

ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER MODEL TX-18



Black and Silver models

BUD, BUDN,UD	120V AC, 60Hz
BUG, UG	220V AC, 50Hz
BUQA	240V AC, 50Hz
BUW, UW	120 or 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:	30 watts per channel,min RMS,at 8 ohms, both channels driven,from 40Hz to 20kHz, with no more than 0.3% THD.
Musical Power Output:	2 × 72 watts at 4 ohms,1kHz (DIN) 2 × 52 watts at 8 ohms,1kHz (DIN)
Continuous Power Output:	2 × 40 watts at 4 ohms,1kHz (DIN) 2 × 33 watts at 8 ohms,1kHz (DIN)
Total Harmonic Distortion:	0.1% at 25W 0.1% at 1 watt output
IM Distortion:	0.1% at 25W 0.1% at 1 watt output
Damping Factor:	35 at 8 ohms
Frequency Response:	20-30,000Hz ± 1dB
RIAA Deviation:	20-20,000Hz ± 0.8dB
Sensitivity and Impedance:	Phono: 2.5mV/50kohms CD/Tape Play: 150mV/50kohms Tape Rec: 150mV/3.5kohms (Phono)
Phono overload:	150mV 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
Loudness(-30dB):	+7dB at 70Hz, +5dB at 10kHz

TUNER SECTION

FM:

	-G/W/Q models-	-120V model-
Tuning Range:	87.50-108.00MHz(50kHz steps)	87.5-108.0MHz(100kHz steps)
Usable Sensitivity:	Mono: 12.4dBf, 2.3μV, IHF 1.2 μV, 75 ohms DIN Stereo: 2.5 μV,75 ohms	Mono: 12.4dBf, 2.3μV Stereo: 19.2dBf, 5.0μV
50dB Quieting Sensitivity:	Mono: 2.2 μV,75 ohms Stereo: 22μV,75 ohms	Mono: 18.2dBf, 4.5μV Stereo: 38.2dBf, 45 μV
Capture Ratio:	1.5dB	1.5dB
Image Rejection Ratio:	80dB	40dB
IF Rejection Ratio:	90dB	90dB
Signal-to-Noise Ratio:	Mono: 70dB Stereo: 65dB	Mono: 70dB Stereo: 65dB
Selectivity:	50dB DIN (±300kHz,40kHz Devi.)	
ACA:		55dB
AM Suppression Ratio:	50dB	50dB
Harmonic Distortion:	Mono: 0.15% Stereo: 0.30%	Mono: 0.15% Stereo: 0.30%
Frequency Response:	30-15,000Hz ±1.5dB	30-15,000Hz ±1.5dB
Stereo Separation:	40dB at 1kHz 30dB at 100-10,000Hz	40dB at 1kHz 30dB at 100-10,000Hz
Muting level:	17.2dBf, 2μV	17.2dBf, 4μV
Stereo Threshold:	17.2dBf, 2μV	17.2dBf, 4μV

AM:

Tuning Range:	522-1,611kHz(9kHz steps)	520-1,710kHz(10kHz steps)
Usable Sensitivity:	30μV	30μV
Image Rejection Ratio:	40dB	40dB
IF Rejection Ratio:	30dB	30dB
Signal-to-Noise Ratio:	40dB	40dB
Harmonic Distortion:	0.8%	0.8%

GENERAL

Dimensions(W × H × D):	435 × 97 × 317mm 17-1/8" × 3-15/16" × 12-1/2"	435 × 97 × 317mm 17-1/8" × 3-15/16" × 12-1/2"
Weight:	5.7kg.,12.6lbs.	5.7kg.,12.6lbs.

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.

D (120V) model

Circuit no.	Part no.	Description
F501,F601	252059	4A(SS-2),Speaker protection
F901	252048	3A(ST-6),Primary

G (220V) and Q (240V) models

Circuit no.	Part no.	Description
F501,F601	252075	2.5A-SE-EAK,Speaker protection
F902	252073	1.6A-SE-EAK,Primary
F903,F904	252077	4A-SE-EAK,Secondary
F905	252070	1A-SE-EAK,Secondary

W (Worldwide) model

Circuit no.	Part no.	Description
F501,F601	252059	4A(SS-2),Speaker protection
F901	252048	3A(ST-6),Primary
F902	252073	1.6A-SE-EAK,Primary

2.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 supply cord and nickel screw on the back panel.

Specifications: 3.3Mohm \pm 10% at 500V.

3.Step band selector switch

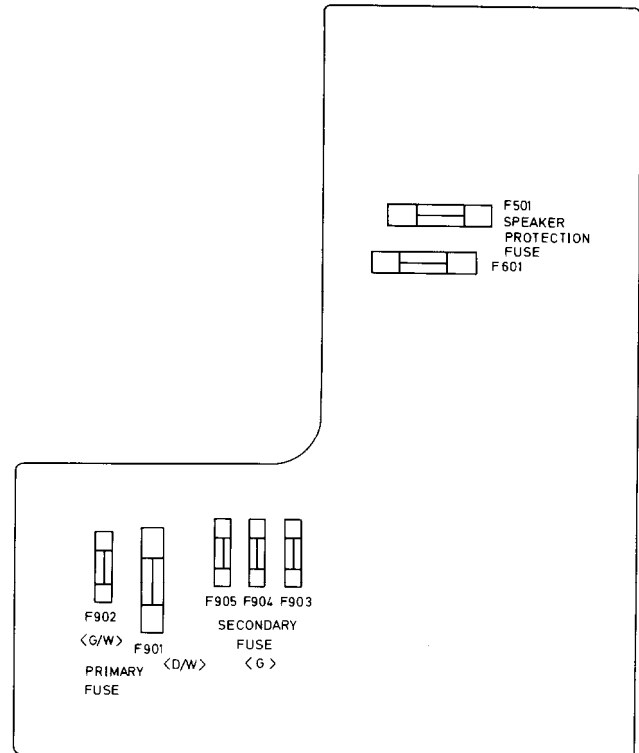
Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 50kHz (FM) and 9kHz (AM) at the factory, but may have to be reset to 100kHz and 10kHz depending on the area where the unit is used.

De-emphasis	FM step	AM step
Europe: 50 μ sec	50kHz	9kHz
U.S.A.: 75 μ sec	100kHz	10kHz

4.Change of voltage

Worldwide 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.

