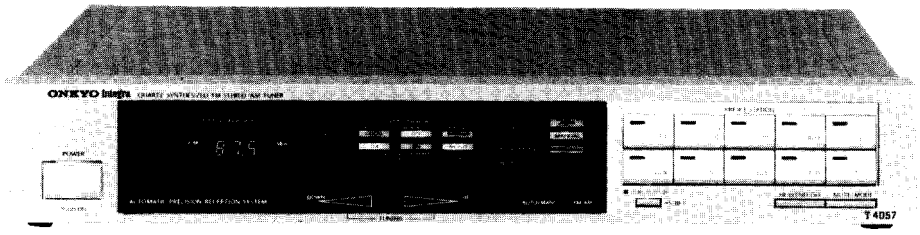
SERIAL No. 3195

ONKYO SERVICE MANUAL

SYNTHESIZED
FM STEREO/AM TUNER
MODEL T-4057



Silver and black models

UD, UDN, BUD, BUDN	120V AC, 60Hz
UG, BUG	220V AC, 50Hz
UW, BUW	120 or 220V AC, 50/60Hz
UQA, UQB	240V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

TABLE OF CONTENTS

ONKYO AUDIO COMPONENTS

SPECIFICATIONS

120V model

FM:

Tuning Range:	87.5 – 108.0 MHz (100kHz steps)
Usable Sensitivity:	Mono: 10.8dBf, 1.9μ, IHF Stereo: 17.2dBf, 4.0μV
50dB Quieting Sensitivity:	Mono: 16.1dBf, 3.5μV Stereo: 36.1dBf, 35μV
Capture Ratio:	1.3dB
Image Rejection Ratio:	40dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 75dB Stereo: 68dB
Alternate Channel Attenuation:	55dB IHF (±400kHz)
AM Suppression Ratio:	50dB
Total Harmonic Distortion:	Mono: 0.1% Stereo: 0.2%
Frequency Response:	30 – 15,000Hz ±1.5dB
Stereo Separation:	40dB at 1kHz 30dB at 70 – 10,000Hz
Output Voltage:	0.6V
Muting Level:	17.2dBf, 4.0μV

AM:

Tuning Range:	530 – 1610kHz (10kHz steps)
Usable Sensitivity:	25μV
Image Rejection Ratio:	40dB
IF Rejection Ratio:	30dB
Signal-to-Noise Ratio:	40dB
Total Harmonic Distortion:	0.8%
Output Voltage:	150mV

General

Semiconductors:	FETs: 5 TR: 35 ICs: 10 Diodes: 57 LEDs: 26
Dimensions(W×H×D):	435 x 77 x 372 mm (17-1/8" x 3" x 14-5/8")
Weight:	4.1 kg., 9 lbs.

Specifications and features are subject to change without notice.

Other models

FM:

Tuning Range:	87.5 – 108.0 MHz (50kHz steps)
Usable Sensitivity:	Mono: 10.8dBf, 1.9μV, IHF 0.9μV 75 ohms DIN Stereo: 2.0μV 75 ohms
50dB Quieting Sensitivity:	Mono: 1.7μV 75 ohms Stereo: 17 μV 75 ohms
Capture Ratio:	1.3dB
Image Rejection Ratio:	90dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 75dB Stereo: 68dB
Selectivity:	60dB DIN (±300 kHz, 40 kHz Dev.)
AM Suppression Ratio:	50dB
Total Harmonic Distortion:	Mono: 0.1% Stereo: 0.2%
Frequency Response:	30 – 15,000Hz ± 1.5dB
Stereo Separation:	40dB at 1kHz 30dB at 70 – 10,000Hz
Output Voltage:	0.8V
Muting Level:	2.0μV

AM:

Tuning Range:	522 – 1611 kHz (9 kHz steps)
Usable Sensitivity:	25μV
Image Rejection Ratio:	40dB
IF Rejection Ratio:	30dB
Signal-to-Noise Ratio:	40dB
Total Harmonic Distortion:	0.8%
Output Voltage:	150mV

General

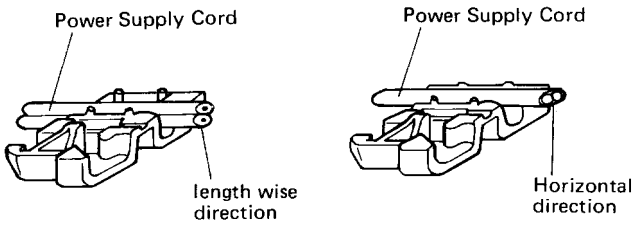
Antennas:	FM: coaxial terminal AM: built-in loop antenna and external terminal
Semiconductors:	FETs: 5 TR: 36 ICs: 10 Diodes: 57 LEDs: 26
Dimensions(W×H×D):	435 x 77 x 372 mm (17-1/8" x 3" x 14-5/8")
Weight:	5.2 kg., 11.4 lbs.

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

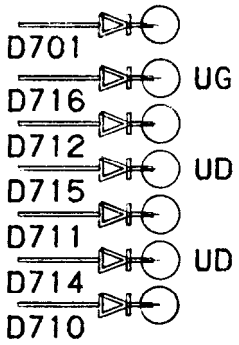
1. Replacement of power supply cord

There are two power supply cord outlets on the strainrelief. Insert them in prescribed direction to ensure safety. AS-UC-3 (UD<120V> model) should be inserted lengthwise and other types of cords should be inserted horizontally.



2. Band Switch

The frequency steps of the UD and UG models are fixed. The FM STEP can be changed from 100kHz to 50kHz by exchanging the D715 diode for a D716 item. If the opposite is desired, replace the D716 diode with a D715 item. Remove the D714 diode to decrease the AM step from 10kHz to 9kHz. If the opposite is desired, add a US1040 (Part No. 223150) or other diode to the D714. (See Page 10)



Bottom view

3. Replacement of lamp

This unit is used two lamps listed below.

Circuit no.	Part no.	Description
PL001	210149	PL14V0.06AW-3.0, Power indicator
PL903	210064A	PL6.3V, 250mA, Dial plate illumination

4. Safety-check output

(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 ± 10% at 500V.

5. Change of band step/de-emphasis

Universal models are equipped with a band step/ de-emphasis switch on the back panel. This switch is set to following position.

	Emphasis	AM step	FM step
set position	50 sec.	9 kHz	50 kHz
other	75 sec.	10 kHz	100 kHz

6. Change of voltage

Universal 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 tuning the power switch on.

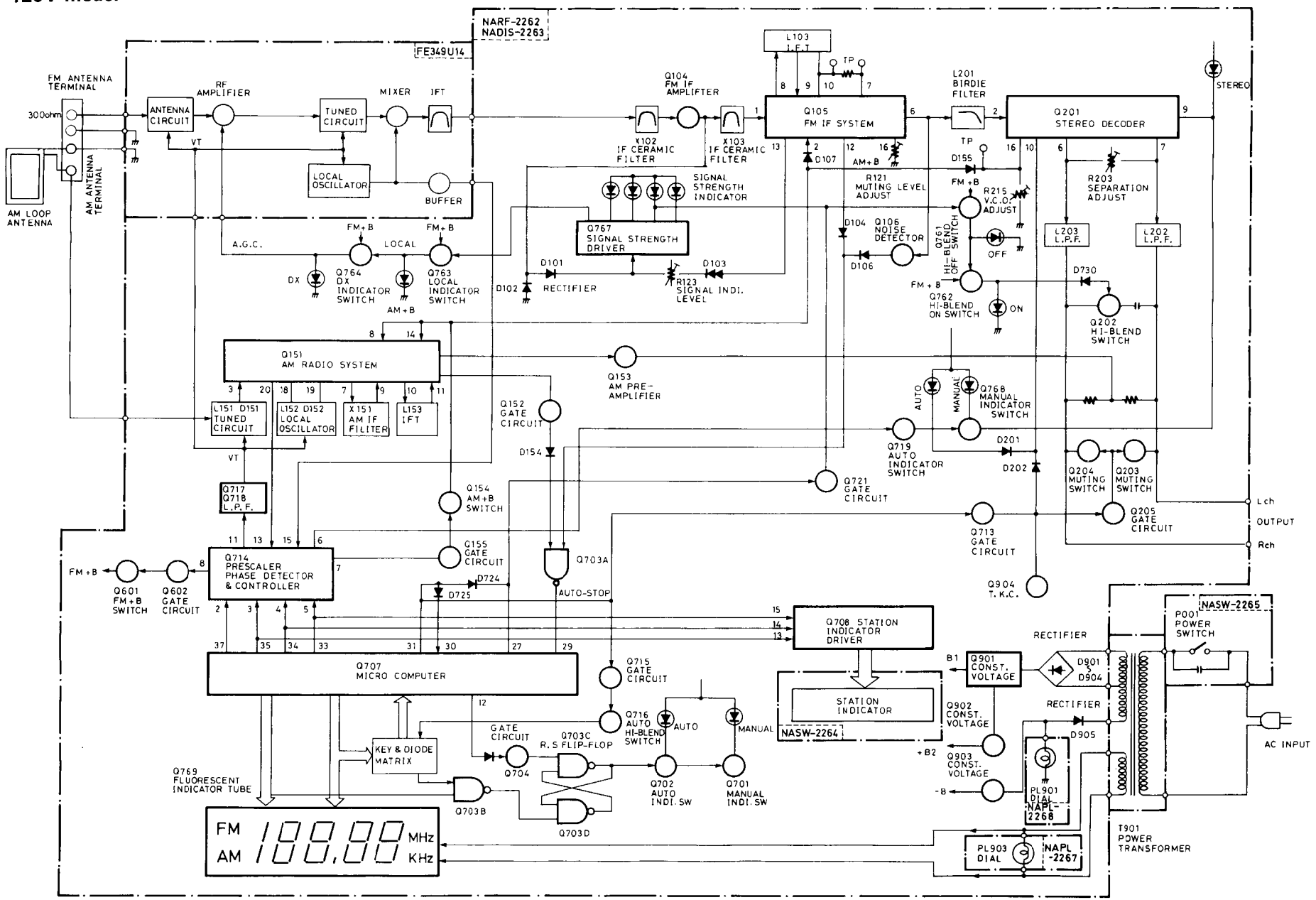
This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

