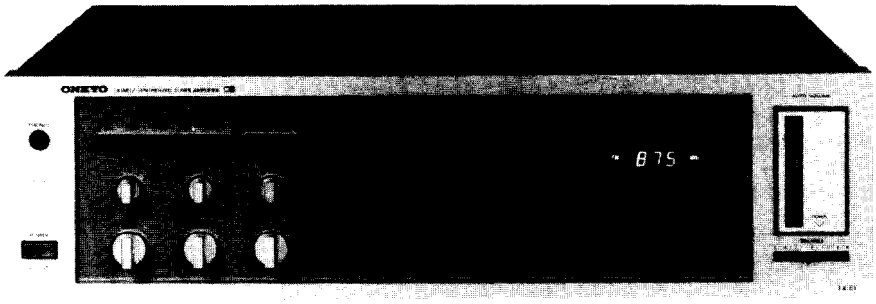
SERIAL NO. 3135

ONKYO® SERVICE MANUAL

QUARTZ SYNTHESIZED

TUNER AMPLIFIER

MODEL TX-61



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ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Output Power:	60 watts per channel, min RMS at 8 ohms, both channels driven, from 20Hz to 20,000Hz with no more than 0.025% total harmonic distortion
Total Harmonic Distortion:	0.025% at rated power 0.025% at 1 watt output
IM Distortion:	0.025% at rated power 0.025% at 1 watt output
Damping Factor:	50 at 8 ohms
Frequency Response:	20Hz—30,000Hz (±1dB)
RIAA Deviation:	20Hz—20,000Hz (±0.5dB)
Sensitivity & Impedance:	Phono: (MM) 2.5mV, 50 kohms (MC) 350μV, 330 ohms Tape Play: 150mV, 50 kohms Tape Rec: 150mV, 3.5 kohms (PH)
Phono Overload:	200mV R.M.S. at 1kHz 0.025% T.H.D.
Signal-to-Noise Ratio:	Phono: 86dB (at 10mV input (MM) A weighted) 76dB (IHF A-202) Tape: 95dB (A weighted) 80dB (IHF A-202)
Tone Controls:	Bass: ±12dB at 100Hz Treble: ±10dB at 10kHz
Filters:	High: 6kHz, 6dB/oct. Subsonic: 15Hz, 6dB/oct
Loudness (−30dB):	±9dB at 40Hz ±5dB at 20kHz

TUNER SECTION

FM:

Tuning Range:	87.5—108MHz (100kHz steps) (D model) 87.5—108MHz (50kHz steps) (W model)
Usable Sensitivity:	Mono: 10.3dBf, 1.8μV Stereo: 17.2dBf, 4.0μV
50dB Quieting Sensitivity:	Mono: 14.7dBf, 3.0μV Stereo: 37.2dBf, 40μV
Capture Ratio:	1.3dB
Image Rejection Ratio:	80dB
IF Rejection Ratio:	90dB
Spurious Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 75dB Stereo: 70dB
Alternate Channel Att.:	70dB
AM Suppression Ratio:	55dB
Harmonic Distortion	Mono: 0.12% Stereo: 0.2%
Frequency Response:	30Hz—15,000Hz (±1.5dB)
Stereo Separation:	40dB at 1kHz 33dB at 100Hz—10,000Hz
Muting level:	17.2dBf, 4μV
Stereo Threshold:	17.2dBf, 4μV

AM:

Tuning Range:	520—1,710kHz (10kHz steps) (D model) 520—1710kHz (10kHz steps) or 522—1611kHz (9kHz steps) (W model)
Usable Sensitivity:	30μV
Image Rejection Ratio:	40dB
IF Rejection Ratio:	30dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.8%

GENERAL

Power Supply:	AC 120V, 60Hz (D model) AC 120/220V, 50/60Hz (W model)
Outputs:	Speaker A & B, Phones, Tape Rec. Out 1 & 2, EPS OUT/PRE OUT, AC Outlet (D model) (unswitched x 1, switched x 1)
Inputs:	Phono, Tape Play 1 & 2, EPS IN/ MAIN IN FM and AM Antennas
Antennas:	FM: 300 ohms balanced and 75 ohms unbalanced AM: built-in loop antenna and ex ternal terminal
Semiconductors:	6FET, 56 transistors, 23ICs, 102 diodes (D model) 6FET, 59 transistors 23ICs, 105 diodes (W model)
Dimensions (W x H x D)	500 x 141 x 450 mm 19-11/16" x 5-9/16" x 17-3/4"
Weight:	13.0kg. 28.6lbs.

Specifications and features are subject to change without notice.

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Printed in Japan
01-27-25K-CA
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PRECAUTIONS

1. Replacing the fuses

Remove the top cover. The primary fuses are located on the fuse terminal 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
Primary fuse	F901	252050	5A (ST-6)	120V model
	F902	252075	2.5A-SE-EAK	120/220V model
	F901	252020	5A-T	120/220V model

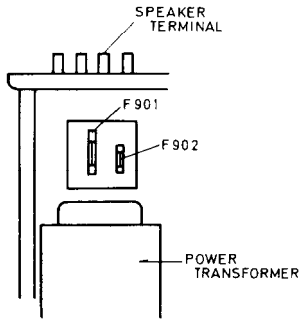


Fig. 1

2. Replacing the 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}.

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 (Pertrix)	S A F T (Leclanche)	Hellesens	Supper Pila	Eveready
Manganese	1.5	R6	AA	15P	815	M15P	710	59P	920	VS734	8950				R6S	VI 18	63	
				15F	915	M15F	7AA	59	910	VS034A		SP12		251	R6B	VI 28		915
				15	1015	M150F	15	0199	930	VS334		SP12		244	T3S	VI 38		1015
				15D	1215	M1504	5AA					HP7		280		VI 75		

2. De-emphasis Switch (Only W model)

The 50μsec/75μsec 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 50μsec position. For use 75μsec regions, switch over to the 75μsec 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
—AMPLIFIER SECTION—

