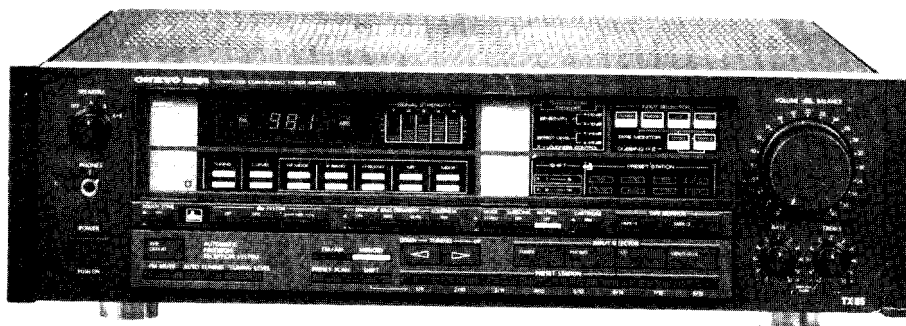


ONKYO SERVICE MANUAL

COMPUTER CONTROLLED TUNER AMPLIFIER MODEL TX-85



UD, UDN, BUD, BUDN	120V AC, 60Hz
UW, BUW	120 or 220V AC, 50/60Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK $\triangle$ 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 PARTS 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.



SPECIFICATIONS

Amplifier Section

Power output:	80 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 ± 1 dB
RIAA Deviation:	20 – 20,000 Hz ± 0.5 dB
Sensitivity and Impedance:	Phono(MM): 2.5mV/50 kohms Phono(MC): 350 μ V/330 ohms Tape Play: 150mV/50 kohms Tape Rec: 150mV/3.3 kohms (phono)
Phono Overload:	180mV RMS at 1 kHz, 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) Tape: 98dB (A weighted) 80dB (IHF A-202)
Tone Controls:	Bass: ± 8 dB at 70Hz Treble: ± 8 dB at 20kHz
Loudness (–30dB):	+6dB at 70Hz, +5dB at 20kHz
Subsonic:	15Hz (–6dB/oct.)

Tuner Section

FM:	
Tuning Range:	87.9 – 107.9MHz (200kHz 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:	80dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 76dB Stereo: 70dB
Alternate Channel Attenuation:	70dB (IF Narrow)
AM Suppression Ratio:	55dB
Harmonic Distortion:	Mono: 0.10% (IF Wide) Stereo: 0.18% (IF Wide)
Frequency Response:	30 – 15,000Hz ± 1.5 dB
Stereo Separation:	40dB at 1kHz 30dB at 100 – 10,000Hz
Tuning Level (Hi/Lo):	27.2dBf, 13 μ V/17.2dBf, 4 μ V
Stereo Threshold:	17.2dBf, 4 μ V (Lo)

AM:

Tuning Range:	530 – 1620kHz (10kHz steps)
Usable Sensitivity:	30 μ V
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.8%

GENERAL

Power Supply:	AC 120V, 60Hz
Semiconductors:	FETs: 16 TRs: 98 ICS: 27 Diodes: 151
Dimensions (WxHxD):	480 x 142 x 460mm (18 7/8" x 5 5/8" x 18 1/8")
Weight:	15kg., 33lbs.

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuses

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

	120 model	
Circuit No.	Part No.	Description
F921	252051	6A (ST-6), Primary fuse
	Universal model	
F921	252051	6A (ST-6), Primary fuse for 120V
F922	252076	3.15A-SE-EAK, Primary fuse for 220V

2. Replacing the lamps

This unit uses the lamp listed below.

Circuit no.	Parts no.	Description
PL921	210064A	PL 6.3V, 250mA, Dial plate illumination

3. Safety-check out (D model)

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

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

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

4. Change of De-emphasis

W models are equipped with a $50\mu\text{sec}$ - $75\mu\text{sec}$ selector switch. This switch is located on the back panel. This switch is set to $50\mu\text{sec}$ at the factory, but may have to be reset to $75\mu\text{sec}$ depending on the area where the unit is used.

Europe: $50\mu\text{sec}$

U.S.A.: $75\mu\text{sec}$

5. Change of voltage

W models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the 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.

6. 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.

TABLE OF CONTENTS

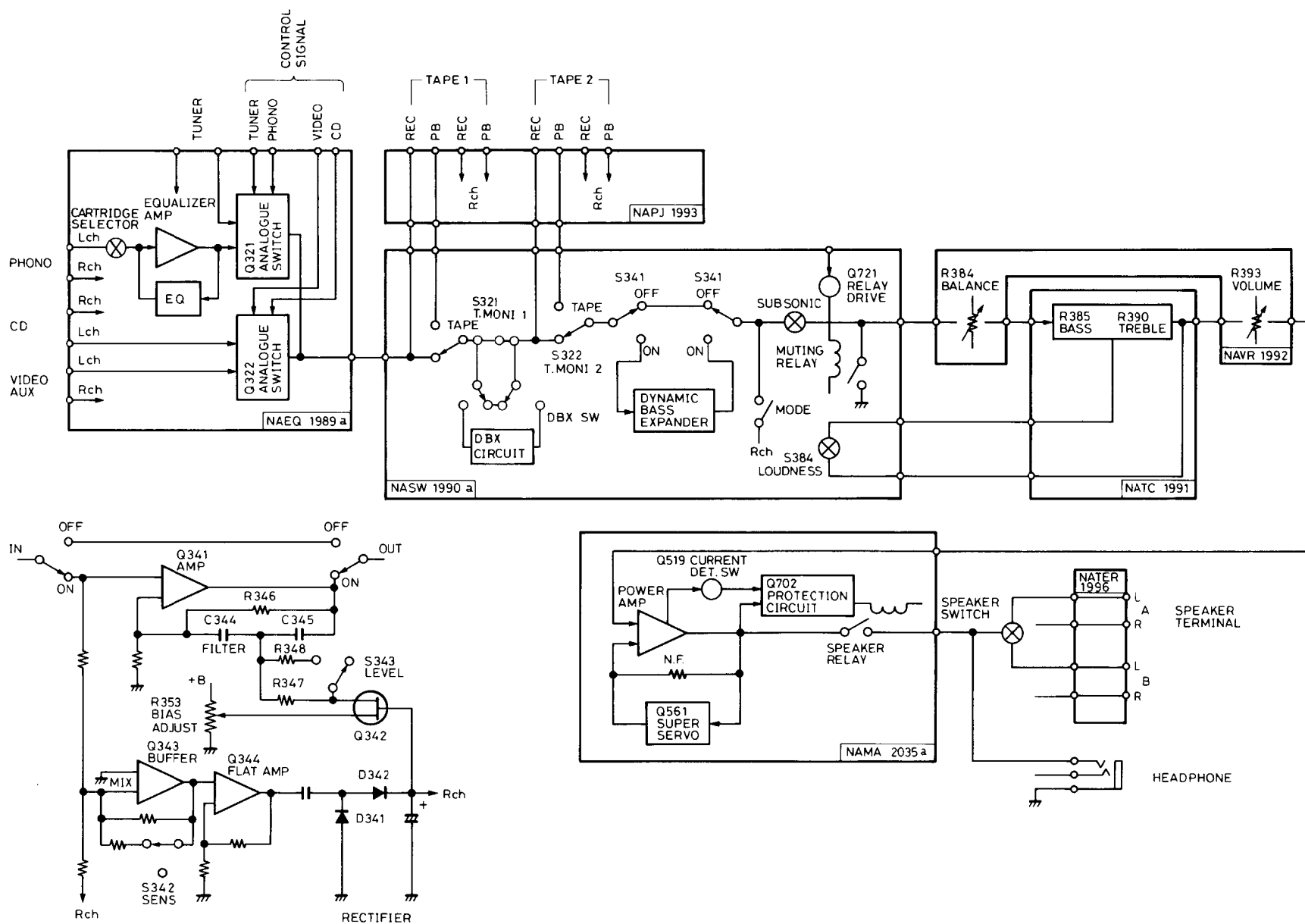
Specifications	2
Service procedures	3
Block diagram	
Amplifier section	4
Tuner section	5
Block diagram of IC	6
Exploded view	12
Parts list	13
Adjustment procedures	14
Schematic diagram	
Amplifier section	27
Tuner section	23
DBX circuit	33
Packing view	34

Printed circuit board view and parts list

Digital circuit	17
Switch circuit	18
De-emphasis/band selector switch	18
Display circuit	19
Control switch circuit	19
Volume/balance control circuit	20
Tape input/output terminal	20
Speaker terminal	20
FM/AM tuner	21
Power amplifier	25
Equalizer amplifier	29
Dynamic bass expander circuit	29
Tone control circuit pc board	30
Power supply circuit	31
Power switch	31
Dial illumination lamp	31
DBX circuit	32

