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ONKYO® SERVICE MANUAL

SUPER SERVO INTEGRATED STEREO AMPLIFIER MODEL A-65

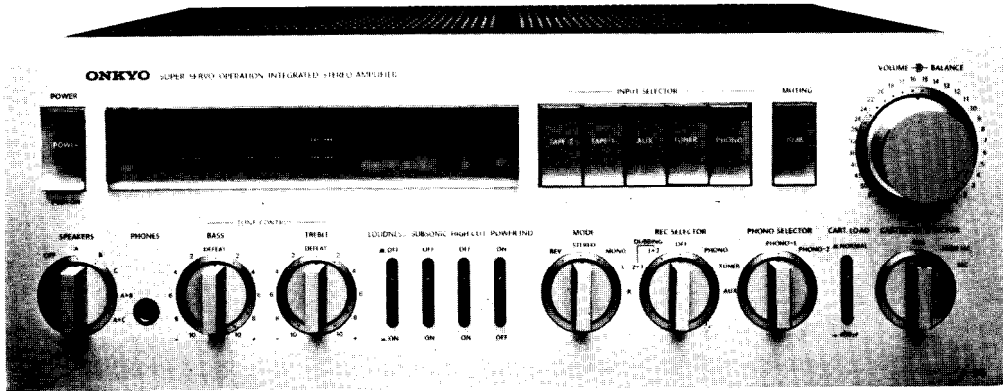


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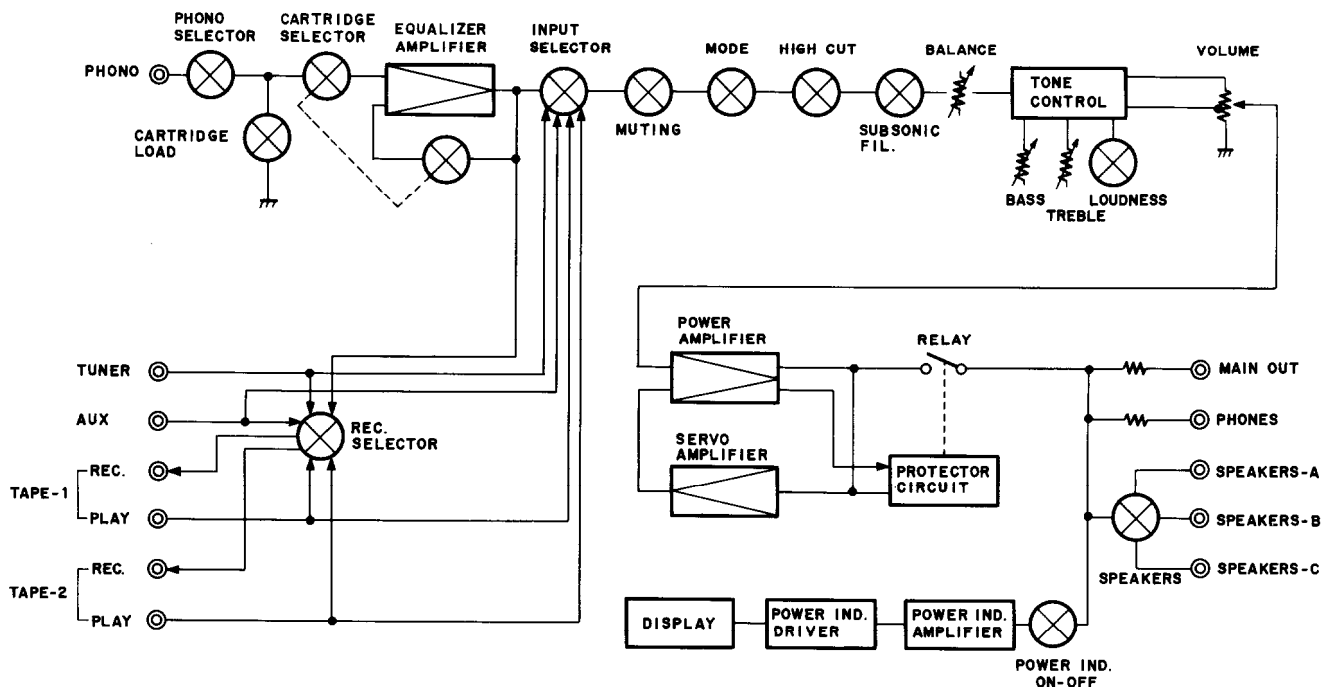