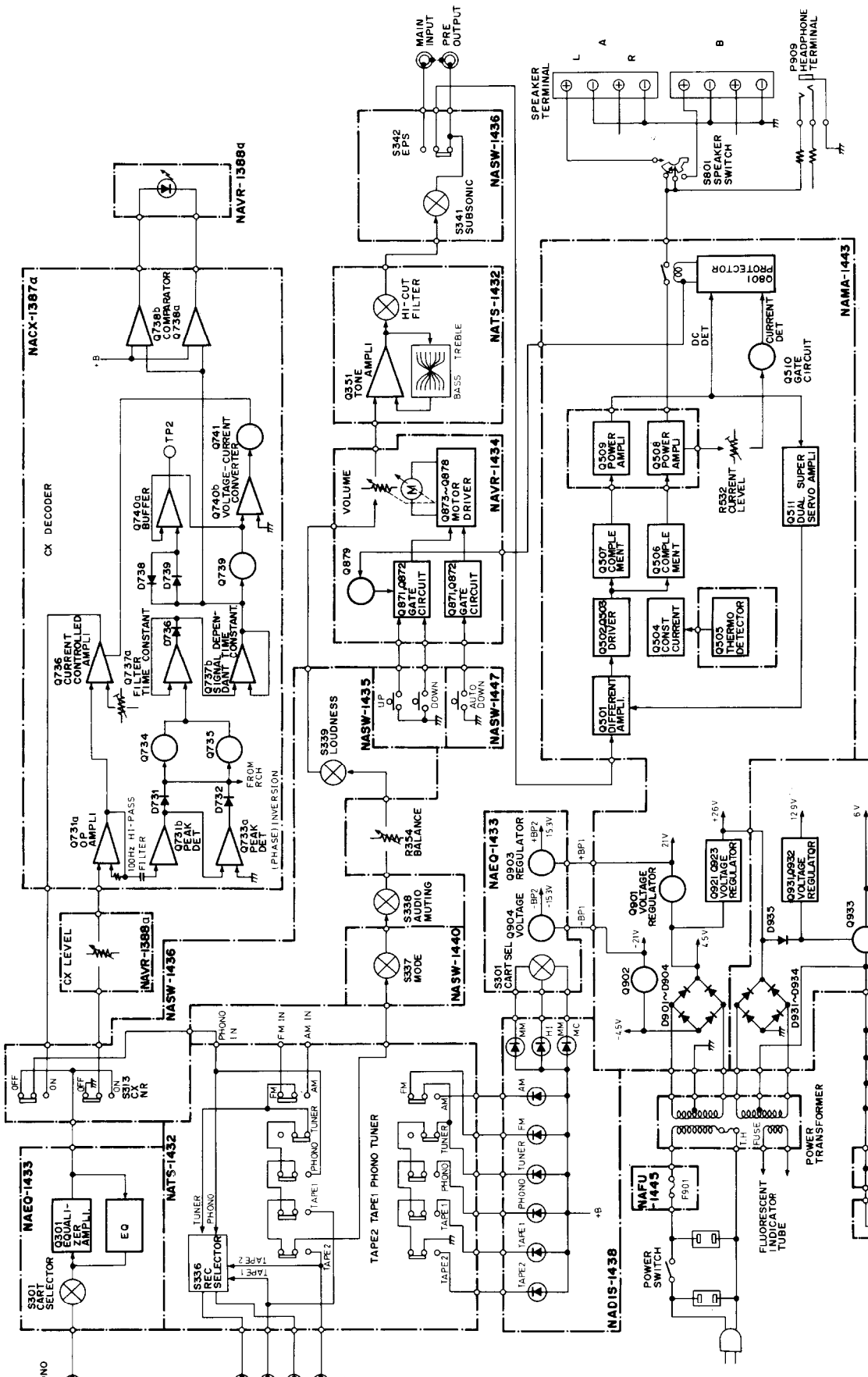


Fig. 2

BLOCK DIAGRAM

—TUNER SECTION—

D model

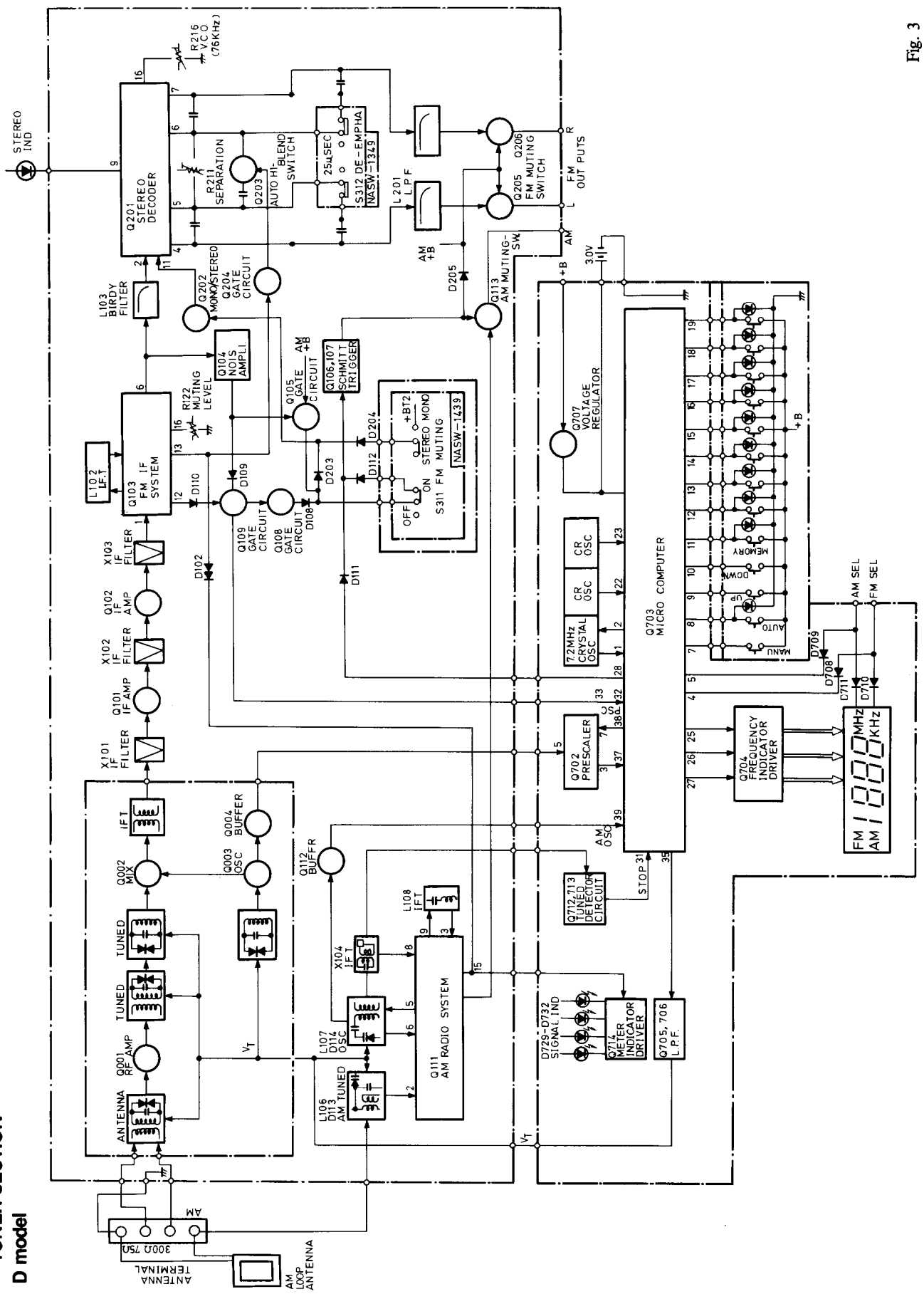


Fig. 3

BLOCK DIAGRAM

—TUNER SECTION—

W model

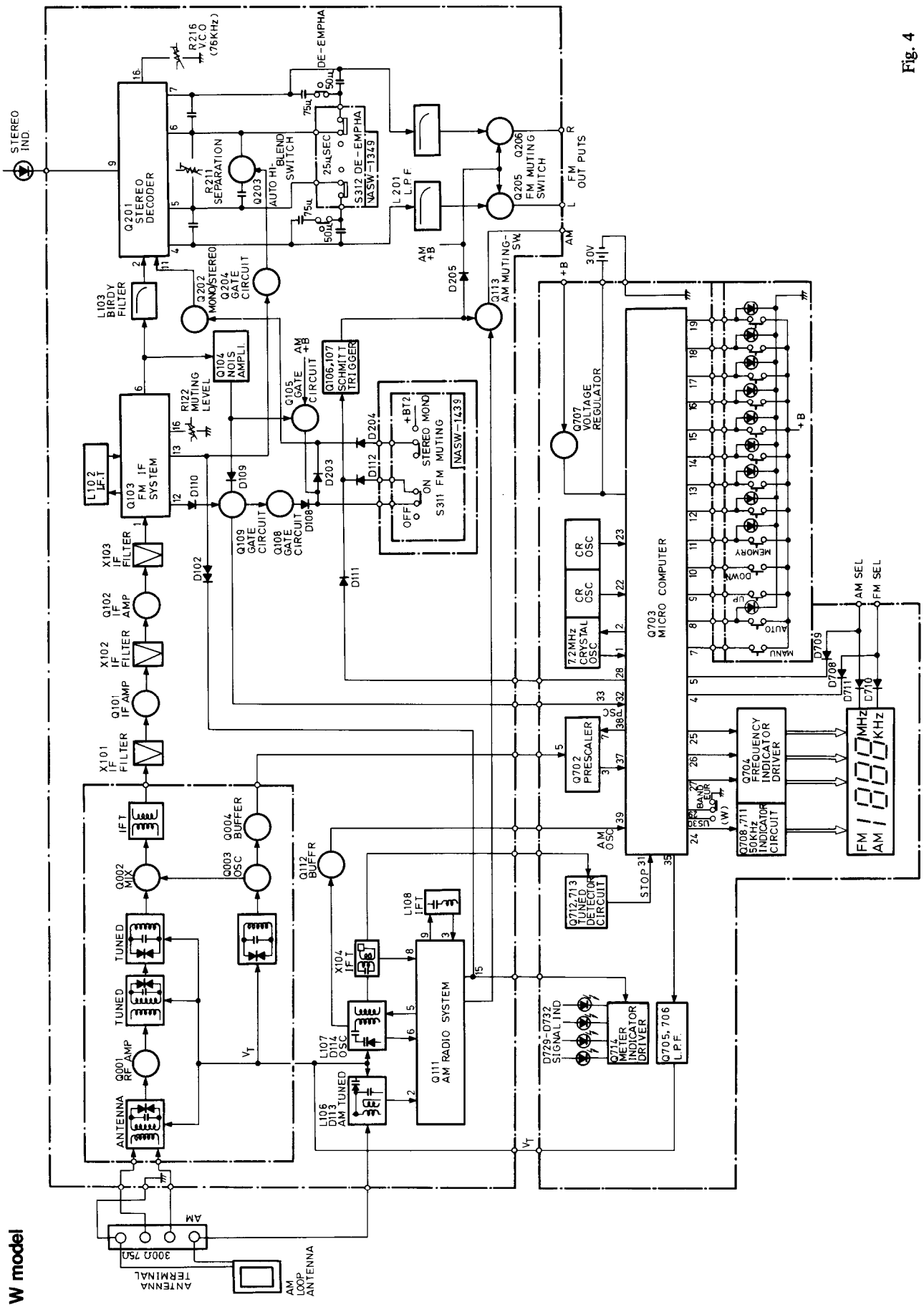


Fig. 4

COMPONENT LOCATION

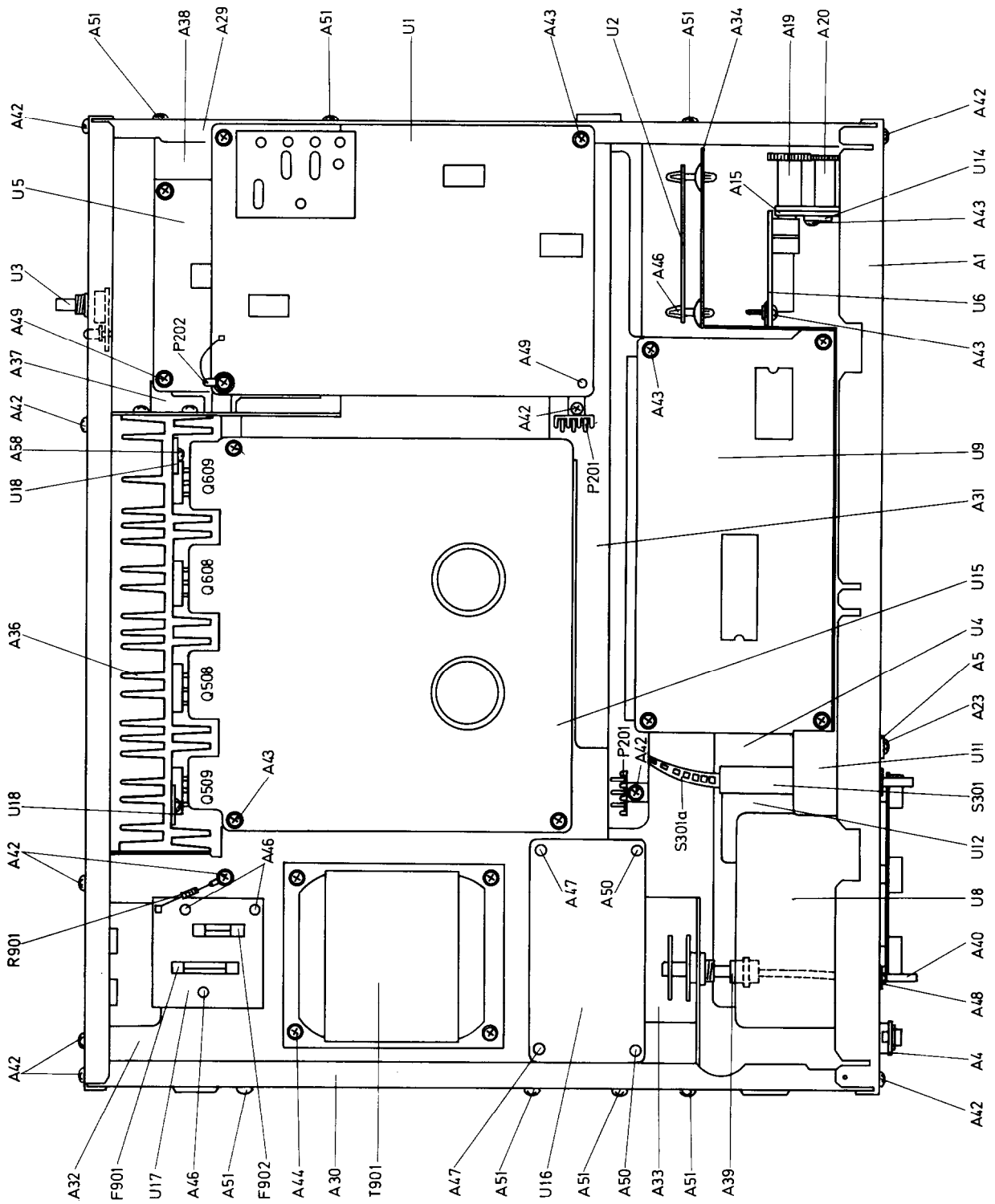


Fig. 5

EXPLODED VIEW

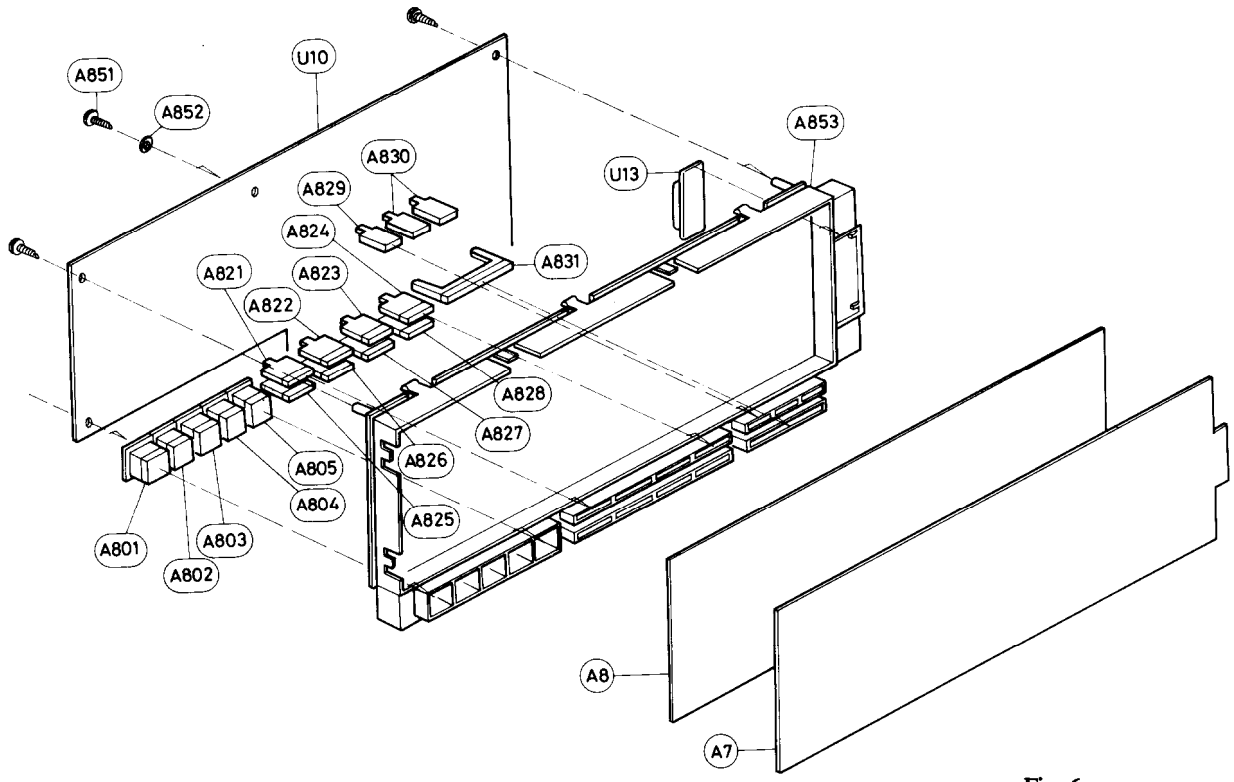


Fig. 6

Holder view

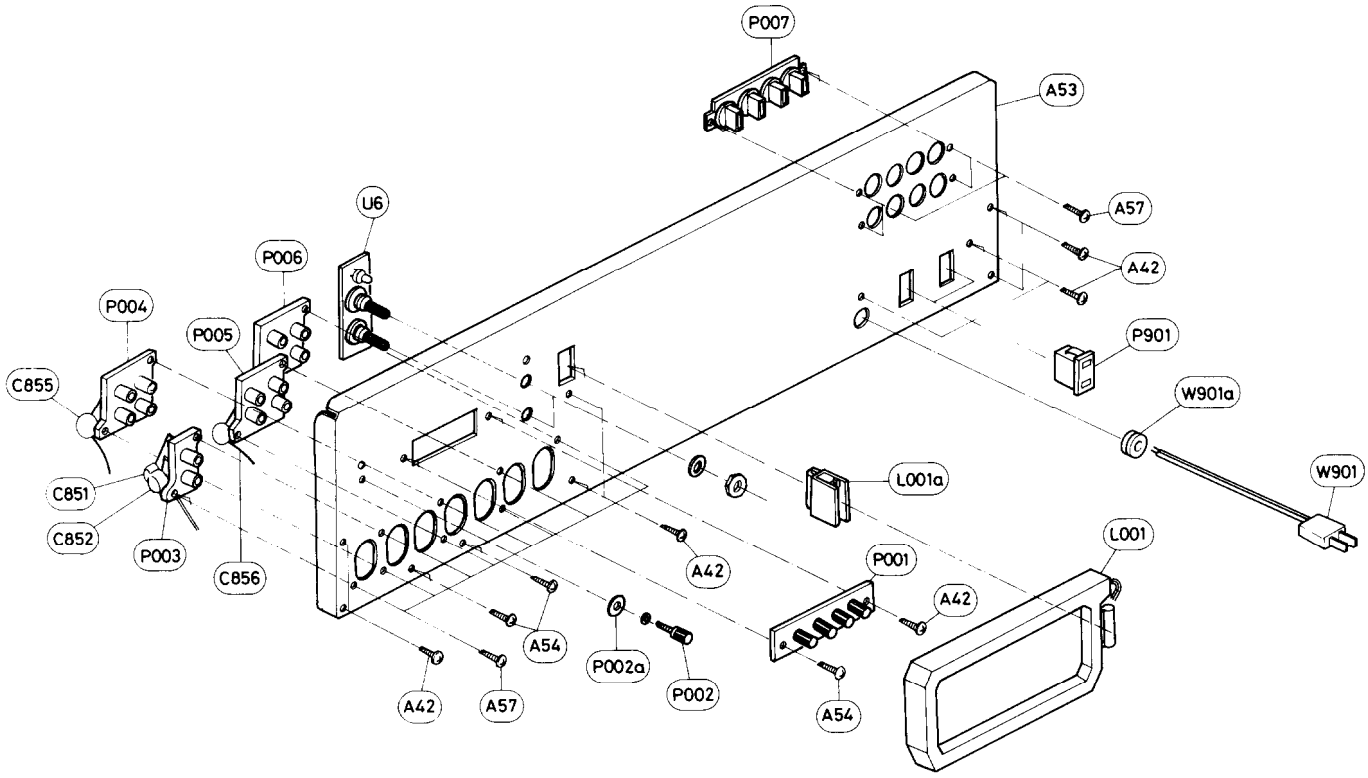


Fig. 7

Back panel view

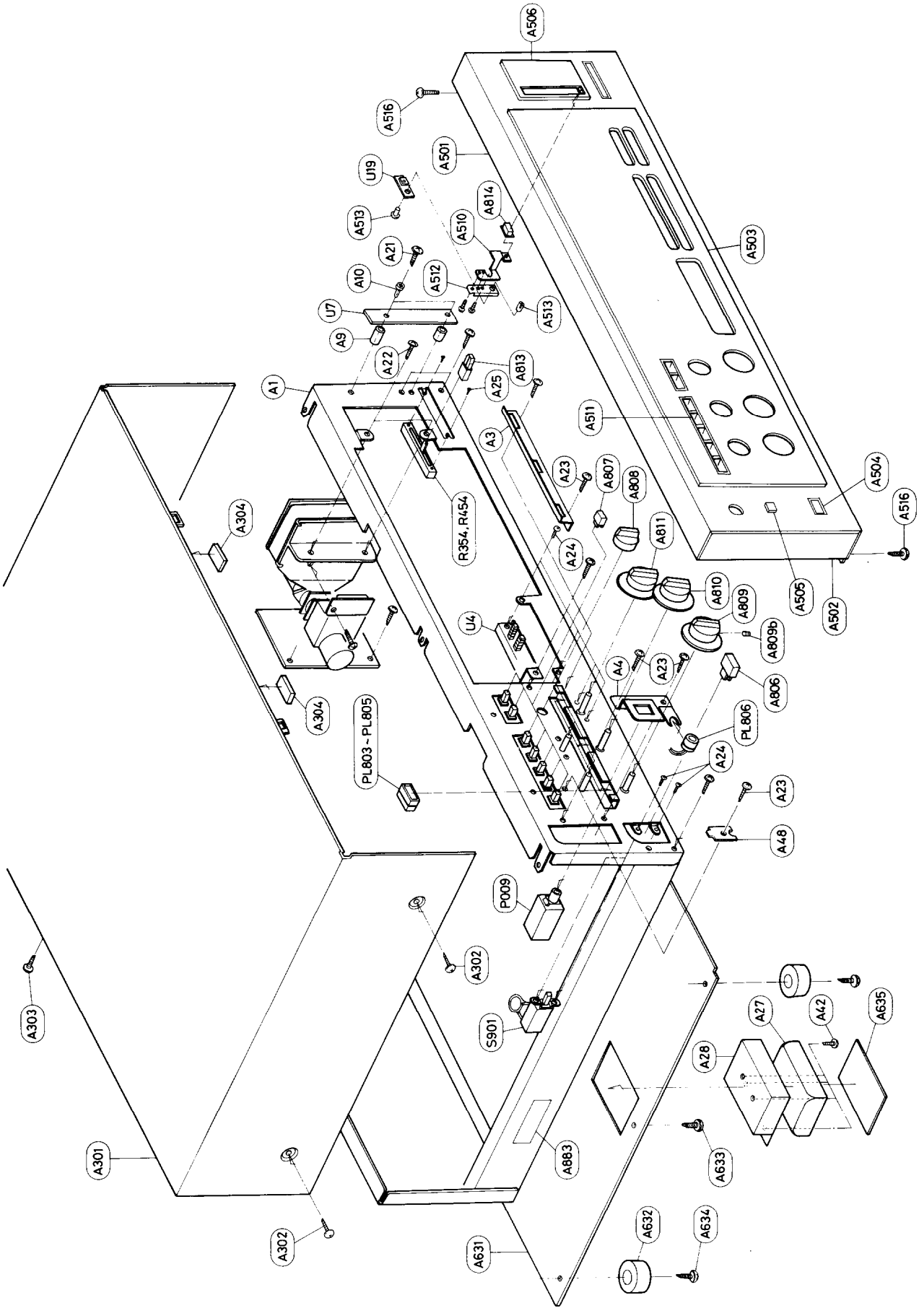

A506
A516
A501
U19
A513
A814
A510
A21
A10
A512
A503
U7
A513
A9
A22
A813
A25
A1
A511
A3
A23
A807
A808
A504
A516
A304
R354, R454
A24
A811
A810
A809
A505
A502
U4
A809b
A4
A23
A806
A304
PL803 - PL805
PL806
A24
A23
A48
P009
A302
A303
S901
A635
A27
A42
A28
A883
A633
A301
A302
A631
A632
A634

