SERIAL NO. 3169

ONKYO SERVICE MANUAL

SYNTHESIZED
FM STEREO/AM TUNER
MODEL T-33

Silver and black models

UD, UDN, BUD, BUDN	120V AC, 60Hz
UW, BUW	120V or 220V AC, 60/50Hz

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 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.

SPECIFICATIONS

FM:

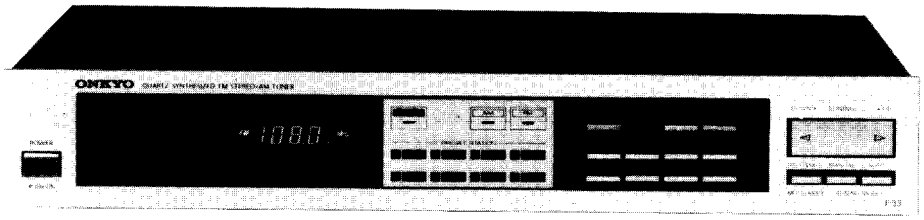
Tuning Range:	87.5 – 108.0MHz (100kHz steps) [D model] 87.5 – 108.0MHz (50kHz steps) [W model]
Usable Sensitivity:	Mono: 11.2dBf, 2.0μV, IHF Stereo: 17.2dBf, 4.0μV
50dB Quieting Sensitivity:	Mono: 16.1dBf, 3.5μV Stereo: 36.1dBf, 35μV
Capture Ratio:	1.5dB
Image Rejection Ratio:	40dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 73dB Stereo: 66dB
Alternate Channel Att:	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:	0.5V
Muting Level:	17.2dBf, 4.0μV

ONKYO AUDIO COMPONENTS

SERIAL NO. 3172

ONKYO SERVICE MANUAL

SYNTHESIZED FM STEREO/AM TUNER
MODEL T-33/T-300
SYNTHESIZED FM STEREO/MW/LW TUNER
MODEL T-33L



ONKYO AUDIO COMPONENTS

AM:

Tuning Range:	520 – 1,710kHz (10kHz steps) [D model] 522 – 1,611kHz or 520 – 1,710kHz (9kHz or 10kHz steps) [W model]
Usable Sensitivity:	25μV
Image Rejection Radio:	40dB
IF Rejection Ratio:	30dB
Signal-to-Noise Ratio:	40dB
Total Harmonic Distortion:	0.8%
Output Voltage:	150mV

General

Power Supply:	AC 120V, 60Hz [D model] AC 120 or 220V, 50/60Hz [W model]
Semiconductors:	FETs: 6 TR: 24 ICs: 10 Diodes: 40 LEDs: 19 [D model] FETs: 6 TR: 26 ICs: 10 Diodes: 42 LEDs: 19 [W model]
Dimensions (W x H x D):	418 x 73 x 269mm (16-1/2" x 2-7/8" x 10-5/8")
Weight:	3.8kg., 8.4lbs.

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. To prevent the CMOS IC from being damaged by static electricity from human body when the front panel controls are handled, ground the controls by connecting a lead wire between spring holding the control knobs and bracket S using special solder. (only for silver models) Ordinary solder can not be used on this spring. Consequently, if the lead wire breaks, reattach using the solder already on the spring.

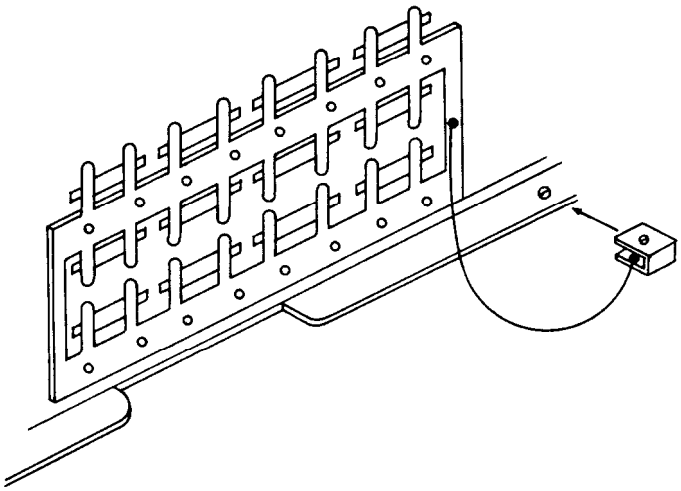
2. **Insulation resistance measurement (only U.S model)**
   Connect the insulating-resistance tester between the plug of power supply cable and the nickel screw on the back panel.
   Specification; 500V, 3.3MΩ ± 10%

3. **Replacing the lamp**

   This unit uses the lamp listed below.

circuit no.	part no.	description
PL901	210064A	PL6.3V 250mA, dial plate illumination

4. **Voltage Selector (Back Panel)**
   W models are equipped with a voltage selector to conform with local power supplies. 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 a 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. Models without a voltage selector can only be used in areas where the power supply is the same as that of the unit.



5. **Tuning Step Frequency Switch (Back Panel)**
   W models are equipped with a switch for the AM (9kHz/10kHz) and FM (50kHz/100kHz) bands. The switch should be set to the proper steps for the radio broadcast frequencies in your area.

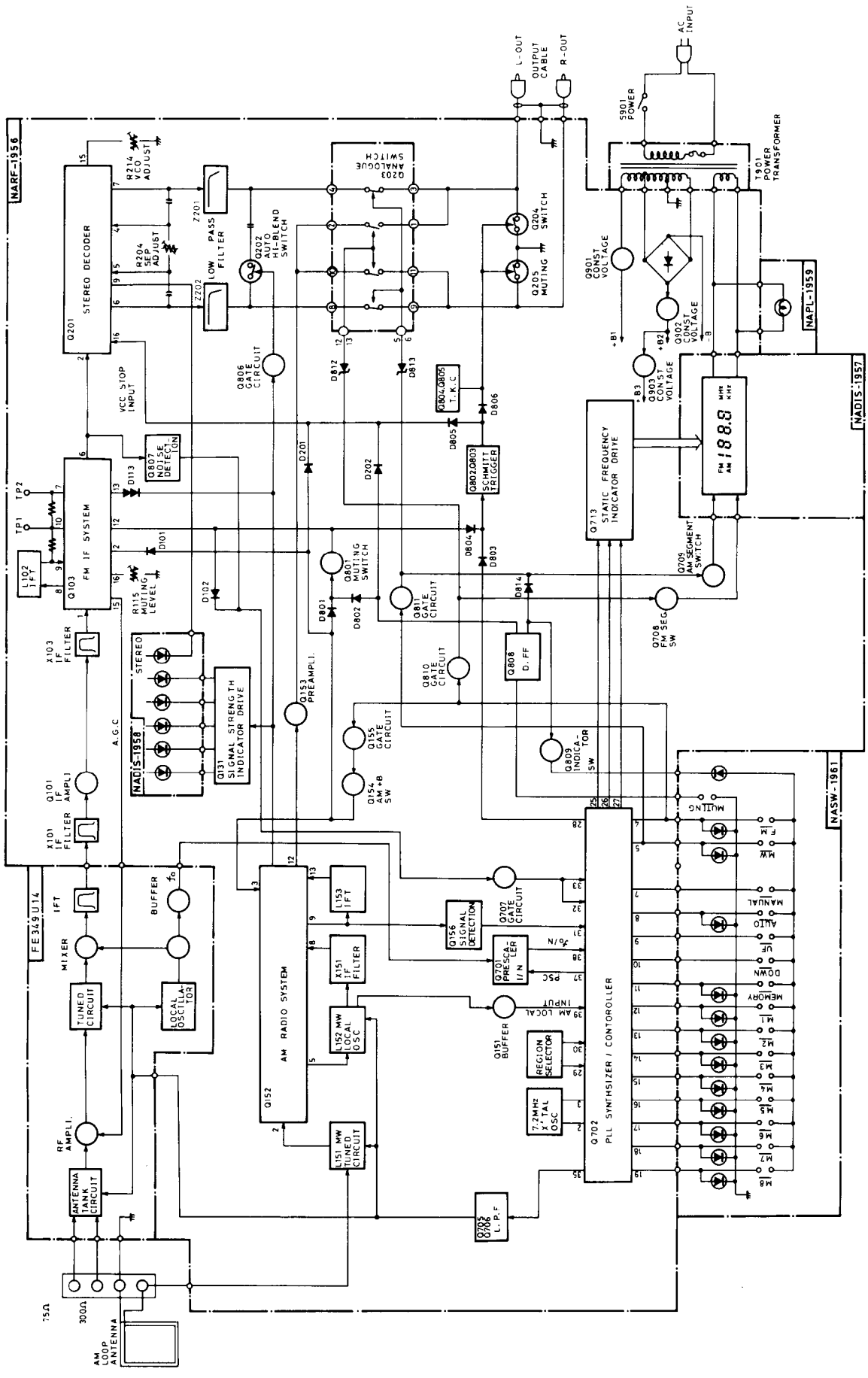
6. **Memory Preservation**
   This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to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

