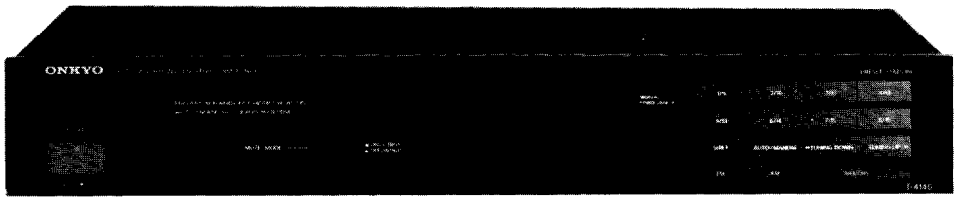
SERIAL NO. 3251

ONKYO SERVICE MANUAL

SYNTHESIZED
FM STEREO/AM TUNER
MODEL T-4140



Black model

BUD, BUDN	120V AC, 60Hz

SAFETY-RELATED COMPONENT WARNING!!
COMPONENTS IDENTIFIED BY MARK ⚠ 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.

TABLE OF CONTENTS

ONKYO
AUDIO COMPONENTS

SPECIFICATIONS

FM:		
Tuning Range:	87.9-107.9MHz(200kHz steps)	
Usable Sensitivity:	Mono:	11.2dBf, 2.0μV,IHF
	Stereo:	17.2dBf, 4.0μV
50dB Quieting Sensitivity:	Mono:	16.1dBf, 3.5μV
	Stereo:	36.1dBf, 35 μV
Capture Ratio:	1.5dB	
Image Rejection Ratio:	40dB	
IF Rejection Ratio:	90dB	
Signal-to-Noise Ratio:	Mono:	73dB
	Stereo:	66dB
ACA:	50dB IHF(±400kHz)	
AM Suppression Ratio:	50dB	
Harmonic Distortion:	Mono:	0.1%
	Stereo:	0.2%
Frequency Response:	30-15,000Hz ±1.5dB	
Stereo Separation:	40dB at 1kHz	
	30dB at 70-10,000Hz	
Output voltage:	500mV	
Muting level:	17.2dBf, 4μV	
AM:		
Tuning Range:	530-1,620kHz(10kHz steps)	
Usable Sensitivity:	25μV	
Image Rejection Ratio:	40dB	
IF Rejection Ratio:	30dB	
Signal-to-Noise Ratio:	40dB	
Harmonic Distortion:	0.8%	
Output voltage:	150mV	
GENERAL:		
Dimensions(W×H ×D):	435×71×268mm	
	17-1/8"×2-13/16"×10-9/16"	
Weight:	3.0kg., 6.6lbs.	

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1.Safety-check out

(Only U.S.A. 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 suuply cord and chassis.

Specifications: 3.3Mohm ±10% at 500V.