SPECIFICATIONS

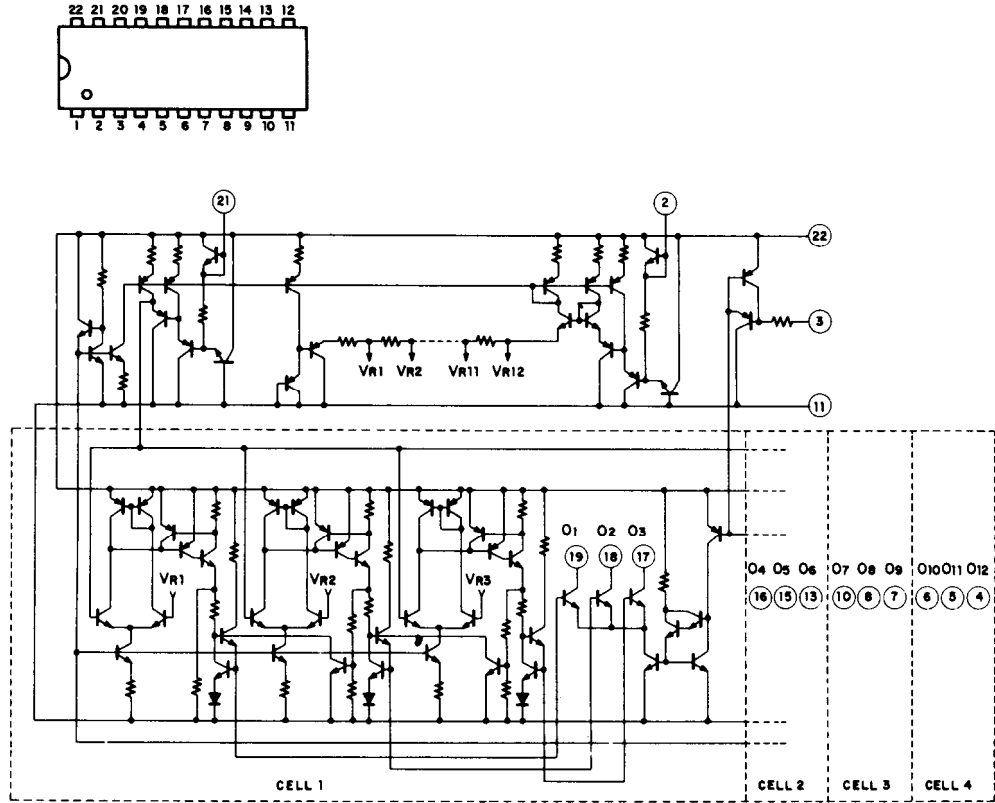
Power Output:	100 watts per channel min. RMS, at 8 ohms both channels driven, from 20 Hz to 20 kHz, with no more than 0.015%THD.	High Cut Filter:	6 kHz (6 dB/oct.)
Total Harmonic Distortion:	0.015% at rated power	Subsonic Filter:	15 Hz (6 dB/oct.)
IM Distortion:	0.015% at rated power	Muting:	-20 dB
Damping Factor:	50 at 8 ohms	Loudness:	+7 dB at 70 Hz +5 dB at 10 kHz
Frequency Response:	2 - 50,000 Hz \pm 1 dB	MAIN Output:	1.5V (600 ohms)
RIAA Deviation (MM):	20 - 20,000 Hz \pm 0.2 dB	General	
Sensitivity and Impedance:	Phono (MM): 2.5mV/50kohms (MC): 350 μ V/330ohms	Semiconductors:	8 ICs, 51 transistors, 33 diodes, 26 LEDs
	Tuner: 150mV/50kohms	Dimensions:	418(W) x 151(H) x 402(D)mm 16-1/2" x 5-15/16" x 15-13/16"
	Tape Play: 150mV/50kohms	Weight:	15.5 kg, (34.2 lbs.)
	Tape Rec: 150mV/1kohms (phono)	Power Supply:	AC 220 volts, 50 Hz, (G model) AC 120 volts, 60 Hz (D model)
Phono Overload:	250mV RMS at 1kHz, 0.015% THD.		
Bass Control:	\pm 8dB at 70 Hz		
Treble Control:	\pm 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: 85dB (IHF A-202, 0.5V input, 1 watt output)		

Specifications and features are subject to change without notice.

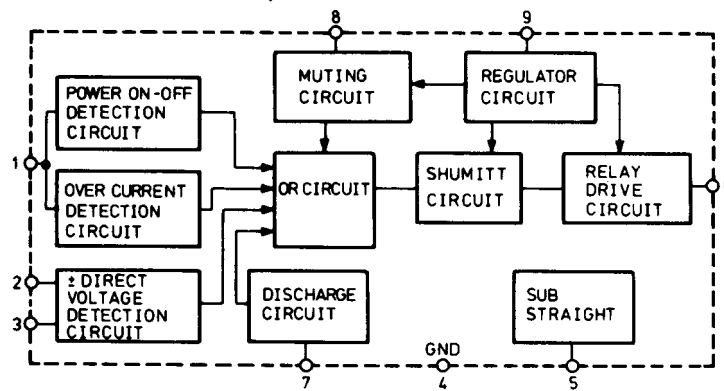
BLOCK DIAGRAM



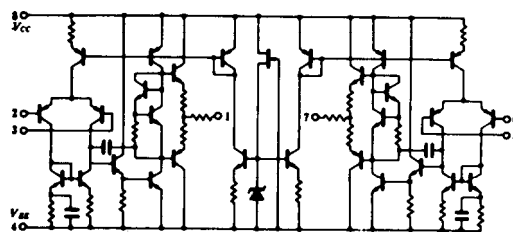
IR2431 (Output Power Indicator Drive)



TA7317P (Protection Circuit)



NJM4558 (Operation Amplifier)



PRECAUTIONS

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

CIRCUIT NO.	PARTS NO.	DESCRIPTION
F901	252052	7A (ST-6), AC fuse (120V model)
F901	252077	4A-SE-EAK, AC fuse (220V model)
F902, F903	252100	10A-EAK, AC fuse (220V model)

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.

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 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

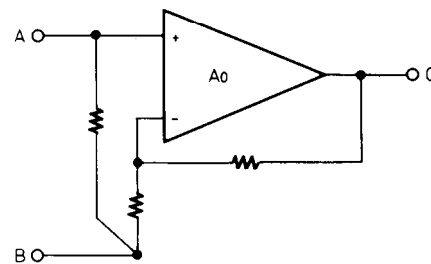


Fig. 1

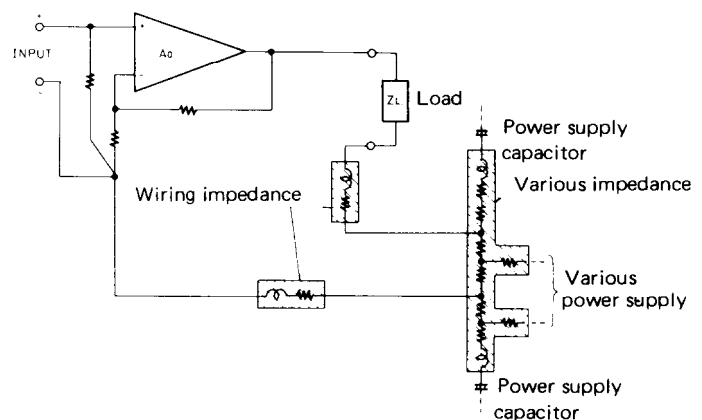


Fig. 2

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.

