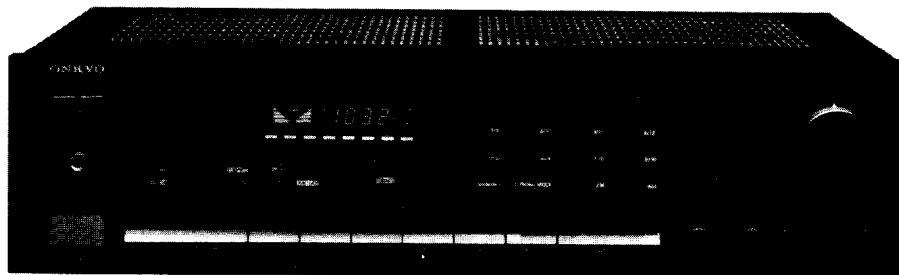


ONKYO® SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER MODELS TX-82/TX-82M



Black model

BHUD, BHUDN	120V AC, 60Hz
BHUG	220V AC, 50Hz
BHUQ	240V AC, 50Hz
BHUW	120/220V AC, 50/60Hz

SAFETY-RELATED COMPONENT WARNING!!
COMPONENTS IDENTIFIED BY MARK Δ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE 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.

TABLE OF CONTENTS

Specifications	2
Service procedures	3
Exploded view	4
Parts list	5
Circuit descriptions	6
Block diagram - Amp. section -	12
- Tuner section -	13
Block diagram of IC	14
Packing view	17
Adjustment procedures	18
Pc board view/parts list	
Power amp.	21
FM/AM tuner	25
Display	29
Preamp.	30
Remote control	33
Switch	33
Speaker	34
Volume	34
Schematic diagram	
Amp. section - 120V -	23
- Other -	35
Tuner section - 120V -	27
- Other -	31
Disassembling procedures	37

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Power Output:	45 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.08% THD.
Musical Power Output:	2 x 126 watts at 4 ohms, 1kHz (DIN) 2 x 78 watts at 8 ohms, 1kHz (DIN)
Continuous Power Output:	2 x 70 watts at 4 ohms, 1kHz (DIN) 2 x 55 watts at 8 ohms, 1kHz (DIN)
Total Harmonic Distortion:	0.08% at rated power 0.08% at 1 watt output
IM Distortion:	0.08% at rated power 0.08% at 1 watt output
Damping Factor:	35 at 8 ohms
Frequency Response:	20 - 30,000 Hz \pm 1dB
RIAA Deviation:	20 - 20,000 Hz \pm 0.8dB
Sensitivity and Impedance:	Phono: 2.5mV/50 kohms CD/Tape Play: 150mV/50 kohms Tape Rec: 150mV/3.5 kohms (phono)
Phono Overload:	120mV RMS at 1kHz, 0.04% 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: \pm 10dB at 100Hz Treble: \pm 10dB at 10kHz
Muting:	-20dB

TUNER SECTION

FM:

Tuning Range:

Usable Sensitivity:

50dB Quieting Sensitivity:

Capture Ratio:

Image Rejection Ratio:

IF Rejection Ratio:

Signal-to-Noise Ratio:

Selectivity

AM Suppression Ratio:

Harmonic Distortion:

Frequency Response:

Stereo Separation:

AM:

Tuning Range:

Usable Sensitivity:

Image Rejection Ratio:

IF Rejection Ratio:

Signal-to-Noise Ratio:

Harmonic Distortion:

OTHER MODELS

87.5 - 108.0MHz (50kHz steps)

Mono: 12.8dBf, 1.2 μ V, 75 ohms
1.0 μ V (S/N 26dB, 40kHz Devi.)
75 ohms DIN

Stereo: 18.0dBf, 2.2 μ V, 75 ohms
23 μ V (S/N 46dB, 40kHz Devi.)
75 ohms DIN

Mono: 18.0dBf, 2.2 μ V, 75 ohms

Stereo: 37.2dBf, 20 μ V, 75 ohms

1.5dB

85dB

90dB

Mono: 72dB

Stereo: 66dB

50dB DIN (\pm 300kHz, 40kHz dev.)

50dB

Mono: 0.15%

Stereo: 0.30%

30 - 15,000Hz \pm 1.5dB

45dB at 1kHz

30dB at 100 - 10,000Hz

522 - 1611kHz (9kHz steps)

30 μ V

40dB

40dB

40dB

40dB

0.7%

120V MODELS

87.9 - 107.9MHz (200kHz steps)

Mono: 11.2dBf, 1.9 μ V

Stereo: 17.2dBf, 4.0 μ V

Mono: 17.2dBf, 4.0 μ V

Stereo: 37.2dBf, 40 μ V

1.5dB

40dB

90dB

Mono: 72dB

Stereo: 66dB

55dB (ACA)

50dB

Mono: 0.15%

Stereo: 0.30%

30 - 15,000Hz \pm 1.5dB

45dB at 1kHz / 30dB at 100 - 10,000Hz

530-1620 kHz (10kHz steps)

30 μ V

40dB

40dB

40dB

40dB

0.7%

GENERAL

Dimensions (W x H x D):	435 x 110 x 345 mm 17-1/8" x 4-3/8" x 13-1/2"
Weight:	7.5 kg., 16.5 lbs

Specifications and features are subject to change without notice.

Remote Control transmitter RC-82S

Transmitter:	Infrared
Signal range:	Approx. 5 meters (16ft. 4")
Power supply:	Two "AA" batteries (1.5V x 2)
Dimensions (W x H x D):	64 x 18 x 149 mm 2-1/2" x 11/16" x 5-7/8"
Weight:	110 grams 3.9 oz. (including batteries)

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
F901	252049	4A (ST-6), Primary

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

Circuit no.	Part no.	Description
F902	252074	2 A-SE-EAK, Primary
F903, F904	252078	5A-SE-EAK, Secondary
F905, F906	252070	1A-SE-EAK, Secondary

W (Worldwide) model

Circuit no.	Part no.	Description
F901	252049	4A (ST-6), Primary
F902	252074	2 A-SE-EAK, Primary

2. Change of FM/AM band step.

– 120V model –

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 D709 and D710 on the display PC board.

If the AM band step is changed from 10kHz to 9kHz, add a diode (1SS133) to D711 on the display PC board.

–220V model –

This model is not located the band selector switch.

If the FM band step is changed from 50kHz to 200kHz, remove two diodes (1SS133) to D709 and D710 on the display PC board.

If the AM band step is changed from 9kHz to 10kHz, remove a diode (1SS133) to D711 on the display PC board.

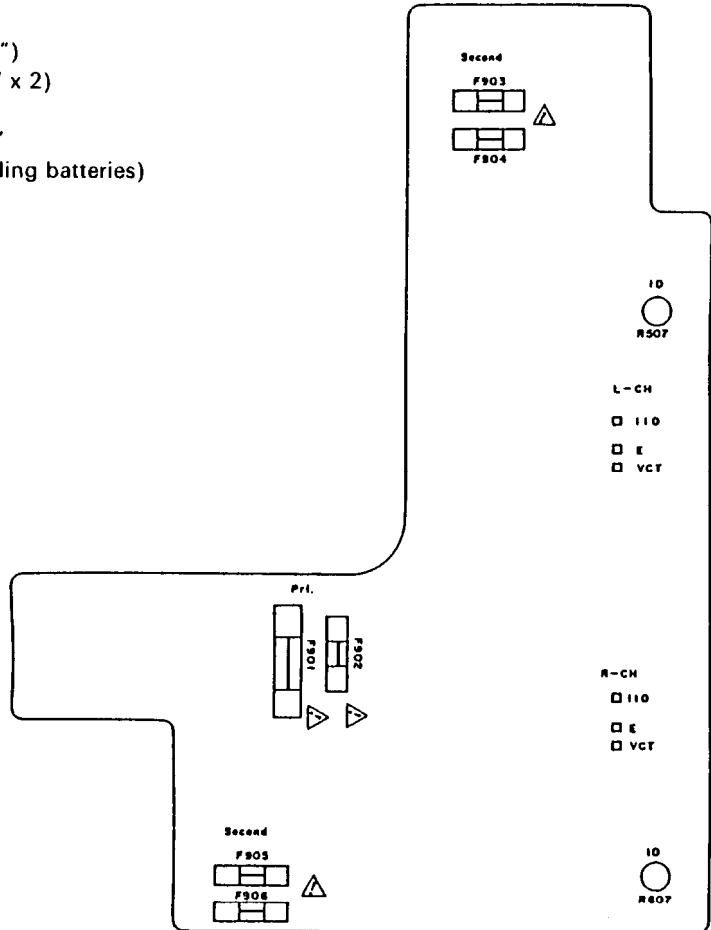
– Worldwide model –

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

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.

**4. 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 terminal GND on the back panel.

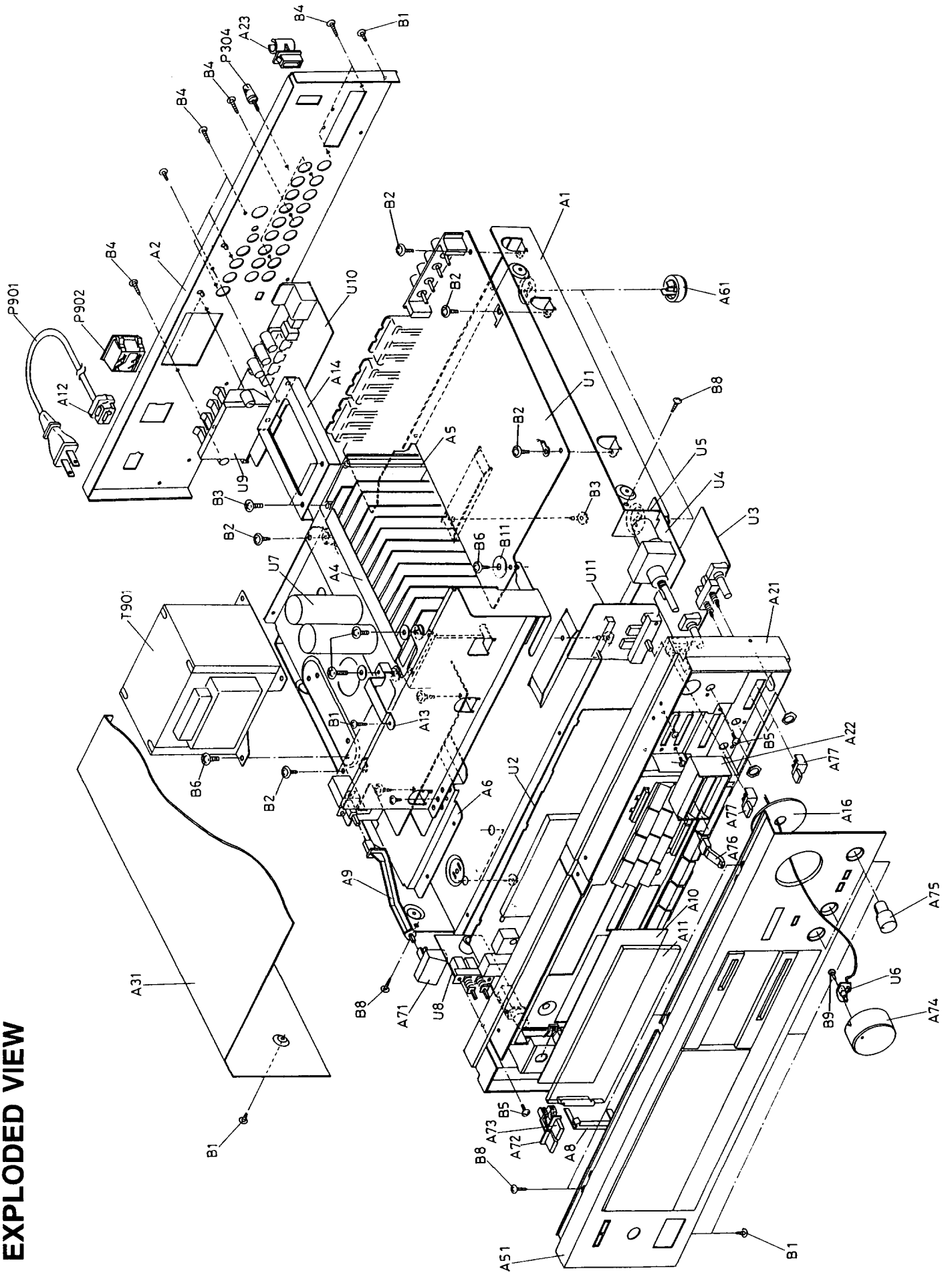
Specifications: 3.3Mohm \pm 10% at 500V.

5. 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.