Fig. 8

PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
A1	27110173A	Front bracket
A3	27140676A	Bracket, lamp
A4	27140679	Bracket, headphone
A5	27140678	Bracket, left
A6	27140680	Bracket, pc
A7	28130154B	Dial plate
A8	28133064A	Back plate
A9	27300503	Collar
A10	27300442	Bush
A11	28140020	4x10x40mm, Cushion
A15	29105115	Case ass'y
A19	27300473	Gear, volume
A21	831130168	3TTW + 16B, Tapping screw
A22	833130080	3TTP + 8P, Tapping screw
A23	834130068	3TTS + 6B, Tapping screw
A24	82113006	3P + 6FN, Pan head screw
A25	82112003	2P + 3FN, Pan head screw
A27	27300360	Case, battery
A28	27140463	Bracket, battery
A29	27115121A	Side bracket, right
A30	27115122	Side bracket, left
A31	27130315	Bracket, center
A32	27130316A	Bracket, power transformer
A33	27140674	Bracket, speaker
A34	27130317A	Bracket, auto
A36	27160107	Heatsink
A37	27140673	Bracket, heatsink
A38	27140675	Bracket, equalizer
A39	27273008	Joint, speaker
A40	27260086	Shaft, speaker
A42	834130068	3TTS + 6B, Tapping screw
A43	831130088	3TTW + 8B, Tapping screw
A44	838440089	4TTW + 8C (BC), Tapping screw
A45	834130108	3TTS + 10B, Tapping screw
A46	27190011	Holder
A47	27190164	Holder
A48	27140184	Bracket, shaft
A49	27190062	Holder
A50	27190009	Holder
A51	838130068	3TTB + 6B, Tapping screw
A52	27175011C	Leg
A53	27120418	Back panel (D)
	27120419	Back panel (W)
A54	834230108	3TTS + 10B (NI), Tapping screw
A56	834130068	3TTS + 6B, Tapping screw
A57	834130108	3TTS + 10B, Tapping screw
A58	834130088	3TTS + 8B, Tapping screw
A301	28184149A	Top cover
A302	838440089	4TTB + 8C (BC), Tapping screw
A303	834130068	3TTS + 6B, Tapping screw
A304	28140020	4x10x40mm, Cushion
A501	13258121	Front panel ass'y
A502	28125077-2	End cap
A503	28191142	Clear plate
A504	27267179	Guide, power
A505	28198574-1	Facet
A506	27267199	Guide, volume
A507	28140425	Cushion
A508	28130155	Plate, volume
A509	28199064B	Film
A510	27180136	Spring
A511	27267200	Guide, mode
A512	27140681	Bracket, auto
A513	880009	Rivert
A516	835130065	3STF + 6B, Tapping screw
A631	27170133	Bottom board
A632	27175009A	Leg
A633	831130068	3TTW + 6B, Tapping screw
A634	834130128	3TTS + 12B, Tapping screw
A635	27300359	Lid
A521	27180147	Spring
A801	28320774	Knob, TAPE2
A802	28320775	Knob, TAPE1
A803	28320776	Knob, PHONO
A804	28320777	Knob, TUNER
A805	28320778	Knob, FM
A806	28320760	Knob, power
A807	28320772	Knob, mode
A808	28320800	Knob, speaker
A809	28320802A	Knob, tone
A810	28320803A	Knob, selector
A811	28320801A	Knob
A812	28320799	Knob, volume
A813	28320804	Knob, balance
A814	28320805	Knob, auto
A801	28320811	Knob, station 1
A822	28320812	Knob, station 2
A823	28320813	Knob, station 3
A824	28320814	Knob, station 4
A825	28320815	Knob, station 5
A826	28320816	Knob, station 6
A827	28320817	Knob, station 7
A828	28320818	Knob, station 8
A829	28320809	Knob, red
A830	28320808	Knob, memory
A831	28320779	Knob, tuning
A851	833130080	3TTB + 8P, Tapping screw
A852	870048	W3x8x0.8mm, Nylon washer
C851, C852	379124737	0.047μF, 50V, Capacitor, DEW
C855, C856	330924730	0.047μF, 50V, Capacitor, ceramic
C901	3500065A	0.01μF, 400V, Capacitor IS
C901a	27300080	Cover, capacitor
F901	252050	5A (ST-6), Primary fuse (D)
F901	252020	5A—T, Primary fuse (W)
F902	252075	2.5A-EA-EAK, Primary fuse (W)
L001	232098	NMA-3040, AM loop antenna
L001a	27190129	Holder, AM loop antenna
P001	25060035	NTM-4TRMC06, Antenna terminal
P002	25060044	Ground terminal
P002a	87613010	W3x10F, Flat washer
P003	25045047	NPJ-2PRBL22, Terminal, PHONO
P004-P006	25045025	NPJ-4PRBL03, Terminal, Tape1/2 and EPS
P007, P008	25060049	NTM-4PRMN18, Speaker terminal
P009	25045067	HLJ-0279-01-070, Stereo headphone
P201	26060025	T5251-B, Ground terminal
P202	223004-1	Terminal
	26065203	Binder
P901, P902	25050046	NSCT-2P15, AC outlet (D)
PL803-PL805	210109	PL14V0. 06AW4.0, Lamp, Rec/Treble/Bass
PL806	210096	PL14V0.08AW-2, Power indicator lamp
Q508,Q608	2201103 or 2201102	2SD845 (O) or 2SD845 (R), Power amplifier transistor
Q509,Q609	2201093 or 2201092	2SB755 (O) or 2SB755 (R), Power amplifier transistor
R354,R454	6142011	N30LGC100KMN15Z, Balance control variable resistor
R551,R651	441623314	330Ω, 1W, Metal oxide film resistor
R901	431523355	3.3MΩ, 1/2W, Solid resistor
S301	25030221	NRSM-103-25ZV, Cartridge selector switch
S301a	25065210	Wire, remote switch
S801	26030222	NRS-124-50Y, Speaker selector switch
S901	25035135 or 25035321	NPS-111-L100P or NPS-111-L285P, Power switch (D)
S901	25035176 or 25035322	NPS-111-L140 or NPS-111-L286P, Power switch (W)
S902	25065123	NSS-1258P, Voltage selector switch (W)
	250142	NSS-2225, Band selector switch
T901	230622	NPT-783D, Power transformer (D)

REF. NO.	PARTS NO.	DESCRIPTION
T901	230623	NPT-783DG, Power transformer (W)
U1	13258574D	NARF-1374d, FM/AM tuner pc board ass'y (D)
	13260574E	NARF-1374e, FM/AM tuner pc board ass'y (W)
U2	13258587A	NACX-1387a, CX decoder pc board ass'y
U3	13258588A	NAVR-1388a, CX level pc board ass'y
U4	13258532	NATS-1432, Tone control and switch circuit pc board ass'y
U5	13258533	NAEQ-1433, Equalizer amplifier pc board ass'y
U6	13258534	NAVR-1434, Auto volume circuit pc board ass'y
U7	13258535	NASW-1435, UP/DOWN switch pc board ass'y
U8	13258536	NASW-1436, Operation switch pc board ass'y
U9	13258537	NADG-1437, Digital circuit pc board ass'y (D)
	13260537A	NADG-1437a, Digital circuit pc board ass'y (W)
U10	13258538	NADIS-1438, Display pc board ass'y (D)
	13260538A	NADIS-1438a, Display pc board ass'y (W)
U11	13258539	NASW-1439, Muting switch pc board ass'y
U12	13258540	NASW-1440, Mode switch pc board ass'y
U13	13258541	NAPL-1441, Dial illumination lamp pc board ass'y
U14	13258542	NAPL-1442, Volume illumination lamp pc board ass'y
U15	13258543	NAMA-1443, Power amplifier, protector and power supply pc board ass'y (D)
U15	13260543A	NAMA-1443a, Power, protector and power supply pc board ass'y (W)
U16	13258544	NAPS-1444, Power supply circuit pc board ass'y
U17	13258545	NAFU-1445, Fuse terminal pc board ass'y
	13260545A	NAFU-1445a, Fuse terminal pc board ass'y
U18	13258546	NACC-1446, Thermal detector pc board ass'y
U19	13258547	NASW-1447, Auto down switch pc board ass'y
W901	253112	AS-UC-4, Power supply cable (D)
	253092	AS-CEE, Power supply cable (W)
W901a	270280	SR-4K-4, Strainrelief

Note: (D) : Only 120V model
(W) : Only 120/220V model

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 (Only W model)

Connect the DC voltmeter between the + BT1 and E terminals on the power amplifier pc board. Adjust the semi-fixed resistor R929 so that the indication of voltmeter become 25.3V.

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
   LOUNDNESS . . . . . OFF
   TAPE 1, 2 . . . . . OFF (SOURCE)

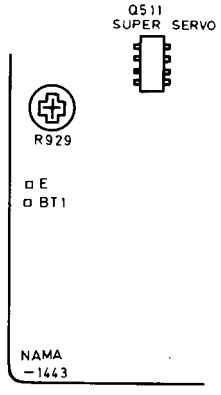
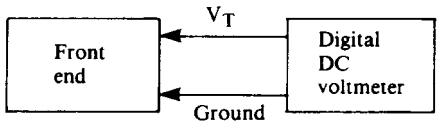


Fig. 9

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			
1	600 kHz (603 kHz)	L107	Digital DC voltmeter	2.5V
2	1400 kHz (1404 kHz)	C156		15.5V
3	Repeat steps 1 and 2 as necessary			

( ) : W model

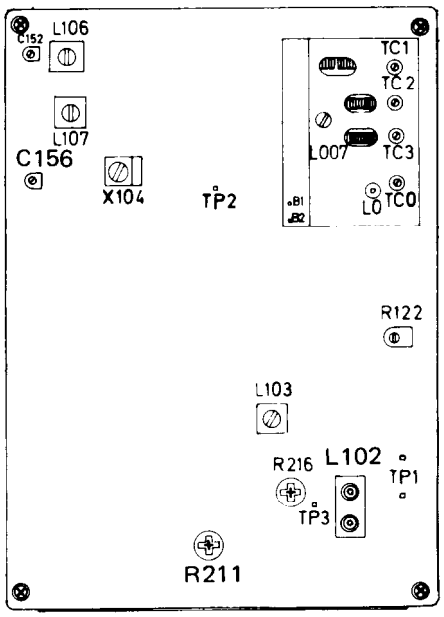
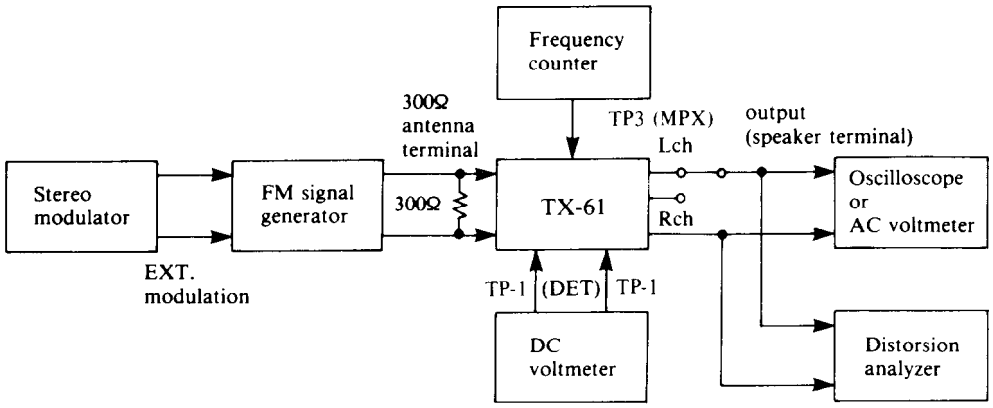


Fig 10

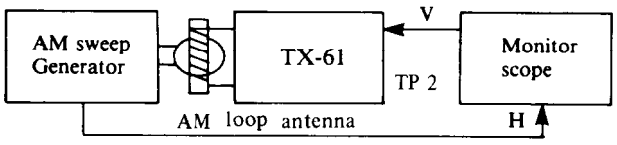
3. FM adjustment



Item		FM signal generator	Stereo modulator	Dial to set	Adjust	Output indicator	Adjust for	Remarks
IF FM	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	

4. AM IF adjustment

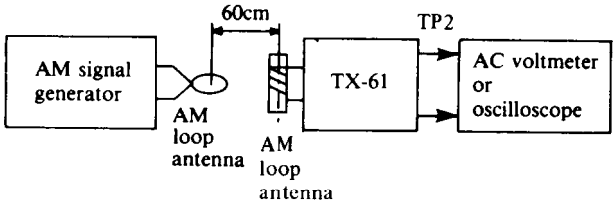
1. Set the dial to quiet point.



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

Remark : Usually not necessary to adjust.

5. 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

6. Idling Current Adjustment

Connect the DC voltmeter between ID and CT terminals.
Adjust the semi-fixed resistors R514 and R614 so that the reading of voltmeter becomes 12 ±3mV.
Notes : Adjust after switching on for 5 minutes.

Open load, VOLUME.....Minimum, TAPE-1.....ON

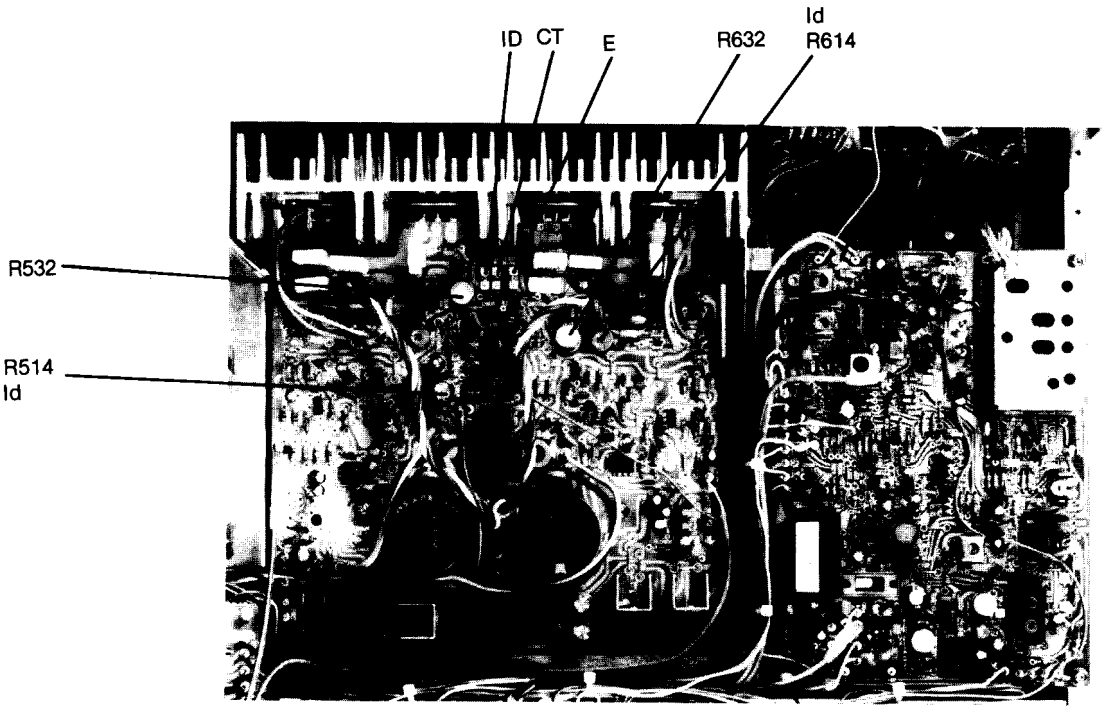
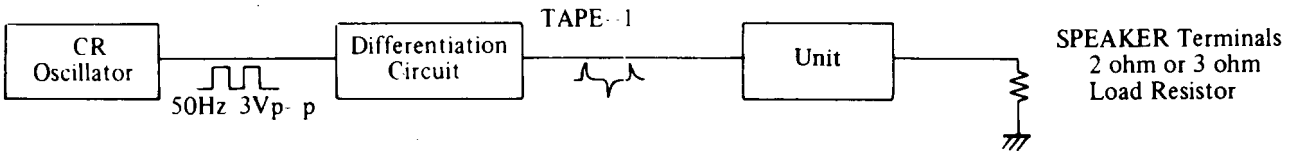
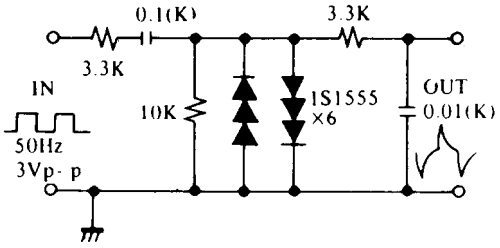


Fig. 11

7. Current Detector Circuit Adjustment





Differentiation Circuit

Apply a tone burst signal to the TAPE-1 terminals. Connect a 2Ω hollow resistor to the speaker terminals, and adjust variable resistor R532 (Lch) or R632 (Rch) so that the relay is operated at maximum volume. Connect a 3Ω hollow resistor to the speaker terminals. Confirm the relay is not operated at maximum volume. (See Fig. 11)

NOTES: Adjust after switching on for 5 minutes.
VOLUME-Maximum

8. Center Voltage Check

When the transistor of the differential amp, the power amplifier or the constant current circuit has been replaced, check the center voltage.

Connect a DC VTVM between the CT and E terminals and check if the reading of the DC VTVM is within ±10mV. Perform this check 5 minutes after the power switch has been set to On.

9. CX Decoder Adjustment

1. Apply the sine wave signal of 1kHz, 2.5mV to the PHONO terminal of left-ch. (right-ch.).
2. Insert the shorted pin to the PHONO terminal of right-ch. (left-ch). (See Fig. 14)
3. Connect the DC voltmeter to the terminal TP-2.
4. Adjust the variable resistor R731 (R732) on the back panel so that the reading of voltmeter become 5V. Confirm that the L.E.D. of back panel light on.
   Specifications; 4.6 to 5.4V.
5. Connect the DC voltmeter to terminal TP-3L (TP-3R). Adjust the semi-fixed resistor R765 (R766) so that the reading of voltmeter become 150mV.
6. Proceed for right channel in the same manner.
7. Apply the tone burst signal of 1kHz, 2.5mV as shown fig. 13 to the PHONO terminal of left-ch. (right-ch).
8. Connect the DC voltmeter to the terminal TP-3R (TR-3L). Adjust the R760 (R759) so that the reading of voltmeter become 0V.
9. Proceed for right channel in the same manner.

