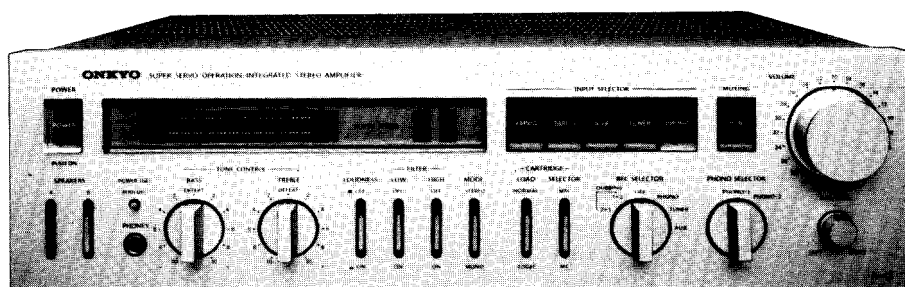




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ONKYO® SERVICE MANUAL**SUPER SERVO INTEGRATED
STEREO AMPLIFIER
MODEL A-45****TABLE OF CONTENTS**

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ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

Power Output: 70 watts per channel min. RMS, at 8 ohms both channels driven, from 20 Hz to 20 kHz, with no more than 0.018%THD.

Total Harmonic Distortion: 0.018% at rated power

IM Distortion: 0.018% at rated power

Damping Factor: 50 at 8 ohms

Frequency Response: 2 – 50,000 Hz ± 1 dB

RIAA Deviation (MM): 20 – 20,000 Hz ± 0.3 dB

Sensitivity and Impedance: Phono (MM): 2.5mV/50kohms

(MC): 350 μ V/330ohms

Tuner/AUX: 150mV/50kohms

Tape Play: 150mV/50kohms

Tape Rec: 150mV/1kohms

(phono)

Phono Overload: 200mV RMS at 1kHz, 0.018% THD.

Bass Control: ± 8 dB at 70 Hz

Treble Control: ± 8 dB at 10,000 Hz

Signal to Noise Ratio: Phono (MM): 80dB(IHF A-202,

5mV input,

1 watt output)

(MC): 68dB(IHF A-202,

0.5mV input,

1 watt output)

Tuner & Tape: 84dB(IHF A-202,

0.5V input,

1 watt output)

High Cut Filter: 6 kHz (6 dB/oct.)

Subsonic Filter: 15 Hz (6 dB/oct.)

Muting: –20 dB

Loudness: +7 dB at 70 Hz

+5 dB at 10 kHz

General

Semiconductors: 8 ICs, 27 transistors, 30 diodes, 28 LEDs

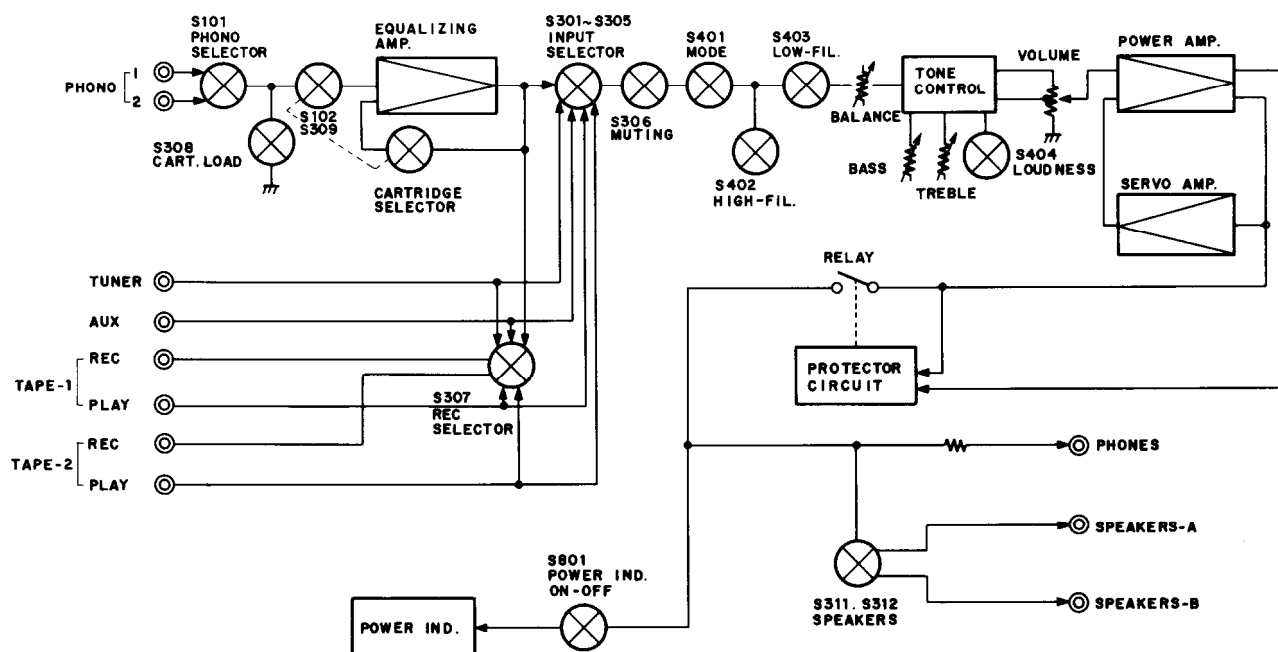
Dimensions: 418(W) x 125(H) x 392(D)mm
16-1/2" x 4-15/16" x 15-7/16"

Weight: 9.8 kg, (21.6 lbs.)

Power Supply: AC 220 V 50 Hz, 120/220 V
50/60 Hz, AC 120V 60Hz.

Specifications and features are subject to change without notice.