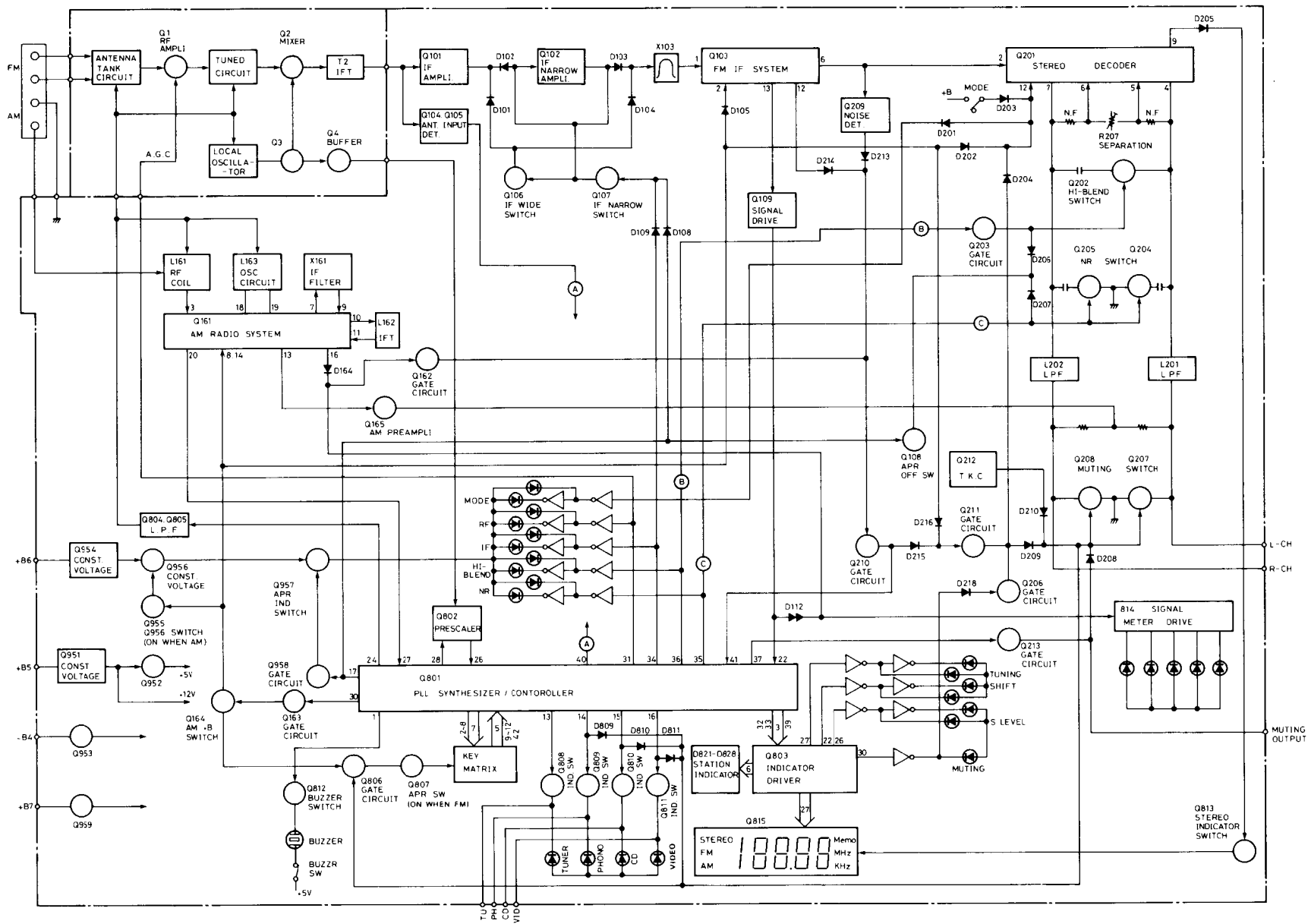
BLOCK DIAGRAM

— Amplifier section —



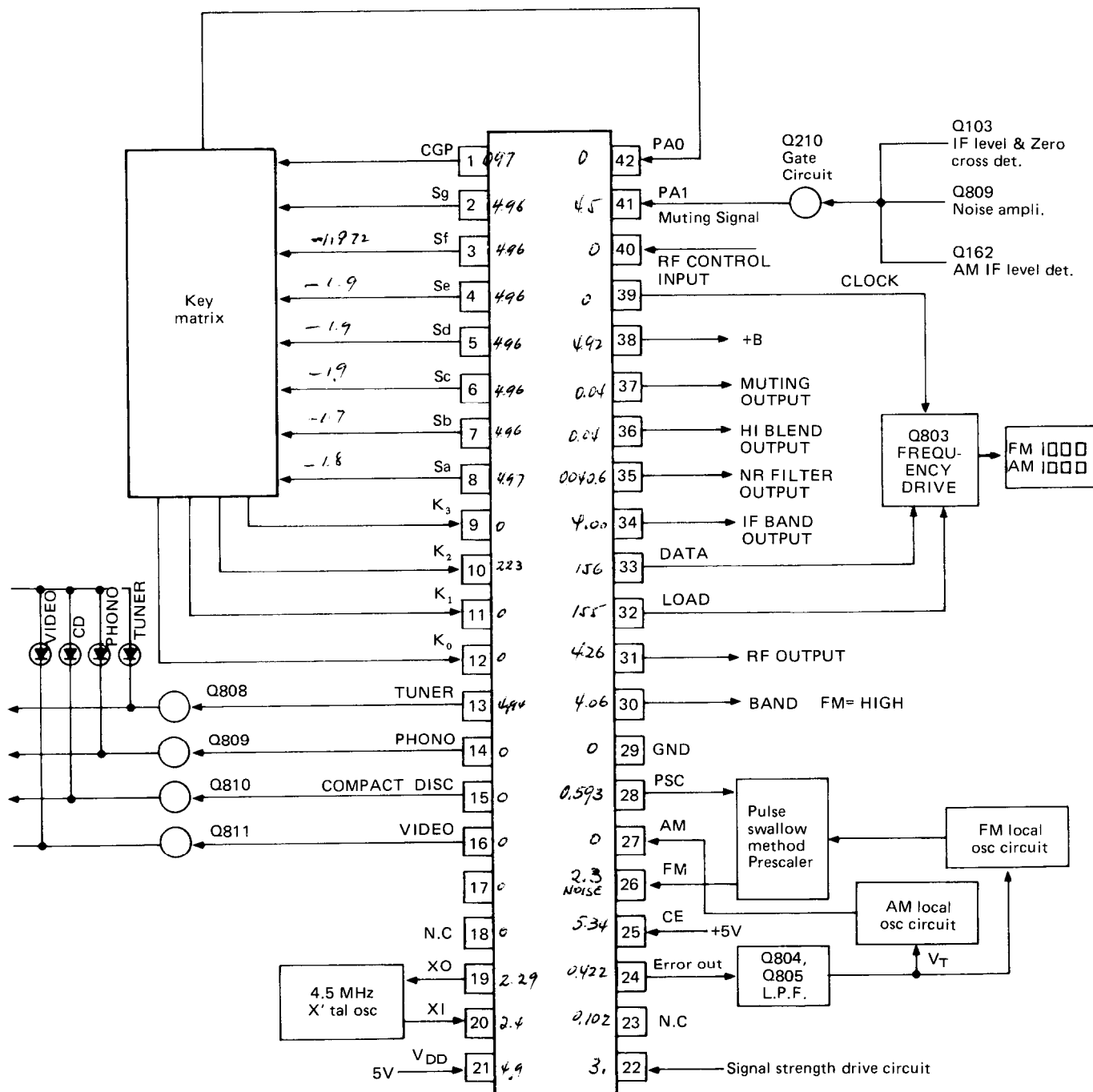
BLOCK DIAGRAM

— Tuner section —



BLOCK DIAGRAM OF IC

μ PD1712CU-712-513 (Synthesizer and controller)

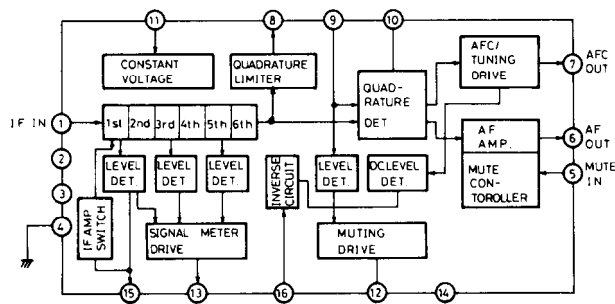


Matrix circuit

	PAD (42)	K ₃ (9)	K ₂ (10)	K ₁ (11)	K ₀ (12)
Sg (2)	MEMORY	UP	DOWN	AUTO/MANUAL	FM/AM
Sf (3)	DISPLAY	PROGRAM	AUTO MEMORY	PRESET SCAN	
Se (4)	M5/M15	M4/M14	M3/M13	M2/M12	M1/M11
Sd (5)	M10/M20	M9/M19	M8/M18	M7/M17	M6/M16
Sc (6)	DNR	HI-BLEND	IF	RF	MUTE LEVEL
Sb (7)	PHONO	TUNER	SIGNAL/FREQ	MUTING	MONO/STEREO
Sa (8)	TEST	TAPE 2	APR DEFEAT	VIDEO	COMPACT DISC
CGP (1)	BAND 2	BAND 1	BAND 0	PRESET	APR

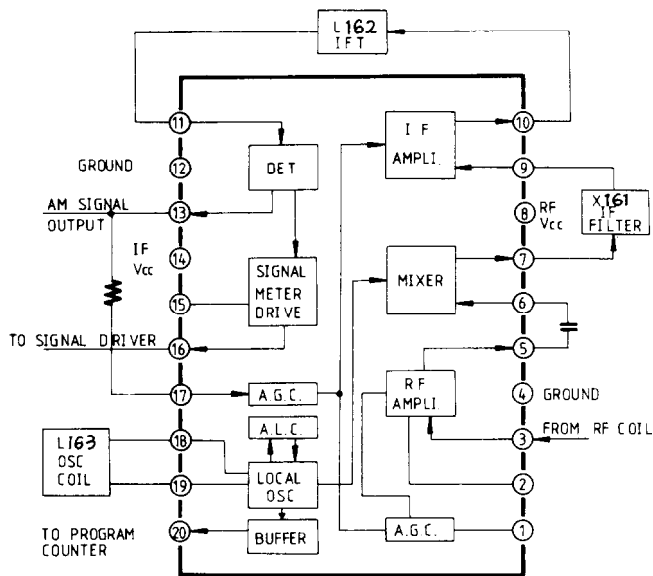
1	CGP	Buzzer drive output and Key return signal source of diode matrix . Active high.
2	Sg	Key return signal source output terminals. Active high.
3	Sf	
4	Se	
5	Sd	
6	Sc	
7	Sb	
8	Sa	
9	K3	Terminals for input of the key return matrix and diode matrix.
10	K2	
11	K1	
12	K0	
13	D6	Tuner output. Active high.
14	D5	Phono output. Active high.
15	D4	Compact disc output. Active high.
16	D3	Video output. Active high.
17	D2	APR defeat output. Active high.
18	D1	Not used.
19	X0	Connect to the 4.5MHz crystal oscillator.
20	X1	
21	V _{DD}	Device power terminal; supplies 5V during normal operation and 3V from the super capacitor C804 for memory preservation.
22	AD	A/D converter input terminal.
23	E02	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided oscillation frequency is higher than the reference frequency. In the opposite case, Low level is output. Floating occurs when the frequencies match. The output is applied to the variable capacitor diode in the local oscillation circuit of AM/FM through low pass filter Q805 and Q806. The output from both terminals is the same, but only E01 is used.
24	E01	
25	CE	Chip enable input. Device selection signal terminal. High level . . . Normal operation Low level . . . Memory preservation.
26	FM	FM local oscillator input.
27	AM	AM local oscillator input.
28	PSC	Output to control the division ratio of the prescaler.
29	GND	Ground terminal
30	PB3	FM/AM band selector output. FM at the high level.
31	PB2	DX/LOCAL selector output. DX at the high level.
32	PB1	LOAD output.
33	PB0	DATA output
34	PC3	IF band selector output. Wide position at the high level.
35	PC2	Output to switch NR filter. Active high.
36	PC1	Output to switch the hi-blend filter. Active low.
37	PC0	Muting output. Active high.
38	INT	Remote control input. Not used.
39	PA3	CLOCK output.
40	PA2	RF control input.
41	PA1	Sensor input.
42	PA0	Key return signal input.

LA1235 (FM IF system)

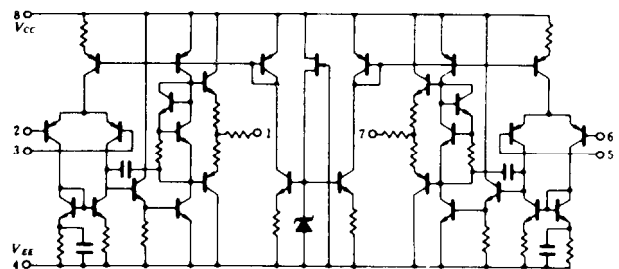


1. IF signal input
2. IF amplifier switch input
H level: Off
5. Muting switch input
6. Composite signal output
7. AFC output
8. IF amplifier output
9. 10.7MHz input
10. Reference voltage
11. Power supply
12. Muting output
Tuned: L level
13. Signal strength output
15. Muting level

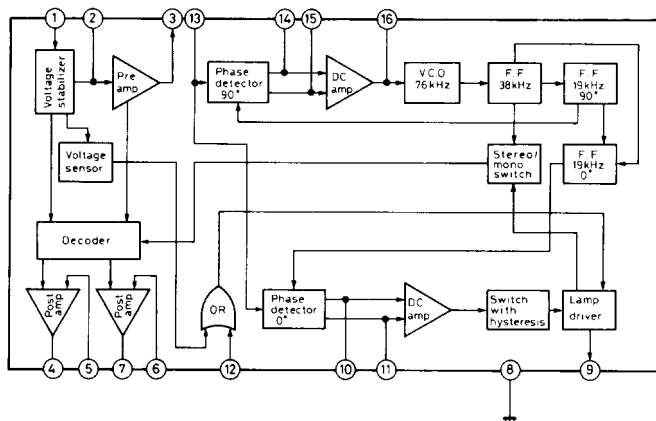
LA1245 (AM radio system)

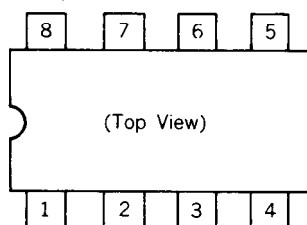


NJM4558, 4559, 4560 (Operation amplifier)

