

ONKYO® SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER MODEL TX-41

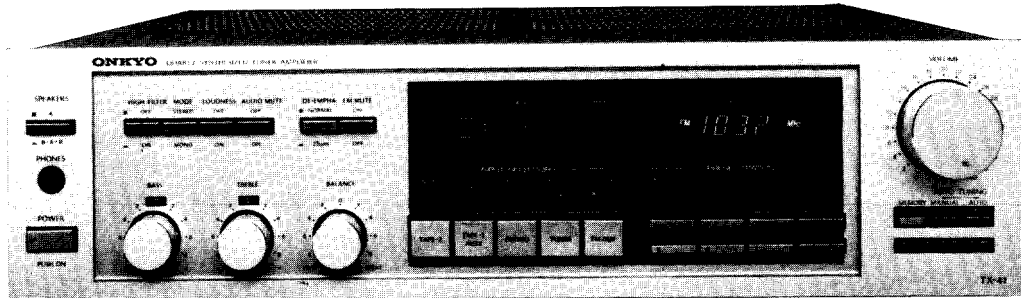


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ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Output Power:	30 watts per channel, min. RMS, at 8 ohms both channels driven, from 20 Hz to 20,000 Hz, with no more than 0.06% total harmonic distortion.
Total Harmonic Distortion:	0.06% at rated power 0.06% at 1 watt output
IM Distortion:	0.1% at rated power 0.06% at 1 watt output
Damping Factor:	35 at 8 ohms
Frequency Response:	20 Hz – 30,000 Hz (± 1 dB)
RIAA Deviation:	20 Hz – 20,000 Hz (± 0.8 dB)
Sensitivity & Impedance:	Phono: 2.5 mV, 50 k Ω Tape Play: 150 mV, 50 k Ω Tape Rec: 150 mV, 3.5 k Ω (PH)
Phono Overload:	110 mV R.M.S. at 1 kHz, 0.06% T.H.D.
Signal-to-Noise Ratio:	Phono: 85 dB (at 10 mV input A weighted) 75 dB (IHF A-202) Tape: 95 dB (A weighted) 80 dB (IHF A-202)
Tone Controls:	Bass: ± 12 dB at 100 Hz Treble: ± 10 dB at 10 kHz
Loudness:	+9 dB at 40 Hz +5 dB at 20 kHz

TUNER SECTION (120 V model)

FM:

Tuning Range:	87.5 – 108 MHz (100 kHz steps)
Usable Sensitivity:	Mono: 11.2 dBf, 2.0 μ V Stereo: 19.2 dBf, 5 μ V
50 dB Quieting Sensitivity:	Mono: 17.2 dBf, 4.0 μ V Stereo: 37.2 dBf, 40 μ V
Capture Ratio:	1.5 dB
Image Rejection Ratio:	45 dB
IF Rejection Ratio:	80 dB
Spurious Rejection Ratio:	80 dB
Signal-to-Noise Ratio:	Mono: 71 dB Stereo: 66 dB
Alternate Channel Att.:	55 dB
AM Suppression Ratio:	50 dB
Harmonic Distortion:	Mono: 0.15% Stereo: 0.3%
Frequency Response:	30 Hz – 15,000 Hz (± 1.5 dB)
Stereo Separation:	40 dB at 1 kHz 30 dB at 100 Hz – 10,000 Hz
Muting Level:	17.2 dBf, 4 μ V
Stereo Threshold:	17.2 dBf, 4 μ V

AM:

Tuning Range:	520 – 1710 kHz (10 kHz steps)
Usable Sensitivity:	30 μ V
Image Rejection Ratio:	40 dB
IF Rejection Ratio:	30 dB
Signal-to-Noise Ratio:	40 dB
Harmonic Distortion:	0.8%

TUNER SECTION (220 V model)

FM:

Tuning Range:	87.5 – 108 MHz (50 kHz steps)
Usable Sensitivity:	Mono: 11.2 dBf, 2.0 μ V Stereo: 19.2 dBf, 5 μ V
50 dB Quieting Sensitivity:	Mono: 17.2 dBf, 4.0 μ V Stereo: 37.2 dBf, 40 μ V
Capture Ratio:	1.5 dB
Image Rejection Ratio:	80 dB
IF Rejection Ratio:	90 dB
Spurious Rejection Ratio:	90 dB
Signal-to-Noise Ratio:	Mono: 71 dB Stereo: 66 dB
Selectivity:	50 dB (± 300 kHz, 40 kHz Devi.)
AM Suppression Ratio:	50 dB
Harmonic Distortion:	Mono: 0.15% Stereo: 0.3%
Frequency Response:	30 Hz – 15,000 Hz (± 1.5 dB)
Stereo Separation:	40 dB at 1 kHz 30 dB at 100 Hz – 10,000 Hz
Muting Level:	17.2 dBf, 4 μ V
Stereo Threshold:	17.2 dBf, 4 μ V

AM:

Tuning Range:	522 – 1611 kHz (9 kHz steps)
Usable Sensitivity:	30 μ V
Image Rejection Ratio:	40 dB
IF Rejection Ratio:	30 dB
Signal-to-Noise Ratio:	40 dB
Harmonic Distortion:	0.8%

GENERAL

Power Supply:	120 V, 60 Hz (D model) 220 V, 50 Hz (G model) 120/220 V, 50/60 Hz (W model)
Outputs:	Speaker A & B, Phones, Tape Rec. Out 1 & 2, AC Outlet (unswitched) (Only D model) Phono, Tape Play 1 & 2, FM and AM Antennas
Antennas:	FM: 300 ohms balanced and 75 ohms unbalanced AM: built-in loop antenna and external terminal
Semiconductors:	6 FET, 22 transistors, 11 ICs, 74 diodes
Dimensions (WxHxD):	418 x 114 x 392 mm 16-1/2" x 4-1/4" x 15-7/16"
Weight:	7.7 kg, 17 lbs.

* Specifications and features are subject to change without notice.

PRECAUTIONS

1. Replacing the MOS IC

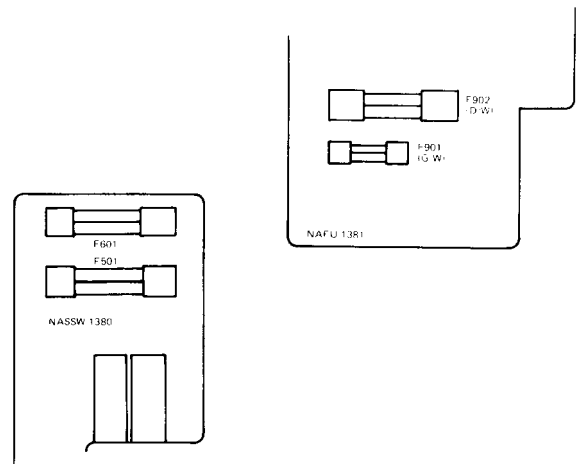
- All MOS devices should be stored or transported in materials that are somewhat conductive. MOS devices must not be inserted into conventional plastic "snow" or plastic trays.
- All MOS devices should be placed on a grounded bench surface and operators should ground themselves prior to handling devices,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

2. Replacing the fuses

Remove the top cover. The speaker protection fuses are located on the speaker switch pc board. The primary fuses are located on the fuse holder pc board as shown in the fig.1.

Caution: For continued protection against fire hazard, replace only with same type and same rating fuse.

	Circuit No.	Parts No.	Description	Remarks
Speaker fuse	F501, F601	252059	4A (SS-2)	120V model
	F501, F601	252076	3.15A-SE-EAK	220V model
	F501, F601	252014	4A-T	120/220V model
Primary fuse	F902	252049	4A (ST-6)	120V model
	F901	252074	2A-SE-EAK	G/W models
	F902	252014	4A-T	120/220V model



SPECIAL MODES OPERATION

1. 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 two batteries into the battery holder in the bottom of the unit before turning on power for the first time.

Type	Voltage (V)	IEC	United States									United Kingdom		West Germany	France	Denmark	Italy	Australia	
			ANSI	NEDA	Eveready	Mallory	Ray-O Vac	Bright Star	Burgess	RCA	Sears	Eveready (BEREC)	Mallory	VARTA (Perrix)	S A F T (Leclanché)	Hellesens	Supper Pila	Eveready	
Manganese	1.5	R6	AA	15P	815	M15P	710	59P	920	VS734	8950			251	R6S	V1 18	63	915	
				15F	915	M15F	7AA	59	910	VS034A					SP12	R6B			V1 28
				15	1015	M150F	15	0199	930	VS334					SP12	T3S			V1 38
				15D	1215	M1504	5AA								HP7				V1 75

2. De-emphasis switch (Only W model)

The 50 μsec /75 μsec selector switch employed in the W (120/220V) model is located on the bottom board. When shipped from the factory, this switch is set to the 50 μsec position. For use 75 μsec regions, switch over to the 75 μsec position.

3. Voltage Selector (Only W model)

Some models are equipped with a voltage selector to conform with local power supplies.

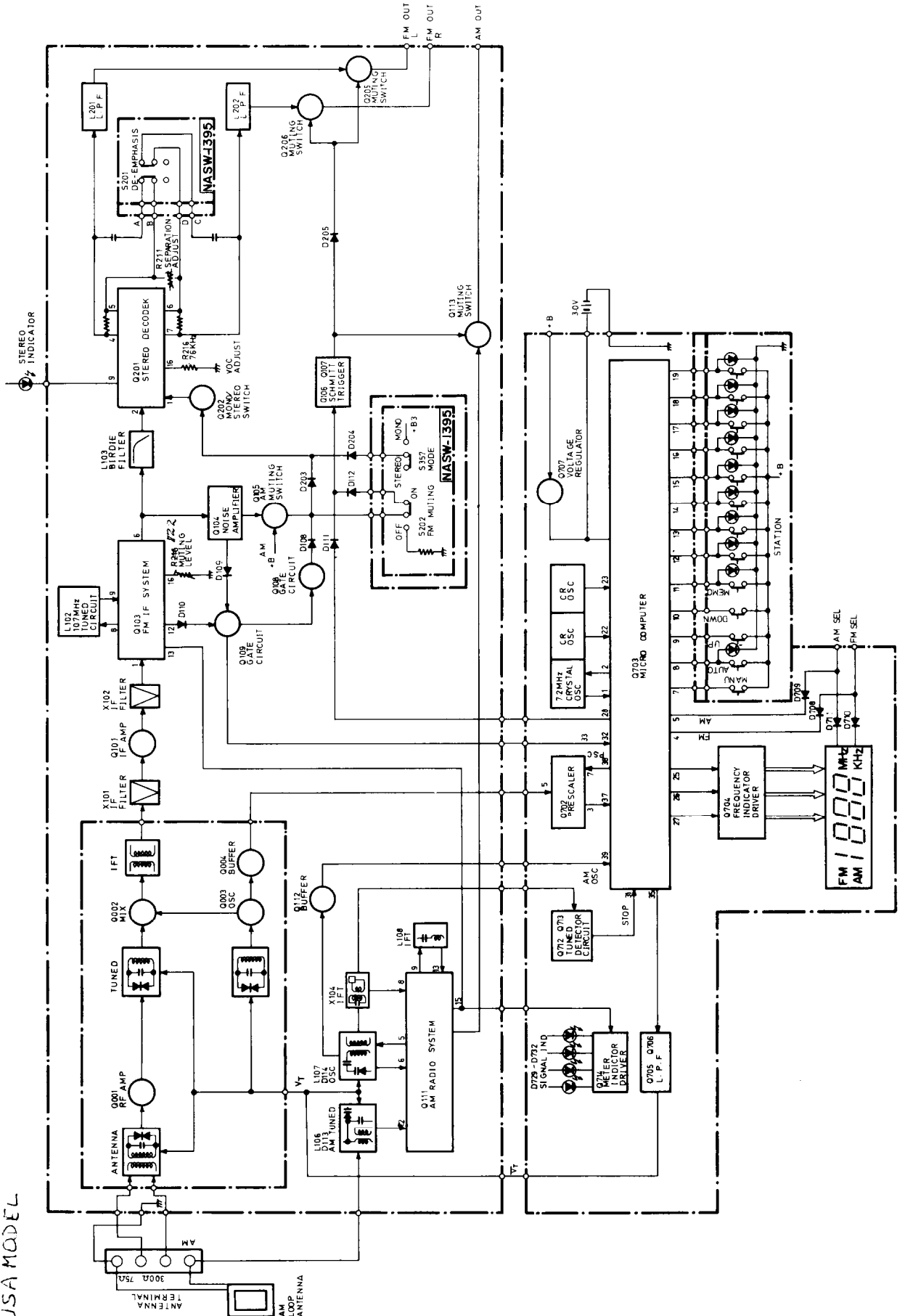
Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