BLOCK DIAGRAM



PRECAUTIONS

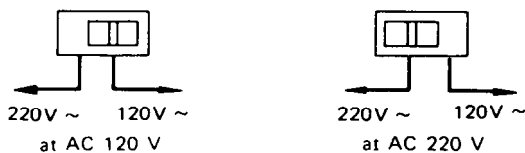
1. For continued protection against fire hazard, replace only with same type and same rating fuse.

CIRCUIT NO.	PARTS NO.	DESCRIPTION	NOTE
F901	252050	5A (ST-6), AC fuse (D)	D: 120V
F901	252076	3.15A-SE-EAK, AC fuse (G)	G: 220V
F903	252099	8A-EAK, AC fuse (G)	W: 120/220V model
F901	252020	5A-T, AC fuse (W)	
F902	252076	3.15A-SE-EAK, AC fuse (W)	

2. Replacement for differential, driver, complementary and power amplifier transistors, if necessary, must be made from the same beta (h_{FE}) group as the original type.

3. Voltage Selector (rear panel)

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. Voltage is changed by sliding the groove in the switch with a screwdriver or similar instrument to the right or left position. Confirm that the switch has been moved all the way to the right or left 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.



CIRCUIT DESCRIPTION

Dual Super-Servo

Onkyo's super-servo amp using ultralow frequency feedback servo circuits consisting of high-performance operational amplifiers has completely done away with a number of problems that have heretofore plagued amplifiers. These include distortion caused by capacitors used in the signal path, internally generated noise in the ultralow frequency range, and a lack of frequency response in the low ranges caused by record warp and tonearm resonance. Frequency response and tonal quality is as never before. The newly developed dual super-servo system has an additional function over our previous super-servo amp. That additional function may be noted by looking at the accompanying series of illustrations. First note the commonly used unbalanced NF amp depicted in Fig. 1 where the signal is input at point A as referenced to point B, and output at point C as referenced to point B. Common input/output reference in amplifiers is an ideal, but in fact difficult to attain. This is particularly true in power amps with high output current; unless impedances are matched, it is next to impossible. In Fig. 2, very small impedances are present at the same time return current is flowing from other circuits, thus the circuit in Fig. 2 may be considered equivalent to that of Fig. 3. Up to now, in order to lower these unnecessary impedances, large diameter wiring and busbar grounds have been used with some

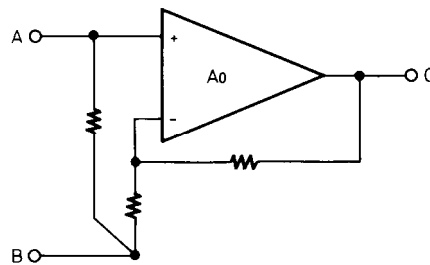


Fig. 1

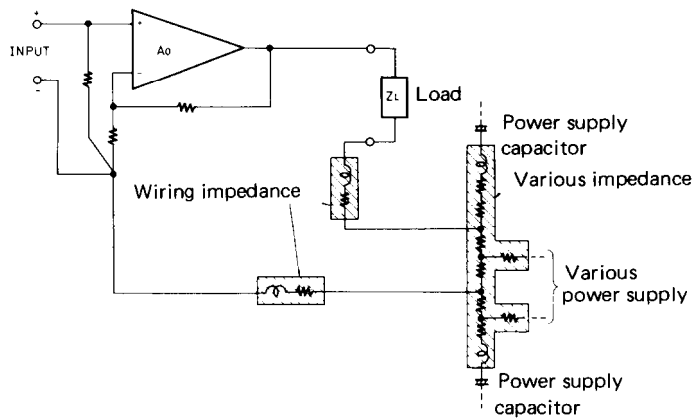


Fig. 2

degree of effectiveness, however we have improved upon these methods. Looking at the problem from another angle, the dual super-servo solves the problem without improvisations. As noted in Fig. 4, by applying a super-servo to the positive side, and with a servo return on the negative side, unnecessary signal components are equalized, consequently cancelled. And because the same potential exists, ground potential between input and output is the same. Put another way, in Fig. 5 and 6 the unnecessary components generated between input and output are short-circuited by the servo-circuit. Next, with separate amps, generally the preamp and main amp have been thought of as separate entities. A number of amp combinations have been used, but here again compatibility, or the lack of, may be attributed to ground potential in most cases. Also in the cables connecting 2 amps, there is cord impedance, contact resistance at the pin connector and wiring impedance to contend with, and even though the pin connectors are separated left from right, they became common via the power amp ground. This results in crosstalk between the left and right channel, poor channel separation, duller sound resolution and presence. And any difference in the ground potential between the preamp and power amp is detected and equalized by the servo. This is equal to the grounds of both amps being directly connected.