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/MW/LW 3-band 16-station random mode. The 8 FM/8 AM 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 50 kHz output	Output that represents the 50kHz FM band tuning step for European models. Goes to the high level for the 50 kHz 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	Regin specification input	See table 1.
30	E1		
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.

BLOCK DIAGRAM

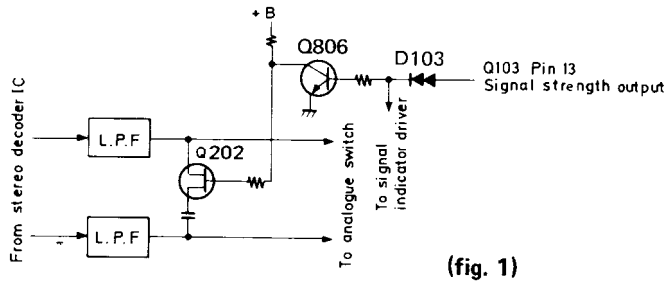


Pin No.	Symbol	Terminal	Description
34	DO1	Error output	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided oscillation frequency is high than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies match. The output is applied to the variable capacitor diode in the front end through low pass filter Q703 and Q704. The output from both terminals is the same, but only D01 is used.
35	D02		
36	TEST	Test terminal	Test mode at the high level.
37	FM IN	FM programmable counter input	Connect to the prescaler output (Pin3 of Q701)
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 broadcast signal.
40	$\overline{INH}$	Inhibit input	Operates normally at the high level. Inhibit status at the low level.
41	$\overline{INT}$	Initialize input	Operates normally at the high level. At the low level, the internal status is initialized.
42	V_{DD}	Power suuply	Device power terminal; supplies 5V during the normal operation and 2.5V from the super capacitor (C714) for memory preservation.

E1 (Pin 30)	E2 (Pin 29)	Regin	Band	Frequency range	Intermediate frequency	Scan step	Reference frequency
0	1	U.S.A	FM	87.5 ~ 108.0 MHz	+10.7 MHz	100 kHz	25 kHz
			AM1	520 ~ 1 710 kHz	+450 kHz	10kHz	10 kHz
1	1		AM2	522 ~ 1710 kHz	+450 kHz	9kHz	9kHz
1	0	Europe	FM	87.50 ~ 108.00 MHz	+10.7 MHz	50 kHz	25 kHz
			MW	522 ~ 1611 kHz	+450 kHz	9 kHz	9 kHz
			LM	153 ~ 360 kHz	+450 kHz	1 kHz	1 kHz
0	0	Japan	FM	76.0 ~ 90.0 MHz	-10.7 MHz	100 kHz	25 kHz
			AM	522 ~ 1611 kHz	+450 kHz	9 kHz	9 kHz

