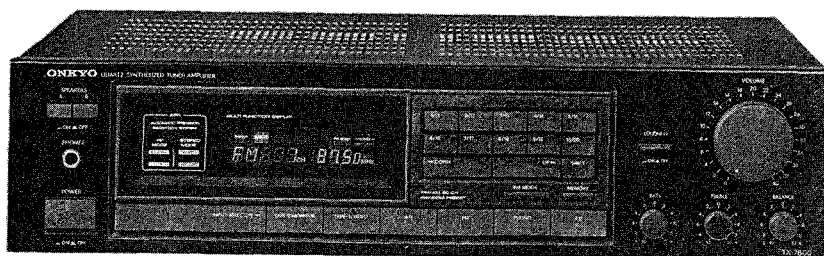


ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER MODEL TX-7600



Black and Silver models

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:	35 watts per channel, min, RMS, at 8 ohms, both channels driven, from 40Hz to 20kHz, with no more than 0.3% total harmonic distortion.
Musical Power Output:	2 × 85 watts at 4 ohms, 1kHz (DIN) 2 × 65 watts at 8 ohms, 1kHz (DIN)
Continuous Power Output:	2 × 45 watts at 4 ohms, 1kHz (DIN) 2 × 40 watts at 8 ohms, 1kHz (DIN)
Total Harmonic Distortion:	0.3% at rated power 0.1% at 25 watts output
IM Distortion:	0.3% at rated power 0.1% at 25 watts output
Damping Factor:	35 at 8 ohms
Frequency Response:	20 – 30,000Hz ±1dB
RIAA Diviation:	20 – 20,000Hz ±0.8dB
Sensitivity and Impedance:	Phono: 2.5mV/50 kohms CD: 150mV/50 kohms Tape Play: 150mV/50 kohms Tape Rec: 150mV/3.5 kohms
Phono Overload (MM):	120mV RMS at 1kHz, 0.3% THD.
Signal-to-Noise Ratio:	Phono: 85dB (at 10mV input, A weighted) 75dB (IHF A-202) CD/Tape: 95dB (A weighted) 80dB (IHF A-202)
Tone controls:	Bass: ±10dB at 100Hz Treble: ±10dB at 10kHz

TUNER SECTION

FM:	–220V/240V/ Worldwide models–
Tuning Range:	87.50 – 108.00MHz (50kHz steps)
Usable Sensitivity:	Mono: 12.4dBf, 1.2μV, 75ohms 1.2μV (S/N 26dB, 40kHz Devi.) 75ohms DIN Stereo: 19.2dBf, 2.5μV, 75ohms 25μV (S/N 46dB, 40kHz Devi.) 75ohms DIN
50dB Quieting Sensitivity:	Mono: 18.2dBf, 2.2μV, 75ohms Stereo: 38.2dBf, 22μV, 75ohms
Capture Ratio:	1.5dB
Image Rejection Ratio:	85dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 70dB Stereo: 65dB
Selectivity:	50dB DIN (±300kHz, 40kHz dev.)
AM suppression Ratio:	50dB
Harmonic Distortion:	Mono: 0.15% Stereo: 0.30%
Frequency Response:	30 – 15,000Hz ±1.5dB
Stereo Separation:	40dB at 1kHz 30dB at 100 – 10,000Hz
Muting Level:	17.2dBf, 4μV
AM:	
Tuning Range:	522 – 1611kHz (9kHz steps)
Usable Sensitivity:	30μV
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.8%

GENERAL

Dimensions (W × H × D):	435 × 115 × 320mm 17-1/8" × 4-1/2" × 12-9/16"
Weight:	5.7kg., 12.6lbs.

SERVICE PROCEDURES

1.Replacing the fuses

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

Circuit no.	Part no.	Description
F902	252071	1.25A-SE-EAK,Primary

2.Changing the band step

With the exception of the models below, a BAND STEP selector switch is not provided.

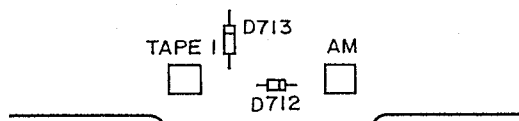
(FM)

MODEL	BAND STEP	D713	R122
UD	100kHz→50kHz	Additional	27kΩ→27kΩ
UG/UQ	50kHz→100kHz	Eliminated	27kΩ→13kΩ

(AM)

BAND STEP	D712
10kHz→9kHz	Additional
9kHz→10kHz	Eliminated

In D712 ISS133 (Part No. 223163) is used. In D713 US1040 (Part No. 223150) is used. R101, with the muting amplitude determined, is on the back panel side of the tuner circuit printed circuit board assembly test points TP-1 and TP-2. (Refer page 13)