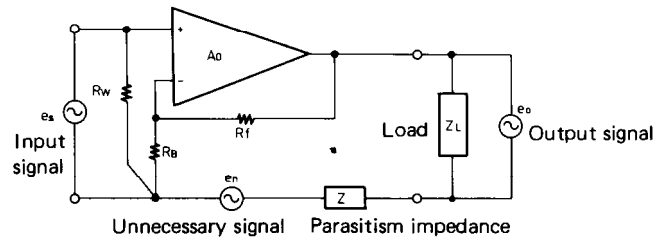


Fig. 3

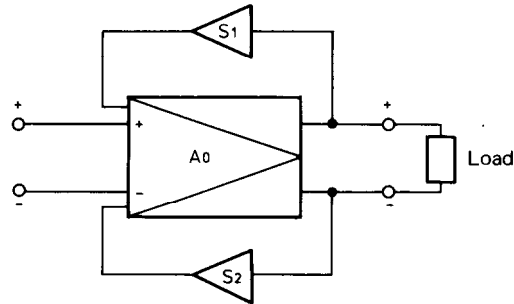


Fig. 4

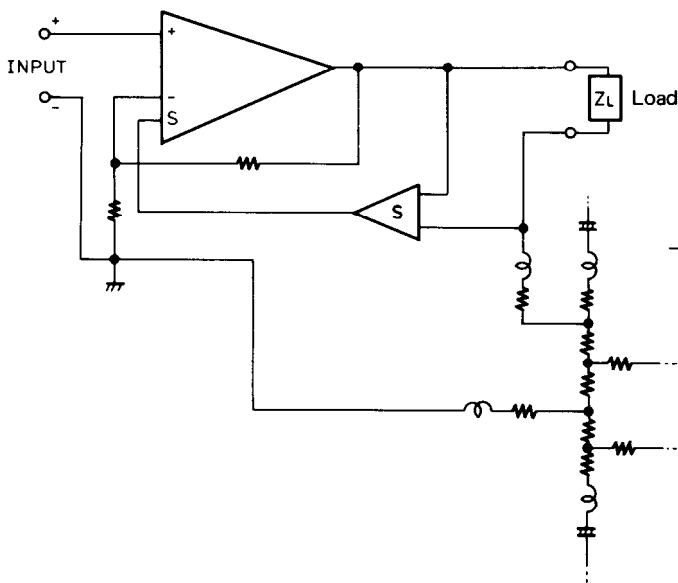


Fig. 5