7. Memory preservation

This unit dose 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 super capacitor of C703. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month to keep the back-up system operable. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and the location and placement of the unit. On the average, memory contations are protected over a period of 2 weeks after the last time power has been turned off. This period is shorter when the unit exposed to very high humidity or used in an area with an extermely humid climate.

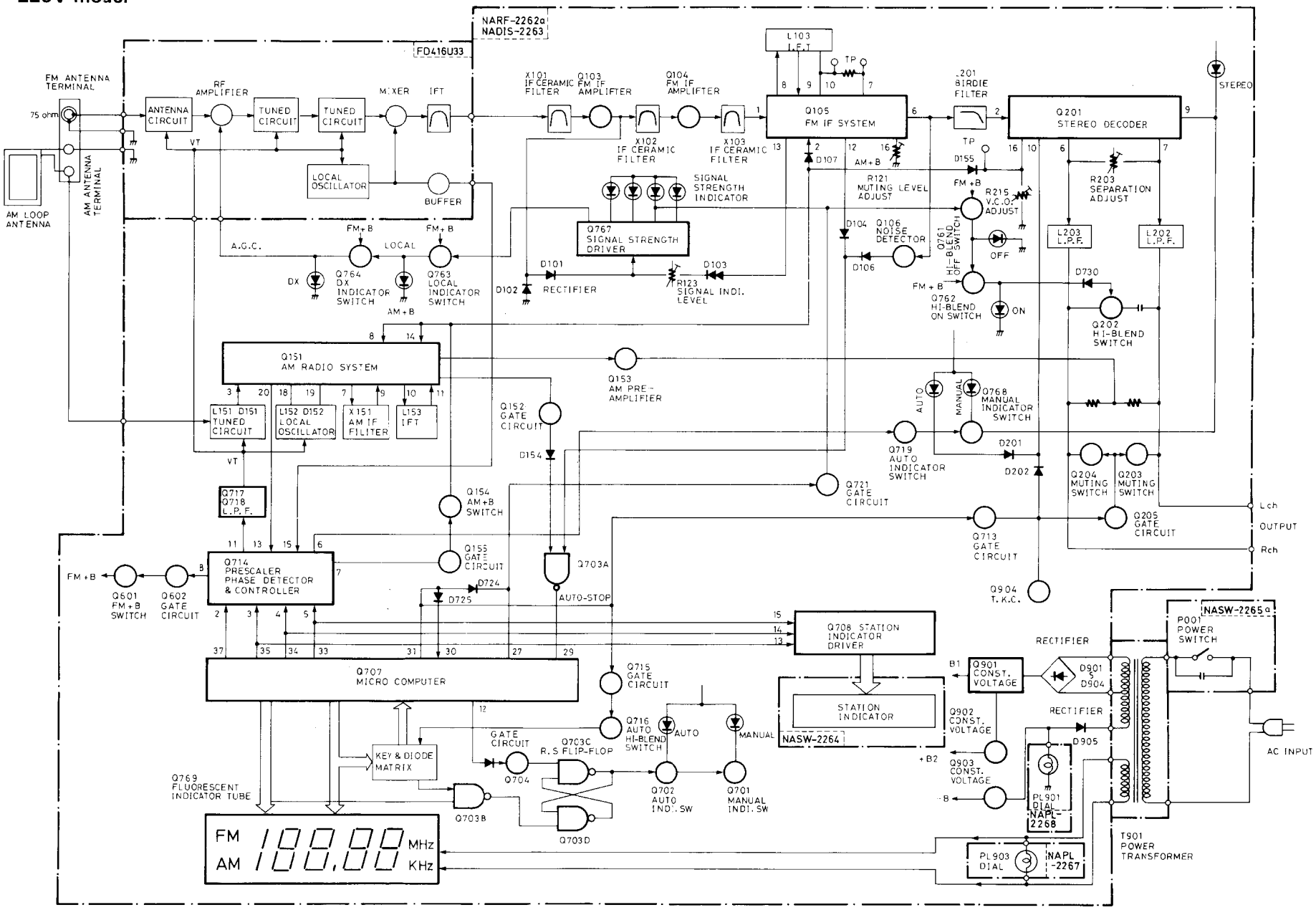
BLOCK DIAGRAM

–120V model–

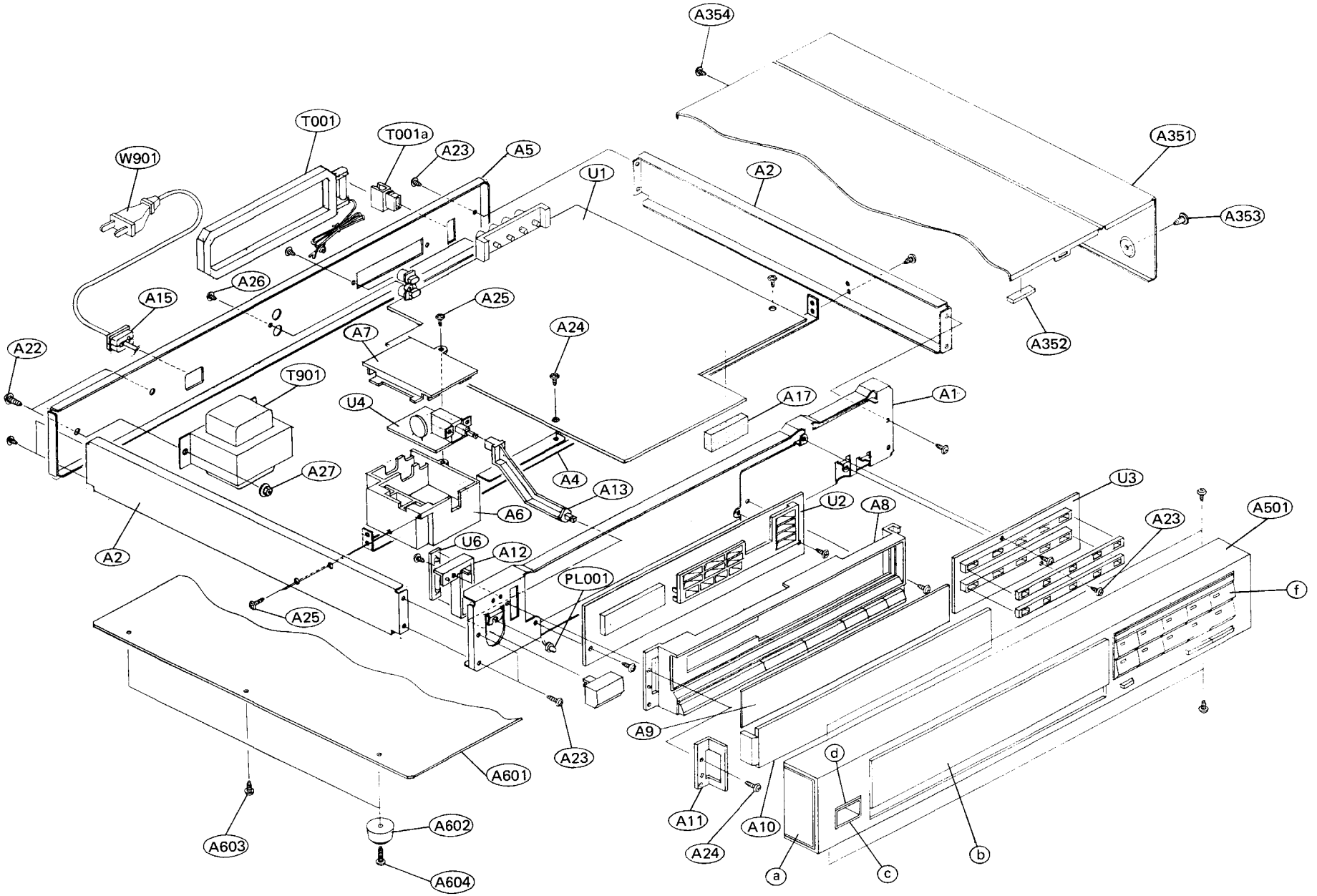


BLOCK DIAGRAM

–220V model–



EXPLODED VIEW



EXPLODED VIEW PARTS LIST

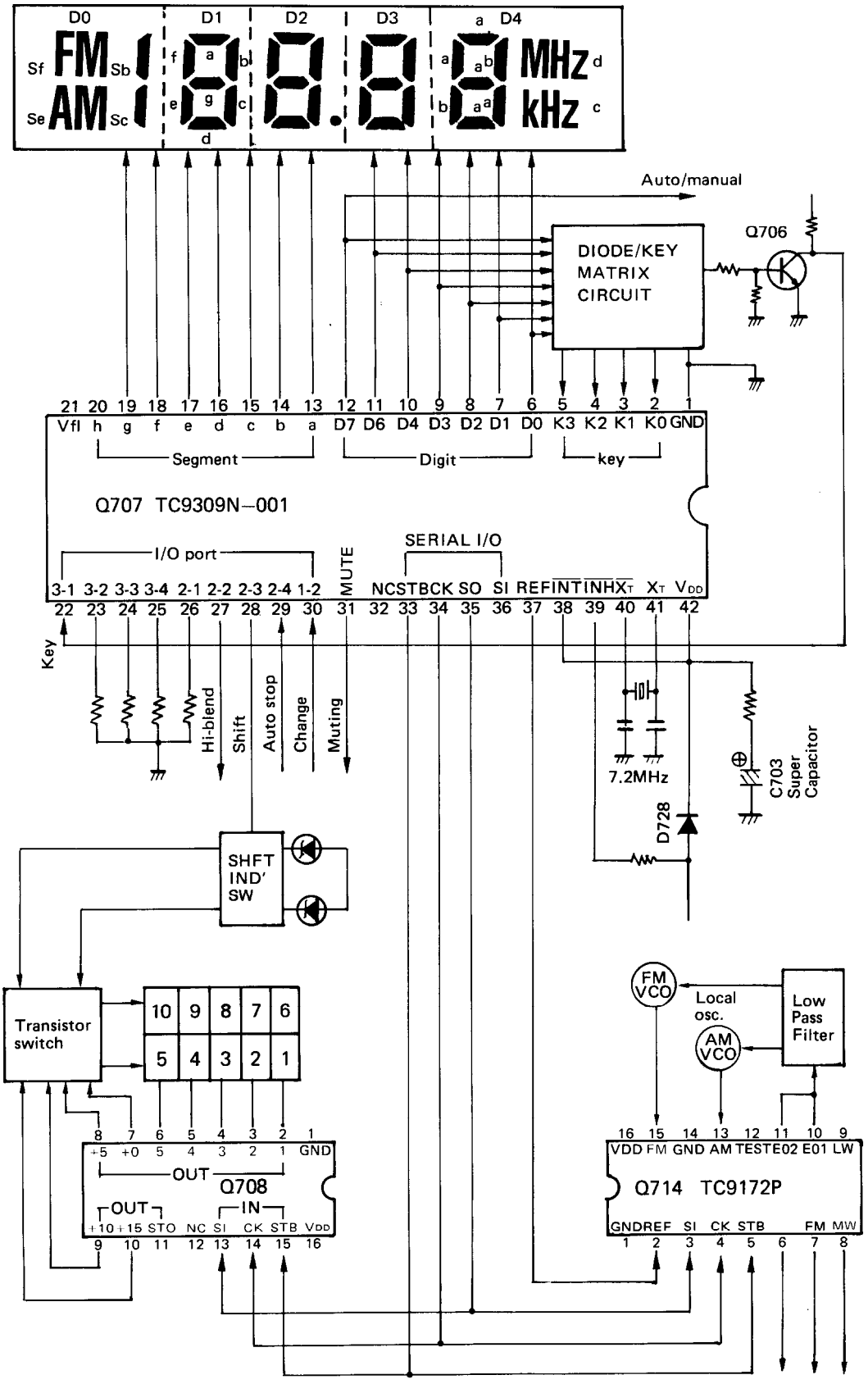
REF. NO.	PART NO.	DESCRIPTION
A1	27110242A	Front Bracket
A2	27115014G	Side bracket
A4	27130387	Bracket, center
A5	27120676	Back panel <D>
	27120677	Back panel <G>
	27120679	Back panel <W>
A6	27190351	Holder, power
A7	27190356	Holder, lid
A8	27190347	Holder ass'y
A9	28133129A	Back plate ass'y
A10	28130222	Dial plate
A11	27190353	Holder, dial
A12	27190198	Holder, lamp
A13	27273030C	Joint L
A15	⚠27300750	Strainrelief
A17	28140516	14 x 50 x 8, Cushion
A19	28140613	Cushion
A22	838440089	4TTB+8C(BC), Tapping screw
A23	834430068	3TTS+68(BC), Tapping screw
A24	831430088	3TTW+8B(BC), Tapping screw
A25	834430080	3TTP+8P(BC), Tapping screw
A26	834430108	3TTS+10B(BC), Tapping screw
A27	86414010	FWN4 x 10FN, Flange nut
A28	834230108	3TTS+10B(Ni), Nickel screw
A31	82143006	3P+6F–N(BC), Pan head screw <W>
A32	82142604	2.6P+4F(BC), Pan head screw <W>
A351	28184188	Top cover <S>
	28184183	Top cover <B>
A352	28140020	10 x 40 x 4, Cushion
A353	838440089	4TTB+8C(BC), Tapping screw
A354	834430068	3TTS+6B(BC), Tapping screw
A501	18368121	Front panel ass'y <S>