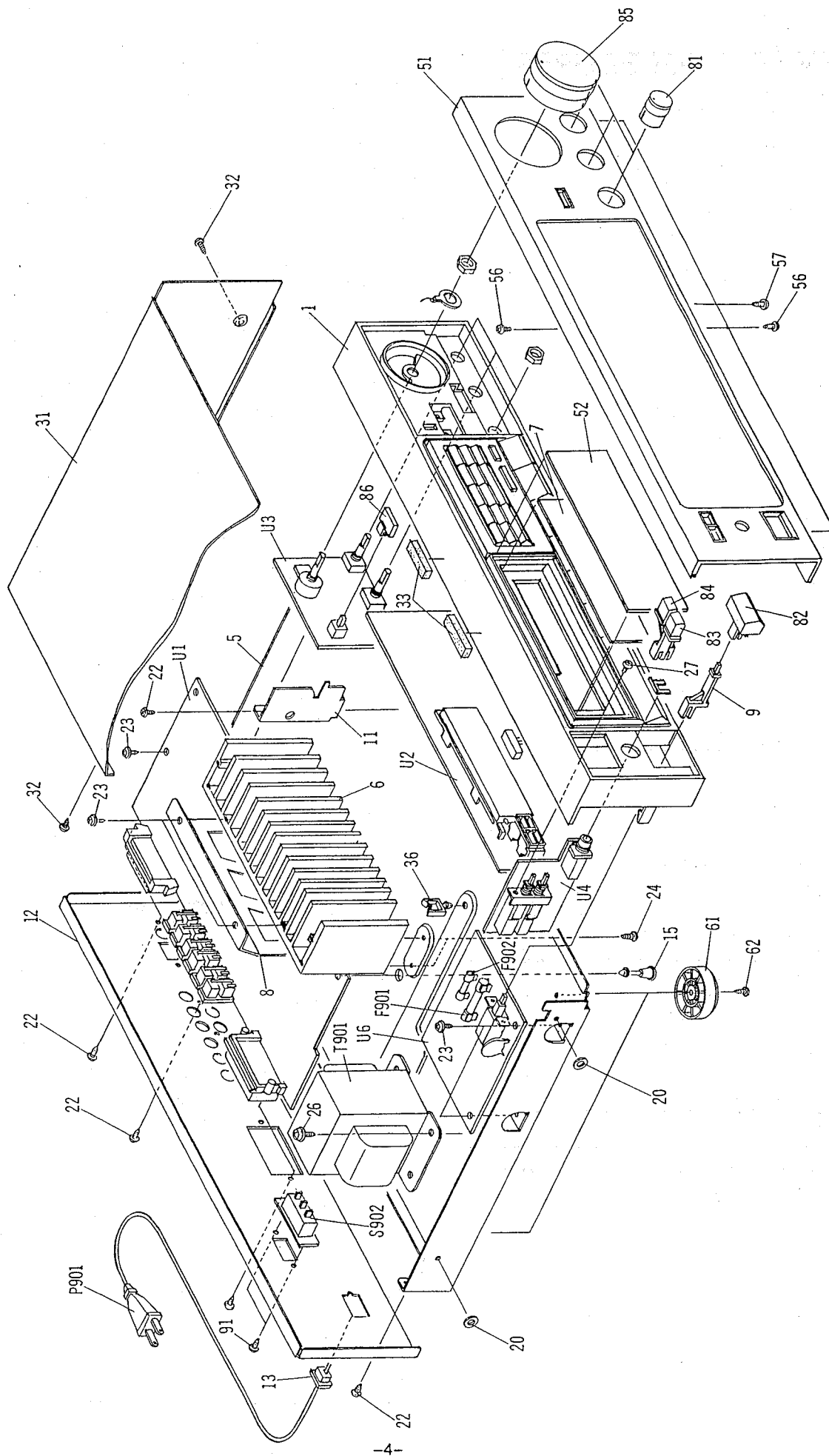


3.Memory preservation

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

14
für Strong

EXPLODED VIEW



PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1	27110471B	Front bracket ass'y
	27110470B	Front bracket ass'y <S>
5	27100187B	Chassis
6	27160183	Radiator
7	28133218	Back plate
8	27130574	Bracket, IC
9	27273116	Joint, POWER
11	27130577	Bracket, SHIELD
12	27121229	Back panel
13	27300750	△ Bushing(Strainrelief)
15	27190524	KGLS-14R, Holder
20	27270212	Spacer
22	834430088	3TTS+8B(BC), Tapping screw
23	831130088	3TTW+8B, Tapping screw
26	830440089	4TTC+8C(BC), Tapping screw
27	82143006	3P+6FN(BC), Fan head screw
31	28184432	Top cover
	28184431	Top cover <S>
32	834430088	3TTS+8B(BC), Tapping screw
33	28140020	Cushion
36	27300833	Clamp
51	1A154121	Front panel ass'y
	1A155121	Front panel ass'y <S>
52	28191504	Clear plate
56	833430080	3TTP+8P(BC), Tapping screw
57	834430088	3TTS+8B(BC), Tapping screw
61	27175219A	Leg
62	834430088	3TTS+8B(BC), Tapping screw
81	28323310	Knob, TONE
	28323688	Knob, TONE <S>
82	28323241-1A	Knob, POWER
	28323249-1A	Knob, POWER <S>
83	28323314	Knob, SPEAKER A
	28323313-1	Knob, SPEAKER A <S>
84	28323316	Knob, SPEAKER B
	28323315-1	Knob, SPEAKER B <S>
85	28323689-1	Knob, VOLUME
	28323690	Knob, VOLUME <S>
86	28323638	Knob, LOUDNESS
	28323637	Knob, LOUDNESS <S>
F902	252071	△ 1.25A-SE-EAK, Fuse, primary
P901	253149 or 253151	△ AS-CEE, Power supply cord
T901	2300407	△ NPT-1027G, Power transformer

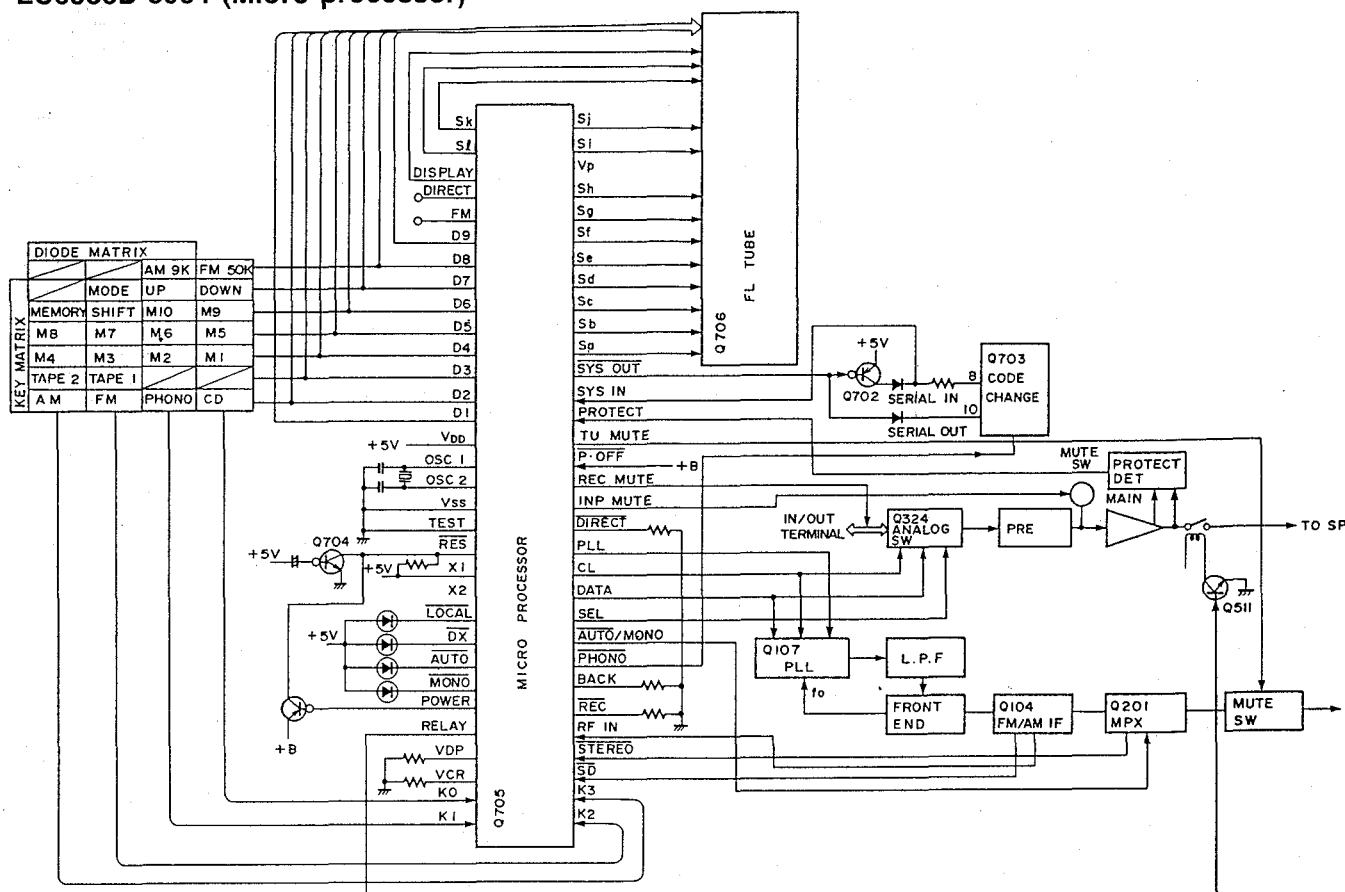
NOTE: : Only Black model
<S> : Only Silver model

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

IC BLOCK DIAGRAM AND DESCRIPTIONS

Q705

LC6538D-3984 (Micro processor)



Pin No.	Terminal	Descriptions
1	Sk	These are the output terminal for segment signal.
2	Sl	"H" when active.
3	DISPLAY	This is the display control output terminal. "H" during FL tube lights on.
4	DIRECT	This is the direct indicator output terminal. Not used.
5	FM	This is FM control output terminal. Not used.
6	D9	These are the output terminal for digit and key scan signal. "H" when active.
7	D8	
8	D7	
9	D6	
10	D5	
11	D4	
12	D3	
13	D2	
14	D1	
15	VDD	This is the device power source terminal. At the time of operation, the supply is 5V. The internal data memory (RAM) is maintained by means of the super capacitor.
16	OSC1	This is the main system clock connection terminal. Connect to the 4.00MHz ceramic oscillator.
17	OSC2	
18	VSS	Ground terminal.
19	TEST	This is the test terminal for LSI. Connect to the ground terminal.
20	RES	This is the reset terminal. Reset at the low level when the power is turned on.
21	X1	These are the sub clock input terminal. Not used.
22	X2	
23	LOCAL	These are the auto reception mode indicator output terminal. "L" when active.
24	DX	
25	AUTO	
26	MONO	

Pin No.	Terminal	Descriptions
27	POWER	This is the power control output terminal. "H" when the power is turned on.
28	RELAY	This is the speaker protection relay control output terminal. "H" when active.
29	VDP	These are the video signal control output terminal. Not used.
30	VCR	
31	K0	These are the key return signal input terminal. "H" when active.
32	K1	
33	K2	
34	K3	
35	SD	This is the auto stop input terminal. Auto tuning stops when this terminal becomes low level.
36	STEREO	This is the input terminal for detection of the stereo broadcast. "L" when stereo broadcast.
37	RF IN	This is IF signal level input terminal. DX mode when this terminal becomes the high level.
38	REC	These are the mode setting input terminals.
39	BACK	
40	PHONO	This is PHONO control output terminal. "L" when selector switch is PHONO.
41	AUTO/MONO	This is AUTO/MONO switching output terminal. "L" when AUTO.
42	SEL	Connect to terminal SEL of analog switch. (Q324 LC7821)
43	DATA	This is the serial data output terminal. Connect to terminal DATA of PLL IC (Q107 LM7001) and terminal DI of analog switch.
44	CLOCK	This is the serial clock output terminal. Connect to terminal CI of PLL IC and terminal DI of analog switch.
45	PLL	Connect to terminal CE of PLL IC.
46	DIRECT	This is the direct control output terminal. "L" when active.
47	INP MUTE	This is the muting output terminal for audio amplifier. "H" when the selector switch is operated.
48	REC MUTE	This is the muting output terminal for recording. "H" when the selector switch is operated.
49	P. OFF	This is the input terminal for detection of stoppage of electric current. "L" when the stoppage of electric current.
50	TU MUTE	This is the muting output terminal of tuner section. "H" when active.
51	PROTECT	This is the detection terminal for protection circuit. The speaker relay turns off when this terminal becomes the high level.
52	SYS IN	This is the system code input terminal. "H" when active.
53	SYS OUT	This is the system code output terminal. "L" when active.
54	Sa	These are the segment output terminal. "H" when active.
55	Sb	
56	Sc	
57	Sd	
58	Se	
59	Sf	
60	Sg	
61	Sh	
62	VP	This is the power supply terminal for pull-down resistor.
63	Si	These are the segment output terminal. "H" when active.
64	Sj	