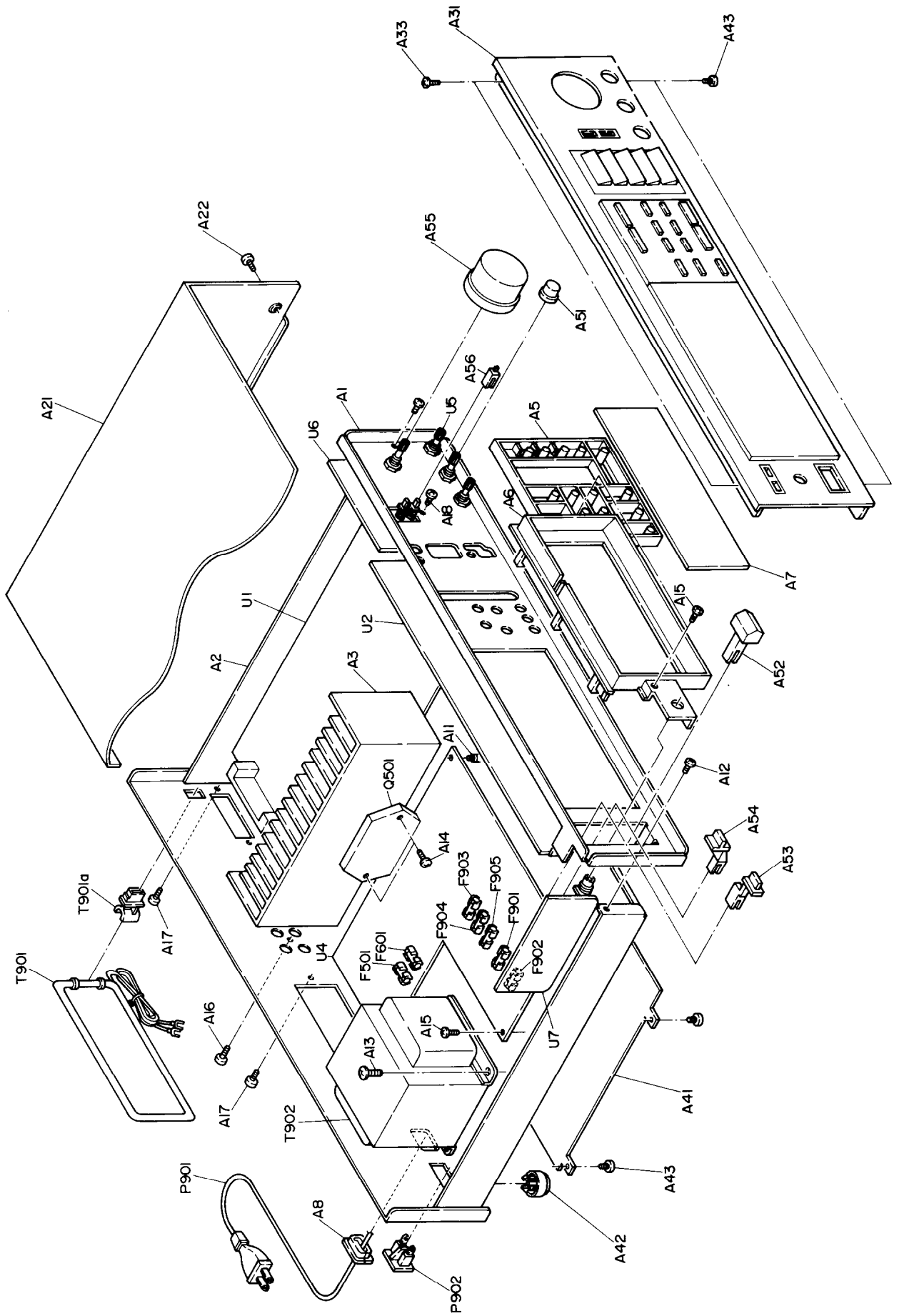


<fig.1>

5.Memory preservation

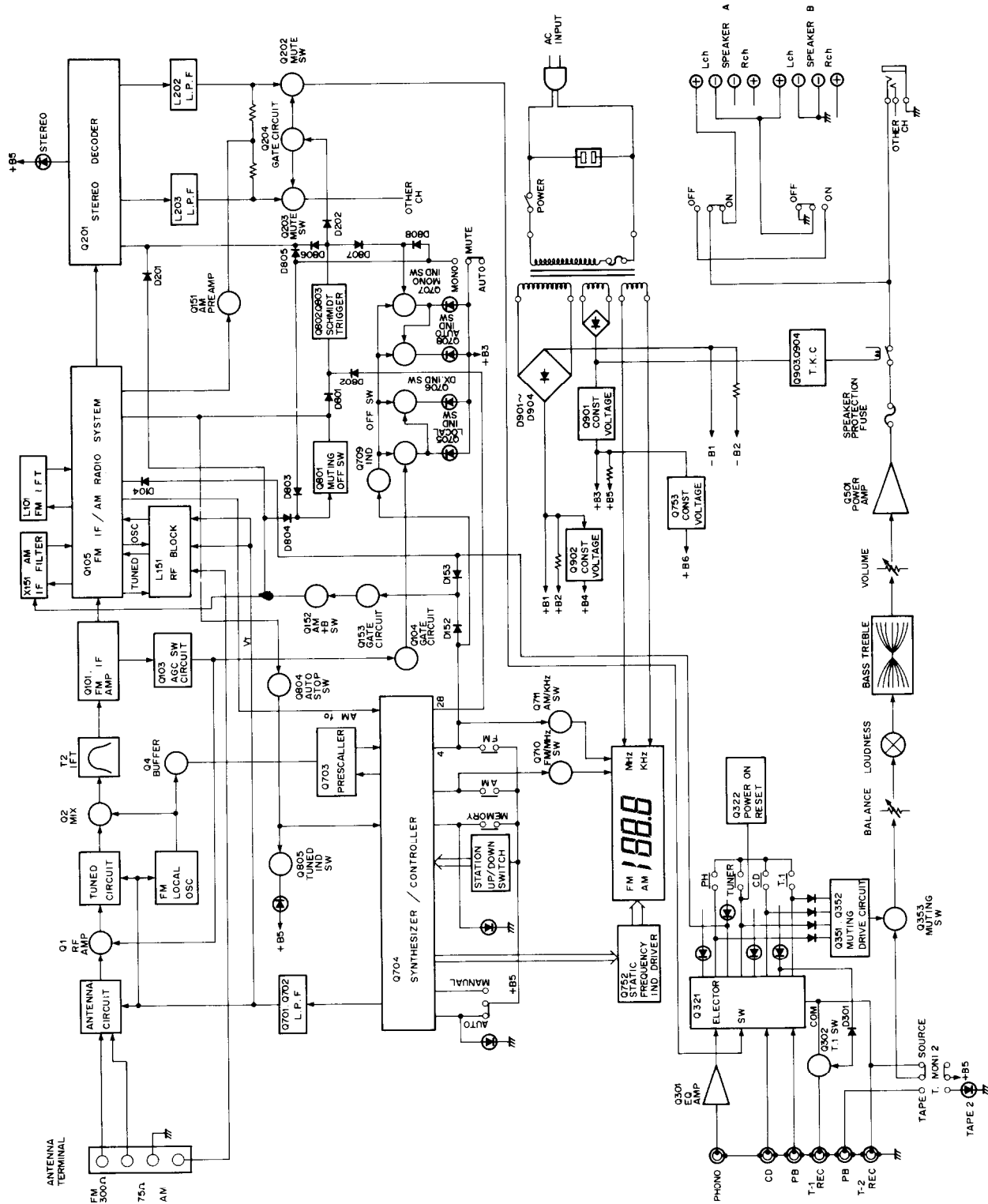
This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note 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.