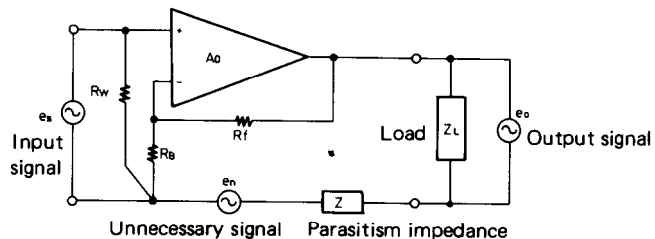


Fig. 3

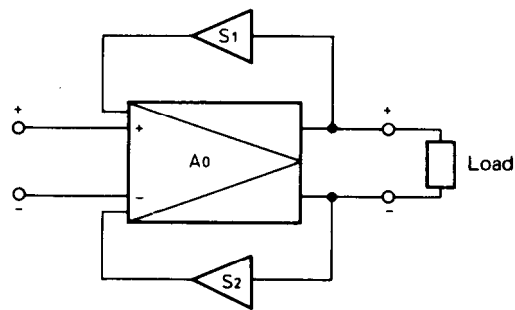


Fig. 4

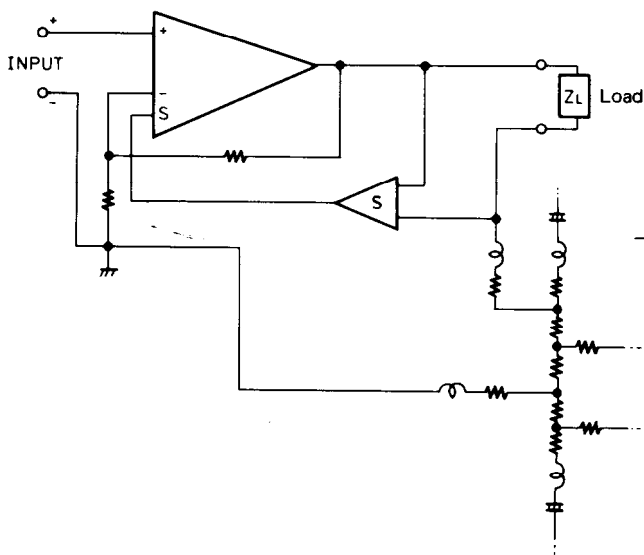


Fig. 5

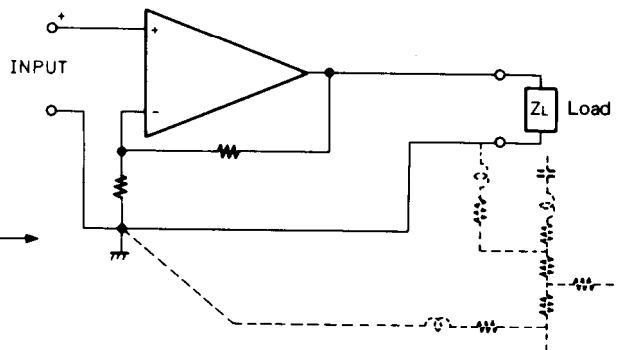
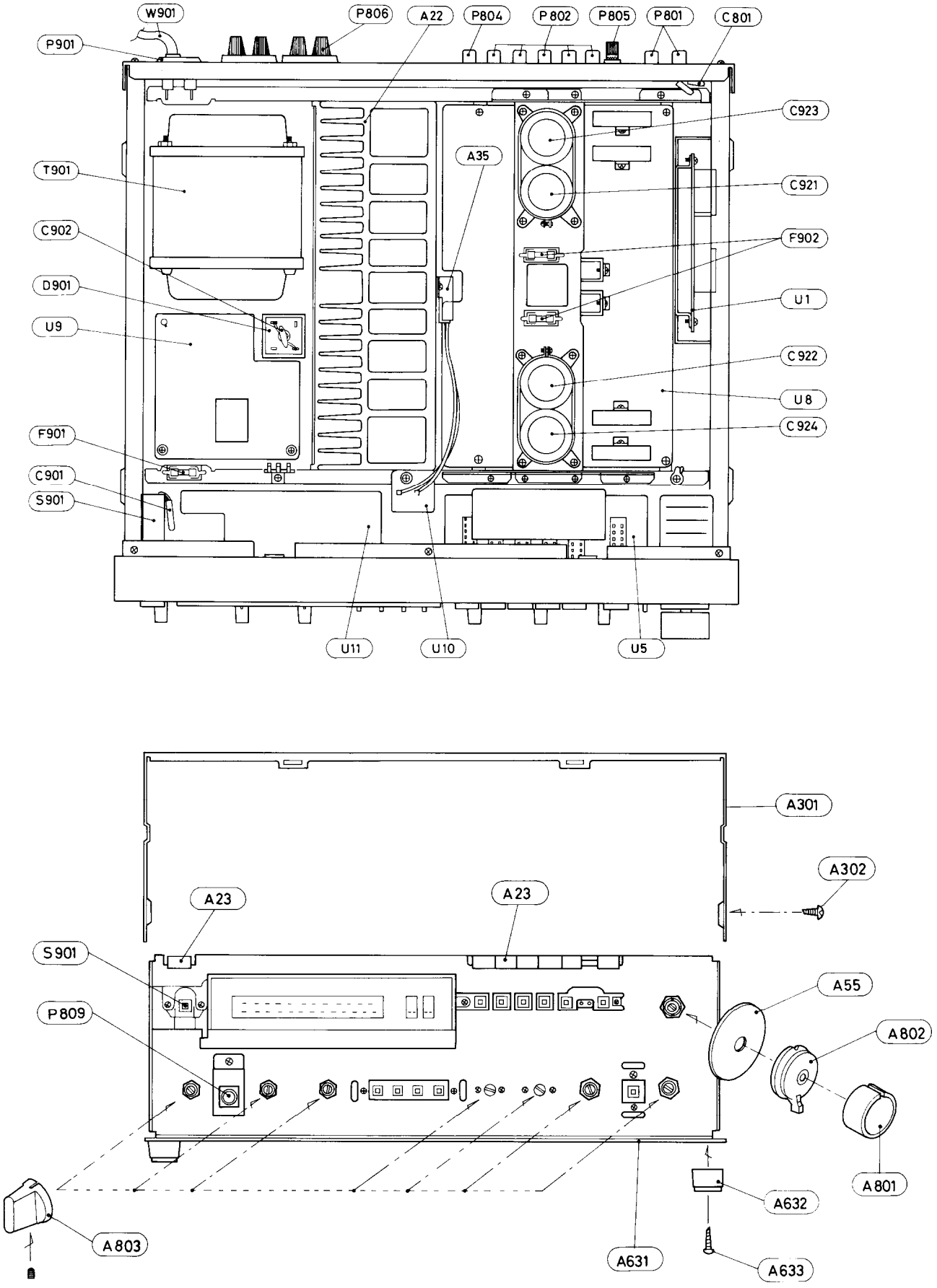
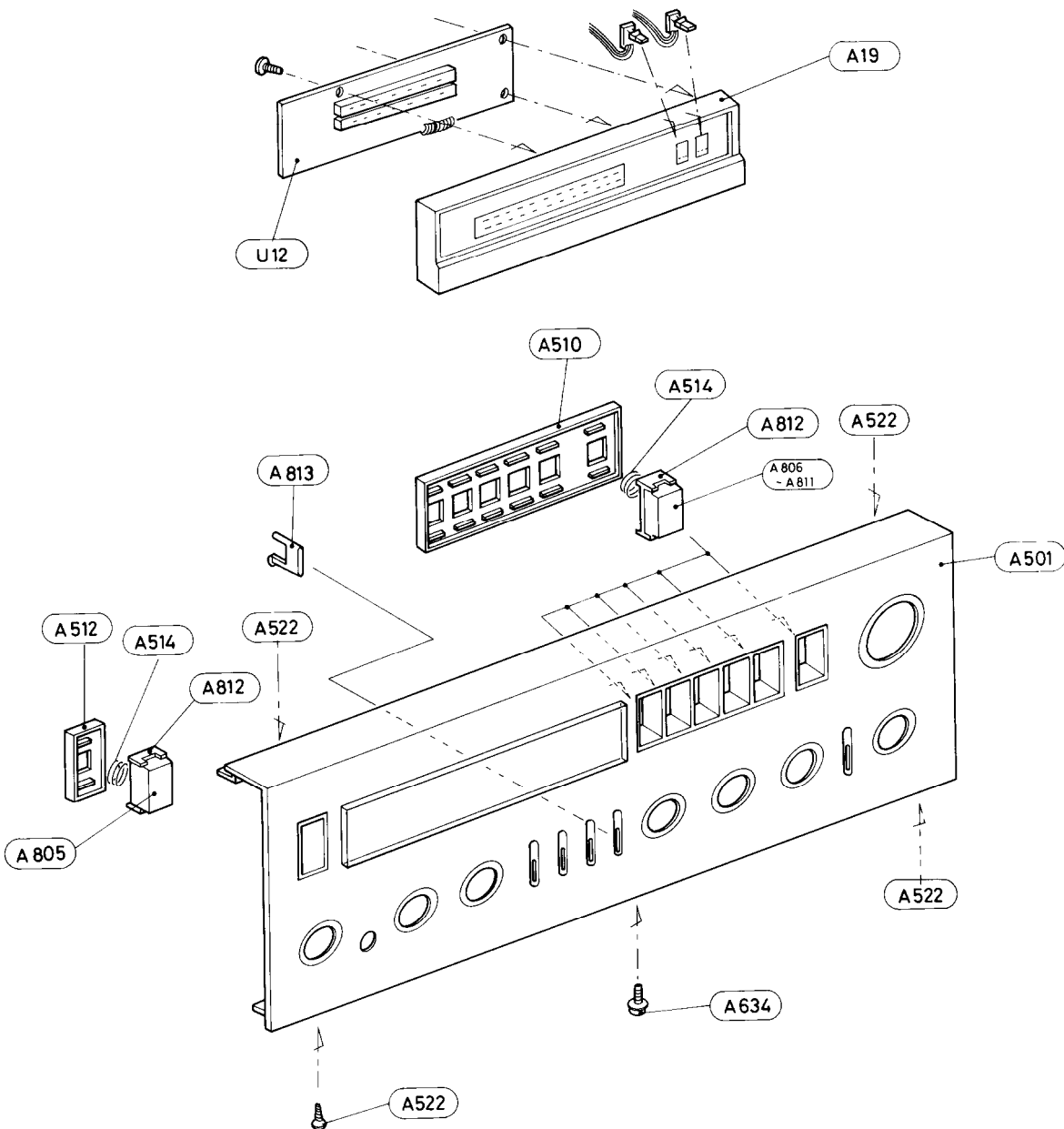