Key and diode matrix

	D1(14)	D2(13)	D3(12)	D4(11)	D5(10)	D6(9)	D7(8)	D8(7)	D9(6)
K3(34)		AM	TAPE-2	M4	M8	MEMORY	DIRECT	PSET30	
K2(33)		FM	TAPE-1	M3	M7	SHIFT	FM MODE	EU1/2	
KI(32)		PHONO	VCR	M2	M6	M10	UP	AM9K	VKEY
K0(31)	POWER	CD	VDP	M1	M5	M9	DOWN	FM50K	PKEY
DIODE MATRIX									

FM50K (FM band setting)

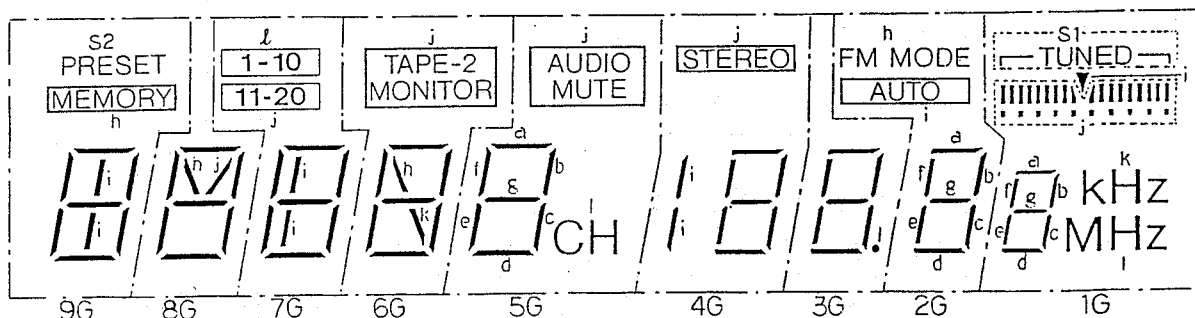
FM50K	Region	Frequency range	Channel space	Reference frequency	IF frequency
1	Europe	87.50 ~ 108.00MHz	50kHz	25kHz	10.7MHz
0	U.S.A.	87.5 ~ 108.0MHz	100kHz	25kHz	10.7MHz

AM9K (AM band setting)

AM9K	Region	Frequency range	Channel space	Reference frequency	IF frequency
1	Europe	522 ~ 1611 kHz	9kHz	9kHz	450kHz
0	U.S.A.	530 ~ 1710 kHz	10kHz	10kHz	450kHz

Q706

FIP9BDM8 (FL tube)



Terminal connection

TERMINAL NO. ELECTRODE	1 F	2 F	3 NP	4 P (j)	5 9G	6 P (i)	7 8G	8 P (h)	9 P (g)	10 7G	11 P (f)	12 NP	13 6G	14 P (e)	15 P (d)	16 P (c)	17 5G	18 P (b)		
TERMINAL NO. ELECTRODE			19 P (a)	20 NP	21 4G	22 P (k)	23 P (l)	24 NP	25 3G	26 P (s2)	27 2G	28 P (s1)	29 1G	30 NP	31 NP	32 NP	33 1G	34 NP	35 F	36 F

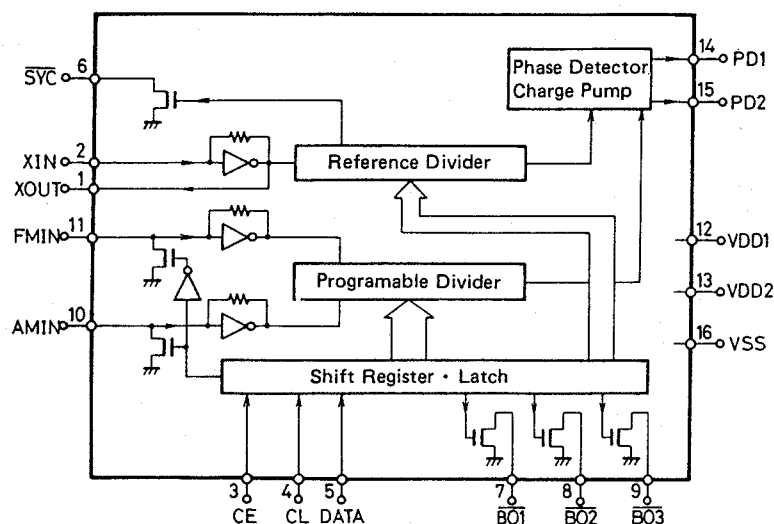
Notes F: Filament G: Grid
P: Anode NP: No Pin

Connection of fluorescent tube and microprocessor

	D9 (6)	D8 (7)	D7 (8)	D6 (9)	D5 (10)	D4 (11)	D3 (12)	D2 (13)	D1 (14)
Sa (54)	a	a	a	a	a	a	a	a	a
Sb (55)	b	b	b	b	b	b	b	b	b
Sc (56)	c	c	c	c	c	c	c	c	c
Sd (57)	d	d	d	d	d	d	d	d	d
Se (58)	e	e	e	e	e	e	e	e	e
Sf (59)	f	f	f	f	f	f	f	f	f
Sg (60)	g	g	g	g	g	g	g	g	g
Sh (61)	MEMORY	h	h	h				FM MODE	
Si (63)	i	i	i			/		AUTO	▼
Sj (64)	j	j	11-20	TAPE-2	MUTING	STEREO		MONO	
Sk (1)			k	k	k				kHz
Sl (2)	l		1-10		CH				MHz

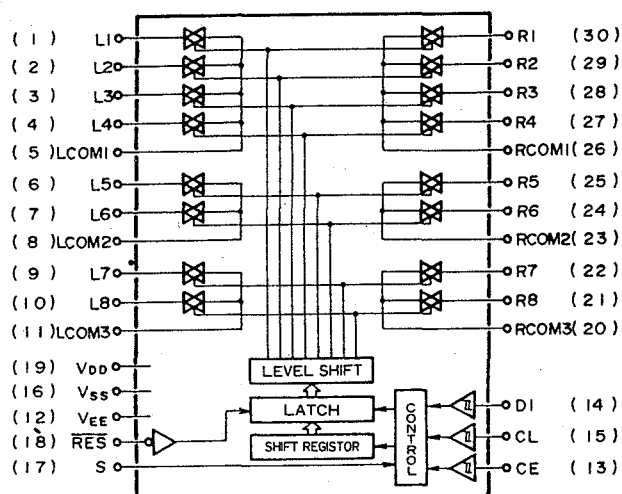
(): Pin number of micro processor

Q107
LM7001 (PLL synthesizer and controller)

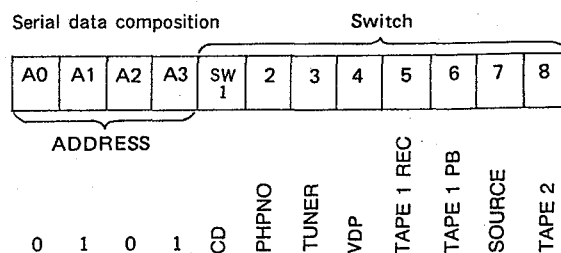


Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2 MHz crystal oscillator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of micro processor.
4	CL	Serial clock input terminal. Connect to the CLOCK terminal of microprocessor.
5	DATA	Serial data input terminal. Connect to the DATA terminal of microprocessor.
6	SYN	Not used.
7	BO1	Not used.
8	BO2	FM control signal output terminal. "L" when FM.
9	BO3	AM control signal output terminal. "L" when AM.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator terminal.
12	VDD1	Power supply terminal for back-up.
13	VDD2	Power supply terminal.
14	PD1	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 through the low pass filters.
15	PD2	
16	Vss	Ground terminal.

Q324 LC7821 (Analog switch)



Serial data composition

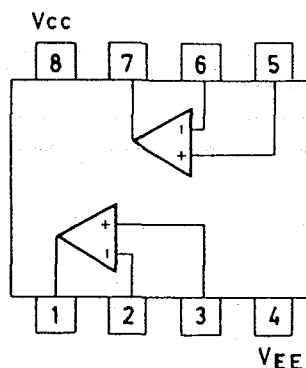


The source becomes ON when the bit of switch becomes the high level.