EXPLODED VIEW



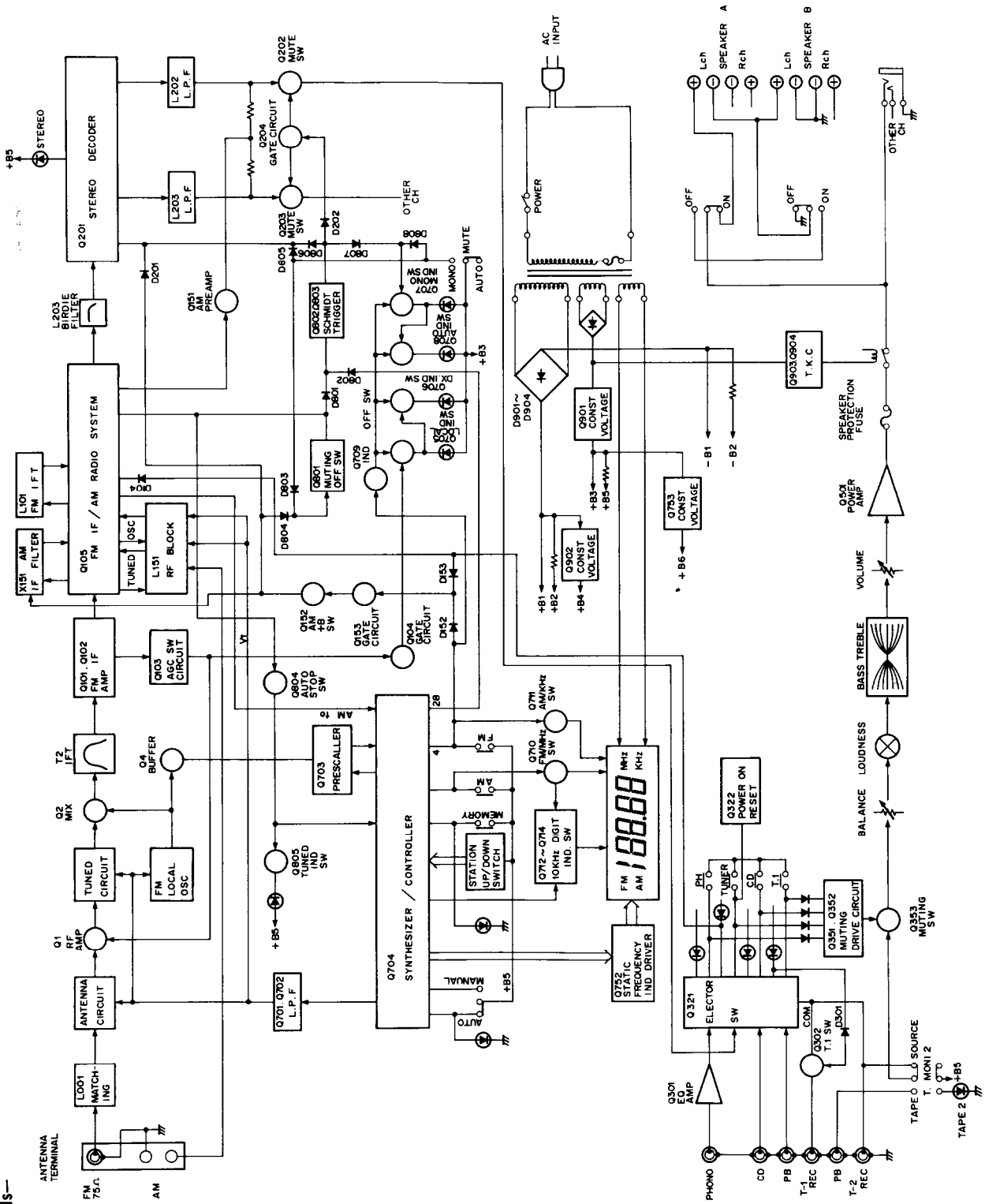
BLOCK DIAGRAM

-120V model-



BLOCK DIAGRAM

-220/240V models-



CIRCUIT DESCRIPTIONS

1.Synthesizer and controller operation

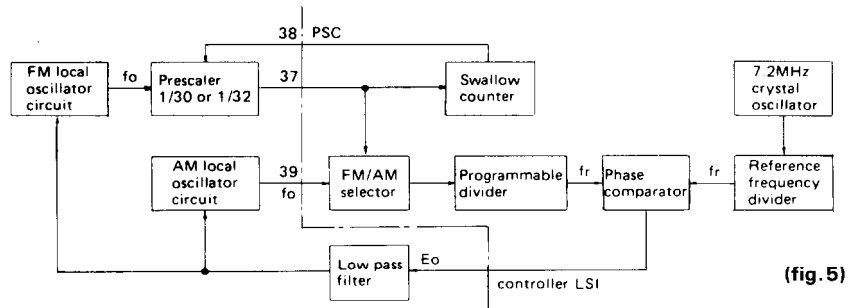
Pin No.	Symbol	Terminal	Description
1	GND	Ground	
2	XT	X'tal	Connected to the 7.2MHz crystal oscillator for the reference frequency.
3	XT		
4	FM	FM band specification input	Mutual reset type,performs switching of each band,FM/MW/LW.
5	MW	MW band specification input	
6	LW	LW band specification input	
7	MANUAL	Manual tuning mode specification input	Mutual reset type,performs auto search and manual operation mode switching during UP/DOWN tuning.
8	AUTO	Auto search tuning mode specification input	
9	UP	UP tuning key input	Connect the push key and perform UP/DOWN tuning.
10	DOWN	DOWN tuning key input	
11	STO	Memory store command input	The preset memory is set to the write mode when the key is pressed.
12~19	M1~M8	Preset memory channel specification input	Controls the write and read out of the internal 16-station preset memory along with the MC1 and MC2 input.
20	MC-1	Memory control input	Set the 16-station preset memory to the 8 FM/8 AM station mode or the FM/AM 2-band 16-station random mode.The 16-station random mode is used in this unit.
21	MC-2		
22	OSC2	AM oscillator terminal	CR connection terminal for the oscillator that determines the scan speed during the AM search mode.
23	OSC1	FM oscillator terminal	CR connection terminal for the oscillator that determines the scan speed during the FM search mode.
24	0/5	FM 50kHz output	Output that represents the 50kHz FM band tuning step for European models. Goes to the high level for the 50kHz setting.
25	CK2	Tuned frequency data output	Outputs the serial data and timing clock to the tuned frequency display driver.
26	CK1		
27	DATA		
28	MUTE	Muting signal output	Goes to the high level during muting output.
29	E2	Region specification	See table 1.
30	E1	input	
31	STOP 3	AM IF signal input	During AM reception, this counts the IF signal and stops auto search.
32	STOP 2	Auto search stop signal input	When the stop 1 input (pin 33) is at the high level and this terminal goes to the high level, auto search is stopped.
33	STOP 1	Scan speed slow input	When the high level is input at this terminal, the auto search speed is cut in half.

Pin No.	Symbol	Terminal	Description
34	DO 1	Error output	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided oscillation frequency is high 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 front end through low pass filter Q701 and Q702. The output from both terminals is the same, but only DO1 is used.
35	DO 2		
36	TEST	Test terminal	Test mode at the high level.
37	FM IN	FM programmable counter input	Connect to the prescaler output (pin 3 of Q703)
38	PSC	Pulse swallow control output	Output to the control the division ratio of the prescaler.
39	AM IN	AM local oscillator signal input	Terminal for input of AM local oscillator signal.
40	INH	Inhibit input	Operates normally at the high level. Inhibit status at the low level.
41	INT	Initialize input	Operates normally at the high level. At the low level, the internal status is initialized.
42	Vdd	Power supply	Device power terminal: supplies 5V during the normal operation and 2.5V from the super capacitor (C715) for the memory preservation.

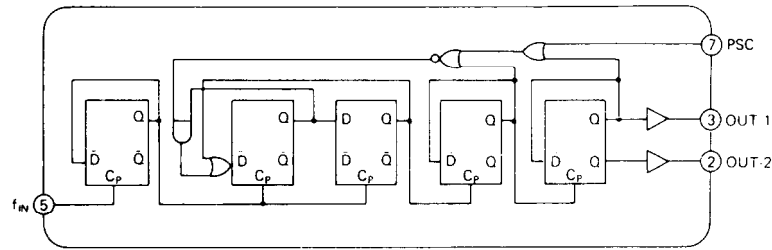
Table 1

E1 (Pin 30)	E2 (Pin 29)	Region	Band	Frequency range	Intermediate Frequency	Scan step	Reference Frequency
0	1	U.S.A	FM	87.5~108.0MHz	+10.7MHz	100kHz	25kHz
			AM 1	520 ~1710kHz	+450kHz	10kHz	10kHz
1	1		AM 2	522 ~1710kHz	+450kHz	9kHz	9kHz
1	0	Europe	FM	87.50 ~108.00MHz	+10.7MHz	50kHz	25kHz
			MW	522 ~1611kHz	+450kHz	9kHz	9kHz
			LW	153 ~360kHz	+450kHz	1kHz	1kHz
0	0	Japan	FM	76.0~90.0MHz	-10.7MHz	100kHz	25kHz
			AM	522 ~1611kHz	+450kHz	9kHz	9kHz

2.PLL tuned circuit



(fig. 5)



TD6104P (Prescaler)

A block diagram of the tuned of the PLL is shown in fig. 5.

Operation during AM reception

The reception frequency is applied to the programmable divider where it is divided to $1/N$ and output as f_v . This is applied to the phase comparator where it is compared with frequency reference f_r (9kHz for G/W models and 10kHz for D model). If f_r and f_v differ, E_o equal to the difference in frequency is output. Since error output E_o is a pulse waveform, it is passed through the low pass filter to change it into DC voltage V_d , which is applied to the variable capacitor diode in the front end to change the reception frequency. This continues until f_v and f_r are the same and $E_o=0$.

