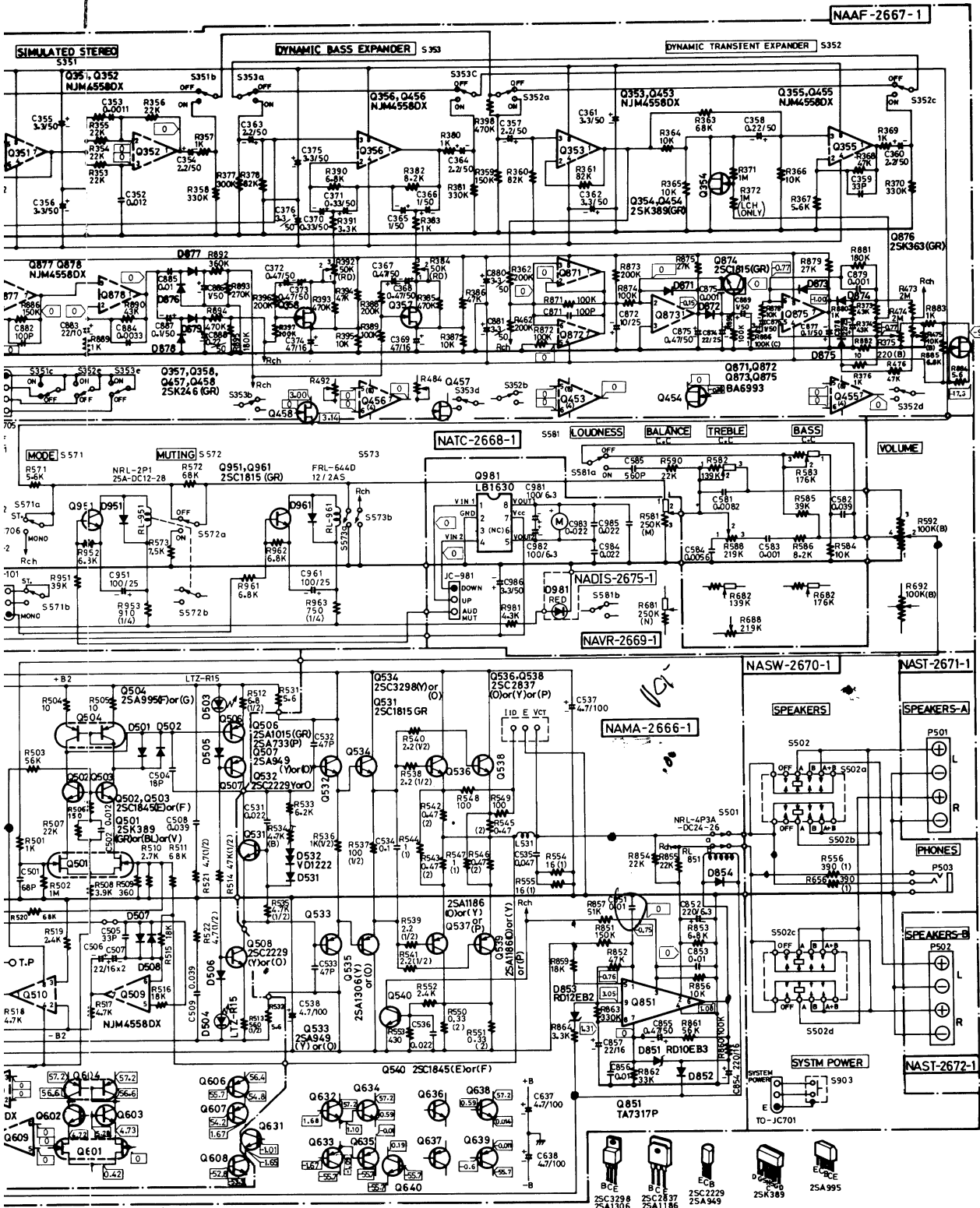
SCHEMATIC DIAGRAM

-AMPLIFIER SECTION-

If the unit shuts OFF and ON frequently when changing input selector buttons, check D906.



E F G



SPECIFICATIONS

AMPLIFIER SECTION

Power Output:	100 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.02% THD.
Total Harmonic Distortion:	0.02% at rated power
IM Distortion:	0.02% at rated power
Damping Factor	50 at 8 ohms
Frequency Response:	20 – 30,000 Hz \pm 1dB
RIAA Deviation:	20 – 20,000 Hz \pm 0.5dB
Sensitivity and Impedance:	Phono(MM): 2.5mV/50 kohms Phono(MC): 350 μ V/330 ohms CD/Tape Play: 150mV/50 kohms Tape Rec: 150mV/3.3 kohms
Phono Overload (MM):	180mV RMS at 1kHz, 0.02% THD
Signal-to-Noise Ratio:	Phono (MM): 93dB (at 10mV input, A weighted) 76dB (IHF A-202) Phono (MC): 88dB (at 5mV input, A weighted) 67dB (IHF A-202) CD/Tape: 98dB (A weighted) 80dB (IHF A-202)
Tone Controls:	Bass: \pm 8dB at 70Hz Treble: \pm 8dB at 20kHz
Loudness (–30dB):	+6dB at 70Hz, +5dB at 20kHz
Muting:	–20dB

TUNER SECTION

FM:

Tuning Range:	87.9 – 107.9MHz (200kHz steps) and/or 87.5 – 108.0MHz (50kHz steps)
Usable Sensitivity:	Mono: 10.3dBf, 1.8 μ V Stereo: 17.2dBf, 4.0 μ V
50dB Quieting Sensitivity:	Mono: 14.7dBf, 3.0 μ V Stereo: 37.2dBf, 40 μ V
Capture Ratio:	1.3dB
Image Rejection Ratio:	45dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 76dB Stereo: 70dB
Alternate Channel Attenuation:	55dB
AM Suppression Ratio:	55dB
Harmonic Distortion:	Mono: 0.10% Stereo: 0.18%
Frequency Response:	30 – 15,000Hz \pm 1.5dB
Stereo Separation:	45dB at 1kHz/30dB at 100 – 10,000Hz
Tuning Level (Hi/Lo):	27.2dBf, 13 μ V/17.2dBf, 4 μ V

AM:

Tuning Range:	530 – 1620kHz (10kHz steps) and/or 522 – 1611kHz (9kHz steps)
Usable Sensitivity:	30 μ V
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.7%

GENERAL

Power Supply:	
USA & Canadian models	AC 120V, 60Hz
World wide model	AC 120V, 60Hz/AC 220V, 50Hz switchable
Dimensions (W x H x D):	480 x 147 x 460 mm 18-7/8" x 5-2/3" x 18-1/8"
Weight:	15 kg., 33.0 lbs.
Remote Control transmitter RC-108X	
Transmitter:	Infrared
Signal range:	Approx. 5 meters 16ft. 4"
Power supply:	Two "AA" batteries (1.5V x 2)
Dimensions (W x H x D):	55 x 19 x 167 mm 2-1/8" x 3/4" x 6-5/8"
Weight:	120 grams 4.2 oz. (including batteries)

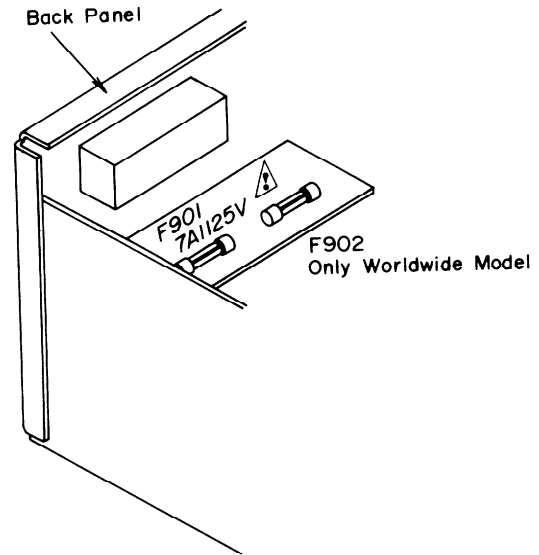
Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuse

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

Circuit No.	Part No.	Description
F901	252052	7A (ST-6), Primary fuse
F902	252077	4A-SE-EAK, Primary fuse (Only Worldwide model)



2. Safety-check out

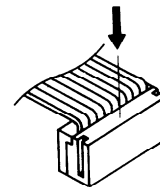
After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Connect the insulating-resistance tester between the plug of power supply cable and terminal GND on the back panel.

Specification: 3.3MΩ ±10% at 500V

3. Removement of jumper wire.

Push the socket in the direction of arrow and pull the jumper wire out.



4. 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 operable. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and the location 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.

5. Replacing the lamp

This unit uses the lamp listed below.

Circuit no.	Part no.	Description
PL701	210064A	PL 6.3V, 250mA, Power indicator lamp

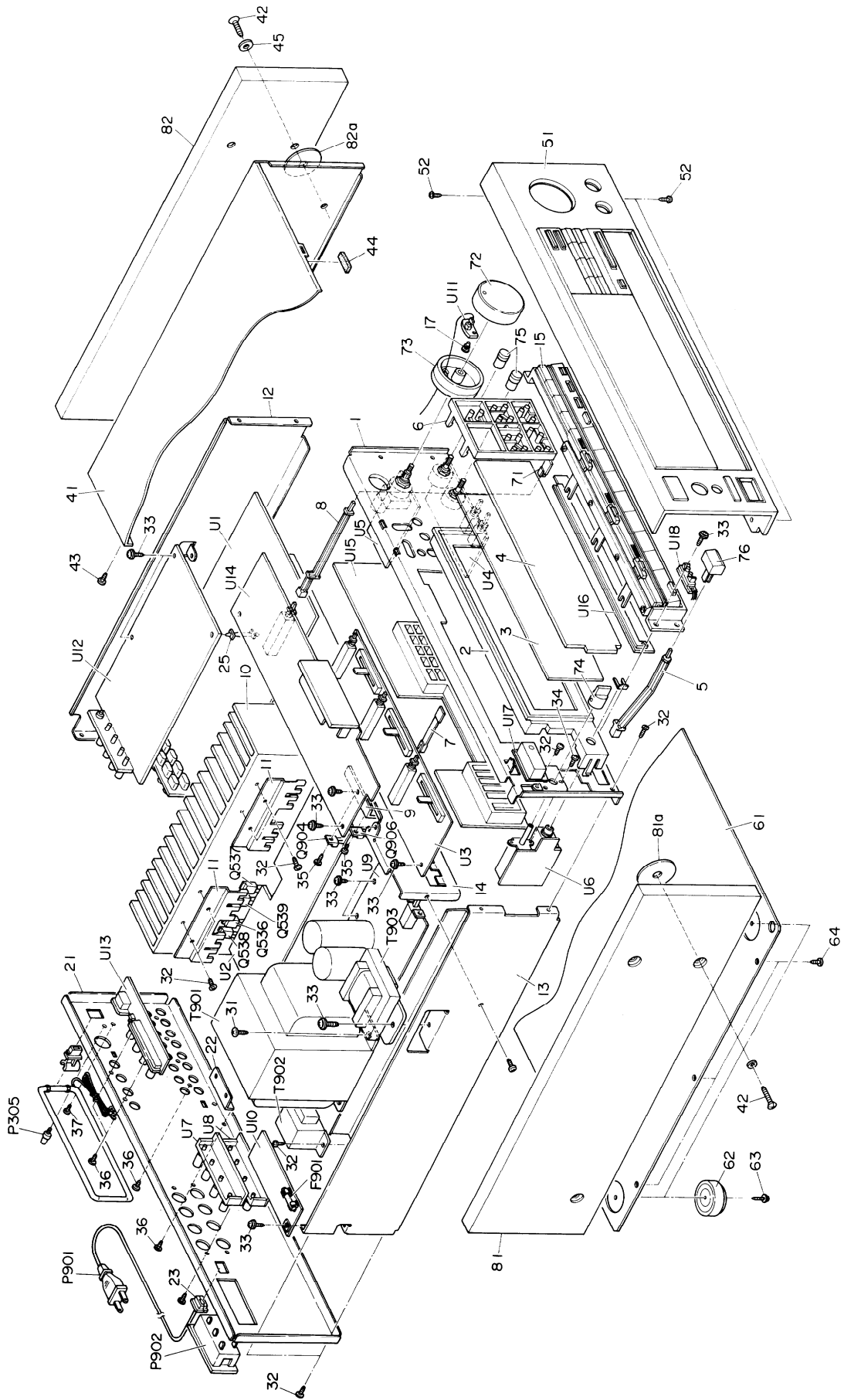
6. Remote Control Operator Batteries

The remote control operator is powered by two batteries. Before using this unit for the first time, insert the two batteries (included). The remote control operator has no on/off switch. Average battery life is one year. This period may be shorter depending on the frequency of use and environment (temperature and humidity) in which the remote control operator is used. If the remote control does not operated even through front panel controls function normally, the batteries should be replaced. Used only batteries listed in the following chart.

