

ONKYO® SERVICE MANUAL

QUARTZ SYNTHESIZED FM STEREO/AM TUNER MODEL T08

QUARTZ SYNTHESIZED FM STEREO/MW/LW TUNER MODEL T08L

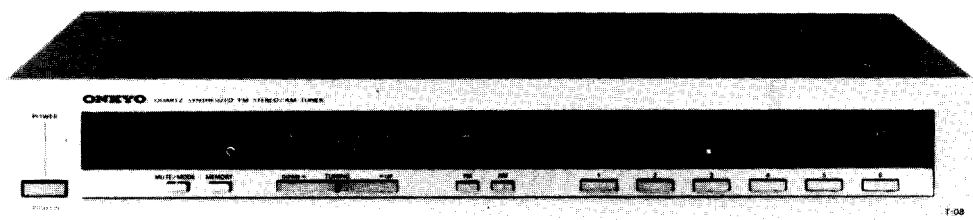


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ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

T-08D

FM:

Tuning Range: 87.9 – 107.9 MHz (200 kHz steps)

Usable Sensitivity: Mono: 10.8 dBf, 1.9 μ V, IHF
Stereo: 17.2 dBf, 4.0 μ V

50 dB Quieting Sensitivity: Mono: 16.1 dBf, 3.5 μ V
Stereo: 36.1 dBf, 35 μ V

Capture Ratio: 1.5 dB

Image Rejection Ratio: 45 dB

IF Rejection Ratio: 85 dB

Signal-to-Noise Ratio: Mono: 73 dB

Stereo: 65 dB

Alternate Channel Att.: 60 dB IHF ($\pm$ 400 kHz)

AM Suppression Ratio: 50 dB

Total Harmonic Distortion: Mono: 0.15%

Stereo: 0.25%

Frequency Response: 30 – 15,000 Hz $\pm$ 1.5 dB

Stereo Separation: 40 dB at 1 kHz
30 dB at 100 – 10,000 Hz

Output Voltage: 500 mV

Muting Level: 13.2 dBf, 2.5 μ V

AM:

Tuning Range: 530 – 1620 kHz (10 kHz steps)

Usable Sensitivity: 25 μ V

Image Rejection Ratio: 45 dB

IF Rejection Ratio: 30 dB

Signal-to-Noise Ratio: 40 dB

Total Harmonic Distortion: 0.8%

Output Voltage: 150 mV

General

Power Supply: AC 120 volts, 60 Hz

Antennas: FM: 300 ohms balanced and
75 ohms unbalanced

AM: built-in loop antenna
and external terminal

Semiconductors: 4 FETs, 36 transistors, 12 ICs,
48 diodes, 15 LEDs

Dimensions (W x H x D): 418 x 72 x 275 mm
(16-1/2" x 2-7/8" x 10-13/16")

Weight: 3.4 kg, 7.5 lbs.

* Specifications and features are subject to change without notice.

T-08G/W/Q

FM:

Tuning Range: 87.5 – 108.0 MHz (50 kHz steps)
87.9 – 107.9 MHz (200 kHz step:
for Canadian Model)

Usable Sensitivity: Mono: 10.8 dBf, 1.9 μ V, IHF
1.6 μ V (S/N 26 dB,
40 kHz Dev.) DIN

Stereo: 17.2 dBf, 4.0 μ V, IHF
50 μ V (S/N 46 dB,
40 kHz Dev.) DIN

50 dB Quieting Sensitivity: Mono: 16.1 dBf, 3.5 μ V
Stereo: 36.1 dBf, 35 μ V

Capture Ratio: 1.5 dB

Image Rejection Ratio: 45 dB

IF Rejection Ratio: 85 dB

Signal-to-Noise Ratio: Mono: 73 dB

Stereo: 65 dB

Selectivity: 55 dB DIN ($\pm$ 300 kHz, 40 kHz Dev.)

AM Suppression Ratio: 50 dB

Total Harmonic Distortion: Mono: 0.15%

Stereo: 0.3%

Frequency Response: 30 – 15,000 Hz $\pm$ 1.5 dB

Stereo Separation: 40 dB at 1 kHz
30 dB at 100 – 10,000 Hz

Output Voltage: 500 mV

Muting Level: 13.2 dBf, 2.5 μ V

MW:

Tuning Range: 522 – 1611 kHz (9 kHz steps)
530 – 1620 kHz (10 kHz step:
for Canadian Model)

Usable Sensitivity: 25 μ V

Image Rejection Ratio: 45 dB

IF Rejection Ratio: 30 dB

Signal-to-Noise Ratio: 40 dB

Total Harmonic Distortion: 0.8%

Output Voltage: 150 mV

General

Power Supply: European Models: AC 220 V, 50 Hz
British & Australian Models:
AC 240 V, 50 Hz
Worldwide Models: AC 120 V, 60 Hz/
AC 220 V, 50 Hz

Antennas: FM: 300 ohms balanced and
75 ohms unbalanced

AM: built-in loop antenna
and external terminal

Semiconductors: 4 FETs, 36 transistors, 12 ICs,
48 diodes, 15 LEDs

Dimensions (W x H x D): 418 x 72 x 275 mm
(16-1/2" x 2-7/8" x 10-13/16")

Weight: 3.4 kg, 7.5 lbs.

* Specifications and features are subject to change without notice.

T-08L

FM:

Tuning Range:	87.5 – 108.0 MHz (50 kHz steps)
Usable Sensitivity:	Mono: 10.8 dBf, 1.9 μ V, 1HF 1.6 μ V (S/N 26 dB, 40 kHz Dev.) DIN Stereo: 17.2 dBf, 4.0 μ V, 1HF 50 μ V (S/N 46 dB, 40 kHz Dev.) DIN
50 dB Quieting Sensitivity:	Mono: 16.1 dBf, 3.5 μ V Stereo: 36.1 dBf, 35 μ V
Capture Ratio:	1.5 dB
Image Rejection Ratio:	45 dB
IF Rejection Ratio:	85 dB
Signal-to-Noise Ratio:	Mono: 73 dB Stereo: 65 dB
Selectivity:	55 dB DIN ($\pm$ 300 kHz, 40 kHz Dev.)
AM Suppression Ratio:	50 dB
Total Harmonic Distortion:	Mono: 0.15% Stereo: 0.3%
Frequency Response:	30 – 15,000 Hz $\pm$ 1.5 dB
Stereo Separation:	40 dB at 1 kHz 30 dB at 100 – 10,000 Hz
Output Voltage:	500 mV
Muting Level:	13.2 dBf, 2.5 μ V
MW:	
Tuning Range:	522 – 1611 kHz (9 kHz steps)
Usable Sensitivity:	25 μ V
Image Rejection Ratio:	45 dB

IF Rejection Ratio:	30 dB
Signal-to-Noise Ratio:	40 dB
Total Harmonic Distortion:	0.8%
Output Voltage:	150 mV

LW:

Tuning Range:	146 – 353 kHz (9 kHz steps)
Usable Sensitivity:	35 μ V
Image Rejection Ratio:	30 dB
IF Rejection Ratio:	30 dB
Signal-to-Noise Ratio:	40 dB
Total Harmonic Distortion:	0.8%
Output Voltage:	150 mV

General

Power Supply:	European Models: AC 220 V, 50 Hz Canadian Models: AC 120 V, 60 Hz British & Australian Models: AC 240 V, 50 Hz Worldwide Models: AC 120 V, 60 Hz/ AC 220 V, 50 Hz
Antennas:	FM: 300 ohms balanced and 75 ohms unbalanced AM (MW/LW): built-in loop antenna and external terminal
Semiconductors:	4 FETs, 36 transistors, 12 ICs 48 diodes, 15 LEDs
Dimensions (W x H x D):	418 x 72 x 275 mm (16-1/2" x 2-7/8" x 10-13/16")
Weight:	3.4 kg, 7.5 lbs.

* Specifications and features are subject to change without notice.

PRECAUTIONS

1. Replacing the C MOS IC

1. All MOS devices should be stored or transported in materials that are somewhat conductive. MOS devices must not be inserted into conventional plastic "snow" or plastic trays.
2. All MOS devices should be placed on a grounded bench surface and operators should ground themselves prior to handling devices, since a worker can be statically charged with respect to the bench surface.
3. Nylon clothing should not be worn while handling MOS circuits.
4. When lead straightening or hand soldering is necessary, provide ground straps for the apparatus used.
5. Double check test equipment setup for proper polarity of voltage before conducting parametric or functional testing.
6. All unused device inputs should be connected to V_{DD} or V_{SS} .

2. Memory Preservation Batteries

Because stations stored in the memory by the FM/AM preset keys would normally be lost when power is turned off or the plug removed from the wall socket, this unit requires two memory preservation batteries to preserve the contents of the memory even when power is turned off. Be sure to insert the correct type of batteries into the battery holder in the bottom of the unit before turning on power for the first time.

3. Voltage Selector (rear panel)

120/220V 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. Voltage is changed by sliding the groove in the switch with a screwdriver or similar instrument to the top or bottom position. Confirm that the switch has been moved all the way up or down before turning the power switch on. If there is no voltage selector switch on the unit you have purchased, it can only be used in areas where the power supply voltage is the same as that of the unit.

4. De-Emphasis Switch (rear panel)

120/220V models are equipped with a 50 μ sec – 75 μ sec selector switch. This switch is set to 50 μ sec at the factory, but may have to be reset 75 μ sec depending on the area where the unit is used:

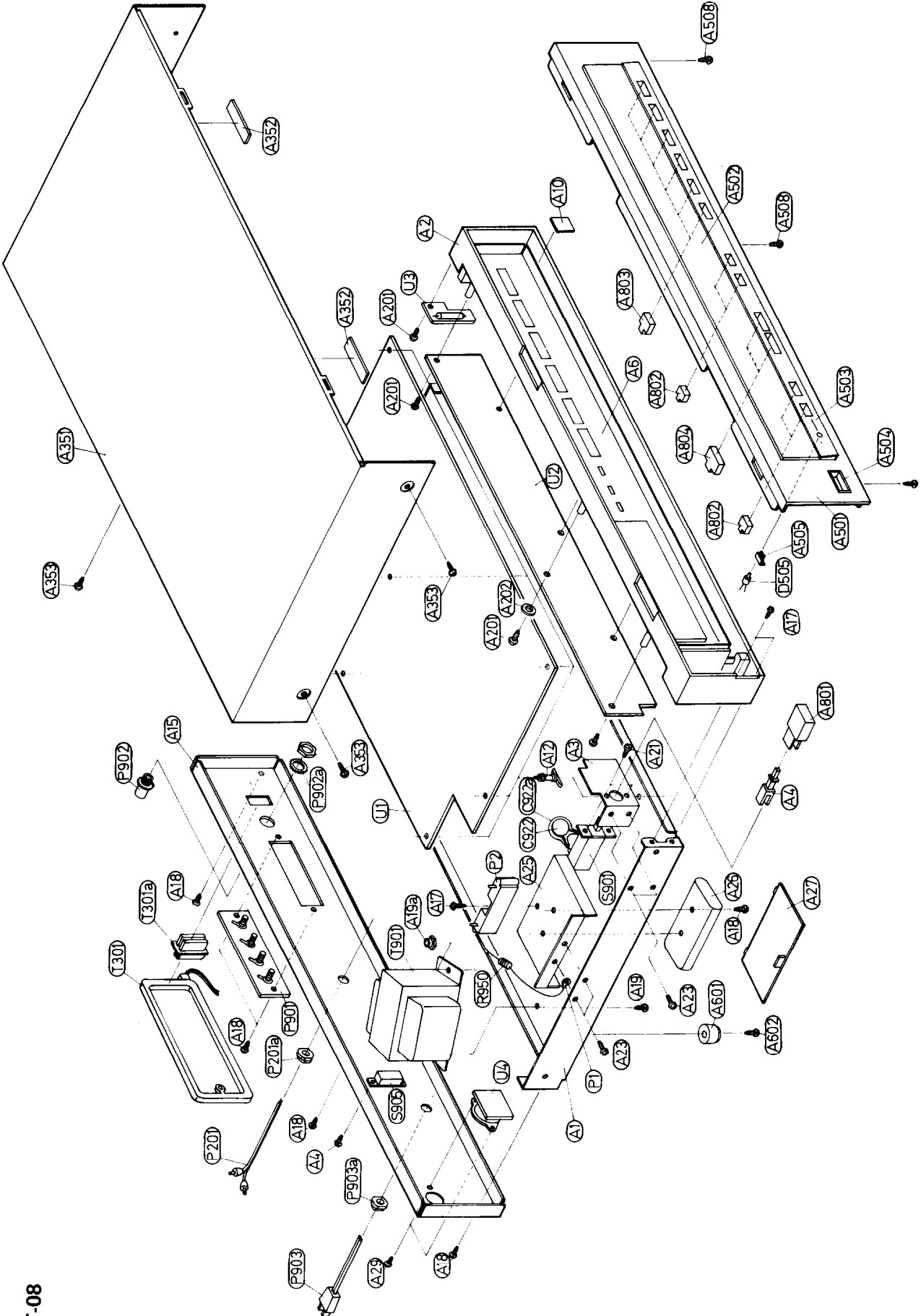
Europe:	50 μ sec
U.S.A. :	75 μ sec

5. AM Tuning Step Frequency Switch (bottom panel)

120/220V models are equipped with a switch to change the AM Tuning step frequency from 9kHz. These units are set to 9kHz at the factory; change to 10kHz if this gives better results in your locality.