Table 1

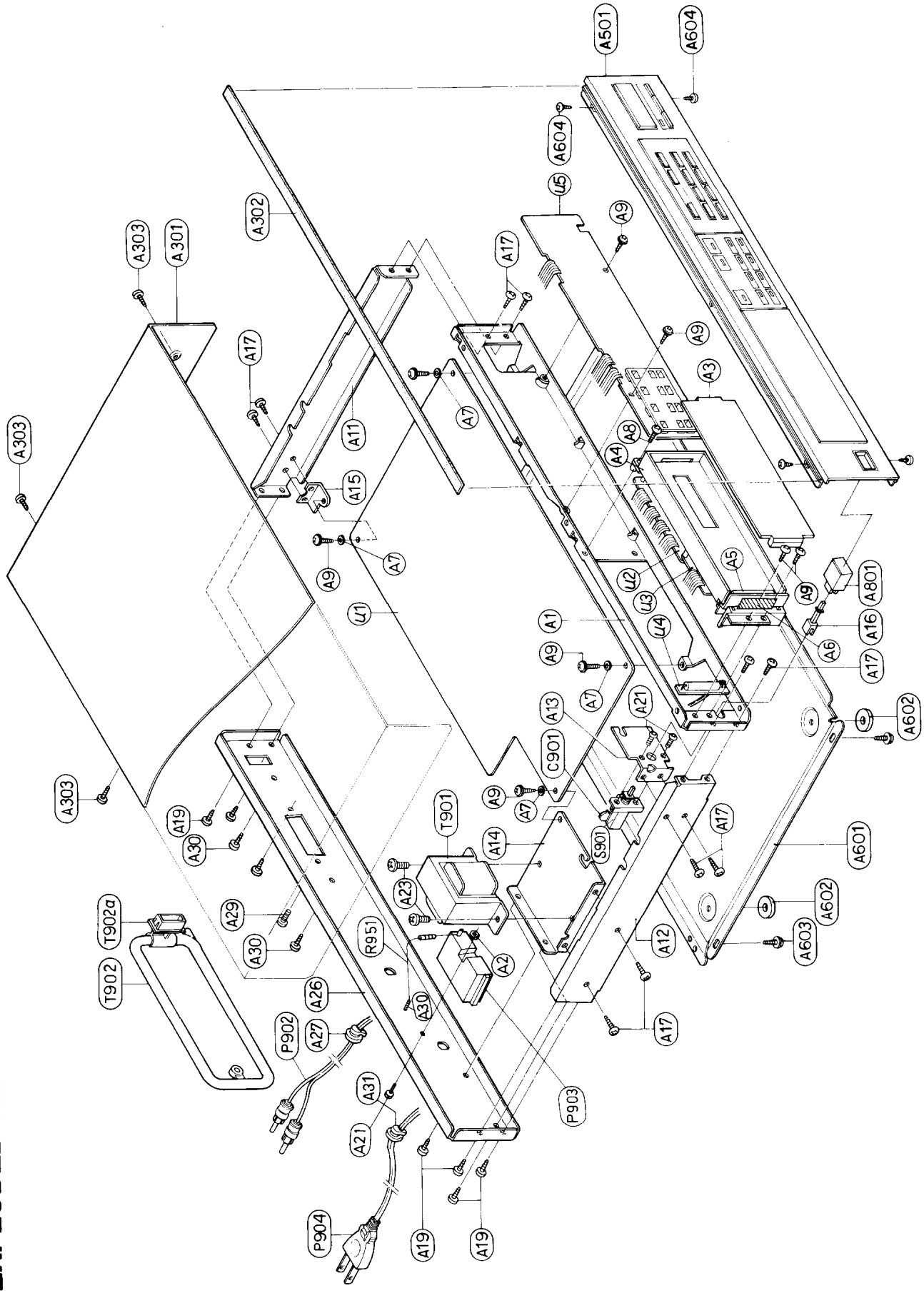
2. Auto-Hi-blend circuit



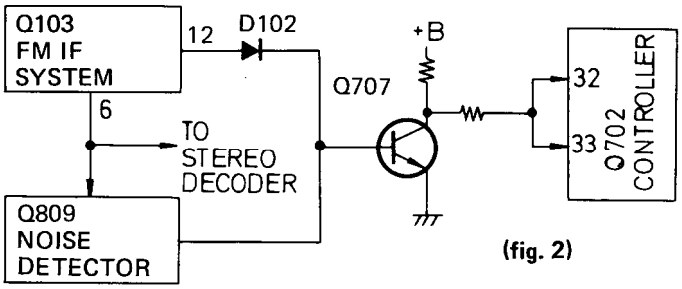
(fig. 1)

There is a 3-stage IF level detection circuit in the IC of Q103. A direct current voltage approximately proportional to the electrical field intensity is output from output pin 13. This is used to turn off Q806 and turn on Q202 when the electrical field is weak and, making use of the fact that the phase of noise components in the high range of stereo broadcasts is reversed left-right, the left and right channels are mixed in the high range to reduce noise.

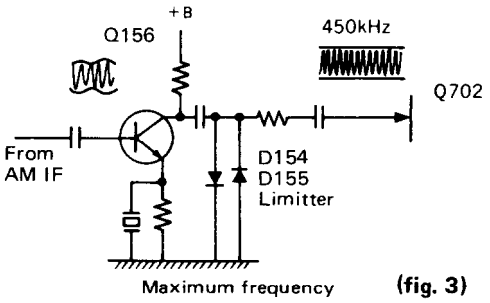
EXPLODED VIEW



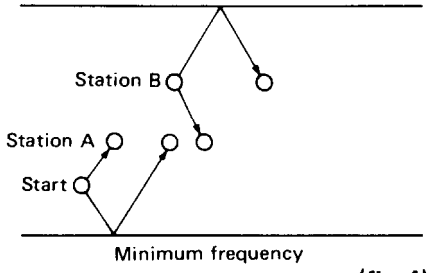
3. Auto-search tuning circuit



(fig. 2)



(fig. 3)



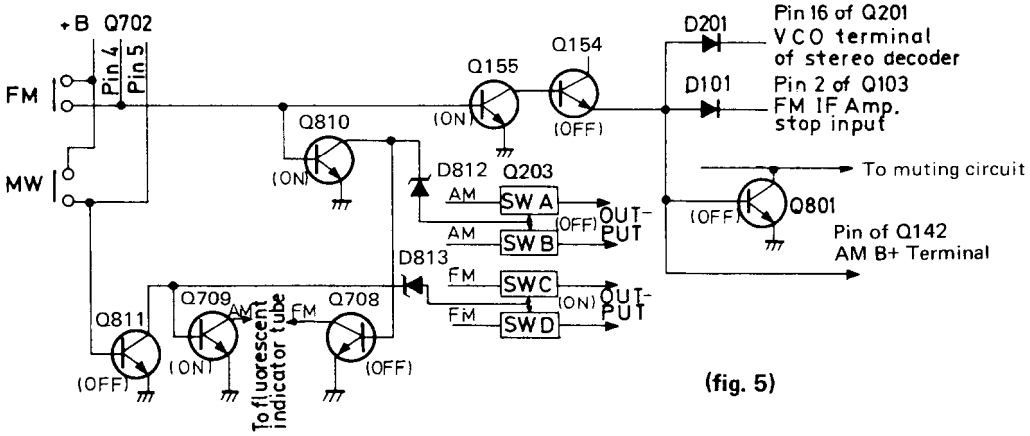
(fig. 4)

During FM reception, this is operated by the IF level detection and zero point detection circuits included in the FM IF system IC of Q103 and by the noise component detection circuit of Q851. When a station is tuned, the output of all outputs go to the low level so Q707 goes from on to off, causing pins 32 and 33 of the controller IC to go to the high level to complete auto search tuning.

During AM reception, the AM IF signal is taken, amplified by Q156, limited to a certain amplitude by the D154 D155 limiter circuits and auto search tuning is completed when the IF signal becomes 450 ± 3 kHz.

- **Manual Tuning**
  When the UP or DOWN key is pressed, the frequency goes up or down by one step. When either key is held down, the frequency rapidly increases or decreases (scans) and stops when the key is released. When either end of the tuning range is reached, key input will no longer be received and the frequency will stop at the highest or lowest frequency.
- **Auto Tuning**
  When the UP or DOWN key is pressed, scanning begins in the up or down direction, stopping where there is a radio station. Since auto scan is operated by a triangular wave, scanning is begun in the opposite direction the instant either end of the tuning range is roached. Also, if the UP or DOWN key is pressed when the tuned frequency is not at either end of the range, up or down scanning will begin.

4. FM/AM selector circuit



(fig. 5)

The FM/AM selector circuit is shown in the diagram. fig. 5. Pins 4 and 5 of Q702 are of the mutual reset type. For FM, pin 4 is high and pin 5 is low; for AM, pin 4 is low and pin 5 is high. Because pin 5 is high and pin 4 is low during AM reception, Q811 is on and Q810 is off, the analog switches SW1 and SW2 of Q203 are on while SW3 and SW4 are off, so an AM signal is output. Also, since Q709 goes to on and Q708 to off, the AM, kHz segments of the fluorescent display are turned on. At the same time, Q155 is turned off and Q154 turned on, so +B is supplied to the power source terminal of the radio system pin 3 of Q152.

Pin 16 of Q201 goes to the high level, the VCO oscillator stops, and pin 2 of Q103 goes to the high level so the FM IF amp is also switched off. Also, during AM reception, Q801 is turned on so the muting circuit is off. During FM reception, all of the switching transistors mentioned above perform the opposite operations to switch to the FM mode. Figures in parenthese indicate transistor operation during FM reception.