Type	Voltage	ANSI	NEDA	Eveready	Mallory
Manganese	1.5V	AA	15P	815	M15P
			15P	915	M15F
			15	1015	M150F
			15D	1215	M1504

Ray-O-Vac	Bright Star	Burgess	RCA	Sears	IEC
710	59P	920	VS734	8950	R6
7AA	59	910	VS034A		
15	0199	930	VS334		
5AA					

EXPLODED VIEW



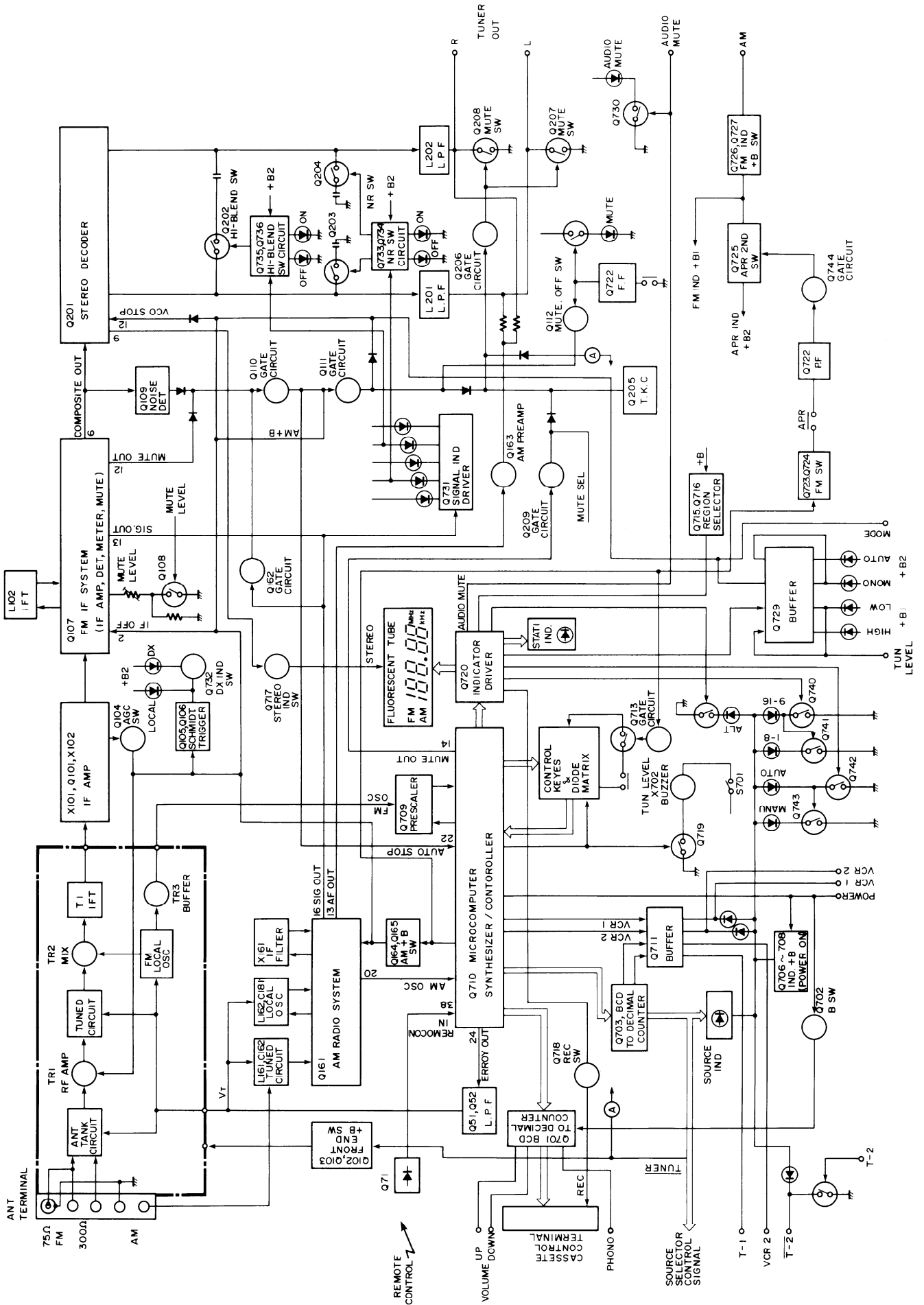
PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	27110288D	Front bracket	74	28322649	Knob, speaker	U6	18688570-1	NASW-2670-1, Speaker switch pc board ass'y
2	27190463A	Holder	75	28322598	Knob, tone	U7	18688571-1	NAST-2671-1, Speaker terminal pc board ass'y
3	28133169A	Back plate	76	28321905B	Knob, power	U8	18688572-1	NAST-2672-1, Speaker terminal pc board ass'y
4	28130239	Dial plate	77	880011	Rivert	U9	18688573-1	NAPS-2673-1, Power supply circuit pc board ass'y <D>
5	27273036A	Joint	81	28185262	Side panel L ass'y	U10	18688574-1	NAPF-2674-1, Fuse terminal pc board ass'y <D>
6	28322593A	Holder knob B	82	28185264	Side panel R ass'y	U11	18688575-1	NADIS-2675-1, Volume indicator pc board ass'y
7	28322594	Knob, push	91	831130088	3TTW+8B (BC), Tapping screw <W>	U12	18688581-1	NARF-2681-1, FM/AM tuner pc board ass'y <D>
8	27273054A	Joint	F901	252052	7A (ST-6), Primary fuse	U13	18688582-1	NAVU-2682-1, Video circuit pc board ass'y
9	27160188	Radiator S	F902	252077	4A-SE-EAK, Primary fuse <W>	U14	18688584-1	NADG-2684-1, Digital control circuit pc board ass'y <D>
10	27160190A	Radiator	P305	25060044	Terminal GND	U15	18688585-1	NADIS-2685-1, Display circuit pc board ass'y
11	27130435	Bracket, transistor	P501	27190105	Holder, AM loop antenna	U16	18688586-1	NASW-2686-1, Function switch pc board ass'y
12	27115160-1	Side bracket R	P901	253123 or 253136	AS-UC-6#18, Power supply cord <D>/WX>	U17	18688588-1	NADG-2688-1, Digital circuit pc board ass'y
13	27130436A	Bracket L	P901	253123 or 253136	AS-UC-6#18, Power supply cord <D>/WX>	U18	18688589-1	NADIS-2689-1, Display circuit pc board ass'y
14	27130437	Bracket C	P901	253092-1A	AS-CEE-2, Power supply cord <W>	U19	18688583-1	NASW-2683-1, Band step switch pc board ass'y <W>
15	28322575A	Knob ass'y	P902	25050293	NSCT-6P120, Outlet <D>/WX>			
16	28140700	t7 x 10 x 10, Cushion	Q536, Q538	2201533,	2SC2837 (O),			
17	28140488	60 x 10 x 13, Cushion	Q636, Q638	2201534 or 2201535	2SC2837 (Y) or 2SA1186 (O),			
18	28170014	Bushing	Q537, Q539	2201523 or 2201524 or 2201525	2SA1186 (P), Transistor 78M12, Const. voltage IC			
19	27120885	Back panel <D>	Q904	222780122	2SA1186 (P), Transistor			
20	27120886	Back panel <W>	Q905, Q906	2201404 or 2201405	2SD1406 (Y) or 2SD1406 (GR), Transistor			
21	27120887	Back panel <WX>	S904	25065287	NSS-22113P, Voltage selector switch <W>			
22	27141075	Bracket, back, radiator	T901	2300116	NPT-922D, Power transformer			
23	27300750	Strainrelief	T902	2300117	NPT-922DG, Power transformer			
24	27141075-1	Bracket, front, radiator	T902	2300118	NPT-923D, Power transformer			
25	27190369	Holder	T903	2300119	NPT-923DG, Power transformer			
31	830440089	4TTC+8B (BC), Tapping screw	U1	18688565-1	NCH-4149, Linear phase transformer			
32	834430068	3TTS+8B (BC), Tapping screw	U2	18688566-1	NADA-2665-1, Equalizer and switch circuit pc board ass'y			
33	831130088	3TTW+8B, Tapping screw	U3	18688567-1	NAMA-2666-1, Main amplifier pc board ass'y			
34	82143006	3P+6F (BC), Pan head screw	U4	18688568-1	NAATC-2667-1, Control circuit pc board ass'y			
35	834430088	3TTS+8B (BC), Tapping screw	U5	18688569-1	NAATC-2668-1, Tone control pc board ass'y			
36	834430108	3TTS+10B (BC), Tapping screw			NAVR-2669-1, Volume control pc board ass'y			
37	834230108	3TTS+10B (Ni), Nickel screw						
38	834430128	3TTS+12B (BC), Tapping screw						
41	28184322A	Top cover						
42	836440303	4STV+30CQ (BC), Tapping screw						
43	834430068	3TTS+6B (BC), Tapping screw						
44	28140020	t4 x 40 x 10, Cushion						
45	870086	W4 x 12 (BC), Special washer						
51	18688121	Front panel ass'y						
52	834430068	3TTS+6B (BC), Tapping screw						
56	28140456	t2 x 40 x 4, Cushion						
57	27150226	Shielded plate						
58	29110066	33cm, Aluminium tape						
61	27170177-1	Bottom board						
62	27175127	Leg						
63	831130088	3TTW+8B, Tapping screw						
64	834430088	3TTS+8B (BC), Tapping screw						
71	28322600A	Knob, expander						
72	28322596A	Knob, volume						
73	28322597A	Knob, balance						