BLOCK DIAGRAM

-TUNER SECTION-

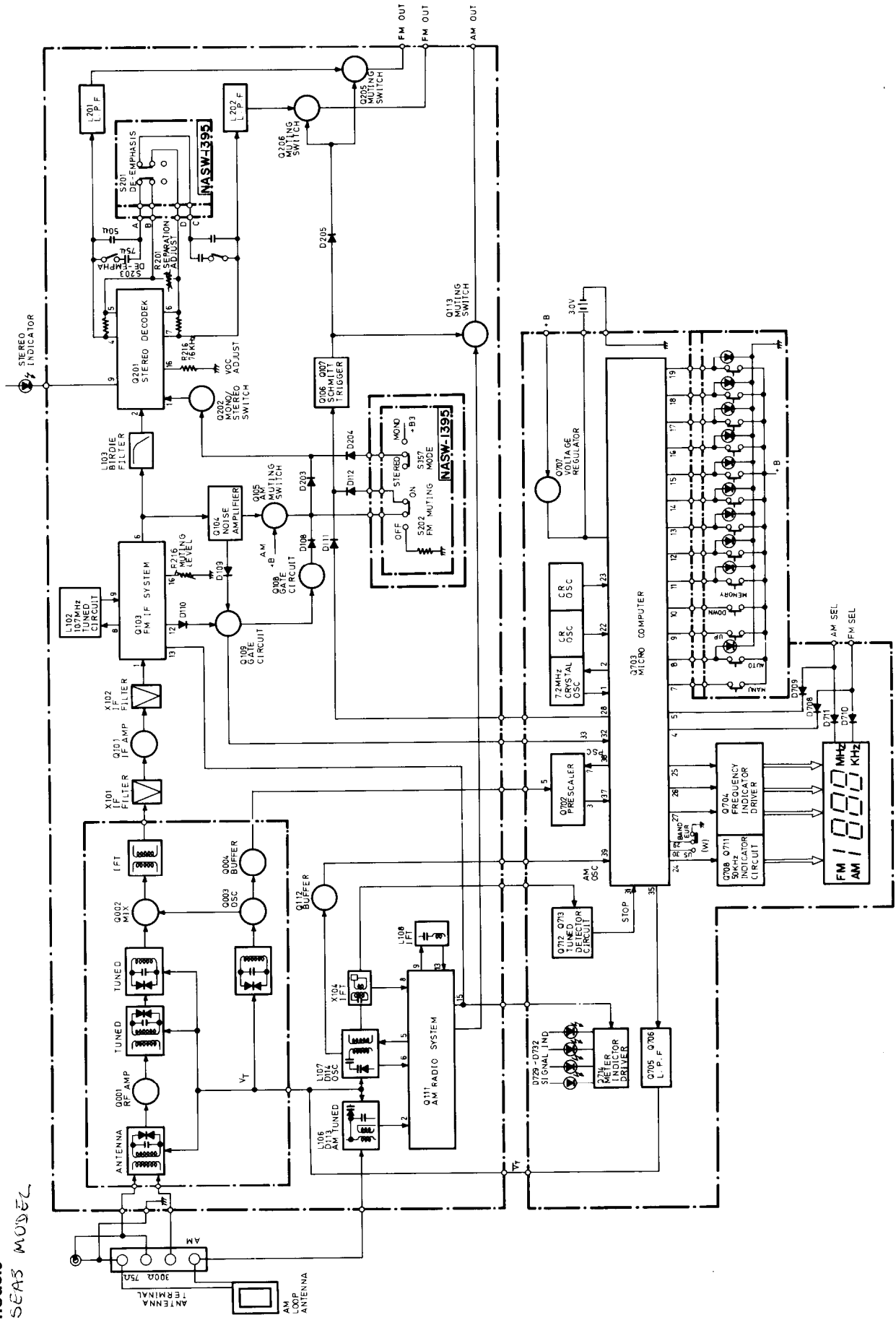
D model

USA MODEL

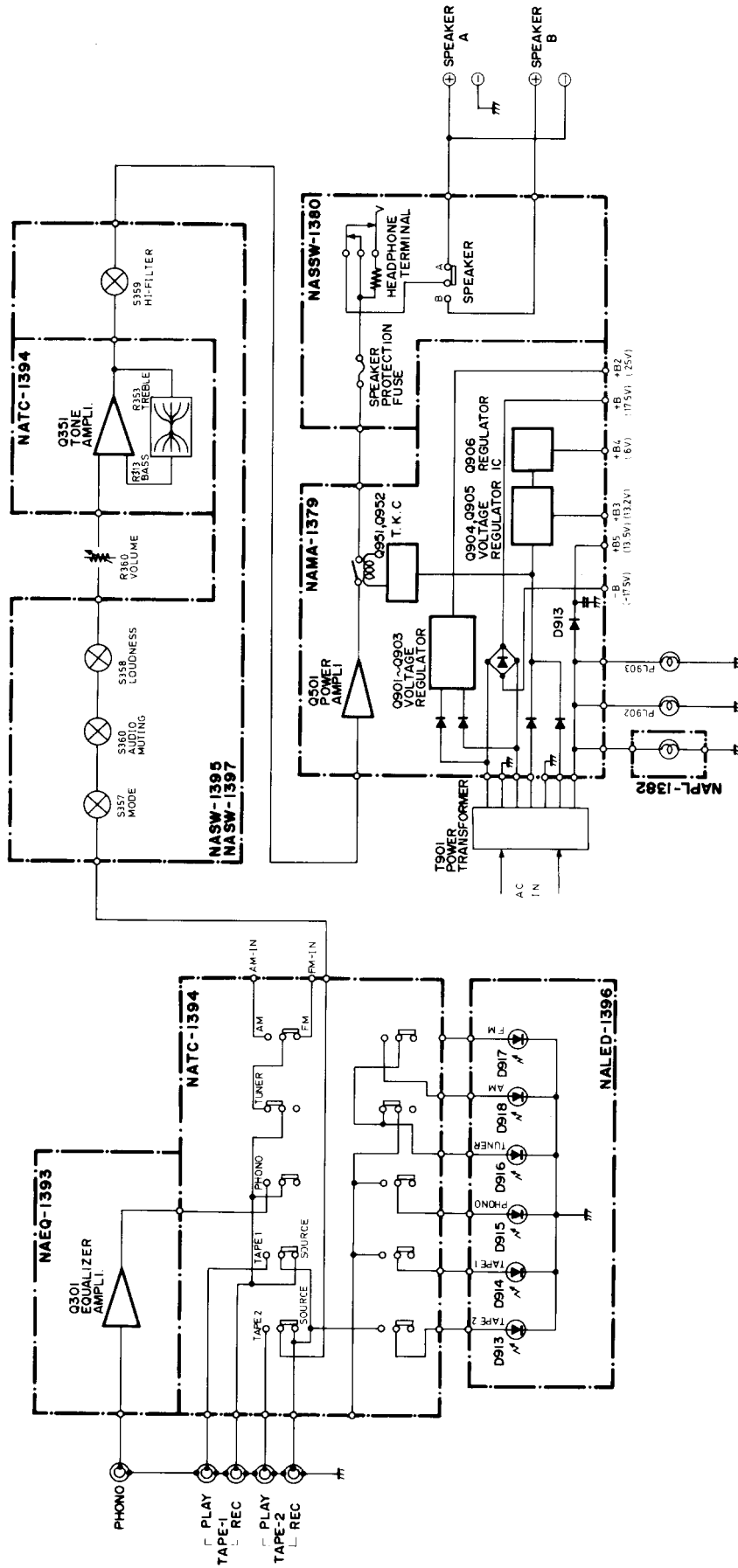


BLOCK DIAGRAM

-TUNER SECTION-
G/W models
OVERSEAS MODEL

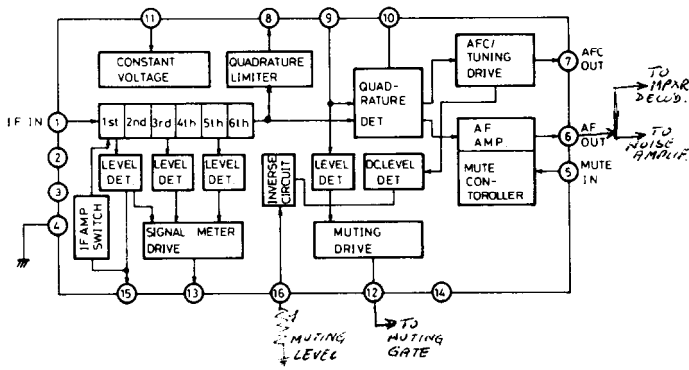


BLOCK DIAGRAM —AMPLIFIER SECTION—

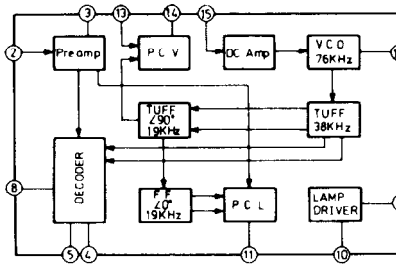


BLOCK DIAGRAM OF IC

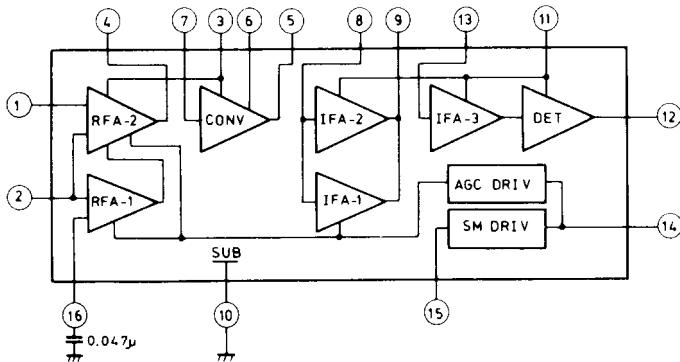
μ PC1167C2 (FM IF system)



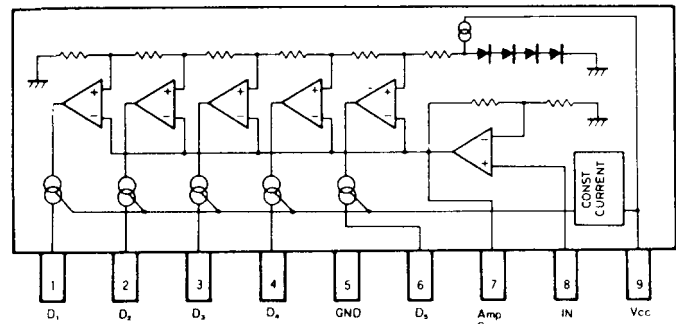
HA 12016 (Stereo decoder)



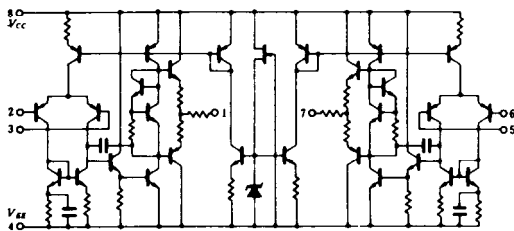
LA1240 (AM radio system)