A501a	28125137A	End cap
A501b	28191292	Clear plate
A501c	27267206B	Guide, power
A501d	28198577	Facet, power
A501e	28198592A	Facet B
A501f	28321938	Knob ass'y
A501	18388121	Front panel ass'y <B>
A501a	28125138A	End cap
A501b	28191292	Clear plate
A501c	27267235B	Guide, power
A501d	28198577	Facet, power
A501e	28198592A	Facet B
A501f	28321954	Knob ass'y
A601	27170156	Bottom board
A602	27175009A	Leg
A603	834430068	3TTS+6B(BC), Tapping screw
A604	834430108	3TTS+10B(BC), Tapping screw
A801	28321904	Knob, power <S>
	28321905	Knob, power <B>
PL001	210149	PL14V0.06AW–3.0, Lamp
S002	⚠25065123	NSS-1258P, Voltage selector switch <W>
T001	232098	NMA-3040, AM antenna
T001a	27190129	Holder, antenna
T901	⚠230885	NPT-879D, Power transformer <D>
	⚠230886	NPT-879G, Power transformer <G>
	⚠230887	NPT-879DG, Power transformer <W>
U1	18368562	NARF-2262, Main pc board ass'y <D>
	18374562A	NARF-2262A, Main pc board ass'y <G>
	18370562B	NARF-2262B, Main pc board ass'y <W>
U2	18368563	NADIS-2263, Display pc board ass'y
U3	18368564	NASW-2264, Function switch pc board ass'y
U4	⚠18368565	NASW-2265, Power switch pc board ass'y <D>
	⚠18374565A	NASW-2265A, Power switch pc board ass'y <G/W>
U5	18370566	NASW-2266, Band/Emphasis selector switch pc board ass'y <W>
U6	⚠18368567	NAPL-2267, Lamp pc board ass'y <D>
U7	18374568	NAPL-2268, Lamp pc board ass'y <G/W>
W901	⚠253128	AS-CEE, Power supply cord <G/W>
	⚠253099B or 253099C	AS-UC-3, Power supply cord <D>

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

NOTE: <D>: Only 120V model
<G>: Only 220V model
<W>: Only Universal model
<S>: Only Silver model
<B>: Only Black model

CIRCUIT DESCRIPTION

The tuning system incrorporates three intergrated circuits:a Q714 pahse lock loop unit with a pre-scaler, a Q707 controller and a Q708 driver for the station indicator.