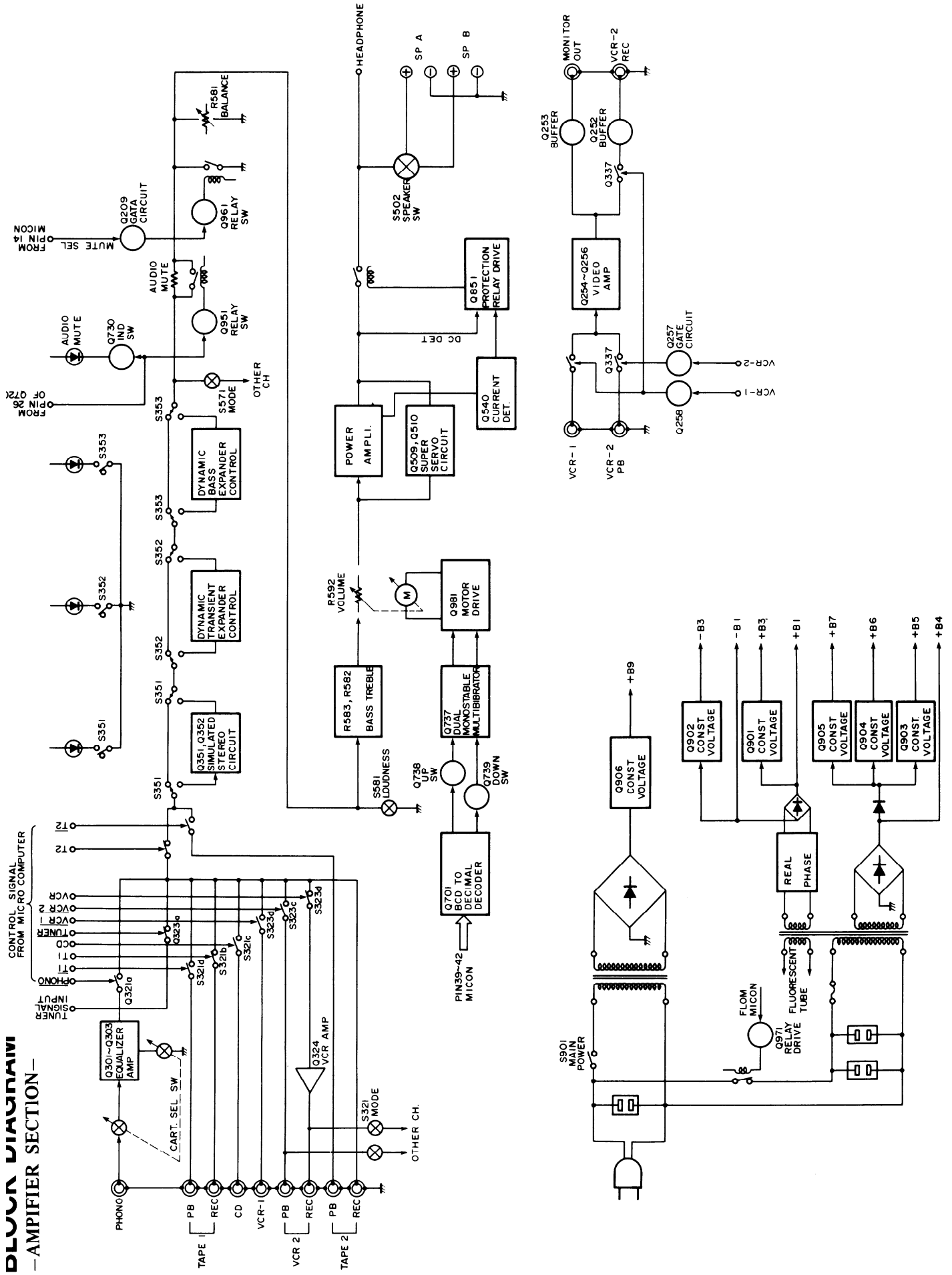
Note: <D> : Only 120V model
<W> : Only Worldwide model
<WX> : Only PX model

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

BLOCK DIAGRAM -TUNER SECTION-



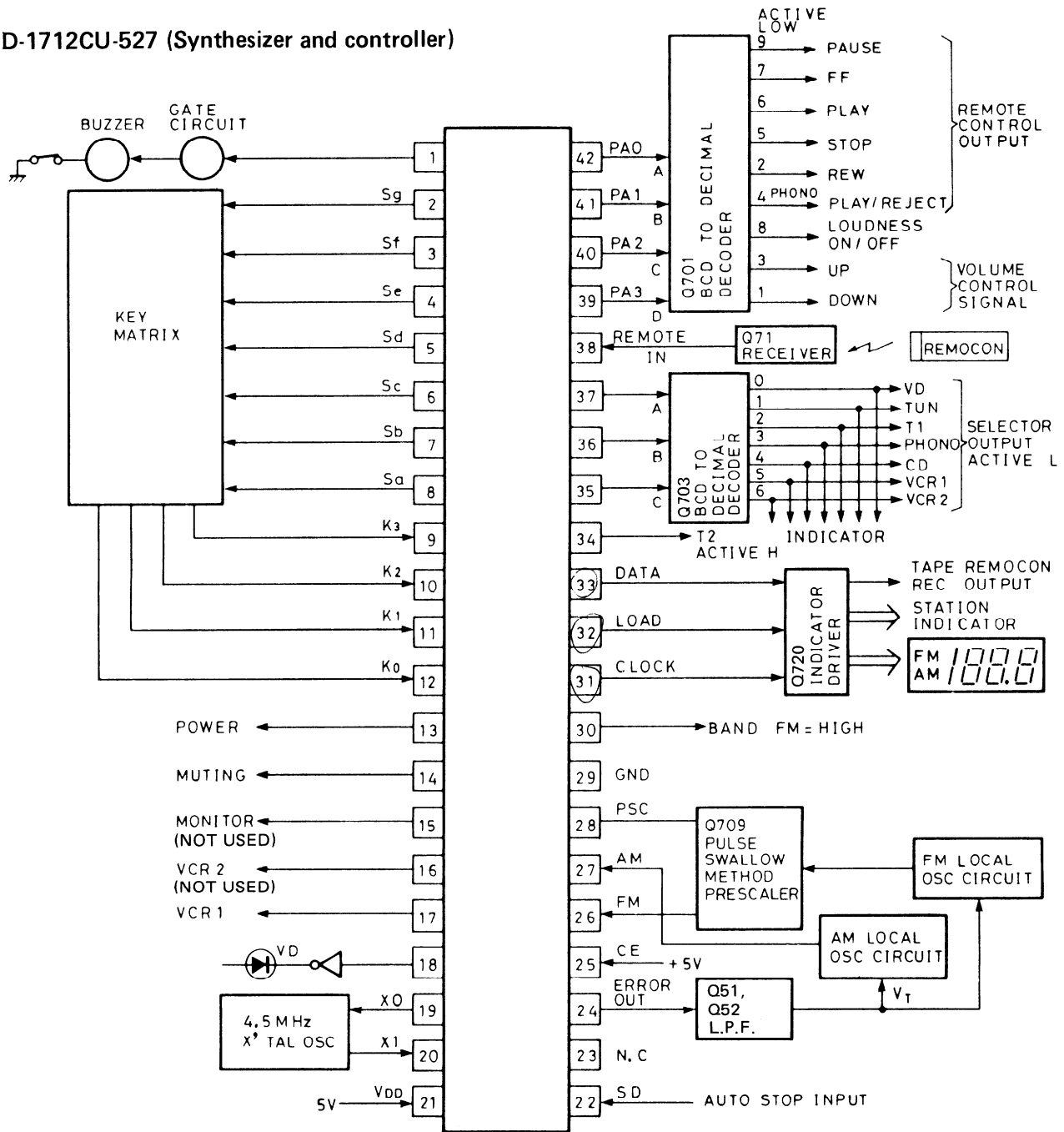
DLUON DIANNAW
-AMPLIFIER SECTION-



BLOCK DIAGRAM OF IC

Microcomputer operation

μ PD-1712CU-527 (Synthesizer and controller)

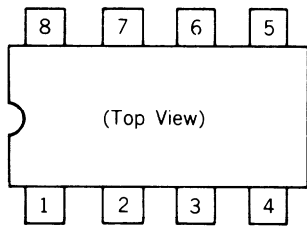


Pin No.	Symbol	Description
1	CPG	Clock pulse output for buzzer when pressed the operation keies and auto-tuning.
2	Sg	Key return signal source output terminals.
3	Sf	
4	Se	
5	Sd	
6	Sc	
7	Sb	
8	Sa	

Pin No.	Symbol	Description
9 10 11 12	K3 K2 K1 K0	Key return signal input terminals.
13	POWER	System power control output. Active high.
14	MUTE	Goes to the high level during muting control signal output. Active high.
15	MONITOR	Monitor output terminal for control of video. Active high.
16	VCR2	VCR2 output terminal for control of video. Active high.
17	VCR1	VCR1 output terminal for control of video. Active high.
18	VD	Output terminal for indicator VD. Active high.
19 20	X0 X1	Connect to the 4.5MHz crystal oscillator.
21	V _{DD}	Device power terminal; supplies 5V during normal operation and 3V from the super capacitor C710 for memory preservation.
22	SD	Station detector input terminal. When this terminal goes to the high level, auto search tuning is stopped.
23 24	E02 E01	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided local oscillator frequency is high than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator circuit of AM/FM through low pass filter Q151 and Q152. The output from both terminals is the same, but only E01 is used.
25	CE	Chip enable input. Device selection signal terminal. High level ... Normal operation Low level ... Memory preservation.
26	FM	Local oscillator frequency input terminal is divided by prescaler Q709.
27	AM	Local oscillator frequency input terminal.
28	PSC	Output terminal to control the division ratio of the prescaler Q709.
29	GND	Ground terminal
30	FM/AM	FM/AM band selector output. FM at the high level and AM at the low level.
31	CK	Clock output for indicator driver IC Q718.
32	LOAD	Load output for indicator driver IC Q718.
33	DATA	Data output for indicator driver IC Q718.
34	TAPE 2	TAPE 2 control output terminal. Active high.
35	PC2 (C)	BCD code output for source selector.
36	PC1 (B)	
37	PC0 (A)	
38	INT	Remote control input.
39	PA3 (D)	BCD code outputs for the electron volume and remote control signal for tape deck and turntable.
40	PA2 (C)	
41	PA1 (B)	
42	PA0 (A)	

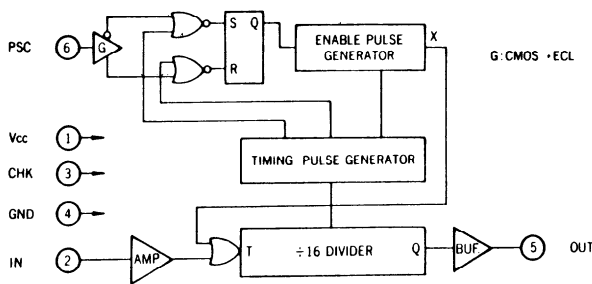
μPB553AC (Prescaler)

Pin Connection

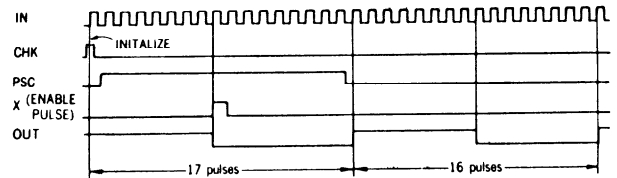


1. Pin 1 (Vcc) +5 volts Supply
2. Pin 2 (IN) FM local oscillator signal input
3. Pin 3 (CHK) Check terminal
4. Pin 4 (GND) Ground terminal
5. Pin 5 (OUT) Prescaler terminal
6. Pin 6 (PSC) Prescaler control terminal
7. Pin 7, 8 Not connected