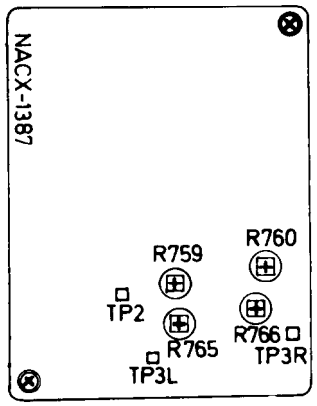


Fig. 12

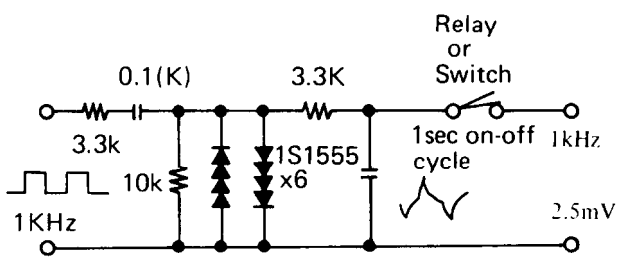


Fig. 13

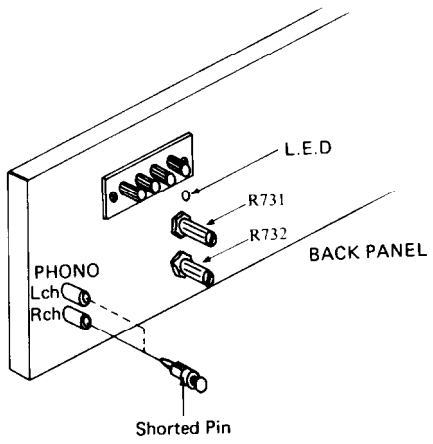
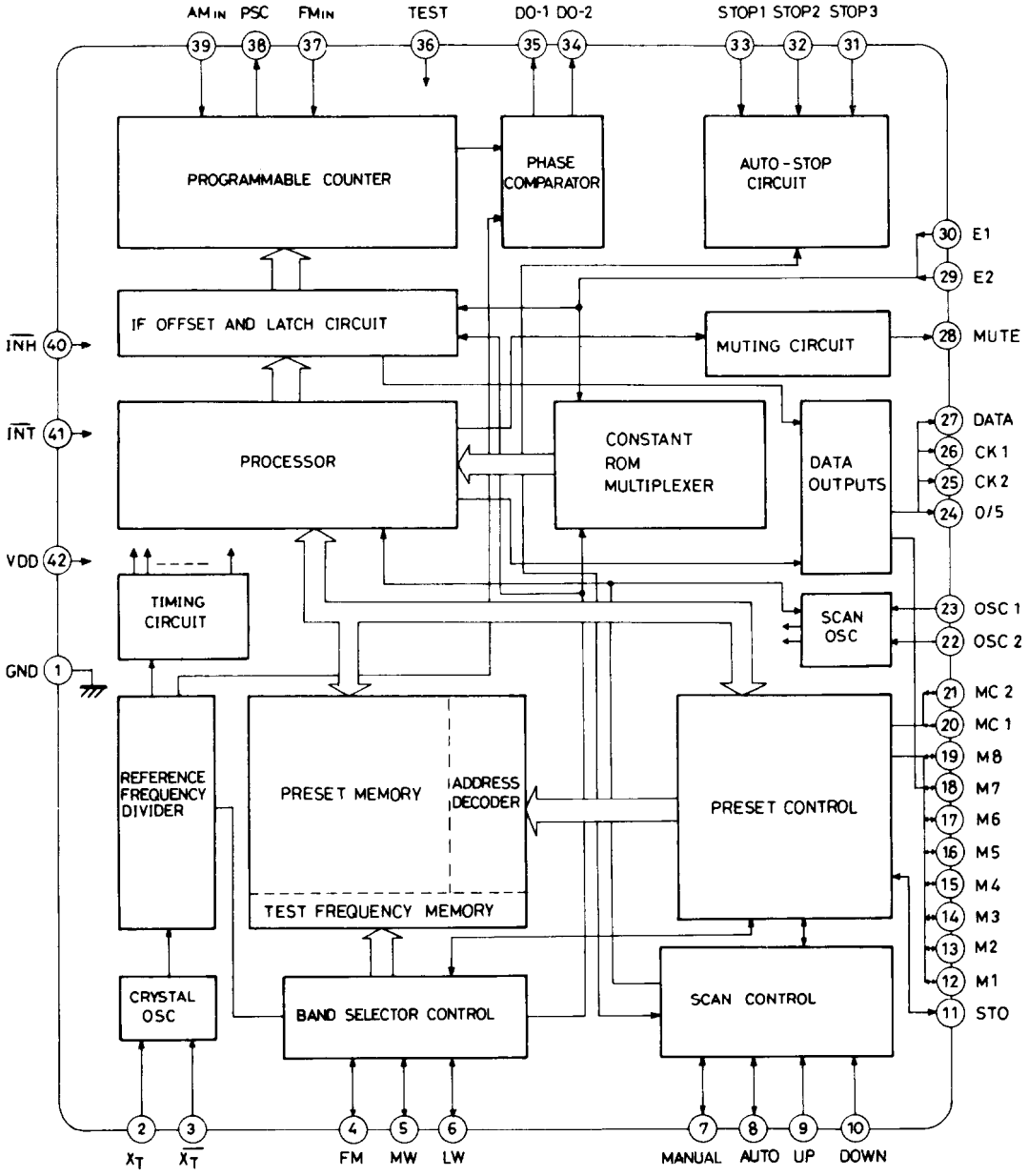


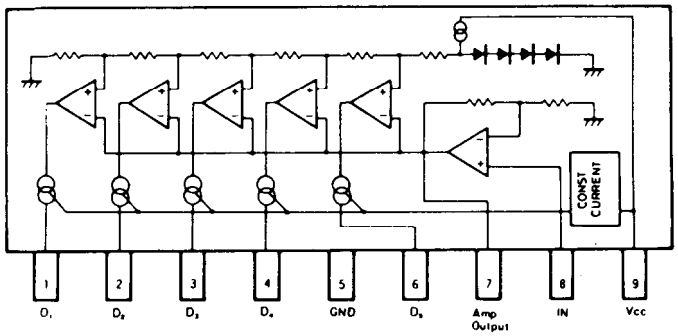
Fig. 14

BLOCK DIAGRAM OF IC

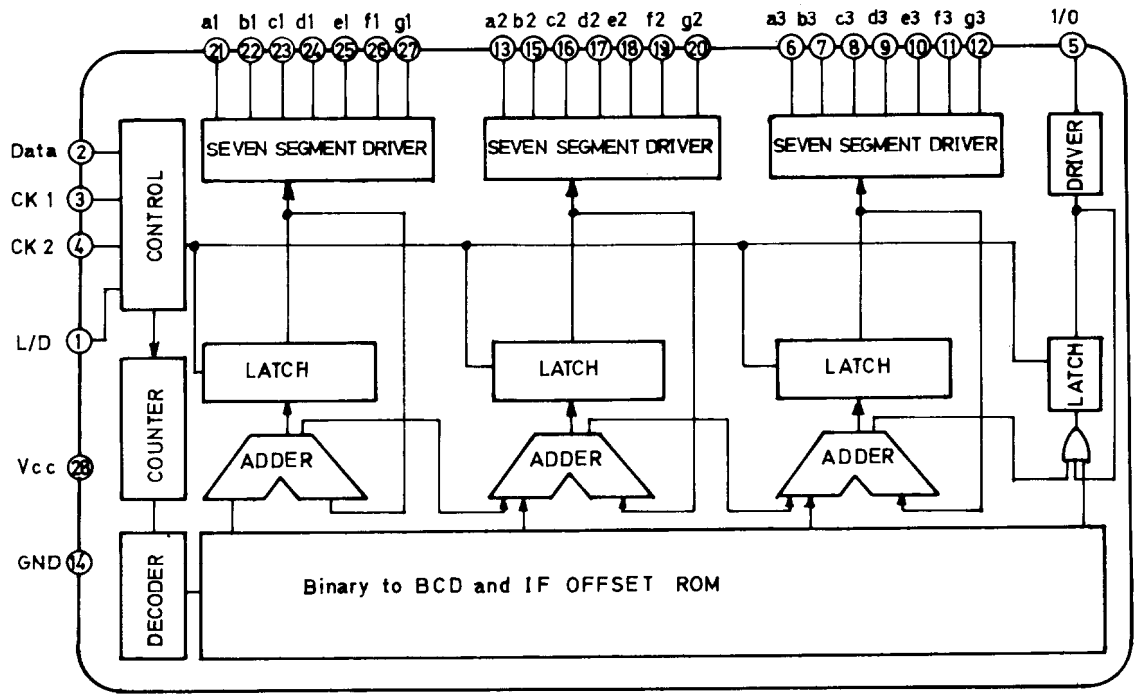
TC9147P (Micro computer)



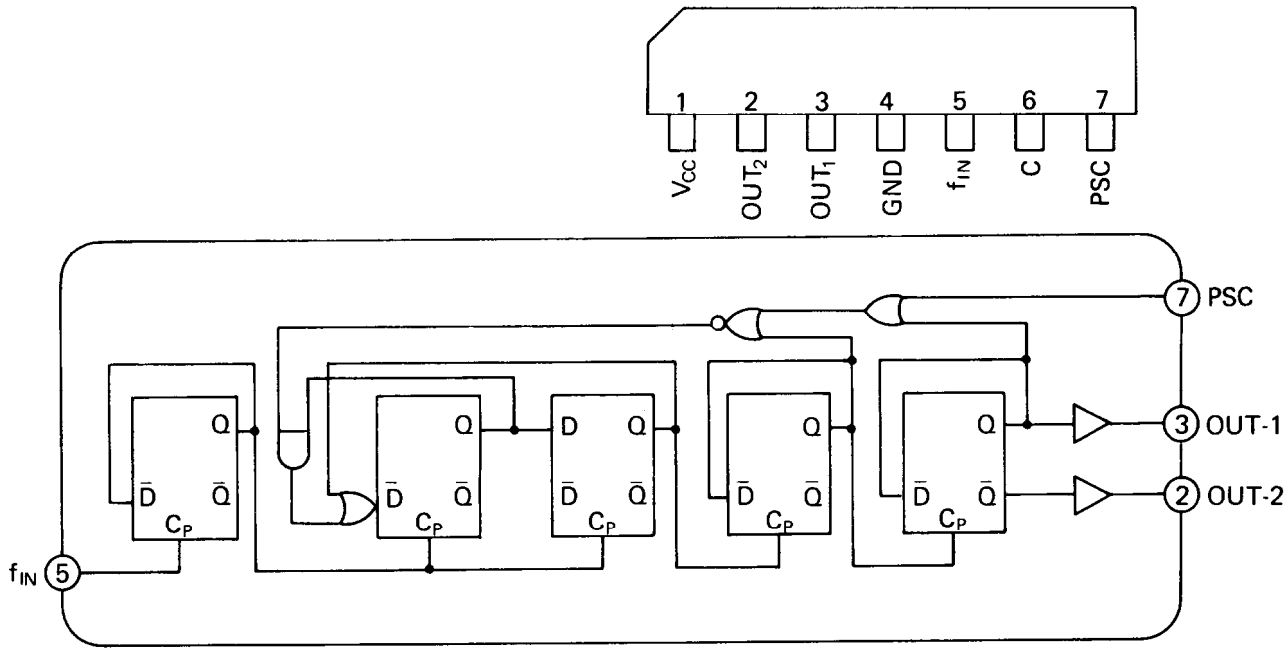
BA6124 (Signal meter driver)

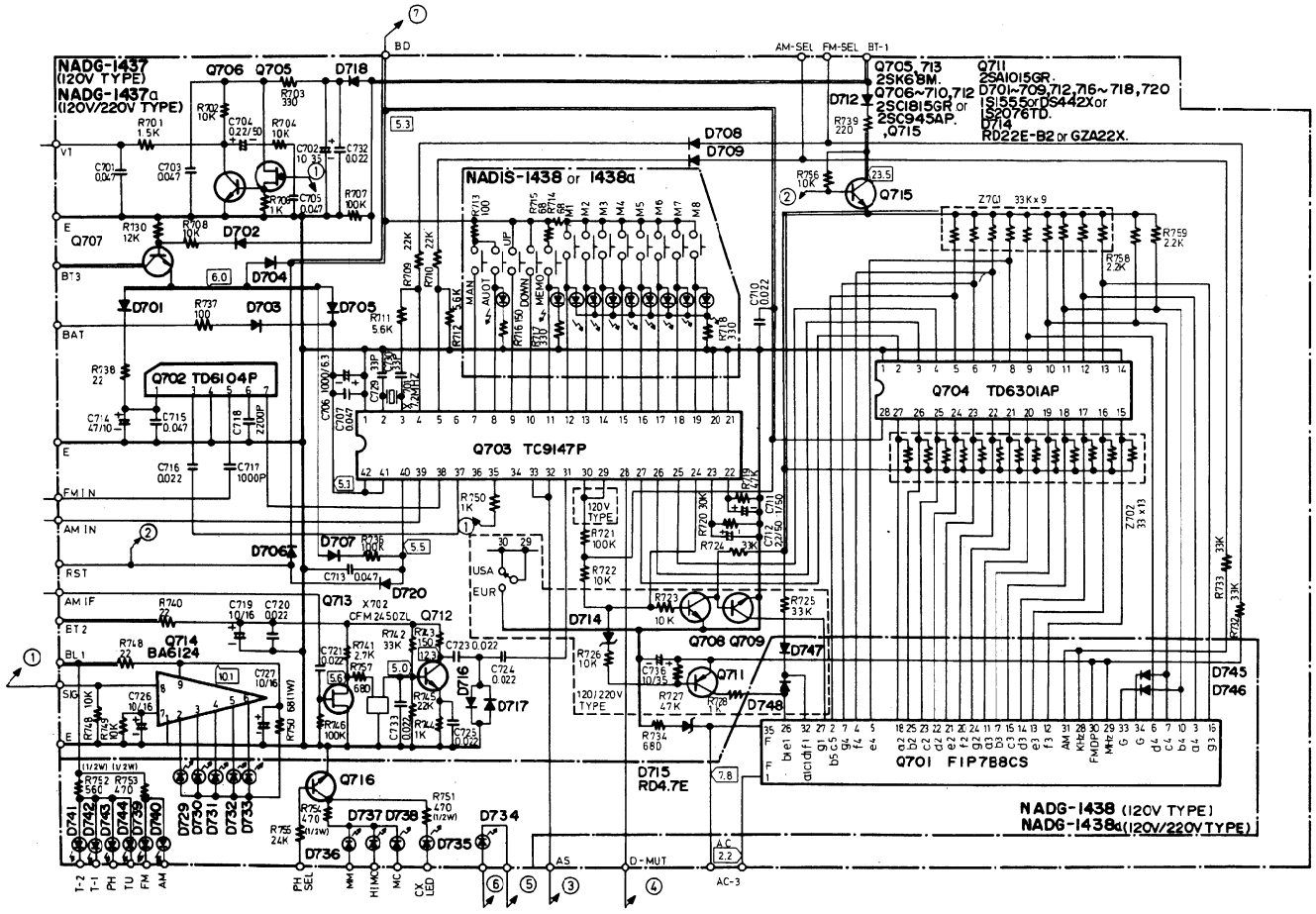


TD6301AP (Fluorescent indicator tube driver)



TD6104P (Prescaler)