TC9303N-001 (Controller IC)

Pin No.	Symbol	Terminal	Description
1	GND	Ground	
2–5	K0 ~ K3	Key return signal input	Terminal for input of the return signals from the external key and diode matrix.
6–10 11	D0 ~ D4 D6	Digit signal output	Fluorescent indicator tube digit signal output and key return signal output terminals.
12	D7	Digit signal output	Key return signal output terminal.
13–19	a ~ g	Segment signal output	Fluorescent indicator tube segment signal output terminals.
20	h	Segment signal output	Not used.
21	–VFL	Power supply	Device power supply terminal; supplies –21V.
22	P3-1	Return signal input	Terminal for input of the return signal from external diode matrix.
23–25 26	P3-2 ~ P3-4 P2-1	I/O port	Not used.
27	F2	Hi-blend output	The function is operated with the HI-BLEND OFF switch on the front panel. The hi-blend switch circuit is off by the high level.
28	F1	Shift indicator output	Terminal for indication of stations (1 ~ 10) or stations (11 ~ 20). The indication becomes 1 ~ 10 by the high level.
29	STP	Auto stop input	Input terminal for detecting whether or not a broadcast signal is being received during auto tuning. Stopped by the high level.
30	CHG	Change	Input terminal to return muting output high level signal to controller.
31	MUTE	Muting circuit control output	Output signal for muting control. With MUTE/MODE switch is "ON" position a signal with a level opposite that of the Stop input is generated. In "OFF" position the low level is generated to shut off the muting irrespective of Stop input.
32	TEST		
33 34 35	STB CK SO	Strobe pulse output Serial clock output Serial data output	Serial data output for the control of the Q714 phase lock loop IC and the Q704 station indicator driver IC.
36	SI	Serial data input	Not used.
37	REF	Reference frequency signal output	Output for reference frequency as supplied to the phase lock loop IC, i.e., square wave signal; 25kHz during FM mode and 10kHz (for 10kHz step range) or 9kHz (for 9kHz step range) during AM mode.
38	$\overline{\text{INT}}$	Initial program load	
39	$\overline{\text{INH}}$	Inhibit input	
40 41	$\overline{\text{XT}}$ XT	X'tal	Connected to the 7.2MHz crystal oscillator.
42	VDD	Power supply	Device power supply terminal; supplies 5V during normal operation and more than 2V from the C703 super capacitor for memory preservation.

KEY MATRIX DESCRIPTION

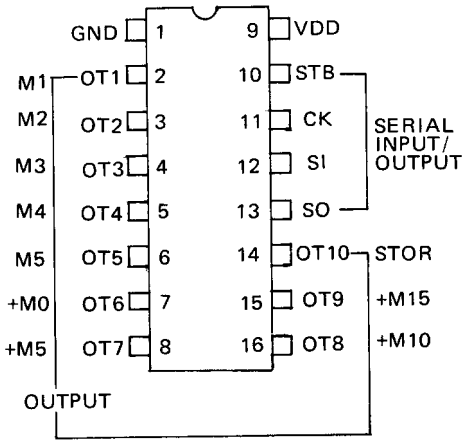
	D0(6)	D1(7)	D2(8)	D3(9)	D4(10)	D6(11)	D7(12)
K4(22)	FM0	FM1	MW0	MW1	LW0	LW ena	
K3(5)	3	7		SHIFT	MUTING	REW ena	BAND KEY
K2(4)	2	6	10	HI-BLEND	AUTO/MANUAL	IF min	Mran
K1(3)	1	5	9		DOWN	IF pls	M1
K0(2)	MEMORY	4	8	FM/AM	UP	+10	M0

Note: Key matrix

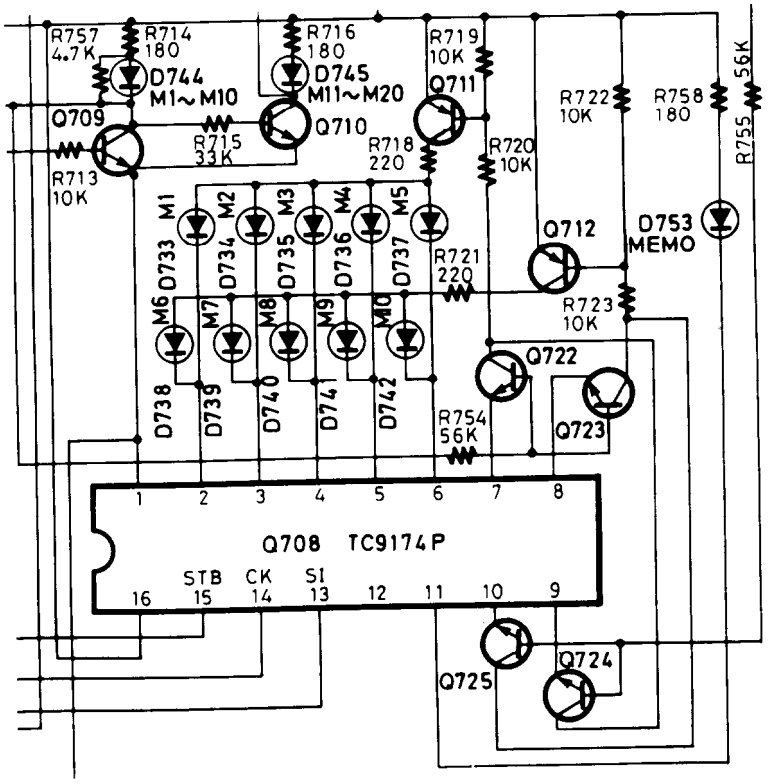
Diode matrix (High level when the diode is connected.)

BAND	CORD 0 1	TUNING RANGE	STEP	REFERENCE FREQUENCY	IF FREQUENCY
FM	0 0	76.0 ~ 90.0MHz	100kHz	25kHz	−10.7MHz
	0 1	87.5 ~ 108.0MHz			+10.7MHz
	1 0	87.50 ~ 108.00MHz	50kHz		
	1 1	87.50 ~ 108.00MHz			−10.7MHz
MW	0 0	522 ~ 1,629kHz	9kHz	9kHz	+450kHz
	0 1	522 ~ 1,611kHz			
	1 0	531 ~ 1,602kHz			
	1 1	530 ~ 1,610kHz	10kHz	10kHz	

FM0, 1 . . . FM band setting.
MW0, 1 . . . MW band setting.
Mran, M0, M1 . . . Memory number setting.

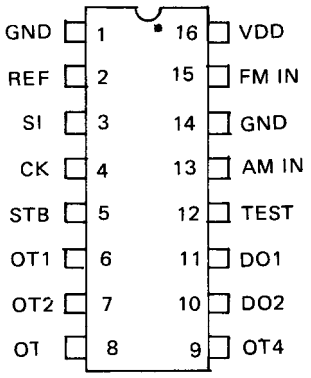


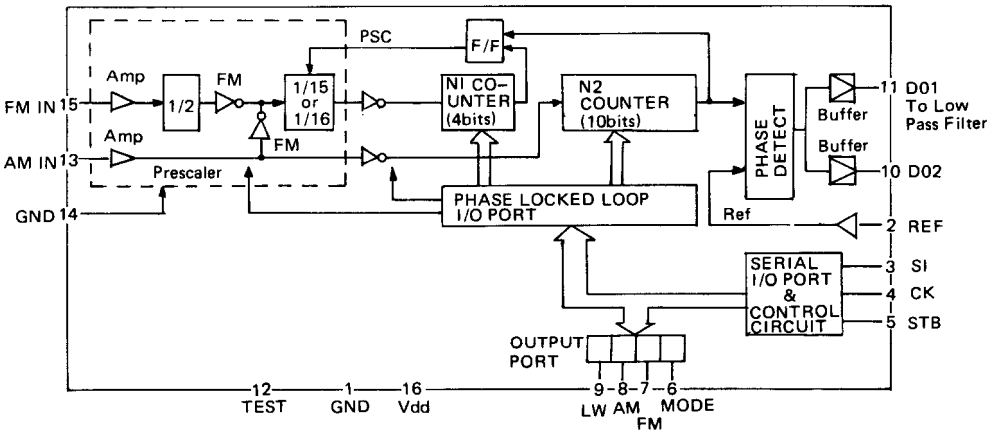
TC9174P (Station indicator driver)



The indicator driver output, either the OT1–OT5 or the OT6–OT9, is converted into low level by means of the serial data from the controller. When the 8th station is received, the OT3(4 pin) and the OT7 (8 pin) become low level, the Q712 and Q713 are turned on and the D740 LED comes on to indicate that the 8th station is being received.