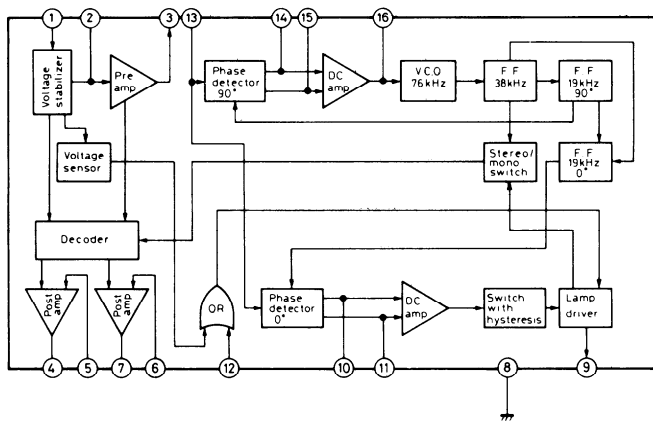
Block Diagram



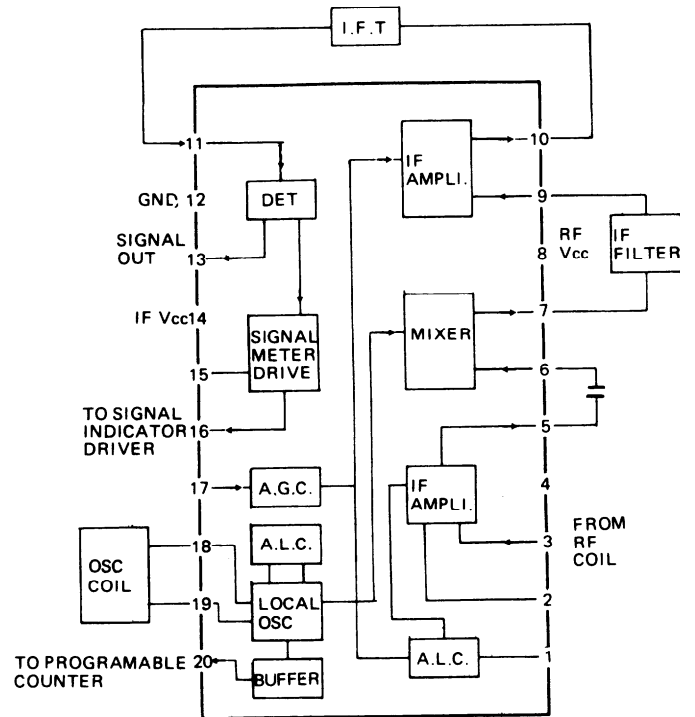
Timing Chart



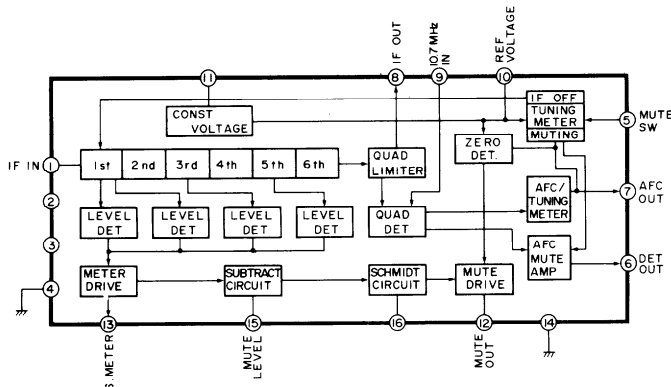
HA12016 (Stereo decoder)



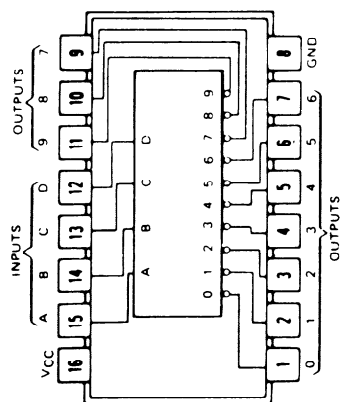
LA1245 (AM Radio System)



LA1235(FM IF System)

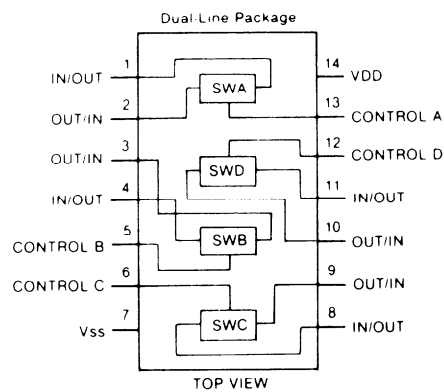


74LS145 (BCD to Decimal Decoder/Driver)

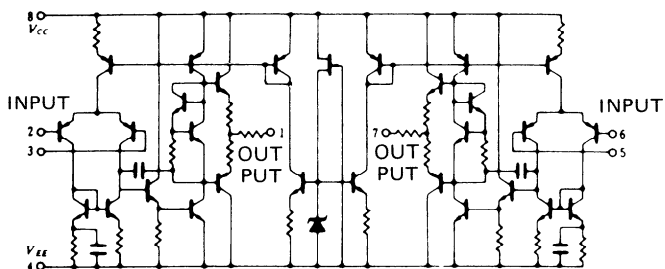


NO	INPUTS				OUTPUTS									
	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	L	H	H	H	H	H	H	H	H	H
2	L	L	H	L	L	H	H	H	H	H	H	H	H	H
3	L	L	H	H	L	H	H	H	H	H	H	H	H	H
4	L	H	L	L	L	H	H	H	H	H	H	H	H	H
5	L	H	L	H	L	H	H	H	H	L	H	H	H	H
6	L	H	H	L	L	H	H	H	H	L	H	H	H	H
7	L	H	H	H	L	H	H	H	H	L	L	H	H	H
8	H	L	L	L	L	H	H	H	H	H	H	L	H	H
9	H	L	L	H	L	H	H	H	H	H	H	L	L	H
INVALID	H	L	L	L	L	H	H	H	H	H	H	H	H	H
	H	L	L	H	L	H	H	H	H	H	H	H	H	H
	H	L	H	L	L	H	H	H	H	H	H	H	H	H
	H	L	H	H	L	H	H	H	H	H	H	H	H	H
	H	H	L	L	L	H	H	H	H	H	H	H	H	H
	H	H	L	H	L	H	H	H	H	H	H	H	H	H
	H	H	H	L	L	H	H	H	H	H	H	H	H	H
	H	H	H	H	L	H	H	H	H	H	H	H	H	H

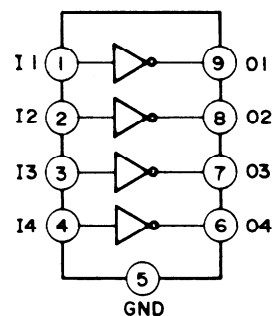
4066B (Analog Switch)



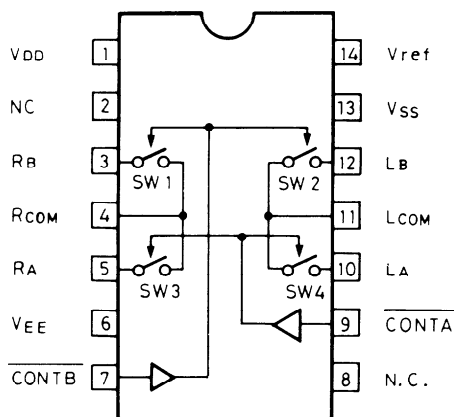
NJM4558/4560 (Operational Amplifier)



TD62551S (Single Driver)



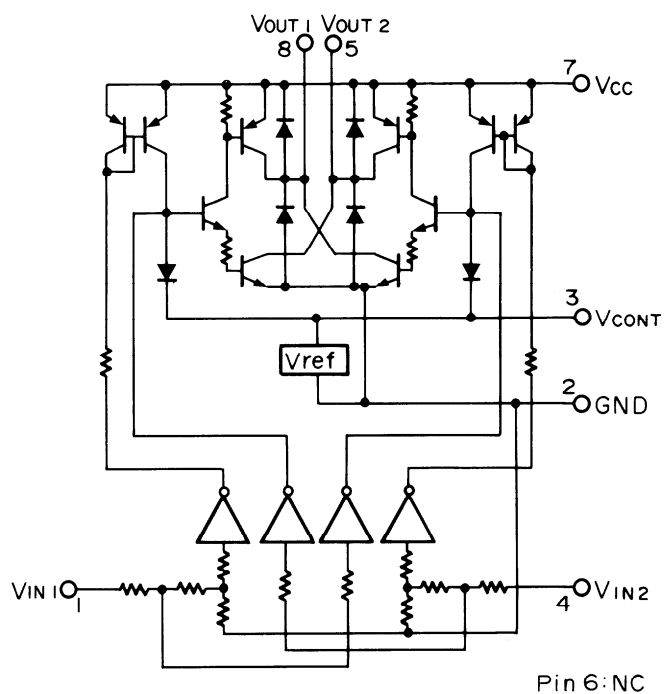
μPD6360C (Analogue switch)



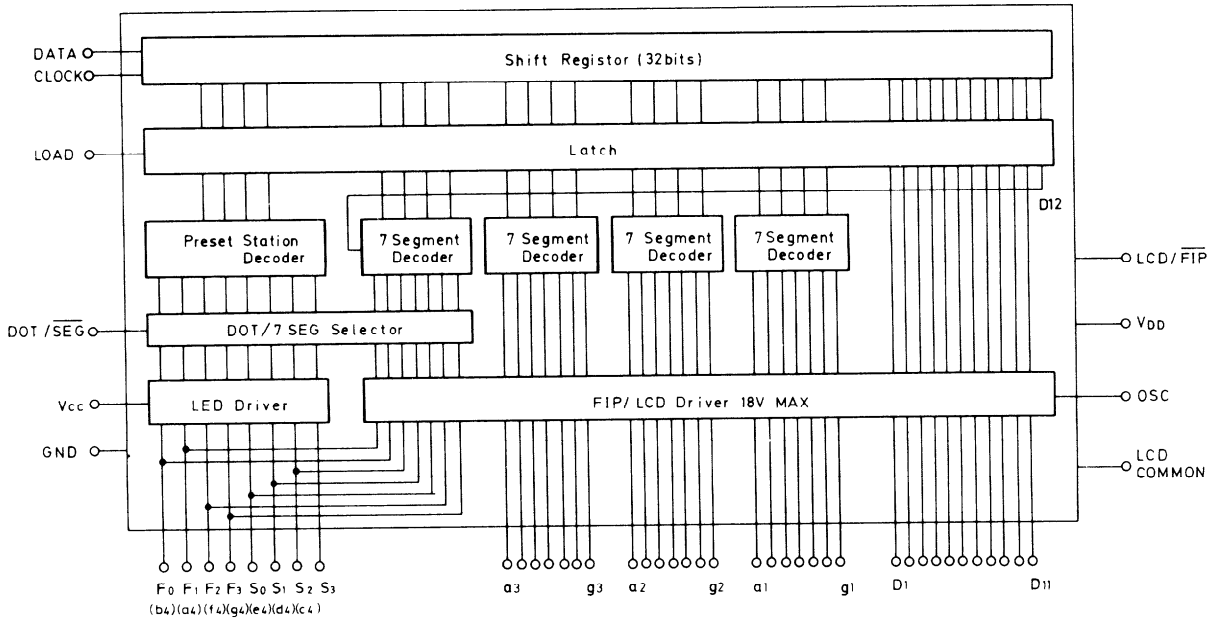
TRUTH TABLE

CONTROL INPUT		SW1, SW2	SW3, SW4
CONT A	H	..	OFF
	L	-	ON
CONT B	H	OFF	-
	L	ON	-

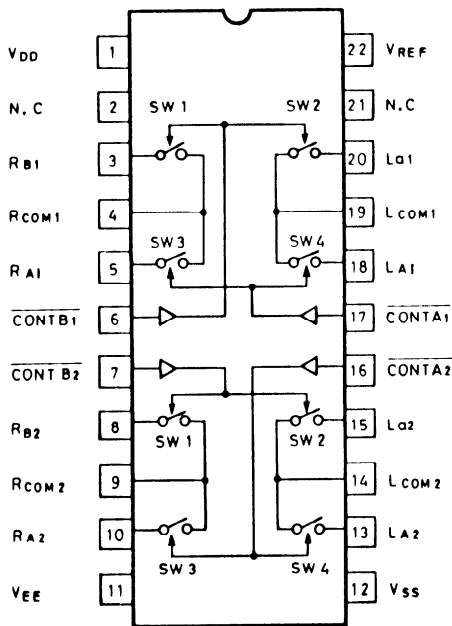
LB1630 (Motor driver)



μPD6320G (Indicator Driver)

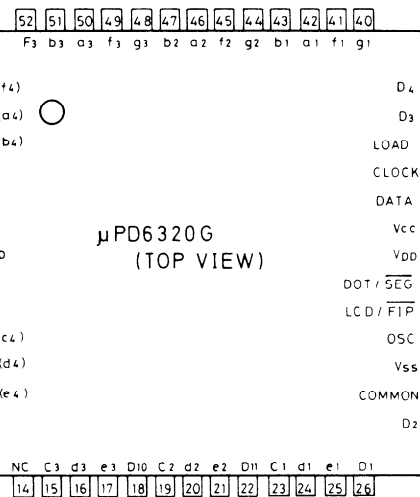


μPD6362C (Electron Switch for Stereo System)