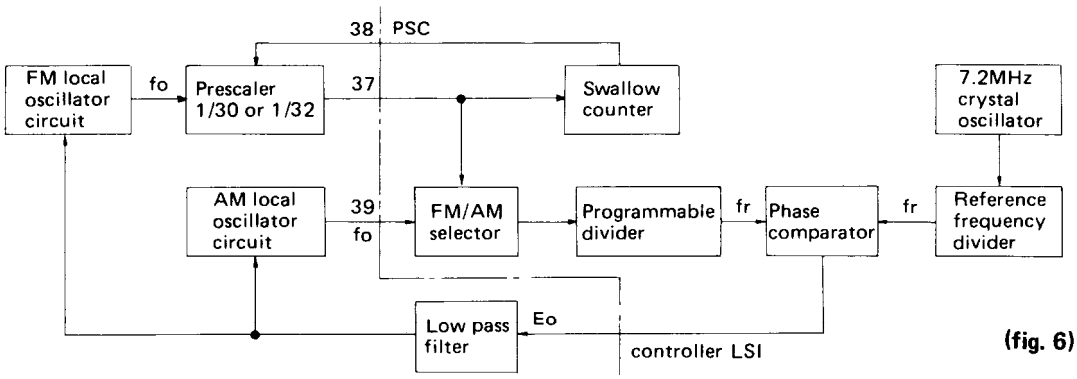
PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
A1	27110183A	Front bracket
A2	863430	N-3F-N (BC), Nut
A3	28130212A	Dial plate
A4	27190179C	Holder, lamp
A5	28140456	2x40x4mm, Cushion
A6	28140460	0.5x22x12mm, Cushion
A7	870060	Flat washer
A8	833430080	3TTP+8P (BC), Tapping screw
A9	831430088	3TTW+8B (BC), Tapping screw
A11	27115045H	Side bracket R
A12	27115090B	Side bracket L
A13	27140721A	Bracket, switch
A14	27130327	Bracket, power transformer
A15	27140320A	Bracket, pcb
A16	27260062	Shaft
A17	834430068	3TTS+6B (BC), Tapping screw
A19	834430068	3TTS+6B (BC), Tapping screw
A21	82143006	3P+6FN (BC), Pan head screw
A23	838440089	4TTB+8C (BC), Tapping screw
A26	27120568A	Back panel (D)
	27120570	Back panel (W)
A27	270025	SR-3P-4, Strainrelief
A29	834430108	3TTS+10B (BC), Tapping screw
A30	834230108	3TTS+10B (Ni), Nickel screw
⚠ A31	270025	SR-3P-4, Strainrelief (D)
⚠	270280A	SR-4K-4, Strainrelief (W)
A301	28184154A	Top cover (S)
	28184200	Top cover (B)
A302	28140546	0.5x10x390mm, Cushion
A303	834430068	3TTS+6B (BC), Tapping screw
A501	18208121	Front panel ass'y (S)
	28191151A	Clear plate
	27215092	Decoration frame
	27140784	Bracket S
	27180146	Spring
	28320886	Knob, tuning
	28320871	Knob, push
	28320935	Knob, red
	28321471A	Knob, auto
	18228121	Front panel ass'y (B)
	28191151A	Clear plate
	27215094	Decoration frame
	28321226	Knob, tuning
	28321227	Knob, push
	28320935	Knob, red
	28321472	Knob, auto
A601	27170093B	Bottom board
A602	27175011C	Leg
A603	834430068	3TTS+6B (BC), Tapping screw
A604	838430068	3TTB+6B (BC), Tapping screw
A605	28140044	2x12x12mm, Cushion
A606	28140107	16x20x20mm, Cushion
A801	28320852	Knob, power (S)
	28321160	Knob, power (B)
⚠ C901	3500065A	0.01μF AC, 400/125V, Capacitor IS
⚠ C901a	27300601	Cover, capacitor
P902	2010087A	Output cable
⚠ P903	25108010	Terminal, primary, AC
⚠ P904	253099B	AS-UC-3, Power supply cable (D)
⚠	253083-1	AS-CEE, Power supply cable (W)
⚠ R901	431523355	3.3MΩ, 1/2W, Solid resistor (D)
⚠ S901	25035295	NPS-111-L261P, Power switch
⚠ S902	25065123	NSS-1258P, Voltage selector switch (W)
⚠ T901	230683	NPT-806D, Power transformer (D)
⚠	230685	NPT-806DG, Power transformer (W)
T902	232085	NMA-3034, AM loop antenna
T902a	27190105	Holder, antenna
U1	18208556	NARF-1956, FM/AM tuner pc board ass'y (D)
	18210556B	NARF-1956b, FM/AM tuner pc board ass'y (W)
U2	18208557	NADIS-1957, Frequency indication pc board ass'y
U3	18208558	NADIS-1958, Signal/Stereo indication pc board ass'y
U4	18208559	NAPL-1959, Dial illumination lamp pc board ass'y
U5	18208561	NASW-1961, Switch/Indication pc board ass'y
U6	18210560	NASW-1960, Band selector switch pc board ass'y (W)

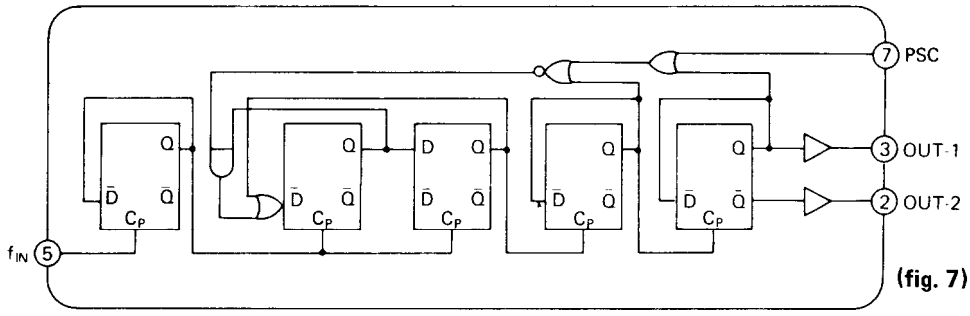
NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

(D): Only 120V model
(W): Only 120/220V model
(S): Only silver model
(B): Only black model

5. PLL tuned circuit



(fig. 6)



(fig. 7) TP6104P Block diagram

A block diagram of the tuned circuit of the PLL is shown in figer 6.

Operation during MW reception

The reception frequency is applied to the programmable divider where it is divided to 1/N and output as fv. This is applied to the phase comparator where it is comparated with frequency reference fr (10kHz or 9kHz). If fr and fv differ, Eo equal to the difference in frequency is output. Since error output Eo is a pulse waveform, it is passed through the low pass filter to change it into DC voltage VD, which is applied to the variable capacitor diode in the front end to change the reception frequency. This continues until fv and fr are the same and Eo = 0.

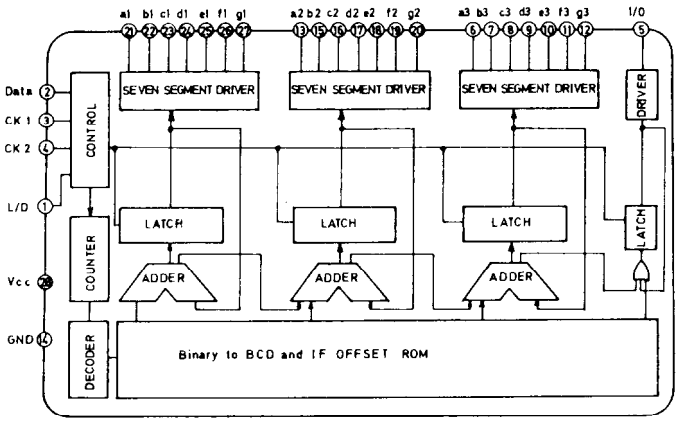
Operation during FM reception

The pulse swallow method is used in the prescaler of the T-33, T-33L and T-300. 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").