Fig. 6

COMPONENT LOCATION



EXPLODED VIEW



PARTS LIST

SYMBOL NO.	PARTS NO.	DESCRIPTION	SYMBOL NO.	PARTS NO.	DESCRIPTION
A1	27110138	Front bracket	A23	27300405	Guide, lamp
A2	27130254	Bracket, selector	A24	27190009	LCB-4, Holder
A3	27140506	Bracket, volume	A26	27120313	Back panel (D)
A4	27140507	Bracket, headphone		27120314	Back panel (G)
A5	27150125	Shielded plate	A34	223012	Bracket
A6	27115026E	Side bracket	A35	270281	Holder, thermal switch
A7	27130248	Bracket, front	A37	834130068	3TTS+6B, Tap screw
A8	27130249	Bracket, back	A39	834430068	3TTS+6B(BC), Tap screw
A9	27130250	Bracket, power transformer	A40	834430108	3TTS+10B(BC), Tap screw
A11	27130251	Bracket, equalizer	A41	834230108	3TTS+10B(Ni), Tap screw
A12	27130252A	Bracket	A42	838440109	4TTB+10BQ(BC), Tapping screw
A13	27150131	Shielded plate, selector	A44	871140	SW4, Washer
A14	27150132	Shielded plate	A46	833140162	4STP+16BQ, Tapping screw
A15	27150130	Shielded plate	A47	82113015	3P+15FN, Pan head screw
A16	27130253	Band, capacitor	A48	82113006	3P+6FN, Pan head screw
A19	27190113	Holder	A49	82113008	3P+8FN, Pan head screw
A20	28130116	Plate	A50	831130088	3TTW+8B, Tap screw
A21	28199049	Film	A51	834130108	3TTS+10B, Tap screw
A22	27160091A	Radiator	A52	834140108	4TTS+10B, Tap screw