EXPLODED VIEW

T-08



PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
A1	27100048	Chassis	C922	3500065A	0.01 μ F, 400V, Capacitor IS
A2	27110127-1B	Front bracket	C922a	27300080	Cover, capacitor
A3	27140526	Bracket, switch	D505	225070	SLP-144B, L.E.D, muting indicator
A4	27260062	Shaft, switch	P1	223004	Terminal
A6	13218901	Back plate ass'y	P2	25108010	LG-2C, Terminal
A7	27267159A	Guide, L.E.D	P201	2010039	PN-B, Output cable
A8	28191072	Clear plate S	P201a	270025	SR-3P-4, Strainrelief
A9	28130103A	Dial plate	P901	25060035	NTM-4PRMC06, Terminal, antenna
A10	28140333	Cushion	P902	25045088	75 Ω antenna connector (G)
A12	27190038	Holder	P902a	870057	M10B, Toothed washer (G)
A15	27120407	Back panel (D)	P903	253099A	AS-UC-3, Power supply cable (D)
	27120408	Back panel (G)	P903a	270025	SR-3P-4, Strainrelief (D)
	27120409	Back panel (W)	P903	253083	AS-CEE, Power supply cable (G/W)
A17	834130088	3TTS+8B, Tapping screw	P903a	270280	SR-4K-4, Strainrelief (G/W)
A18	834130068	3TTS+6B, Tapping screw	R950	431523355	3.3M Ω , 1/2W, Resistor, solid (D)
A19	834140108	4TTS+10B, Tapping screw (D/W)	S901	25035135	NPS-111-L100P, Power switch (D)
	82114010	4P+10FN, Pan head screw (G)	S901	25035322 or	NPS-111-L286P or
A19a	86214010	WN4x6FN, Washer head nut (G)		25035176	NPS-111-L140, Power switch (G/W)
A21	82113006	3P+6FN, Pan head screw	S905	25065123	NSS-1258P, Voltage selector (W)
A23	838130068	3TTB+6B, Tapping screw	T301	232085	NMA-3034, AM loop antenna
A25	27140461-1	Battery bracket	T301a	27190105	Holder, AM loop antenna
A26	27300360	Battery case	T901	230467A	NPT-734D, Power transformer (D)
A27	27300359	Lid		230468	NPT-734G, Power transformer (G)
A29	82112604	2.6P+4F, Pan head screw		230469	NPT-734DG, Power transformer (W)
A201	831130080	3TTW+8P, Tapping screw	U1	13218527	NARF-1427, FM/AM tuner pc board ass'y (D)
A202	870069	W10x5, Nylon washer		13224527A	NARF-1427a, FM/AM tuner pc board ass'y (G)
A351	28184104	Top cover		13220527B	NARF-1427b, FM/AM tuner pc board ass'y (W)
A352	28140020	4x10x40mm, Cushion	U2	13218528	NADIS-1428, Display pc board ass'y (D)
A353	834430068	3TTS+6B (BC), Tapping screw		13224528A	NADIS-1428a, Display pc board ass'y (G/W)
A501	13218121	Front panel ass'y	U3	13218529	NAPL-1429, Dial illumination lamp pc board ass'y
A502	28191073C	Clear plate	U4	13218530	NARM-1430, Remote terminal pc board ass'y
A503	27267176B	Plate			
A504	27267109	Guide, power			
A505	27190160	Holder, L.E.D			
A508	831130080	3TTW+8P, Tapping screw			
A601	27175018	Leg			
A602	834130108	3TTS+10B, Tapping screw			
A801	28320573	Knob, power			
A802	28320501	Knob, MW/Memory/FM/AM/Muting			
A803	28320502	Knob, station			
A804	28320503	Knob, UP/DOWN			

Note: D: Only 120V model
G: Only 220V model
W: Only 120/220V model

DISASSEMBLING PROCEDURES

1. Removal of front panel

1. Remove the four screws (A353) holding the side bracket and the top cover.
2. Remove a screw (A353) holding the top cover and back panel.
3. Remove the three screws (A508) holding the front panel and front bracket from bottom side.
4. Insert the driver between the front panel and front bracket as shown in the fig. 1, and remove the front panel from the projection of the front bracket.

2. Removal of the digital pc board

1. Remove the top cover and the front panel.
2. Remove the three screws (A17) holding the front bracket and digital pc board from the front side.
3. Remove the seven screws (A201) holding the digital pc board and the front bracket.

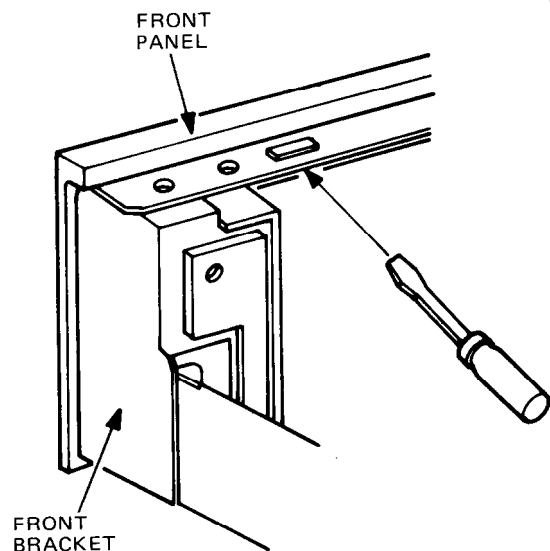
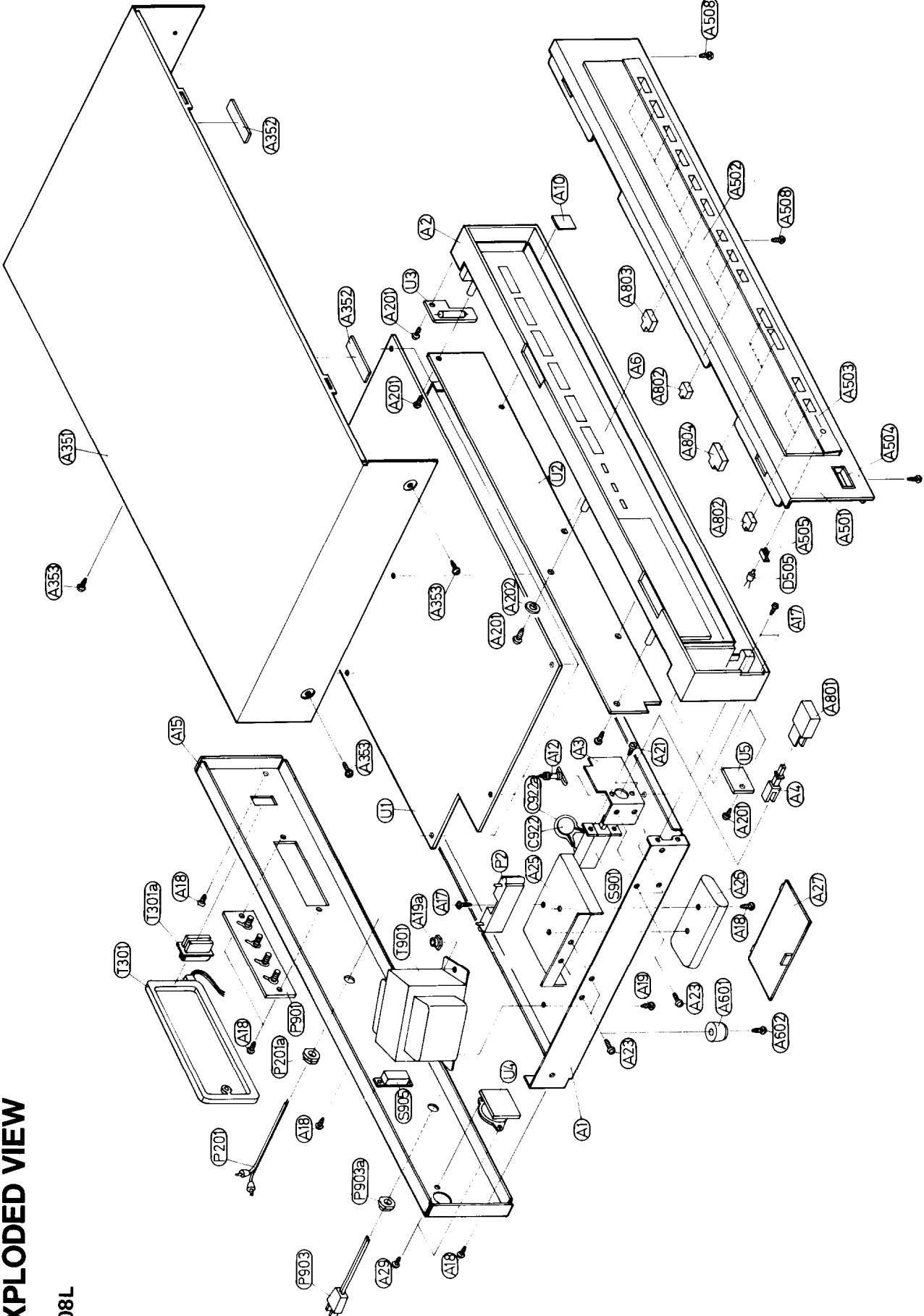


Fig. 1

EXPLODED VIEW

T-08L

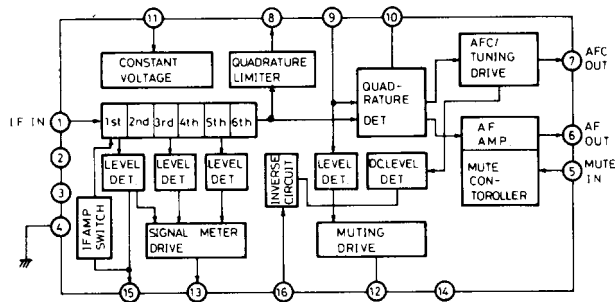


PARTS LIST

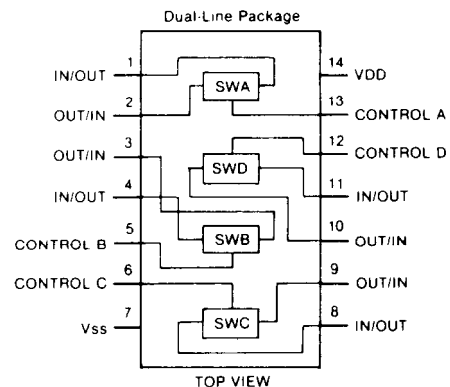
REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
A1	27100048	Chassis	A602	834130108	3TTS+10B, Tapping screw
A2	27110127-1B	Front bracket	A801	28320573	Knob, power
A3	27140526	Bracket, switch	A802	28320501	Knob, MW/Memory/FM/MW/LW/ Muting
A4	27260062	Shaft, switch	A803	28320502	Knob, station
A6	13520901	Back plate ass'y	A804	28320503	Knob, UP/DOWN
A7	27267198	Guide, L.E.D	C922	3500065A	0.01 μ F, 400V, Capacitor IS
A8	28191072	Clear plate S	C922a	27300080	Cover, capacitor
A9	28130103A	Dial plate	D505	225070	SLP-144B, L.E.D, muting indicator
A10	28140333	Cushion	P1	223004	Terminal
A12	27190038	Holder	P2	25108010	LG-2C, Terminal
A15	27120410	Back panel	P201	2010039	PN-B, Output cable
A17	834130088	3TTS+8B, Tapping screw	P201a	270025	SR-3P-4, Strainrelief
A18	834130068	3TTS+6B, Tapping screw	P901	25060035	NTM-4PRMC06, Terminal, antenna
A19	82114010	4P+10FN, Pan head screw	P903	253083	AS-CEE, Power supply cable
A19a	86214010	WN4x10FN, Washer head nut	P903a	270280	SR-4K-4, Strainrelief
A21	82113006	3P+6FN, Pan head screw	S901	25035322 or 25035176	NPS-111-L286 or NPS-111-L140, Power switch
A23	838130068	3TTB+6B, Tapping screw	T301	232085	NMA-3034, AM loop antenna
A25	27140461-1	Battery bracket	T301a	27190105	Holder, AM loop antenna
A26	27300360	Battery case	T901	230468	NPT-734G, Power transformer
A27	27300359	Lid	U1	13520527C	NARF-1427C, FM/AM tuner pc board ass'y
A29	82112604	2.6P+4F, Pan head screw	U2	13520528B	NADIS-1428b, Display pc board ass'y
A201	831130080	8TTW+8P, Tapping screw	U3	13218529	NAPL-1429, Dial illumination lamp pc board ass'y
A202	870069	W10x5, Nylon washer	U4	13218530	NARM-1430, Remote terminal pc board ass'y
A351	28184104	Top cover	U5	13520531	NALED-1431, Memory indicator pc board ass'y
A352	28140020	4x10x40mm, Cushion			
A353	834430068	3TTS+6B (BC), Tapping screw			
A501	13520121	Front panel ass'y			
A503	27267177B	Plate			
A504	27267109	Guide, power			
A505	27190160	Holder, L.E.D			
A508	831130080	3TTW+8P, Tapping screw			
A601	27175018	Leg			