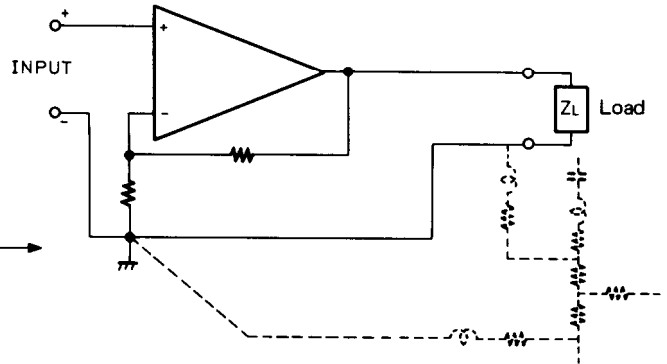
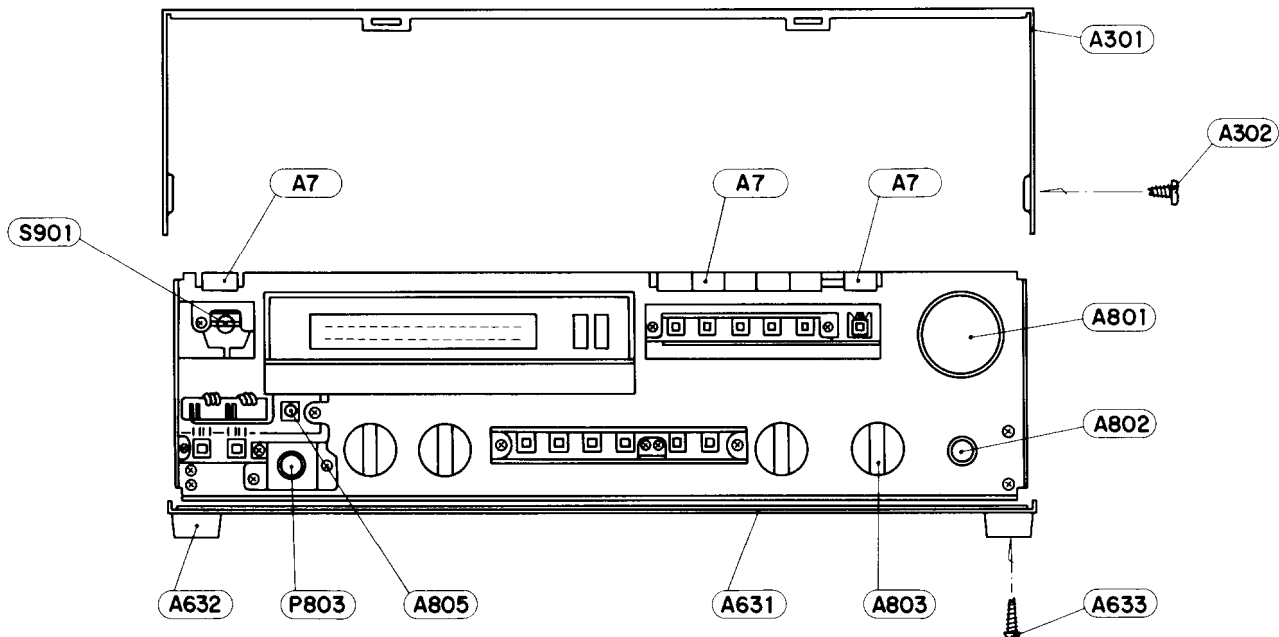
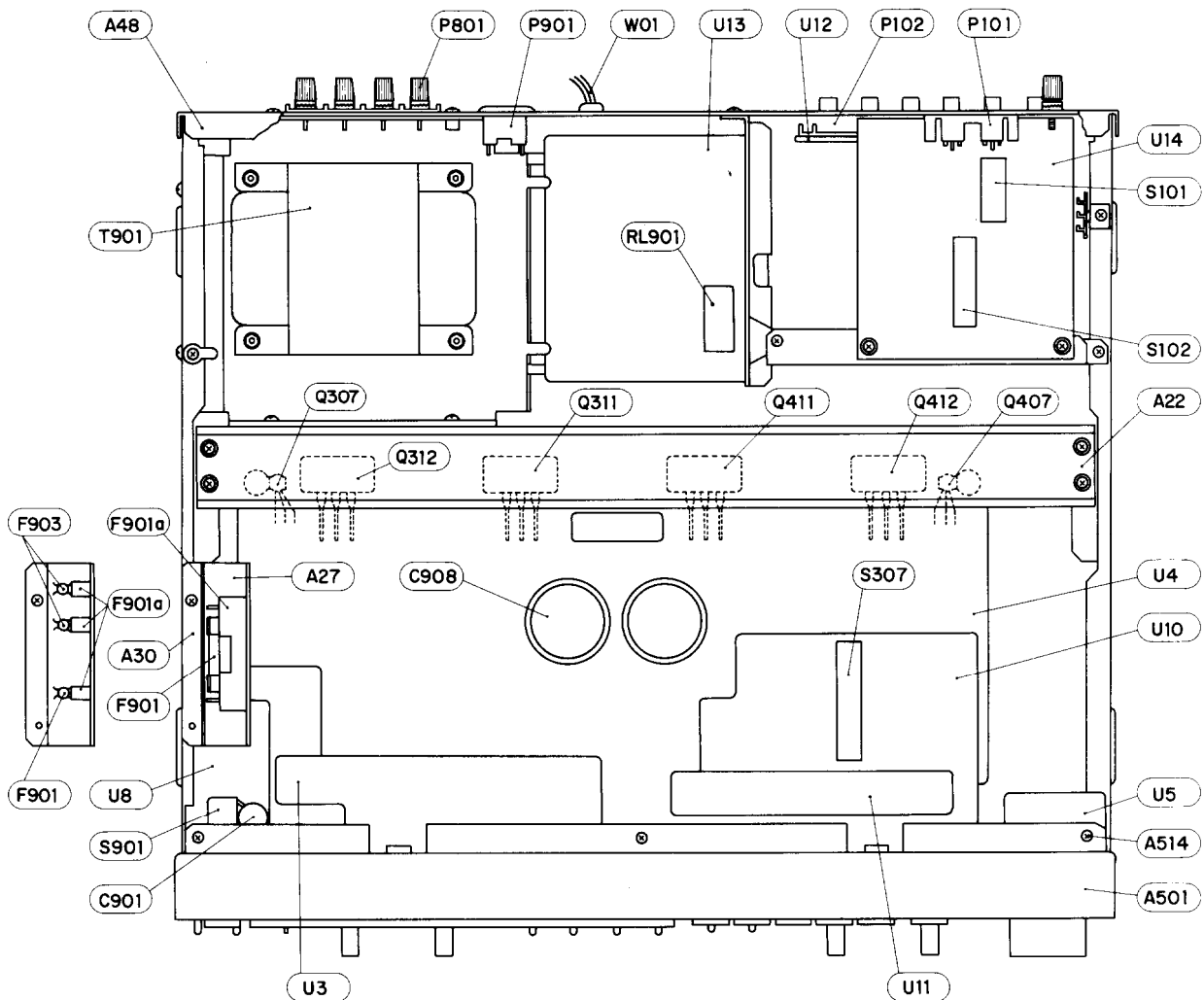
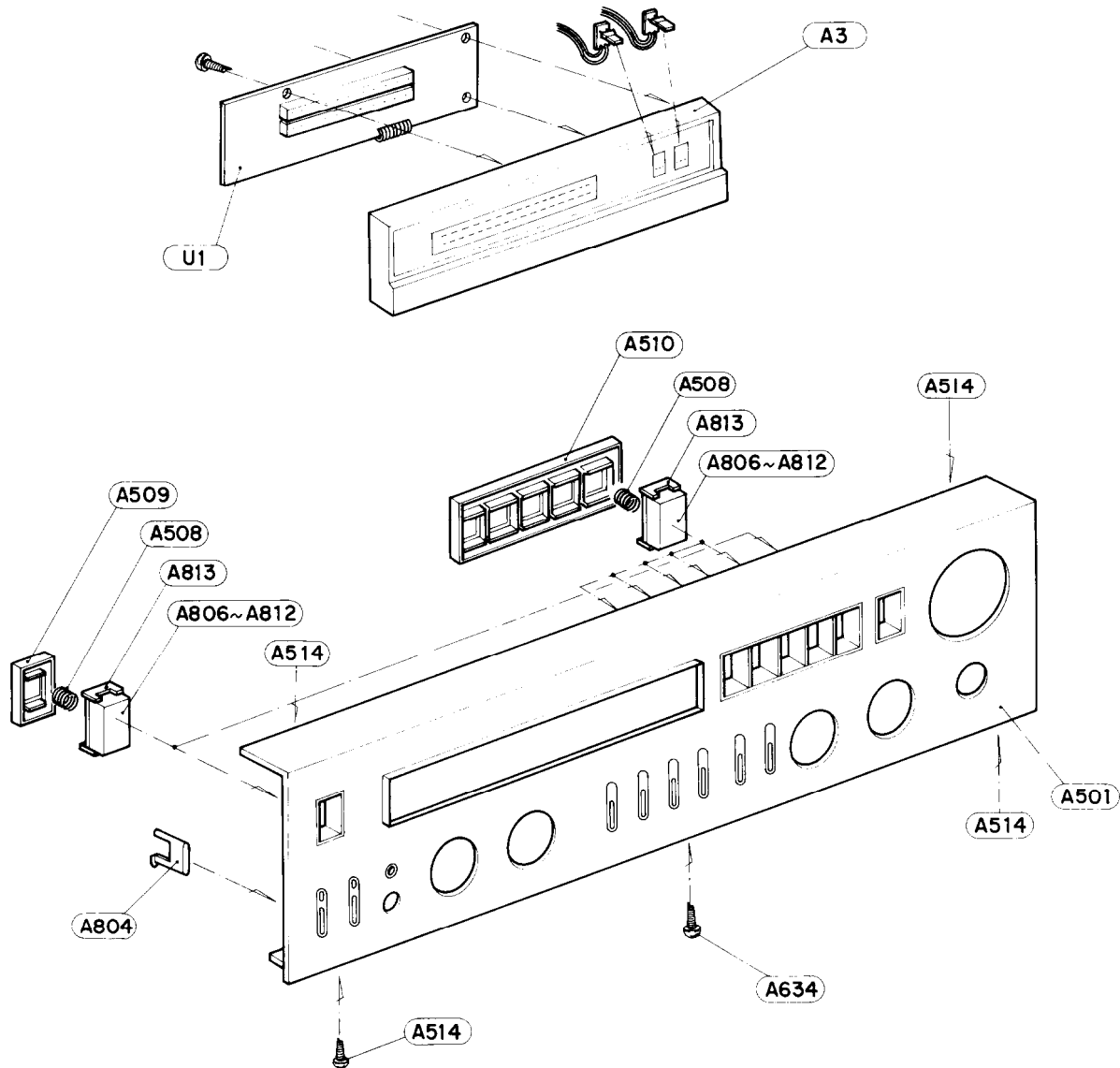