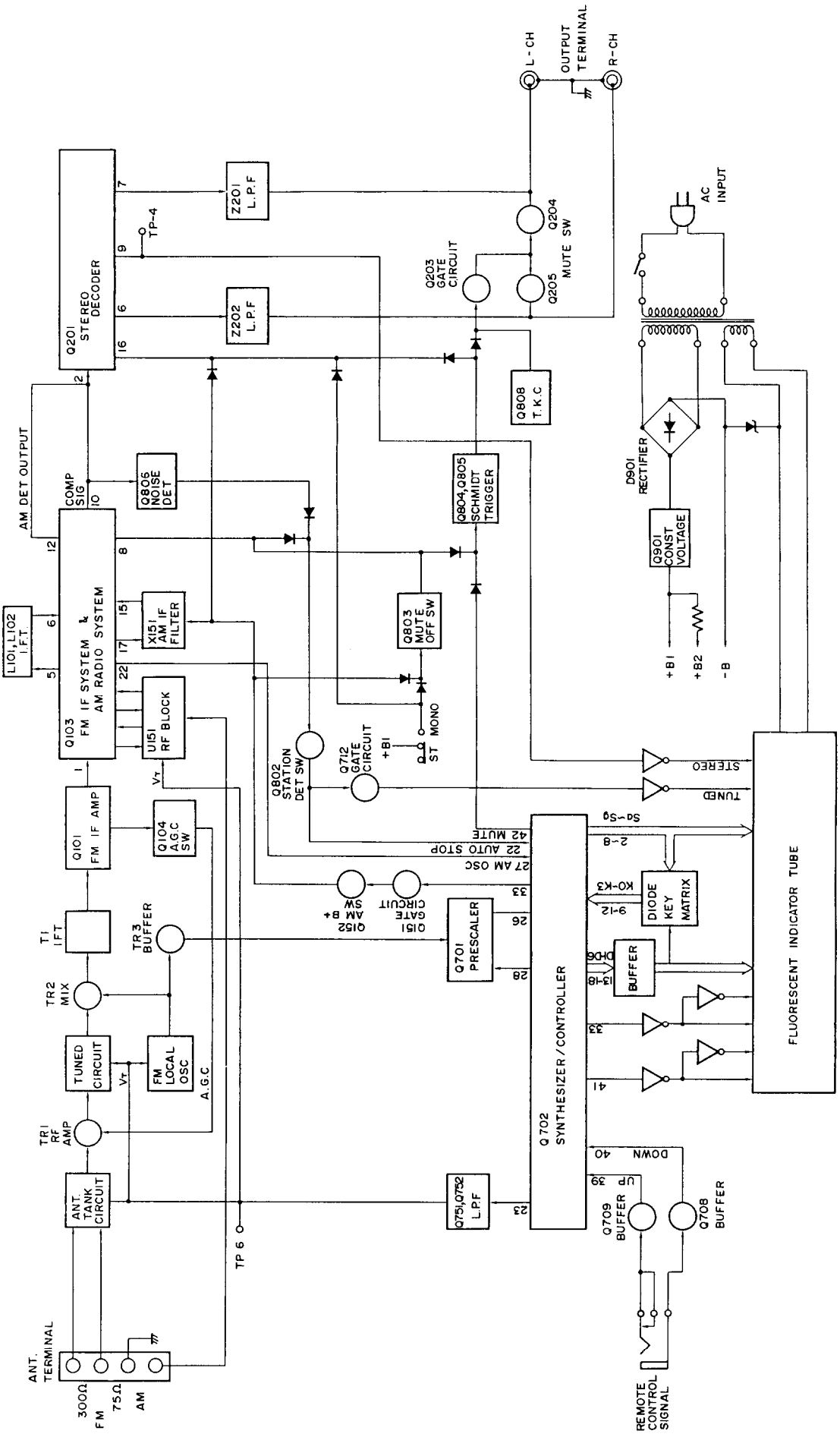
2.Memroy preservation

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.

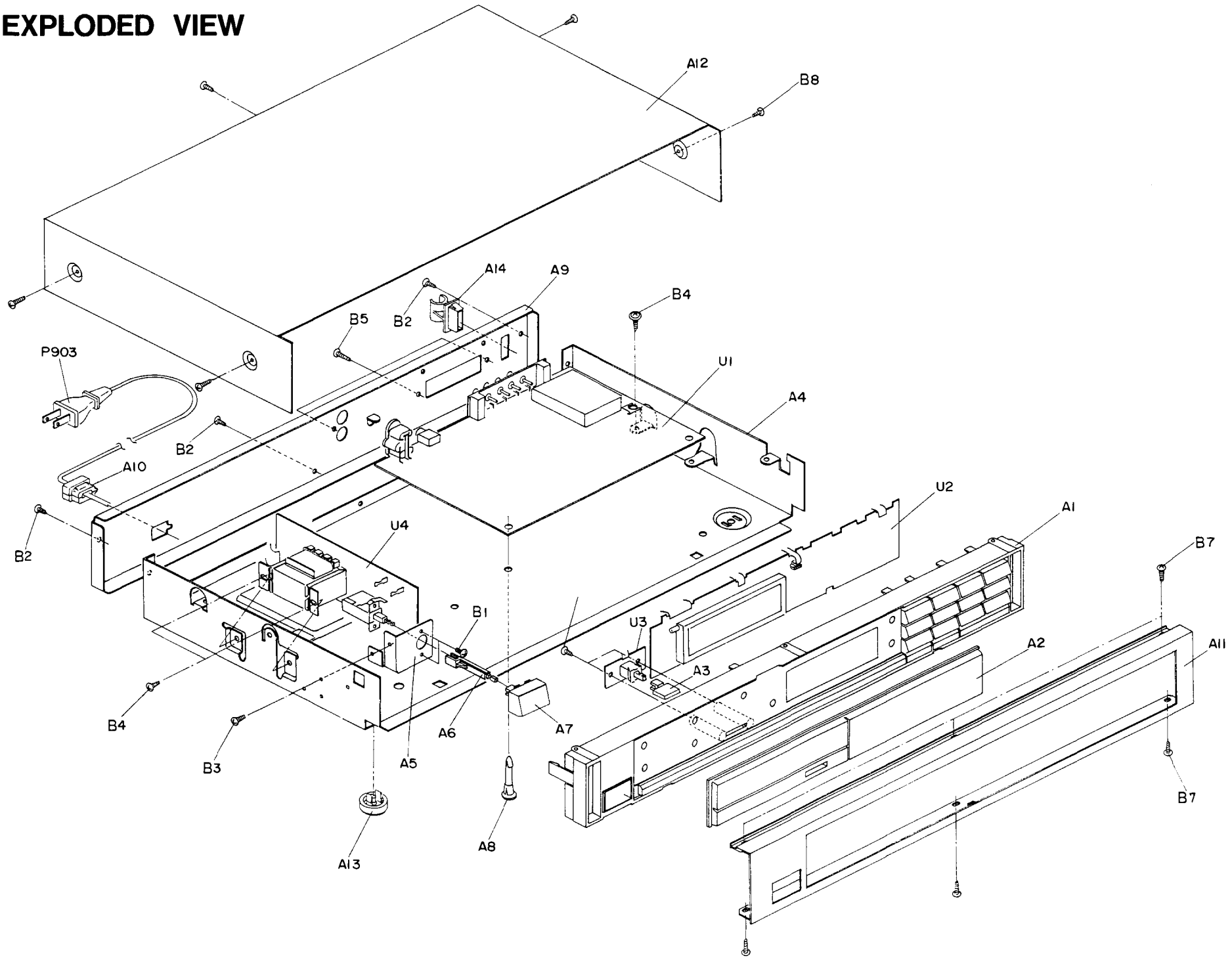
3.Change of FM/AM band step.

This model is not located the band selector switch.
If the FM band step is changed from 200kHz to 50kHz, add two diodes (1SS133) to D706 and D707 on the display PC board.
If the AM band step is changed from 10kHz to 9kHz, add a diode (1SS133) to D718 on the display PC board.