EXPLODED VIEW



PARTS LIST

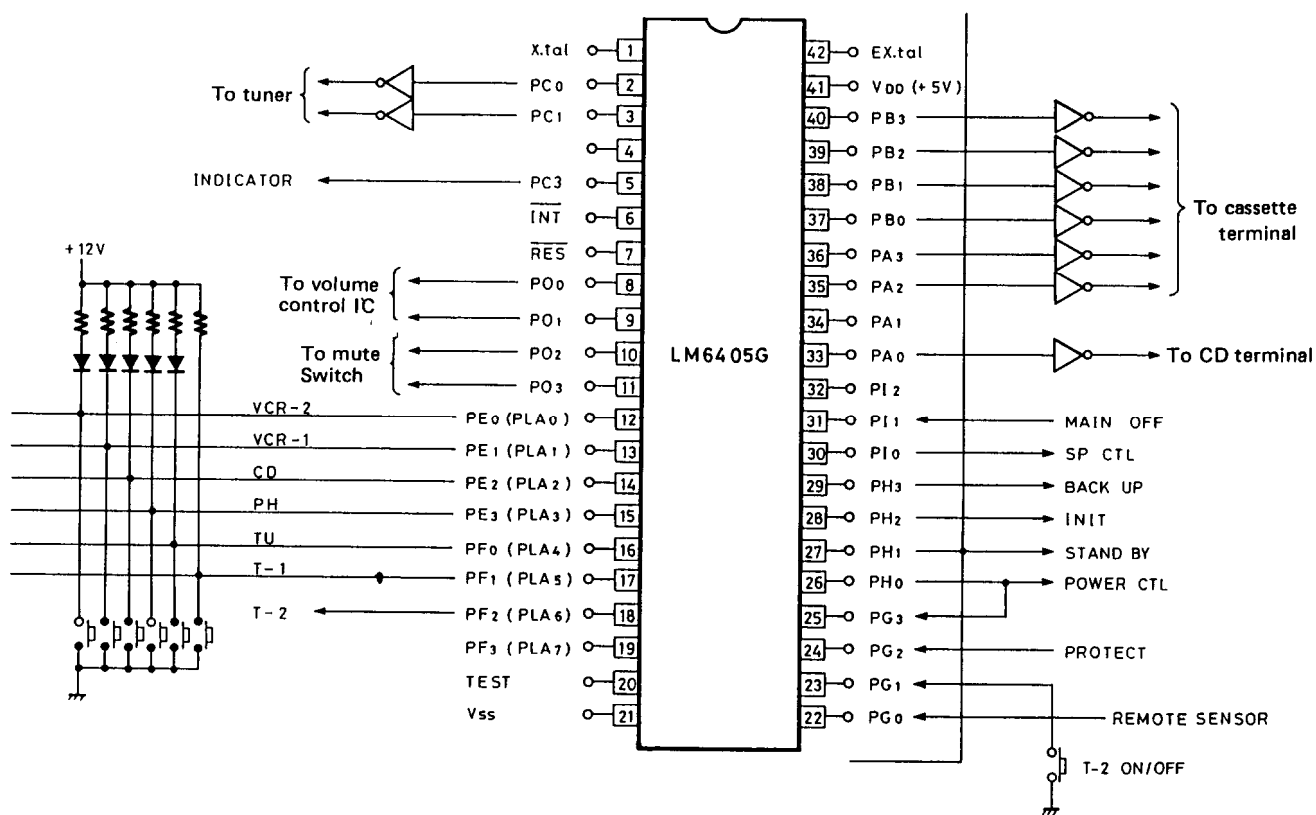
REF.NO.	PART NO.	DESCRIPTION	P304	25060044	Terminal GND	U6	1A013574-1	NADIS-2874-1, Volume indicator pc board ass'y
A1	27100121A	Chassis	P901	253123, AS-UC-6#18, Power supply cord <D>	U7	1A008575-2	NAPS-2875-2, Power amplifier and power supply pc board ass'y <D>	
A2	27120941	Back panel <D>		253136 or AS-SAA, Power supply cord <Q>		1A008575-2A	NAPS-2875-2A, Power amplifier and power supply pc board ass'y <G/Q>	
	27120942	Back panel <G>		253140 NSCT-2P118T, AC outlet <D>		1A007575-2B	NAPS-2875-2B, Power amplifier and power supply pc board ass'y <W>	
	27120944	Back panel <W>		2201783, 2SC3854(O), or Speaker switch pc board ass'y <D/W>	U8	1A013576-1	NASW-2876-1, Speaker switch pc board ass'y <D/W>	
A3	27130470	Bracket, shielded		2201784 or 2SC3854(P), Transistors		1A013576-1A	NASW-2876-1A, Speaker switch pc board ass'y <G/Q>	
A4	27130468A	Bracket, radiator		2201773, 2SA1490(O), or Speaker terminal board ass'y <G/Q>		1A013577-1	NAETC-2877-1, Speaker terminal board ass'y <D/W>	
A5	27160201	Radiator		2201774 or 2SA1490(Y) or Speaker terminal board ass'y <D/W>		1A013577-1A	NAETC-2877-1A, Speaker terminal board ass'y <G/Q>	
A6	27130469A	Bracket, power transformer	P902	2201754, 2SD1913(R), or Speaker terminal board ass'y <G/Q>		1A008578-2	NAETC-2878-2, Remote control terminal pc board ass'y	
A8	27190359A	Holder, dial plate	Q508, Q608	2201404 or 2SD1406(Y) or Speaker terminal board ass'y <G/Q>		1A008579-2	NAAF-2879-2, Switch pc board ass'y	
A9	27273030C	Joint L		2201405 2SD1406(GR), Transistors	U10			
A10	28133176A	Back plate	Q509, Q609	25065123 NPS-1258P, Voltage selector switch <W>	U11			
A11	28130242A	Dial plate		2300198 NPT-955D, Power transformer				
A12	27300750	Strainrelief		2300199 NPT-955G, Power transformer				
A13	27141122	Bracket F	Q902, Q905	2300200 NPT-955DG, Power transformer				
A14	27141123A	Bracket R		2300201 NPT-955Q, Power transformer				
A15	27270216	Spacer		1A008569-2 NAAR-2869-2, FM/AM tuner pc board ass'y <D>				
A21	27110393B	Front bracket ass'y	S903	1A008569-2A NAAR-2869-2A, FM/AM tuner pc board ass'y <G/Q>				
A22	27190526	Holder, slider		1A007569-2B NAAR-2869-2B, FM/AM tuner pc board ass'y <W>				
A23	27190105	Holder, antenna		1A008570-2 NADIS-2870-2, Display pc board ass'y <D>				
A31	28184357A	Top cover	T901	1A008570-2A NADIS-2870-2A, Display pc board ass'y <G/Q>				
A51	1A007121	Front panel ass'y		1A007570-2B NADIS-2870-2B, Display pc board ass'y <W>				
A52	28140220	Cushion		1A008571-2 NAAF-2871-2, Preamplifier pc board ass'y <D>				
A61	27175130	Leg		1A008571-2A NAAF-2871-2A, Preamplifier pc board ass'y <G/W/Q>				
A71	28322795A	Knob, Power		1A013572-1 NAAF-2872-1, Volume pc board ass'y				
A72	28322304-1	Knob, Speaker A		1A013573-1 NAETC-2873-1, Volume motor pc board ass'y				
A73	28322305-1	Knob, Speaker B						
A74	28322923B	Knob, Volume						
A75	28322929	Knob, Tone						
A76	28322925	Knob, Slide						
A77	28322927A	Knob, Push						
B1	834430068	3TTS+6B(BC), Tapping screw	U1					
B2	831130088	3TTW+8B, Tapping screw						
B3	838440089	4TTB+8C(BC), Tapping screw						
B4	834430108	3TTS+10B(BC), Tapping screw						
B5	82143006	3P+6FN(BC), Pan head screw	U2					
B6	830440089	4TTC+8C(BC), Tapping screw						
B7	82142004	2P+4F(BC), Pan head screw						
B8	833430080	3TTP+8F(BC), Tapping screw						
B9	880011	Rivet						
B10	830440109	4TTC+10C(BC), Tapping screw	U3					
B11	870060	Flat washer						
F901	252049	4A(ST-6), Fuse, primary <D/W>						
F902	252074	2A-SE-EAK, Fuse, primary <G/W/Q>						
F903, F904	252078	5A-SE-EAK, Fuse, secondary						
F905, F906	252070	<G/Q> . 1A-SE-EAK, Fuse, secondary <G/Q>						

NOTE: <D>: Only 120V model
 <G>: Only 220V model
 <Q>: Only 240V model
 <W>: Only Worldwide model

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

CIRCUIT DESCRIPTION

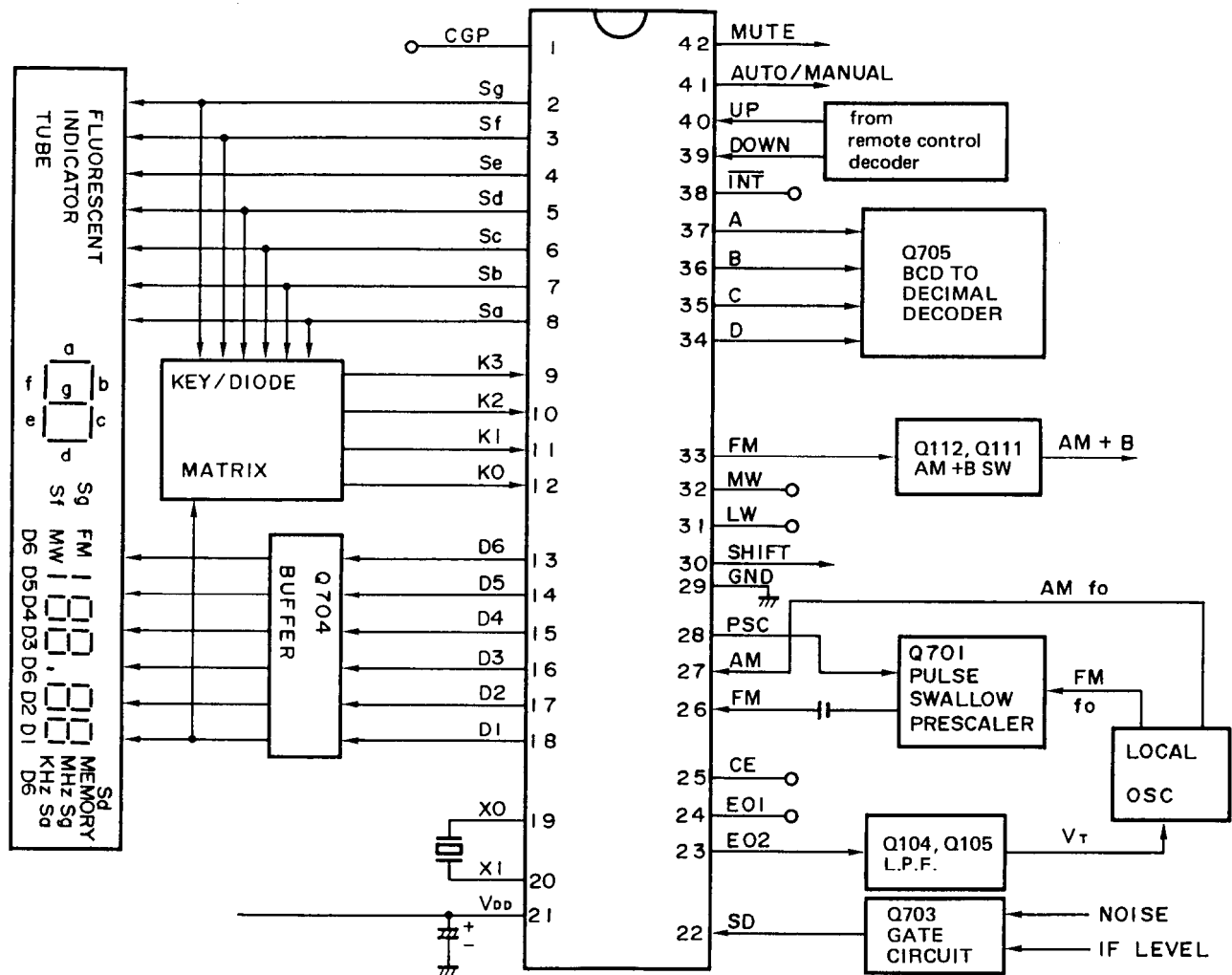
1: Remote control decoder (LM6405G)



Pin No.	Code	Description
1	X'tal	Ceramic resonator
2	ST. UP	Preset STATION UP signal output terminal Output "L" during pushing of remote control STATION UP KEY
3	ST. DN	Preset STATION DOWN signal output terminal Output "L" during pushing of remote control STATION DOWN KEY
5	INDI	Terminal for indicating Light received by remote control; during light reception, "L" is output
7	RES	Reset terminal
8	VOL. UP	VOLUME UP signal output terminal Outputs "L" during pushing of VOLUME UP KEY
9	VOL. DN	VOLUME DOWN signal output terminal Output "L" during pushing of VOLUME DOWN KEY
10	MUTING	MUTING ON/OFF output terminal Switching of "L" ↔ "H" (ON = "H") by means of remote control AUDIO MUTING KEY