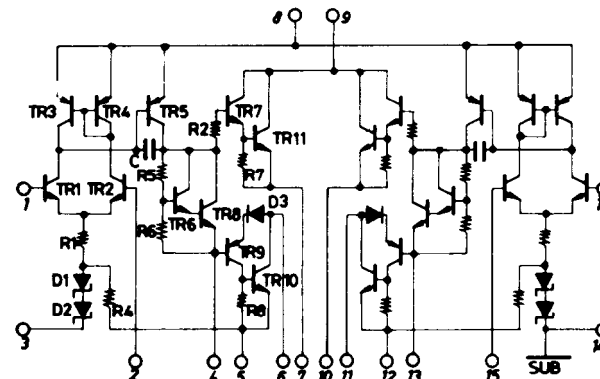
BA6124 (Signal meter driver)



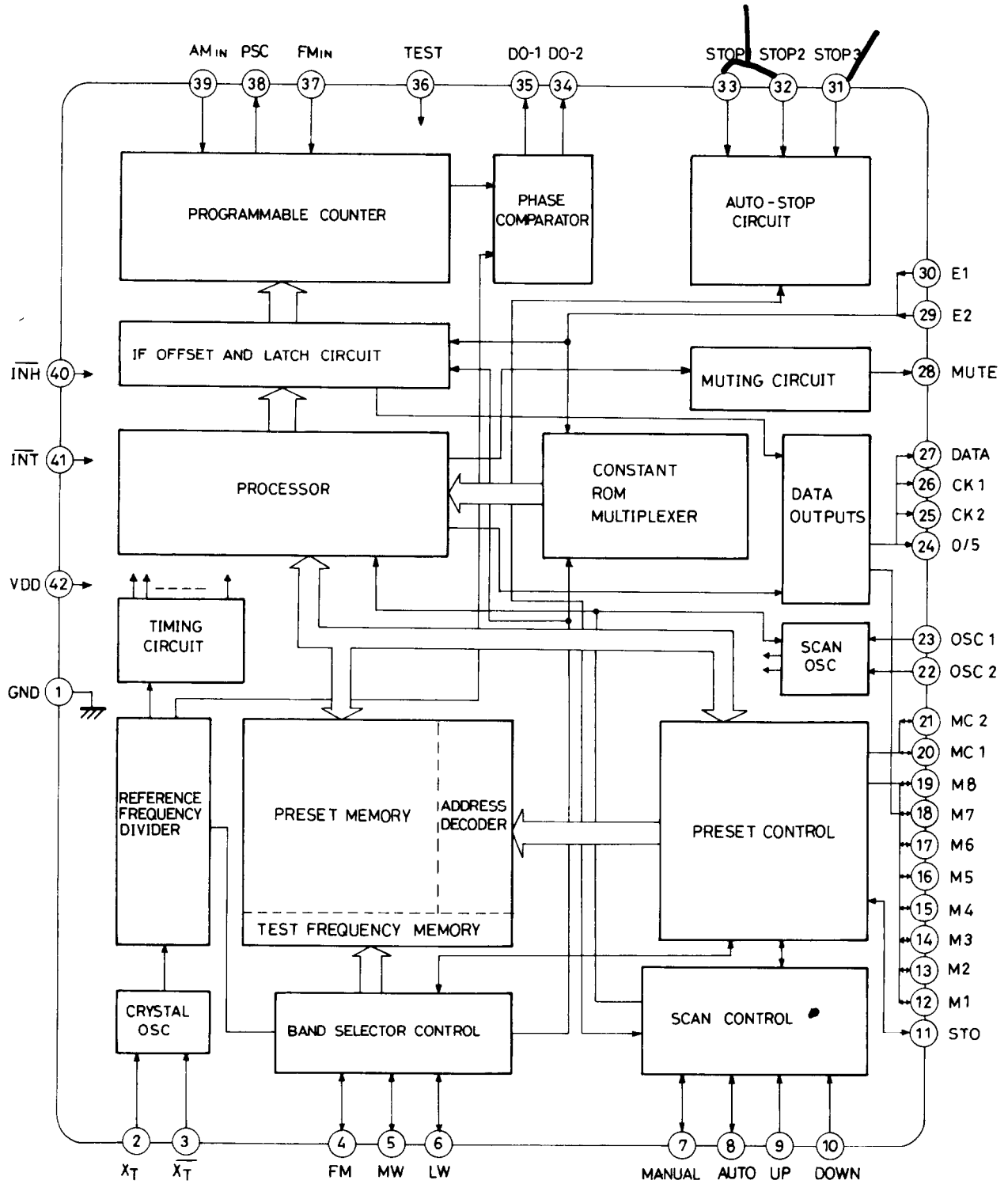
NJM4558D, 4559DX EQUIVALENT CIRCUIT



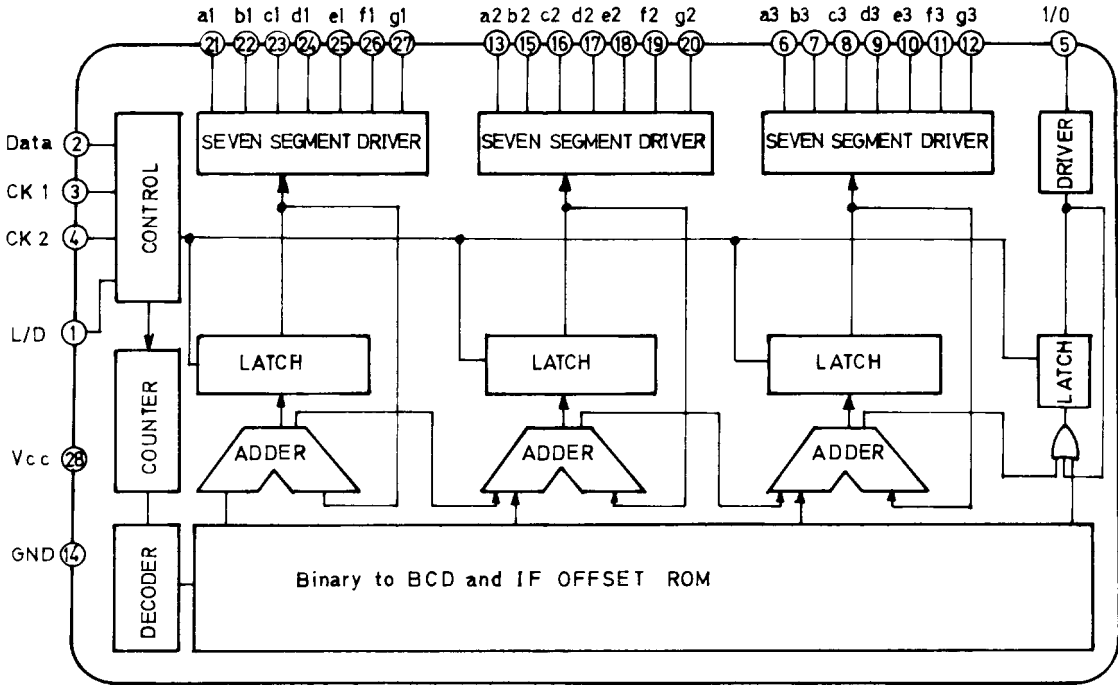
STK-463 EQUIVALENT CIRCUIT



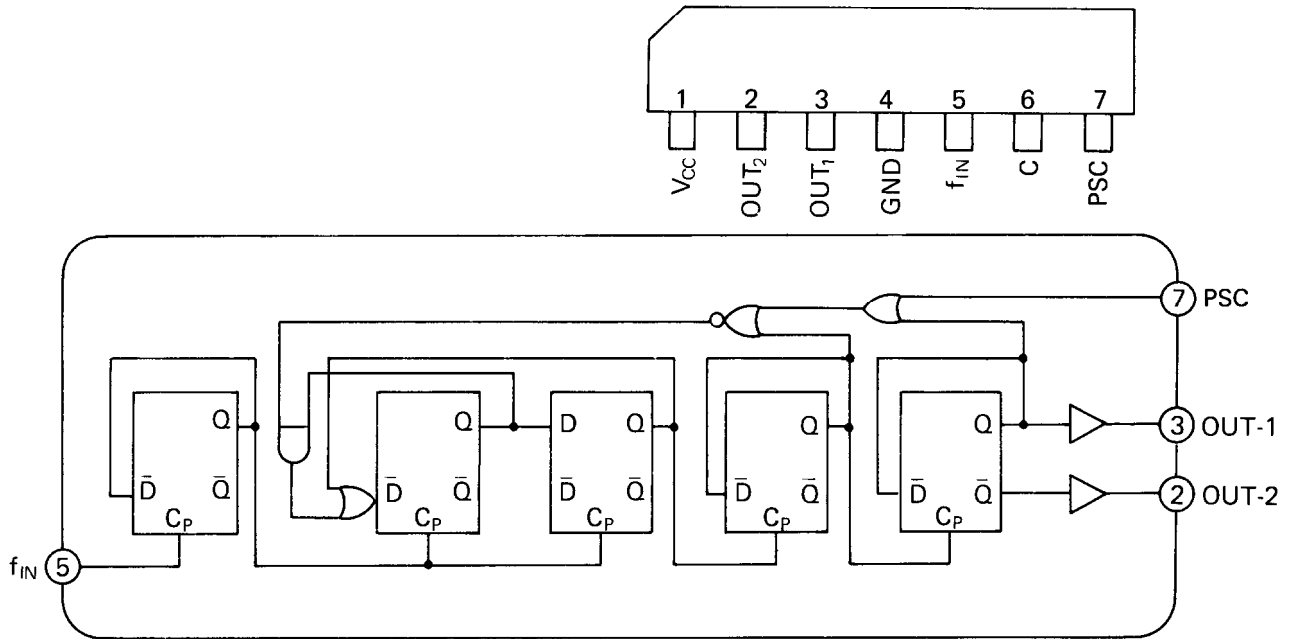
TC9147P (Micro computer)



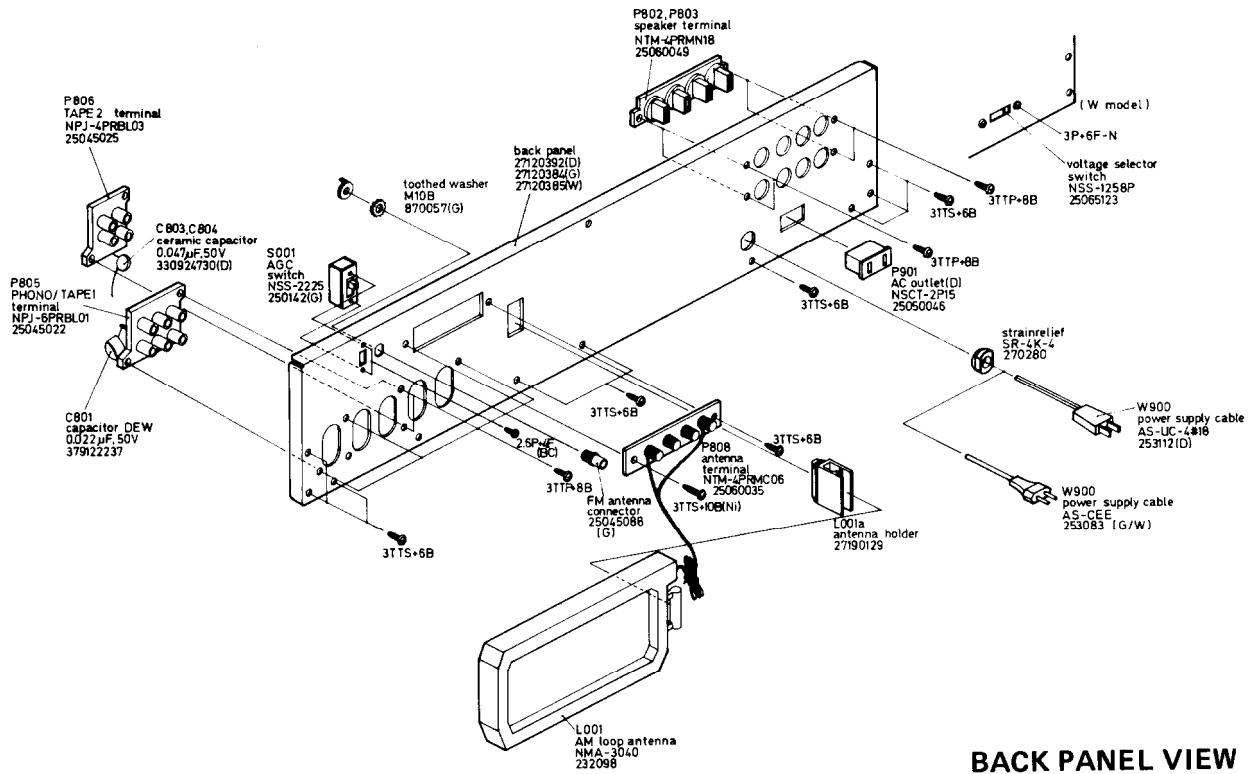
TD6301AP (Fluorescent indicator tube driver)