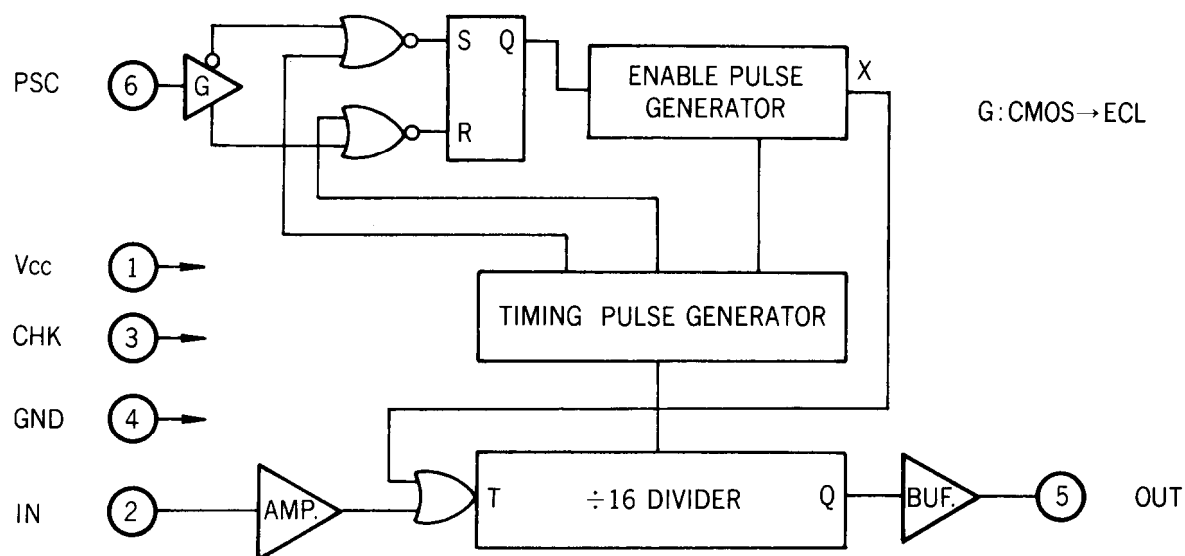
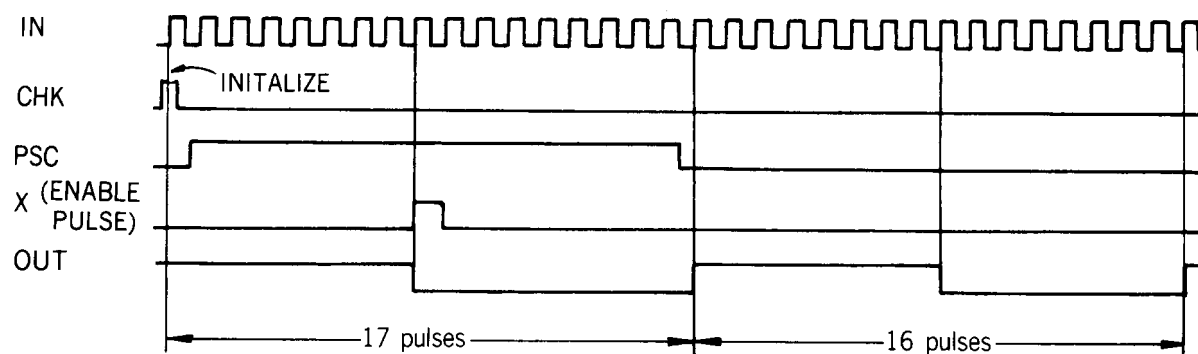


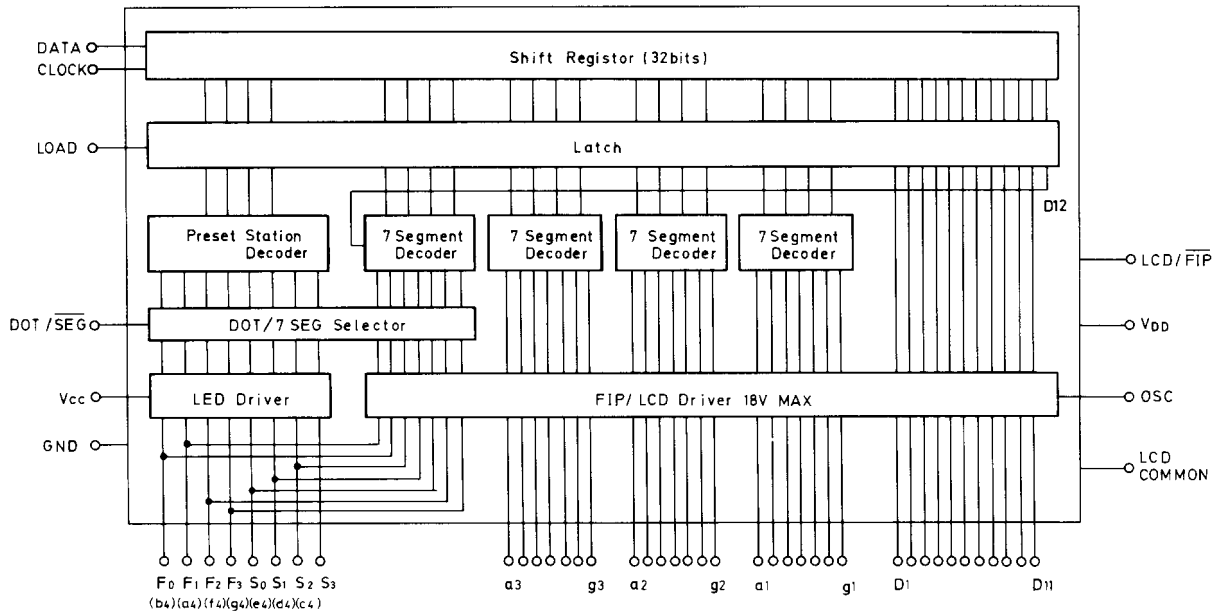
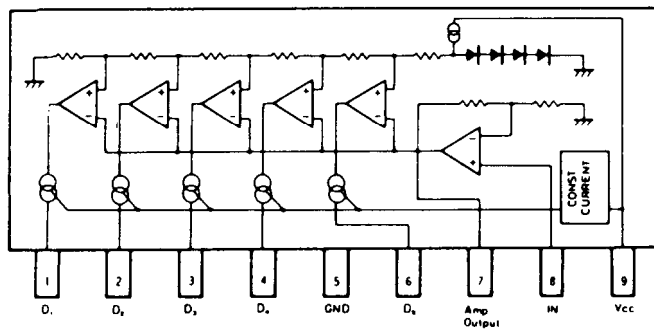
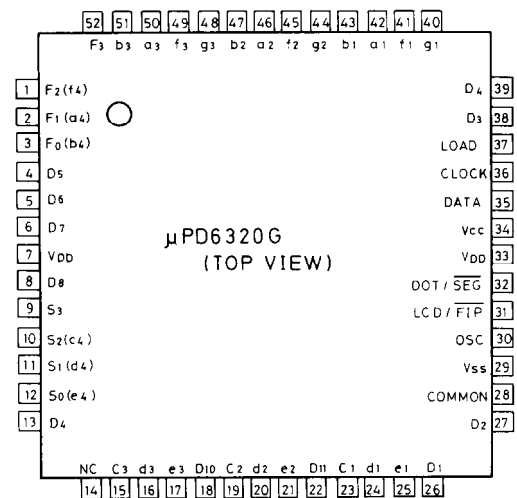
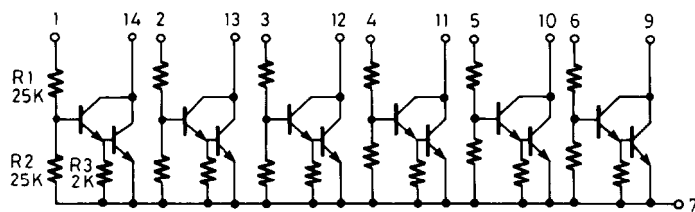
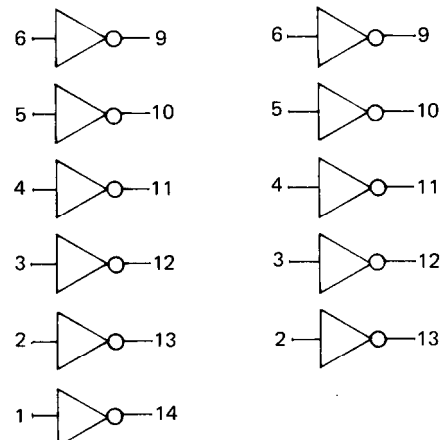
HA12016 (Stereo decoder)



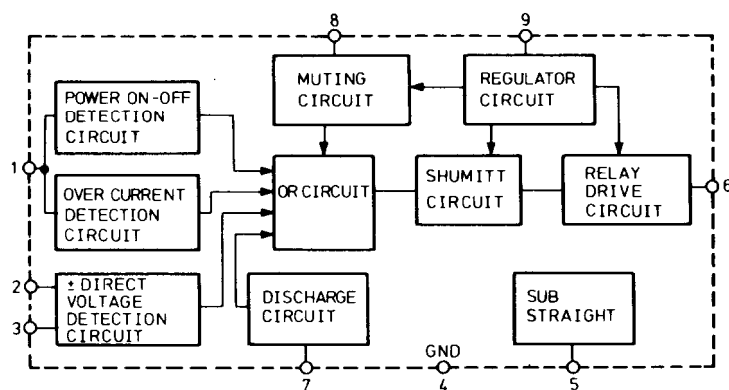
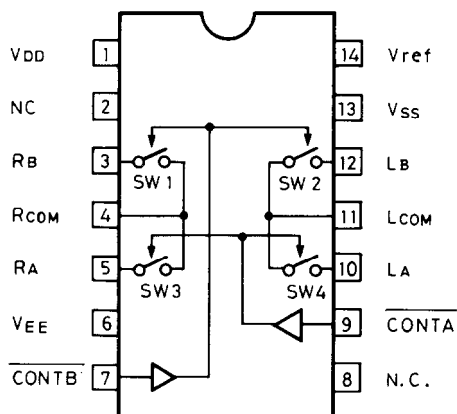
μ PB553AC (Prescaler)**Pin Connection**

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

Block Diagram**Timing Chart**

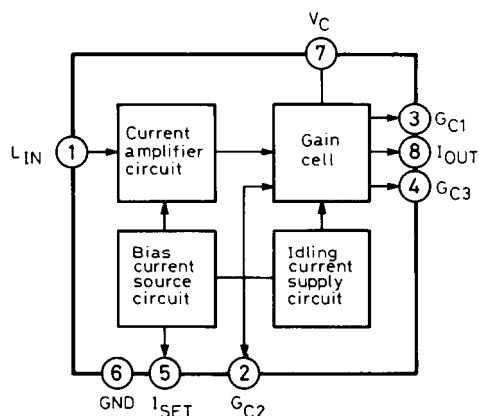
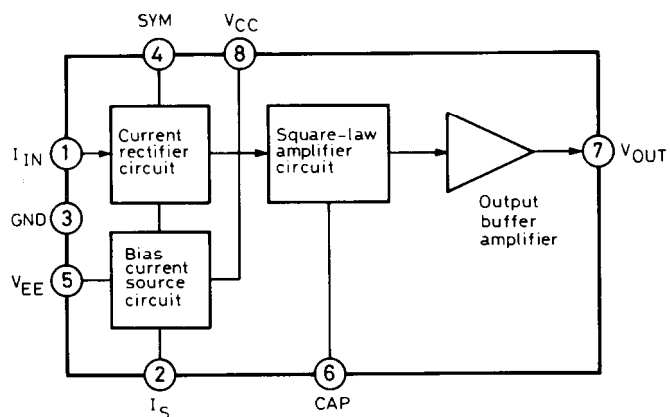
μPD6320G (Indicator drive)**LB1403 (Signal strength indicator driver)****BA612/BA614 (Indicator drive)****BA614****BA612**

TA7317P (Protection circuit drive)

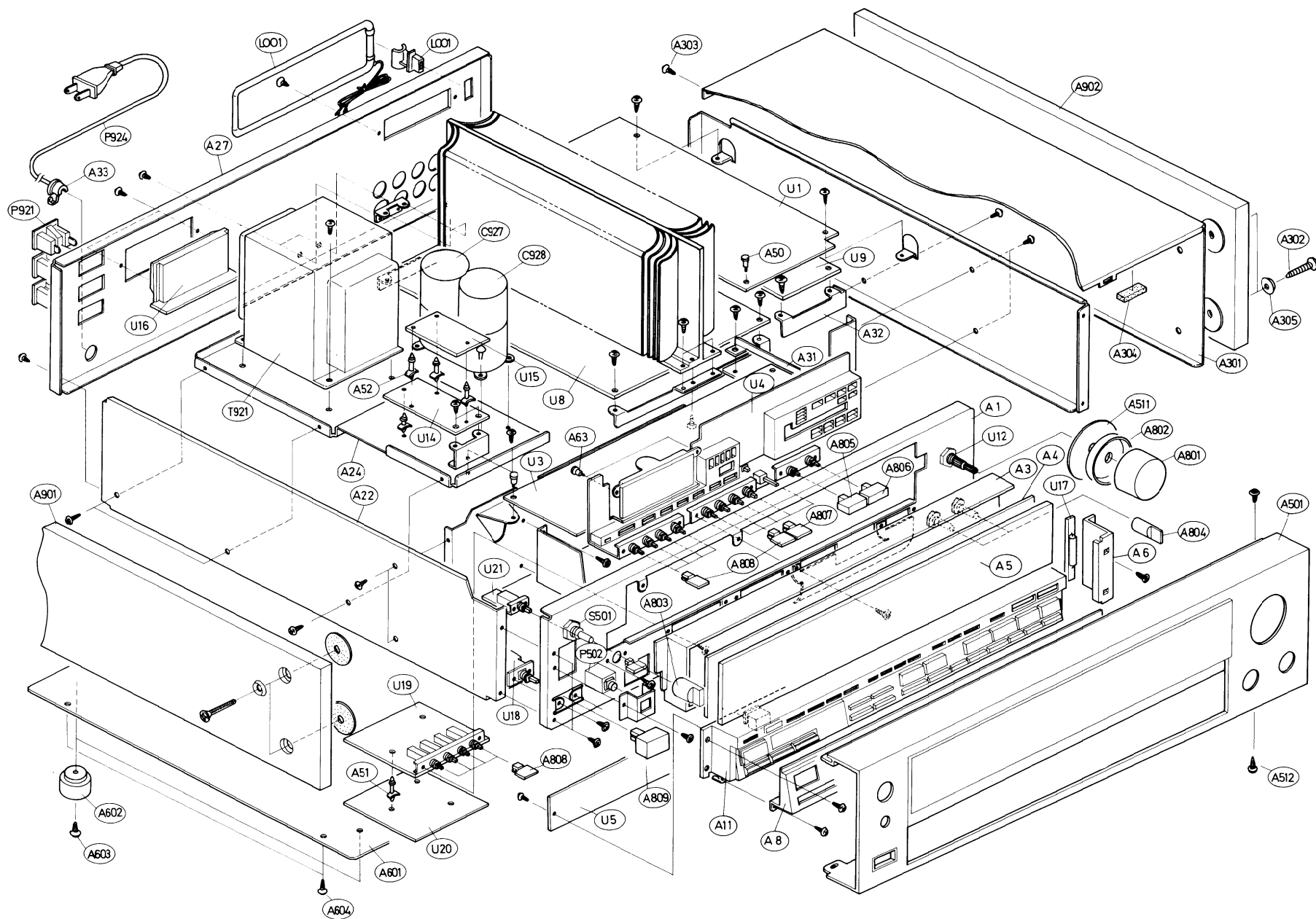
 μ PD6360C (Analogue switch)