SYMBOL NO.	PARTS NO.	DESCRIPTION	SYMBOL NO.	PARTS NO.	DESCRIPTION
A55	28140126	53φ, Cushion	Q315, Q316	2201303 or	2SB863(O) or
A56	28140050	0.8t×50×30mm, Cushion	Q415, Q416	2201302	2SB863(R), Power amplifier transistor
A57	28140348	0.5t×54×3mm, Cushion	R171, R271	5104117	N40DQL32C100KTP500KM35H, Volume/Balance control variable resistor
A58	28175037	Insulating plate	S101B	25030194	NRSM-102-30BU, Phono selector switch
A301	28184112	Top cover	S103B	25030193	NRSM-103-30BU, Cartridge selector switch
A302	834430068	3TTS+6B(BC), Tap screw	S801	25030196	NRSM-226-30YW, Speaker selector switch
A303	28140020	4×10×40mm, Cushion	S901	25035201	NPS-111-L156P, Power switch (D)
A304	28140105	6×55×10mm, Cushion	S901	25035051	NPS-122-L16P, Power switch (G)
A501	12509121	Front panel ass'y	T901	230499	NPT-743D, Power transformer (D)
A502	28191085	Clear plate	T901	230500	NPT-743G, Power transformer (G)
A503	27262096	Plate, power	U1	12509505	NAEQ-1105, Equalizer amplifier pc board ass'y
A504	27262097	Plate A	U2	12509506	NASW-1106, Switch pc board ass'y
A505	27262098	Plate B	U3	12509507	NAPJ-1107, Input/output terminal pc board ass'y
A506	27262099	Plate C	U4	12509508	NASW-1108, Recording selector switch pc board ass'y
A507	27262100	Plate D	U5	12509509	NASW-1109, Input selector pc board ass'y
A508	27262101	Plate E	U6	12509511	NASW-1111, Switch pc board ass'y
A509	27267113	Guide, selector	U7	12509512	NATC-1112, Tone control pc board ass'y
A510	27267114	Guide B	U8	12509513	NAMA-1113, Power amplifier pc board ass'y
A511	27267116	Guide, power	U9	12509514	NAPR-1114, Protector circuit pc board ass'y
A512	27267115	Guide A	U10	12509515	NASW-1115, Thermal detector switch pc board ass'y
A513	27267102	Guide, push	U11	12509516B	NAME-1086b, Output power indicator circuit pc board ass'y
A514	28180079	Spring	U12	12549585	NADIS-1085, Output power indicator circuit pc board ass'y
A515	28199045	Film	U13, U14	12549587	NALED-1087, MM/MC indicator L.E.D. pc board ass'y
A518	27262105	Plate F	W901	253099A	AS-UC-3, Power supply cable (D)
A522	834130068	3TTS+6B, Tap screw	W901	253092	AS-CEE-2, Power supply cable (G)
A631	27170104	Bottom board	W901a	270025	SR-3P-4, Strainrelief (D)
A632	27175009A	Leg	W901c	270280	SR-4K-4, Strainrelief (G)
A633	831130128	3TTW+12B, Tap screw	Note: D: Only 120V model G: Only 220 model		
A634	831130068	3TTW+6B, Tap screw			
A801	28320553	Knob, volume			
A802	28320554	Knob, balance			
A803	28320529	Knob, selector			
	801146	Screw			
A805	28320546	Knob, power			
A806	28320547	Knob, tape 2			
A807	28320548	Knob, tape 1			
A808	28320549	Knob, aux.			
A809	28320550	Knob, tuner			
A810	28320551	Knob, phono			
A811	28320552	Knob, muting			
A812	28320545	Knob, base			
A813	28320530	Knob, push			
C901	3500060	0.01μF, 125V, CS capacitor (D)			
C901a	27300080	Cover, capacitor (D)			
C901	3500058	PME265MB510, IS capacitor (G)			
C902	335251039	0.01μF, 500V, Ceramic capacitor			
C801-C804	379124737	0.047μF, 50V, DEW capacitor			
C809	335321025	1000pF, 50V, Ceramic capacitor (G)			
C921-C924	3504160	12,000μF, 63V, Elect. capacitor			
D901	223861	KBC10-02, Silicon diode			
F901	252077	4A-SE-EAK, AC fuse (G)			
F901a	25065096	NPF-073, Fuse holder (G)			
F902, F903	252100	10A-EAK, AC fuse (G)			
F902a, F903a	25065096	NPF-073, Fuse holder (G)			
PL901	210121	PL14V0.06AW-2.5, Power indicator lamp			
P801	25045044	NPJ-4PRBL21, Phono input terminal			
P804	25045026	NPJ-2PRBL04, Main output terminal			
P805	25060044	Ground terminal			
P805a	87613010	W3×10F, Washer			
F805b	87313006	M3-B, Toothed washer			
P806-P808	25060029	NTM-4PRMN05, Speaker terminal			
P809	25045067	HLJ-0279-01-070, Stereo headphone jack			
P901-P903	25050046A	NSCT-2P15, Ac outlet (D)			
Q308, Q408	2211255 or 2211256	2SC1815(GR) or 2SC1815(BL), Thermal detector transistor			
Q313, Q314	2201313 or 2201312	2SD1148(O) or 2SD1148(R), Power transistor			

PRINTED CIRCUIT BOARD-PARTS LIST

EQUALIZER AMPLIFIER PC BOARD (NAEQ-1105) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Transistors		
Q101, Q102]	2211783 or	2SA991(E) or
Q201, Q202]	2211782	2SA991(F)
Q103, Q203]	2211445 or	2SC2291(F) or
	2211446	2SC2291(G)
Q104, Q204]	2211895 or	2SC1815L(GR) or
	2211896	2SC1815L(BL)
Q105, Q205]	2211732 or	2SC1845(F) or
	2211733	2SC1845(E)
Q106, Q206]	2211792 or	2SA992(F) or
	2211793	2SA992(E)
Diodes		
D101, D201]	223133 or	DS442X or
	223105	1S1555
Capacitors		
C102, C202]	391041007	10 μ F, 16V, LL
C107, C207]	352724719	470 μ F, 6.3V, Elect.
C110, C210]	352761019	100 μ F, 35V, Elect.
C111, C211]	379122235	0.022 μ F \pm 10%, 50V, DEW
C112, C212]	352980226	2.2 μ F, 50V, Non-polar elect.
C113, C213]	379121225	1,200pF \pm 10%, 50V, DEW
C115, C215]	379121834	0.018 μ F \pm 5%, 50V, DEW
C116, C216]	379121524	1,500pF \pm 5%, 50V, DEW
C117, C217]	379125624	5,600pF \pm 5%, 50V, DEW
C118, C218]	379121024	1,000pF \pm 5%, 50V, DEW
C121, C122]	352761019	100 μ F, 35V, Elect.
Resistors		
R119, R120]	442521204	12 Ω , 1/2W, Metal oxide film
R219, R220]		
R126, R226]	442621234	12k Ω , 1W, Metal oxide film
Switches		
S101A]	25065159	NSS-2272, Phono 1/2 selector
S103A]	25065156	NSS-8371, Cartridge selector