Fig. 6

COMPONENT LOCATION



EXPLODED VIEW



PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
A1	27110132A	Front bracket	A28	27140377	Bracket, pc board
A2	27140489	Headphone bracket	A29	28140234	10x50x20mm, Cushion
A3	12549901	Holder ass'y	A30	28175036	Insulating plate
A4	28199049	Film	A31	870060	W3x15mm, Washer
A5	28130110	Plate	A35	831130082	3SW+8BQ, Tapping screw
A6	27150130	Shielded plate	A36	834130062	3STS+6BQ, Tapping screw
A7	27300402	Lamp guide	A37	834140102	4STS+10BQ, Tapping screw
A8	28140349	60.8x17x40mm, Cushion	A38	838440109	4TTB+10C(BC), Tap screw
A9	27150134	Shielded plate	A39	871440	SW-4, Washer
A10	28140234	10x10x20mm, Cushion	A40	86414010	WN4x10FN, Nut
A11	82113006	3P+6F-N, Pan head screw	A41	833130062	3STP+6BQ, Tapping screw
A12	834130062	3STS+6BQ, Tapping screw	A42	82113010	3P+10FN, Pan head screw
A13	834130082	3STS+8BQ, Tapping screw	A43	834130102	3STS+10BQ, Tapping screw
A14	831130082	3STW+8BQ, Tapping screw	A48	27120293A	Back panel (D)
A20	27115043D	Side bracket		27120294	Back panel (G)
A21	27115086	Side bracket (L)		27120296	Back panel (W)
A22	27160090	Radiator	A49	834130062	3STS+6BQ, Tapping screw
A23	27140376	Transistor holding bracket	A50	834130102	3STS+10BQ, Tapping screw
A24	27130148	Power transformer bracket	A51	834230102	3STS+10BQ(NI), Tapping screw
A25	27150096C	Shielded plate, equalizer	A301	28184111	Top cover
A26	27140494	Bracket, pc board	A302	838440089	4TTB+8C(BC), Tap screw
A27	27140491	Bracket, fuse	A303	834130082	3STS+8BQ, Tapping screw

CIRCUIT NO.	PARTS NO.	DESCRIPTION
A304	28140020	4x10x40mm, Cushion
A501	12529121	Front panel ass'y
A502	28191081	Glass plate
A503	27267101	Guide, speaker
A504	27267102	Guide, push
A505	27267103	Guide, switch
A506	27267104	Guide, knob
A507	27267106	Guide (E)
A508	28180079	Spring
A509	27267105	Guide, cover
A510	27267107	Guide (F)
A511	28199045	16x10mm, Film
A513	28140328	18x6x30mm, Cushion
A514	834130062	3STS+6BQ, Tapping screw
A515	28199050	95x11mm, Cushion
A631	27170102	Bottom board
A632	27175009A	T-C, Leg
A633	831130162	3STW+16BQ, Tapping screw
A634	831130062	3STW+6BQ, Tapping screw
A801	28320527	Knob, volume
A802	28320528	Knob, Balance
A803	28320529	Knob, selector
	801146	4x6mm, Screw
A804	28320530	Knob, push
A805	28320536	Knob, switch
A806	28320531	Knob, power
A807	28320532	Knob, Phono
A808	28320533	Knob, tuning
A809	28320534	Knob, tape 1
A810	28320535	Knob, tape 2
A811	28320538	Knob, muting
A812	28320539	Knob, aux
A813	28320537	Knob, base
C101	379124737	0.047 μ F, 50V, DEW capacitor
C901	3500060	0.01 μ F, 125V, CS capacitor (D)
	27300080	Cover, capacitor (D)
	3500058	PME-265MB510, IS capacitor (G/W)
F901	252050	5A(ST-6), AC fuse (D)
F901	252076	3.15A-SE-EAK, AC fuse (G)
F903	252099	8A-EAK, AC fuse (G)
F901	252020	5A-T, AC fuse (W)
F902	252076	3.15A-SE-EAK, AC fuse (W)
F901a	25050050	HO438A, Fuseholder (D/W)
F901a, F903a	25065096	NPF-073, Fuseholder (G)
F902a	25065096	NPF-073, Fuseholder (W)
P801, P802	25060038	NTM-4PRMN09, Speaker terminal
P803	25045067	H1J-0279-01-070, Stereo headphone jack
P804	25060044	3x14mm, Ground terminal
	87613010	W3x10F, Washer
P901-P903	25050046A	NSCT-2P15, AC outlet (D)
Q307, Q407	2211255 or 2211256	2SC 1815 (GR) or 2SC1815 (BL), Thermal detector transistor
Q311, Q411	2201102 or 2201103	2SD845(R) or 2SD845(O), Power amplifier transistor
Q312, Q412	2201092 or 2201093	2SB755(R) or 2SB755(O), Power amplifier transistor
S102B	25030192	NRSM-102-30BU, Phono selector switch
S307B	25030191	NRSM-106-30BU, Recording selector switch
	25065158	Wire, switch
S801	25035257	NPS-122-L221, Power output indicator switch
S901	25035047	NPS-111-L12P, Power switch (D)
	25035051	NPS-121-L16p, Power switch (G/W)
S902	25065109	NSS-2255P, Voltage selector switch (W)
T901	230487	NPT-740D, Power transformer (D)
	230488	NPT-740G, Power transformer (G)