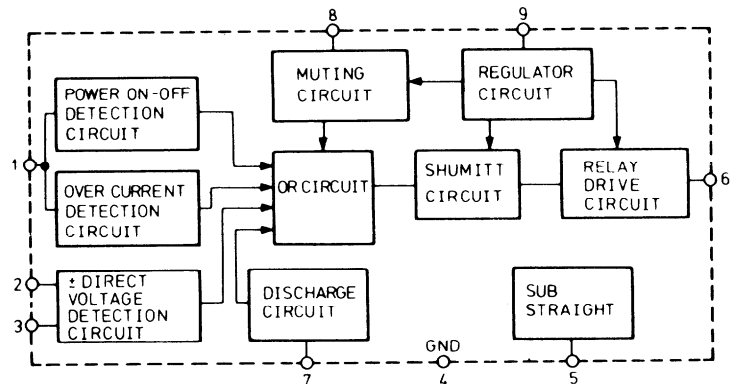


Thru Table

Control Input		SW1, SW2	SW3, SW4
CONT A	H	—	OFF
	L	—	ON
CONT B	H	OFF	—
	L	ON	—

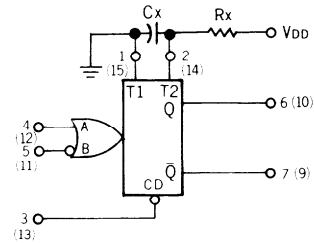
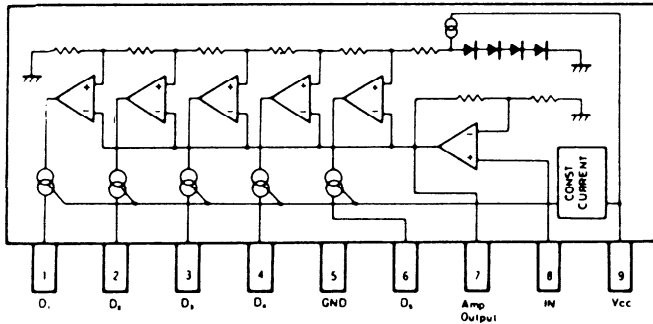


TA7317P (Protection Circuit Driver)

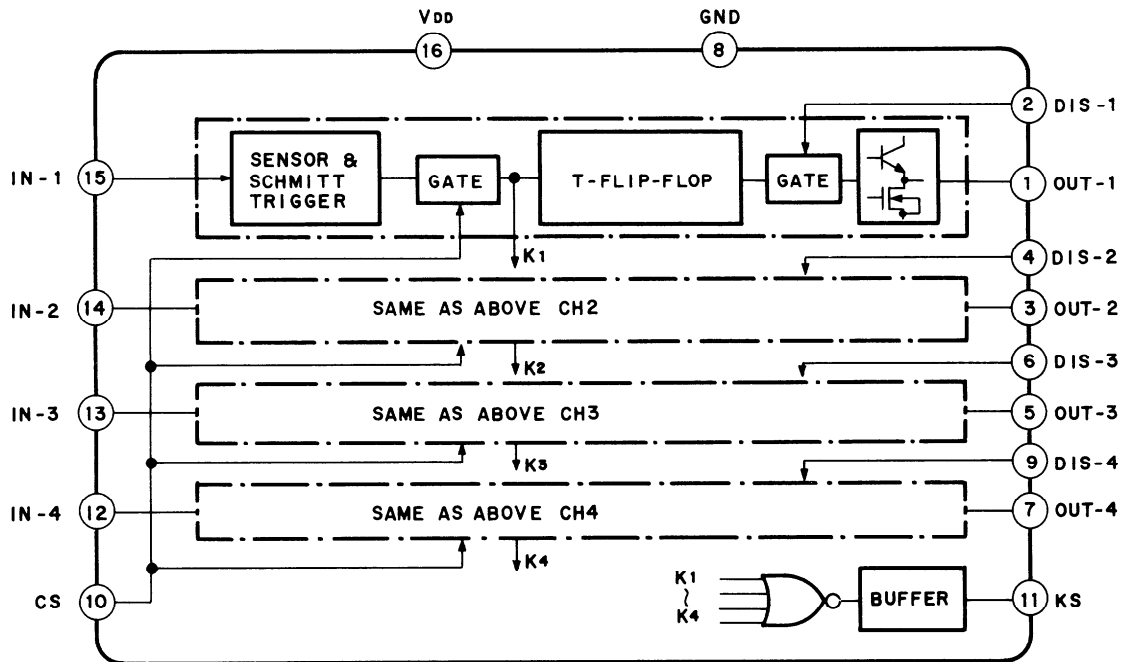


BA6124 (Signal strength indicator driver)

4528 (Dual Monostable Multivibrator)

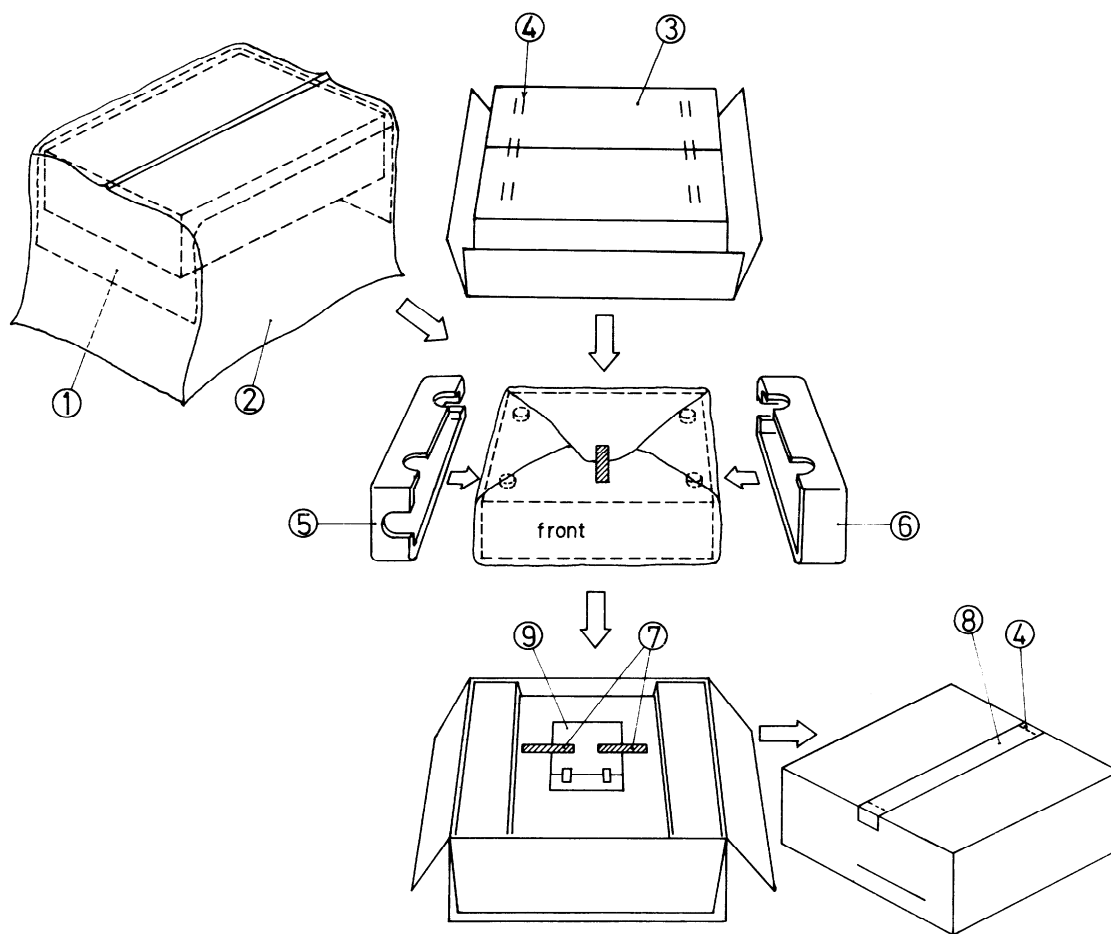


TC9130P



Pin nos.	Mark	Terminal	Descriptions
15 | 12	IN-1 | IN4	Input signal	When the supply voltage of this terminal changes from the high level to low level, the output terminal does the inversion.
1, 3 5, 7	OUT-1 | OUT4	Output	
2, 4 6, 9	DIS-1 | DIS-4	Output forbidden	When this terminal does the low level, the output becomes the low level.
10	CS	Input forbidden	When this terminal does the low level, the acceptions of input terminals are forbidden. And the flip-flop of inner holds the before condition.
11	KS	Input detector	When the input terminal becomes the low level, this terminal becomes the low level.
16	V _{DD}	Power supply	
8	GND	Ground	

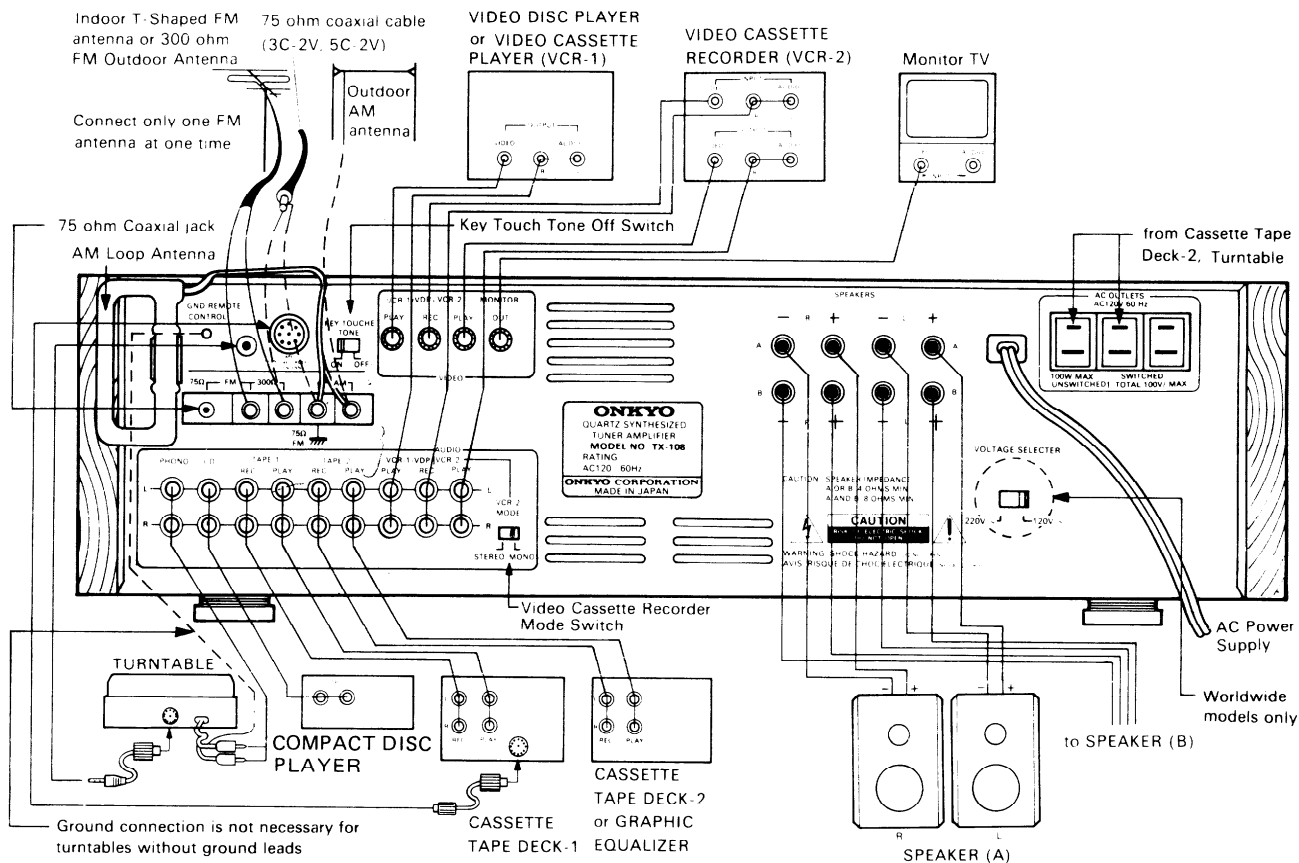
PACKING VIEW



REF. NO.	PART NO.	DESCRIPTION
1	29095319	500 × 1000mm, Protection sheet
	29095371	Sheet P
2	29100035A	1020 × 720mm, Poly-vinyl bag
3	29051327	Master carton box
4	282301	Sealing hook
5	29091093B	Pad R
6	29091094B	Pad L
7	29110032	Adhesive tape
8	260012	Damplon tape
9	Accessory bag ass'y	
	3010054	UM-3, Two batteries
	241066A	Remote control unit
	29100006A	250 × 350, Poly-vinyl bag
	29341019	Instruction manual
	292064A	FM antenna
	232119	NAM-3052, AM loop antenna
	2010140	Connection cable, DIN-pin
	2010141	Connection cable, DIN
	29365006-7	Warranty card <DN>
	29365012A	Warranty card <PX>
	29358002C	Service station list <DN/PX>
	25055018	CV-K-1, Conversion plug <W>
	25055251	CV-CP, Conversion plug <PX>

Note: <DN>: Only U.S.A. model
 <W>: Only Worldwide model
 <PX>: Only PX model

SYSTEM CONNECTION DIAGRAM



Turntable Connections

Connect the output leads of the turntable to the PHONO jacks.