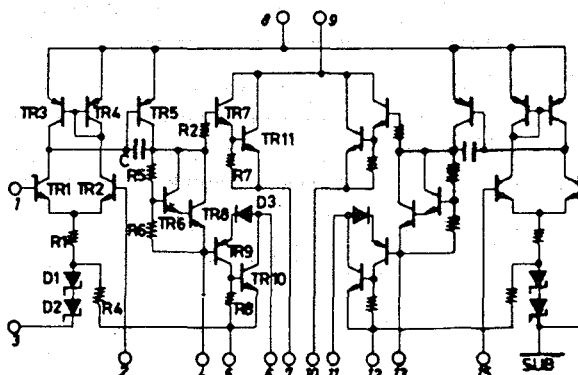
(Q312)

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	CD	Input/output terminals of audio signal of right channel. Control to the inside analog switch at the serial data.	16	Vss	Ground terminal.
2	PHONO		17	S	Selector terminal.
3	TUNER		18	RES	Reset terminal. When power is turned ON, the condition of the analog switch is not determined, but when this terminal is "L", all analog switches are OFF.
4	L COM 1		19	VDD	Power supply terminal. (+15V)
5	VDP		20	R COM 3	Input/output terminals of audio signal of left channel. Control to the inside analog switch at the serial data.
6	VCR PLAY		21	TAPE 1 PLAY	
7	L COM 2		22	R COM 2	
8	TAPE 1 PLAY		23	VCR PLAY	
9	L COM 3		24	VDP	
10			25	R COM 1	
11			26	TUNER	
12	V _{EE}	Negative power supply terminal. (-15V)	27	PHONO	
13	CE	Chip enable terminal. Connect to SEL terminal of micro processor.	28	CD	
14	DI	Serial data input terminal. Connect to DATA terminal of micro processor.	29		
15	CL	Serial clock input terminal. Connect to CLOCK terminal of micro processor.	30		

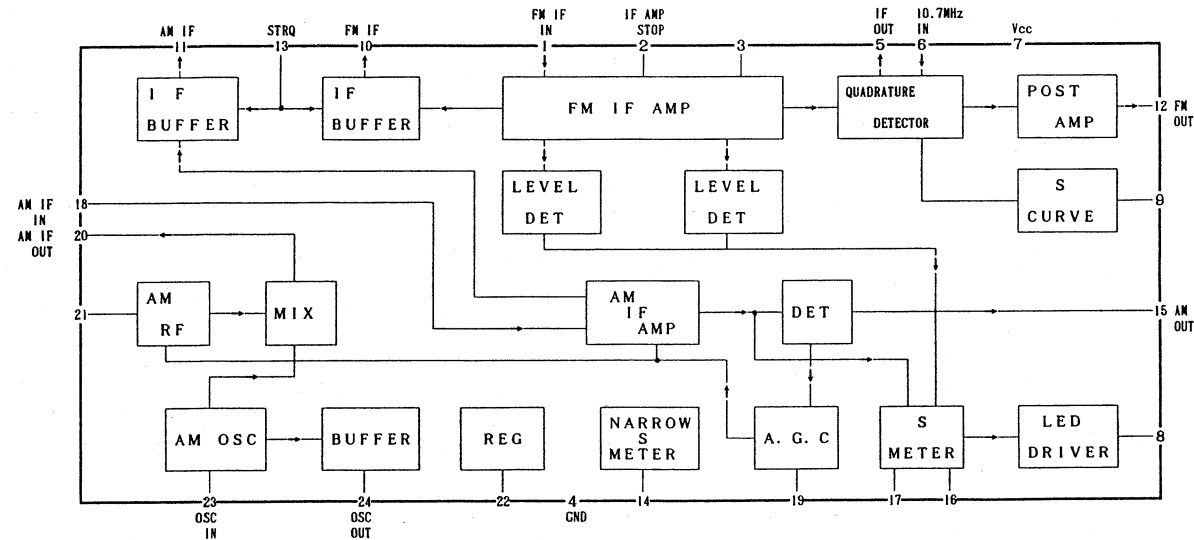
Q301, Q401, Q402 NJM4558D-X (Operation amplifier)



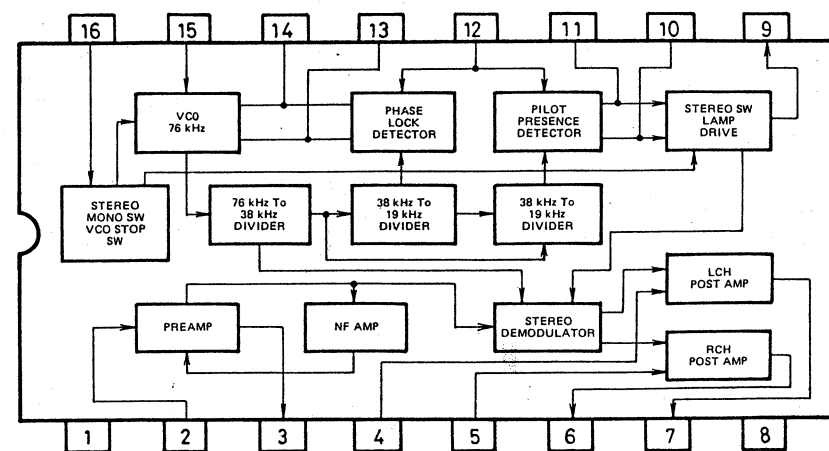
Q501 STK4151V (Power amplifier IC)



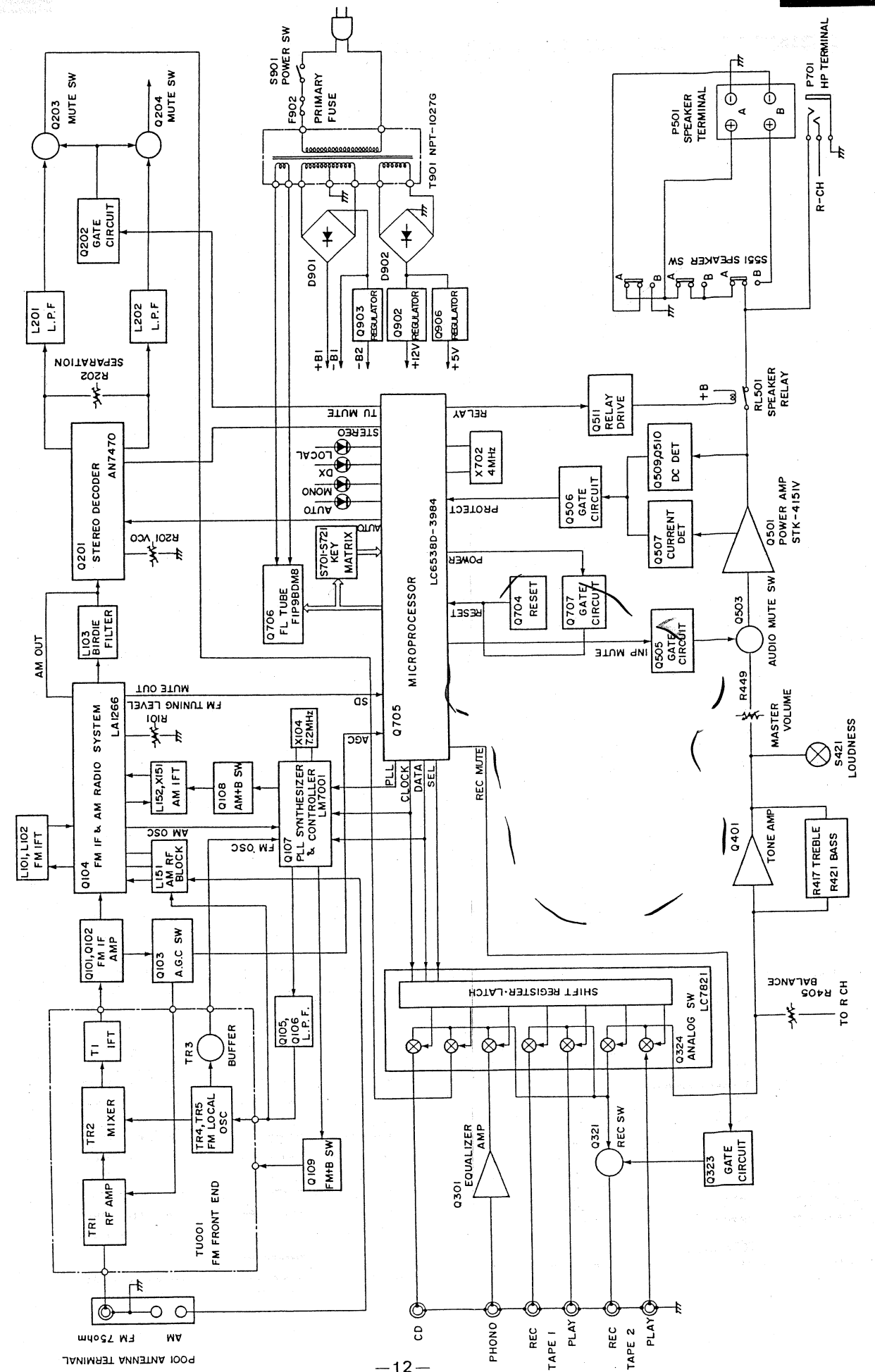
Q104
LN1266 (FM IF & AM radio system)



Q201
AN7470 (Stereo decoder)