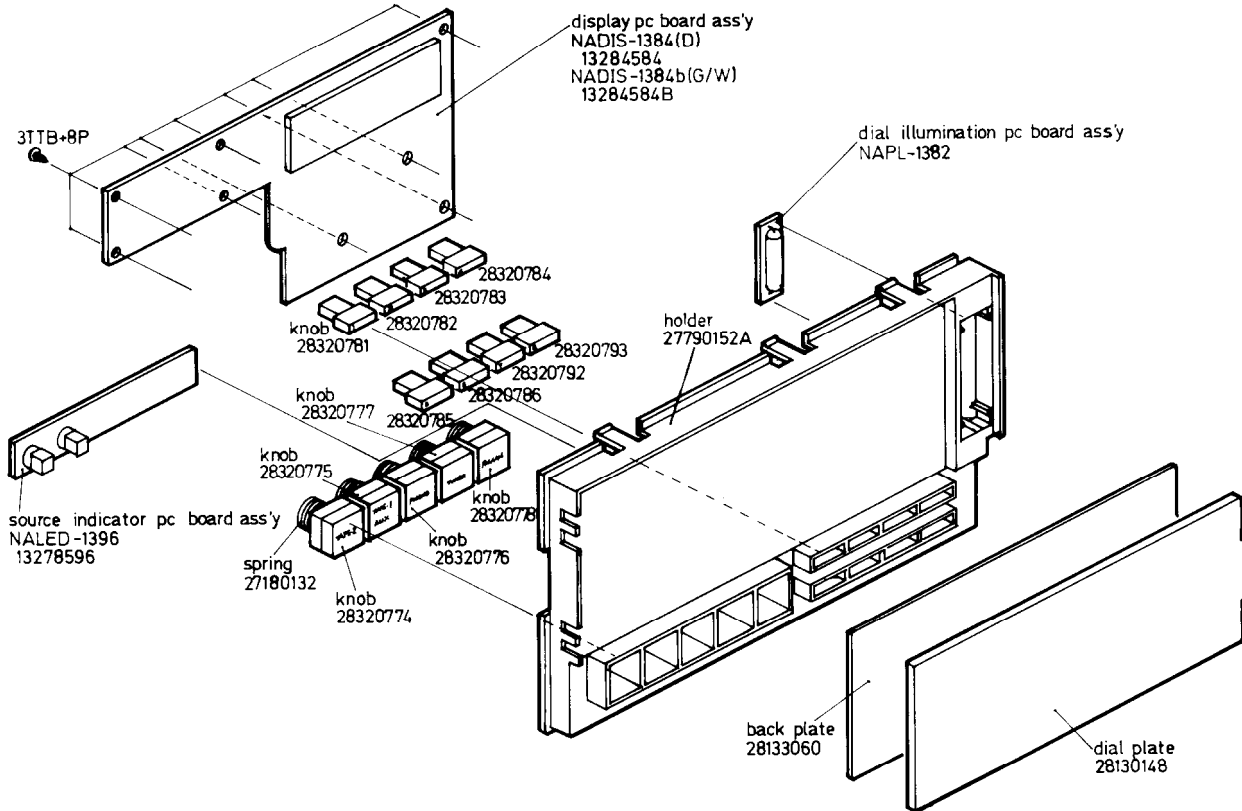
TD6104P (Prescaler)



EXPLODED VIEW

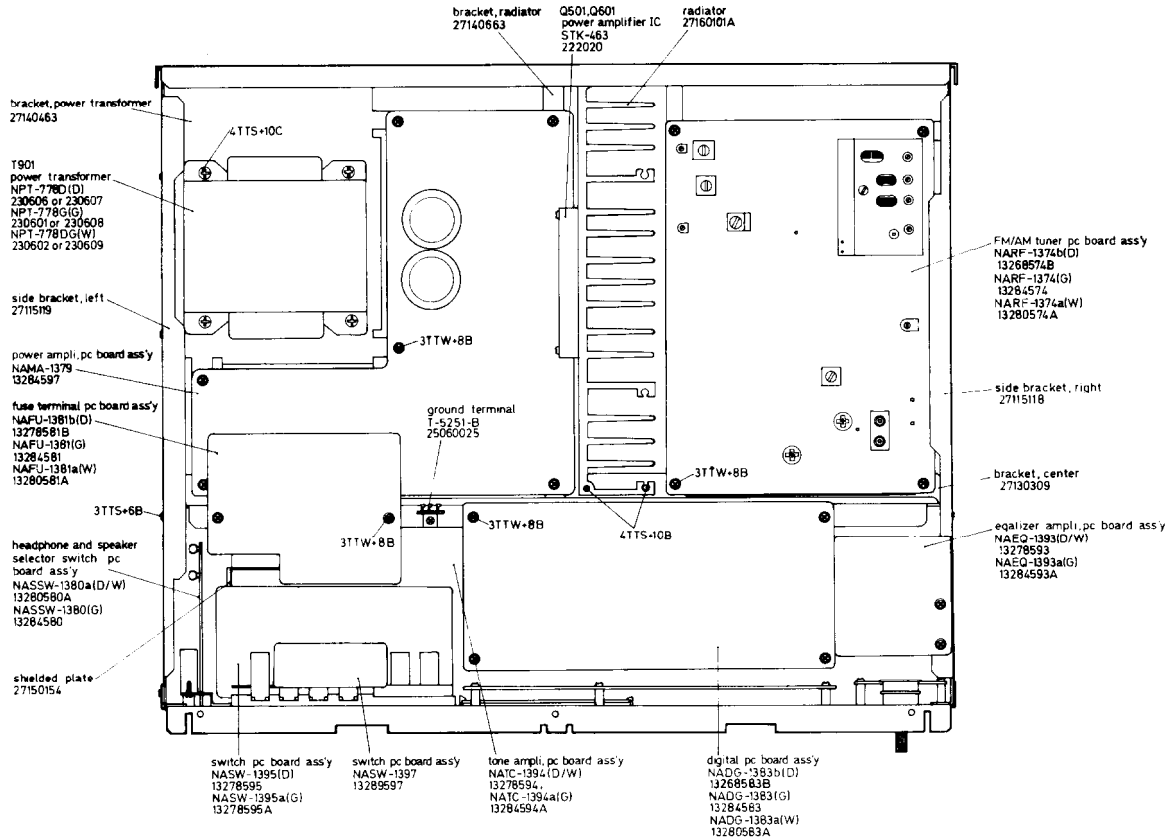


BACK PANEL VIEW



HOLDER VIEW

COMPONENT LOCATION



PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
A1	27110169A	Front bracket	A506	27267192	Guide, mode
A4	27130308	Bracket, lamp	A507	27267193	Guide, tuning
A5	27150154	Shielded plate	A508	28198572	Facet
A6	27140658	Bracket, left side	A631	27170131A	Bottom board
A7	27140659	Bracket, right side	A632	27175009	Leg
A9	28130148	Dial plate	A635	27300359	Lid
A10	28133060A	Back plate	A801	28320543-1	Knob, volume
A17	28140126	53mm, Cushion	A803	28320760	Knob, power
A18	28140185	40mm, Cushion	A804	28320761	Knob
A19	28175055	Insulating plate	A805	28320772	Knob, mode
A20	27115118	Side bracket, right	A806	28320774	Knob, tape 2
A21	27115119A	Side bracket, left	A807	28320775	Knob, tape 1
A22	27130309	Bracket, center	A808	28320776	Knob, phono
A23	27130310	Bracket, power transformer	A809	28320777	Knob, tuning
A25	27140463	Bracket, battery	A810	28320778	Knob, FM
A26	27300360	Case, battery	A811	28320795A	Knob, balance
A27	27160101A	Radiator	A812	28320771A	Knob, tone
A28	27140663	Bracket, radiator	A819	29320780	Knob, memory
A45	27120392	Back panel (D)	A820	13284902	Knob ass'y
	27120384	Back panel (G)	A823	28320794	Knob, red
	27120385	Back panel (W)		28320781	Knob, station 1
A301	28184146	Top cover		29320782	Knob, station 2
A304	28140024	0.5x10x390mm, Cushion		28320783	Knob, station 3
A501	13284121	Front panel ass'y		28320784	Knob, station 4
A503	13284901	Clear plate ass'y		28320785	Knob, station 5
A504	27267179	Guide, power		28320786	Knob, station 6
A505	27267180	Guide, speaker		28320792	Knob, station 7
				28320793	Knob, station 8