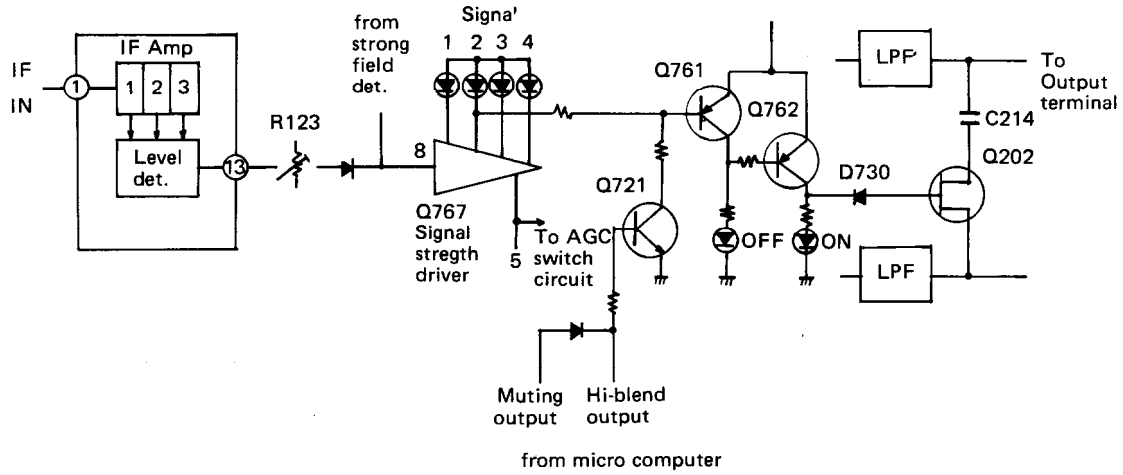
TC9172P (PLL IC)





Pin No.	Symbol	Terminal	Description
1	GND	Ground	
2	REF	Reference frequency input	Input for reference frequency as supplied from the controller IC i.e., square wave signals; 25 kHz during FM mode and 10 kHz (for 10 kHz step range) or 9 kHz (for 9 kHz step range) during AM mode.
3 4 5	SI CK STB	Serial data input Serial clock input Strobe input	This function supplies and receives data within the controller to control the serial input port, determination of dividing ratio and versatile I/O port.
6	MODE	Model output	FM mode can be performed in AUTO or MONO mode by pressing the MUTE/MODE switch on the front panel. High level at AUTO mode.
7	FM	FM output	High level at FM. This signal controls B circuit in AM IC, FM IF and and multiplex circuit.
8	AM	AM output	High level at AM. This signal controls the B circuit in the FM indicator.
9	LW		Not used.
10, 11	E01, E02	Error outputs	Charge pump output of the phase detector which constitutes the phase lock loop. The high level is output when the divided local oscillator signal frequency is higher than the reference frequency from controller. In the opposite case, the low level is output. Floating occures when the frequencies match. The output is applied to the variable capacitor diode in the front end through the low pass filter Q717 and Q718. The output from both terminals is same.
12		TEST	
13	AM	AM local oscillator	AM local oscillator input
14	GND		
15	FM	FM local oscillator	FM local oscillator input
16	VDD	Power supply	

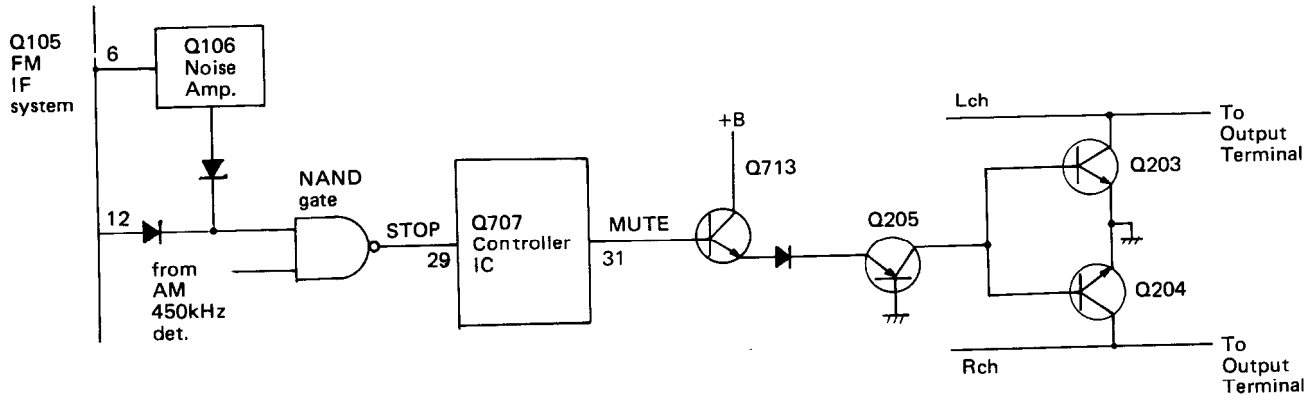
Hi-Blend Circuit



The Q105 FM IF system incorporates IC's with a built-in IF level detector with a 13 pin output. If an input above 35dB enters the antenna, the 2 pin of Q767 signal driver becomes low level, the Q761 is turned on, the Q762 and Q202 are turned off and the high blend function is turned off. Whenever the HI-BLEND OFF switch is pressed to switch off input lower than off level, the output of the 27 pin Q707 inverts to become high level, the Q721 and Q761 are turned on and the high blend function is turned off. When the UP/DOWN switch is pressed and the 27 pin of the Q715 and Q716 are high level the following happens.

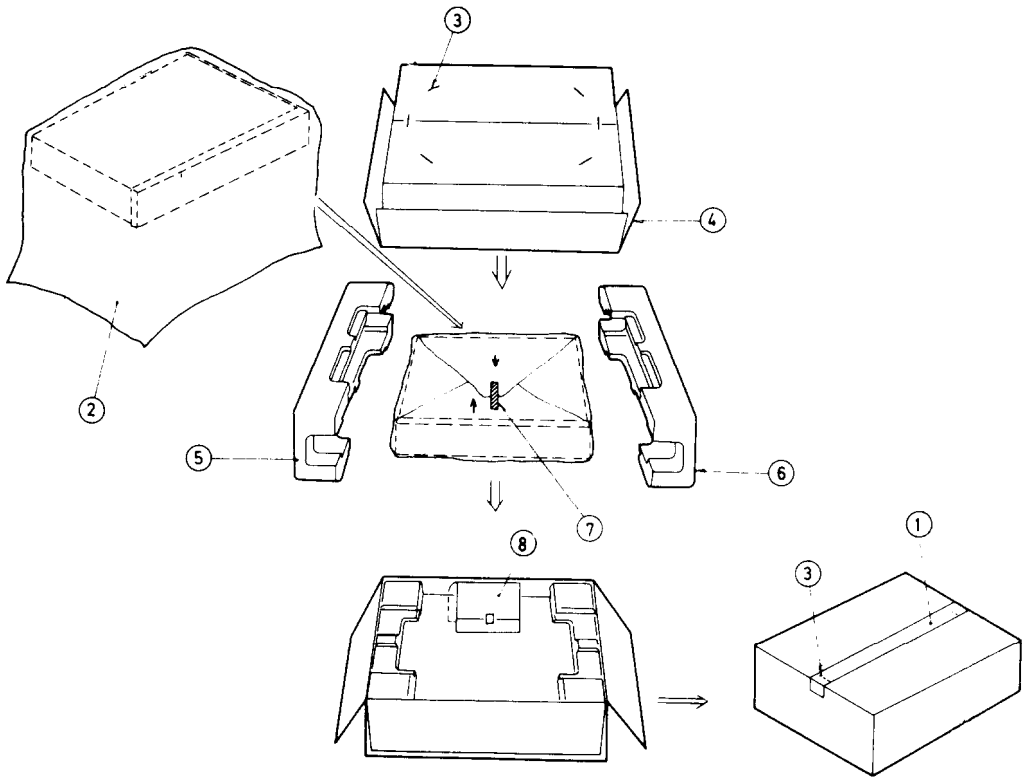
The 31 pin of the MUTE terminal become high level, turning on the Q715 and Q716 witch perform the same function as pressing the HI-BLEND OFF switch. That is the 27 pin become low, high blend is turned on and Q715 and Q716 are turned off.

Muting/Auto Tuning Circuit



This function receives signals louder than muting level. If the signal contains no noise factor, the NAND gate input is converted from high levl to low level and the output becomes high level. In case the STOP terminal in the controller changes from low to high level the auto muting function is shut off. If theMUTE switch is in auto mode, the muting signal changes from high to low level, the Q713, Q203–Q205 transistors are turned off generating an output signal.

PACKING VIEW



REF. NO.	PART NO.	DESCRIPTION
1	29095012–1	500 x 800mm, Protection sheet
2	29100036A	550 x 850mm, Poly-vinyl bag
3	282301	Sealing hook
4	29051076	Master carton box <S>
	29051077	Master carton box <B>
5	29090772	Pad R
6	29090771	Pad L
7	261504	30 x 80mm, Adhesive tape
8	260012	50 x 700mm, Damplon tape
9	Accessary bag ass'y	
	U.S.A. model	
	29340854	Instruction manual
	292064A	FM antenna
	2010095	Connection cord
	29365006–6	Warranty card
	29358002C	Service station list
	29100006A	350 x 250mm, Poly-vinyl bag
	120V model	
	29340854	Instruction manual
	292064A	FM antenna
	2010095	Connection cord
	29100006A	350 x 250mm, Poly-vinyl bag
	220V model	
	29340855	Instruction manual
	292092	FM antenna
	2010095	Connection cord
	29100006A	350 x 250mm, Poly-vinyl bag
	Universal model	
	29340855	Instruction manual
	292064A	FM antenna
	2010095	Connection cord
	25055040	CV–K–2, Conversion plug
	29100006A	350 x 250mm, Poly-vinyl bag

NOTE:

<S>: Only silver model

<B>: Only black model

ADJUSTMENT PROCEDURES

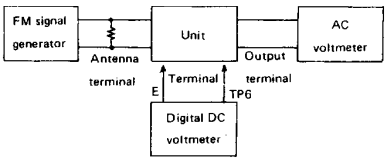
FM Section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuned frequency	Output indicator	Adjustment point	Adjust	Remarks
FM RF	1	Fig. 1		———	87.5 MHz	Digital DC voltmeter	LO	1.5 ± 0.4V	Usually not necessary to adjust.
	2		108.0 MHz, 1 kHz 75 kHz devi.		108.0 MHz	AC voltmeter	RF	Maximum	
FM IF	1	Fig. 2	99.0 MHz, 1 kHz 75 kHz devi. 65 dBf (60 dB μ)	———	99.0 MHz	DC voltmeter	L103 Pri. coil	OV	Muting switch to off. Repeat the steps 1 and 2 until no further adjustment is necessary. Muting switch to on after adjustment.
	2					Distortion analyzer	L103 secondary coil	Minimum	
VCO		Fig. 3	99.0 MHz, 1 kHz 75 kHz devi. 65 dBf (60 dB μ)	———	99.0 MHz	Frequency counter	R215	76,000 ± 76 Hz	Muting switch to on.
Stereo Distortion		Fig. 4	99.0 MHz, Ext. modulation 65 dBf (60 dB μ)	L+R 1 kHz, 67.5 kHz devi. Pilot signal 7.5 kHz devi.	99.0 MHz	Distortion analyzer	IF core on front end	Minimum	
Stereo Separation	1	Fig. 4	99.0 MHz, Ext. modulation 65 dBf (60 dB μ)	Lch. 1 kHz	99.0 MHz	Rch. output	R203	Minimum	Maximum and same separation at the channels left and right.
	2			Rch. 1 kHz		Lch. output		Minimum	
Muting Level	1	Fig. 2	99.0 MHz, 1 kHz 75 kHz devi. 17.2 dBf (12 dB μ)	———	99.0 MHz	Oscilloscope	R121	Signal	
	2		16.2 dBf (11 dB μ)					No signal	
Signal Indicator Level		Fig. 2	99.0 MHz, 1kHz 75kHz devi. 55 dBf (50 dB μ)	———	99.0 MHz	Signal indicator	R123	4th LED light on.	

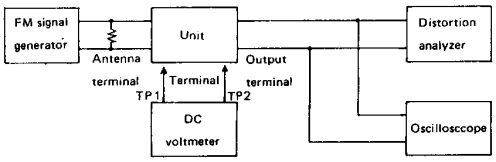
AM Section

120V model

Step	AM SG output	Tuned frequency	Output indicator	Adjust. point	Adjust for	Remarks
1		530 kHz	Digital DC voltmeter	L152	1.2 ± 0.1V	Repeat the steps 1 and 2 until no further adjustment is necessary.
2		1610 kHz		TC152	9.5 ± 0.1V	
3	600 kHz, 400 Hz 30% mod. 60 dB/m	600 kHz	AC voltmeter	L151	Maximum	Repeat the steps 3 and 4 until no further adjustment is necessary.
4	1400 kHz. 400 Hz 30% mod. 60 dB/m	1400 kHz		TC151	Maximum	
5	1000 kHz, 400 Hz 30% mod. 60 dB/m	1000 kHz	AC voltmeter	X151	Maximum	



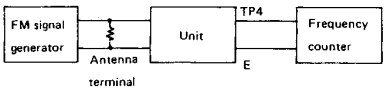
(fig. 1)



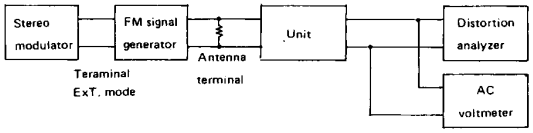
(fig.2)

Other models

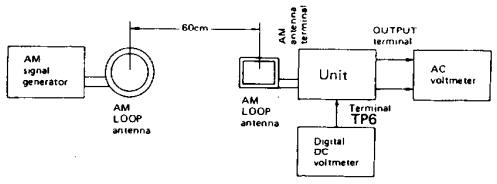
Step	AM SG output	Tuned frequency	Output indicator	Adjust. point	Adjust for	Remarks
1		522 kHz	Digital DC voltmeter	L152	1.2 ± 0.1V	Repeat the steps 1 and 2 until no further adjustment is necessary.
2		1611 kHz		TC152	9.5 ± 0.1V	
3	603 kHz, 400 Hz 30% mod. 60 dB/m	603 kHz	AC voltmeter	L151	Maximum	Repeat the steps 3 and 4 until no further adjustment is necessary.
4	1404 kHz, 400 Hz 30% mod. 60 dB/m	1404 kHz		TC151	Maximum	
5	999 kHz, 400 Hz 30% mod. 30 dB/m	999 kHz	AC voltmeter	X151	Maximum	



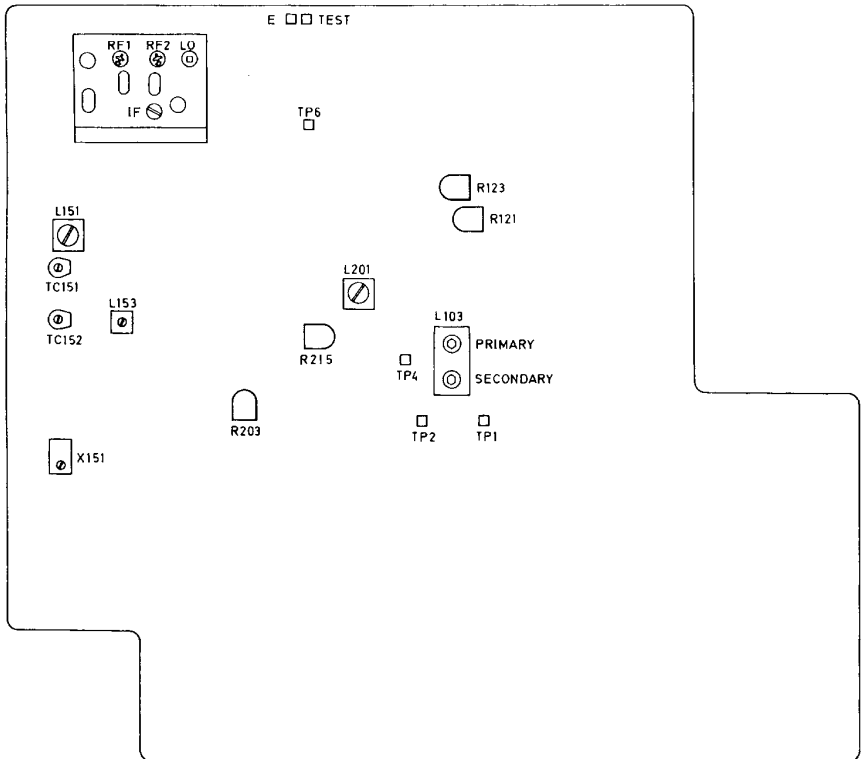
(fig. 3)



(fig. 4)

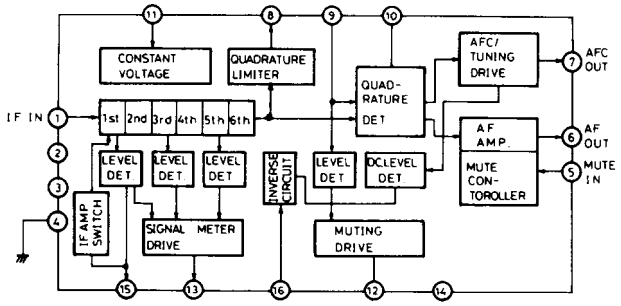


(fig. 5)



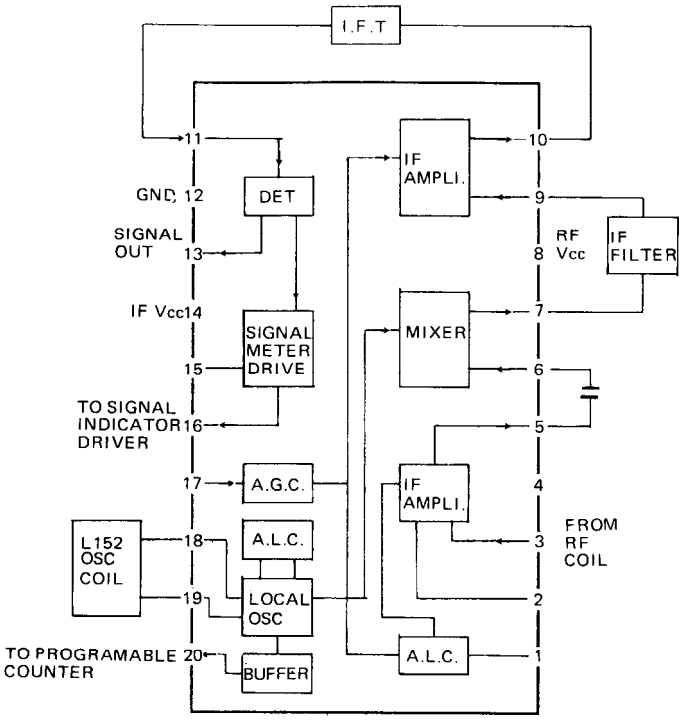
BLOCK DIAGRAM OF IC

HA-11225(FM IF system)