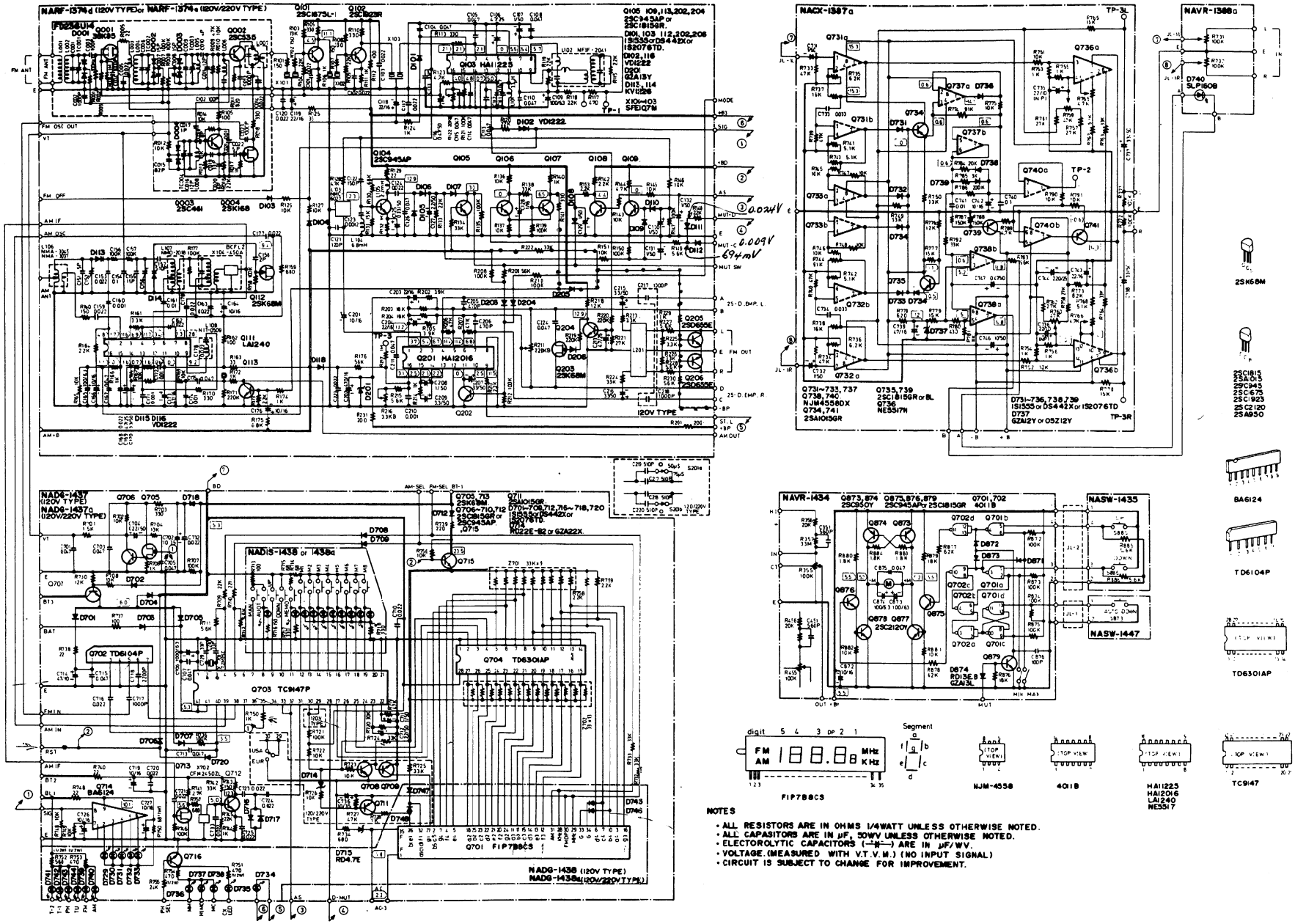




DIGITAL CIRCUIT PC BOARD (NADG-1437/a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q702	222675	TD6104P, Prescaler
Q703	222674	TC9147P, PLL synthesizer and controller
Q704	222673	TD6301AP, Frequency indicator driver
Q714	222670	BA6124, Signal meter driver
	Transistors [D model]	
Q705,Q713	2211303	2SK68A (M)
Q706,Q707	2211255 or	2SC1815 (GR) or
Q712,Q715	2210746	2SC945A (P)
	Transistors [W model]	
Q705	2211303	2SK68A (M), F.E.T
Q706-Q709	2211255 or	2SC1815 (GR) or
Q712,Q715	2210746	2SC945A (P)
Q711	2211454 or	2SA1015 (Y) or
	2211455	2SA1015 (GR)
Q713	2211303	2SK68A (M)
	Diodes [D model]	
D701-D709	223103,	1S1555,
D716-D718	223133 or	DS442X or
D712,D720	223145	1S2076TD
D715	223944 or	RD4.7E-B or
	223943	RD4.7E-C
	Diodes [W model]	
D701-D709	223103,	1S1555,
D712,D720	223133 or	DS442X or
D716-D718	223145	1S2076TD
D714	2239752 or	RD22E-B2 or
	2241231	GZA22X
D715	223944 or	RD4.7E (C) or
	223943	RD4.7E (B)
	Crystal	
X701	3010073	XTL-7.2M
	Ceramic filter	
X702	3010048	CFM2-450ZL
	Capacitors	
C702	352761009	10μF, 35V, Elect.
C704	395162297	0.22μF, 35V, Tantalum
C706	352721029	1,000μF, 6.3V, Elect.
C711	352780109	1μF, 50V, Elect.
C712	352780229	2.2μF, 50V, Elect.
C714	352734709	47μF, 10V, Elect.
C719	352741009	10μF, 16V, Elect.
C726,C727	352741009	10μF, 16V, Elect.
C736	352761009	10μF, 35V, Elect. (W)
	Resistors	
R750	441626804	68Ω, 1W, Metal oxide film
Z701	49121333509	33kΩx9, 1/8W, Network
Z702	49121333513	33kΩx13, 1/8W, Network

SCHEMATIC DIAGRAM



NOTES

- ALL RESISTORS ARE IN OHMS 1/4WATT UNLESS OTHERWISE NOTED.
- ALL CAPASITORS ARE IN μF, 50WV UNLESS OTHERWISE NOTED.
- ELECTOROLYTIC CAPACITORS (—‖—) ARE IN μF/WV.
- VOLTAGE.(MEASURED WITH V.T.V.M.) (NO INPUT SIGNAL)
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

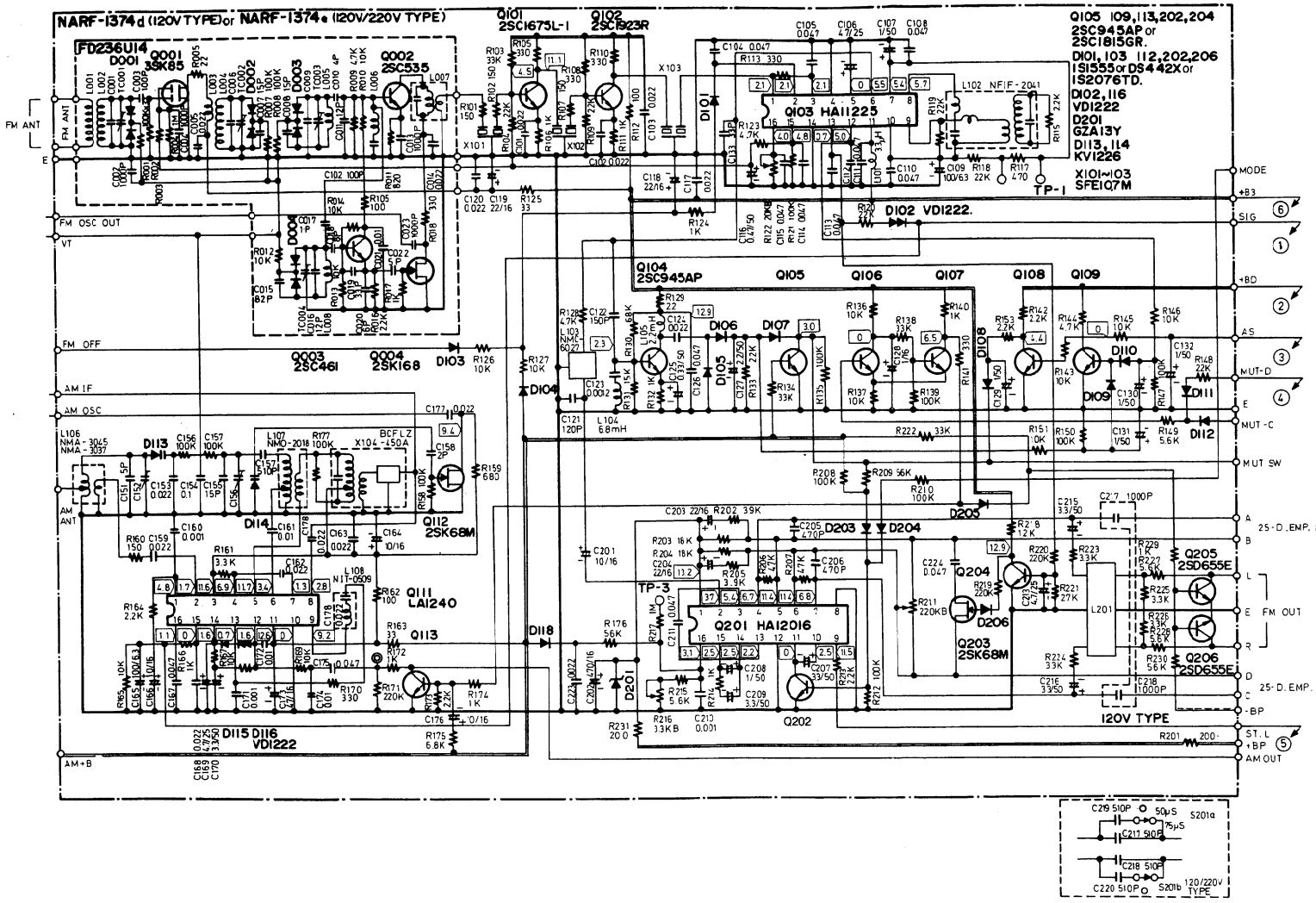
ONKYO CORPORATION

DISPLAY PC BOARD (NADIS-1438)

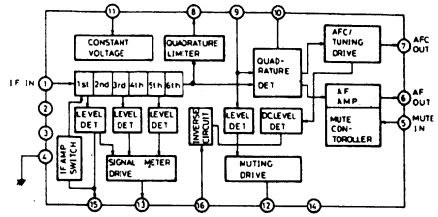
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Fluorescent indicator tube	
Q701	212016	FIP7B8CS
	Transistor	
Q716	2211255 or 2210746	2SC1815 (GR) or 2SC945A (P)
	L.E.Ds	
D719	225028	GL9PG59
D720	225029	GL9PR9
D721-D728	225057	SR538D
D729-D733	225028	GL9PG59
D734	225059	GL9PR9
D735	225112	GL-9HY84
D736-D738	225028	GL9PG59
D739,D740	225111	GL-9PG54
D741-D744	225112	GL9HY84
	Diodes	
D745,D476	223105, 223133 or 223145	1S15555, DS442X or 1S2076TD
	Resistors	
R751,R753	441524714	470Ω, 1/2W, Metal oxide film
R752	441525614	560Ω, 1/2W, Metal oxide film
R754	441524714	470Ω, 1/2W, Metal oxide film
	Switches	
S701-S713	25035275	NPS-111-S239
	Holder ass'y	
A853	13258903	
	Knobs	
A801	28320774	TAPE2
A802	28320775	TAPE1
A803	28320776	PHONO
A804	28320777	TUNER
A805	28320778	FM
A821	28320811	STATION 1
A822	28320812	STATION 2
A823	28320813	STATION 3
A824	28320814	STATION 4
A825	28320815	STATION 5
A826	28320816	STATION 6
A827	28320817	STATION 7
A828	28320818	STATION 8
A829	28320809	RED
A830	28320808	MEMORY
A831	28320779	TUNING
	Screws	
A851	833130080	3TTB + 8P, Tapping
	Washer	
A852	870048	W3x8x0.8mm, Nylon
	Cushion	
	28140433	8x60x6mm, Fluorescent indicator tube

DIAL/VOLUME ILLUMINATION LAMP PC BOARD (NAPL-1441/1442)

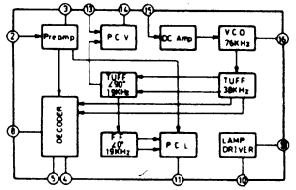
CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL801	210091	PL12V150mA, Blue cap, Edge lamp
PL802	210038	PL12V150mA, Volume indicator lamp



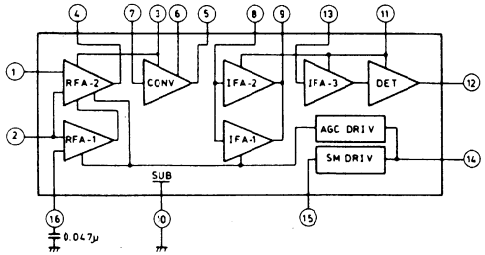
HA11225 (FM IF system)



HA12016 (Stereo decoder)



LA1240 (AM radio system)



PRINTED CIRCUIT BOARD-PARTS LIST
FM/AM TUNER PC BOARD (NARF-1374d/e)

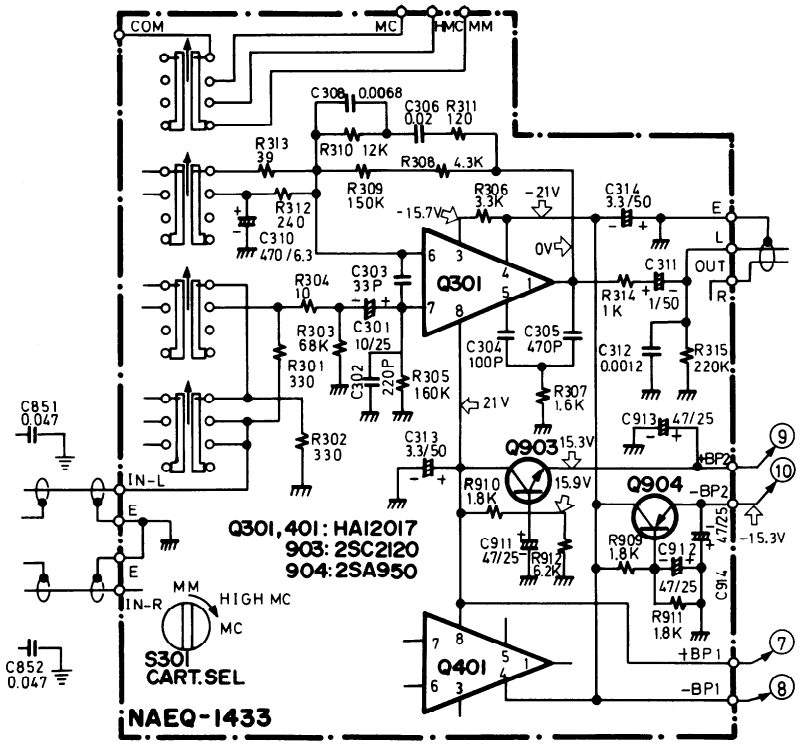
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Front end	
	240043	FD236U14
	ICs	
Q103	222540	HA11225, FM IF system
Q111	222497	LA1240, AM radio system
Q201	222593	HA12016, Stereo decoder
	Transistors	
Q101	2210823	2SC1675 (L-1)
Q102	2211722	2SC1923 (R)
Q104	2210746	2SC945A (P)
Q105-Q109	2210746,	2SC945A (P),
Q113,Q202	2211255 or	2SC1815 (GR) or
Q204	2212115	2SC2458 (GR)
Q112,Q203	2211302 or	2SK68A (L) or
	2211303	2SK68A (M)
Q205,Q206	2211705	2SD655 (E)
	Diodes	
D101,D103	223105,	1S1555,
D104-D112	223133 or	DS442X or
D115,D118	223145	1S2076TD
D102,D116	4000068	VD1222
D113,D114	223136	KV1226
D201	2241132 or	GZA13Y or
	2242911	EQA0213A
D203-D206	223105,	1S1555,
	223133 or	DS442X or
	223145	1S2076TD
	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	NMA-3045 or
	232089	NMA-3037
L107	232084	NMO2018
L201	233032A	NMC-8-7
	Transformers	
L102	233274	NFIF6041
L108	232041	NIT-0509
	Ceramic filters	
X101-X103	3010024	SFE10.7MLA
X104	3010058	BCFLZ450A
	Capacitors	
C106	352750479	4.7μF, 25V, Elect.
C107	352780109	1μF, 50V, Elect.
C109	352721019	100μF, 6.3V, Elect.
C116	352784799	0.47μF, 50V, Elect.
C118,C119	352742209	22μF, 16V, Elect.
C125	352783399	0.33μF, 50V, Elect.
C127	352780229	2.2μF, 50V, Elect.
C128-C132	352780109	1μF, 50V, Elect.
C152,C156	3060010	NTC-20P09, Trimmer
C157	372525114	510pF ±5%, 50V, Styrol
C164,C166	352741009	10μF, 16V, Elect.
C165	352721019	100μF, 6.3V, Elect.
C169	352750479	4.7μF, 25V, Elect.
C170	352780339	3.3μF, 50V, Elect.
C173	352744709	47μF, 16V, Elect.
C176	352741009	10μF, 16V, Elect.
C201	352741009	10μF, 16V, Elect.
C202	352744719	470μF, 16V, Elect.
C203,C204	352742209	22μF, 16V, Elect.
C205,C206	372524714	470pF ±5%, 50V, Styrol
C207,C209	352780339	3.3μF, 50V, Elect.
C208	352780109	1μF, 50V, Elect.
C210	372621024	1,000pF ±5%, 50V, Styrol
C213	3526750479	4.7μF, 25V, Elect.
C215,C216	352780339	3.3μF, 50V, Elect.
C217,C218	372521024	1,000pF ±5%, 50V, Styrol (D)
C217-C220	372525114	510pF ±5%, 50V, Styrol (W)
	Resistors	
R122	5215046	N08HR50KBC, Semi-fixed
R211	5225037	N10HR220KBD, Semi-fixed
R216	5225029	N10HR3.3KBD, Semi-fixed
	Switch	
S201	250142	NSS2225, De-emphasis (W)
	Screws	
	82142604	2.6P+6F (BC), Pan head

MUTING/DE-EMPHASIS SWITCH PC BOARD (NASW-1439)