Operation during FM reception

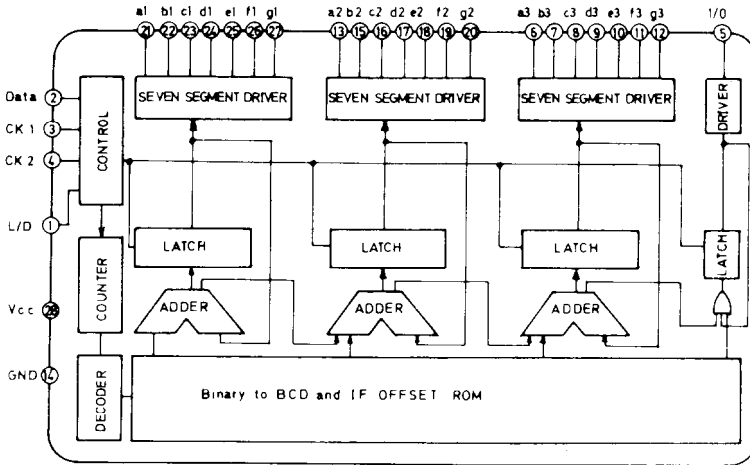
The pulse swallow method is used in the prescaler of this unit. In this type of prescaler, a supplementary number

(changed according to the program code input) and the divided reception frequency from the prescaler are combined in the control counter and the prescaler's division factor is switched $1/30$ or $1/32$ according to external control ($1/32$ when the PSC terminal is "H" and $1/30$ when it is "L").

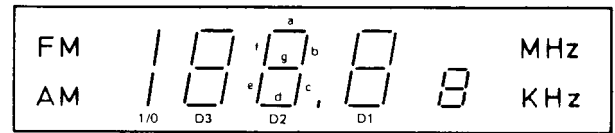
The station oscillator frequency is applied to the programmable divider, but the programmable divider has an upper frequency limit of only 30MHz, so the pulse swallow-type prescaler, which can be used up to 150MHz, is inserted for division to $1/N_p$.

The signal is applied to the programmable divider and divided to $1/N$. The result is compared with a 25kHz frequency reference in the phase detector and error is output as E_o until a match is obtained as in AM operation.

3. Frequency indicator circuit



TD6301AP block diagram



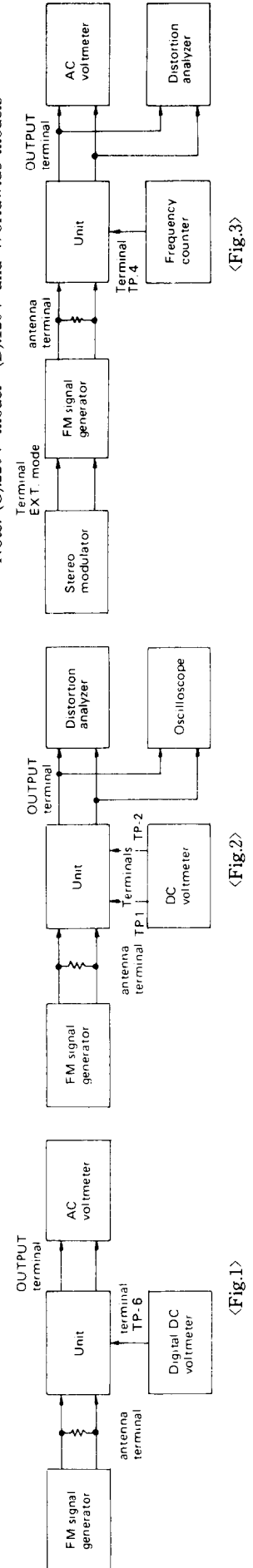
Pin No.	Terminal	Description
1	L/D	Output indication switching input terminal:Fluorescent display at the low level,and LED display at the high level.
2	Data	Tuned frequency data input terminal:Input from the system controller LSI to the serial.
3,4	CK1 CK2	Tuned frequency data input control timing input terminal: Transferred simultaneously with data from the system controller LSI.
5	I/O	Segment drive output terminal:Sets the number of display digit for FM(100MHz) and AM(1000kHz) reception.
6-12	a3-g3	Seven segment drive output terminal:Sets the number of display digit for FM(10MHz) and AM(100kHz) reception.
13, 15-20	a2-g2	Seven segment drive output terminal:Sets the number of display digit for FM(1MHz) and AM(10kHz) reception.
21-27	a1-g1	Seven segment drive output terminal:Sets the number of display digit for FM(100kHz) and AM(1kHz) reception.
14	Vcc	Power source terminal
28	Gnd	Ground

ADJUSTMENT PROCEDURES

FM section

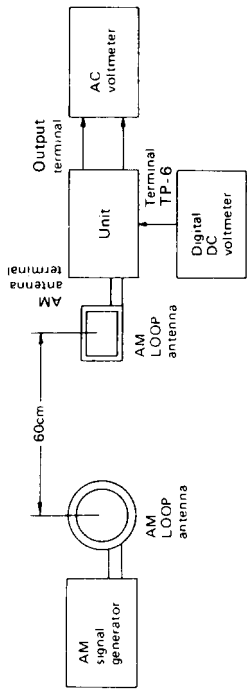
Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
Front end	1	Fig.1	—	—	88.0MHz	Digital DC voltmeter	T1(L5)	1.5V±0.4V	Usually not necessary to adjust.
	2		107.9MHz 1kHz,75kHz devi.	—	107.9MHz	AC voltmeter	TC1,TC2(G) TC1(D)	Maximum output	
I F	1	Fig.2	99.0MHz 1kHz,75kHz devi. 65dBf(60dB)	—	99.0MHz	DC voltmeter	L101 Primary	0V	Set the muting switch to OFF. Repeat the steps 1 and 2 until no further adjustment is necessary.
	2		—	—	99.0MHz	Distortion analyzer	L101 Secondary	Minimum	
V C O		Fig.3	MONO 99.0MHz 1kHz,75kHz devi. 65dBf(60dB)	NO STEREO SIGNAL	99.0MHz	Frequency counter	R215	19kHz±10Hz	Set the muting switch to ON.
Stereo distortion		Fig.3	99.0MHz Ext. modulation 65dBf(60dB)	L+R 1kHz 67.5kHz devi.	99.0MHz	Distortion analyzer	T2	Minimum	
			99.0MHz Ext. modulation 65dBf(60dB)	Lch. 1kHz Rch. 1kHz	99.0MHz	Rch. AC voltmeter Lch. AC voltmeter	R205	Minimum Minimum	Maximum and same separation
Tuning indicator level	1	Fig.2	99.0MHz 1kHz,75kHz devi. 29.2dBf(24dB)	—	99.0MHz	Tuning indicator	R156	Light on	
	2		99.0MHz 1kHz,75kHz devi. 28.2dBf(23dB)	—				Light off	