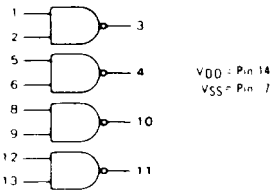
1. IF signal input
2. IF amplifier switch input
   H level: Off
5. Muting switch input
6. Composite signal output
7. AFC output
8. IF amplifier output
9. 10.7MHz input
10. Reference voltage
11. Power supply
12. Muting output
    Tuned: L level
13. Signal strength output
15. AGC out put
16. Muting level

LA-1245 (AM radio system)

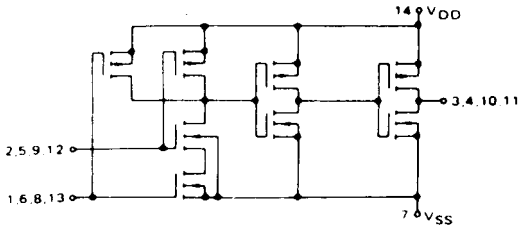


4011B (Nand gate)

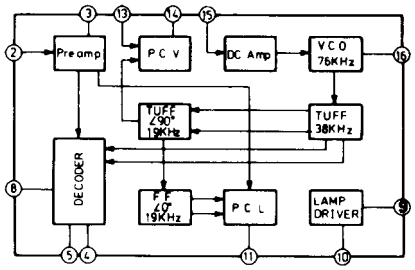
LOGIC DIAGRAM



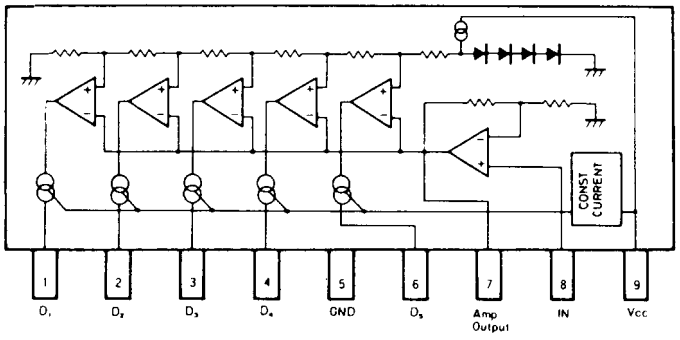
CIRCUIT SCHEMATICS
(1/4 of Device Shown)



HA-1196 (Stereo decoder)



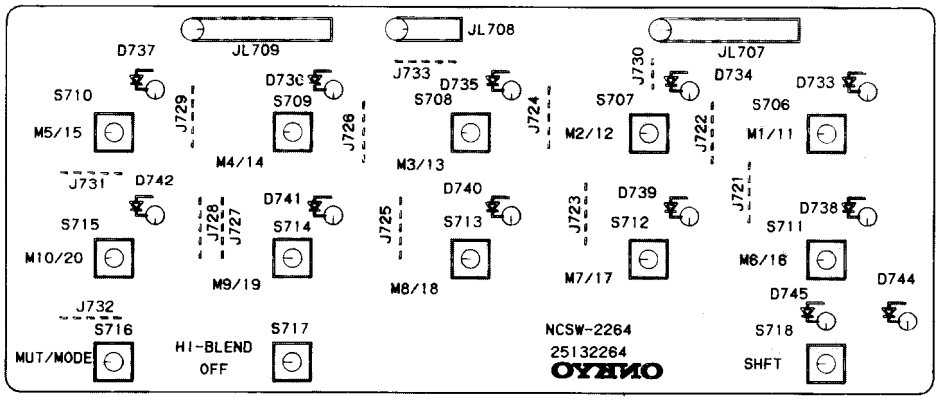
LB1403 (Signal strength indicator driver)



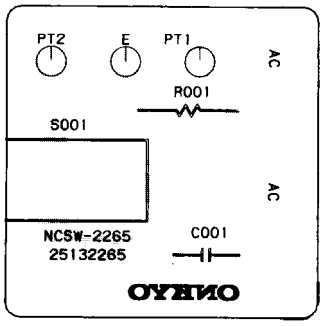
AM Section
12NV model

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

Function switch



Power switch



PRINTED CIRCUIT BOARD PARTS LIST

DISPLAY PC BOARD (NADIS–2263)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Fluorescent tube	
Q769	212018	7BT-15ZA
	IC	
Q767	222666	LB1403
	Transistors	
Q761-Q764	2211454 or 2212494	2SA1015(Y) or JA101(P)
Q768	2211255, 2210746 or 2212485	2SC1815(GR), 2SC945A (P) or JC501(Q)
	Diode	
D762	223150, 223145 or 223124	US1040, 1S2076TD or 1S2473
	LEDs	
D741, D766	225142	SEL2913K
D753, D769	225141	SEL2213C
D768, D770	225142	SEL2913K
D742, D765	225137CG,	SEL2413ECG,
D767	225137DG or	SEL2413EDG or
D771-D775	225137DY	SEL2413EDY
	Capacitor	
C763	352741009	10μF, 16V, Elect.
	Switches	
S701-S705	25035389	NPS-111-S353
	Holder	
	27190354A	LED
	Cushion	
	28140597	10x40x1.5

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

FUNCTION SWITCH PC BOARD (NASW–2264)

CIRCUIT NO.	PART NO.	DESCRIPTION
	LEDs	
D733-D742	225141	SEL2213C
D744	225137CG, 225137DG or 225137DY	SEL2413ECG, SEL2413EDG or SEL2413EDY
D745	225142	SEL2913K
	Switches	
S706-S718	25035389	NPS-111-S353
	Holders	
	27190355A	LED 5
	27190249	LED

POWER SWITCH PC BOARD (NASW–2265/A)

CIRCUIT NO.	PART NO.	DESCARIPTION
C001	⚠3500065A	DE7150FZ103PAC400/125V, Capacitor IS
R001	⚠431523355	3.3MΩ, 1/2W Solid resistor<D>
S001	⚠25035295	NPS-111-L261P, Power switch
	25060092	NTM-1S33, Terminal

BAND/EMPHASIS SELECTOR SWITCH PC BOARD (NASW–2266)

CIRCUIT NO.	PART NO.	DESCRIPTION
S002	25065240	NSS-42102, Slide switch

LAMP PC BOARD (NAPL–2267)

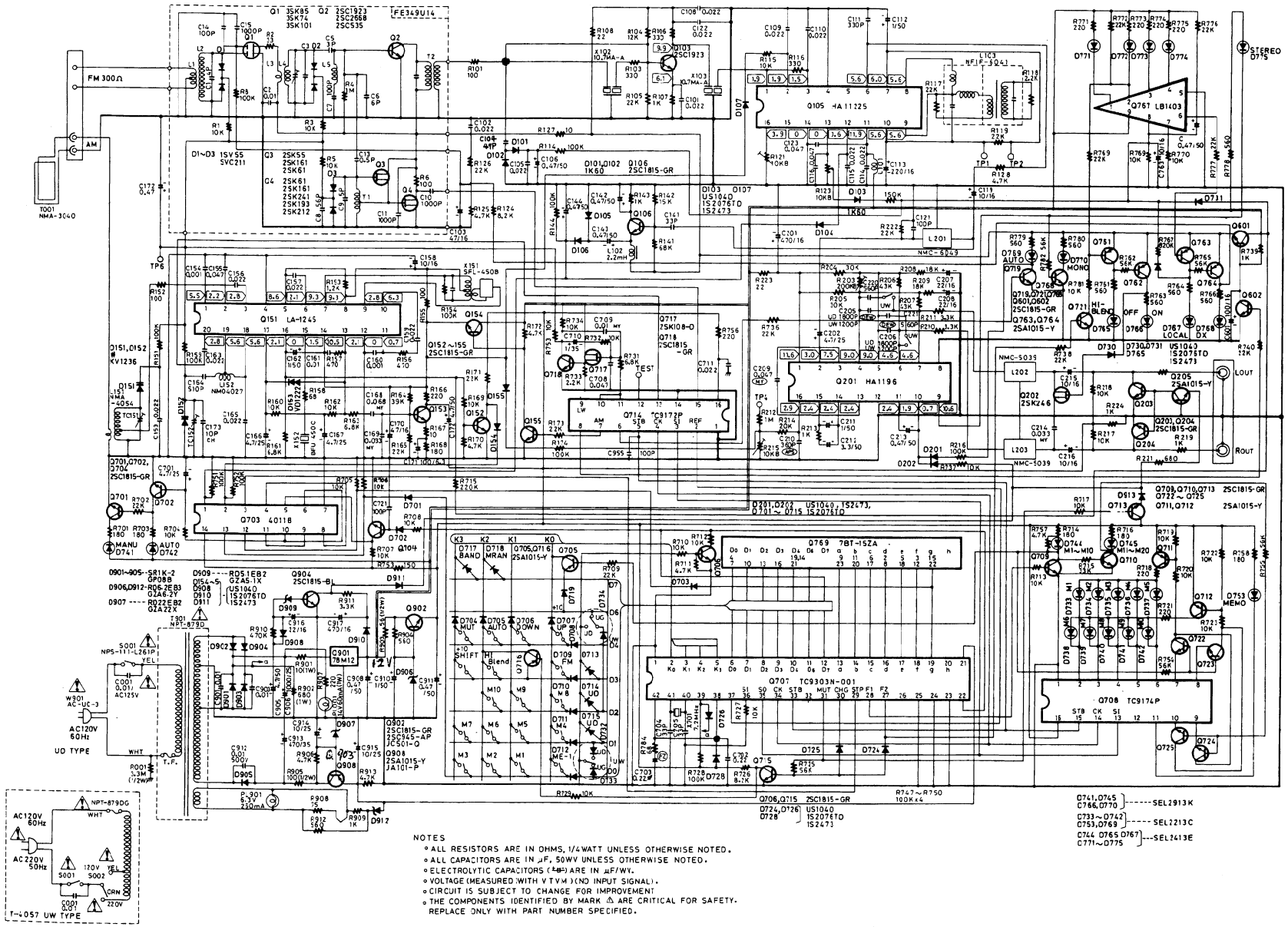
CIRCUIT NO.	PART NO.	DESCRIPTION
PL903	210064A	PL6.3V250mA, Lamp