Pin No.	Code	Description
11	MUT-2	Muting signal output terminal for TAPE-2 change-over "H" during 200mS change-over time to TAPE-2
12	VCR-2	Selector signal output terminal for VCR-2 change-over "L" during 200mS after pushing remote control VCR-2 KEY
13	VCR-1	Selector signal output terminal for VCR-1 change-over "L" during 200mS after pushing remote control VCR-1 KEY
14	CD	Selector CD change-over signal output terminal "L" during 200mS after pushing remote control CD KEY
15	PH	Selector PHONO change-over signal output terminal "L" during 200mS after pushing remote control PHONO KEY
16	TU	Selector signal output terminal for TUNER change-over "L" during 200mS after pushing remote control TUNER KEY
17	T-1	Selector signal output terminal for TAPE-1 change-over "L" during 200mS after pushing remote control TAPE-1 KEY
18	T-2	Selector signal output terminal for TAPE-1 change-over Switching of "H" ↔ "L" by means of remote control TAPE-2 KEY
21	GND	GND terminal
22	REM IN	Remote control signal input terminal
23	T-2 CTL	TAPE-2 ON/OFF control input terminal T-2 output is changed-over with "L" input
24	PROTECT	Protection function input terminal; with "H" input, output SP CTL "H"
25	CONT IN	Power source condition input terminal; connects to POWER output; POWER ON with "H"
26	POWER	Power source control output terminal Switching of "H" ↔ "L" (ON = "H")
27	STBY	Terminal for indication during STANDBY; POWER reversing output
28	INIT	Output terminal for start of selector "L" during 300mS when power source is ON
29	B. UP	Output terminal for back up during STANDBY
30	SP CTL	Speaker control output terminal ("L" = speaker output ON)
31	M. OFF	Main power source OFF detection terminal
33	CD MODE	Serial signal output terminal for CD control use
35	REW	Cassette deck control signal output terminal "H" during 200mS after pushing remote control REW KEY
36	FF	Cassette deck control signal output terminal "H" during 200mS after pushing remote control FF KEY
37	REC	Cassette deck control signal output terminal "H" during 200mS after pushing remote control REC KEY
38	STOP	Cassette deck control signal output terminal "H" during pushing of remote control STOP KEY
39	PAUSE	Cassette deck control signal output terminal "H" during 200mS after pushing remote control PAUSE KEY
40	PLAY	Cassette deck control signal output terminal "H" during 200mS after pushing remote control PLAY KEY
41	V _{DD}	Power source terminal
42	Extal	Ceramic resonator connection terminal

2. Controller connection



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 C714 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 occurs when the frequencies match. The output is applied to the variable capacitor diode in the front end through the low pass filter Q104 and Q105. 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. <table border="1" style="margin-left: 40px;"> <thead> <tr> <th></th> <th>M1</th> <th>M2</th> <th>M3</th> <th>M4</th> <th>M5</th> <th>M6</th> <th>M7</th> <th>M8</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>B</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>C</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>D</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> </tr> </tbody> </table>		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
	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 FM band settings. See table 2.
10/9kHz AM band settings. See table 3.

BAND0	BAND1	REGION	FREQUENCY RANGE	CHANNEL SPACE
D710	D709			
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).

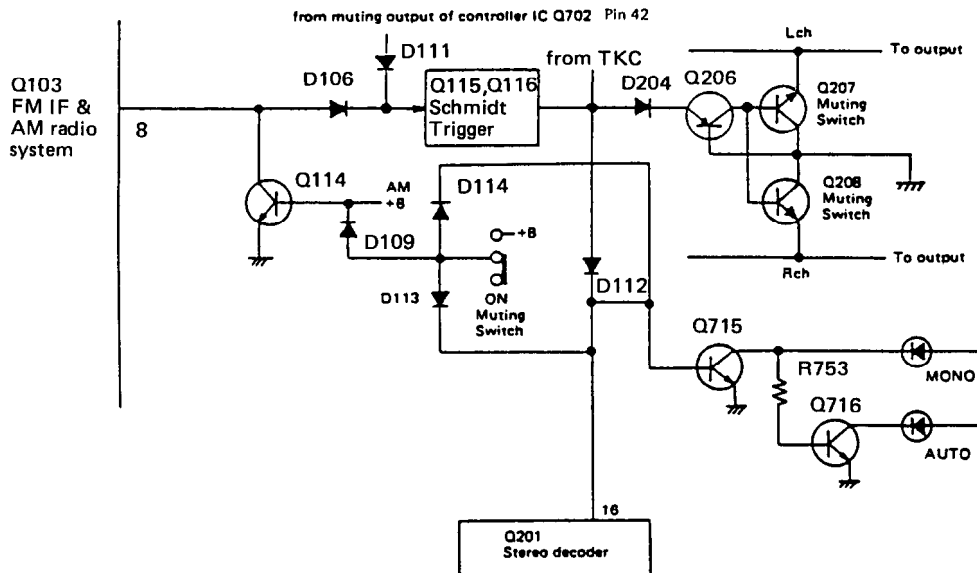
table 2

AM	10kHz/9kHz	FREQUENCY RANGE	CHANNEL SPACE
	D711		
0	0	530-1620kHz	10kHz
0	1	522-1611kHz	9kHz
1	0	531-1602kHz	9kHz

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

table 3

3. Muting circuit



The muting circuit operates in the following cases.

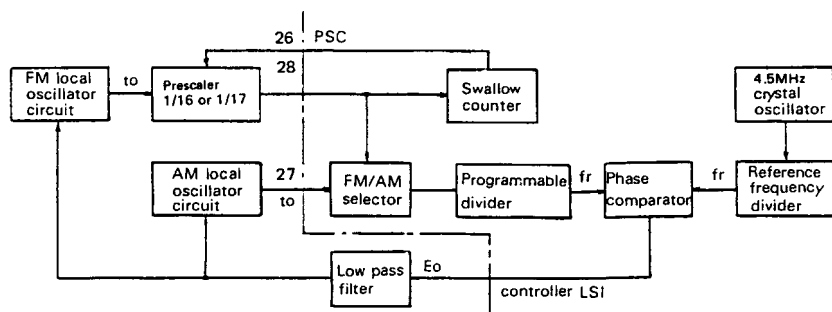
1. While pin 42 of controller IC outputs the high level.
Q207 and Q208 are turned on and muting is closed in the following cases: (1) While the manual UP/DOWN switch is being held down, (2) When a station in the memory is recalled, and (3) While a radio station is being received using auto search tuning.
2. When an FM station is not being received (and the muting switch is on).

The IF level in the FM IF system (set at R101 so muting

is opened at 17.2dBf and zero-cross detection circuit (tuning point 55kHz (100kHz step): 30kHz (50kHz step)-are output at pin 8 through the AND circuit. When a station is turned, the output goes to the low level.

When output goes to the low level, Q115 turned off, Q116 is turned on and Q207 and Q208 are turned off, so muting is opened. At the same, pin 16 of stereo decoder Q201 goes to the low level, so the VCO oscillator starts.

4. PLL tuned circuit



A block diagram of the tuned of the PLL is shown in the above diagram.

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

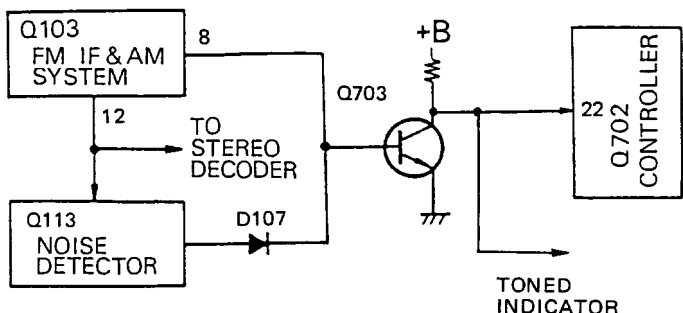
The pulse swallow method is used in the prescaler of this unit. In this type of prescaler, a supplementary number

(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 1/16 or 1/17 according to external control (1/16 when the PSC terminal is "H" and 1/17 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.

5. Auto search tuning circuit

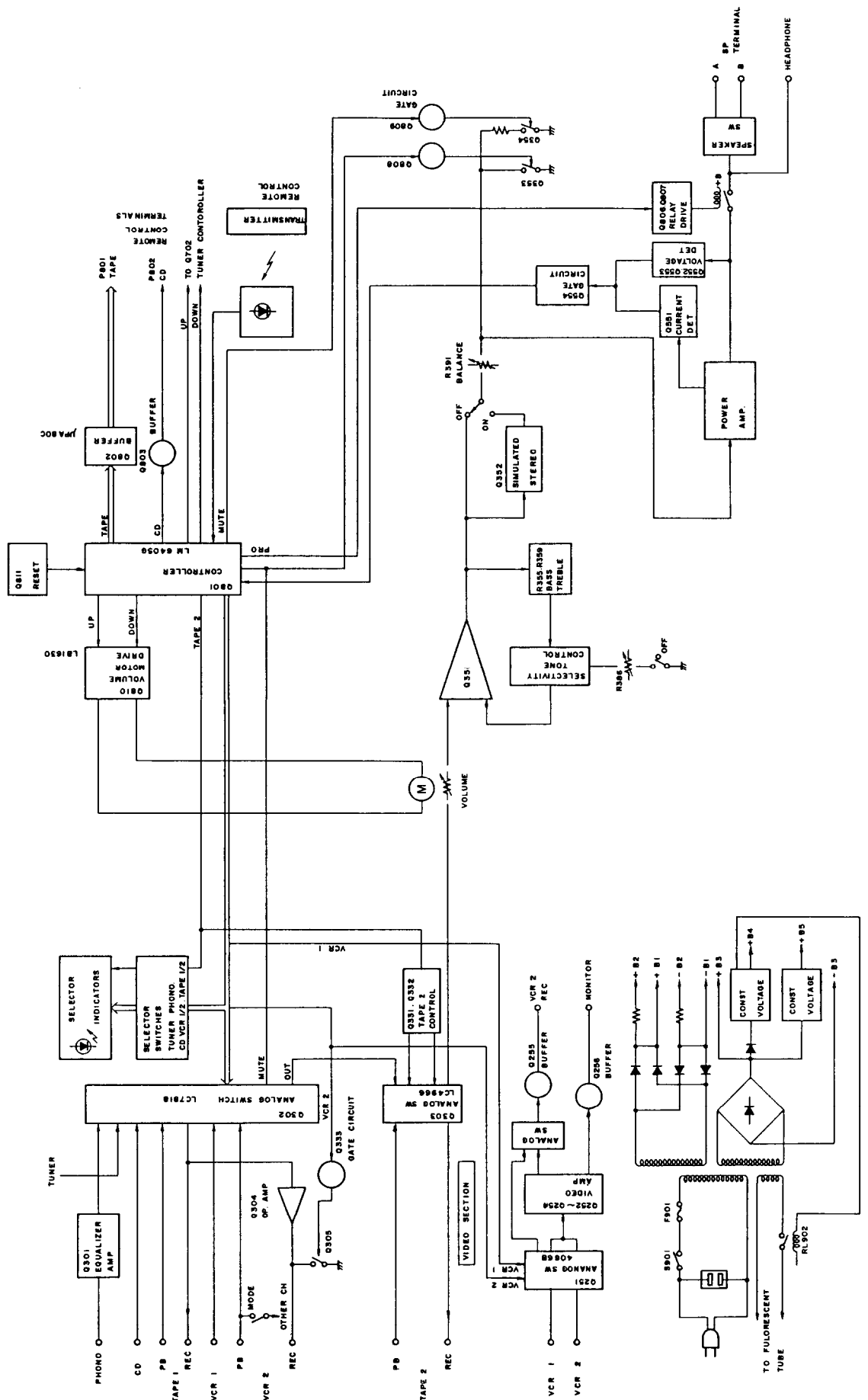


During FM reception, this is operated by the IF level detection and zero cross detection circuits included in the FM IF & AM system IC of Q103 and by the noise component detection circuit of Q113. When a station is tuned, the output of all outputs go to the low level so Q703 goes from on to off, causing pin 22 of the controller IC to go to the high level to complete auto search tuning.

During AM reception, this is operated by the IF level detection included in the FM IF & AM system IC of Q103. When a station is turned, Q703 goes to off, causing pin 22 of the controller IC to go to the high level to complete auto search tuning.