Be sure to connect the ground (earth) lead wire from the turntable to the ground terminal (GND). Lack of proper ground connection will cause hum. Turntables not provided with GND wires do not need to be connected.

- If a compatible Onkyo remote control turntable is used with this unit, the TX-108 remote controller can also be used to start and stop turntable operation. In this case, connect the supplied phono DIN cord plug to the DIN type remote control jack on the turntable and the turntable remote control jack on the rear panel of TX-108. Then plug the turntable power cord plug into one of the rear panel switched outlets.

Compatible Onkyo Remote Control Turntables	
CP-1057F	CP-1044F
CP-1055F II	CP-1055F
CP-1046F	⋮

Compact Disc Player

Connect the output leads of the CD player or an additional audio component to the CD jacks. An Onkyo CD player with remote control can be operated by the TX-108's RC-108X remote control transmitter. For more details, refer to your CD player instruction manual.

Onkyo CD players that can be operated by the RC-108X remote control transmitter:	
DX-200	•
DX-320	•
DX-220	•

Tape Deck

This unit has facilities for two tape deck. However, only the tape deck connected to the TAPE-1 jacks can be used by remote control. Therefore, if you have two decks, connect the remote control compatible one to the TAPE-1 jacks and the other deck to the TAPE-2 jacks.

Compatible Onkyo Remote Control Cassette Decks	
TA-2028	TA-2036
TA-2090 (3-head)	TA-2048 (3-head)
TA-2056 (3-head)	TA-2058 (3-head)

ADJUSTMENT PROCEDURES

Preparation

• Input

FM mono: 1kHz, 75kHz devi., 60dB/ μ V

FM stereo: 1kHz, L+R 67.5kHz devi.: Pilot signal 19kHz
7.5kHz devi.

AM: 400Hz, 30% mod.,

• Output

Connect the non-inductive type resistor of 8 ohms to the speaker terminal A of left and right channels unless otherwise noted.

• Standard knob position

TAPE MONITOR	.....	SOURCE
MUTING/LOUDNESS	.....	OFF
VOLUME	.....	Maximum
BASS/TREBLE/BALANCE	.....	Center
MODE	.....	STEREO
SPEAKER	.....	A
SIMULATED STEREO	.....	OFF
DYNAMIC BASS EXPANDER	.....	OFF
DYNAMIC TRANSIENT EXPANDER	.....	OFF

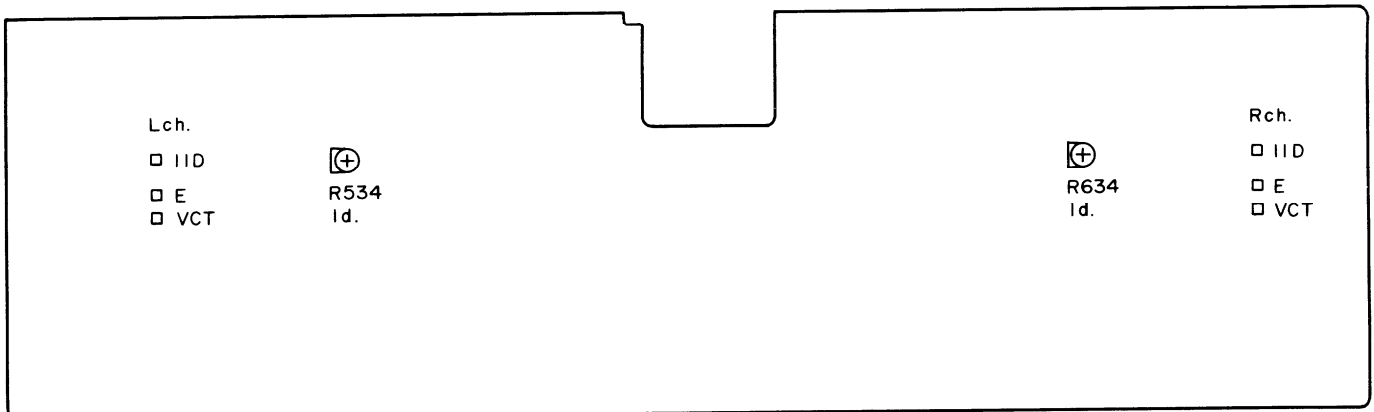
Amplifier section

1. Idling current adjustment

Connect the DC voltmeter to the terminals IID and VCT on the main amplifier pc board.

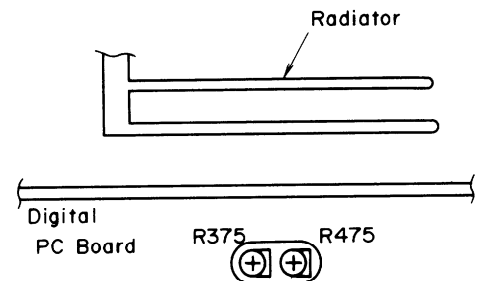
Adjust the semi-fixed resistors R534 and R634 so that the indication of voltmeter is 20 ± 2 mV.

Notes: VOLUME Maximum, Open load,
Adjust after switching on for 6 minutes.



2. Dynamic transient expander level adjustment

1. Set DYNAMIC TRANSIENT EXPANDER switch to off and SOUND PROCESSOR LEVEL to minimum position.
2. Connect the AF oscillator to the terminal CD and AC voltmeter to the left channel of speaker terminal A.
3. Supply the sine wave of 1kHz -30dBV from AF oscillator and turn VOLUME until AC voltmeter reading 1V.
4. Set DYNAMIC TRANSIENT EXPANDER switch to on and adjust R375 until AC voltmeter reading 1V.
5. Connect the AC voltmeter to the right channel of speaker terminal A.
6. Supply the sine wave of 1kHz -30dBV from AF oscillator and turn VOLUME until AC voltmeter reading 1V.
7. Set DYNAMIC TRANSIENT EXPANDER switch to on and adjust R475 until AC voltmeter reading 1V.



PRINTED CIRCUIT BOARD PARTS LIST

FM/AM tuner pc board (NARF-2681-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240070	TFFG1U113X
	ICs	
Q107	222680	LA1235, FM IF system
Q161	222701	LA1245, AM radio system
Q201	222593	HA12016, Stereo decoder
	Transistors	
Q51	2212294 or 2211293	2SK108 (D) or 2SK68 (M), FET
Q52	2211255	2SC1815 (GR)
Q101	2211722 or 2211723	2SC1923 (R) or 2SC1923 (O)
Q102, Q104	2211255,	2SC1815 (GR),
Q105, Q106	2210746 or	2SC945A (P) or
Q108-Q112	2212485	JC501 (Q)
Q103, Q163	2211256	2SC1815 (BL)
Q162, Q164	2211255,	2SC1815 (GR),
Q165, Q205	2210746 or	2SC945A (P) or
Q209	2212485	JC501 (Q)
Q202, Q203	2212304 or	2SK381 (D) or
Q204	2211945	2SK246 (GR), FET
Q206	2211454 or 2212494	2SA1015 (Y) or JA101 (P)
Q207, Q208	2211705, 2211706 or 2212794	2SD655 (E), 2SD655 (F) or 2SD1468 (R)
	Diodes	
D101, D102	223132	1K60
D103	2241291	RD3. 3EB1
D104	223163	1SS133
D105	4000068	VD1222
D106-D114	223163	1SS133
D161, D162	223157	KV1236Z
D163	4000068	VD1222
D164-D166	223163	1SS133
D201-D209	223163	1SS133
	Coils	
L101	233105	NCH-1005
L103	233031	NMC-9-1
L161	232113	NMA-3049, AM ant.
L162	232110	NMO-4027, AM osc
L201, L202	233291	NMC-5039, LPF
	Transformer	
L102	233274	NFIF-6041
	Ceramic filters	
X101, X102	3010006	SFE10.7MA8 (RED)
X161	3010075	SFL450B3
X162	3010076	BFU450C
	Capacitors	
C52	395160227	2.2 μ F, 35V, Tantal
C53	392884797	0.47 μ F, 50V, LL
C103	354741019	100 μ F, 16V, Elect.
C104	354721019	100 μ F, 6.3V, Elect.
C105	354780229	2.2 μ F, 50V, Elect.
C107	354742209	2.2 μ F, 16V, Elect.
C108	354780229	2.2 μ F, 50V, Elect.
C109	354741009	10 μ F, 16V, Elect.
C114	354780229	2.2 μ F, 50V, Elect.
C115	354741009	10 μ F, 16V, Elect.
C121, C126	354784799	0.47 μ F, 50V, Elect.
C128	354780229	2.2 μ F, 50V, Elect.
C129	354741009	10 μ F, 16V, Elect.
C130	354780109	1 μ F, 50V, Elect.
C162, C181	3060010	NTC-20P09, Trimmer

CIRCUIT NO.	PART NO.	DESCRIPTION
C168	354741009	10 μ F, 16V, Elect.
C171	354744709	47 μ F, 16V, Elect.
C173	354780109	1 μ F, 50V, Elect.
C175	354750479	4.7 μ F, 25V, Elect.
C176	354741009	10 μ F, 16V, Elect.
C179	370135114	510pF \pm 5%, 100V, APS
C184	354781099	0.1 μ F, 50V, Elect.
C185	354721019	100 μ F, 6.3V, Elect.
C186	354780339	3.3 μ F, 50V, Elect.
C189	354744709	47 μ F, 16V, Elect.
C201	354780109	1 μ F, 50V, Elect.
C202	354744719	470 μ F, 16V, Elect.
C203, C204	354721019	100 μ F, 6.3V, Elect.
C207, C208	370138214	820pF \pm 5%, 100V, APS <W>
C209	354780339	3.3 μ F, 50V, Elect.
C210	354750479	4.7 μ F, 25V, Elect.
C211	354780109	1 μ F, 50V, Elect.
C212	354780339	3.3 μ F, 50V, Elect.
C213	370131024	1,000pF \pm 5%, 100V, APS
C218, C219	354741009	10 μ F, 16V, Elect.
C220	354750479	4.7 μ F, 25V, Elect.
C221	354744719	470 μ F, 16V, Elect.
	Resistors	
R127	5210066	N06HR22KBD, Semi-fixed
R132	5210068	N06HR47KBD, Semi-fixed
R209	5210070	N06HR100KBD, Semi-fixed
R214	5210061	N06HR3.3KBD, Semi-fixed
	Terminals	
	25060091	NTM-5PDMN32, Antenna
	Sockets	
	25050267	NSCT-3P95, Jumper
	25050270	NSCT-6P98, Jumper
	25050273	NSCT-9P101, Jumper
	Bracket	
	27141059	Ground