BLOCK DIAGRAM OF IC

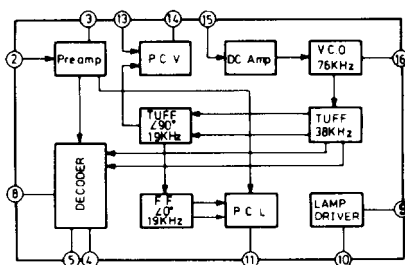
μ PC1167C2 (FM IF system)



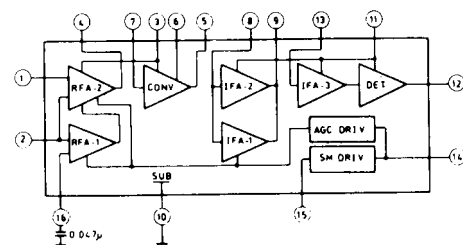
4066B (Quad bilateral switch)



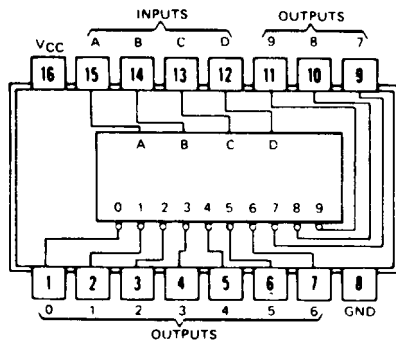
HA1196 (MPX decoder)



HA1197 (AM radio system)



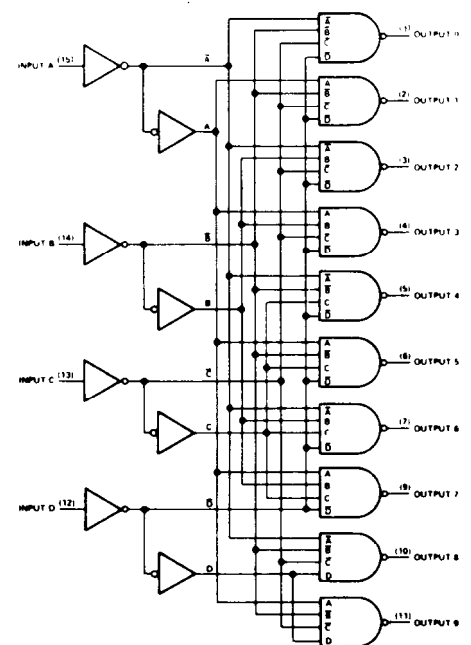
• 74LS42 (BCD to DECIMAL Decoder)



Pin Connection Diagram

NO	INPUTS				OUTPUTS									
	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	H	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	L	H	H	H	H	H	H	H
4	L	H	L	L	H	H	H	L	H	H	H	H	H	H
5	L	H	L	H	H	H	H	H	L	H	H	H	H	H
6	L	H	H	L	H	H	H	H	H	L	H	H	H	H
7	L	H	H	H	H	H	H	H	H	H	L	H	H	H
8	H	L	L	L	H	H	H	H	H	H	H	L	H	H
9	H	L	L	H	H	H	H	H	H	H	H	H	L	H
INVALID	H	L	H	L	H	H	H	H	H	H	H	H	H	H
	H	L	H	H	H	H	H	H	H	H	H	H	H	H
	H	L	L	L	H	H	H	H	H	H	H	H	H	H
	H	L	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	L	H	H	H	H	H	H	H	H	H	H

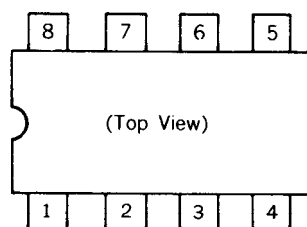
Function Table



Logic Diagram

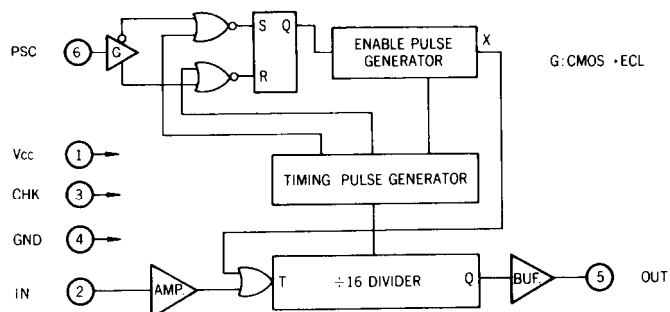
• μ PB533AC (Prescaler)

Pin Connection

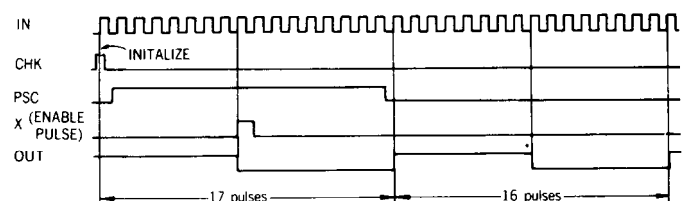


1. Pin 1 (Vcc) +5 volts Supply
2. Pin 2 (IN) FM local oscillator signal input
3. Pin 3 (CHK) Check terminal
4. Pin 4 (GND) Ground terminal
5. Pin 5 (OUT) Prescaler terminal
6. Pin 6 (PSC) Prescaler control terminal
7. Pin 7,8 Not connected

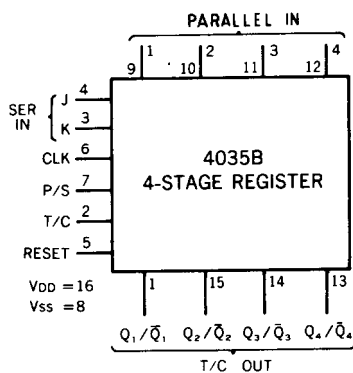
Block Diagram



Timing Chart



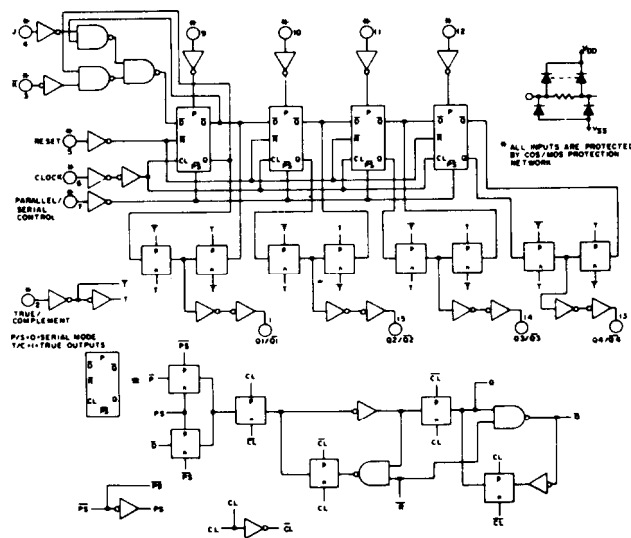
•4035B (4-Stage Parallel-In/Parallel-Out Shift Register with J-K Input and True/Complement Output)



Pin Connection Diagram

CL	I_{n-1} (INPUTS)				I_n (OUTPUTS)
	J	K	R	Q_{n-1}	Q_n
	0	X	0	0	0
	1	X	0	0	1
	X	0	0	1	0
	1	0	0	Q_{n-1}	$\overline{Q_{n-1}}$ TOGGLE MODE
	X	1	0	1	1
	X	X	0	Q_{n-1}	Q_{n-1}
X	X	X	1	X	0

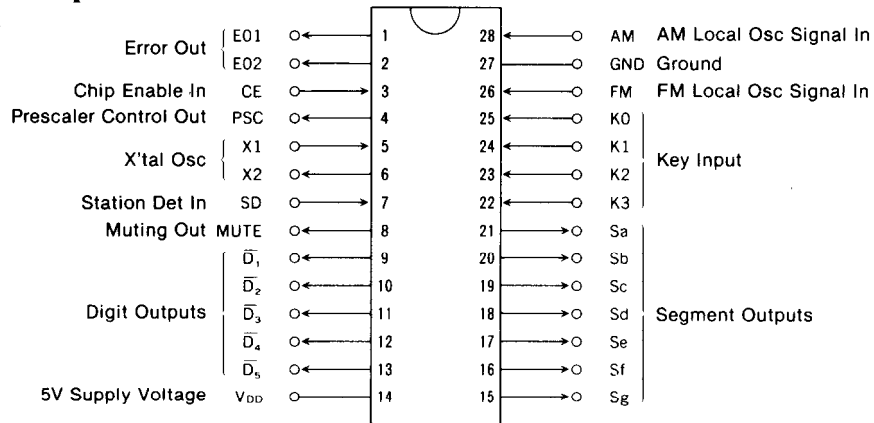
First Stage Truth Table



Logic Diagram

CIRCUIT DESCRIPTION

1. Micro Computer Operation



Pin. No.	Symbol	Terminal	Description
1 2	E01 E02	Error Outputs	Charge pump output of the phase detector which 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 in the front end through low pass filters Q403 and Q404. The output from both terminals is Only E01 is used.
3	CE	Chip Enable Input	Device selection signal input terminal. HIGH level...normal operation; LOW level...memory preservation.
4	PSC	Prescaler Control Output	This terminal outputs a signal that switches the prescaler division ratio to 1/16 or 1/17 when the pulse swallow method is used for division (FM only).
5 6	X1 X2	X'tal	Connected to the 4.5MHz crystal oscillator.
7	SD	Station Detector Input	Input terminal for detecting whether or not a broadcast signal is being received during auto-tuning. Stopped by the HIGH level. Not used.
8	MUTE	Muting Output	Output terminal which mutes the shock noise occurring when the PLL is released; active HIGH.
9—13	D1—D5	Digit Outputs	Display digit output signal terminals; active LOW.
14	VDD	Supply Voltage	Device power terminal; supplies 5V during normal operation and 3V from the external power source (two batteries) for memory preservation.
15—21	Sa—Sg	Segment Outputs	Display tube segment signal output, key return signal source and station display signal terminals; active HIGH. Since these terminals can handle 30V, they are connected directly to the segment terminals of the fluorescent display tubes.
22—25	K0—K3	Key Return Signal Inputs	Terminals for input of the key return signals from the external key matrix.
26	FM	FM Local Oscillator Signal Inputs	FM signals received are divided by 1/16 or 1/17 by prescaler μ PB553AC for input to this terminal.
27	GND	Ground	
28	AM	AM Local Oscillator Signal Input	Terminal for input of AM broadcast signal.

2. Control Key Connections

UP, DOWN.....Pressing the UP or DOWN key will cause the frequency to be shifted upward or downward (in 200kHz steps with the D model and in 50 kHz steps with the W/G model). If the key is pressed for more than 0.5 seconds, the frequency will be shifted 50 kHz every 40ms until it is released.

MW, FM, LW.....The MW, FM, LW band switches.

MEMORY.....Pressing this key causes the memory to be placed in the write-enabled state. The frequency displayed will be stored in one of the memories 1—6 if the corresponding memory key is then pressed within 5 seconds. The write-enabled state will be cleared after 5 seconds if none of the memory keys are pressed, or if the AM/FM selector keys are pressed.

M1—M7(M6).....These keys are used to preset and recall the contents of the memory. Positions are provided for keys for reading/writing up to 7 frequencies, but only 6 keys are installed in the T-08. See the paragraph on MEMORY for writing frequencies. Pressing one of the keys M1—M6 once will cause the contents of the corresponding memory (a frequency) to be read. A muting signal of about 0.45 seconds duration is output at this time.

TPP (Tracking Point Preset).....Switch is used to write adjustment frequencies into preset memory during set production. Not used with the T-08. When the IC VDD is first inserted, the lowest FM and MW frequency is placed in the memory.