SWITCH PC BOARDS (NASW-1106/1108/1109/1111/1115) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Capacitor		
C151]	352741009	10 μ F, 16V, Elect.
Lamps		
PL801–PL806]	210123	PL14V0.06AW-0.6, Input indicator
Switches		
S102]	25035257	NPS-122-L221, Cartridge load selector
S104]	25030195	NRSM-146-30SS, Recording selector
S105–S109]	25035255	NPS-562-L219, Input selector
S110]	25035164	NPS-142-L128, Muting
S111]	25030190	NRSM-145-30SS, Mode
S701]	25065127	1P-105A-100, Thermal detector

INPUT/OUTPUT TERMINAL PC BOARD (NAPJ-1107) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Capacitors		
C805–C808]	379124737	0.047 μ F \pm 20%, 50V, DEW
Terminals		
P802, P803]	25045072	NPJ-6PDBL36, Input/output

TONE CONTROL PC BOARD (NATC-1112) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Capacitors		
C156, C256]	379122245	0.22 μ F \pm 10%, 50V, DEW
C157, C257]	379124725	4,700pF \pm 10%, 50V, DEW
C171, C271]	379121235	0.012 μ F \pm 10%, 50V, DEW
C173, C273]	379123935	0.039 μ F \pm 10%, 50V, DEW
C174, C274]	379121025	1,000pF \pm 10%, 50V, DEW
C175, C275]	379126825	6,800pF \pm 10%, 50V, DEW
Resistors		
R161, R261]	431421567	15M Ω , 1/4W, Solid
R172, R272]	5148071	N16RQM11C110K180K30M, Bass control variable
R176, R276]		
R174, R178]	431421567	15M Ω , 1/4W, Solid
R182, R274]		
R278, R282]		
R180, R280]	5148072	N16RGM11C220K30M, Treble control variable
Switches		
S112–S115]	25035256	NPS-422-L220, Loudness/Hi-cut/Subsonic

POWER AMPLIFIER PC BOARD (NAMA-1113) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
ICs		
Q317, Q318]	222502	NJM-4558DX
Q417, Q418]		
Transistors		
Q301, Q401]	2211915 or	2SK240(GR) or
	2211916	2SK240(BL)
Q302, Q303]	2211732 or	2SC1845(F) or
Q402, Q403]	2211733	2SC1845(E)
Q304, Q404]	2211515 or	2SA995(F) or
	2211516	2SA995(E)
Q305, Q405]	2211792 or	2SA992(F) or
	2211793	2SA992(E)
Q306, Q406]	2211593 or	2SB648A(C) or
	2211592	2SB648A(B)
Q307, Q407]	2211603 or	2SD668A(C) or
	2211602	2SD668A(B)
Q308, Q408]	2211255 or	2SC1815(GR) or
	2211256	2SC1815(BL)
Q309, Q409]	2211634 or	2SC2229(Y) or
	2211633	2SC2229(O)
Q310, Q410]	2211354 or	2SA949(Y) or
	2211353	2SA949(O)
Q311, Q411]	2200864 or	2SC2238(Y) or
	2200863	2SC2238(O)
Q312, Q412]	2200874 or	2SA968(Y) or
	2200873	2SA968(O)
Q313, Q314]	2201313 or	2SD1148(O) or
Q413, Q414]	2201312	2SD1148(R)
Q315, Q316]	2201302	2SB863(R)
Q415, Q416]	2201303 or	2SB863(O) or
Q701, Q702]	2211792 or	2SA992(F) or
	2211793	2SA992(E)
Q921, Q923]	2200664 or	2SC1626(Y) or
	2200663	2SC1626(O)
Q922, Q924]	2200674 or	2SA816(Y) or
	2200673	2SA816(O)
Diodes		
D301, D302]	223105 or	1S1555 or
D305, D306]	223133	DS442X
D401, D402]		
D405, D406]		
D303, D403]	4000068	VD1222
D304, D404]		

CIRCUIT NO.	PARTS NO.	DESCRIPTION
D921, D922	224071 or 224126	05Z24U or GZA24U
D923, D924	224065 or 224120	05Z18U or GZA18U
Coils		
L301, L401	231015	S-0.8C
Capacitors		
C303, C403	379121035	0.01 μ F \pm 10%, 50V, DEW
C309, C409	379121025	1,000pF \pm 10%, 50V, DEW
C311, C411	379121035	0.01 μ F \pm 10%, 50V, DEW
C323, C423	379134735	0.047 μ F \pm 10%, 50V, DEW
C331, C332	352752209	22 μ F, 25V, Elect.
C431, C432		
C925, C926	352784709	47 μ F, 50V, Elect.
C927, C928	352761019	100 μ F, 35V, Elect.
C929, C930	352760479	4.7 μ F, 35V, Elect.
C931-C934	352754709	47 μ F, 25V, Elect.
Resistors		
R309, R409	442623614	360 Ω , 1W, Metal oxide film
R315, R415	5225072	N10HR4.7KBDM, Idling current adjustment
R331, R431	442524714	470 Ω , 1/2W, Metal oxide film
R332, R432		
R333, R433	442621524	150 Ω , 1W, Metal oxide film
R334-R337	442520224	2.2 Ω , 1/2W, Metal oxide film
R434-R437		
R338-R341	4000060	0.27 Ω , 2W, Metal plate
R438-R441		
R342, R343	442720104	1 Ω , 2W, Metal oxide film
R442, R443		
R344-R347	4000080	0.47 Ω , 5W, Metal plate
R444-R447		
R350, R450	442620564	5.6 Ω , 1W, Metal oxide film
R351, R451	442621004	10 Ω , 1W, Metal oxide film
R352, R452	442626834	68k Ω , 1W, Metal oxide film
R705, R706	5225005	N10HR2.2KBD, Current detector level adjustment
R921, R922	442524714	470 Ω , 1/2W, Metal oxide film
R923, R924	442523924	3.9k Ω , 1/2W, Metal oxide film
R927, R928	442525614	560 Ω , 1/2W, Metal oxide film