LAMP PC BOARD (NAPL–2268)

CIRCUIT NO.	PART NO.	DESCRIPTION
PL903	210064A	PL6.3V250mA, Lamp

SCHEMATIC DIAGRAM

–D/W models–



NOTES

- ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF, 50WV UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (⊕⊖) ARE IN μF/WV.
- VOLTAGE (MEASURED WITH V T V M) (NO INPUT SIGNAL).
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT
- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.

PRINTED CIRCUIT BOARD PARTS LIST

MAIN PC BOARD (NARF–2262 a/b)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240061	FE349U14 <D/W>
TU001	240059	FE416U33 <G>
	ICs	
Q105	222540	HA-11225
Q151	222701	LA-1245
Q201	222453	HA-1196
Q703	222513 or	μPD4011B or
	222840111	4011B
Q707	222867	TC9303N-001
Q708	222868	TC-9174P
Q714	222869	TC-9172P
Q901	222780122	78M12
	Transistors	
Q103	2211723	2SC1923(0) <G>
Q104	2211723	2SC1923(0)
Q106	2211255,	2SC1815(GR),
Q152-Q155	2210746 or	2SC945A(P) or
Q203, Q204	2212485	JC501(Q)
Q202	2211944 or	2SK246(Y) or
	2211945	2SK246(GR)
Q205	2211454 or	2SA1015(Y) or
	2212494	JA101(P)
Q601, Q602	2211255,	2SC1815(GR),
Q701, Q702	2210746 or	2SC945A(P) or
Q704, Q706	2212485	JC501(Q)
Q709, Q710	2211255,	2SC1815(GR),
Q713, Q715	2210746 or	2SC945A(P) or
Q718, Q719	2212485	JC501(Q)
Q705, Q711	2211454 or	2SA1015(Y) or
Q712, Q716	2212494	JA101(P)
Q717	2212294	2SK108(D)
Q902, Q721	2211255,	2SC1815(GR),
Q722-Q725	2212485 or	JC501(Q) or
	2210746	2SC945A(P)
Q903	2211454 or	2SA1015(Y) or
	2212494	JA101(P)
Q904	2211256	2SC1815(BL)
	Diodes	
D101-D103	223132	1K60
D153	4000068	VD1222
D104-D106	223150,	US1040,
D154, D155	223145 or	1S2076TD or
D201, D202	223124	1S2473
D151, D152	223140	KV1236
D107	223133 or	DS442X or
	223145	1S2076TD
D701-D713	223150,	US1040,
D717-D719	223145 or	1S2076TD or
D730, D731	223124	1S2473
D714, D715	223150,	US1040,
	223145 or	1S2076TD or
	223124	1S2473 <D>
D716	223150,	US1040,
	223145 or	1S2076TD or
	223124	1S2473 <G>
D732-D734	223150,	US1040,
	223145 or	1S2076TD or
	223124	1S2473 <W>
D728, D781	223150,	US1040,
D724, D725	223145 or	1S2076TD or
	223124	1S2473

CIRCUIT NO.	PART NO.	DESCRIPTION
D735, D908	223150,	US1040,
D910, D911	223145 or	1S2076TD or
D913	223124	1S2473
D901-D905	223804 or	SR1K-2 or
	223848	GP08B
D906, D912	2239493 or	RD6, 2EB3 or
	2240972	GZA6, 2Y
D907	2239752 or	RD22EB2 or
	2241231	GZA22X
D909	2239452 or	RD5. 1EB2 or
	2240931	GZA5.1X
	Coils	
L101	233105	NCH-1005
L102	233031	NMC-9-1
L151	232120	NMA-4054
L152	232110	NMO-4027
L201	233319	NMC-6049
L202, L203	233291	NMC-5039
L104	233312	NFA-3051
	Transformer	
L103	233274	NFIF-6041
	Ceramic filters	
X101-X103	3010043	SFE10.7MM <G>
X101, X102	3010006	SFE10.7MA-A <D/W>
X151	3010075	SFL-450B3
X152	3010076	BFU450C
	X'tal	
X701	3010073	XTL-7.2M
	Capacitors	
C103	352744709	47μF, 16V, Elect.
C106	352784799	0.47μF, 50V, Elect.
C112	352780109	1μF, 50V, Elect.
C113	352742219	220μF, 16V, Elect.
C119	352741009	10μF, 16V, Elect.
C142-C144	352784799	0.47μF, 50V, Elect.
TC151, TC152	3060010	NTC-20P09, Trimmer
C158	352741009	10μF, 16V, Elect.
C162	352780109	1μF, 50V, Elect.
C164	370135114	510pF±5%, 100V, APS
C166, C167	352750479	4.7μF, 25V, Elect.
C170	352744709	47μF, 16V, Elect.
C171	352721019	100μF, 6.3V, Elect.
C172	352750479	4,7μF, 25V, Elect.
C201	352744719	470μF, 16V, Elect.
C202	352750479	4.7μF, 25V, Elect.
C205, C206	379121224	1,200pF±5%, 50V, DEW <G/W>
	379121824	1,800pF±5%, 50V, DEW <D
C207, C208	352742209	22μF, 16V, Elect.
C210	370133614	360pF±5%, 100V, APS
C211	352780109	1μF, 50V, Elect.
C212	352780339	3.3μF, 50V, Elect.
C213	352784799	0.47μF, 50V, Elect.
C215, C216	352741009	10μF, 16V, Elect.
C217, C218	379121025	1,000pF±10%, 50V, DEW <G>
C219	379121035	0.01μF±10%, 50V, DEW <G
C220, C221	370135614	560pF±5%, 100V, APS <W>
C601	352741019	100μF, 16V, Elect.
C701	352750479	4.7μF, 25V, Elect.
C703	3020020	0.22F, 5V, Super
C710	395160107	1μF, 35V, Tantalum
C712	352784799	0.47μF, 50V, Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION
C905	352760479	4.7μF, 35V, Elect.
C906	352751029	1,000μF, 25V, Elect.
C908	352784799	0.47μF, 50V, Elect.
C910	352780109	1μF, 50V, Elect.
C911	352784799	0.47μF, 50V, Elect.
C913	352764719	470μF, 35V, Elect.
C914, C915	352751009	10μF, 25V, Elect.
C916	352742209	22μF, 16V, Elect.
C917	352744719	470μF, 16V, Elect.
	Resistors	
R121, R123	5215045	N08HR10KBC, Semi-fixed
R203	5215048	N08HR200KBC, Semi-fixed
R215	5215045	N08HR10KBC, Semi-fixed
R901	441621004	10Ω, 1W, Metal oxide film
R902	441626814	680Ω, 1W, Metal oxide film
R903	441525604	56Ω, 1/2W, Metal oxide film
R905	441521014	100Ω, 1/2W, Metal oxide film
R907	441622214	220Ω, 1W, Metal oxide film

CIRCUIT NO.	PART NO.	DESCRIPTION
	Terminals	
	25060087	NTM2PDMN31, Antenna <G>
	25060085	NTM4PDMN29, Antenna <D/W>
	25045141	NPJ2PDBL54, Output
	Radiator	
	27160011A	RAD-05
	Screws	
	82143010	3P+10F(BC), Pan head
	834430108	3TTS+10B(BC), Tapping
	Nut	
	863430	N-3F-N(BC), Radiator

<D>: Only 120V model
<G>: Only 220V model
<W>: Only Universal model

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