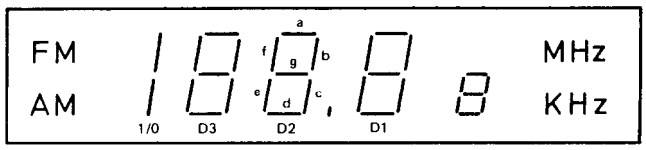
The station oscillator frequency is applied ot the programmable divider, but the programmable divider has en upper frequency limit of only 30MHz, so the pulse swallow-type prescaler, which can be used up to 150 MHz, is inserted for division to 1/Np;

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

6. Frequency indicator circuit



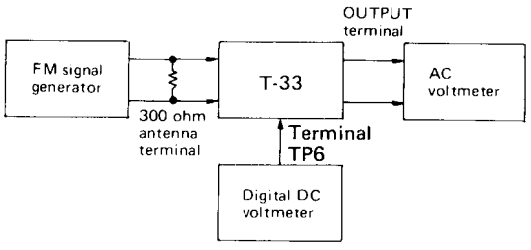
(fig. 8) TD6301AP Block diagram



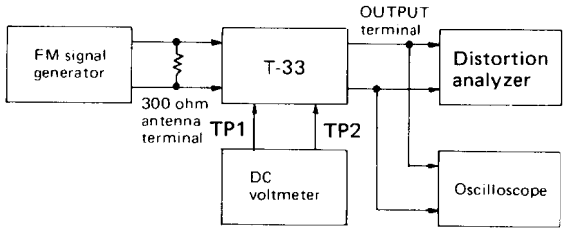
ADJUSTMENT PROCEDURES

FM section

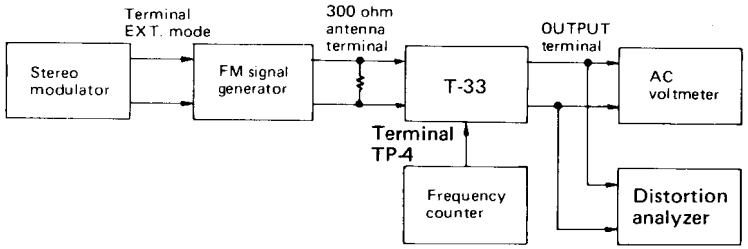
Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Turning dial setting	Output indicator	Adjustment	Adjust for	Remarks
FM RF	1	Fig. 1	—	—	87.5 MHz	Digital DC voltmeter	LO	1.2V ± 0.4V	
	2	Fig. 1	107.9 MHz 1 kHz, 75 kHz devi.	—	107.9 MHz	AC voltmeter	TC	Maximum output	
FM IF	1	Fig. 2	98.1 MHz 1 kHz, 75 kHz devi. 65 dBf (60 dB)	—	98.1 MHz	DC voltmeter	L102 Primary coil	0V	Repeat the steps 1 and 2 until no further adjustment is necessary
	2	Fig. 2		—		Distortion analyzer	L102 Secondary coil	Minimum	
VCO		Fig. 3	98.1 MHz, 1 kHz, 75 kHz devi. 65 dBf (60 dB)	—	98.1 MHz	Frequency counter	R214	19 kHz ± 19 Hz	Remove the frequency counter after adjustment
Separation	1	Fig. 3	98.1 MHz 65 dBf (60 dB) Ext. modulation	L ch. 1 kHz	98.1 MHz	R ch. AC voltmeter	R204	Minimum	Maximum and same separation
	2			R ch. 1 kHz		L ch. AC voltmeter		Minimum	
Distortion		Fig. 3	98.1 MHz 65 dBf (60 dB) Ext. modulation	L+R 1 kHz	98.1 MHz	Distortion analyzer	IF	Minimum	
Muting level	1	Fig. 2	98.1 MHz 17.2 dBf (12 dB) 1 kHz, 75 kHz devi.	—	98.1 MHz	Oscilloscope	R115	Signal output	Muting switch to on.
	2		98.1 MHz 16.2 dBf (11 dB) 1 kHz, 75 kHz devi.					No output	



(fig. 1)



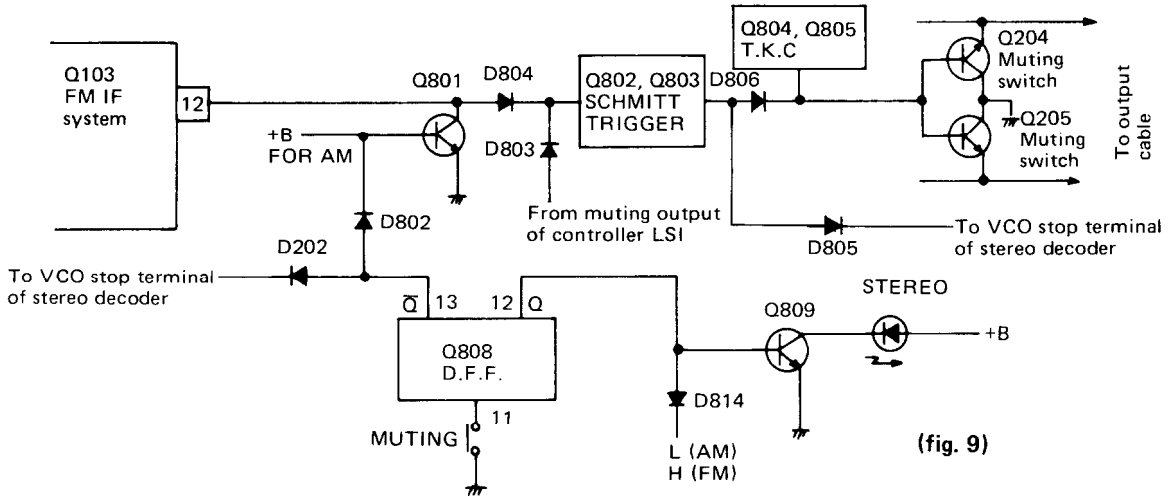
(fig. 2)



(fig. 3)

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	1/0	Segment drive output terminal: Sets the number of display digit for FM (100MHz) and AM (1,000kHz) reception.
6-12	a3-g3	Seven segment drive output terminals: Sets the number of display digit for FM(10MHz) and AM (100kHz) reception.
13, 15-20	a2-g2	Seven segment drive output terminals: Sets the number of display digit for FM (1MHz) and AM (10kHz) reception
21-27	a1-g1	Seven segment drive output terminals; set the number of display digit for FM (100kHz) and AM (1kHz) reception
14	Vcc	Power source terminal
28	Gnd	Ground