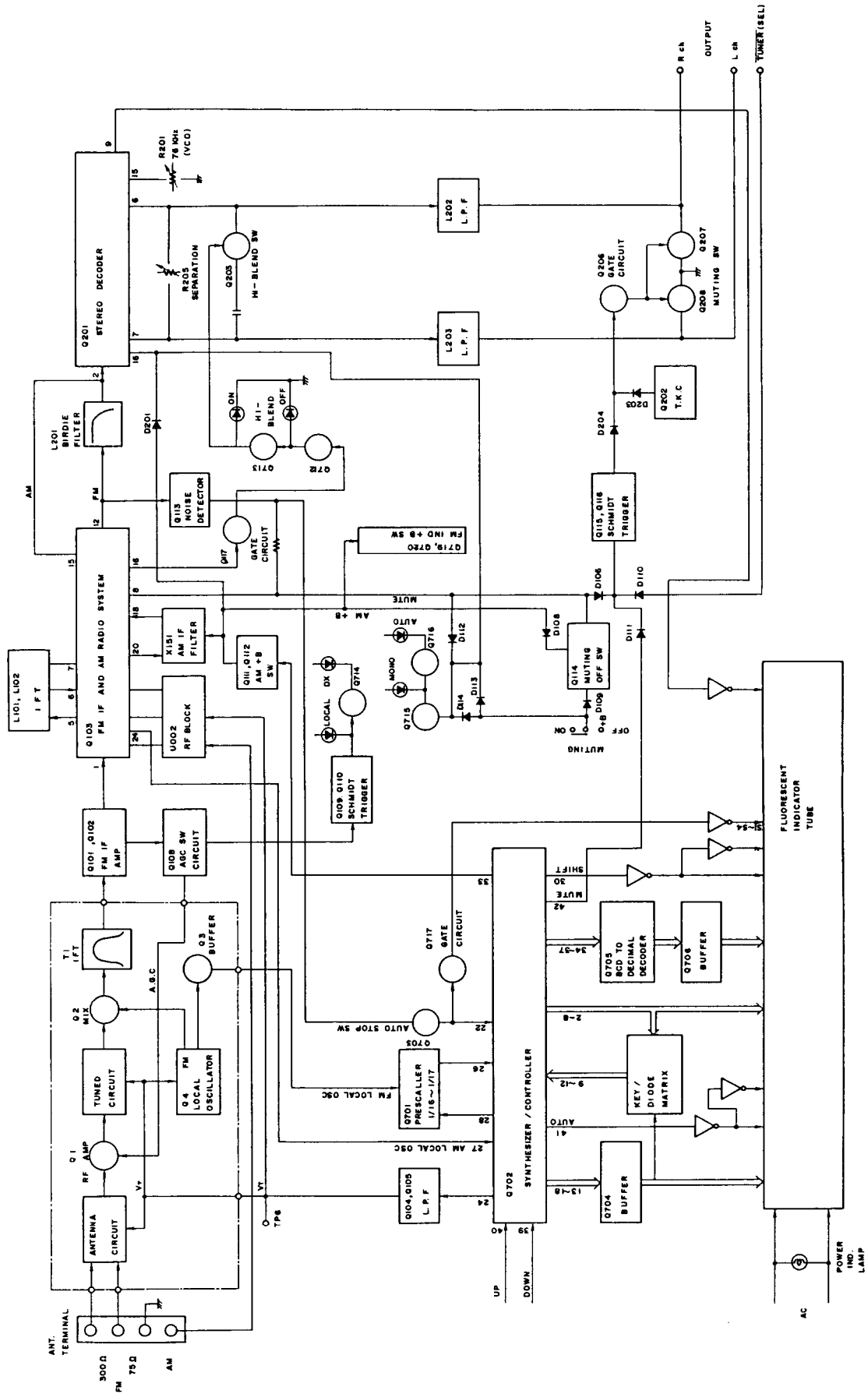
BLOCK DIAGRAM

— AMPLIFIER SECTION —

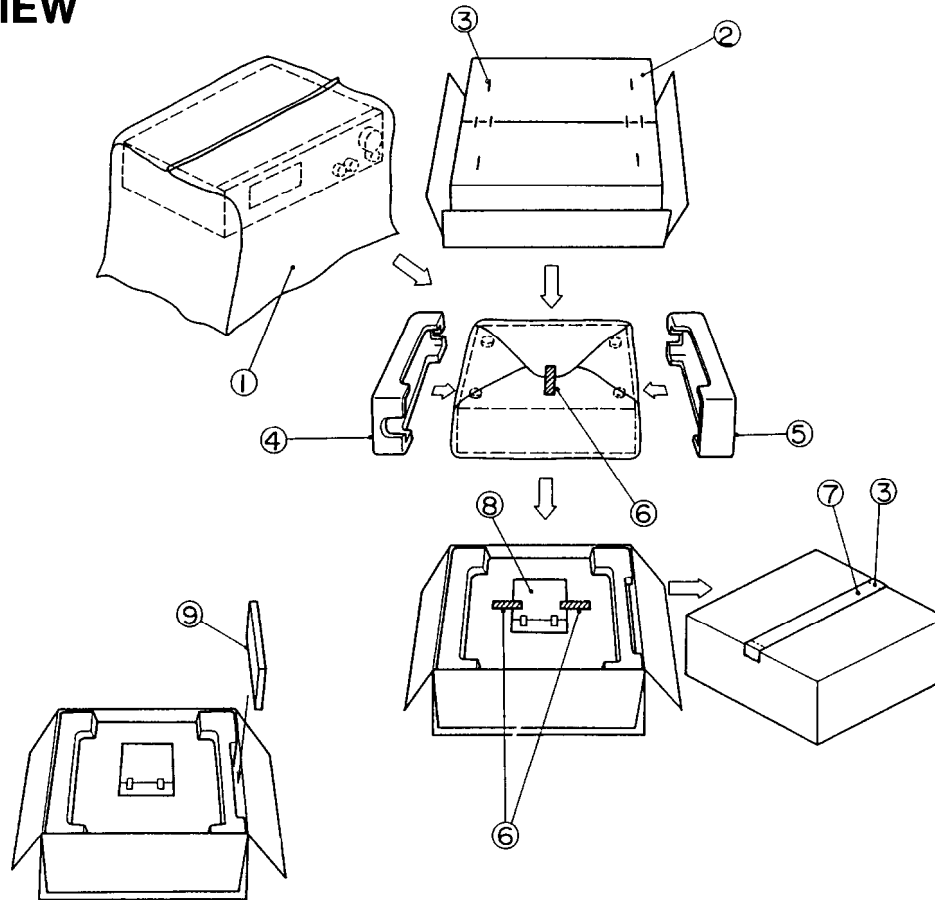


BLOCK DIAGRAM

-- TUNER SECTION --



PACKING VIEW



REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	29100034	850×650mm, Poly-vinyl bag		24140003	RC-82S, Remote control transmitter
	29095012-1	800×500mm, Protection sheet		25060088	FM adaptor <Only 240V model>
2	29051457	Master carton box (TX-82)		29100097	250×350mm, Poly-vinyl bag
	29051459	Master carton box (TX-82M)			
3	282301	Sealing hook			
4	29091158A	Pad R			
5	29091157	Pad L			
6	29110032	Tape			
7	260012	Dampion tape			
8		Accessory bag ass'y			
		– 120V model –			
	29341113	Instruction manual			
	292064B	FM antenna			
	232119	NMA-3052, AM loop antenna			
	2010141	Connection cord for cassette deck			
	2010159	Connection cord for CD player			
	3010054	UM-3, Two batteries (TX-82)			
	29100097	250×350mm, Poly-vinyl bag			
	29365019	Warranty card <Only U.S.A. model>			
	29358002E	Service station list <Only U.S.A. model>			
		– 220V/240V models –			
	29341114	Instruction manual			
	292092	FM antenna			
	232119	NMA-3052, AM loop antenna			
	2010141	Connection cord for cassette deck			
	2010159	Connection cord for CD player			
	3010054	UM-3, Two batteries			
		– Worldwide model –			
	29341114	Instruction manual			
	292092	FM antenna			
	232119	NMA-3052, AM loop antenna			
	2010141	Connection cord for cassette deck			
	2010159	Connection cord for CD player			
	3010054	UM-3, Two batteries			
	24140003	RC-82S, Remote control transmitter			
	25055018	CV-K-1, Conversion plug			
	25060088	FM Adaptor			
	29100097	250×350mm, Poly-vinyl bag			
9	24140006	Remote control transmitter ass'y (TX-82M) (Refer the service manual of model RC-AV1M)			

ADJUSTMENT PROCEDURES

Preparation

• Input

FM mono: 1kHz, 75kHz devi., 60dB/ μ V

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

AM: 400Hz, 30% mod.,

• Output

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

• Standard knob position

TAPE MONITOR	SOURCE
VOLUME	Maximum
BASS/TREBLE/BALANCE	Center
MODE	STEREO
SPEAKER	A
SIMULATED STEREO	OFF
SELECTIVE TONE CONTROL	OFF

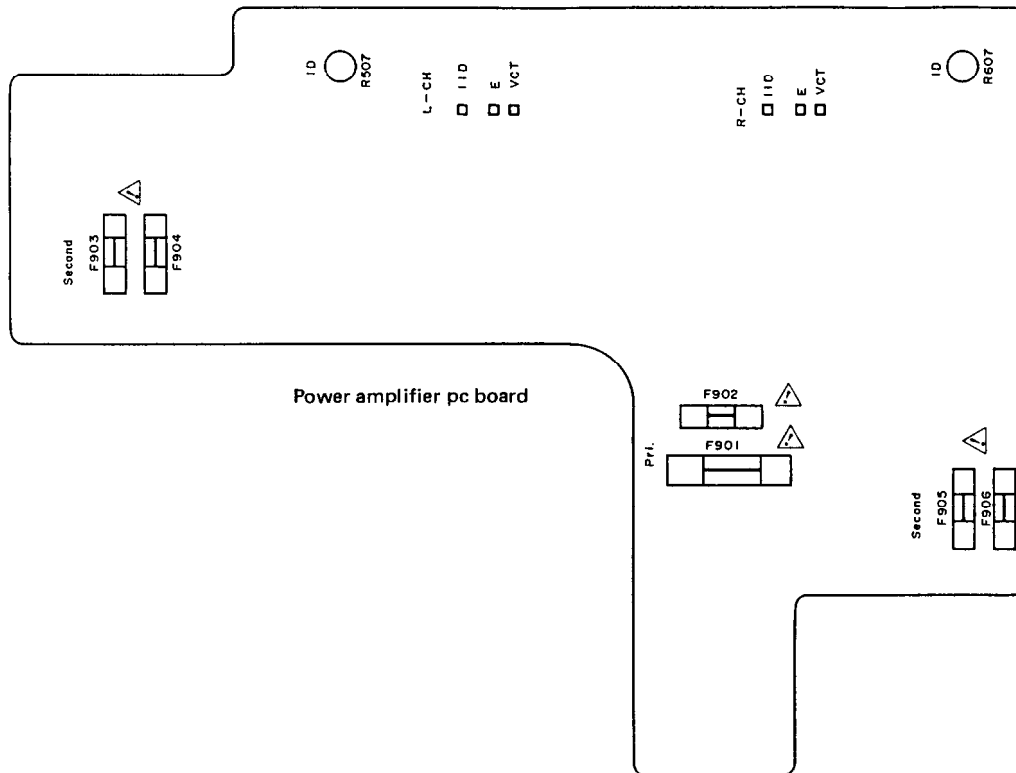
Amplifier section

1. Idling current adjustment

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

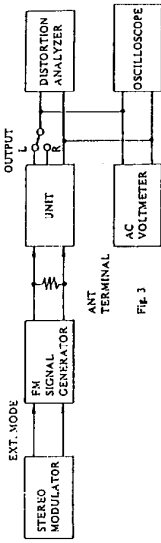
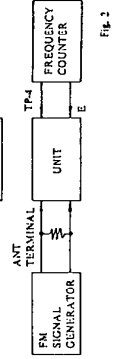
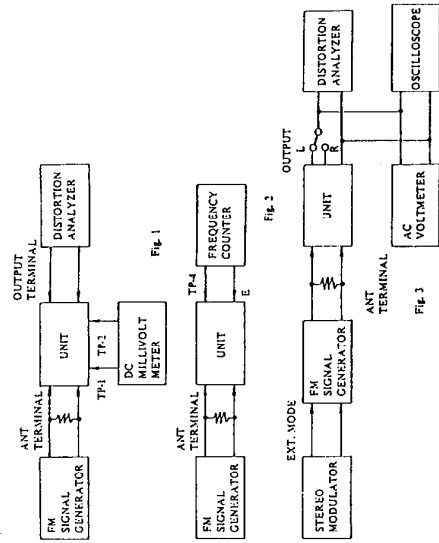
Adjust the semi-fixed resistors R507 and R607 so that the indication of voltmeter is 7.5 ± 1.5 mV.