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	230489	NPT-740DG, Power transformer (W)
U1	12549585	NADIS-1085, Power output indicator pc board ass'y
U2	12549587	NALED-1087, MM/MC indicator pc board ass'y
U3	12529586A	NAME-1086a, Output indicator drive pc board ass'y
U4	12529589	NAAF-1089, Main amplifier and tone circuit pc board ass'y
U5	12529590	NAVR-1090, Volume control pc board ass'y
U6	12529591	NAVR-1091, Balance control pc board ass'y
U7	12529592	NASW-1092, MM/MC selector switch pc board ass'y
U8	12529593	NASW-1093, Speaker selector switch pc board ass'y
U9	12529594	NALED-1094, Speaker indicator pc board ass'y
U10	12529595	NASW-1095, Switch pc board ass'y
U11	12529596	NASW-1096, Switch pc board ass'y
U12	12529597	NAPJ-1097, Input/output terminal pc board ass'y
U13	12529598	NAPS-1098, Protector circuit pc board ass'y
U14	12529599	NAEQ-1099, Equalizer amplifier pc board ass'y
W01	253099A	AS-UC-3, Power supply cable (D)
	253092	AS-CEE-2, Power supply cable (G/W)
W02	270025	SR-3P-4, Strainrelief (D)
	270280	SR-4K-4, Strainrelief (G/W)

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

PRINTED CIRCUIT BOARD — PARTS LIST

OUTPUT POWER INDICATOR PC BOARD (NADIS-1085) — PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q502, Q602	222621	IR2431, IC
D506, D606	225068	GL-112V13, L.E.D

CARTRIDGE SELECTOR INDICATOR PC BOARD (NALED-1087) — PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	225082	SLP-155B-01, L.E.D

OUTPUT INDICATOR DRIVE PC BOARD (NAME-1086a) — PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
		IC
Q501, Q601	222502	NJM-4558DX
		Diodes
D501-D503	223133 or 223105	DS442X or 1S1555
D601-D603	224096 or 224041	GZA5.6U or 05Z5.6U
		Capacitors
C502, C602	352780109	1 μ F, 50V, Elect.
C503	352734709	47 μ F, 10V, Elect.
C504, C505	352754709	47 μ F, 25V, Elect.
C506	352780339	3.3 μ F, 50V, Elect.
C508	352780479	4.7 μ F, 50V, Elect.
		Resistors
R502, R602	5215021	N08HR10KBC, Output indicator level adjusting semi-fixed

CIRCUIT NO.	PARTS NO.	DESCRIPTION
R511	431521525	1.5k Ω , 1/2W, Solid
	Wire	
	79139	JL6-80-5-5P2.5
	Lamp	
PL901	210121	PL14V0.06AW-2.5

MAIN AMPLIFIER AND TONE CIRCUIT PC BOARD (NAAF-1089) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q313, Q314 } Q413, Q414 }	222502 or 222597	NJM-4558DX or NJM-4558DN
	Transistors	
Q301, Q401	2211915 or 2211916	2SK240(GR) or 2SK240(BL)
Q302, Q303 } Q402, Q403 }	2211255 or 2211256	2SC1815(GR) or 2SC1815(BL)
Q304, Q404	2211515 or 2211516	2SA995(F) or 2SA995(G)
Q305, Q405	2211454	2SA1015(Y)
Q306, Q406	2211742	2SA915(L)
Q307, Q407	2211255 or 2211256	2SC1815(GR) or 2SC1815(BL)
Q308, Q408	2211762	2SC1940(L)
Q309, Q409	2211924 or 2211923	2SC2824(Y) or 2SC2824(O)
Q310, Q410	2211934 or 2211933	2SA1184(Y) or 2SA1184(O)
Q311, Q411	2201102 or 2201103	2SD845(R) or 2SD845(O)
Q312, Q412	2201092 or 2201093	2SB755(R) or 2SB755(O)
Q901	2200673 or 2200674	2SA816(O) or 2SA816(Y)
Q902	2200663 or 2200664	2SC1626(O) or 2SC1626(Y)
	Diodes	
D301, D401 } D302, D402 }	4000068	VD1222
D303-D305 } D403-D405 }	223133 or 223105	DS442X or 1S1555
D905, D906	224124 or 224069	GZA22U or 05Z22U
	Coils	
L301, L401	231001	S-1.3B
	Capacitors	
C310, C410	379121035	0.01 μ F \pm 10%, 50V, DEW
C317, C417	379121025	1,000pF \pm 10%, 50V, DEW
C318, C418	379121035	0.01 μ F, 50V, DEW
C322, C422	379124737	0.047 μ F \pm 20%, 50V, DEW
C328, C329	352752209	22 μ F, 25V, Elect.
C428, C429		
C908, C909	3504159	20,000 μ F, 55V, Elect.
C910, C913	352781019	100 μ F, 50V, Elect.
C911, C912	352751019	100 μ F, 25V, Elect.
C914, C915	352751019	100 μ F, 25V, Elect.
	Resistors	
R304, R404	431421567	15M Ω , 1/4W, Solid
R306, R406	5148070	N16RQM-11C-110K180K30M, Bass control variable
R308, R408 } R312, R412 } R315, R415 } R316, R416 }	431421567	15M Ω , 1/4W, Solid
R330, R430	5225072	N16RGM-11C-220K30M, Treble control variable
R331, R431	441522424	N10HR4.7KBDM, Idling current adjusting semi-fixed
R332, R432	441526824	2.4k Ω , 1/2W, Metal oxide film
R335, R435	441621514	6.8k Ω , 1/2W, Metal oxide film
R336, R436 } R337, R437 }	4000047	150 Ω , 1W, Metal oxide film
R338, R438	441720104	0.47 Ω , 5W, Metal plate
		1 Ω , 2W, Metal oxide film