BLOCK DIAGRAM



PRINTED CIRCUIT BOARD PARTS LIST

MAIN CIRCUIT PC BOARD (NAAR-3558-2A)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end			Ceramic filters	
U001	240085	TFFG4E122A	X101	3010070	SFE10.7MS3GYA <G/W>
	ICs		X102	3010137	SFE10.7MMK <G/W>
Q104	22240039	LA1266	X151	3010123	SFZ450JL
Q107	22240090	LM7001	X152	3010076	BFU450C
Q201	22240242	AN7470		X'tal	
Q301	222502	NJM4558D-X	X104	3010141	XTL-7.2M
Q324	22240079	LC7821		Capacitors	
Q501	222044	STK4151V	C001	354741009	10 μ F, 16V, Elect.
Q902	222780125	78M12HF	C106	354784799	0.47 μ F, 50V, Elect.
Q906	222780055	78M05HF	C107	354742209	22 μ F, 16V, Elect.
	Transistors		C108	354784709	47 μ F, 50V, Elect.
Q101	2211723	2SC1923-O	C112	354780229	2.2 μ F, 50V, Elect.
Q102	2210746	2SC945A-P	C113	354784799	0.47 μ F, 50V, Elect.
Q103	2211255	2SC1815-GR	C116	371122234	0.022 μ F $\pm$ 5%, 50V, Mylar
Q105	2212294	2SK108-D	C117	371123334	0.033 μ F $\pm$ 5%, 50V, Mylar
Q106	2211255	2SC1815-GR	C118	354780229	2.2 μ F, 50V, Elect.
Q108, Q109	2212600	DTA124ES	C119	354782299	0.22 μ F, 50V, Elect.
Q202, Q323	2211455 or	2SA1015-GR or	C123	354721019	100 μ F, 6.3V, Elect.
Q505, Q506	2212495	JA101-Q	C154	354780479	4.7 μ F, 50V, Elect.
Q203, Q204	2212285 or	2SC2878-A or	C155	354784709	47 μ F, 50V, Elect.
Q321, Q322	2212286	2SC2878-B	C156, C157	354741009	10 μ F, 16V, Elect.
Q503, Q504	2212285 or	2SC2878-A or	C159	371123334	0.033 μ F $\pm$ 5%, 50V, Mylar
	2212286	2SC2878-B	C160	371122234	0.022 μ F $\pm$ 5%, 50V, Mylar
Q507, Q508	2211732 or	2SC1845-F or	C201	354744719	470 μ F, 16V, Elect.
	2211733	2SC1845-E	C202	354741009	10 μ F, 16V, Elect.
Q509, Q510	2211255	2SC1815-GR	C204, C205	371121224	1200pF $\pm$ 5%, 50V, Mylar
Q511	2210746	2SC945A-P	C206	371124734	0.047 μ F $\pm$ 5%, 50V, Mylar
Q903	2211455 or	2SA1015-GR or	C207	370134714	470pF $\pm$ 5%, 100V, APS
	2212495	JA101-Q	C208	354780109	1 μ F, 50V, Elect.
	Diodes		C209	354780339	3.3 μ F, 50V, Elect.
D101, D102	223132	1K60	C210	354782299	0.22 μ F, 50V, Elect.
D103	223150,	US1040,	C212, C213	354741009	10 μ F, 16V, Elect.
	223145 or	1S2076TD or	C215, C216	354780229	2.2 μ F, 50V, Elect.
	223124	1S2473	C217, C218	371123924	3900pF $\pm$ 5%, 50V, Mylar
D201, D501	223163	ISS133	C219	354780229	2.2 μ F, 50V, Elect.
D502	224150512 or	05AZ5.1Y or	C301, C302	354780229	2.2 μ F, 50V, Elect.
	224450512	MTZ5.1B	C307, C308	354721019	100 μ F, 6.3V, Elect.
D503	223163	ISS133	C309, C310	371126224	6200pF $\pm$ 5%, 50V, Mylar
D901	22380023	RBV401	C311, C312	371121824	1800pF $\pm$ 5%, 50V, Mylar
D902	223862 or	WL01 or	C313, C314	354780229	2.2 μ F, 50V, Elect.
	223890	W01RL	C315, C316	354741019	100 μ F, 16V, Elect.
D903, D904	224151202 or	05AZ12Y or	C333	354741009	10 μ F, 16V, Elect.
	224451202	MTZ12B	C334	354780229	2.2 μ F, 50V, Elect.
D906	223880 or	GP101N4003 or	C501, C502	354780229	2.2 μ F, 50V, Elect.
	223896	1N4003F	C507, C508	354742219	220 μ F, 16V, Elect.
D907	223163	ISS133	C511, C512	354784709	47 μ F, 50V, Elect.
D908	224152703 or	05AZ27Z or	C513, C514	354781019	100 μ F, 50V, Elect.
	224452703	MTZ27C	C515	354781009	10 μ F, 50V, Elect.
D910	224450512	MTZ5.1B	C521, C522	371124734	0.047 μ F $\pm$ 5%, 50V, Mylar
	Transformers		C523	354722219	220 μ F, 6.3V, Elect.
L101	233401	NF1F-4072	C525	354780479	4.7 μ F, 50V, Elect.
L102	233402	NF1F-4073	C526	354780109	1 μ F, 50V, Elect.
L152	232139	NM1F-4062	C905, C906	3504207	6800 μ F, 50V, Elect.
	Coils		C907, C908	354742219	220 μ F, 16V, Elect.
L103	233383	NMC-6070	C910, C912	354784709	47 μ F, 50V, Elect.
L201, L202	233294	NMC-5040	C911	354752229	2200 μ F, 25V, Elect.
L501, L502	231001	S-1.3B	C915, C919	354781009	10 μ F, 50V, Elect.
	RF block		C917, C921	354741009	10 μ F, 16V, Elect.
L151	232152	NMRF-7052	R101	5210070 or 5210220	N06HR100KBD Semi-fixed

CIRCUIT NO.	PART NO.	DESCRIPTION
R201	5210062 or 5210216	N06HR4.7KBD or N06HR5KBD, Semi-fixed
R202	5210072 or 5210222	N06HR220KBD or N06HR200KBD, Semi-fixed
R513-R516	442523324	3.3kohm, 1/2W, Metal oxide film
R517, R518	442520914	9.1ohm, 1/2W, Metal oxide film
R519, R520	4500001	BPR2FK-0.1, Metal plate
R527-R530	442520824	8.2ohm, 1/2W, Metal oxide film
R902, R903	441729114	910ohm, 2W, Metal oxide film
R904	441726804	68ohm, 2W, Metal oxide film
R906	442521004	10ohm, 1/2W, Metal oxide film
R913	442520104	1ohm, 1/2W, Metal oxide film
	Terminals	
P001	25060087	NTM-2PDMN31, Antenna
P501	25060093	NTM-8PDM134, Speaker
P301	25045252	NPJ-6PDBL124
P302	25045213	NPJ-6PDBL92
	Relay	
RL501	25065339	NRL-2P5A-DC24-046

DISPLAY CIRCUIT PC BOARD (NADIS-3559-2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q705	22240244	LC6538D-3984
	Transistor	
Q707	2212600	DTA124ES
Q704	221282	DTC144ES
	FL tube	
Q706	212075	FIP9BDM8
	Diodes	
D708-D711	223150,	US1040,
D714-D717	223145 or 223124	1S2076TD or 1S2473
D712	223163	1SS133
D713	223150,	US1040,
	223145 or 223124	1S2076TD or 1S2473
D718-D720	223163	1SS133
D721	223150,	US1040,
	223145 or 223124	1S2076TD or 1S2473
D722	223163	1SS133
D729	224150622 or 224450622	05AZ6.2Y or MTZ6.2B
	L.E.Ds	
D723, D725	225137CG, 225137DG or 225137DY	SEL2413E-CG, SEL2413E-DG or SEL2413E-DY
D724, D726	225142	SEL2913K

CIRCUIT NO.	PART NO.	DESCRIPTION
	OSC element	
X702	3010150	CST4.00MGW
	Coil	
L701	233400K220	NCH-2238
	Capacitors	
C704	3000051	0.047F, 5.5V, Super
C707	354780109	1 μ F, 50V, Elect.
C708	375524744	0.47 μ F $\pm$ 5%, 50V, Plastic (MTT)
	Resistors	
R709	49163473406	47kohm $\times$ 6, 1/10W, Network
R711	49163104404	100kohm $\times$ 4, 1/10W, Network
R717	49163473405	47kohm $\times$ 5, 1/10W, Network
	Switch	
S701-S721	25035548	NPS-111-S510
	Holder	
	27190700	L.E.D

TONE CIRCUIT PC BOARD (NAAF-3560-2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q401, Q402	222502	NJM4558D-X
	Capacitors	
C401, C402	354780229	2.2 μ F, 50V, Elect.
C405, C406	354780229	2.2 μ F, 50V, Elect.
C407, C408	371122234	0.022 μ F $\pm$ 5%, 50V, Mylar
C409, C410	354780339	3.3 μ F, 50V, Elect.
C411, C412	371122234	0.022 μ F $\pm$ 5%, 50V, Mylar
C413, C414	354741019	100 μ F, 16V, Elect.
C443, C444	371124734	0.047 μ F $\pm$ 5%, 50V, Mylar
	Resistors	
R405	5104228	N14RHC250K WT22Z, Variable, Balance
R417	5104229	N14RHC100K WT22Z, Variable, Treble
R421	5104229	N14RHC100K WT22Z, Variable, Bass
R449	5142001	N16RGP100K BTP25, Variable, Volume
	Switch	
S441	25035611	NPS-122-L573
	Socket	
JL304a	25050378	NSCT-3P205