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



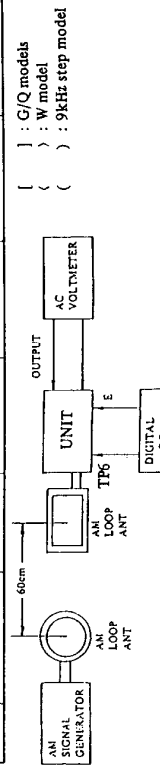
FM section

Item	Step	Connection of instrument	FM SC output	Stereo modulator output	Turning dial setting	Output indicator	Adjustment	Adjust for	Remarks
FM IF	1	Fig. 1	99.1MHz 1kHz, 75kHz devi. 65dB (60dB)	-	99.1MHz	DC voltmeter	L101	0V	Muting switch: off Repeat the steps 1 and 2 until no further adjustment is necessary
	2	Fig. 1	99.1MHz 17.2dBf (12dB) Ext. modulation	L + R : 1kHz 67.5kHz devi.	99.1MHz	Distortion analyzer	L102	Minimum	
Stereo Indicator level	1	Fig. 3	99.1MHz 16.2dBf (11dB) Ext. modulation	Pilot signal 19kHz 7.5kHz devi.	99.1MHz	Stereo indicator	R101	Light on	Muting switch: on
	2	Fig. 3	99.1MHz 1kHz, 75kHz devi. 65dB (60dB)	-	99.1MHz	Frequency counter	R201	19kHz ± 10Hz	
VCO		Fig. 2	99.1MHz 1kHz, 75kHz devi. 65dB (60dB)	-	99.1MHz	Distortion analyzer	IF on front end	Minimum	Maximum and same separation
Stereo Distortion	1	Fig. 3	99.1MHz 65dBf (60dB) Ext. modulation	L or Rch. 1kHz	99.1MHz	Distortion analyzer	R202	Minimum	
	2	Fig. 3	99.1MHz 35.2dBf (30dB) 1kHz, 75kHz devi.	Lch. 1kHz Rch. 1kHz	99.1MHz	Ch. AC voltmeter Lch. AC voltmeter	R102	Light off	
Hi-blend level		Fig. 3	99.1MHz 1000kHz (999kHz) 400Hz 30% mod. 60dB/m	-	99.1MHz	Hi-blend indicator			



AM section

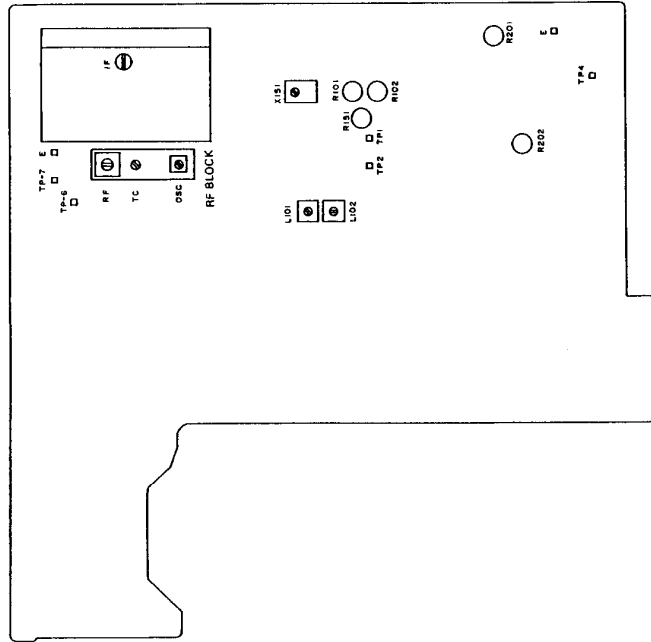
Step	AM SC output	Tuned frequency	Output indicator	Adjustment point	Adjust for	Remarks
1		530kHz [522kHz] [531kHz]	Digital DC voltmeter	OSC on RF block	1.4V ± 0.1V	
2		1620kHz (1611kHz)	Digital DC voltmeter		8.0 ± 1.0V	
3	600kHz(603kHz) 400Hz 30% mod. 60dB/m	600kHz (603kHz)	AC voltmeter	RF on RF block	Maximum	Repeat the steps 3 and 4 until no further adjustment is necessary.
4	1400kHz (1404kHz) 400Hz 30% mod. 60dB/m	1400kHz (1404kHz)	AC voltmeter	TC on RF block	Maximum	
5	1000kHz (999kHz) 400Hz 30% mod. 60dB/m	1000kHz (999kHz)	AC voltmeter	X1.51	Maximum	
6	Same as above	1000kHz (999kHz)	First signal indicator	R1.51	Light on	



Reference specifications

Tuned voltage
87.9MHz 2.0 ± 0.5V
107.9MHz 7.7 ± 0.5V (120V model)
87.5MHz 2.0 ± 0.5V
108.0MHz 7.7 ± 0.5V (Other models)

Auto stop level
AM: Less than 66dB/m
FM: Less than 17dBμ



PRINTED CIRCUIT BOARD PARTS LIST

POWER AMPLIFIER AND POWER SUPPLY PC BOARD (NAPS-2875-2/2A/2B)

CIRCUIT NO.	PART NO.	DESCRIPTION
Transistors		
Q501, Q601	2211371 or 2211372	2SC2259(O-001) or 2SC2259(O-002)
Q502, Q602	2211732 or 2211733	2SC1845(F) or 2SC1845(E)
Q503, Q603	2211353 or 2211354	2SA949(O) or 2SA949(Y)
Q504, Q604	2211633 or 2211634	2SC2229(O) or 2SC2229(Y)
Q505, Q605	2211255	2SC1815(GR)
Q506, Q606	2212653 or 2212654	2SC3421(O) or 2SC3421(Y)
Q507, Q607	2211643 or 2211644	2SA965(O) or 2SA965(Y)
Q508, Q608 *	2201783, 2201784 or 2201786	2SC3854(O), 2SC3854(Y) or 2SC3854(P)
Q509, Q609 *	2201773, 2201774 or 2201776	2SA1490(O), 2SA1490(Y) or 2SA1490(P)

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

Ex. 2SC3854(O) 2SA1490(O)

Same beta group

Q551-Q553	2211732 or	2SC1845(F) or
Q651	2211733	2SC1845(E)
Q554, Q804	2211792 or 2211793	2SA992(F) or 2SA992(E)

Q805	2211256	2SC1815(BL)
Q807, Q903	2211255,	2SC1815(GR),
Q904	2210746 or 2212485	2SC945A(P) or JCS01(Q)
Q902, Q905	2201754, 2201755, 2201404 or 2201405	2SD1913(R), 2SD1913(S), 2SD1406(Y) or 2SD1406(GR)


Diodes

D501, D502	223163	1SS133
D503, D603	4000068	VD1222
D802	223163	1SS133
D901-D904	223897 or 22380003	P300DL or 1N5402F
D905, D906	2239651 or 2243241	RD1.3EB1 or MTZ1.3A
D907	223862 or 223890	WL01 or W01RL
D908	223896 or 223880	1N4003F or GPI01N4003
D909	223163	1SS133
D910	2239631 or 2243231	RD1.2EB1 or MTZ1.2A
D911	2239493 or 2243163	RD6.2EB3 or MTZ6.2C

Capacitors

C501, C601	354780229	2.2 μ F, 50V, Elect.
C513, C613	354721019	100 μ F, 6.3V, Elect.
C515	354722219	220 μ F, 6.3V, Elect.
C516, C517	354790479	4.7 μ F, 100V, Elect.
C552	354722219	220 μ F, 6.3V, Elect.
C553	354780109	1 μ F, 50V, Elect.
C806	354744709	47 μ F, 16V, Elect.
C901	3500065A	0.01 μ F, AC400V/125V, IS
C904, C905	3504207	6800 μ F, 50V, Elect.
C906, C907	354761019	100 μ F, 35V, Elect.
C908, C909	391242217	220 μ F, 16V, Elect.

NOTE: <D>: Only 120V model
<G>: Only 220/240V models
<W>: Only Worldwide model

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

C911	354752229	2200 μ F, 25V, Elect.
C912	354741019	100 μ F, 16V, Elect.
C914	354744709	47 μ F, 16V, Elect.
C915	354744719	470 μ F, 16V, Elect.
C916	354761019	100 μ F, 35V, Elect.
C918	354743319	330 μ F, 16V, Elect.
C919	354724719	470 μ F, 6.3V, Elect.
C920	354762209	22 μ F, 35V, Elect.
C921	354761019	100 μ F, 35V, Elect.

Resistors		
R507, R607	5210064	N06HR10KBD, Semi-fixed
R510, R610	442522714	270ohm, 1/2W, Metal oxide film
R511, R611	441620104	1ohm, 1W, Metal oxide film
R512, R612	4000063	0.47ohm, 2W, Metal plate
R513, R613	4000063	0.47ohm, 2W, Metal plate
R516, R616	442520824	8.2ohm, 1/2W, Metal oxide film
R521	442520104	1ohm, 1/2W, Metal oxide film
R901	431523355	Δ 3.3Mohm, 1/2W, Solid <D>
R902-R905	441623914	390ohm, 1W, Metal oxide film
R906, R907	442520104	1ohm, 1/2W, Metal oxide film <D/W>
R908	441620474	4.7ohm, 1W, Metal oxide film
R912	441721804	18ohm, 2W, Metal oxide film
R914	442522204	22ohm, 1/2W, Metal oxide film
Switch		
S901	25035398	NPS-111-L362P, Power
Relays		
RL801	25065134	NRL-2P5A-DC24-07
RL902	25065298	NRL-1P1A-DC12-40
Socket		
P116	25050270	NSCT-6P98
Plug		
P352	25055133	NPLG-3P117
Fuseholders		
F901a	250113	Δ SN5051 <D/W>
F902a	25050065	Δ YSH403T <G/W>
F903a-F906a	25050065	Δ YSH403T <G>
Fuses		
F901	252049	Δ 4A(ST-6), Primary <D/W>
F902	252074	Δ 2A-SE-EAK, Primary <G/W>
F903, F904	252078	Δ 5A-SE-EAK, Secondary <G>
F905, F906	252070	Δ 1A-SE-EAK, Secondary <G>
Label		
	29360626-1	Fuse <D>

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

PRINTED CIRCUIT BOARD PARTS LIST

FM/AM TUNER PC BOARD(NAAR-2869-2/2A/2B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240070	TFFG1U116A <D>
	240072	TFFG3E111X <G/W>
	ICs	
Q103	22240039	LA1266
Q201	222678	μ PC1161C3
Q301, Q401	222534	NJM4559D-X
Q302	222996	LC7818
Q303	22240025	LC4966
Q304, Q404	222465 or 222502	NJM4558D or NJM4558DX
Q801	22240024	LM6405G-2077
Q802	222807	μ PA81C
	Transistors	
Q101	2211722 or 2211723	2SC1923(R) or 2SC1923(O)
Q102	2211722 or 2211723	2SC1923(R) or 2SC1923(O) <G/W>

Q104	2212294 or 2211293	2SK108(D) or 2SK68(M)	L101	Transformers 233374	NFIF-4060
Q105, Q113	2211255	2SC1815(GR)	L102	233375	NFIF-4061
Q108-Q112	2211255,	2SC1815(GR),	L103	Coils 233105	NCH-1005
Q114-Q117	2210746 or	2SC945A(P) or	L104	233031 or	NMC-9-1 or
Q202, Q332	2212485	JC501(Q)	L201	231081	NCH-2129
Q203	2211945 or 2212304	2SK246(GR) or 2SK381(D)	L202, L203	233236	NMC-6027 <G/W>
Q206, Q331	2211455,	2SA1015(GR),		233355A	NMC-4059
Q333, Q806	2212495 or 2210803	JA101(Q) or 2SA733(P)	L151	RF block 232135	NMRF-7045
Q207, Q208	2211705, 2211706 or 2212794	2SD655(E), 2SD655(F) or 2SD1468(R)	X101, X102	Ceramic filters 3010071	SFE10.7MA5 <D>
Q305, Q405	2212285 or 2212286	2SC2878(A) or 2SC2878(B)	X101-X103	3010043	SFE10.7MM <G/W>
Q803, Q811	2211255, 2210746 or 2212485	2SC1815(GR), 2SC945A(P) or JC501(Q)	X151	3010075	SFL450B3
	Diodes		X152	3010076	BFU450C
D101, D102	223132	1K60	X801	3010099	CSA4.00MG
D103	2241291	RD3.3EB1	C108	354741019	100 μ F, 16V, Elect.
D104-D114	223163	1SS133	C110	354780109	1 μ F, 50V, Elect.
D201-D204	223163	1SS133	C112	354782299	0.22 μ F, 50V, Elect.
D801	223163	1SS133	C115	354780339	3.3 μ F, 50V, Elect.
D803-D806	223163	1SS133	C116	354741009	10 μ F, 16V, Elect.
			C117	354780479	4.7 μ F, 50V, Elect.
			C118, C120	354741009	10 μ F, 16V, Elect.
			C121	354780339	3.3 μ F, 50V, Elect.
			C123	354784799	0.47 μ F, 50V, Elect.
			C124	354742209	22 μ F, 16V, Elect.
			C128	354780479	4.7 μ F, 50V, Elect.
			C129	354782299	0.22 μ F, 50V, Elect.
			C131	354784799	0.47 μ F, 50V, Elect.
			C134	354780229	2.2 μ F, 50V, Elect.
			C135-C137	354741009	10 μ F, 16V, Elect.
			C202	354742209	22 μ F, 16V, Elect.
			C203	354744719	470 μ F, 16V, Elect.
			C207, C208	354741009	10 μ F, 16V, Elect.
			C210	354782299	0.22 μ F, 50V, Elect.
			C211	354780339	3.3 μ F, 50V, Elect.
			C212	354780109	1 μ F, 50V, Elect.
			C213	370134714	470pF \pm 5%, 100V, APS
			C215	354780479	4.7 μ F, 50V, Elect.
			C216	354744719	470 μ F, 16V, Elect.
			C220, C221	354780229	2.2 μ F, 50V, Elect.
			C222, C803	354741009	10 μ F, 16V, Elect.
			C807	354780339	3.3 μ F, 50V, Elect.
			C815, C816	354780229	2.2 μ F, 50V, Elect.
			C302, C402	354780229	2.2 μ F, 50V, Elect.
			C305, C405	354721019	100 μ F, 6.3V, Elect.
			C308, C408	354780229	2.2 μ F, 50V, Elect.
			C309, C310	354743319	330 μ F, 16V, Elect. <D/W>
				391242217	220 μ F, 16V, Elect. <G>
			C316, C317	354780229	2.2 μ F, 50V, Elect.
			C341	354781099	0.1 μ F, 50V, Elect.
			C342, C343	354780339	3.3 μ F, 50V, Elect.
			C416, C417	354780229	2.2 μ F, 50V, Elect.
			Resistors		
			R101	5210068	N06HR47KBD, Semi-fixed
			R102	5210070	N06HR100KBD, Semi-fixed
			R151	5210064	N06HR10KBD, Semi-fixed
			R201	5210062	N06HR4.7KBD, Semi-fixed
			R202	5210072	N06HR220KBDM, Semi-fixed
			R345-R349	49163103405	10kohmX5, 1/10W, Network
			R802-R809	49163103408	10kohmX8, 1/10W, Network
			Terminals		
			P001	25060085	NTM-4PDMN29, Antenna <D>
				25060087	NTM-2PDMN31, Antenna <G/W>
			P301-P303	25045213	NPJ-6PDBL92 <D>
				25045166	NPJ-6PDBL60 <G/W>