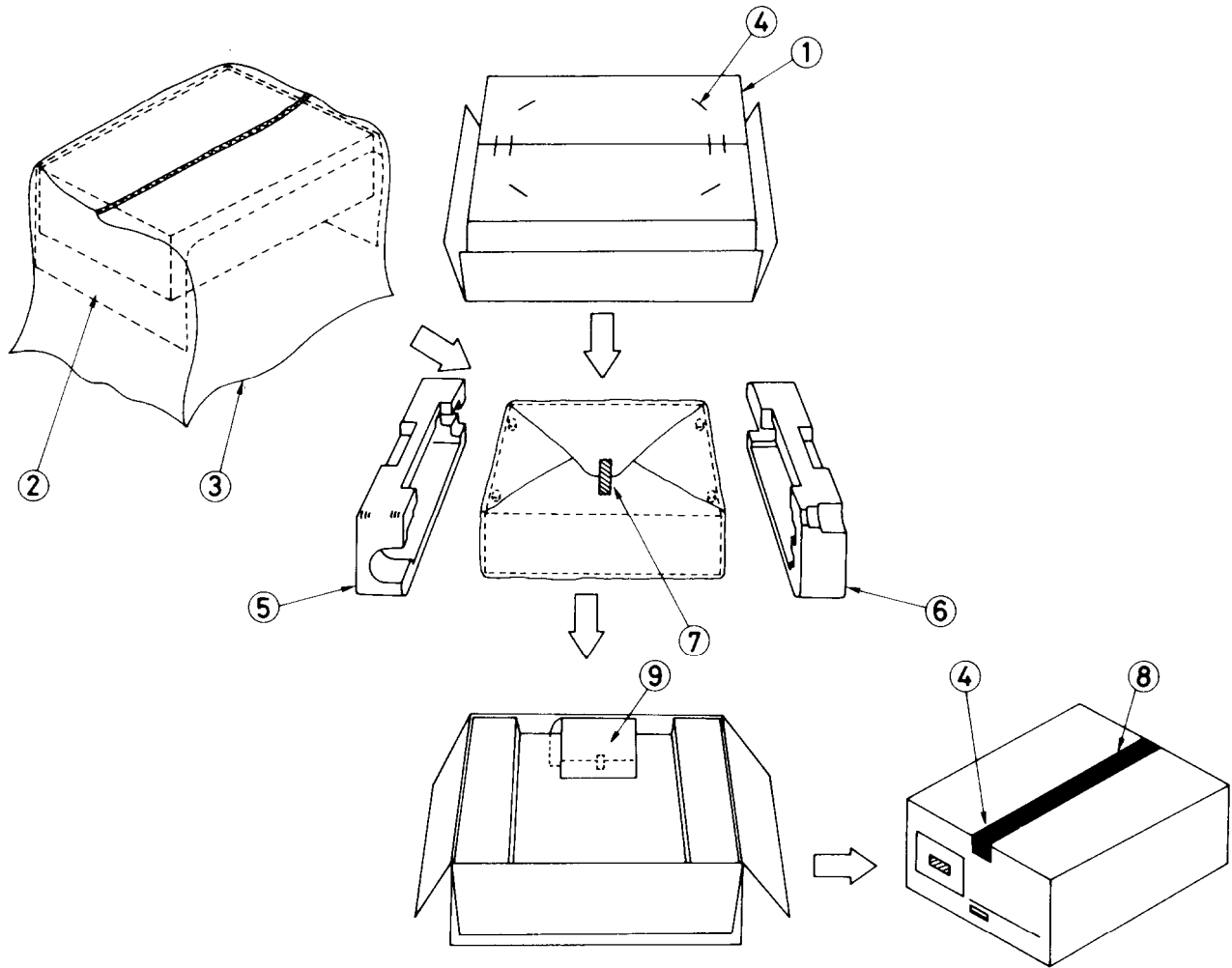
REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
C801	379122237	0.022 μ F, 50V, Capacitor, DEW (D/W)	U8	13278581B	NAFU-1381b, Fuse terminal pc board ass'y (D)
	379124737	0.047 μ F, 50V, Capacitor, DEW (G)		13284581	NAFU-1381, Fuse terminal pc board ass'y (G)
C803, C804	330924730	0.047 μ F, 50V, Capacitor, ceramic (D)		13280581A	NAFU-1381a, Fuse terminal pc board ass'y (W)
C900	3500060	0.01 μ F, 125V, Capacitor CS (D)	U9	13284582	NAPL-1382, Dial illumination lamp pc board ass'y
	3500065A	0.01 μ F, 240V, Capacitor IS (G/W)			
C900a	27300080	Cover, capacitor	U10	13268583B	NADG-1383b, Digital circuit pc board ass'y (D)
F501, F601	252059	4A (SS-2), Speaker protection fuse (D)		13284583	NADG-1383, Digital circuit pc board ass'y (G)
	252076	3.15A-SE-EAK, Speaker protection fuse (G)			
	252014	4A-T, Speaker protection fuse (W)			
F902	252049	4A (ST-6), Primary fuse (D)		13280583A	NADG-1383a, Digital circuit pc board ass'y (W)
F901	252074	2A-SE-EAK, Primary fuse (G/W)			
F902	252014	4A-T, Primary fuse (W)	U11	13284584	NADIS-1384, Fluorescent indicator tube pc board ass'y (D)
L001	232098	NMA-3040, Am loop antenna			
L001a	27190129	Holder, antenna		13284584B	NADIS-1384b, Fluorescent indicator tube ass'y (G/W)
P802, P803	25060049	NTM-4PRMN18, Speaker terminal	U12	13284585	NADIS-1385, Operation switch pc board ass'y
P805	25045022	NPJ-6PRBL01, Tape 1 and Phono terminal			
P806	25045025	NPJ-4PRBL03, Tape 2 terminal	U13	13278597	NASW-1397, Switch circuit pc board ass'y
P808	25060035	NTM-4PRMC06, Antenna terminal			
P809	25045088	FM antenna connector (G)	U14	13280586	NASW-1386, FM/AM band selector switch pc board ass'y (W)
P809a	870057	M10B, Toothed washer (G)			
Q501, Q601	222020	STK-463, Power amplifier IC	W900	253112	AS-UC-4, Power wupply cable (D)
R900	431523355	3.3M Ω , 1/2W, Resistor, solid (D)		2503083	AS-CEE, Power supply cable (G/W)
R360, R460	5147013	N16RG100KBT35, Volume control variable resistor	W900a	270280	SR-4K-4, Strainrelief
				25060025	T-5251-B, Ground terminal
R375	5104137A	N16RC100KW25, Balance control variable resistor			
S900	25035321 or 25035135	NPS-111-L285P or NPS-111-L100P, Power switch (D)	NOTE:	D: Only 120V model	
S900	25035322 or 25035176	NPS-111-L286P or NPS-111-L140P, Power switch (G/W)		G: Only 220V model	
S001	250142	NSS-2225, AGC switch (G)		W: Only 120/220V model	
S902	25065123	NSS-1258P, Voltage selector switch			
P901	25050046	NSCT-2P15, AC outlet (D)			
T901	230606 or 230607	NPT-778D or NPT-781D, Power transformer (D)	[screws]		
	230601 or 230608	NPT-778G or NPT-781G, Power transformer (G)			
	230602 or 230609	NPT-778DG or NPT-781DG, Power transformer (W)			
U1	13268574B	NARF-1374b, FM/AM tuner pc board ass'y (D)			
	13284574	NARF-1374, FM/AM tuner pc board ass'y (G)			
	13280574A	NARF-1374a, FM/AM tuner pc board ass'y (W)			
U2	13278593	NAEQ-1393, Equalizer amplifier pc board ass'y (D/W)			
	13284593A	NAEQ-1393A, Equalizer amplifier pc board ass'y (G)			
U3	13278594	NATC-1394, Tone amplifier pc board ass'y (D/W)			
	13284594A	NATC-1394A, Tone amplifier pc board ass'y (G)			
U4	13278595	NASW-1395, Switch pc board ass'y (D)			
	13278595A	NASW-1395a, Switch pc board ass'y (G/W)			
U5	13278596	NALED-1396, Source indicator pc board ass'y			
U6	13284579	NAMA-1379, Power amplifier pc board ass'y			
U7	13280580A	NASSW-1380a, Speaker switch pc board ass'y (D/W)			
	13284580	NASSW-1380, Speaker switch pc board ass'y (G)			

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

[screws]

	PARTS NO.	DESCRIPTION
3TTB + 6B	838130068	Bind
3TTS + 6B	834130068	Tapping
3P + 6FN	82113006	Pan head
3P \pm 6BQ (Ni)	801143	Pan head
3TTW + 8B	831130088	Tapping
3TTS + 8B	834130088	Tapping
3TTP + 8P	833130080	Tapping
3TTS + 10B (Ni)	834230108	Tapping
3TTS + 16B	834130168	Tapping
4TTB + 8C (BC)	838440089	Tapping
4TTS + 10B	834140108	Tapping
3TTW + 6B	831130068	Tapping
3TTS + 12B	834130128	Tapping

PACKING VIEW



REF. NO.	PARTS NO.	DESCRIPTION
1	29050556	Master carton box
2	29095012-1	500x800mm, Protection sheet
3	29100034	850x650mm, Poly-vinyl bag
4	282301	Sealing hook
5	29090693	Pad, right side
6	29090692	Pad, left side
7	29110032	Adhesive tape
8	260012	Dampson tape
9		Accessory bag ass'y
(U.S.A. model)		
	29340608	Instruction manual
	292064A	FM antenna
	29365006-3	Warranty card
	29358002	Service station list
	29100006	250x350mm, Poly-vinyl bag
	3010054	Battery
(120V model)		
	29340608	Instruction manual
	292064A	FM antenna
	29100006	250x350mm, Poly-vinyl bag
	3010054	Battery

REF. NO.	PARTS NO.	DESCRIPTION
(West Germany model)		
	29340603	Instruction manual
	292064A	FM antenna
	29365005-3	Warranty card
	29100006	250x350mm, Poly-vinyl bag
(220V model)		
	29340603	Instruction manual
	292064A	FM antenna
	29100006	250x350mm, Poly-vinyl bag
(120/220V model)		
	29340603	Instruction manual
	292064A	FM antenna
	25055040	CV-K-2, Conversion plug
	29100006	250x350mm, Poly-vinyl bag

ADJUSTMENT PROCEDURES

INSTRUMENTS REQUIRED

1. DC Voltmeter
2. AM Sweep Generator
3. AM/FM Signal Generator
4. AC VTVM
5. Oscilloscope
7. Distortion Analyzer
8. Stereo Modulator
9. Frequency Counter

1. +B2 voltage adjustment

(1) D model

Connect the DC voltmeter between the +B2 and E terminals. Adjust the Semi-fixed resistor R909 so that the indication of voltmeter becomes 25V.

(2) G/W models

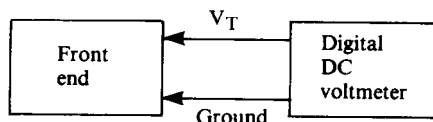
Connect the DC voltmeter between the +B2 and E terminals. Adjust the R909 so that the indication of voltmeter becomes 26.8V. (Before change of zener diode of D714) Adjust the R909 so that the indication of voltmeter becomes 25V. (After change of D714)

Note: When this voltage is low, the fluorescent indicator tube lights off.

Zener diode	Before change	After change
	GZA24Y or	RD22E-B2 or
	GZA22Z	GZA22X

The zener diode D714 is located on the digital circuit pc board.

2. Front end adjustment



Step	Set to dial	Adjust	Output indicator	Adjust for
FM adjustment				
1	88.1 MHz	L008 (LO)	Digital DC voltmeter	3.03V
2	107.9MHz	TC004 (TCO)		20.8V
3	Repeat steps 1 and 2 as necessary			
AM adjustment (D model)				
1	600 kHz	L107	Digital DC voltmeter	2.5V
2	1400 kHz	C156		15.5V
3	Repeat steps 1 and 2 as necessary			
AM adjustment (G/W models)				
1	603 kHz	L107	Digital DC voltmeter	2.5V
2	1404 kHz	C156		15.5V
3	Repeat steps 1 and 2 as necessary			

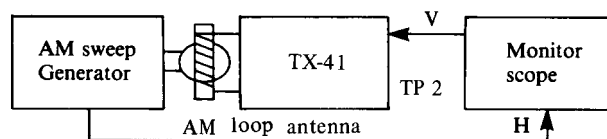
Remark : Usually not necessary to adjust.

GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400Hz 30% (AM), 1kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO).
3. Standard knob position
 SPEAKERS A
 BASS, TERBLE & BALANCE Center
 MODE STEREO
 LOUDNESS OFF
 TAPE 1, 2 OFF (SOURCE)

3. AM IF adjustment

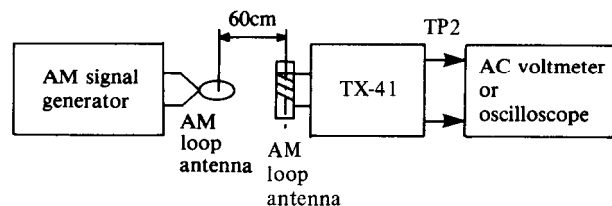
1. Set the dial to quiet point.



Set signal	Adjust	Adjust for
450 kHz	X104	The output of monitor scope becomes maximum symmetrical response

Remark : Usually not necessary to adjust.