TRUTH TABLE

CONTROL INPUT		SW1, SW2	SW3, SW4
$\overline{\text{CONT A}}$	H	—	OFF
	L	—	ON
$\overline{\text{CONT B}}$	H	OFF	—
	L	ON	—

 μ PC1252H2 (DBX) μ PC1253H2 (Level sensor)

EXPLODED VIEW



PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
A1	27110218A	Front bracket	A501	18288121	Front panel ass'y	T921	△ 230817	NPT-844D, Power transformer (D)
A2	27140894	Bracket, headphone		27262272	Plate, bass		△ 230818	NPT-844DG, Power transformer (W)
A3	27190272	Holder		27262271	Plate, speaker			
A4	28133097A	Back plate		28191255	Clear plate	U1	18288582A	NARF-1982a, FM/AM tuner pc board ass'y (D)
A5	28130213A	Dial plate		27267331	Gauide, power		18280582C	NARF-1982c, FM/AM tuner pc board ass'y (W)
A6	29105132	Lamp case	A511	28140206A	φ60mm, Cushion	U2	18120583	NASW-1983, De-emphasis switch pc board ass'y (W)
A7	27262274	Plate, decoration	A512	834430068	3TTS+6B (BC), Tapping screw	U3	18288582A	NADG-1984a, Digital circuit pc board ass'y (D)
A8	27210455	Panel S ass'y — OUTSIDE	A601	27170177	Bottom board		18280584C	NADG-1984c, Digital circuit pc board ass'y (W)
	28125147	End cap S, right — INSIDE DRAWER	A602	27175049A	Leg	U4	18128585	NADIS-1985, Display pc board ass'y
	28125148	End cap S, left	A603	831430088	3TTW+8B (BC), Tapping screw	U5	18128586	NASW-1986, Control switch circuit pc board ass'y
A11	28321521A	Holder ass'y, knob (B)	A604	834430068	3TTS+6B (BC), Tapping screw	U6	18128587	NASW-1987, Switch pc board ass'y
A12	833420068	2TTP+6B (BC), Tapping screw	A801	28321486	Knob, volume	U7	18120588	NASW-1988, Band switch pc board ass'y (W)
A13	27160144	Radiator	A802	28321484-1	Knob, balance	U8	18288535A	NAMA-2035a, Power amplifier pc board ass'y
A14	27140692	Bracket, transistor	A803	28321517	Knob, speaker	U9	18288589A	NAEQ-1989a, Equalizer amplifier pc board ass'y
A15	260204	Clamp	A804	28321515	Knob, bass	U10	18288590A	NASW-1990a, Dynamic bass expander circuit pc board ass'y
A16	27150183	Shielded plate	A805	28321501	Knob, tape-1	U11	18128591	NATC-1991, Tone control circuit pc board ass'y
A21	27115160A	Side bracket R	A806	28321502	Knob, tape-2	U12	18128592	NAVR-1992, Volume/Balance control pc board ass'y
A22	27115161	Side bracket L	A808	28321489	Knob, push	U13	18128593	NAPJ-1993, Tape input/output terminal pc board ass'y
A23	27130353	Bracket C	A809	28321528	Knob, power	U14	18128594	NAPS-1994, Power supply circuit pc board ass'y
A24	27130320G	Bracket, power transformer	A807	28321488A	Knob, push	U15	18128595	NAPS-1995, Power supply circuit pc board ass'y
A25	27140778	Bracket P	A901	28185205A	Side panel L	U16	18128596	NATRM-1996, Speaker terminal pc board ass'y
A26	27130189	Bracket KE	A902	28185206A	Side panel R	U17	18128597	NAPL-1997, Dial illumination lamp pc board ass'y
A27	27120576A	Back panel (D)	C328, C329	330924730	0.047μF, 50V, Ceramic capacitor	U18	△ 18128598	NASW-1998, Power switch pc board ass'y (D)
A28	27120577	Back panel (W)					△ 18120598A	NASW-1998a, Power switch pc board ass'y (W)
A28	27140693	Bracket, back	C927, C928	△ 3504172	15,000μF, 59V, Elect. capacitor	U19	18288599	NADBX-2099, Dbx circuit pc board ass'y
A31	27130354	Bracket, pc board	D505, D605	4000068	VD1222, Diode	U20	18288500	NADBX-2100, Dbx circuit pc board ass'y
A32	27130355	Bracket, pc board	F921	△ 252051	6A (ST-6), Primary fuse	U21	18288501	NALED-2101, LED pc board ass'y
A33	△ 270280	SR-4K-4, strainrelief	F922	△ 252076	3.15A-SE-EAK, Primary fuse (W)			
A51	880004	Rivert						
A52	27190164	Holder	L001	232085	NMA-3034, AM loop antenna			
A53	834430068	3TTS+6B (BC), Tapping screw	L001a	27190105	Holder, antenna			
A54	831430088	3TTW+8B (BC), Tapping screw	P502	25045067	HLJ-0279-01-070, Headphone terminal			
A55	834230108	3TTS+10B (Ni), Nickel screw						
A56	833426060	2.6TTP+6P (BC), Tapping screw	P921	△ 25050046	NSCT-2P15, AC outlet (D)			
A57	833425059	2.5TTP+5C (BC), Tapping screw		△ 25108010	LG-2C, Terminal, primary (W)			
A58	834430108	3TTS+10B (BC), Tapping screw	P924	△ 253112	AS-UC-4#18, Power supply cord (D)			
A59	833430080	3TTP+8P (BC), Tapping screw		△ 253092-1	AS-CEE-2, Power supply cord (W)			
A60	82143006	3P+6FN (BC), Pan head screw	P925	25060044	Ground terminal			
A61	834430108	3TTS+10B (BC), Tapping screw	P930	223004-1	B-5, Terminal			
A62	830440089	4TTC+8C (BC), Tapping screw	Q517	2201223 or	25C2773 (O) or			
A63	880009	Rivert	Q617	2201224	25C2773 (Y), Transistor			
A64	834430128	3TTS+12B (BC), Tapping screw	Q518	2201233 or	25A1169 (O) or			
A65	82142604	2.6P+4F (BC), Pan head screw (W)	Q618	2201234	25A1169 (Y), Transistor			
A66	863430	N-3F-N (BC), Nut (W)	R571, R671	441623914	390Ω, 1W, Metal oxide film resistor			
A71	27140900	Bracket, center						
A72	28191252A	Clear plate D	S301b	25065204	Remote switch, wire section			
A73	27260062	Shaft, switch	S301c	25035194	Remote switch, operation section			
A81	27190011	Holder						
A301	28184231	Top cover	S501	25030238	NRSM-144-25Y, Sepaker selector switch			
A302	836440303	4STU+30CQ (BC), Tapping screw	S922	△ 25065123	NSS-1258P, Voltage selector switch (W)			
A303	834430068	3TTS+6B (BC), Tapping screw						
A304	28140020	4x10x40mm, Cushion						
A305	870086	W4x12 (BC), Washer						

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

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.

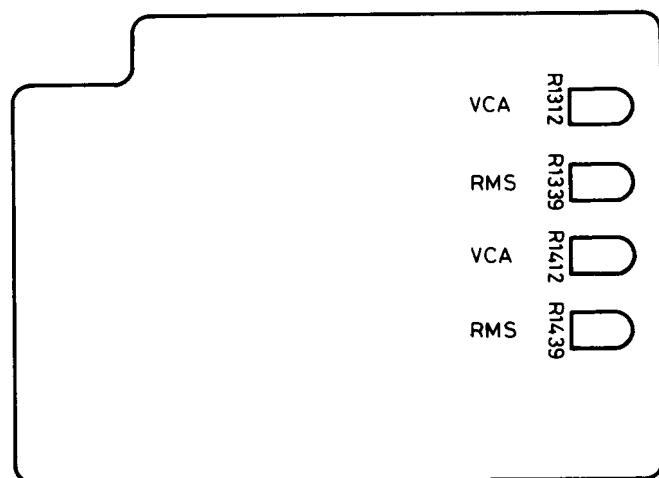
AM: 400Hz, 30% mod., 74dB/m

• 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

BASS, TREBLE, BALANCE	Center
TAPE-1, TAPE-2	Off
TUNING LEVEL	Low
FM MUTING	On
APR	On
DYNAMIC BASS EXPANDER	Off
TOUCH TONE	On
SUBSNIC, LOUDNESS	Off
Mode	Stereo
SPEAKER	A



Amplifier section

1. Idling current adjustment

Connect the DC voltmeter to the terminals Iid and Vct on the power amplifier pc board.

Adjust the semi-fixed resistors R538 and R638 so that the indication of voltmeter is $10 \pm 2\text{mV}$.

Notes: VOLUME Maximum, Open load,
Adjust after switching on for 5 minutes.

2. Dynamic bass expander level adjustment

1. Connect the AF oscillator to the input terminal CD on the back panel.
2. Connect the AC voltmeter to the speaker terminal A.
3. Set the AF oscillator output to 70Hz and -31dBV (28mV).
4. Set the Sens switch to -10dB and Level switch to $+6\text{dB}$.
5. Press the Dynamic bass expander switch to on.
6. Set the Volume to -30dB .
7. Turn fully the semi-fixed resistors R353 and R453 counter-clockwise (minimum position).
8. Adjust R353 and R453 so that the output voltage rises up $+3\text{dB}$ than minimum position.

3. DBX adjustment

1. Connect the AF oscillator to the playback terminal of TAPE 1.
2. Connect the distortion analyzer to the speaker terminals.
3. Set the AF oscillator output to 100Hz and -10dB (316mV).
4. Set TAPE 1 and TAPE PLAY of dbx SYSTEM to on.
5. Adjust the semi-fixed resistors R1339 and R1439 so that the distortion analyzer reading becomes minimum.
6. Change the frequency of AF oscillator to 10kHz.
7. Adjust the semi-fixed resistors R1312 and R1412 so that the distortion analyzer reading becomes minimum.

ADJUSTMENT PROCEDURES

INSTRUMENTS REQUIRED

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

1. +B2 voltage adjustment

(1) D model

Connect the DC voltmeter between the +B2 and E terminals. Adjust the Semi-fixed resistor R909 so that the indication of voltmeter becomes 25V.

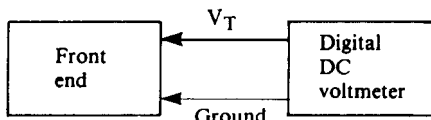
(2) G/W models

Connect the DC voltmeter between the +B2 and E terminals. Adjust the R909 so that the indication of voltmeter becomes 26.8V. (Before change of zener diode of D714) Adjust the R909 so that the indication of voltmeter becomes 25V. (After change of D714)
Note: When this voltage is low, the fluorescent indicator tube lights off.

Zener diode	Before change	After change
	GZA24Y or	RD22E-B2 or
	GZA22Z	GZA22X

The zener diode D714 is located on the digital circuit pc board.