BLOCK DIAGRAM



EXPLODED VIEW

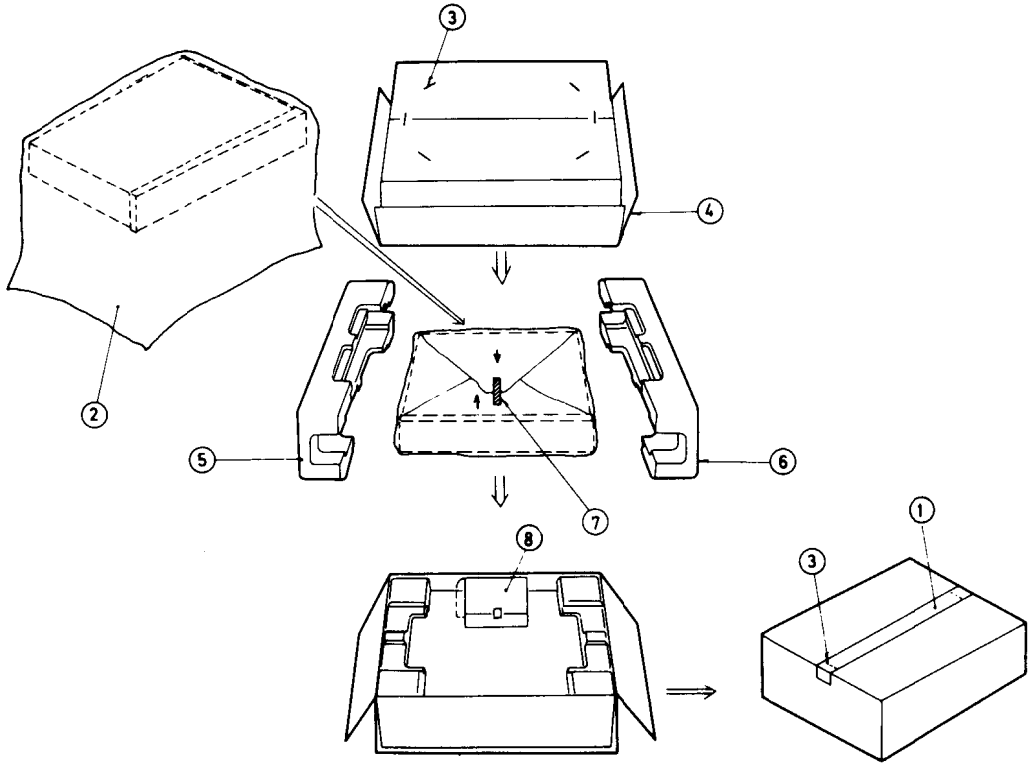


PARTS LIST

REF NO.	PART NO.	DESCRIPTION
A1	27110327B	Front bracket ass'y
A2	28191384A	Clear plate
A3	28322797	Knob PUSH
A4	27100116	Chassis
A5	27141112	Bracket, power
A6	27260170A	Joint, switch
A7	28322795A	Knob, power
A8	27190511	Holder
A9	27120930	Back panel
A10	27300750	⚠ Strainrelief
A11	27210782	Front panel
A12	28184350A	Top cover
A13	27175130	Leg
A14	27190105	Holder, antenna
B1	82143006	3P+6FN(BC), Pan head screw
B2	834430068	3TTS+6B(BC), Tapping screw
B3	838430068	3TTB+6B(BC), Tapping screw
B4	831430088	3TTW+8B(BC), Tapping screw
B5	834430108	3TTS+10B(BC), Tapping screw
B6	834230108	3TTS+10B(Ni), Nickel screw
B7	833430080	3TTP+8P(BC), Tapping screw
B8	834430088	3TTS+8B(BC), Tapping screw
B9	838430088	3TTB+8B(BC), Tapping screw
P903	253142A or 253142	⚠ AC-UC-7#18, Power supply cord
U1	1A046558-1	NARF-2858-1, Main circuit pc board ass'y
U2	1A046559-1	NADIS-2859-1, Display circuit pc board ass'y
U3	1A046560-1	NASW-2860-1, Muting switch pc board ass'y
U4	1A046561-1	NAPS-2861-1, Power supply circuit pc board ass'y