7. Muting circuit



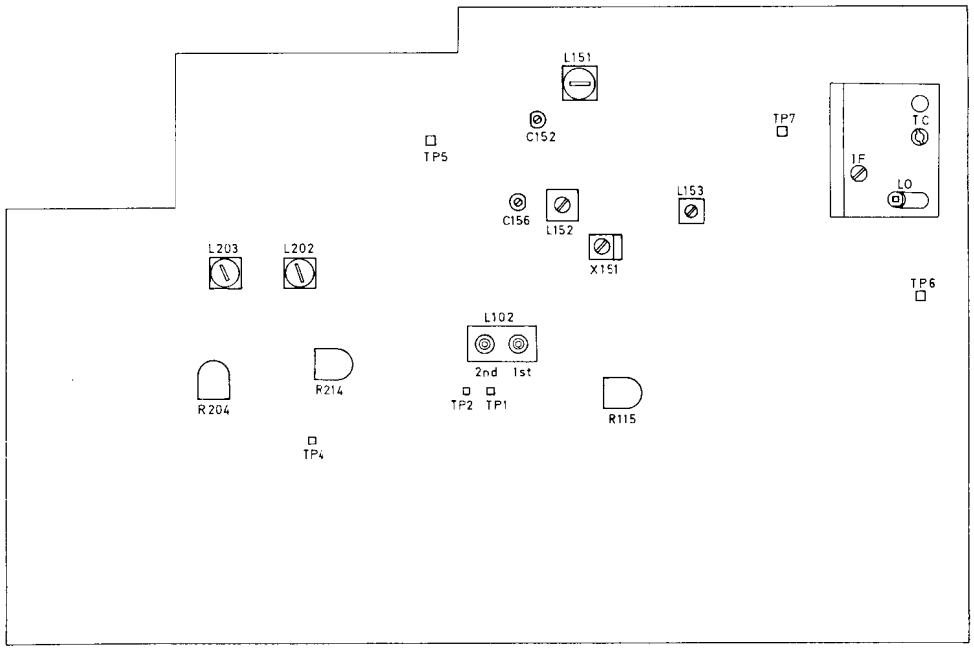
(fig. 9)

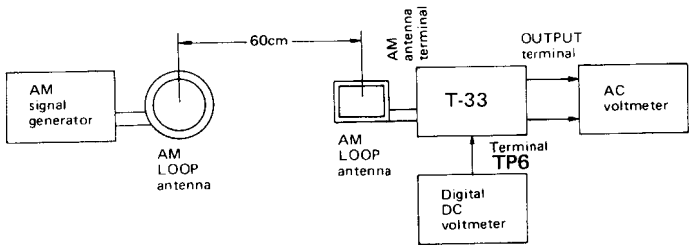
The muting circuit operates in the following cases.

1. When power is turned on, the charging current goes from B+ to R814 to C805, so Q805 is cut off and Q204 and Q205 are turned on. When the voltage at both ends of C805 is more than about 0.6V, Q805 is turned on so Q204 and Q205 are turned off and muting is opened.
2. When power is turned off, Q804 turns off, the discharging current goes from C804 to R813 to D808 to Q204 and Q205 so muting is closed.
3. While pin 28 of the controller IC outputs the high level, Q204 and Q205 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.
4. When an FM station is not being received (and the muting switch is on).
   The IF level in the FM IF system (set at R115 so muting is opened at 17 dBf) and zero point detection circuit (tuning point ±35kHz) are output at pin 12 through the AND circuit. When a station is tuned, the output goes to the low level.
   When output goes to the low level, Q802 is turned off, Q803 is turned on and Q204 and Q205 are turned off, so muting is opened;

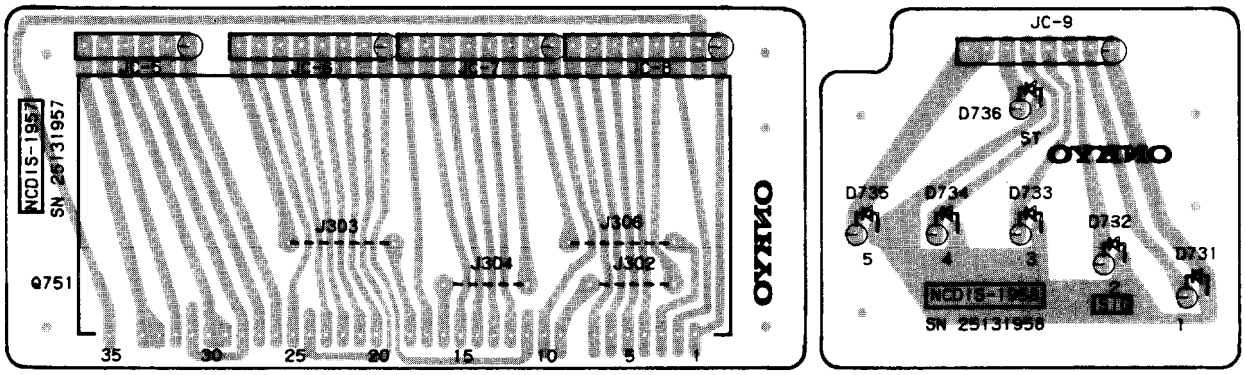
AM Section

Step	AM SG output	Tuned frequency	Output indicator	Adjust. point	Adjust for	Remarks
1		520 kHz	Digital DC voltmeter	L152	1.2V	Repeat the steps 1 and 2 until no further adjustment is necessary.
2		1710 kHz		C156	10.5V	
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 neccessary.
4	1400 kHz, 400Hz 30% mod. 60 dB/m	1400kHz		C152	Maximum	
5	1000 kHz, 400 Hz 30% mod. 60 dB/m	1000 kHz	AC voltmeter	X151 L153	Maximum	





PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



SIGNAL/STEREO INDICATION PC BOARD (NADIS-1958)

CIRCUIT NO.	PART NO.	DESCRIPTION
D731-D735	225047	SLP251B, LED
D736	225046	SLP151B, LED

DIAL PLATE ILLUMINATION LAMP PC BOARD (NAPL-1959)

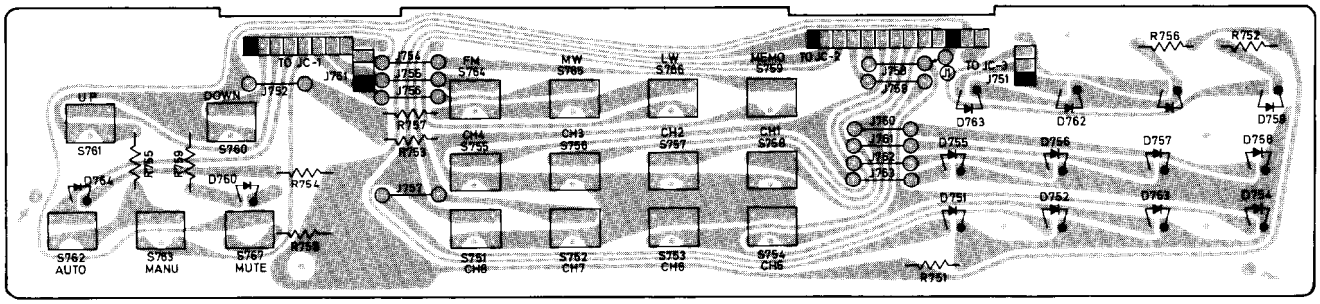
CIRCUIT NO.	PART NO.	DESCRIPTION
PL901	210064A	250mA, 6.3V, Lamp

FREQUENCY INDICATION PC BOARD (NADIS-1957)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q751	212016	FIP7B8CS, Fluorescent indicator tube
	27190231	Holder
	28140433	8x60x6, Cushion