2. Front end adjustment



Step	Set to dial	Adjust	Output indicator	Adjust for
FM adjustment				
1	88.1 MHz	L008 (LO)	Digital DC voltmeter	3.03V
2	107.9MHz	TC004 (TCO)		20.8V
3	Repeat steps 1 and 2 as necessary			
AM adjustment (D model)				
1	600 kHz	L107	Digital DC voltmeter	2.5V
2	1400 kHz	C156		15.5V
3	Repeat steps 1 and 2 as necessary			
AM adjustment (G/W models)				
1	603 kHz	L107	Digital DC voltmeter	2.5V
2	1404 kHz	C156		15.5V
3	Repeat steps 1 and 2 as necessary			

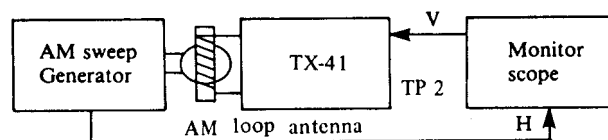
Remark : Usually not necessary to adjust.

GENERAL ALIGNMENT CONDITIONS

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

3. AM IF adjustment

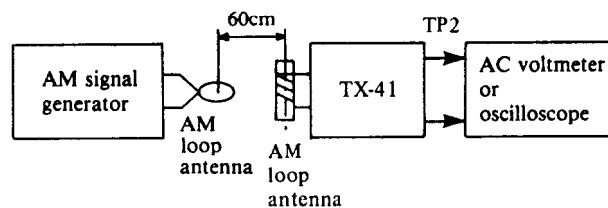
1. Set the dial to quiet point.



Set signal	Adjust	Adjust for
450 kHz	X104	The output of monitor scope becomes maximum symmetrical response

Remark : Usually not necessary to adjust.

4. AM RF adjustment

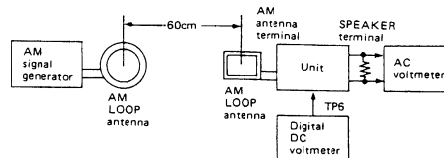


	AM Signal generator	Dial to set	Adjust	Adjust for
1	600kHz (603kHz) 400Hz, 30% mod.	600kHz (603kHz)	L106	Maximum
2	1400kHz (1404kHz) 400Hz, 30% mod.	1400kHz (1404kHz)	C152	Maximum
3	Repeat steps 1 and 2 as necessary			

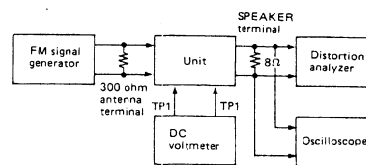
NOTE : () : 220 V model

AM Section

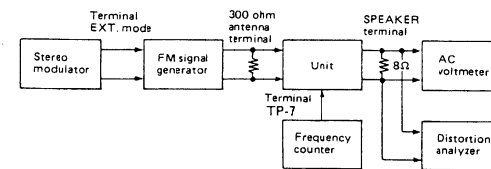
Step	AM SG output	Tuned frequency	Output indicator	Adjust. point	Adjust for	Remarks
1		530 kHz	Digital DC voltmeter	L163	1.0±0.1V	Repeat the steps 1 and 2 until no further adjustment is necessary.
2		1620 kHz		C183	20.0±0.2V	
3	600 kHz, 400 Hz 30% mod. 74 dB/m	600 kHz	AC voltmeter	L161	Maximum	Repeat the steps 3 and 4 until no further adjustment is necessary.
4	1400 kHz, 400Hz 30% mod. 74 dB/m	1400 kHz		C162	Maximum	
5	990 kHz, 74 Hz 30% mod. 74 dB/m	990 kHz	AC voltmeter	X161 L162	Maximum	



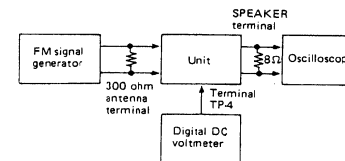
(Fig. 1)



(Fig. 2)



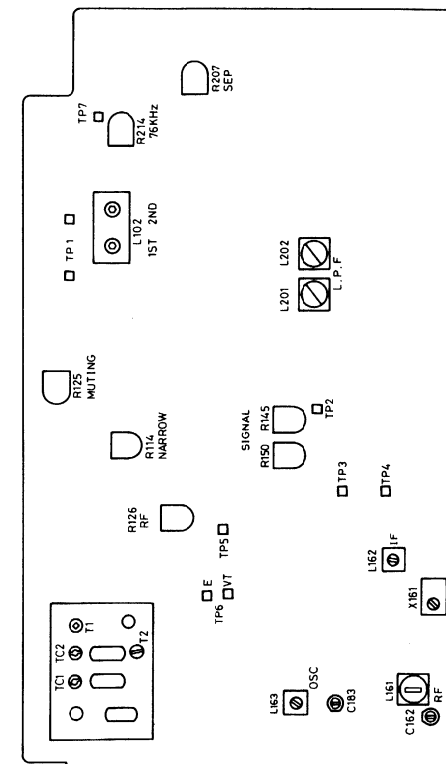
(Fig. 3)



(Fig. 4)

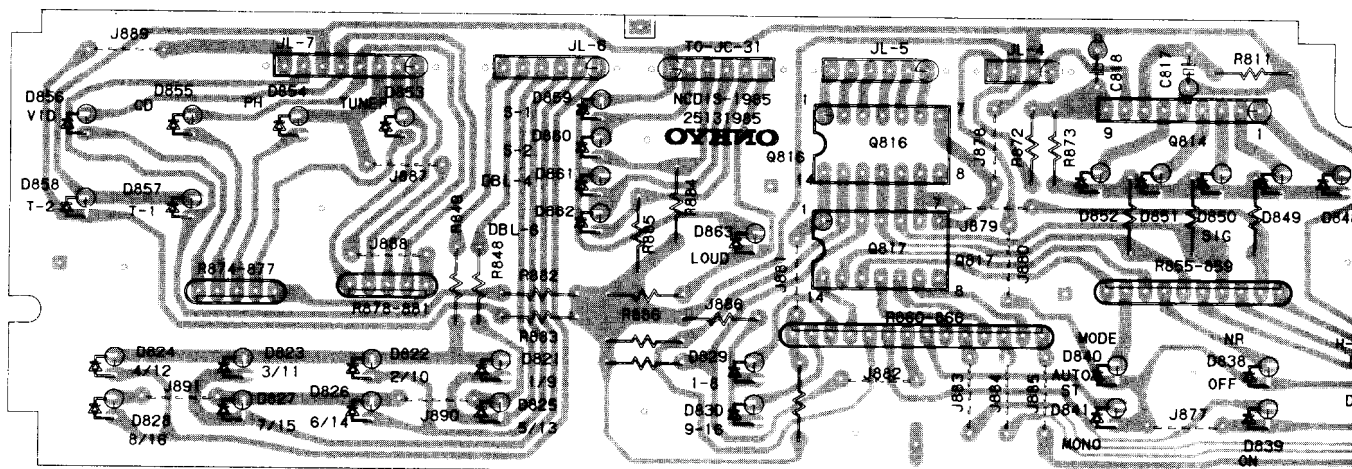
FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuned frequency	Output indicator	Adjustment	Adjust for	Remarks
FM IF	1	Fig. 2	99.1 MHz 1 kHz, 75 kHz devi. 65 dBf (60 dB)	—	99.1 MHz	DC voltmeter	L102 1st coil	OV	Muting: off Repeat the steps 1 and 2 until no further adjustment is necessary
	2					Distortion analyzer	L102 2nd coil	Minimum	
VCO		Fig. 3	99.1 MHz 1 kHz, 75 kHz devi. 65 dBf (60 dB)	—	99.1 MHz	Frequency counter	R214	76 kHz±76 Hz	Remove the frequency counter after adjustment
Distortion		Fig. 3	99.1 MHz 65 dBf (60 dBf) Ext. modulation	L+R 1 kHz	99.1 MHz	Distortion analyzer	IF coil on the front end (T2)	Minimum	
Separation	1	Fig. 3	99.1 MHz 65 dBf (60 dB) Ext. modulation	L ch. 1 kHz	99.1 MHz	R ch. AC voltmeter	R207	Minimum	Maximum and same separation
	2			R ch. 1 kHz		L ch. AC voltmeter		Minimum	
IF Band		Fig. 3	99.1 MHz no modulation 25.2 dBf (20 dB)	—	99.1 MHz	NARROW indicator	R145	Light on <i>SIGNAL STRENGTH</i>	APR switch to on
Narrow IF level	1	Fig. 4	99.1 MHz No modulation 25.2 dBf (20 dB)	—	99.1 MHz	DC voltmeter	R114	Same value as above (step 1)	APR switch to on
	2								
APR level	1	Fig. 4	99.1 MHz 17.2 dBf (12 dB)	—	99.1 MHz	DC voltmeter	R150	1.2±0.05V	APR: on Repeat the steps 1 and until no further adjustment is necessary
	2		99.1 MHz 45.2 dBf (40 dB)				R145	3.2±0.1V	
Muting	1	Fig. 4	99.1 MHz 18.2 dBf (13dB)	—	99.1 MHz	Oscilloscope	R125	Signal	TUNING Level : Low
	2		99.1 MHz 17.2 dBf (12 dB)					No signal	

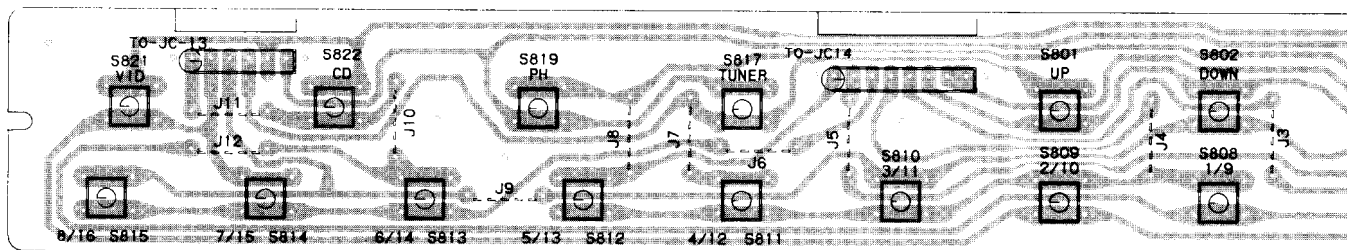


PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

DISPLAY CIRCUIT PC BOARD



CONTROL SWITCH CIRCUIT PC BOARD

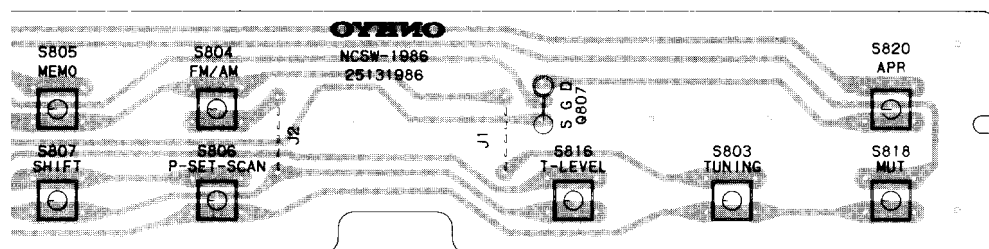
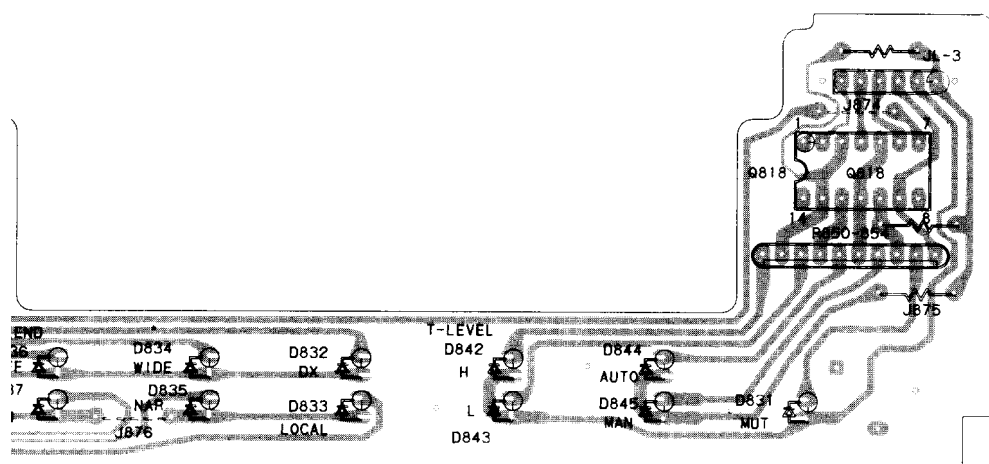