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

PACKING VIEW

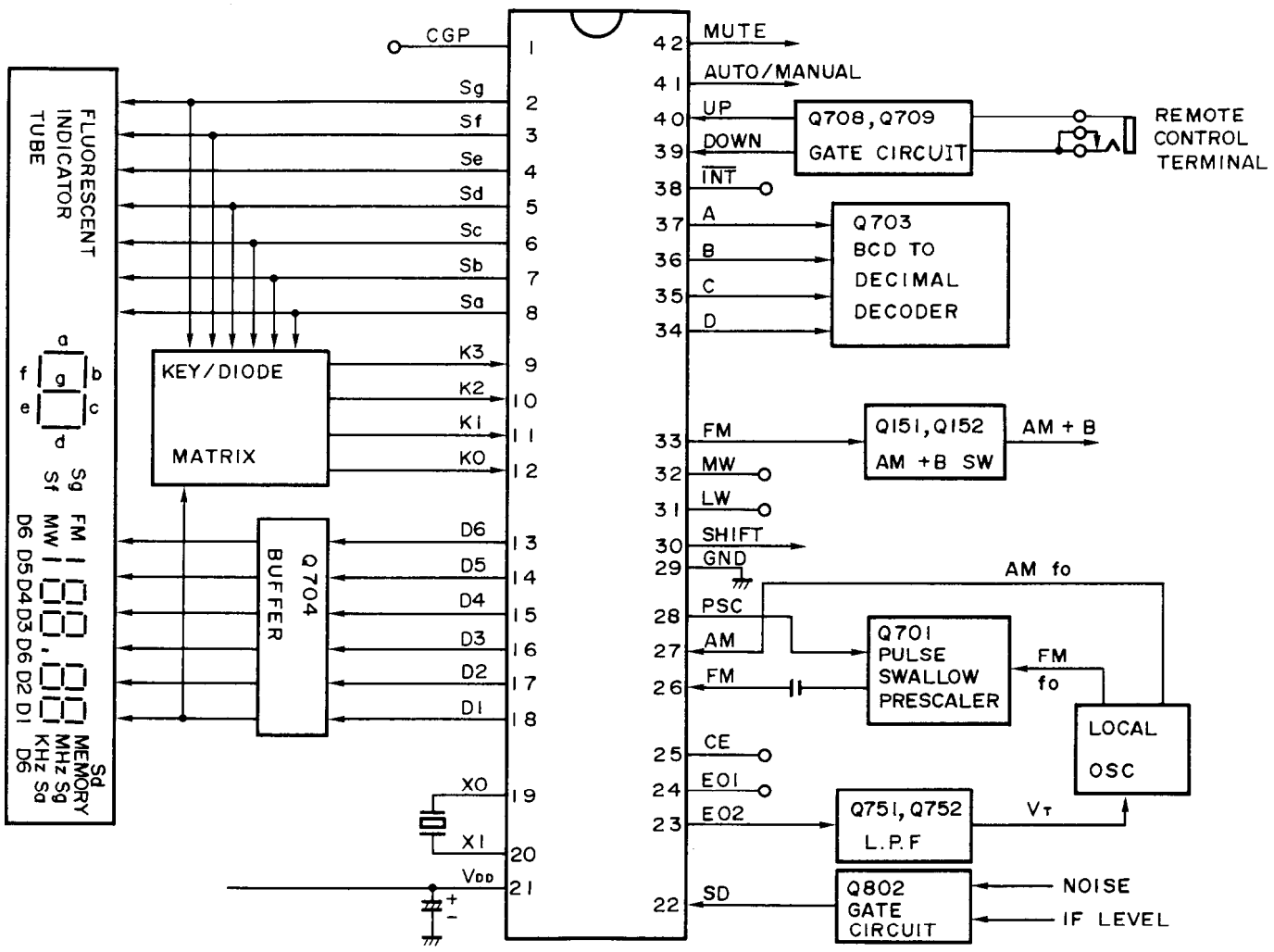


REF. NO.	PART NO.	DESCRIPTION
1	260012	50×700mm, Damplon tape
2	29100037A	650×500mm, Poly-vinyl bag
3	282301	Sealing hook
4	29051444A	Master carton box
5	29090533F	Pad R
6	29090532B	Pad L
7	29110032	W=15mm, Adhesive tape

REF. NO.	PART NO.	DESCRIPTION
8	Accessary bag ass'y	
	292064B	FM antenna
	232119	NMA-3052, AM loop antenna
	2010098A	Connection cord
	29341098	Instruction manual
	29365019	Warranty card ⟨UDN⟩
	29358002E	Service station list ⟨UDN⟩
	29100006A	250×350mm, Poly-vinyl bag

NOTE: ⟨UDN⟩: Only U.S.A. model

CIRCUIT DESCRIPTION



Pin No.	Symbol	Terminal	Description
1	CGP		Output terminal for sound "PEE".
2 – 8	Sa – Sg	Segment outputs	Display tube signal terminal output and key return signal source terminals; active high. Since these terminals can handle 30V, they are connected directly to the segment terminals of the fluorescent display tube.
9 – 12	K0 – K3	Key return signal inputs	Terminals for input of the key return signals from external matrix circuit.
13 – 18	D1 – D6	Digit outputs	Display tube digit output signal terminals; active low. D1 is used the key return signal source to diode matrix.
19, 20	X1, X2	X'tal	Connect to the 4.5MHz crystal oscillator.
21	V_{DD}	Power source input	Device power source terminal; supplies 5V during normal operation and 2.5V from the super capacitor C701 for memory preservation.

Pin No.	Symbol	Terminal	Description
22	SD	Station detector signal input	Input terminal for detecting whether or not a broadcast signal is being received during auto-tuning. Stopped by the high level.
23, 24	E01, E02	Error outputs	Charge pump output of the phase detector with 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 occures when the frequencies match. The output is applied to the variable capacitor diode in the front end through the low pass filter Q751 and Q752. The output from both terminals is same, but only E02 is used.
25	CE	Chip enable	Device selection signal input terminal. High level ... Normal operation Low level ... Memory preservation
26	FM	FM local oscillator signal input	Input terminal for FM local oscillator is divided by 1/16 or 1/17 by prescaler Q701.
27	AM	AM local oscillator signal input	Terminal for input of the AM local oscillator signal.
28	PSC	Pulse swallow control output	This terminal outputs a signal that switches the prescaler division ratio of Q701 to 1/16 or 1/17 when the pulse swallow method is used for division. (FM only)
29	GND	Ground	
30	SHIFT	Preset reverse indication output	Terminal for indication output whether M1 – M8 or M9 – M16 the preset key. M1 – M8: Low level M9 – M16: High level
31	LW	Band switching signal outputs	Terminals for signal output switching of each band. High level is output from terminal of FM (pin no. 33) and low level is output from other terminals (pin no. 31 & 32) during FM reception.
32	MW		
33	FM		
34 35 36 37	A B C D	Preset station indication outputs	Terminals for BCD code output of preset station indicator. M1 M2 M3 M4 M5 M6 M7 M8 A 1 0 1 0 1 0 1 0 B 0 1 1 0 0 1 1 0 C 0 0 0 1 1 1 1 0 D 0 0 0 0 0 0 0 1
38	INT		Not used.
39	MEMORY	Memory down input	Terminal for down signal input of preset memory. Active low.
40	MEMORY UP	Memory up input	Terminal for up signal input of preset memory. Active low.
41	AUTO/ MANUAL	Auto/Manual indication output	Terminal for indication output whether or auto the tuning mode. This terminal becomes high during auto mode and low during manual mode.
42	MUTE	Muting output	Output terminal which mutes the shock noise occurring when the PLL is released; active high. The muting signal is output as shown below. UP/DOWN of manual/auto mode, preset memory is recalled, band switching and preset scan.