Video circuit pc board (NAVD-2682-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q251	222840661	4066B, Analog switch
	Transistors	
Q252, Q253	2211255	2SC1815 (GR)
Q254	2211454 or 2212494	2SA1015 (Y) or JA101 (P)
Q255, Q256	2211255	2SC1815 (GR)
Q257, Q258	2211255, 2210746 or 2212485	2SC1815 (GR), 2SC945A (P) or JC501 (Q)
	Capacitors	
C251, C253	354741009	10 μ F, 16V, Elect.
C252, C254	354724719	470 μ F, 6.3V, Elect.
C256	354744709	47 μ F, 16V, Elect.
C258	354741009	10 μ F, 16V, Elect.
	Switch	
S701	25065286	NSS-22112, Slide, Buzzer
	Sockets	
P701	25050294	NSCT-8P121, Remote control, Tape
	25050267	NSCT-3P-95, Jumper
	25050273	NSCT-9P-101, Jumper
	Terminals	
	25045192	NPJ-4PDBL76, Video
P702	25045204	HSJ0847-01-010, Remote control Phono

PRINTED CIRCUIT BOARD PARTS LIST

Digital control circuit pc board (NADG-2684-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
		ICs
Q701, Q703	222741451	74LS145, BCD to decimal counter
Q709	222619	μ PB553AC, Prescaler
Q710	222932	μ PD1712CU-527, Microcomputer
Q711	222930	TD62551S, Buffer
Q720	222770	μ PD6320G, Flat package
Q737	222850281	μ PD4528BC, Dual multivibrator
		Fluorescent indicator tube
Q721	212023	FIP7F8S
		Transistors
Q702	2211256	2SC1815 (BL)
Q704, Q706	2211255,	2SC1815 (GR),
Q707, Q714	2210746 or	2SC945A (P) or
Q717-Q719	2212485	JC501 (Q)
Q708	2211705,	2SD655 (E),
	2211706 or	2SD655 (F) or
	2212794	2SD1468 (R)
Q715, Q716	2211255,	2SC1815 (GR),
	2210746 or	2SC945A (P) or
	2212485	JC501 (Q) <W>
Q738, Q739	2211255,	2SC1815 (GR),
Q742, Q743	2210746 or	2SC945A (P) or
	2212485	JC501 (Q)
		Diodes
D701-D703	223163	1SS133
D704, D715	223150,	US1040,
	223145 or	1S2076TD or
	223124	1S2473
D705-D707	223163	1SS133
D708-D710	223163	1SS133 <W>
D711	223150,	US1040,
	223145 or	1S2076TD or
	223124	1S2473 <W>
D712, D713	223163	1SS133 <W>
D714, D716	223163	1SS133 <W>
D717	223163	1SS133
D720, D721	223163	1SS133
D722	2241291	RD3.3EB1
D723	2239471 or	RD5.6EB1 or
	2243151	MTZ5.6A
		X'tal
X701	3010052	XTL-4.5M
		Buzzer
X702	241048	PKM24-4A0
		Capacitors
C701	354780109	1 μ F, 50V, Elect.
C702, C704	354784799	0.47 μ F, 50V, Elect.
C706	354723319	330 μ F, 6.3V, Elect.
C709	354723319	330 μ F, 6.3V, Elect.
C710	3000050 or	0.047 μ F, 5.5V or
	3020027	5R5V473, Super
C714	354721019	100 μ F, 6.3V, Elect.
C717	354780109	1 μ F, 50V, Elect.
C718	354741009	10 μ F, 16V, Elect.
C728, C729	354786899	0.68 μ F, 50V, Elect.
C733, C736	354742209	22 μ F, 16V, Elect.
C737	354781099	0.1 μ F, 50V, Elect.
C738	352742209	22 μ F, 16V, Elect. <W>
		Resistors
R716-R719	49163104404	100kohm \times 4,1/10W, Network
R722-R725	49163103404	10kohm \times 4,1/10W, Network
R727-R734	49163103408	10kohm \times 8,1/10W, Network

CIRCUIT NO.	PART NO.	DESCRIPTION
		Sockets
	25050267	NSCT-3P95, Jumper
	25050268	NSCT-4P96, Jumper
	25050272	NSCT-8P100, Jumper
	25050269	NSCT-5P97, Jumper <W>
		Plugs
	25055184	NPLG-3P168
	25055187	NPLG-6P171
	25055189	NPLG-8P173
		Bracket
	27141039	Fluorescent tube

Display pc board (NADIS-2685-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
		Lamp
PL701	210064A	PL6.3V250mA
		ICs
Q722	222625	TC9130P
Q729	222930	TD62551S
Q731	222670	BA6124
		Transistors
Q712, Q723	2212600	DTA124ES
Q713, Q724	2211255,	2SC1815 (GR),
Q727, Q730	2210746 or	2SC945A (P) or
Q732, Q740	2212485	JC501 (Q)
Q725, Q726	2211705,	2SD655 (E), or
	2211706 or	2SD655 (F)
	2212794	2SD1468 (R)
Q728	2212600	DTA124ES
Q733-Q736	2212600	DTA124ES
Q741, Q744	2211255,	2SC1815 (GR),
	2210746 or	2SC945A (P) or
	2212485	JC501 (Q)
		Diodes
D718, D719	223163	1SS133
D724, D725	223163	1SS133
		L.E.Ds
D741, D742	225137CG,	SEL2413CG,
D745, D746	225137DG or	SEL2413DG or
D748, D750	225137DY	SEL2413DY
D743, D744	225142	SEL2913K
D747, D749	225142	SEL2913K
D752-D756	225137CG,	SEL2413CG,
D760	225137DG or	SEL2413DG or
D762-D769	225137DY	SEL2413DY
D751, D758	225142	SEL2913K
D759, D761	225142	SEL2913K
D770-D773	225142	SEL2913K
		Capacitors
C721	353782299	0.22 μ F, 50V, Elect.
C722	354782299	0.22 μ F, 50V, Elect.
C725-C727	353741009	10 μ F, 16V, Elect.
C732	353742209	22 μ F, 16V, Elect.
C734	354741009	10 μ F, 16V, Elect.
		Switches
S703	25035389	NPS-111-S353, Tuning level
S706	25035389	NPS-111-S353, Memory
S707	25035389	NPS-111-S353, Auto/Manual
S708	25035389	NPS-111-S353, FM/AM
S711	25035389	NPS-111-S353, Shift
S712	25035389	NPS-111-S353, UP
S713	25035389	NPS-111-S353, Down
S714-S721	25035389	NPS-111-S353, Stations
S728	25035389	NPS-111-S353, FM muting
S729	25035389	NPS-111-S353, APR
		Holder
	27190464A	LED

Control circuit pc board (NAAF-2667-1)

CONTROL CIRCUIT PC BOARD

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q351, Q352	222502	NJM4558DX
Q353, Q355	222502	NJM4558DX
Q356, Q456	222502	NJM4558DX
Q453, Q455	222502	NJM4558DX
Q871, Q872	222964	BA6993
Q873, Q875	222964	BA6993
Q877, Q878	222502	NJM4558DX
Transistors		
Q354, Q454	2212805	2SK389 (GR), FET
Q357, Q358	2211945	2SK246 (GR), FET
Q457, Q458	2211945	2SK246 (GR), FET
Q874	2211255 or 2210746	2SC1815 (GR) or 2SC945A (P)
Q876	2212524	2SK363 (GR)
Diodes		
D871-D879	223163	1SS133
Capacitors		
C351, C354	354780229	2.2 μ F, 50V, Elect.
C355, C356	354780339	3.3 μ F, 50V, Elect.
C357	354780229	2.2 μ F, 50V, Elect.
C358	354782299	0.22 μ F, 50V, Elect.
C360, C363	354780229	2.2 μ F, 50V, Elect.
C361, C362	354780339	3.3 μ F, 50V, Elect.
C364	354780229	2.2 μ F, 50V, Elect.
C365, C366	354780109	1 μ F, 50V, Elect.
C367, C368	354784799	0.47 μ F, 50V, Elect.
C369, C374	354744709	47 μ F, 16V, Elect.
C370, C371	354783399	0.33 μ F, 50V, Elect.
C372, C373	354784799	0.47 μ F, 50V, Elect.
C375, C376	354780339	3.3 μ F, 50V, Elect.
C457, C460	354780229	2.2 μ F, 50V, Elect.
C458	354782299	0.22 μ F, 50V, Elect.
C463, C464	354780229	2.2 μ F, 50V, Elect.
C465, C466	354780109	1 μ F, 50V, Elect.
C467, C468	354784799	0.47 μ F, 50V, Elect.
C469, C474	354744709	47 μ F, 16V, Elect.
C470, C471	354783399	0.33 μ F, 50V, Elect.
C472, C473	354784799	0.47 μ F, 50V, Elect.
C872	354751009	10 μ F, 25V, Elect.
C873	354784799	0.47 μ F, 50V, Elect.
C874	354752209	22 μ F, 25V, Elect.
C876, C886	354780109	1 μ F, 50V, Elect.
C877, C887	354781099	0.1 μ F, 50V, Elect.
C878	354752209	22 μ F, 25V, Elect.
C880, C881	354780339	3.3 μ F, 50V, Elect.
C883	354732209	22 μ F, 10V, Elect.
C888	354782299	0.22 μ F, 50V, Elect.
C889	354780109	1 μ F, 50V, Elect.
Resistors		
R375, R475	5210054	N06HR220BD, Semi-fixed
R384, R484	6112001	N30LGL50KRD10Z, Slide variable, Dynamic bass expander, 50Hz
R392, R492	6112001	N30LGL50KRD10Z, Slide variable, Dynamic bass expander, 100Hz
R877	6111001	N30LL100KC10Z, Slide variable, Dynamic transient expander
R475	5210064	N06HR10KBD, Semi-fixed
Switches		
S351	25035528	NPS-142-L490, Simulated stereo
S352	25035529	NPS-162-L491, Dynamic transient expander
S353	25035529	NPS-162-L491, Dynamic bass expander