DISPLAY CIRCUIT PC BOARD (NADIS-1985)

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q814	222666	LB1403
Q816, Q817	222771	BA614
Q818	222772	BA612
L.E.D.s		
D821-D832	225137	SEL2413E
D834, D836	225137	SEL2413E
D838, D840	225137	SEL2413E
D842, D844	225137	SEL2413E
D848-D856	222137	SEL2413E
D833, D835	225142	SEL2913K
D837, D839	225142	SEL2913K
D841, D843	225142	SEL2913K
D845	225142	SEL2913K
D857-D863	225142	SEL2913K
Capacitors		
C817, C818	352741009	10 μ F, 16V, Elect.
Resistors		
R850-R854	49241221505	220 Ω x5, 1/8W, Network
R855-R859	49241181505	180 Ω x5, 1/8W, Network
R860-R866	49241181507	180 Ω x7, 1/8W, Network
R874-R877	49121221504	220 Ω x4, 1/8W, Network
R878-R881	49121103504	10k Ω x4, 1/8W, Network
Holders		
27190270B		LED, left
27190271A		LED, right
Screws		
833430080		3TTP+8P (BC), Tapping

CONTROL SWITCH CIRCUIT PC BOARD (NASW-1986)

CIRCUIT NO.	PART NO.	DESCRIPTION
Transistor		
Q807	2212304, 2211945 or 2211293	2SK381D, 2SK246 (GR) or 2SK68 (M)
Switches		
S801-S822	25035389	NPS-111-S353



VOLUME/BALANCE CONTROL PC BOARD (NAVR-1992)

CIRCUIT NO.	PART NO.	DESCRIPTION
R384, R484	5104145	N16RDQMC250KMN100 KBTP40, Volume/Balance control variable resistor

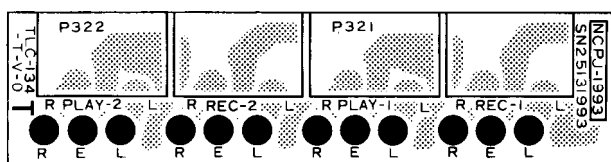
TAPE INPUT/OUTPUT TERMINAL PC BOARD (NAPJ-1993)

CIRCUIT NO.	PART NO.	DESCRIPTION
P321, P322	25045142	NPJ-4PDBL55, Tape input/ output terminal

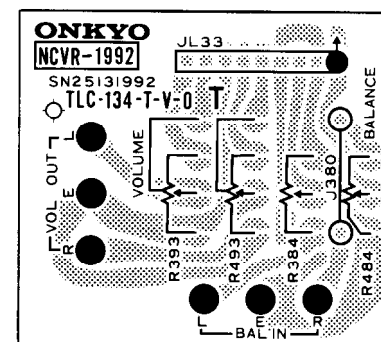
SPEAKER TERMINAL PC BOARD (NATRM-1996)

CIRCUIT NO.	PART NO.	DESCRIPTION
P501	25060058	NTM-8PDML25, Speaker terminal

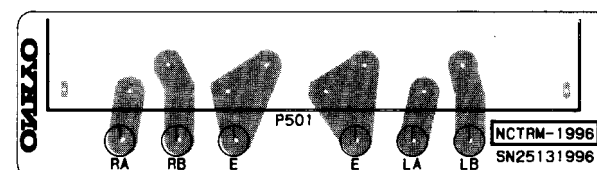
TAPE INPUT/OUTPUT TERMINAL PC BOARD



VOLUME/BALANCE CONTROL PC BOARD



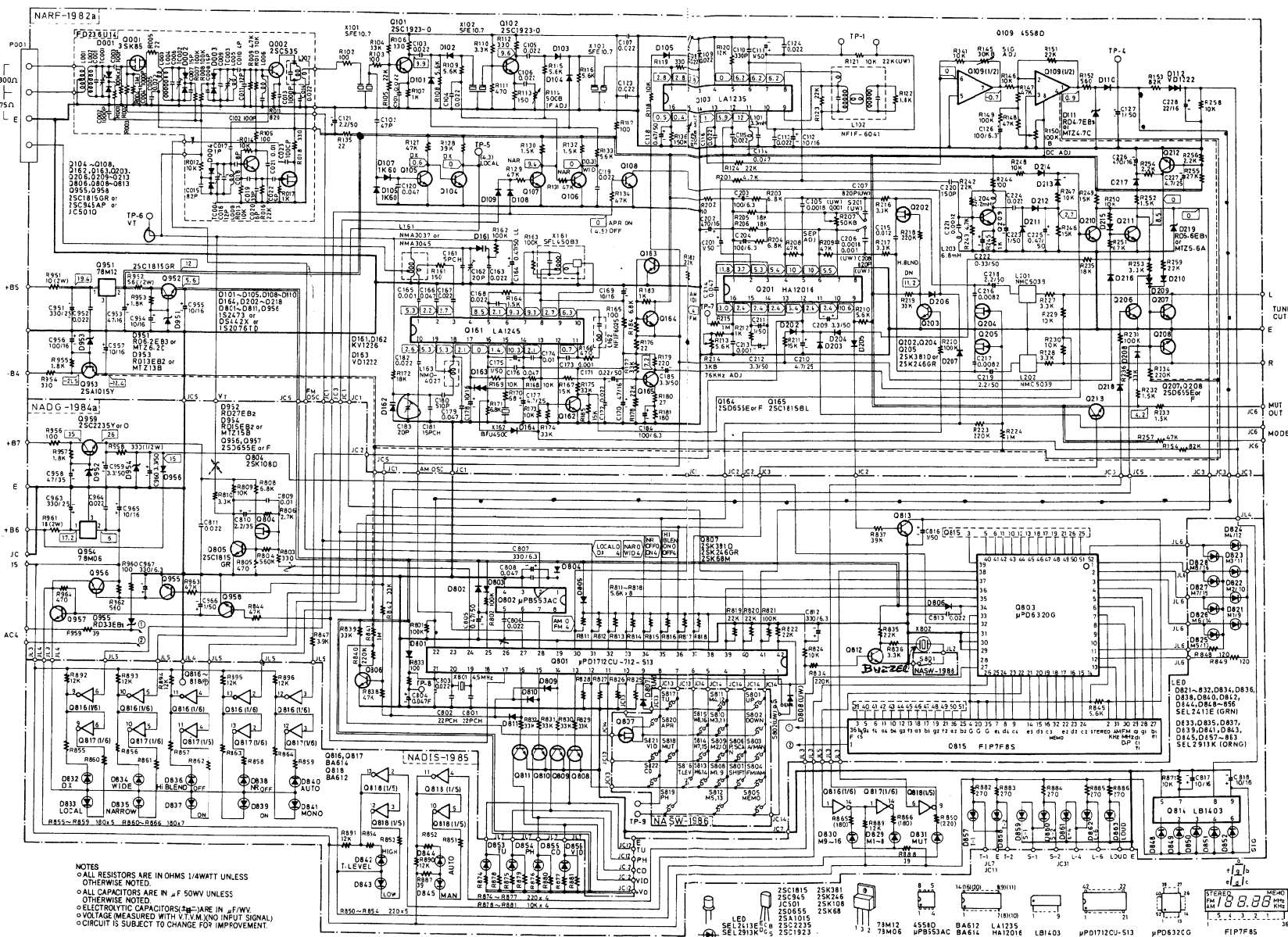
SPEAKER TERMINAL PC BOARD



FM/AM TUNER PC BOARD (NARF-1982 a/c)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
Front end			Capacitors		
TU001	240063	BFE496U11	C111	352780109	1 μ F, 50V, Elect.
ICs			C112	352741009	10 μ F, 16V, Elect.
Q103	222680	LA1235	C118	352784799	0.47 μ F, 50V, Elect.
Q109	222465	NJM4558D	C121	352780229	2.2 μ F, 50V, Elect.
Q161	222701	LA1245	C126	352721019	100 μ F, 6.3V, Elect.
Q201	222593	HA12016	C127	352780109	1 μ F, 50V, Elect.
Q951	222780122	78M12	C162	3060010	NTC-20P-09, Trimmer
Transistors			C164	392884797	0.47 μ F, 50V, LL
Q101, Q102	2211723	2SC1923 (O)	C169	352741009	10 μ F, 16V, Elect.
Q104-Q108	2211255,	2SC1815 (GR),	C170	352744709	47 μ F, 16V, Elect.
Q162, Q163	2210746 or	2SC945A (P) or	C171	352782299	0.22 μ F, 50V, Elect.
Q203, Q206	2212485	JC501 (Q)	C175	352780109	1 μ F, 50V, Elect.
Q164, Q207	2211705 or	2SD655 (E) or	C177	352750479	4.7 μ F, 25V, Elect.
Q208	2211706	2SD655 (F)	C178	352741009	10 μ F, 16V, Elect.
Q165	2211256	2SC1815 (BL)	C180	370135114	510pF $\pm$ 5%, 100V, APS
Q202	2212304 or	2SK381 (D) or	C183	3060010	NTC-20P-09, Trimmer
Q204, Q205	2211945	2SK246 (GR)	C184	352721019	100 μ F, 6.3V, Elect.
	2211945 or	2SK246 (GR) or	C185	352780339	3.3 μ F, 50V, Elect.
	2211293	2SK68 (M)	C201	352780109	1 μ F, 50V, Elect.
Q209-Q213	2211255,	2SC1815 (GR),	C202	352744719	470 μ F, 16V, Elect.
	2210746 or	2SC945A (P) or	C203, C204	352721019	100 μ F, 6.3V, Elect.
	2212485	JC501 (Q)	C207, C208	370138214	820pF $\pm$ 5%, 100V, APS (W)
Q952	2211255	2SC1815 (GR)	C209	352780339	3.3 μ F, 50V, Elect.
Q953	2211454	2SA1015 (Y)	C210	352750479	4.7 μ F, 25V, Elect.
Diodes			C211	352780109	1 μ F, 50V, Elect.
D101-D105	223145,	1S2076TD,	C212	352780339	3.3 μ F, 50V, Elect.
D108-D110	223133 or	DS442X or	C213	370131024	1,000pF $\pm$ 5%, 100V, APS
D164	223124	1S2473	C218, C219	352780229	2.2 μ F, 50V, Elect.
D106, D107	223132	1K60	C222	352783399	0.33 μ F, 50V, Elect.
D111	2239433 or	RD4. 7EB3 or	C223	352780109	1 μ F, 50V, Elect.
D112, D163	2243133	MTZ4. 7C	C225	352784799	0.47 μ F, 50V, Elect.
	4000068	VD1222	C226	352744719	470 μ F, 16V, Elect.
	223136	KV1226, Variable capacitor	C227	352750479	4.7 μ F, 25V, Elect.
D161, D162	223145,	1S2076TD,	C228	352742209	22 μ F, 16V, Elect.
D202-D218	223133 or	DS442X or	C951	352753319	330 μ F, 25V, Elect.
D219	223124	1S2473	C953	352744709	47 μ F, 16V, Elect.
	2239471	RD5. 6EB1 or	C954, C955	352741009	10 μ F, 16V, Elect.
	2243151	MTZ5. 6A	C956	352741019	100 μ F, 16V, Elect.
D951	2239493 or	RD6. 2EB3 or	C957	352741009	10 μ F, 16V, Elect.
D953	2243163	MTZ6. 2C	Resistors		
	2239652 or	RD13EB2 or	R114	5215041	N08HR500BC, Semi-fixed
	2243242	MTZ13B	R125	5215003	N08HR20KBC, Semi-fixed
Coils			R145	5215062	N08HR30KBC, Semi-fixed
L101	233105 or	NCCH-1005 or	R150	5215047	N08HR100KBC, Semi-fixed
L161	233024	NCCH-1501	R207	5215046	N08HR50KBC, Semi-fixed
	232089 or	NMA-3037 or	R214	5215061	N08HR3KBC, Semi-fixed
	232107	NMA-3045	R951	441721004	10 Ω , 2W, Metal oxide film
L163	232110	NMO-4027	R952	441525604	56 Ω , 1/2W, Metal oxide film
L201, L202	233291	NMC-5039	Radiator		
L203	231042	NCH-2082	27160011A	RAD-05	
L204	233031	NMC-9-1	Sockets		
Transformers			25050140	NJPS-3P-S	
L102	233274	NFIF-6041	25050141	NJPS-4P-S	
L162	232095	NFIF-6025	25050143	NJPS-6P-S	
Ceramic filters			Terminal		
X101, X103	3010024	SFE10. 7ML-A	P001	25060085	NTM-4PDMN29, Antenna
X102	3010070	SFE10. 7MS3GY-A	Screws		
X161	3010075	SFL450B3	82143010	3P+10F (BC), Pan head screw	
X162	3010076	BFU450C	834430068	3TTS+6B (BC), Tapping	
			Nut		
			863430	N-3F-N (BC)	