Control key and diode matrix connections

	K3(9)	K2(10)	K1(11)	K0(12)
Sg(2)	M4/M14	M3/M13	M2/M12	M1/M11
Sf(3)	M8/M18	M7/M17	M6/M16	M5/M15
Se(4)		PRESET SCAN	M10/M20	M3/M19
Sd(5)	SHIFT	LW	MW	FM
Sc(6)	AUTO MANUAL	MEMORY	DOWN	UP
Sb(7)	HI-BLEND	DISPLAY	PROGRAM	WIDE/ NARROW
Sa(8)	*10/9kHz	*LW2	*LW1	*AM
D1(18)	*BAND 0	*BAND 1	*10/8	STATIC/ DYNA

*Diode matrix table 1

BAND0	BAND1	REGION	FREQUENCY RANGE	CHANNEL SPACE
D706	D707			
0	0	U.S.A.	87.9-107.9MHz	200kHz
1	1	Europe	87.50-108.00MHz	50kHz

0: Open 1: Connect the diode (1SS133). table 2

AM	10kHz/9kHz	FREQUENCY RANGE	CHANNEL SPACE
D712	D718		
0	0	530-1620kHz	10kHz
0	1	522-1611kHz	9kHz
1	0	531-1602kHz	9kHz

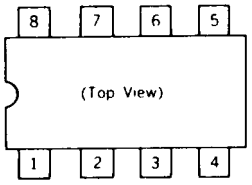
0: Open 1: Connect the diode (1SS133). table 3

BAND0, BAND1 ····· FM band settings. See table 2.
10/9kHz ····· AM band settings. See table 3.

BLOCK DIAGRAM OF IC

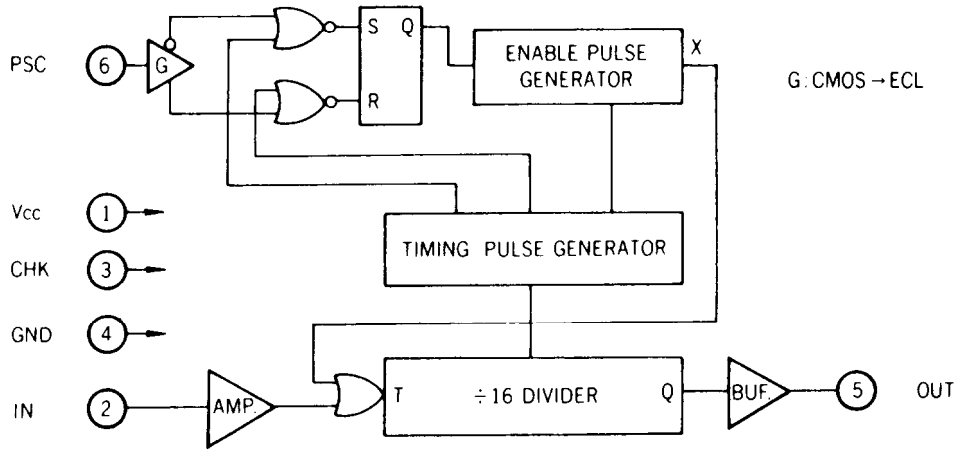
μPB553AC(Prescaler)

Pin Connection

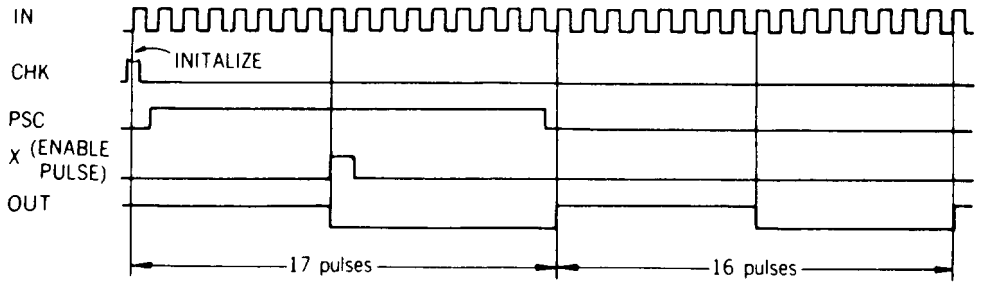


1. Pin 1 (Vcc).....+5 volts Supply
2. Pin 2 (IN).....FM local oscillator signal input
3. Pin 3 (CHK).....Check terminal
4. Pin 4 (GND).....Ground terminal
5. Pin 5 (OUT).....Prescaler terminal
6. Pin 6 (PSC).....Prescaler control terminal
7. Pin 7,8.....Not connected