(Continued on page 29)

DISPLAY PC BOARD

	Switch	
S301	25065286	NPS-22112, Mode, VCR-2
	Sockets	
P101, P102	2000657	NSAS-10P613
P111	25050270	NSCT-6P98
P112	25050268	NSCT-4P96

D706	2239472 or 2243152	RD5.6EB2 or MTZ5.6B
D707, D708	223163	1SS133
D709-D711	223163	1SS133 <G/W>
D712-D719	223163	1SS133
D740-D747	223163	1SS133

DISPLAY PC BOARD(NADIS-2870-2/2A/2B)

CIRCUIT NO. PART NO. DESCRIPTION

	Opto. module	
U002	241068	BX-1407
	ICs	
Q701	222619	μ PB553AC
Q702	22240026	μ PD1711CU-524
Q704	222801	μ PA80C
Q705	222741451	74LS145
Q706, Q707	222801	μ PA80C
	Transistors	
Q703, Q717	2211255,	2SC1815(GR),
Q720	2210746 or	2SC945A(P) or
	2212485	JC501(Q)
Q712, Q713	2212600	DTA124ES
Q714-Q716	2211256	2SC1815(BL)
Q719	2211705,	2SD655(E),
	2211706 or	2SD655(F) or
	2212794	2SD1468(R)
	Fluorescent tube	
Q721	212037	8-BT-49GK
	Lamp	
PL701	210064A	6.3V, 0.25A
	Diodes	
D701-D705	223163	1SS133

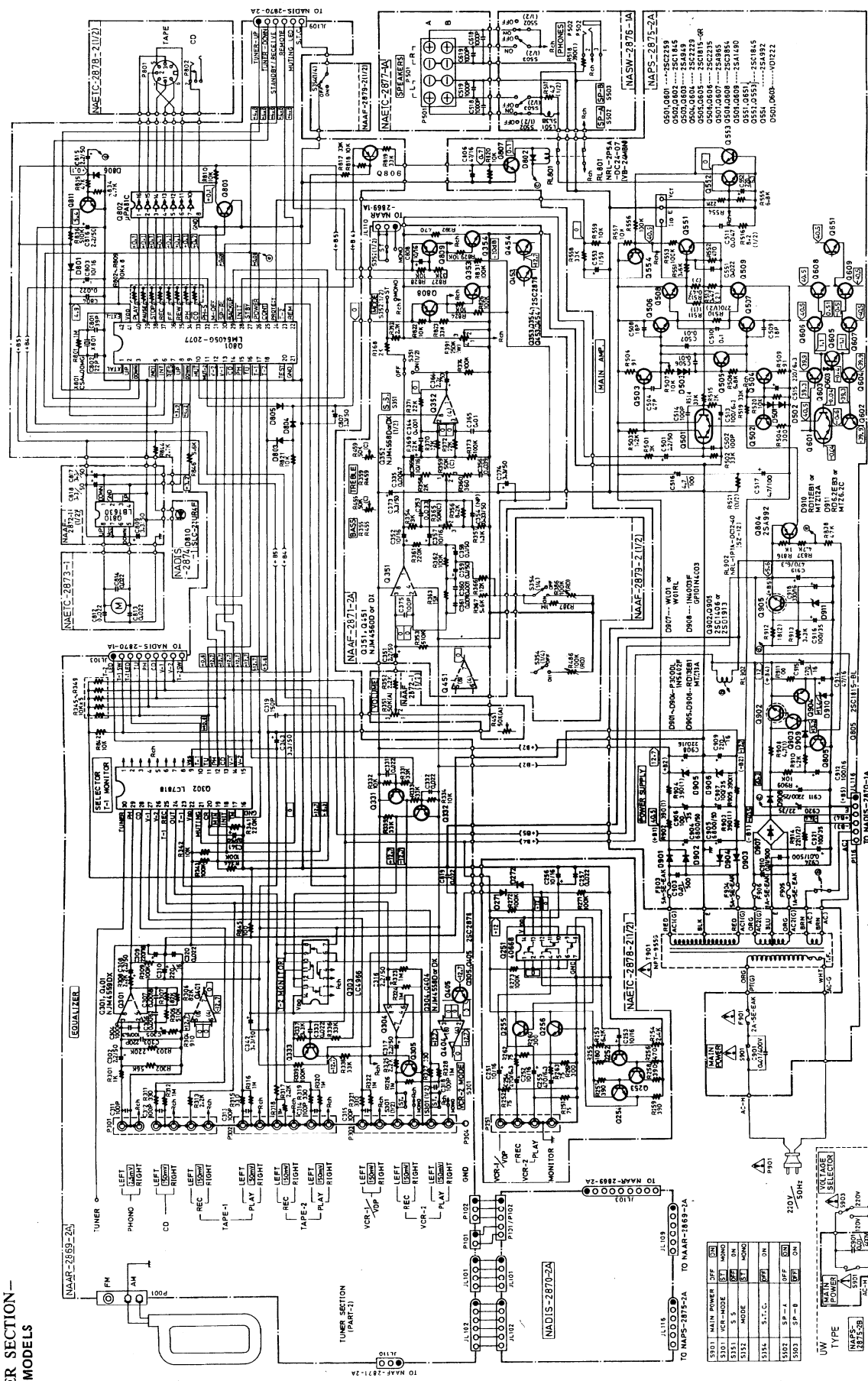
	L.E.Ds	
D720	225141	SEL2213C
D722-D724	225137CG,	SEL2413CG,
D730	225137DG or	SEL2413DG or
D733-D737	224137DY	SEL2413DY
D726-D729	225142	SEL2913K
D738, D739	225142	SEL2913K
	Capacitors	
C701	354723319	330 μ F, 6.3V, Elect.
C704	354784799	0.47 μ F, 50V, Elect.
C706	353721019	100 μ F, 6.3V, Elect.
C714	3020027 or	0.047F, 5V or
	3000050	0.047F, 5.5V, Super
C715	354782209	22 μ F, 50V, Elect.
C716, C717	354780109	1 μ F, 50V, Elect.
C718, C719	354721019	100 μ F, 6.3V, Elect.
C720	354741009	10 μ F, 16V, Elect.
C721-C729	3020031	CN3RAE331M, Block
C730-C735	3020030	CN3R7E331M, Block
C736, C737	354741019	100 μ F, 16V, Elect.

	X'tal	
X701	3010091	XTL-4.5M

	Resistors	
R705-R717	49163223413	22kohmX13, 1/10W, Network
R718-R724	49163104407	100kohmX7, 1/10W, Network
R725-R728	49163104404	100kohmX4, 1/10W, Network

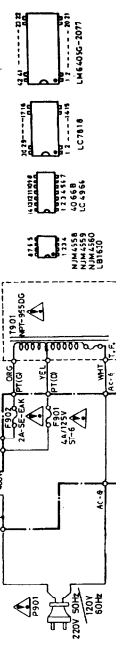
SCHEMATIC DIAGRAM
-AMPLIFIER SECTION-
OTHER MODELS

A B C D E F G



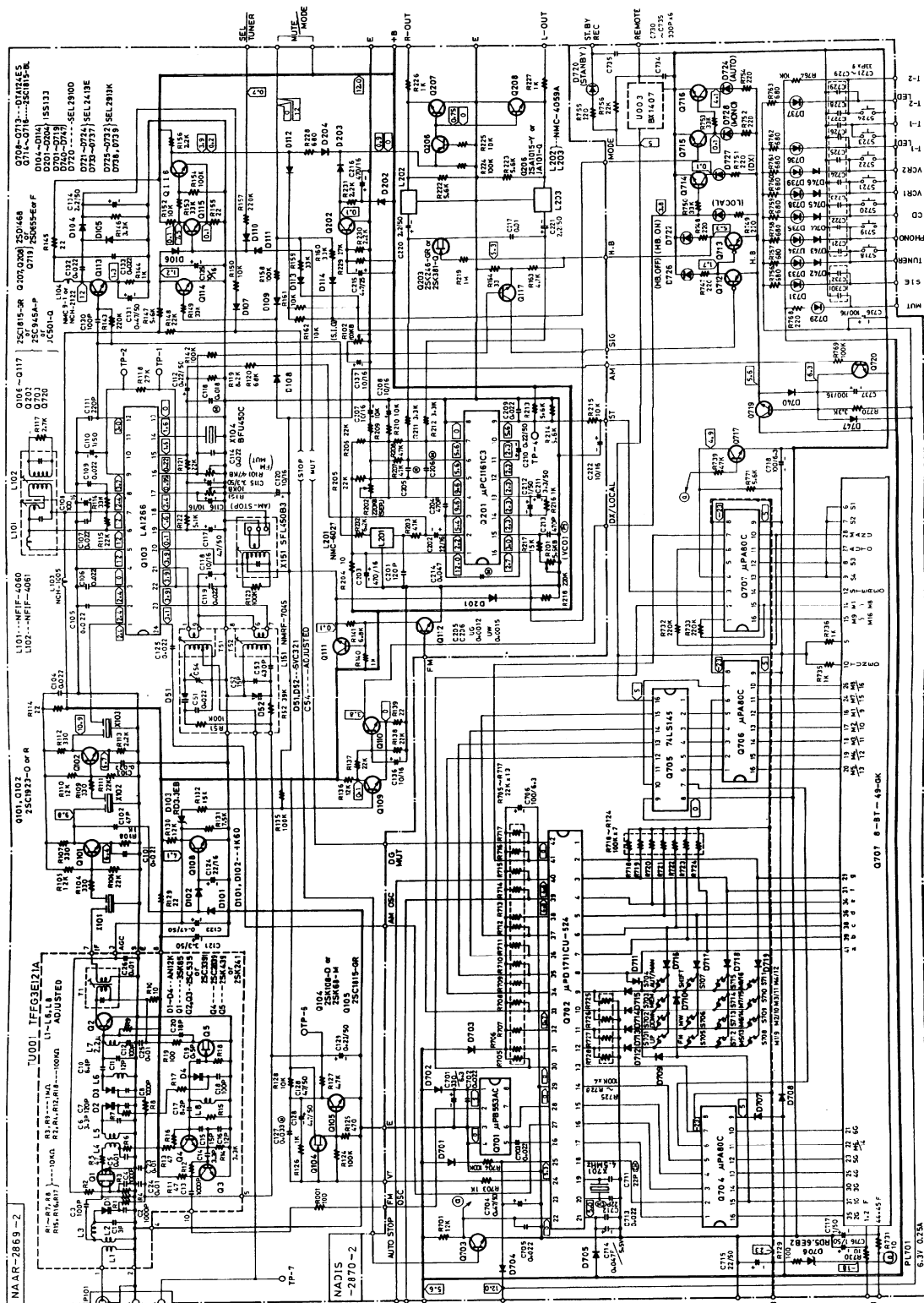
NOTES:
 ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.
 ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE NOTED.
 ALL DIODES ARE IN VOLTS UNLESS OTHERWISE NOTED.
 ALL TRANSISTORS ARE IN VOLTS UNLESS OTHERWISE NOTED.
 ALL INTEGRATED CIRCUITS ARE IN VOLTS UNLESS OTHERWISE NOTED.
 ALL PARTS ARE ON HAND AT THE TIME OF PRINTING.
 ALL PARTS ARE SUBJECT TO CHANGE WITHOUT NOTICE.
 THIS SCHEMATIC IS FOR INFORMATION ONLY AND IS NOT TO BE USED AS A BASIS FOR REPAIR OR RECONSTRUCTION.
 PLEASE CONSULT WITH A SERVICE ENGINEER FOR MORE INFORMATION.