PRINTED CIRCUIT BOARD-PARTS LIST

Main amplifier pc board (NAMA-2666-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
					Capacitors
			C537, C538	354790479	4.7 μ F, 100V, Elect.
			C637, C638	354790479	4.7 μ F, 100V, Elect.
			C852	354722219	220 μ F, 6.3V, Elect.
			C854	354742219	220 μ F, 16V, Elect.
			C855	354784799	0.47 μ F, 50V, Elect.
			C857	354742209	22 μ F, 16V, Elect.
			C915	352766809	68 μ F, 35V, Elect.
			C916	354752229	2,200 μ F, 25V, Elect.
			C917	354764709	47 μ F, 35V, Elect.
			C918, C920	354741009	10 μ F, 16V, Elect.
			C919, C921	354761019	100 μ F, 35V, Elect.
			C922, C923	354722219	220 μ F, 6.3V, Elect.
					Resistors
			R534, R634	5210062	N06HR4.7KBD, Semi-fixed
			R535, R635	442524724	4.7kohm, 1/2W, Metal oxide Film
			R536 , R636	442521024	1kohm, 1/2W, Metal oxide film
			R537, R637	442521014	100ohm, 1/2W, Metal oxide film
			R538-R541	442520224	2.2ohm, 1/2W, Metal oxide film
			R638-R641	442520224	2.2ohm, 1/2W, Metal oxide film
			R542, R543	4000063	0.47ohm, 2W, Metal plate
			R642, R643	4000063	0.47ohm, 2W, Metal plate
			R544 , R644	441620104	1ohm, 1W, Metal oxide film
			R545, R546	4000063	0.47ohm, 2W, Metal plate
			R645, R646	4000063	0.47ohm, 2W, Metal plate
			R547 , R647	441620104	1ohm, 1W, Metal oxide film
			R550, R551	4000061	0.33ohm, 2W, Metal plate
			R650, R651	4000061	0.33ohm, 2W, Metal plate
			R554, R555	441621604	16ohm, 1W, Metal oxide film
			R654, R655	441621604	16ohm, 1W, Metal oxide film
			R910	441520104	1ohm, 1/2W, Metal oxide film
			R911	441621024	1kohm, 1W, Metal oxide film
			R912	441521004	10ohm, 1/2W, Metal oxide film
			R913	441620474	4.7ohm, 1W, Metal oxide film
			R914	441622204	22ohm, 1W, Metal oxide film
					Relay
			RL851	25065237	NRL-4P3A-DC24-26
					Coils
			L531, L631	231015	S-0.8C
					ICs
Q851	222584	TA7317P			
Q903	222780153	78L15			
					Transistors
Q531, Q631	2211255	2SC1815 (GR)			
Q532, Q632	2211633 or 2211634	2SC2229 (O) or 2SC2229 (Y) #			
Q533, Q633	2211353 or 2211354	2SA949 (O) or 2SA949 (Y) #			
Q534, Q634	2201643 or 2201644	2SC3298 (O) or 2SC3298 (Y) #			
Q535, Q635	2201633 or 2201634	2SA1306 (O) or 2SA1306 (Y) #			
Q536, Q538	2201533,	2SC2837 (O),			
Q636, Q638	2201534 or 2201535	2SC2837 (Y) or 2SC2837 (P) #			
Q537, Q539	2201523,	2SA1186 (O)			
Q637, Q639	2201524 or 2201525	2SA1186 (Y) or 2SA1186 (P) #			
Q540, Q640	2211732 or 2211733	2SC1845 (F) or 2SC1845 (E)			
					Diodes
D531, D631	223150,	US1040,			
D852, D854	223124 or 223145	1S2473 or 1S2076TD			
D532, D632	4000068	VD1222			
D851	2243213 or 2239593	MTZ10C or RD10EB3			
D853	2243232 or 2239632	MTZ12B or RD12EB2			
D901	223898	RB602			
D902, D903	223897	P300DL			
D906	223890 or 223862	W01RL or WL01			
D907	223896 or 223880	1N4003F or GP101N4003			
D908	2243151 or 2239471	MTZ5.6A or RD5.6EB1			

Power supply circuit pc board (NAPS-2673-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
Transistors		
Q906	2201404 or 2201405	2SD1406 (Y) or 2SD1406 (GR)
Q971	2211256	2SC1815 (BL)
Diodes		
D909	223890 or 223862	W01RL or WL01
D910	223896 or 223880	1N4003F or GP101N4003
D911	2239493	RD6.2EB3
D971	223163	1SS133
Capacitors		
C901, C902	3500065A	△DE7150FZ103PAC400V/125V, IS
C904, C905	3504176	20,000μF, 69V, Elect.
C925, C927	354741019	100μF, 16V, Elect.
C926	354742229	2,200μF, 16V, Elect.
C928	354733319	330μF, 10V, Elect.
C929	354724719	470μF, 6.3V, Elect.
Resistors		
R917	442520104	1ohm, 1/2W, Metal oxide film
R918	441623314	330ohm, 1W, Metal oxide film
R919	441620474	4.7ohm, 1W, Metal oxide film
Switch		
S901	25035398	△NPS-111-L362P, Power
Relay		
	25065248	NRL-1P15A-DC12-29
Terminal		
	27300732	Buss

Speaker switch pc board (NASW-2670-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
R556, R656	441623914	390ohm, 1W, Metal oxide film resist
S502	25030285	NRSF-144-25SS, Rotary switch, Spe
S903	25035500	NPS-111-S462, Power switch
P503	25045183	HLJ4318-01-3020, Headphone termi

CAUTION: Replacement for transistor of mark #, if necessary, must be made from the same beta group (HEF) as the original type.

EX. 2SA 1186 (O), 2SC 2837 (O)

same group

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

PRINTED CIRCUIT BOARD-PARTS LIST

Equalizer and switch circuit pc board ass'y (NADA-2665-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs				
Q303, Q403	222570	NJM4560DX	Q502, Q503	2211732 or	2SC1845 (F) or
Q321, Q323	222926	μ PD6362C	Q602, Q603	2211733	2SC1845 (E)
Q322	222768	μ PD6360C	Q504, Q604	2211515 or	2SA995 (F) or
Q324, Q424	222502	NJM4558DX		2211516	2SA995 (G)
Q509, Q510	222502	NJM4558DX	Q506, Q606	2211455 or	2SA1015 (GR) or
Q609, Q610	222502	NJM4558DX		2210803	2SA733 (P)
	Transistors		Q507, Q607	2211354 or	2SA949 (Y) or
Q301, Q302	2211783 or	2SA991 (E) or		2211353	2SA949 (O)
Q401, Q402	2211782	2SA991 (F)	Q508, Q608	2211634 or	2SC2229 (Y) or
Q501, Q601	2212805,	2SK389 (GR),		2211633	2SC2229 (O)
	2212806 or	2SK389 (BL) or	Q901	2201074	2SD880 (Y)
	2212807	2SK389 (Y)	Q902	2201244	2SB834 (Y)

CIRCUIT NO.	PART NO.	DESCRIPTION
Capacitors		
C301, C401	354741009	10 μ F, 16V, Elect.
C305, C405	354722229	2,200 μ F, 6.3V, Elect.
C309, C409	354780109	1 μ F, 50V, Elect.
C311, C312	354762219	220 μ F, 35V, Elect.
C321	379122235	22,000pF \pm 10%, 50V, Plastic
C326, C426	354780229	2.2 μ F, 50V, Elect.
C327, C427	354780229	2.2 μ F, 50V, Elect.
C329-C334	354780339	3.3 μ F, 50V, Elect.
C506, C606	354742209	22 μ F, 16V, Elect.
C507, C607	354742209	22 μ F, 16V, Elect.
C906, C907	354782219	220 μ F, 50V, Elect.
C910, C911	354764709	47 μ F, 35V, Elect.
C912, C913	3500086	470 μ F, 25V, Elect.
Resistors		
R512, R612	442520684	6.8ohm, 1/2W, Metal oxide film
R513, R613	442525614	560ohm, 1/2W, Metal oxide film
R514, R614	442524734	47kohm, 1/2W, Metal oxide film
R521, R522	442520474	4.7ohm, 1/2W, Metal oxide film
R902-R905	441622214	220ohm, 1W, Metal oxide film
Switches		
S301	25035530	NPS-162-L492, Cartridge select
S321	25065286	NSS-22112, VCR mode
Socket		
	25050267	NSCT-3P-95, Jumper
Terminals		
P301	25045171	NPJ-4PDBL65, Phono/CD
P302	25045171	NPJ-4PDBL65, Tape 1
P303	25045166	NPJ-6PDBL60, Tape 2/VCR-1
P304	25045171	NPJ-4PDBL65, VCR-2
Radiators		
	27160029	RAD-07
Screws		
	82143010	3P+10FN (BC), Pan head
Tube		
	79086	ESG-3, Silicon glass
Bracket		
	27141059	Ground

CIRCUIT NO.	PART NO.	DESCRIPTION
Diodes		
D301, D302	223163	1SS133
D401, D402	223163	1SS133
D501, D502	223150,	US1040,
D505, D506	223124 or	1S2473 or
D601, D602	223145	1S2076TD
D605, D606		
D507, D508	223163	1SS133
D607, D608	223163	1SS133
D904, D905	2243273 or 2239713	MTZ18C or RD18EB3
L.E.Ds		
D503, D504	225232	LTZ-R15
D603, D604	225232	LTZ-R15

TONE CONTROL CIRCUIT PC BOARD

VOLUME CONTROL PC BOARD

VOLUME INDICATOR PC BOARD

SPEAKER TERMINAL PC BOARD

Tone control circuit pc board (NATC-2668-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
Transistors		
Q951, Q961	2211255 or 2210746	2SC1815 (GR) or 2SC945A (P)
Diodes		
D951, D961	223163	1SS133
Capacitors		
C951, C961	354751019	100 μ F, 25V, Elect.
Resistors		
R582, R583 R682, R683 R588, R688	5144003 5148074	N16RQMC140K180K30, Variable, bass control N16RGMC219K30, Variable, treble control
Switches		
S571, S581	25035531	NPS-222-L493, Mode/Loudness
Relaies		
RL951 RL961	25065247 25065048	NRL-2P1.25A-DC12-28, Audio muting FRL-64P12/2AS, Selector muting

Volume control pc board (NAVR-2669-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
IC		
Q981	222963	LB1630
Capacitors		
C981, C982 C986	354721019 354780339	100 μ F, 6.3V, Elect. 3.3 μ F, 50V, Elect.
Resistor		
R581, R681 R592, R692	5104188	N16RDQMC250KMN100KBT40F, Variable with motor, Volume/Balance
Sockets		
P982	2000567 25050267	NSAS-2P523 NSCT-3P95, Jumper
Plug		
	25055132	NPLG-2P116
Bracket		
	27141059	Ground

Volume indicator pc board (NADIS-2675-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
D981	225219	SLC-22UR4F, L.E.D
P981	2000584A 27270103A	NSAS-4P540, Socket Spacer, L.E.D.

Speaker terminal pc boards (NAST-2671-1/2672-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P501, P502	25060098	NTM-4PDMN38, Speaker terminals

Function switch pc board (NASW-2686-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
L.E.Ds		
D731, D732	225206C or	SEL2910D-C or
D740	225206D	SEL2910D-D
D733-D739	225137CG, 225137DG or 225137DY	SEL2413CG, SEL2413DG or SEL2413DY
Switches		
S704	25035389	NPS-111-S353, Audio muting
S709	25035389	NPS-111-S353, Tuner
S710	25035389	NPS-111-S353, ALT
S722	25035389	NPS-111-S353, Tape 2
S723	25035389	NPS-111-S353, Tape 1
S724	25035389	NPS-111-S353, CD
S725	25035389	NPS-111-S353, Phono
S726	25035389	NPS-111-S353, VCR 2
S727	25035389	NPS-111-S353, VCR 1
Sockets		
P751A	2000489	NSAS-6P445
P752A	2000490	NSAS-6P446
P753A	2000568	NSAS-12P524
P754A	2000569	NSAS-16P525
Holder		
	27190465A	LED

FUSE TERMINAL PC BOARD**Fuse terminal pc board (NAFU-2674-1/1A/1B)**

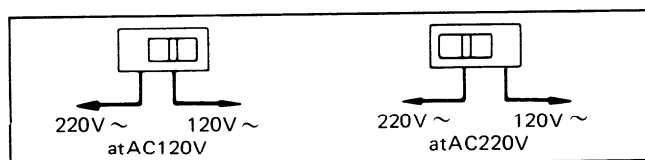
CIRCUIT NO.	PART NO.	DESCRIPTION
R901	431523355	△ 3.3Mohm, 1/2W, Solid resistor <D>
F901	252052	△ 7A (ST-6), Primary fuse
F901a	250113	△ SN5051, Fuseholder
F902	252077	△ 4A-SE-EAK, Primary fuse <W/WX>
F902a	25050065	△ YSH403T, Fuseholder <W/WX>
F901b	29360486	Fuse rating label
	29360626-1	Label, fuse <D>
	27141059	Bracket, ground <D>
	25060092	Terminal <W>
F902b	29360374	Fuse rating label <W/WX>

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

NOTE: <D> : Only 120V model
<W> : Only Worldwide model
<WX> : Only PX model

- **Voltage Selector (Rear Panel)**

Worldwide 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. 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. Models without a voltage selector can only be used in areas where the power supply is the same as that of the unit.



- **De-Emphasis and Tuning Frequency Step Switch (Bottom)**

Some models are equipped with a switch that controls both de-emphasis (50 μ sec – 75 μ sec) and the AM (9kHz/10kHz) and FM (50kHz/200kHz) band tuning steps.

Be sure to set this switch to match the De-Emphasis and tuning step frequency in your area.

U.S.A	75 μ sec	10kHz/200kHz
Other areas	50 μ sec	9kHz/50kHz