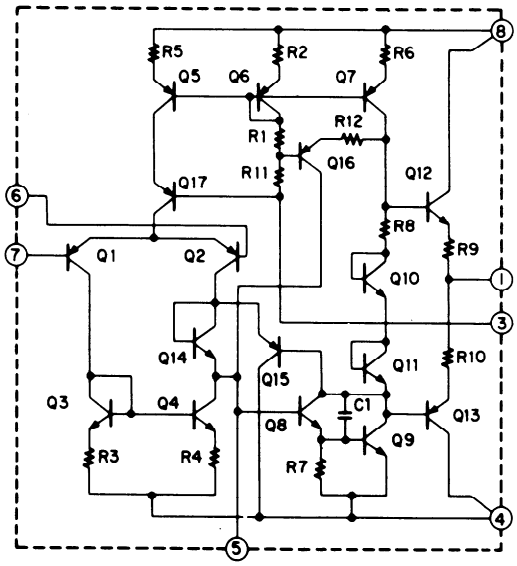
CIRCUIT NO.	PARTS NO.	DESCRIPTION
S311,S312	25035330	NPS-222-L294, Switch

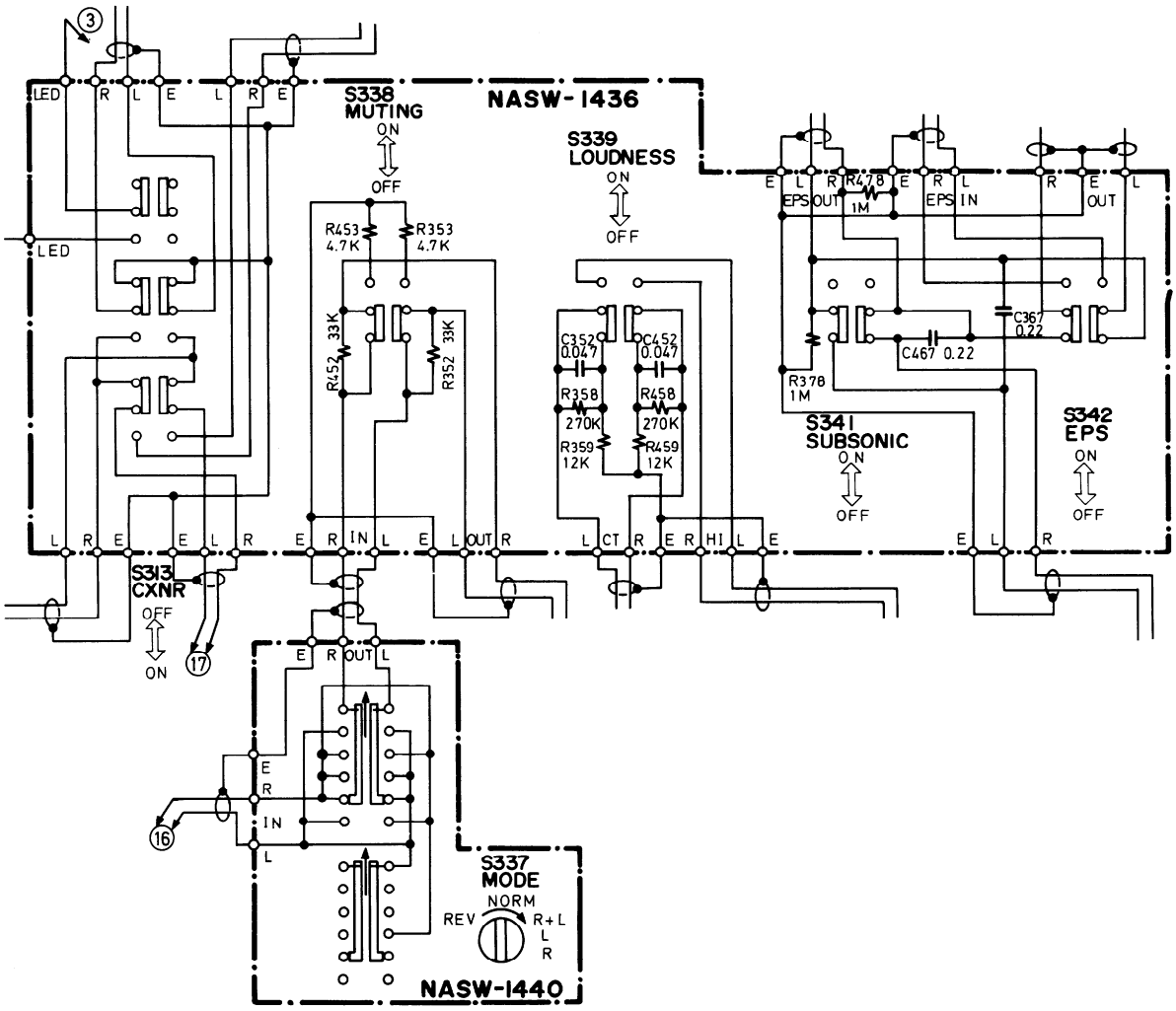
Note : D : Only 120V model
W : Only 12/220V model

Muting switch pc board

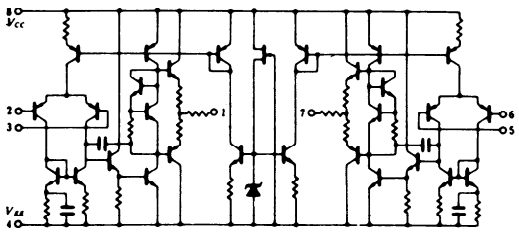


HA12017 (Equalizer amplifier)

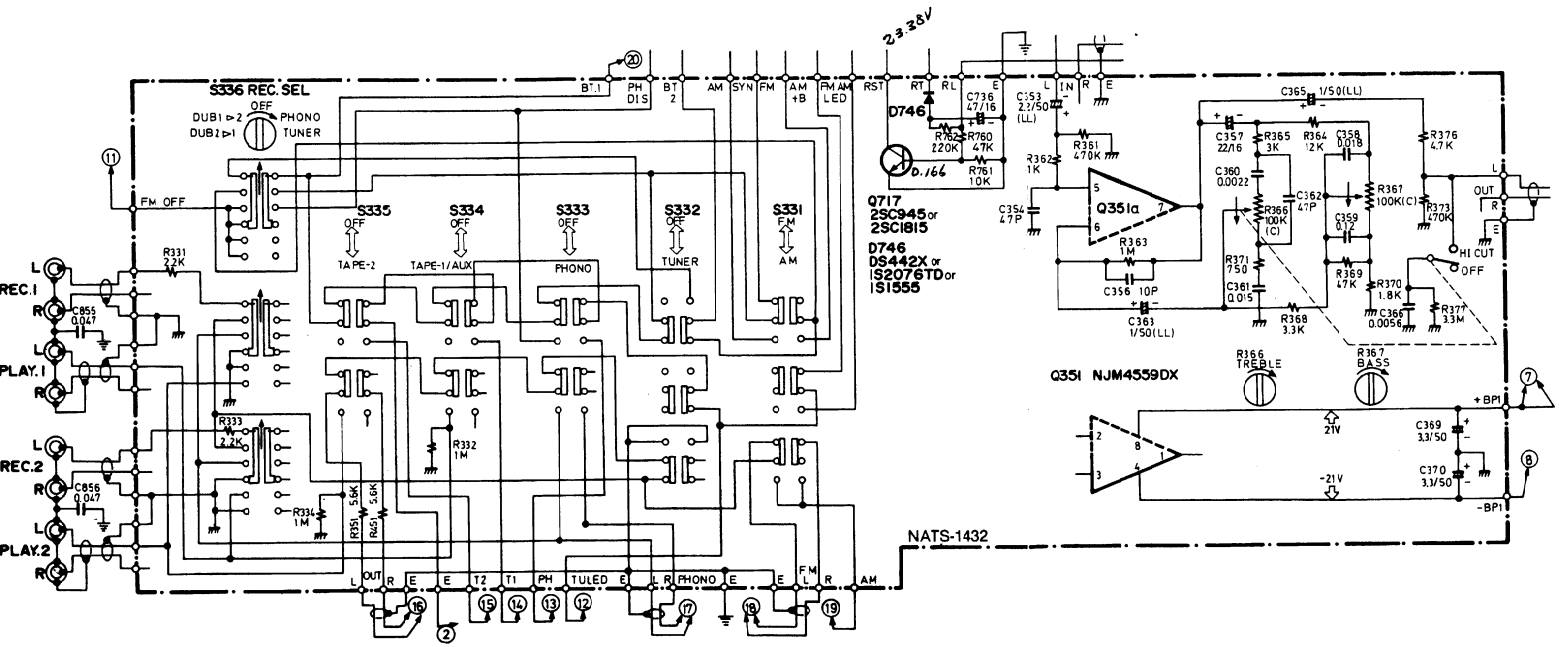




NJM4559DX (Operation amplifier)



1.7 Output
2.6 Inverse input
3.5 Input



EQUALIZER AMPLIFIER PC BOARD (NAEQ-1433)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q301,Q401	222594	HA12017
	Transistors	
Q903	2211163 or	2SC2120 (O) or
	2211164	2SC2120 (Y)
Q904	2211503 or	2SA950 (O) or
	2211504	2SA950 (Y)
	Capacitors	
C301,C401	392851007	10μF, 25V, LL
C310,C410	352724719	470μF, 6.3V, Elect.
C311,C411	352780109	1μF, 50V, Elect.
C313,C413	352780339	3.3μF, 50V, Elect.
C314,C414	352780339	3.3μF, 50V, Elect.
C315,C415	352782209	22μF, 50V, Elect.
C911-C914	352754709	47μF, 25V, Elect.
	Switch	
S301a-d	25065207	NSS-8392, Cartridge selector

MODE SWITCH PC BOARD (NASW-1440)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S337	25030223	NRSM-145-25SS

OPERATION SWITCH PC BOARD (NASW-1436)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S313,S338	25035331	NPS-162-442-L295,
S339,S341		CX/MUTE/LOUDNESS/SUB
S342		FIL/EPS
	27140677	Bracket, switch
	82113006	3P+6FN, Pan head screw

TONE AMPLIFIER AND SWITCH CIRCUIT PC BOARD (NATS-1432)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	IC	
Q501,Q601	222534	NJM-4559DX
	Transistor	
Q717	2211255 or	2SC1815 (GR) or
	2210746	2SC945A (P)
	Diode	
D746	223105,	1S1555,
	223133 or	DS442X or
	223145	1S2076TD
	Capacitors	
C353,C453	392880227	2.2μF, 50V, LL
C357,C457	352752209	22μF, 16V, Elect.
C363,C463	392880107	1μF, 50V, LL
C365,C465	352780109	1μF, 50V, Elect.
C369,C370	352780339	3.3μF, 50V, Elect.
C736	352741009	10μF, 16V, Elect.
	Resistors	
R366,R466	5148082	N16RQMS11C100KC025M, Treble control
R367,R467	5148081	N16RGM11C100KCS25M, Bass control
	Switches	
S331-S335	25035318	NPS-262-342-L282, Selector
S336	25030219	NRSM-165-25SS, Rec. selector
	Plates	
	27150155	Shielded
	28175055	Insulator

Auto volume circuit pc board

AUTO VOLUME CIRCUIT PC BOARD (NAVR-1434)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q701,Q702	222840111 or	4011B or
	222513	TC4011BP
	Transistors	
Q873,Q874	2211504	2SA950 (Y)
Q875,Q876	2211255 or	2SC1815 (GR) or
	2210746	2SC945A (P)
Q877,Q878	2211164	2SC2120 (Y)
Q879	2211255 or	2SC1815 (GR) or
	2210746	2SC945A (P)
	Diodes	
D871-D873	223105,	1S1555,
	223133 or	DS442X or
	223145	1S2076TD
D874	223965 or	RD13E-B or
	224113	GZA13L
	Capacitors	
C872	352741009	10μF, 16V, Elect.
C873,C874	352721019	100μF, 6.3V, Elect.
	Resistor	
R355,R455	5104134	N16RTMS100KBTP15, Volume control variable

UP/DOWN SWITCH PC BOARD PARTS LIST (NASW-1435)

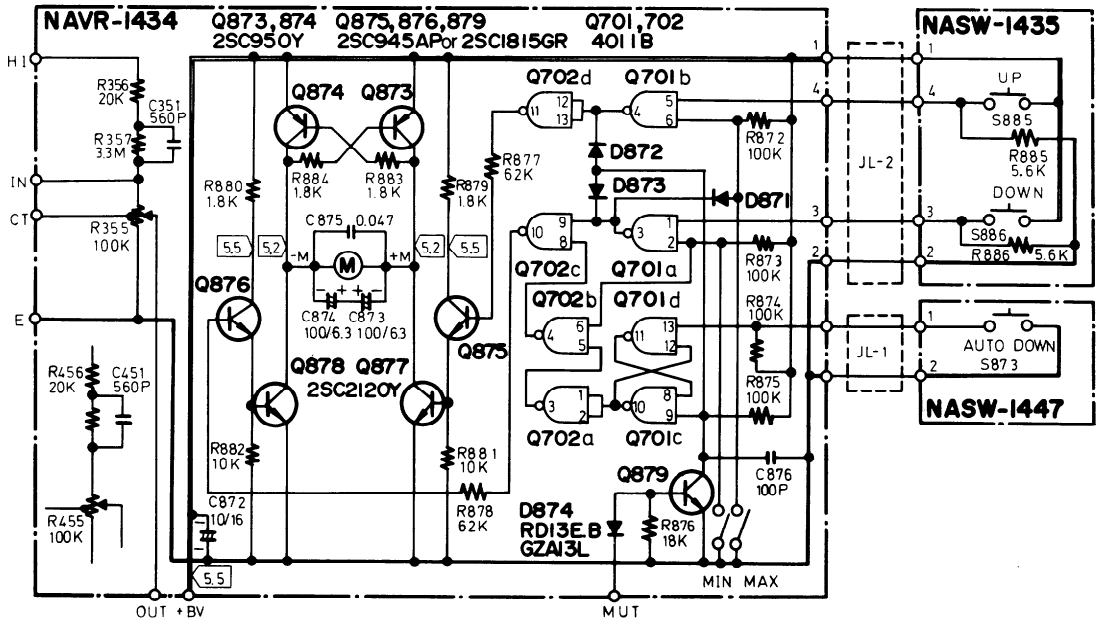
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Switches	
S871,S872	25035275	NPS-111-S239

AUTO DOWN SWITCH PC BOARD (NASW-1447)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S873	25035275	NPS-111-S239

Auto down switch pc board

UP/DOWN switch pc board

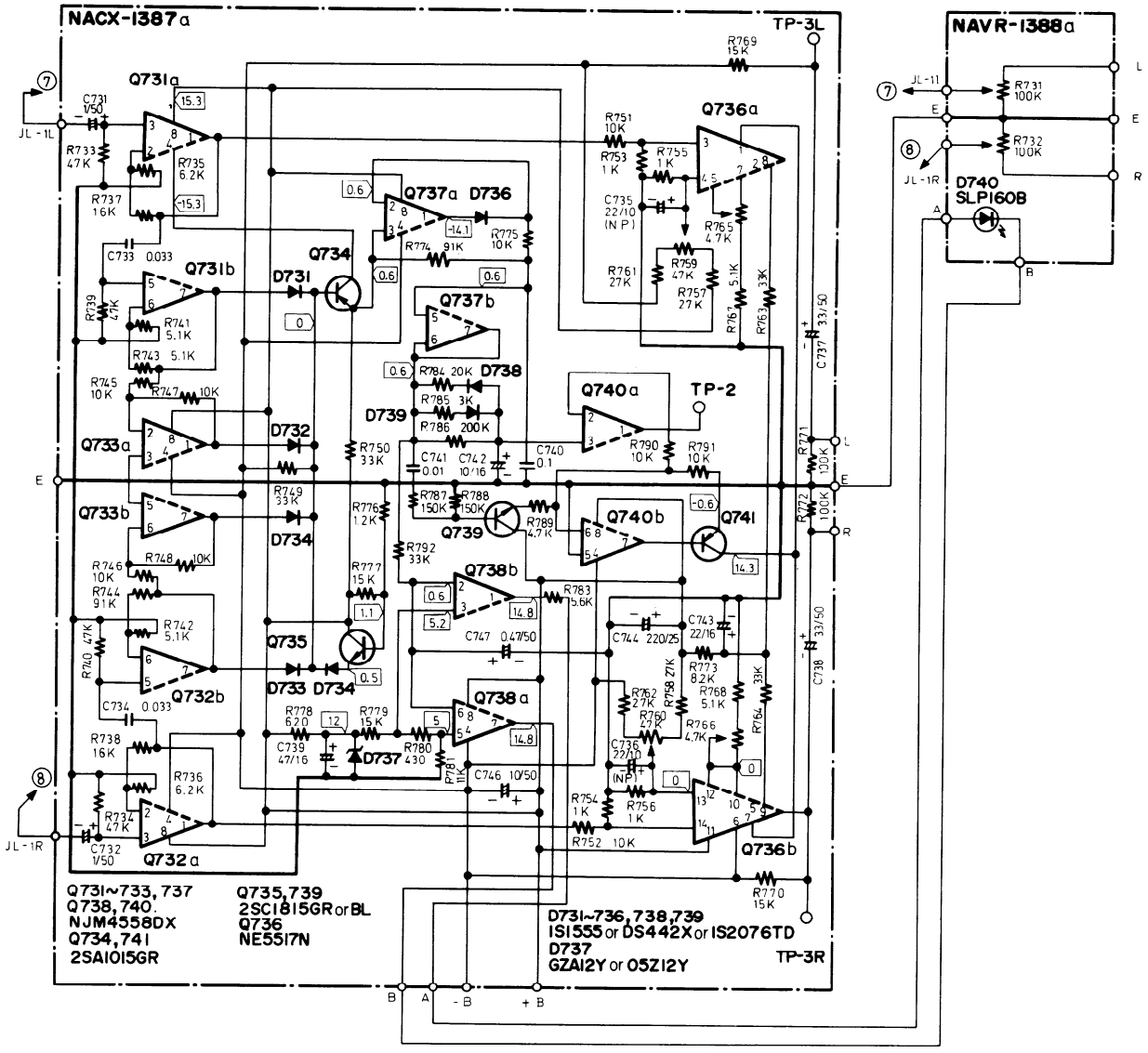


MODEL TX-61

SUBSTITUTIVE PARTS LIST

NOTE:USE THE REGULAR PARTS WHEN REPLACEMENT

TYPE	CIRCUIT NO.	DESCRIPTION	REGULAR PARTS	SUBSTITUTIVE PARTS	APPLICATION
UD	D735,741-744	LED	GL9HY84Y	GL9HY84B	5021-5520
UD	Q701	FL TUBE	7B8CS	7B8BC	5521-6020
UD	Q731-Q733	IC	NJM4558DX	NJM4558DD	5021-5520
UD	Q733,738,740	IC	NJM4558DX	NJM4558DD	5021-5520