Note: (G):220V model (D):120V and Worldwide models

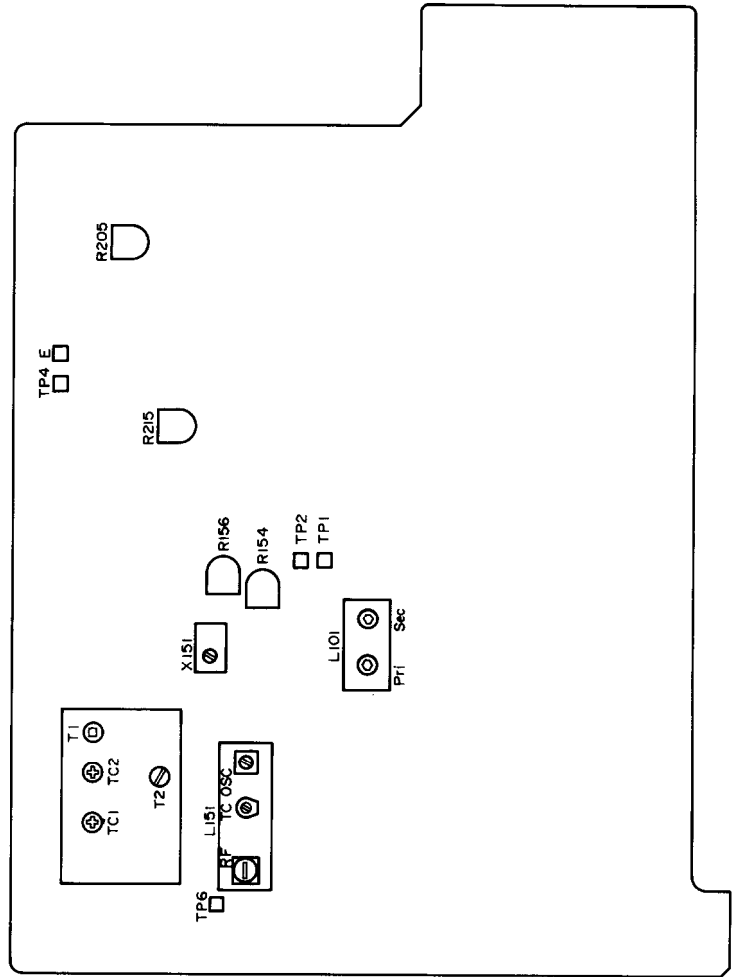


AM section

Step	AM SG output	Tuning Frequency	Output indicator	Adjustment point	Adjust for	Remarks
1	—	522kHz (520kHz)	Digital DC voltmeter	L151 OSC	1.2V±0.1V	Usually not necessary to adjust.
2	603kHz, 60dB/m (600kHz) 400Hz 30% mod.	603kHz (600kHz)	A C voltmeter	L151 R F	Maximum	Repeat the steps 2 and 3 until no further adjustment is necessary.
3	1404kHz, 60dB/m (1400kHz) 400Hz 30% mod.	1404kHz (1400kHz)	voltmeter	L151 T C	Maximum	
4	999kHz, 30dB/m (1000kHz) 400Hz 30% mod.	999kHz (1000kHz)	A C voltmeter	X151	Maximum	
5	999kHz, 30dB/m (1000kHz) 400Hz 30% mod.	999kHz (1000kHz)	TUNED indicator	R154	Light on	

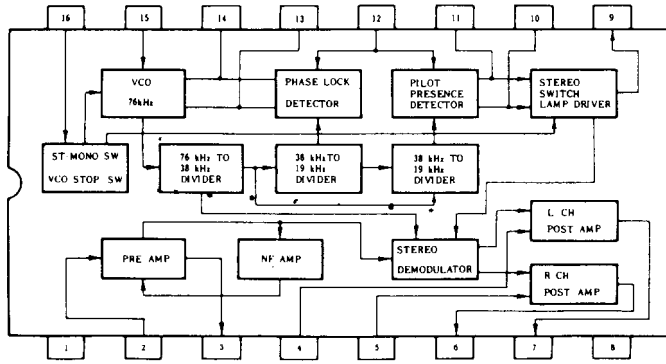


Note: () :120V model <10kHz step>

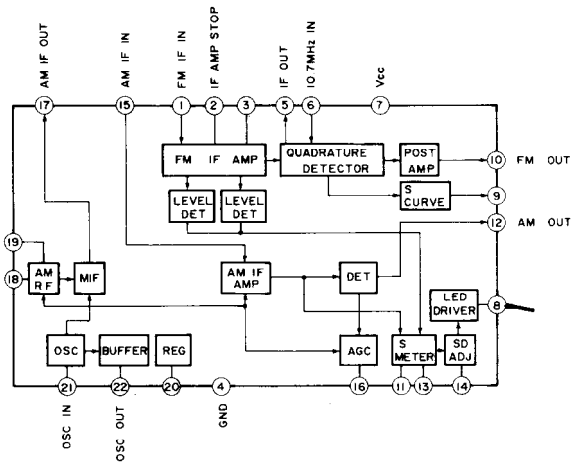


BLOCK DIAGRAM OF IC

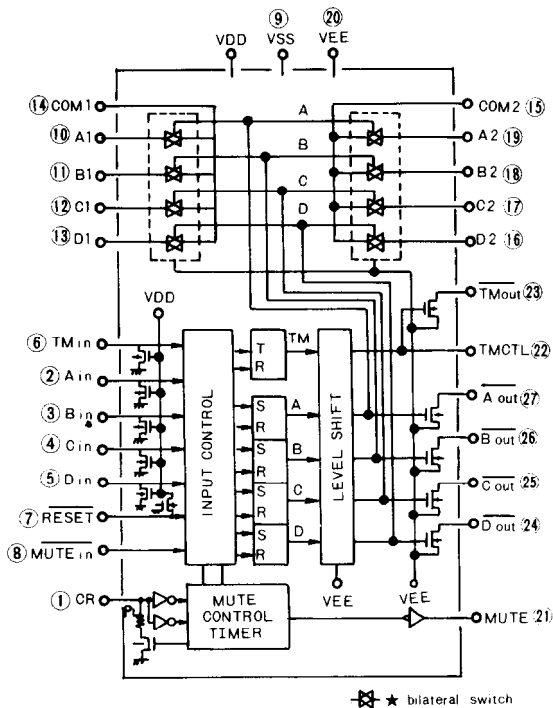
μPC1161C3(Stereo decoder)



LA1265(AM radio/FM IF system)

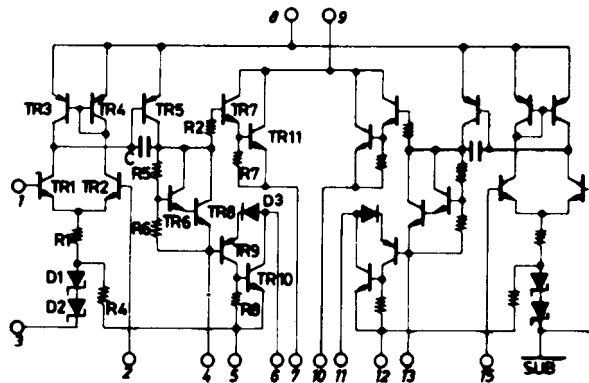


LC7817(Analog switch)

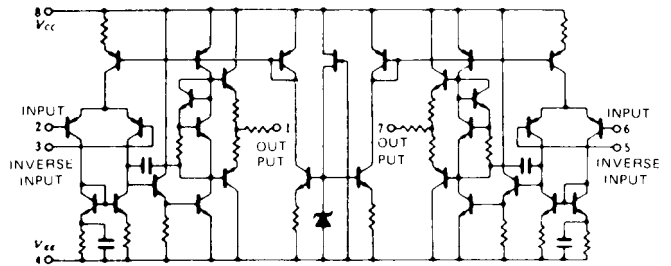


⊗ ★ bilateral switch

STK-4151V(Power amplifier)



NJM4558/4559(Operational amplifier)



PRINTED CIRCUIT BOARD-PARTS LIST

HEADPHONE TERMINAL PC BOARD(NAHP-2598-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
R551,R661	441522714	270ohm,1/2W,Metal oxide film resistor
S501,S502	25035517	NPS-222-L479,Push switch,Speaker
P502	25045184	HJL-0520-01-010,Headphone terminal <G/W>
	25045193	HJL-0521-01-010,Headphone terminal <D>

TONE CONTROL PC BOARD(NATC-2596-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
Transistors		
Q351	2211255, 2210746 or 2212485	2SC1815(GR), 2SC945A(P) or JC501(Q)
Q352	2211455, 2210803 or 2212495	2SA1015(GR), 2SA733(P) or JA101(Q)
Q353,Q354	2212285 or 2212286	2SC2878(A) or 2SC2878(B)
Capacitors		
C361	352780109	1 μ F,50V,Elect.
C362,C462	352781099	0.1 μ F,50V,Elect.
Resistors		
R352	5146049	N16RLC250KWT30,Variable,Balance
R353,R453	5148073	N16RQMC110K180K30,Variable,Bass
R357,R457	5148102	N16RGMC219K30,Variable,Treble

DISPLAY PC BOARD(NADIS-2593-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
Fluorescent tube		
Q751	212016	FIP7B8CS
IC		
Q752	222673	TD6301AP
Transistor		
Q753	2211455, 2210803 or 2212495	2SA1015(GR), 2SA733(P) or JA101(Q)
L.E.Ds		
D341-D344	225137CG,	SEL2413ECG,
D751,D753	225137DG or	SEL2413EDG or
D754,D757	225137DY	SEL2413EDY
D345,D755	225142	SEL2913K
D756	225142	SEL2913K
D752,D758	225141	SEL2213C
Diodes		
D346-D348	223150,	1S1040,
D759	223124 or 223145	1S2473 or 1S2076TD
D760,D761	223150, 223124 or 223145	1S1040, 1S2473 or 1S2076TD <G/W>
D762	2243192 or 2239552	MTZ8.2A or RD8.2E-B2
Capacitor		
C751	352741009	10 μ F,16V,Elect.
Resistors		
R341,R342	441522024	2kohm,1/2W,Metal oxide film
R343	441628214	820ohm,1/2W,Metal oxide film
R757-R765	49121333409	33kohm \times 9,1/8W,Network
R766-R778	49121333413	33kohm \times 13,1/8W,Network
Switches		
S321-S324	25035389	NPS-111-S353
S325	25035515	NPS-142-L477
S751-S763	25035389	NPS-111-S353
Holder		
	27190434	L.E.D
Cushion		
	28140593	3.5 \times 10 \times 40mm