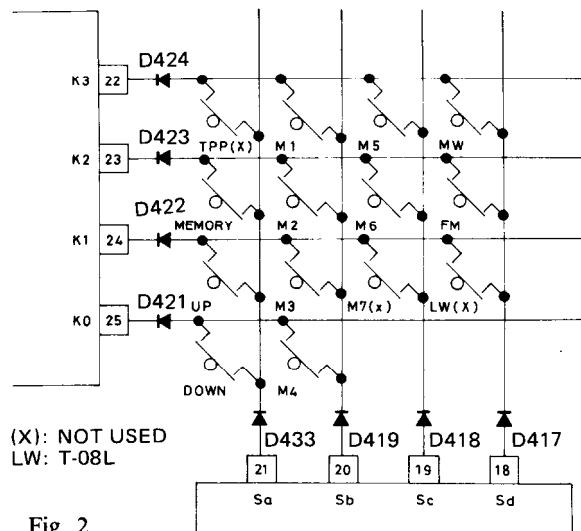


Fig. 2

3. Key Matrix Connections

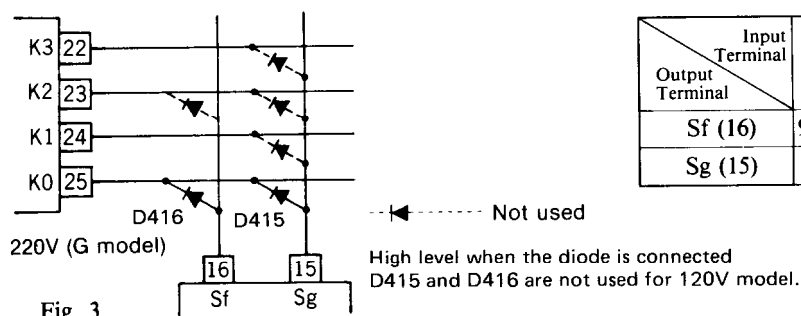


Fig. 3

IF1, IF0.....IF offset value settings for FM. See Table 2.

BAND1, BAND0.....Geographical FM band settings. See Table 3.

9kHz, 10kHz.....MW band settings. See Table 4.

AUTO/MANUAL.....Auto tuning for 1, manual tuning for 0. Manual only with the T-08.

Input Terminal	K0 (25)	K1 (24)	K2 (23)	K3 (22)
Output Terminal				
Sf (16)	9kHz/10kHz		AUTO/MANU	
Sg (15)	BAND 0	BAND 1	IF 1	IF 0

table 1

IF 1	IF 0	IF Frequency
0	0	10.700MHz
0	1	10.675MHz
1	0	10.750MHz
1	1	10.725MHz

table 2

BAND 1	BAND 0	Band	Frequency Range	Channel Space
0	0	120V model	87.9~107.9MHz	200kHz
0	1	220V model	87.50~108.00MHz	50kHz
1	0	Japan	76.1~89.9MHz	100kHz

table 3

9kHz/10kHz	Frequency range	Channel Space	Reference Frequency
0	530~1620kHz	10kHz	10kHz
1	522~1611kHz	9kHz	9kHz

table 4

4. FM/AM Selector Circuit

The FM/AM selector circuit is shown in Figure 4. Operation of this circuit is controlled by digit signal $\overline{D5}$ and segment output signals S_a and S_g .

For FM reception, both $\overline{D5}$ and S_g are "H" (S_a is "L") and output from b of RS-F/F is "H." Since output from c is "L," Q420 is turned ON to light the FM indicator and Q419 is turned OFF. Further, AM operation ceases because Q303 goes ON and Q302 OFF so that B+ is not supplied to AM IC Q301. Also, Q206 goes ON, turning Q205 OFF so that the FM signal is output.

For AM reception, both $\overline{D5}$ and S_a are "H" (S_g is "L"), output from b of RS-F/F is "L" and that from c is "H" so that all transistors operate in the opposite manner, the AM indicator is lit and the AM signal is output. Further, Q304 goes ON so that B+ is supplied to pin 3 of AM IC Q301 to start AM operation. Also, the level at pin 2 of IC Q103 of the FM IF system becomes "H" so that this IC does not operate and output from the 16-pin VCO also ceases.

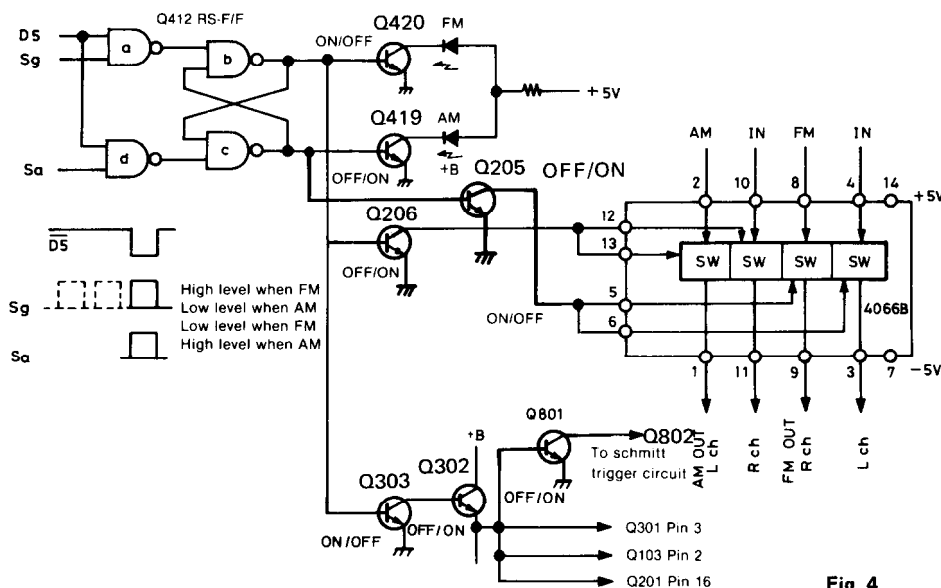


Fig. 4

5. Preset Station Indicator Circuit

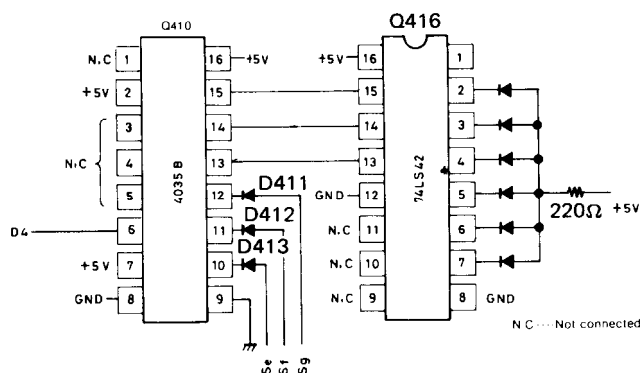


Fig. 5

Preset station indicator connections are shown in Figure 5. BCD codes are output from segment terminals S_e — S_g in synchronization with the timing of digit signal $\overline{D4}$. The sequence is shown in the timing chart in Figure 6. The display signal for the "1" in the first digit of the frequency display is output from segment terminals S_b and S_c at timing T1 of digit signal $\overline{D4}$ (blank codes are output from segment terminals S_e — S_g at this time). At timing T2, the BCD code

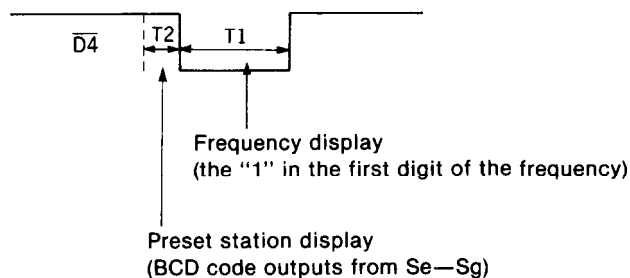


Fig. 6

for preset station display is output from segment terminals S_e — S_g (at this time, blank codes are output from segment terminals S_a — S_d). Since output is timed as shown in Figure 8, it is replaced with starting output at D—F/F of Q416. This is output as BCD code to the decimal counter to display the frequency.

6. PLL Tuned Circuit

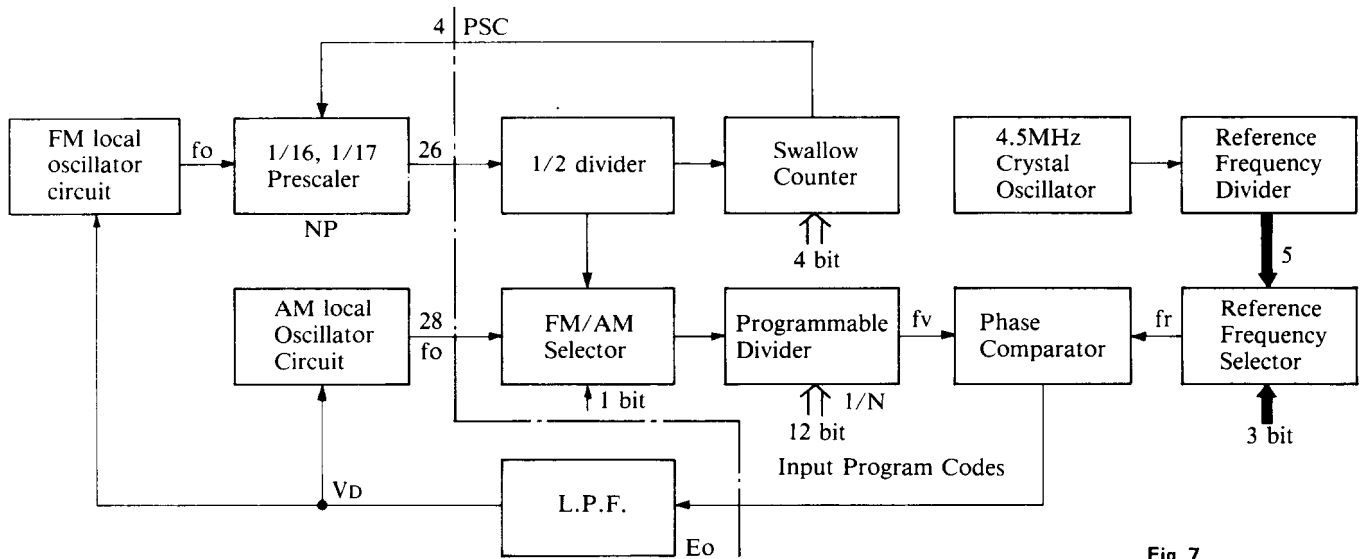


Fig. 7

A block diagram of the tuned circuit of the PLL is shown in Figure 13.

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 detector where it is compared with frequency standard f_r (9kHz for G/W model and 10 kHz 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 in the front end to change the reception frequency. This continues until f_v and f_r are the same and $E_o = 0$. (G/W model)

Since AM signals received range from 522 kHz to 1611kHz, they are changed to 972kHz–2061kHz for reception. Furthermore, since $f_v = f_o/N$, the divisor, N , is changed by program code input so that $N = 972/9 - 2061/9 = 108 - 229$. (D model)

Since AM signals received range from 530kHz to 1620kHz, they are changed to 980kHz–2070kHz for reception.

Furthermore, since $f_v = f_o/N$, the divisor, N , is changed by program code input so that $N = 980/10 - 2070/10 = 98 - 207$.

Operation During FM Reception.

The pulse swallow method is used in the prescaler of the T-25. 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 between 1/16 and 1/17 according to external control (1/17 when the PSC terminal is "H" and 1/16 when it is "L").

The station oscillation 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 then divided to 1/2 in the microcomputer and applied to the programmable divider and divided to $1/N$. The result is compared with a 25 kHz frequency standard in the phase detector and the error is output as E_o until a match is obtained as in AM operation.

7. Muting Circuit

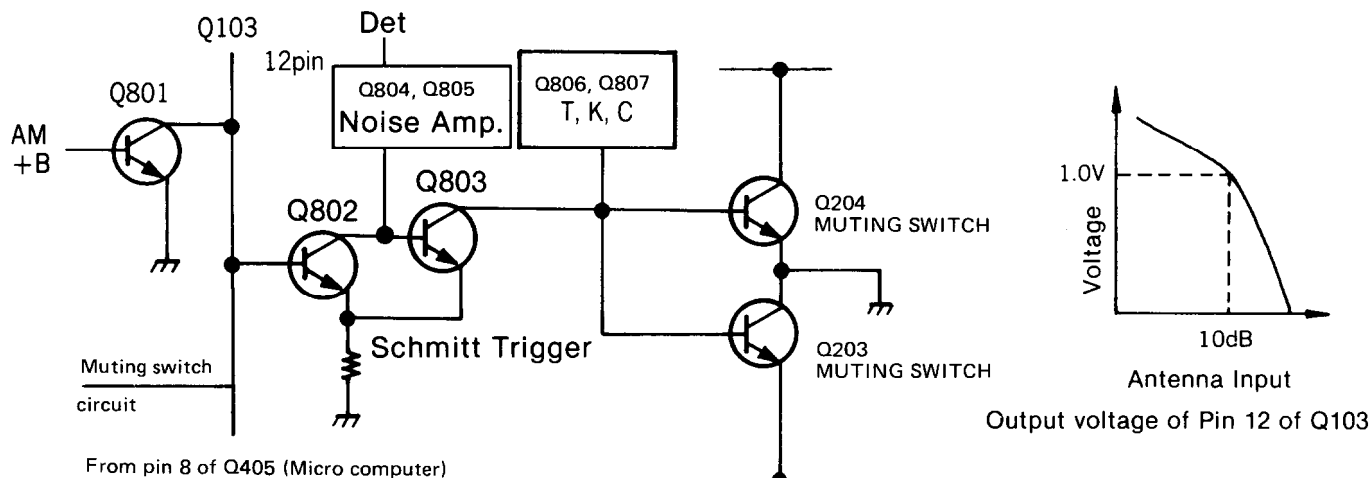


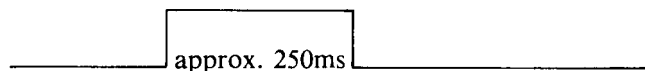
Fig. 8

A muting circuit consisting of a zero cross and IF level detectors is built into IC Q103; output of this circuit is from pin 12. R127 is the variable resistor used to set the muting level, and is set so that muting opens at 10dB. When the antenna input level exceeds 10dB, transistor Q802 is turned OFF, Q803 is turned ON, and Q203 and Q204 are turned OFF so that the FM signal is output from the output terminal. Further, this circuit closes muting when a noise element is detected in the output of noise amplifier Q804, Q805. Q801 is ON during AM reception so that all transistors operate in the above manner and the AM signal is output.