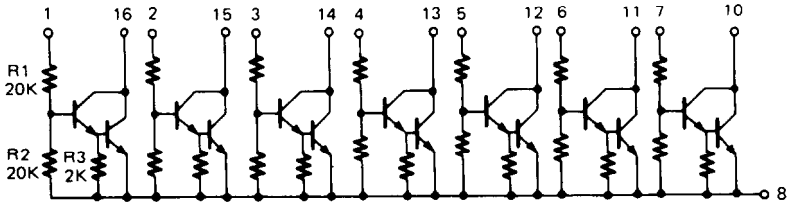
Block Diagram



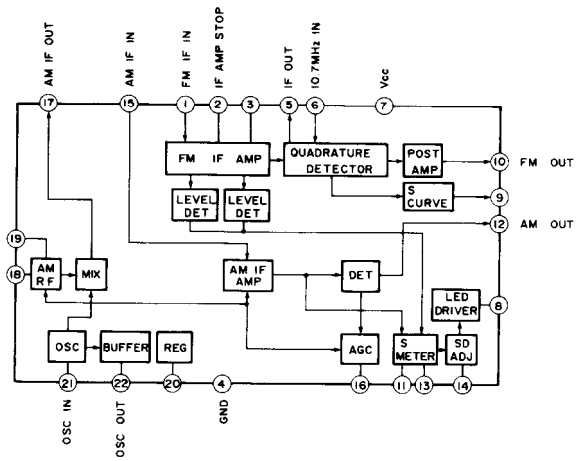
Timing Chart



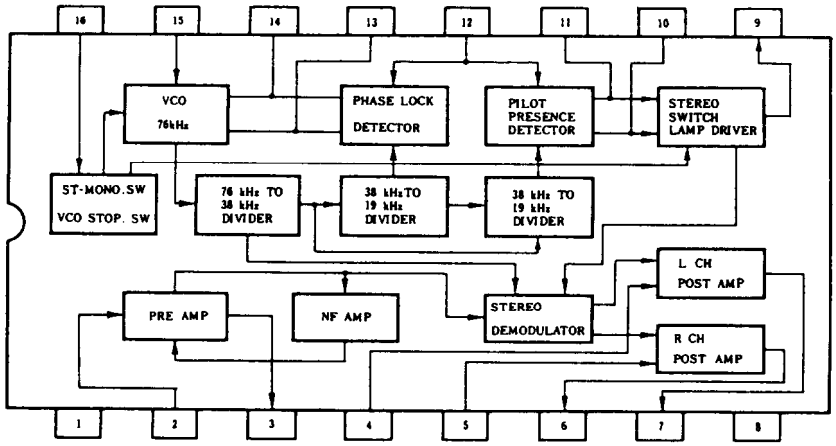
μPA80C(Buffer amplifier)



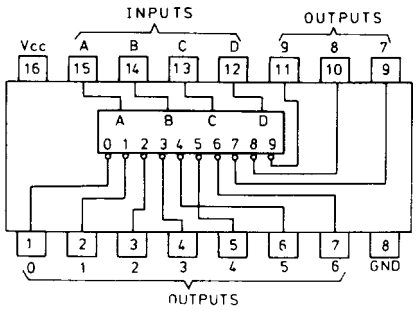
LA1265(AM radio/FM IF system)



μPC1161C3(Stereo decoder)



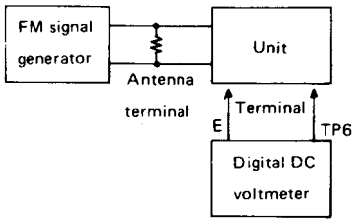
74LS42(BCD to decimal decoder)



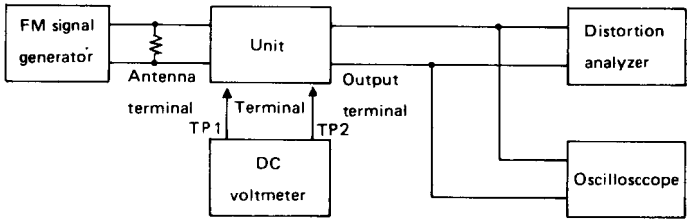
ADJUSTMENT PROCEDURES

FM section

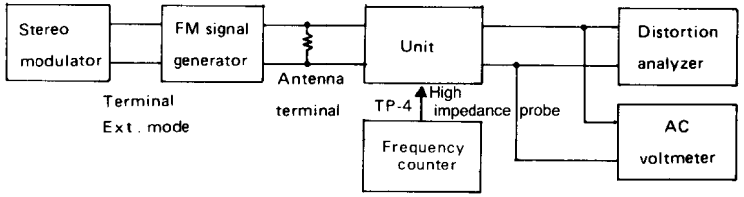
Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuned frequency	Output indicator	Adjustment point	Adjust for	Remarks
IF	1	Fig.2	99.1MHz 1kHz, 75kHz devi. 65dBf(60dB)		99.1MHz	DC voltmeter	L101	0V±20mV	Set the mode switch to MONO. Repeat the steps 1 and 2 until no further adjustment is necessary.
	2					Distortion analyzer	L102	Minimum	
Tuned indicator level		Fig.2	99.1MHz 1kHz, 75kHz devi 17.2dBf(12dB)		99.1MHz	Tuned indicator	R101	Light on	
VCO		Fig.3	99.1MHz 1kHz, 75kHz devi. 65dBf(60dB)		99.1MHz	Frequency counter	R201	19kHz±10Hz	Set the mode switch to STEREO
Stereo distortion		Fig.3	99.1MHz Ext. modulation 65dBf(60dB)	L+R 1kHz 67.5kHz devi.	99.1MHz	Distortion analyzer	IF on the front end	Minimum	
Stereo separation	1	Fig.3	99.1MHz Ext. modulation 65dBf(60dB)	Lch. 1kHz	99.1MHz	Rch. AC voltmenter	R202	Minimum	Maximum and same separation
	2			Rch. 1kHz		Lch. AC voltmeter		Minimum	
Tuned voltage	1	Fig.1			87.9MHz	Digital DC voltmeter		1.5±0.5V	
	2				107.9MHz			8.0±0.5V	