Note: (W): Only Universal model



POWER AMPLIFIER PC BOARD (NAMA-2035/a)

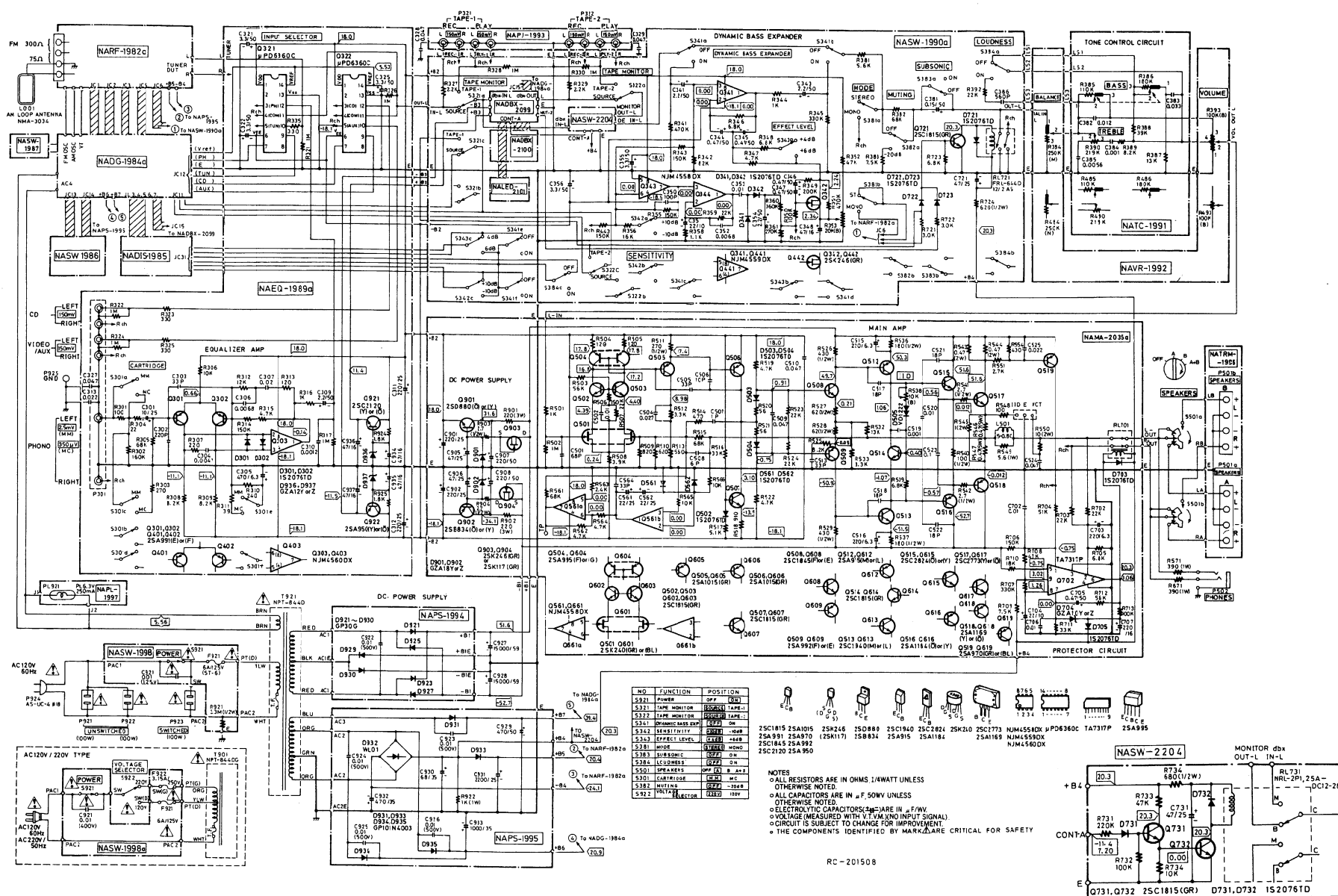
CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
ICs			Capacitors		
Q561, Q661	222502	NJM4558DX	C515, C615	352722219	220 μ F, 6.3V, Elect.
Q702	222584	TA7317P	C516, C616		
Transistors			C561, C661	352752209	22 μ F, 25V, Elect.
Q501, Q601	2211915 or	2SK240 (GR) or	C562, C662	352752209	22 μ F, 25V, Elect.
	2211916	2SK240 (BL)	C703	352722219	220 μ F, 6.3V, Elect.
Q502, Q602	2211255	2SC1815 (GR)	C704	352732209	22 μ F, 10V, Elect.
Q503, Q603	2211255	2SC1815 (GR)	C705	352784799	0.47 μ F, 50V, Elect.
Q504, Q604	2211515 or	2SA955 (F) or	C707	352742219	220 μ F, 16V, Elect.
	2211516	2SA955 (G)	C901, C902	352752219	220 μ F, 25V, Elect.
Q505, Q605	2211455	2SA1015 (GR)	C905, C906	352754709	47 μ F, 25V, Elect.
Q506, Q606	2211455	2SA1015 (GR)	C907, C908	352782219	220 μ F, 50V, Elect.
Q507, Q607	2211255	2SC1815 (GR)	Resistors		
Q508, Q608	2211732 or	2SC1845 (F) or	R511, R611	442522714	270 Ω , 1/2W, Metal oxide film
	2211733	2SC1845 (E)	R526, R626	442524314	430 Ω , 1/2W, Metal oxide film
Q509, Q609	2211792	2SA992 (F) or	R529, R529		
	2211793	2SA992 (E)	R527, R528	441526204	62 Ω , 1/2W, Metal oxide film
Q512, Q612	2211743 or	2SA915 (M) or	R627, R628		
	2211742	2SA915 (L) *	R536, R537	442521814	180 Ω , 1/2W, Metal oxide film
Q513, Q613	2211763 or	2SC1940 (M) or	R636, R637		
	2211762	2SC1940 (L) *	R538, R638	5225015	N08HR10KBD, Semi-fixed
Q514, Q614	2211255	2SC1815 (GR)	R540, R640	442521014	100 Ω , 1/2W, Metal oxide film
Q515, Q615	2211923 or	2SC2824 (O) or	R541, R542	442520274	2.7 Ω , 1/2W, Metal oxide film
	2211924	2SC2824 (Y) *	R641, R642		
Q516, Q616	2211933 or	2SA1184 (O) or	R543, R544	4000063	0.47 Ω , 2W, Metal plate
	2211934	2SA1184 (Y) *	R643, R644		
Q517, Q617	2201164 or	2SC2581 (Y) or	R545, R645	441620104	1 Ω , 1W, Metal oxide film
	2201163	2SC2581 (O) *	R546, R547	4000080	0.47 Ω , 2W, Metal plate
Q517, Q617	2201224	2SC2273 (Y) or	R646, R647		
	2201223	2SC2273 (O) *	R549, R649	441620564	5.6 Ω , 1W, Metal oxide film
Q518, Q618	2201234 or	2SA1169 (Y) or	R550, R650	441721004	10 Ω , 2W, Metal oxide film
	2201233	2SA1169 (O) *	R901, R902	441822214	220 Ω , 3W, Metal oxide film
Q901	2201073 or	2SD880 (O) or	Relay		
	2201074	2SD880 (Y) *	RL701	25065237	NRL-4P3A-DC24-26
Q902	2201243 or	2SB834 (O) or	Radiators		
	2201244	2SB834 (Y) *	27160029		RAD-07
Q903, Q904	2211945 or	2SK246 (GR) or	Brackets		
	2211315	2SK117 (GR)	27140695A		Back
Diodes			27140694		Front
D501, D601	223145,	1S2076TD,	Screws		
	223133 or	DS442X or	82143010		3P+10FN (BC), Pan head screw
	223105	1S1555 (TX-65)	831430088		3TTW+8B (BC), Tapping
D502-D504	223145,	1S2076TD,			
D561, D562	223133 or	DS442X or			
D602-D604	223105	1S1555			
D661, D662	223145,	1S2076TD,			
D703, D705	223133 or	DS442X or			
	223105	1S1555			
D704	2241072 or	GZA-10Y or			
	2241073	GZA-10Z			
D901, D902	2241192 or	GZA-18Y or			
	2241193	GZA-18Z			
Coils					
L501, L601	231015	S-0. 8C			

CAUTION: Replacement for transistor of mark *, if necessary, must be made from the same beta group (H_{EF}) as the original type.

EX. 2SA 1184 (O), 2SC 2581 (O)

Same beta group

SCHEMATIC DIAGRAM



ONKYO CORPORATION

TX85(After change of dbx)

Addition parts:

REF. NO. PART NO. DESCRIPTION

U22	18288504	NASW-2204, Relay drive circuit pc board ass'y
	29355113	Caution sheet, dbx

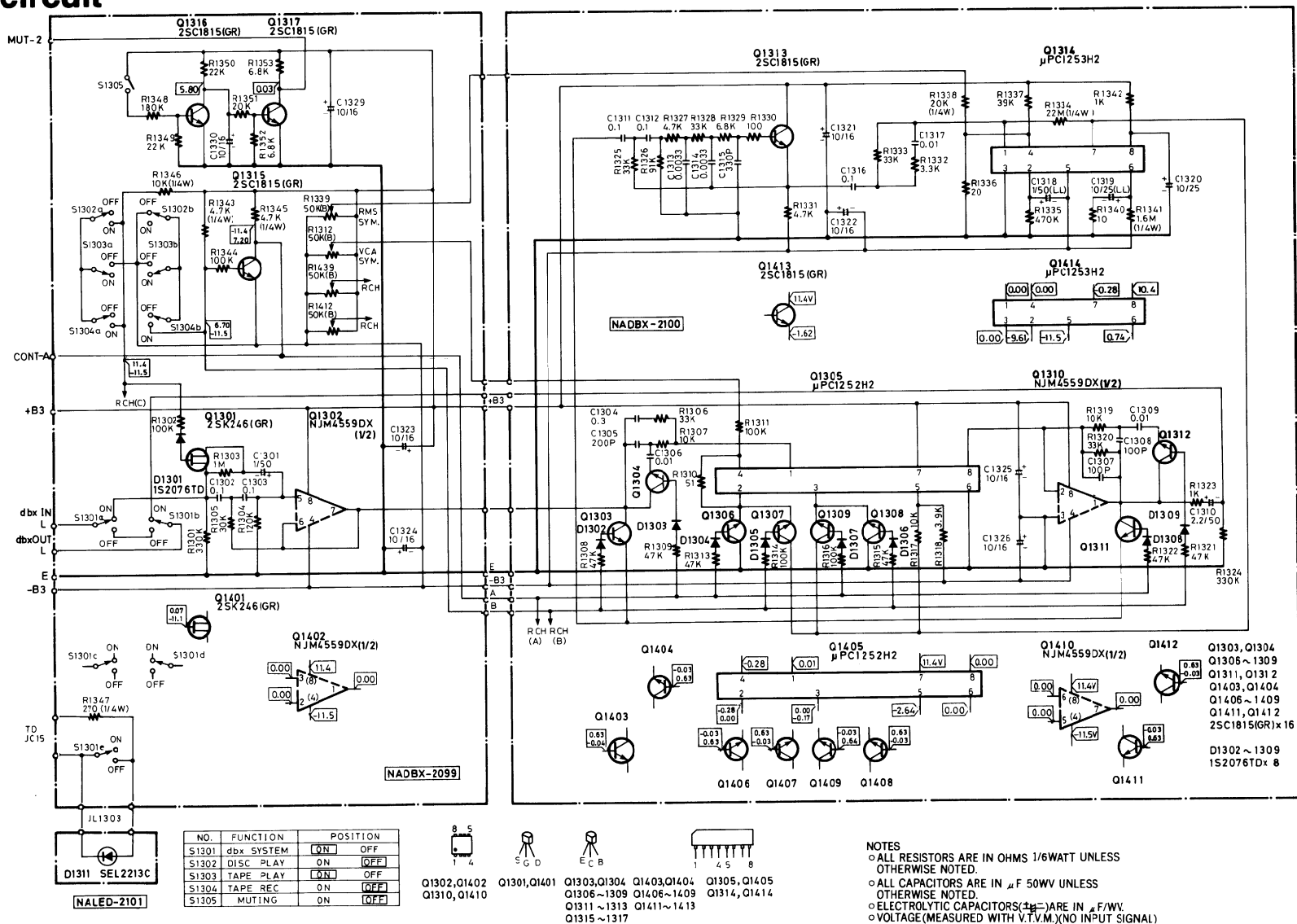
PRINTED CIRCUIT BOARD—PARTS LIST

RELAY DRIVE CIRCUIT PC BOARD(NASW-2204)

CIRCUIT NO. PART NO. DESCRIPTION

	Transistors	
Q731,Q732	2211255or	2SC1815(GR)or
	2210746	2SC945A(P)
	Diodes	
D731,D732	223145,	1S2076TD,
	223133 or	DX442X or
	223105	1S1555
	Capacitor	
C731	352744709	47 μ F, 25V, Elect.
	Resistors	
R731	417412244	220kohm,1/ 4W,Carbon
R732	417411044	100kohm,1/ 4W,Carbom
R733	417414734	47kohm,1/ 4W,Carbon
R734	417411034	10kohm,1/ 4W,Carbon
R735	441526814	680kohm,1/ 2W,Metal oxide film
	Relay	
RL731	25065247	NRL-2P1.25A-DC12-28

Application:After 1541 pcs.(Refer serial number of last four digits.)