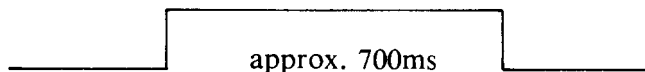
When the STATION, BAND (AM/FM), UP or DOWN switches are operated, the pulses shown in Figure 9 are output from pin 8 of Q703 and muting is activated.

Note : The noise amplifier is not used for 120V model.

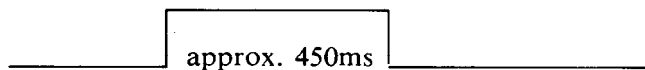
① UP/DOWN



Band (89.9 — 76.1MHz, 76.1 — 89.9MHz)



② STATION



③ BAND

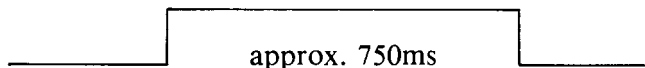


Fig. 9

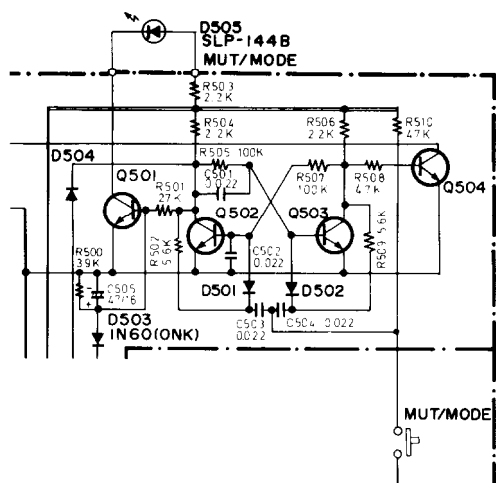


Fig. 10

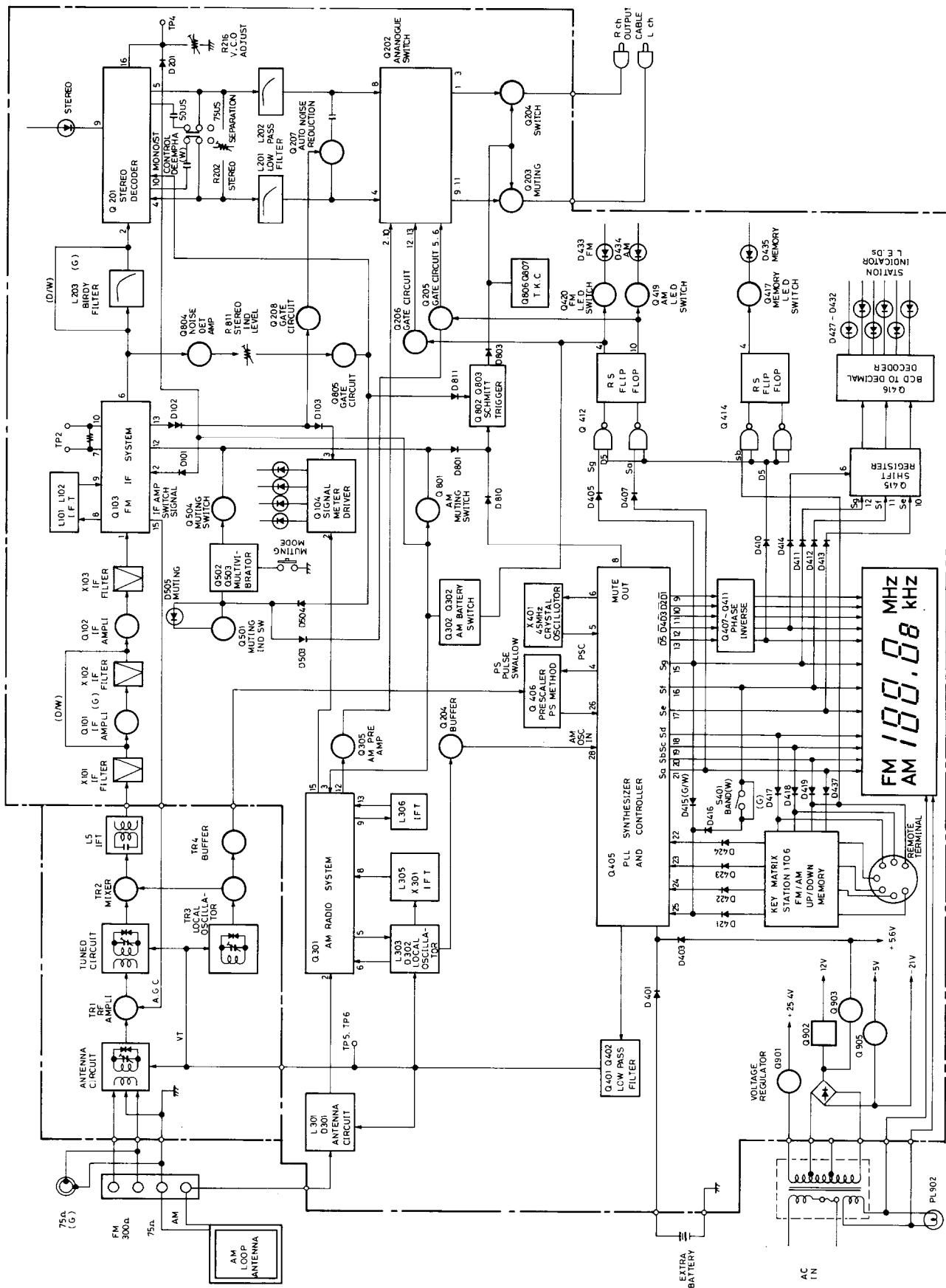
Muting switch circuit

A muting switch circuit is used the flip-flop circuit of multivibrator.

When press the MUT/MODE switch, transistor Q503 is turned OFF, Q504 is turned ON, and FM signal is output so that the Q203 and Q204 transistors operate in the above manner.

Q502 is turned ON and MUT L.E.D light off, Q501 is OFF during AM reception and MUT L.E.D light off.

BLOCK DIAGRAM



ADJUSTMENT PROCEDURES

INSTRUMENTS REQUIRED

1. Stereo Modulator
2. FM Signal Generator with Frequency Counter
3. Frequency Counter
4. Digital DC Voltmeter
5. DC Voltmeter
6. Distortion Analyzer
7. AC Voltmeter
8. Oscilloscope

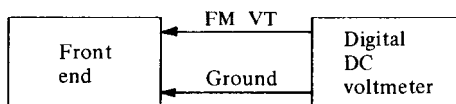
GENERAL ALIGNMENT CONDITION

Standard modulation is 1 kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO)

1. FM adjustment

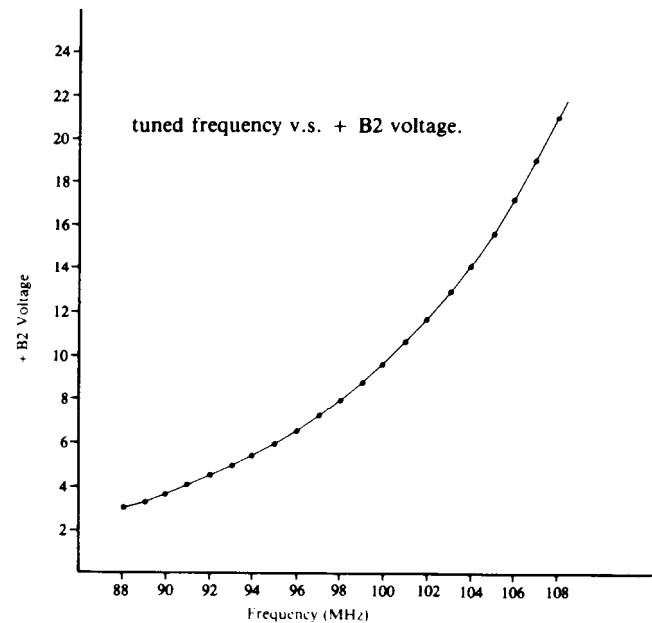
1. Front end

Connect the digital DC voltmeter to the TP-5 (FM VT) terminal.



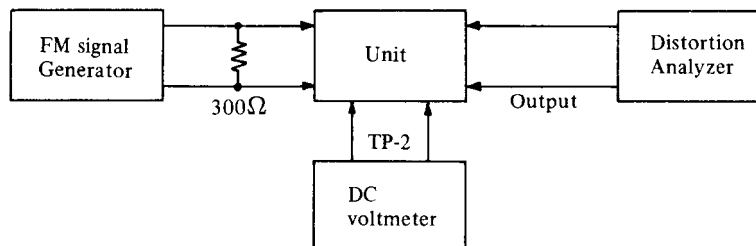
Step	Set to dial	Adjust	Output indicator	Adjust for
1	88.1 MHz	L3 (LO)	Digital DC voltmeter	3.03V
2	107.9MHz	TC3 (TCO)		20.8V
3	Repeat steps 1 and 2 until no further improvement is noticed.			

Usually not necessary to adjust.



2. FM IF adjustment

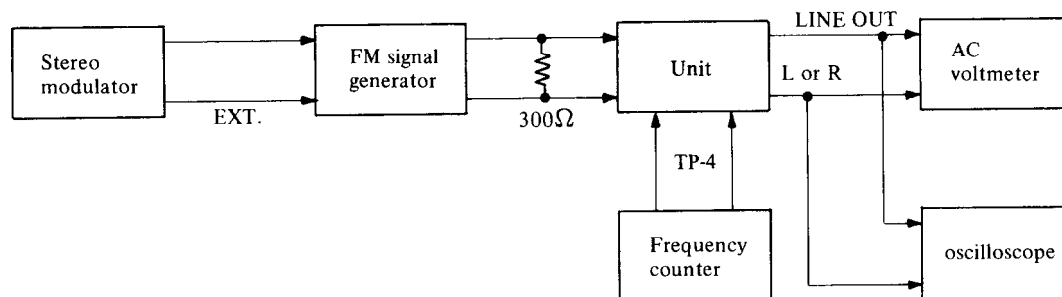
- 1) Connect the FM signal generator to the 300-ohm FM ANTENNA terminals via a 300-ohm dummy load.
- 2) Connect the DC voltmeter to the TP-2 terminals.
- 3) Connect the distortion analyzer to the line output terminal.



Step	FM signal generator	Dial to set	Adjuat	Output indicator	Adjust for
1	98.1MHz, 65dBf, 1KHz, 75kHz devi.	No input signal	L101	DC voltmeter	0V
2		98.1MHz	L102 L5 (IF)	Distortion analyzer	Minimum
3	Repeat steps 1 and 2 until no further improvement is noticed.				

3. Multiplex and muting circuit

- 1) Connect the stereo modulator to the external modulator terminal of FM signal generator, thereby using the FM signal generator as external modulation.
- 2) Connect the frequency counter to the TP-4 terminal.
- 3) Connect the AC voltmeter and oscilloscope to the LINE out terminal.



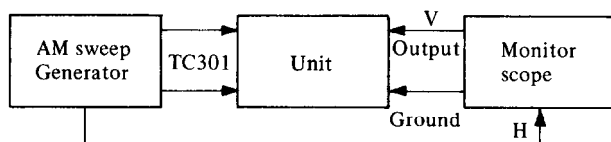
Item	FM SG	Stereo modulator	Set to dial	Adjust	Output indicator	Adjust for	Remarks
V.C.O	98.1MHz 65dBf	_____	98.10MHz	R216	Frequency counter	76kHz	Turn off the modulation
Stereo Separation	98.1MHz 65dBf Ext. modulation	Rch	98.10MHz	R202	AC voltmeter (Lch)	Minimum	Maximum and same separation
		Lch			AC voltmeter (Rch)	Minimum	
Muting level	98.1MHz, 13.2dBf 1kHz, 75kHz devi.	_____	98.10MHz	R127	Oscilloscope	Signal	
	98.1MHz, 12.2dBf 1kHz, 75kHz devi.	_____				No signal	
Stereo level	98.1MHz, 17.2dBf Ext. modulation	L+R 68.25kHz devi.	98.10MHz	R811	Stereo indicator	ON	
	98.1MHz, 16.2dBf Ext. modulation	Pilot 6.75kHz devi.				OFF	

2. AM adjustment

1. AM IF

Press the selector switch to MW.