PROTECTOR CIRCUIT PC BOARD (NAPR-1114) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
IC		
Q711	222584	TA7317P
Transistor		
Q714	2211255 or 2211256	2SC1815(GR) or 2SC1815(BL)
Diodes		
D711, D712	223848 or	GP-08B or
D911, D912	223804	SR1K-2
D713	224043 or 224098	05Z6.2U or GZA6.2U
Capacitors		
C711, C712	352922206	22 μ F, 6.3V, Non-polar
C714	352732209	22 μ F, 10V, Elect.
C715	352784799	0.47 μ F, 50V, Elect.
C716	352743319	330 μ F, 16V, Elect.
C912, C915	352741029	1,000 μ F, 16V, Elect.
C914	352744719	470 μ F, 16V, Elect.
Resistors		
R751, R752	441723904	390 Ω , 2W, Metal oxide film
R911	442521004	10 Ω , 1/2W, Metal oxide film
R912	442522204	22 Ω , 1/2W, Metal oxide film
Relay		
RL711	25065036	NRL-4P3A-DC12-01, Speaker

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

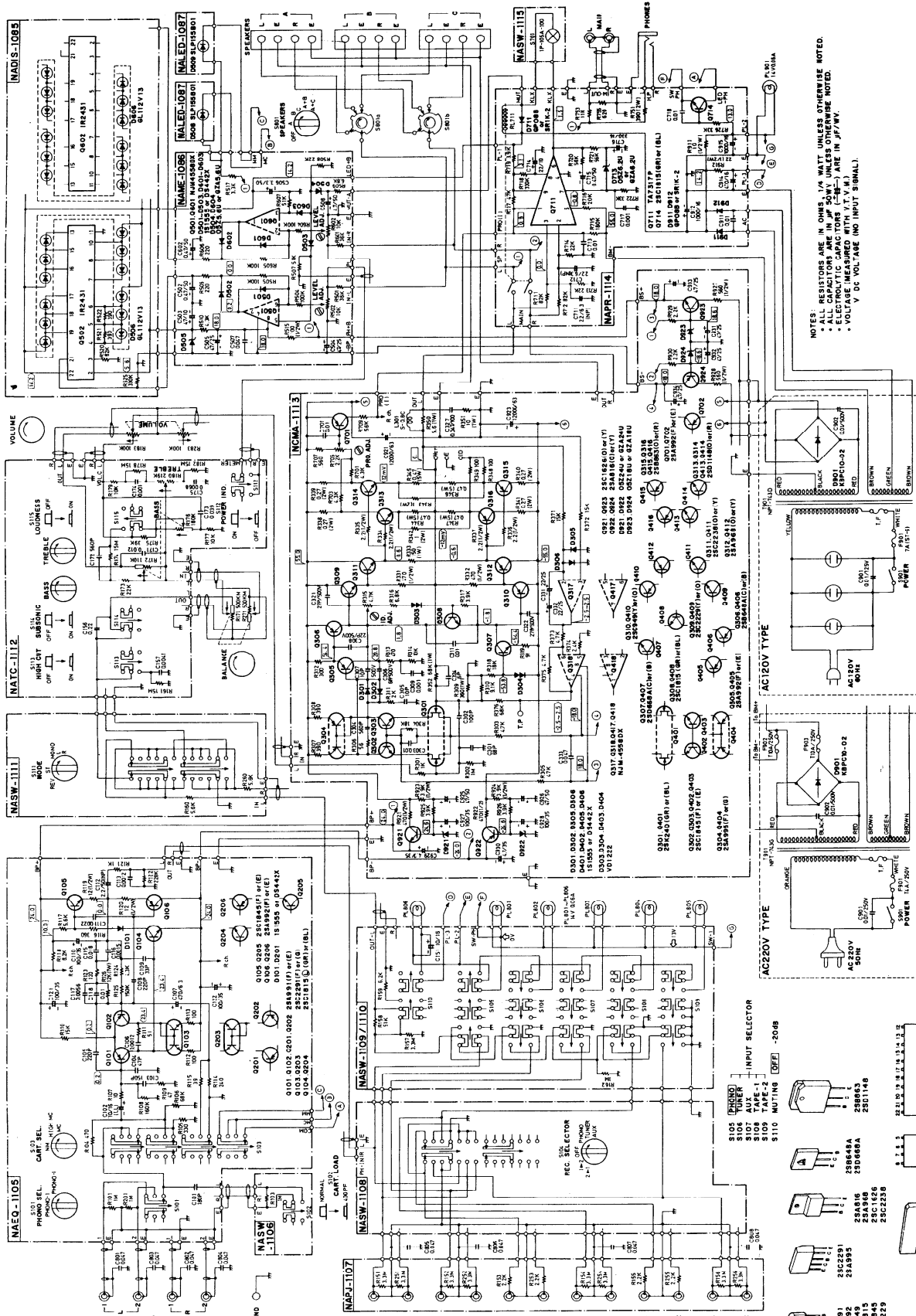
OUTPUT POWER INDICATOR DRIVER PC BOARD (NAME-1086b) – PARTS LIST

CIRCUIT NO.	PARTS NO.,	DESCRIPTION
IC		
Q501-Q601	222502 or 222597	NJM-4558DX or NJM-4558DN
Diodes		
D501-D503	223133 or 223105	DS442X or 1S1555
D504, D505	224096 or 224041	GZA5.6-U or 05Z5.6-U
D601-D603	223133 or 223105	DS442X or 1S1555
Capacitors		
C502, C602	352780229	2.2 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	N08HR10KBD, Semi-fixed
R515	442521014	100 Ω , 1/2W, Metal oxide film

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

CIRCUIT NO.	PARTS NO.	DESCRIPTION
D508, D509	225082	SLP-155B-01, L.E.D.

SCHEMATIC DIAGRAM



NOTES:
 * ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.
 * ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE NOTED.
 * VOLTAGE MEASURED WITH A.T.V.M.I.
 * V DC VOLTAGE (NO INPUT SIGNAL).

- INPUT SELECTOR -2068
- S105 PHONO
 - S107 TAPE-1
 - S108 TAPE-2
 - S109 TAPE-3
 - S110 Muting
- 28A801
28A802
28A803
28A804
28A805
28A806
28A807
28A808
28A809
28A810
28A811
28A812
28A813
28A814
28A815
28A816
28A817
28A818
28A819
28A820
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28A890
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28A895
28A896
28A897
28A898
28A899
28A900

MAIN AMPLIFIER ADJUSTMENT

Set the all control knobs to standard position.