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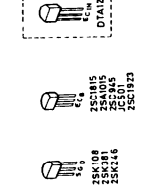
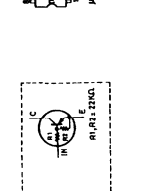
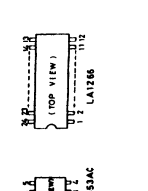
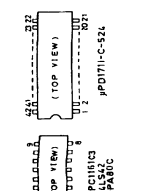
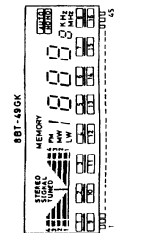


TYPE	VALUE	WATTAGE	RESISTANCE	WATTAGE
5301	MAIN POWER	50W	250V	50W
5302	100V-150V	5W	100V	5W
5303	150V-200V	5W	150V	5W
5304	200V-250V	5W	200V	5W
5305	250V-300V	5W	250V	5W
5306	300V-350V	5W	300V	5W
5307	350V-400V	5W	350V	5W
5308	400V-450V	5W	400V	5W
5309	450V-500V	5W	450V	5W
5310	500V-550V	5W	500V	5W
5311	550V-600V	5W	550V	5W
5312	600V-650V	5W	600V	5W
5313	650V-700V	5W	650V	5W
5314	700V-750V	5W	700V	5W
5315	750V-800V	5W	750V	5W
5316	800V-850V	5W	800V	5W
5317	850V-900V	5W	850V	5W
5318	900V-950V	5W	900V	5W
5319	950V-1000V	5W	950V	5W
5320	1000V-1050V	5W	1000V	5W
5321	1050V-1100V	5W	1050V	5W
5322	1100V-1150V	5W	1100V	5W
5323	1150V-1200V	5W	1150V	5W
5324	1200V-1250V	5W	1200V	5W
5325	1250V-1300V	5W	1250V	5W
5326	1300V-1350V	5W	1300V	5W
5327	1350V-1400V	5W	1350V	5W
5328	1400V-1450V	5W	1400V	5W
5329	1450V-1500V	5W	1450V	5W
5330	1500V-1550V	5W	1500V	5W
5331	1550V-1600V	5W	1550V	5W
5332	1600V-1650V	5W	1600V	5W
5333	1650V-1700V	5W	1650V	5W
5334	1700V-1750V	5W	1700V	5W
5335	1750V-1800V	5W	1750V	5W
5336	1800V-1850V	5W	1800V	5W
5337	1850V-1900V	5W	1850V	5W
5338	1900V-1950V	5W	1900V	5W
5339	1950V-2000V	5W	1950V	5W
5340	2000V-2050V	5W	2000V	5W
5341	2050V-2100V	5W	2050V	5W
5342	2100V-2150V	5W	2100V	5W
5343	2150V-2200V	5W	2150V	5W
5344	2200V-2250V	5W	2200V	5W
5345	2250V-2300V	5W	2250V	5W
5346	2300V-2350V	5W	2300V	5W
5347	2350V-2400V	5W	2350V	5W
5348	2400V-2450V	5W	2400V	5W
5349	2450V-2500V	5W	2450V	5W
5350	2500V-2550V	5W	2500V	5W
5351	2550V-2600V	5W	2550V	5W
5352	2600V-2650V	5W	2600V	5W
5353	2650V-2700V	5W	2650V	5W
5354	2700V-2750V	5W	2700V	5W
5355	2750V-2800V	5W	2750V	5W
5356	2800V-2850V	5W	2800V	5W
5357	2850V-2900V	5W	2850V	5W
5358	2900V-2950V	5W	2900V	5W
5359	2950V-3000V	5W	2950V	5W
5360	3000V-3050V	5W	3000V	5W
5361	3050V-3100V	5W	3050V	5W
5362	3100V-3150V	5W	3100V	5W
5363	3150V-3200V	5W	3150V	5W
5364	3200V-3250V	5W	3200V	5W
5365	3250V-3300V	5W	3250V	5W
5366	3300V-3350V	5W	3300V	5W
5367	3350V-3400V	5W	3350V	5W
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5372	3600V-3650V	5W	3600V	5W
5373	3650V-3700V	5W	3650V	5W
5374	3700V-3750V	5W	3700V	5W
5375	3750V-3800V	5W	3750V	5W
5376	3800V-3850V	5W	3800V	5W
5377	3850V-3900V	5W	3850V	5W
5378	3900V-3950V	5W	3900V	5W
5379	3950V-4000V	5W	3950V	5W
5380	4000V-4050V	5W	4000V	5W
5381	4050V-4100V	5W	4050V	5W
5382	4100V-4150V	5W	4100V	5W
5383	4150V-4200V	5W	4150V	5W
5384	4200V-4250V	5W	4200V	5W
5385	4250V-4300V	5W	4250V	5W
5386	4300V-4350V	5W	4300V	5W
5387	4350V-4400V	5W	4350V	5W
5388	4400V-4450V	5W	4400V	5W
5389	4450V-4500V	5W	4450V	5W
5390	4500V-4550V	5W	4500V	5W
5391	4550V-4600V	5W	4550V	5W
5392	4600V-4650V	5W	4600V	5W
5393	4650V-4700V	5W	4650V	5W
5394	4700V-4750V	5W	4700V	5W
5395	4750V-4800V	5W	4750V	5W
5396	4800V-4850V	5W	4800V	5W
5397	4850V-4900V	5W	4850V	5W
5398	4900V-4950V	5W	4900V	5W
5399	4950V-5000V	5W	4950V	5W
5400	5000V-5050V	5W	5000V	5W

SCHEMATIC DIAGRAM
TUNER SECTION
OTHER MODELS

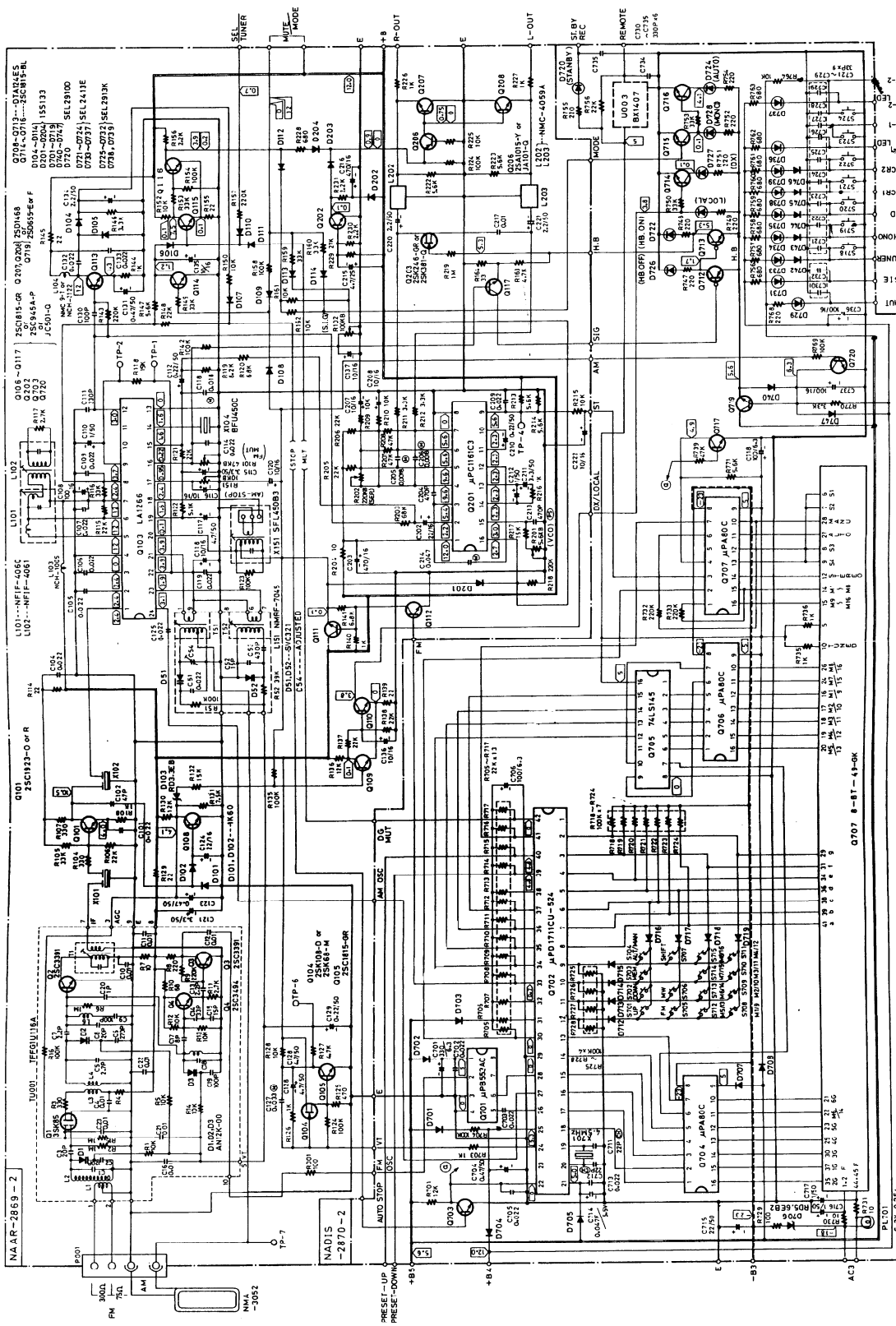


- NOTES**
- ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS ARE IN P.F. UNLESS OTHERWISE NOTED.
 - ELECTROLYTIC CAPACITORS ARE IN μ F UNLESS OTHERWISE NOTED.
 - ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
 - THE COMPONENTS IDENTIFIED BY MARK A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ.

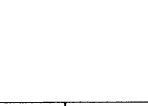
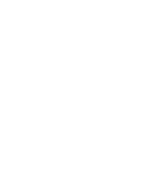
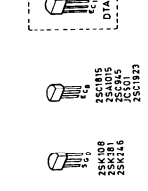
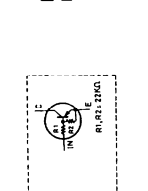
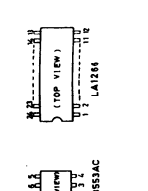
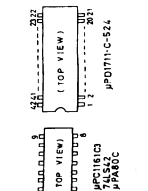
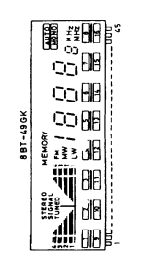