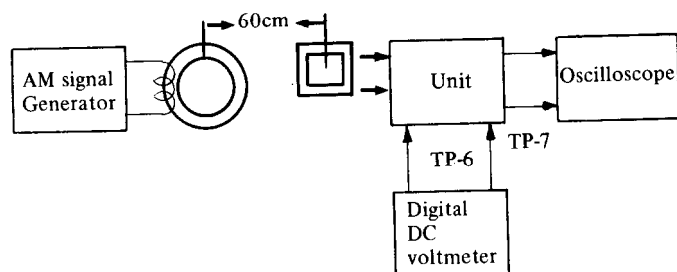
Connect the AM sweep generator between TC 301 variable capacitor. Connect the monitor scope to the TP-3 AM output terminal.



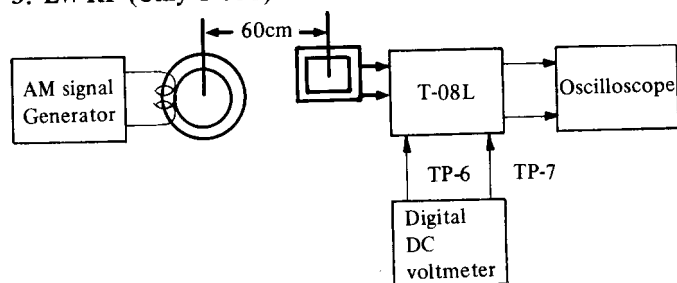
Set signal	Adjust	Adjust for
450 kHz	L305	The output of monitor scope becomes maximum symmetrical response

Remark : Usually not necessary to adjust.

2. AM RF



3. LW RF (Only T-08L)



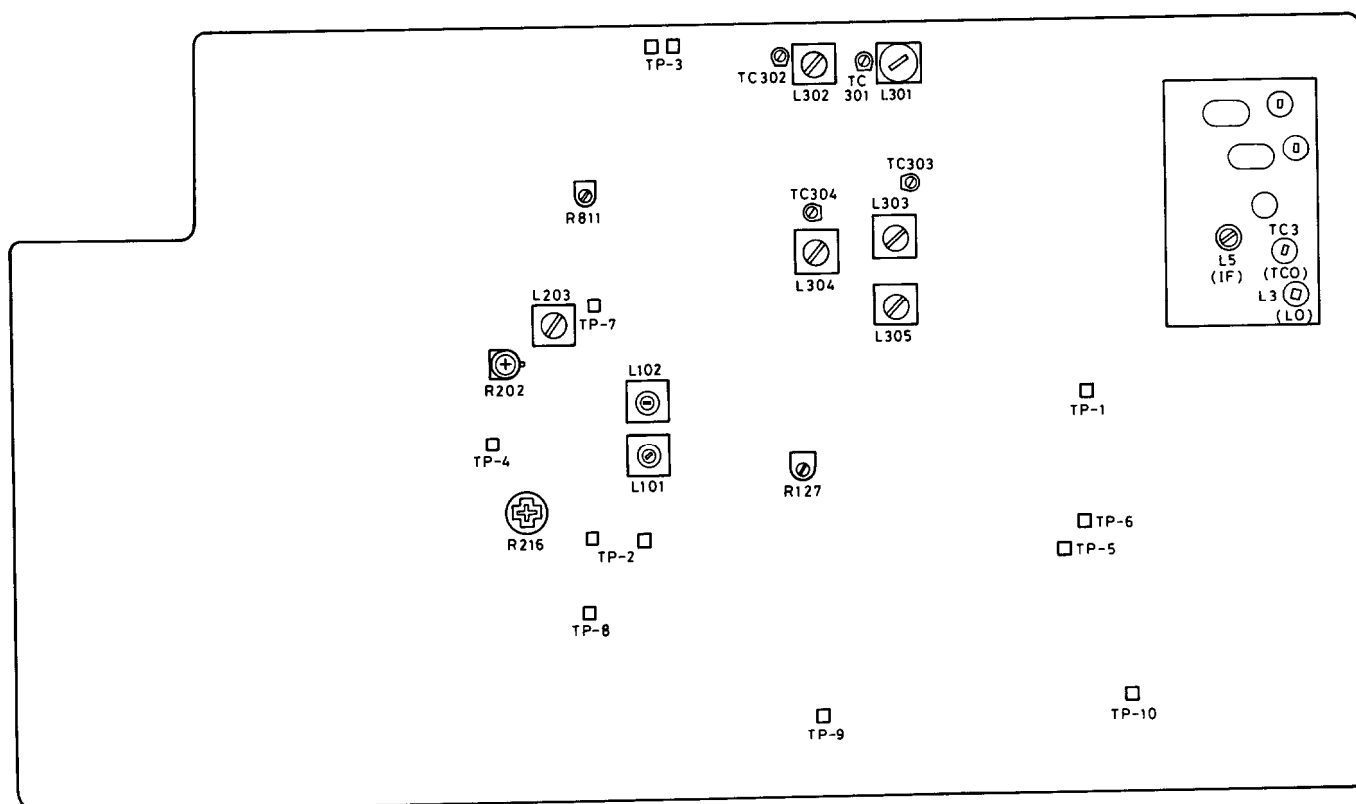
Step	Set to dial	Adjust	Output indicator	Adjust for
1	603 (600) kHz	L303	Digital DC voltmeter	3.7V
2	1404 (1400) kHz	TC303		15.5V
3	Repeat steps 1 and 2 until no further improvement is noticed.			

Step	Set to dial	Adjust	Output indicator	Adjust for
1	164 kHz	L304	Digital DC voltmeter	4.9V
2	317 kHz	TC304		15.8V
3	Repeat steps 1 and 2 until no further improvement is noticed.			

	AM Signal generator	Dial to set	Adjust	Adjust for
1	603kHz (600) 400Hz, 30% mod.	603kHz	L301	Maximum
2	1404kHz (1400) 400Hz, 30% mod.	1404kHz	TC301	Maximum
3	Repeat steps 1 and 2 for maximum.			

	AM Signal generator	Dial to set	Adjust	Adjust for
1	164kHz 400Hz, 30% mod.	164kHz	L302	Maximum
2	317kHz 400Hz, 30% mod.	317kHz	TC302	Maximum
3	Repeat steps 1 and 2 for maximum.			

(): 120V model



PC BOARD-PARTS LIST

FM/AM TUNER AND DIGITAL CIRCUIT PC BOARD (NARF-1427/b)

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Front end				
TU001	240044	FD166U12	D805	223103	1N60
	ICs		D803, D804	223105,	1S1555,
Q103	222608	μPC1167C2, FM IF system	D806, D807	223133 or	DS442X or
Q104	222541	LB1426, Signal strength meter driver	D809–D811	223145	1S2076TD
Q201	222453	HA1196, Stereo decoder	D901	223804 or	SR1K-2 or
Q202	222575 or	TC4066BP or	D902	223848	GP08B
	222840661	4066B, Analogue switch		223979 or	RD27EB or
Q301	222626	HA1197, AM radio system		223922	WZ270
Q405	222618	μPD1703C-016, Micro computer	D903	223862	WL01
Q406	222619	μPB553AC, Prescaler	D904, D906	224020	WZ063
Q412, Q414	222513 or	TC4011BP or	D905	224082	WZ056
	222840111	4011B, NAND gate			
Q415	222840351	4035B, Shift register		Transformers	
Q416	222740421	74LS42, BCD to decimal decoder	L101	233243	NFIF-6029P
Q902	222780122	78M12, Voltage regulator	L102	233244	NFIF-6029S
	Transistors		L305	232077	NMIF-6009
Q102	2211722	2SC1923 (R)	L306	232041	NIT-0509
Q203–Q206	2211254 or	2SC1815 (Y) or			
Q208	2210747	2SC945A (Q1)		Coils	
Q207	2211293	2SK68 (M), F.E.T	L201, L202	233181	NMC-5018
Q302, Q303	2211254 or	2SC1815 (Y) or	L301	232089	NMA-3037
Q305	2210747	2SC945A (Q1)	L303	232084	NMO2018
Q304	2211293	2SK68 (M), F.E.T	L801	233031	NMC-9-1
Q401, Q402	2211255	2SC1815 (GR)			
Q407–Q411	2211454	2SA1015 (Y)	X101, X103	3010006	SFE10.7MA-A
Q417, Q419	2211254 or	2SC1815 (Y) or	X301	3010049	CFM2-450 BL
	2210747	2SC945A (Q1)			
Q501–Q504	2211255	2SC1815 (GR)		Crystal	
Q801–Q803	2211254 or	2SC1815 (Y) or	X401	3010052	XTL-4.5M
Q805–Q807	2210747	2SC945A (Q1)			
Q804	2211255	2SC1815 (GR)		Capacitors	
Q901	2210747	2SC945A (Q1)	C104	352741009	10μF, 16V, Elect.
Q903	2201035 or	2SD325 (E) or	C106	352780339	3.3μF, 50V, Elect.
	2201034	2SD325 (D)	C109	352780109	1μF, 50V, Elect.
Q904	2211254 or	2SC1815 (Y) or	C111	352780229	2.2μF, 50V, Elect.
	2210747	2SC945A (Q1)	C118	35274100	10μF, 16V, Elect.
Q905	2211454	2SA1015 (Y)	C119	352733309	33μF, 10V, Elect.
			C120, C122	352741009	10μF, 16V, Elect.
			C201	352742219	220μF, 16V, Elect.
			C202	352750479	4.7μF, 25V, Elect.
			C205, C206	352741009	10μF, 16V, Elect.
			C207, C208	352780109	1μF, 50V, Elect.
D101, D103	223105,	1S1555,	C209	352784799	0.47μF, 50V, Elect.
D201, D202	223133 or	DS442X or	C210	352780109	1μF, 50V, Elect.
D304	223145	1S2076TD	C211	352780339	3.3μF, 50V, Elect.
D102	4000068	VD1222	C212	352523614	360pF ± 5%, Styrol
D203, D204	224129 or	RD3.3E-B or	C215	352752209	22μF, 25V, Elect.
	224084	WZ-032	C216	352734709	47μF, 16V, Elect.
D301, D302	223136	KV1226	C217	352741009	10μF, 16V, Elect.
D303	4000068	VD1222	TC301, TC303	3060010	NTC-20P09, Trimmer
D401–D405	223105,	1S1555,	C301	352741009	10μF, 16V, Elect.
D407	223133 or	DS442X or	C305	352741009	10μF, 16V, Elect.
D410–D414	223145	1S2076TD	C309	352744709	47μF, 16V, Elect.
D415, D416	223105	1S1555	C311	352780339	3.3μF, 50V, Elect.
(Only W model)	223133 or	DS442X	C312	352750479	4.7μF, 25V, Elect.
	223145	1S2076TD	C314	352721019	100μF, 6.3V, Elect.
D503	2231031 or	1N60 (ONK) or	C317	352780109	1μF, 50V, Elect.
	223147	1N60FM	C324	372525114	510pF ± 5%, 50V, Styrol
D417–D424	223105,	1S1555,	C402	395160107	1μF, 35V, Tantalum
D501–D502	223133 or	DS442X or	C411	352723319	330μF, 6.3V, Elect.
D504, D801	223145	1S2076TD			

CIRCUIT NO.	PARTS NO.	DESCRIPTION
C412	352721029	1,000 μ F, 6.3V, Elect.
C414	352741009	10 μ F, 16V, Elect.
C505	352744709	47 μ F, 16V, Elect.
C802	352750479	4.7 μ F, 25V, Elect.
C806–C808	352784799	0.47 μ F, 50V, Elect.
C809	352744719	470 μ F, 16V, Elect.
C811	352721019	100 μ F, 6.3V, Elect.
C902	352784719	470 μ F, 50V, Elect.
C903	352780109	1 μ F, 50V, Elect.
C905	352761029	1,000 μ F, 35V, Elect.
C906, C909	352764719	470 μ F, 35V, Elect.
C910	352741009	10 μ F, 16V, Elect.
C911, C912	352721019	100 μ F, 6.3V, Elect.
C914	352764719	470 μ F, 35V, Elect.
C915	352763319	330 μ F, 35V, Elect.
C916	352741009	10 μ F, 16V, Elect.
C918, C919	352780109	1 μ F, 50V, Elect.
Resistors		
R127	5215046	N08HR50KBC, Semi-fixed
R202	5215048	N08HR200KBC, Semi-fixed
R216	5225015	N10HR10KBD, Semi-fixed
R418–R422	49121104505	100k Ω ×5, Network
R423–R429	49121104507	100k Ω ×7, Network
R430–R433	49121333504	33k Ω ×4, Network
R811	5215047	N08HR100KBC, Semi-fixed
R904	441723304	33 Ω , 2W, Metal oxide film
R905	441721514	150 Ω , 2W, Metal oxide film
R908	441521024	1k Ω , 1/2W, Metal oxide film
R911	441528204	82 Ω , 1/2W, Metal oxide film
Radiator		
	27160011A	RAD-05
Screws		
	82113008	3P+8FN, Radiator, Pan head
	834130088	3TTS+8B, Radiator, Tapping
Nut		
	863130	N-3FN
Switches (Only W model)		
S201	25065160	NSS-2273, De-emphasis
S401	250142	NSS-2225, AM band