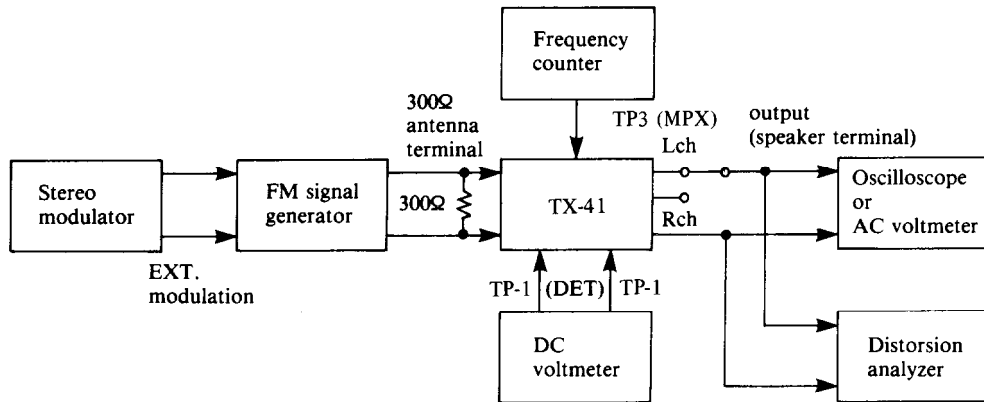
4. AM RF adjustment



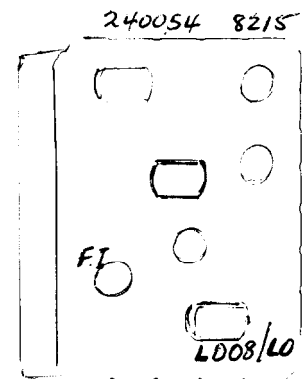
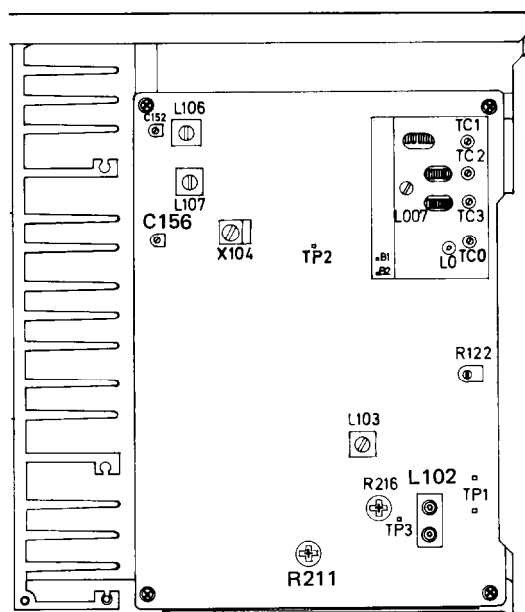
	AM Signal generator	Dial to set	Adjust	Adjust for
1	600kHz (603kHz) 400Hz, 30% mod.	600kHz (603kHz)	L106	Maximum
2	1400kHz (1404kHz) 400Hz, 30% mod.	1400kHz (1404kHz)	C152	Maximum
3	Repeat steps 1 and 2 as necessary			

NOTE : () : 220 V model

5. FM adjustment



Item	FM signal generator	Stereo modulator	Dial to set	Adjust	Output indicator	Adjust for	Remarks
FM IF	1	_____	No input signal	L102 BACK	DC voltmeter	0V	Repeat steps 1 and 2 as necessary
	2	98.1MHz, 65dBf, 1kHz, 75kHz devi.	98.1MHz	L102 FRONT	Distorsion analyzer	Minimum	
V.C.O	98.1MHz 65dBf	_____	98.1MHz	R216	Frequency counter	76kHz	Turn off the modulation
Stereo Separation	98.1MHz 65dBf Ext. modulation	Rch	98.1MHz	R211	AC voltmeter (Lch)	Minimum	Maximum and same separation
		Lch			AC voltmeter (Rch)	Minimum	
Muting level	98.1MHz, 17dBf 1kHz, 75kHz devi.	_____	98.1MHz	R122	Oscilloscope	Signal	Set the muting switch to on position
	98.1MHz, 16dBf 1kHz, 75kHz devi.	_____				No signal	



PRINTED CIRCUIT BOARD-PARTS LIST

FM/AM TUNER PC BOARD

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Front end		C164, C166	352741009	10 μ F, 16V, Elect.
	240054	FE396U11 [D]	C165	352721019	100 μ F, 6.3V, Elect.
	240043	FD236U14 [G/W]	C169	352750479	4.7 μ F, 25V, Elect.
	ICs		C170	352780339	3.3 μ F, 50V, Elect.
Q103	222608	μ PC1167C2, FM IF	C173	352744709	47 μ F, 16V, Elect.
Q111	222497	LA1240, AM radio system	C176	352741019	100 μ F, 16V, Elect. [G/W]
Q201	222593	HA12016, Stereo decoder	C201	352741009	10 μ F, 16V, Elect.
	Transistors		C202	352744719	470 μ F, 16V, Elect.
Q101	2211722	2SC1923 (R)	C203, C204	352742209	22 μ F, 16V, Elect.
Q104	2210746	2SC945A (P)	C205, C206	372524714	470pF \pm 5%, 50V, Styrol
Q105-Q109	2210746 or	2SC945A (P) or	C207	352780339	3.3 μ F, 50V, Elect.
	2211255	2SC1815 (GR)	C208	352780109	1 μ F, 50V, Elect.
Q112	2211302 or	2SK68A (L) or	C209	352780339	3.3 μ F, 50V, Elect.
	2211303	2SK68A (M)	C210	372521024	1,000pF \pm 5%, 50V, Styrol
Q113, Q202	2210746 or	2SC945A (P) or	C215, C216	352780339	3.3 μ F, 50V, Elect.
	2211255	2SC1815 (GR)	C217, C218	372521024	1,000pF \pm 5%, 50V, Styrol [D]
Q205, Q206	2211705	2SD655E	C217, C218	372525614	560pF \pm 5%, 50V, Styrol [G]
	Diodes (G/W models)		C217-C220	372525614	560pF \pm 5%, 50V, Styrol [W]
D101-D112	223105,	1S1555,	Resistors		
D115, D118	223133 or	DS442X or	R122	5215023	N08HR50KBC, Semi-fixed
D203-D205	223145	1S2076TD	R211	5225037	N10HR220KBD, Semi-fixed
D113, D114	223136	KV1226	R216	5225029	N10HR3.3KBD, Semi-fixed
D116	4000068	VD1222		Switch	
	Diodes (D model)		S201	250142	NSS-2225, De-emphasis selector [W]
D102	4000068	VD1222		Screws	
D103-D112	223105,	1S1555, 30V - 0.1A		82142604	2.6P+4F (BC), Pan head, de-emphasis [W]
D101, D115	223133 or	DS442X or			
D118	223145	1S2076TD			
D203-D205					
D113, D114	223136	KV1226			
	Coils				
L101	233105 or	NCH-1005 or			
	233024	NCCH-1501			
L103	233236	NMC-6027			
L104	233122	NCH3013			
L105	233031	NMC-9-1			
L106	232107 or	NMA3045 or			
	232089	NMA3037			
L107	232084	NMO2018			
L108	232041	NIT-0509			
L201, L202	233107	NMC5002			
	Transformer				
L102	233270	NFIF-6040			
L108	232041	NIT-0509			
	Ceramic filters				
X101, X102	3010043	SFE10.7MM [G/W]			
X104	3010058	BCFLZ450A			
X101, X102	3010006	SFE10.7MA (RED) [D]			
	Capacitors				
C106, C107	352780109	1 μ F, 50V, Elect.			
C116	352784799	0.47 μ F, 50V, Elect.			
C118	352742209	22 μ F, 16V, Elect.			
C119	352742209	22 μ F, 16V, Elect.			
C125	352783399	0.33 μ F, 50V, Elect.			
C127	352780229	2.2 μ F, 50V, Elect.			
C128-C132	352780109	1 μ F, 50V, Elect.			
C152, C156	3060010	NTC-20P09, Trimmer			
C157	372525114	510pF \pm 5%, 50V, Styrol			

Note: [D]: only 120V model
[G]: only 220V model
[W]: only 120/220V model

PRINTED CIRCUIT BOARD VIEW FROM COMPONENT SIDE

DIGITAL CIRCUIT PC BOARD

PRINTED CIRCUIT BOARD-PARTS LIST

DIGITAL CIRCUIT PC BOARD (NADG-1383b)

D model

CIRCUIT NO.	PARTS NO.	DESCRIPTION
ICs		
Q702	222675	TD-6104P, Prescaler
Q703	222674	TC-9147P, Micro computer
Q704	222673	TD6301AP, Driver, fluorescent tube
Q714	222670	BA6124, Signal meter driver
Transistors		
Q705	2211303	2SK68A (M)
Q706, Q707	2211255 or	2SC1815 (GR) or
Q712	2210746	2SC954A (P)
Q713	2211303	2SK68A (M)
Diodes		
D701-D712	223103,	1S1555,
D716-D718	223133 or	DS442X or
	223145	1S2076TD
D715	223944 or	RD4.7E-B or
	223943	RD4.7E-C
Crystal		
X701	3010073	XTL-7.2M
Ceramic filter		
X702	3010048	CFM2-450ZL
Capacitors		
C702	352761009	10 μ F, 35V, Elect.
C704	395162297	0.22 μ F, 35V, Tantalum
C706	352721029	1,000 μ F, 6.3V, Elect.
C708	352761009	10 μ F, 35V, Elect.
C711	352780109	1 μ F, 50V, Elect.
C712	352780229	2.2 μ F, 50V, Elect.
C713	352784799	0.47 μ F, 50V, Elect.
C714	352734709	47 μ F, 10V, Elect.

CIRCUIT NO. PARTS NO. DESCRIPTION

C719	352741009	10 μ F, 16V, Elect.
C726, C727	352741009	10 μ F, 16V, Elect.

Resistors

R750	441626804	68 Ω , 1W, Metal oxide film
Z701	49121333509	33k Ω x 9, 1/8W, Network
Z702	49121333513	33k Ω x 13, 1/8W, Network

DIGITAL CIRCUIT PC BOARD (NADG-1383)

G/W models

CIRCUIT NO. PARTS NO. DESCRIPTION

ICs		
Q702	222675	TD6104P, Prescaler
Q703	222674	TC9147P, Micro computer
Q704	222673	TD6301AP, Driver, fluorescent tube
Q714	222670	BA6124, Signal meter driver
Transistors		
Q705	2211303	2SK68A (M)
Q706-Q710	2211255 or	2SC1815 (GR) or
	2210746	2SC954A (P)
Q711	2211454 or	2SA1015 (Y) or
	2211455	2SA1015 (GR)
Q712	2211255 or	2SC1815 (GR) or
	2210746	2SC945A (P)
Q713	2211303	2SK68A (M)
Diodes		
D701-D713	223103,	1S1555,
D716-D718	223133 or	DS442X or
D735, D736	223145	1S2076TD
D714	2241252 or	GZA24Y or
	2241233	GZA22Z (Before change)
	2239752 or	RD22E-B2 or
	2241231	GZA22X (After change)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Note: When replace this diode (D714), use the zener diode of after change. Confirm that the +B2 voltage is 25 volts. When this voltage is low, the fluorescent tube light off.		
D715	223944 or 223943	RD4.7E-B or RD4.7E-C
	Crystal	
X701	3010073	XTL-7.2M
	Ceramic filter	
X702	3010048	CFM2-450ZL
	Capacitors	
C702	352761009	10 μ F, 35V, Elect.
C704	395162297	0.22 μ F, 35V, Tantalum
C706	352724719	470 μ F, 6.3V, Elect.
C708	352761009	10 μ F, 35V, Elect.
C711	352780109	1 μ F, 50V, Elect.
C712	352780229	2.2 μ F, 50V, Elect.
C713	352784799	0.47 μ F, 50V, Elect.
C714	352734709	47 μ F, 10V, Elect.
C719	352741009	10 μ F, 16V, Elect.
C726, C727	352741009	10 μ F, 16V, Elect.
	Resistors	
R750	441626804	68 Ω , 1W, Metal oxide film
Z701	49121333509	33k Ω ×9, 1/8W, Network
Z702	49121333513	33k Ω ×13, 1/8W, Network

DISPLAY PC BOARD (NADIS-1384 a/b)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Fluorescent indicator tube	
Q701	212016	FIP7B8CS
	L.E.Ds	
D721-D728	225057	SR538D
D729-D732	225028-3	GL9PG59C
D733	225029	GL9PR9
	Switch	
S701-S708	25035275	NPS-111-S239
	Holder	
	27190152	
	Screws	
	833130080	3TTP+8P, Tap
	Washer	
	870048	W3×8×0.8, Nylon
	Cushion	
	28140417	
	Knobs	
	28320781	Station 1
	28320782	Station 2
	28320783	Station 3
	28320784	Station 4
	28320785	Station 5
	28320786	Station 6
	28320792	Station 7
	28320793	Station 8