〈Fig.1〉



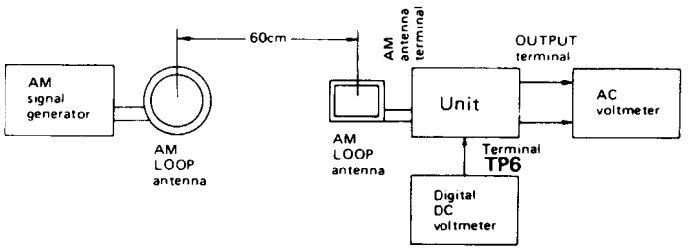
〈Fig.2〉



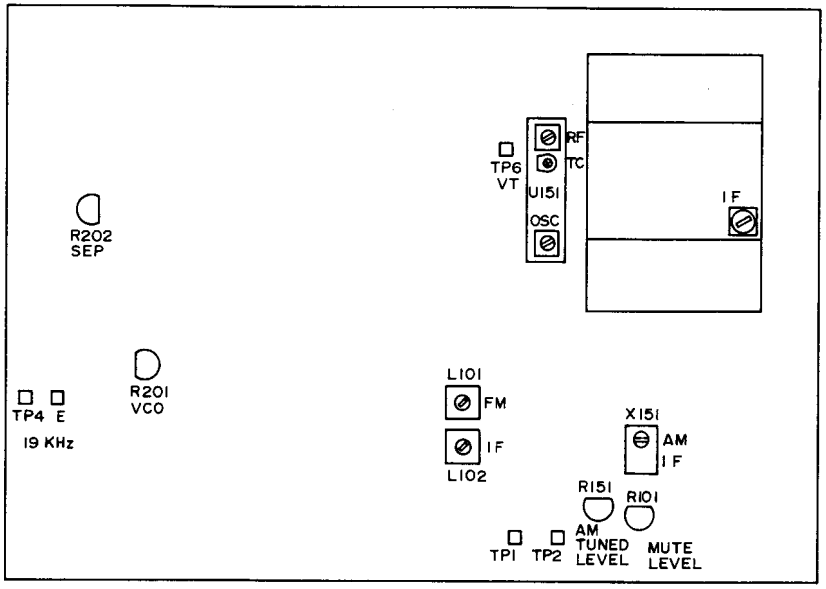
〈Fig.3〉

AM section

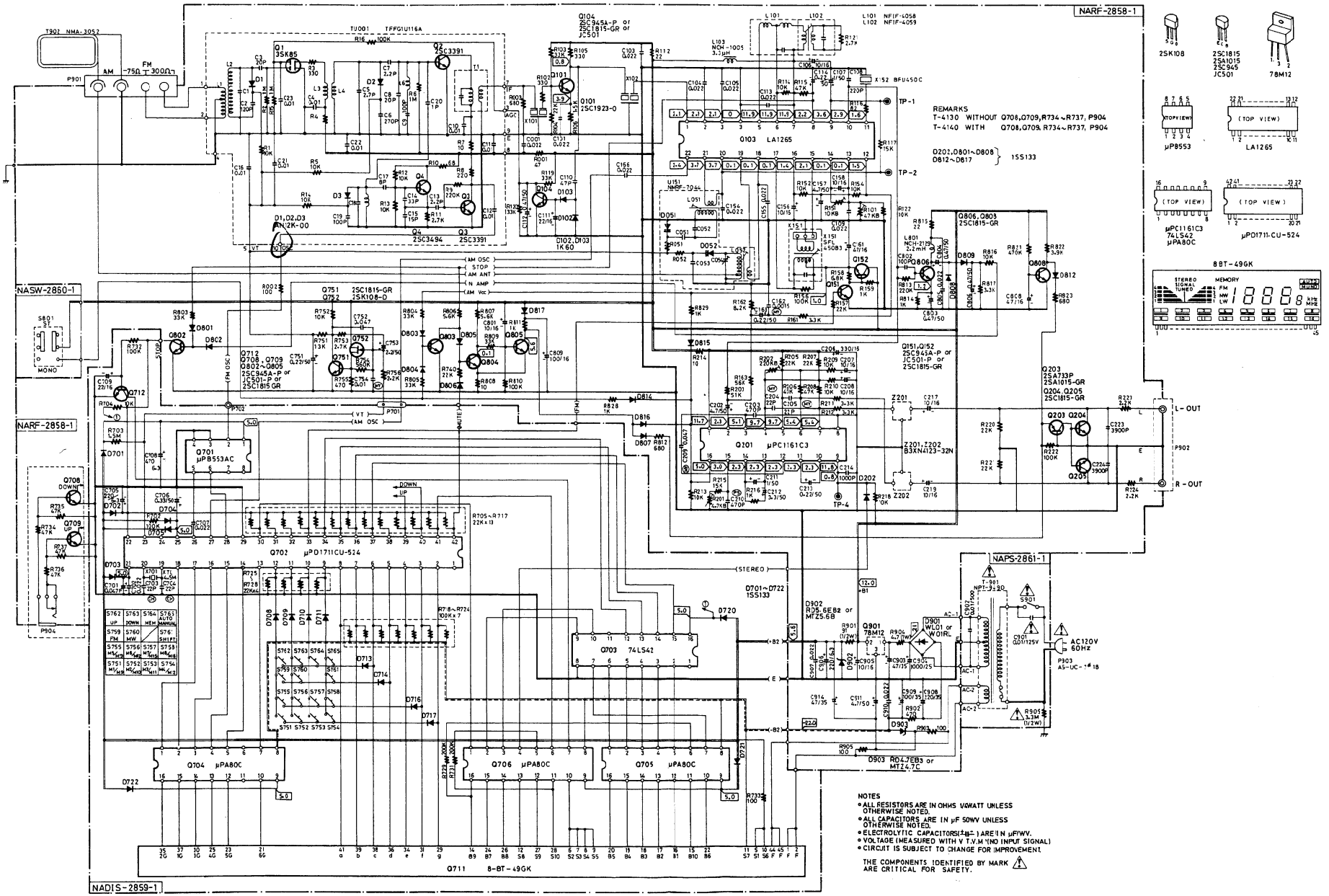
Step	AM SG output	Tuned Frequency	Output indicator	Adjustment point	Adjust for	Remarks
1		530kHz	Digital DC voltmeter	OSC on U151	1.5V±0.1V	
2		1620kHz			8.0±1.0V	
3	600kHz, 64dB/m 400Hz 30% mod.	600kHz	AC voltmeter	RF on U151	Maximum	Repeat the steps and 4 until no further adjustment is necessary.
4	1400kHz, 64dB/m 400Hz 30% mod.	1400kHz		TC on U151	Maximum	
5	1000kHz, 64dB/m 400Hz 30% mod.	1000kHz	AC voltmeter	X151	Maximum	
6	1000kHz, 64dB/m 400Hz 30% mod.	1000kHz	TUNED indicator	R151	Light on	