CIRCUIT NO.	PARTS NO.	DESCRIPTION
R339, R439	4000049	0.27 Ω , 5W, Metal plate
R341, R441	5225005	N10HR2.2KBD, Protector level adjusting semi-fixed
R344, R444	441626834	68k Ω , 1W, Metal oxide film
R345, R445	441623914	390 Ω , 1W, Metal oxide film
R353, R453	441520564	5.6 Ω , 1/2W, Metal oxide film
R354, R454	441721004	10 Ω , 2W, Metal oxide film
R901	441521814	180 Ω , 1/2W, Metal oxide film
R902, R905	431523325	3.3k Ω , 1/2W, Solid
R904	441621814	180 Ω , 1W, Metal oxide film
R907	431528215	820 Ω , 1/2W, Solid
	Raditors	
	27160029	RAD-07
	Bracket	
	27140381	
	Screws	
	82113008	3P+8F-N, Pan head
	831130082	3STW+8BQ, Tapping
	Switch	
S401-S404	25035246	NPS-422-L210, Mode, Hi-cut, subsonic filter and loudness

VOLUME CONTROL PC BOARD (NAVR-1090) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
R317, R417	5172061	N24RGL41C100KBT35, Variable resistor

BALANCE CONTROL PC BOARD (NAVR-1091) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
R305, R405	5148068	N16RGM-C-500KMN30, Variable resistor

SWITCH PC BOARDS (NASW-1092/93/95/96) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S308, S309	25035254	NPS-222-L218, cartridge load and MM/MC
R335, R455	441623314	330 Ω , 1W, Metal oxide film
S311, S312	25035253	NPS-242-L217, Speaker selector
S301-S305	25035252	NPS-542-L216, Input selector
S306	25035251	NPS-142-L215, Muting
S307	25065079	NSS-4643, Recording selector
PL301-PL306	210080	PL14V0.06AW-0.5, Lamp

SPEAKER INDICATOR PC BOARD (NALED-1094) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	225047	SLP251B, L. E.D.

INPUT/OUTPUT TERMINAL PC BOARD (NAPJ-1097) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
P102, P103	25045072	NPJ-6PDBL36, Input/output terminal
	72579	UL2468#247-2.5, Wire

PROTECTOR CIRCUIT PC BOARD (NAPS-1098) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	IC	
Q904	222584	TA7317P
	Transistor	
Q903	2211395 or 2211396	2SA970(GR) or 2SA970(BL)
	Diodes	
D901-D904	223841	GP-30G
D907-D911	223848	GP-08B
D912	224098	GZA-6.2U

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Capacitors		
C918-C920	352741029	1,000 μ F, 16V, Elect.
C932	352732209	22 μ F, 10V, Elect.
C933	352721019	100 μ F, 6.3V, Elect.
C934	352784799	0.47 μ F, 50V, Elect.
C936	352743319	330 μ F, 16V, Elect.
Resistor		
R910	441521004	10 Ω , 1/2W, Metal oxide film
Relay		
RL901	25065140	NRL-2P5A-DC-12-06

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Capacitors		
C102, C202	372521814	180pF \pm 5%, 50V, ST
C103, C203	352751009	10 μ F, 25V, Elect.
C106, C206	352724719	470 μ F, 16V, Elect.
C109, C209	379126824	6,800 μ F \pm 5%, 50V, DEW
C110, C210	379122034	0.02 μ F \pm 5%, 50V, DEW
C111, C211	352780109	1 μ F, 50V, Elect.
C113, C114 C213, C214	352780339	3.3 μ F, 50V, Elect.
Resistors		
R112, R212	441521234	12k Ω , 1/2W, Metal oxide film
Switches		
S101	25065159	NSS-2372, Phono selector
S102	25065151	NSS-6268, Cartridge selector
Terminal		
P101	25045084	NPJ-4PBL-42, Phono input

EQUALIZER AMPLIFIER PC BOARD (NAEQ-1099) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
ICs		
Q101, Q201	222594	HA12017

MAIN AMPLIFIER ADJUSTMENT

Set the all control knobs to standard position.

Standard knob position

SELECTOR	AUX
VOLUME	Minimum
BALANCE, BASS/TREBLE	CENTER (FLAT)
MODE	STEREO
LOUDNESS, SUBSONIC FIL., HI-CUT FIL.	OFF
BASS/TREBLE	DEFEAT
SPEAKERS	A
MUTING	0dB

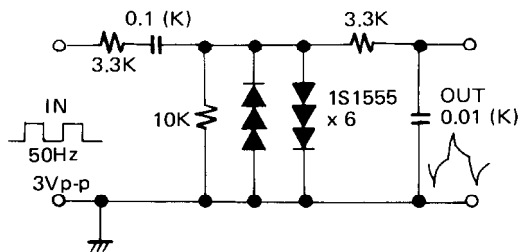
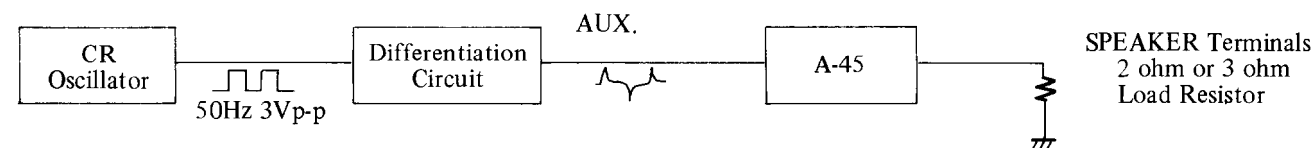
1. IDLING CURRENT ADJUSTMENT

1. Connect the DC voltmeter between I_{DD} and V_{CT} terminals.
2. Adjust the voltage to 8 \pm 3mV with semi-fixed resistor of R330 and R430.