VOLUME CONTROL PC BOARD

VOLUME CONTROL PC BOARD(NAVR-2597-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
R371,R471	5104180	N16RGH100KBT30,Variable resistor, Volume
S351,S352	25035520	NPS-222-L482,Push switch

BAND SELECTOR SWITCH PC BOARD(NASW-2594-1)

Only Worldwide model		
CIRCUIT NO.	PART NO.	DESCRIPTION
S371	25065267	NSS-22109,Slide switch

NOTE: <D>:Only 120V model
<G>:Only 220V and 240V models
<W>:Only worldwide model

PRINTED CIRCUIT BOARD-PARTS LIST

FM/AM TUNER PC BOARD(NARF-2592-1/1A/1B)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end			Ceramic filters	
TU001	240061	FE349U14 <D/W>	X101,X102	3010071	SFE10.7MA5 <D/W>
	240059	FE416U33 <G>	X101	3010070	SFE10.7MS3GYA <G>
	ICs		X102	3010043	SFE10.7MM <G>
Q105	222912	LA-1265	X151	3010075	SFL450B3
Q201	222678	μ PC1161C3	X152	3010076	BFU450C
Q301,Q401	222502 or	NJM4558DX or		Capacitors	
	222534	NJM4559DX	C002	352780339	3.3 μ F,50V,Elect.
Q321	222923	LC7816	C107	352742209	22 μ F,16V,Elect.
Q703	222675	TD6104P	C108	352784799	0.47 μ F,50V,Elect.
Q704	222674	TC9147BP	C111	352741009	10 μ F,16V,Elect.
	Transistors		C112	352780229	2.2 μ F,50V,Elect.
Q101	2211722 or	2SC1923(R) or	C116	352782299	0.22 μ F,50V,Elect.
	2211723	2SC1923(O)	C152,C155	352741009	10 μ F,16V,Elect.
Q102	2210746	2SC945A(P) <G>	C156	352750479	4.7 μ F,25V,Elect.
Q103,Q104	2211255,	2SC1815(GR)	C157	352741009	10 μ F,16V,Elect.
Q152	2210746 or	2SC945A(P) or	C159	352780109	1 μ F,50V,Elect.
	2212485	JC501(Q)	C161	352780229	2.2 μ F,50V,Elect.
Q151,Q153	2211256	2SC1815(BL)	C162	352721019	100 μ F, 6.3V,Elect.
Q202,Q203	2212794,	2SD1468(R),	C201	352750479	4.7 μ F,25V,Elect.
	2211705 or	2SD655(E) or	C202	352744719	470 μ F,16V,Elect.
	2211706	2SD655(F)	C206,C207	352741009	10 μ F,16V,Elect.
Q204,Q322	2211455,	2SA1015(GR),	C208,C209	352780109	1 μ F,50V,Elect.
	2210803 or	2SA733(P) or	C210	352782299	0.22 μ F,50V,Elect.
	2212495	JA101(Q)	C212	352780339	3.3 μ F,50V,Elect.
Q302,Q402	2211945	2SK246(GR)	C213	352780109	1 μ F,50V,Elect.
Q701	2211255	2SC1815(GR)	C214	370134714	470pF \pm 5%,50V,APS
Q702	2212294 or	2SK108(D) or	C302	352780229	2.2 μ F,50V,Elect.
	2211293	2SK68(M)	C304	352721019	100 μ F, 6.3V,Elect.
Q705,Q707	2211255,	2SC1815(GR),	C308	352780229	2.2 μ F,50V,Elect.
Q709-Q711	2210746 or	2SC945A(P) or	C321	379122235	22,000pF \pm 10%,50V,Plastic <D/W>
Q801-Q805	2212485	JC501(Q)	C325,C326	352742219	220 μ F,16V,Elect.
Q706,Q708	2211256	2SC1815(BL)	C327	352784799	0.47 μ F,50V,Elect.
Q712,Q713	2211255,	2SC1815(GR),	C329	352750479	4.7 μ F,25V,Elect.
	2210746 or	2SC945A(P) or	C402	352780229	2.2 μ F,50V,Elect.
	2212485	JC501(Q) <G/W>	C404	352721019	100 μ F, 6.3V,Elect.
Q714	2211455,	2SA1015(GR),	C408	352780229	2.2 μ F,50V,Elect.
	2210803 or	2SA733(P) or	C702	352741009	10 μ F,16V,Elect.
	2212495	JA101(Q) <G/W>	C703	395160107	1 μ F,35V,Tantalum
	Diodes		C708	352734709	47 μ F,10V,Elect.
D101,D102	223132	1K60	C711	352780109	1 μ F,50V,Elect.
D104,D152	223150,	US1040,	C712	352780229	2.2 μ F,50V,Elect.
D153,D201	223124 or	1S2473 or	C713	352780479	0.47 μ F,50V,Elect.
D301,D401	223145	1S2076TD	C715	3020017	0.022F,5V,Super
D321-D324	223150,	US1040,	C801,C802	352741009	10 μ F,16V,Elect.
D701-D703	223124 or	1S2473 or	C951	352741009	10 μ F,16V,Elect.
D803-D808	223145	1S2076TD		Resistors	
D801,D802	223155	1SS138	R154	5215045	N08HR10KBC,Semi-fixed
D951	2243152 or	MTZ5.6B or	R156	5215062	N08HR30KBC,Semi-fixed
	2239472	RD5.6EB2	R205	5215048	N08HR200KBC,Semi-fixed <D/W>
	Coils			5215049	N08HR500KBC,Semi-fixed <G>
L001	233312	NMA-3051 <G>	R215	5215044	N08HR5KBC,Semi-fixed
L102	233105	NCH-1005	R951	441521114	110ohm,1/2W,Metal oxide film
L201	233236	NMC-6027 <G>		Socket	
L202,L203	233291	NMC-5039 <G>		25050273	NSCT-9P101
	Transformer			Terminals	
L101	233351	NFIF-4056	P301-P303	25045171	NPJ-4PDBL-65,Input/Output
	RF block		P901	25060085	NTM-4PDBL-65,Antenna <D/W>
L151	232128	NMRF-7043		25060087	NTM-2PDMN31,Antenna <G>
	X'tal			Bracket	
X701	3010073	XTL-7.2M		27141059	Ground

PRINTED CIRCUIT BOARD-PARTS LIST

POWER AMPLIFIER PC BOARD (NAAF-2595-1/1A/1B)