CX DECODER PC BOARD (NACX-1387a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q731-Q733	222502	NJM-4558DX
Q736	222617	NE5517N
Q737, Q738	222502	NJM-4558DX
Q740		
	Transistors	
Q734, Q741	2211455	2SA1015 (GR)
Q735, Q739	2211255 or	2SC1815 (GR) or
	2211256	2SC1815 (BL)
	Diodes	
D731-D736	223105,	1S1555,
D738, D739	223133 or	DS442X or
	223145	1S2076TD
D737	2241112 or	GZA12Y or
	224187	05Z12Y
	Capacitors	
C731, C732	352780109	1μF, 50V, Elect.
C735, C736	352932206	22μF, 10V, Non-polar elect.
C737, C738	352780339	3.3μF, 50V, Elect.
C739	352744709	47μF, 16V, Elect.
C742	352741009	10μF, 16V, Elect.
C743	352742209	22μF, 16V, Elect.
C744, C745	352752219	220μF, 25V, Elect.
C746	352781009	10μF, 50V, Elect.
C747	352784799	0.47μF, 50V, Elect.
	Resistors	
R759, R760	5225034	N10HR47KBD, Semi-fixed
R765, R766	5225019	N10HR4.7KBD, Semi-fixed

CX LEVEL CONTROL PC BOARD (NAVR-1388a)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
D740	225103	SLP-160B, L.E.D
R731, R732	5148083	N16RL100KB20Z, CX level control

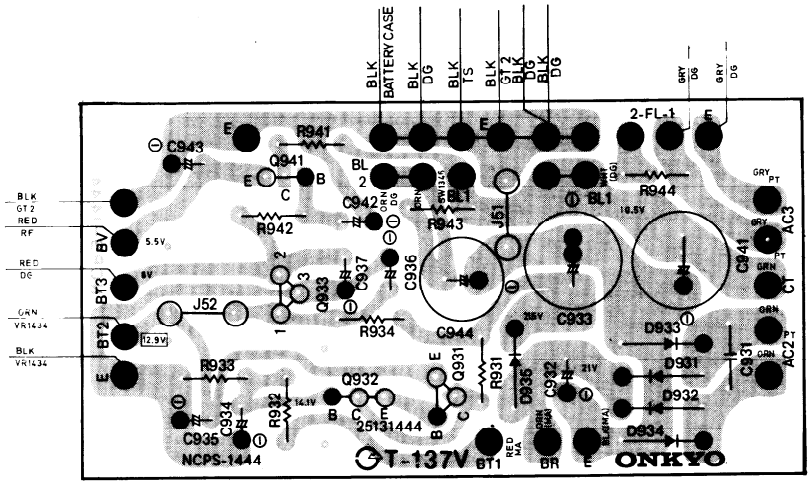
POWER SUPPLY CIRCUIT PC BOARD (NAPS-1444)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Transistors	
Q931	2201073 or	2SD880 (O) or
	2201074	2SD880 (Y)
Q932	2211255 or	2SC1815 (GR) or
	2211256	2SC1815 (BL)
Q941	2200664 or	2SC1626 (Y) or
	2200663	2SC1626 (O)
	IC	
Q933	222780062	78M06
	Diodes	
D931-D935	223804 or	SR1K-2 or
	223848	GP08B
	Lamps	
PL803-PL805	210109	PL14V0.06AW4.0
PL806	210096	PL14V0.08AW-2
	Capacitors	
C931	335251039	10,000pF, 500V, Ceramic
C932	352754709	47μF, 25V, Elect.
C933	352752229	2,200μF, 25V, Elect.
C934,C935	352744709	47μF, 16V, Elect.
C936,C937	352780339	3.3μF, 50V, Elect.
C941	352743329	3,300μF, 16V, Elect.
C942	352721019	100μF, 6.3V, Elect.
C943	352722219	220μF, 6.3V, Elect.
C944	352741029	1,000μF, 6.3V, Elect.
	Resistors	
R931	442521004	10Ω, 1/2W, Metal oxide film
R934	442523304	33Ω, 1/2W, Metal oxide film
R941,R943	442521004	10Ω, 1/2W, Metal oxide film
	Radiator	
	27160029	RAD-07
	Screws	
	82113008	3P + 8FN, Pan head

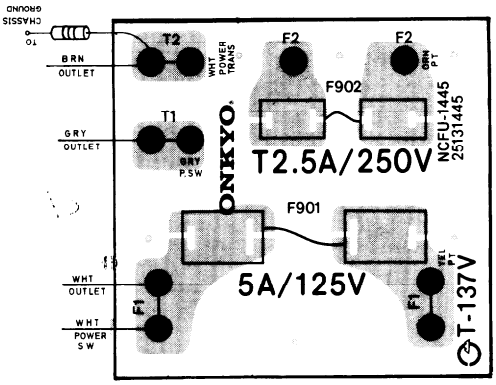
FUSE TERMINAL PC BOARD (NAFU-1445/a)

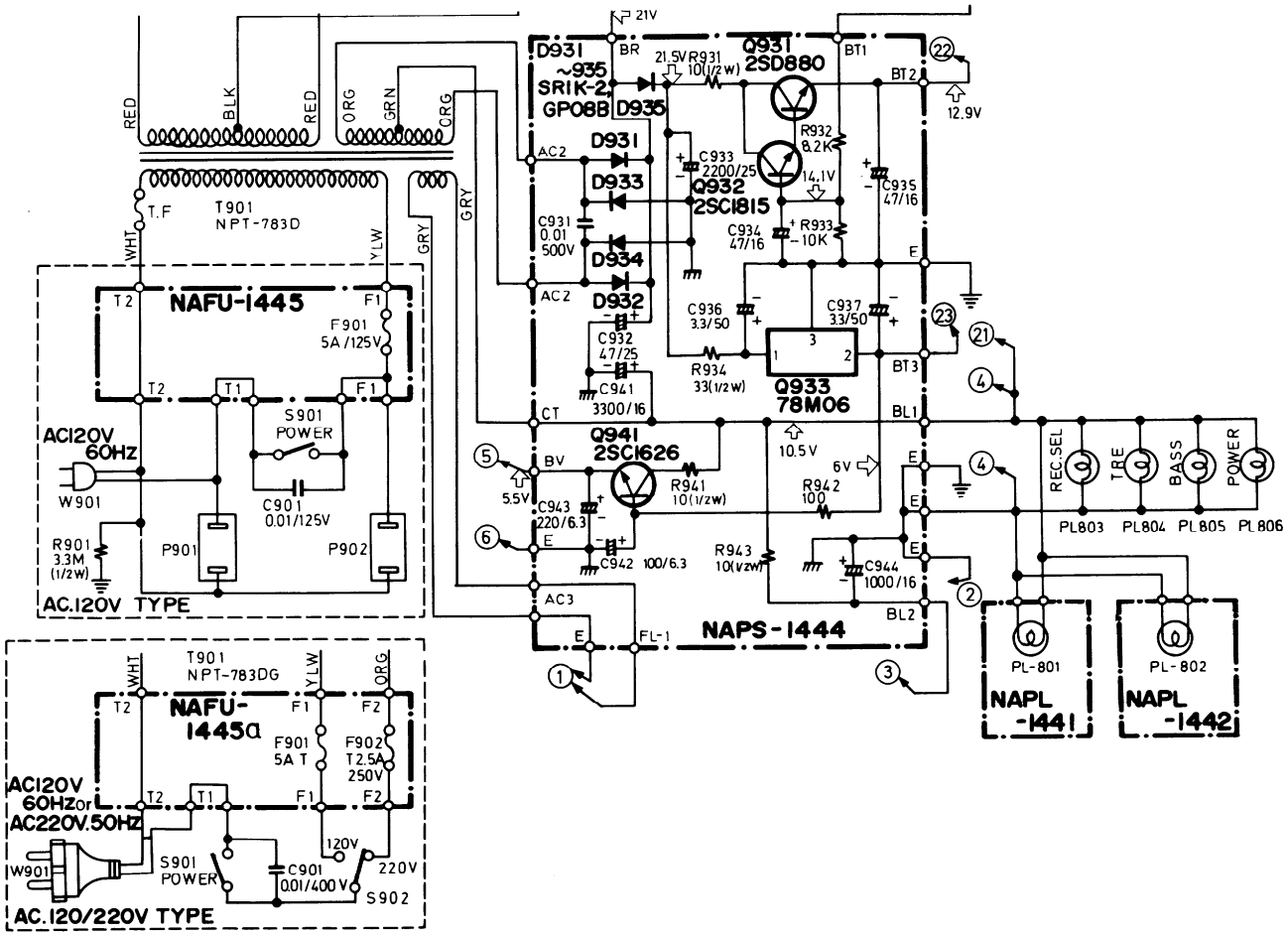
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	(D model)	
F901	252050	5A (ST-6), Primary fuse
F901a	250113	SN-5051, Fuse holder
	(W model)	
F901	252020	5A—T, Primary fuse
F902	252075	2.5A-SE-EAK, Primary fuse
F901a	250113	SN-5051, Fuse holder
F902a	25050065	YSH403T, Fuse holder