DISPLAY PC BOARD

PRINTED CIRCUIT BOARD-PARTS LIST

TONE CONTROL PC BOARD (NATC-1394)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q351, Q451	222534	NJM-4559DX
	Capacitors	
C353, C453	392880227	2.2 μ F, 50V, LL
C356, C456	392880107	1 μ F, 50V, LL
C361, C461	352742209	22 μ F, 16V, Elect.
C364, C464	352780109	1 μ F, 50V, Elect.
C366, C367	352780339	3.3 μ F, 50V, Elect.
C369	352780339	3.3 μ F, 50V, Elect.
	Resistors	
R363, R463	5148080	N16RGM11C100KCO25M, Treble control variable
R370, R470	5148081	N16RGM11C100KCS25M, Bass control variable
	Switches	
S352-S356	25035325	NPS-262-342-L289, Source selector

SWITCH PC BOARD (NASW-1395) (D model)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Switches	
S201, S202	25035319	NPS-222-L283
S357-S360	25035326	NPS-422-L290
	Bracket	
	27140664	Bracket, push
	Screws	
	82113006	3P+6FN, Pan head

SWITCH PC BOARD (NASW-1395a) (G /W models)

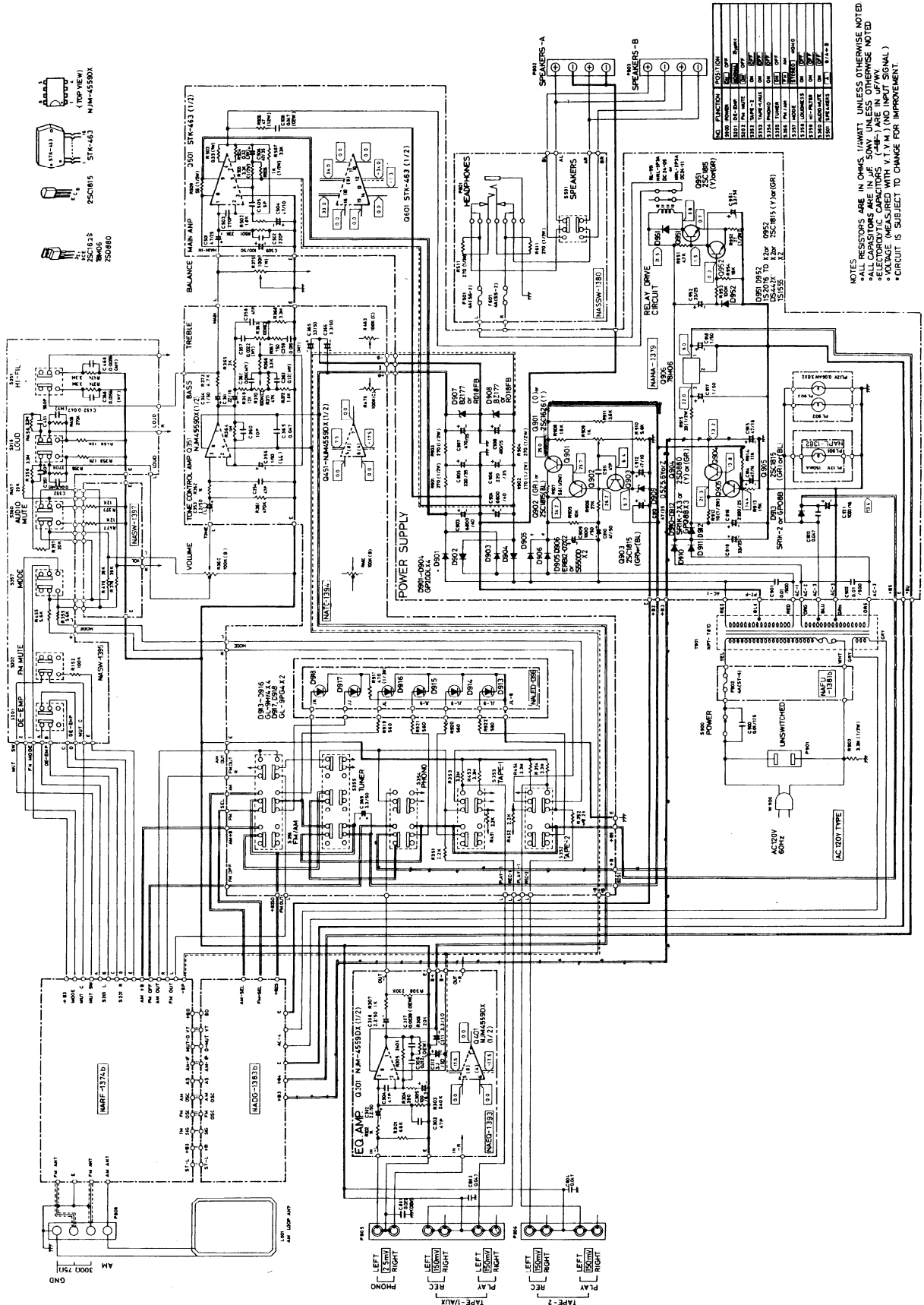
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Transistor	
Q907	2210746 or 2211255	2SC945A (P) or 2SC1815 (GR)
	Diode	
D914	223145, 223133 or 223105	1S2076TD, DS442X or 1S1555
	Capacitor	
C922	352744709	47 μ F, 16V, Elect.
	Switches	
S201, S202	25035319	NPS-222-L283
S357-S360	25035326	NPS-422-L290
	Bracket	
	27140664	Switch
	Screws	
	82113006	3P+6FN, Pan head

EQUALIZER AMPLIFIER PC BOARD (NAEQ-1393)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q301, Q401	222534	NJM-4559DX
	Capacitors	
C302, C402	352780229	2.2 μ F, 50V, Elect.
C305, C405	352721019	100 μ F, 6.3V, Elect.
C308, C408	352780229	2.2 μ F, 50V, Elect.
C311, C312	352780339	3.3 μ F, 50V, Elect.

SCHEMATIC DIAGRAM

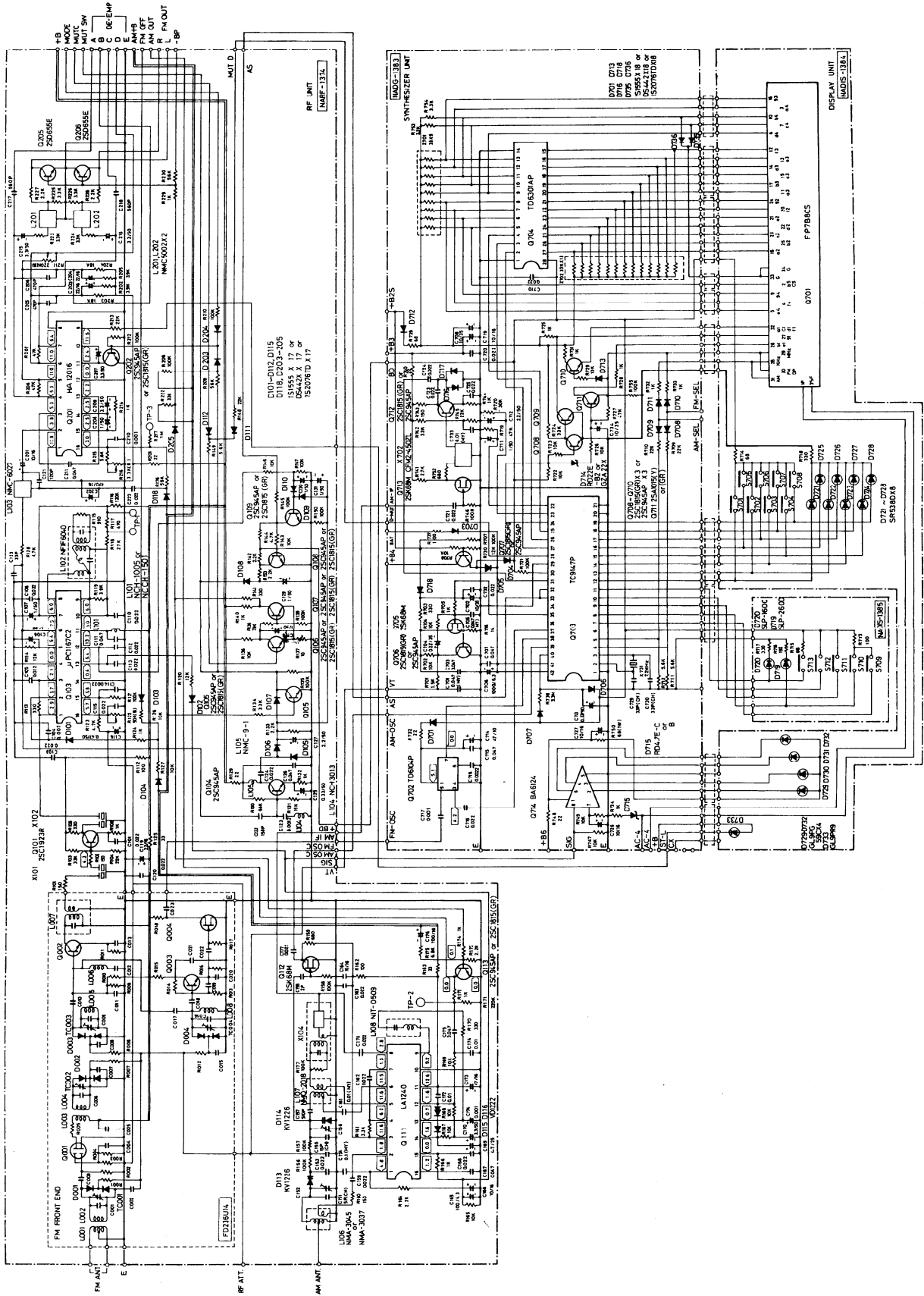
D model



NOTES:
 *ALL RESISTORS ARE IN OHMS, UNLESS OTHERWISE NOTED.
 *ALL CAPACITORS ARE IN UF, UNLESS OTHERWISE NOTED.
 *ELECTROLYTIC CAPACITORS (-POL) ARE IN UF/VV.
 *VOLTAGE (MEASURED WITH V.T.P.M.) (NO INPUT SIGNAL).
 *CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