INDICATOR PC BOARD (NADIS-1428)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Transistor		
Q420	2211254 or 2210747	2SC1815 (Y) or 2SC945A (Q1)
Fluorescent indicator tube		
Q422	212010	7-BT-05A2

CIRCUIT NO.	PARTS NO.	DESCRIPTION
L.E.Ds		
D104–D107	225048	SLP-252B-04, Signal
D205	225046	SLP-151B
D427–D432	225057	SR538D
D433, D434	225047	SLP-251B
D435	225046	SLP-151B
Diode		
D437	223105, 223145 or 223133	1S1555, 1S2076TD or DS442X
Switches		
	25035156	NPS-111-S120
Bracket		
	27110127-1B	Front
Cushion		
	28140300	Fluorescent indicator tube
Screws		
	831130080	3TTW+8P, Tapping screw
Washer		
	870069	W10x5mm, Nylon

DIAL ILLUMINATION LAMP PC BOARD (NAPL-1429)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL902	210064A 831130080	250mA, 6.3W, Lamp 3TTW+8P, Tapping screw

REMOTE CONTROL TERMINAL PC BOARD (NARM-1430)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
P401	25050070	NSCT-7P20

PC BOARD-PARTS LIST

G model

FM/AM TUNER AND DIGITAL CIRCUIT PC BOARD (NARF-1427a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Front end		D806, D807	223145	1S2076TD
	240044	FD166U12	D805	223103	1N60
	ICs		D809-D811	223105,	1S1555,
Q103	222608	μ PC1167C2, FM IF system		223133 or	DS442X or
Q104	222541	LB1426, Signal strength meter driver	D901	223145	1S2076TD
Q201	222453	HA1196, Stereo decoder		223804 or	SR1K-2 or
Q202	222575 or	TC4066BP or		223848	GP08B
	222840661	4066B, Analogue switch	D902	223979 or	RD27EB or
Q301	222626	HA1197, AM radio system		223922	WZ270
Q405	222618	μ PD1703C016, Micro computer	D903	223862	WL01
Q406	222619	μ PB553AC, Prescaler	D904, D906	224020	WZ063
Q412, Q414	222513 or	TC4011BP or	D905	224082	WZ056
	222840111	4011B, NAND gate		Transformers	
Q415	222840351	4035B, Shift register	L101	233243	NFIF-6029P
Q416	222740421	74LS42, BCD to decimal decoder	L102	233244	NFIF-6029S
Q902	222780122	78M12, Voltage regulator	L305	232077	NMIF-6009
			L306	232041	NIT-0509
	Transistors				
Q101, Q102	2211722	2SC1923 (R)		Coils	
Q203-Q206	2211254 or	2SC1815 (Y) or	L201, L202	233181	NMC-5018
Q208	2210747	2SC945A (Q1)	L203	233236	NMC-6027
Q207	2211293	2SK68 (M), F.E.T	L301	232089	NMA-3037
Q302, Q303	2211254 or	2SC1815 (Y) or	L303	232084	NMO2018
Q305	2210747	2SC945A (Q1)	L801	233031	NMC-9-1
Q304	2211293	2SK68 (M), F.E.T		Ceramic filters	
Q401, Q402	2211255	2SC1815 (GR)	X101-X103	3010043	SFE10.7MA-A
Q407-Q411	2211454	2SA1015 (Y)	X301	3010049	CFM2-450BL
Q417, Q419	2211254 or	2SC1815 (Y) or		Crystal	
	2210747	2SC945A (Q1)	X401	3010052	XTL-4.5M
Q501-Q504	2211255	2SC1815 (GR)		Capacitors	
Q801-Q803	2211254 or	2SC1815 (Y) or	C104	352741009	10 μ F, 16V, Elect.
Q805-Q807	2210747	2SC945A (Q1)	C106	352780339	3.3 μ F, 50V, Elect.
Q804	2211255	2SC1815 (GR)	C109	352780109	1 μ F, 50V, Elect.
Q901	2210747	2SC945A (Q1)	C111	352780229	2.2 μ F, 50V, Elect.
Q903	2201035 or	2SD325 (E) or	C118	352741009	10 μ F, 16V, Elect.
	2201034	2SD325 (D)	C119	352733309	3.3 μ F, 10V, Elect.
Q904	2211254 or	2SC1815 (Y) or	C120, C122	352741009	10 μ F, 16V, Elect.
Q905	2210747	2SC945A (Q1)	C201	352742219	220 μ F, 16V, Elect.
	2211454	2SA1015 (Y)	C202	352750479	4.7 μ F, 25V, Elect.
	Diodes		C205, C206	352741009	10 μ F, 16V, Elect.
D101, D103	223105 or	1S1555 or	C207, C208	352780109	1 μ F, 50V, Elect.
D201, D202	223133 or	DS442X or	C209	352784799	0.47 μ F, 50V, Elect.
D304	223145	1S2076TD	C210	352780109	1 μ F, 50V, Elect.
D102	4000068	VD1222	C211	352780339	3.3 μ F, 50V, Elect.
D203, D204	224129 or	RD3.3E-B or	C212	372523614	360pF $\pm$ 5%, 50V, Styrol
	224084	WZ-032	C215	352752209	22 μ F, 25V, Elect.
D301, D302	223136	KV1226	C216	352734709	47 μ F, 10V, Elect.
D303	4000068	VD1222	C217	352741009	10 μ F, 16V, Elect.
D401-D405	223105,	1S1555,	TC301, TC303	3060010	NTC-20P09, Trimmer
D407	223133 or	DS442X or	C301	352741009	10 μ F, 16V, Elect.
D410-D424	223145	1S2076TD	C305	352741009	10 μ F, 16V, Elect.
D501, D502			C309	352744709	47 μ F, 16V, Elect.
D503	2231031 or	1N60 (ONK) or	C311	352780339	3.3 μ F, 50V, Elect.
	223147	1N60FM	C312	352750479	4.7 μ F, 25V, Elect.
D504, D801	223105,	1S1555,			
D803, D804	223133 or	DS442X or			

CIRCUIT NO.	PARTS NO.	DESCRIPTION
C314	352721019	100 μ F, 6.3V, Elect.
C317	352780109	1 μ F, 50V, Elect.
C324	372525114	510pF $\pm$ 5%, 50V, Styrol
C402	395160107	1 μ F, 35V, Tantalum
C411	352723319	330 μ F, 6.3V, Elect.
C412	352721029	1,000 μ F, 6.3V, Elect.
C414	352741009	10 μ F, 16V, Elect.
C802	352750479	4.7 μ F, 25V, Elect.
C806–C808	352784799	0.47 μ F, 50V, Elect.
C809	352744719	470 μ F, 16V, Elect.
C811	352721019	100 μ F, 6.3V, Elect.
C902	352784719	470 μ F, 50V, Elect.
C903	352780109	1 μ F, 50V, Elect.
C905	352761029	1,000 μ F, 35V, Elect.
C906, C909	352764719	470 μ F, 35V, Elect.
C910	352741009	10 μ F, 16V, Elect.
C911, C912	352721019	100 μ F, 6.3V, Elect.
C914	352764719	470 μ F, 35V, Elect.
C915	352763319	330 μ F, 35V, Elect.
C916	352741009	10 μ F, 16V, Elect.
C918, C919	352780109	1 μ F, 50V, Elect.
Resistors		
R127	5215046	N08HR50KBC, Semi-fixed
R202	5215048	N08HR200KBC, Semi-fixed
R216	5225015	N10HR10KBD, Semi-fixed
R418–R422	49121104505	100k Ω $\times$ 5, Network
R423–R429	49121104507	100k Ω $\times$ 7, Network
R430–R433	49121333504	33k Ω $\times$ 4, Network
R811	5215047	N08HR100KBC, Semi-fixed
R904	441723304	33 Ω , 2W, Metal oxide film
R905	441721514	150 Ω , 2W, Metal oxide film
R908	441521024	1k Ω , 1/2W, Metal oxide film
R911	441528204	82 Ω , 1/2W, Metal oxide film
Radiator		
	27160011A	RAD-05
Screws		
	82113008	3P+8FN, Radiator
	834140088	3TTS+8B, Radiator
Nut		
	863130	N-3FN

INDICATOR PC BOARD (NADIS-1428a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Transistors		
Q420	2211254 or 2210747	2SC1815 (Y) or 2SC945A (Q1)
Q421	2211255	2SC1815 (GR)
Fluorescent indicator tube		
Q422	212010	7-BT-05A2

CIRCUIT NO.	PARTS NO.	DESCRIPTION
L.E.Ds		
D104–D107	225048	SLP-252B-04, Signal
D205	225046	SLP-151B
D427–D432	225057	SR538D
D433, D434	225047	SLP-251B
D435	225046	SLP-151B
Diode		
D437	223105, 223145 or 223133	1S1555, 1S2076TD or DS442X
Switches		
	25035156	NPS-111-S120
Bracket		
	27110127-1B	Front
Cushion		
	28140300	Fluorescent indicator tube
Screws		
	831130080	3TTW+8P, Tapping screw
Washer		
	870069	W10 $\times$ 5mm, Nylon

DIAL ILLUMINATION LAMP PC BOARD (NAPL-1429)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL902	210064A 831130080	250mA, 6.3V, Lamp 3TTW+8P, Tapping screw

REMOTE CONTROL TERMINAL PC BOARD (NARM-1430)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
P401	25050070	NSCT-7P20

PC BOARD-PARTS LIST

T-08L

FM/AM TUNER AND DIGITAL CIRCUIT PC BOARD (NARF-1427c)

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
TU001	Front end		D806, D807	223145	1S2076TD
	240044	FD166U12	D805	223103	1N60
Q103	ICs		D809-D811	223105,	1S1555,
	222608	μPC1167C2, FM IF system		223133 or	DS442X or
Q104	222541	LB1426, Signal meter driver	D901	223145	1S2076TD
Q201	222453	HA1196, Stereo decoder		223804 or	SR1K-2 or
Q202	222575 or	TC4066BP or	D902	223848	GP08B
	222840661	4066B, Analogue switch		223979 or	RD27EB or
Q301	222626	HA1197, AM radio system		223922	WZ270
Q405	222618	μPD1703C-016, Micro computer	D903	223862	WL01
Q406	222619	μPB553AC, Prescaler	D904, D906	224020	WZ063
Q412-Q414	222513 or	TC4011BP or	D905	224082	WZ056
	222840111	4011B, NAND gate		Transformers	
Q415	222840351	4035B, Shift register	L101	233243	NFIF-6029P
Q416	222740421	74LS42, BCD to decimal decoder	L102	233244	NFIF-6029S
Q902	222780122	78M12, Voltage regulator	L305	232077	NMIF-6009
			L306	232041	NIT-0509
	Transistors				
Q102	2211722	2SC1923 (R)		Coils	
Q203-Q206	2211254 or	2SC1815 (Y) or	L201, L202	233181	NMC-5018
Q208	2210747	2SC945A (Q1)	L203	233236	NMC-6027
Q207	2211293	2SK68 (M), F.E.T	L301	232089	NMA-3037
Q302, Q303	2211254 or	2SC1815 (Y) or	L302	232092	NLA-2039
Q305-Q310	2210747	2SC945A (Q1)	L303	232084	NMO2018
Q304	2211293	2SK68 (M), F.E.T	L304	232080	NLO-3015
Q401-Q404	2211255	2SC1815 (GR)	L801	233031	NMC-9-1
Q407-Q411	2211454	2SA1015 (Y)		Ceramic filters	
Q417-Q419	2211254 or	2SC1815 (Y) or	X101, X103	3010006	SFE10.7MA-A
	2210747	2SC945A (Q1)	X301	3010049	CFM2-450 BL
Q501-Q504	2211255	2SC1815 (GR)		Crystal	
Q801-Q803	2211254 or	2SC1815 (Y) or	X401	3010052	XTL-4.5M
Q805-Q807	2210747	2SC945A (Q1)		Capacitors	
Q804	2211255	2SC1815 (GR)	C104	352741009	10μF, 16V, Elect.
Q901	2210747	2SC945A (Q1)	C106	352780339	3.3μF, 50V, Elect.
Q903	2201035 or	2SD325 (E) or	C109	352780109	1μF, 50V, Elect.
	2201034	2SD325 (D)	C111	352780229	2.2μF, 50V, Elect.
Q904	2211254 or	2SC1815 (Y) or	C118	352741009	10μF, 16V, Elect.
	2210747	2SC945A (Q1)	C119	352733309	3.3μF, 10V, Elect.
Q905	2211454	2SA1015 (Y)	C120, C122	352741009	10μF, 16V, Elect.
	Diodes		C201	352742219	220μF, 16V, Elect.
D101, D103	223105	1S1555	C202	352750479	4.7μF, 25V, Elect.
D201, D202	223133 or	DS442X or	C205, C206	352741009	10μF, 16V, Elect.
D304, D306	223145	1S2076TD	C207, C208	352780109	1μF, 50V, Elect.
D102	4000068	VD1222	C209	352784799	0.47μF, 50V, Elect.
D203, D204	224129 or	RD3.3E-B or	C210	352780109	1μF, 50V, Elect.
	224084	WZ-032	C211	352780339	3.3μF, 50V, Elect.
D301, D302	223136	KV1226	C212	352523614	360pF±5%, 50V, Styrol
D303	4000068	VD1222	C215	352752209	22μF, 25V, Elect.
D305, D311	223136	KV1226	C216	352734709	47μF, 16V, Elect.
D307, D308	223119	1S1558	C217	352741009	10μF, 16V, Elect.
D309, D310	223105,	1S1555,	TC301-TC303	3060010	NTC-20P09, Trimmer
D401-D424	223133 or	DS442X or	TC304	3060011	NTC-45P10, Trimmer
D501, D502	223145	1S2076TD	C301	352741009	10μF, 16V, Elect.
D503	2231031 or	1N60 (ONK) or	C305	352741009	10μF, 16V, Elect.
	223147	1N60FM			
D504, D801	223105,	1S1555,			
D803, D804	223133 or	DS442X or			