Power supply circuit pc board

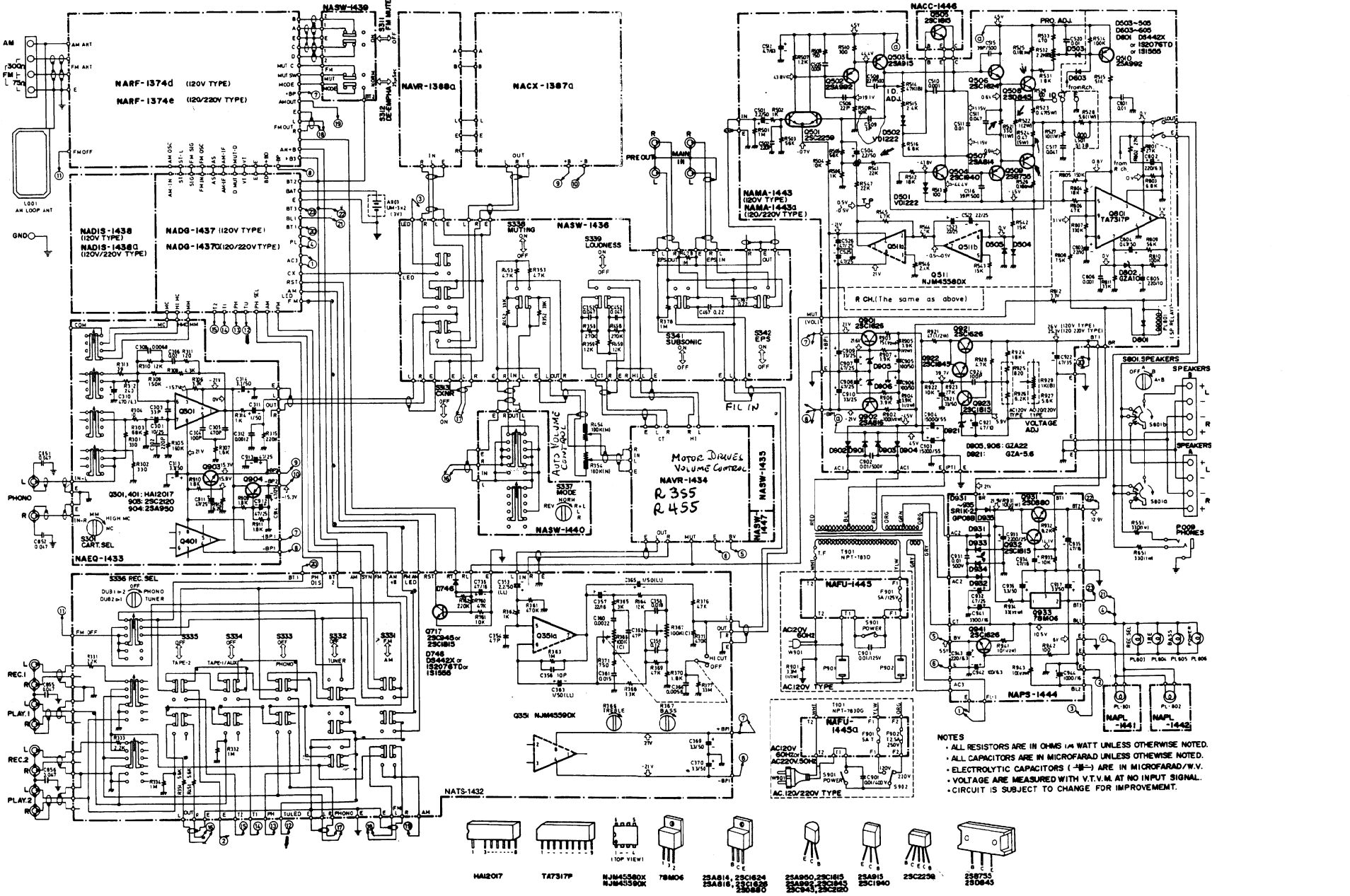


Fuse terminal pc board

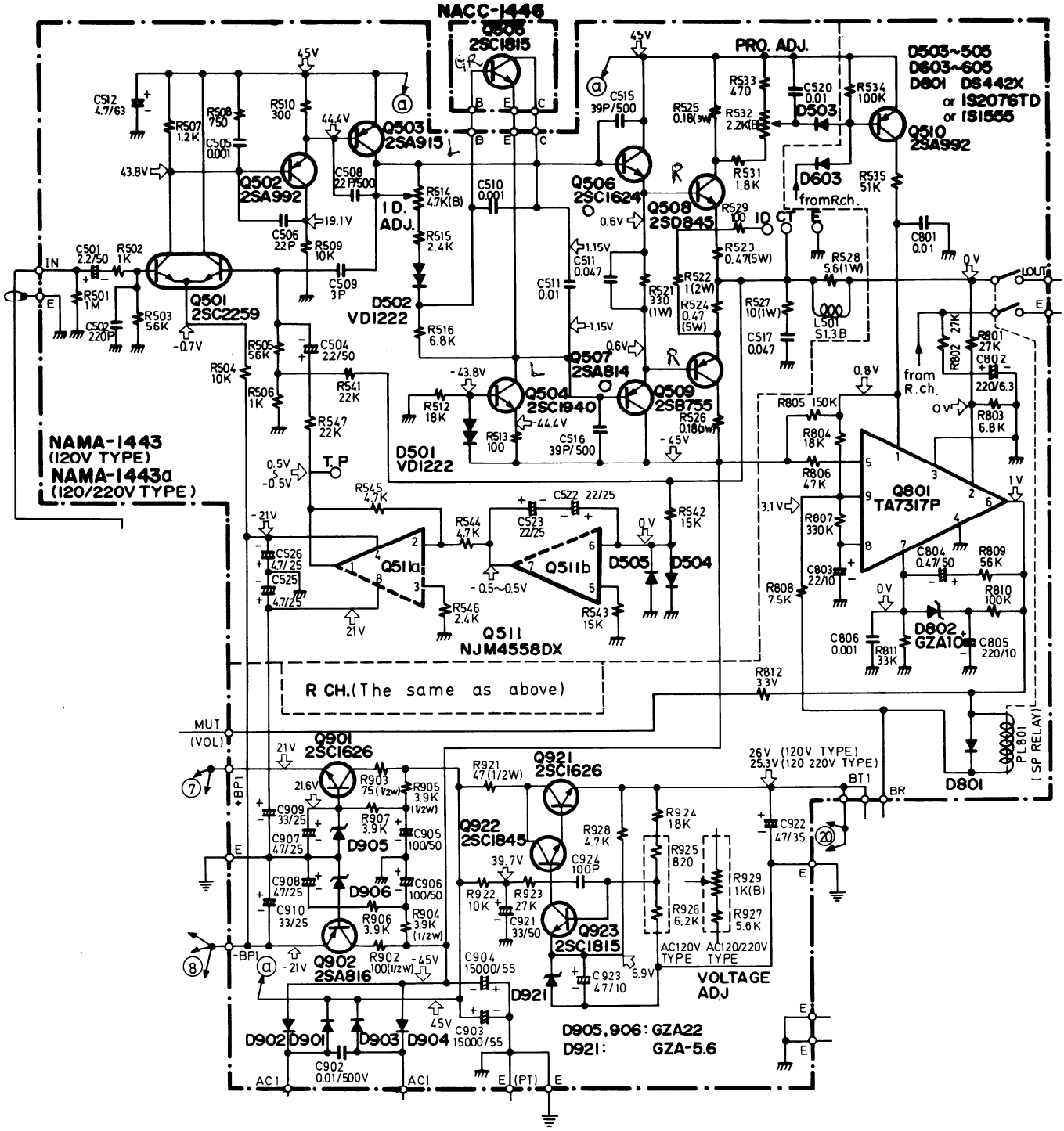




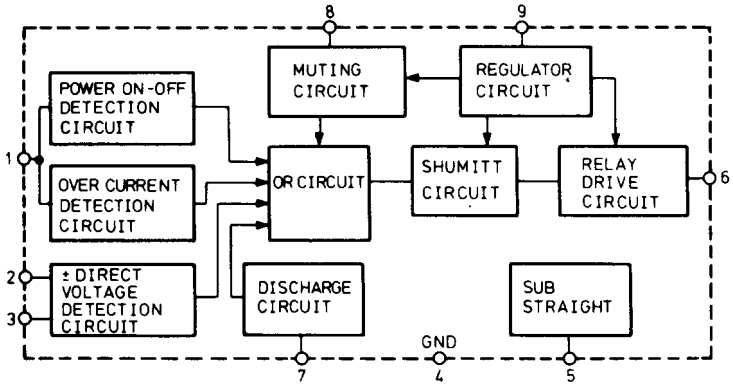
SCHEMATIC DIAGRAM



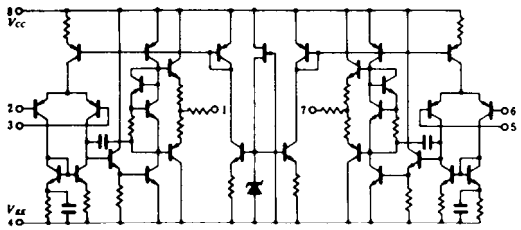
ONKYO CORPORATION


NACC-1446
Q505 2SC1815
PRO. ADJ.
D503~505
D603~605
D801 DS442X
or IS2076TD
or IS1555
Q510 2SA992
D503
D603
fromRch.
Q503 2SA915
Q502 2SA992
Q506 2SC1624
Q508 2SD845
I.D. ADJ.
Q501 2SC2259
D502 VD1222
Q507 2SA814
Q504 2SC1940
Q509 2SB755
D501 VD1222
NAMA-1443
(120V TYPE)
NAMA-1443a
(120/220V TYPE)
T.P
Q511a
Q511b
Q511 NJM4558DX
D505
D504
Q801 TA7317P
D802 GZA10
R CH.(The same as above)
MUT (VOL)
Q901 2SC1626
Q902 2SA816
Q921 2SC1626
Q922 2SC1845
Q923 2SC1815
D905
D906
D921
D902
D901
D903
D904
VOLTAGE ADJ
AC120V TYPE
AC120/220V TYPE
D905,906: GZA22
D921: GZA-5.6
D801
PL801
(SP RELAY)
L501 S1.3B
IN
LOUT
from R.ch.

TA7317P (Protection Circuit)



NJM-4558DX (Super servo amplifier)



1.7 Output
2.6 Inverse input
3.5 Input

POWER AMPLI., PROTECTOR AND POWER SUPPLY PC BOARD (NAMA-1443)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q511,Q611	222502	NJM-4558DX
Q801	222584	TA7317P, Protector
	Transistors	
Q501,Q601	2211371 or	2SC2259 (F) or
	2211372	2SC2259 (G)
Q502,Q602	2211792 or	2SA992 (F) or
	2211793	2SA992 (E)
Q503,Q603	2211742	2SA915(L)
Q504,Q604	2211762	2SC1940 (L)
Q506,Q606	2201174 or	2SC1624 (Y) or
	2201173	2SC1624 (O)
Q507,Q607	2201184 or	2SA814 (Y) or
	2201183	2SA814 (O)
CAUTION : When replace the transistors Q506, Q507, Q606 and Q607, if necessary, use the same hFE (Beta) rank transistor.		
(Q508,Q608)	2201103 or	2SD845 (O) or
	2201102	2SD845 (R)
(Q509,Q609)	2201093 or	2SB755 (O) or
	2201092	2SB755 (R)
When replace the power amplifier transistor Q508, Q509, Q608 and Q609, if necessary, use the same hFE (Beta) transistor.		
Q510	2211792 or	2SA992 (F) or
	2211793	2SA992 (E)
Q901	2200664 or	2SC1626 (Y) or
	2200663	2SC1626 (O)
Q902	2200674 or	2SA816 (Y) or
	2200673	2SA816 (O)
Q921	2200663 or	2SC1626 (O) or
	2200664	2SC1626 (Y)
Q922	2211732 or	2SC1845 (F) or
	2211733	2SC1845 (E)
Q923	2211255 or	2SC1815 (GR) or
	2211256	2SC1815 (BL)
	Diodes	
D501,D502	4000068	VD1222
D601,D602	4000068	VD1222
D503-D505	223133,	DS442X,
D603-D605	223145 or	1S2076TD or
	223105	1S1555
D801	223133	DS442X
D802	2241072 or	GZA-10Y or
	2241073	GZA-10Z
D901-D904	223863	GP30DL
D905,D906	2241231 or	GZA-22X or
	2241232	GZA-22Y
D921	2240953	GZA-5.6Z
	Coils	
L501,L502	231001	S-1.3B

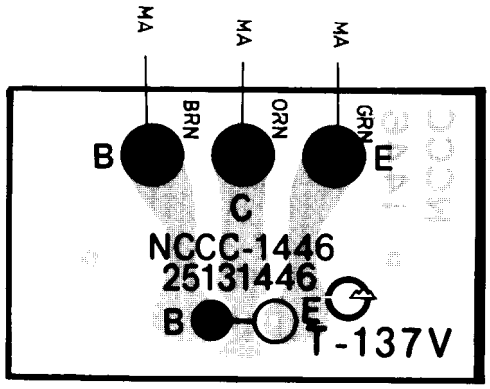
CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Capacitors	
C501,C601	352780229	2.2μF, 50V, Elect.
C504,C604	352780229	2.2μF, 50V, Elect.
C512,C612	352770479	4.7μF, 63V, Elect.
C522,C622	352752209	22μF, 25V, Elect.
C523,C623	352752209	22μF, 25V, Elect.
C524,C525	352750479	4.7μF, 25V, Elect.
C624,C625	352750479	4.7μF, 25V, Elect.
C802	352721019	100μF, 6.3V, Elect.
C803	352732209	22μF, 10V, Elect.
C804	352784799	0.47μF, 50V, Elect.
C805	352742219	220μF, 16V, Elect.
C903,C904	3504161	15,000μF, 55V, Elect.
C905,C906	352781019	100μF, 50V, Elect.
C907,C908	352754709	47μF, 25V, Elect.
C909,C910	342753309	33μF, 25V, Elect.
C921	352783309	33μF, 50V, Elect.
C922	352764709	47μF, 35V, Elect.
C923	352734709	47μF, 10V, Elect.
	Resistors	
R514,R614	5225072	N10HR4.7KBDM, Semi-fixed
R521,R621	441623314	330Ω, 1W, Metal oxide film
R522,R622	441720104	1Ω, 2W, Metal oxide film
R523,R623	4000080	0.47Ω, 5W, Metal plate
R524,R624	4000080	0.47Ω, 5W, Metal plate
R525,R625	4000070	0.18Ω, 3W, Metal plate
R526,R626	4000070	0.18Ω, 3W, Metal plate
R527,R627	441621004	10Ω, 1W, Metal oxide film
R528,R628	441620564	5.6Ω, 1W, Metal oxide film
R532,R632	5225005	N10HR2.2KBD, Semi-fixed
R902	442521014	100Ω, 1/2W, Metal oxide film
R903	442527504	75Ω, 1/2W, Metal oxide film
R904,R905	441523924	3.9kΩ, 1/2W, Metal oxide film
R921	442524704	47Ω, 1/2W, Metal oxide film
R929	5225014	N10HR1KBDM, Semi-fixed [W]
	Relay	
RL801	25065134	NRL-2P-5A-DC24V-07
	Radiator	
	27160029	RAD-07
	Screws	
	82113008	3P+8FN, Pan head

THERMAL DETECTOR PC BOARD (NACC-1446)

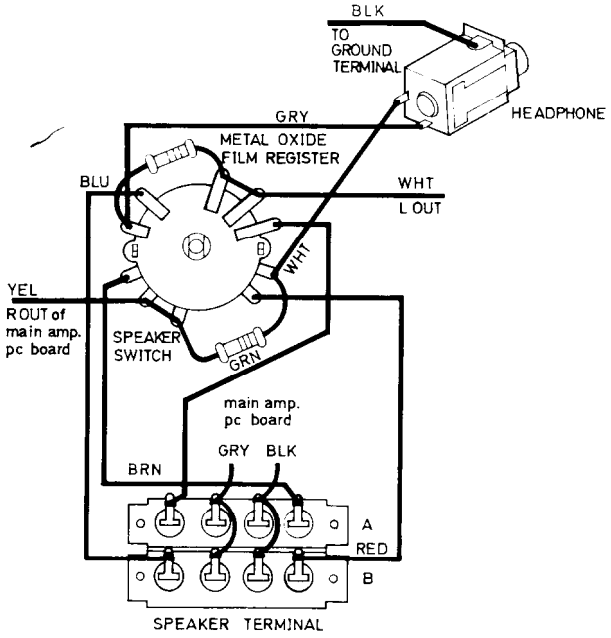
CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q05	2211255 or	2SC1815 (GR) or
	2211256	2SC1815 (BL)

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

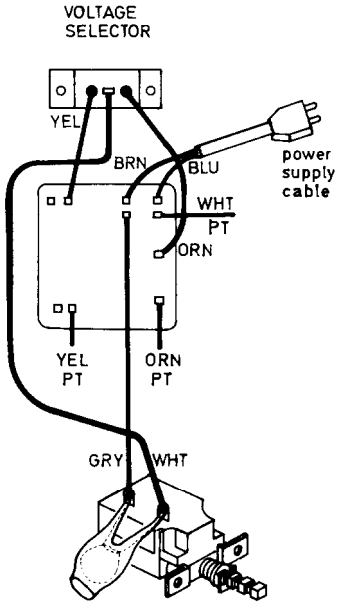
Thermal detector pc board



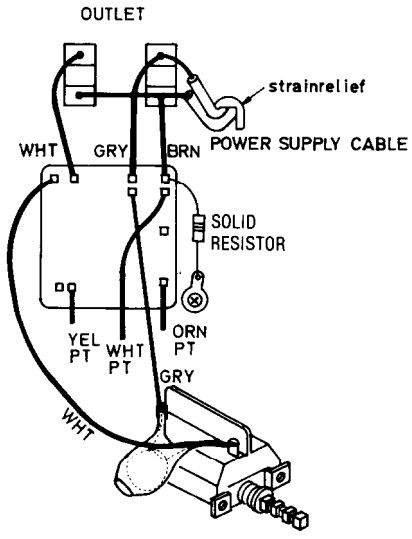
Speaker switch connection diagram



Power supply circuit connection diagram

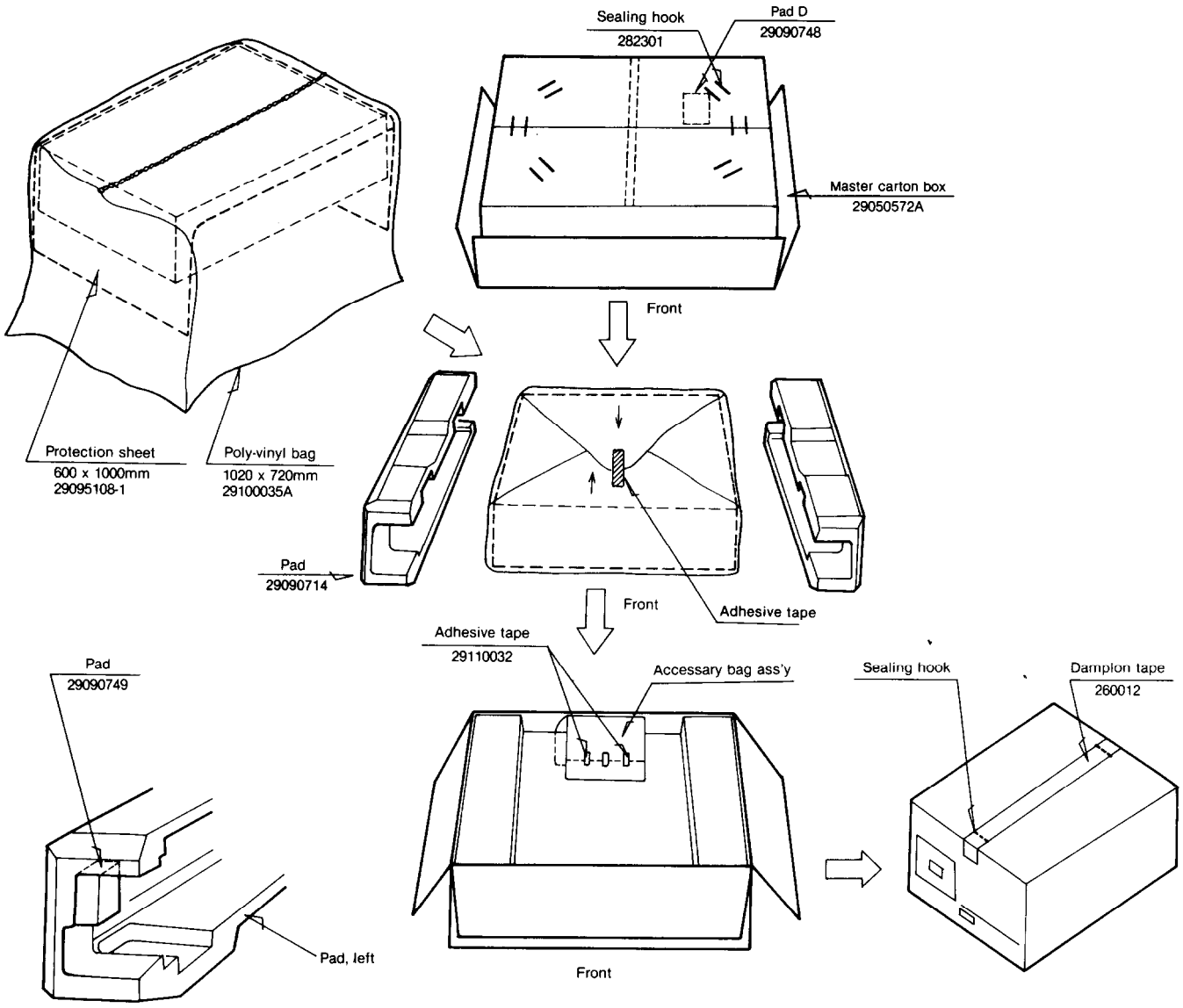


W model



D model

PACKING VIEW



PARTS NO.	DESCRIPTION
Accessary bag ass'y	
(U.S.A. model)	
29340624	Instruction manual
292064A	FM antenna
29365006-4	Warranty card
29358002	Service station list
29100006	250x350mm, Poly-vinyl bag
3010054	Battery

PARTS NO.	DESCRIPTION
(120V model)	
29340624	Instruction manual
292064A	FM antenna
29100006	250x350mm, Poly-vinyl bag
3010054	Battery
(120/220V model)	
29340624	Instruction manual
292064A	FM antenna
25055018	CV-K-2, Conversion plug
2910006	250x350mm, Poly-vinyl bag