NOTES: Adjust after switching on for 5 minutes.

VOLUME	Minimum
LOAD	Open

2. CURRENT DETECTOR LEVEL ADJUSTMENT



Differentiation Circuit

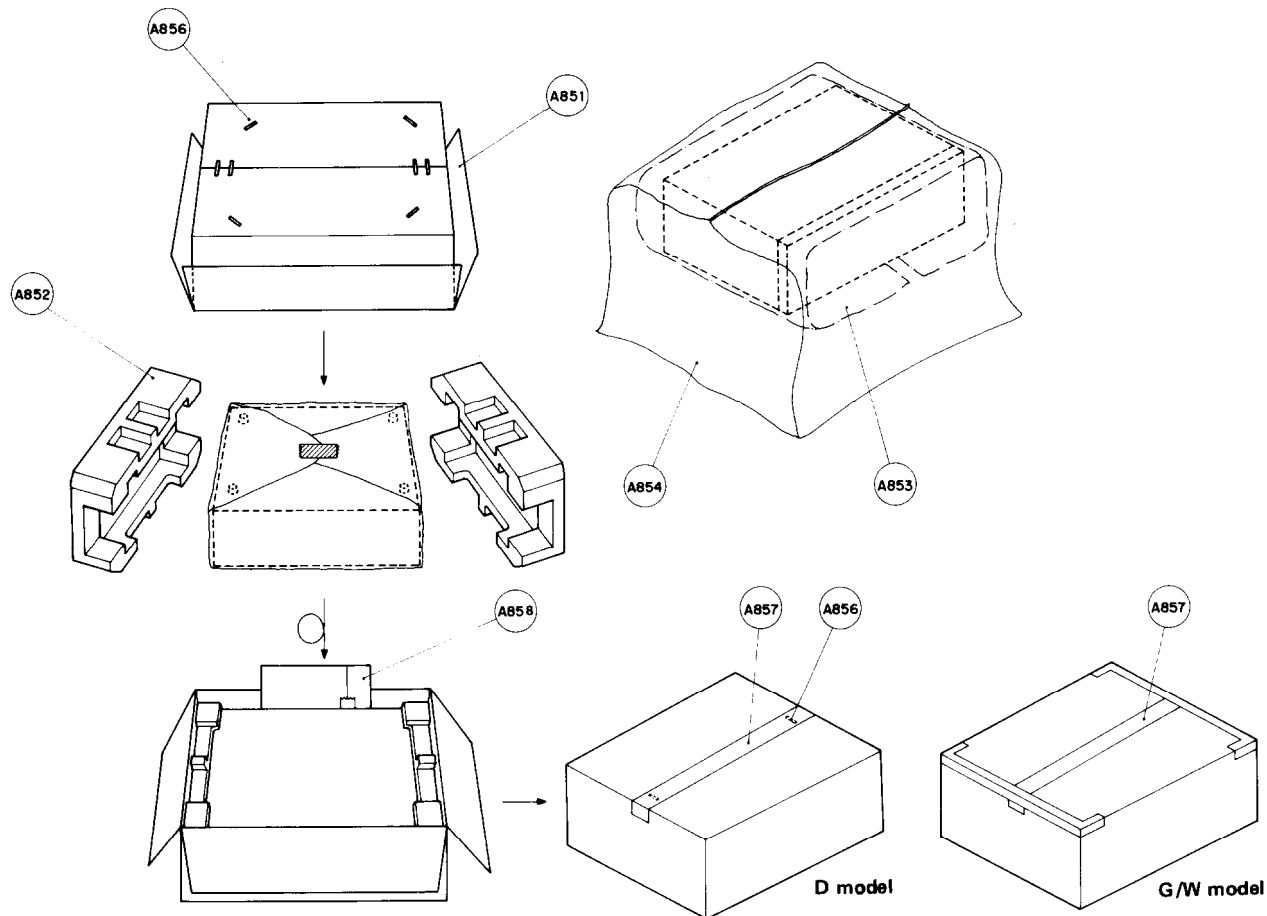
NOTES: Adjust after switching on for 5 minutes.
VOLUME Maximum

Apply a tone burst signal to the AUX terminal, connect a 2 ohms hollow resistor to the speaker terminals and adjust the variable resistor R341 and R441 so that the relay is operated at maximum volume. Confirm that the relay is not operated when the 3 ohms hollow resistor is connected.

3. OUTPUT INDICATOR LEVEL ADJUSTMENT

1. Connect the AF oscillator across AUX terminal and AC voltmeter across speaker terminals.
2. Connect the hollow resistor of 8 ohms across speaker terminal (A).
3. Set the AF oscillator output to 100mV, 1kHz.
4. Adjust the output voltage to 17.8V with volume control.
5. Then adjust the semi-fixed resistor of R502 and R602 so that the 11th L.E.D. lights up.

PACKING PROCEDURES



PACKING PROCEDURES – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
A851	29050442	Master carton box
A852	29090398A	Pad
A853	29095012-1	500×800mm, Protection sheet
A854	29100036	850×550mm, Poly bag
A855	261504	3×15cm, Tape
A856	282301	Sealing hook
A857	260012	5×180cm, Damplon tape
A883	29360363	Caution label (U)
A884	29360378	Label (U)
A887	29360429K	Label, fuse (U)
Accessory bag ass'y		
	29340497	Instruction manual (D)
	29340498	Instruction manual (G/W)
	29365006	Warranty card (U)
	29365005-2	Warranty card (V)
	29358002	Service station list (U)
	29100006	250×350mm, Poly bag
	25055018	CV-K-1, Conversion plug (W)

NOTE: U: Only U.S.A. model
 D: Only 120V model
 V: Only West Germany model
 G: Only 220V model
 W: Only 120/220V model

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