〈Fig.4〉



SCHEMATIC DIAGRAM



ONKYO CORPORATION

PRINTED CIRCUIT BOARD–PARTS LIST

MAIN CIRCUIT PC BOARD (NARF-2858-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240070	TFFG1U116A
	Transistors	
Q101	2211723	2SC1923(O)
Q104	2211255 or	2SC1815(GR) or
Q151, Q152	2210746	2SC945A(P)
Q203	2211455 or	2SA1015(GR) or
	2210803	2SA733(P)
Q204, Q205	2211255	2SC1815(GR)
Q708, Q709	2211255 or	2SC1815(GR) or
	2210746	2SC945A(P)
Q751	2211255	2SC1815(GR)
Q752	2212294	2SK108(D)
Q802-Q805	2211255 or	2SC1815(GR) or
	2210746	2SC945A(P)
Q806, Q808	2211255	2SC1815(GR)
	ICs	
Q103	222912	LA1265
Q201	222678	μPC1161C3
Q901	222780122	78M12
	Diodes	
D102, D103	223132	1K60
D202, D812	223163	1SS133
D801-D809	223163	1SS133
D814-D817	223163	1SS133
D901	223862 or	WL01 or
	223890	W01RL
D902	2239472 or	RD5.6EB2 or
	2243152	MTZ5.6B
D903	2243133 or	MTZ4.7C or
	2239433	RD4.7EB3
	Transformers	
L101	233370	NFIF-4058
L102	233371	NFIF-4059
	Coils	
L103	233105	NCH-1005
L801	231081	NCH-2129
	RF block	
U151	232133	NMRF-7044
	Filters	
X101, X102	3010071	SFE10.7MA5
X151	3010075	SFL-450B3
X152	3010076	BFU-450C
Z201, Z202	3020016	B3×N4123-32N
	Capacitors	
C106	354741009	10μF, 16V, Elect.
C107	354780109	1 μF, 50V, Elect.
C111	354742209	22μF, 16V, Elect.
C112	354784799	0.47μF, 50V, Elect.
C114	354782299	0.22μF, 50V, Elect.
C156	354741009	10μF, 16V, Elect.
C157	354780479	4.7 μF, 50V, Elect.
C158	354741009	10μF, 16V, Elect.
C161	354744709	47μF, 16V, Elect.
C163	354782299	0.22μF, 50V, Elect.
C202	354780479	4.7 μF, 50V, Elect.
C206	354743319	330 μF, 16V, Elect.
C207, C208	354741009	10μF, 16V, Elect.
C210	370134714	470pF ±5%, 100V, APS
C211	354780109	1 μF, 50V, Elect.
C212	354780339	3.3 μF, 50V, Elect.
C213	354782299	0.22μF, 50V, Elect.
C217, C219	354741009	10μF, 16V, Elect.
C751	354782299	0.22μF, 50V, Elect.
C753	354780229	2.2 μF, 50V, Elect.
C801	354741009	10μF, 16V, Elect.
C803, C804	354784799	0.47μF, 50V, Elect.
C806	354784799	0.47μF, 50V, Elect.
C808	354744709	47μF, 16V, Elect.
C809	354741019	100 μF, 16V, Elect.
C903	354764709	47μF, 35V, Elect.
C904	354751029	1000μF, 25V, Elect.
C905	354741009	10μF, 16V, Elect.
C906	354722219	220 μF, 6.3V, Elect.
C908	354762219	220 μF, 35V, Elect.
C909	354761019	100 μF, 35V, Elect.
C911	354780479	4.7 μF, 50V, Elect.
C914	354764709	47μF, 35V, Elect.
	Resistors	
R101	5210068	N06HR47KBD, Semi-fixed
R151	5210064	N06HR10KBD, Semi-fixed
R201	5210062	N06HR4.7KBD, Semi-fixed
R202	5210072	N06HR220KBD, Semi-fixed
R901	442529104	91ohm, 1/2W, Metal oxide film
R904	441620474	4.7ohm, 1W, Metal oxide film
	Terminals	
P901	25060085	NTM-4PDMN29, Antenna
P902	25045182	NPJ-2PDBL72, Output
P904	25045215	S-G8515, Remote control input
	Sockets	
P701	2000643A	NSAS-4P559
P702	2000673	NSAS-6P629
	Radiator	
	27160176	RAD-56
	Screw	
	82143006	3P+6FN(BC), Pan head
	Bracket	
	27141059	Ground

DISPLAY CIRCUIT PC BOARD (NADIS-2859-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q701	222619	μPB553AC
Q702	22240026	μPD1711CU-524
Q703	222740421	74LS42
Q704-Q706	222801	μPA80C
	Transistor	
Q712	2211255 or	2SC1815(GR) or
	2210746	2SC945A(P)
	Fluorescent indicator tube	
Q711	212037	8-BT-49GK
	Crystal	
X701	3010091	XTL-4.5M
	Diodes	
D701-D705	223163	1SS133
D708-D711	223163	1SS133

D713, D714	223163	1SS133
D716, D717	223163	1SS133
D720-D722	223163	1SS133
	Capacitors	
C701	3020027 or	0.047F, 5V or
	3000050	0.047F, 5.5V, Super
C705	354722219	220 μF, 6.3V, Elect.
C706	354783399	0.33μF, 50V, Elect.
C708	354724719	470 μF, 6.3V, Elect.
C709	354742209	22μF, 16V, Elect.
	Resistors	
R705-R717	49163223413	22kohm×13, 1/10W, Network
R718-R724	49163104407	100kohm ×7, 1/10W, Network
R725-R728	49163223404	22kohm×4, 1/10W, Network
	Switches	
S751-S765	25035548	NPS-111-S510, Push

MUTING SWITCH PC BOARD (NASW-2860-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S801	25035537	NPS-122-L499, Push switch

POWER SUPPLY CIRCUIT PC BOARD (NAPS-2861-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	2300177	⚠ NPT-949D, Power transformer
C901	3500065A	⚠ 0.01μF, AC400V/125V, Capacitor IS
R905	431523355	⚠ 3.3Mohm, 1/2W, Solid resistor
S901	25035558	⚠ NPS-111-L520P, Power switch

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

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