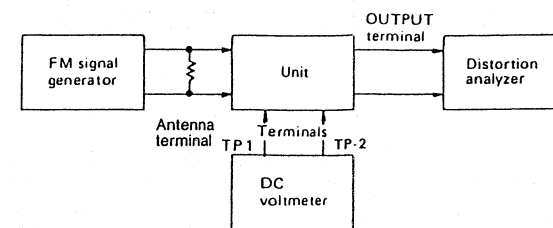
SPEAKER SWITCH PC BOARD (NASW-3561-2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
R551, R552	441622714	270ohm, 1W, Metal oxide film resistors
S551	25035610	NPS-122-142-L572, Speaker switch
P551	25045255	YKB21-5009, Headphone jack

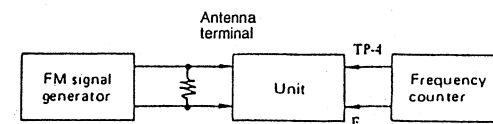
ADJUSTMENT PROCEDURES

FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuned frequency	Output indicator	Adjustment point	Adjust for	Remarks
I F	1	Fig. 1	99.1MHz 1kHz, 75kHz devi. 65dBf(60dB)	—	99.1MHz	DC voltmeter	L101	$0 \pm 20\text{mV}$	Set the FM mode switch to MONO. Repeat the steps 1 and 2 until no further adjustment is necessary.
	2					Distortion analyzer	L102	Minimum	
V C O		Fig. 2	99.1MHz 1kHz, 75kHz devi. 65dBf(60dB)	—	99.1MHz	Frequency counter	R201	$19\text{kHz} \pm 10\text{Hz}$	Set the FM mode switch to AUTO.
Stereo distortion		Fig. 3	99.1MHz Ext. modulation 65dBf(60dB)	L+R 1kHz 67.5kHz devi.	99.1MHz	Distortion analyzer	IF on front end	Minimum	
Stereo separation	1	Fig. 3	99.1MHz Ext. modulation 65dBf(60dB)	Lch. 1kHz	99.1MHz	Rch. AC voltmeter	R202	Minimum	Maximum and same separation
	2			Rch. 1kHz		Lch. AC voltmeter		Minimum	
Tuned indicator level	1	Fig. 3	99.1MHz 1kHz, 75kHz devi. 17.2dBf(12dB)		99.1MHz	TUNED indicator	R101	Light on	
	2		99.1MHz 1kHz, 75kHz devi. 16.2dBf(11dB)					Light off	

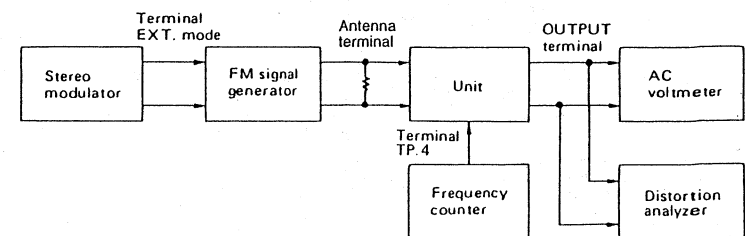


<Fig. 1>



Use the high impedance probe. (10:1)

<Fig. 2>



<Fig. 3>

AM section

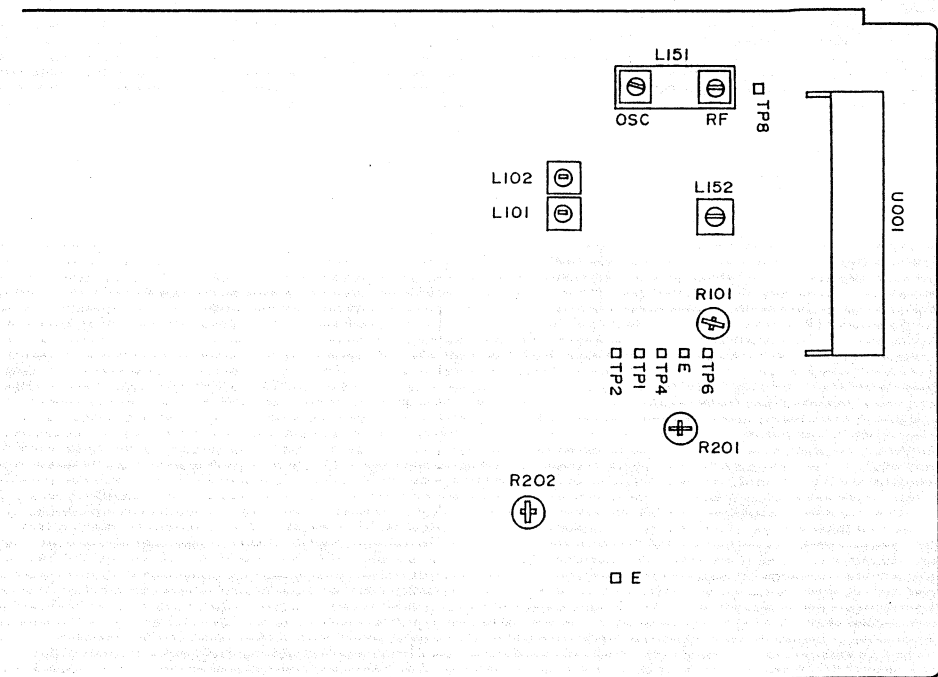
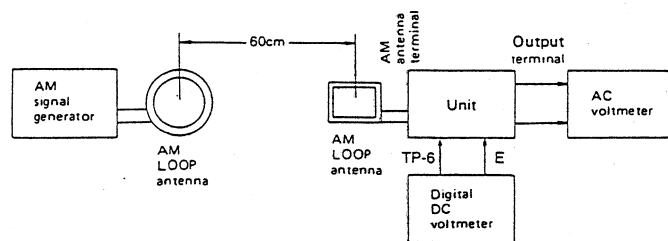
Step	AM SG output	Tuned Frequency	Output indicator	Adjustment point	Adjust for
1	—	522kHz	Digital DC voltmeter	OSC coil on RF block	$1.5\text{V} \pm 0.1\text{V}$
2	603kHz, 60dB/m 400Hz 30% mod.	603kHz	A C voltmeter	RF coil on R F block	Maximum
3	990kHz, 60dB/m 400Hz 30% mod.	990kHz	A C voltmeter	L152	Maximum

Reference specifications

Tuned voltage AM 522kHz $1.5 \pm 0.4\text{V}$
 1611kHz $7.5 \pm 0.5\text{V}$
 87.50MHz $2.0 \pm 0.5\text{V}$
 108.0MHz $7.5 \pm 0.5\text{V}$