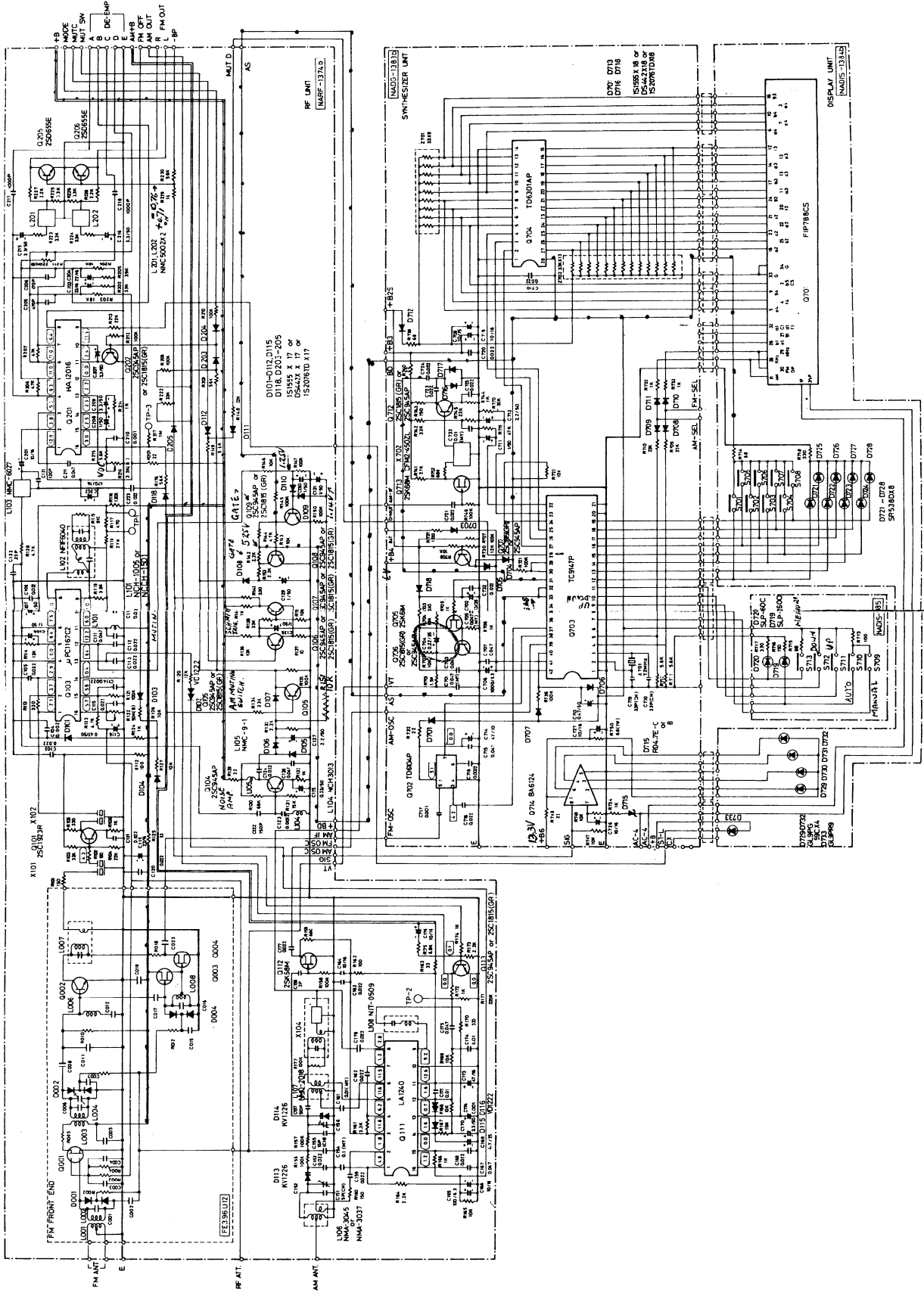
SCHEMATIC DIAGRAM

G model



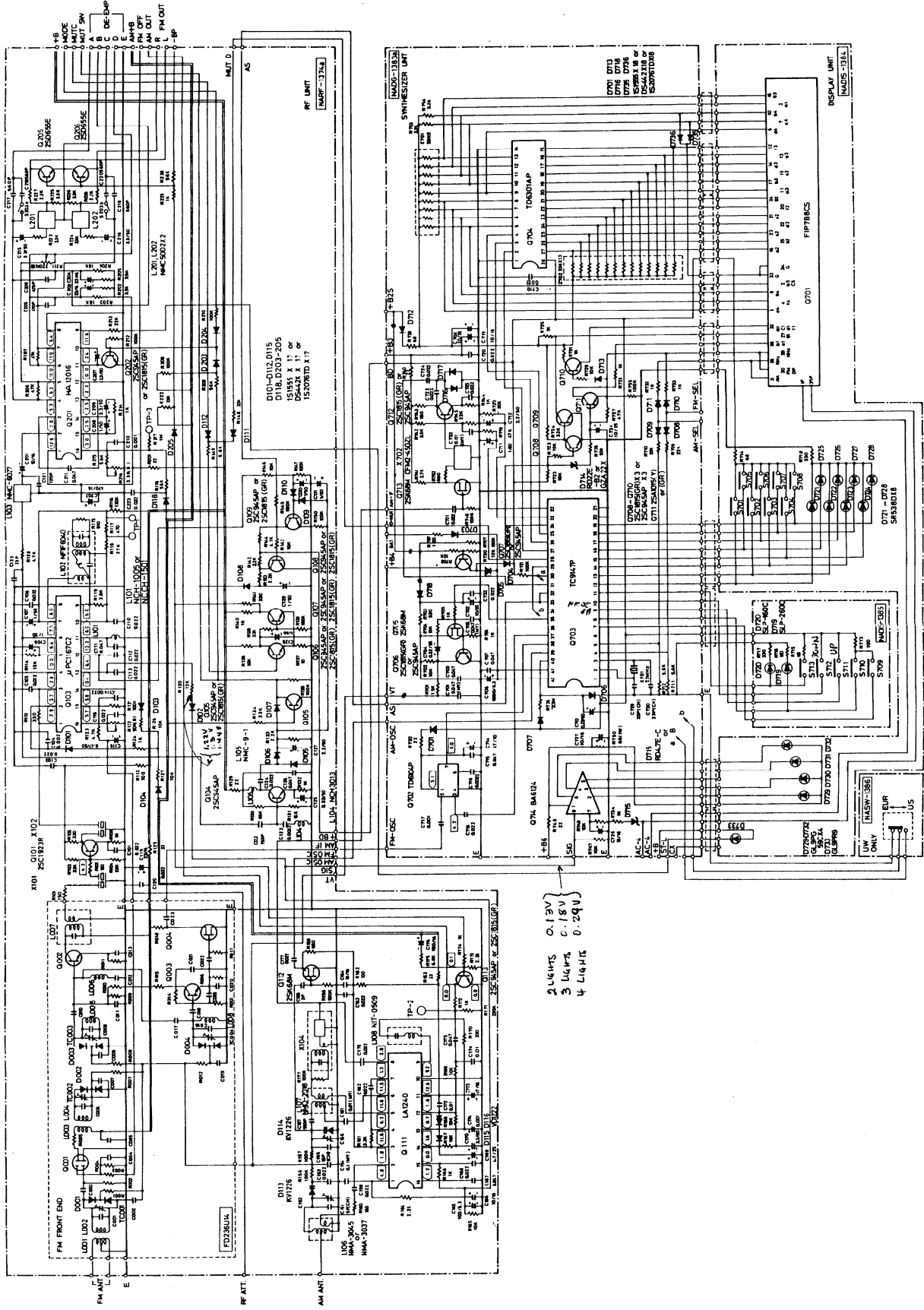
SCHEMATIC DIAGRAM

D model



SCHEMATIC DIAGRAM

W model



CIRCUIT NO.	PARTS NO.	DESCRIPTION
Capacitors		
C501, C601	352750479	4.7 μ F, 25V, Elect.
C504, C604	352734709	47 μ F, 10V, Elect.
C506, C606	352764709	47 μ F, 35V, Elect.
C509	352781019	100 μ F, 50V, Elect.
C903, C904	3504169	6,800 μ F, 40V, Elect.
C905, C906	352762219	220 μ F, 35V, Elect.
C907, C908	352754719	470 μ F, 25V, Elect.
C909	352781029	1,000 μ F, 50V, Elect.
C910	352784709	47 μ F, 50V, Elect.
C912	352734709	47 μ F, 10V, Elect.
C913	352764709	47 μ F, 35V, Elect.
C914, C915	352744709	47 μ F, 16V, Elect.
C916	352752229	2,200 μ F, 25V, Elect.
C917, C918	352780109	1 μ F, 50V, Elect.
C919	352751019	100 μ F, 25V, Elect.
C921	352741029	1,000 μ F, 16V, Elect.
C951	352780339	3.3 μ F, 50V, Elect.
C952	352753309	33 μ F, 25V, Elect.
Resistors		
R503, R603	441623394	0.33 Ω , 1W, Metal oxide film
R504, R604		
R505, R605	441523324	3.3k Ω , 1/2W, Metal oxide film
R506, R606	441521024	1k Ω , 1/2W, Metal oxide film
R508, R608	441520474	4.7 Ω , 1/2W, Metal oxide film
R509	441525604	56 Ω , 1/2W, Metal oxide film
R901-R904	441522714	270 Ω , 1/2W, Metal oxide film
R907	441520564	5.6 Ω , 1/2W, Metal oxide film
R909	5215018	N8HR1KBC, Semi-fixed
R912	441521004	10 Ω , 1/2W, Metal oxide film
R915	441523304	33 Ω , 1/2W, Metal oxide film
R952	441522704	27 Ω , 1/2W, Metal oxide film
Relay		
RL951	25065108 or 25065205	NRL-2P3A-DC24-05 or NRL-2P3A-DC24-11
Radiator		
	27160029	RAD-07
Screw		
	82113008	3P+8F-N, Pan head

PRINTED CIRCUIT BOARD-PARTS LIST

POWER AMPLIFIER PC BOARD (NAMA-1379)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
ICs		
Q906	222780062	7806M, Voltage regulator
Q501, Q601	222020	STK-463, Power ampli.
Transistors		
Q901	2200663 or 2200664	2SC1626 (O) or 2SC1626 (Y)
Q902, Q903	2211255 or	2SC1815 (GR) or
Q905	2211256	2SC1815 (BL)
Q904	2201074 or 2201075	2SD880 (Y) or 2SD880 (GR)
Q951, Q952	2211254 or 2211255	2SC1815 (Y) or 2SC1815 (GR)
Diodes		
D901-D904	223845	GP20DL
D905, D906	223850 or 223873	ERB12-02 or S5500D
D907, D908	224072 or 224000	BZ177 or RD18FB
D909	224163 or 224164	05Z5.6Y or 05Z5.6Z
D910-D913	223804 or 223848	SR1K-2 or GP-08B
D951, D952	223145, 223133 or 223105	1S2076TD, DS442X 1S1555
Lamps		
PL902, PL903	210109	PL14V0.06AW4.0 (Blue lead wire), after change
	210144	PL12V60mAW3.0 (Black lead wire), before change

Notes: When replacing the lamp, use the same light.

SPEAKER SELECTOR SWITCH PC BOARD (NASSW-1380)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
R511, R611	441522714	270 Ω , 1/2W, Metal oxide film resistor
S501, S502	25035329	NPS-222-L293, Speaker selector switch
P801	25045109	HLJ4308-01-040, Stereo headphone jack
	25050065	YSH403T, Fuse holder [G]
	250113	SN5051, Fuse holder [D/W]
F501, F601	252059	4A (SS-2), Speaker fuse [D]
F501, F601	252076	3.15A-SE-EAK, Speaker fuse [G]
F501, F601	252014	4A-T, Speaker fuse [W]
	27140668-1	Bracket, switch
	880009	Rivert

FUSE TERMINAL PC BOARD (NAFU-1381)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
(D model)		
F902	252049	4A (ST-6), Primary fuse
	250113	SN5051, Fuse holder
(G model)		
F901	252074	2A-SE-EAK, Primary fuse
	25050065	YSH403T, Fusre holder
(W model)		
F901	252074	2A-SE-EAK, Primary fuse (220V)
	25050065	YSH403T, Fuse holder
F902	252014	4A-T, Primary fuse (120V)
	250113	SN5051, Fuse holder

PRINTED CIRCUIT BOARD VIEW FROM COMPONENT SIDE

SOURCE INDICATOR PC BOARD

OPERATION SWITCH PC BOARD

PRINTED CIRCUIT BOARD-PARTS LIST

OPERATION SWITCH PC BOARD (NADIS-1385)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	L.E.Ds	
D719	225093	SLP-260C, Auto indicator
D720	225092	SLP-160C, Memory indicator
	Switches	
S709-S713	25035275	NPS-111-S239
	Holder	
	27190151	
	Screw	
	834130068	3TTS+6B

FREQUENCY RANGE SELECTOR SWITCH PC BOARD (NASW-1386) (Only W model)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	250142	NSS-2225, Slide switch
	82142604	2.6P+4F (BC), Pan head screw

SELECTOR INDICATOR PC BOARD (NALED-1396)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	L.E.Ds	
D913-D916	225112	GL-9HY84
D917, D918	225111	GL-9PG54
	Resistor	
R917	442524714	470 Ω , 1/2W, Metal oxide film
	Spacer	
	27270071	

DIAL ILLUMINATION LAMP PC BOARD (NAPL-1382)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL901	210091	PL12V150mA, Blue cap