BAND SELECTOR SWITCH PC BOARD (NASW-1960) (Only 120/220V model)

CIRCUIT NO.	PART NO.	DESCRIPTION
S701	250142	NSS-2225, Push switch

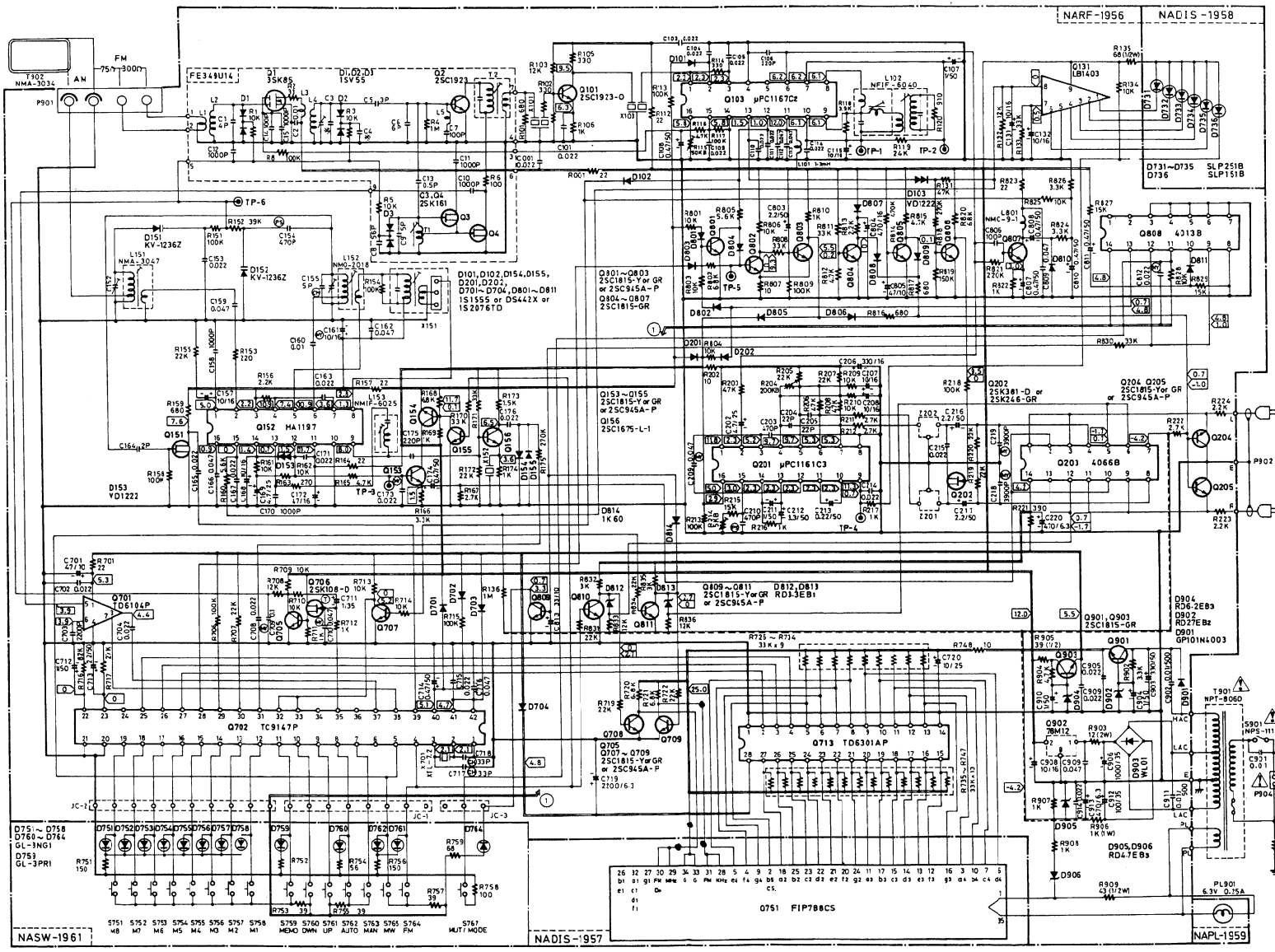


SWITCH AND INDICATION PC BOARD (NASW-1961)

CIRCUIT NO.	PART NO.	DESCRIPTION
	LEDs	
D751-D758	225134	GL-3NG1, Station
D759	225126	GL-3PR1, Memory
D760-D762	225134	GL-3NG1, Auto/FM/MW
D764	225134	GL-3NG1, Mute/Mode
	Switches	
S751-S765 S767	25035389	NPS-111-S353
	Holder	
	27190178A	LED
	Screw	
	833430080	3TTP+8P (BC)

SCHEMATIC DIAGRAM

– D Model –



NOTES
- ALL RESISTORS ARE IN OHMS 1/6WATT 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.