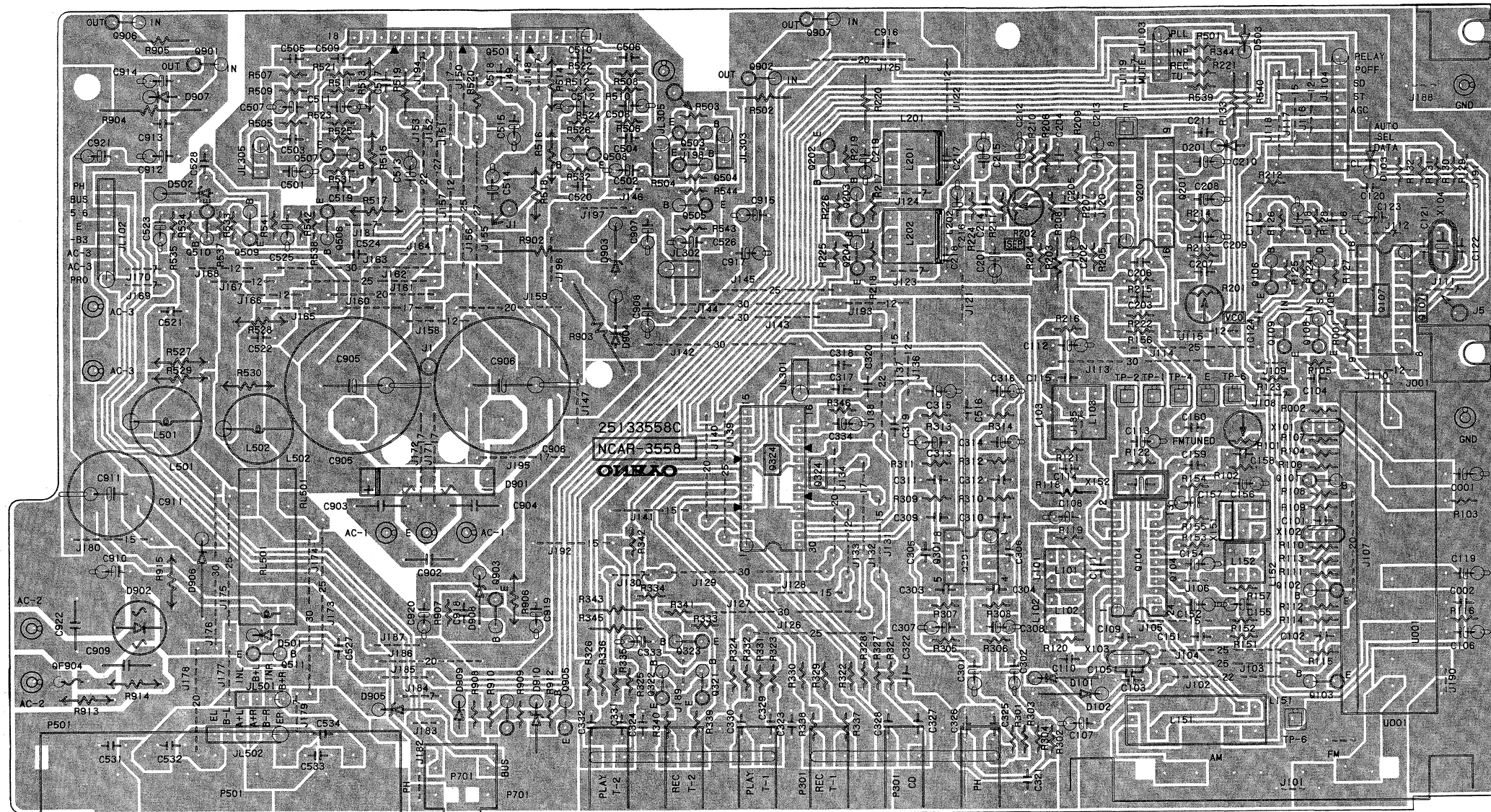
Muting width $35 \pm 10\text{kHz}$
 Muting level (U.S.A. model) FM $14 \pm 15\text{dB}$
 Auto stop level AM Less than 72dB/m
 FM Less than $20\text{dB}\mu$

Stereo indicator level $14 \pm 4\text{dB}\mu$



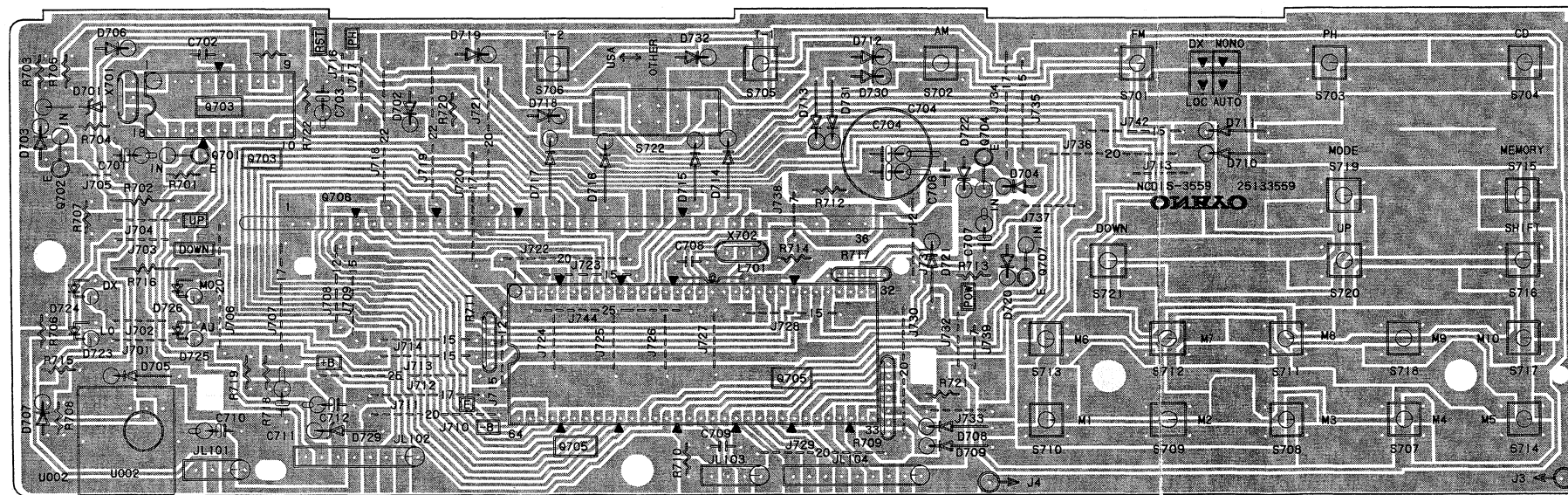
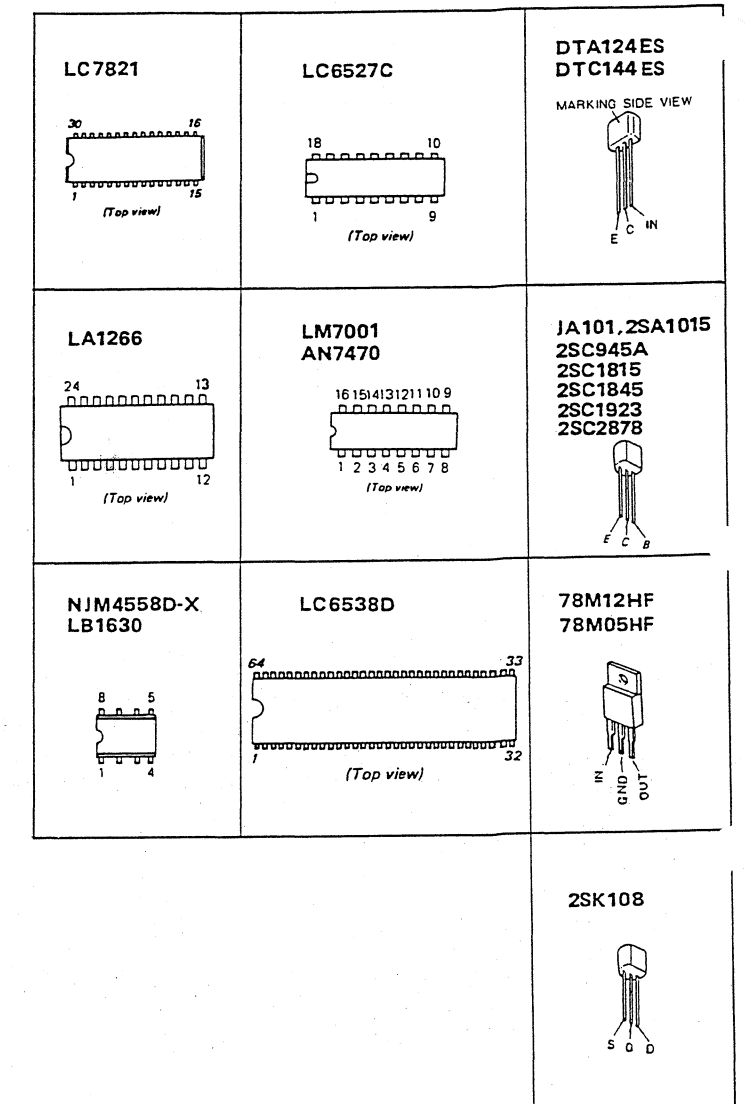
Adjustment point.