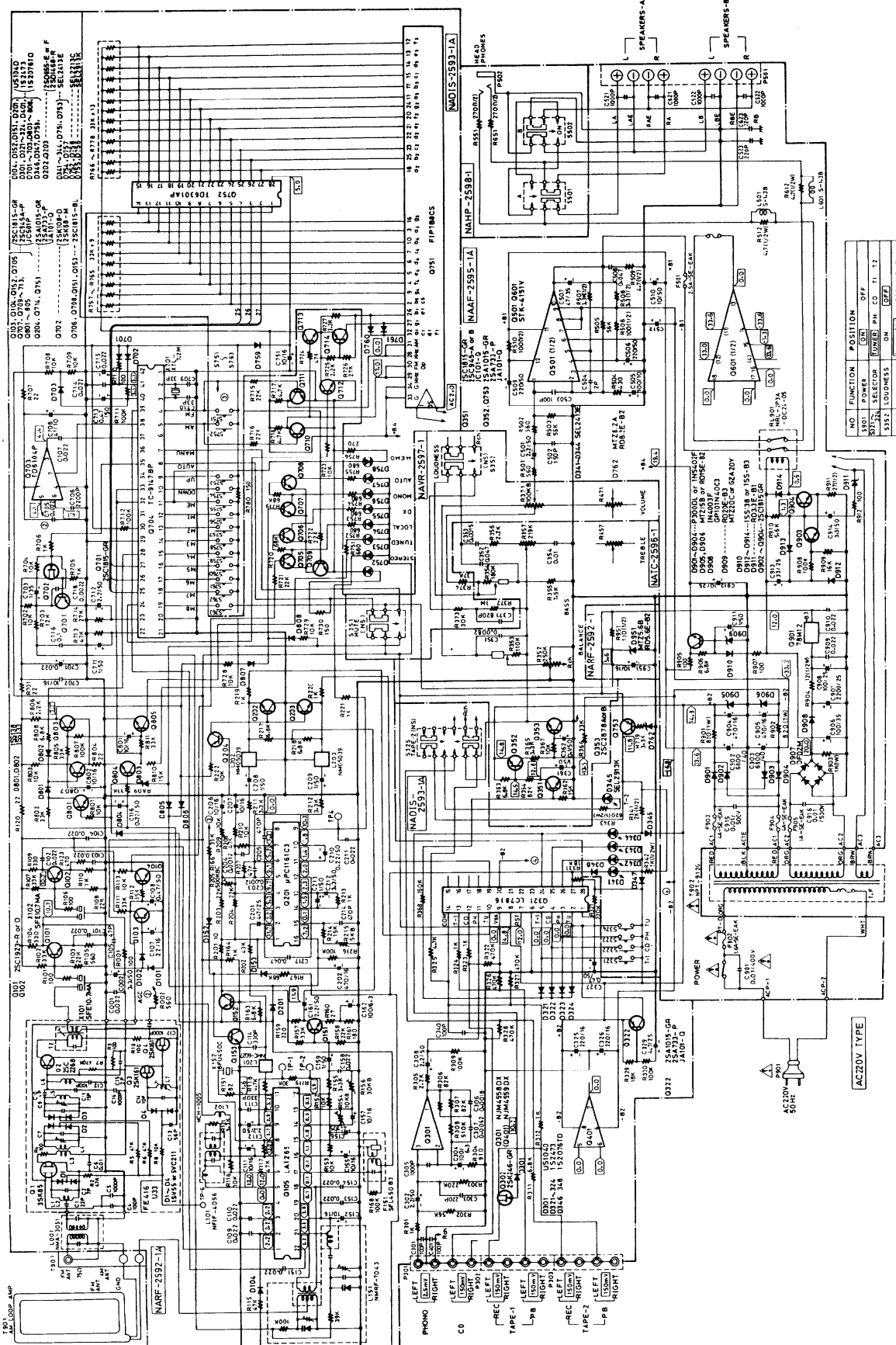
CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
		Capacitors			
	C501, C601	2.2 μ F 50V Elect.			
	C505, C605	352780229			
	C506, C606	352721019			
	C506	352782219			
	C507, C607	352764709			
	C509	352782219			
	C512, C514	352781009			
	C901	3500065A			
	C902, C903	3504171			
	C904, C905	352744719			
	C906	352761019			
	C907	352752229			
	C908	352751019			
	C911	352780109			
	C510, C912	352751009			
	C913	352753209			
	C914	352780339			
		Resistors			
	R506	441521014			
	R507, R607	441523324			
	R508, R608	441523324			
	R509, R609	441520474			
	R510	441521014			
	R512, R612	441520474			
	R901, R902	441628214			
	R903	441621024			
	R904	441521204			
	R911	441522704			
	R913	431523255			
	R990	441520104			
		Relay			
	RL901	250665108			
		Switch			
	S901	Δ NPS-111-L362P Power			
		Terminal			
	P501	250600933			
		Fuseholders			
		25060094			
		Sockets			
		25050268			
		25050269			
		NSCT-4P-96			
		NSCT-5P-97			
		Radiator			
		27160176			
		Screw			
		82143006			
		Brackets			
		27141059			
		25060092			
		Label			
		29360626-1			
		29360405			
		Fuses			
		252048			
		252073 or			
		252077			
		252077			
		252070			
		252059			
		252075			

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

NOTE: (D) Only 120V model
(G) Only 220V and 240V models
(W) Only Worldwide model

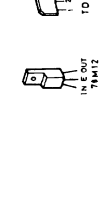
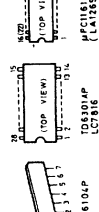
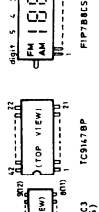
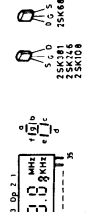
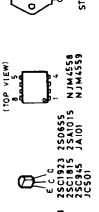
SCHEMATIC DIAGRAM

-G/Q models-



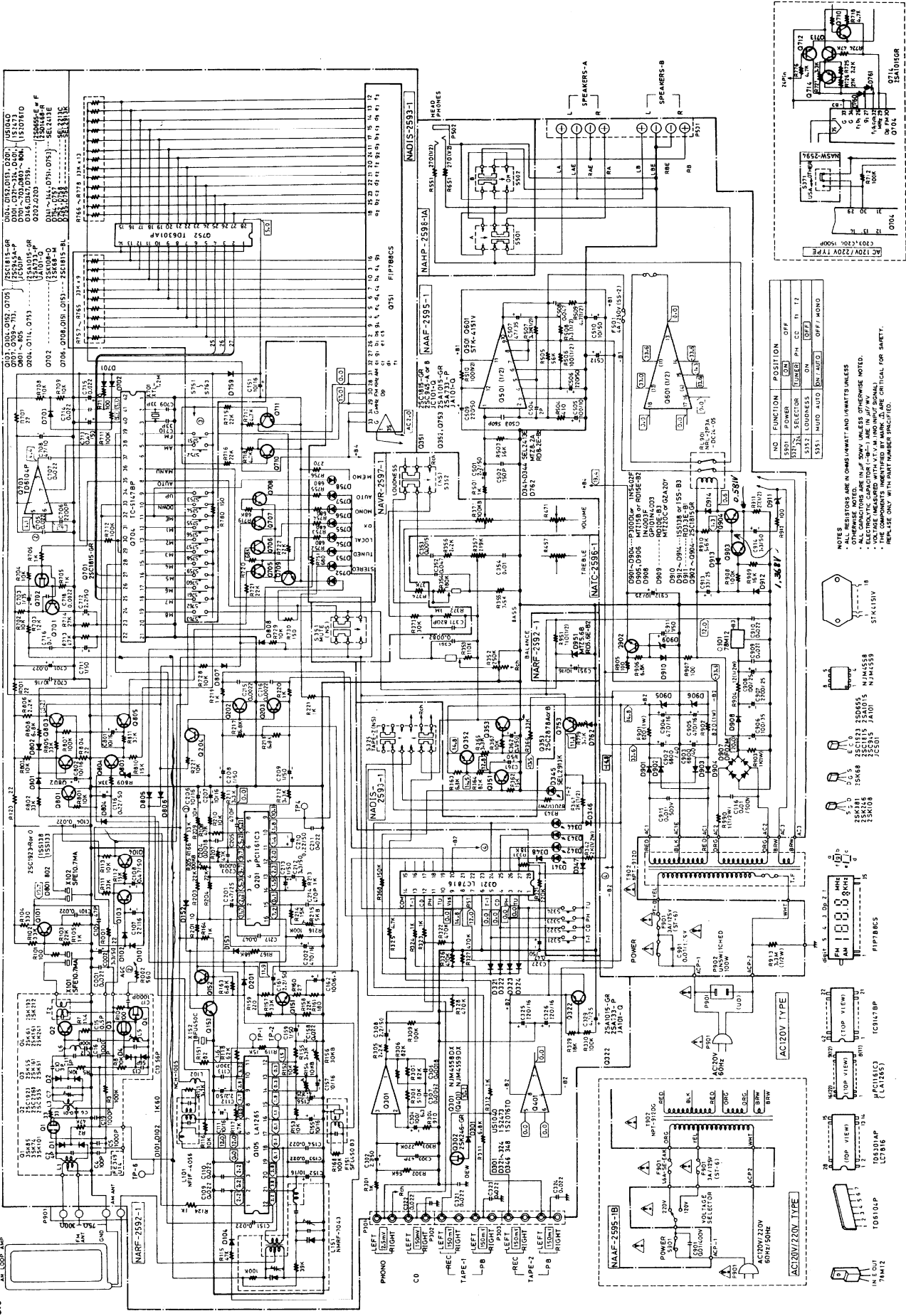
NO.	FUNCTION	POSITION	OFF
101	POWER	ON	OFF
102	LOGNESS	ON	OFF
103	AUTO	ON	OFF
104	AV	ON	OFF
105	AV	ON	OFF
106	AV	ON	OFF
107	AV	ON	OFF
108	AV	ON	OFF
109	AV	ON	OFF
110	AV	ON	OFF
111	AV	ON	OFF
112	AV	ON	OFF
113	AV	ON	OFF
114	AV	ON	OFF
115	AV	ON	OFF
116	AV	ON	OFF
117	AV	ON	OFF
118	AV	ON	OFF
119	AV	ON	OFF
120	AV	ON	OFF
121	AV	ON	OFF
122	AV	ON	OFF
123	AV	ON	OFF
124	AV	ON	OFF
125	AV	ON	OFF
126	AV	ON	OFF
127	AV	ON	OFF
128	AV	ON	OFF
129	AV	ON	OFF
130	AV	ON	OFF
131	AV	ON	OFF
132	AV	ON	OFF