CIRCUIT NO.	PARTS NO.	DESCRIPTION
C309	352744709	47 μ F, 16V, Elect.
C311	352780339	3.3 μ F, 50V, Elect.
C312	352750479	4.7 μ F, 25V, Elect.
C314	352721019	100 μ F, 6.3V, Elect.
C317	352780109	1 μ F, 50V, Elect.
C324	372525114	510pF $\pm$ 5%, 50V, Styrol
C330	372522214	220pF $\pm$ 5%, 50V, Styrol
C331, C332	352784799	0.47 μ F, 50V, Elect.
C402	395160107	1 μ F, 35V, Tantalum
C406	395164797	0.47 μ F, 35V, Tantalum
C411	352723319	330 μ F, 6.3V, Elect.
C412	352721029	1,000 μ F, 6.3V, Elect.
C414	352741009	10 μ F, 16V, Elect.
C505	352744709	47 μ F, 16V, Elect.
C802	352750479	4.7 μ F, 25V, Elect.
C806–C808	352784799	0.47 μ F, 50V, Elect.
C809	352744719	470 μ F, 16V, Elect.
C811	352721019	100 μ F, 6.3V, Elect.
C902	352784719	470 μ F, 50V, Elect.
C903	352780109	1 μ F, 50V, Elect.
C905	352761029	1,000 μ F, 35V, Elect.
C906, C909	352764719	470 μ F, 35V, Elect.
C910	352741009	10 μ F, 16V, Elect.
C911, C912	352721019	100 μ F, 6.3V, Elect.
C914	352764719	470 μ F, 35V, Elect.
C915	352763319	330 μ F, 35V, Elect.
C916	352741009	10 μ F, 16V, Elect.
C918, C919	352780109	1 μ F, 50V, Elect.
Resistors		
R127	5215046	N08HR50KBC, Semi-fixed
R202	5215048	N08HR200KBC, Semi-fixed
R216	5225015	N10HR10KBD, Semi-fixed
R418–R422	49121104505	100k Ω $\times$ 5, Network
R423–R429	49121104507	100k Ω $\times$ 7, Network
R430–R433	49121333504	33k Ω $\times$ 4, Network
R811	5215047	N08HR100KBC, Semi-fixed
R904	441723304	33 Ω , 2W, Metal oxide film
R905	441721514	150 Ω , 2W, Metal oxide film
R908	441521024	1k Ω , 1/2W, Metal oxide film
R911	441528204	82 Ω , 1/2W, Metal oxide film
Relaies		
RL301	25065135	FRL-644D05-2AS
RL302	25065093	FRL-644D12-1AS
Radiator		
	27160011A	RAD-05
Screws		
	82113008	3P+8FN, Radiator
	834140088	3TTS+8B, Radiator
Nut		
	863130	N-3FN

INDICATOR PC BOARD (NADIS-1428b)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Transistors		
Q420, Q421	2211254 or 2210747	2SC1815 (Y) or 2SC945A (Q1)
Fluorescent indicator tube		
Q422	212010	7-BT-05A2
L.E.Ds		
D104–D107	225048	SLP-252B-04, Signal
D205, D435	225046	SLP-151B
D427–D432	225057	SR538D
D433–D434	225047	SLP-251B
Diode		
D437	223105, 223145 or 223133	1S1555, 1S2076TD or DS442X
D425, D426	223106	1S1554
Switches		
	25035156	NPS-111-S120
Bracket		
	27110127-1B	Front
Cushion		
	28140300	Fluorescent indicator tube
Screws		
	831130080	3TTW+8P, Tapping screw
Washer		
	870069	W10x5mm, Nylon

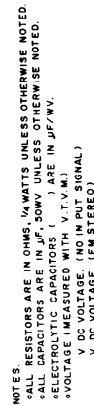
DIAL ILLUMINATION LAMP PC BOARD (NAPL-1429)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL902	210064A	250mA, 6.3V, Lamp
	831130080	3TTW+8P, Tapping screw
D436	225046	SLP-151B, L.E.D

REMOTE CONTROL TERMINAL PC BOARD (NARM-1430)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
P401	25050070	NSCT-7P20

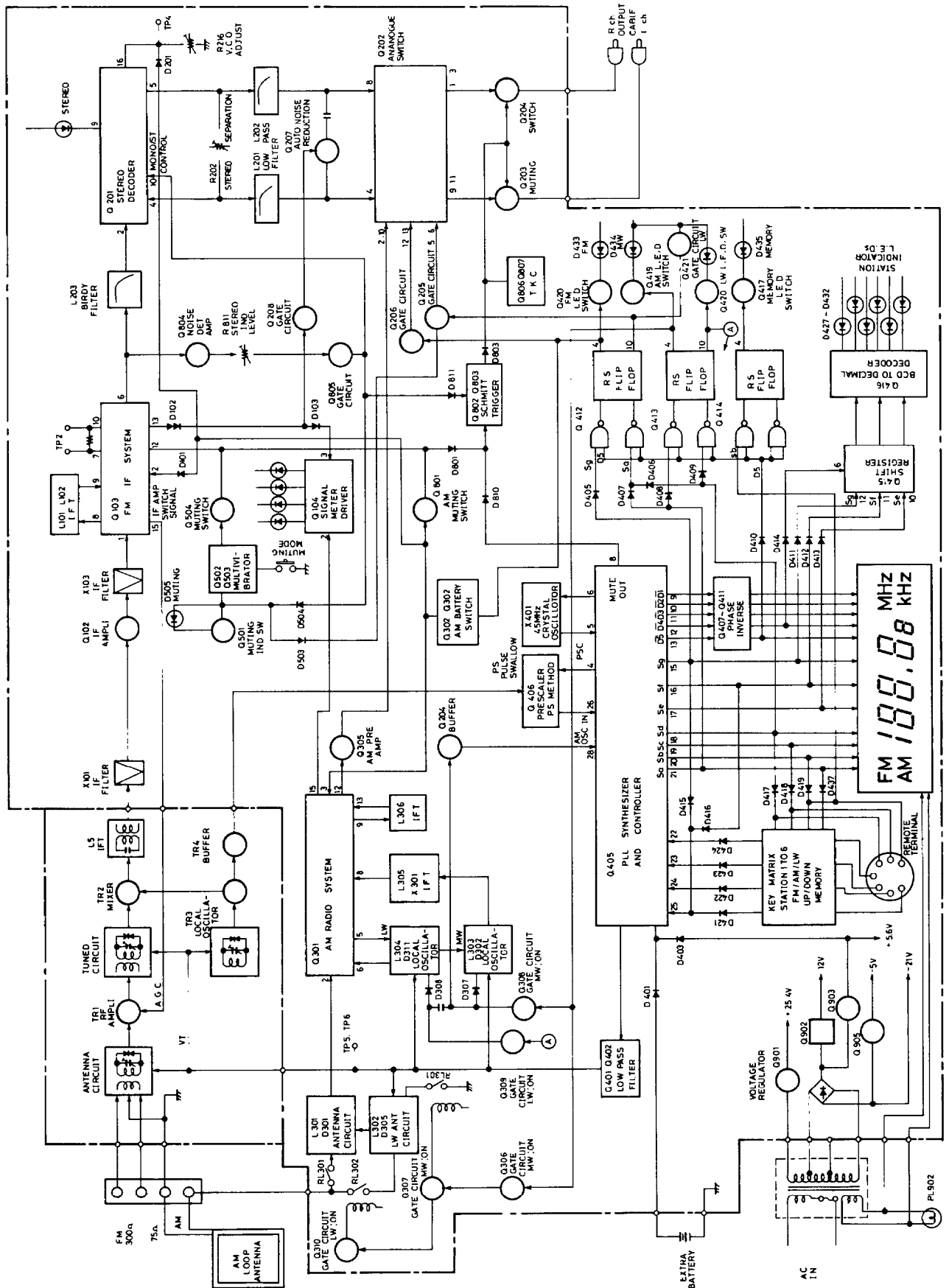
D model



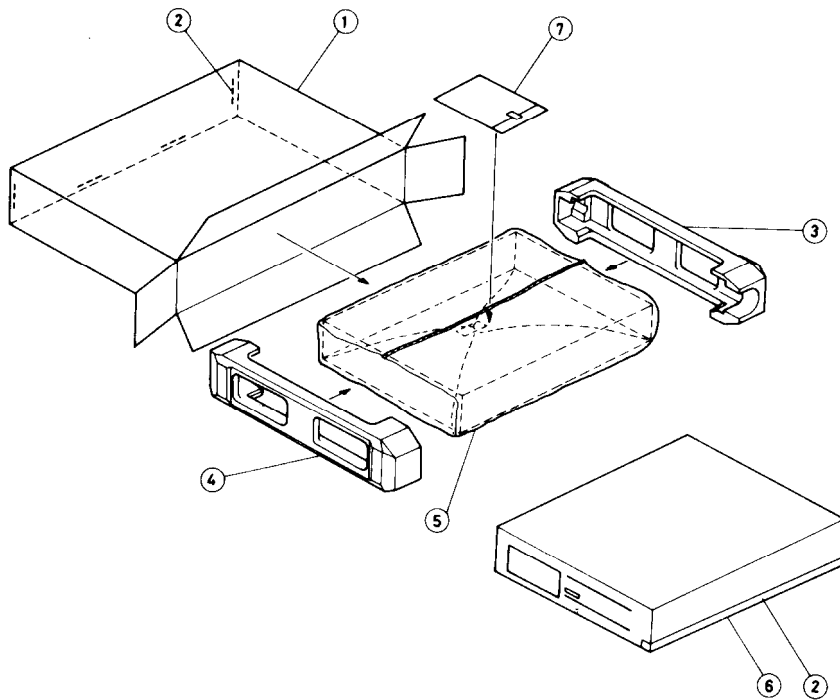
ONIKYO CORPORATION

BLOCK DIAGRAM

T-08L



PACKING VIEW



REF. NO.	PARTS NO.	DESCRIPTION
1	29050566	Master carton box (T-08)
	29050567	Master carton box (T-08L)
2	282301	Sealing hook
3	29090533C	Pad, right
4	29090532A	Pad, left
5	29100051	420x750mm, Poly-vinyl bag
6	260012	50x450mm, Dampalon tape
7		Accessory bag ass'y

(U.S.A. model)

29340620	Instruction manual
292064A	FM antenna
3010054	Two batteries
29358002	Service station list
29100006	350x250mm, Poly-vinyl bag
29365006-3	Warranty card

(120V model)

29340620	Instruction manual
292064A	FM antenna
3010054	Two batteries
29100006	350x250mm, Poly-vinyl bag

REF. NO.	PARTS NO.	DESCRIPTION
	(220V model)	
	29340621	Instruction manual
	292064A	FM antenna
	29100006	350x250mm, Poly-vinyl bag

(West Germany model)

29340621	Instruction manual
292064A	FM antenna
29100006	350x250mm, Poly-vinyl bag
29365005-3	Warranty card

(Universal model)

29340621	Instruction manual
292064A	FM antenna
29100006	350x250mm, Poly-vinyl bag
25055040	Conversion plug

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