ONKYO CORPORATION

PRINTED CIRCUIT BOARD PARTS LIST

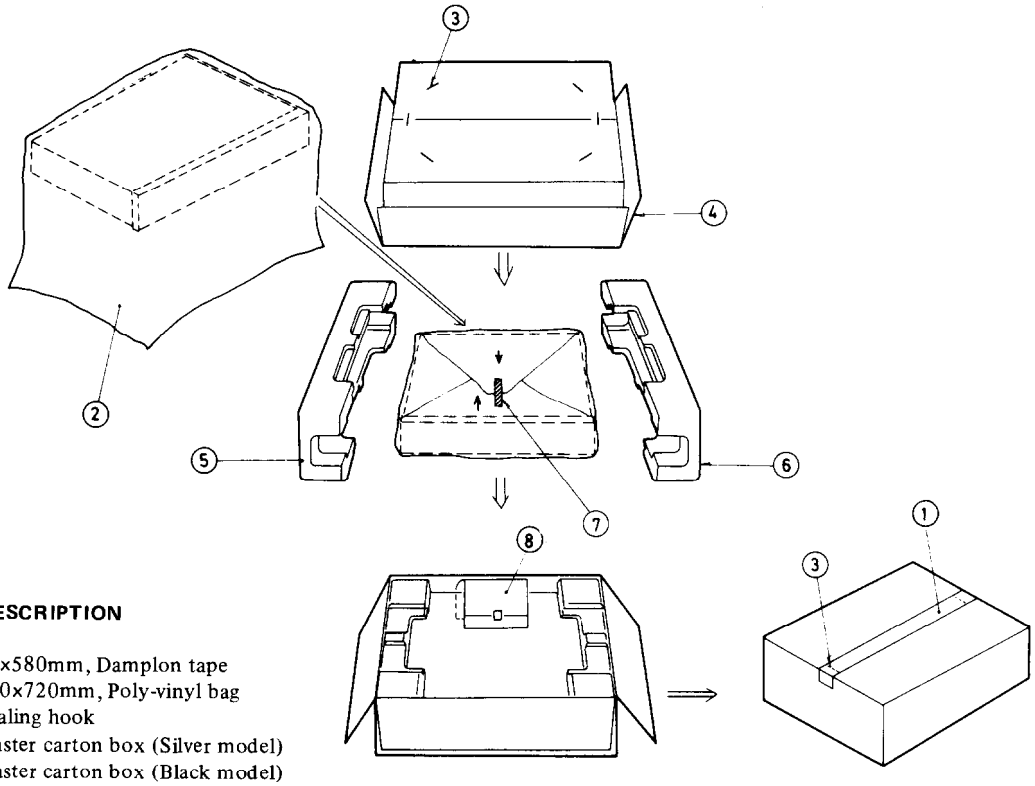
FM/AM TUNER PC BOARD (NARF-1956/b)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240061	FE349U14
	ICs	
Q103	222608	μPC1167C2
Q131	222666	LB1403
Q152	222626	HA1197
Q201	222678	μPC1161C3
Q203	222575 or 222840661	TC4066BP or 4066B
Q701	222675	TD6104P
Q702	222674	TC9147P
Q713	222673	TD6301AP
Q808	222840131	4013B
Q902	222780122	78M12
	Transistors	
Q101	2210746	2SC945A (P)
Q151, Q202	2212304 or 2211945	2SK381 (D) or 2SK246 (GR)
Q153-Q155 Q204, Q205	2211254, 2211255 or 2210746	2SC1815 (Y), 2SC1815 (GR) or 2SC945A (P)
Q156	2210823	2SC1675 (L-1)
Q705 Q707-Q709	2211254, 2211255 or	2SC1815 (Y), 2SC1815 (GR) or
Q801-Q803	2210746	2SC945A (P)
Q706	2212294 or 2211303	2SK108 (D) or 2SK68 (M)
Q804-Q807	2211255	2SC1815 (GR)
Q809-Q811	2211254, 2211255 or 2210746	2SC1815 (Y), 2SC1815 (GR) or 2SC945A (P)
Q901, Q903	2211255	2SC1815 (GR)
Q710, Q711	2211254, 2211255 or 2210746	2SC1815 (Y), 2SC1815 (GR) or 2SC945A (P) (W)
Q712	2211454	2SA1015 (GR) (W)
	Diodes	
D101, D102 D154, D155	223105, 223133 or 223145	1S1555, DS442X or 1S2076TD
D103, D153	4000068	VD1222
D151, D152	223157	KV1236Z
D201, D202 D701-D704 D801-D811	223105, 223133 or 223145	1S1555, DS442X or 1S2076TD
D812, D813	2241291	RD3.3EB1
D814	223132	1K60
D901	223880	GP101N4003
D902	2239792	RD27EB2
D903	223862	WL01
D904	2239493	RD6.2EB3
D905, D906	2239433	RD4.7EB3
D705, D706	223105, 223133 or 223145	1S1555, DS442X or 1S2076TD (W)
	Coils	
L101	233105 or 233024	NCH-1005 or NCCH-1501
L151	232111	NMA-3047
L152	232084	NMO-2018
L801	233031	NMC-9-1
	Transformers	
L102	233270	NFIF-6040
L153	232095	NMIF-6025

CIRCUIT NO.	PART NO.	DESCRIPTION
	Filters	
X101, X103	3010071	SFE10.7MA5, Ceramic
X151	3010075	SFL450B3, Ceramic
X152	3010076	BFU450C, Ceramic
Z201, Z202	3020016	B3XN4123-32N, Notch
	X'tal	
X701	3010073	XTL-7.2M
	Capacitors	
C107	352780109	1μF, 50V, Elect.
C108	352784799	0.47μF, 50V, Elect.
C115	352741009	10μF, 16V, Elect.
C131, C132	352741009	10μF, 16V, Elect.
C152, C156	3060010	NTC20P09, Trimmer
C154	370134714	470pF ±5%, 100V, APS
C157, C161	352741009	10μF, 16V, Elect.
C168	352741009	10μF, 16V, Elect.
C169	352750479	4.7μF, 25V, Elect.
C172	352744709	47μF, 16V, Elect.
C174	352784799	0.47μF, 50V, Elect.
C202	352750479	4.7μF, 25V, Elect.
C206	352743319	330μF, 16V, Elect.
C207, C208	352741009	10μF, 16V, Elect.
C210	370134714	470pF ±5%, 100V, APS
C211	352780109	1μF, 50V, Elect.
C212	352780339	3.3μF, 50V, Elect.
C213	352782299	0.22μF, 50V, Elect.
C216, C217	352780229	2.2μF, 50V, Elect.
C220	352724719	470μF, 6.3V, Elect.
C701	352734709	47μF, 10V, Elect.
C711	395160107	1μF, 35V, Tantalum
C712	352780109	1μF, 50V, Elect.
C713	352780229	2.2μF, 50V, Elect.
C714	352784799	0.47μF, 50V, Elect.
C716	3020018	0.047F, 5V, Super
C719	352722229	2,200μF, 6.3V, Elect.
C720	352751009	10μF, 25V, Elect.
C803	352780229	2.2μF, 50V, Elect.
C804	352744719	470μF, 16V, Elect.
C805	352734709	47μF, 10V, Elect.
C807, C808	352784799	0.47μF, 50V, Elect.
C810, C811	352784799	0.47μF, 50V, Elect.
C813	352733309	33μF, 10V, Elect.
C903	352783319	330μF, 50V, Elect.
C904, C910	352780109	1μF, 50V, Elect.
C906	352761029	1,000μF, 35V, Elect.
C908	352741009	10μF, 16V, Elect.
C912	352761019	100μF, 35V, Elect.
C913	352724719	470μF, 6.3V, Elect.
	Resistors	
R115	5215046	N08HR50KBC, Semi-fixed
R135	441526804F	68Ω, 1/2W, Metal oxide film
R204	5215048	N08HR200KBC, Semi-fixed
R214	5215044	N08HR5KBC, Semi-fixed
R726-R734	49121333509	33kΩx9, 1/8W, Network
R735-R747	49121333513	33kΩx13, 1/8W, Network
R903	441721204F	12Ω, 2W, Metal oxide film
R905	441523904F	39Ω, 1/2W, Metal oxide film
R906	441621024F	1kΩ, 1W, Metal oxide film
R909	441524304F	43Ω, 1/2W, Metal oxide film
	Terminal	
P901	25060085	NTM-4PMN29, Antenna

CIRCUIT NO.	PART NO.	DESCRIPTION
	Sockets	
JC1	25050145	NJPS-8P-S
JC2	25050147	NJPS-10P-S
JC3	25050140	NJPS-3P-S
	Radiator	
	27160011A	RAD-05
	Screws	
	82143008	3P+8F (BC), Pan head
	834430068	3TTS+6B (BC), Tapping
	Nut	
	863430	N-3F-N (BC)

PACKING VIEW



REF. NO.	PART NO.	DESCRIPTION
1	260012	50x580mm, Damplon tape
2	29100051	420x720mm, Poly-vinyl bag
3	282301	Sealing hook
4	29050907	Master carton box (Silver model)
	29050908	Master carton box (Black model)
5	29090533D	Pad R
6	29090532A	Pad L
7	29110032	W=15mm, Adhesive tape
8	Accessary bag complete	
	292064A	FM antenna
	29340754	Instruction manual (120V model)
	29340755	Instruction manual (120/220V model)
	25055040	CV-K-2, Conversion plug (120/220V model)
	29365006-5	Warranty card (U.S. model)
	29358002A	Service station list (U.S. model)
	29100006A	350x250mm, Poly-vinyl bag

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