NOTES:
 - ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS ARE IN μF UNLESS OTHERWISE NOTED.
 - ELECTROLYTIC CAPACITORS ARE IN μF AND POLARITY IS INDICATED BY + AND -.
 - THE COMPONENTS IDENTIFIED BY MARK "A" ARE CRITICAL FOR SAFETY.
 - RELEASE ONLY WITH PART NUMBER SPECIFIED.



SCHEMATIC DIAGRAM

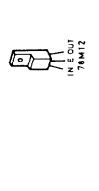
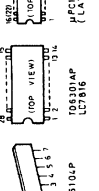
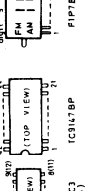
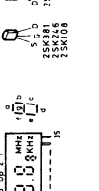
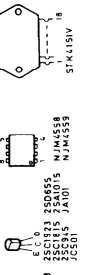
-D/W models-



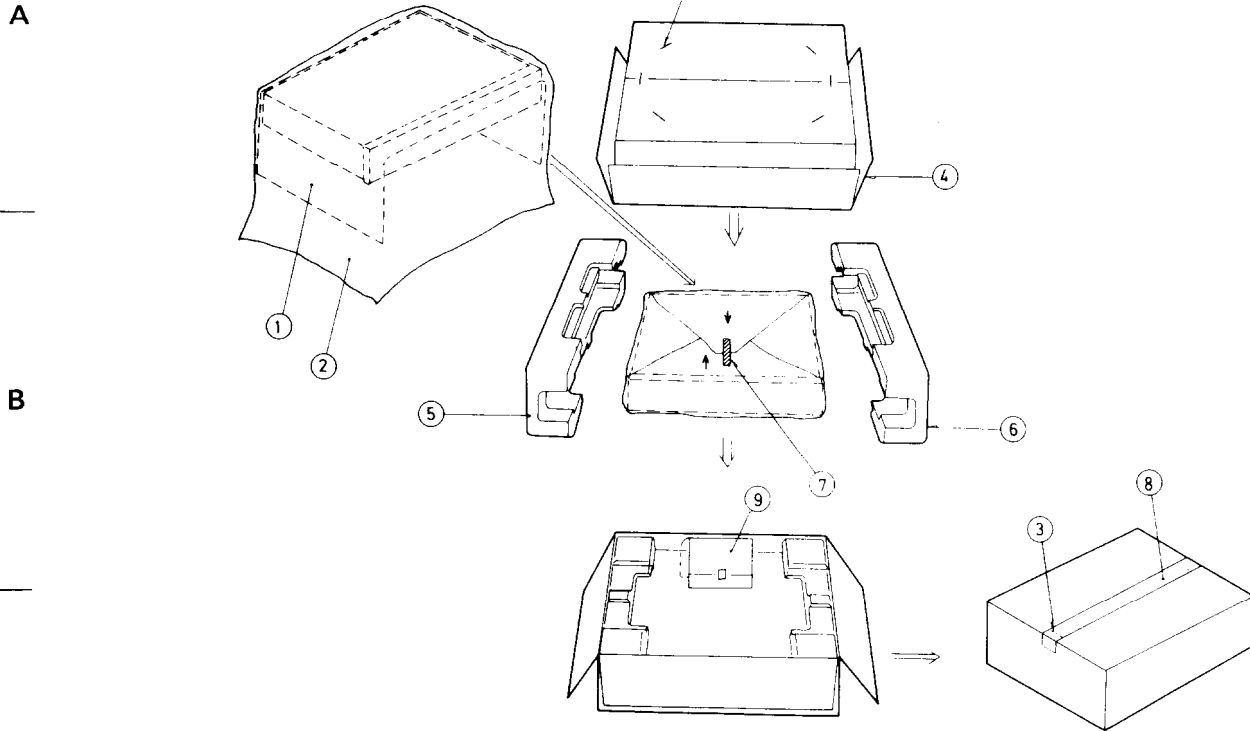
001 002 003 004 005 006 007 008 009 010 011 012 013 014 015 016 017 018 019 020 021 022 023 024 025 026 027 028 029 030 031 032 033 034 035 036 037 038 039 040 041 042 043 044 045 046 047 048 049 050 051 052 053 054 055 056 057 058 059 060 061 062 063 064 065 066 067 068 069 070 071 072 073 074 075 076 077 078 079 080 081 082 083 084 085 086 087 088 089 090 091 092 093 094 095 096 097 098 099 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

NO.	FUNCTION	POSITION	ON	OFF
5301	POWER	SELECTOR	PH	CC
5312	LOUDNESS	ON	OFF	
5351	AUTO AUTO	ON	OFF	

NOTES:
 1. ALL PARTS ARE IN OHMS UNLESS OTHERWISE NOTED.
 2. ALL CAPACITORS ARE IN μ F UNLESS OTHERWISE NOTED.
 3. VOLTAGE MEASURED WITH V.T.A. (NO INPUT SIGNAL).
 4. RESISTOR VALUES IN OHMS UNLESS OTHERWISE NOTED.
 5. RESISTOR VALUES IN K Ω UNLESS OTHERWISE NOTED.



PACKING VIEW



REF.NO.	PART NO.	DESCRIPTION
1	29095012-1	500 × 800mm, Protection sheet
2	29100036A	550 × 850mm, Poly-vinyl bag
3	282301	Sealing hook
4	29051285	Master carton box <S>
	29051286	Master carton box
5	29090690C	Pad R
6	29090691B	Pad L
7	29110032	W=15mm, Adhesive tape
8	260012	W=50mm, Damplon tape
9		Accessory bag ass'y
		U.S.A. model
	292064A	FM antenna
	29340986	Instruction manual
	232119	NMA-3052, AM loop antenna
	29365006-7	Warranty card
	29368002C	Service station list
	29100006A	250 × 350mm, Poly-vinyl bag

NOTE: : Only black model
<S>: Only silver model

REF.NO.	PART NO.	DESCRIPTION
		120V model
	292064A	FM antenna
	29340986	Instruction manual
	232119	NMA-3052, AM loop antenna
	29100006A	250 × 350mm, Poly-vinyl bag
		220V model
	292092	FM antenna
	29340987	Instruction manual
	232119	NMA-3052, AM loop antenna
	29100006A	250 × 350mm, Poly-vinyl bag
		Worldwide model
	292064A	FM antenna
	29340987	Instruction manual
	232119	NMA-3052, AM loop antenna
	29100006A	250 × 350mm, Poly-vinyl bag
	25055040	CV-K-2, Conversion plug
		240V model
	292092	FM antenna
	29340987	Instruction manual
	232119	NMA-3052, AM loop antenna
	29100006A	250 × 350mm, Poly-vinyl bag
	25060088	Antenna adaptor FM

E