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



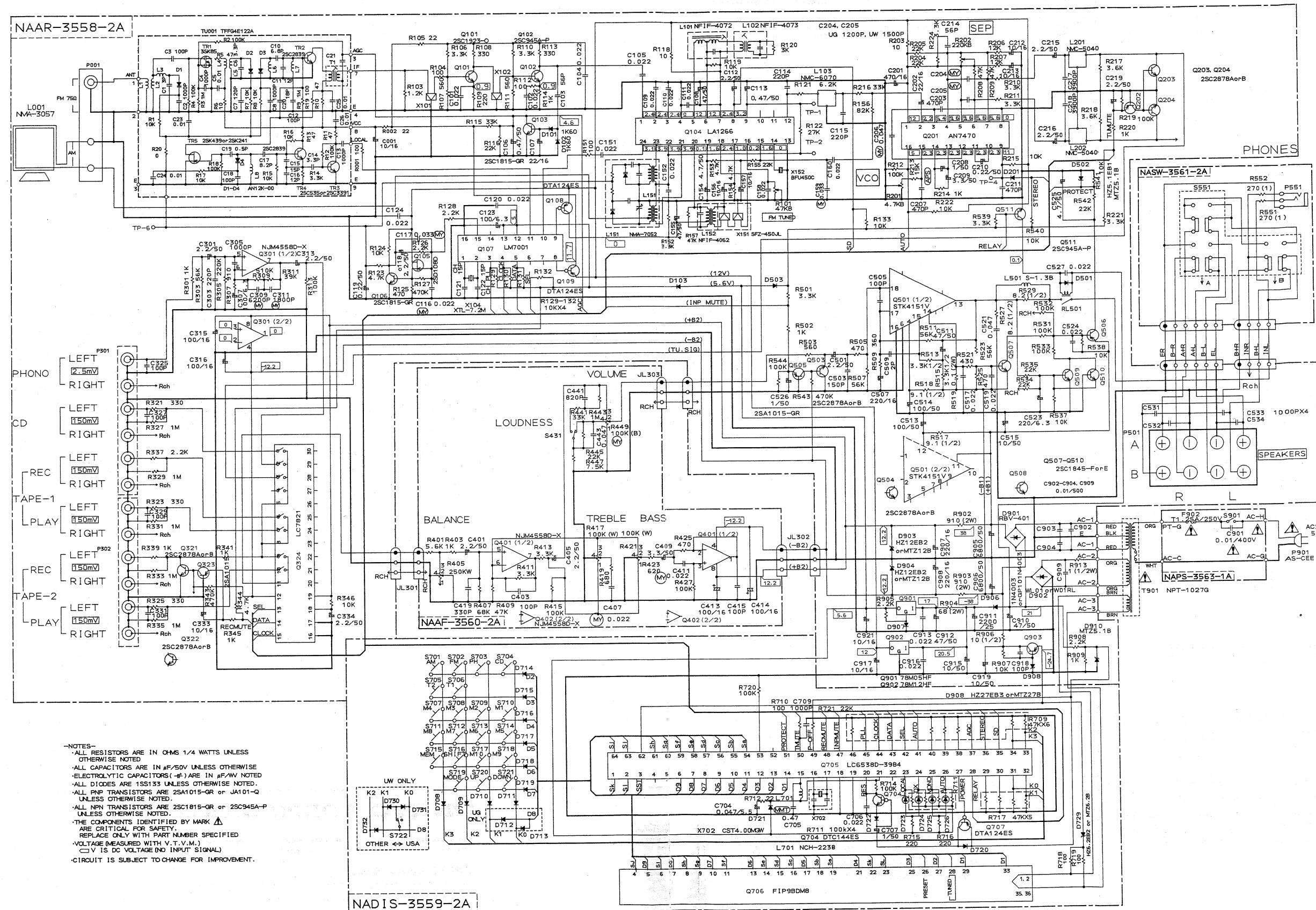
MAIN CIRCUIT PC BOARD

SEMI-CONDUCTOR VIEW



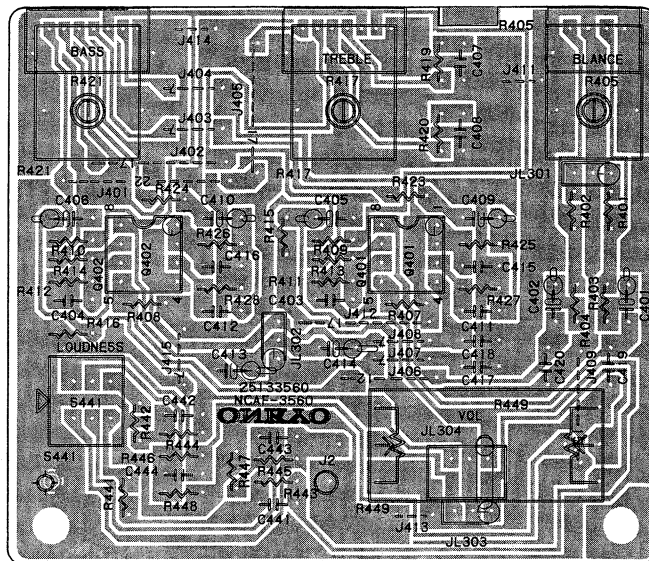
DISPLAY CIRCUIT PC BOARD

SCHEMATIC DIAGRAM

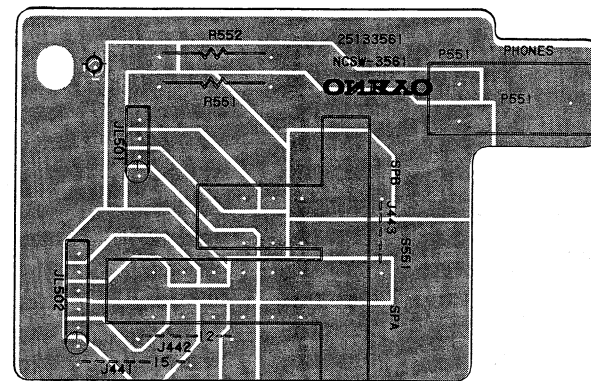


PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

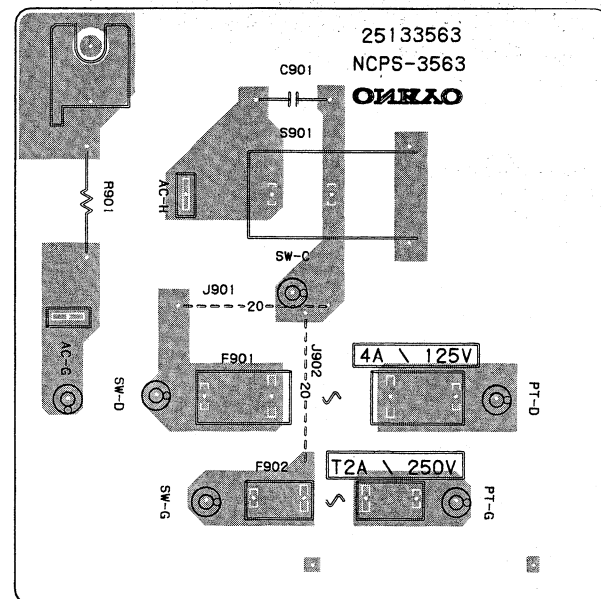
PACKING VIEW



TONE CIRCUIT PC BOARD



SPEAKER SWITCH PC BOARD

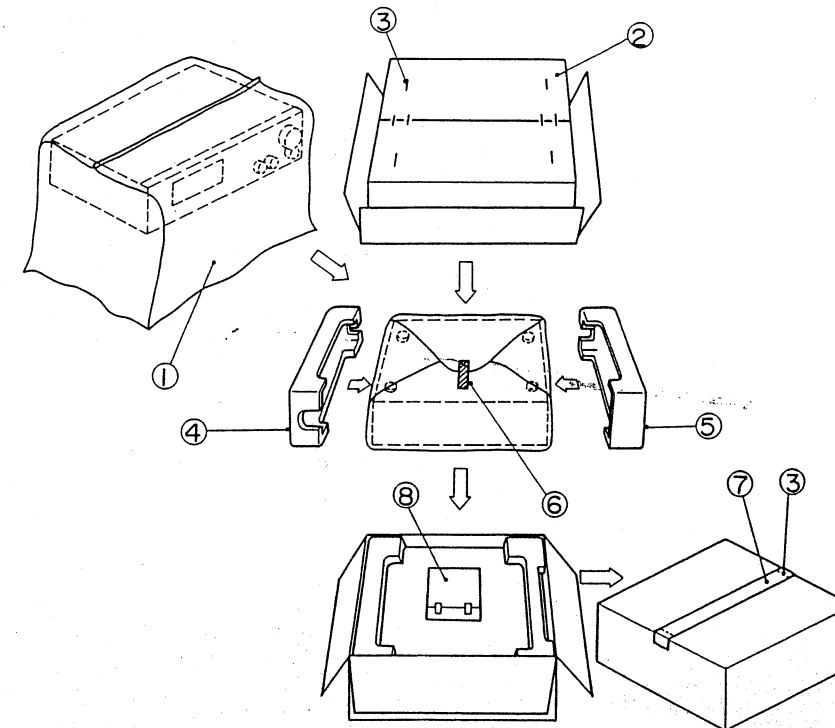


POWER SUPPLY PC BOARD

POWER SUPPLY CIRCUIT PC BOARD (NAPS-3563-2A)

CIRCUIT NO.	PART NO.	DESCRIPTION
C901	3500065A	△ DE7150FZ103P AC400V/125V, Capacitor IS
	27301216	△ SB1925, Cover for C901
S901	25035550	△ NPS-111-L512P, Power switch
F902a	25050065	△ YSH4037, Fuseholder
F902	252074	△ 2A-SE-EAK, Fuse, primary
	29361169	△ T1.25A 250V, Label, rating fuse

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



REF. NO.	PART NO.	DESCRIPTION
1	29100034	850 × 650mm, Poly-vinyl bag
2	29051891	Master carton box (Black model)
	29051892	Master carton box (Silver model)
3	282301	Sealing hook
4	29091328A	Pad R
5	29091327A	Pad L
6	261504	Adhesive tape
7	260012	Damplon tape
8	Accessory bag ass'y	
	29341398	Instruction manual
	292092	FM antenna
	232140	NMA-3057, AM loop antenna
	29100097	250 × 350mm, Poly-vinyl bag
	29365020A	Warranty card
	29100094A	Poly-vinyl bag

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