Standard knob position

SELECTOR	AUX
VOLUME	Minimum
BALANCE	CENTER
MODE	STEREO
LOUDNESS, SUBSONIC FIL., HI-CUT FIL.	OFF
BASS/TREBLE	OFF
SPEAKERS	A
MUTING	OFF

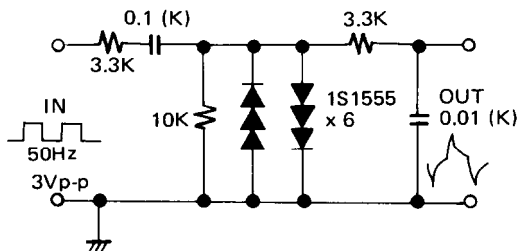
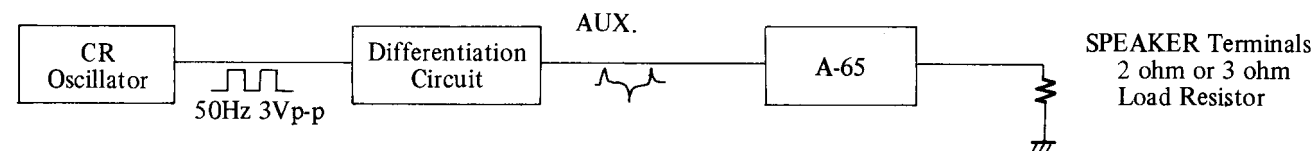
1. IDLING CURRENT ADJUSTMENT

1. Connect the DC voltmeter between I_{ID} and V_{CT} terminals.
2. Adjust the voltage to $12 \pm 3mV$ with semi-fixed resistor of R315 and R415.

NOTES: Adjust after switching on for 5 minutes.

VOLUME	Minimum
LOAD	Open

2. CURRENT DETECTOR LEVEL ADJUSTMENT



Differentiation Circuit

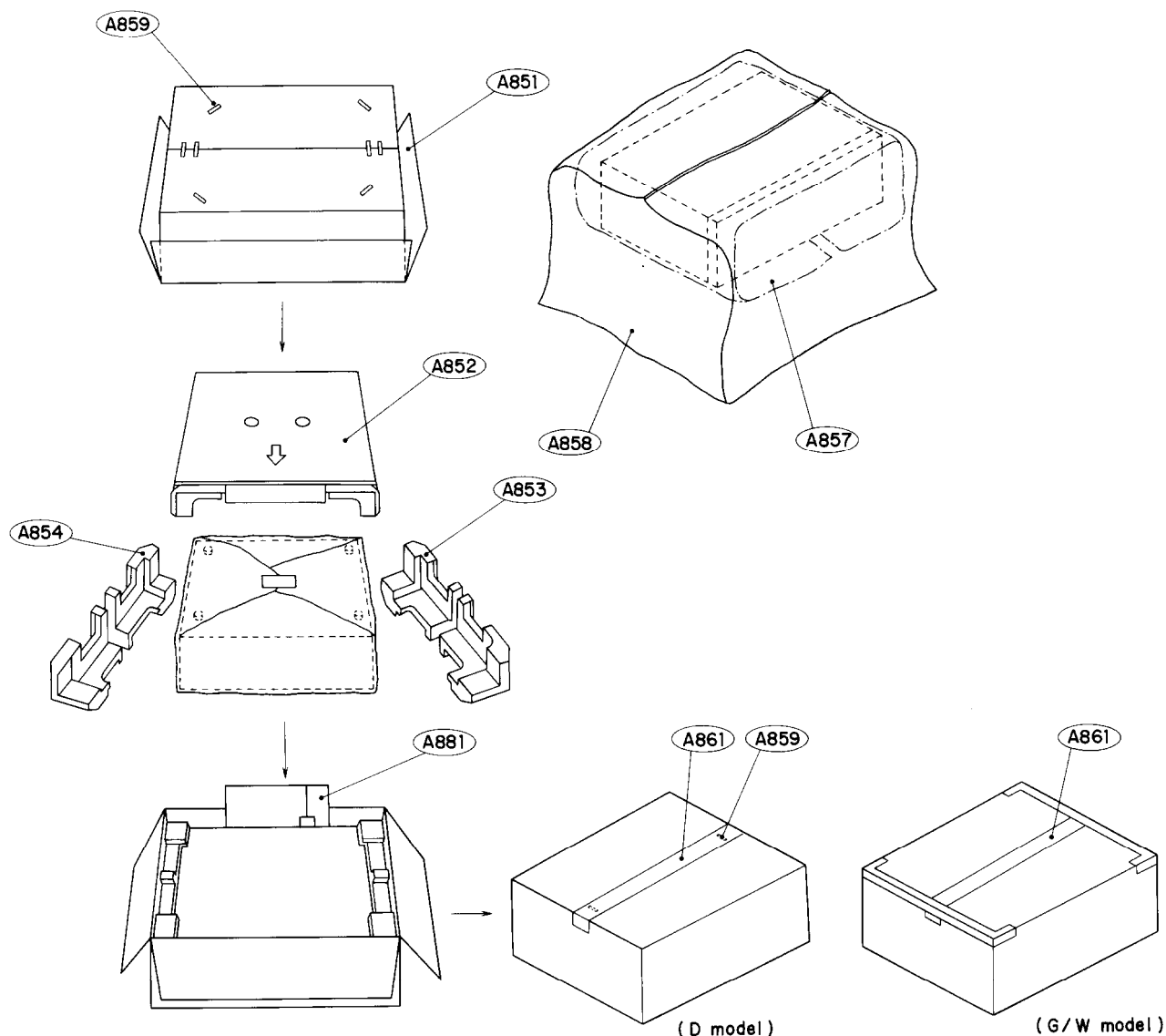
NOTES: Adjust after switching on for 5 minutes.
 VOLUME Maximum

Apply a tone burst signal to the AUX terminal, connect a 2 ohms hollow resistor to the speaker terminals and adjust the variable resistor R705 and R706 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 21.1V 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

SYMBOL NO.	PARTS NO.	DESCRIPTION
A851	29050454	Master carton box
A852	29090401A	Pad, bottom
A853	29090399	Pad, upper
A854	29090399-1	Pad, upper, right
A857	29095115	500x1, 100mm, Protection sheet
A858	29100034	850x650mm, Poly bag
A859	282301	Sealing hook
A861	260012	Damplon tape
A881		Accessory bag ass'y
	29340507	Instruction manual (D)
	29340508	Instruction manual (G)
	29365006	Warranty card (N)
	29365005-3	Warranty card (V)
	29358002	Service station list (N)
	29100006	250x350mm, Poly bag

Note: (D) Only 120V model
 (G) Only 220V model
 (V) Only West Germany model
 (N) Only U.S.A. model