SCHEMATIC DIAGRAM

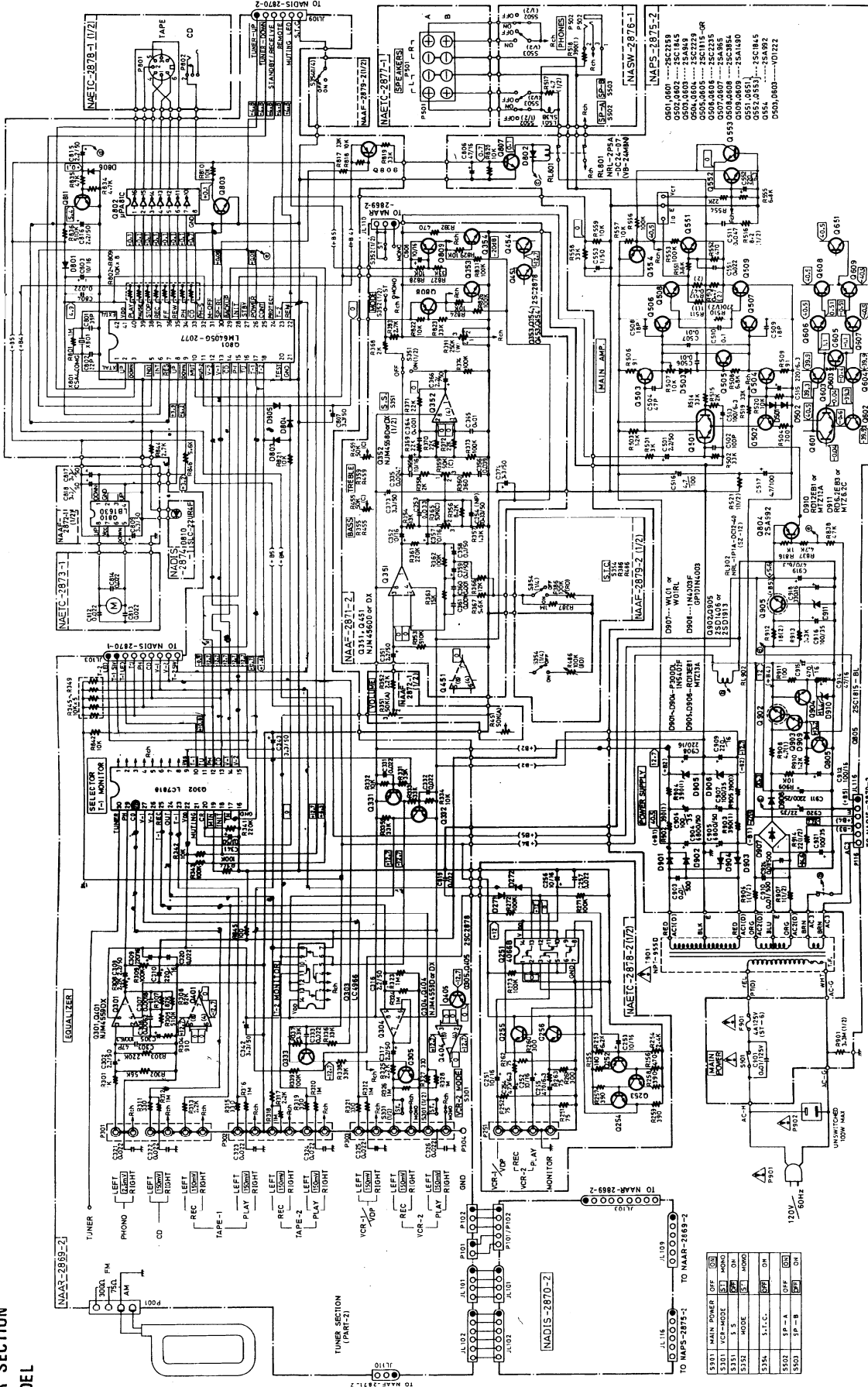
TUNER SECTION
120V MODEL



- NOTES:**
- RESISTOR VALUES IN OHMS, KILOHMS OR MEGOHMS ARE SHOWN WITHOUT UNITS.
 - ALL CAPACITORS ARE IN PICOFARADS UNLESS OTHERWISE NOTED.
 - ALL TUNING DIODES ARE 6X8 UNLESS OTHERWISE NOTED.
 - ALL VALUES ARE LISTED IN OHMS UNLESS OTHERWISE NOTED.
 - VALUES IN PARENTHESES ARE ALTERNATE VALUES FOR DIFFERENT MODELS.
 - RESISTOR VALUES IN PARENTHESES ARE ALTERNATE VALUES FOR DIFFERENT MODELS.
 - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.



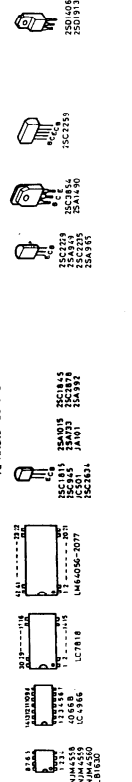
SCHEMATIC DIAGRAM
AMPLIFIER SECTION
120V MODEL



5311	MAIN POWER	OFF	ON
5311	VCR MODE	OFF	ON
5311	S	OFF	ON
5312	MODE	ST	MONO
5314	S-F.C.	OFF	ON
5321	SP-A	OFF	ON
5322	SP-B	OFF	ON

NOTES

- 1. ALL RESISTORS ARE 1% TOLERANCE UNLESS OTHERWISE NOTED.
- 2. ALL CAPACITORS ARE 5% TOLERANCE UNLESS OTHERWISE NOTED.
- 3. ALL TRANSISTORS ARE 100% BETA UNLESS OTHERWISE NOTED.
- 4. ALL DIODES ARE 1N4001 UNLESS OTHERWISE NOTED.
- 5. ALL INTEGRATED CIRCUITS ARE 100% BETA UNLESS OTHERWISE NOTED.
- 6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
- 7. ALL DIMENSIONS ARE TO CENTER UNLESS OTHERWISE NOTED.
- 8. ALL DIMENSIONS ARE TO DIMENSION LINES UNLESS OTHERWISE NOTED.
- 9. ALL DIMENSIONS ARE TO DIMENSION LINES UNLESS OTHERWISE NOTED.
- 10. ALL DIMENSIONS ARE TO DIMENSION LINES UNLESS OTHERWISE NOTED.



	Switches				
S701-S715	25035548	NPS-111-S510	C366	354780229	2.2 μ F, 50V, Elect.
S718-S724	25035548	NPS-111-S510	C373, C374	354780339	3.3 μ F, 50V, Elect.
S717	25065286	NSS-22112 <W>	C808	354741009	10 μ F, 16V, Elect.
	Holders			Resistors	
	27190518	APR	R355, R455	5104202	N12RGLC50KC25Z, Variable, Bass
	27190519	Selector	R359, R459	5104202	N12RGLC50KC25Z, Variable, Treble
	Cushion		R391	5104201	N12RLC250KW25Z, Variable, Balance
	28140538	10X40X3.5			

PREAMPLIFIER PC BOARD(NAAF-2871-2/2A)

CIRCUIT NO.	PART NO.	DESCRIPTION			
			S351, S352	Switches 25035556	NPS-222-L518
				Sockets	
Q351, Q451	222579 or 222570	NJM4560D or NJM4560DX	P352	2000590	NSAS-6P546
Q352, Q355	222465 or 222502	NJM4558D or NJM4558DX	P353	25050270	NSCT-6P98
	Transistors				
Q353, Q354	2212285 or	2SC2878(A) or			
Q453, Q454	2212286	2SC2878(B)			
Q808, Q809	2211455, 2210803 or 2212495	2SA1015(GR), 2SA733(P) or JA101(Q)			
	Capacitors				
C351, C451	354780229	2.2 μ F, 50V, Elect.			
C352, C452	354741009	10 μ F, 16V, Elect.			
C354, C454	352983396	0.33 μ F, 50V, Non-polar elect.			
C357, C457	354741009	10 μ F, 16V, Elect.			
C358, C458	354781099	0.1 μ F, 50V, Elect.			
C359, C459	354781099	0.1 μ F, 50V, Elect.			
C363	354741009	10 μ F, 16V, Elect.			

NOTE: <D>: Only 120V model
<G>: Only 220/240V models
<W>: Only Worldwide model

**REMOTE CONTROL TERMINAL PC BOARD
(NAETC-2878-2)**

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q251	222840661	4066B
	Transistors	
Q252	2211455, 2210803 or 2212495	2SA1015(GR), 2SA733(P) or JA101(Q)
Q253-Q256	2211255, 2210746 or 2212485	2SC1815(GR), 2SC945A(P) or JC501(Q)
	Diodes	
D271, D272	223163	1SS133
	Capacitors	
C251-C253	354741009	10 μ F, 16V, Elect.
C254, C255	354724719	470 μ F, 6.3V, Elect.
C256	354741009	10 μ F, 16V, Elect.
	Terminal	
P251	25045216	NPJ-4PDBL94
	Sockets	
P801	25050294	NSCT-8P121
P104	25050268	NSCT-4P96
P105	25050272	NSCT-8P100
	Jack	
P802	25045215	S-G8515

SWITCH PC BOARD(NAAF-2879-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
R386, R486	6182003	N25LGL100KRD10Z, Variable resistor
S354	25035557	NPS-142-L519, Push switch

VOLUME PC BOARD(NAAF-2872-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q810	222963	LB1630, IC
C809, C817	354780339	3.3 μ F, 50V, Elect. capacitors
C818	354780339	3.3 μ F, 50V, Elect. capacitor
R351, R451	5104200	N16RGM50KA30F, Variable resistor, Volume
P351	2000635	NSAS-4P591, Socket

VOLUME INDICATOR PC BOARD(NADIS-2874-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
D810	225219	SLC-22UR4F, L.E.D
	27270103A	Spacer

SPEAKER SWITCH PC BOARD(NASW-2876-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
L501, L601	231001	S-1.3B, Coils
R517, R617	442520474	4.7ohm, 1/2W, Metal oxide film resistors
R518, R618	441623914	390ohm, 1W, Metal oxide film resistors
S502, S503	25035517	NPS-222-L479, Push switch
P502	25045187	HLJ-0541-01-010, Stereo headphone terminal <D/W>
	25045139	HLJ-0540-01-010, Stereo headphone terminal<G>

SPEAKER TERMINAL PC BOARD(NASW-2877-1/1A)

CIRCUIT NO.	PART NO.	DESCRIPTION
P501	25060093	NTM-8PDML34, Speaker terminal

NOTE: <D>: Only 120V model
 <G>: Only 220/240V models
 <W>: Only Worldwide model

DISASSEMBLING PROCEDURES

1. Top cover

Remove a screw holding the top cover and the back panel.

Remove the four screws holding the back panel and the chassis.

2. Front panel

Remove the top cover.

Remove the six screws holding the front panel and the front bracket.

3. Bottom board (Chassis)

Remove the top cover and the front panel.

Remove the five screws A holding the back panel and the chassis. (See Fig. 1)

Remove the four screws B and the two screws C. (See Fig. 2)

Remove the two screws D holding the chassis and the front bracket. (See Fig. 2)

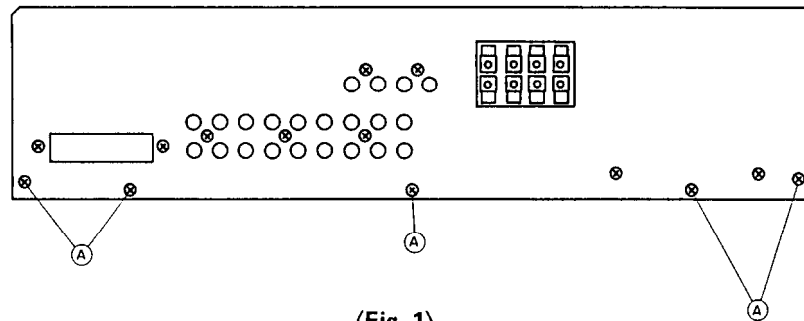
Remove the three screws E on the AM/FM tuner pc board. (See Fig. 3)

4. Front bracket

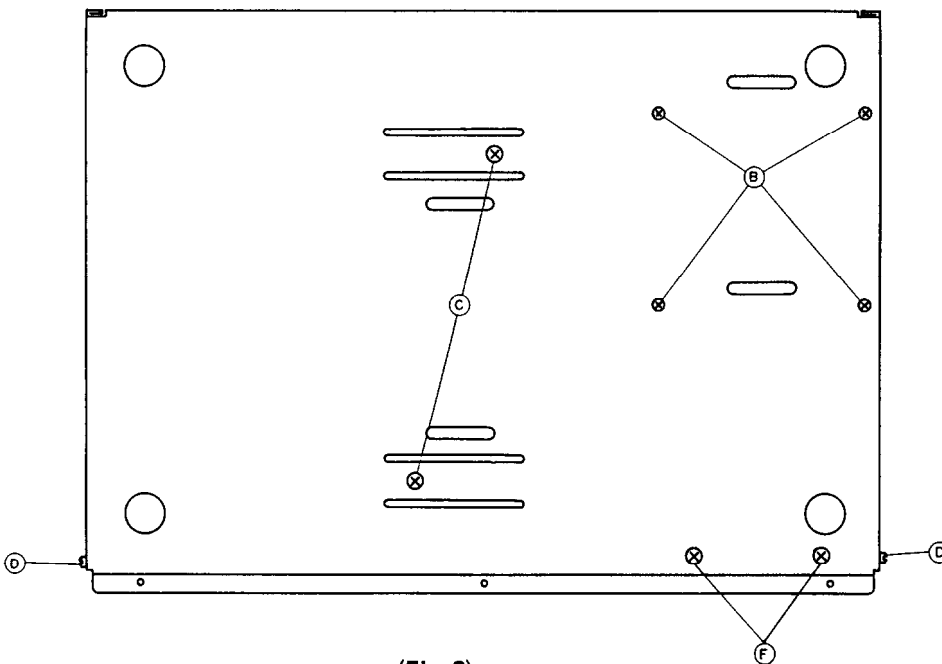
Remove the bottom board (Chassis).

Remove the bracket between the front bracket and the radiator.

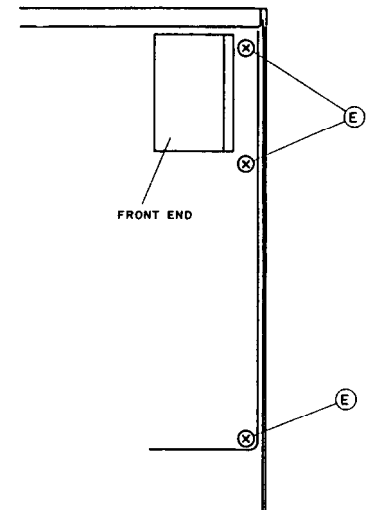
Remove the two screws F. (See Fig. 2)



(Fig. 1)



(Fig. 2)



(Fig. 3)