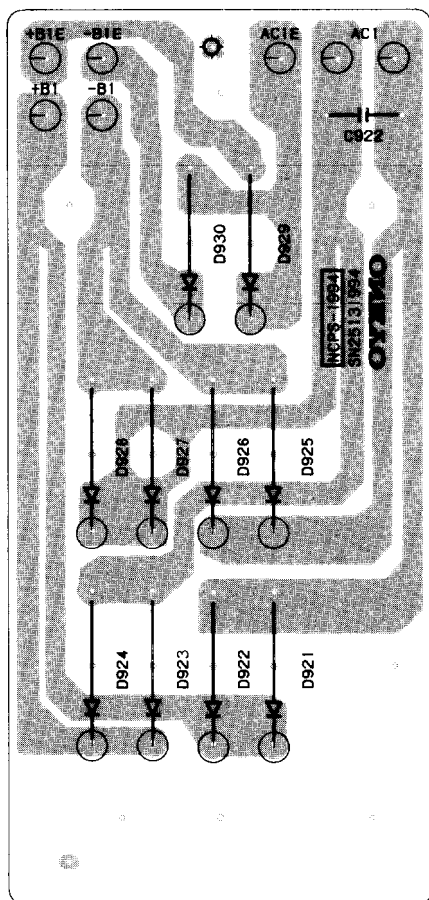


NOTES

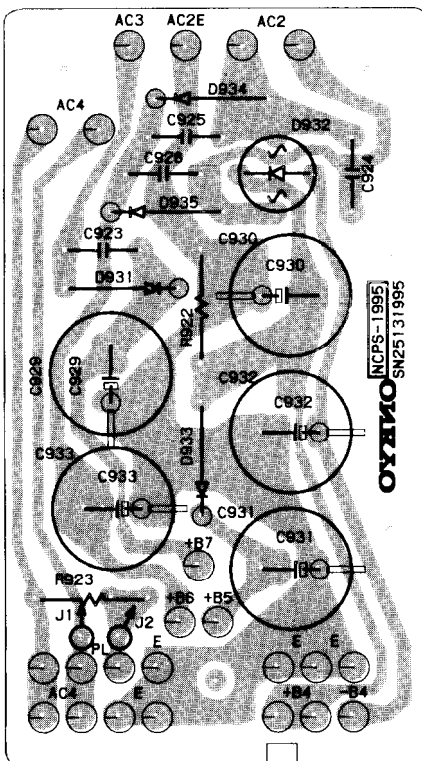
- ALL RESISTORS ARE IN OHMS 1/6WATT UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μ F 50VW UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (1-) ARE IN μ F/WV.
- VOLTAGE (MEASURED WITH V.T.V.M.) (NO INPUT SIGNAL)
- S1301~S1305 GANG
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
- THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY.

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

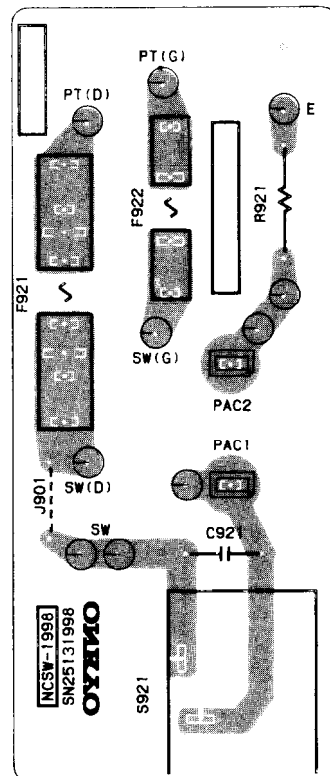
POWER SUPPLY CIRCUIT
PC BOARD



POWER SUPPLY CIRCUIT
PC BOARD



POWER SWITCH
PC BOARD



DIAL ILLUMINATION LAMP PC BOARD
(NAPL-1997)

CIRCUIT NO.	PART NO.	DESCRIPTION
PL921	210064A	250mA, 6.3V, Lamp

POWER SUPPLY CIRCUIT PC BOARD
(NAPS-1994)

CIRCUIT NO.	PART NO.	DESCRIPTION
D921, D923 D925, D927 D929, D930	223841	GP-30G, Diode

POWER SUPPLY CIRCUIT PC BOARD
(NAPS-1995)

CIRCUIT NO.	PART NO.	DESCRIPTION
Diodes		
D931, D933	223880	GP101N4003
D934, D935	223880	GP101N4003
D932	223862	WL01
Capacitors		
C929	352784719	470μF, 50V, Elect.
C930	352766809	68μF, 35V, Elect.
C931	352752229	2,200μF, 25V, Elect.
C932	352764719	470μF, 35V, Elect.
C933	352761029	1,000μF, 35V, Elect.
Resistor		
R922	441621024	1kΩ, 1W, Metal oxide film

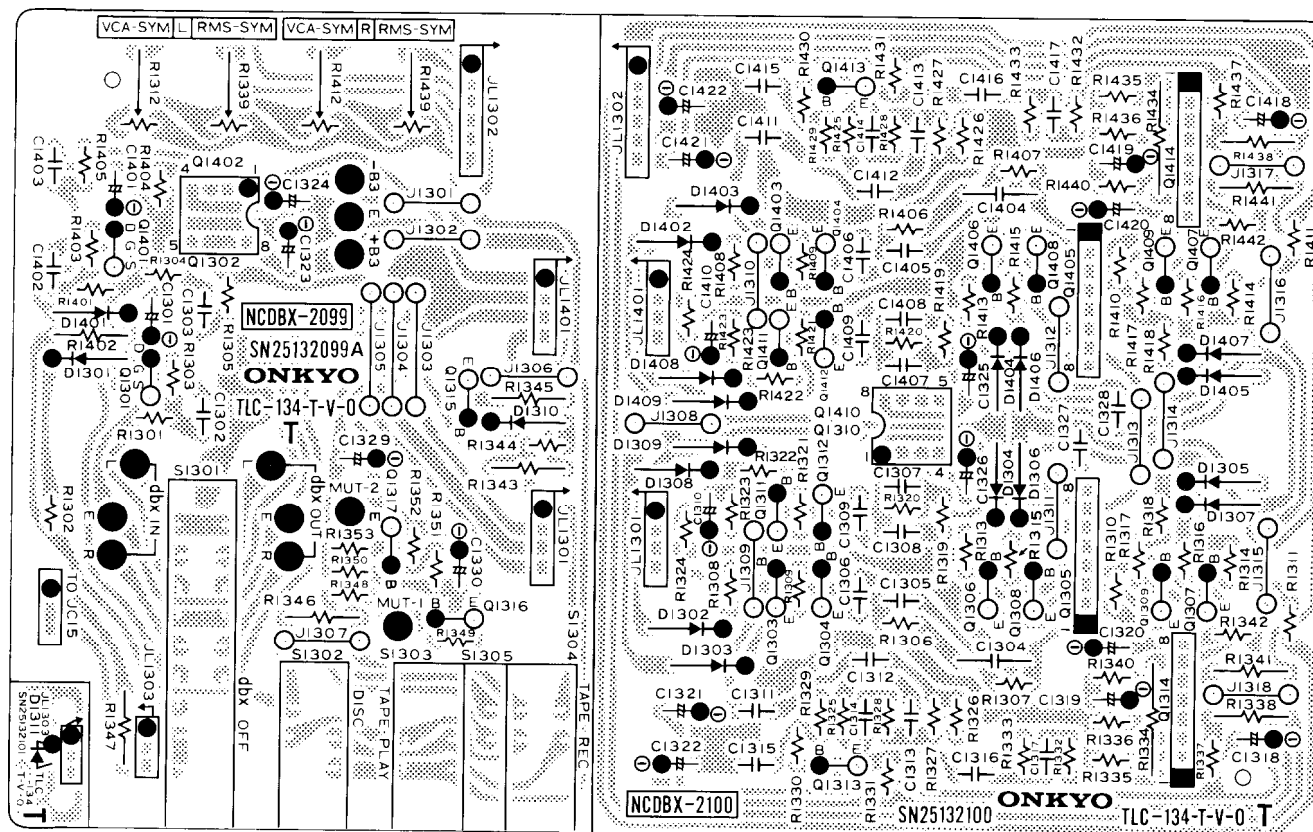
POWER SWITCH PC BOARD (NASW-1998/a)

CIRCUIT NO.	PART NO.	DESCRIPTION
△ C921	3500065A	0.01μF, AC400V/125V, Capacitor IS
△ R921	431523355	3.3MΩ, 1/2W, Solid resistor (D)
△ S921	25035015A	NPS-111-LA3, Power switch
△ F921	252051	6A (ST-6), Primary fuse
△ F921a	250113	SN5051
△ F922	252076	3.15A-SE-EA, Primary fuse (W)
△ F922a	25050065	YSH403T, Fuseholder (W)
△ C921a	27300601	Cover, capacitor

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
Note (W): Only Universal model

DBX CIRCUIT PC BOARD



DBX CIRCUIT PC BOARD (NADBX-2099)

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q1302, Q1402	222534	NJM4559DX
Transistors		
Q1301, Q1401	2211945	2SK246 (GR)
Q1315-Q1317	2211255 or 2210746	2SC1815 (GR) or 2SC945A (P)
Diodes		
D1301, D1401	223145, 223133 or 223105	1S2976TD, DS442X or 1S1555
Capacitors		
C1301, C1401	352780109	1 μ F, 50V, Elect.
C1323, C1324 C1329, C1330	352741009	10 μ F, 16V, Elect.
Resistors		
R1312, R1339 R1412, R1439	5215023	N08HR50KBC, Semifixed
Switches		
S1301-S1305	25035432	NPS-162-322-L396

LED PC BOARD (NALED-2101)

CIRCUIT NO.	PART NO.	DESCRIPTION
D1311	225141	SEL2213C

DBX CIRCUIT PC BOARD (NADBX-2100)

CIRCUIT NO.	PART NO.	DESCRIPTION
ICs		
Q1305, Q1405	222805	μ PC-1252H2
Q1310, Q1410	222534	NJM-4559DX
Q1314, Q1414	222806	μ PC-1253H2
Transistors		
Q1303, Q1304	2211255 or	2SC1815 (GR) or
Q1306-Q1309	2210746	2SC945A (P)
Q1311-Q1313	2211255 or	2SC1815 (GR) or
Q1403, Q1404	2210746	2SC945A (P)
Q1406-Q1409	2211255 or	2SC1815 (GR) or
Q1411-Q1413	2210746	2SC945A (P)
Diodes		
D1302-D1309	223145,	1S2076TD,
D1402-D1409	223133 or 223105	DS442X or 1S1555
Capacitors		
C1310, C1410	352780229	2.2 μ F, 50V, Elect.
C1318, C1418	392880107	1 μ F, 50V, LL
C1319, C1419	392851005	10 μ F, 25V, LL
C1320, C1420	352751009	10 μ F, 25V, Elect.
C1321, C1421	352741009	10 μ F, 16V, Elect.
C1322, C1422 C1325, C1326		

Resistors		
R1334, R1434	431422267	22M Ω , 1/4W, Solid